C&T SOLUTION INC.

# USER'S MANUAL

## VCO-6000-RPL

### Machine Vision Computer

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# Prefaces

## Revision

| Revision | Description | Date |
|---|---|---|
| 1.0 | Manual Released | 2023/10/12 |

## Disclaimer

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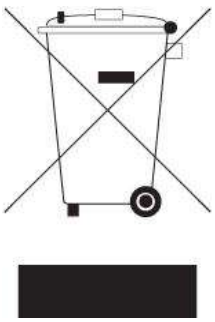
## Environmental Protection Announcement

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 be 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 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 C&T Solution Inc website at https://www.candtsolution.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 | *Choosing one：*<br>• **VCO-6000-RPL-3E Series**<br>• **VCO-6000-RPL-4E Series** | 1 |
| 2 | Wall Mount Kit | 1 |
| 3 | Accessory Kit | 1 |
| 4 | DVI to VGA Adapter | 1 |

# Ordering Information

VCO-6000-RPL-3E Series

| Model No. | Product Description |
|---|---|
| **VCO-6000-RPL-3E** | Machine Vision Computer w/ LGA 1700 for Intel 12/13/14th Gen CPU & R680E PCH, 3x PCIe |
| **VCO-6000-RPL-3E-4B7M** | Machine Vision Computer w/ LGA 1700 for Intel 12/13/14th Gen CPU & R680E PCH, 3x PCIe, 6x HDD |
| **VCO-6000-RPL-3E-2B15M** | Machine Vision Computer w/ LGA 1700 for Intel 12/13/14th Gen CPU & R680E PCH, 3x PCIe, 4x HDD |
| **VCO-6000-RPL-3E-2N15M** | Machine Vision Computer w/ LGA 1700 for Intel 12/13/14th Gen CPU & R680E PCH, 3x PCIe, 2x 15mm NVMe |
| **VCO-6000-RPL-3E-2PWR** | Machine Vision Computer w/ LGA 1700 for Intel 12/13/14th Gen CPU & R680E PCH, 3x PCIe, 2x Power input |
| **VCO-6000-RPL-3E-4B7M-2PWR** | Machine Vision Computer w/ LGA 1700 for Intel 12/13/14th Gen CPU & R680E PCH, 3x PCIe, 6x HDD, 2x Power input |
| **VCO-6000-RPL-3E-2B15M-2PWR** | Machine Vision Computer w/ LGA 1700 for Intel 12/13/14th Gen CPU & R680E PCH, 3x PCIe, 4x HDD, 2x Power input |
| **VCO-6000-RPL-3E-2N15M-2PWR** | Machine Vision Computer w/ LGA 1700 for Intel 12/13/14th Gen CPU & R680E PCH, 3x PCIe, 2x 15mm NVMe, 2x Power input |

VCO-6000-RPL-4E Series

| Model No. | Product Description |
|---|---|
| **VCO-6000-RPL-4E** | Machine Vision Computer w/ LGA 1700 for Intel 12/13/14th Gen CPU & R680E PCH, 3x PCIe |
| **VCO-6000-RPL-4E-4B7M** | Machine Vision Computer w/ LGA 1700 for Intel 12/13/14th Gen CPU & R680E PCH, 3x PCIe, 6x HDD |
| **VCO-6000-RPL-4E-2B15M** | Machine Vision Computer w/ LGA 1700 for Intel 12/13/14th Gen CPU & R680E PCH, 3x PCIe, 4x HDD |
| **VCO-6000-RPL-4E-2N15M** | Machine Vision Computer w/ LGA 1700 for Intel 12/13/14th Gen CPU & R680E PCH, 3x PCIe, 2x 15mm NVMe |
| **VCO-6000-RPL-4E-2PWR** | Machine Vision Computer w/ LGA 1700 for Intel 12/13/14th Gen CPU & R680E PCH, 3x PCIe, 2x Power input |
| **VCO-6000-RPL-4E-4B7M-2PWR** | Machine Vision Computer w/ LGA 1700 for Intel 12/13/14th Gen CPU & R680E PCH, 3x PCIe, 6x HDD, 2x Power input |
| **VCO-6000-RPL-4E-2B15M-2PWR** | Machine Vision Computer w/ LGA 1700 for Intel 12/13/14th Gen CPU & R680E PCH, 3x PCIe, 4x HDD, 2x Power input |
| **VCO-6000-RPL-4E-2N15M-2PWR** | Machine Vision Computer w/ LGA 1700 for Intel 12/13/14th Gen CPU & R680E PCH, 3x PCIe, 2x 15mm NVMe, 2x Power input |

# Optional Accessories

| Model No. | Product Description |
|---|---|
| 1-E09A22102 | Adapter AC/DC 24V 9.2A 220W with 3pin Terminal Block Plug 5.0mm Pitch |
| 1-E09A22801 | Adapter AC/DC 24V/11.67A 280W with 3pin Terminal Block Plug 5.0mm Pitch |
| 1-E09A36001 | Adapter AC/DC 24V/15A 360W with 3pin Terminal Block Plug 5.0mm Pitch |
| SFICBL022 | Power Cord, 3-pin US Type, 180cm |
| 1-TPCD00002 | Power Cord, European Type, 180cm |
| 1-TPCD00001 | Power Cord, 3-pin UK Type, 180cm |
| 3-RC6300EXFAN | External Double FAN KIT |

Chapter 1

# Product Introductions

## 1.1 Overview

The VCO-6000-RPL Series Machine Vision Systems provide powerful computing and excellent graphic performance, which are suitable for graphic-intensive and computing-oriented applications including image and vision measurement, machine automation. Delivering high quality, durability and compact construction, the systems leverages a reliable fanless and cable-free configuration, optimal thermal dissipation, and easy installation for flexible and user-friendly system development and application implementation in harsh environments.

### Machine Vision Computer

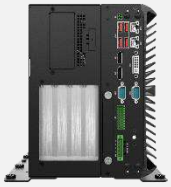
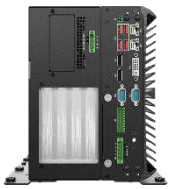
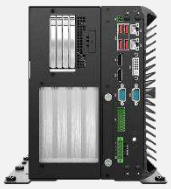
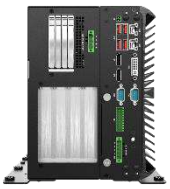
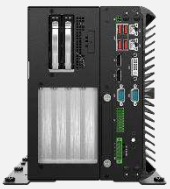
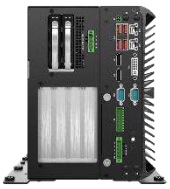
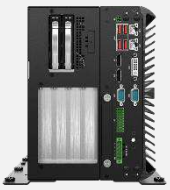
**VCO-6000-RPL-3E Series**

**VCO-6000-RPL-4E Series**

VCO-6000-RPL-3E Series

| Model No. | Front Panel |
|---|---|
| • **VCO-6000-RPL-3E**<br>1x PCIe x16 (Gen4), 2x PCIe x1 (Gen3) |  |
| • **VCO-6000-RPL-3E-2PWR**<br>1x PCIe x16 (Gen4), 2x PCIe x1 (Gen3),<br>2x Power input |  |
| • **VCO-6000-RPL-3E-4B7M**<br>1x PCIe x16 (Gen4), 2x PCIe x1 (Gen3), 6x HDD |  |
| • **VCO-6000-RPL-3E-4B7M-2PWR**<br>1x PCIe x16 (Gen4), 2x PCIe x1 (Gen3), 6x HDD,<br>2x Power input |  |
| • **VCO-6000-RPL-3E-2B15M**<br>1x PCIe x16 (Gen4), 2x PCIe x1 (Gen3), 4x HDD |  |
| • **VCO-6000-RPL-3E-2B15M-2PWR**<br>1x PCIe x16 (Gen4), 2x PCIe x1 (Gen3), 4x HDD,<br>2x Power input |  |
| • **VCO-6000-RPL-3E-2N15M**<br>1x PCIe x16 (Gen4), 2x PCIe x1 (Gen3), 2x 15mm NVMe |  |
| • **VCO-6000-RPL-3E-2N15M-2PWR**<br>1x PCIe x16 (Gen4), 2x PCIe x1 (Gen3), 2x 15mm NVMe,<br>2x Power input |  |

VCO-6000-RPL-4E Series

| Model No. | Front Panel |
|---|---|
| • **VCO-6000-RPL-4E**<br>2x PCIe x16 Slot (x8 Lane, Gen 4),<br>1x PCIe x4 (x1 Lane, Gen 3) |  |
| • **VCO-6000-RPL-4E-2PWR**<br>2x PCIe x16 Slot (x8 Lane, Gen 4),<br>1x PCIe x4 (x1 Lane, Gen 3),<br>2x Power input |  |
| • **VCO-6000-RPL-4E-4B7M**<br>2x PCIe x16 Slot (x8 Lane, Gen 4),<br>1x PCIe x4 (x1 Lane, Gen 3),<br>6x HDD |  |
| • **VCO-6000-RPL-4E-4B7M-2PWR**<br>2x PCIe x16 Slot (x8 Lane, Gen 4),<br>1x PCIe x4 (x1 Lane, Gen 3),<br>6x HDD,<br>2x Power input |  |
| • **VCO-6000-RPL-4E-2B15M**<br>2x PCIe x16 Slot (x8 Lane, Gen 4),<br>1x PCIe x4 (x1 Lane, Gen 3),<br>4x HDD |  |
| • **VCO-6000-RPL-4E-2B15M-2PWR**<br>2x PCIe x16 Slot (x8 Lane, Gen 4),<br>1x PCIe x4 (x1 Lane, Gen 3),<br>4x HDD,<br>2x Power input |  |
| • **VCO-6000-RPL-4E-2N15M**<br>2x PCIe x16 Slot (x8 Lane, Gen 4),<br>1x PCIe x4 (x1 Lane, Gen 3),<br>2x 15mm NVMe |  |
| • **VCO-6000-RPL-4E-2N15M-2PWR**<br>2x PCIe x16 Slot (x8 Lane, Gen 4),<br>1x PCIe x4 (x1 Lane, Gen 3),<br>2x 15mm NVMe,<br>2x Power input |  |

### 1.1.1 Key Features

- LGA 1700 socket for 12/13/14th Gen. Intel® ADL & RPL Processor (65W/35W TDP)
- Intel® R680E chipset
- 2x DDR5 4800/5600MHz SODIMM. Max. up to 64GB
- Triple Independent Display by 1x DVI-I and 2x DisplayPort
- 2x Intel® 2.5GbE supporting Wake-on-LAN and PXE
- 2x Full-size Mini PCIe (1x shared by 1x mSATA), 2x SIM socket
- 2x 2.5" SATA HDD Bay (1x Internal) and with RAID 0, 1 support
- 1x M.2 (E Key, PCIe x1, USB 2.0, 2230, Support CNVi)
- 6x RS-232/422/485 (4x internal), 4x USB 3.2 Gen 2, 5x USB 3.2 Gen 1 (internal)
- 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 (35W CPU); -25°C to 60°C (65W CPU)
- TPM 2.0 Supported

| PCIe Expansion | Model No. |
|---|---|
| 1x PCIe x16 (Gen4), 2x PCIe x1 (Gen3) | • VCO-6000-RPL-3E |
| 2x PCIe x16 Slot (x8 Lane, Gen 4), 1x PCIe x4 (x1 Lane, Gen 3) | • VCO-6000-RPL-4E |

| SSD/HDD Features | Model No. |
|---|---|
| 1x Internal 2.5" SATA/SSD HDD Bay (support H=9mm)<br>1x Removable 2.5" SATA HDD Bay (support H=7mm, Hot-swappable) | • VCO-6000-RPL-3E<br>• VCO-6000-RPL-4E |
| 1x Internal 2.5" SATA/SSD HDD Bay (support H=9mm)<br>5x Removable 2.5" SATA HDD Bay (support H=7mm, Hot-swappable) | • VCO-6000-RPL-3E-4B7M<br>• VCO-6000-RPL-4E-4B7M |
| 1x Internal 2.5" SATA/SSD HDD Bay (support H=9mm)<br>1x Removable 2.5" SATA HDD Bay (support H=7mm, Hot-swappable)<br>2x Removable 2.5" SATA HDD Bay (support H=15mm, Hot-swappable) | • VCO-6000-RPL-3E-2B15M<br>• VCO-6000-RPL-4E-2B15M |
| 1x Internal 2.5" SATA/SSD HDD Bay (support H=9mm)<br>1x Removable 2.5" SATA HDD Bay (support H=7mm, Hot-swappable)<br>2x Removable 2.5" U.2 NVMe Bay (support H=15mm, Hot-swappable) | • VCO-6000-RPL-3E-2N15M<br>• VCO-6000-RPL-4E-2N15M |

| 2x Power input | Model No. | |
|---|---|---|
| 9~48VDC<br>12~48VDC<br>(For GPU/Card Expansion) | • VCO-6000-RPL-3E-2PWR<br>• VCO-6000-RPL-3E-4B7M-2PWR<br>• VCO-6000-RPL-3E-2B15M-2PWR<br>• VCO-6000-RPL-3E-2N15M-2PWR | • VCO-6000-RPL-4E-2PWR<br>• VCO-6000-RPL-4E-4B7M-2PWR<br>• VCO-6000-RPL-4E-2B15M-2PWR<br>• VCO-6000-RPL-4E-2N15M-2PWR |

# 1.2 Hardware Specification

## System

**Support 12/13th/14th(Non-vPRO) Gen Intel® ADL & RPL Processor (LGA 1700, 65W/35W TDP)**

- Intel® Core™ i9-14900/i9-13900E/i9-12900E, up to 24 Cores, 36MB Cache, up to 5.8 GHz, 65W
- Intel® Core™ i9-14900T/i9-13900TE/i9-12900TE, up to 24 Cores, 36MB Cache, up to 5.5 GHz, 35W
- Intel® Core™ i7-14700, up to 20 Cores, 33MB Cache, up to 5.4 GHz, 65W
- Intel® Core™ i7-14700T, up to 20 Cores, 33MB Cache, up to 5.2 GHz, 35W
- Intel® Core™ i7-13700E/i7-12700E, up to 16 Core, 30MB Cache, up to 5.1 GHz, 65W
- Intel® Core™ i7-13700TE/i7-12700TE, up to 16 Cores, 30MB cache, up to 4.8 GHz, 35W
- Intel® Core™ i5-14500/i5-13500E/i5-12500E, up to 14 Cores, 24MB Cache, up to 5.0 GHz, 65 W
- Intel® Core™ i5-14500T/i5-13500TE/i5-12500TE, up to 14 Core, 24MB Cache, up to 4.8 GHz, 35W
- Intel® Core™ i3-13100E/i3-12100E, up to 8 Cores, 12MB cache, up to 4.4 GHz, 60W
- Intel® Core™ i3-14100T/i3-13100TE/i3-12100TE, up to 4 Cores, 12MB Cache, up to 4.4 GHz, 35W
- Intel® Core™ 300T, up to 2 Cores, 6MB Cache, up to 3.4 GHz, 35W
- Intel® Pentium® G7400E,2 Cores, 6MB Cache, 3.6 GHz, 46W
- Intel® Pentium® G7400TE, 2 Cores, 6MB Cache, 3.0 GHz, 35W
- Intel® Celeron® G6900E, 2 Cores, 4MB Cache, 3.0 GHz, 46W
- Intel® Celeron® G6900TE, 2 Cores, 4MB Cache, 2.4 GHz, 35W

| | |
|---|---|
| System Chipset | Intel® R680E Express Chipset |
| LAN Chipset | 2.5 GbE1: Intel I226, Support Wake-on-LAN and PXE, Support TSN<br>2.5 GbE2: Intel I226, Support Wake-on-LAN and PXE, Support TSN |
| Audio Codec | Realtek ALC888S |
| System Memory | 2x 262-Pin DDR5 4800/5600MHz SODIMM.<br>Max. up to 64GB (ECC and Non-ECC) |
| Graphics | Intel® UHD Graphics 770/710 |
| BIOS | AMI 256Mbit SPI BIOS |
| Watchdog | Software Programmable Supports 1~255 sec. System Reset |
| TPM | TPM 2.0 |

## Display

| | |
|---|---|
| DisplayPort | 2x DisplayPort, Support resolution 5120 x 3200,<br>Up to 7680 x 4320 |
| DVI | 1x DVI-I, support resolution 1920 x 1200 |
| Multiple Display | Triple Display |
| VGA | Yes (by optional split cable) |

| Storage | M.2 | SIM Socket | |
|---|---|---|---|
| VCO-6000-RPL-3E-4B7M<br>VCO-6000-RPL-3E-4B7M-2PWR<br>VCO-6000-RPL-4E-4B7M<br>VCO-6000-RPL-4E-4B7M-2PWR | 1x M.2 B Key, 2242/3042/3052<br>(PCIe x2, Support AI Module/NVMe Storage)<br>(PCIe x1 & USB 3.2 Gen1, Support 4G/5G) | 2x External SIM socket<br>(Mini PCIE attached) | 1x Internal 2.5" SATA/SSD HDD Bay (support H=9mm)<br>5x Removable 2.5" SATA HDD Bay (support H=7mm, Hot-swappable) |
| VCO-6000-RPL-3E-2B15M<br>VCO-6000-RPL-3E-2B15M-2PWR<br>VCO-6000-RPL-4E-2B15M<br>VCO-6000-RPL-4E-2B15M-2PWR | | | 1x Internal 2.5" SATA/SSD HDD Bay (support H=9mm)<br>1x Removable 2.5" SATA HDD Bay (support H=7mm, Hot-swappable)<br>2x Removable 2.5" SATA HDD Bay (support H=15mm, Hot-swappable,) |
| VCO-6000-RPL-3E-2N15M<br>VCO-6000-RPL-3E-2N15M-2PWR<br>VCO-6000-RPL-4E-2N15M<br>VCO-6000-RPL-4E-2N15M-2PWR | | | 1x Internal 2.5" SATA/SSD HDD Bay (support H=9mm)<br>1x Removable 2.5" SATA HDD Bay (support H=7mm, Hot-swappable)<br>2x Removable 2.5" U.2 NVMe Bay (support H=15mm, Hot-swappable) |

## Expansion

| | | |
|---|---|---|
| Mini PCIe | 1x Full-size Mini PCIe (1x shared by 1x mSATA) | |
| PCIe | • 1x PCIe x16 (Gen4), 2x PCIe x1 (Gen3) ：<br>Model No：<br>VCO-6000-RPL-3E<br>VCO-6000-RPL-3E-4B7M<br>VCO-6000-RPL-3E-2B15M<br>VCO-6000-RPL-3E-2N15M<br>VCO-6000-RPL-3E-2PWR<br>VCO-6000-RPL-3E-4B7M-2PWR<br>VCO-6000-RPL-3E-2B15M-2PWR<br>VCO-6000-RPL-3E-2N15M-2PWR | • 2x PCIe x16 Slot (x8 Lane, Gen 4),<br>1x PCIe x4 (x1 Lane, Gen 3)：<br>Model No：<br>VCO-6000-RPL-4E<br>VCO-6000-RPL-4E-4B7M<br>VCO-6000-RPL-4E-2B15M<br>VCO-6000-RPL-4E-2N15M<br>VCO-6000-RPL-4E-2PWR<br>VCO-6000-RPL-4E-4B7M-2PWR<br>VCO-6000-RPL-4E-2B15M-2PWR<br>VCO-6000-RPL-4E-2N15M-2PWR |

