

**Jetson Platform**

**AIB-MX11/MX12-1-A2**

**AIB-MX21/MX22-1-A2**

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**USER MANUAL**

## Document Change History

| Version | Date       | Description                                                                                                   |
|---------|------------|---------------------------------------------------------------------------------------------------------------|
| V1.0    | 2023/07/06 | Initial Release.                                                                                              |
| V1.1    | 2023/10/30 | Update DS information                                                                                         |
| V1.2    | 2025/11/19 | Update J1 module FAN spec for AIB-MX11/12/21/22-1-A2                                                          |
| V1.3    | 2025/12/29 | Update Block Diagram / Layout placement drawing<br>Add OOB connector from Connectors and Switches Description |
| V1.4    | 2026/05/19 | Update HW information, specifications                                                                         |
| V1.5    | 2026/07/24 | Update block diagram                                                                                          |

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Version 1.0

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## Contact Information

Aetina Corporation | Headquarters

17F-1, No.237, Sec.1, Datong Rd., Xizhi Dist., New Taipei City 221, TAIWAN

Phone +886-2-7709 2568

Fax +886-2-7746 1102

Mail [sales@aetina.com](mailto:sales@aetina.com)

## Worldwide Technical Support

Mail [Tech\\_support@aetina.com](mailto:Tech_support@aetina.com)

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4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy of the proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

## ESD Warning

This product, like all electronic products, uses the product that can be damaged by electrostatic discharge (ESD). When handling, care must be taken so that the devices are not damaged. Damage due to inappropriate handling is not covered by the warranty. The following precautions must be taken:

- Do not open the protective conductive packaging until you have read the following and are at an approved anti-static workstation.
- If working on a prototyping board, use a soldering iron or station that is marked as ESD-safe.
- Always disconnect the product from the prototyping board when it is being worked on.
- Always discharge yourself by touching a grounded bare metal surface or approved anti-static mat before picking up an ESD - sensitive electronic component.
- Use an approved anti-static mat to cover your work surface.

## Safety Precautions

Please read the following safety instructions carefully. It is advised that you keep this manual for future references:

1. All cautions and warnings on the equipment should be noted.
2. Make sure the power source matches the power rating of the device.
3. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
6. Always completely disconnect the power before working on the system's hardware.
7. Keep this equipment away from humidity.
8. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
9. The openings on the enclosure are for air convection. Protect the equipment from overheating.  
**DO NOT COVER THE OPENINGS.**
10. Be sure that the room in which you choose to operate your system has adequate air circulation. Ensure that the chassis cover is secure.
11. The chassis design allows cooling air to circulate effectively. An open chassis permits air leaks, which may interrupt and redirect the flow of cooling air from internal components.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
14. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
15. If any of the following situations arises, please the contact our service personnel:
  - Damaged power cord or plug
  - Liquid intrusion to the device
  - Exposure to moisture
  - Device is not working as expected or in a manner as described in this manual
  - The device is dropped or damaged
  - Any obvious signs of damage displayed on the device

# Contents

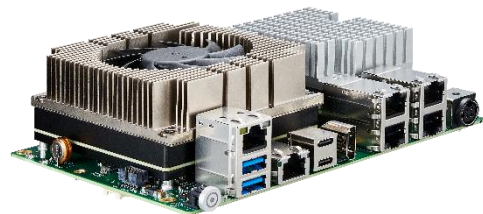
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# 1. Introduction

AIB-MX11/12/21/22 series supports NVIDIA Jetson AGX Orin series modules, and you can quickly emulate the functionality of your desired end product for software development and hardware verification.

To build a functional prototype of your target system you will need:

- NVIDIA Jetson AGX Orin 32GB/64GB module
- Carrier board
- Power adaptor



## 1.1 Features

- Supports NVIDIA Jetson AGX Orin 32GB/64GB
- 2/4 x IEEE 802.3af GbE PSE ports
- 1 x M.2 B-Key, 1 x M.2 E-Key, 1 x M.2 M-Key slot
- 1 x GbE, 1 x 10GbE port
- Wide Power Input Range 9 to 36V DC
- Operating Temperature -25°C ~ +80°C
- Supports OOB (out-of-band) powered by Innodisk (optional)

## 1.2 Specifications

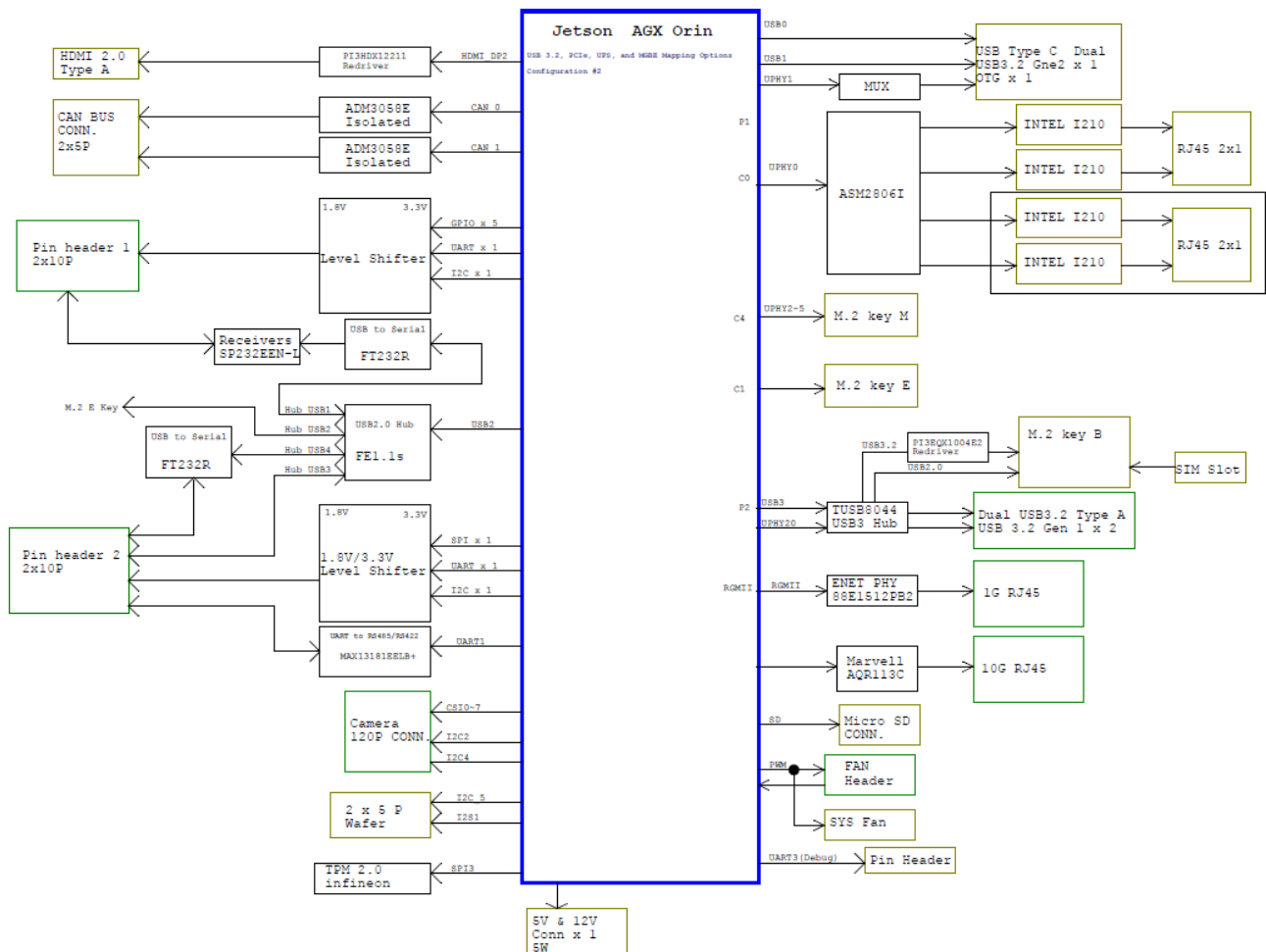
### ■ Carrier board specifications

| Specification        | AIB-MX11                                                                                                                                 | AIB-MX12                 | AIB-MX21                                                                                                                        | AIB-MX22                 |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| Module Compatibility | NVIDIA Jetson AGX Orin 32GB                                                                                                              |                          | NVIDIA Jetson AGX Orin 64GB                                                                                                     |                          |
| AI Performance       | 200 TOPs                                                                                                                                 |                          | 275 TOPs                                                                                                                        |                          |
| GPU                  | 1792-core NVIDIA Ampere GPU<br>with 56 Tensor Cores                                                                                      |                          | 2048-core NVIDIA Ampere GPU<br>with 64 Tensor Cores                                                                             |                          |
| CPU                  | 8-core Arm® Cortex®-A78AE<br>v8.2 64-bit CPU 2MB L2 + 4MB L3                                                                             |                          | 12-core Arm® Cortex®-A78AE<br>v8.2 64-bit CPU 3MB L2 + 6MB L3                                                                   |                          |
| Memory               | 32GB 256-bit LPDDR5 204.8 GB/s                                                                                                           |                          | 64GB 256-bit LPDDR5 204.8 GB/s                                                                                                  |                          |
| Storage              | 64GB eMMC 5.1                                                                                                                            |                          |                                                                                                                                 |                          |
| Display              | 1 x HDMI 2.0 Type-A                                                                                                                      |                          |                                                                                                                                 |                          |
| TPM                  | TPM v2.0 (default)                                                                                                                       |                          |                                                                                                                                 |                          |
| RTC                  | RTC battery CR2032 (default with battery)                                                                                                |                          |                                                                                                                                 |                          |
| Audio                | Line-out, Line-in, Mic (optional, requires daughter board)                                                                               |                          |                                                                                                                                 |                          |
| Camera Input         | 1 x 16-Lane MIPI expansion connector (120 pin)                                                                                           |                          |                                                                                                                                 |                          |
| LAN                  | 1 x RJ-45 GbE port<br>1 x RJ-45 10GbE port                                                                                               |                          |                                                                                                                                 |                          |
| PoE Interface        | 2 x RJ-45 GbE <b>PSE</b>                                                                                                                 | 4 x RJ-45 GbE <b>PSE</b> | 2 x RJ-45 GbE <b>PSE</b>                                                                                                        | 4 x RJ-45 GbE <b>PSE</b> |
|                      | IEEE 802.3af compliant, power output 15W per port, 30 W max per connector                                                                |                          |                                                                                                                                 |                          |
| USB                  | 2 x USB 3.2 Gen1 Type-A<br>1 x USB 3.2 Gen2 Type-C<br>1 x USB 2.0 OTG Type-C                                                             |                          |                                                                                                                                 |                          |
| I/O Interfaces       | 2 x UART<br>1 x UART (debug only)<br>1 x RS-232<br>1 x RS-422 / RS-485<br>2 x CAN 2.0b (isolated; supports CAN FD)<br>2 x I²C<br>1 x I²S |                          | 1 x SPI<br>5 x GPIO<br>2 x 3.3V DC / 0.5A<br>2 x 5V DC / 0.5A<br>1 x 5V DC / 0.5A (standby)<br>1 x 12V DC / 0.5A<br>1 x USB 2.0 |                          |
| Expansion            | 1 x M.2 B-Key 3042/3052 (LTE/4G/5G)<br>1 x M.2 E-Key 2230 (Wi-Fi/BT)                                                                     |                          | 1 x microSIM card socket<br>1 x OOB (out-of-band, optional)                                                                     |                          |

|                         |                                                                                                 |                     |                          |                     |
|-------------------------|-------------------------------------------------------------------------------------------------|---------------------|--------------------------|---------------------|
|                         | 1 x M.2 M-Key 2280 (supports NVMe; PCIe Gen4 x4)                                                |                     | 1 x GMSL power connector |                     |
|                         | 1 x microSD card socket                                                                         |                     | 1 x 1PPS module function |                     |
| MISC. Function          | 1 x Power button, 1 x Recovery button, 1 x Reset Button                                         |                     |                          |                     |
| Power Consumption       | Idle: 10.5 W                                                                                    | Idle: 10.5 W        | Idle: 12 W               | Idle: 12 W          |
|                         | Full Loading: 85 W                                                                              | Full Loading: 125 W | Full Loading: 116 W      | Full Loading: 146 W |
|                         | Idle configuration: Connect with Keyboard, Mouse and HDMI Display                               |                     |                          |                     |
|                         | Full Loading configuration: Connect with Keyboard, Mouse, HDMI Display and LAN with CPU and GPU |                     |                          |                     |
|                         | 100% Loading                                                                                    |                     |                          |                     |
| Power Input / Connector | DC-in 9 to 36V DC, 4-Pin DC Jack Power Connector                                                |                     |                          |                     |
| Dimension (W x D x H)   | 176 x 132 x 57.32 mm (6.93 x 5.19 x 2.26 in)                                                    |                     |                          |                     |
| Net Weight              | 0.980 kg (2.161 lb) w/ Fansink                                                                  |                     |                          |                     |
| Vibration               | 1 Grms, IEC 60068-2-64, random, 5 ~ 500 Hz, 1 hr/axis                                           |                     |                          |                     |
| Shock                   | 10 G, IEC 60068-2-27, half sine, 11 ms duration                                                 |                     |                          |                     |
| Temperature             | Operating Temp.: -25°C ~ +80°C (-13°F ~ +176°F)                                                 |                     |                          |                     |
|                         | Storage Temp.: -40°C ~ +85°C (-40°F ~ +185°F)                                                   |                     |                          |                     |
| Humidity                | 95% @ 40°C (104°F) (non-condensing)                                                             |                     |                          |                     |
| Software Support        | Linux (supports NVIDIA® Jetpack™ 6.2 and above)                                                 |                     |                          |                     |
| Certification           | CE, FCC Class A, UKCA                                                                           |                     |                          |                     |

