

# USER'S MANUAL

## RCO-3000-RPL

Small Form Factor Computer



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## Prefaces

### Revision

| Revision | Description                                                      | Date       |
|----------|------------------------------------------------------------------|------------|
| 1.0      | Manual Released                                                  | 2026/02/06 |
| 1.1      | Intel® Core™ Series 2 (Bartlett Lake-S) & DDR5 Max. 48 GB Update | 2026/02/06 |

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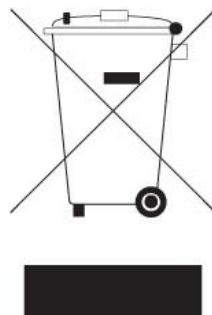
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### Environmental Protection Announcement

Do not dispose this electronic device into the trash while discarding. Please recycle to minimize pollution and ensure environment protection.



## Safety Precautions

Before installing and using the equipment, please read the following precautions:

- Put this equipment on a reliable surface during installation. Dropping it or letting it fall could cause damage.
- The power outlet shall be installed near the equipment and shall be easily accessible.
- Turn off the system power and disconnect the power cord from its source before making any installation. Be sure both the system and the external devices are turned OFF. Sudden surge of power could ruin sensitive components. Make sure the equipment is properly grounded.
- When the power is connected, never open the equipment. The equipment should be opened only by qualified service personnel.
- Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
- Disconnect this equipment from the power before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
- Avoid the dusty, humidity and temperature extremes.
- Do not place heavy objects on the equipment.
- If the equipment is not used for long time, disconnect it from the power to avoid being damaged by transient over-voltage.
- The storage temperature shall be above -30°C and below 85°C.
- The computer is provided with a battery-powered real-time clock circuit. There is a danger of explosion if incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.
- If one of the following situation arises, get the equipment checked by service personnel:
  - The power cord or plug is damaged.
  - Liquid has penetrated into the equipment.
  - The equipment has been exposed to moisture.
  - The equipment does not work well or it cannot work according to the user's manual.
  - The equipment has been dropped and damaged.
  - The equipment has obvious signs of breakage.

## Technical Support and Assistance

1. Visit the Premio Inc website at [www.premioinc.com](http://www.premioinc.com) where you can find the latest information about the product.
2. Contact your distributor, our technical support team or sales representative for technical support if you need additional assistance. Please have following information ready before you call:
  - Model name and serial number
  - Description of your peripheral attachments
  - Description of your software (operating system, version, application software, etc.)
  - A complete description of the problem
  - The exact wording of any error messages

## Conventions Used in this Manual



### WARNING

This indication alerts operators to an operation that, if not strictly observed, may result in severe injury.



### CAUTION

This indication alerts operators to an operation that, if not strictly observed, may result in safety hazards to personnel or damage to equipment.



### NOTE

This indication provides additional information to complete a task easily.

## Package Contents

Before installation, please ensure all the items listed in the following table are included in the package.

| Item | Description                                | Q'ty |
|------|--------------------------------------------|------|
| 1    | RCO-3000-RPL Series                        | 1    |
| 2    | Wall Mounting kit with Vibration Isolation | 1    |

## Ordering Information

| Model No.      | Product Description                                                                                                                          |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| RCO-3000-RPL   | SFF Computer w/ LGA 1700 for Intel® Core™ Processors (Series 2)/14th/13th/12th Gen Processors & Q670E PCH, 1x EBIO, 2x LAN                   |
| RCO-3000-RPL-P | SFF Computer w/ LGA 1700 for Intel® Core™ Processors (Series 2)/14th/13th/12th Gen Processors & Q670E PCH, 1x EBIO, 2x LAN, w/ Power Adapter |

## Optional Accessories

| Model No.   | Product Description                                                    |
|-------------|------------------------------------------------------------------------|
| 1-E09A12002 | Adapter AC/DC 24V 9.2A 220W with 3pin Terminal Block Plug 5.0mm Pitch  |
| 1-E09A22801 | Adapter AC/DC 24V 11.6A 280W with 3pin Terminal Block Plug 5.0mm Pitch |
| 1-TPCD00005 | Power Cord, 3-pin US Type, 180cm                                       |
| 1-TPCD00002 | Power Cord, European Type, 180cm                                       |
| 1-TPCD00001 | Power Cord, 3-pin UK Type, 180cm                                       |

## Chapter 1

# Product Introductions

## 1.1 Overview

The Advanced Fanless Embedded Systems RCO-3000-RPL series are designed with rich I/O, high flexibility and easy expansion capabilities which are ideal for diverse industrial applications. Support 12/13/14th Gen. Intel® Core™ processor, RCO-3000-RPL Series is an extreme features integration, outstanding system performance, versatile I/O connections, and rugged reliability fanless embedded systems. It offers dramatically enhanced CPU and graphics performance, wide power and feature advanced features, rich connectivity interfaces, wide range 9~48 VDC power input, and high reliability even operating in temperature extremes (-25°C to 70°C).

Rear Panel



Front Panel



## Key Features

- Intel® Core™ Processors (BTL, Series 2) / 14th / 13th / 12th Gen RPL/ADL Series, LGA1700 35W/45W
- Intel® Q670E Express Chipset
- 4x Independent Displays
- 2x Intel® 2.5GbE supporting Wake-on-LAN and PXE, 3x External SIM socket
- 2x 2.5" SATA SSD Bay (1x Internal) with RAID 0, 1, 5 support
- 1x M.2 E Key, 2230 (PCIe x1, USB 2.0)
- 1x M.2 B Key, 2242/3042/3052 (PCIe x2, or PCIe x1 & USB 3.2 Gen1; Support AI Module/NVMe Storage/4G/5G)
- 1x M.2 B Key, 2242/3042/3052 (PCIe x2 or SATA; Support AI Module/NVMe/SATA Storage/4G)
- 3x RS-232/422/485, 6x USB 3.2 Gen 2 (10 Gbps)
- 8x DI + 8x DO with isolation
- 9 to 48VDC Wide Range Power Input Supporting AT/ATX Mode
- Wide Operating Temperature (-25°C to 70°C)
- TPM 2.0 Supported

## 1.2 Hardware Specification

### System

#### Processors

Intel® Core™ Processors (BTL, Series 2) / 14th / 13th / 12th Gen RPL/ADL Series, LGA1700

| Intel Core Series 2<br>(Bartlett Lake-S)     | CPU Model             | 251TE (Core™ 7) | 221TE (Core™ 5) | 201TE (Core™ 3) |            |
|----------------------------------------------|-----------------------|-----------------|-----------------|-----------------|------------|
|                                              | P + E Cores           | 8P + 16E        | 6P + 8E         | 4P              |            |
|                                              | P-core Base Frequency | 1.4 GHz         | 1.8 GHz         | 2.9 GHz         |            |
|                                              | L3 Cache              | 36 MB           | 24 MB           | 12 MB           |            |
|                                              | Processor Base Power  | 45W             | 45W             | 45W             |            |
| Intel 14th Gen<br>(Raptor Lake-S<br>Refresh) | CPU Model             | i9-14900T       | i7-14700T       | i5-14500T       | i3-14100T  |
|                                              | Total Cores (P + E)   | 8P + 16E        | 8P + 12E        | 6P + 8E         | 4P         |
|                                              | P-core Base Frequency | 2.1 GHz         | 1.1 GHz         | 1.3 GHz         | 2.7 GHz    |
|                                              | L3 Cache              | 36 MB           | 33 MB           | 24 MB           | 12 MB      |
|                                              | Processor Base Power  | 35W             | 35W             | 35W             | 35W        |
| Intel 13th Gen<br>(Raptor Lake-S)            | CPU Model             | i9-13900TE      | i7-13700TE      | i5-13500TE      | i3-13100TE |
|                                              | Total Cores (P + E)   | 8P + 16E        | 8P + 8E         | 6P + 8E         | 4P         |
|                                              | P-core Base Frequency | 1.00 GHz        | 1.10 GHz        | 1.30 GHz        | 2.40 GHz   |
|                                              | L3 Cache              | 36 MB           | 30 MB           | 24 MB           | 12 MB      |
|                                              | Processor Base Power  | 35W             | 35W             | 35W             | 35W        |
| Intel 12th Gen<br>(Alder Lake-S)             | CPU Model             | i9-12900TE      | i7-12700TE      | i5-12500TE      | i3-12100TE |
|                                              | Total Cores (P + E)   | 8P + 8E         | 8P + 4E         | 6P              | 4P         |
|                                              | P-core Base Frequency | 1.10 GHz        | 1.40 GHz        | 1.90 GHz        | 2.10 GHz   |
|                                              | L3 Cache              | 30 MB           | 25 MB           | 18 MB           | 12 MB      |
|                                              | Processor Base Power  | 35W             | 35W             | 35W             | 35W        |

|                |                                                                                                                                                                                            |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| System Chipset | Intel® Q670E Express Chipset                                                                                                                                                               |
| LAN Chipset    | <ul style="list-style-type: none"> <li>2.5 GbE1: Intel I226 (Support Wake-on-LAN and PXE, Support TSN)</li> <li>2.5 GbE2: Intel I226 (Support Wake-on-LAN and PXE, Support TSN)</li> </ul> |
| Audio Codec    | Realtek ALC888S                                                                                                                                                                            |
| System Memory  | 1x DDR5 4800/5600 MT/s SO-DIMM Max. 48GB                                                                                                                                                   |
| Graphics       | Integrated Intel® UHD Graphics 770/730                                                                                                                                                     |
| BIOS           | AMI 256Mbit SPI BIOS                                                                                                                                                                       |
| Watchdog       | Software Programmable Supports 1~255 sec. System Reset                                                                                                                                     |
| AI Accelerator | Supports up to 2x Hailo-8™ modules                                                                                                                                                         |
| TPM            | TPM 2.0                                                                                                                                                                                    |

## Storage

|         |                                                                                                                                                              |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SSD/HDD | <ul style="list-style-type: none"> <li>1x 9mm 2.5" SATA SSD Bay (Internal)</li> <li>1x 7mm 2.5" SATA SSD Bay (Hot-swappable)</li> </ul> Support RAID 0, 1, 5 |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Display

|                  |                                                                                                                 |
|------------------|-----------------------------------------------------------------------------------------------------------------|
| Display Port     | 4x DisplayPort 1.4a, support resolution 4096 x 2304, Up to 7680 x 4320<br>(1x DP Port Co-layout HDMI Connector) |
| HDMI             | Yes, Shared by 1x DP port                                                                                       |
| Multiple Display | 4x Independent Displays                                                                                         |

## I/O

|        |                                                                                                                                                                                              |
|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Audio  | 1x Line-out                                                                                                                                                                                  |
| CAN    | 2x CAN 2.0 A/B 2-pin Internal header                                                                                                                                                         |
| COM    | 3x RS-232/422/485;<br>2x RS-232/422/485 Internal header                                                                                                                                      |
| DIO    | 8 in / 8 out (Isolated)                                                                                                                                                                      |
| LAN    | 2x 2.5GbE RJ45                                                                                                                                                                               |
| USB    | 6x USB 3.2 Gen 2 (10Gbps)                                                                                                                                                                    |
| Others | 5x WiFi Antenna Holes<br>1x Power Switch, 1x AT/ATX Switch<br>1x Remote Power On/Off<br>1x PC/Car Mode Switch<br>1x Delay Time Switch<br>1x Clear CMOS Switch<br>1x Mic In Header (Internal) |

## Power

|                        |                                                                                      |
|------------------------|--------------------------------------------------------------------------------------|
| Power Adaptor          | Optional AC/DC 24V/9.2A, 220W<br>Optional AC/DC 24V/11.67A, 280W                     |
| Power Mode             | AT, ATX (ATX Default)                                                                |
| Power Ignition Sensing | Power Ignition Management                                                            |
| Power Supply Voltage   | 9~48VDC                                                                              |
| Power Connector        | 3-pin Terminal Block                                                                 |
| Power Protection       | OVP (Over Voltage Protection)<br>OCP (Over Current Protection)<br>Reverse Protection |

## Operating System

|         |                  |
|---------|------------------|
| Windows | Windows 10/11    |
| Linux   | Linux kernel 5.x |

## Expansion

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| M.2 B-Key         | 1x M.2 B key Type: 2242/3042/3052 <ul style="list-style-type: none"> <li>• Support PCIe x2/PCIe x1 &amp; USB 3.2 Gen1</li> <li>• Support NVMe Storage/Hailo AI Module/4G/5G</li> </ul> 1x M.2 B key Type: 2242/3042/3052 <ul style="list-style-type: none"> <li>• Support PCIe x2/SATA signal</li> <li>• Support NVMe/SATA Storage/4G</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                        |
| M.2 E-Key         | 1x M.2 E key slot (2230) <ul style="list-style-type: none"> <li>• Support PCIe x1 &amp; USB 2.0; Support CNVi</li> <li>• Support Wifi Module</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| SIM Socket        | 1x External Standard SIM socket<br>1x External Dual Nano SIM socket                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Expansion Modules | Occupied One Universal I/O Slot: <ul style="list-style-type: none"> <li>• 4-port 1GbE module with Intel® I350 Chipset, RJ-45 or M12 connector (PoE optional)</li> <li>• 2-Port 10GbE RJ45 with Intel X710 Chipset</li> <li>• 4-Port USB with Renesas uPD720201K8 host controller (share PCIe Gen2 x1 bandwidth)</li> <li>• 1x RJ45 port for OOB Management Module</li> <li>• 1x M.2 M-Key (PCIe x4 Lane, 2242/2260) for NVMe/AI Module</li> <li>• 2x M.2 B-Key 2242/3042/3052:               <ul style="list-style-type: none"> <li>- 2x M.2 (PCIe x2 Lane) for NVMe/up to 1x AI Module or</li> <li>- 1x M.2 (PCIe x2 Lane) for NVMe/AI Module and 1x M.2 (PCIe x1 Lane + USB 3.2 Gen 1) for 4G/5G Module, 1x External SIM socket (M.2 attached)</li> </ul> </li> </ul> |

## Environment

|                   |                                                                                          |
|-------------------|------------------------------------------------------------------------------------------|
| Operating Temp.   | -25°C to 70°C (35W/45W CPU)                                                              |
| Storage Temp.     | -30°C to 85°C                                                                            |
| Relative Humidity | 10% to 95% (non-condensing)                                                              |
| Vibration         | With HDD: 1 Grms (5 - 500 Hz, 0.5 hr/axis)<br>With SSD: 5 Grms (5 - 500 Hz, 0.5 hr/axis) |
| Shock             | With SSD: 50G half-sin 11ms                                                              |
| Certification     | UL, CE, FCC Class A,<br>EMC Conformity with EN50155 & EN50121-3-2                        |

## Physical

|              |                                            |
|--------------|--------------------------------------------|
| Construction | Extruded Aluminum with Heavy Duty Metal    |
| Dimension    | 192 (W) x 227 (D) x 69.5 (H) mm            |
| Weight       | 5KG - 5.4KG                                |
| Mounting     | Wall Mounting kit with Vibration Isolation |

## 1.3 System I/O

### RCO-3000-RPL

#### Rear Panel

##### DP/HDMI port

Used to connect a DP/HDMI monitor or connect optional split cable for dual display mode

##### Digital I/O Terminal Block

The Digital I/O terminal block supports 8 digital input and 8 digital output

##### DisplayPort

Used to connect a DisplayPort monitor

##### COM port

COM1 ~ COM3 support RS232/422/485 serial device

##### USB 3.2 Gen 2 Port

Used to connect USB 3.2 Gen 2

##### LAN port

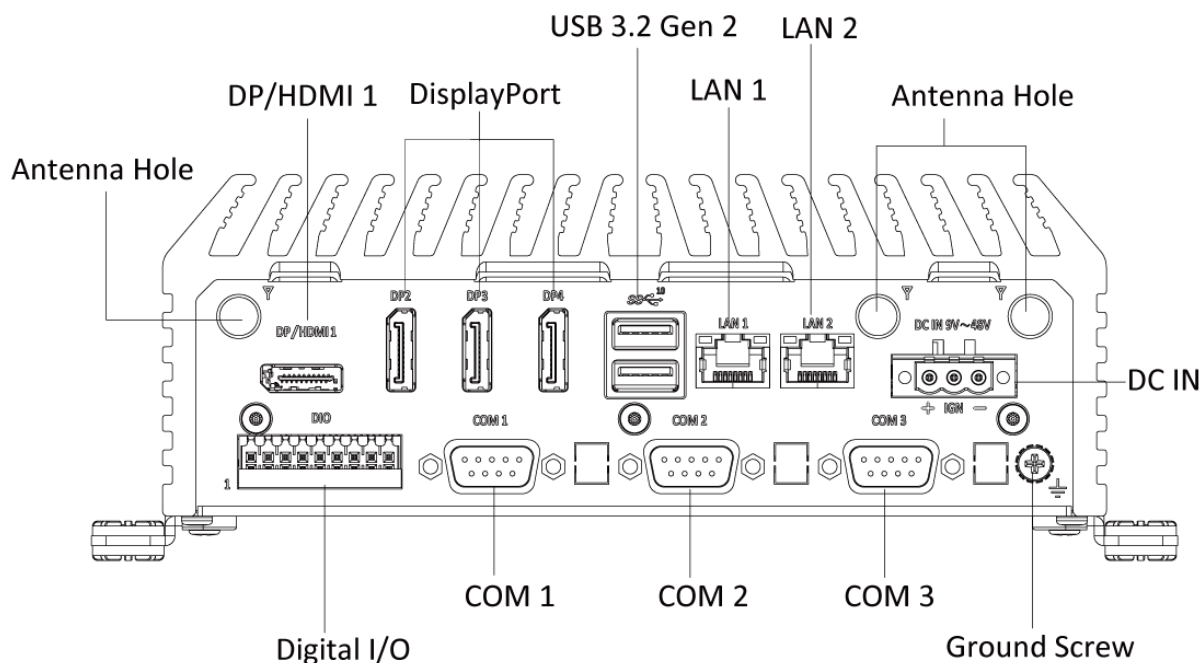
Used to connect the system to a local area network

##### Antenna hole

Used to connect an antenna for optional Mini-PCIe WiFi module

##### DC IN

Used to plug a DC power input with terminal block



Rear Panel

## RCO-3000-RPL

### Front Panel

#### ATX power on/off switch

Press to power-on or power-off the system

#### Power LED

Indicates the power status of the system

#### HDD LED

Indicates the status of the hard drive

#### Antenna hole

Used to connect an antenna for optional Mini-PCIe WiFi module

#### USB 3.2 Gen 2 port (10 Gbps)

Used to connect USB 3.2 device

#### Removable HDD

Removable 2.5" SATA HDD Bay  
(support H=7mm, hot-swappable)  
Support RAID 0, 1, 5

#### AT/ATX mode select switch

Used to select AT or ATX power mode

#### Remote Power on/off Terminal Block

Used to plug a remote power on/off terminal block

#### PC/Car mode select switch

Used to select PC or Car mode

#### Clear CMOS

Used to clear CMOS

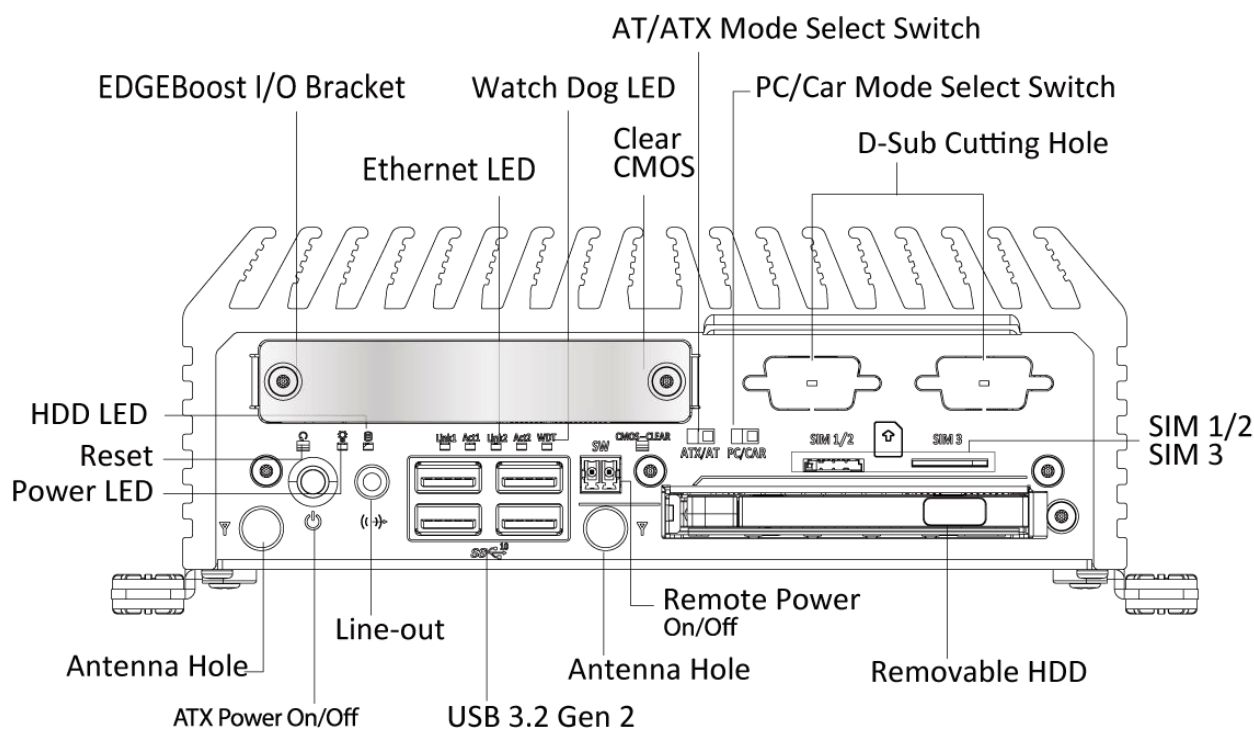
#### Line-out

Used to connect a speaker

#### SIM card

Used to insert SIM card

#### EDGEBoost I/O bracket (optional)

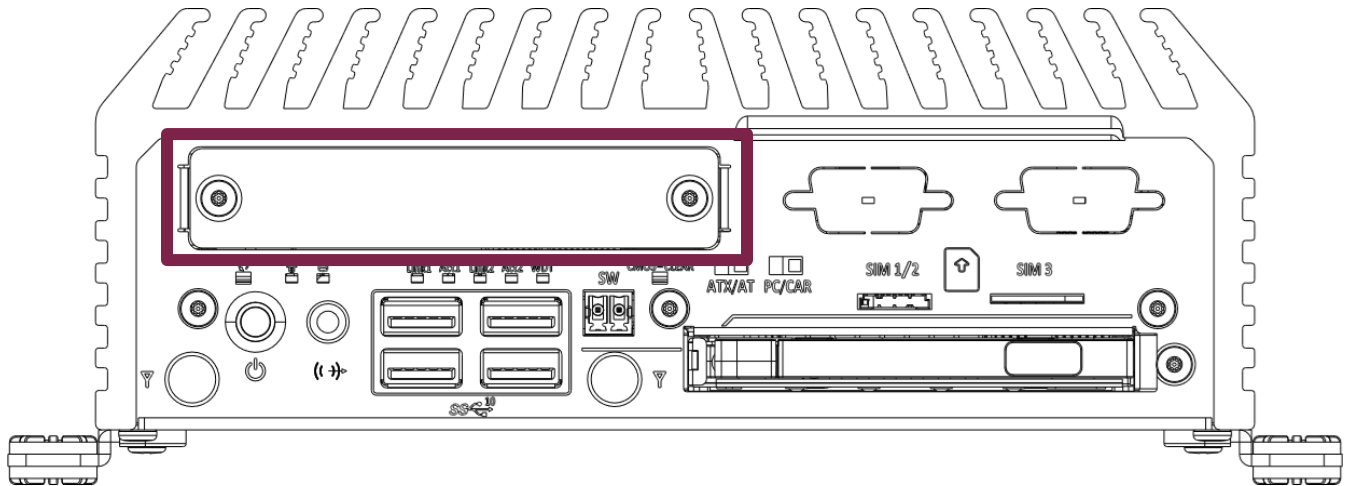


Front Panel

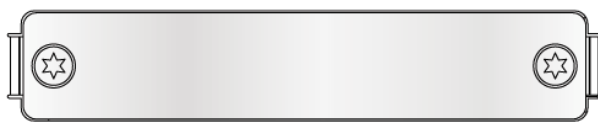
### 1.3.1 EDGEBoost I/O Bracket [EBIO]

#### Model No :

- RCO-3000-RPL-4L
- RCO-3000-RPL-4LM12
- RCO-3000-RPL-4P
- RCO-3000-RPL-4PM12
- RCO-3000-RPL-D10G
- RCO-3000-RPL-4U3
- RCO-3000-RPL-2M2BK
- RCO-3000-RPL-M2MK



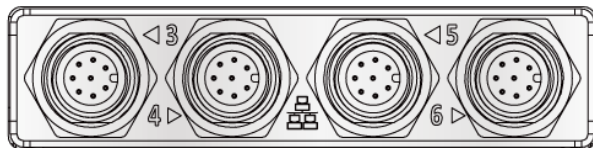
### Available EDGEBoost I/O



1x M.2 M-Key (4-Lane)



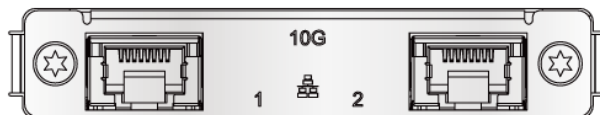
2x M.2 B-Key (1x 5G SIM)  
(Right Universal Slot Only)



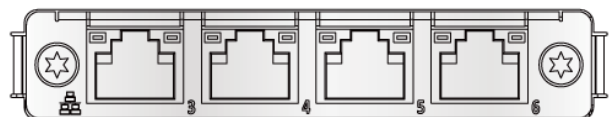
4x M12 LAN/POE Ports



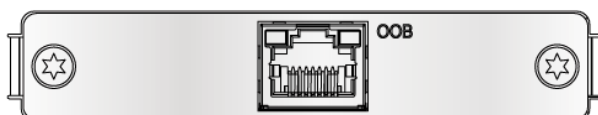
4x USB 3.0 Ports



2x 10GbE LAN Ports



4x RJ45 LAN/POE Ports

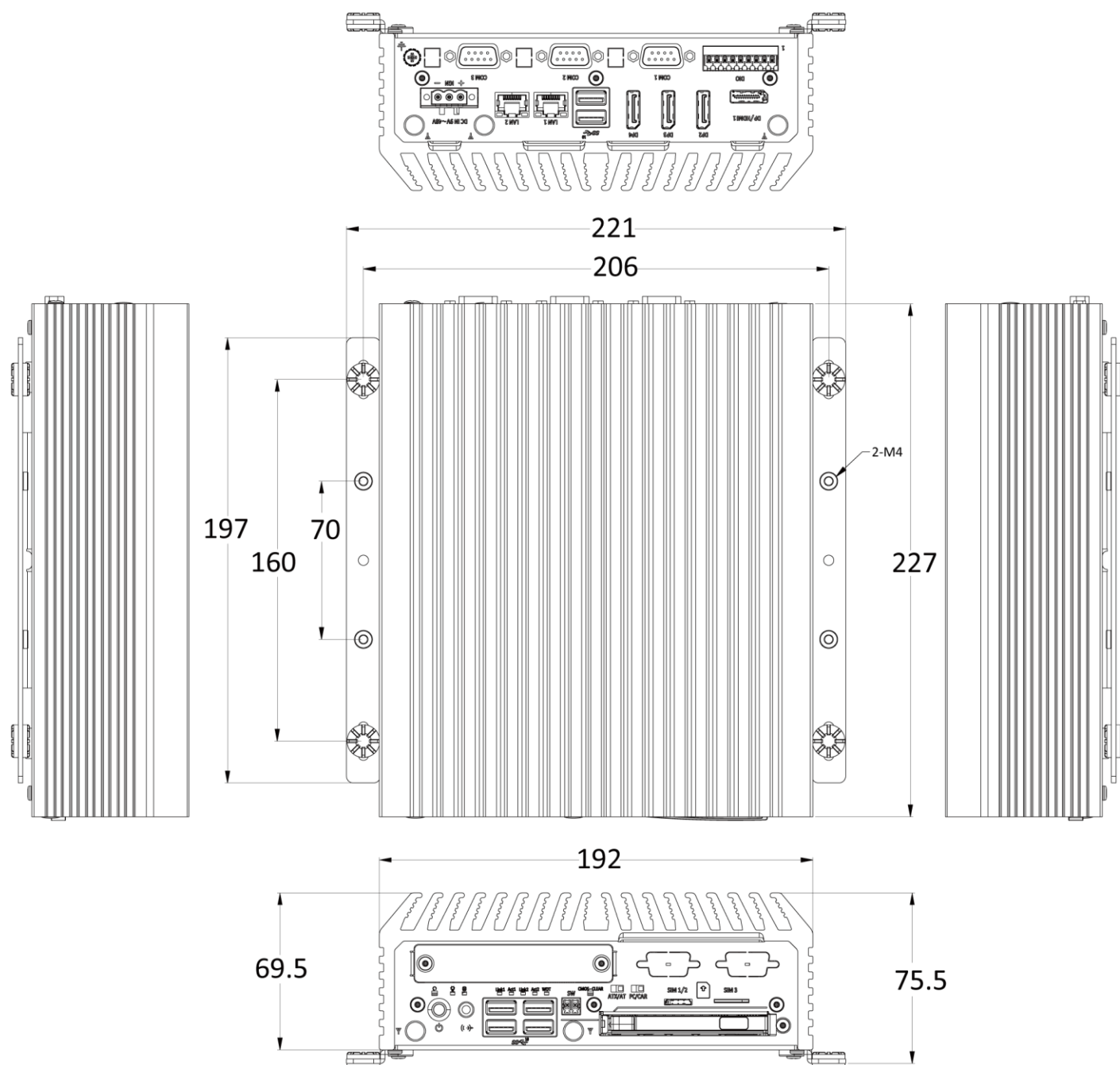


1x RJ45 Remote Management

## 1.4 Mechanical Dimensions

# RCO-3000-RPL

Unit: mm

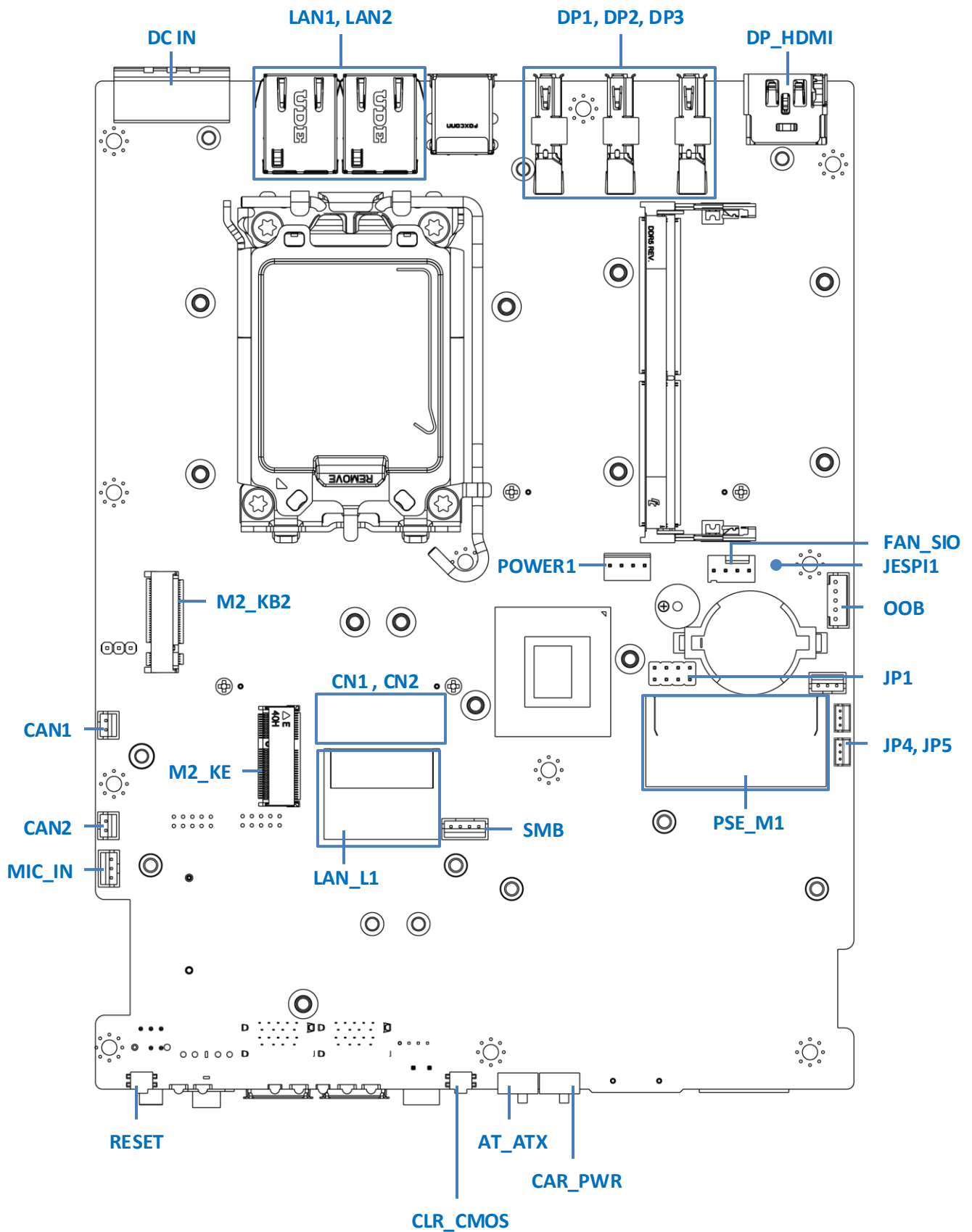


## Chapter 2

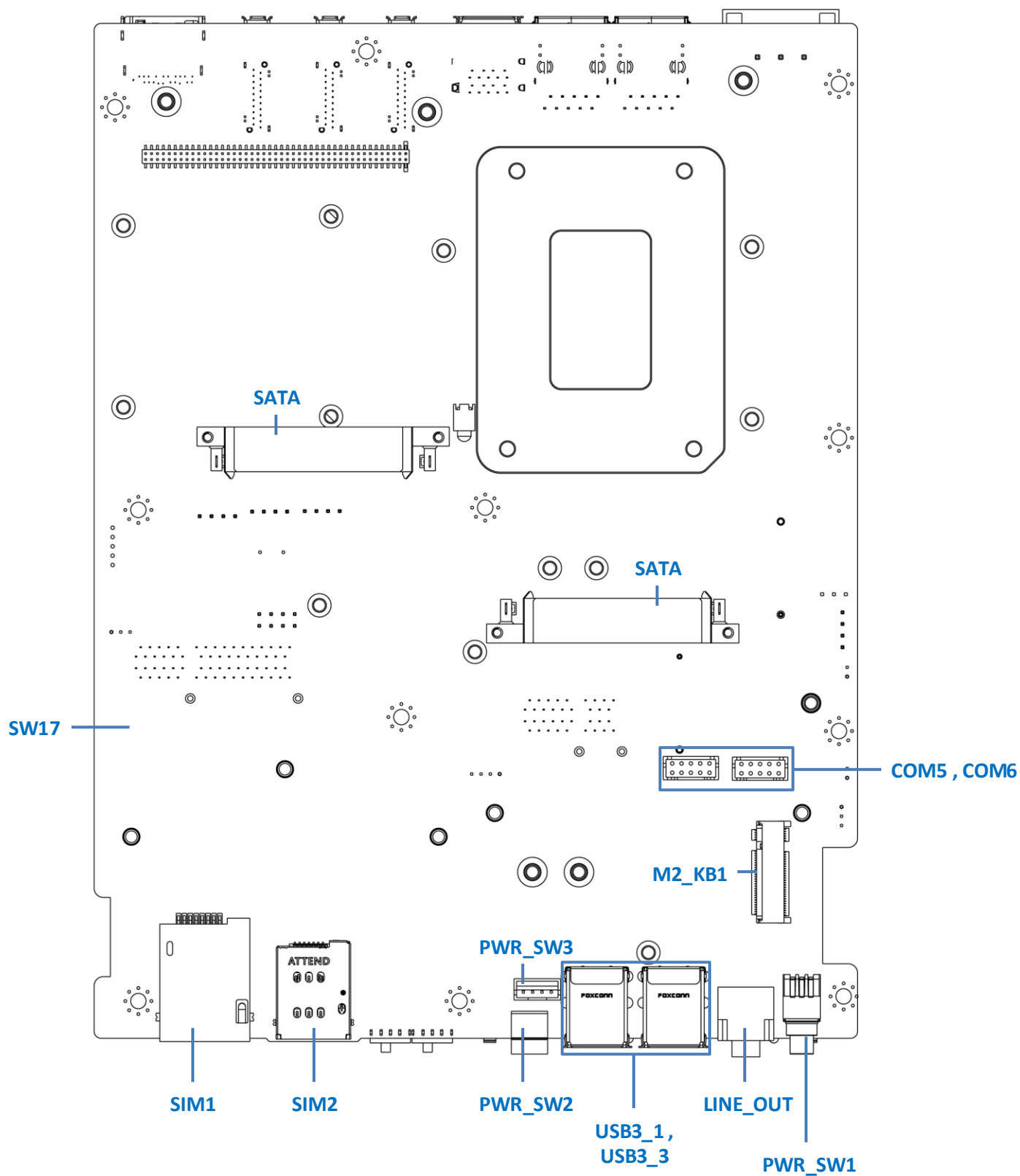
# Mechanical Specifications

## 2.1 Switch and Connector Locations

### 2.1.1 Top View



## 2.1.2 Bottom View

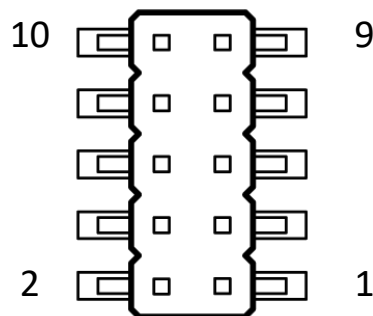
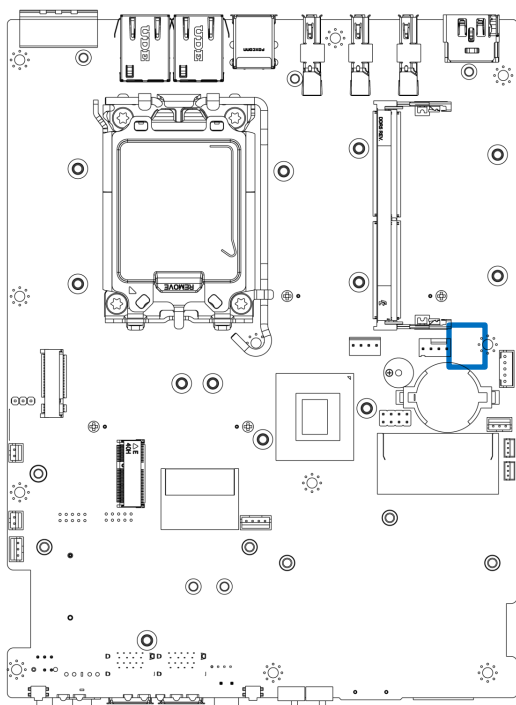


## 2.2 Connector / Switch Definition

| Connector Location | Definition                              |
|--------------------|-----------------------------------------|
| AT_ATX             | AT / ATX Power Mode Switch              |
| PWR_SW 1~3         | Power Switch                            |
| RESET              | Reset Switch                            |
| DC_IN              | 3-pin DC +9V~48V Power Input Connector  |
| DIO1               | 8DI / 8DO Connector                     |
| COM 1/2/3/5/6      | RS232 / RS422 / RS485 Connector         |
| DP 1~3             | DP Connector                            |
| DP_HDMI            | DP / HDMI Connector                     |
| LAN 1~2            | LAN Connector                           |
| FAN_SIO            | Smart FAN Connector                     |
| Power1             | +12V / +5V Power Connector              |
| USB3_1~3           | USB 3 Gen2 , USB 3 Gen1 , USB2.0        |
| CN 1 ~2            | USB 3 Gen1 , USB2.0                     |
| SIM 1~2            | SIM Card Socket                         |
| CAR_PWR            | PC mode / CAR mode select               |
| MIC                | Mic-in Connector                        |
| LINE_OUT           | LINE-OUT Jack                           |
| LAN_L1             | PCIe x4 Slot                            |
| M2_KB1             | M.2 B Key Socket for PCIe / SATA        |
| M2_KB2             | M.2 B Key Socket for PCIe / USB3        |
| M2_KE              | M.2 E Key Socket for PCIe / CNVI        |
| PWR_LED            | Power LED Status                        |
| HDD_LED            | HDD Access LED Status                   |
| WDT_LED            | Watchdog LED Status                     |
| SATA 1~2           | SATA with Power Connector               |
| OOB                | OOB control signal                      |
| JP4                | OOB Auto Link                           |
| JP5                | OOB Remote Debug port                   |
| SW17               | COM1 or OOB Remote Debug port selection |

## 2.3 I/O Interface Descriptions

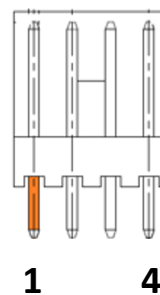
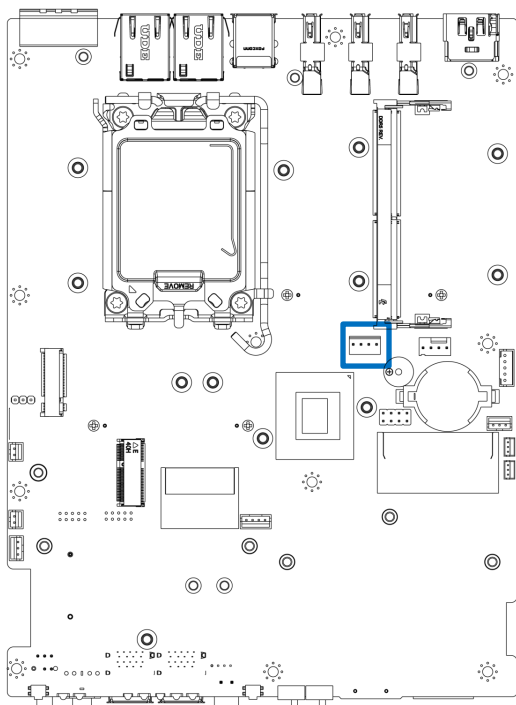
### 2.3.1 ESPI Debug Con