## I/O

| | |
|---|---|
| COM | 2x RS-232/422/485 ; 6x RS-232/422/485 (internal) |
| DIO | 8 in / 8 out (Isolated) |
| LAN | 2x RJ45 |
| Universal I/O Bracket | 2x Universal I/O Bracket (By mini PCIe interface) |
| USB | 4x USB 3.2 Gen 2 (10 Gbps)<br>5x USB 3.2 Gen 1 (5 Gbps, Internal)<br>1x USB 3.2 Gen 1 header (5 Gbps, internal) |
| Others | 4x WiFi Antenna Holes<br>1x Power Switch, 1x AT/ATX Switch, 1x Remote Power On/Off<br>1x PC/Car Mode Switch, 1x Delay Time Switch<br>1x Removable CMOS Battery (internal)<br>1x 6CM FAN Module (Optional) |

## Operating System

| | |
|---|---|
| Windows | Windows 10/11 |
| Linux | Linux kernel |

## Power

| | |
|---|---|
| Power Adapter | Optional AC/DC 24V/9.2A, 220W<br>Optional AC/DC 24V/11.67A, 280W (GPU/Card Expansion)<br>Optional AC/DC 24V/15A, 360W (i7/i9 CPU/GPU/Card Expansion) |
| Power Mode | AT, ATX |
| Power Ignition Sensing | Power Ignition Management |
| Power Supply Voltage | 9~48VDC<br>12~48VDC (Optional, For GPU/Card Expansion) **(optional)** |
| Power Connector | 5-pin Terminal Block<br>4-pin Terminal Block (optional) |
| Power Protection | OVP (Over Voltage Protection);<br>OCP (Over Current Protection)<br>Reserve Protection |

## Environment

| | |
|---|---|
| Operating Temp. | -25°C to 70°C (35W CPU)<br>-25°C to 60°C (65W CPU) |
| Storage Temp. | -30°C to 85°C |
| Relative Humidity | 10% to 95% (non-condensing) |
| Standards / Certification | CE, FCC Class A |
| Vibration | With SSD: 3 Grms, 5 - 500 Hz, 0.5 hr/axis<br>With HDD: 1 Grms, 5 - 500 Hz, 0.5 hr/axis |
| Shock | With SSD: 20G, half sine, 11ms |

## Physical

| | |
|---|---|
| Construction | Extruded Aluminum with Heavy Duty Metal |
| Dimension | • **VCO-6000-RPL-3E Series**：<br>157 (W) x 340 (D) x 240 (H) mm<br>• **VCO-6000-RPL-4E Series**：<br>177 (W) x 340 (D) x 240 (H) mm |
| Mounting | Wall Mounting |

# 1.3 System I/O

## 1.3.1 VCO-6000-RPL-3E

**ATX power on/off switch**
Press to power-on or power-off the system

**DC IN**
Used to plug a DC power input with terminal Block

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

**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)

**DisplayPort**
Used to connect a DisplayPort monitor

**LAN Port**
Used to connect the system to a local area network

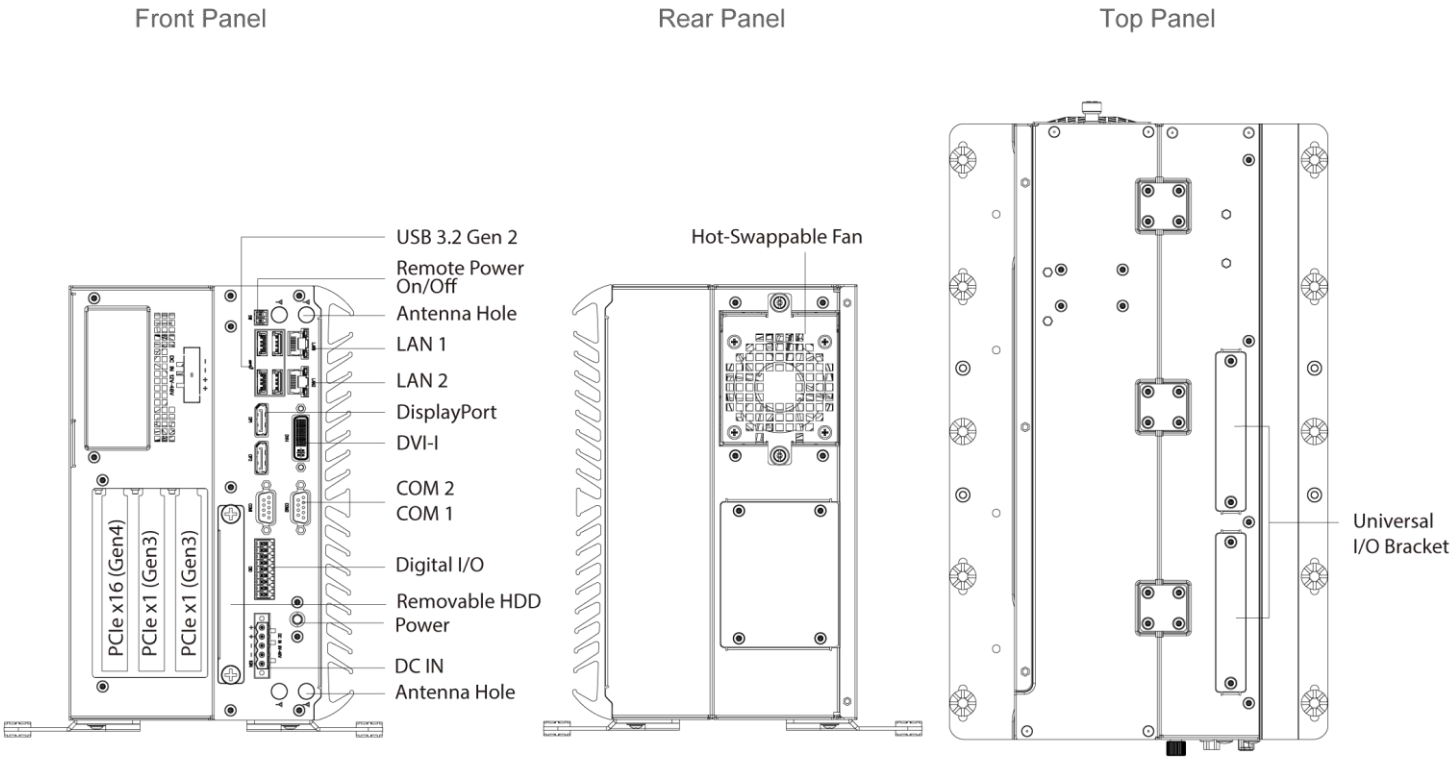
**DVI-I port**
Used to connect a DVI monitor or connect optional split cable for dual display mode

**COM port**
COM1 & COM2 support RS232/422/485 serial device

**Remote Power on/off Terminal Block**
Used to plug a remote power on/off terminal block

**2x Universal I/O Bracket**

**Hot-Swappable Fan**
Easily removed for replacements or quick maintenance in the field.



## VCO-6000-RPL-3E Series Expansion

VCO-6000-RPL-3E / VCO-6000-RPL-3E-4B7M / VCO-6000-RPL-3E-2B15M / VCO-6000-RPL-3E-2N15M / VCO-6000-RPL-3E-2PWR / VCO-6000-RPL-3E-4B7M-2PWR / VCO-6000-RPL-3E-2B15M-2PWR / VCO-6000-RPL-3E-2N15M-2PWR

**Storage (optional)**

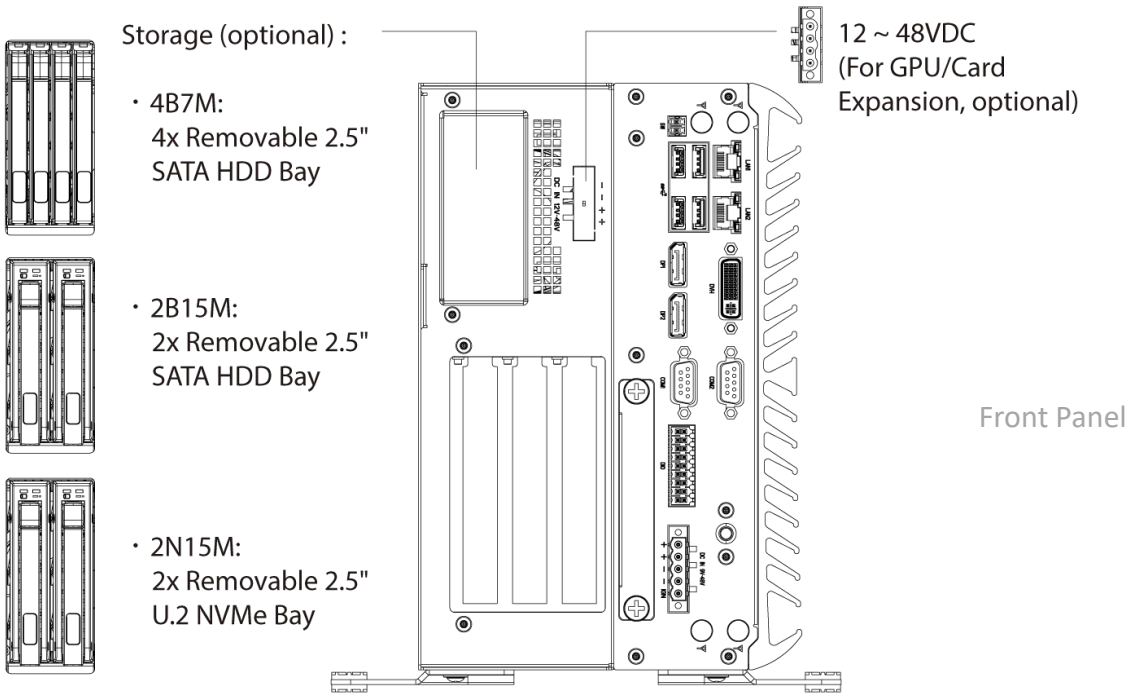
- 4B7M:
  4x Removable 2.5" SATA HDD Bay
- 2B15M:
  2x Removable 2.5" SATA HDD Bay
- 2N15M:
  2x Removable 2.5" U.2 NVMe Bay

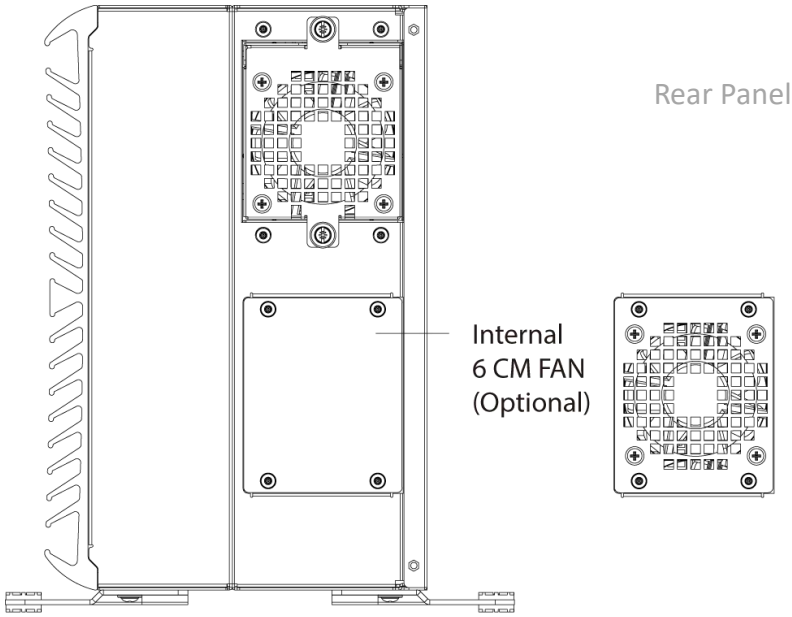
**DC IN 12 ~ 48VDC (optional)**

- 12 ~ 48VDC (For GPU/Card Expansion)

**FAN (optional)**

- Internal 6 CM FAN (Optional)



## 1.3.2 VCO-6000-RPL-4E

**ATX power on/off switch**
Press to power-on or power-off the system

**DC IN**
Used to plug a DC power input with terminal Block

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

**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)

**DisplayPort**
Used to connect a DisplayPort monitor

**LAN Port**
Used to connect the system to a local area network

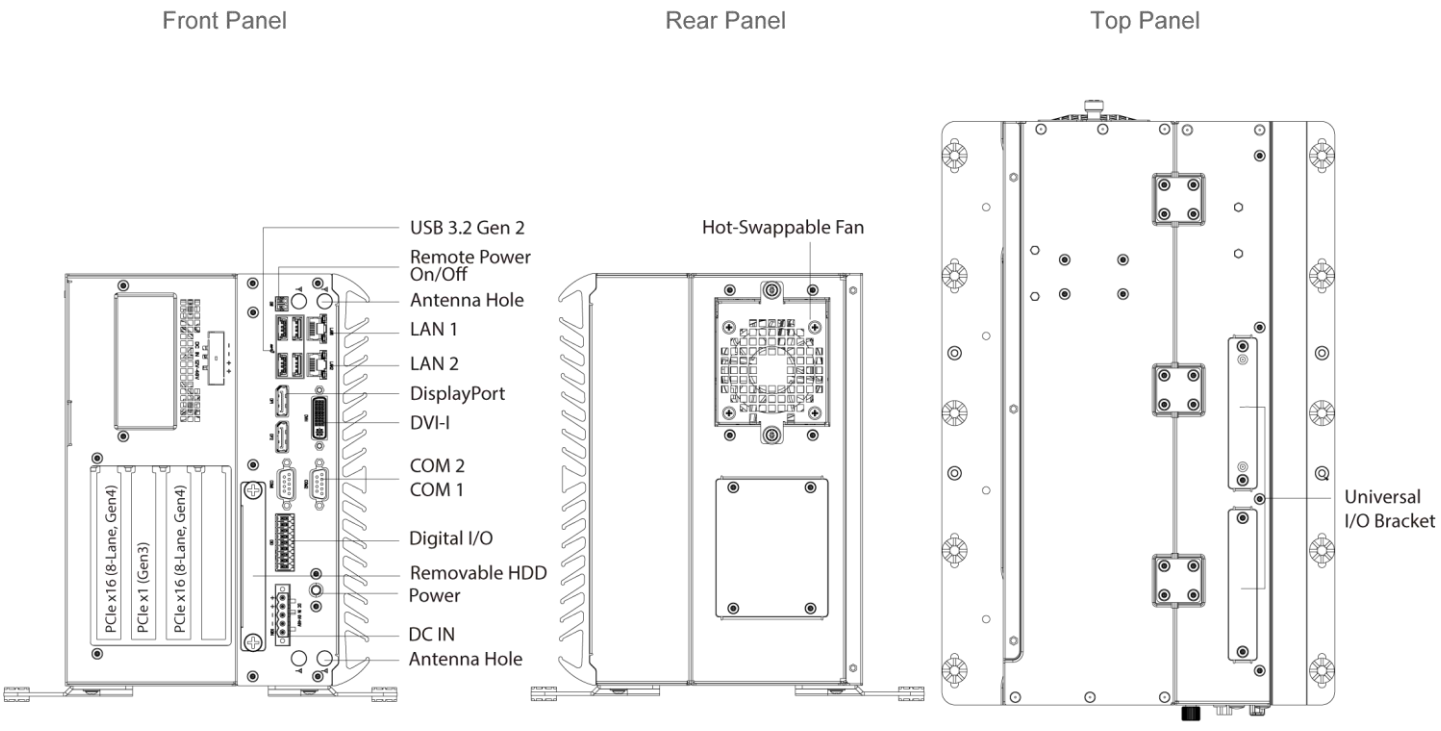
**DVI-I port**
Used to connect a DVI monitor or connect optional split cable for dual display mode

**COM port**
COM1 & COM2 support RS232/422/485 serial device

**Remote Power on/off Terminal Block**
Used to plug a remote power on/off terminal block

**2x Universal I/O Bracket**

**Hot-Swappable Fan**
Easily removed for replacements or quick maintenance in the field.



## VCO-6000-RPL-4E Series Expansion

VCO-6000-RPL-4E / VCO-6000-RPL-4E-4B7M / VCO-6000-RPL-4E-2B15M / VCO-6000-RPL-4E-2N15M / VCO-6000-RPL-4E-2PWR / VCO-6000-RPL-4E-4B7M-2PWR / VCO-6000-RPL-4E-2B15M-2PWR / VCO-6000-RPL-4E-2N15M-2PWR

**Storage (optional)**

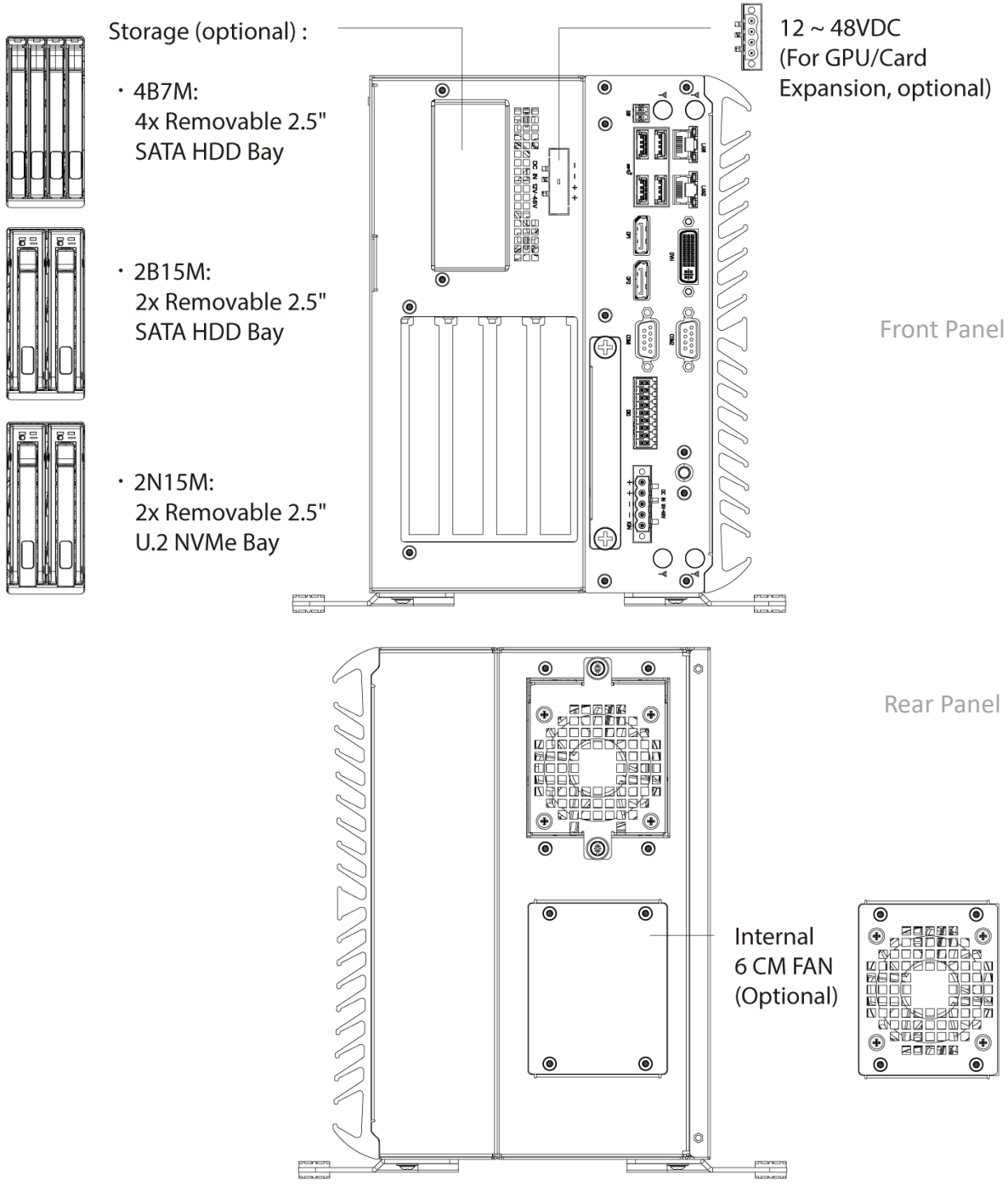
- 4B7M:
  4x Removable 2.5" SATA HDD Bay
- 2B15M:
  2x Removable 2.5" SATA HDD Bay
- 2N15M:
  2x Removable 2.5" U.2 NVMe Bay