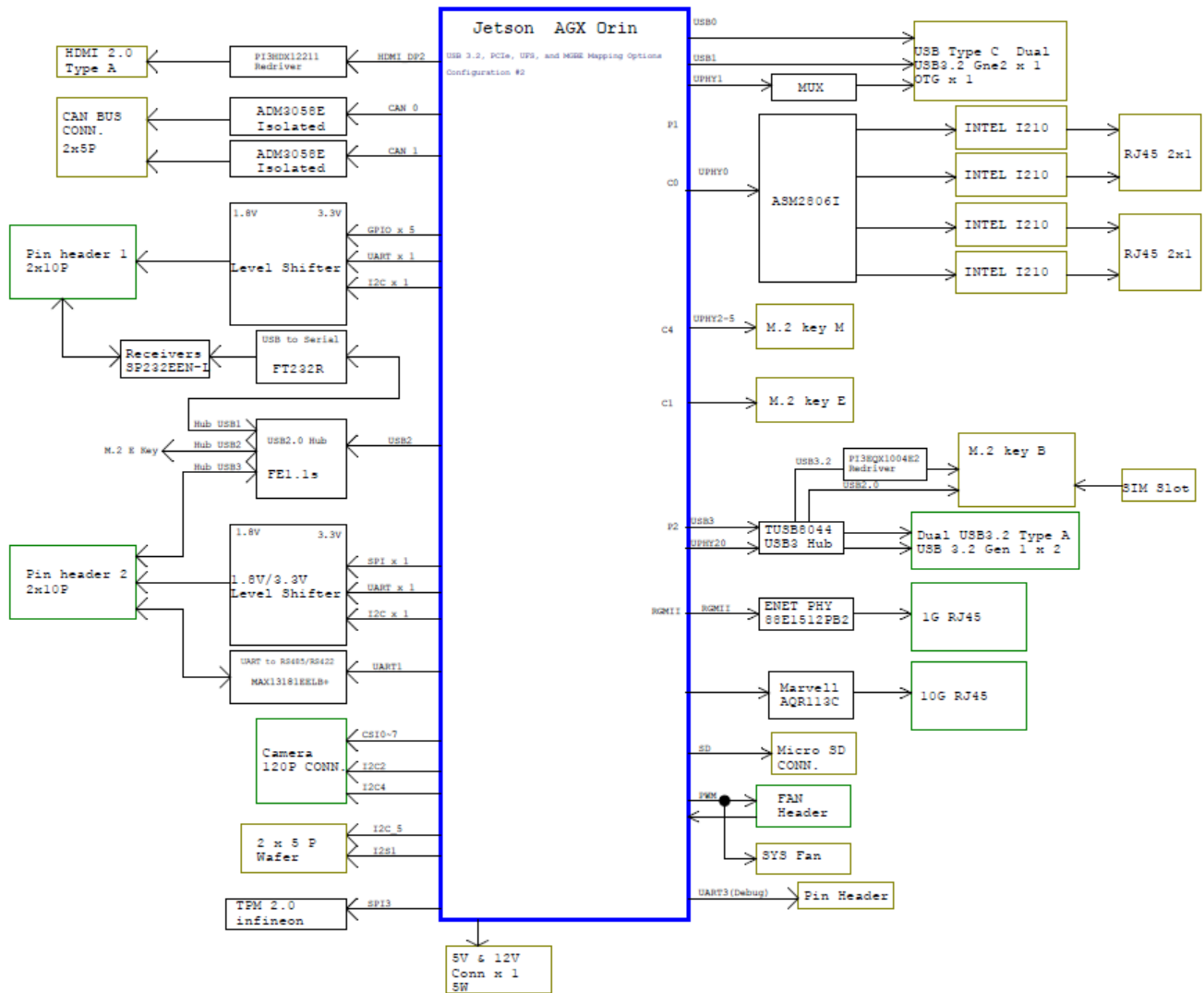
## 2. Hardware Information

### Block Diagram



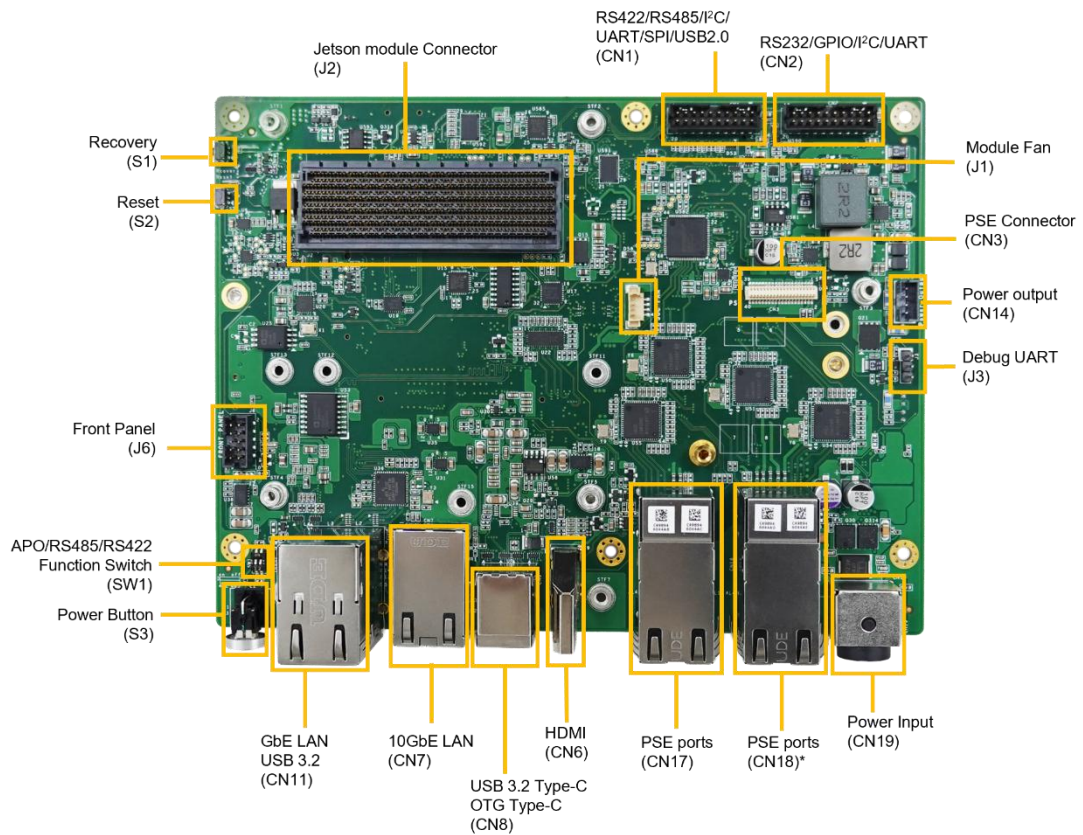
AIB-MX11 / AIB-MX21 Block diagram

## AIB-MX12 / AIB-MX22 Block diagram



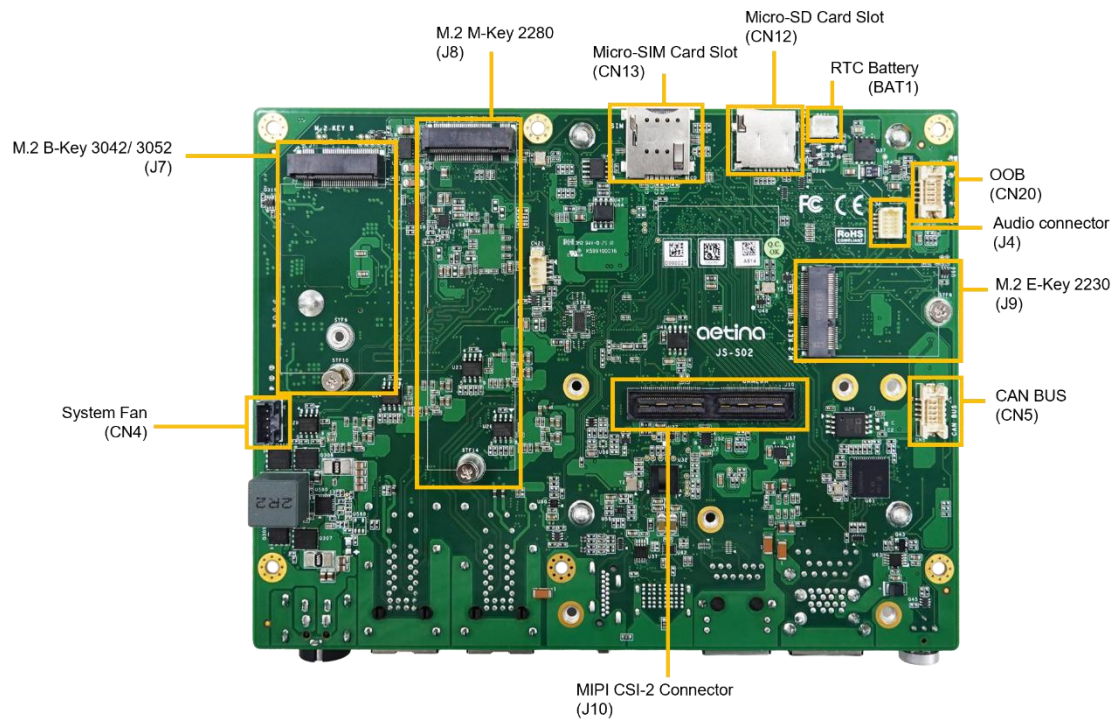
## 2.1 Connectors, LEDs, and Switches Reference Designators

### Top



\*PSE ports (CN18) are not populated on the AIB-MX11 and AIB-MX21 series.

## Bottom



## 2.2 Reference Designators (Connectors, LEDs, Switches)

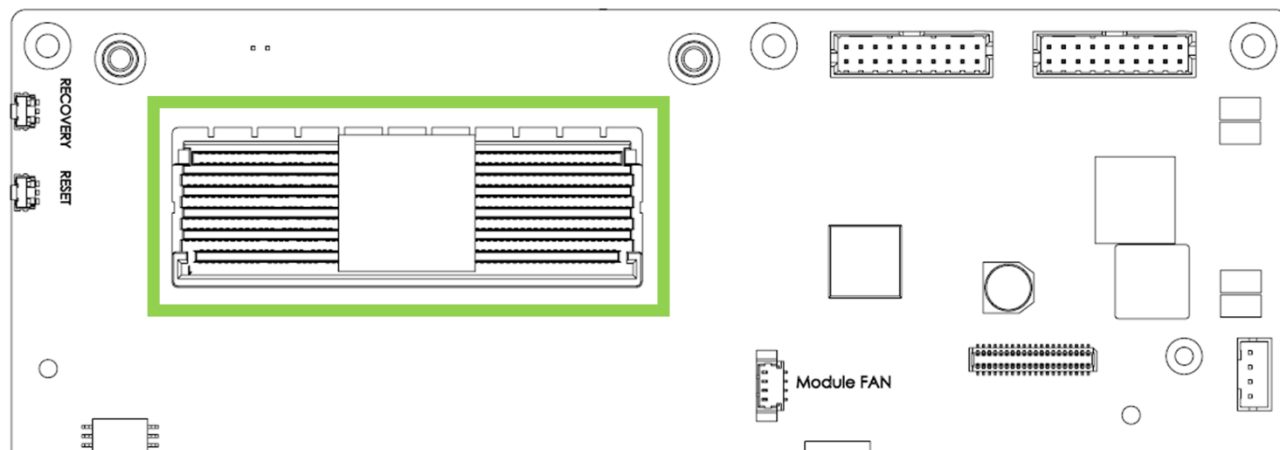
| Reference Designator | Specification                                                                                     |
|----------------------|---------------------------------------------------------------------------------------------------|
| J2                   | Jetson AGX Orin Module Connector                                                                  |
| S1                   | Recovery Button                                                                                   |
| S2                   | Reset Button                                                                                      |
| J6                   | Front Panel Connector                                                                             |
| SW1 (Position 1)     | Auto Power-On (APO) Switch                                                                        |
| SW1 (Position 2)     | RS-422 / RS-485 Switch                                                                            |
| J1                   | Module Fan Connector                                                                              |
| CN1                  | Miscellaneous I/O Connector<br>(Supports RS422 / RS485 / I <sup>2</sup> C / UART / SPI / USB 2.0) |
| CN2                  | Miscellaneous I/O Connector<br>(Supports RS232 / GPIO / I <sup>2</sup> C / UART)                  |
| CN14                 | DC output 5V / 12V Connector                                                                      |
| J3                   | Debug UART                                                                                        |
| S3                   | Power Button                                                                                      |
| CN11                 | Dual-Port USB 3.2 Gen1 Type-A Connector                                                           |
| CN11                 | GbE RJ45 LAN Connector                                                                            |
| CN7                  | 10 GbE RJ45 LAN Connector                                                                         |
| CN8                  | USB 2.0 OTG Type-C; USB 3.2 Gen2 Type-C                                                           |
| CN6                  | HDMI 2.0 Type-A Connector                                                                         |
| CN17                 | Dual-Port GbE RJ45 LAN Connector (Supports PSE)                                                   |
| CN18                 | Dual-Port GbE RJ45 LAN Connector (Supports PSE)                                                   |
| CN19                 | DC Power Input Connector                                                                          |
| CN5                  | CAN BUS                                                                                           |
| J9                   | M.2 E-Key 2230 Connector                                                                          |
| CN20                 | OOB Connector (Out-of-Band, Optional)                                                             |
| J4                   | Audio connector (Optional, Requires Daughter Board)                                               |

|      |                                                 |
|------|-------------------------------------------------|
| BAT1 | RTC Battery Connector (Default with Battery)    |
| J10  | 120-Pin Board to Board Connector for MIPI CSI-2 |
| CN12 | microSD Card Socket                             |
| CN13 | microSIM Card Socket                            |
| CN21 | 1PPS Module Function                            |
| J8   | M.2 M-Key 2280 Connector                        |
| J7   | M.2 B-Key 3042/3052 Connector                   |
| CN4  | System Fan Connector                            |

## 2.3 Connectors, LEDs, and Switches – Specifications

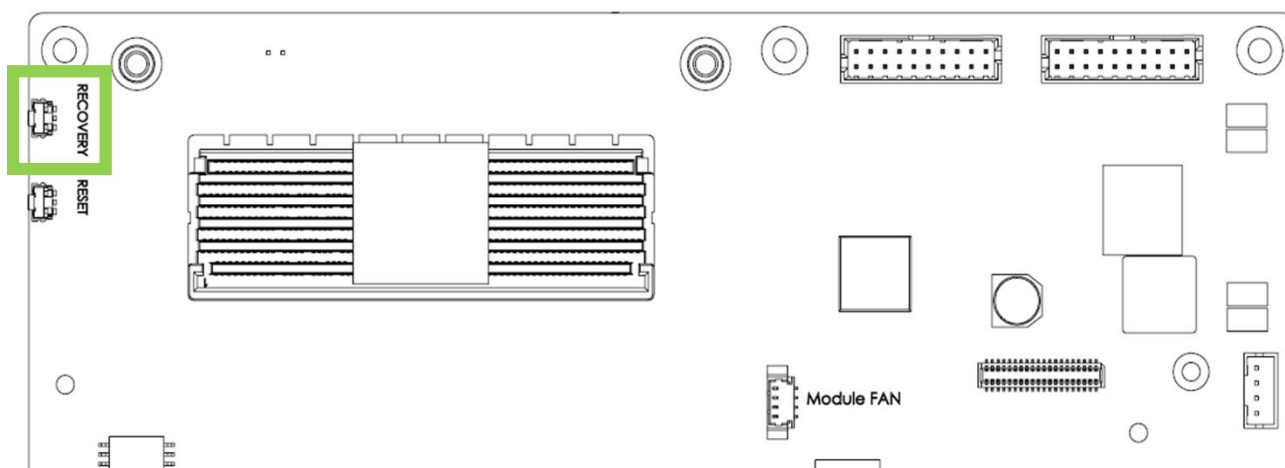
Here are the connectors and Pinout information of AIB-MX11/12/21/22 carrier board below.