#### JESPI1

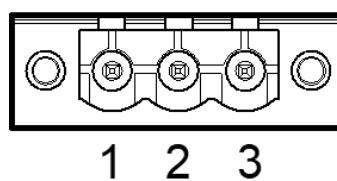
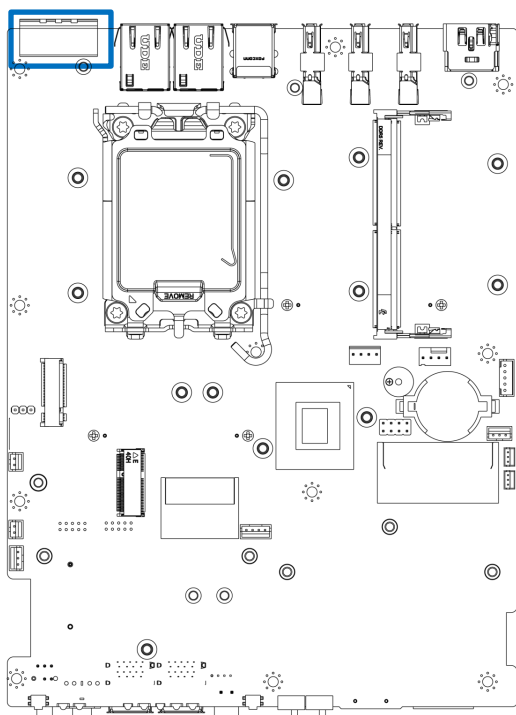
| Pin | Signal    | Pin | Signal      |
|-----|-----------|-----|-------------|
| 1   | ESPI_IO_0 | 2   | 3.3V        |
| 3   | ESPI_IO_1 | 4   | ESPI_RESET# |
| 5   | ESPI_IO_2 | 6   | ESPI_CS#    |
| 7   | ESPI_IO_3 | 8   | ESPI_CLOCK  |
| 9   | N/A       | 10  | GND         |

### 2.3.2 Power Con



**POWER1**

| Pin | Signal |
|-----|--------|
| 1   | +5V    |
| 2   | GND    |
| 3   | GND    |
| 4   | +12V   |

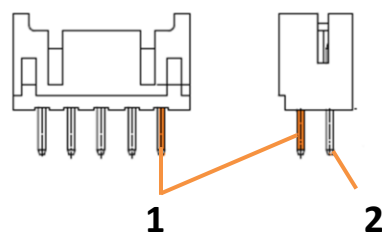
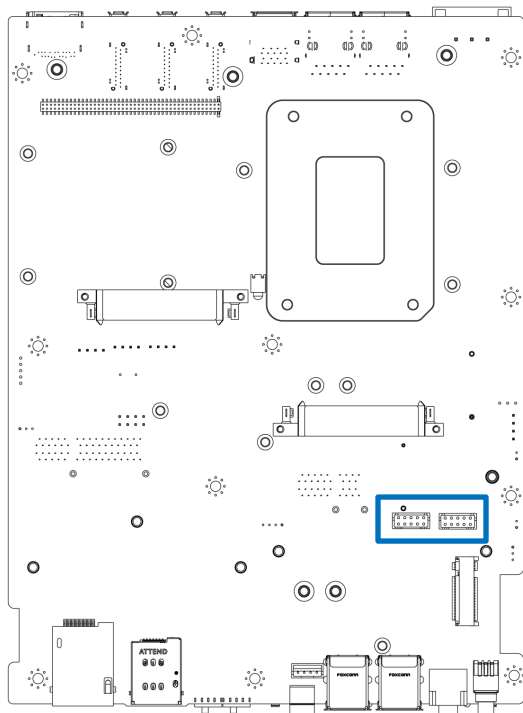


**DC IN : +9V ~ +48V**

**3-pin DC Power Input Connector**

| Pin | Signal     |
|-----|------------|
| 1   | +9V ~ +48V |
| 2   | IGN        |
| 3   | GND        |

### 2.3.3 COM Con

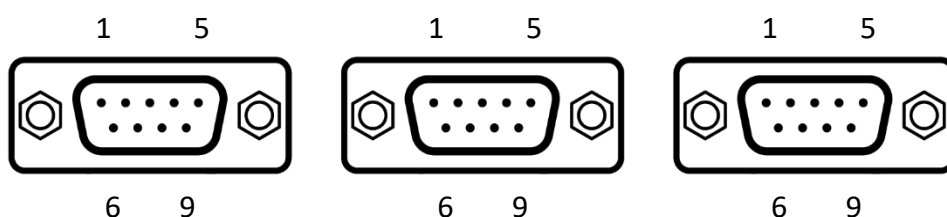
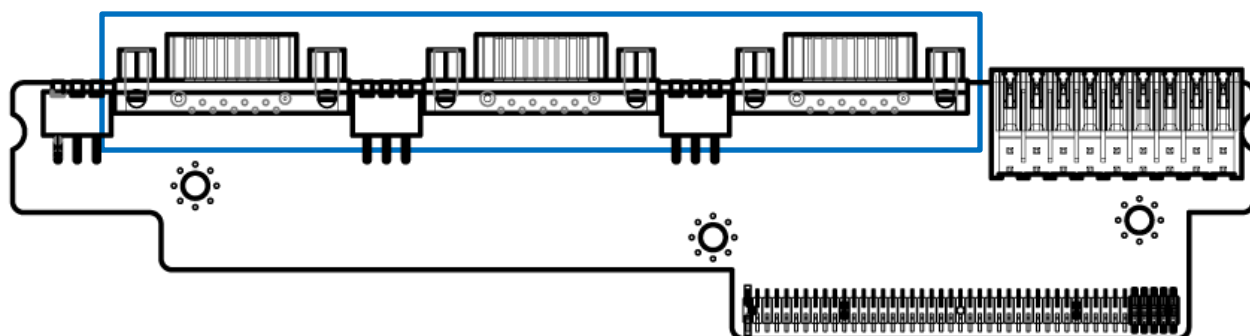


#### COM5 , COM6

| Pin | Signal | Pin | Signal |
|-----|--------|-----|--------|
| 1   | DCD#   | 2   | DSR#   |
| 3   | RXD    | 4   | RTS#   |
| 5   | TXD    | 6   | CTS#   |
| 7   | DTR#   | 8   | RI#    |
| 9   | GND    | 10  | GND    |

RS232 / RS422 / RS485 Connector 2x5 10-pin box header, 2.0mm pitch

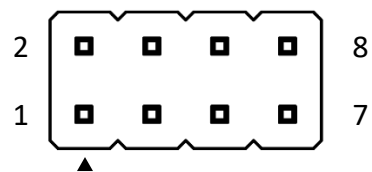
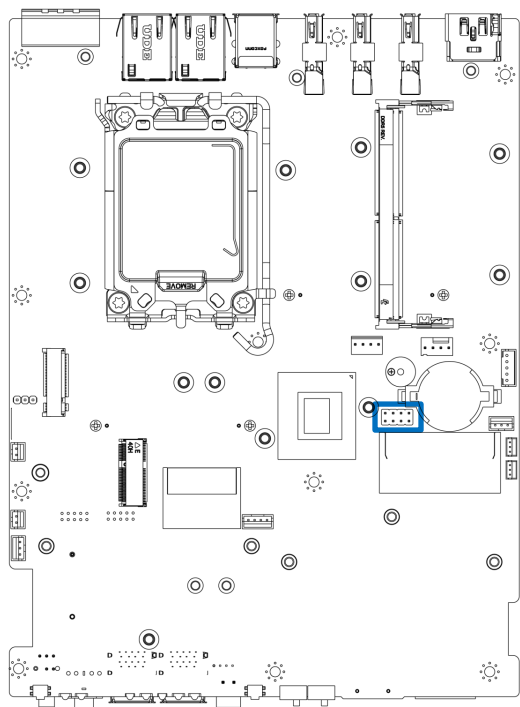
| Pin | RS232 Definition | RS422 / 485 Full Duplex Definition | RS485 Half Duplex Definition |
|-----|------------------|------------------------------------|------------------------------|
| 1   | DCD#             | TX-                                | DATA-                        |
| 2   | DSR#             |                                    |                              |
| 3   | RxD              | TX+                                | DATA+                        |
| 4   | RTS#             |                                    |                              |
| 5   | TxD              | RX+                                |                              |
| 6   | CTS#             |                                    |                              |
| 7   | DTR#             | RX-                                |                              |
| 8   | RI#              |                                    |                              |
| 9   | GND              | GND                                | GND                          |
| 10  | GND              | GND                                | GND                          |

**COM1 , COM2 , COM3****COM1\_2\_3**

RS232 / RS422 / RS485 Connector Type: 9-pin D-Sub

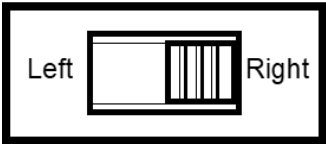
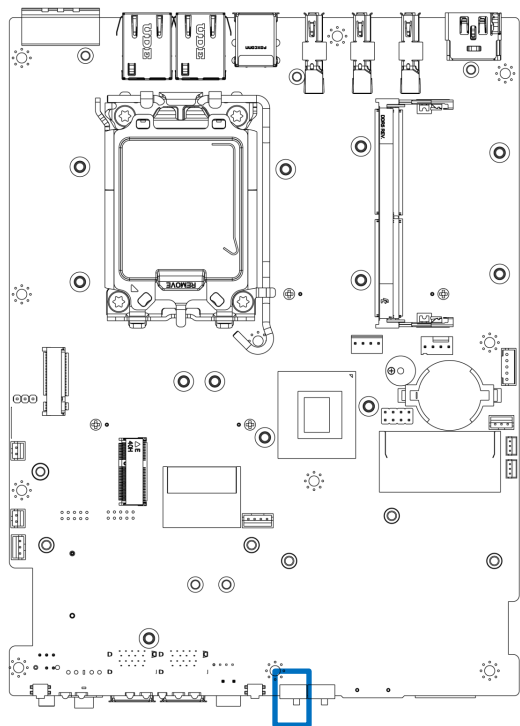
| Pin | RS232 Definition | RS422 / 485 Full Duplex Definition | RS485 Half Duplex Definition |
|-----|------------------|------------------------------------|------------------------------|
| 1   | DCD#             | TX-                                | DATA-                        |
| 2   | RxD              | TX+                                | DATA+                        |
| 3   | TxD              | RX+                                |                              |
| 4   | DTR#             | RX-                                |                              |
| 5   | GND              | GND                                | GND                          |
| 6   | DSR#             |                                    |                              |
| 7   | RTS#             |                                    |                              |
| 8   | CTS#             |                                    |                              |
| 9   | RI#              |                                    |                              |

2.3.4 SF100 SPI Con



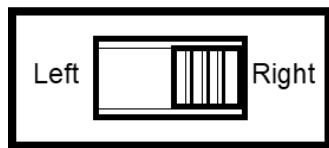
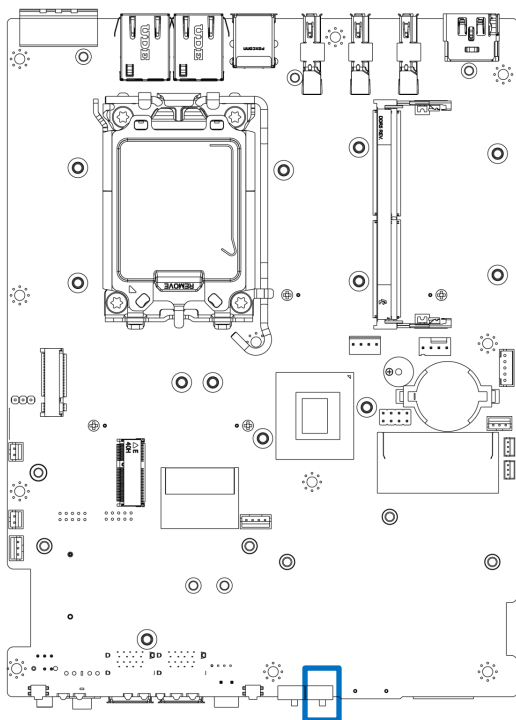
JP1

| Pin | Signal       | Pin | Signal    |
|-----|--------------|-----|-----------|
| 1   | Power ( 3V ) | 2   | GND       |
| 3   | CS#          | 4   | CLK       |
| 5   | MISO         | 6   | MOSI      |
| 7   | NC           | 8   | SPI_GATE# |



AT\_ATX  
AT / ATX Power Mode Switch

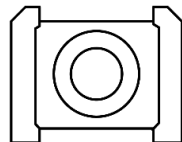
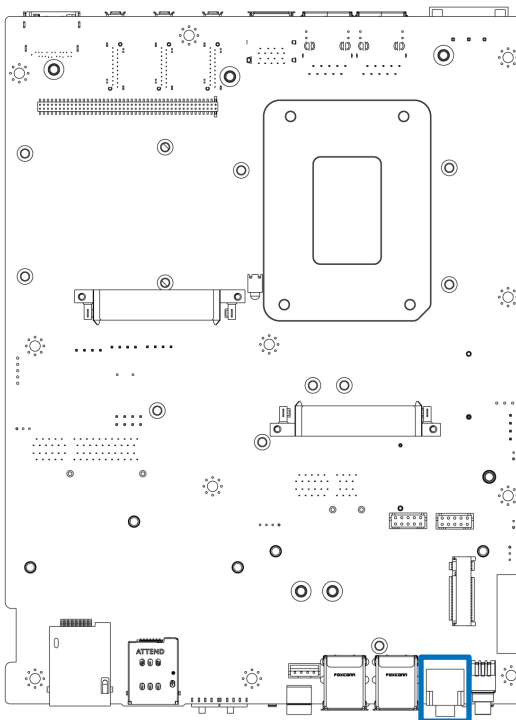
| Switch      | Definition               |
|-------------|--------------------------|
| 1-2 (Left)  | ATX Power Mode (Default) |
| 2-3 (Right) | AT Power Mode            |



**CAR\_PWR**

PC / Car Mode Switch

| Switch      | Definition                 |
|-------------|----------------------------|
| 1-2 (Left)  | PC Power Mode<br>(Default) |
| 2-3 (Right) | Power Ignition Mode        |

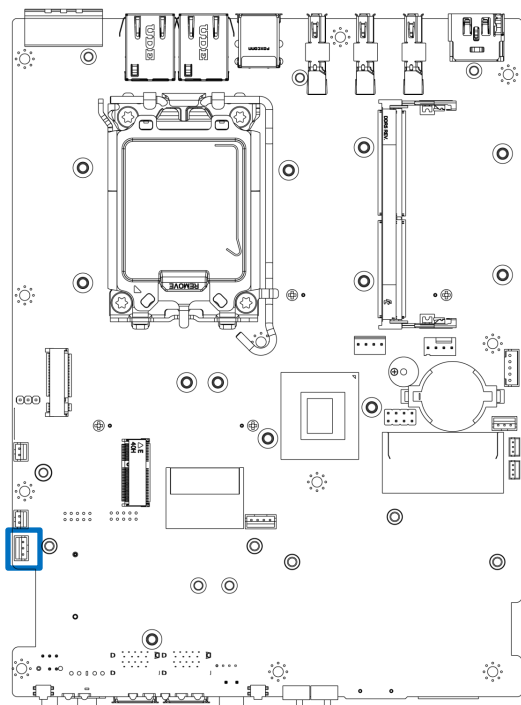


**LINE\_OUT**

Line-out Jack (Green) Connector Type:  
5-pin Phone Jack

| Pin | Definition |
|-----|------------|
| 1   | GND        |
| 2   | OUT_R      |
| 3   | GND        |
| 4   | GND        |
| 5   | OUT_L      |

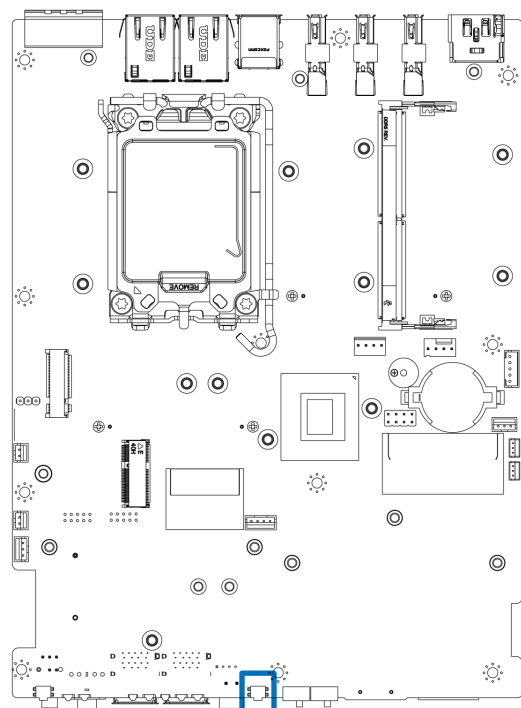
## Mic-in Connector



**MIC\_IN**

| Pin | Definition |
|-----|------------|
| 1   | MICIN_L    |
| 2   | GND        |
| 3   | MICIN_R    |

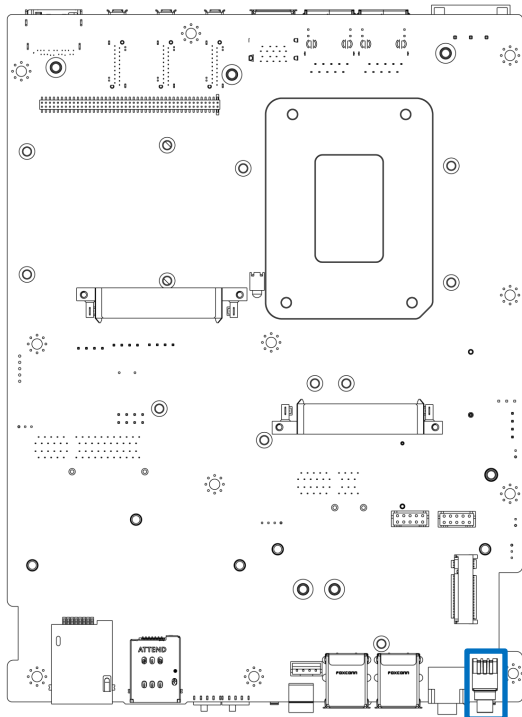
## Clear BIOS Switch



**CLR\_CMOS**

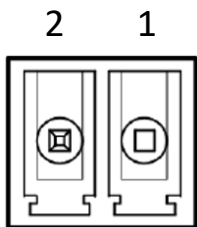
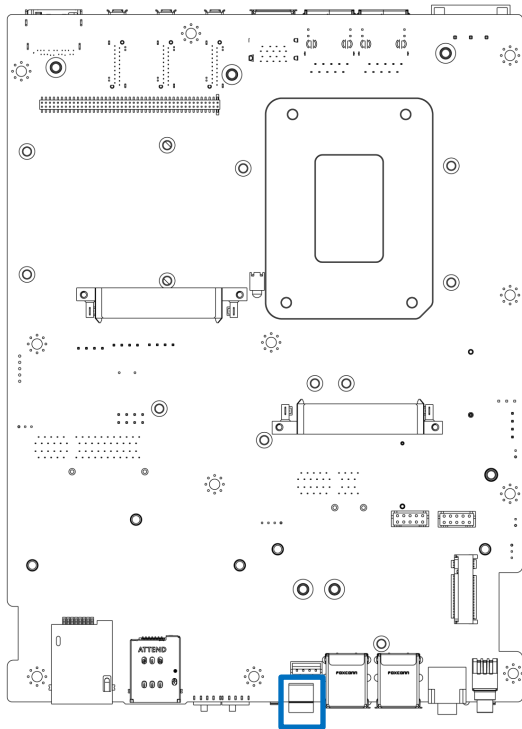
| Switch | Definition |
|--------|------------|
| 1, 2   | RTCRST-L   |
| 3, 4   | GND        |

Power Switch



**PWR\_SW1**  
Power Button

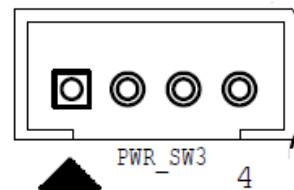
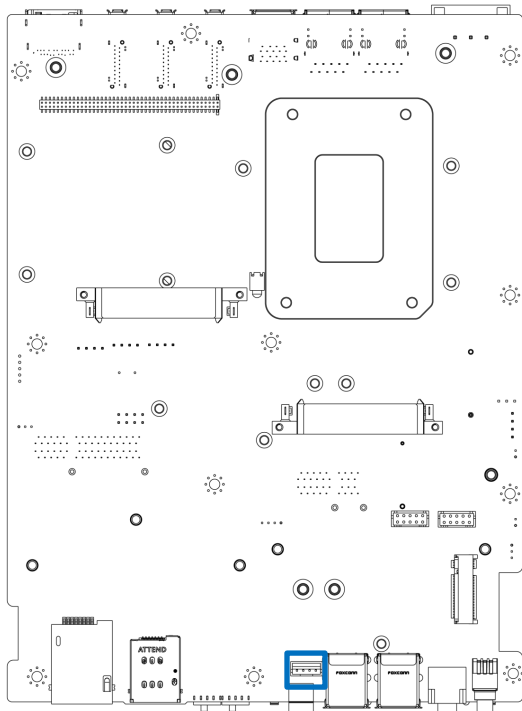
| Pin | Definition   | Pin | Definition |
|-----|--------------|-----|------------|
| 1   | NC           | 4   | GND        |
| 2   | Power Button | 5   | NC         |
| 3   | NC           | 6   | GND        |



**PWR\_SW2**  
Remote Power Switch Type:  
Terminal Block 1x2 2-pin, 3.5mm pitch

| Pin | Definition   |
|-----|--------------|
| 1   | Power Button |
| 2   | GND          |

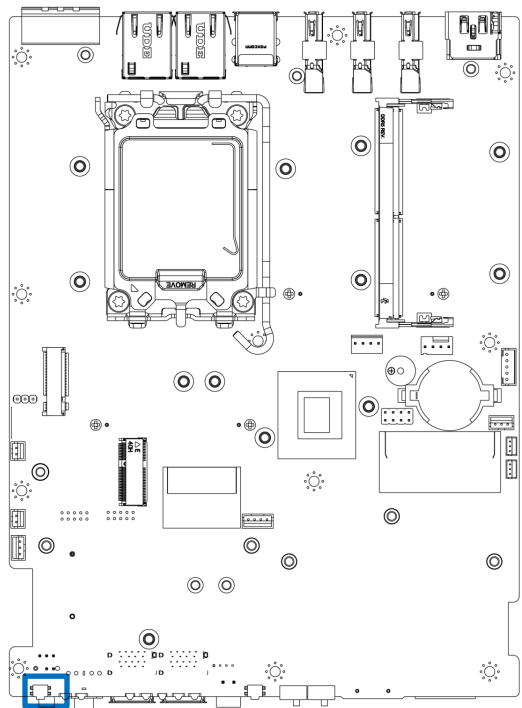
Power Switch



**PWR\_SW3**  
For RCO-3000-RPL

| Pin | Definition   |
|-----|--------------|
| 1   | Power Button |
| 2   | PWR_LED      |
| 3   | HDD_LED      |
| 4   | GND          |

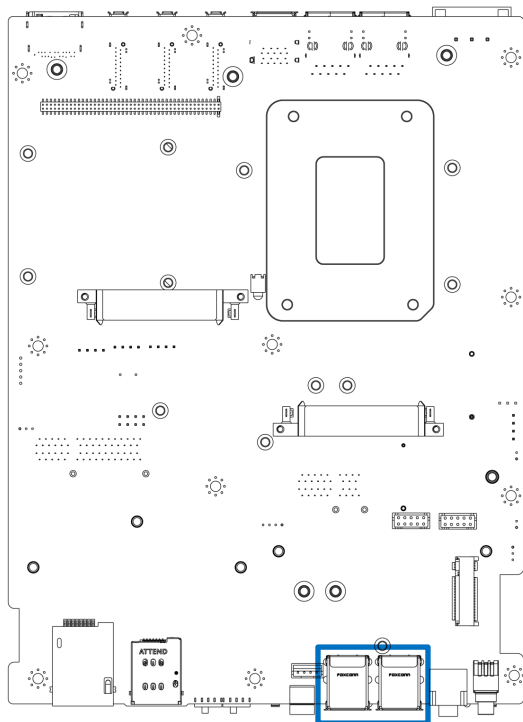
Reset Switch



**RESET**

| Pin | Definition |
|-----|------------|
| 1,2 | RESET      |
| 3,4 | GND        |

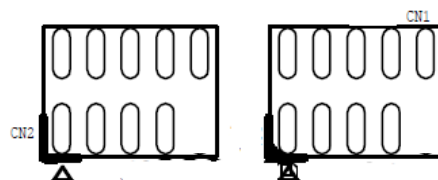
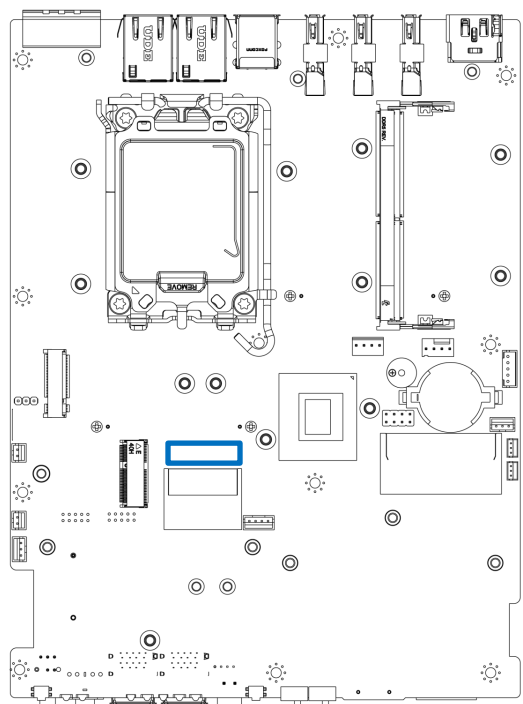
## USB Connector



### USB3\_1 , USB3\_2 , USB3\_3 :

USB3.1 Connector, GEN2 x6 ports, Type A

| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1   | +5V        | 6   | USB3_RX+   |
| 2   | USB2_D-    | 7   | GND        |
| 3   | USB2_D+    | 8   | USB3_TX-   |
| 4   | GND        | 9   | USB3_TX+   |
| 5   | USB3_RX-   |     |            |

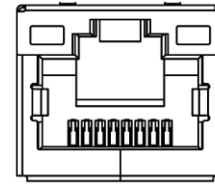
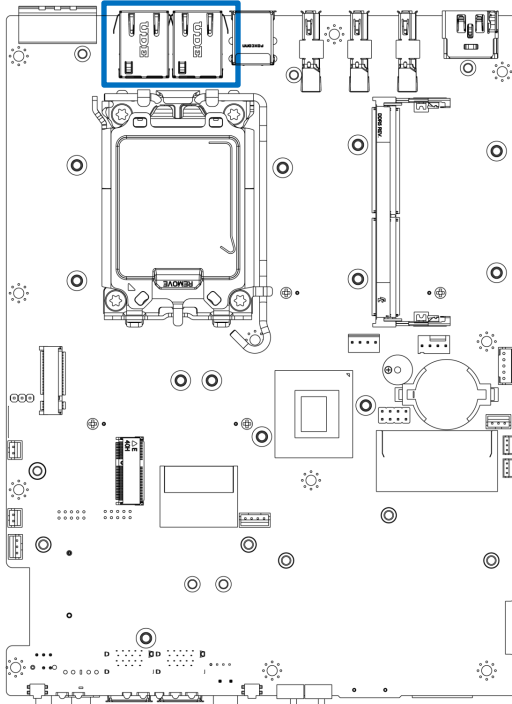


### CN1 , CN2

USB3.0 Connector 2x5 10-pin header, 2.0mm pitch

| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1   | +5V        | 2   | USB3_TX-   |
| 3   | USB_D-     | 4   | USB3_TX+   |
| 5   | USB_D+     | 6   | GND        |
| 7   | GND        | 8   | USB3_RX-   |
| 9   | NC         | 10  | USB3_RX+   |

## LAN Connector



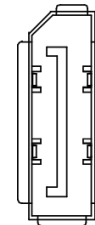
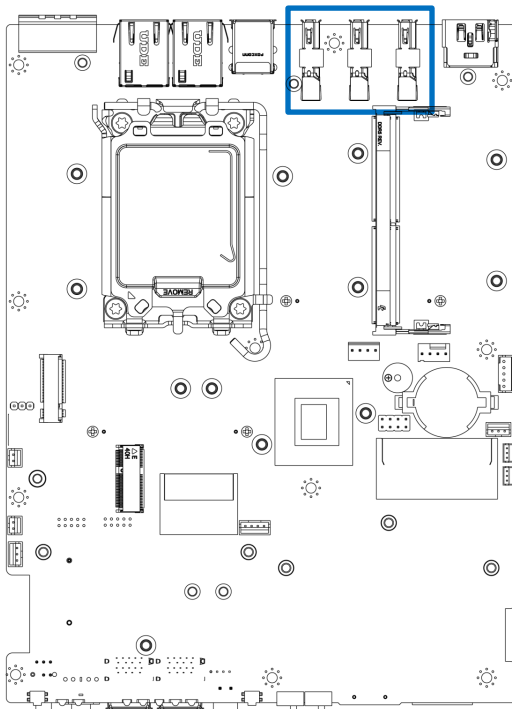
8 1

### LAN1 LAN2

LAN Ports Connector Type:RJ45 port with LEDs

| Pin | Definition |
|-----|------------|
| 1   | LAN1_MDI0P |
| 2   | LAN1_MDI0N |
| 3   | LAN1_MDI1P |
| 4   | LAN1_MDI2P |
| 5   | LAN1_MDI2N |
| 6   | LAN1_MDI1N |
| 7   | LAN1_MDI3P |
| 8   | LAN1_MDI3N |

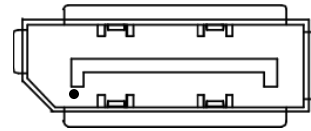
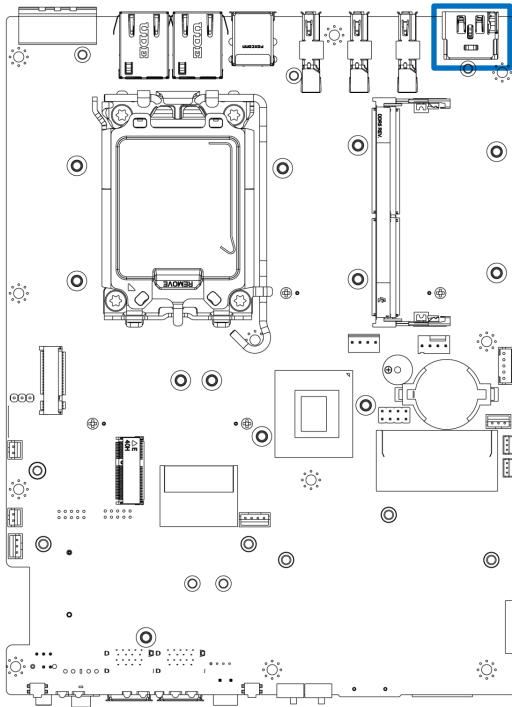
## Display Port Connector



### DP1 , DP2 , DP3

| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1   | DP_LANE0_P | 11  | GND        |
| 2   | GND        | 12  | DP_LANE3_N |
| 3   | DP_LANE0_N | 13  | GND        |
| 4   | DP_LANE1_P | 14  | GND        |
| 5   | GND        | 15  | DP_AUX_P   |
| 6   | DP_LANE1_N | 16  | GND        |
| 7   | DP_LANE2_P | 17  | DP_AUX_N   |
| 8   | GND        | 18  | DP_HPD     |
| 9   | DP_LANE2_N | 19  | GND        |
| 10  | DP_LANE3_P | 20  | +3.3V      |

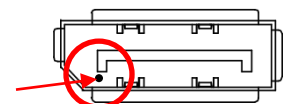
## Display Port / HDMI Connector



### DP\_HDMI

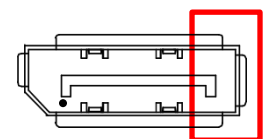
| Pin | Definition         | Pin | Definition         |
|-----|--------------------|-----|--------------------|
| 1   | DP 0_P / HDMI 2_P  | 11  | GND                |
| 2   | GND                | 12  | DP 3_N / HDMI CK_N |
| 3   | DP 0_N / HDMI 2_N  | 13  | GND / CEC          |
| 4   | DP 1_P / HDMI 1_P  | 14  | GND / Reserved     |
| 5   | GND                | 15  | DP_AUX_P / SCL     |
| 6   | DP 1_N / HDMI 1_N  | 16  | GND / SDA          |
| 7   | DP 2_P / HDMI 0_P  | 17  | DP_AUX_N / GND     |
| 8   | GND                | 18  | DP_HPD / +5V       |
| 9   | DP 2_N / HDMI 0_N  | 19  | GND / HPD          |
| 10  | DP 3_P / HDMI CK_P | 20  | +3.3V / NC         |

\* The mistake-proofing design (internal pin) is made to ensure every insertion could be done correctly without any dislocating, even the entry of connector has been designed as compatible to both of DisplayPort and HDMI plug.



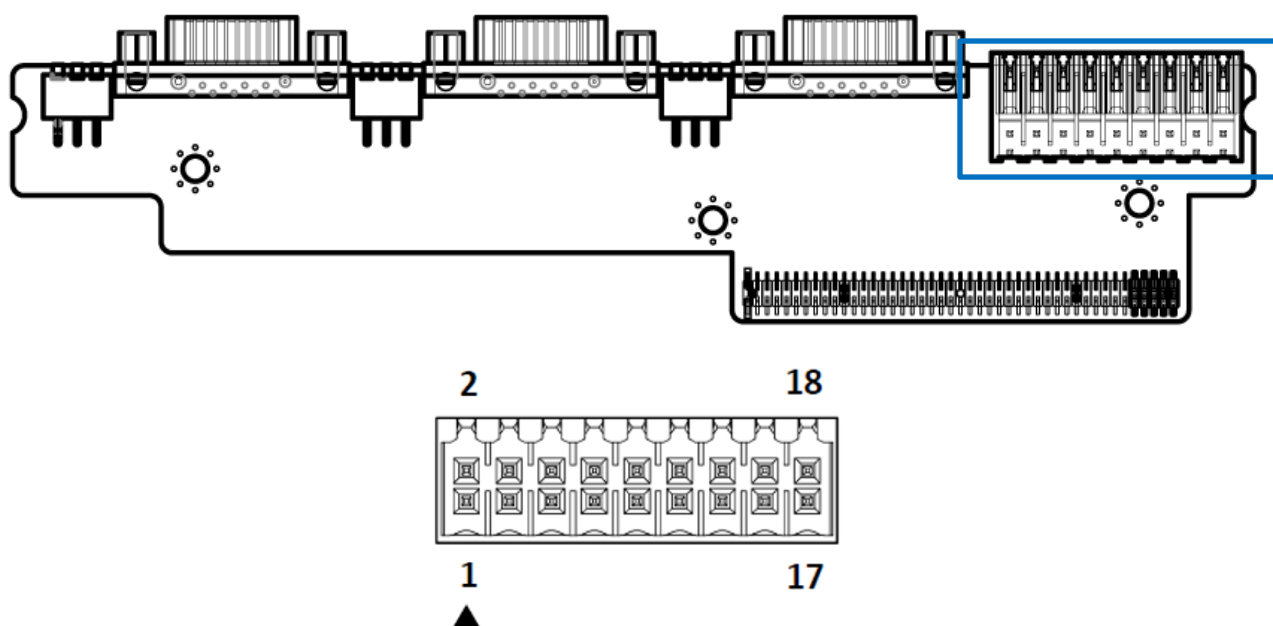
Mistake-proofing pin

\* Keep aligning the right side of entry of connector while plugging HDMI cable into it. In case of any non-smooth insertion or similar bumping into obstacles, be sure stopping further move to avoid breaking the mistake-proofing pin and re-plugging by aligning appropriately after removing it from the connector first. In opposite, please also keep the same direction while unplugging the HDMI cable. Any swing for unplugging shall be unnecessary and avoided to break the mistake-proofing pin.



Aligning right for insertion/  
Unplugging in same way

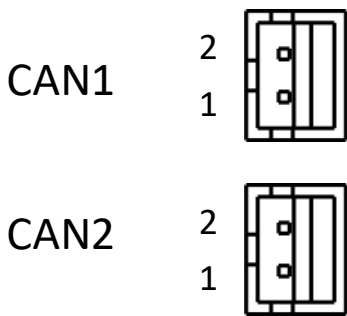
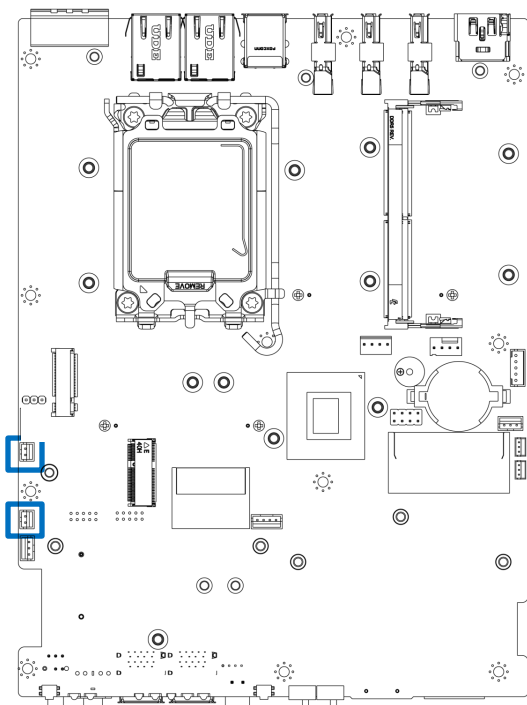
## Digital Input / Output Connector



**DIO** : Digital Input / Output Connector

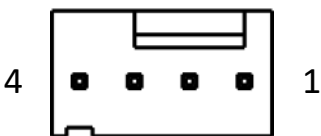
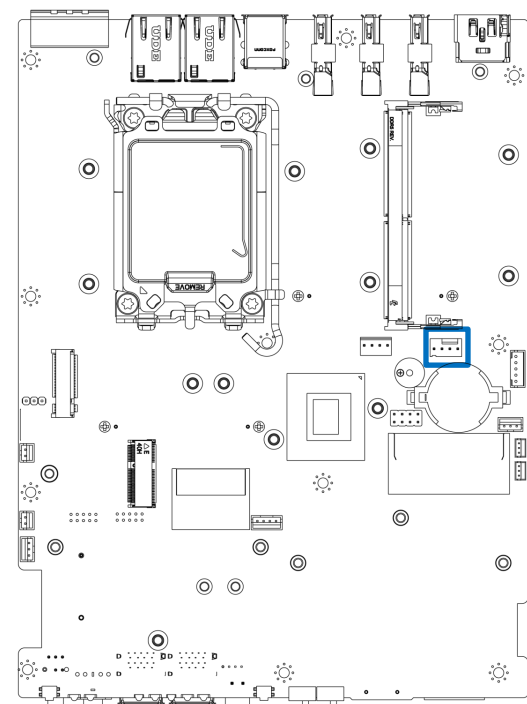
**Type:** Terminal Block 2x9 18-pin, 3.5mm pitch

| Pin | Definition                | Pin | Definition |
|-----|---------------------------|-----|------------|
| 1   | DIN1                      | 2   | DOUT1      |
| 3   | DIN2                      | 4   | DOUT2      |
| 5   | DIN3                      | 6   | DOUT3      |
| 7   | DIN4                      | 8   | DOUT4      |
| 9   | DIN5                      | 10  | DOUT5      |
| 11  | DIN6                      | 12  | DOUT6      |
| 13  | DIN7                      | 14  | DOUT7      |
| 15  | DIN8                      | 16  | DOUT8      |
| 17  | DC power input (+5V~+24V) | 18  | GND        |



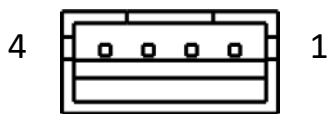
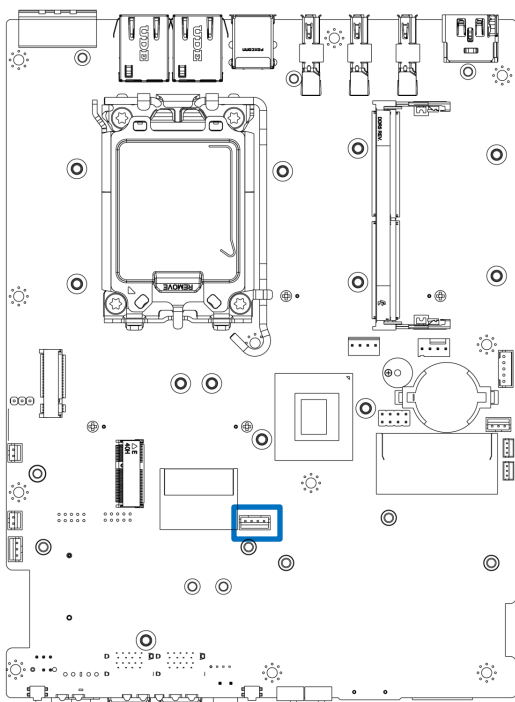
CAN1 CAN2

| Pin | Signal |
|-----|--------|
| 1   | CAN_L  |
| 2   | CAN_H  |



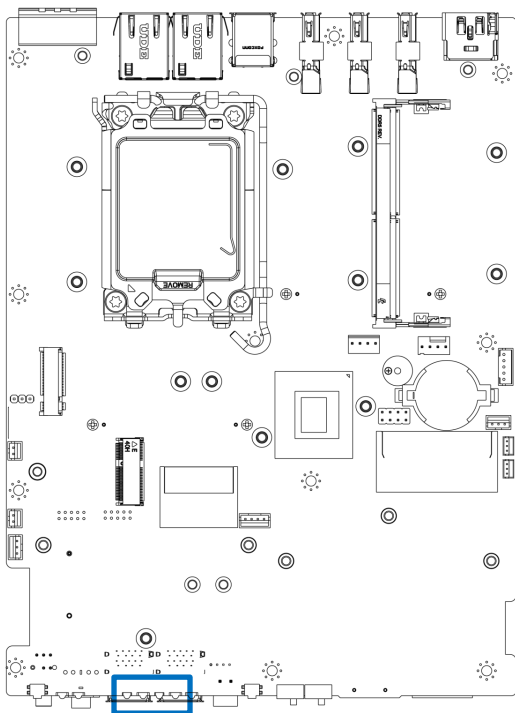
FAN\_SIO

| Pin | Signal  |
|-----|---------|
| 1   | GND     |
| 2   | +12V    |
| 3   | Sense   |
| 4   | Control |



**SMB**

| Pin | Signal   |
|-----|----------|
| 1   | NC       |
| 2   | SMB_CLK  |
| 3   | SMB_DATA |
| 4   | GND      |