**DC IN 12 ~ 48VDC (optional)**

- 12 ~ 48VDC (For GPU/Card Expansion)

**FAN (optional)**

- Internal 6 CM FAN (Optional)

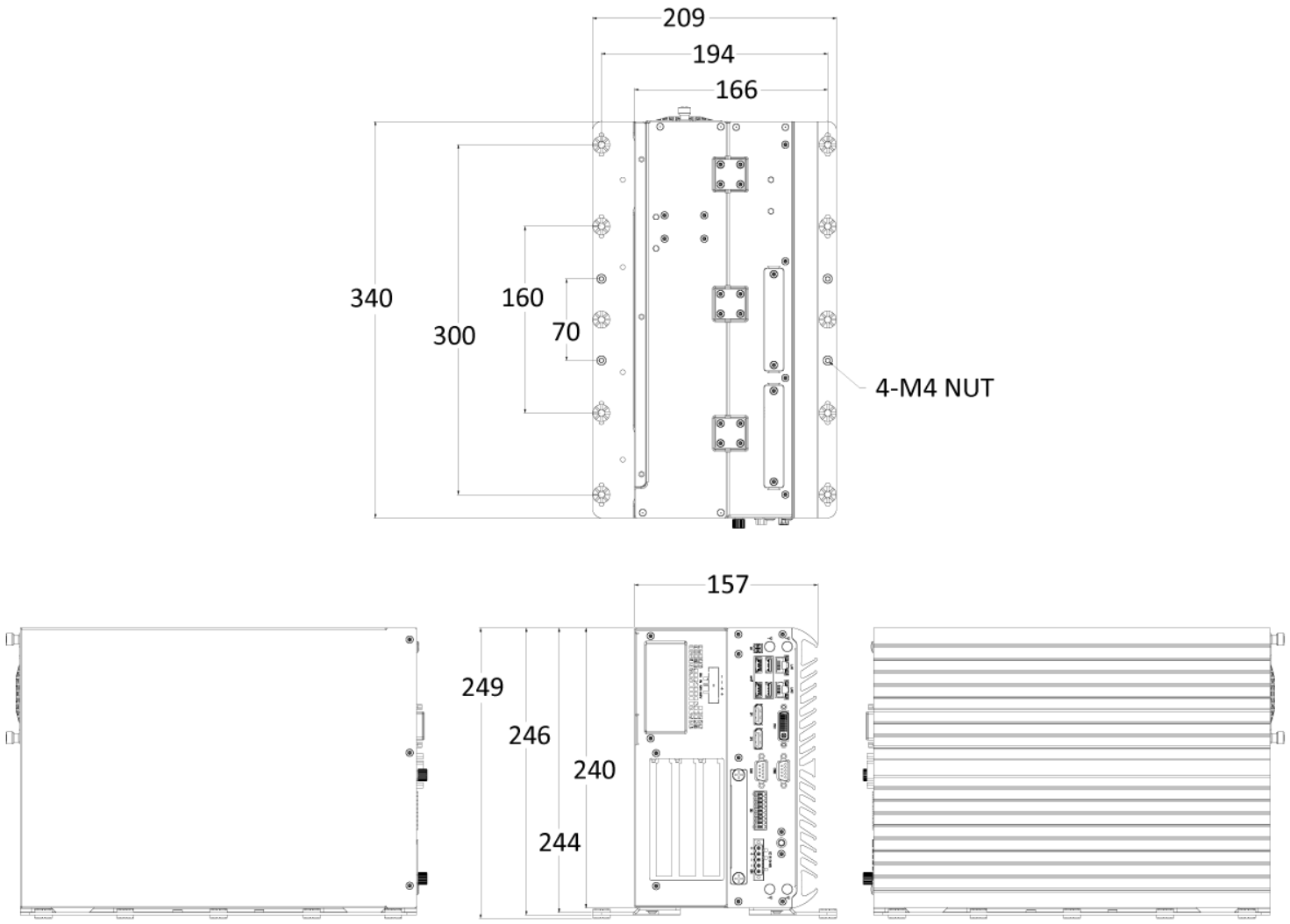


# 1.4 Mechanical Dimensions

## 1.4.1 VCO-6000-RPL-3E Series

Unit: mm

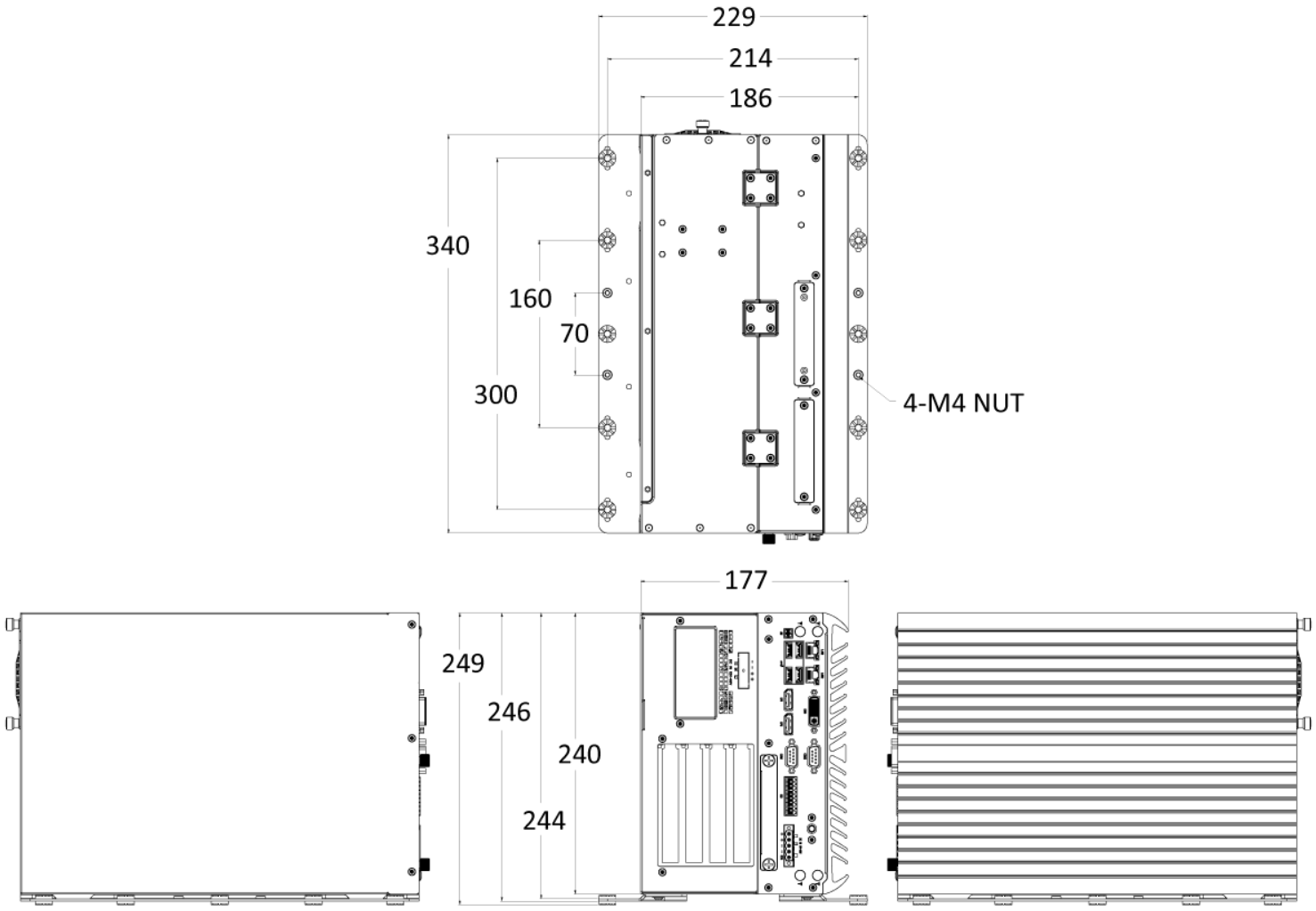
VCO-6000-RPL-3E / VCO-6000-RPL-3E-4B7M / VCO-6000-RPL-3E-2B15M / VCO-6000-RPL-3E-2N15M / VCO-6000-RPL-3E-2PWR / VCO-6000-RPL-3E-4B7M-2PWR / VCO-6000-RPL-3E-2B15M-2PWR / VCO-6000-RPL-3E-2N15M-2PWR



## 1.4.2 VCO-6000-RPL-4E Series

Unit: mm

VCO-6000-RPL-4E / VCO-6000-RPL-4E-4B7M / VCO-6000-RPL-4E-2B15M / VCO-6000-RPL-4E-2N15M / VCO-6000-RPL-4E-2PWR / VCO-6000-RPL-4E-4B7M-2PWR / VCO-6000-RPL-4E-2B15M-2PWR / VCO-6000-RPL-4E-2N15M-2PWR

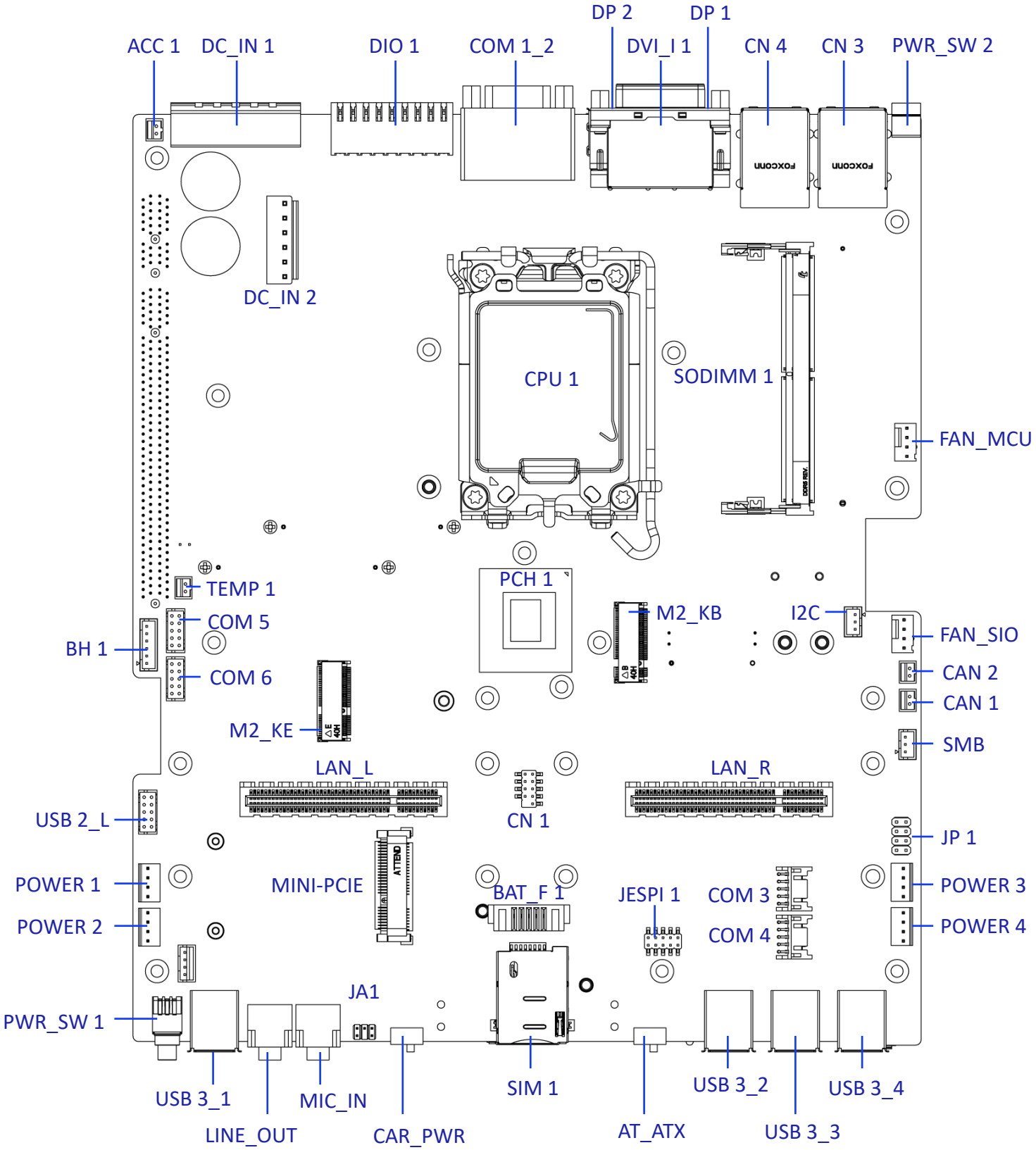


Chapter 2

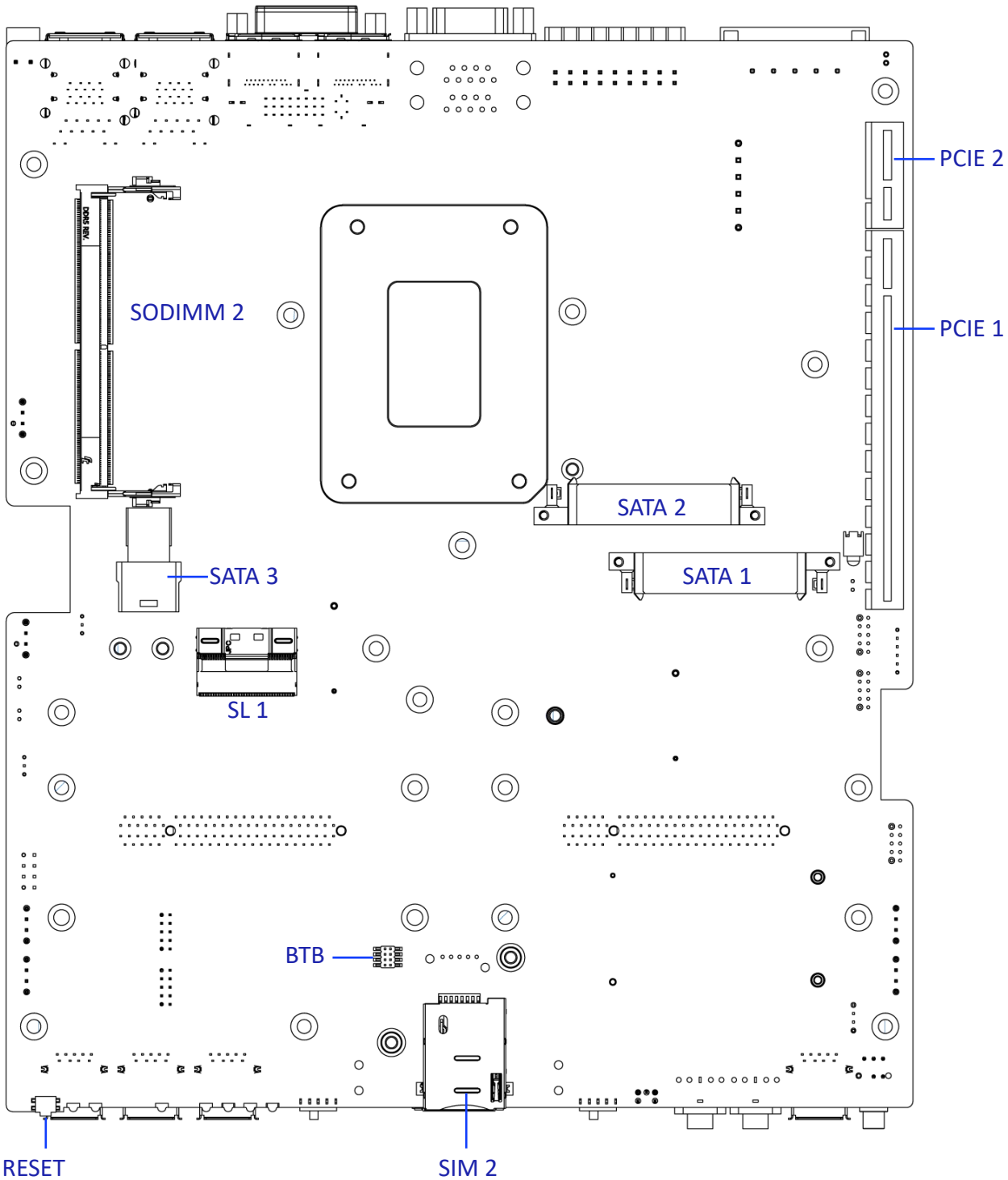
# Mechanical Specifications

# 2.1 Switch and Connector Locations

## 2.1.1 Top View



### 2.1.2 Bottom View

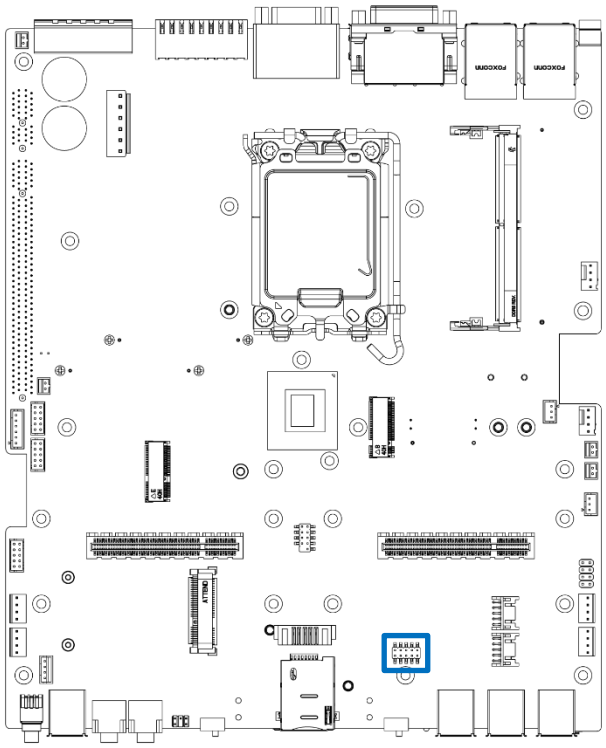


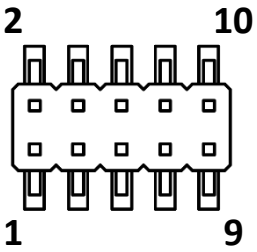
## 2.2 Connector / Switch Definition

| Connector Location | Definition |
|---|---|
| AT_ATX | AT / ATX Power Mode Switch |
| PWR_SW1,2,3 | Power Switch |
| RESET | Reset Switch |
| DC_IN1 | 5-pin DC +9~48V Power Input Connector |
| DC_IN2 | 6-pin DC +9~48V Power Input Connector |
| DIO1 | 8DI / 8DO Connector |
| COM1-6 | RS232 / RS422 / RS485 Connector |
| DP1,2 | DP Connector |
| DVI_I1 | DVI-I Connector |
| CN3,4 | LAN and USB3.2 GEN 2 Ports X2 |
| FAN_CPU,FAN_SIO | Smart FAN Connector |
| PWR1-4 | +12V / 5V Power Connector |
| USB3_1-4 | USB 3.2 Gen 2 、USB 3.2 Gen 1、 USB2.0 |
| SIM1, SIM2 | SIM Card Socket |
| CAR_PWR | PC mode / CAR mode select |
| SL1 | PCI-Express X8 Slimline Connector |
| MIC_IN | Mic-in Jack |
| LINE_OUT | LINE-OUT Jack |
| M2_KE , M2_KB | M.2 key E , key B Connector |
| PCIE1,2, LAN_L, LAN_R | PCI-Express X1 Slot, PCI-Express X8 Slot (PCIex4 w POE) , PCI-Express x16 Slot |
| MINI-PCIE | Mini PCI-Express Socket |
| PWR_LED | Power LED Status |
| HDD_LED | HDD Access LED Status |
| WDT_LED1 | Watchdog LED Status |
| SATA3 | SATA X 4 Port |
| SATA1,2 | SATA with Power Connector |