### ■ Jetson AGX Orin Module Connector



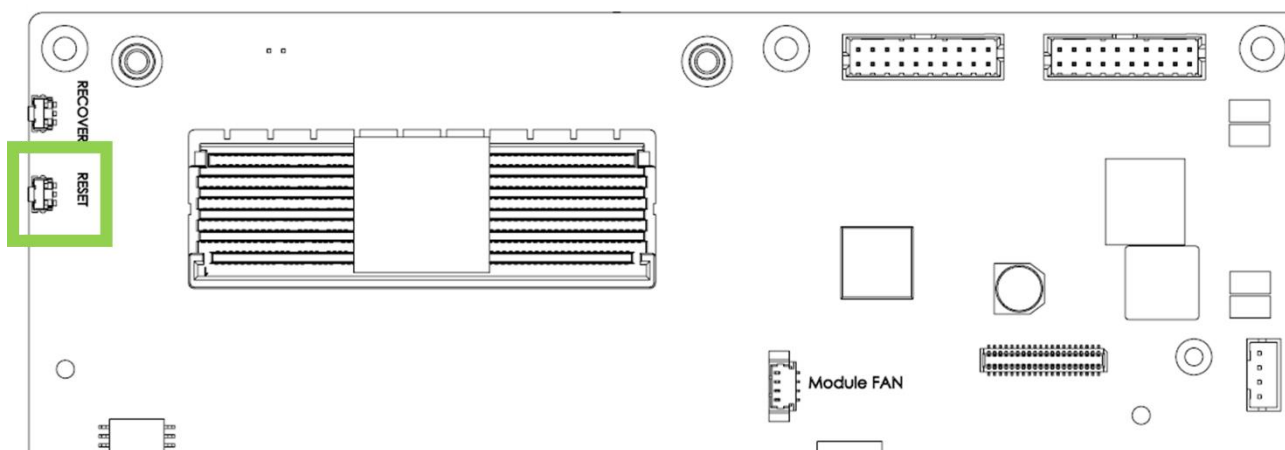
| Property             | Specification                                                                               |
|----------------------|---------------------------------------------------------------------------------------------|
| Reference Designator | J2                                                                                          |
| Connector            | Jetson AGX Orin module connector                                                            |
| Pinout               | Refer to the NVIDIA Jetson AGX Orin System-on-Module specification for detailed definitions |

## ■ Recovery Button



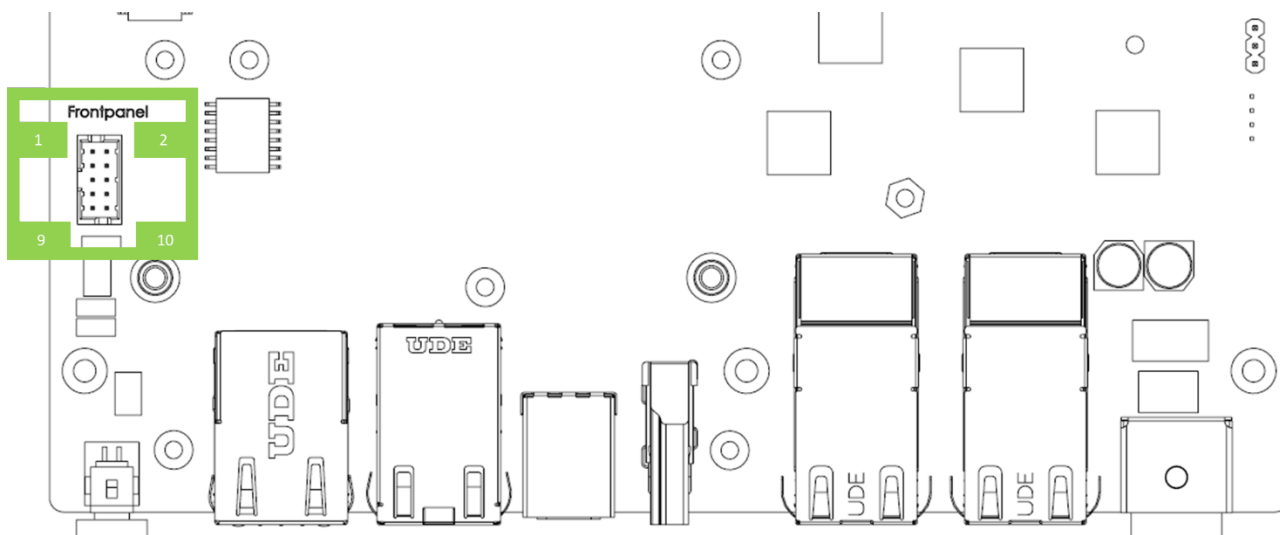
| Property             | Specification                     |
|----------------------|-----------------------------------|
| Reference Designator | S1                                |
| Type                 | Tactile switch                    |
| Notes                | To trigger system recovery action |

## ■ Reset Button



| Property             | Specification                  |
|----------------------|--------------------------------|
| Reference Designator | S2                             |
| Connector            | Tactile switch                 |
| Notes                | To trigger system reset action |

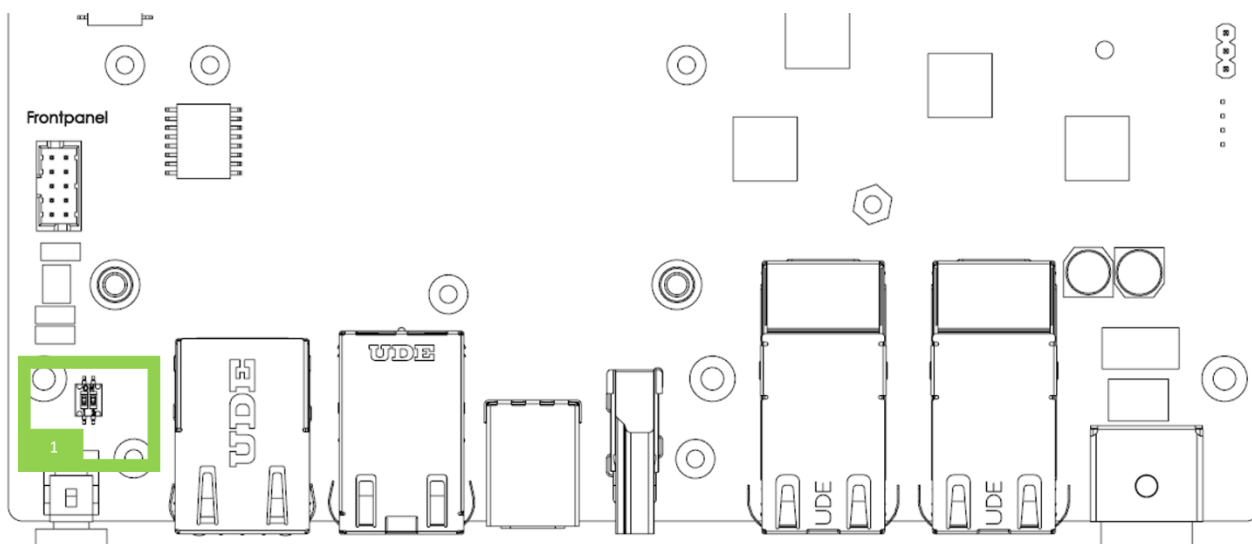
## ■ Front Panel Connector



| Property             | Specification                                      |
|----------------------|----------------------------------------------------|
| Reference Designator | J6                                                 |
| Connector            | 2x5 Pin, 2.0 mm Pitch Wafer (Board-to-Wire Header) |

| Pin # | Signal   | Pin # | Signal |
|-------|----------|-------|--------|
| 1     | Power On | 2     | GND    |
| 3     | Reset    | 4     | GND    |
| 5     | Recovery | 6     | GND    |
| 7     | Sleep    | 8     | GND    |
| 9     | LED+     | 10    | LED-   |

## ■ Auto Power On (APO) Switch

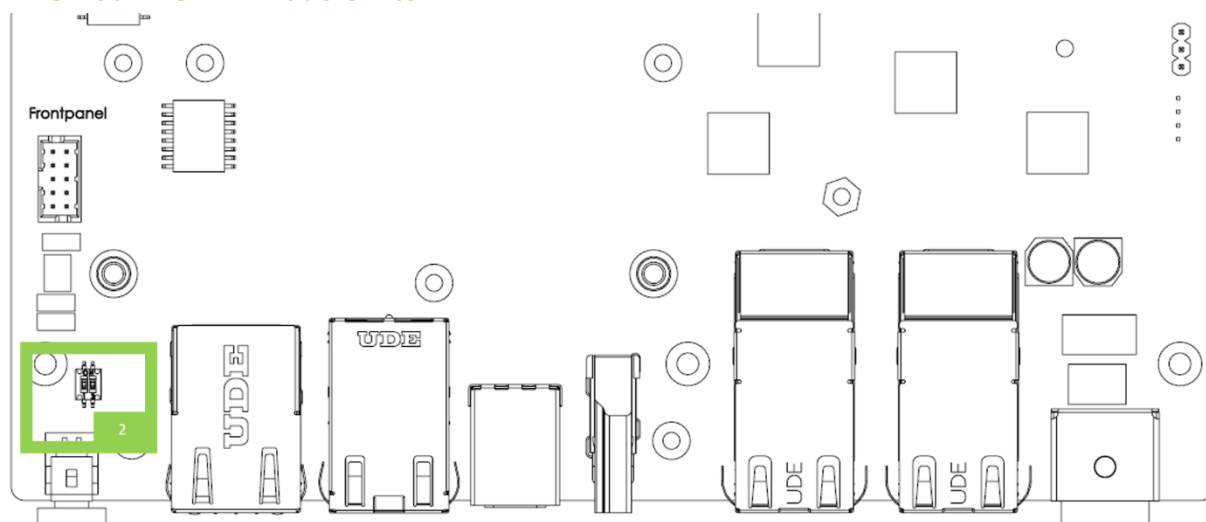


| Property             | Specification                        |
|----------------------|--------------------------------------|
| Reference Designator | SW1 (Position 1)                     |
| Connector            | DIP Switch                           |
| Notes                | This switch enables the APO function |

| Position    | APO Function |
|-------------|--------------|
| ON          | Disable      |
| 1 (Default) | Enable       |

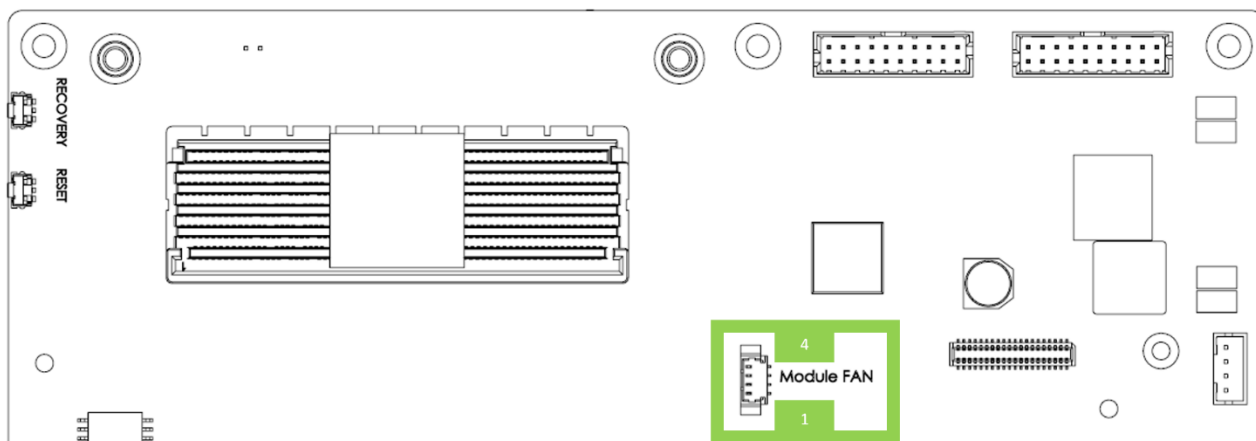
## ■ RS-485 / RS-422 Mode Switch



| Property             | Specification                                      |
|----------------------|----------------------------------------------------|
| Reference Designator | SW1 (Position 2)                                   |
| Connector            | DIP Switch                                         |
| Notes                | The switch selects between RS-485 and RS-422 modes |

| Position    | Switch Function |
|-------------|-----------------|
| ON          | RS-422          |
| 2 (Default) | RS-485          |

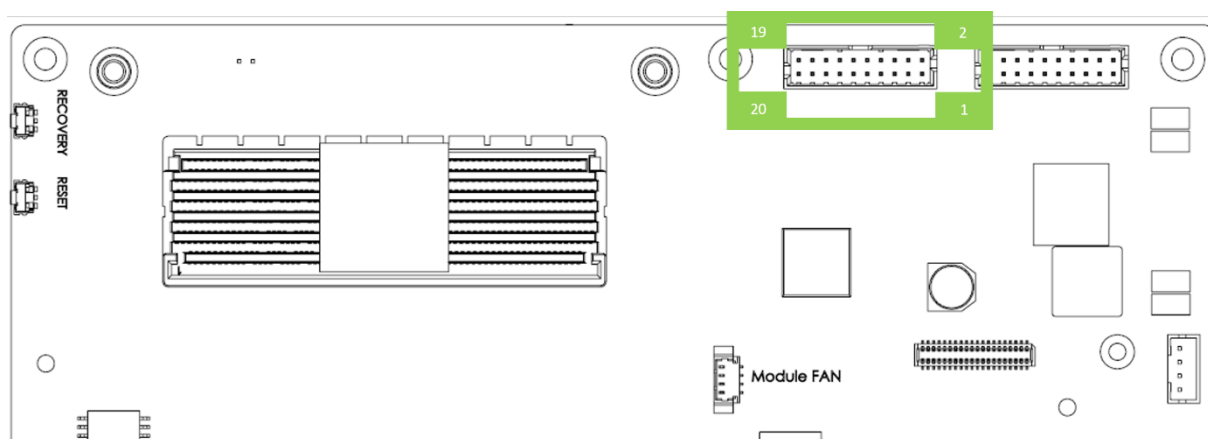
## ■ Module Fan Connector



| Property             | Specification                                       |
|----------------------|-----------------------------------------------------|
| Reference Designator | J1                                                  |
| Connector            | 1x4 Pin, 1.25 mm Pitch Wafer (Board-to-Wire Header) |

| Pin # | Signal  |
|-------|---------|
| 1     | GND     |
| 2     | VDD_12V |
| 3     | TACH    |
| 4     | PWM     |

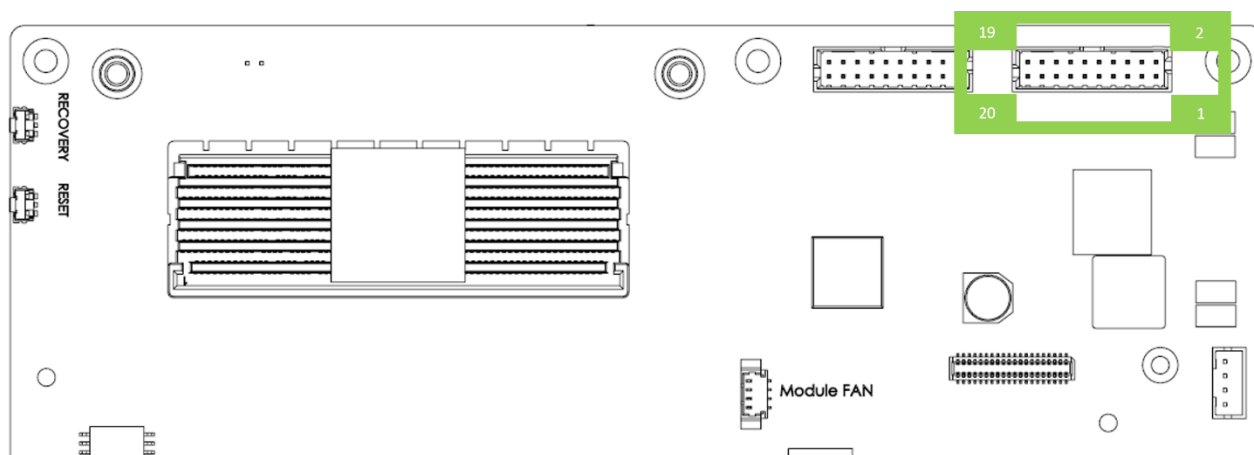
## MISC I/O Connector (RS422/RS485/I<sup>2</sup>C/UART/SPI/USB2.0)



| Property             | Specification                                       |
|----------------------|-----------------------------------------------------|
| Reference Designator | CN1                                                 |
| Connector            | 2x10 Pin, 2.0 mm Pitch Wafer (Board-to-Wire Header) |

| Pin # | Signal                 | Pin # | Signal       |
|-------|------------------------|-------|--------------|
| 1     | VDD_3V3                | 2     | VDD_5V       |
| 3     | I2C_GP2_CLK_3V3        | 4     | USB_D-       |
| 5     | I2C_GP2_DAT_3V3        | 6     | USB_D+       |
| 7     | UART4_TX               | 8     | SPI_MOSI_3V3 |
| 9     | UART4_RX               | 10    | SPI_SCK_3V3  |
| 11    | RS422_A (RX+)          | 12    | SPI_MISO_3V3 |
| 13    | RS422_B (RX-)          | 14    | SPI_CS1_3V3  |
| 15    | RS422_Z (TX-) / RS485- | 16    | SPI_CS0_3V3  |
| 17    | RS422_Y (TX+) / RS485+ | 18    | HF_SW        |
| 19    | GND                    | 20    | GND          |