**LED Status**

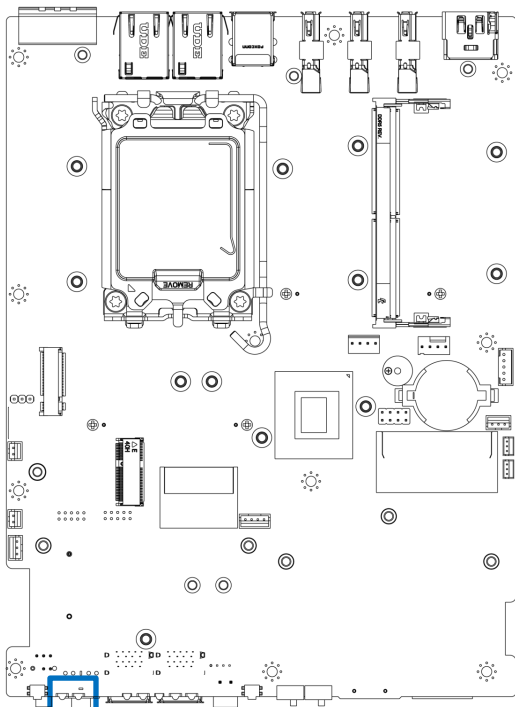


| Act LED Status  | Definition    |
|-----------------|---------------|
| Blinking Yellow | Data Activity |
| Off             | No Activity   |



| Link LED Status | LAN1                 | LAN2                 |
|-----------------|----------------------|----------------------|
| Steady Green    | 2.5Gbps Network Link | 2.5Gbps Network Link |
| Steady Orange   | 1Gbps Network Link   | 1Gbps Network Link   |
| Off             | 100Mbps Network Link | 100Mbps Network Link |

## LED Status

**PWR\_LED1**

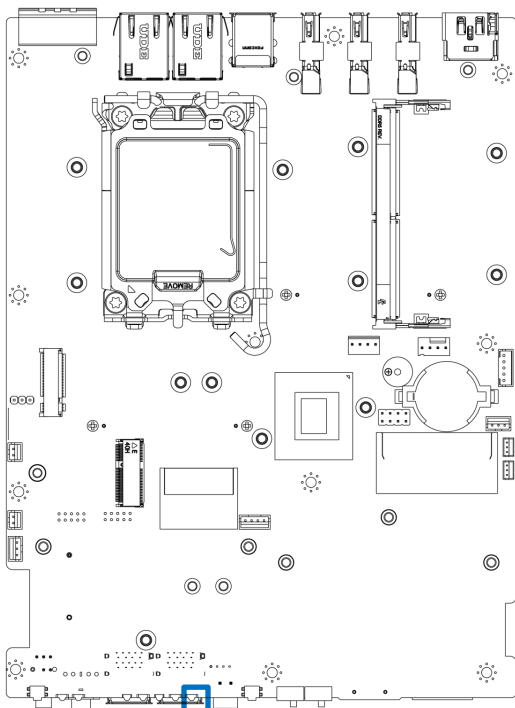
Power LED Status

| Pin | Definition  |
|-----|-------------|
| 1   | POWER LED + |
| 2   | POWER LED - |

**HDD\_LED1**

HDD Access LED Status

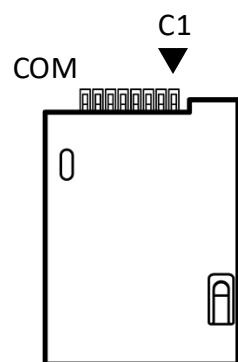
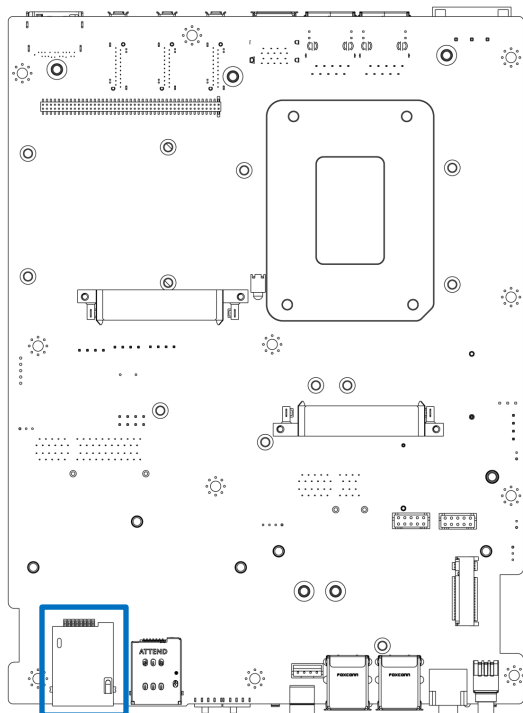
| Pin | Definition |
|-----|------------|
| 1   | HDD LED+   |
| 2   | HDD LED-   |

**WDT\_LED**

WDTOUT LED Status

| Pin | Definition  |
|-----|-------------|
| 1   | WDTOUT LED+ |
| 2   | WDTOUT LED- |

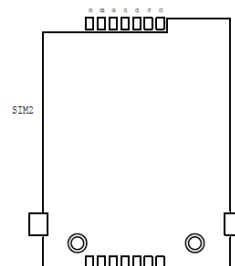
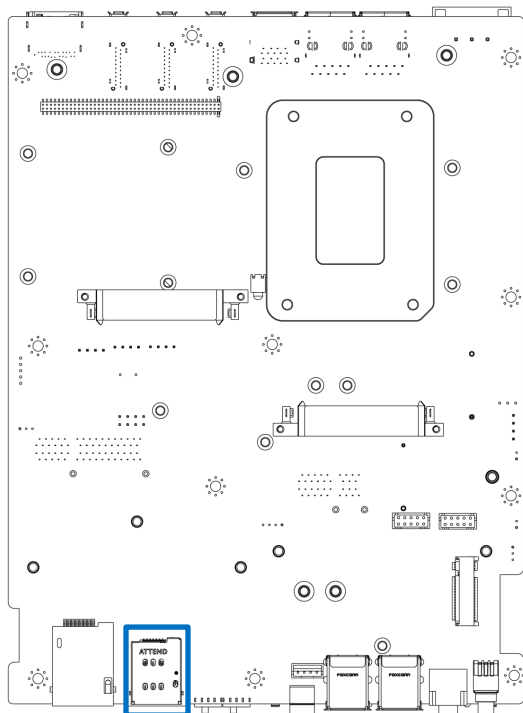
## SIM Card Socket



### SIM1 (for Bottom size M.2 B Key)

| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| C1  | UIM_PWR    | C6  | UIM_VPP    |
| C2  | UIM_RESET  | C7  | UIM_DATA   |
| C3  | UIM_CLK    | CD  | NC         |
| C5  | GND        | COM | GND        |

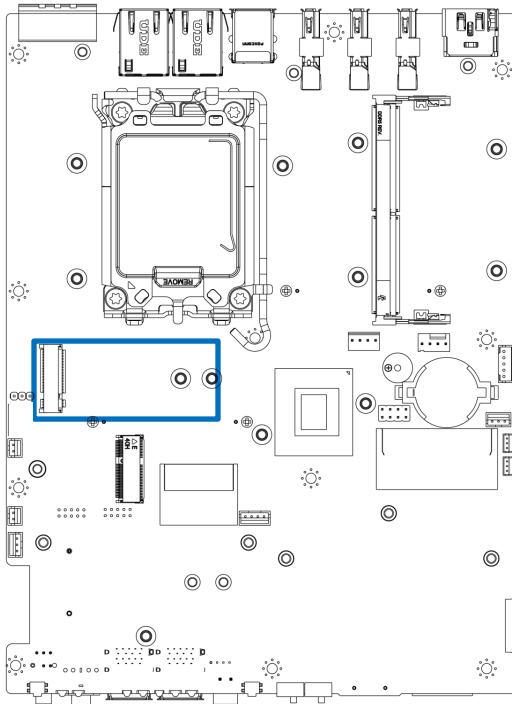
## Dual Nano SIM Card Socket



### SIM2 (for Top size M.2 B Key)

| Pin | Definition | Pin | Definition         |
|-----|------------|-----|--------------------|
| C1  | UIM_PWR    | C6  | UIM_VPP            |
| C2  | UIM_RESET  | C7  | UIM_DATA I/O       |
| C3  | UIM_CLK    | CD  | Card Detect Switch |
| C5  | GND        |     |                    |

## M.2 B Key Socket

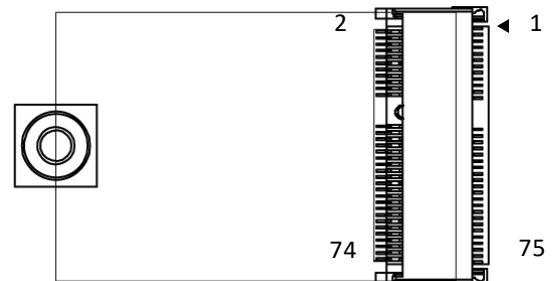
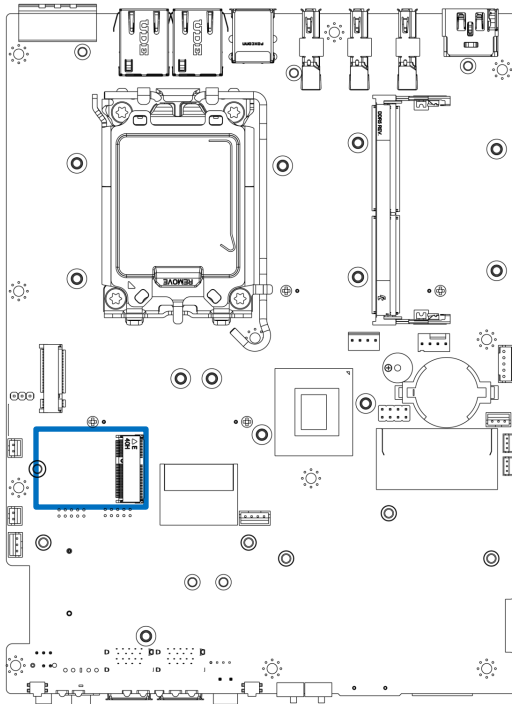


### M2\_KB2

| Pin | Definition       | Pin | Definition           |
|-----|------------------|-----|----------------------|
| 1   | CONFIG_3         | 2   | +3.3V                |
| 3   | GND              | 4   | +3.3V                |
| 5   | GND              | 6   | FULL_CARD_POWER_OFF# |
| 7   | USB_D+           | 8   | W_DISABLE1#          |
| 9   | USB_D-           | 10  | WWAN_LED#            |
| 11  | GND              | 20  | NC                   |
| 21  | CONFIG_0         | 22  | NC                   |
| 23  | GPIO_11(0/1.8V)  | 24  | NC                   |
| 25  | DPR              | 26  | W_DISABLE2#          |
| 27  | GND              | 28  | NC                   |
| 29  | PERn1/USB3.0-Rx- | 30  | USIM1_RST            |
| 31  | PERp1/USB3.0-Rx+ | 32  | USIM1_CLK            |
| 33  | GND              | 34  | USIM1_DATA           |

|    |                  |    |               |
|----|------------------|----|---------------|
| 35 | PETn1/USB3.0-Tx- | 36 | USIM1_VDD     |
| 37 | PETp1/USB3.0-Tx+ | 38 | NC            |
| 39 | GND              | 40 | USIM2_DET     |
| 41 | PERn0            | 42 | USIM2_DATA    |
| 43 | PERp0            | 44 | USIM2_CLK     |
| 45 | GND              | 46 | USIM2_RST     |
| 47 | PETn0            | 48 | USIM2_VDD     |
| 49 | PETp0            | 50 | PCIE_RST_N    |
| 51 | GND              | 52 | PCIE_CLKREQ_N |
| 53 | PCIE_REFCLK_M    | 54 | PCIE_WAKE_N   |
| 55 | PCIE_REFCLK_P    | 56 | NC            |
| 57 | GND              | 58 | NC            |
| 59 | NC               | 60 | NC            |
| 61 | NC               | 62 | NC            |
| 63 | NC               | 64 | NC            |
| 65 | NC               | 66 | USIM1_DET     |
| 67 | NC               | 68 | SUSCLK(32kHz) |
| 69 | CONFIG_1         | 70 | +3.3VAUX      |
| 71 | GND              | 72 | +3.3VAUX      |
| 73 | GND              | 74 | +3.3VAUX      |
| 75 | CONFIG_2         |    |               |

## M.2 E Key Socket

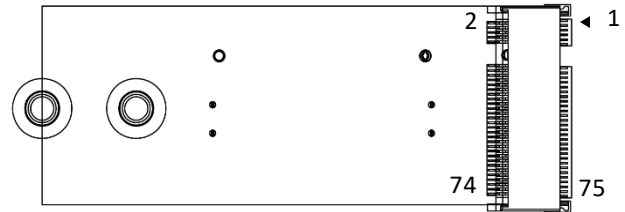
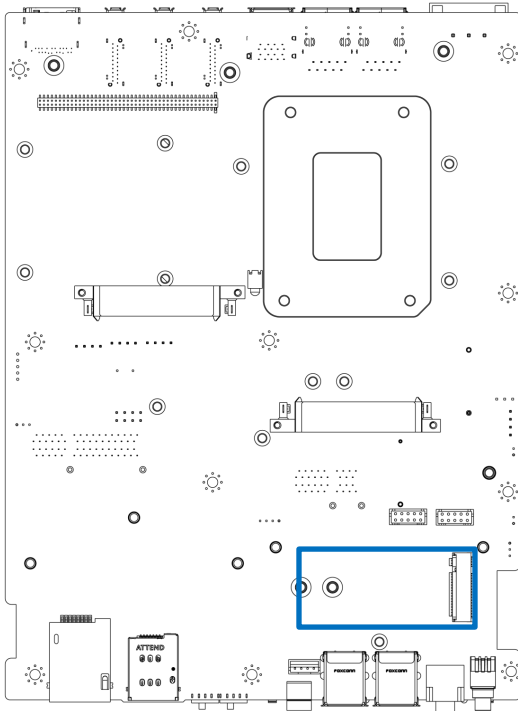


### M2\_KE

| Pin | Definition    | Pin | Definition    |
|-----|---------------|-----|---------------|
| 1   | GND           | 2   | +3.3VAUX      |
| 3   | USB2_D+       | 4   | +3.3VAUX      |
| 5   | USB2_D-       | 6   | NC            |
| 7   | GND           | 8   | I2S2_SCLK     |
| 9   | CNV_WR_1_DN   | 10  | CNV_RF_RESET# |
| 11  | CNV_WR_1_DP   | 12  | I2S2_RXD      |
| 13  | GND           | 14  | MODEM_CLKREQ  |
| 15  | CNV_WR_0_DN   | 16  | NC            |
| 17  | CNV_WR_0_DP   | 18  | GND           |
| 19  | GND           | 20  | UART_WAKE_L   |
| 21  | CNV_WR_CLK_DN | 22  | CNV_BRI_RSP   |
| 23  | CNV_WR_CLK_DP | 32  | CNV_RGI_DT    |
| 33  | GND           | 34  | CNV_RGI_RSP   |

|    |               |    |                     |
|----|---------------|----|---------------------|
| 35 | TxP0          | 36 | CNV_BRI_DT          |
| 37 | TxN0          | 38 | CL_RST#             |
| 39 | GND           | 40 | CL_DATA             |
| 41 | RxP0          | 42 | CL_CLK              |
| 43 | RxN0          | 44 | CNV_PA_BLANKING     |
| 45 | GND           | 46 | CNV_MFUART2_TXD     |
| 47 | REFCLK0+      | 48 | CNV_MFUART2_RXD     |
| 49 | REFCLK0-      | 50 | SUSCLK              |
| 51 | GND           | 52 | PERST0#             |
| 53 | NC            | 54 | M2_KEY-E_BT_DIS2#   |
| 55 | WAKE0#        | 56 | M2_KEY-E_WIFI_DIS1# |
| 57 | GND           | 58 | SMBDATAS_DUAL       |
| 59 | CNV_WT_1_DN   | 60 | SMBCLKS_DUAL        |
| 61 | CNV_WT_1_DP   | 62 | SMBALERT#           |
| 63 | GND           | 64 | Pull Low            |
| 65 | CNV_WT_0_DN   | 66 | PERST1#             |
| 67 | CNV_WT_0_DP   | 68 | NC                  |
| 69 | GND           | 70 | WAKE1#              |
| 71 | CNV_WT_CLK_DN | 72 | +3.3VAUX            |
| 73 | CNV_WT_CLK_DP | 74 | +3.3VAUX            |
| 75 | GND           |    |                     |

## M.2 B Key Socket

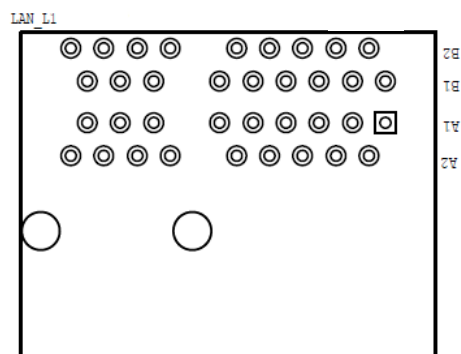
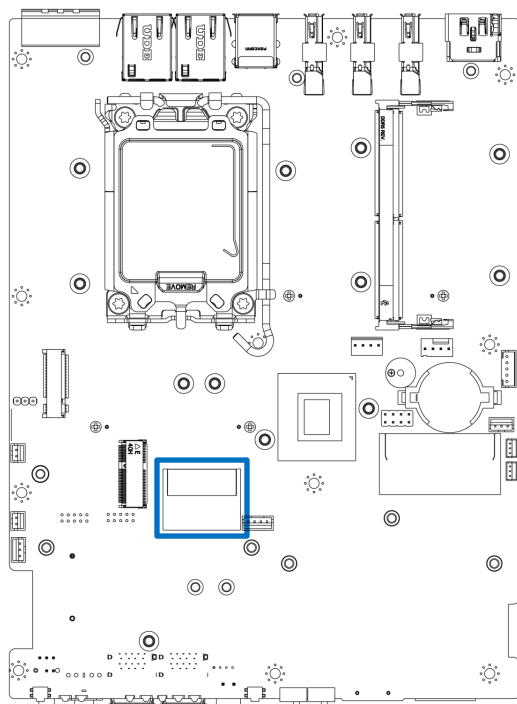


### M2\_KB1

| Pin | Definition      | Pin | Definition           |
|-----|-----------------|-----|----------------------|
| 1   | CONFIG_3        | 2   | +3.3V                |
| 3   | GND             | 4   | +3.3V                |
| 5   | GND             | 6   | FULL_CARD_POWER_OFF# |
| 7   | USB_D+          | 8   | W_DISABLE1#          |
| 9   | USB_D-          | 10  | WWAN_LED#            |
| 11  | GND             | 20  | NC                   |
| 21  | CONFIG_0        | 22  | NC                   |
| 23  | GPIO_11(0/1.8V) | 24  | NC                   |
| 25  | DPR             | 26  | NC                   |
| 27  | GND             | 28  | P_UIM_VPP            |
| 29  | PERn1           | 30  | USIM1_RST            |
| 31  | PERp1           | 32  | USIM1_CLK            |
| 33  | GND             | 34  | USIM1_DATA           |

|    |               |    |               |
|----|---------------|----|---------------|
| 35 | PETn1         | 36 | USIM1_VDD     |
| 37 | PETp1         | 38 | NC            |
| 39 | GND           | 40 | NC            |
| 41 | PERn0/SATA-B+ | 42 | NC            |
| 43 | PERp0/SATA-B- | 44 | NC            |
| 45 | GND           | 46 | NC            |
| 47 | PETn0/SATA-A- | 48 | NC            |
| 49 | PETp0/SATA-A+ | 50 | PCIE_RST_N    |
| 51 | GND           | 52 | PCIE_CLKREQ_N |
| 53 | PCIE_REFCLK_M | 54 | PCIE_WAKE_N   |
| 55 | PCIE_REFCLK_P | 56 | NC            |
| 57 | GND           | 58 | NC            |
| 59 | NC            | 60 | NC            |
| 61 | NC            | 62 | NC            |
| 63 | NC            | 64 | NC            |
| 65 | NC            | 66 | USIM1_DET     |
| 67 | NC            | 68 | SUSCLK(32kHz) |
| 69 | CONFIG_1      | 70 | +3.3VAUX      |
| 71 | GND           | 72 | +3.3VAUX      |
| 73 | GND           | 74 | +3.3VAUX      |
| 75 | CONFIG_2      |    |               |

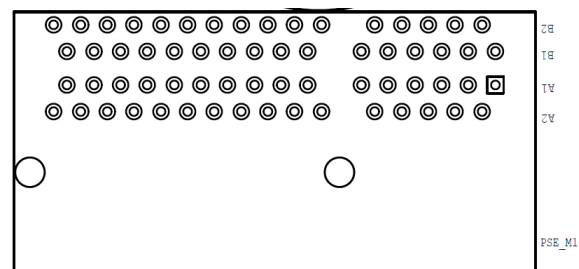
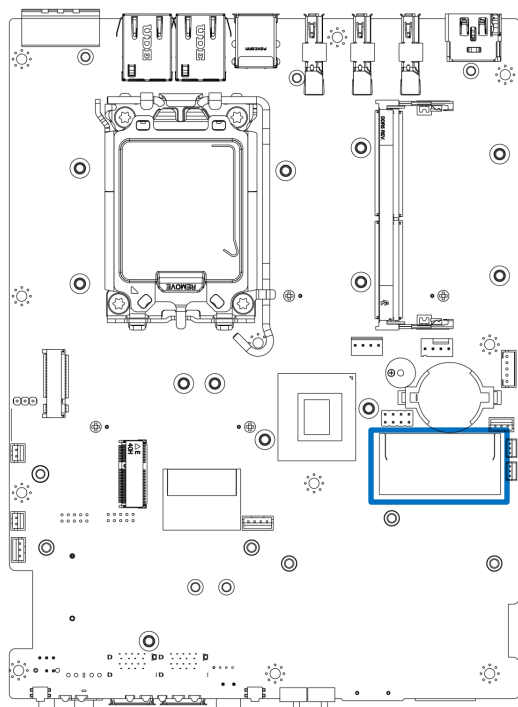
## PCI-Express x1 Slot R/A



### LAN\_L1

| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| B1  | TxP0       | A1  | RxP0       |
| B2  | TxN0       | A2  | RxN0       |
| B3  | GND        | A3  | PSE_OUT1   |
| B4  | TxP1       | A4  | RxP1       |
| B5  | TxN1       | A5  | RxN1       |
| B6  | GND        | A6  | PSE_OUT2   |
| B7  | TxP2       | A7  | RxP2       |
| B8  | TxN2       | A8  | RxN2       |
| B9  | NC         | A9  | PSE_OUT3   |
| B10 | TxP3       | A10 | RxP3       |
| B11 | TxN3       | A11 | RxN3       |
| B12 | WAKE#      | A12 | PSE_OUT4   |
| B13 | RESET#     | A13 | REFCLK+    |
| B14 | +3.3V      | A14 | REFCLK-    |
| B15 | +3.3V      | A15 | SMB_DATA   |
| B16 | +5V        | A16 | SMB_CLK    |
| B17 | +56V       | A17 | +3.3VAUX   |
| B18 | +56V       | A18 | +3.3VAUX   |

## PCI-Express x4 Slot

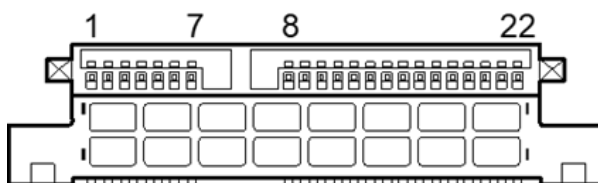
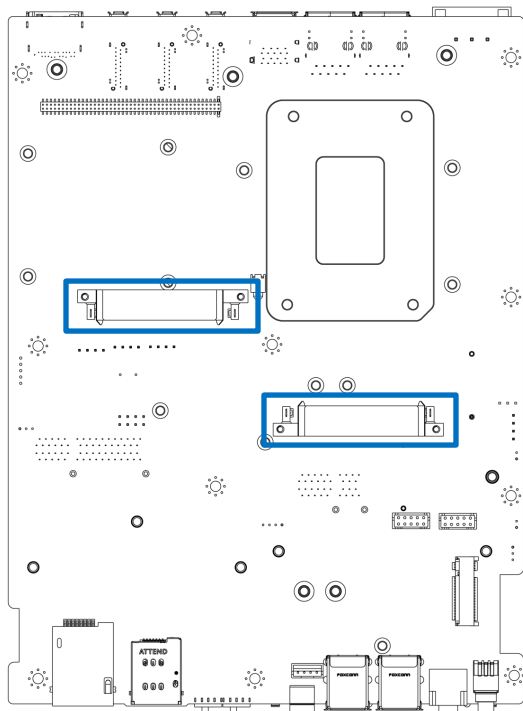


### PSE\_M1

| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| B1  | 9_48VSB_IN | A1  | 9_48VSB_IN |
| B2  | 9_48VSB_IN | A2  | 9_48VSB_IN |
| B3  | 9_48VSB_IN | A3  | 9_48VSB_IN |
| B4  | 9_48VSB_IN | A4  | 9_48VSB_IN |
| B5  | 9_48VSB_IN | A5  | 9_48VSB_IN |
| B6  | 9_48VSB_IN | A6  | 9_48VSB_IN |
| B7  | 9_48VSB_IN | A7  | 9_48VSB_IN |
| B8  | 9_48VSB_IN | A8  | 9_48VSB_IN |
| B9  | 9_48VSB_IN | A9  | 9_48VSB_IN |
| B10 | 9_48VSB_IN | A10 | 9_48VSB_IN |
| B11 | GND        | A11 | GND        |
| B12 | GND        | A12 | GND        |
| B13 | GND        | A13 | GND        |

|     |           |     |      |
|-----|-----------|-----|------|
| B14 | GND       | A14 | GND  |
| B15 | GND       | A15 | GND  |
| B16 | GND       | A16 | GND  |
| B17 | GND       | A17 | GND  |
| B18 | GND       | A18 | GND  |
| B19 | GND       | A19 | GND  |
| B20 | GND       | A20 | GND  |
| B21 | I2C DATA  | A21 | 5V   |
| B22 | I2C CLOCK | A22 | 5V   |
| B23 | 12V       | A23 | 5V   |
| B24 | 12V       | A24 | 3.3V |
| B25 | PSE_OUT1  | A25 | 3.3V |
| B26 | PSE_OUT2  | A26 | 3.3V |
| B27 | PSE_OUT3  | A27 | 56V  |
| B28 | PSE_OUT4  | A28 | 56V  |
| B29 | PSE_OUT5  | A29 | 56V  |
| B30 | PSE_OUT6  | A30 | 56V  |
| B31 | PSE_OUT7  | A31 | 56V  |
| B32 | PSE_OUT8  | A32 | 56V  |

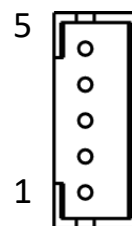
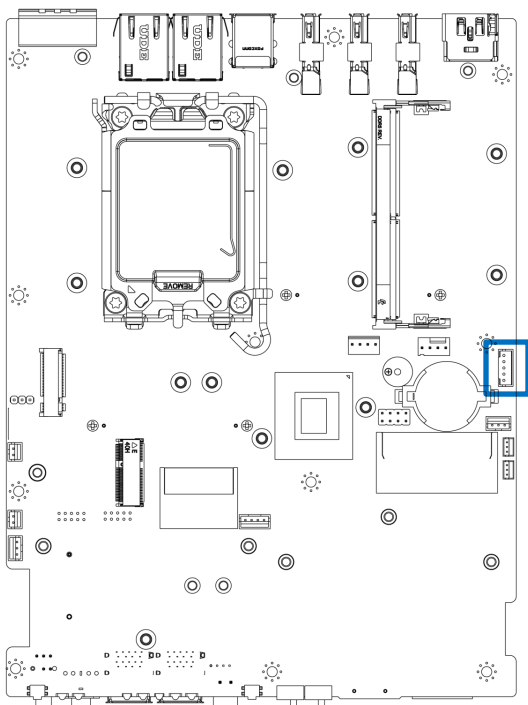
## SATA with Power Connector



### SATA

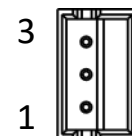
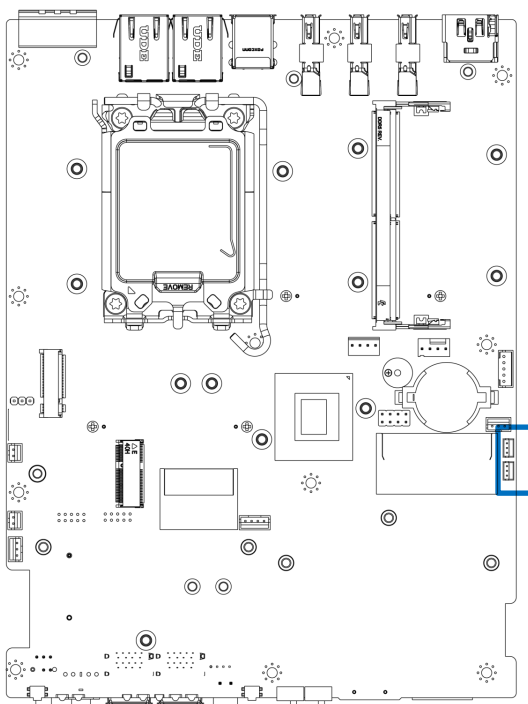
| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1   | GND        | 12  | GND        |
| 2   | TxP        | 13  | GND        |
| 3   | TxN        | 14  | +5V        |
| 4   | GND        | 15  | +5V        |
| 5   | RxN        | 16  | +5V        |
| 6   | RxP        | 17  | GND        |
| 7   | GND        | 18  | GND        |
| 8   | NC         | 19  | GND        |
| 9   | NC         | 20  | NC         |
| 10  | DEVSLP     | 21  | NC         |
| 11  | GND        | 22  | NC         |

## OOB control signal



### OOB

| Pin | Signal      |
|-----|-------------|
| 1   | 5V          |
| 2   | GND         |
| 3   | PWRBTN#     |
| 4   | SLP_RSTBTN# |
| 5   | SYS_PWROK   |



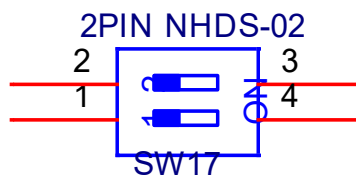
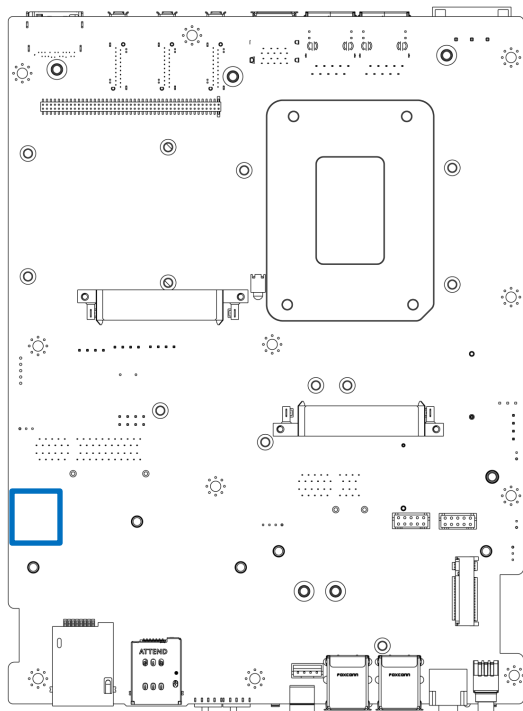
### JP4 OOB Auto Link

| Pin | Signal  |
|-----|---------|
| 1   | COM4_Rx |
| 2   | COM4_Tx |
| 3   | GND     |

### JP5 OOB Remote Debug port

| Pin | Signal  |
|-----|---------|
| 1   | COM1_Rx |
| 2   | COM1_Tx |
| 3   | GND     |

## COM1 or OOB Remote Debug port selection



### SW17

| Pin | ON      | OFF           |
|-----|---------|---------------|
| 1,4 | COM1 Tx | OOB Remote Tx |
| 2,3 | COM1 Rx | OOB Remote Rx |

## Chapter 3

# System Setup

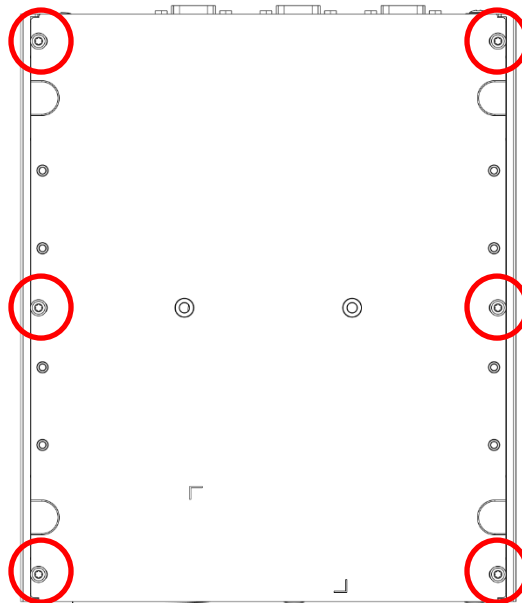
### 3.1 Set torque force to 3.5 kgf-cm to execute all the screwing and unscrewing.

### 3.2 Removing chassis bottom cover

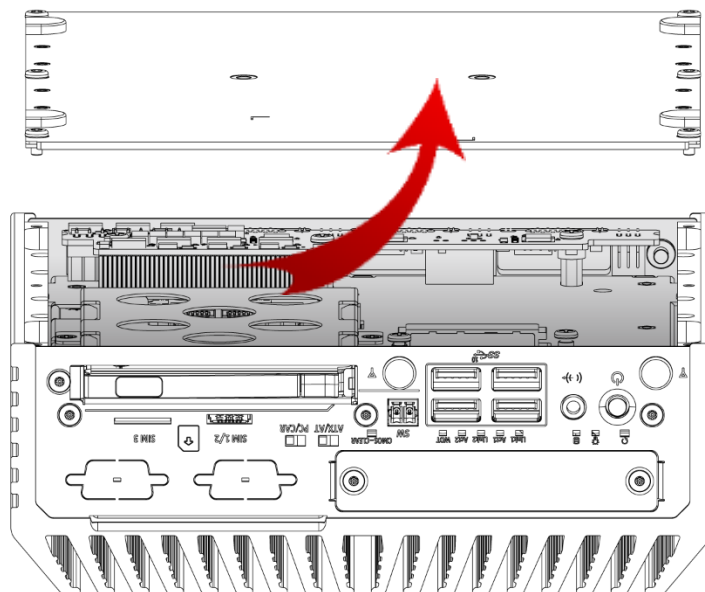
**WARNING**

In order to prevent electric shock or system damage, before removing the chassis cover, must turn off power and disconnect the unit from power source.

1. Place the system faced upside down and unscrew the 6 screws (M3x5L) on the bottom cover.

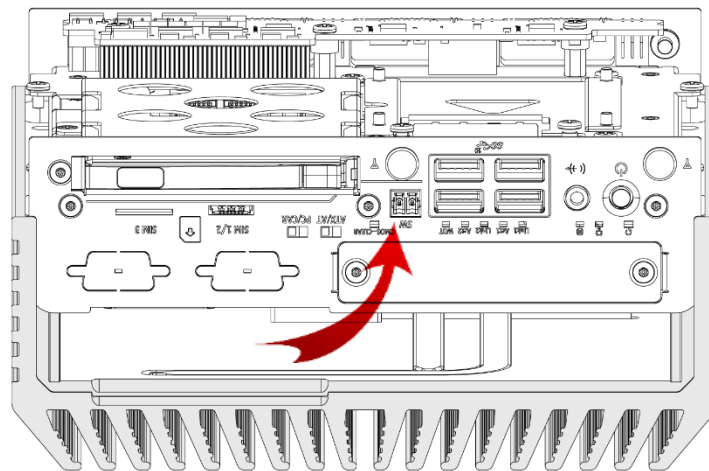
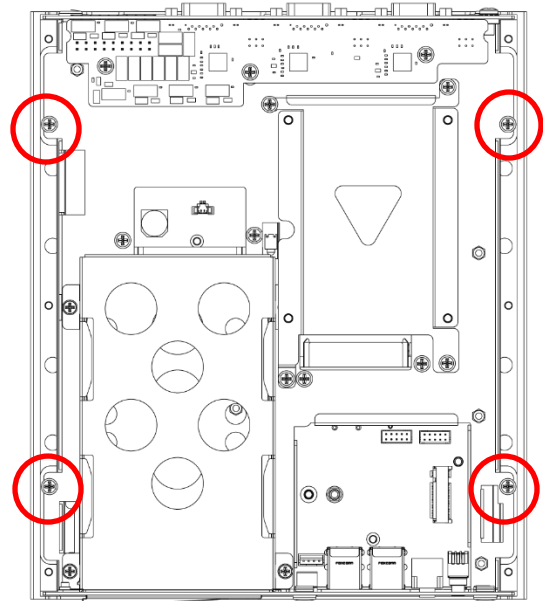


2. Now you can remove the bottom cover.

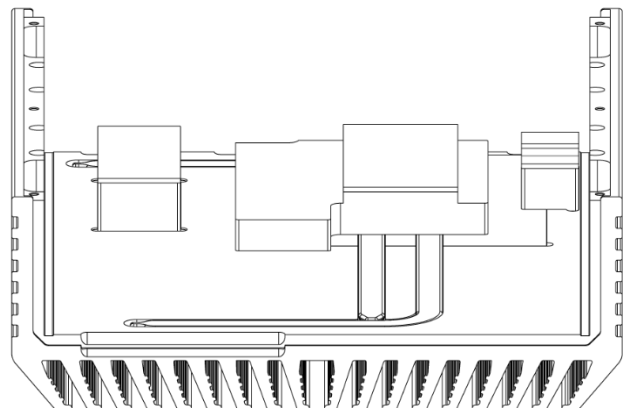
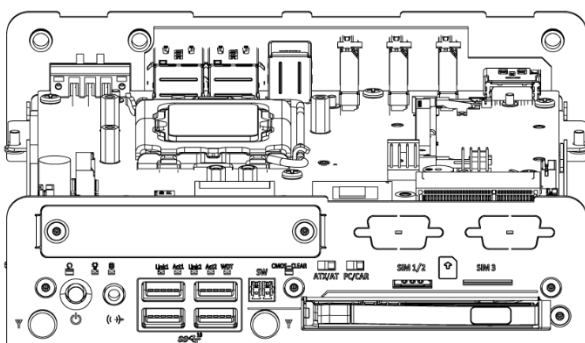


### 3.3 Removing chassis top cover

1. Unscrew the four screws (M3x5L) as highlighted the right.
2. Hold the body of the system and remove from the external cover in an upward motion away from the external cover as pictured below.

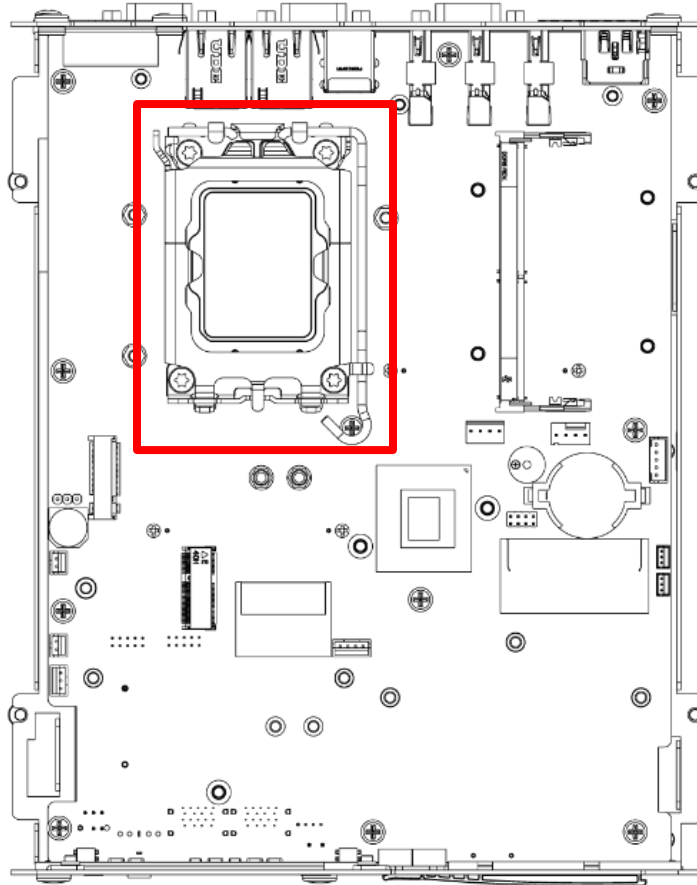


3. Pictured below is the separated system body (left) and external cover (right).

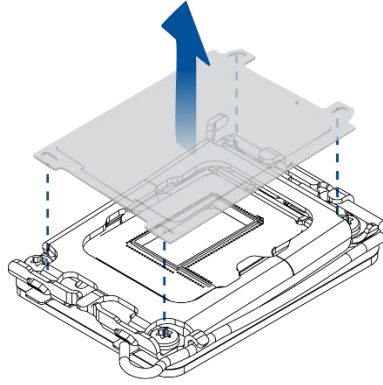


## 3.4 Installing CPU

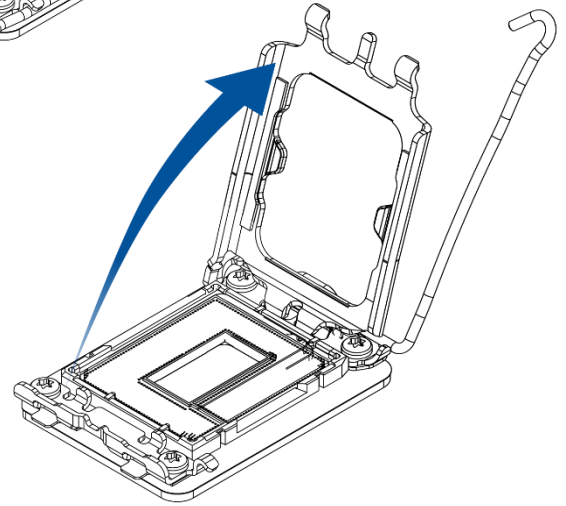
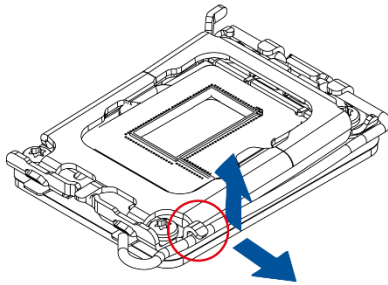
1. CPU socket is located at the top side, as highlighted below.



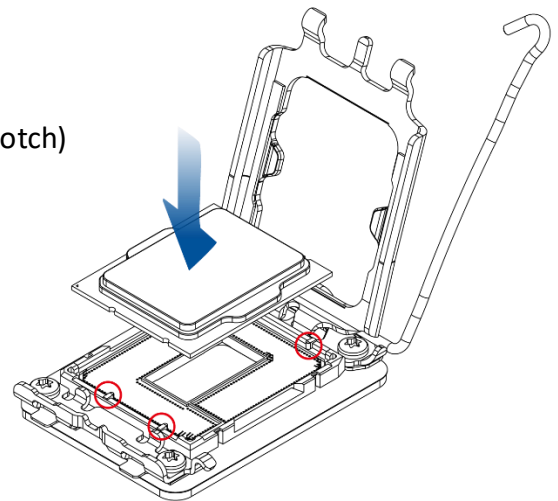
2. Remove the CPU protective cover.