# 2.3 I/O Interface Descriptions

## 2.3.1 ESPI Debug Con

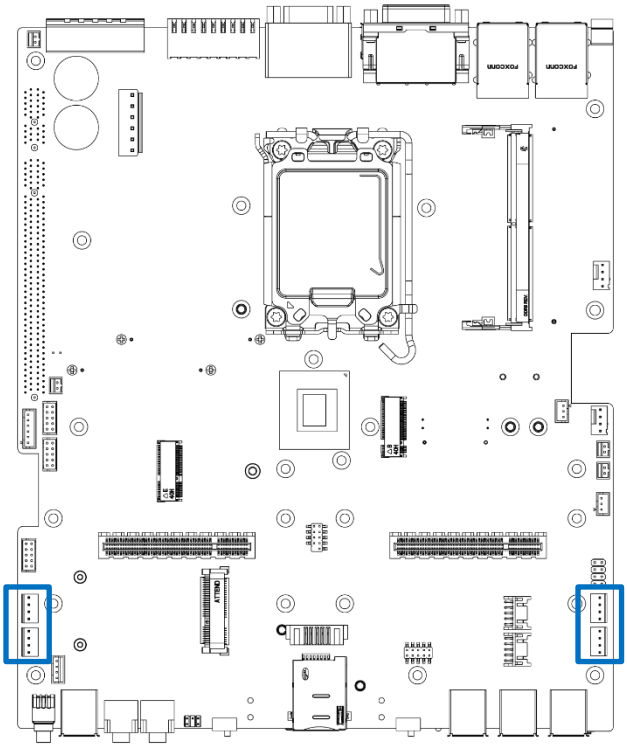





JESPI 1

| 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 |

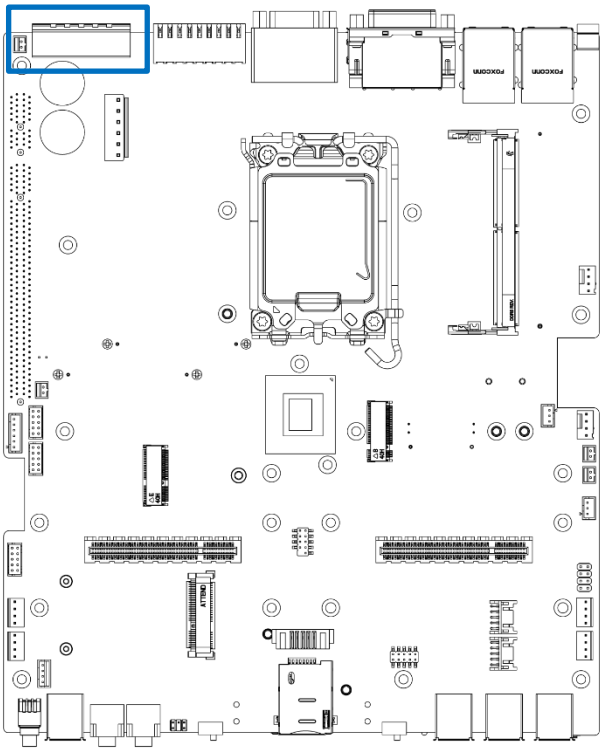
## 2.3.2 Power Con

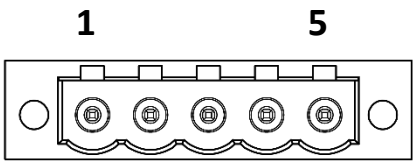



POWER 1~4

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

### 2.3.3 DC IN 1 : 9V ~ 48V

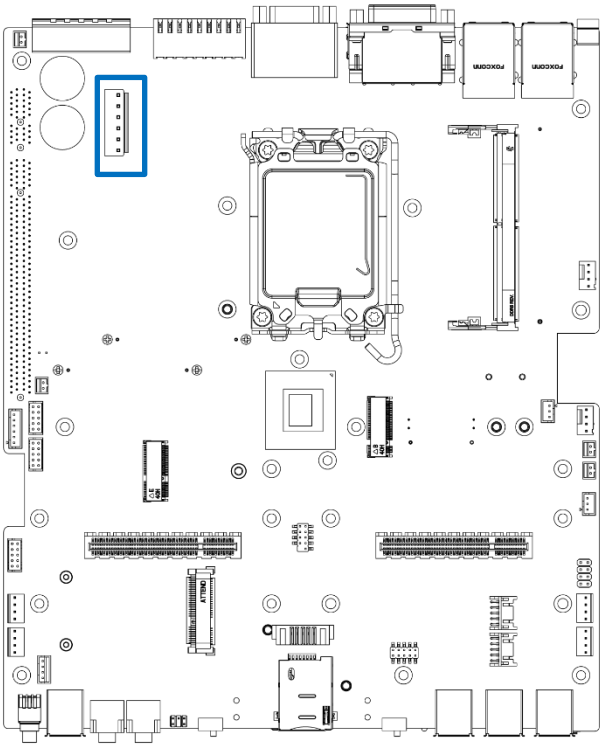


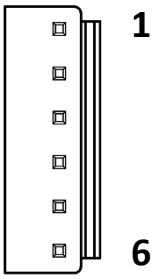



DC IN 1

| Pin | Signal |
|---|---|
| 1 | +9V ~ +48V |
| 2 | +9V ~ +48V |
| 3 | GND |
| 4 | GND |
| 5 | IGN |

### 2.3.4 DC IN 2 : 9V ~ 48V

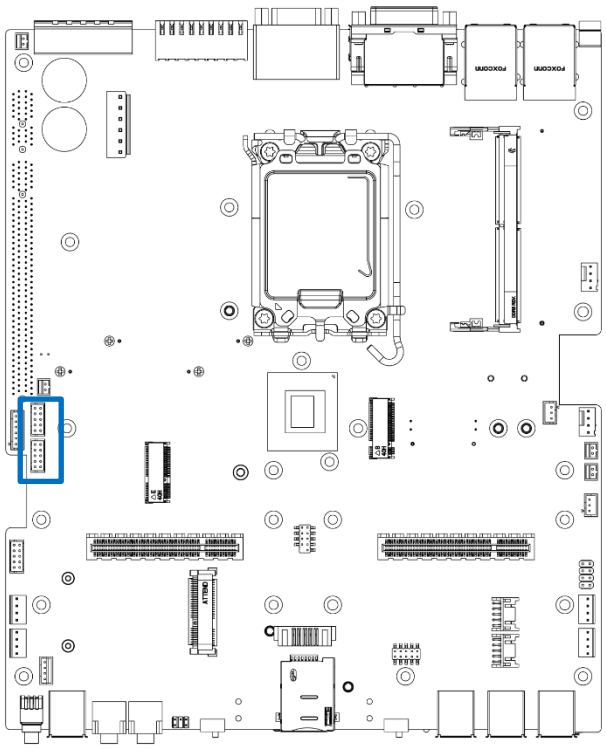


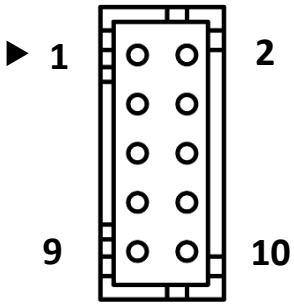



DC IN 2

| Pin | Signal |
|---|---|
| 1 | +9V ~ +48V |
| 2 | +9V ~ +48V |
| 3 | +9V ~ +48V |
| 4 | GND |
| 5 | GND |
| 6 | GND |

### 2.3.5 COM Con





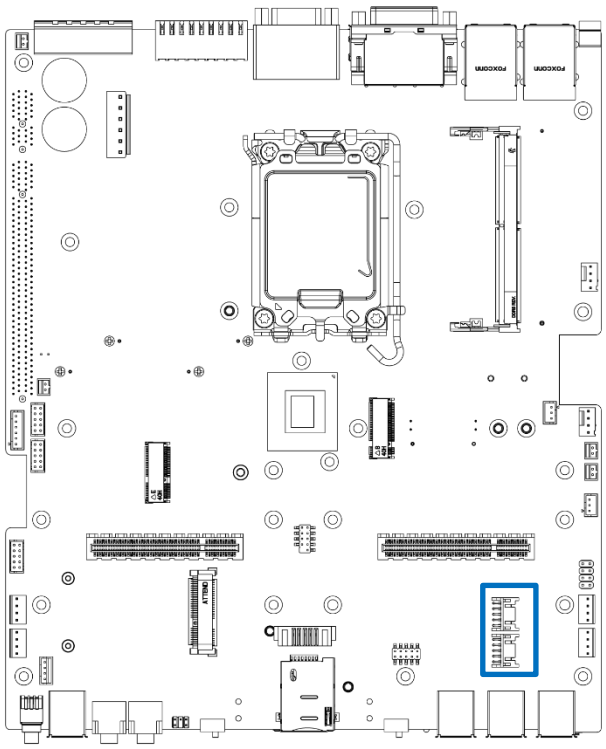

COM 5, COM 6

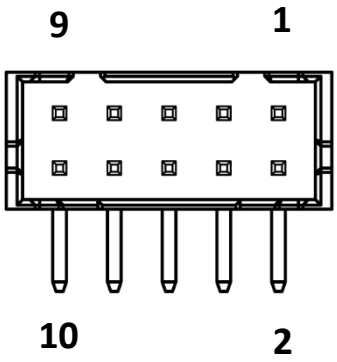
| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | DCD# | 2 | DSR# |
| 3 | RXD | 4 | RTS# |
| 5 | TXD | 6 | CTS# |
| 7 | DTR# | 8 | RI# |
| 9 | GND | 10 | GND |