## ■ MISC I/O Connector (RS232/GPIO/I<sup>2</sup>C/UART)



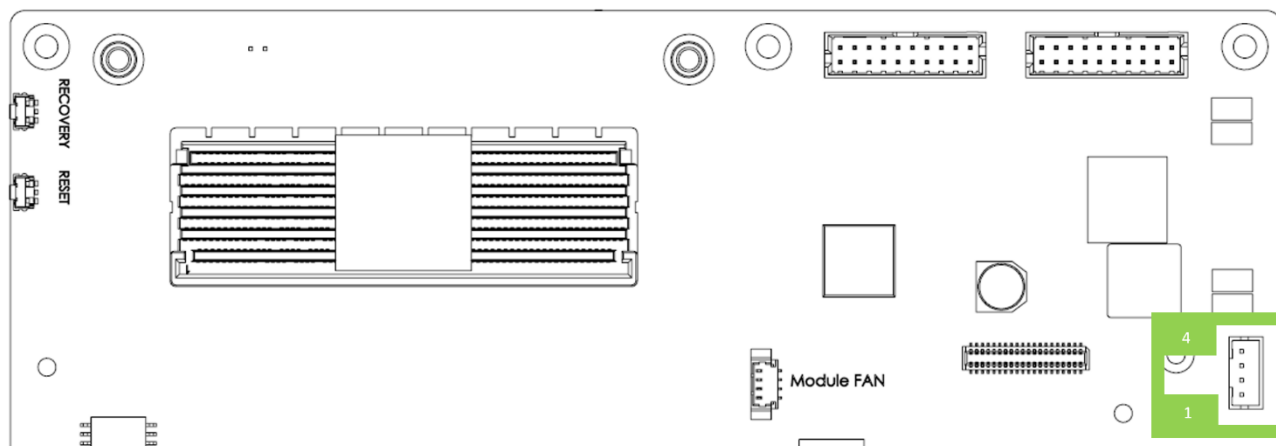
| Property             | Specification                                       |
|----------------------|-----------------------------------------------------|
| Reference Designator | CN2                                                 |
| Connector            | 2x10 Pin, 2.0 mm Pitch Wafer (Board-to-Wire Header) |

| Pin # | Signal          | Pin Config                        | Pin # | Signal            |
|-------|-----------------|-----------------------------------|-------|-------------------|
| 1     | VDD_3V3         |                                   | 2     | VDD_5V (standby)  |
| 3     | GPIO_1)         | PP.04444 / 3V3 / Input / Pull-up  | 4     | UART2_TXD_HDR_3V3 |
| 5     | GPIO_2          | PAC.05491 / 3V3 / Input / Pull-up | 6     | UART2_RXD_HDR_3V3 |
| 7     | GPIO_3          | PR.00456 / 3V3 / Input / Pull-up  | 8     | UART2_CTS_HDR_3V3 |
| 9     | GPIO_4          | PN.01433 / 3V3 / Input / Pull-up  | 10    | UART2_RTS_HDR_3V3 |
| 11    | GPIO_5          | PH.00391 / 3V3 / Input / Pull-up  | 12    | RS232_RXD         |
| 13    | I2C_GP4_CLK_3V3 |                                   | 14    | RS232_RTS         |
| 15    | I2C_GP4_DAT_3V3 |                                   | 16    | RS232_TXD         |
| 17    | GND             |                                   | 18    | RS232_CTS         |
| 19    | GND             |                                   | 20    | GND               |

\*CN2 pins 3, 5, 7, 9, and 11 are defaulted to GPIO input with pull-up. Any change to output mode or alternate configuration requires customization support.

\*Pins 4, 6, 8, and 10 are shared with CN20. These pins are not available on CN2 when the OOB function is enabled.

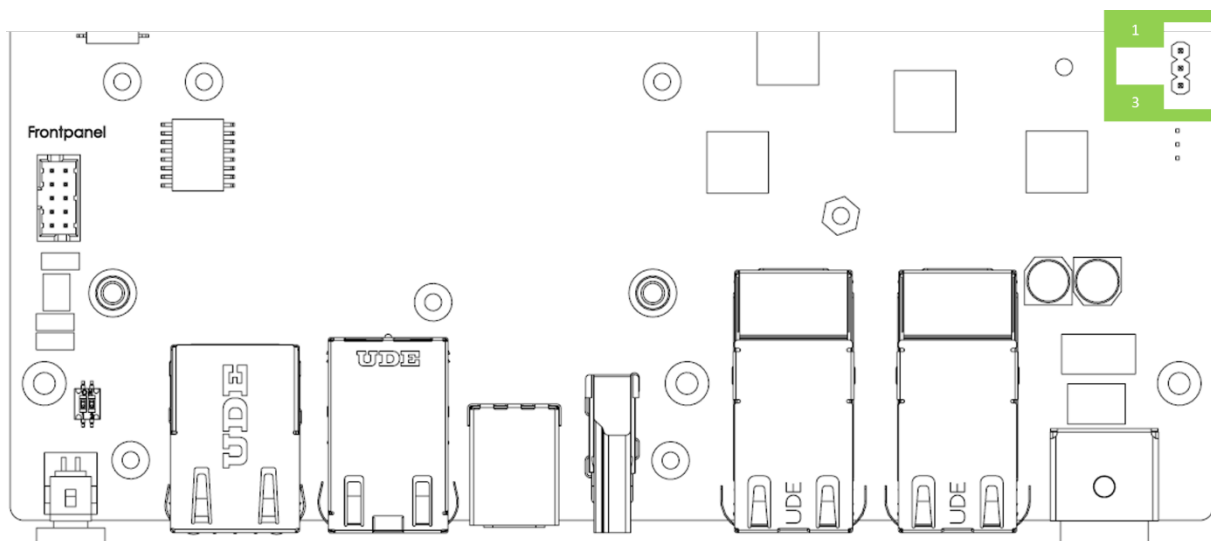
## ■ 5V/12V Output Connector (Supports GMSL)



| Property             | Specification                                                                                                           |
|----------------------|-------------------------------------------------------------------------------------------------------------------------|
| Reference Designator | CN14                                                                                                                    |
| Connector            | 1x4 Pin, 2.0 mm Pitch Wafer (Board-to-Wire Header)                                                                      |
| Notes                | Power output: 5V @ 1A, 12V @ 1A<br>For GMSL, please connect pin #2 (12V) and either of the GND pins (pin #3 or pin #4). |

| Pin # | Signal       |
|-------|--------------|
| 1     | VDD_12V @ 1A |
| 2     | VDD_5V @ 1A  |
| 3     | GND          |
| 4     | GND          |

## ■ Debug UART

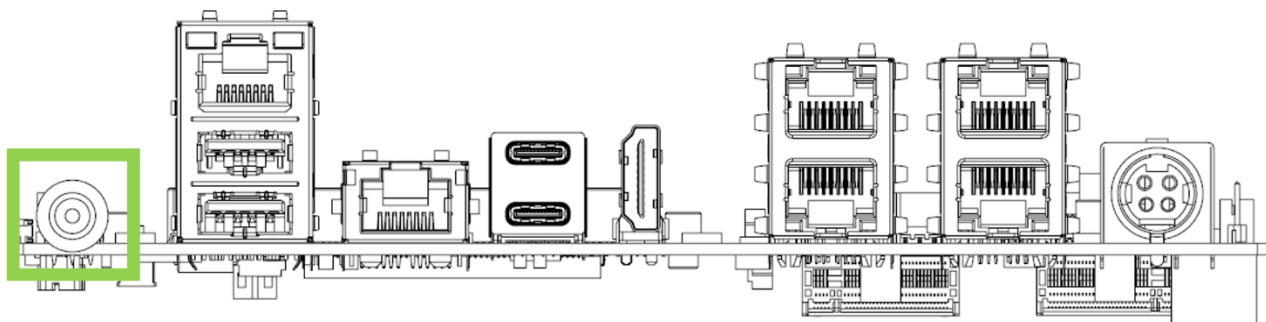


| Property             |  | Specification                                 |
|----------------------|--|-----------------------------------------------|
| Reference Designator |  | J3                                            |
| Connector            |  | 1x3 Pin, 2.54 mm Pitch (Board-to-Wire Header) |

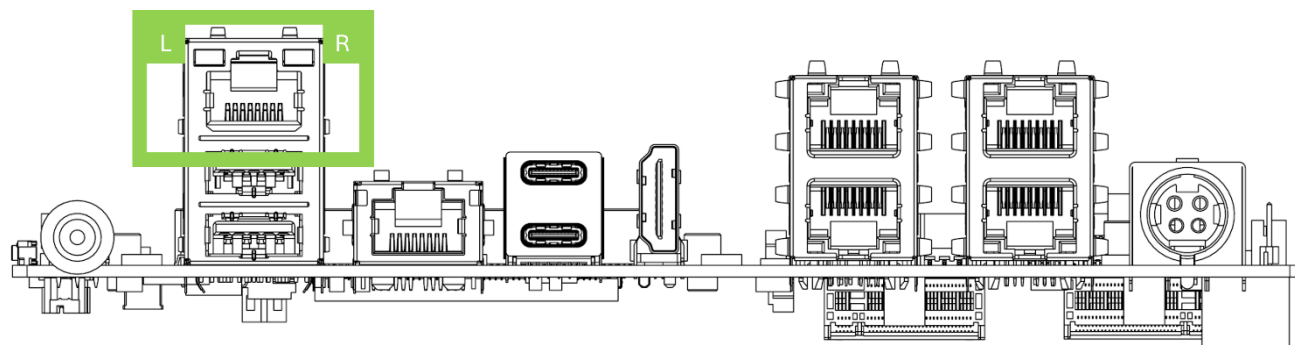
| Pin # | Signal                    |
|-------|---------------------------|
| 1     | Debug_UART_TX (3V3 level) |
| 2     | Debug_UART_RX (3V3 level) |
| 3     | GND                       |

## ■ Power Button



| Property             | Specification                  |
|----------------------|--------------------------------|
| Reference Designator | S3                             |
| Connector            | Tactile switch                 |
| Notes                | To trigger system power on/off |

## ■ Gigabit Ethernet Connector

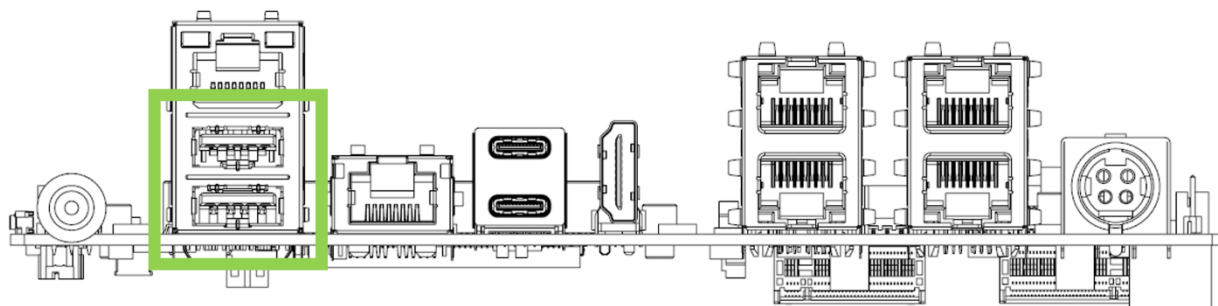


| Property             | Specification                     |
|----------------------|-----------------------------------|
| Reference Designator | CN11                              |
| Connector            | RJ-45 connector                   |
| Pinout               | Please refer to Ethernet standard |
| LAN Source           | Intel Ethernet controller         |

### LAN LED Indicators

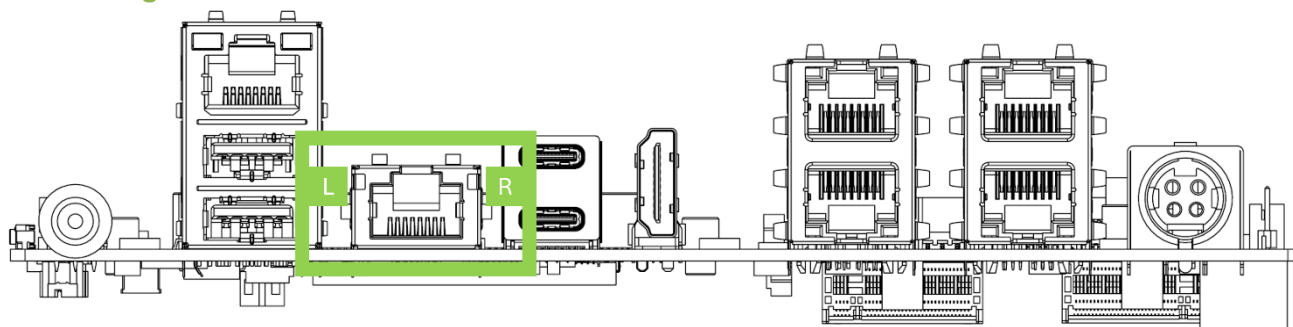
| LAN       | Function    | Color  | Status   | Description       |
|-----------|-------------|--------|----------|-------------------|
| L (Left)  | Link Status | Orange | ON       | Link established  |
|           |             |        | Blinking | Data activity     |
|           |             |        | OFF      | No link           |
| R (Right) | Link Speed  | Yellow | ON       | 100 Mbps / 1 Gbps |
|           |             |        | OFF      | 10 Mbps           |

## ■ Dual USB 3.2 Gen1 Connector-A Connector



| Property             | Specification                                                                                                           |
|----------------------|-------------------------------------------------------------------------------------------------------------------------|
| Reference Designator | CN11                                                                                                                    |
| Connector            | USB Type-A connector                                                                                                    |
| Pinout               | Pin definition follows the USB specification                                                                            |
| Notes                | Supports up to 5Gbps per port. When multiple devices are connected, bandwidth is shared and actual data rates may vary. |