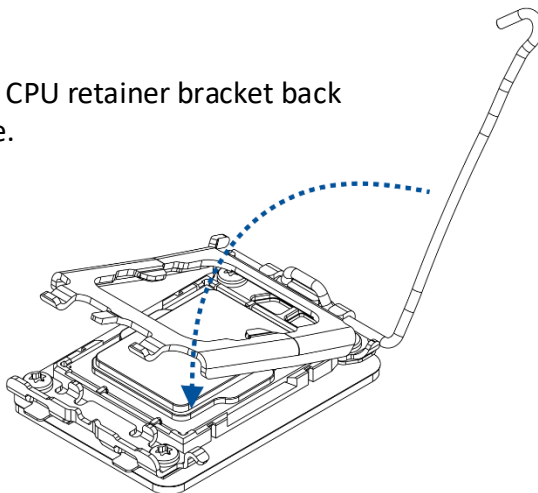
3. Press down the CPU socket lever in order to release the socket.



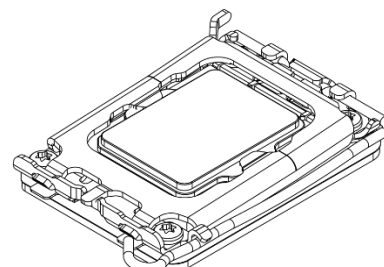
4. Insert CPU gently. (Pay attention to the CPU fool-proof notch)



5. Put the CPU retainer bracket back in place.

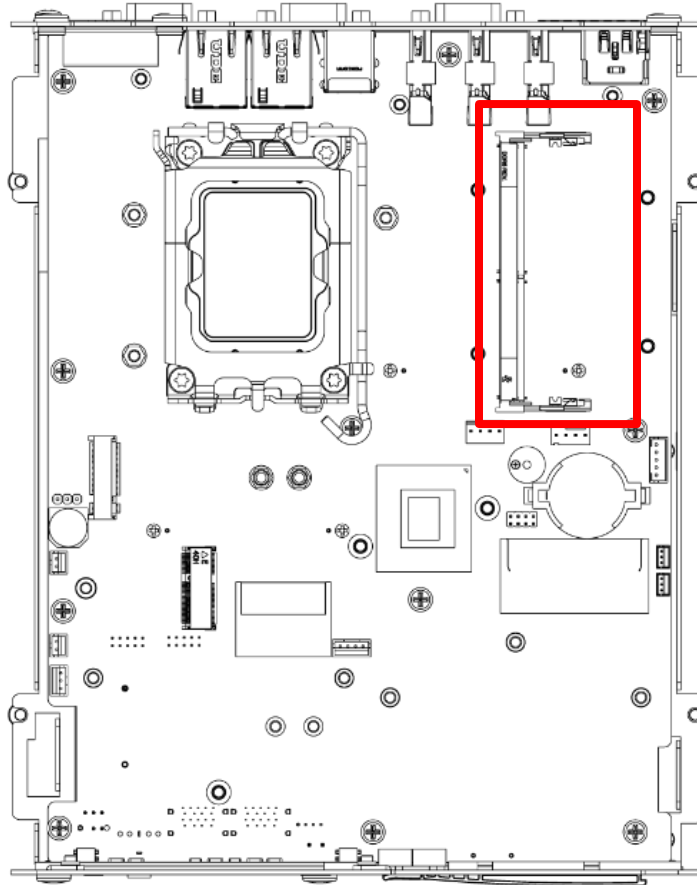


6. Press down the CPU socket lever in order to secure the socket.



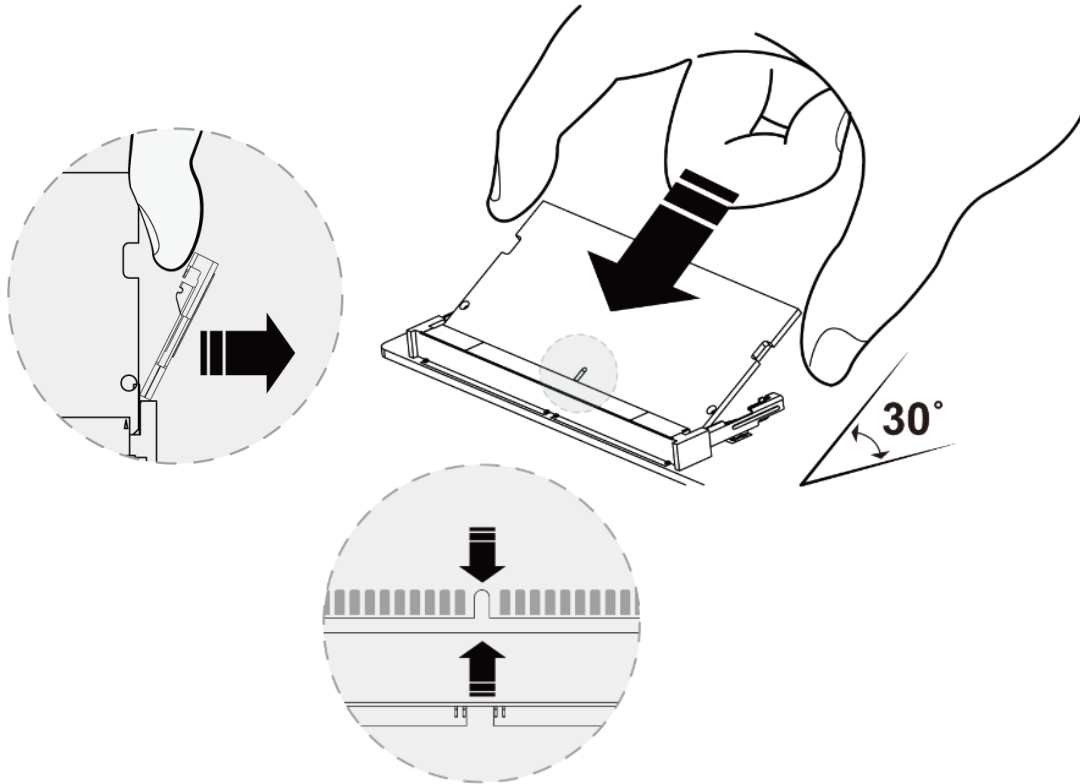
## 3.5 Installing SODIMM

Place the system body with SODIMM socket facing upward.

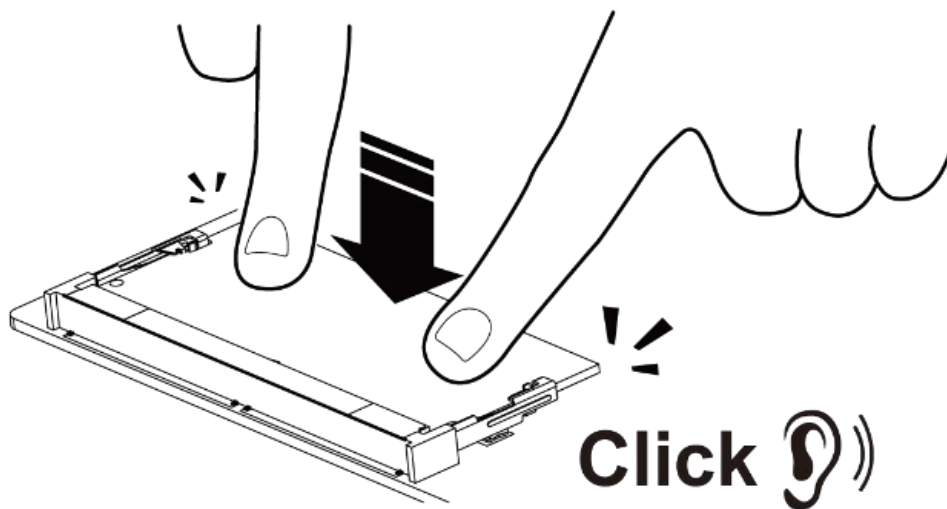


## Install SO-DIMM- Step by Step

1. Gently pull the locking tabs on either side of the SO-DIMM slot. Insert the SO-DIMM module at a 30~45-degree angle.



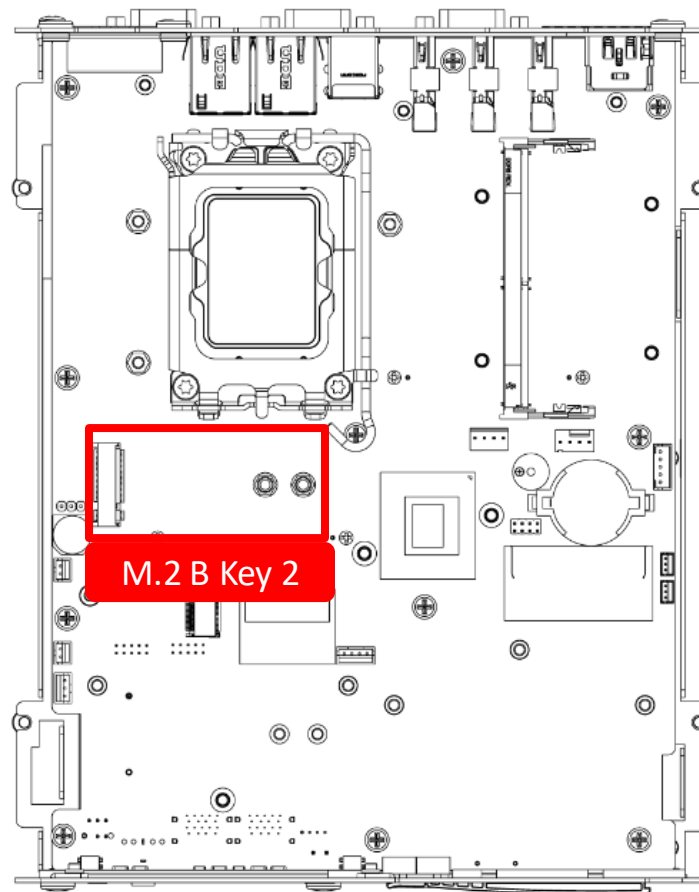
2. Press down gently until you hear a "click" sound and the tabs lock it into place.



## 3.6 Installing 4G/5G Module and Antenna

### 3.6.1 M.2 B Key 2

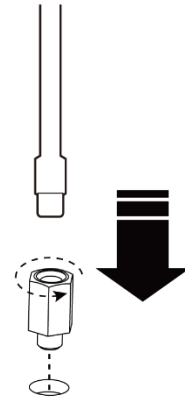
RCO-3000-RPL Series PCBA features two M.2 B Key slots, with the first one located on the top (M.2 B Key 2) and the second on the back (M.2 B Key 1). We will focus on the M.2 B Key 2 slot at the top first.



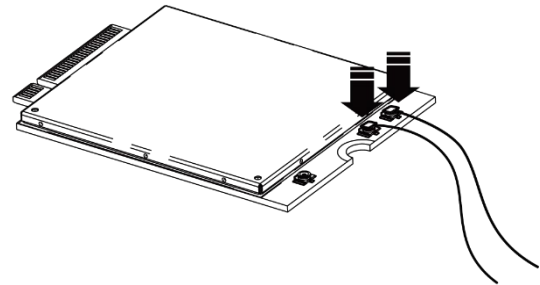
### 1. Assemble the copper stud



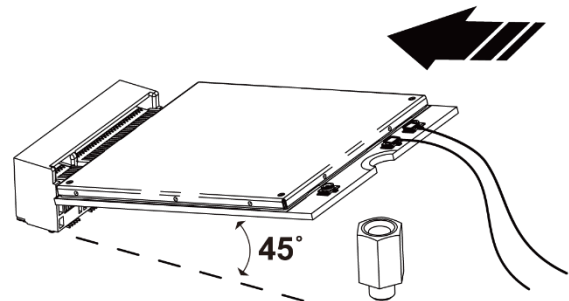
\*Place a copper pillar (M3x6.6L) at the location highlighted in the picture



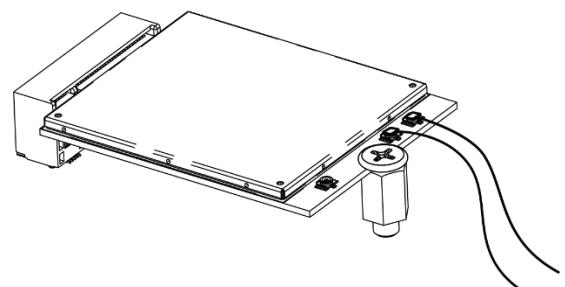
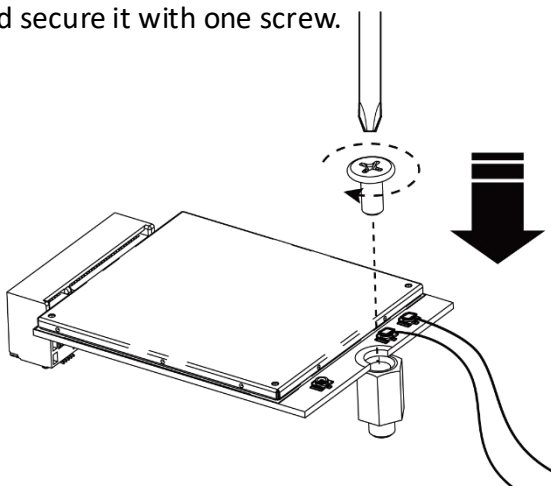
### 2. Connect the SMA cables to the communication (4G/5G) module.



### 3. Insert the communication (4G/5G) module at a 45-degree angle.



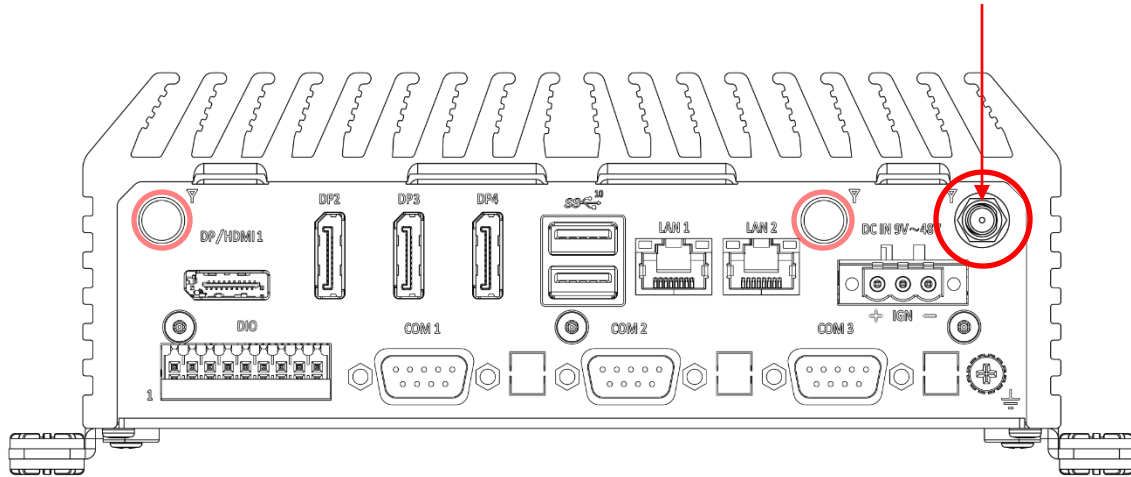
### 4. Press the communication module down and secure it with one screw.



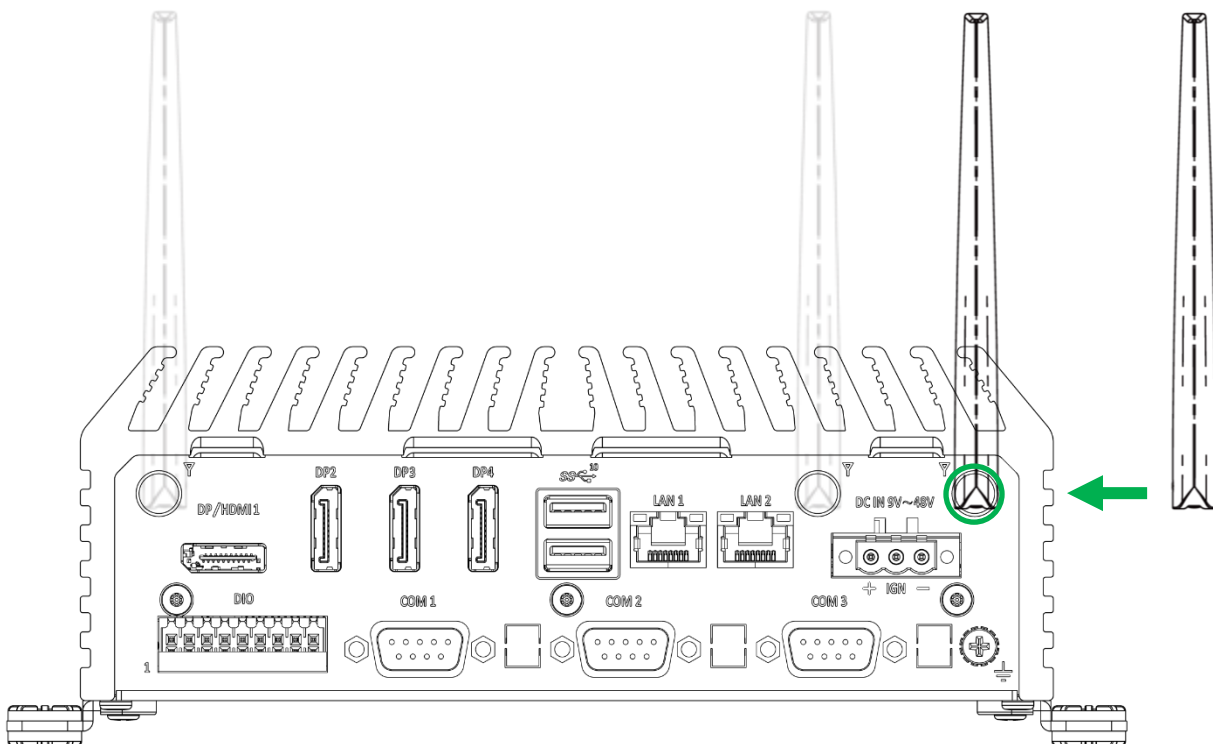
5. Assemble the antenna and SMA jack together; the outcome should resemble the picture below.

5-1. Remove antenna hole cover on the system panel.

5-2. Attach the cable end of the wireless RF connector to the communication module.

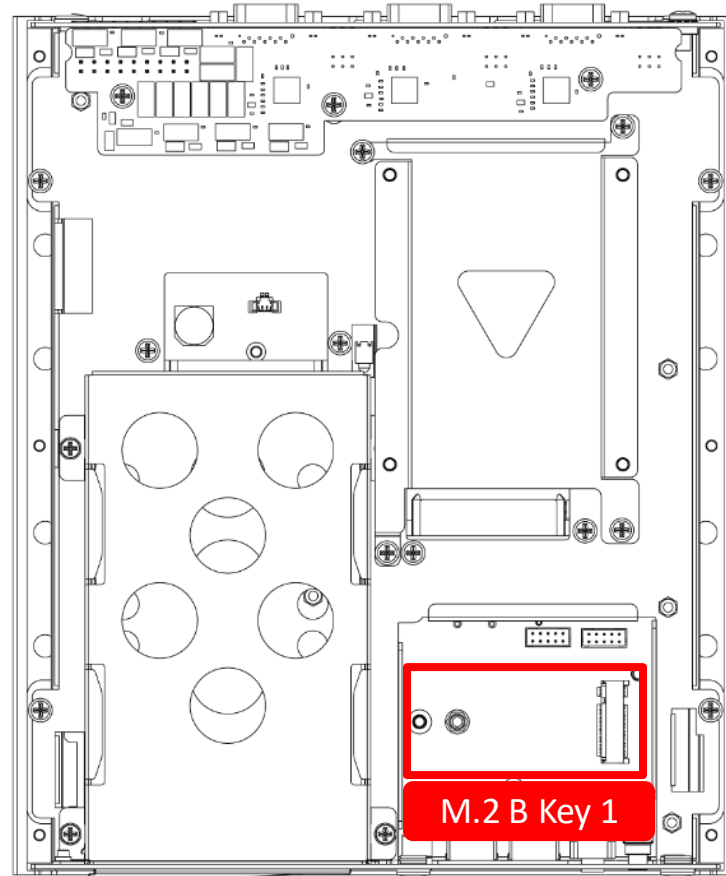


Assemble the antenna  
and SMA jack together



## Installing 4G/5G Module and Antenna

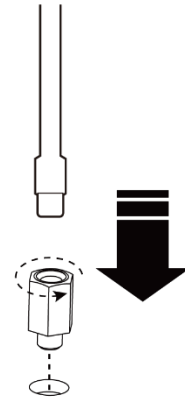
### 3.6.2 M.2 B Key 1



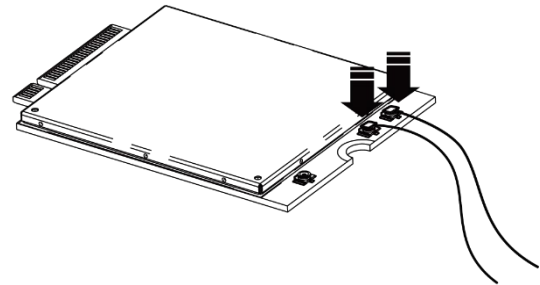
### 1. Assemble the copper stud



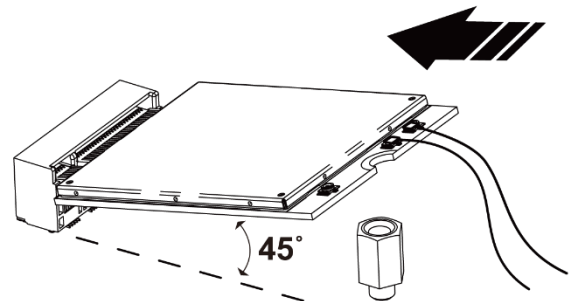
\*Place a copper pillar (M3x6.6L) at the location highlighted in the picture



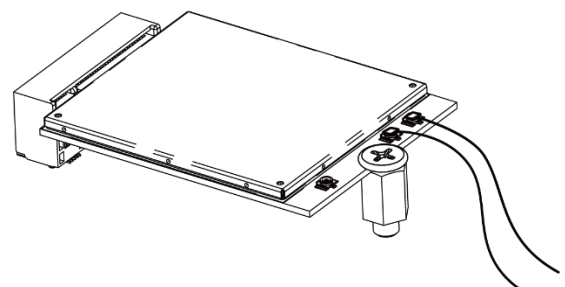
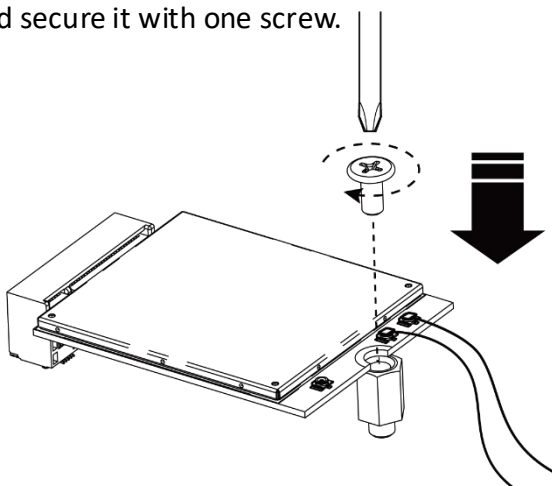
### 2. Connect the SMA cables to the communication (4G/5G) module.



### 3. Insert the communication (4G/5G) module at a 45-degree angle.



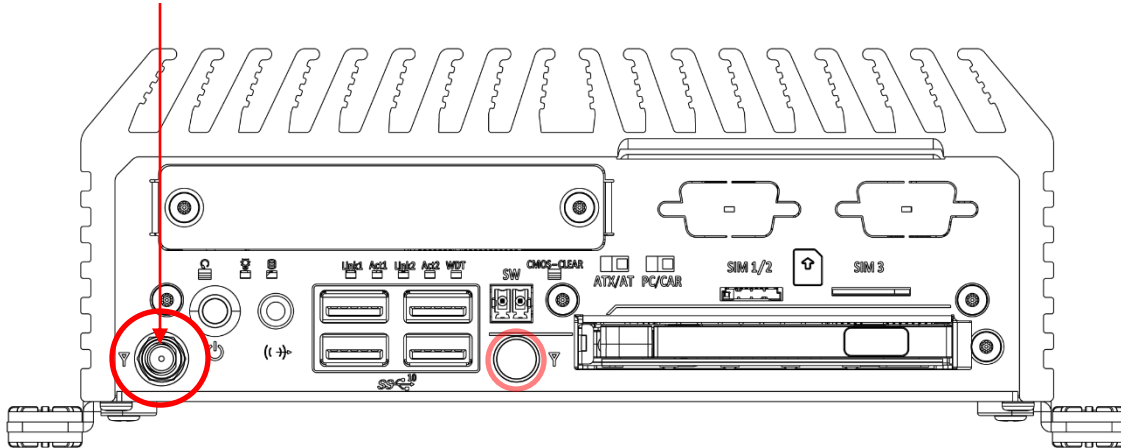
### 4. Press the communication module down and secure it with one screw.



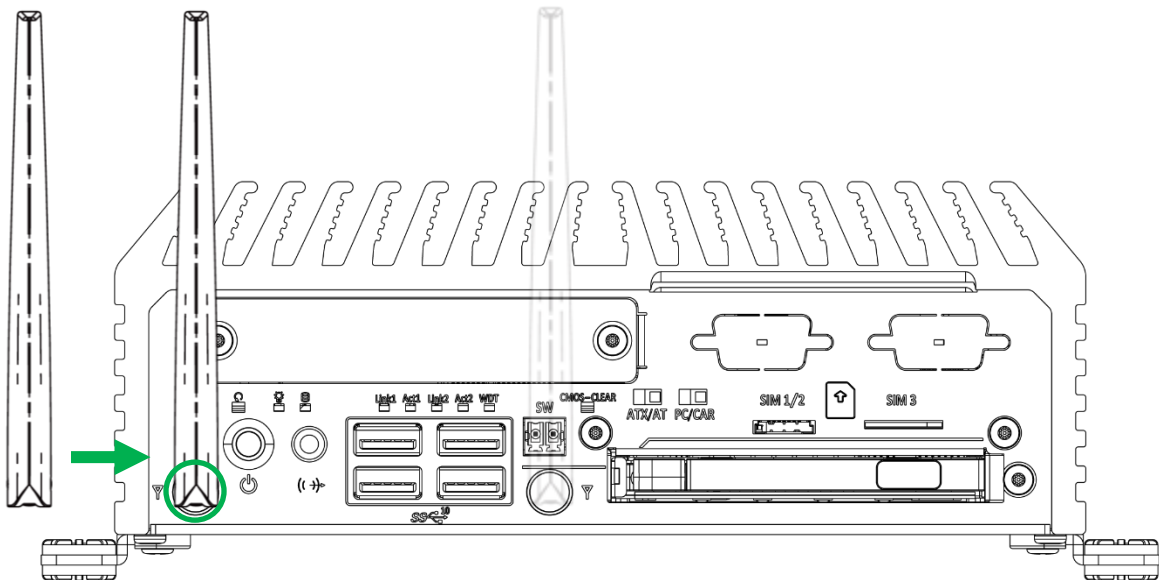
5. Assemble the antenna and SMA jack together; the outcome should resemble the picture below.

5-1. Remove antenna hole cover on the system panel.

5-2. Attach the cable end of the wireless RF connector to the communication module.

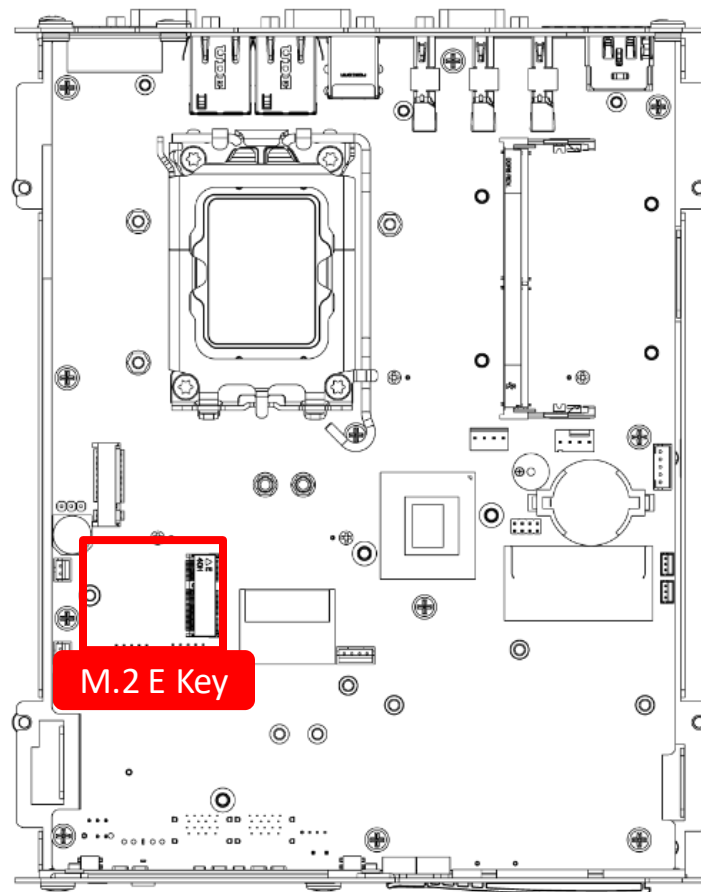


Assemble the antenna  
and SMA jack together

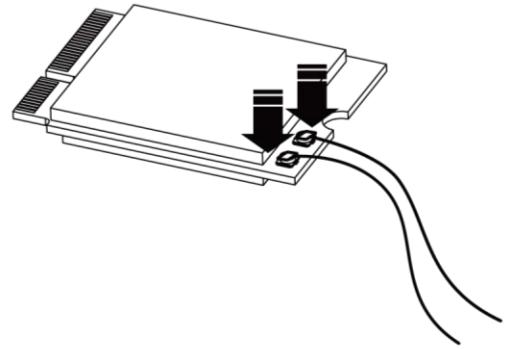


## 3.7 Installing Wi-Fi Module and Antenna

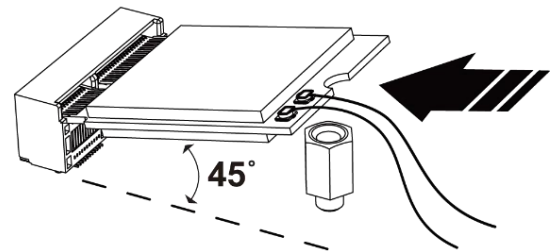
The M.2 E-Key supports Wi-Fi module, , as highlighted in the picture below.



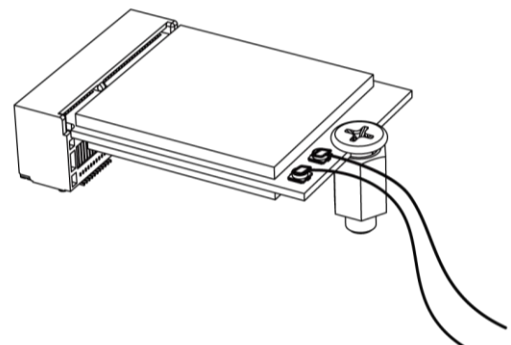
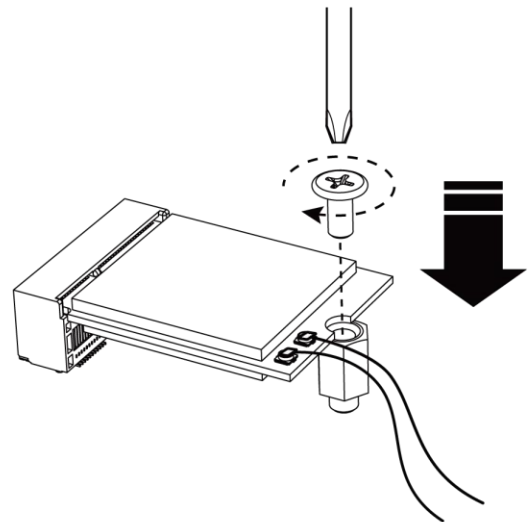
1. Connect the SMA cables to the Wi-Fi module.



2. Insert the Wi-Fi module at a 45-degree angle.



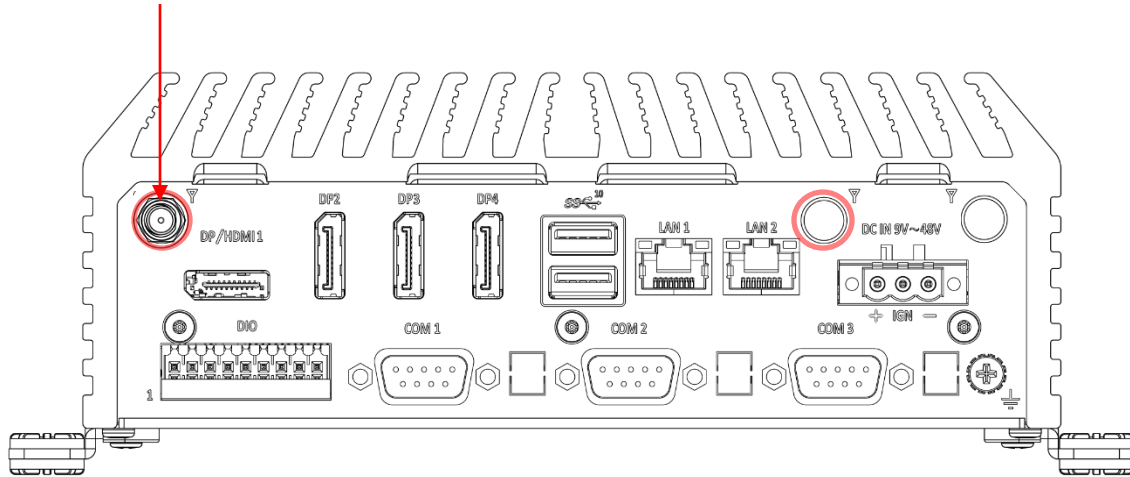
3. Press the Wi-Fi module down and secure it with one screw.



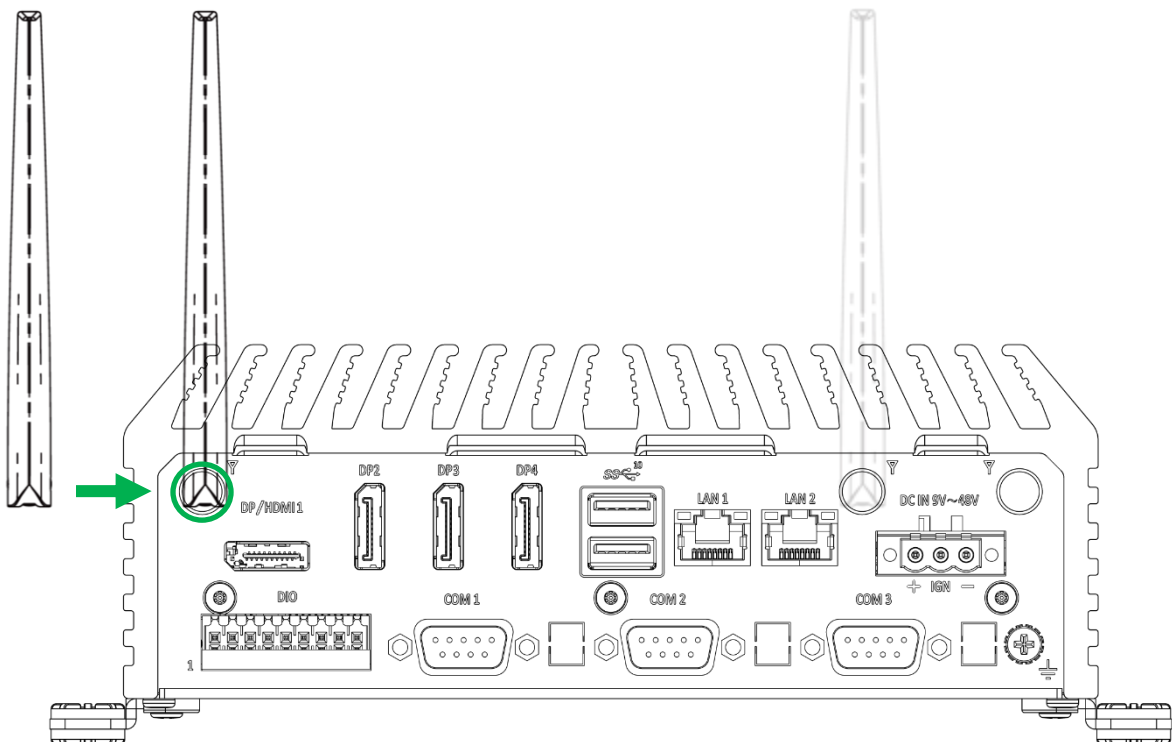
4. Assemble the antenna and SMA jack together; the outcome should resemble the picture below.

4-1. Remove antenna hole cover on the system panel.

4-2. Attach the cable end of the wireless RF connector to the communication module.

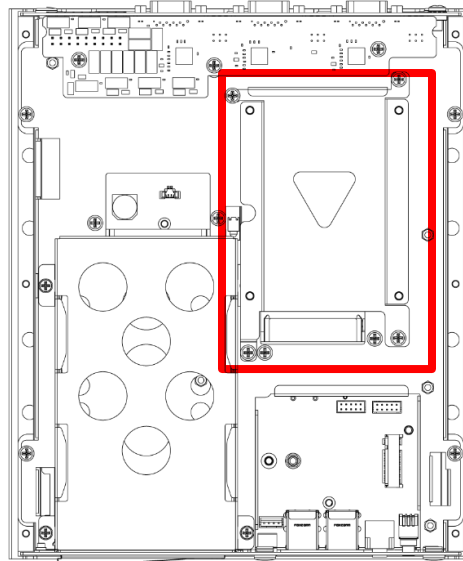


Assemble the antenna  
and SMA jack together

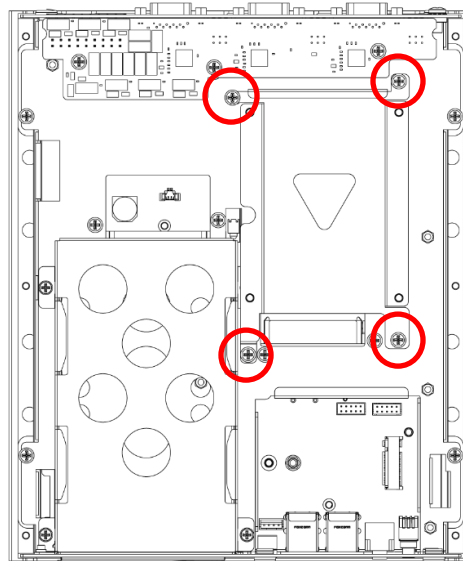


## 3.8 Installing HDD on internal SATA HDD bay

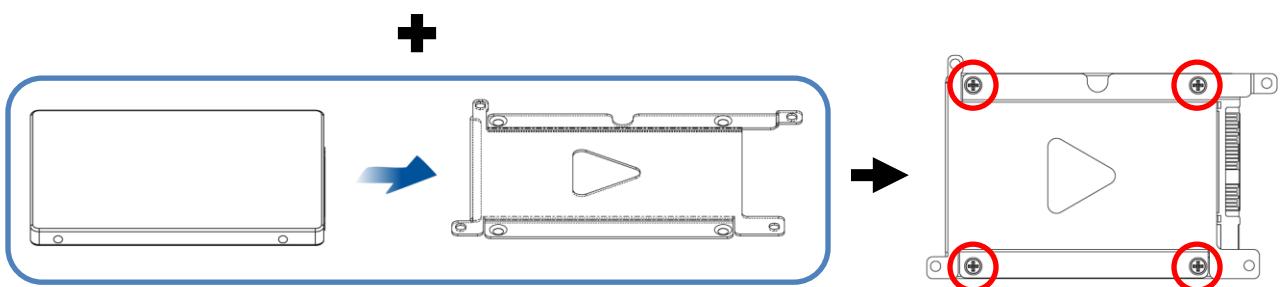
1. One internal SATA HDD bay is available for RCO-3000-RPL series.



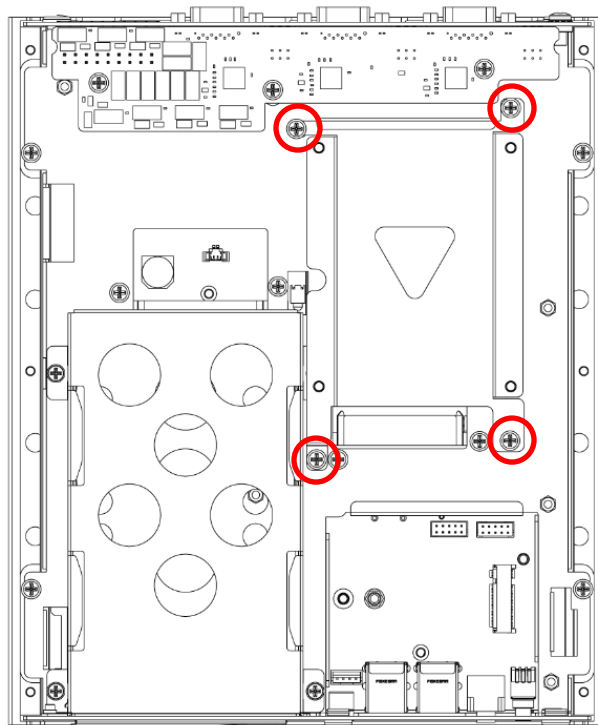
2. Unscrew the four screws (M3x5L) to remove the internal SATA HDD bay.