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

| Pin | Signal | 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 |

## COM Con

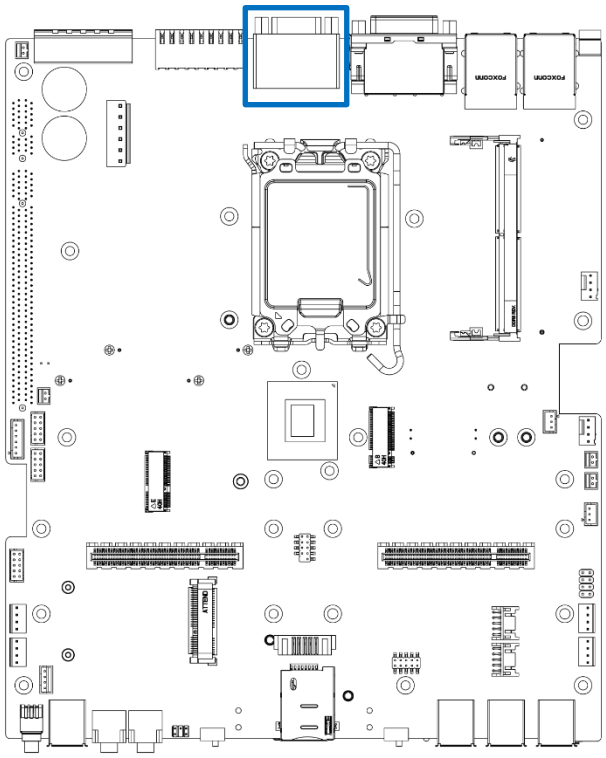


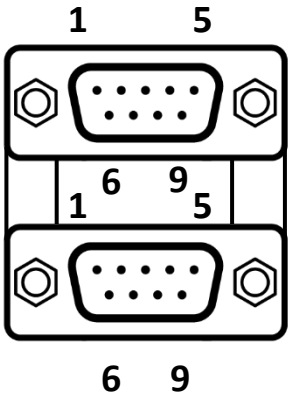



COM 3 , COM 4

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

## COM Con



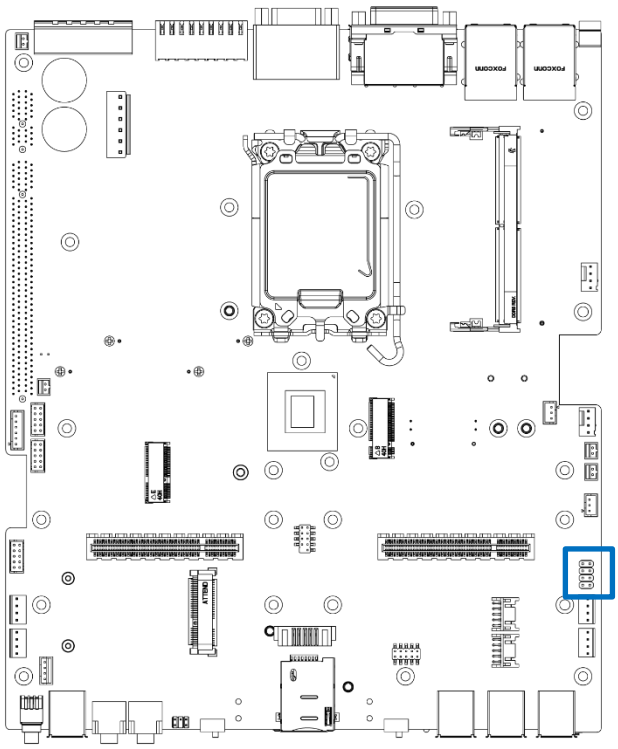


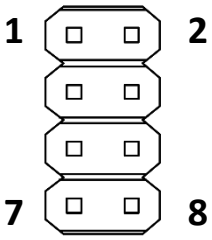

COM 1_2

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# | | |

### 2.3.6 SF100 SPI Con

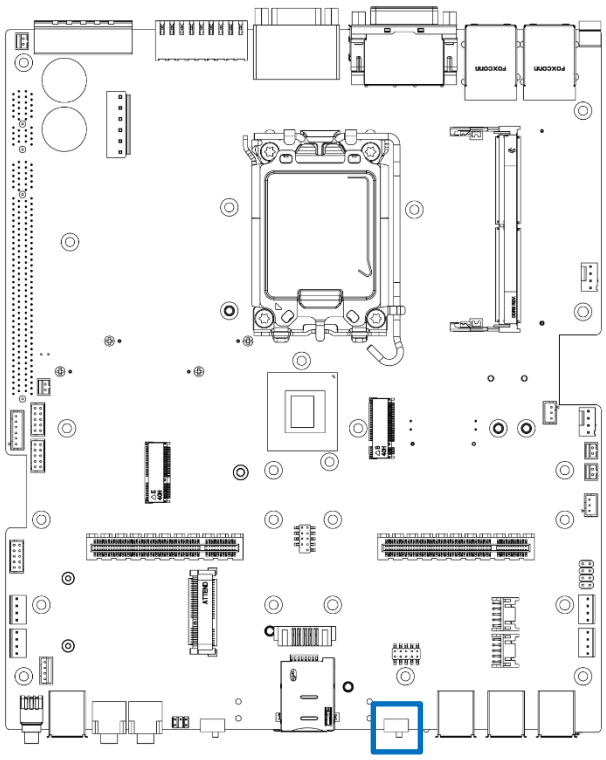


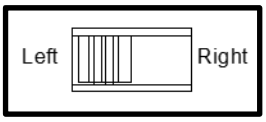



JP 1

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

## 2.3.7 AT / ATX Power Mode Switch

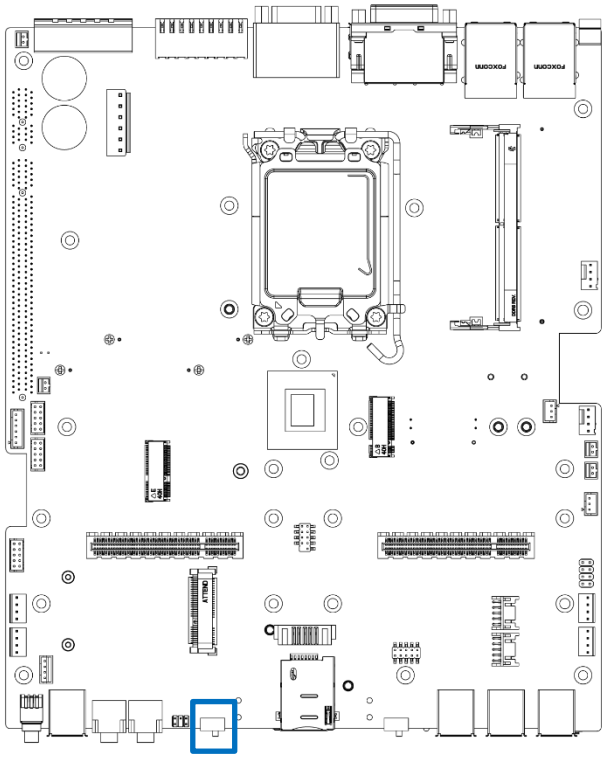


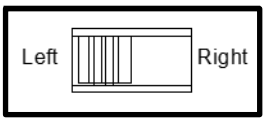



AT_ATX

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

## 2.3.8 PC / Car Mode Switch

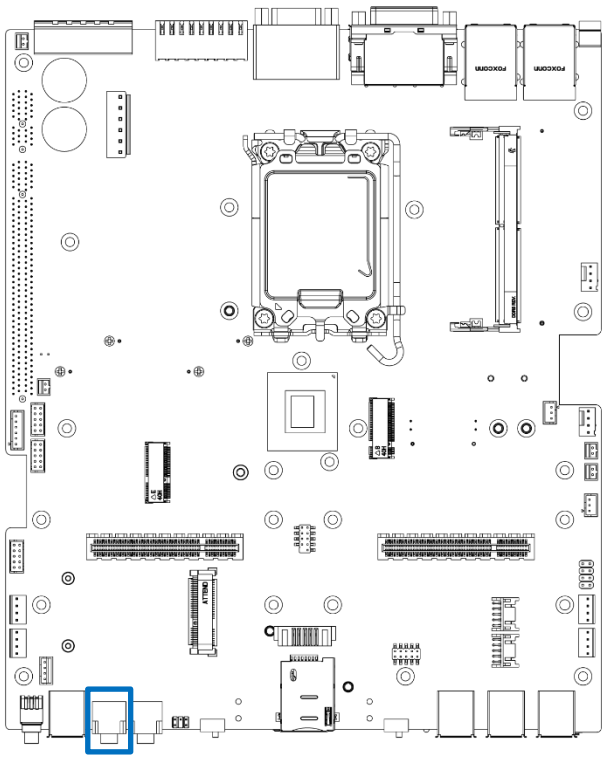


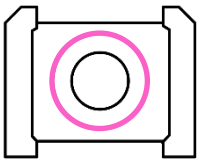



CAR_PWR

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

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

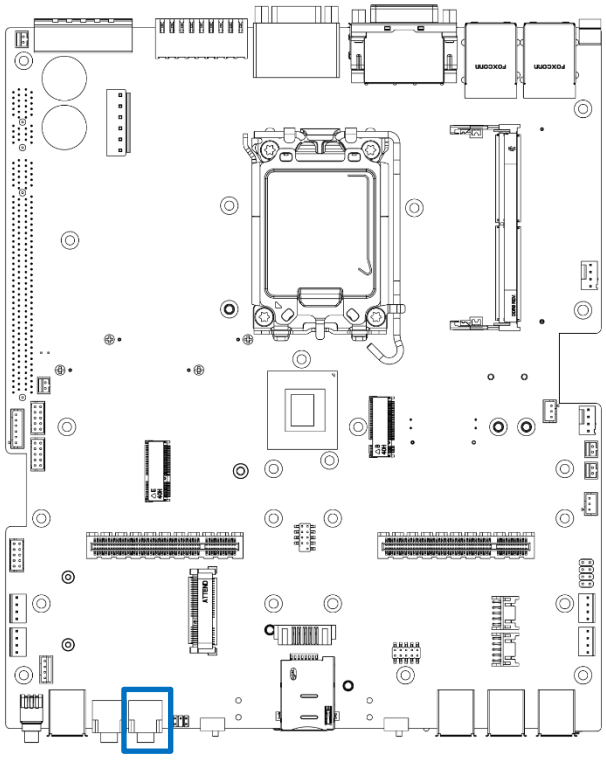


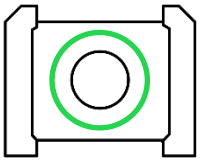


LINE_OUT

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

### 2.3.10 Microphone-in Jack (Pink) Connector Type: 5-pin Phone Jack

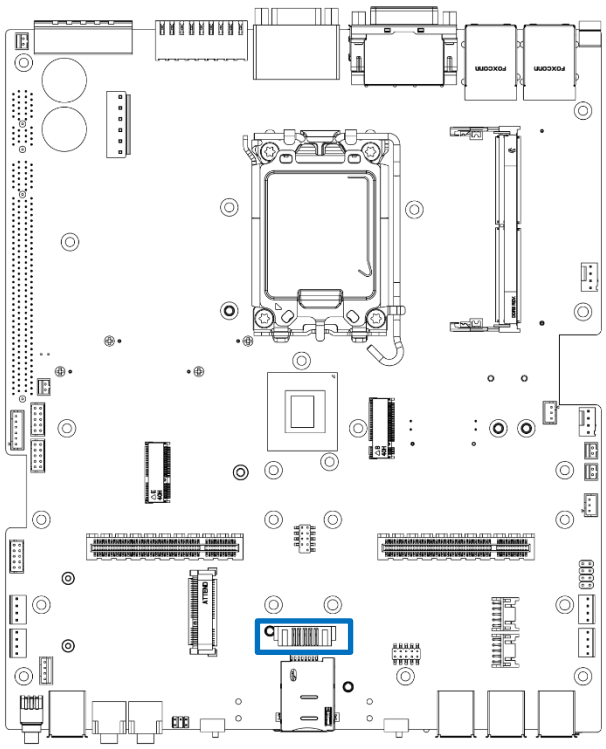


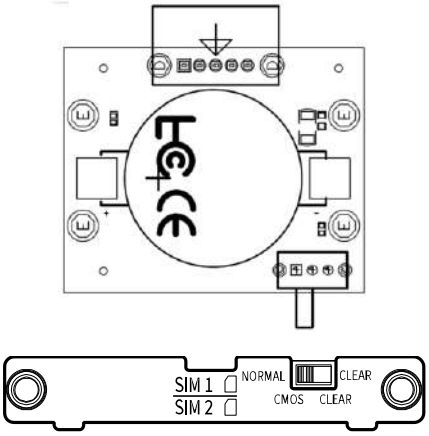


MIC_IN

| Switch | Definition |
|---|---|
| 1 | GND |
| 2 | MIC_R |
| 3 | GND |
| 4 | GND |
| 5 | MIC_L |

## 2.3.11 Clear BIOS Switch

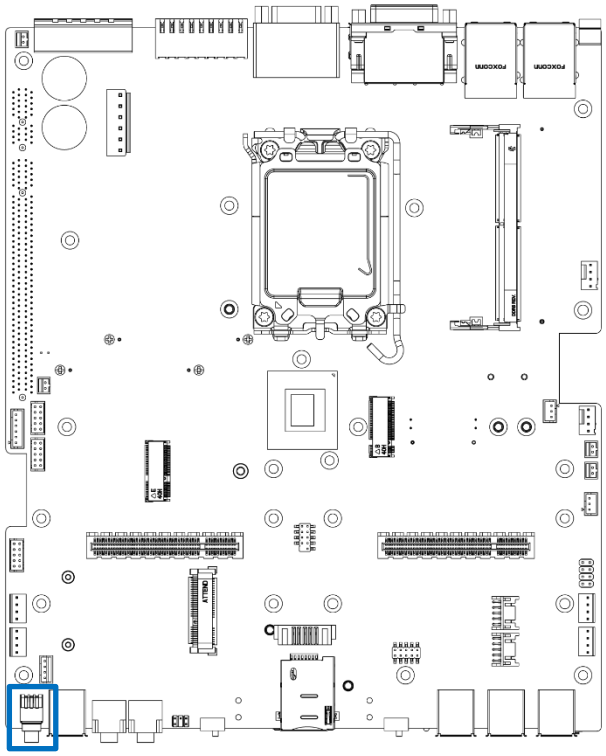





CLR_CMOS

| Switch | Definition |
|---|---|
| 1-2 (Left) | Normal Status (Default) |
| 2-3 (Right) | Clear BIOS |

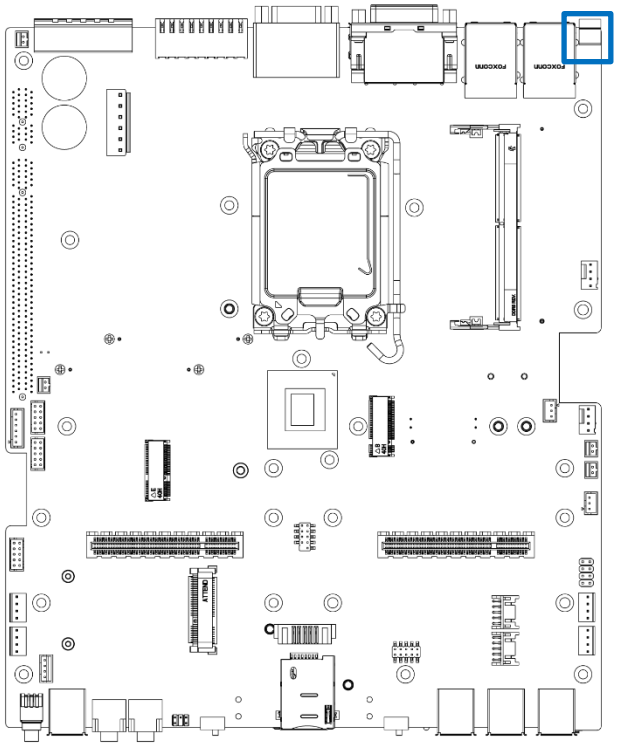
## 2.3.12 Power Button

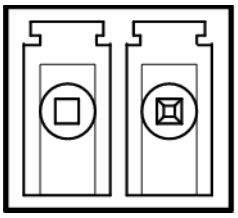


PWR_SW 1

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

### 2.3.13 Remote Power Switch Type: Terminal Block 1x2 2-pin, 3.5mm pitch

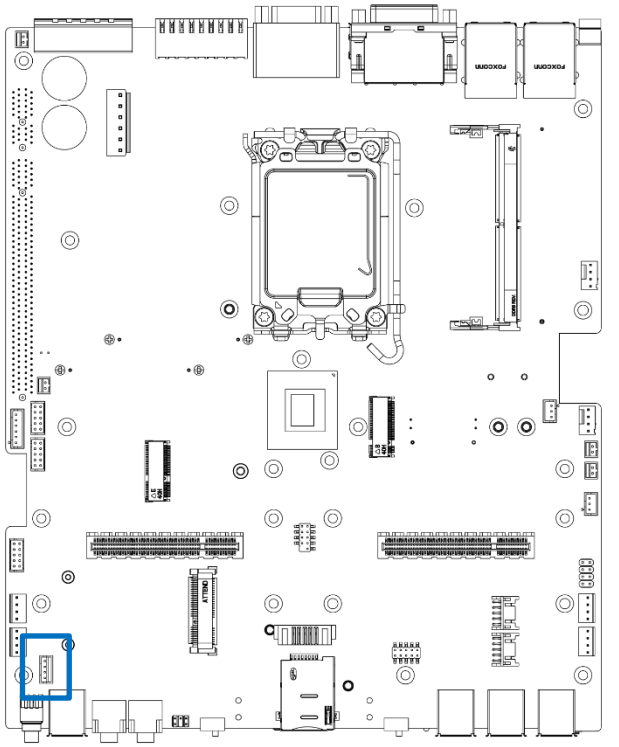


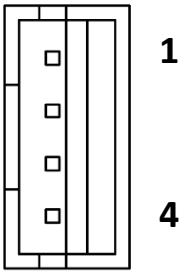



PWR_SW 2

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

### 2.3.14 For VCO-6000-RPL

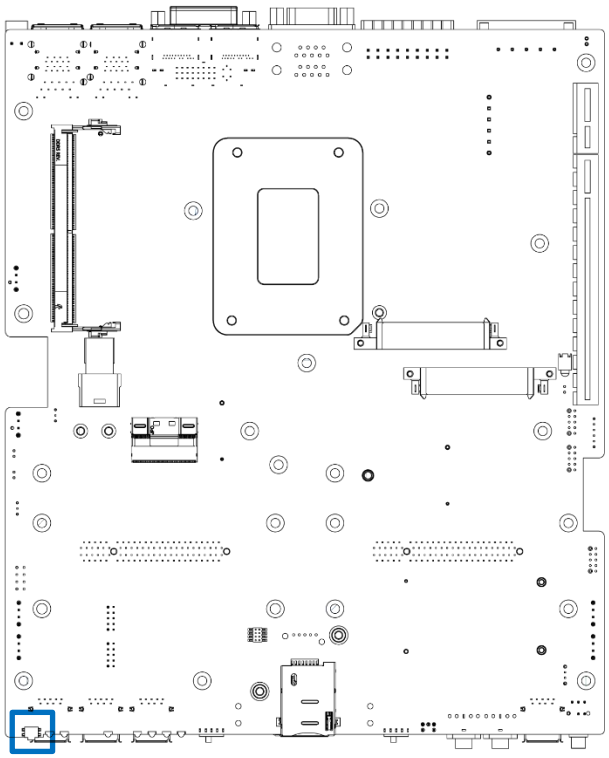


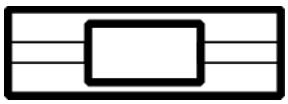



PWR_SW 3

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

## 2.3.15 Reset Button

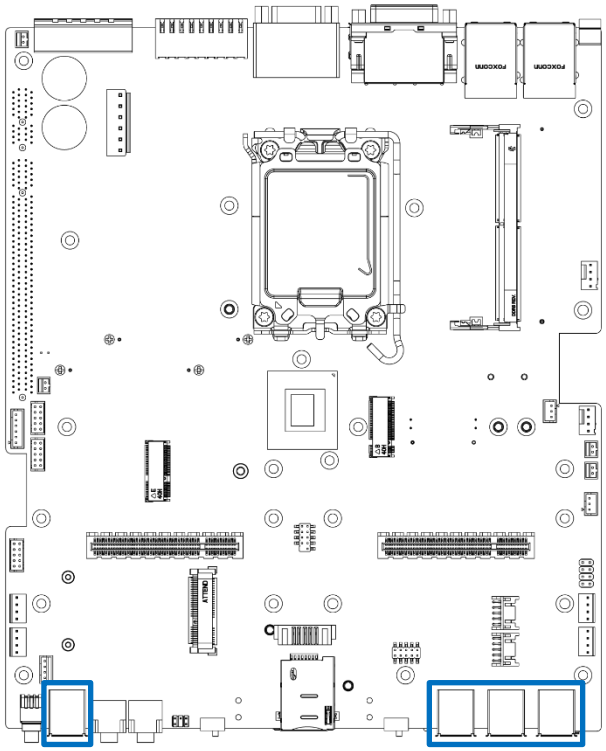


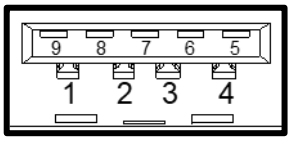


RESET

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

## 2.3.16 USB 3.1 Connector, GEN2 x4 ports, Type A

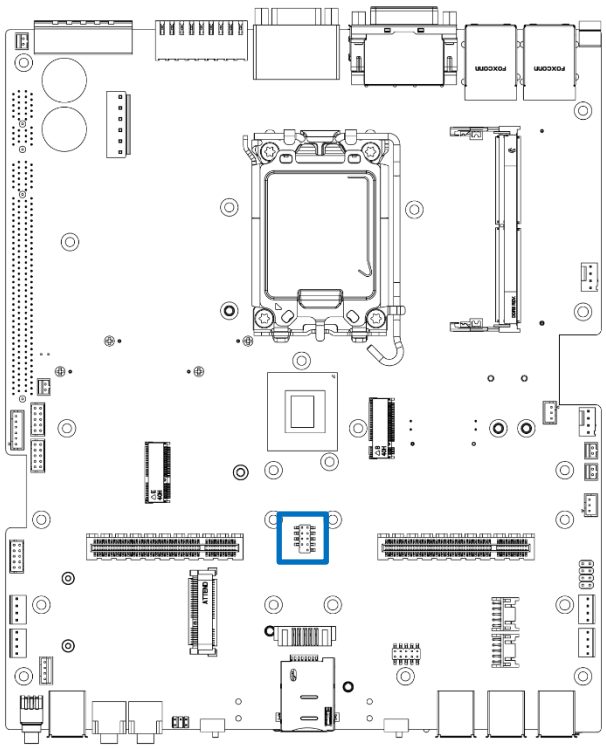


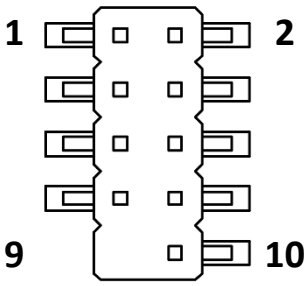



USB 3_1 , USB 3_2 , USB 3_3 , USB 3_4

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

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

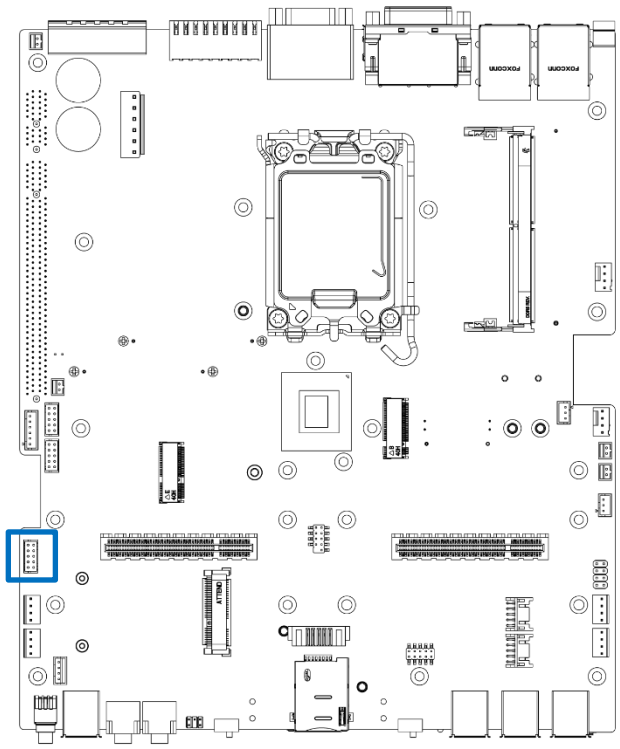


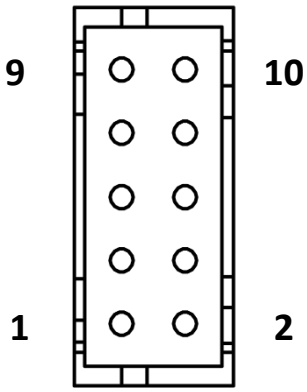



CN 1

| Switch | 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+ |

### 2.3.18 USB2.0 Connector, 2x5 10-pin box header, 2.0mm pitch

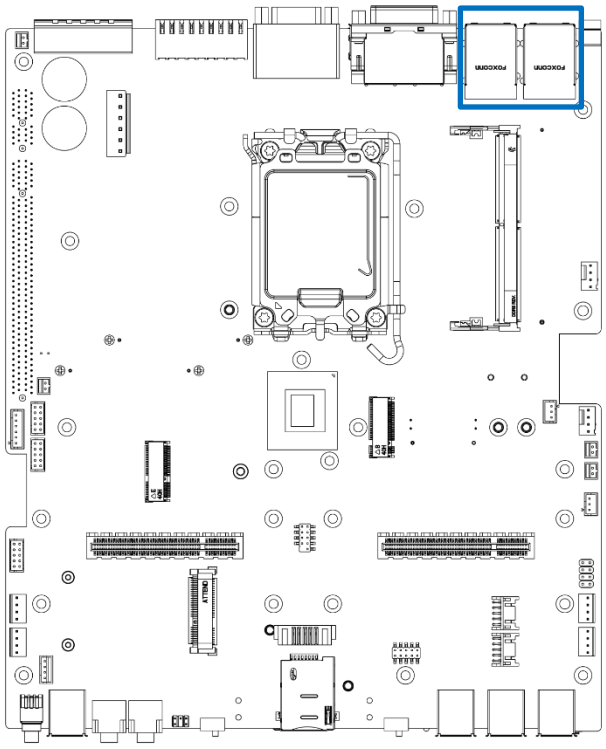


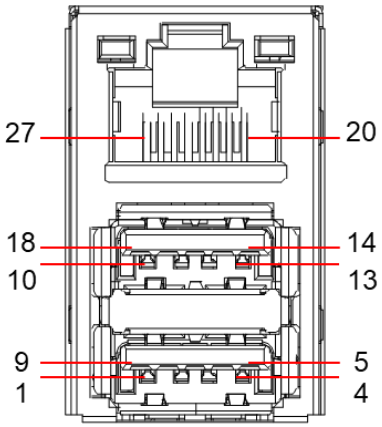



USB 2_L

| Switch | Definition |
|---|---|
| 1 | NC |
| 2 | +5V |
| 3 | NC |
| 4 | USB2_D- |
| 5 | NC |
| 6 | USB2_D+ |
| 7 | NC |
| 8 | GND |
| 9 | NC |
| 10 | GND |