## ■ 10 Gigabit Ethernet Connector

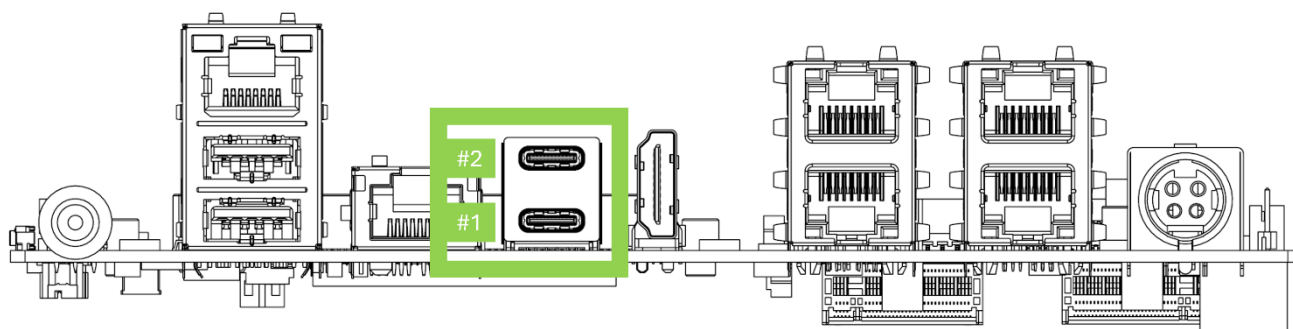


| Property             | Specification                     |
|----------------------|-----------------------------------|
| Reference Designator | CN7                               |
| Connector            | RJ-45 connector                   |
| Pinout               | Please refer to Ethernet standard |
| LAN Source           | NVIDIA SOM native GbE interface   |

### LAN LED Indicators

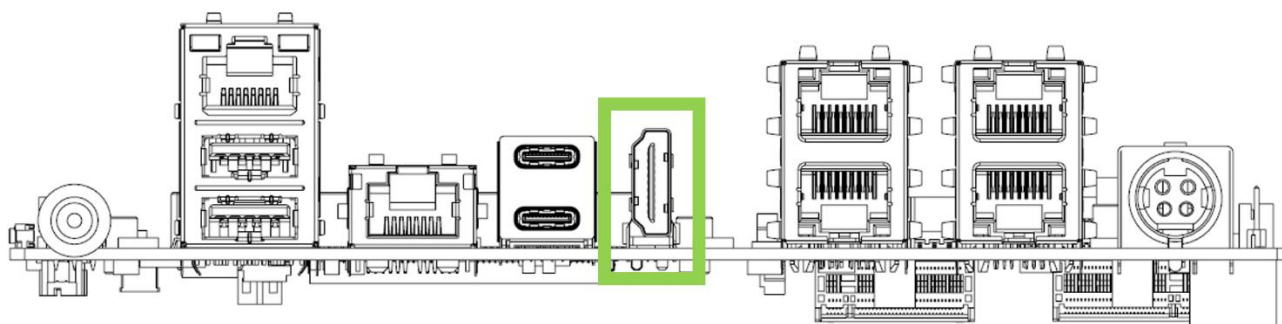
| LAN       | Function    | Color  | Status   | Description                 |
|-----------|-------------|--------|----------|-----------------------------|
| L (Left)  | Link Status | Green  | ON       | Link established            |
|           |             |        | Blinking | Data activity               |
|           |             |        | OFF      | No link                     |
| R (Right) | Link Speed  | Orange | ON       | 100 Mbps / 1 Gbps / 10 Gbps |
|           |             |        | OFF      | 2.5 Gbps / 5 Gbps           |

## ■ USB 2.0 OTG Type-C / USB 3.2 Gen2 Type-C



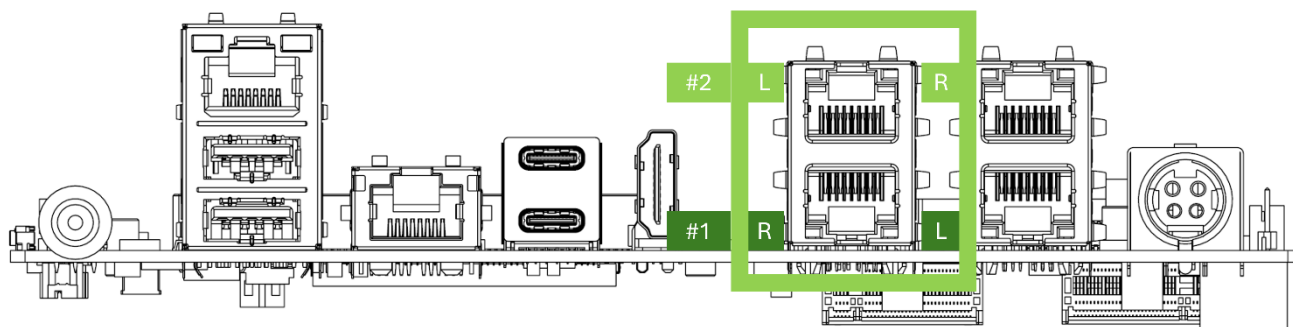
| Property             | Specification                                   |
|----------------------|-------------------------------------------------|
| Reference Designator | CN8                                             |
| Connector            | Dual USB Type-C connector                       |
| Pinout               | Please refer to USB standard                    |
| Notes                | #1 USB 2.0 OTG Type-C<br>#2 USB 3.2 Gen2 Type-C |

## ■ HDMI Type-A Connector



| Property             | Specification                        |
|----------------------|--------------------------------------|
| Reference Designator | CN6                                  |
| Type                 | HDMI Type-A female connector         |
| Pinout               | Please refer to HDMI Type-A standard |
| Notes                | Resolution up to 4K@60Hz             |

## ■ PSE Port 1 / Port 2 Gigabit Ethernet Connector

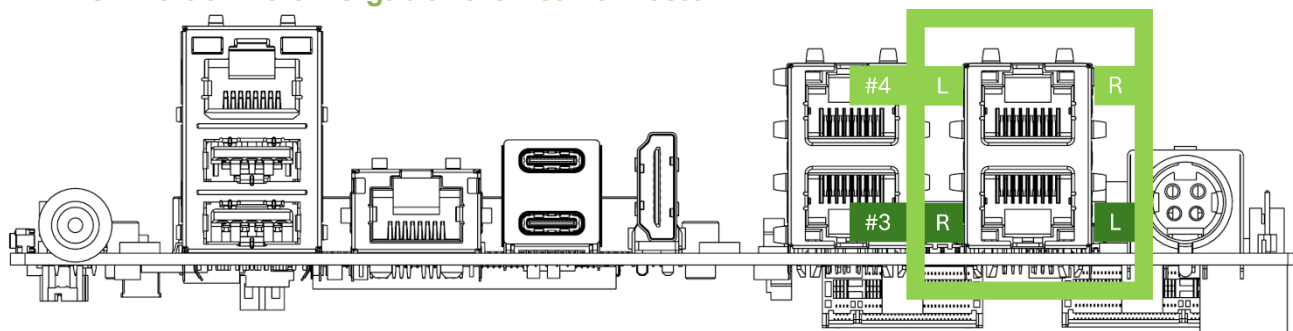


| Property             | Specification                                                                                                               |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------|
| Reference Designator | CN17                                                                                                                        |
| Connector            | Dual-Port RJ-45 connector                                                                                                   |
| Pinout               | Pin definition follows the RJ45 specification                                                                               |
| LAN Source           | Intel Ethernet controller                                                                                                   |
| Notes                | <p>IEEE 802.3af compliant, power output 15W per port, 30 W max per connector.</p> <p>#1 PSE port 1</p> <p>#2 PSE port 2</p> |

### LAN LED Indicators

| LAN       | Function    | Color  | Status   | Description        |
|-----------|-------------|--------|----------|--------------------|
| L (Left)  | Link Status | Yellow | ON       | Link established   |
|           |             |        | Blinking | Data activity      |
|           |             |        | OFF      | No link            |
| R (Right) | Link Speed  | Green  | ON       | 1 Gbps             |
|           |             |        | OFF      | 10 Mbps / 100 Mbps |

## ■ PSE Port 3 / Port 4 Gigabit Ethernet Connector

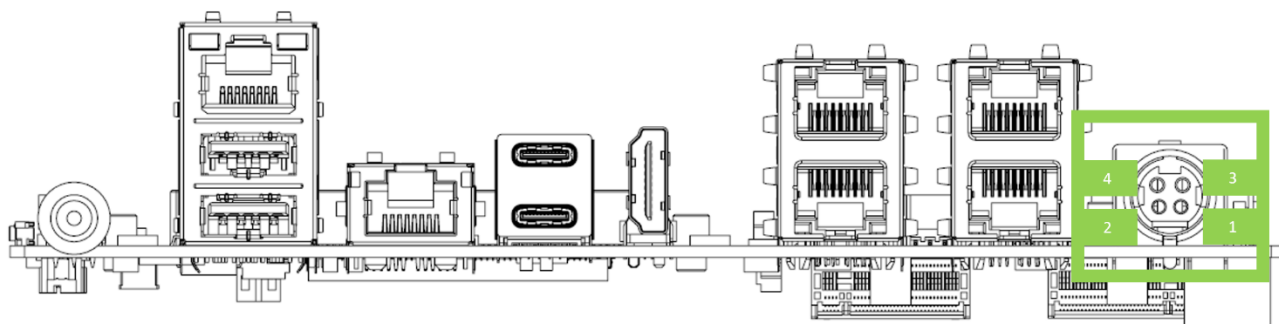


| Property             | Specification                                                                                                                                                                                                       |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reference Designator | CN18                                                                                                                                                                                                                |
| Connector            | Dual-port RJ45 connector                                                                                                                                                                                            |
| Pinout               | Please refer to Ethernet standard                                                                                                                                                                                   |
| LAN Source           | Intel Ethernet controller                                                                                                                                                                                           |
| Notes                | <p>IEEE 802.3af compliant, power output 15W per port, 30 W max per connector.</p> <p>#3 PSE port 3</p> <p>#4 PSE port 4</p> <p>* Dual-port RJ45 connector (CN18) is not populated on the AIB-MX11 and AIB-MX21.</p> |

### LAN LED Indicators

| LAN       | Function    | Color  | Status   | Description        |
|-----------|-------------|--------|----------|--------------------|
| L (Left)  | Link Status | Yellow | ON       | Link established   |
|           |             |        | Blinking | Data activity      |
|           |             |        | OFF      | No link            |
| R (Right) | Link Speed  | Green  | ON       | 1 Gbps             |
|           |             |        | OFF      | 10 Mbps / 100 Mbps |

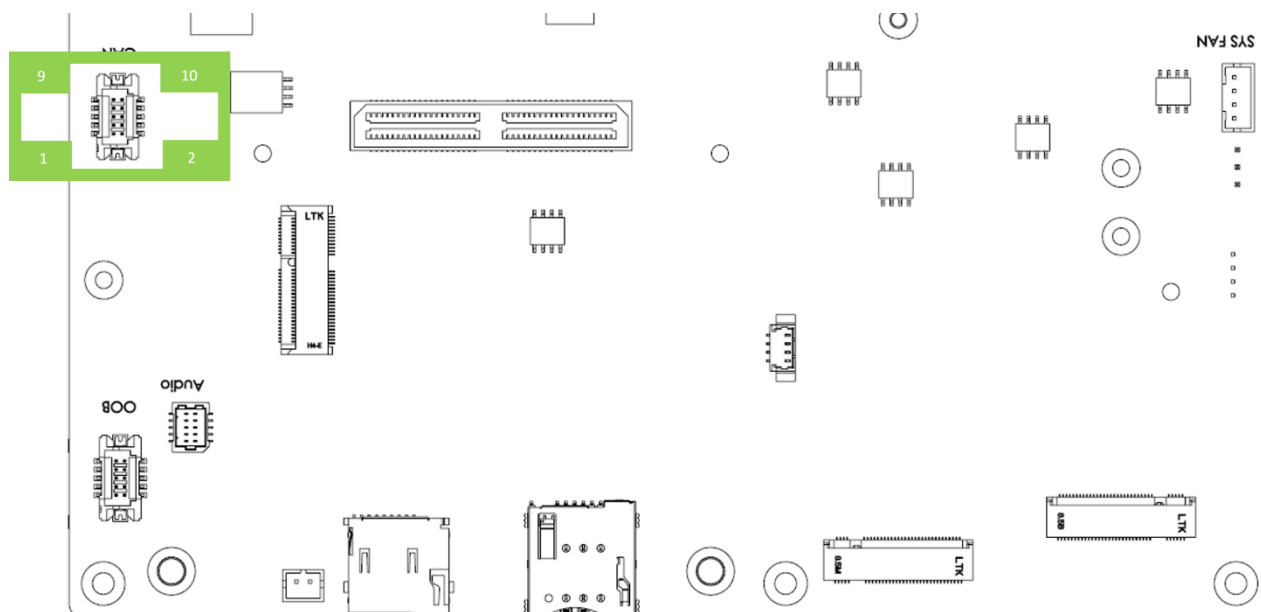
## ■ DC Power Input Connector



| Property             | Specification                    |
|----------------------|----------------------------------|
| Reference Designator | CN19                             |
| Connector            | 4-pin male DC power connector    |
| Pinout               | Please refer to DC Jack standard |

| Pin # | Signal | Pin # | Signal |
|-------|--------|-------|--------|
| 1     | VIN+   | 2     | GND    |
| 3     | VIN+   | 4     | GND    |

## ■ CAN BUS Connector

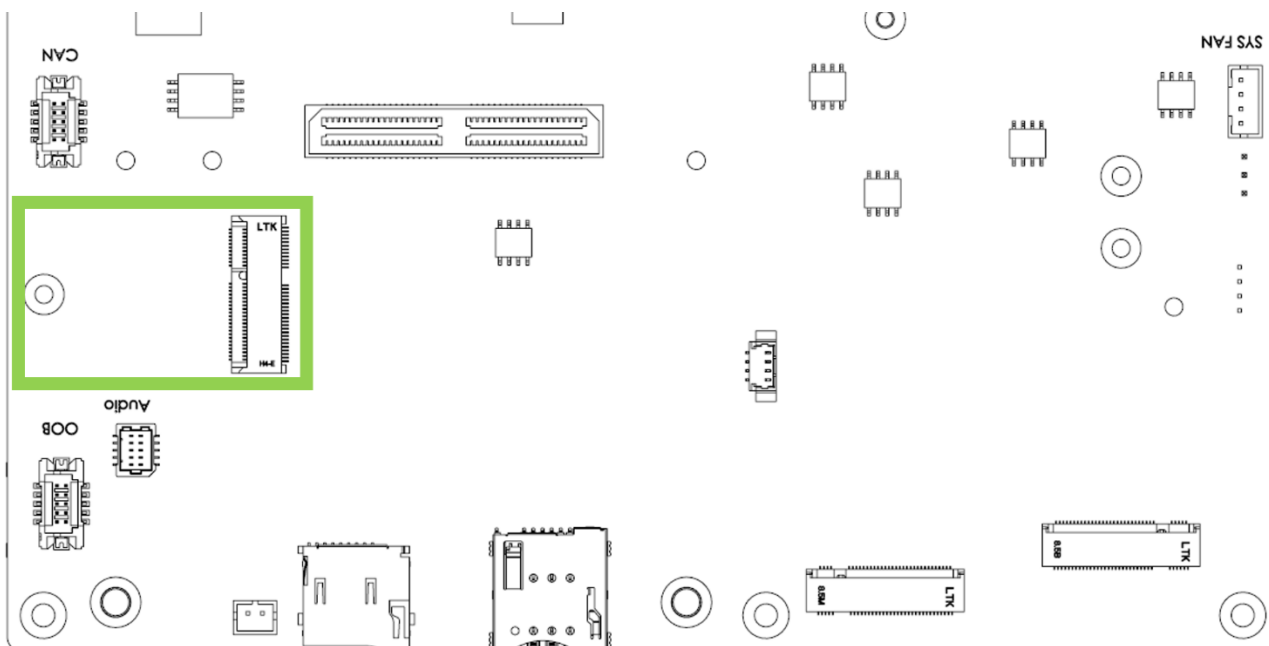


| Property             |  | Specification                                       |  |
|----------------------|--|-----------------------------------------------------|--|
| Reference Designator |  | CN5                                                 |  |
| Connector            |  | 2x5 Pin, 1.25 mm Pitch Wafer (Board-to-Wire Header) |  |