3. Lock the 2.5" HDD with HDD bracket using four screws (M3x4L).

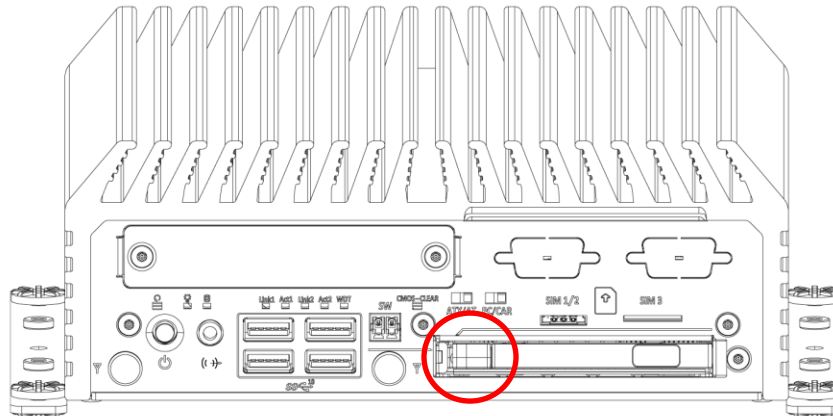


4. Fasten the four screws to lock the internal HDD bracket.

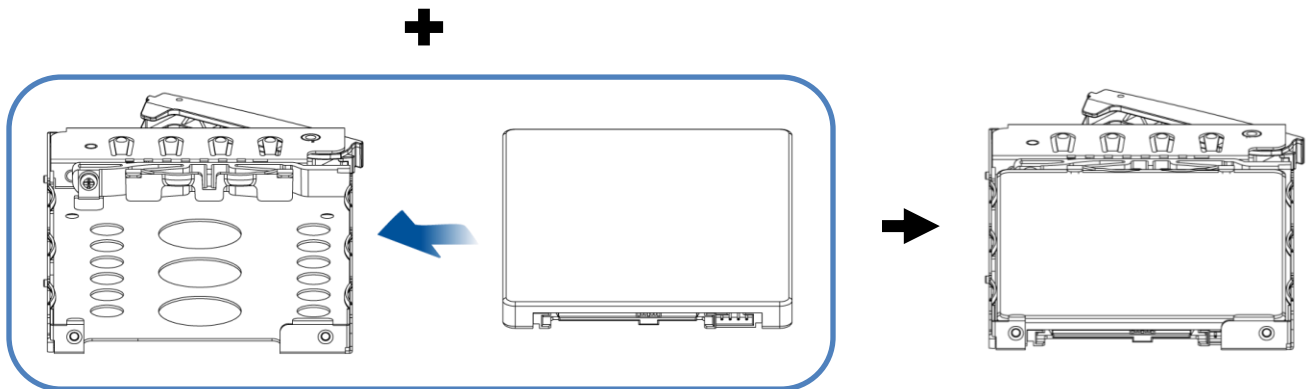


### 3.9 Installing HDD on removable SATA HDD tray

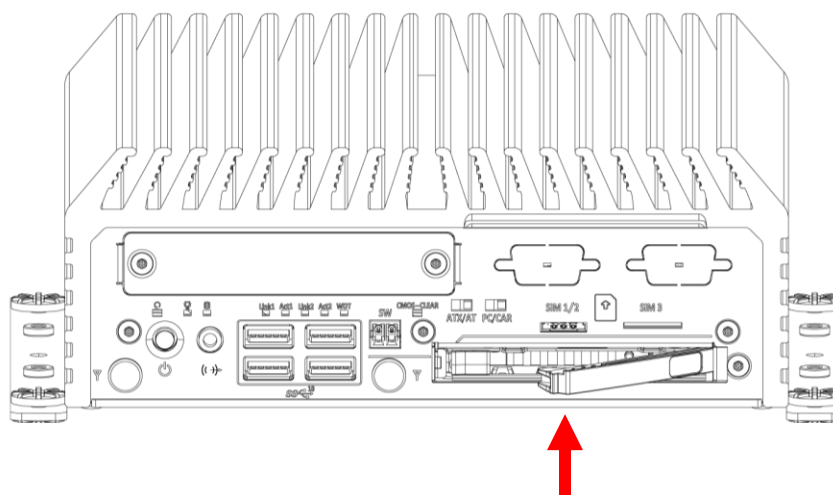
1. One removable SATA HDD tray available for RCO-3000-RPL Series.  
Open the tray lock (as highlighted in red circle), and remove the tray.



2. Unlock the drive lock and insert the HDD/SSD.

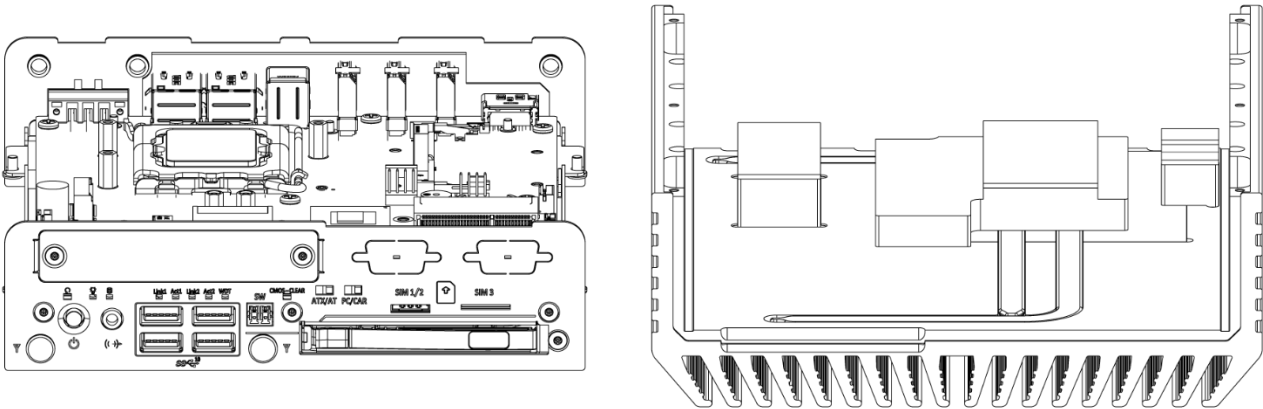


3. Slide the HDD tray back and close the tray lock.

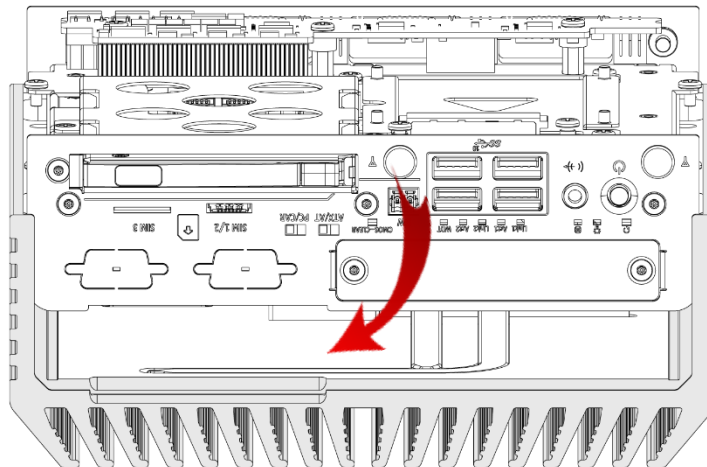


## 3.10 Assembling chassis top cover

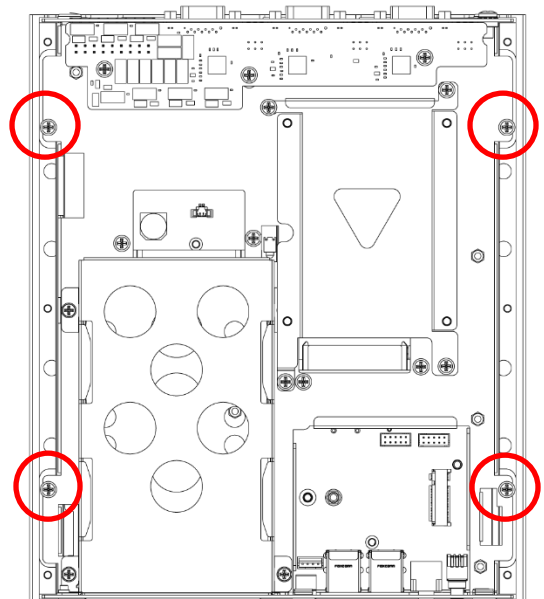
1. Pictured below is the separated system body (left) and external cover (right).



2. Turn the system body upside down and place it vertically towards the external cover.

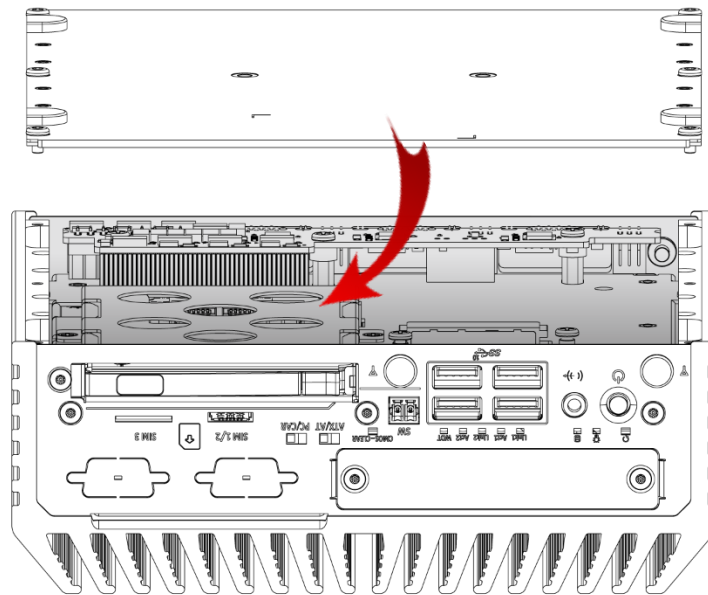


3. Secure the system body with four screws (M3x5L).

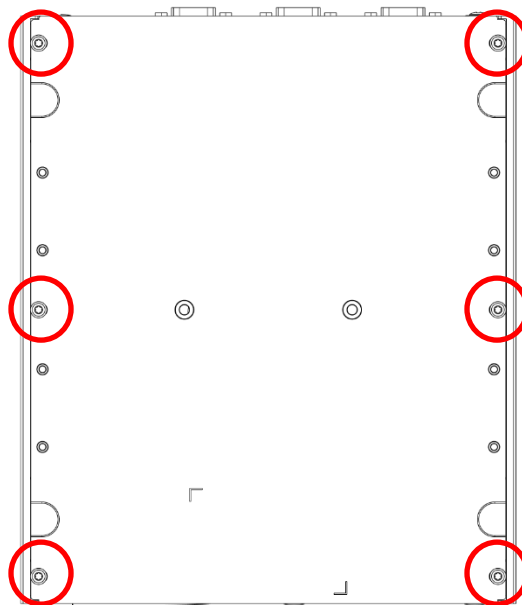


### 3.11 Assembling chassis bottom cover

1. Place the bottom cover according to the below direction and make sure the rail is facing inside the system.

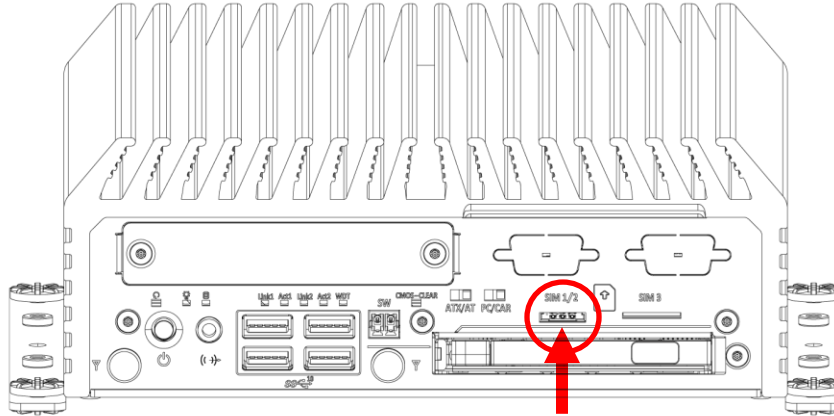


2. Secure the bottom cover with the six screws (M3x5L).



## 3.12 Installing SIM card

1. Pull out the SIM card tray in order to put the Mini SIM cards.



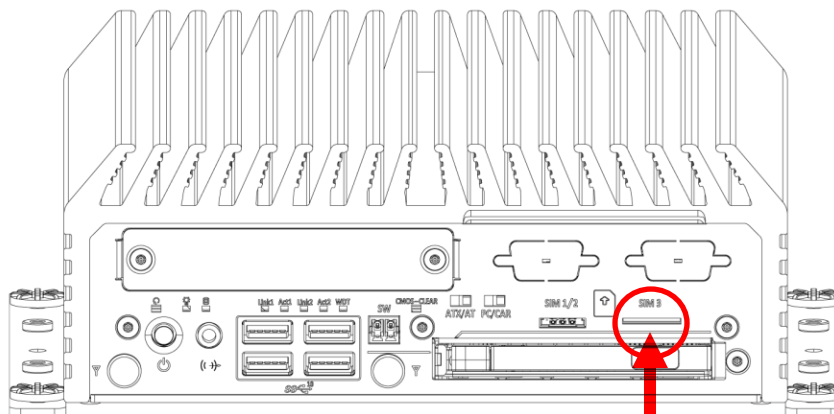
2. Place the Mini SIM card on the front of the tray for SIM1.



3. Place the Mini SIM card on the back of the



4. Insert SIM card into the socket for SIM3.

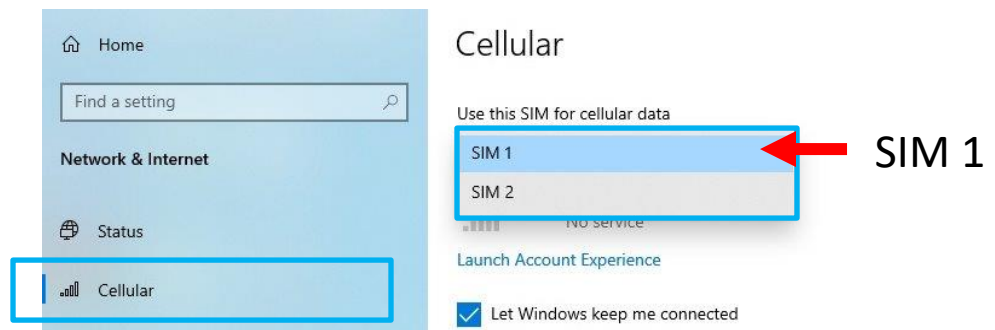
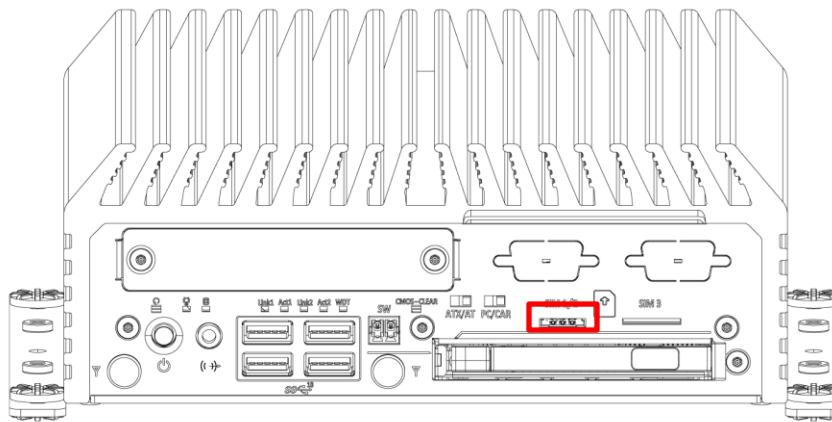


5. Please note that the installation of SIM cards has to match the installation of M.2 B Key slots.

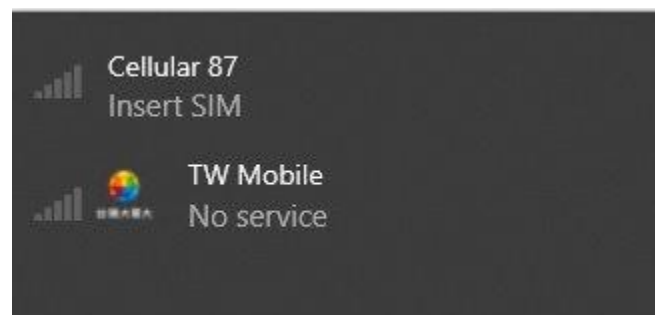
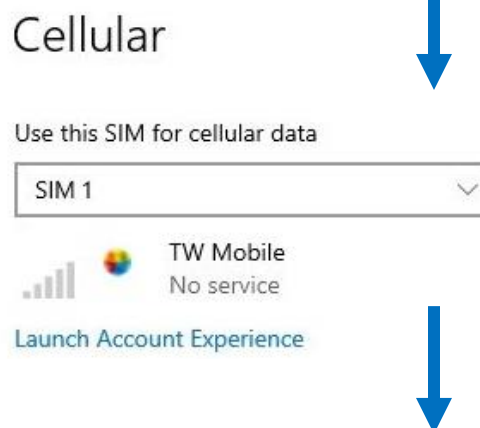
| SIM Card Socket Number | Matching M.2 B Key slots |
|------------------------|--------------------------|
| SIM 1/2                | M.2 B Key 2              |
| SIM 3                  | M.2 B Key 1              |

### 3.13 SIM OS Settings

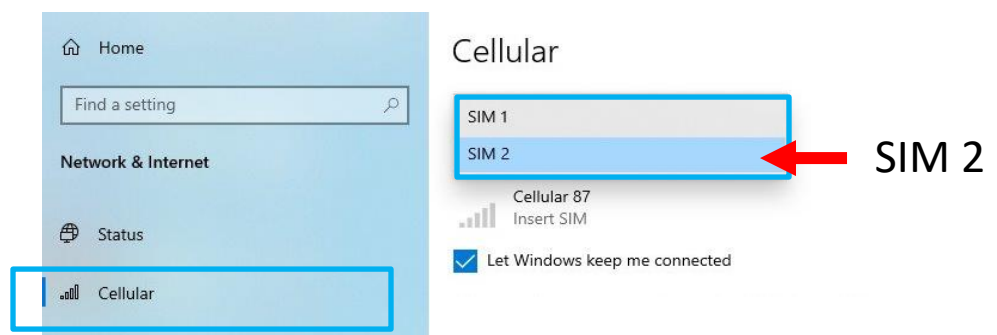
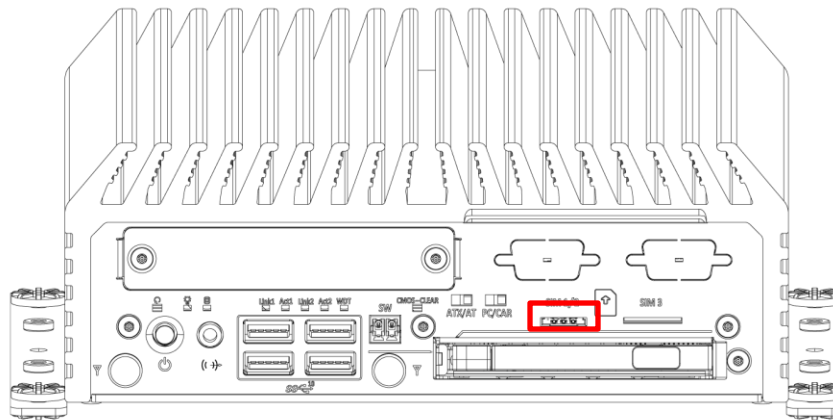
Place the Mini SIM card on front of the tray for SIM1. The Cellular menu will show the SIM 1/2 option.



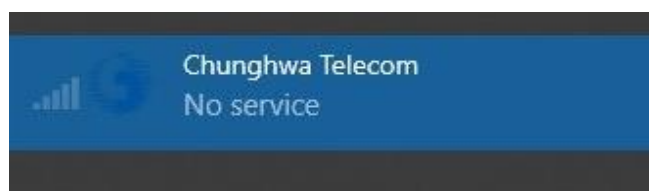
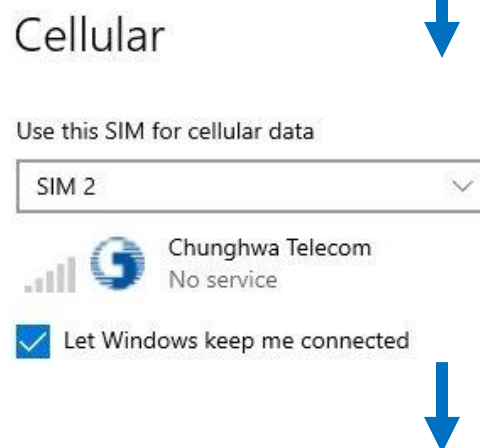
When the Mini SIM card on the front tray for SIM1 is inserted, the operating system will connect to SIM 1.



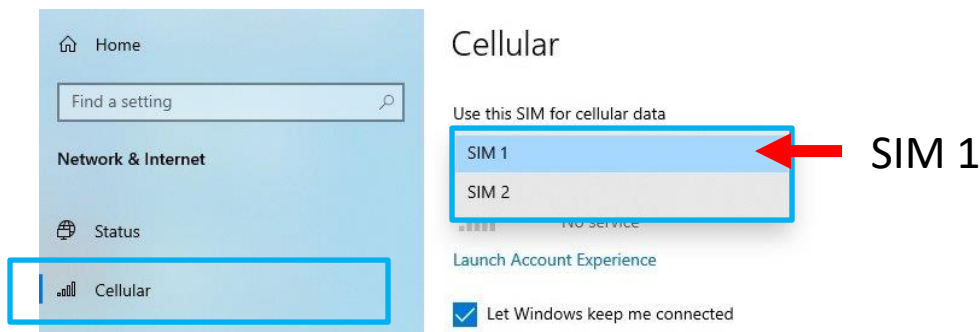
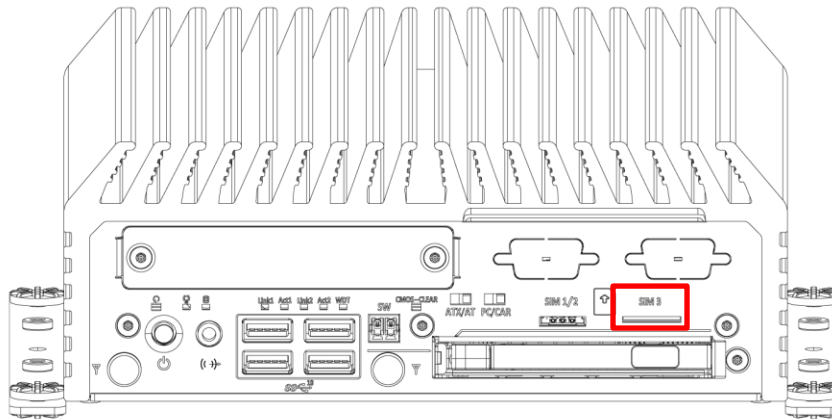
Place the Mini SIM card on back of the tray for SIM2. The Cellular menu will show the SIM 1/2 option.



When the Mini SIM card on the back tray for SIM2 is inserted, the operating system will connect to SIM 2.



Insert a SIM card into the SIM 3 socket. The Cellular menu will show the SIM 1/2 option. Once the SIM card is inserted, the operating system will automatically connect to SIM1 (as shown in the image).



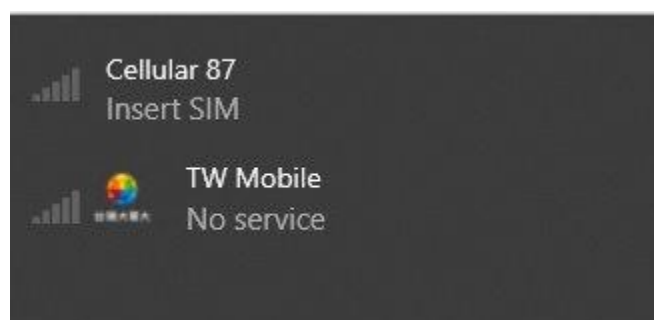
## Cellular

Use this SIM for cellular data

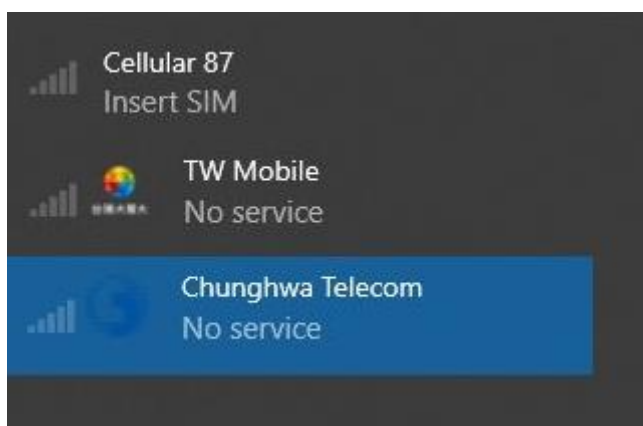
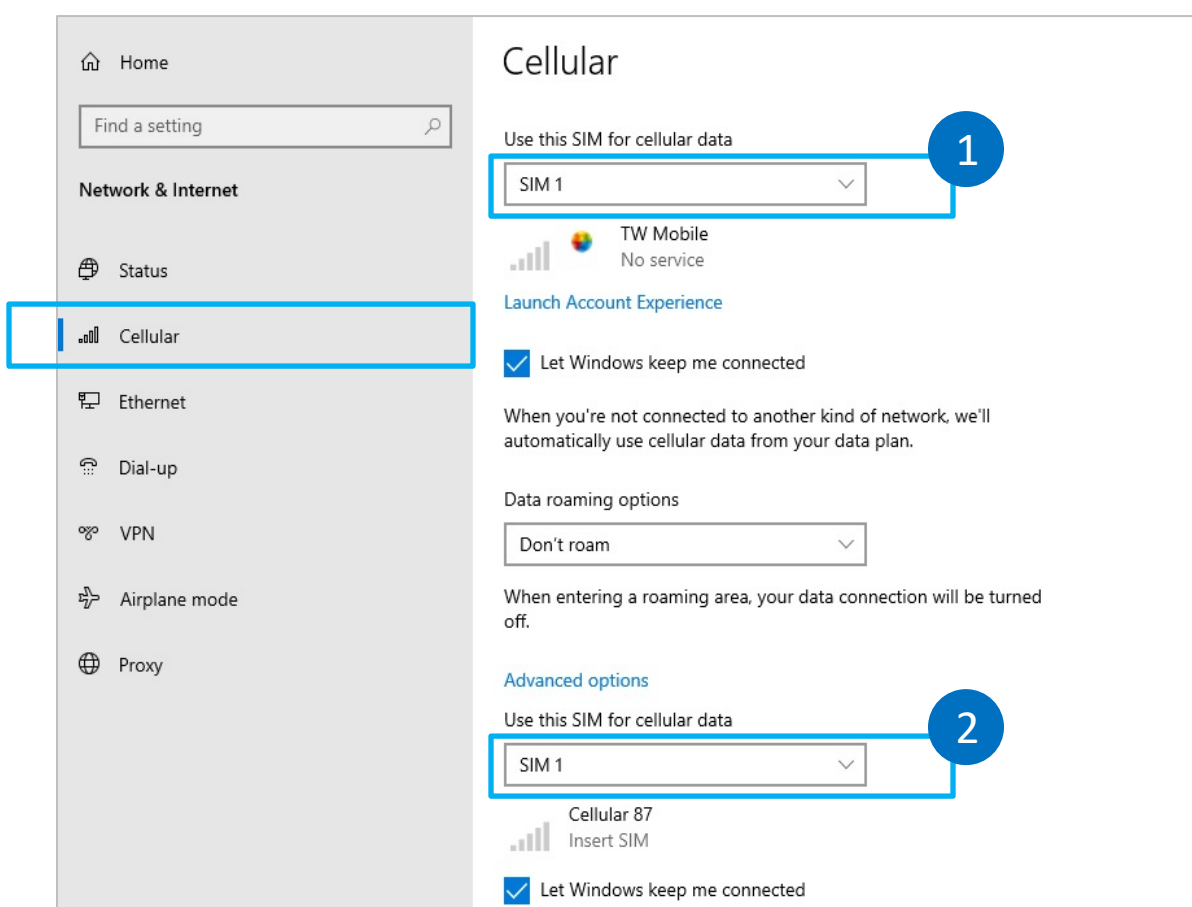
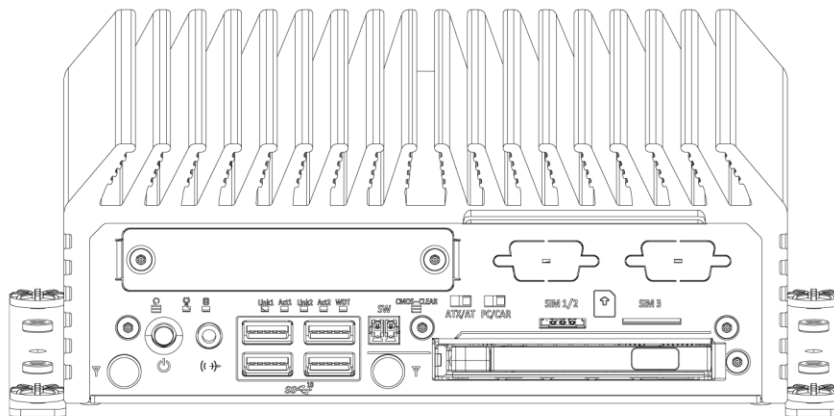


TW Mobile  
No service

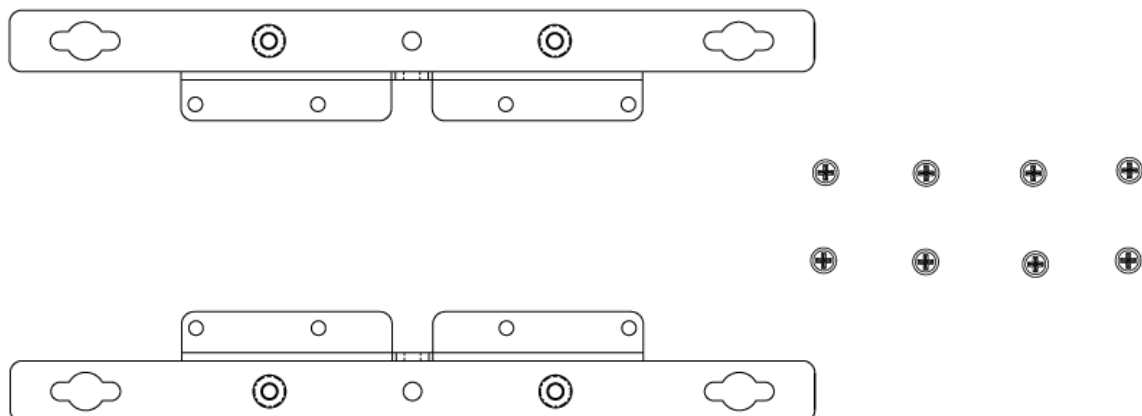
[Launch Account Experience](#)



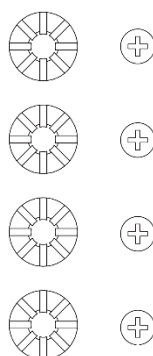
When SIM cards are inserted into both the SIM1/2 slot and the SIM3 socket, the Cellular menu will display two separate SIM options. Users can select which SIM card to use for external connections as shown in the image below.



### Wall Mount

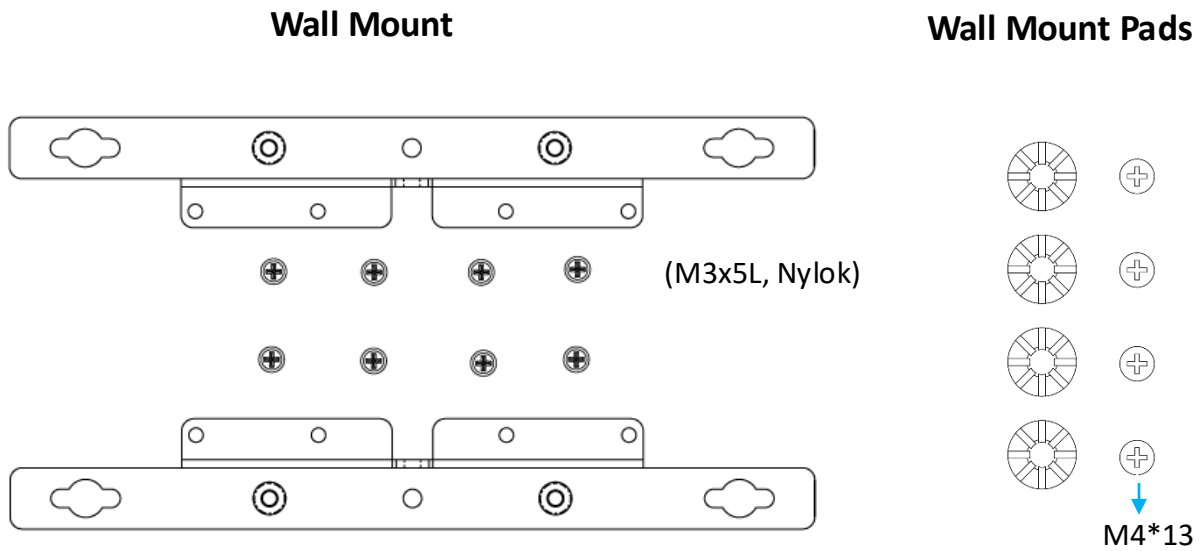


### Wall Mount Pads

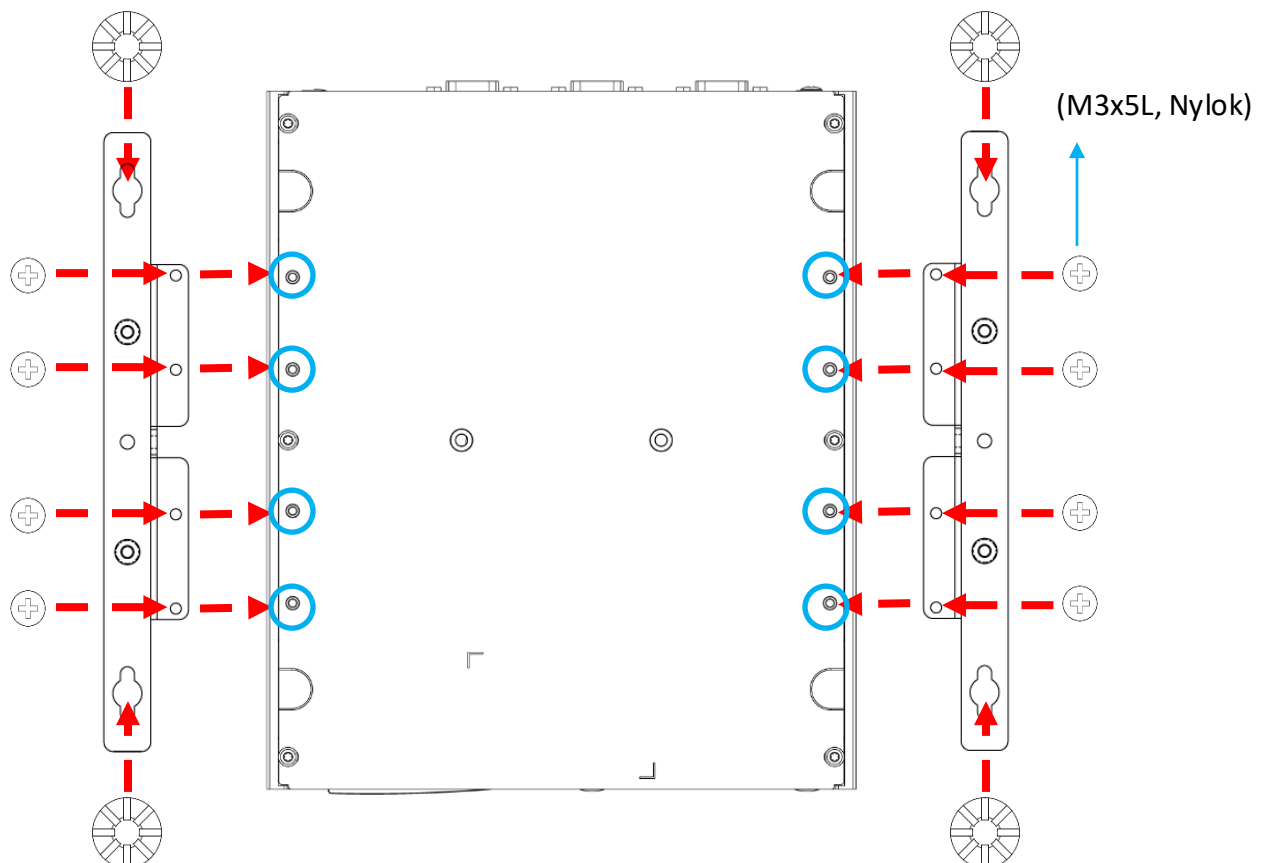


## 3.14 Installing Wall Mount

1. Wall Mount holder is available for DCO-1000-ASL series.

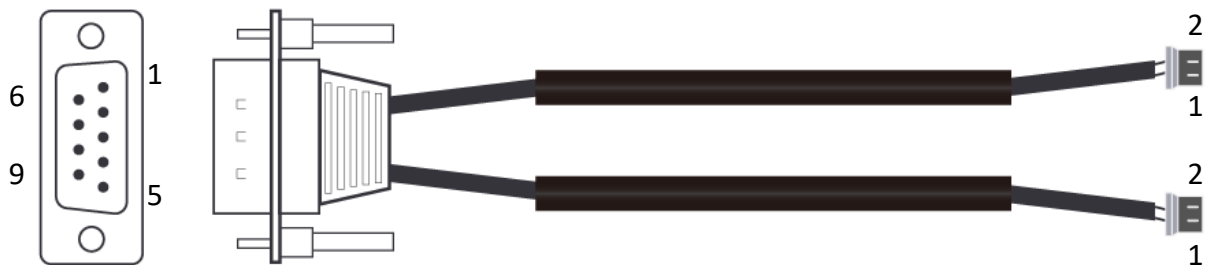


2. Assemble the anti-vibration grommets and screws together.



## Appendix A Optional CANBus Cable

### 1. 1-TCAN00001 > Dual Channel



| CONN1   |          |       | CONN2   | CONN3   |
|---------|----------|-------|---------|---------|
| PIN NO. | FUNCTION | COLOR | PIN NO. | PIN NO. |
| 7       | CAN1 H   | Green | 2       | –       |
| 2       | CAN1 L   | White | 1       | –       |
| 5       | CAN2 H   | Blue  | –       | 2       |
| 4       | CAN2 L   | White | –       | 1       |

### 2. 1-TCAN00002 > Single Channel



| CONN1   |          |       | CONN2   |
|---------|----------|-------|---------|
| PIN NO. | FUNCTION | COLOR | PIN NO. |
| 7       | CAN1 H   | Green | 2       |
| 2       | CAN1 L   | White | 1       |

# Chapter 4

## BIOS Setup

## 4.1 BIOS Introduction

The BIOS provides an interface to modify the configuration. When the battery is removed, all the parameters will be reset.

### BIOS Setup

Power on the embedded system and by pressing <Del> immediately allows you to enter the setup screens. If the message disappears before you respond and you still wish to enter the Setup, restart the system by turning it OFF and ON or pressing the RESET button.

You may also restart the system by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys.

| Control Keys  |                                              |
|---------------|----------------------------------------------|
| <→> <←>       | Select Screen                                |
| <↑> <↓>       | Select Item                                  |
| <Enter>       | Select                                       |
| <Page Up/+>   | Increases the numeric value or makes changes |
| <Page Down/-> | Decreases the numeric value or makes changes |
| <F1>          | General Help                                 |
| <F2>          | Previous Value                               |
| <F3>          | Load Optimized Defaults                      |
| <F4>          | Save Configuration and Exit                  |
| <Tab>         | Select Setup Fields                          |
| <Esc>         | Exit BIOS Setup                              |

### Main Setup

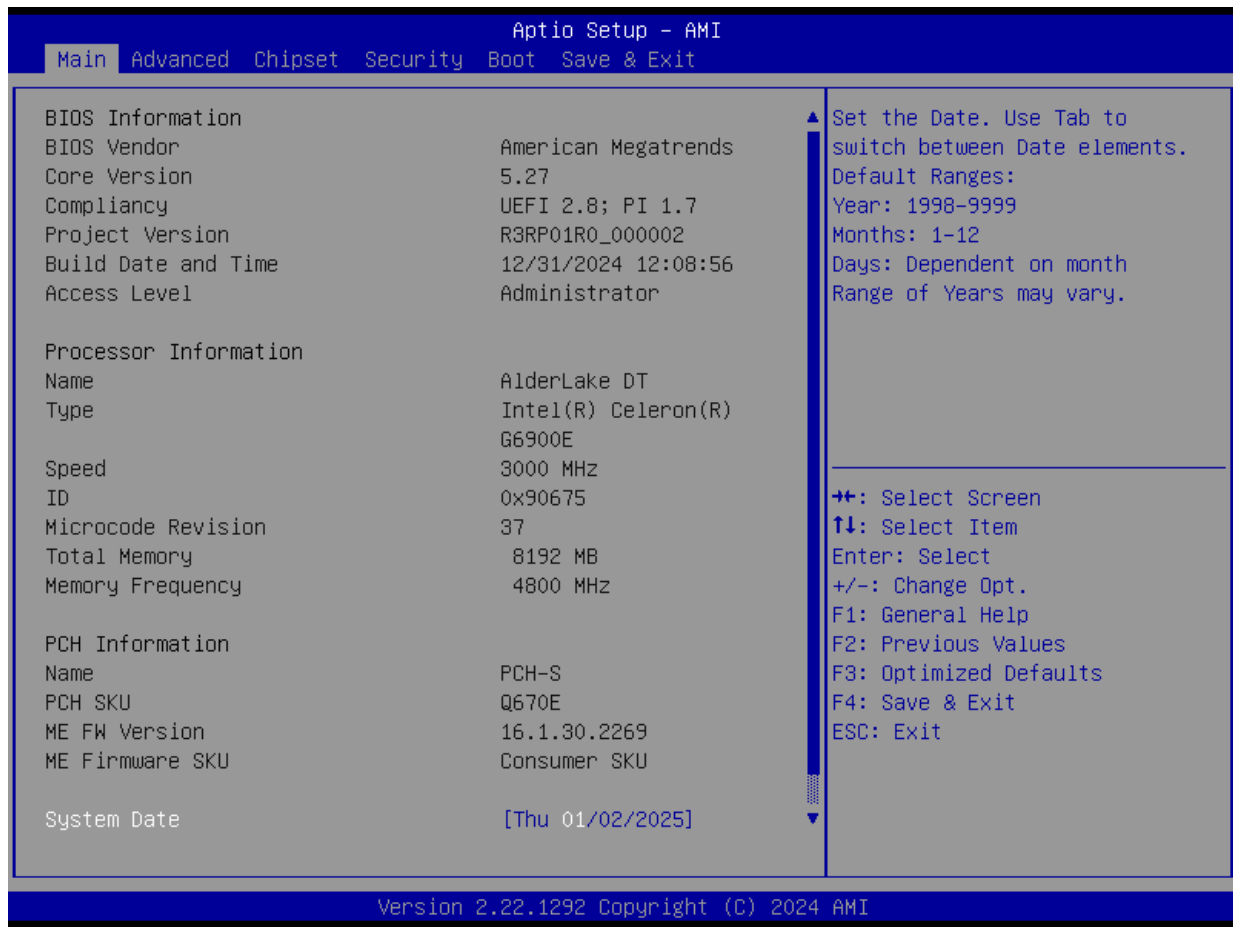
The main menu lists the setup functions you can make changes to. You can use the arrow keys ( ↑↓ ) to select the item. The on-line description of the highlighted setup function is displayed at the bottom of the screen.

### General Help <F1>

The BIOS setup program provides a General Help screen. You can call up this screen from any menu by simply pressing <F1>. The Help screen lists the appropriate keys to use and the possible selections for the highlighted item. Press <Esc> to exit the Help screen.

## 4.2 Main Setup

Press <Del> to enter BIOS CMOS Setup Utility. The Main setup screen is showed as following when the setup utility is entered. System Date/Time is set up in the Main Menu.