### 2.3.19 LAN and USB 3.1 GEN 2 Ports Connector Type: RJ45 port with LEDs and dual USB 3.1 ports

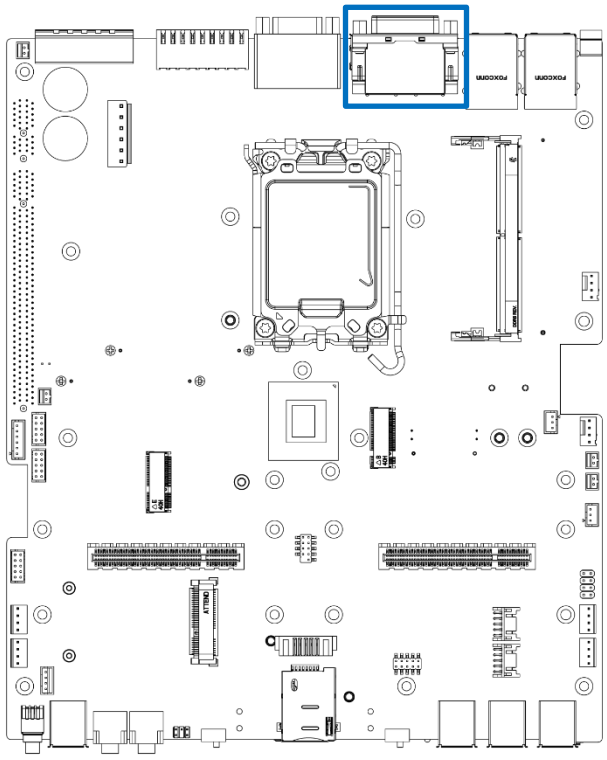


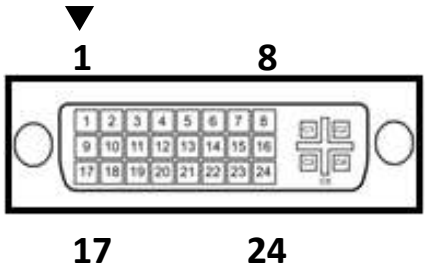



CN3, CN4

| Pin | Definition | Pin | Definition | Pin | Definition |
|---|---|---|---|---|---|
| 1 | +5V | 10 | +5V | 20 | LAN1_MDI0P |
| 2 | USB2_D1- | 11 | USB2_D2- | 21 | LAN1_MDI0N |
| 3 | USB2_D1+ | 12 | USB2_D2+ | 22 | LAN1_MDI1P |
| 4 | GND | 13 | GND | 23 | LAN1_MDI2P |
| 5 | USB3_RX1- | 14 | USB3_RX2- | 24 | LAN1_MDI2N |
| 6 | USB3_RX1+ | 15 | USB3_RX2+ | 25 | LAN1_MDI1N |
| 7 | GND | 16 | GND | 26 | LAN1_MDI3P |
| 8 | USB3_TX1- | 17 | USB3_TX2- | 27 | LAN1_MDI3N |
| 9 | USB3_TX1+ | 18 | USB3_TX2+ | | |

## 2.3.20 DVI-I Connector

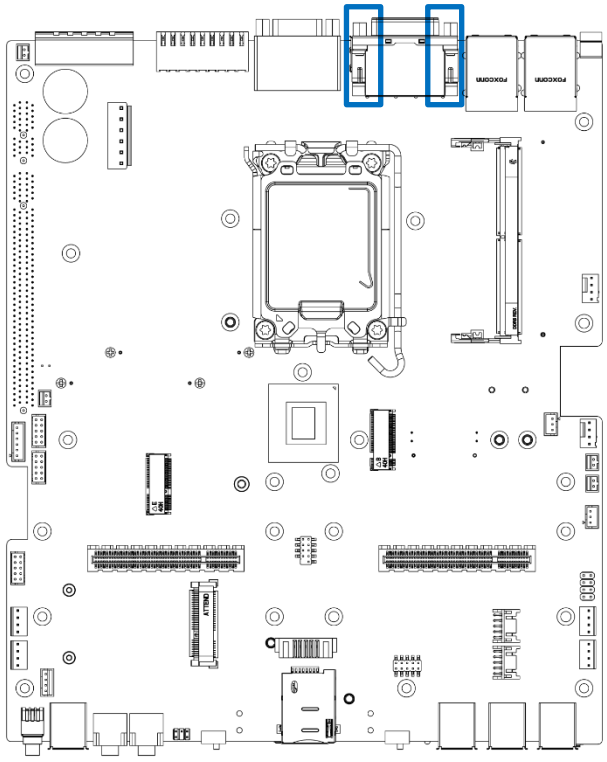


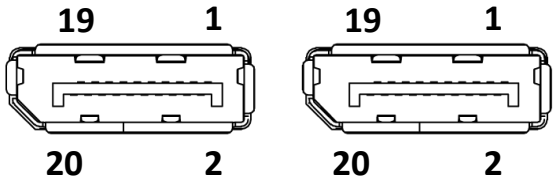



DVI_I 1

| Pin | Definition | Pin | Definition |
|---|---|---|---|
| 1 | DVI_TX2- | 16 | DVI Hot Plug Detect |
| 2 | DVI_TX2+ | 17 | DVI_TX0- |
| 3 | GND | 18 | DVI_TX0+ |
| 4 | NC | 19 | GND |
| 5 | NC | 20 | VGA_DDC_CLOCK |
| 6 | DVI_DDC_CLOCK | 21 | VGA_DDC_DATA |
| 7 | DVI_DDC_DATA | 22 | GND |
| 8 | VGA VSYNC | 23 | DVI_TXCLK+ |
| 9 | DVI_TX1- | 24 | DVI_TXCLK- |
| 10 | DVI_TX1+ | C1 | VGA_RED |
| 11 | GND | C2 | VGA_GREEN |
| 12 | NC | C3 | VGA_BLUE |
| 13 | NC | C4 | VGA_HSYNC |
| 14 | +5V | C5 | GND |
| 15 | GND | | |

### 2.3.21 Display Port Connector

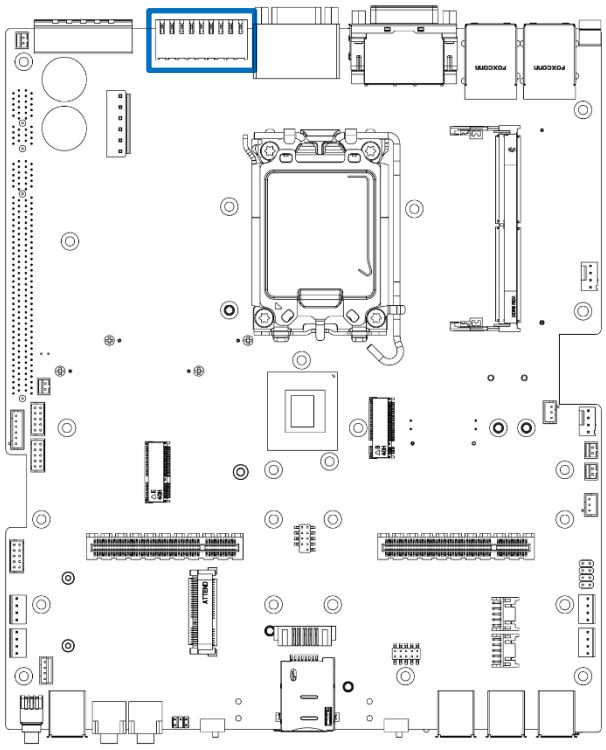


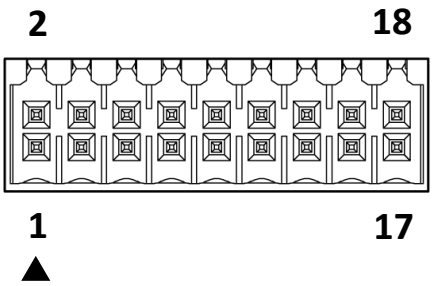



DP 1, DP 2

| 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 |

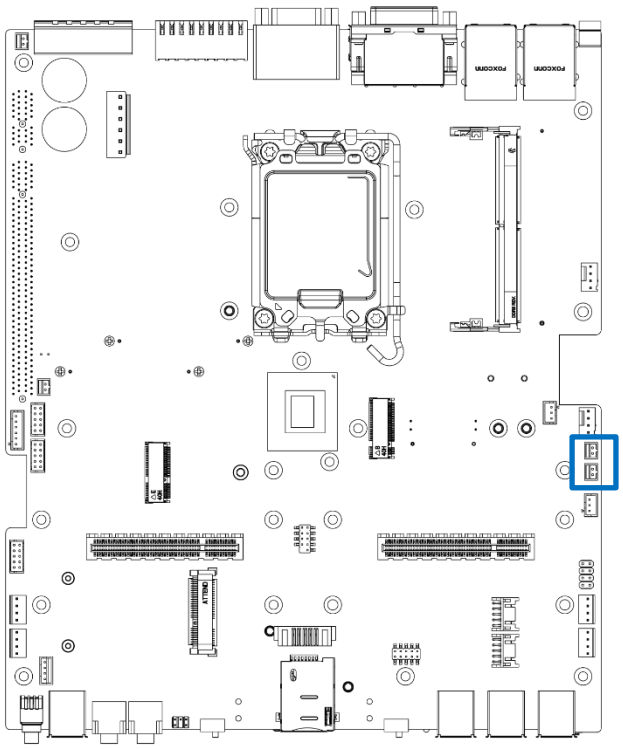
## 2.3.22 Digital Input / Output Connector Type: Terminal Block 2x9 18-pin, 3.5mm pitch

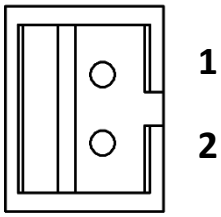





DIO

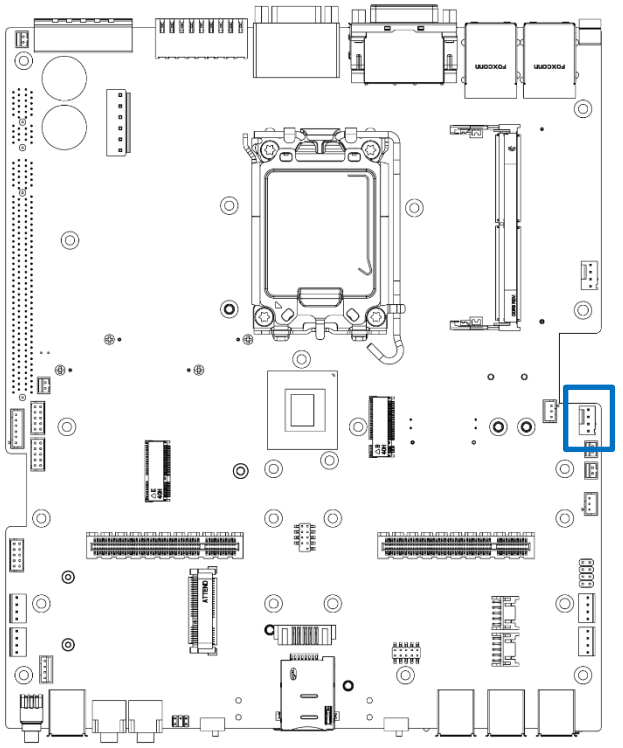
| Pin | Definition | Pin | Definition |
|---|---|---|---|
| 1 | DIN1 | 2 | DOUT1 |
| 3 | DIN2 | 4 | DOUT2 |
| 5 | DIN3 | 6 | DOUT3 |
| 7 | DIN4 | 8 | DOUT4 |
| 9 | DIN5 | 10 | DOUT5 |
| 11 | DIN6 | 12 | DOUT6 |
| 13 | DIN7 | 14 | DOUT7 |
| 15 | DIN8 | 16 | DOUT8 |
| 17 | DC power input (+5V~+24V) | 18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

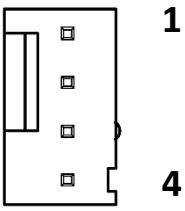





CAN1 CAN2

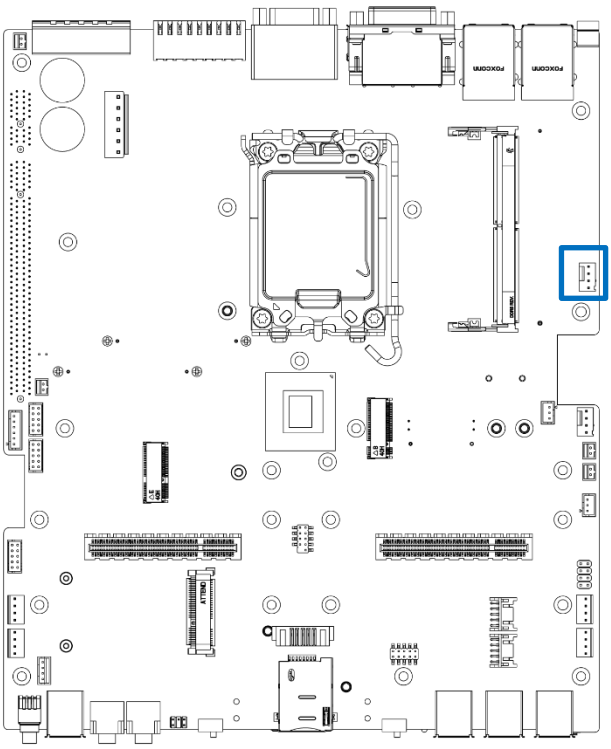
| Pin | Signal |
|---|---|
| 1 | CAN_H |
| 2 | CAN_L |

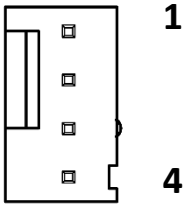





FAN_SIO

| Switch | Definition |
|---|---|
| 1 | GND |
| 2 | +12V |
| 3 | Sense |
| 4 | Control |

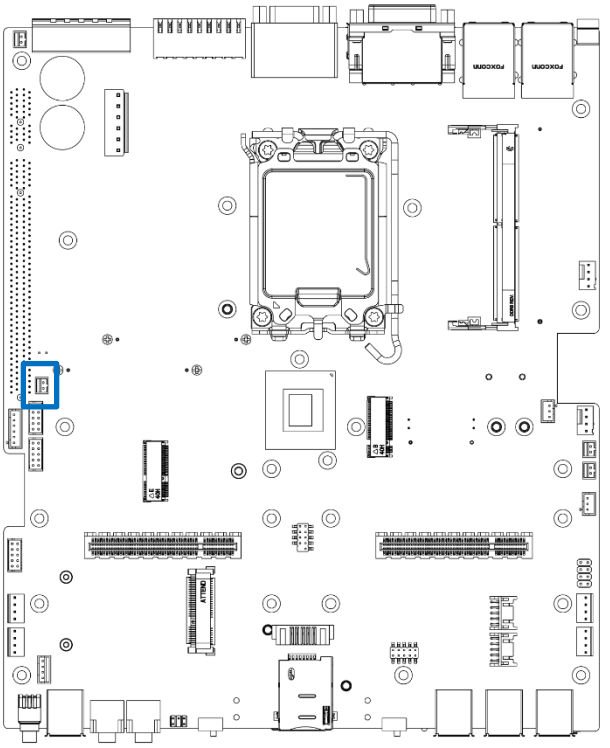


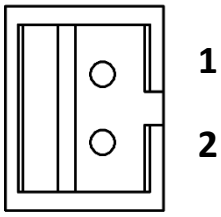



FAN_MCU

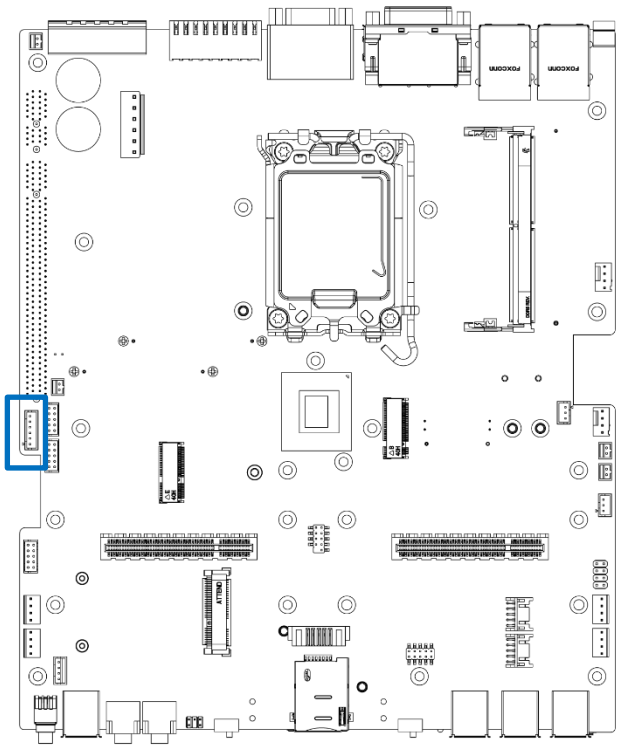
| Pin | Signal |
|---|---|
| 1 | GND |
| 2 | +12V |
| 3 | Sense |
| 4 | Control |

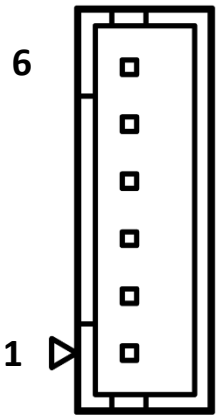
**For FAN_MCU RT**





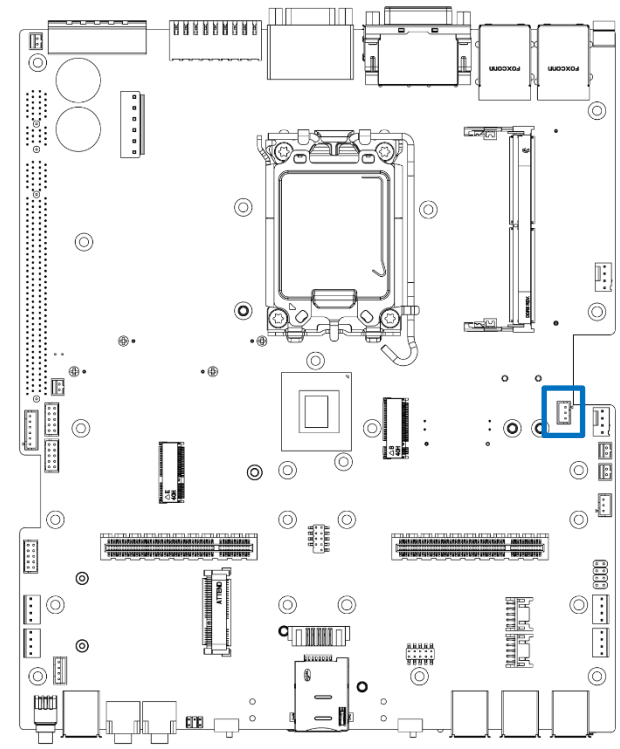

TEMP1

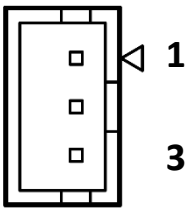





BH 1

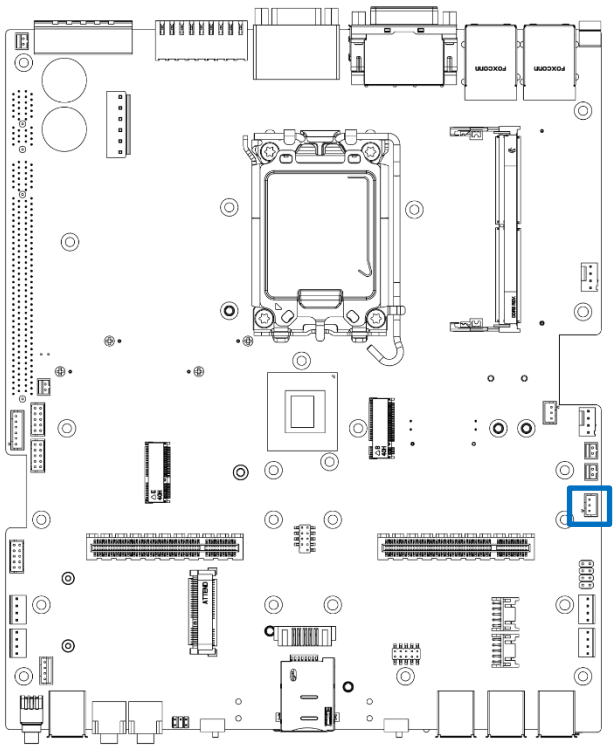
| Pin | Signal |
|---|---|
| 1 | +3.3V |
| 2 | PLTRST# |
| 3 | SLP S4 |
| 4 | SLP S5 |
| 5 | RSTBTN# |
| 6 | GND |