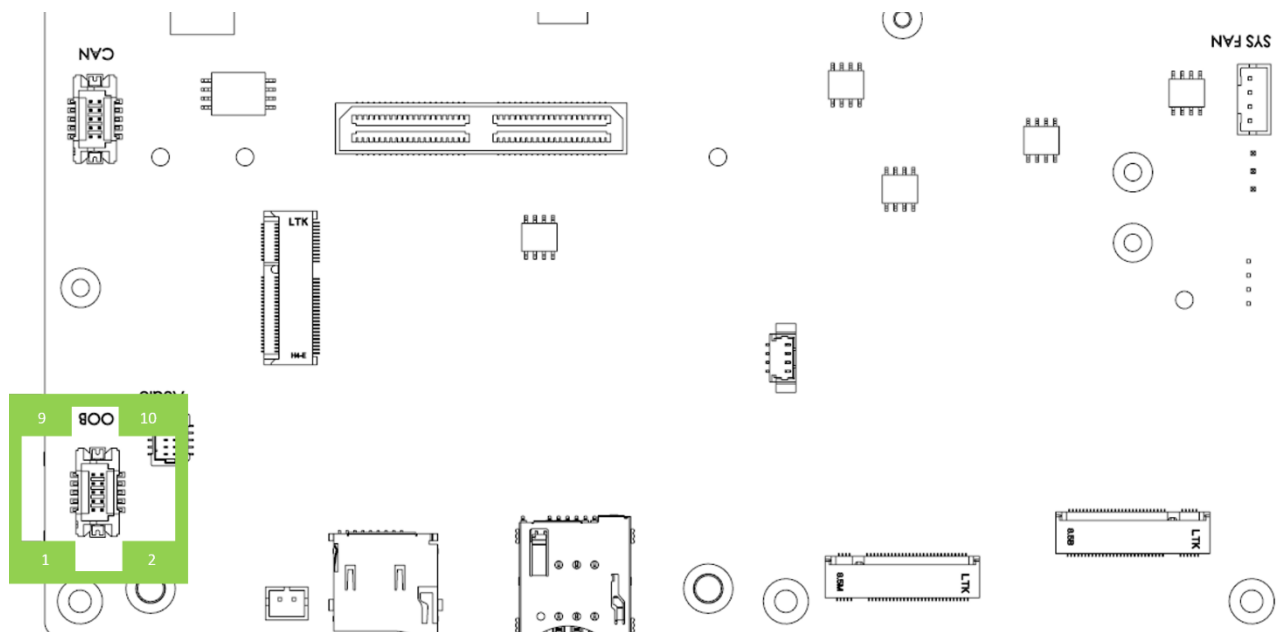
| Pin # | Signal | Pin # | Signal |
|-------|--------|-------|--------|
| 1     | CAN0H  | 2     | CAN1H  |
| 3     | CAN0L  | 4     | CAN1L  |
| 5     | NC     | 6     | NC     |
| 7     | CAN_5V | 8     | CAN_5V |
| 9     | GND    | 10    | GND    |

## ■ M.2 E-Key Connector



| Property             | Specification                                      |
|----------------------|----------------------------------------------------|
| Reference Designator | J9                                                 |
| Connector            | M.2 E-Key 2230                                     |
| Pinout               | Pin definition follows the M.2 E-Key specification |
| Interface            | PCIe Gen4 x1 / USB 2.0                             |
| Notes                | Supports Wi-Fi / Bluetooth                         |

## ■ OOB Connector



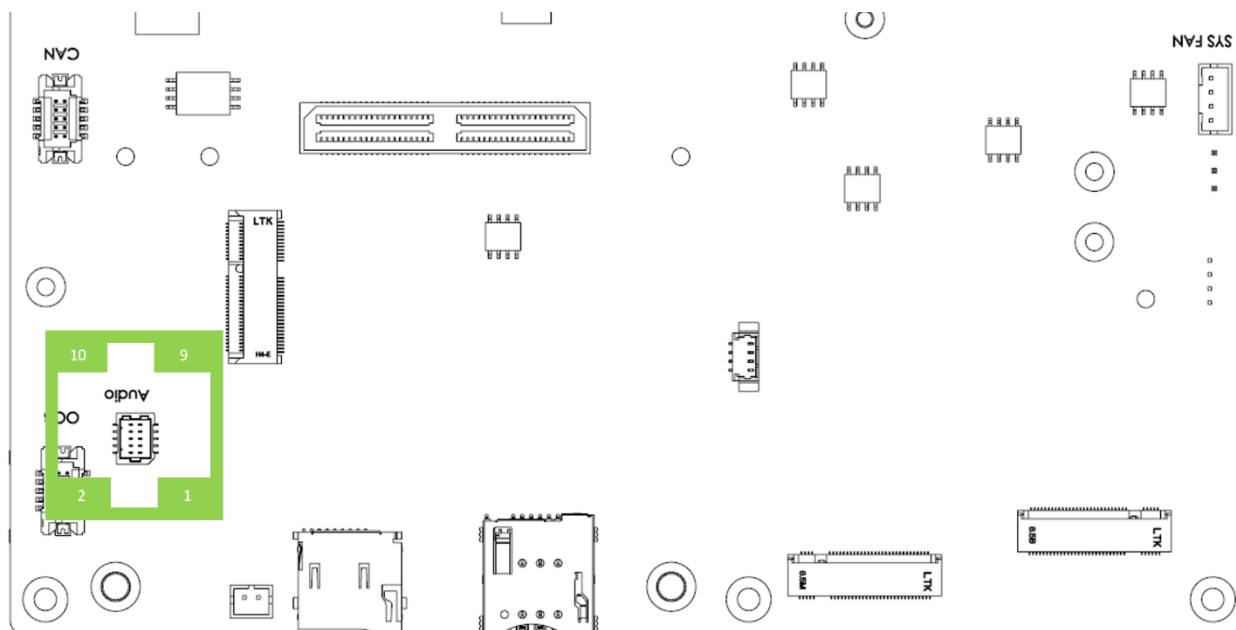
| Property             | Specification                                                 |
|----------------------|---------------------------------------------------------------|
| Reference Designator | CN20                                                          |
| Connector            | 2x5 Pin, 2.0 mm Pitch Wafer (Board-to-Wire Header)            |
| Notes                | Optional; requires module support and software customization. |

| Pin # | Signal     | Pin # | Signal                 |
|-------|------------|-------|------------------------|
| 1     | GND        | 2     | VDD_5V (Standby)       |
| 3     | OOB_GPIO_1 | 4     | UART_TXD (3.3V level)* |
| 5     | OOB_GPIO_2 | 6     | UART_RXD (3.3V level)* |
| 7     | Power on   | 8     | UART_RTS (3.3V level)* |
| 9     | Reset      | 10    | UART_CTS (3.3V level)* |

\*Pins 4, 6, 8, and 10 are shared with CN2.

These pins are not available on CN2 when the OOB function is enabled.

## ■ Audio Board-to-Board Connector

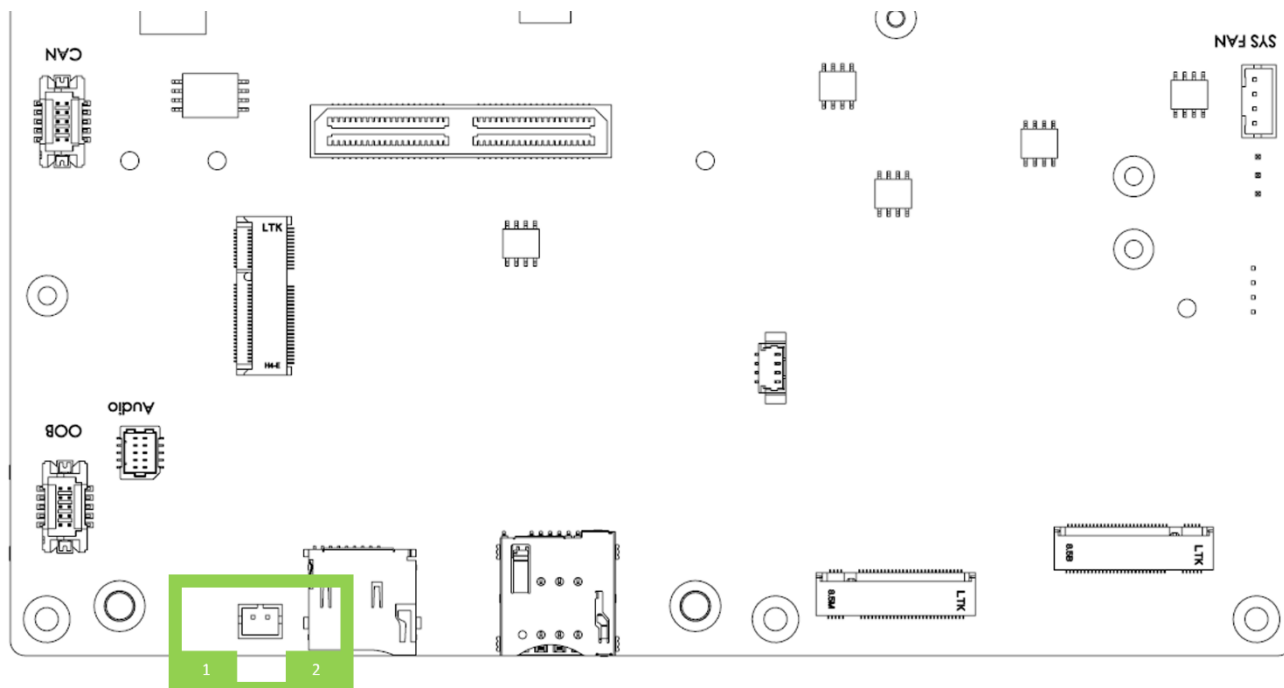


| Property             | Specification                                      |
|----------------------|----------------------------------------------------|
| Reference Designator | J4                                                 |
| Connector            | 2x5 Pin, 1.0 mm Pitch Wafer (Board-to-Wire Header) |

| Pin # | Signal        | Pin # | Signal     |
|-------|---------------|-------|------------|
| 1     | I2S1_SCLK_1V8 | 2     | VDD_3V3    |
| 3     | I2S1_OUT_1V8  | 4     | I2C_G4_DAT |
| 5     | I2S1_IN_1V8   | 6     | I2C_G4_CLK |
| 7     | I2S1_FS_1V8   | 8     | GND        |
| 9     | I2S1_MCLK_1V8 | 10    | GND        |

Note: The voltage level of I2C & I2S is 1.8V

## ■ RTC Battery Connector (Default with Battery)

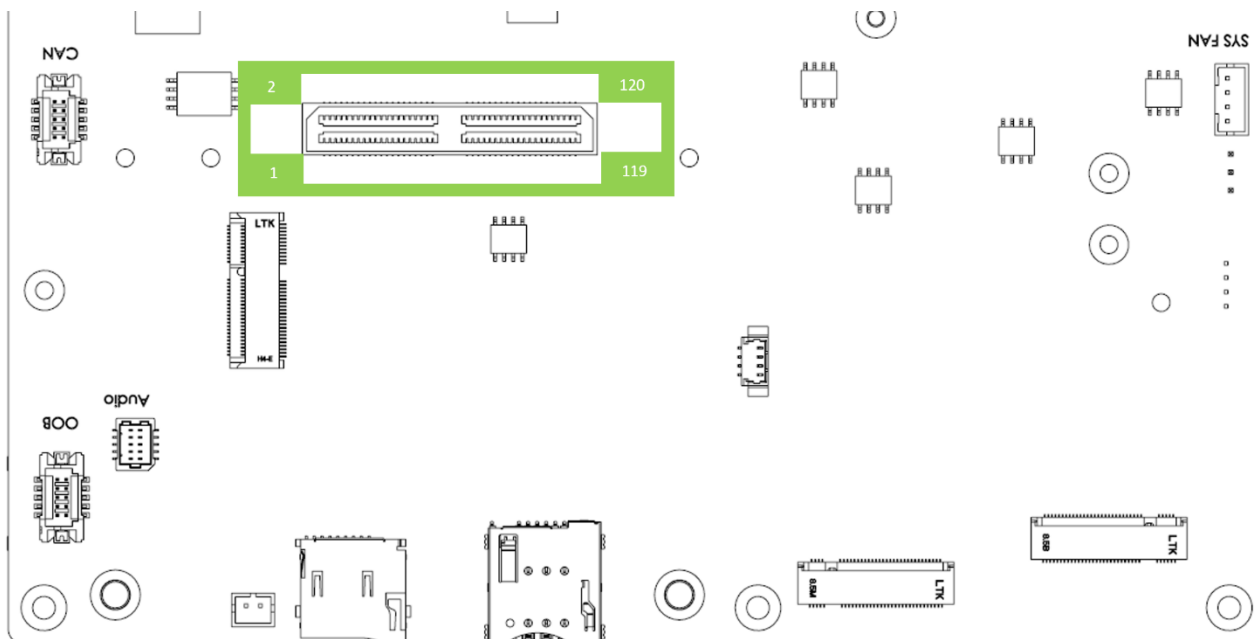


| Property             | Specification                                      |
|----------------------|----------------------------------------------------|
| Reference Designator | BAT1                                               |
| Connector            | 1x2 Pin, 2.0 mm Pitch Wafer (Board-to-Wire Header) |

| Pin # | Signal |
|-------|--------|
| 1     | —      |
| 2     | +      |

## ■ 120-Pin Board-to-Board Connector for MIPI CSI-2



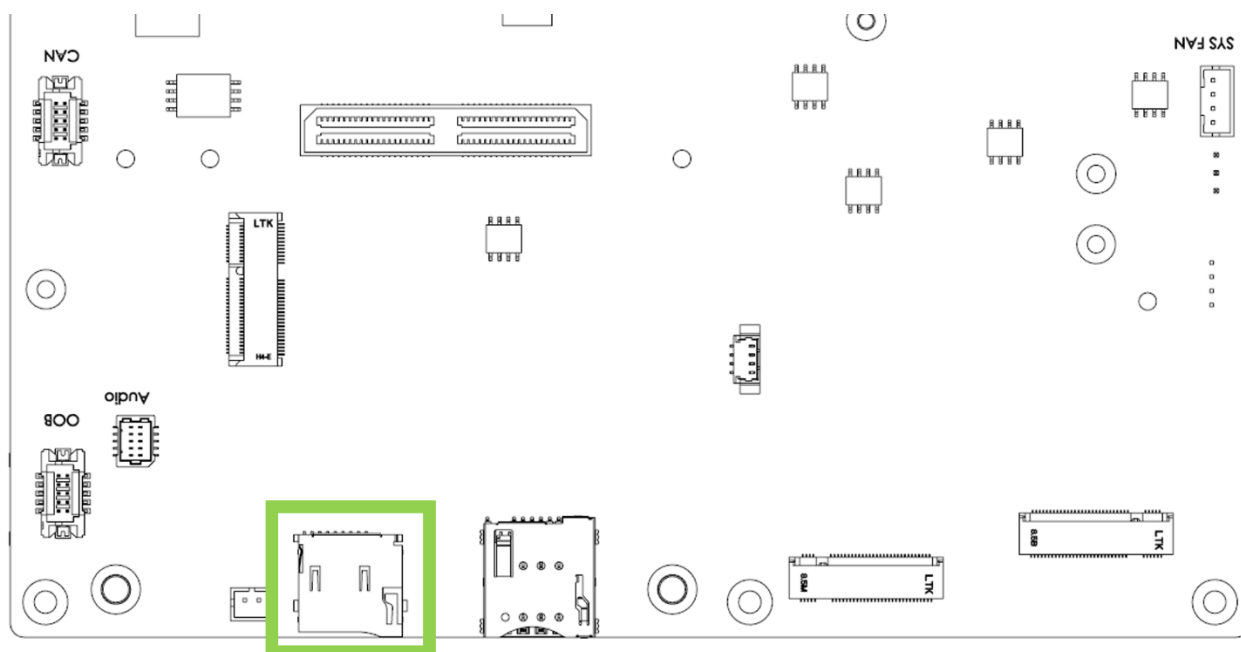
| Property             | Specification         |
|----------------------|-----------------------|
| Reference Designator | J10                   |
| Connector            | QSH 120-Pin connector |