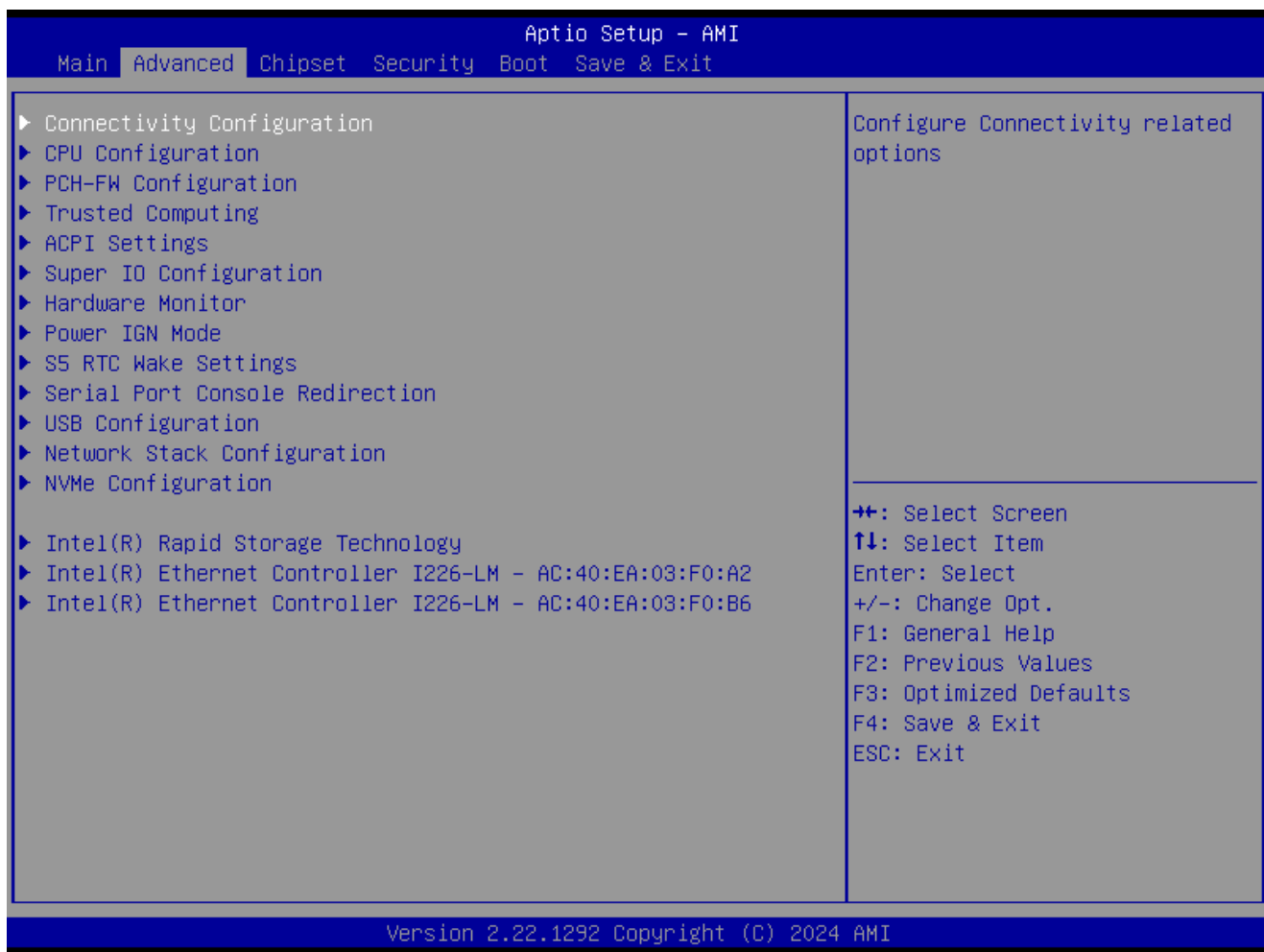
### ■ System Date

Set the system date. Please use <Tab> to switch between data elements.

### ■ System Time

Set the system time. Please use <Tab> to switch between time elements.

## 4.3 Advanced Setup

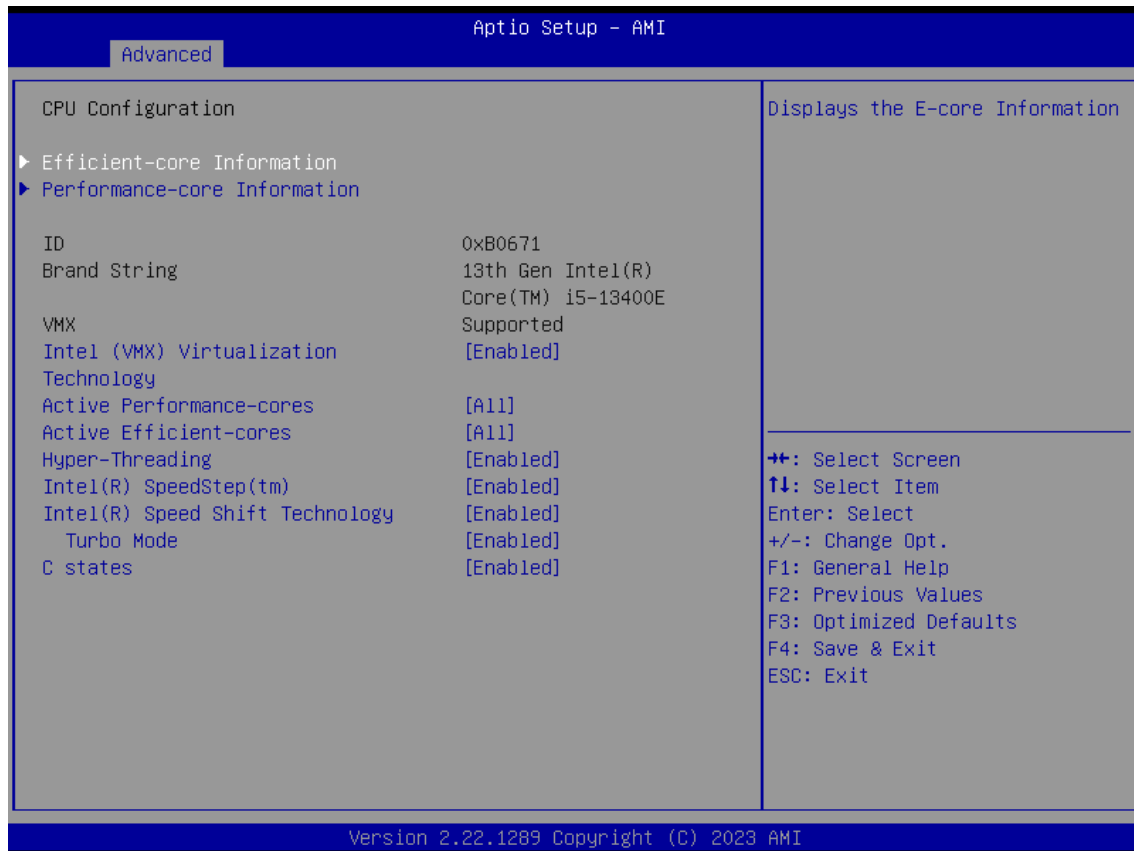


### 4.3.1 Connectivity Configuration



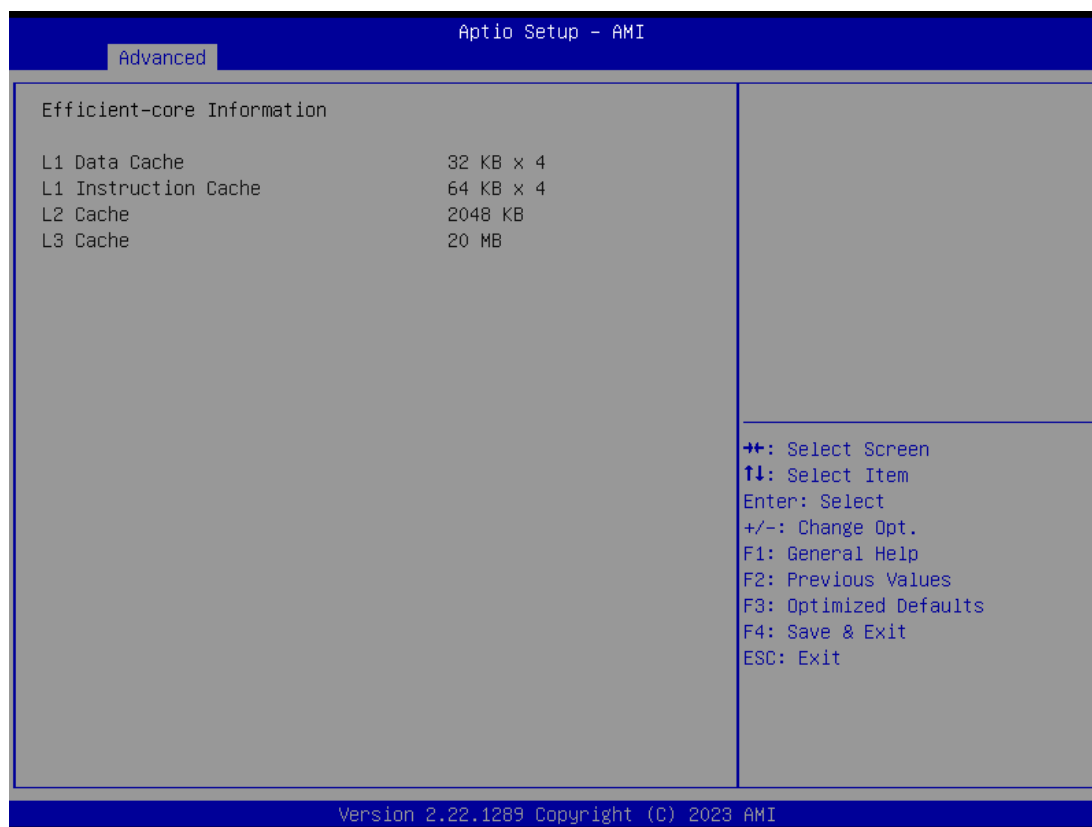
| Item              | Options                                             | Description                                                                                                                                                                                                                                                                                                                                                              |
|-------------------|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CNVi Mode</b>  | Disable Integrated, Auto Detection <b>[Default]</b> | This option configures Connectivity. [Auto Detection] means that if Discrete solution is discovered it will be enabled by default. Otherwise Integrated solution (CNVi) will be enabled; [Disable Integrated] disables Integrated Solution. NOTE: When CNVi is present, the GPIO pins that are used for radio interface cannot be assigned to the other native function. |
| <b>Wi-Fi Core</b> | Enabled <b>[Default]</b> , Disabled                 | This is an option intended to Enable/Disable Wi-Fi Core in CNVi                                                                                                                                                                                                                                                                                                          |
| <b>BT Core</b>    | Enabled <b>[Default]</b> , Disabled                 | This is an option intended to Enable/Disable BT Core in CNVi.                                                                                                                                                                                                                                                                                                            |

### 4.3.2 CPU Configuration

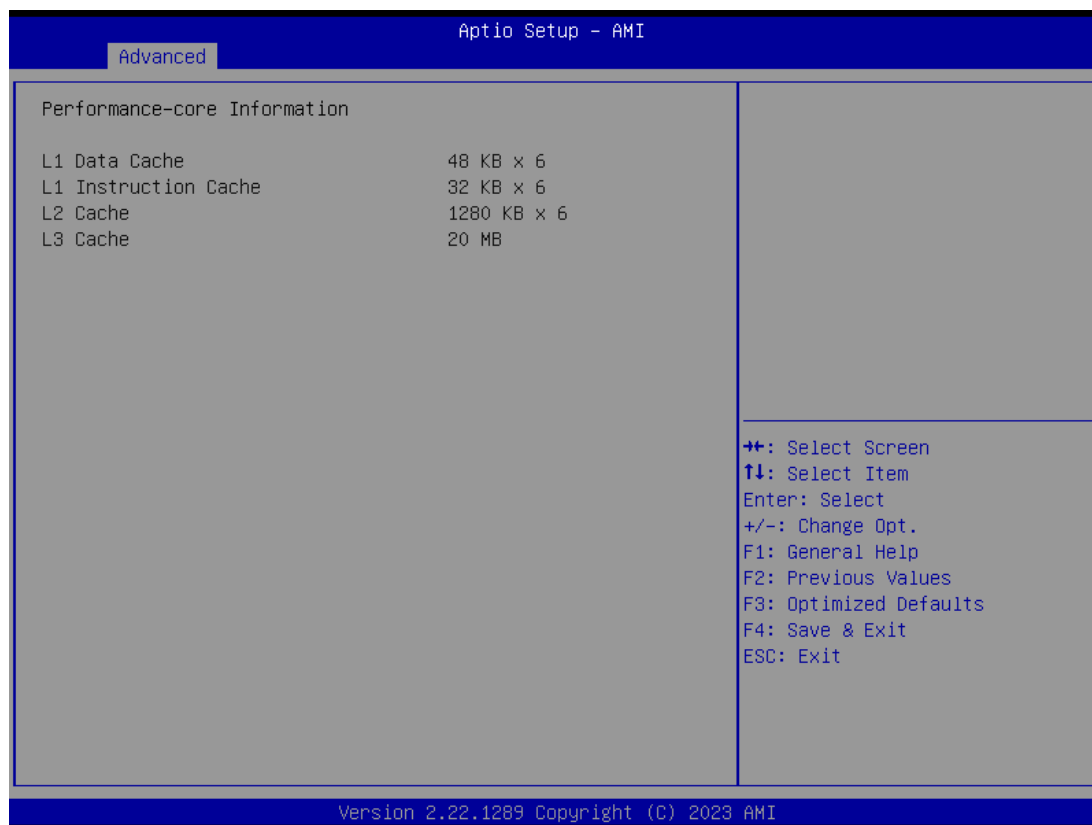


| Item                                         | Options                         | Description                                                                                                                                                        |
|----------------------------------------------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Intel (VMX) Virtualization Technology</b> | Disabled, Enabled[Default]      | When enabled, a VMM can utilize the additional hardware capabilities provided by Virtualization Technology.                                                        |
| <b>Active Performance-cores</b>              | All[Default] ,<br>5,4,3,<br>2,1 | Number of P-cores to enable in each processor package. Note: Number of Cores and E-cores are looked at together. When both are {0,0}, Pcode will enable all cores. |
| <b>Active Efficient-cores</b>                | All[Default] ,<br>3,2,<br>1,0   | Number of E-cores to enable in each processor package. Note: Number of Cores and E-cores are looked at together. When both are {0,0}, Pcode will enable all cores. |
| <b>Hyper-Threading</b>                       | Disabled, Enabled[Default]      | Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading Technology).        |
| <b>Intel(R) SpeedStep(tm)</b>                | Disabled, Enabled[Default]      | Allows more than two frequency ranges to be supported.                                                                                                             |
| <b>Intel(R) Speed Shift Technology</b>       | Disabled, Enabled[Default]      | Enable/Disable Intel(R) Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.                      |
| <b>Turbo Mode</b>                            | Disabled, Enabled[Default]      | Enable/Disable processor Turbo Mode.                                                                                                                               |
| <b>C states</b>                              | Disabled, Enabled[Default]      | Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.                                                                     |

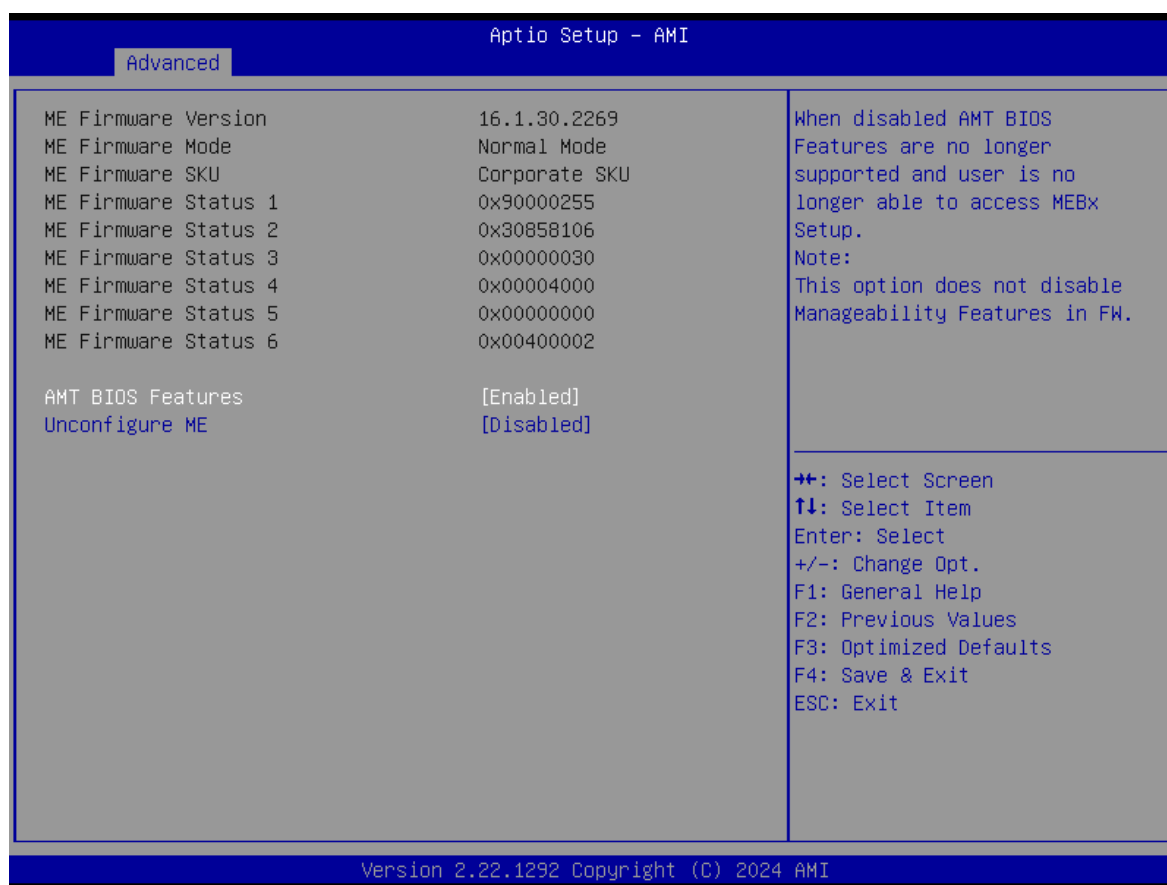
### 4.3.2.1 Efficient-core Information



### 4.3.2.2 Performance-core Information



### 4.3.3 PCH-FW Configuration



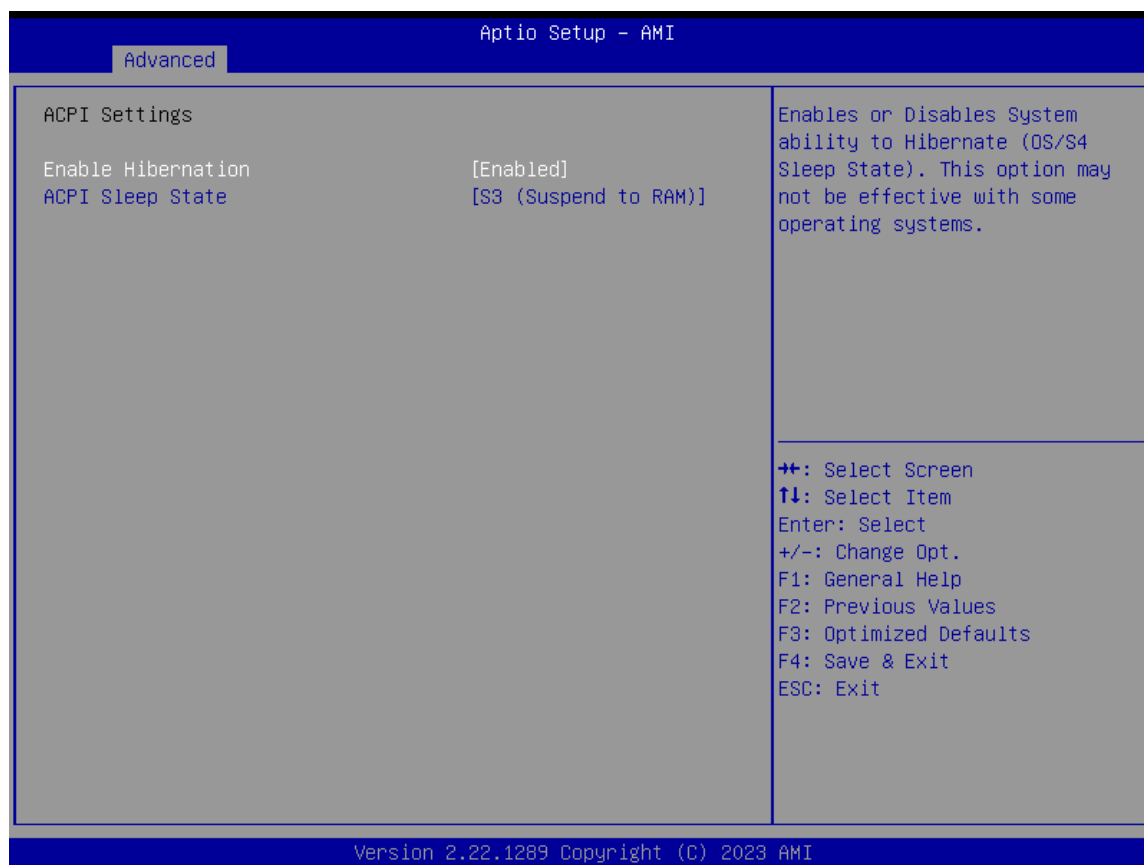
| Item              | Options                     | Description                                                                                                                                                                  |
|-------------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AMT BIOS Features | Disabled, Enabled[Default]  | When disabled AMT BIOS Features are no longer supported and user is no longer able to access MEBx Setup.<br>Note: This option does not disable Manageability Features in FW. |
| Unconfigure ME    | Disabled[Default] , Enabled | Unconfigure ME with resetting MEBx password to default on next boot.                                                                                                         |

### 4.3.4 Trusted Computing



| Item                           | Options                                 | Description                                                                                                                                     |
|--------------------------------|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Security Device Support</b> | Enabled,<br>Disabled <b>[Default]</b> , | Enable/Disable BIOS support for security device. O.S. will not show Security Device.TCG EFI protocol and INT1A interface will not be available. |
| <b>Pending operation</b>       | None <b>[Default]</b> ,<br>TPM Clear    | Schedule an Operation for the Security Device.<br>NOTE: Your Computer will reboot during restart in order to change State of Security Device.   |

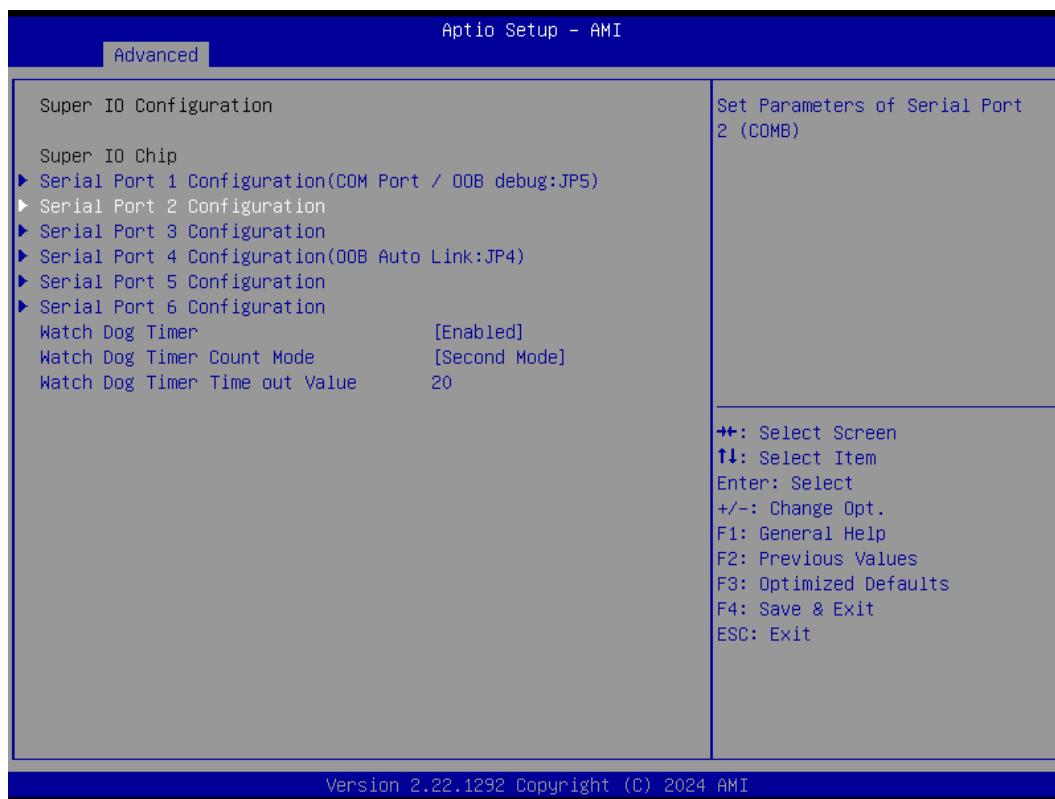
### 4.3.5 ACPI Settings



| Item                      | Options                                                   | Description                                                                                                                        |
|---------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>Enable Hibernation</b> | Disabled ,<br>Enabled <b>[Default]</b> ,                  | Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some operating systems. |
| <b>ACPI Sleep State</b>   | Suspend Disabled,<br>S3 (Suspend to RAM) <b>[Default]</b> | Select the highest ACPI sleep state the system will enter when the SUSPEDN button is pressed.                                      |

### 4.3.6 Super IO Configuration

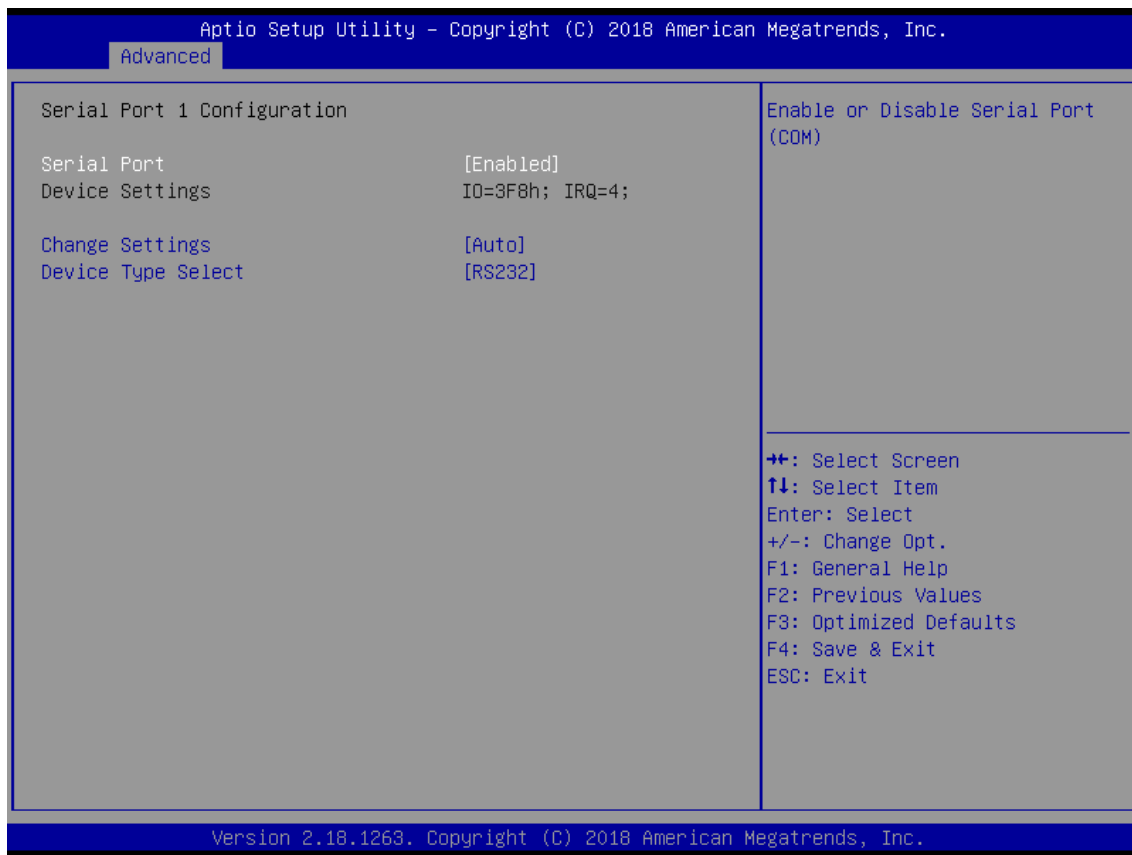
This setting allows you to select options for the Super IO Configuration, and change the value of the selected option.



| Item                                                          | Description                                                 |
|---------------------------------------------------------------|-------------------------------------------------------------|
| <b>Serial Port 1 Configuration(COM Port / OOB debug: JP5)</b> | Set Parameters of Serial Port 1 (COMA /OOB debug:JP5).      |
| <b>Serial Port 2 Configuration</b>                            | Set Parameters of Serial Port 2 (COMB).                     |
| <b>Serial Port 3 Configuration</b>                            | Set Parameters of Serial Port 3 (COMC).                     |
| <b>Serial Port 4 Configuration(OOB Auto Link:JP4)</b>         | Set Parameters of Serial Port 4 (COMD /OOB Auto Link:JP4)). |
| <b>Serial Port 5 Configuration</b>                            | Set Parameters of Serial Port 5 (COME).                     |
| <b>Serial Port 6 Configuration</b>                            | Set Parameters of Serial Port 6                             |

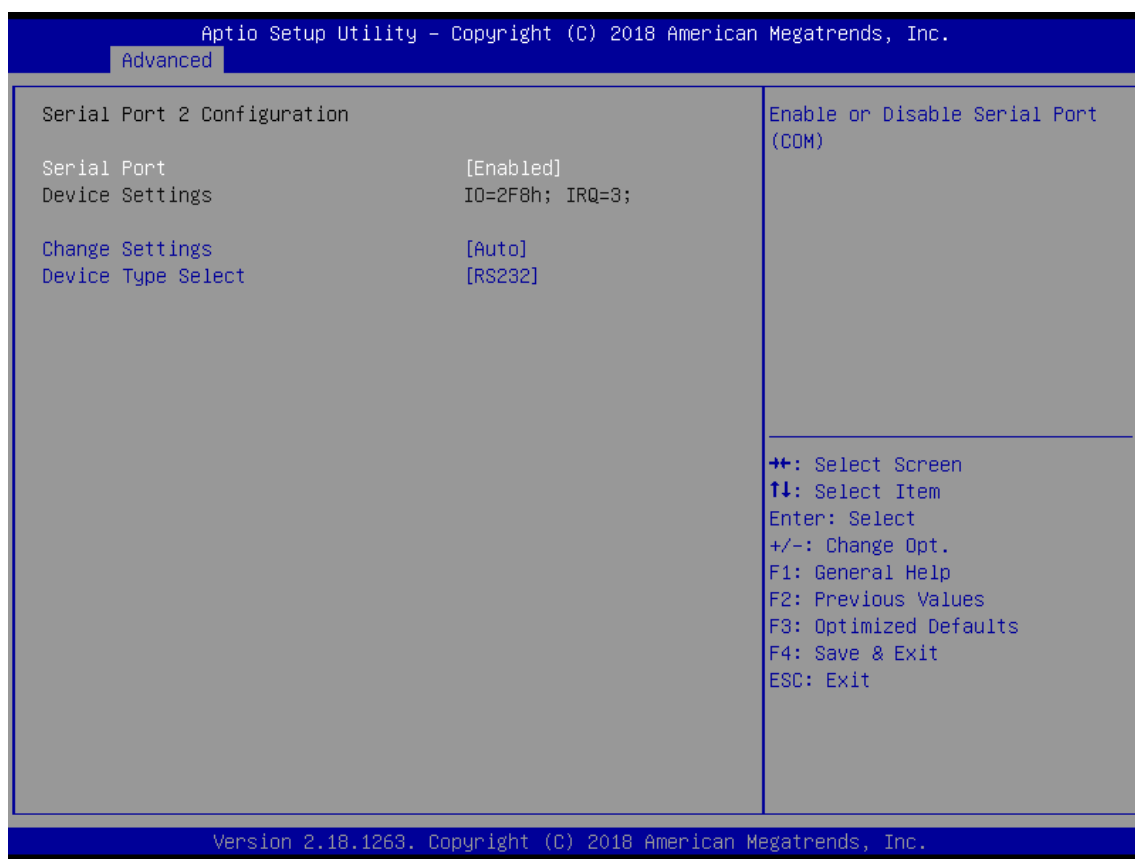
| Item                                  | Options                                            | Description                                   |
|---------------------------------------|----------------------------------------------------|-----------------------------------------------|
| <b>Watch Dog Timer</b>                | Disabled <b>[Default]</b> ,<br>Enabled             | Enabled or Disabled Watch Dog Timer function. |
| <b>Watch Dog Timer Count Mode</b>     | Second Mode <b>[Default]</b> ,<br>Minute Mode      | Select Second Mode or Minute Mode.            |
| <b>Watch Dog Timer Time out Value</b> | 20~255(Second) <b>[Default]</b> ,<br>1~255(Minute) | Watch Dog Timer Time out Value.               |

## Serial Port 1 Configuration



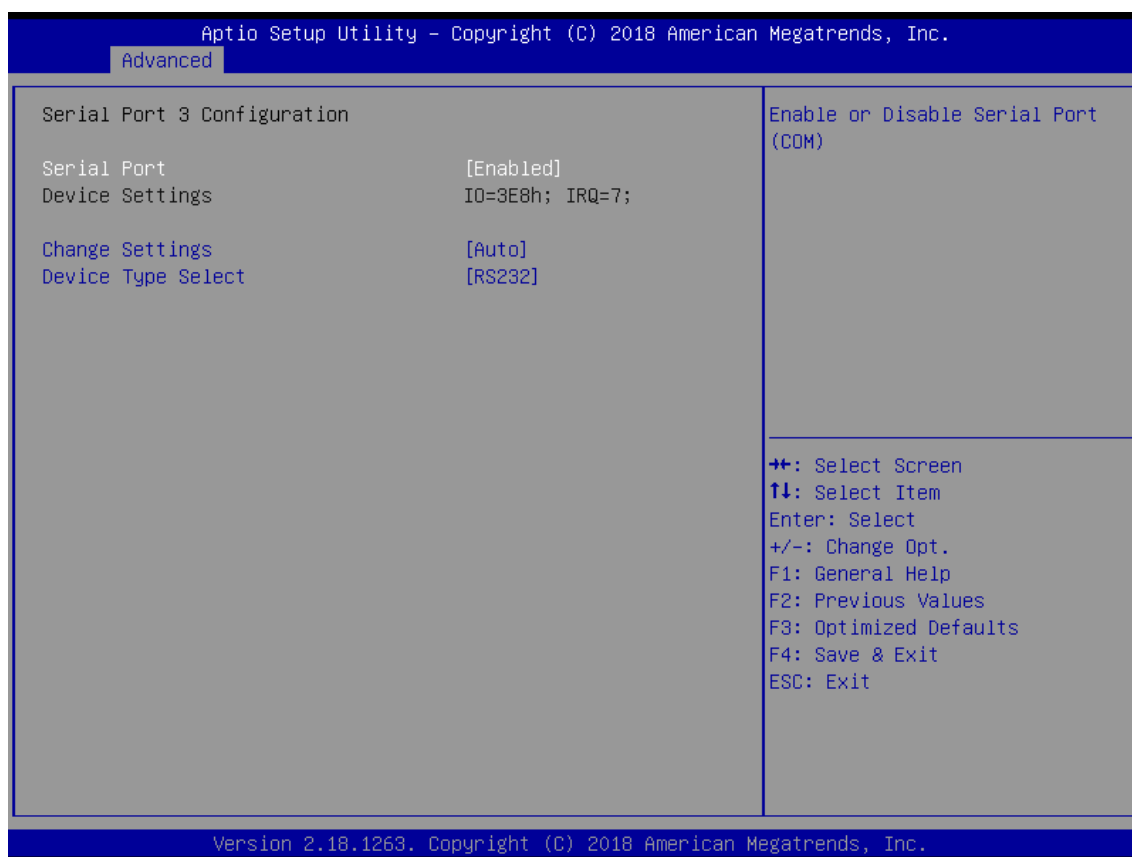
| Item                      | Options                                                                                                                                                                                           | Description                                                                             |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| Serial Port               | Disabled,<br>Enabled[Default]                                                                                                                                                                     | Enable or Disable Serial Port (COM).                                                    |
| Change Settings           | Auto[Default],<br>IO=3F8h; IRQ=4; ,<br>IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; ,<br>IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; ,<br>IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; ,<br>IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12; | This item allows you to change the address & IRQ settings of the specified serial port. |
| Device Type Select        | UART 232[Default],<br>UART 422,<br>UART 485                                                                                                                                                       | Set the Serial Port to RS232 & RS422 & RS485                                            |
| RS-485 Auto Flow Function | Disabled,<br>Enabled[Default]                                                                                                                                                                     | Enabled/Disabled RS485 Autoflow Function                                                |

## Serial Port 2 Configuration



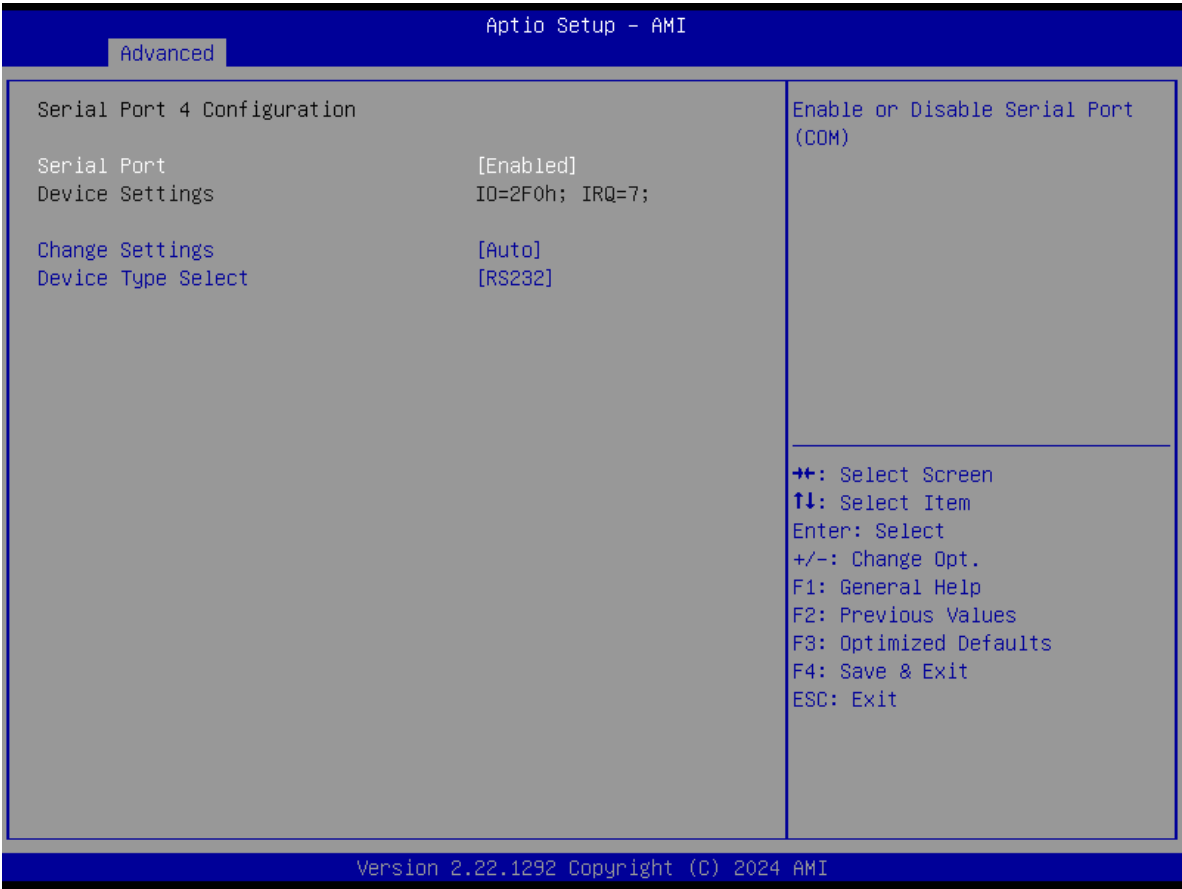
| Item                      | Options                                                                                                                                                                                         | Description                                                                             |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| Serial Port               | Disabled,<br>Enabled[Default]                                                                                                                                                                   | Enable or Disable Serial Port (COM).                                                    |
| Change Settings           | Auto[Default],<br>IO=2F8h; IRQ=3; ,<br>IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; ,<br>IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12;;<br>IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12;;<br>IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12; | This item allows you to change the address & IRQ settings of the specified serial port. |
| Device Type Select        | UART 232[Default],<br>UART 422,<br>UART 485                                                                                                                                                     | Set the Serial Port to RS232 & RS422 & RS485                                            |
| RS-485 Auto Flow Function | Disabled,<br>Enabled[Default]                                                                                                                                                                   | Enabled/Disabled RS485 Autoflow Function                                                |