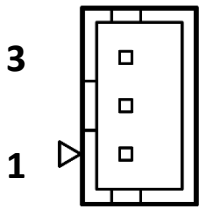





I2C

| Switch | Definition |
|---|---|
| 1 | I2C_DATA |
| 2 | I2C_CLK |
| 3 | GND |

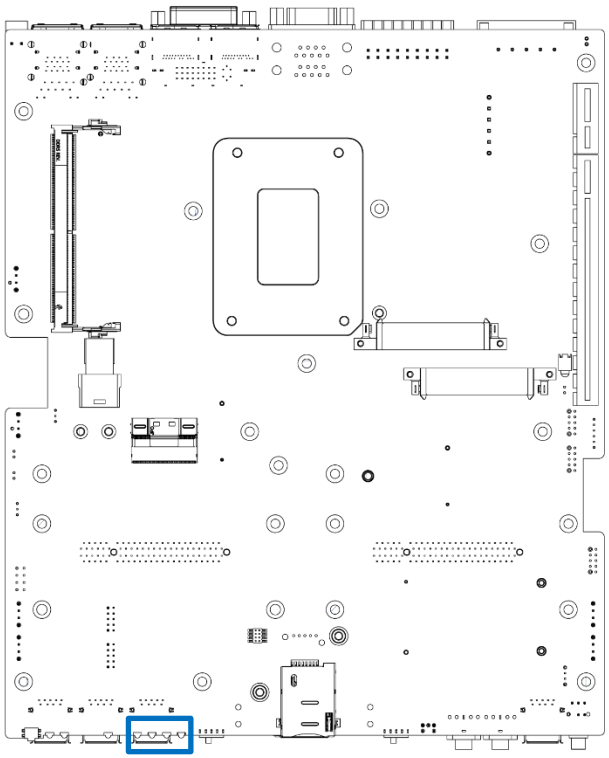





SMB

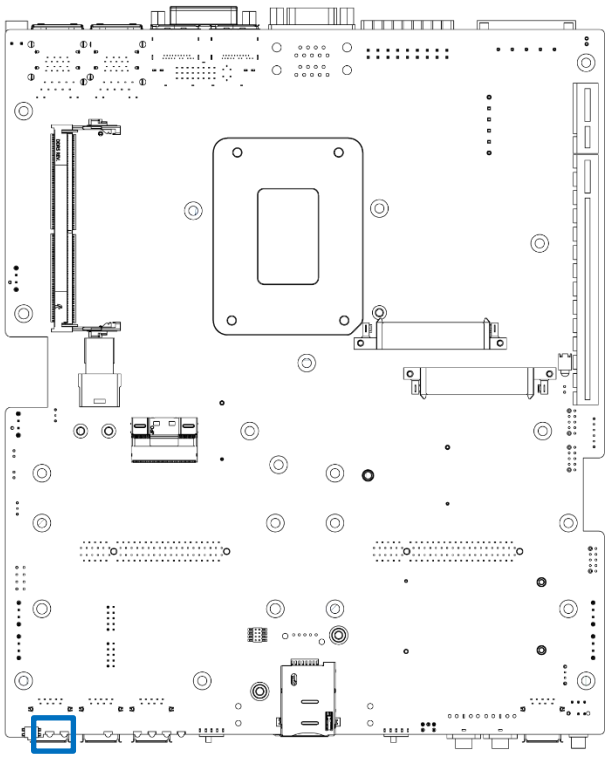
| Pin | Signal |
|---|---|
| 1 | SMB_DATA |
| 2 | SMB_CLK |
| 3 | GND |

## 2.3.23 LED Status



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

| Link LED Status | **CN3** Definition |
|---|---|
| Steady Orange | 1 Gbps Network Link |
| Steady Green | 100 Mbps Network Link |
| Off | 10 Mbps Network Link |
| **Link LED Status** | **CN4** Definition |
| Steady Orange | 2.5 Gbps Network Link |
| Steady Green | 1 Gbps Network Link |
| Off | 100 Mbps Network Link |



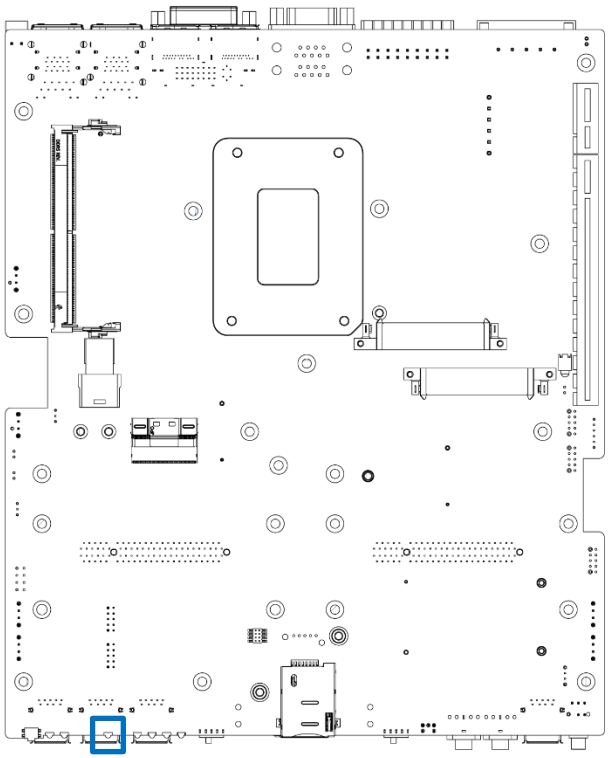
PWR_LED1: Power LED Status

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

HDD_LED1: HDD Access LED Status

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

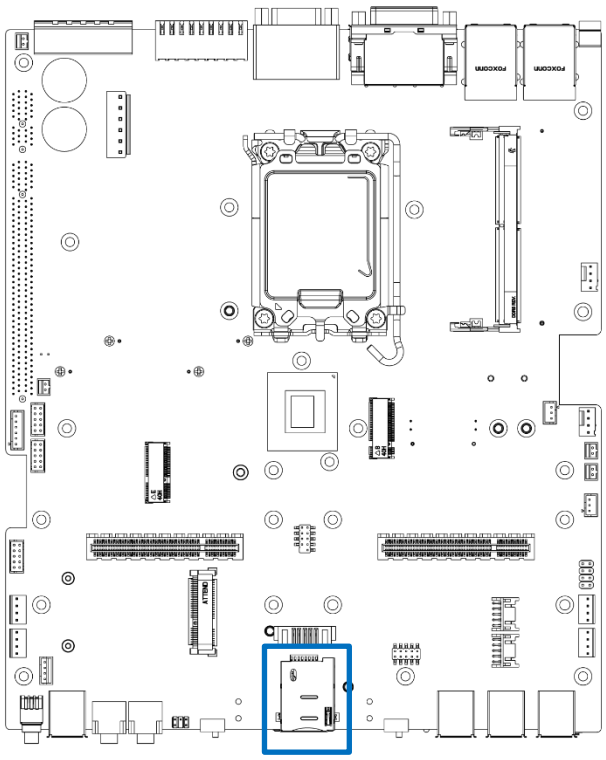
## LED Status

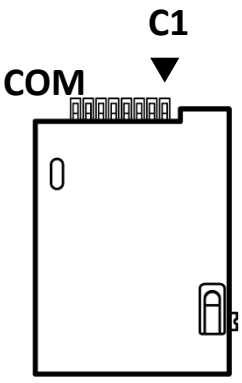


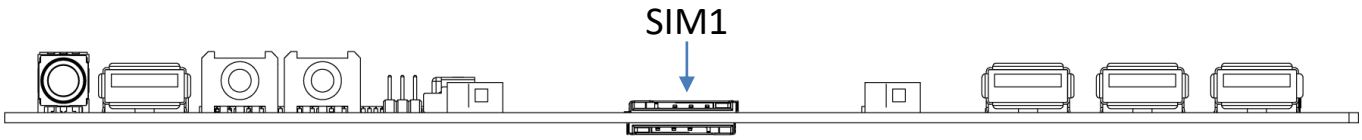
WDT_LED : WDTOUT LED Status

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

### 2.3.24 Top size SIM Card Socket



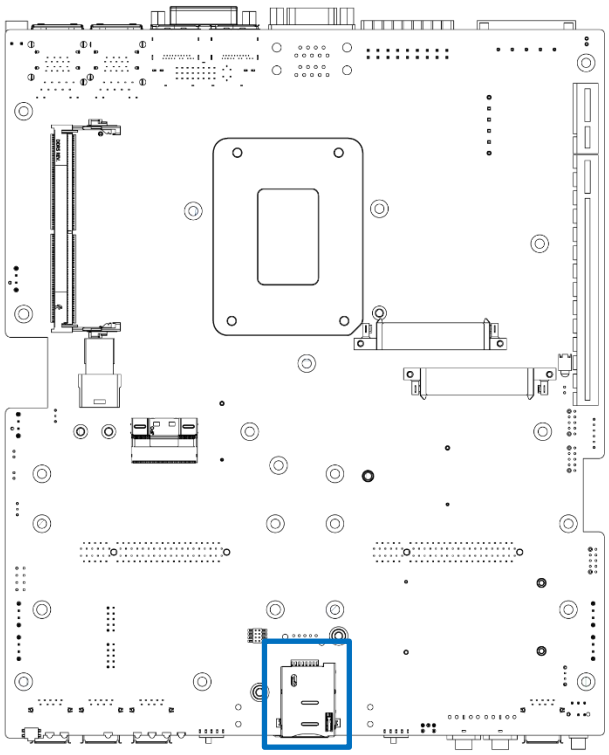


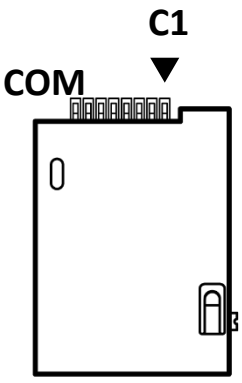



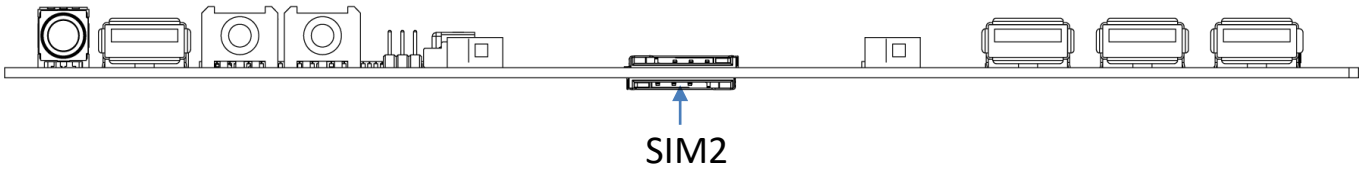

SIM1 (Top size for M.2 B Key)

| 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 |

### 2.3.25 Bottom size SIM Card Socket



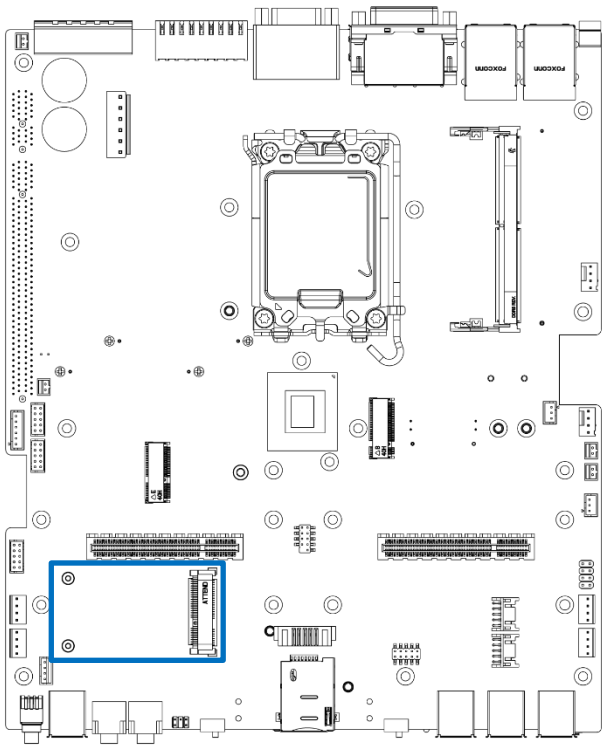


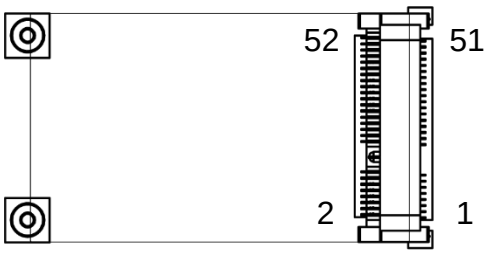




SIM2 (Bottom size for Mini PCIe)

| 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 |

## 2.3.26 Mini PCI-Express / mSATA Socket



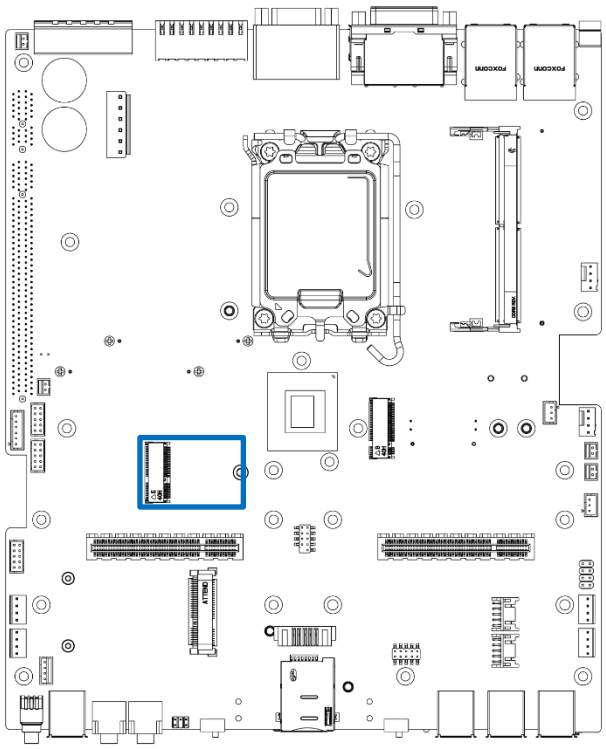


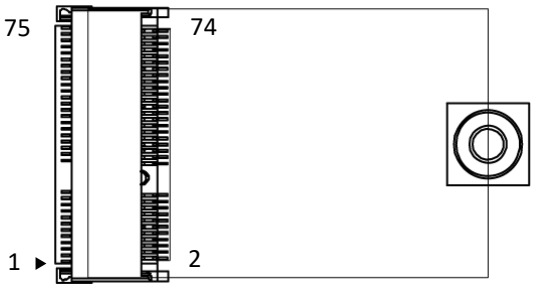

MINIPCIE

| Pin | Definition | Pin | Definition |
|---|---|---|---|
| 1 | WAKE# | 2 | +3.3V |
| 3 | NC | 4 | GND |
| 5 | NC | 6 | +1.5V |
| 7 | CLKREQ# | 8 | UIM_PWR |
| 9 | GND | 10 | UIM_DATA |
| 11 | REFCLK- | 12 | UIM_CLK |
| 13 | REFCLK+ | 14 | UIM_RST |
| 15 | GND | 16 | UIM_VPP |
| 17 | NC | 18 | GND |
| 19 | NC | 20 | NC |
| 21 | GND | 22 | RESET# |
| 23 | RxN | 24 | +3.3VAUX |
| 25 | RxP | 26 | GND |
| 27 | GND | 28 | +1.5V |

| Pin | Definition | Pin | Definition |
|---|---|---|---|
| 29 | GND | 30 | SMB_CLK |
| 31 | TxN | 32 | SMB_DATA |
| 33 | TxP | 34 | GND |
| 35 | GND | 36 | USB2_D- |
| 37 | GND | 38 | USB2_D+ |
| 39 | +3.3V | 40 | GND |
| 41 | +3.3V | 42 | NC |
| 43 | GND | 44 | DEVSLP |
| 45 | NC | 46 | NC |
| 47 | NC | 48 | +1.5V |
| 49 | NC | 50 | GND |
| 51 | PCIE_MSATA_SEL | 52 | +3.3V |

## 2.3.27 M.2 E Key Socket



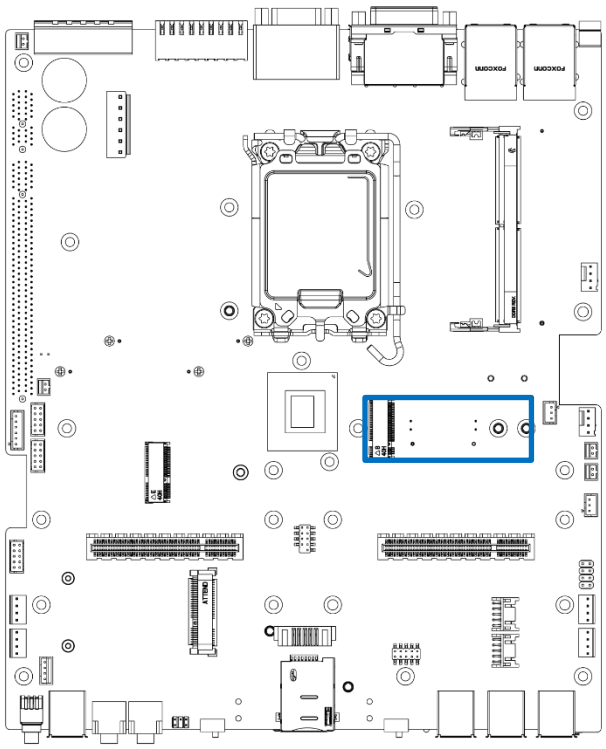



M2_KE

| 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 |

| Pin | Definition | Pin | Definition |
|---|---|---|---|
| 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 | | |