| Pin # | Signal      | Pin # | Signal      |
|-------|-------------|-------|-------------|
| 1     | CSI_0_D0_P  | 2     | CSI_1_D0_P  |
| 3     | CSI_0_D0_N  | 4     | CSI_1_D0_N  |
| 5     | GND         | 6     | GND         |
| 7     | CSI_0_CLK_P | 8     | CSI_1_CLK_P |
| 9     | CSI_0_CLK_N | 10    | CSI_1_CLK_N |
| 11    | GND         | 12    | GND         |
| 13    | CSI_0_D1_P  | 14    | CSI_1_D1_P  |
| 15    | CSI_0_D1_N  | 16    | CSI_1_D1_N  |
| 17    | GND         | 18    | GND         |
| 19    | CSI_2_D0_P  | 20    | CSI_3_D0_P  |
| 21    | CSI_2_D0_N  | 22    | CSI_3_D0_N  |
| 23    | GND         | 24    | GND         |
| 25    | CSI_2_CLK_P | 26    | CSI_3_CLK_P |

|    |              |    |              |
|----|--------------|----|--------------|
| 27 | CSI_2_CLK_N  | 28 | CSI_3_CLK_N  |
| 29 | GND          | 30 | GND          |
| 31 | CSI_2_D1_P   | 32 | CSI_3_D1_P   |
| 33 | CSI_2_D1_N   | 34 | CSI_3_D1_N   |
| 35 | GND          | 36 | GND          |
| 37 | CSI_4_D0_P   | 38 | CSI_6_D0_P   |
| 39 | CSI_4_D0_N   | 40 | CSI_6_D0_N   |
| 41 | GND          | 42 | GND          |
| 43 | CSI_4_CLK_P  | 44 | CSI_6_CLK_P  |
| 45 | CSI_4_CLK_N  | 46 | CSI_6_CLK_N  |
| 47 | GND          | 48 | GND          |
| 49 | CSI_4_D1_P   | 50 | CSI_6_D1_P   |
| 51 | CSI_4_D1_N   | 52 | CSI_6_D1_N   |
| 53 | GND          | 54 | GND          |
| 55 | NC           | 56 | NC           |
| 57 | NC           | 58 | NC           |
| 59 | CSI_5_D0_P   | 60 | CSI_7_D0_P   |
| 61 | CSI_5_D0_N   | 62 | CSI_7_D0_N   |
| 63 | GND          | 64 | GND          |
| 65 | CSI_5_CLK_P  | 66 | CSI_7_CLK_P  |
| 67 | CSI_5_CLK_N  | 68 | CSI_7_CLK_N  |
| 69 | GND          | 70 | GND          |
| 71 | CSI_5_D1_P   | 72 | CSI_7_D1_P   |
| 73 | CSI_5_D1_N   | 74 | CSI_7_D1_N   |
| 75 | I2C_GP3_CLK  | 76 | CAM_ERROR1   |
| 77 | I2C_GP3_DAT  | 78 | CAM_ERROR2   |
| 79 | GND          | 80 | GND          |
| 81 | AVDD_CAM_2V8 | 82 | AVDD_CAM_2V8 |

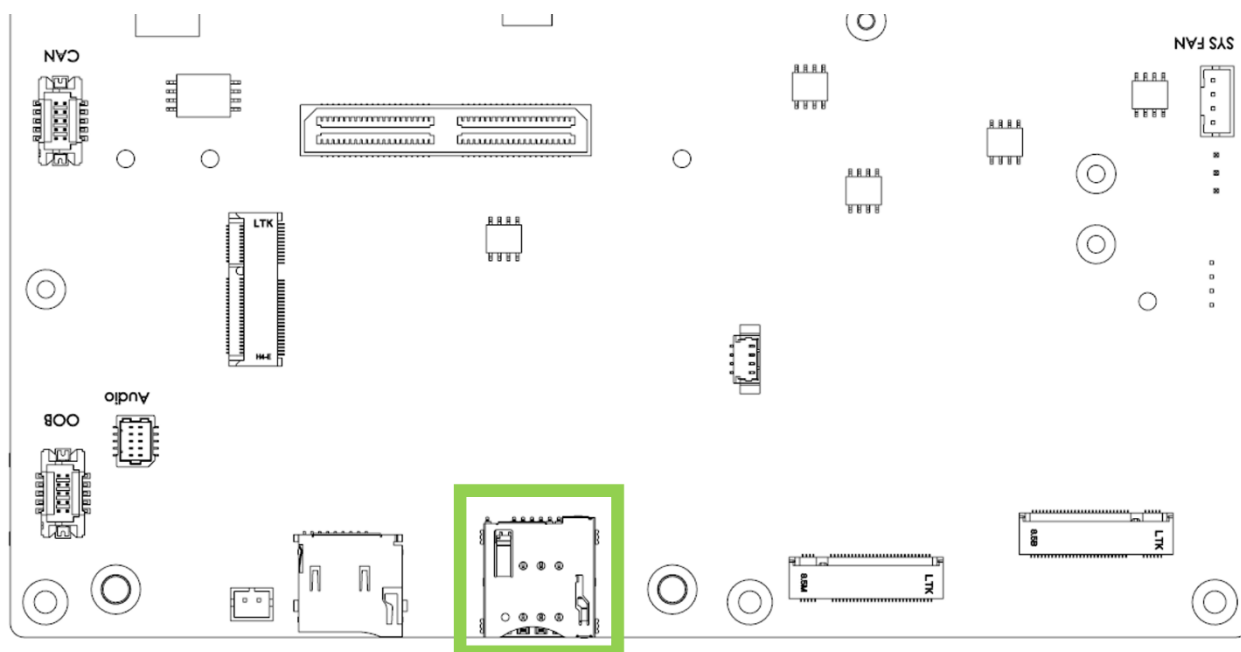
|     |                |     |                  |
|-----|----------------|-----|------------------|
| 83  | AVDD_CAM_2V8   | 84  | CAM_ERROR3       |
| 85  | CAM_FRSYNC1    | 86  | CAM_ERROR4       |
| 87  | I2C_GP2_CLK    | 88  | CAM1_MCLK03      |
| 89  | I2C_GP2_DAT    | 90  | GPIO15_CAM1_PWDN |
| 91  | CAM0_MCLK02    | 92  | GPIO16_CAM1_RST  |
| 93  | CAM0_PWDN      | 94  | CAM2_MCLK04      |
| 95  | CAM0_RST       | 96  | CAM_FRSYNC4      |
| 97  | CAM_FRSYNC3    | 98  | CAM_FRSYNC2      |
| 99  | GND            | 100 | GND              |
| 101 | NC             | 102 | VDD_1V8          |
| 103 | CAM_INT3       | 104 | CAM_INT4         |
| 105 | I2C_GP9_CLK    | 106 | CAM_INT2         |
| 107 | I2C_GP9_SDA    | 108 | VDD_3V3          |
| 109 | NC             | 110 | VDD_3V3          |
| 111 | NC             | 112 | NC               |
| 113 | NC             | 114 | NC               |
| 115 | GND            | 116 | GND              |
| 117 | CAM_INT1       | 118 | VDD_3V3          |
| 119 | CAM_VDD_SYS_EN | 120 | VDD_3V3          |

## ■ microSD Card Socket



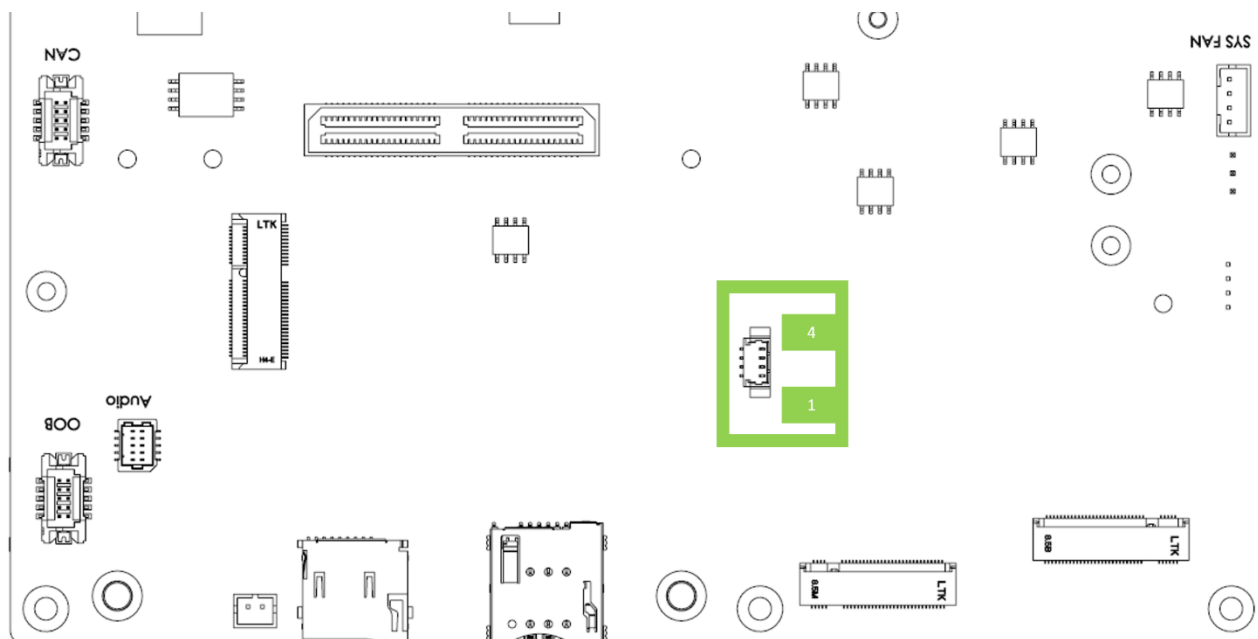
| Property             | Specification                 |
|----------------------|-------------------------------|
| Reference Designator | CN12                          |
| Connector            | microSD push-push card socket |

## ■ microSIM Card Socket



| Property             | Specification                  |
|----------------------|--------------------------------|
| Reference Designator | CN13                           |
| Connector            | microSIM push-push card socket |

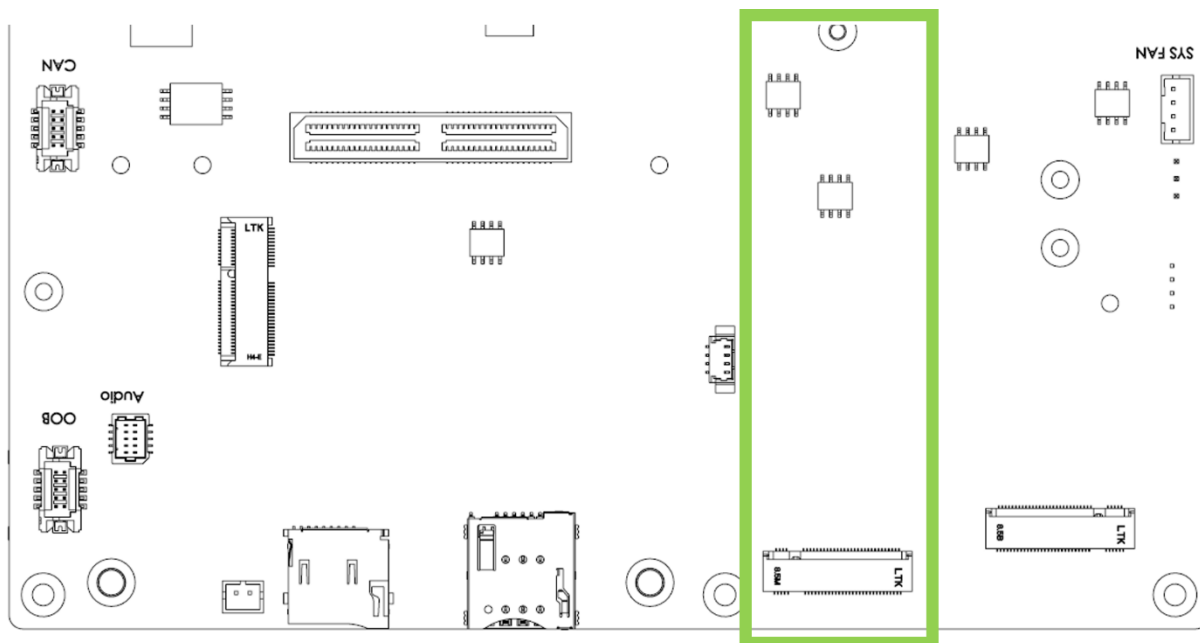
## ■ 1PPS Module function



| Property             | Specification                                       |
|----------------------|-----------------------------------------------------|
| Reference Designator | CN21                                                |
| Connector            | 1x4 Pin, 1.25 mm Pitch Wafer (Board-to-Wire Header) |
| Notes                | 1PPS input supports 1V8 to 3V3 logic levels         |

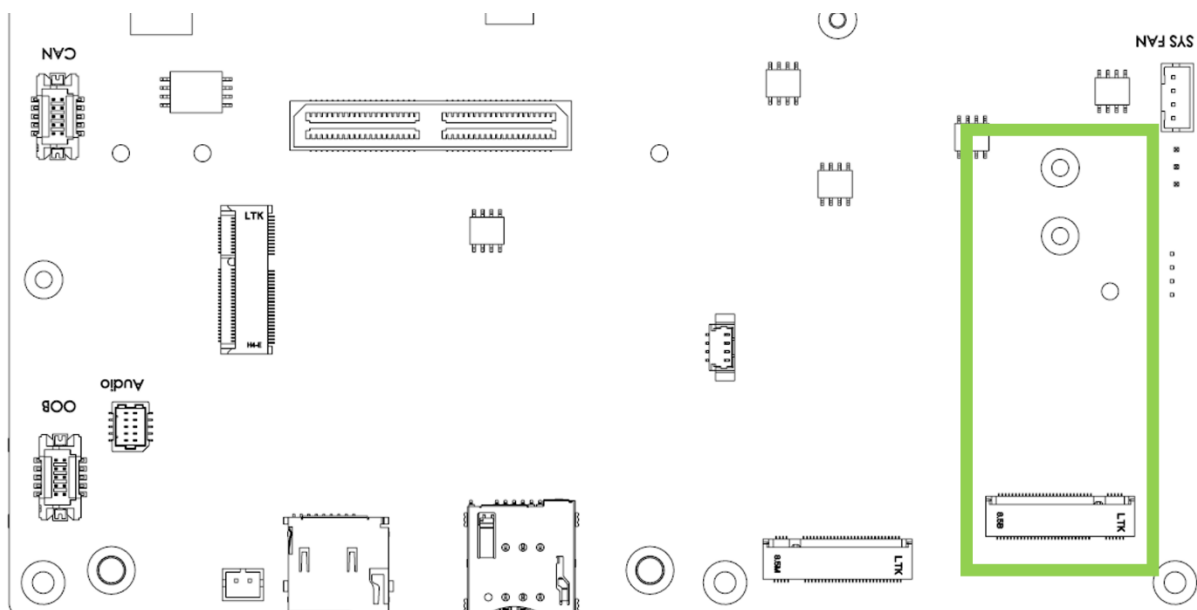
| Pin # | Signal    |
|-------|-----------|
| 1     | GND       |
| 2     | 1PPS_GPIO |
| 3     | NC        |
| 4     | NC        |