## Serial Port 3 Configuration



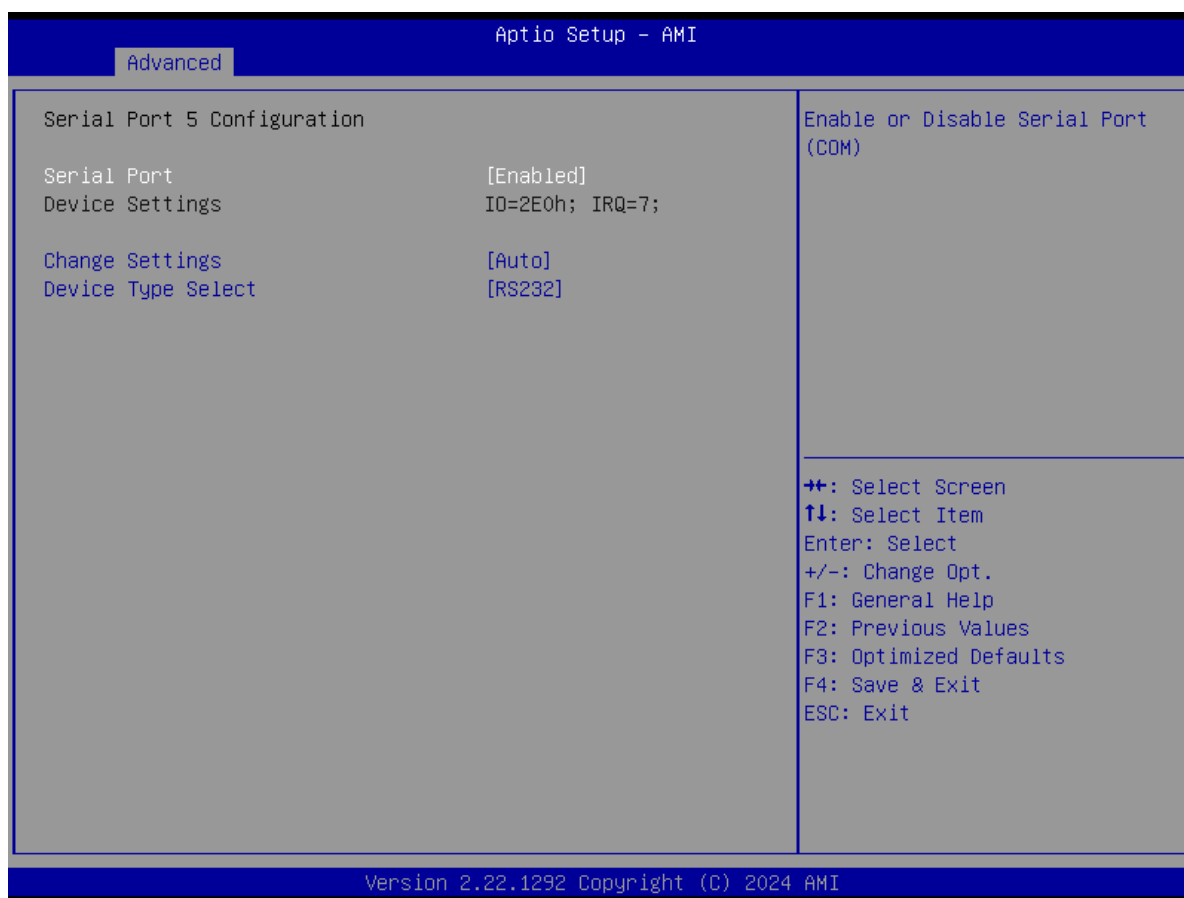
| Item                      | Options                                                                                                                                                                                                    | Description                                                                             |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| Serial Port               | Disabled,<br>Enabled <b>[Default]</b>                                                                                                                                                                      | Enable or Disable Serial Port (COM).                                                    |
| Change Settings           | Auto <b>[Default]</b> ,<br>IO=3E8h; IRQ=7; ,<br>IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; ,<br>IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12; ,<br>IO=2F0h; IRQ=3,4,5,6,7,9,10,11,12; ,<br>IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12; | This item allows you to change the address & IRQ settings of the specified serial port. |
| Device Type Select        | UART 232 <b>[Default]</b> ,<br>UART 422,<br>UART 485                                                                                                                                                       | Set the Serial Port to RS232 & RS422 & RS485                                            |
| RS-485 Auto Flow Function | Disabled,<br>Enabled <b>[Default]</b>                                                                                                                                                                      | Enabled/Disabled RS485 Autoflow Function                                                |

Serial Port 4 Configuration



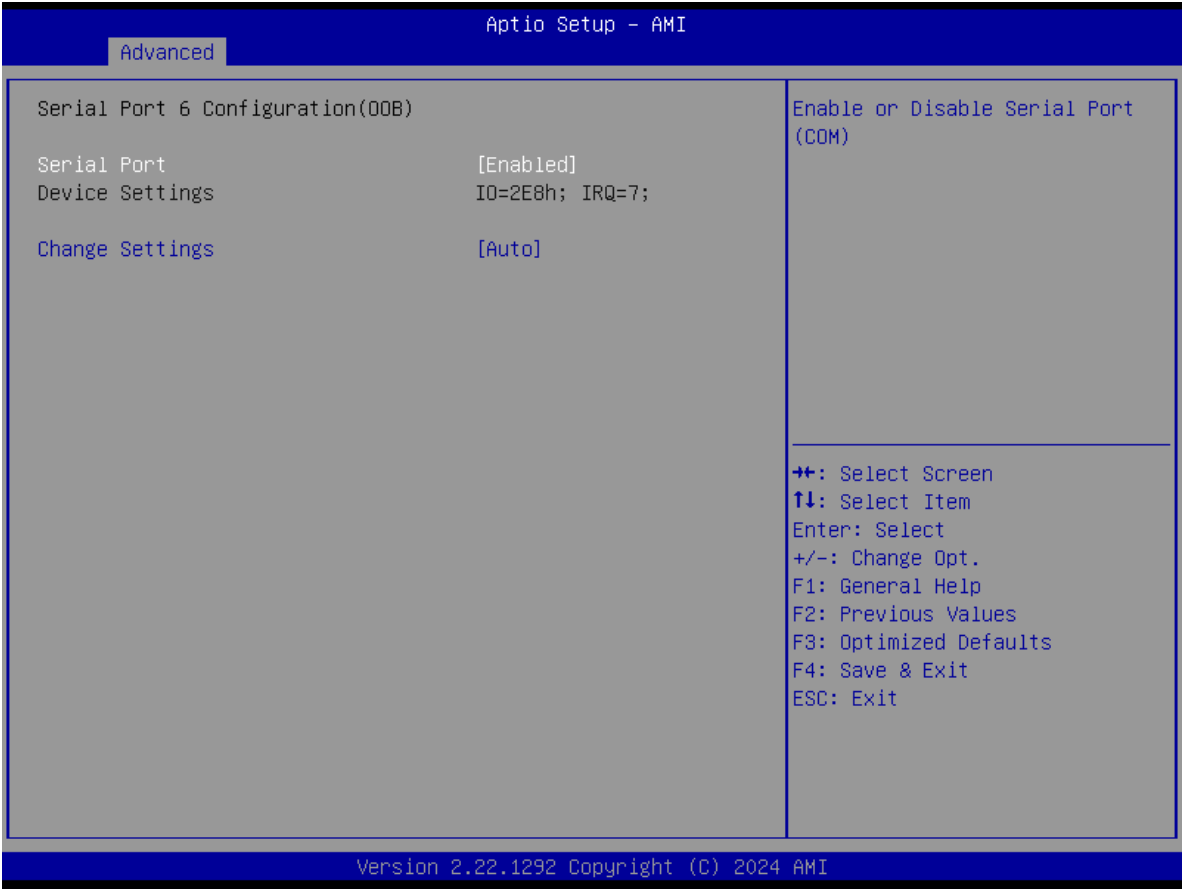
| Item                      | Options                                                                                                                                                                                                    | Description                                                                             |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| Serial Port               | Disabled, Enabled <b>[Default]</b>                                                                                                                                                                         | Enable or Disable Serial Port (COM).                                                    |
| Change Settings           | Auto <b>[Default]</b> ,<br>IO=2F0h; IRQ=7; ,<br>IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; ,<br>IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12; ,<br>IO=2F0h; IRQ=3,4,5,6,7,9,10,11,12; ,<br>IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12; | This item allows you to change the address & IRQ settings of the specified serial port. |
| Device Type Select        | UART 232 <b>[Default]</b> ,<br>UART 422,<br>UART 485                                                                                                                                                       | Set the Serial Port to RS232 & RS422 & RS485                                            |
| RS-485 Auto Flow Function | Disabled, Enabled <b>[Default]</b>                                                                                                                                                                         | Enabled/Disabled RS485 Autoflow Function                                                |

## Serial Port 5 Configuration



| Item                      | Options                                                                                                                                                                                                    | Description                                                                             |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| Serial Port               | Disabled,<br>Enabled <b>[Default]</b>                                                                                                                                                                      | Enable or Disable Serial Port (COM).                                                    |
| Change Settings           | Auto <b>[Default]</b> ,<br>IO=2E0h; IRQ=7; ,<br>IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; ,<br>IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; ,<br>IO=2F0h; IRQ=3,4,5,6,7,9,10,11,12; ,<br>IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12; | This item allows you to change the address & IRQ settings of the specified serial port. |
| Device Type Select        | UART 232 <b>[Default]</b> ,<br>UART 422,<br>UART 485                                                                                                                                                       | Set the Serial Port to RS232 & RS422 & RS485                                            |
| RS-485 Auto Flow Function | Disabled,<br>Enabled <b>[Default]</b>                                                                                                                                                                      | Enabled/Disabled RS485 Autoflow Function                                                |

Serial Port 6 Configuration



| Item            | Options                                                                                                                                                                                                    | Description                                                                             |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| Serial Port     | Disabled,<br>Enabled <b>[Default]</b>                                                                                                                                                                      | Enable or Disable Serial Port (COM).                                                    |
| Change Settings | Auto <b>[Default]</b> ,<br>IO=2E8h; IRQ=7; ,<br>IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; ,<br>IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12; ,<br>IO=2F0h; IRQ=3,4,5,6,7,9,10,11,12; ,<br>IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12; | This item allows you to change the address & IRQ settings of the specified serial port. |

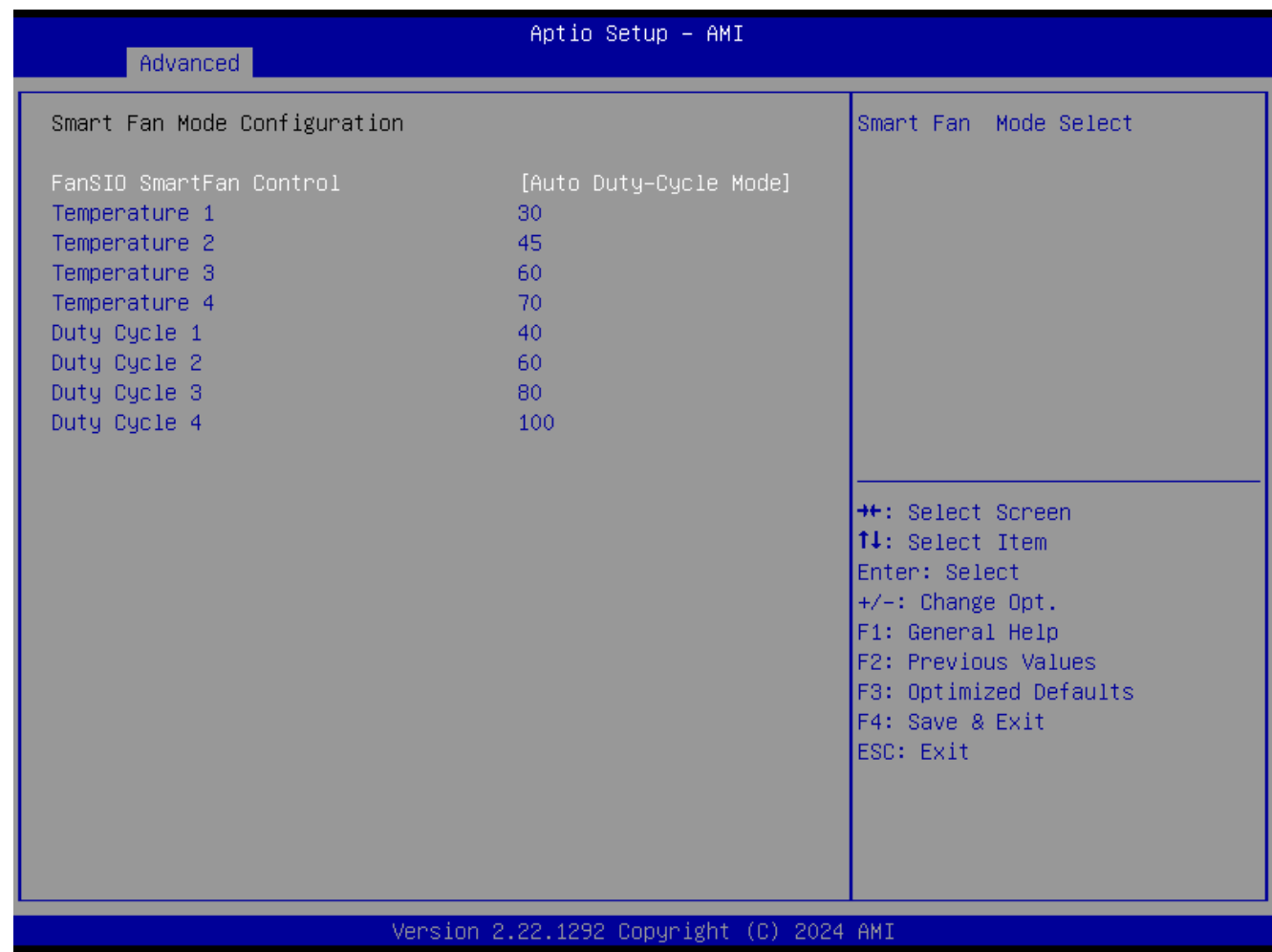
### 4.3.7 Hardware Monitor

These items display the current status of all monitored hardware devices/ components such as voltages and temperatures.



| Item               | Options                                 | Description                  |
|--------------------|-----------------------------------------|------------------------------|
| Smart Fan Function | Disabled,<br>Enabled <b>[Default]</b> , | Enabled or Disable Smart Fan |

Smart Fan Mode Configuration

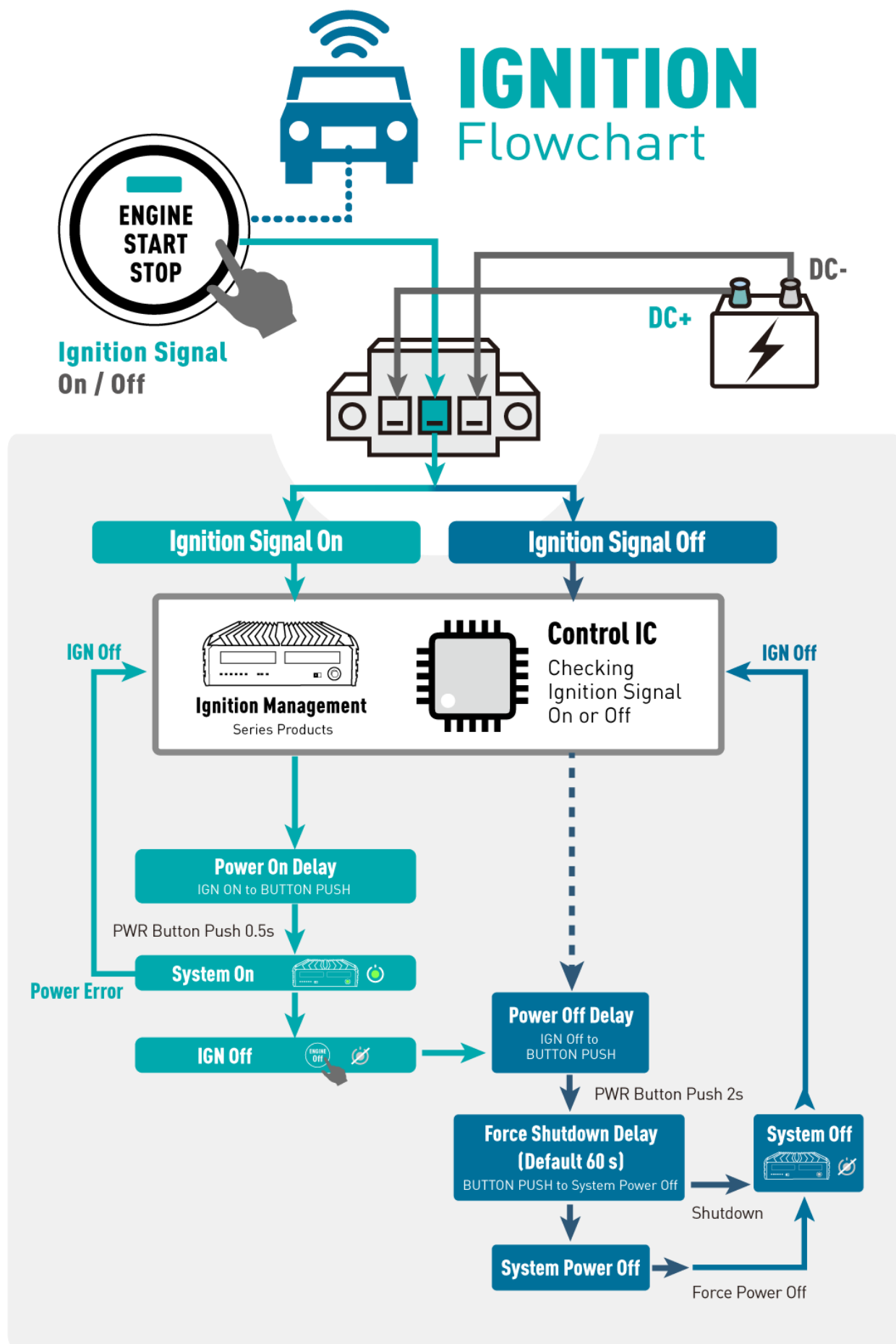


| Item                    | Options                                        | Description                               |
|-------------------------|------------------------------------------------|-------------------------------------------|
| FanSIO SmartFan Control | Manual Mode,<br>Auto Duty-Cycle Mode[Default], | Smart Fan Mode Select                     |
| Temperature 1~4         | 1~100                                          | Auto fan speed control. Temperature 1-100 |
| Duty Cycle 1~4          | 20~100                                         | Auto fan speed control. Duty 20-100       |

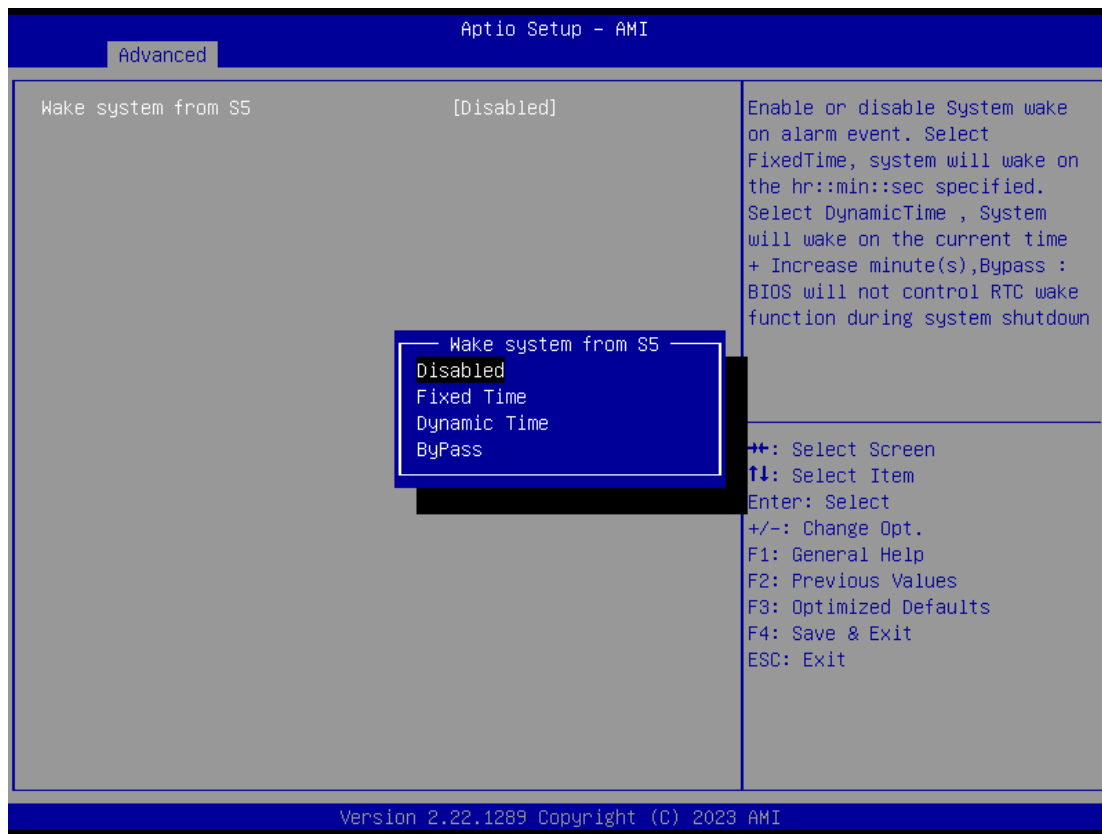
### 4.3.8. Power IGN Mode



| Item                   | Options                                                                                         | Description                                                                                                    |
|------------------------|-------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| <b>IGN Setting</b>     | Read mode[Default]<br>Write IGN                                                                 | Read IGN: BIOS will only read settings from IGN module. Write IGN: BIOS will overwrite settings in IGN module. |
| <b>Power On Delay</b>  | 10 Sec[Default]<br>20 Sec<br>30 Sec<br>40 Sec<br>50 Sec<br>1 Min<br>Manual Mode                 | Power On Delay Select                                                                                          |
| <b>Manual Mode</b>     | 10 Sec[Default]                                                                                 | 10~60 Sec                                                                                                      |
| <b>Power Off Delay</b> | 3 Sec[Default] ,<br>1 Min,<br>5 Min,<br>10 Min,<br>30 Min,<br>1 Hour,<br>2 Hour,<br>Manual Mode | Power Off Delay Select                                                                                         |
| <b>Manual Mode</b>     | 3 Sec[Default]                                                                                  | 3~7200 Sec                                                                                                     |

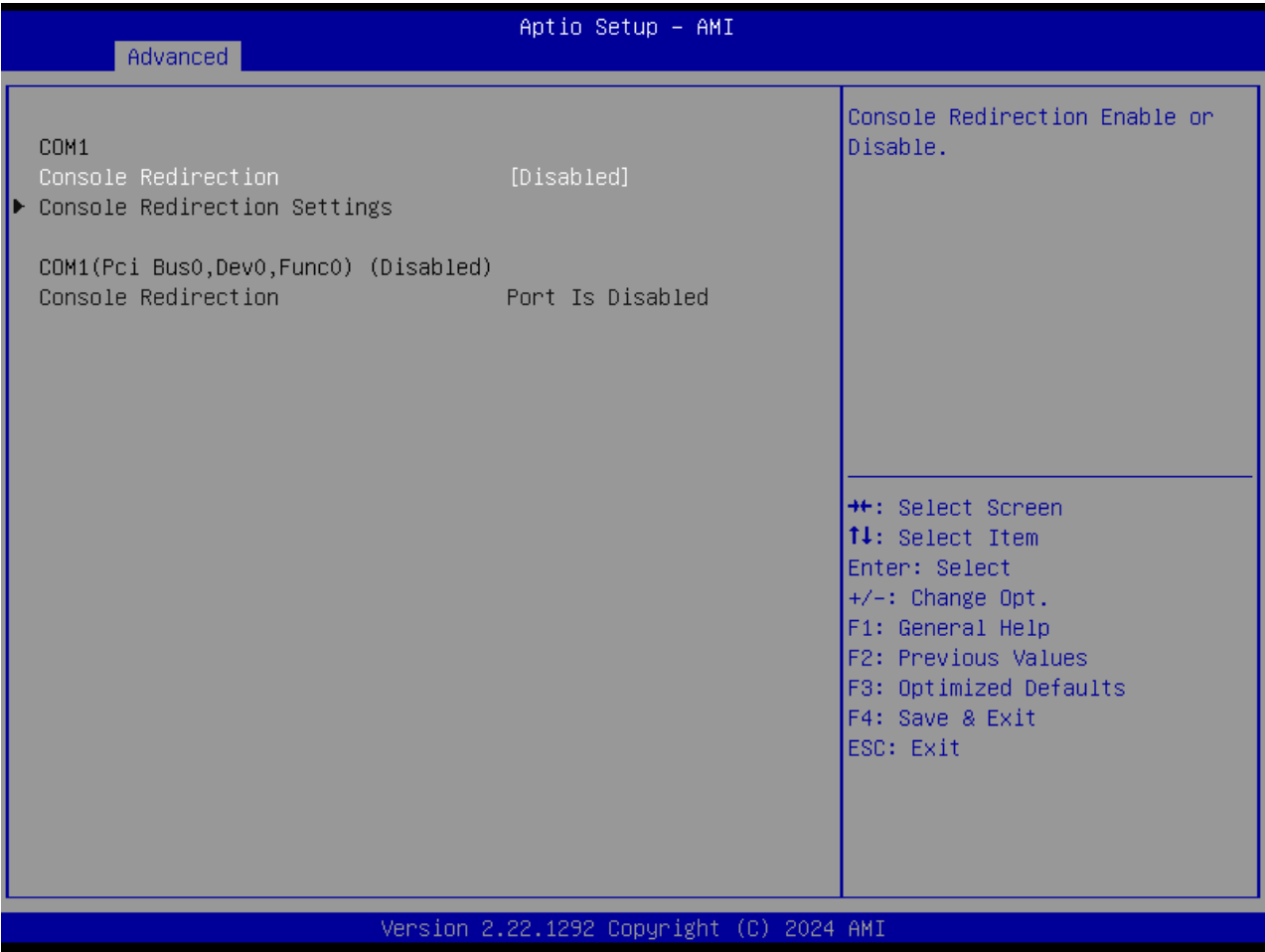


### 4.3.9. Wake system from S5



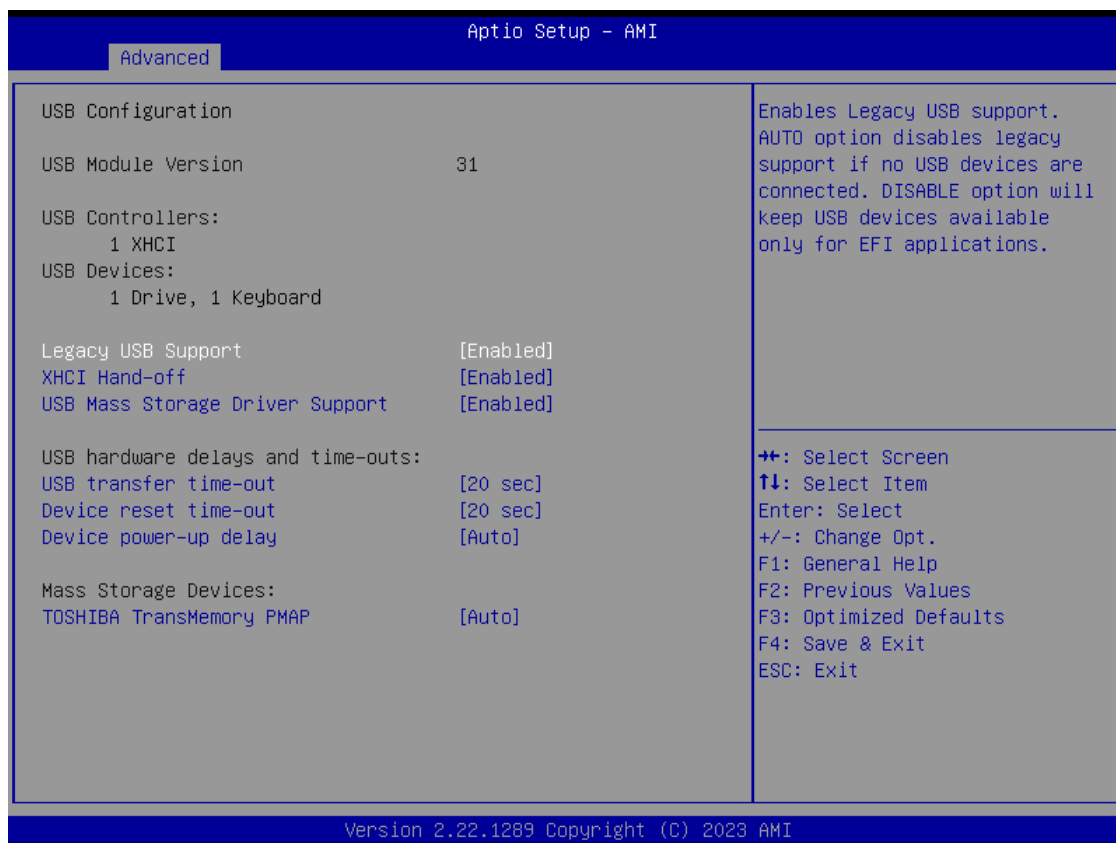
| Item                    | Options                                             | Description                                                                                                                                                                                                                                                            |
|-------------------------|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Wake system from S5     | Disabled[Default], Fixed Time, Dynamic Time, ByPass | Enable or disable System wake on alarm event. Select FixedTime, system will wake on the hr::min::sec specified. Select DynamicTime, System will wake on the current time + Increase minute(s), Bypass : BIOS will not control RTC wake function during system shutdown |
| Wake up day             | 0[Default]                                          | Date (of month) Alarm (0 is mean daily or you can setup a specific month)                                                                                                                                                                                              |
| Wake up hour            | 0[Default]                                          | select 0-23 For example enter 3 for 3am and 15 for 3pm                                                                                                                                                                                                                 |
| Wake up minute          | 0[Default]                                          | select 0-59 for Minute                                                                                                                                                                                                                                                 |
| Wake up second          | 0[Default]                                          | select 0-59 for Second                                                                                                                                                                                                                                                 |
| Wake up minute increase | 0[Default]                                          | 1 - 5                                                                                                                                                                                                                                                                  |

4.3.10 Serial Port Console Redirection



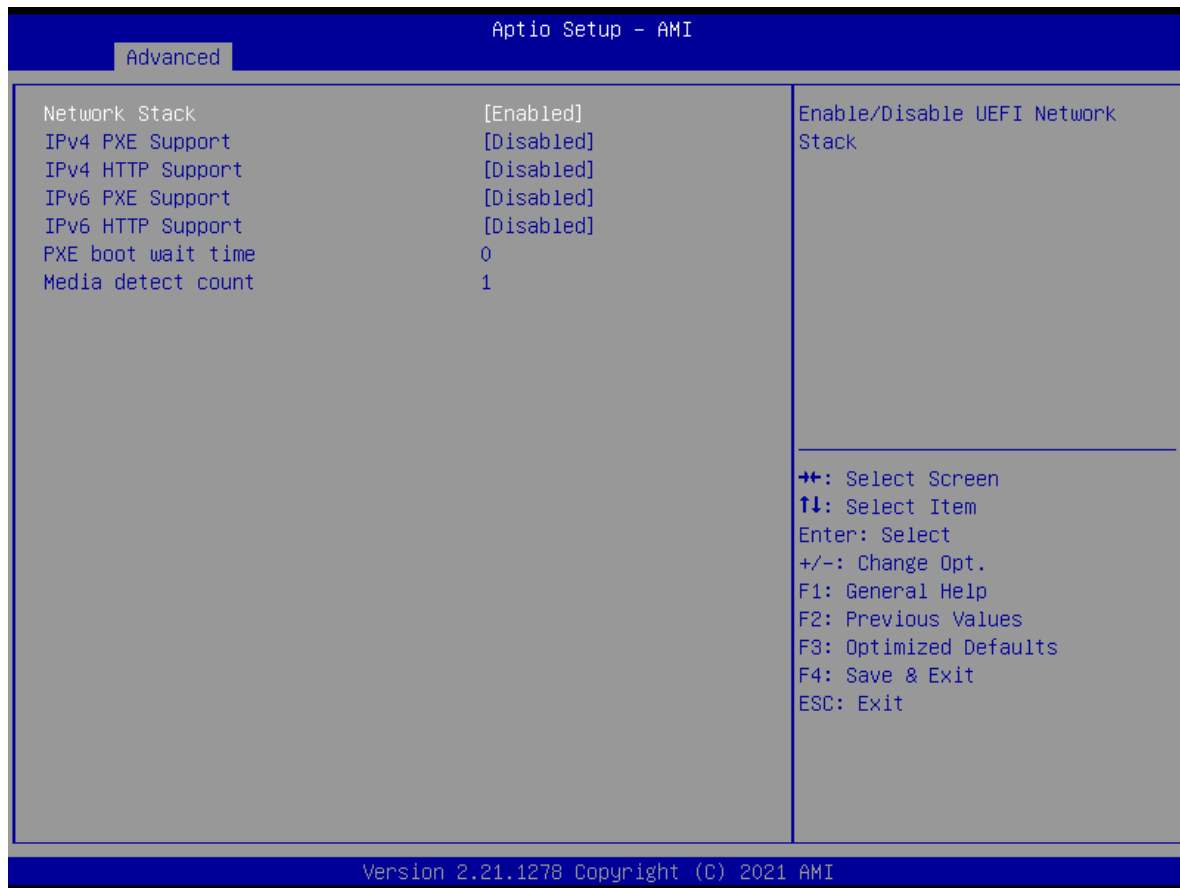
| Item                | Options                    | Description                                                          |
|---------------------|----------------------------|----------------------------------------------------------------------|
| Console Redirection | Disabled[Default], Enabled | These items allows you to enable or disable COM1 console redirection |

### 4.3.11 USB Configuration



| Item                                   | Options                                          | Description                                                                                                                                                                                                |
|----------------------------------------|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Legacy USB Support</b>              | Enabled[Default]<br>Disabled<br>Auto             | Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.                                 |
| <b>XHCI Hand-off</b>                   | Enabled[Default]<br>Disabled                     | This is a workaround for OSeW without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.                                                                                   |
| <b>USB Mass Storage Driver Support</b> | Enabled[Default]<br>Disabled                     | Enable/Disable USB Mass Storage Driver Support.                                                                                                                                                            |
| <b>USB transfer time-out</b>           | 1 sec,<br>5 sec,<br>10 sec,<br>20 sec[Default]   | The time-out value for Control, Bulk, and Interrupt transfers.                                                                                                                                             |
| <b>Device reset time-out</b>           | 10 sec,<br>20 sec[Default],<br>30 sec,<br>40 sec | USB mass storage device Start Unit command time-out.                                                                                                                                                       |
| <b>Device power-up delay</b>           | Auto[Default]<br>Manual                          | Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100ms, for a Hub port the delay is taken from Hub descriptor. |

### 4.3.12 Network Stack Configuration



| Item                      | Options                     | Description                                                                                                   |
|---------------------------|-----------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>Network Stack</b>      | Disabled[Default] , Enabled | Enable/Disable UEFI Network Stack.                                                                            |
| <b>IPv4 PXE Support</b>   | Disabled[Default] , Enabled | Enable/Disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.               |
| <b>IPv4 HTTP Support</b>  | Disabled[Default] , Enabled | Enable/Disable IPv4 HTTP boot support. If disabled, IPv4 HTTP boot support will not be available.             |
| <b>IPv6 PXE Support</b>   | Disabled[Default] , Enabled | Enable/Disable IPv4 PXE boot support. If disabled, IPv6 PXE boot support will not be available.               |
| <b>IPv6 HTTP Support</b>  | Disabled[Default] , Enabled | Enable/Disable IPv6 HTTP boot support. If disabled, IPv6 HTTP boot support will not be available.             |
| <b>PXE boot wait time</b> | 0[Default]                  | Wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the value. |
| <b>Media detect count</b> | 1[Default]                  | Number of times the presence of media will be checked. Use either +/- or numeric keys to set the value.       |

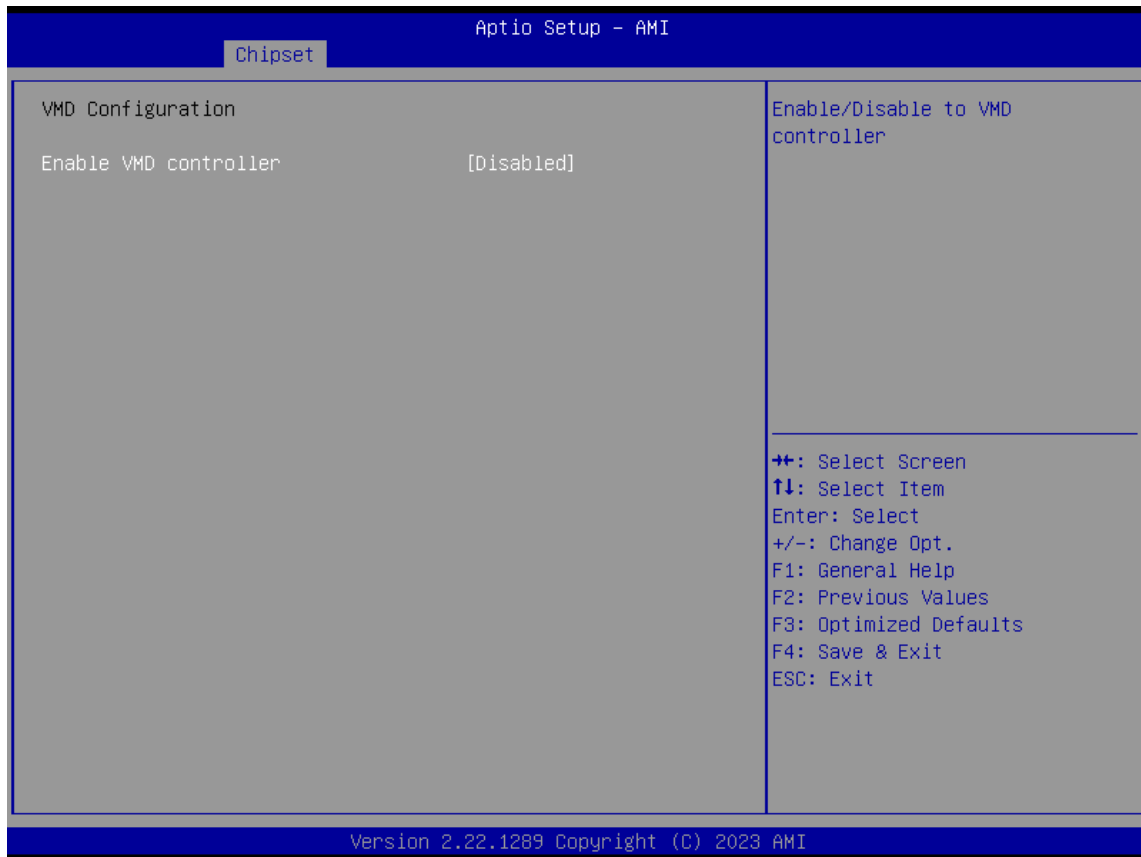
### 4.3.13 NVMe Configuration



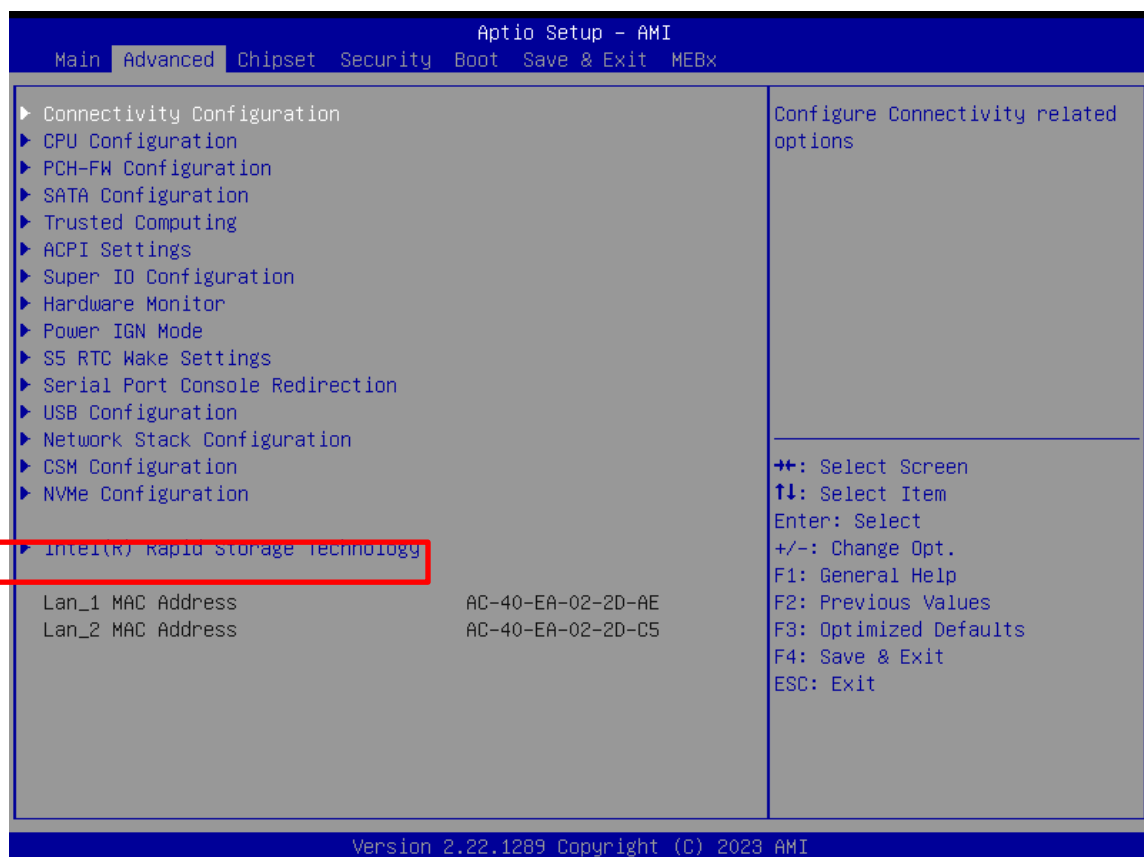
### 4.3.14 RST (UEFI RAID) Configuration

#### How to set the UEFI RAID:

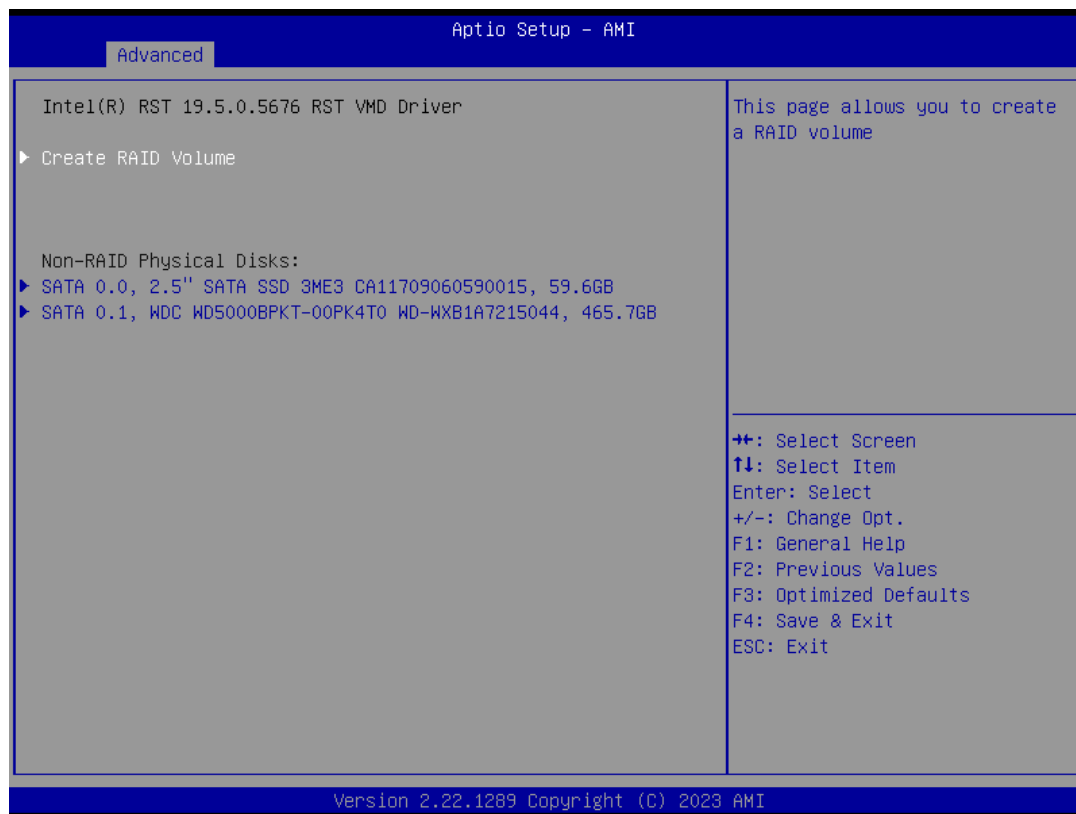
1. When set to “Enable VMD controller”, please save change reset system.