## ■ M.2 M-Key Connector



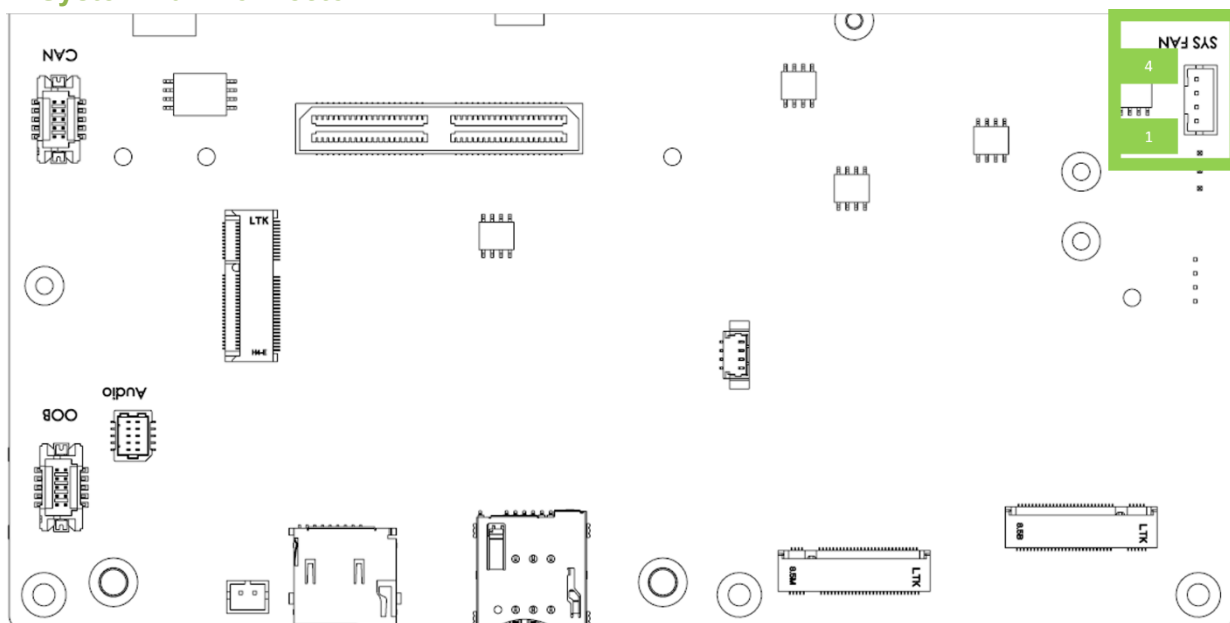
| Property             | Specification                                      |
|----------------------|----------------------------------------------------|
| Reference Designator | J8                                                 |
| Connector            | M.2 M-Key 2280                                     |
| Pinout               | Pin definition follows the M.2 M-Key specification |
| Interface            | PCIe Gen4 x4                                       |
| Notes                | Supports NVMe, PCIe Gen4 x4                        |

## ■ M.2 B-Key Connector



| Property             | Specification                                      |
|----------------------|----------------------------------------------------|
| Reference Designator | J7                                                 |
| Connector            | M.2 B-Key 3042/3052                                |
| Pinout               | Please refer to M.2 B-Key Standard                 |
| Pinout               | Pin definition follows the M.2 B-Key specification |
| Interface            | USB 2.0 / USB 3.2 Gen1                             |
| Notes                | Supports LTE / 4G / 5G                             |

## ■ System Fan Connector



| Property             | Specification                                      |
|----------------------|----------------------------------------------------|
| Reference Designator | CN4                                                |
| Connector            | 1x4 Pin, 2.0 mm Pitch Wafer (Board-to-Wire Header) |

| Pin # | Signal  |
|-------|---------|
| 1     | GND     |
| 2     | VCC_12V |
| 3     | NC      |
| 4     | PWM     |

## 2.4 Power Consumption

The power consumption shown as below is the theoretical value with AGX Orin module installed on

| Model Name | Condition    | Power Consumption (W) |
|------------|--------------|-----------------------|
| AIB-MX11   | Idle         | 10.5 W                |
|            | Full Loading | 85 W                  |
| AIB-MX12   | Idle         | 10.5 W                |
|            | Full Loading | 125 W                 |
| AIB-MX21   | Idle         | 12 W                  |
|            | Full Loading | 116 W                 |
| AIB-MX22   | Idle         | 12 W                  |
|            | Full Loading | 146 W                 |

\*Idle: Connect with Keyboard, Mouse and HDMI Display.

Full Loading: Connect with Keyboard, Mouse, HDMI Display, LAN ports with CPU and GPU 100% Loading.

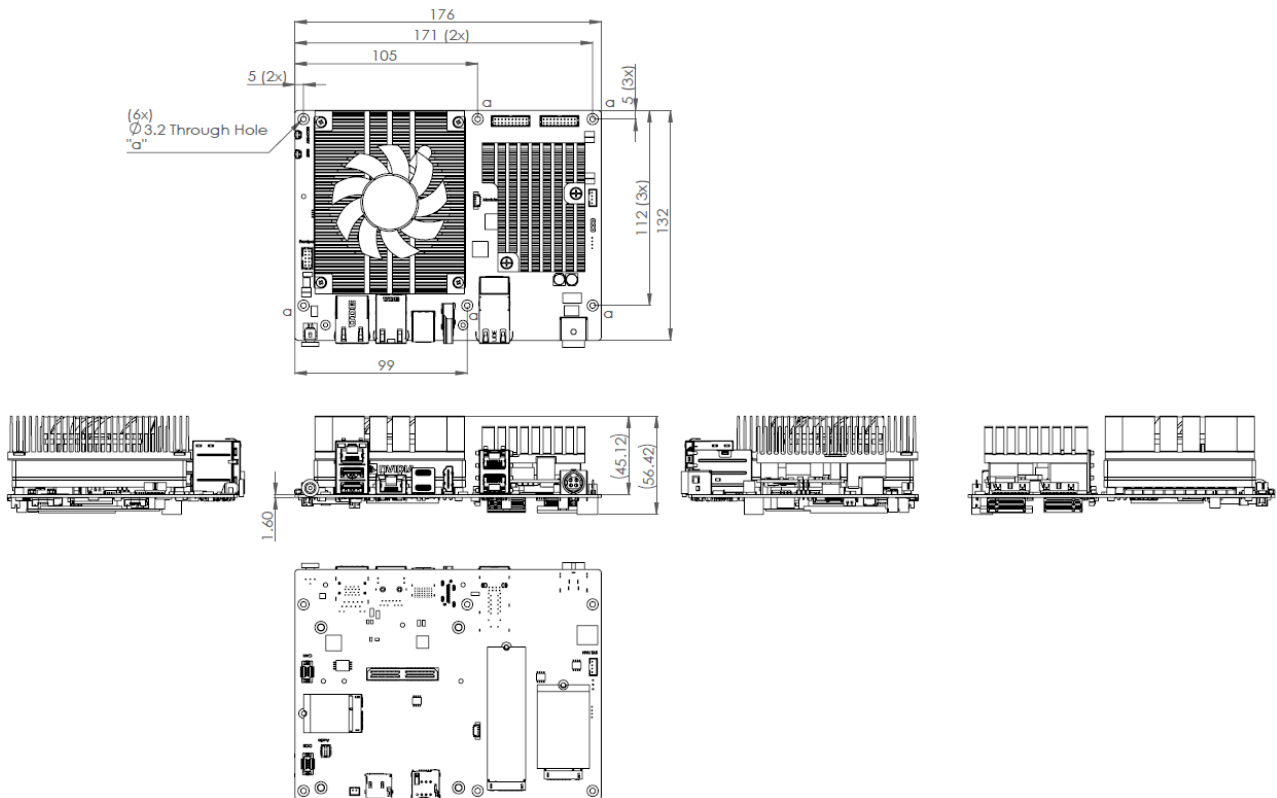
Please refer to the following power consumption of individual I/O interface according to your use case.

| Interface                      | Theoretical Max Power (W)     |
|--------------------------------|-------------------------------|
| USB 3.2 Gen1 Type A (per port) | 4.5 W                         |
| USB Type C                     | 4.5 W                         |
| HDMI                           | 0.25 W                        |
| M.2 E-KEY                      | 2 W                           |
| M.2 M-KEY                      | 7 W                           |
| M.2 B-KEY                      | 3 W                           |
| CAN BUS                        | 1 W                           |
| microSD Card                   | 0.72 W                        |
| RJ-45 (1G)                     | 0.83 W                        |
| RJ-45 (10G)                    | 3.43 W                        |
| PoE (per port)                 | 15 W (IEEE 802.3af compliant) |
| Module Fan                     | 2 W                           |

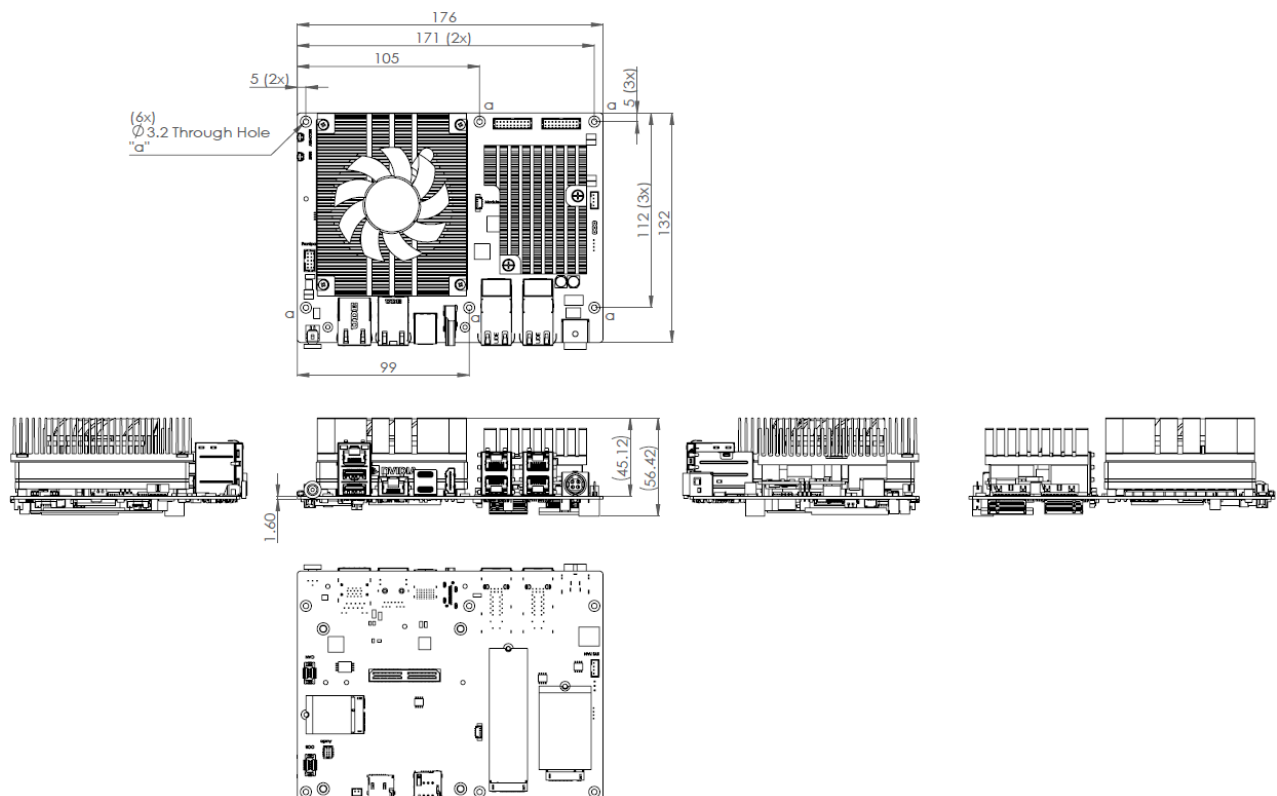
## 2.5 Mechanical Dimensions

Integration assembly drawing for AIB-MX11/12/21/22 carrier board, AGX Orin module and Fansink.

AIB-MX11 / AIB-MX21 System & Mounting Dimensions



AIB-MX12 / AIB-MX22 System & Mounting Dimensions



### 3. Software/BSP Installation

Aetina NVIDIA Jetson products have built-in BSP so the users don't have to install it after getting the products. Since we develop our own BSP, the users may need to follow the BSP installation SOP to re-install/upgrade/downgrade the BSP. Please visit the Aetina website or contact with Aetina FAE at [Tech\\_support@aetina.com](mailto:Tech_support@aetina.com) for installation guides, BSPs and technical tips.

### 4. Recovery Mode

The OTG Type-C port of AIB-MX11/12/21/22 can be connected to another host device (Linux PC running NVIDIA JetPack™) to run recovery process for re-flashing BSP.

Note: Please backup user personal files before flashing process

Connect the OTG Type-C port to another host device which supplying updated BSP file.

Press and hold the Reset button, then press and hold the Recovery button continually.

After one second (1 sec.) release the Reset button first, then release the Recovery button.

The AGX Orin will show up as a new NVIDIA device on USB list (Terminal console) at the host device.

Running re-flashing BSP process can be executed by the host device now.

## 5. Initial Setup

Before using AIB-MX11/12/21/22 series, please follow the steps below to have initial setup.

### 5.1 Prepare the materials

Please prepare the materials list below.

- A monitor with HDMI and respective cables
- USB keyboard and mouse
- Ethernet cable

### 5.2 Hardware connection

ATTENTION: Jetson AGX Orin module is not hot-pluggable. Before installing or removing the module, the main power supply (to power connector, CN19) must be disconnected and adequate time allowed for the various power rails to fully discharge.

For the initial setup, users will need to connect LAN port, keyboard and mouse via USB interface, HDMI interface, and power connector.

### 5.3 Setup details

Step 1: Connect to the monitor while powering off

Step 2: Power on and automatically enter the OS

Step 3: Log in to the Ubuntu OS via credentials below

- Username: nvidia
- Password: nvidia

For more information on how to use Ubuntu and NVIDIA Jetson modules, please visit Ubuntu and NVIDIA website.



**Aetina Corporation | Headquarters**

17F-1, No.237, Sec.1, Datong Rd., Xizhi Dist., New Taipei City 221, TAIWAN

Phone: +886-2-7709 2568

Fax : +886-2-7746 1102

Mail : [sales@aetina.com](mailto:sales@aetina.com)

[www.Aetina.com](http://www.Aetina.com)