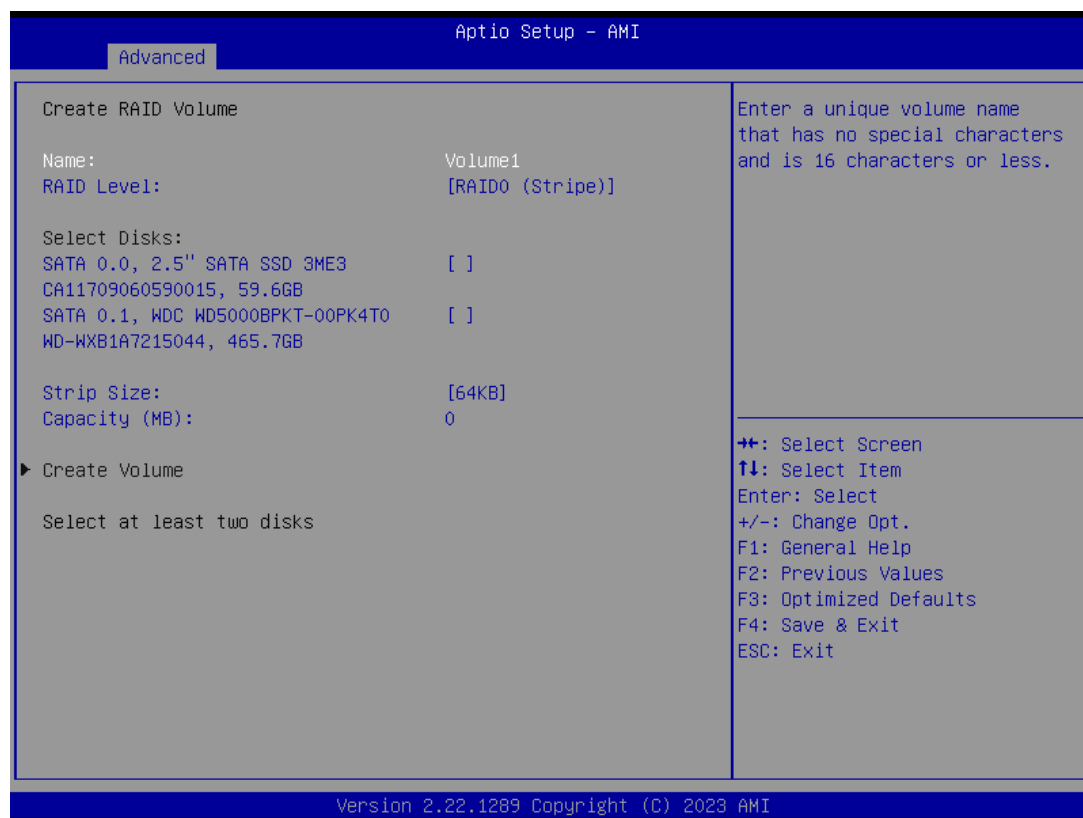
2. After reboot the system, please into BIOS utility and then will see “Intel (R) Rapid Storage Technology”



### 3. Into Intel(R) Rapid Storage Technology, and start create RAID volume.



### 4. Start Create the RAID



■ Select Disk that you want to do the RAID

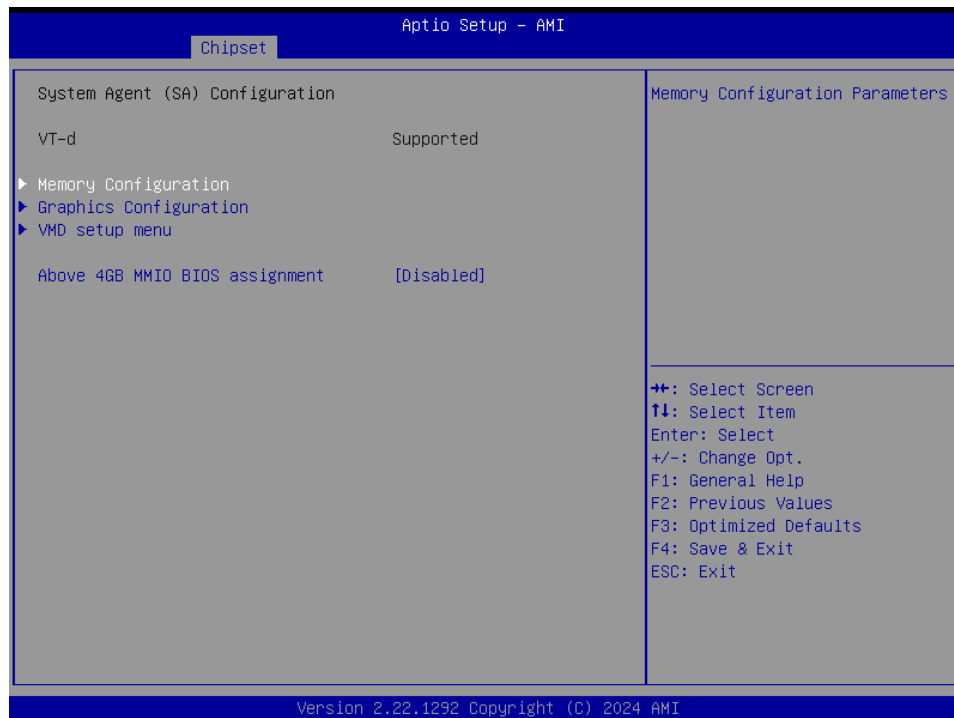
■ Select [x]; No-Select [ ]

## 4.4 Chipset

This section allows you to configure and improve your system and allows you to set up some system features according to your preference.



### 4.4.1 System Agent (SA) Configuration



| Item                           | Options                               | Description                                                                                                                   |
|--------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Above 4GB MMIO BIOS assignment | Enabled,<br>Disabled <b>[Default]</b> | Enable/Disable above 4GB MemoryMappedIO BIOS assignment<br>This is enabled automatically when Aperture Size is set to 2048MB. |

■ Memory Configuration

Aptio Setup - AMI

Chipset

Memory Configuration

|                   |                     |
|-------------------|---------------------|
| Memory Frequency  | 4800 MHz            |
| tCL-tRCD-tRP-tRAS | 40-39-39-77         |
| MC 1 Ch 0 DIMM 0  | Populated & Enabled |
| Size              | 16384 MB (DDR5)     |
| Number of Ranks   | 1                   |

⇄: Select Screen

↑↓: Select Item

Enter: Select

+/-: Change Opt.

F1: General Help

F2: Previous Values

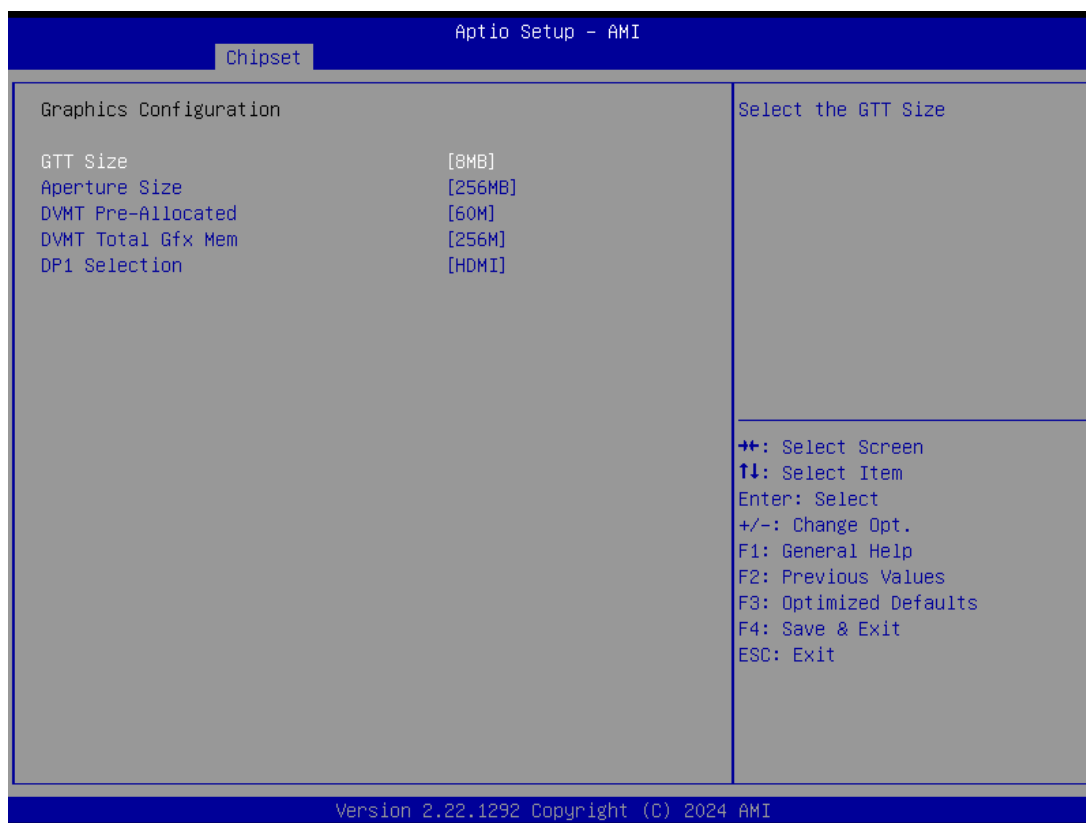
F3: Optimized Defaults

F4: Save & Exit

ESC: Exit

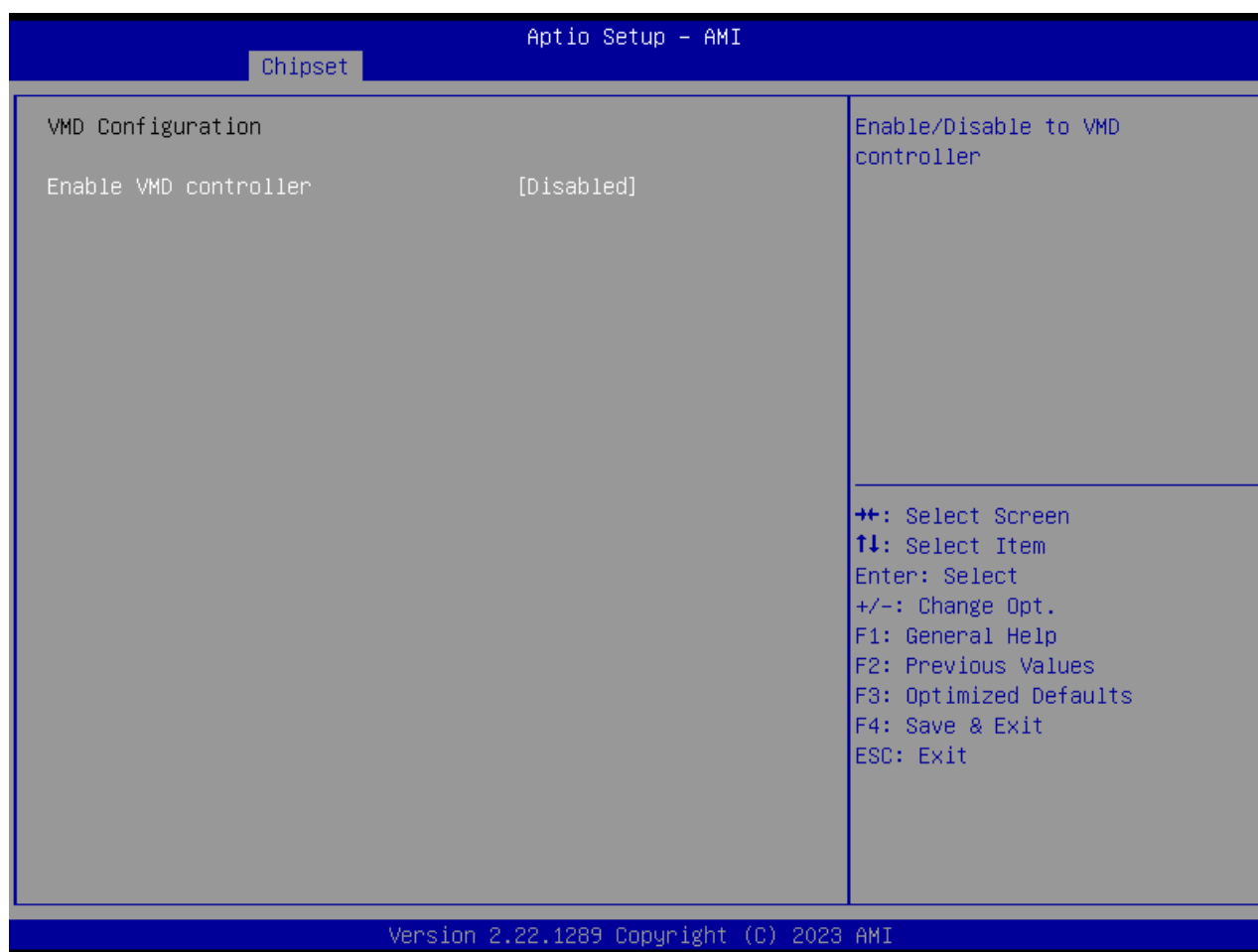
Version 2.22.1292 Copyright (C) 2024 AMI

## ■ Graphic Configuration



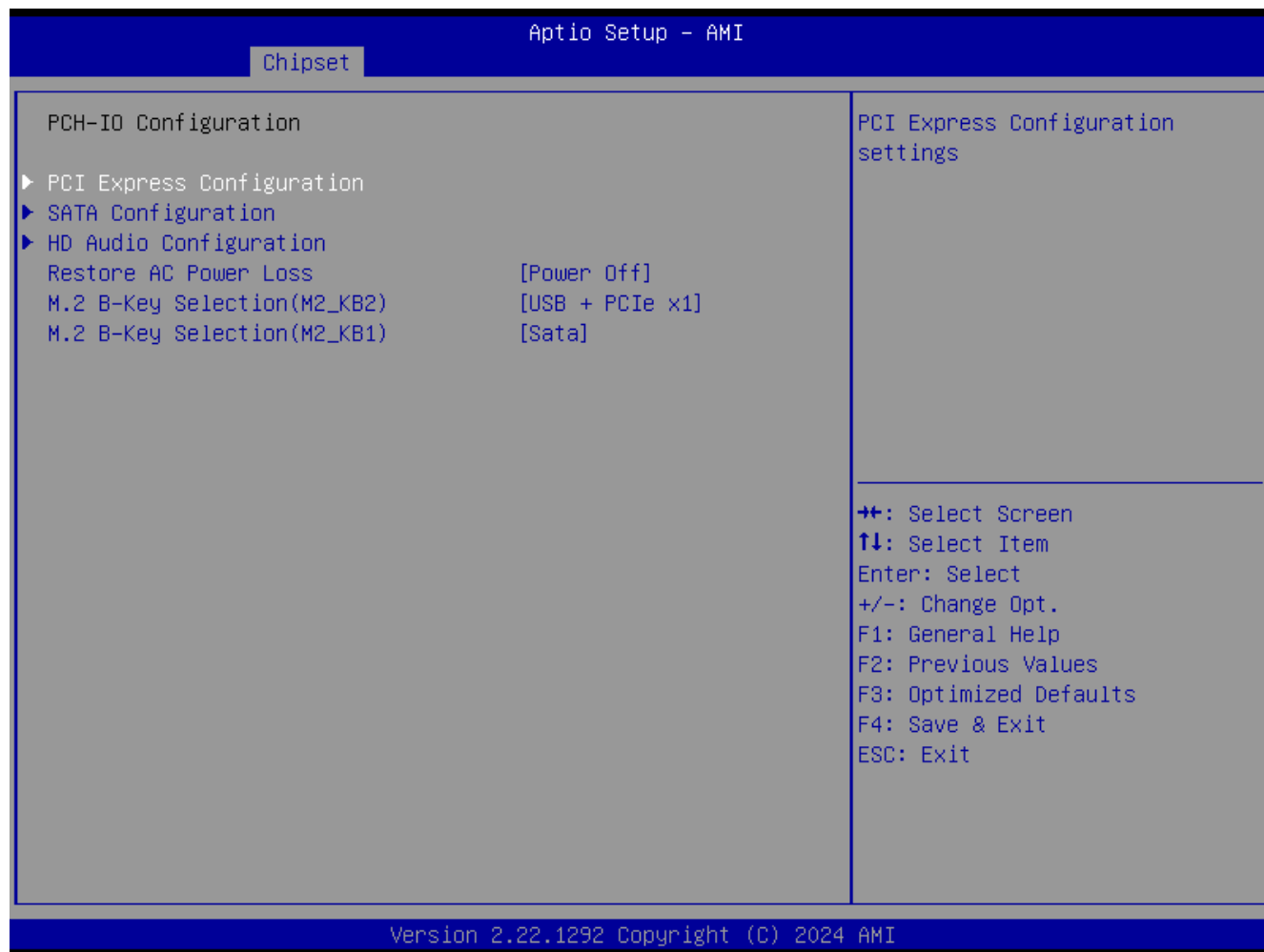
| Item                      | Options                                                                           | Description                                                                                                                                                                      |
|---------------------------|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>GTT Size</b>           | 2MB,<br>4MB,<br>8MB[ <b>Default</b> ]                                             | Select the GTT Size .                                                                                                                                                            |
| <b>Aperture Size</b>      | 128MB,<br>256MB[ <b>Default</b> ] ,<br>512MB,<br>1024MB                           | Select the Aperture Size.<br><br>Note : Above 4GB MMIO BIOS assignment is automatically enabled when selecting 2048MB aperture. To use this feature, please disable CSM Support. |
| <b>DVMT Pre-Allocated</b> | 32M,64M,96M,128M,<br>160M, 36M, 40M,44M,<br>48M,52M,56M,<br>60M[ <b>Default</b> ] | Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.                                                                                 |
| <b>DVMT Total Gfx Mem</b> | 128M,<br>256M[ <b>Default</b> ] ,<br>MAX                                          | Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device.                                                                                                   |
| <b>DP1 selection</b>      | <b>DP</b> ,<br>HDMI[ <b>Default</b> ]                                             | Selects DP1 function: DP or HDMI                                                                                                                                                 |

## ■ VMD Configuration



| Item                         | Options                     | Description                      |
|------------------------------|-----------------------------|----------------------------------|
| <b>Enable VMD controller</b> | Enabled[Default] , Disabled | Enable/Disable to VMD controller |

## 4.4.2 PCH-IO Configuration

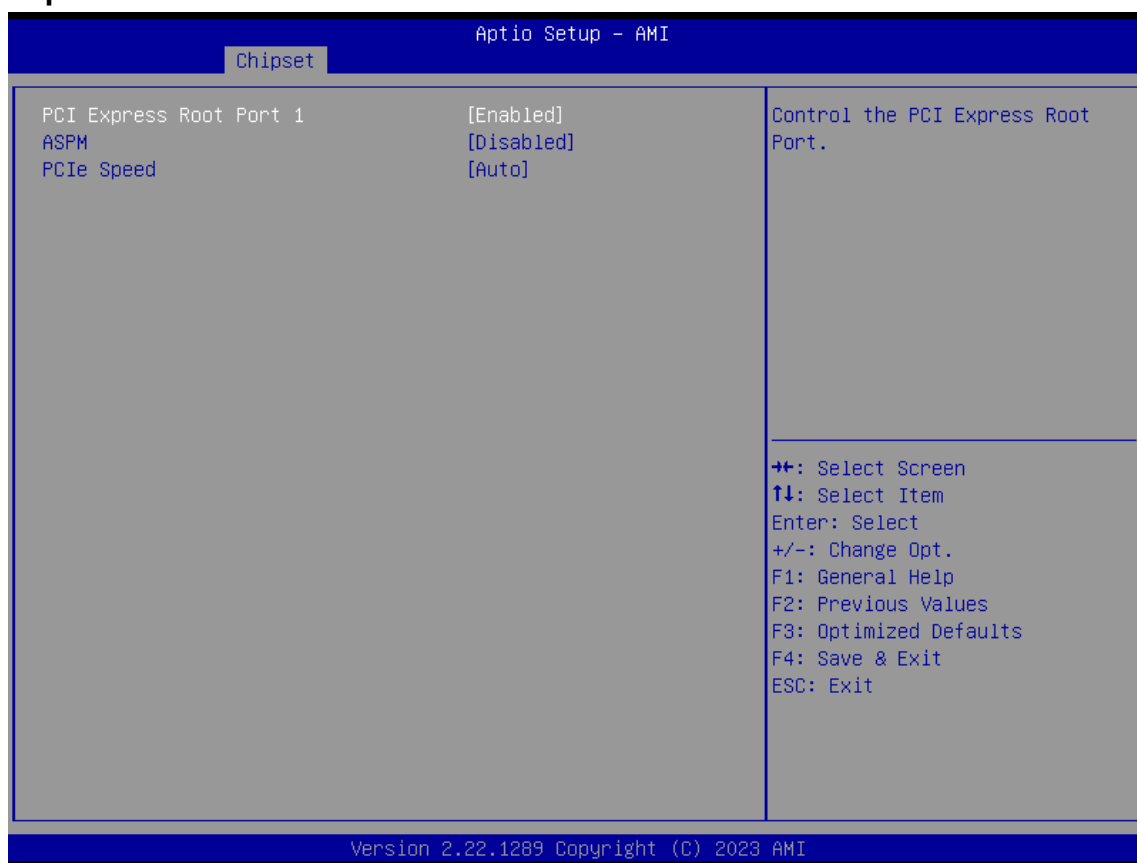


| Item                        | Options                                                 | Description                                                                            |
|-----------------------------|---------------------------------------------------------|----------------------------------------------------------------------------------------|
| Restore AC Power Loss       | Power On,<br>Power Off <b>[Default]</b> ,<br>Last State | Specify what state to go to when power is re-applied after a power failure (G3 state). |
| M.2 B-Key Selection(M2_KB2) | USB + PCIe x1 <b>[Default]</b> ,<br>PCIe x2             | Selects M.2 B-KEY function: PCIe x2 or USB + PCIe x1.                                  |
| M.2 B-Key Selection(M2_KB1) | Sata <b>[Default]</b> ,<br>PCIe x2                      | Selects M.2 B-Key(KB1) function: PCIe x2 or Sata.                                      |

## ■ PCI Express Configuration

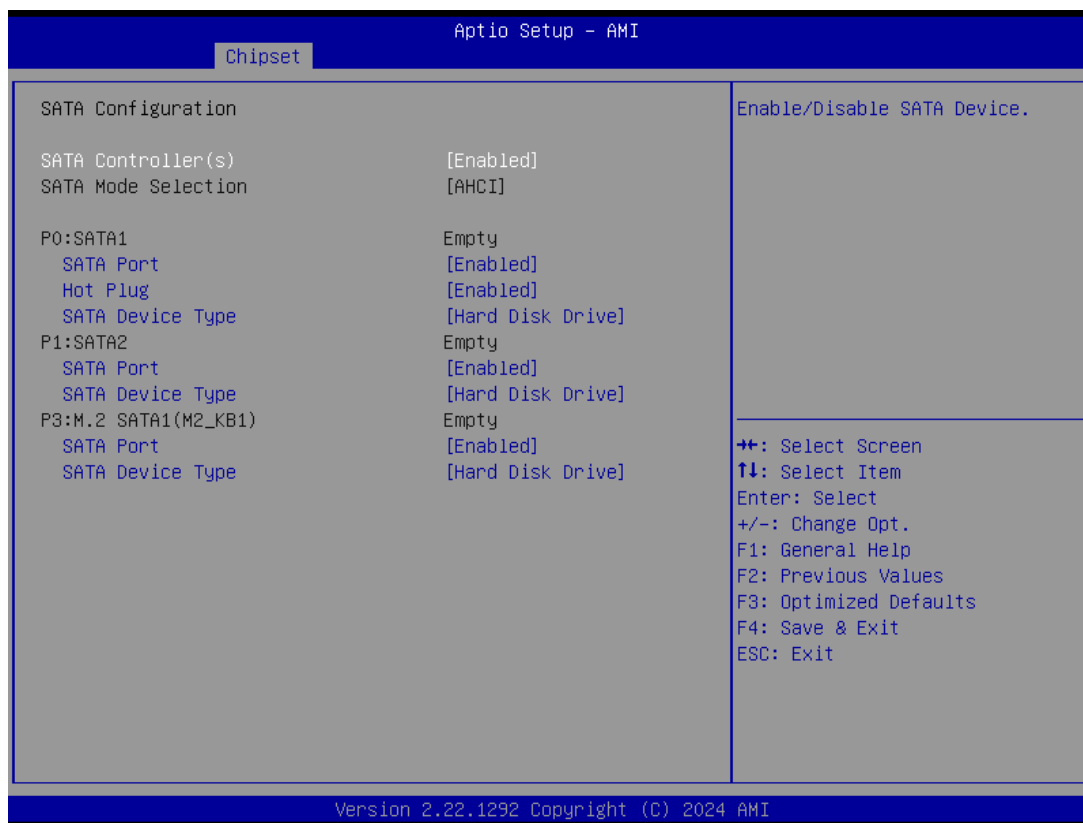
| Aptio Setup - AMI                                                                                                                                                                                                                                                                                   |                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| Chipset                                                                                                                                                                                                                                                                                             |                                 |
| PCI Express Configuration                                                                                                                                                                                                                                                                           | PCI Express Root Port Settings. |
| <ul style="list-style-type: none"><li>▶ PCI Express Root Port 1(M2_KE)</li><li>▶ PCI Express Root Port 3(LAN_1)</li><li>▶ PCI Express Root Port 7(LAN_2)</li><li>▶ PCI Express Root Port 21(M2_KB1)</li><li>▶ PCI Express Root Port 23(M2_KB2)</li><li>▶ PCI Express Root Port 25(LAN_L1)</li></ul> |                                 |
| <ul style="list-style-type: none"><li>→←: Select Screen</li><li>↑↓: Select Item</li><li>Enter: Select</li><li>+/-: Change Opt.</li><li>F1: General Help</li><li>F2: Previous Values</li><li>F3: Optimized Defaults</li><li>F4: Save &amp; Exit</li><li>ESC: Exit</li></ul>                          |                                 |
| Version 2.22.1292 Copyright (C) 2024 AMI                                                                                                                                                                                                                                                            |                                 |

## ■ PCI Express Root Port 1 /3 /7 /21 /23 /27



| Item                                                 | Options                                                    | Description                        |
|------------------------------------------------------|------------------------------------------------------------|------------------------------------|
| <b>PCI Express Root Port<br/>1 /3 /7 /21 /23 /27</b> | Disabled,<br>Enabled <b>[Default]</b>                      | Control the PCI Express Root Port. |
| <b>ASPM</b>                                          | Disabled <b>[Default]</b> ,<br>L1,<br>Auto                 | Set the ASPM Level.                |
| <b>PCIe Speed</b>                                    | Auto <b>[Default]</b> ,<br>Gen1,<br>Gen2,<br>Gen3,<br>Gen4 | Configure PCIe speed.              |

## SATA Configuration



| Item                      | Options                                                 | Description                                                                  |
|---------------------------|---------------------------------------------------------|------------------------------------------------------------------------------|
| <b>SATA Controller(s)</b> | Enabled <b>[Default]</b><br>Disabled                    | Enable/Disable SATA Device.                                                  |
| <b>SATA Port</b>          | Disabled,<br>Enabled <b>[Default]</b>                   | Enable/Disable SATA Port.                                                    |
| <b>Hot Plug</b>           | Disabled,<br>Enabled <b>[Default]</b>                   | Designates this port as Hot Pluggable.                                       |
| <b>SATA Device Type</b>   | Hard Disk Drive <b>[Default]</b> ,<br>Solid State Drive | Identify the SATA port is connected to Solid State Drive or Hard Disk Drive. |

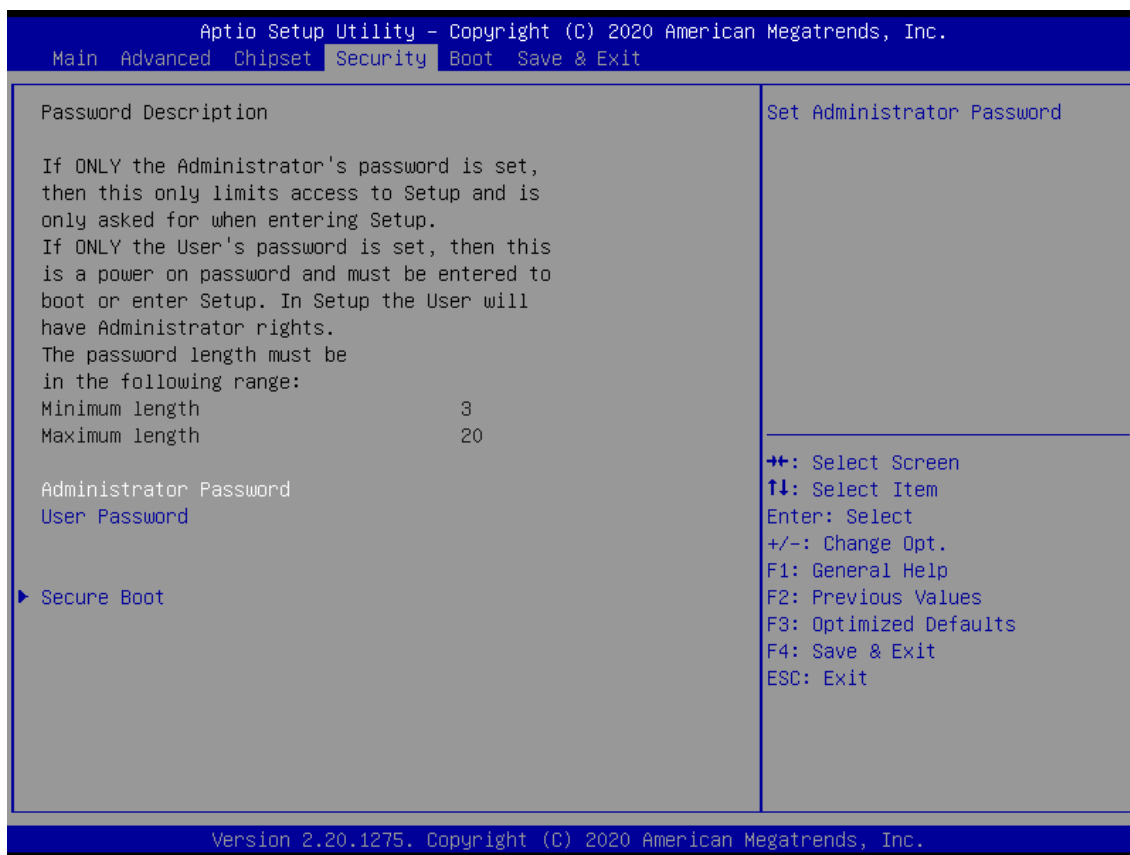
■ HD Audio Configuration



| Item     | Options                               | Description                                                                                                                                            |
|----------|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| HD Audio | Disabled,<br>Enabled <b>[Default]</b> | Control Detection of the HD-Audio device.<br><br>Disabled = HDA will be unconditionally disabled<br><br>Enabled = HDA will be unconditionally enabled. |

## 4.5 Security

Security menu allow users to change administrator password and user password settings.



### ■ Administrator Password

This item allows you to set Administrator Password.

### ■ User Password

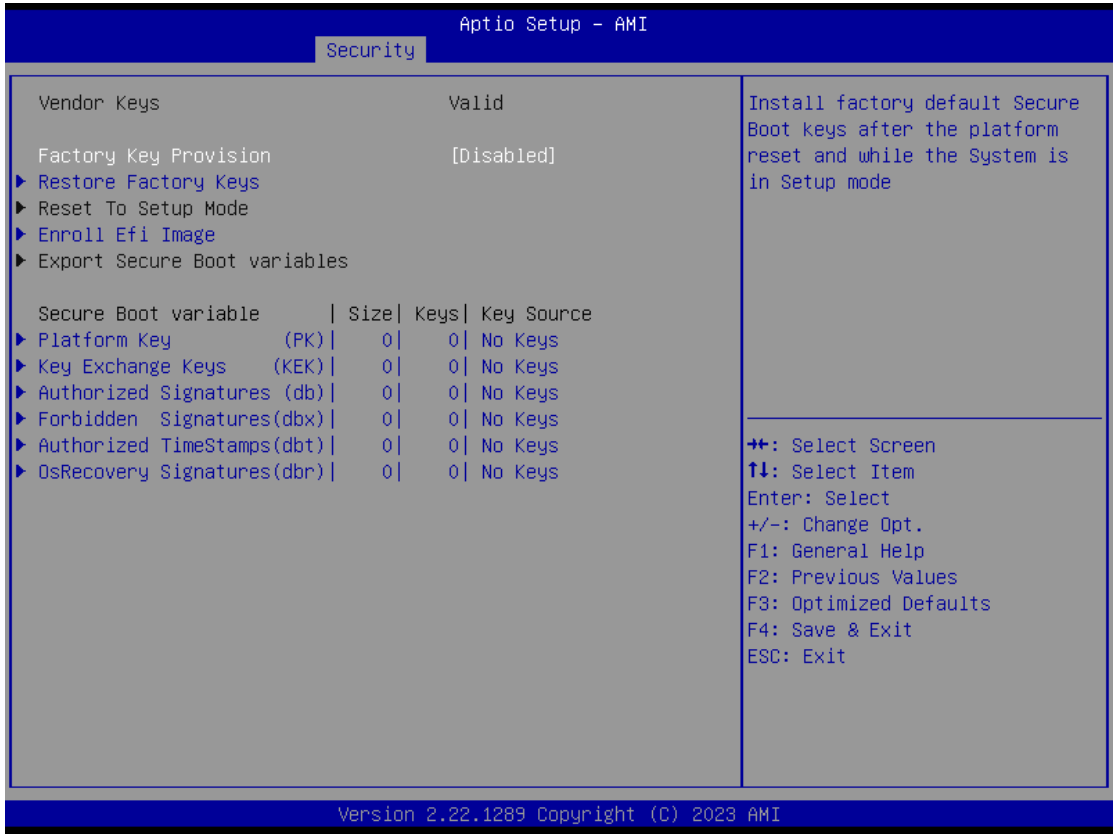
This item allows you to set User Password.

## Security Boot



| Item             | Options                                | Description                                                                                                                                                                  |
|------------------|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Secure Boot      | Disabled <b>[Default]</b> ,<br>Enabled | Secure Boot feature is Active if Secure Boot is Enabled, Platform Key(PK) is enrolled and the System is in User mode.<br><br>The mode change requires platform reset         |
| Secure Boot Mode | Standard,<br>Custom <b>[Default]</b>   | Secure Boot mode options: Standard or Custom.<br><br>In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication |

■ Key Management



| Item                  | Options                                | Description                                                                                             |
|-----------------------|----------------------------------------|---------------------------------------------------------------------------------------------------------|
| Factory Key Provision | Disabled <b>[Default]</b> ,<br>Enabled | Install factory default Secure Boot keys after the platform reset and while the System is in Setup mode |

## 4.6 Boot

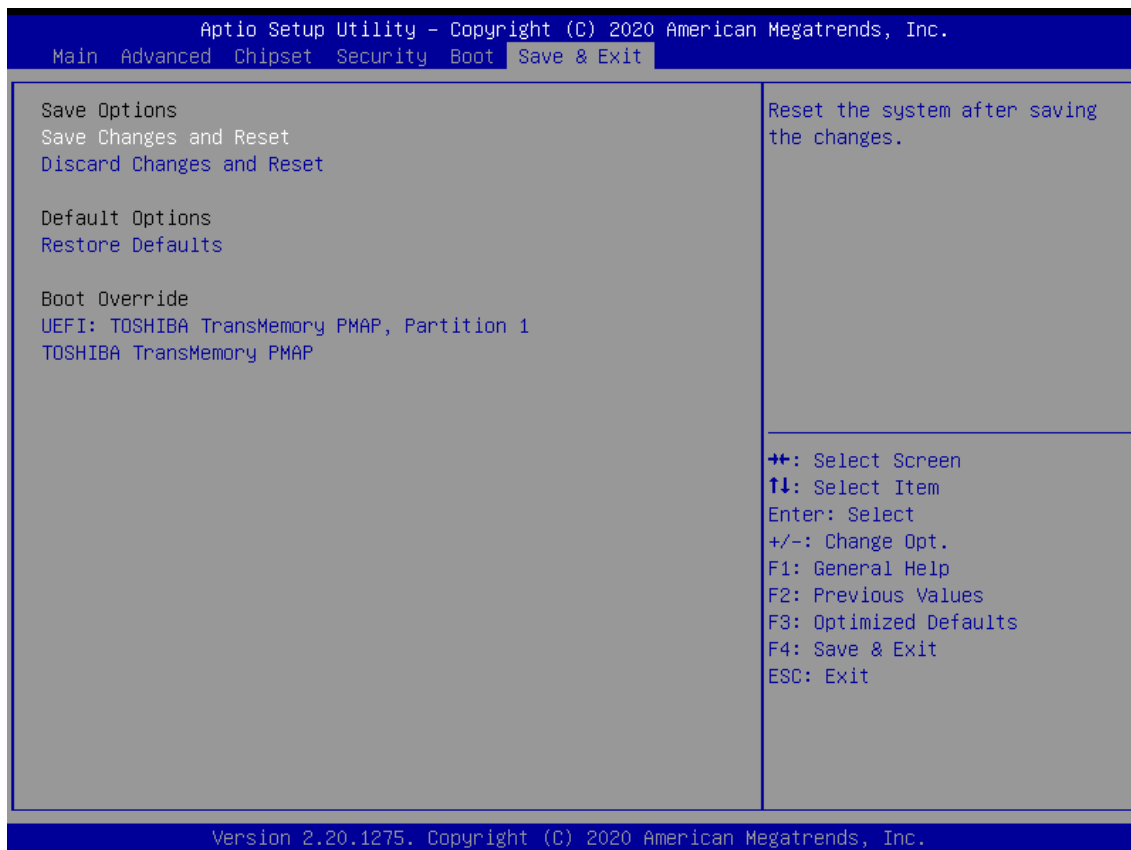
This menu allows you to setup the system boot options.



| Item                        | Options                        | Description                                                                                                                                      |
|-----------------------------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Setup Prompt Timeout</b> | 1[Default]                     | Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.                                                      |
| <b>Bootup NumLock State</b> | On[Default] ,<br>Off           | Select the Keyboard NumLock state.                                                                                                               |
| <b>Quiet Boot</b>           | Disabled[Default] ,<br>Enabled | Enables or disables Quiet Boot option.                                                                                                           |
| <b>Fast Boot</b>            | Disabled[Default] ,<br>Enabled | Enables/Disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options. |

## 4.7 Save & Exit

This setting allows users to configure the boot settings.



### ■ Save Changes and Reset

This item allows user to reset the system after saving the changes. This item allows user to reset the system after saving the changes.

### ■ Discard Changes and Reset

This item allows user to reset the system without saving any changes.

### ■ Restore Defaults

Use this item to restore /load default values for all the setup options.

## 4.8 MEBx



| Item                 | Options | Description |
|----------------------|---------|-------------|
| Intel(R) ME Password |         | MEBx Login  |

## Appendix

# WDT & GPIO

This appendix provides the sample codes of WDT (Watch Dog Timer) and GPIO (General Purpose Input/ Output).

## WDT Sample Code

### WDT Setting

#### **Pseudo Code**

// IO Address 0xA16 is time value(second)

// IO Address 0xA15 is WDT enable and configuration

Example, Set 0xA16=-0x02, 0xA15=0x31, it will reset after 2 seconds

```
#define TimePort          0xA16
```

```
#define TimeEnablePort    0xA15
```

#### **//Set WDT Time Unit**

```
buf1 = ReadByte(TimeEnablePort) & 0xf7; //Clear WDT mode.
```

```
// buf1 |= 0x08; //Bit3 :(1:Minute Mode/0:Second Mode)
```

```
WriteByte(TimeEnablePort, buf1);
```

#### **//Set WDT Time Value**

```
WriteByte (TimePort , 0x02); // Set 2 seconds
```

#### **//Enable WDT**

```
buf1 = ReadByte(TimeEnablePort);
```

```
buf1 |= 0x31;
```

```
    //Bit5 :WD_EN,If this bit is set to 1, the counting of watchdog time is enabled.
```

```
    //Bit4 :WD_PULSE ,Select output mode (0: level, 1: pulse) of WDTRST# by setting this bit.
```

```
    //Bit1~0: Select output pulse width of WDTRST#. 0: 1 ms, 1: 25 ms, 2: 125 ms, 3: 5 sec.
```

```
WriteByte(TimeEnablePort, buf1);
```

#### **// Disable WDT**

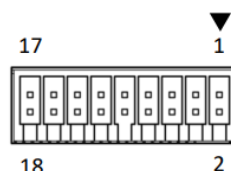
```
buf1 = ReadByte(TimeEnablePort); // Read current WDT setting
```

```
buf1 = buf1 & 0xDF; // Disable WDT by set WD_EN (bit 5) to 0.
```

```
WriteByte(TimeEnablePort, buf1); // Write back WDT setting.
```

## GPIO Sample Code

## GPIO Setting

**DIO** : Digital Input / Output Connector**Type:** Terminal Block 2x9 18-pin, 3.5mm pitch

| Pin | Definition                | Pin | Definition |
|-----|---------------------------|-----|------------|
| 1   | DIN1                      | 2   | DOUT1      |
| 3   | DIN2                      | 4   | DOUT2      |
| 5   | DIN3                      | 6   | DOUT3      |
| 7   | DIN4                      | 8   | DOUT4      |
| 9   | DIN5                      | 10  | DOUT5      |
| 11  | DIN6                      | 12  | DOUT6      |
| 13  | DIN7                      | 14  | DOUT7      |
| 15  | DIN8                      | 16  | DOUT8      |
| 17  | DC power input (+5V~+24V) | 18  | GND        |

The GPIO function is provided by Nuvoton M058SSAN , and it can be accessed through **Smbus/I2C** port. The configuration on the RCO-3000-RPL is described as below.

**Pseudo Code**

```
#define GPI_ADDR  0x02           // Define Input port Address
#define GPO_ADDR 0x01           // Define Output port Address
#define Slave_ADDR 0x40         //Slave Address = 0x40( 7-bit address)
```

```
//Set DOUT1~DOUT8 Value
```

| Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|-------|-------|-------|-------|-------|-------|-------|-------|
| DOUT8 | DOUT7 | DOUT6 | DOUT5 | DOUT4 | DOUT3 | DOUT2 | DOUT1 |

```
//Set GPO to 0x55
```

```
//set DOUT1, DOUT3, DOUT5, DOUT17 to high; Set DOUT2, DOUT4, DOUT6, DOUT8 to Low
SmbusWrite (Slave_ADDR, GPO_ADDR, 0x55);
```

```
// Read DIN1~DIN8 value
```

| Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|-------|-------|-------|-------|-------|-------|-------|-------|
| DIN8  | DIN7  | DIN6  | DIN5  | DIN4  | DIN3  | DIN2  | DIN1  |

```
Data= SmbusReads (Slave_ADDR, GPI_ADDR); //Read DIN1~DIN8 value
```