## 2.3.28 M.2 B Key Socket

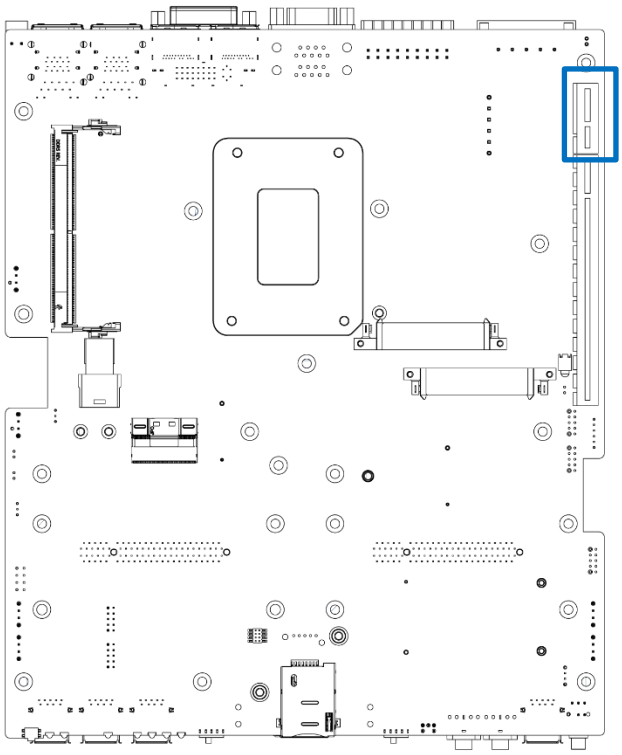


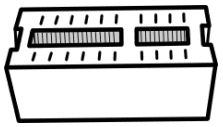

M2_KB

| 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/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 |

| Pin | Definition | Pin | Definition |
|---|---|---|---|
| 37 | PETp1/USB3.0-Tx+ | 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 | | |

## 2.3.29 PCI-Express x1 Slot

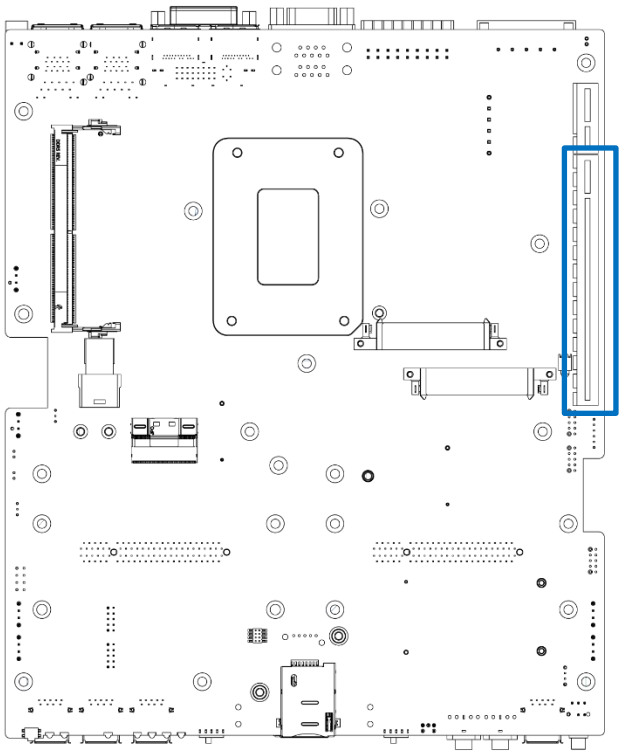


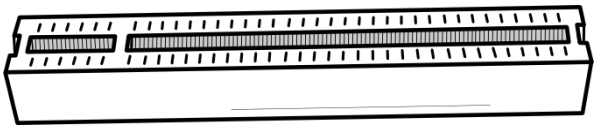


PCIE 2

| Pin | Definition | Pin | Definition |
|---|---|---|---|
| B1 | +12V | A1 | FAN_P4 |
| B2 | +12V | A2 | +12V |
| B3 | +12V | A3 | +12V |
| B4 | GND | A4 | GND |
| B5 | SMB_CLK | A5 | NC |
| B6 | SMB_DATA | A6 | NC |
| B7 | GND | A7 | NC |
| B8 | +3.3V | A8 | NC |
| B9 | NC | A9 | +3.3V |
| B10 | +3.3VAUX | A10 | +3.3V |
| B11 | WAKE# | A11 | RESET# |
| B12 | FAN_P3 | A12 | GND |
| B13 | GND | A13 | REFCLK+ |
| B14 | TxP0 | A14 | REFCLK- |
| B15 | TxN0 | A15 | GND |
| B16 | GND | A16 | RxP0 |
| B17 | FAN_PER | A17 | RxN0 |
| B18 | GND | A18 | GND |

### 2.3.30 PCI-Express x16 Slot





PCIE 1

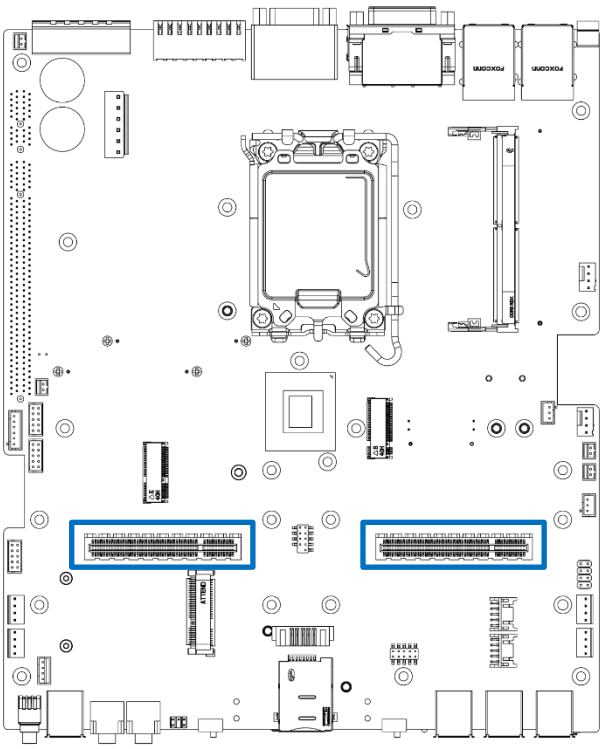
| Pin | Definition | Pin | Definition |
|---|---|---|---|
| B1 | +12V | A1 | NC |
| B2 | +12V | A2 | +12V |
| B3 | +12V | A3 | +12V |
| B4 | GND | A4 | GND |
| B5 | SMB_CLK | A5 | NC |
| B6 | SMB_DATA | A6 | NC |
| B7 | GND | A7 | NC |
| B8 | +3.3V | A8 | NC |
| B9 | NC | A9 | +3.3V |
| B10 | +3.3VAUX | A10 | +3.3V |
| B11 | WAKE# | A11 | RESET# |
| B12 | NC | A12 | GND |
| B13 | GND | A13 | REFCLK+ |

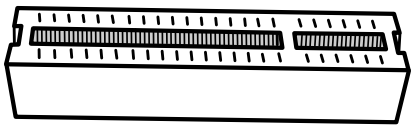
| Pin | Definition | Pin | Definition |
|---|---|---|---|
| B14 | TxP0 | A14 | REFCLK- |
| B15 | TxN0 | A15 | GND |
| B16 | GND | A16 | RxP0 |
| B17 | NC | A17 | RxN0 |
| B18 | GND | A18 | GND |
| B19 | TxP1 | A19 | NC |
| B20 | TxN1 | A20 | GND |
| B21 | GND | A21 | RxP1 |
| B22 | GND | A22 | RxN1 |
| B23 | TxP2 | A23 | GND |
| B24 | TxN2 | A24 | GND |
| B25 | GND | A25 | RxP2 |
| B26 | GND | A26 | RxN2 |
| B27 | TxP3 | A27 | GND |
| B28 | TxN3 | A28 | GND |
| B29 | GND | A29 | RxP3 |
| B30 | NC | A30 | RxN3 |
| B31 | S3 | A31 | GND |
| B32 | GND | A32 | CFG_5 |
| B33 | TxP4 | A33 | CFG_6 |
| B34 | TxN4 | A34 | GND |
| B35 | GND | A35 | RxP4 |
| B36 | GND | A36 | RxN4 |
| B37 | TxP5 | A37 | GND |
| B38 | TxN5 | A38 | GND |

| Pin | Definition | Pin | Definition |
|---|---|---|---|
| B39 | GND | A39 | RxP5 |
| B40 | GND | A40 | RxN5 |
| B41 | TxP6 | A41 | GND |
| B42 | TxN6 | A42 | GND |
| B43 | GND | A43 | RxP6 |
| B44 | GND | A44 | RxN6 |
| B45 | TxP7 | A45 | GND |
| B46 | TxN7 | A46 | GND |
| B47 | GND | A47 | RxP7 |
| B48 | NC | A48 | RxN7 |
| B49 | GND | A49 | GND |
| B50 | TxP8 | A50 | NC |
| B51 | TxN8 | A51 | GND |
| B52 | GND | A52 | RxP8 |
| B53 | GND | A53 | RxN8 |
| B54 | TxP9 | A54 | GND |
| B55 | TxN9 | A55 | GND |
| B56 | GND | A56 | RxP9 |
| B57 | GND | A57 | RxN9 |
| B58 | TxP10 | A58 | GND |
| B59 | TxN10 | A59 | GND |
| B60 | GND | A60 | RxP10 |
| B61 | GND | A61 | RxN10 |
| B62 | TxP11 | A62 | GND |
| B63 | TxN11 | A63 | GND |

| Pin | Definition | Pin | Definition |
|---|---|---|---|
| B64 | GND | A64 | RxP11 |
| B65 | GND | A65 | RxN11 |
| B66 | TxP12 | A66 | GND |
| B67 | TxN12 | A67 | GND |
| B68 | GND | A68 | RxP12 |
| B69 | GND | A69 | RxN12 |
| B70 | TxP13 | A70 | GND |
| B71 | TxN13 | A71 | GND |
| B72 | GND | A72 | RxP13 |
| B73 | GND | A73 | RxN13 |
| B74 | TxP14 | A74 | GND |
| B75 | TxN14 | A75 | GND |
| B76 | GND | A76 | RxP14 |
| B77 | GND | A77 | RxN14 |
| B78 | TxP15 | A78 | GND |
| B79 | TxN15 | A79 | GND |
| B80 | GND | A80 | RxP15 |
| B81 | NC | A81 | RxN15 |
| B82 | NC | A82 | GND |

### 2.3.31 PCI-Express x8 Slot



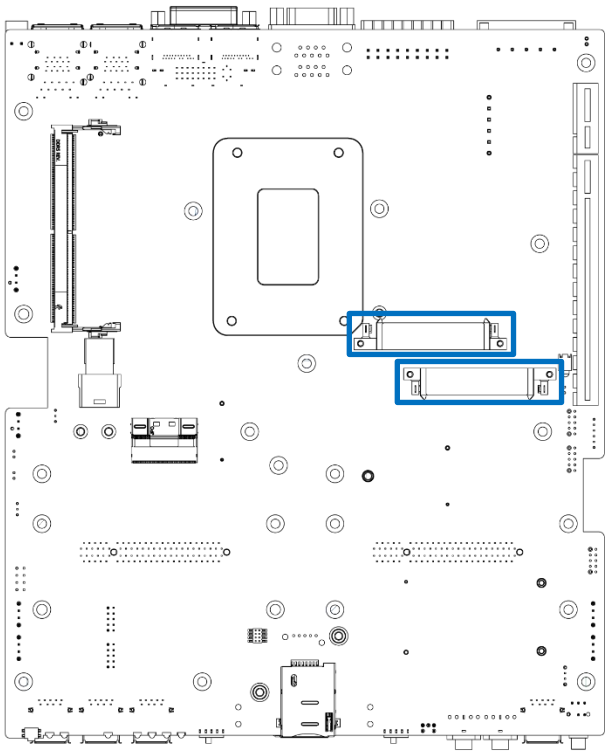


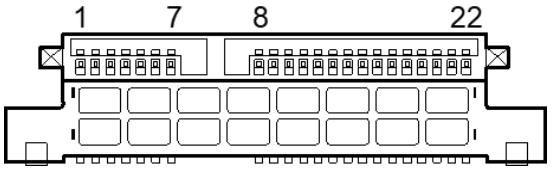
PCIE (LAN_L , LAN_R)

| Pin | Definition | Pin | Definition |
|---|---|---|---|
| B1 | +12V | A1 | NC |
| B2 | +12V | A2 | +12V |
| B3 | +12V | A3 | +12V |
| B4 | GND | A4 | GND |
| B5 | SMB_CLK | A5 | NC |
| B6 | SMB_DATA | A6 | NC |
| B7 | GND | A7 | NC |
| B8 | +3.3V | A8 | NC |
| B9 | NC | A9 | +3.3V |
| B10 | +3.3VAUX | A10 | +3.3V |
| B11 | WAKE# | A11 | RESET# |
| B12 | NC | A12 | GND |
| B13 | GND | A13 | REFCLK+ |
| B14 | TxP0 | A14 | REFCLK- |
| B15 | TxN0 | A15 | GND |

| Pin | Definition | Pin | Definition |
|---|---|---|---|
| B16 | GND | A16 | RxP0 |
| B17 | NC | A17 | RxN0 |
| B18 | GND | A18 | GND |
| B19 | TxP1 | A19 | NC |
| B20 | TxN1 | A20 | GND |
| B21 | GND | A21 | RxP1 |
| B22 | GND | A22 | RxN1 |
| B23 | TxP2 | A23 | GND |
| B24 | TxN2 | A24 | GND |
| B25 | GND | A25 | RxP2 |
| B26 | GND | A26 | RxN2 |
| B27 | TxP3 | A27 | GND |
| B28 | TxN3 | A28 | GND |
| B29 | GND | A29 | RxP3 |
| B30 | NC | A30 | RxN3 |
| B31 | NC | A31 | GND |
| B32 | GND | A32 | NC |
| B33 | 9_48VSB_IN | A33 | 9_48VSB_IN |
| B34 | 9_48VSB_IN | A34 | 9_48VSB_IN |
| B35 | 9_48VSB_IN | A35 | 9_48VSB_IN |
| B36 | 9_48VSB_IN | A36 | 9_48VSB_IN |
| B37 | 9_48VSB_IN | A37 | 9_48VSB_IN |
| B38 | 9_48VSB_IN | A38 | 9_48VSB_IN |
| B39 | 9_48VSB_IN | A39 | 9_48VSB_IN |
| B40 | 9_48VSB_IN | A40 | 9_48VSB_IN |
| B41 | 9_48VSB_IN | A41 | 9_48VSB_IN |
| B42 | 9_48VSB_IN | A42 | 9_48VSB_IN |
| B43 | +3.3VAUX | A43 | +5V |
| B44 | +3.3VAUX | A44 | +5V |
| B45 | +3.3VAUX | A45 | +1.5V |
| B46 | +3.3VAUX | A46 | +1.5V |
| B47 | +1.0VAUX | A47 | +1.0VAUX |
| B48 | +1.0VAUX | A48 | +1.0VAUX |
| B49 | NC | A49 | NC |

## 2.3.32 SATA with Power Connector

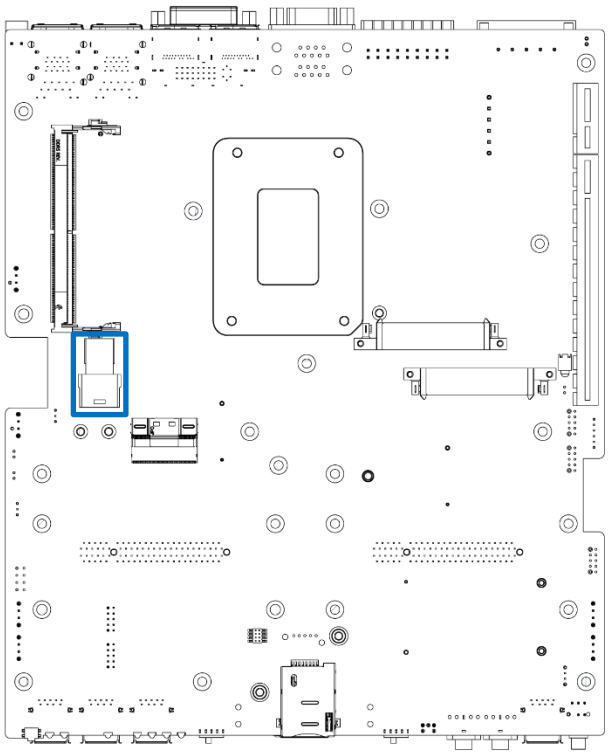


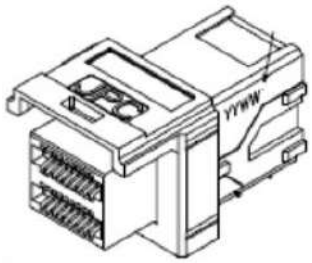



SATA 1, SATA 2

| Pin | Definition |
|---|---|
| 1 | GND |
| 2 | TxP |
| 3 | TxN |
| 4 | GND |
| 5 | RxN |
| 6 | RxP |
| 7 | GND |
| 8 | NC |
| 9 | NC |
| 10 | DEVSLP |
| 11 | GND |

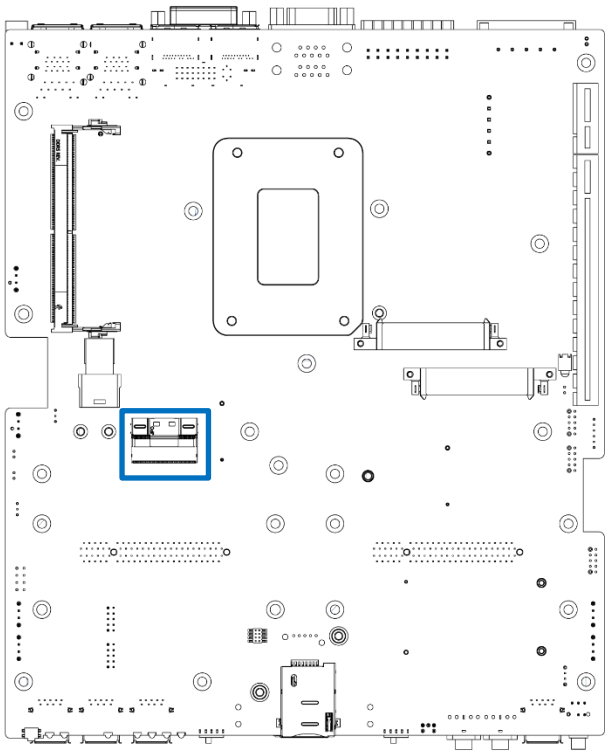
| Pin | Definition |
|---|---|
| 12 | GND |
| 13 | GND |
| 14 | +5V |
| 15 | +5V |
| 16 | +5V |
| 17 | GND |
| 18 | GND |
| 19 | GND |
| 20 | +12V |
| 21 | +12V |
| 22 | +12V |

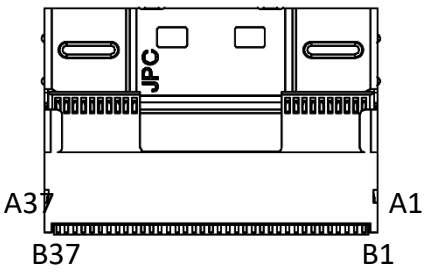




SATA 3

| Pin | Definition | Pin | Definition | Pin | Definition | Pin | Definition |
|---|---|---|---|---|---|---|---|
| A1 | NC | B1 | NC | C1 | NC | D1 | NC |
| A2 | NC | B2 | NC | C2 | NC | D2 | NC |
| A3 | GND | B3 | GND | C3 | GND | D3 | GND |
| A4 | RxP1 | B4 | RxP0 | C4 | TxP1 | D4 | TxP0 |
| A5 | RxN1 | B5 | RxN0 | C5 | TxN1 | D5 | TxN0 |
| A6 | GND | B6 | GND | C6 | GND | D6 | GND |
| A7 | RxP3 | B7 | RxP2 | C7 | TxP3 | D7 | TxP2 |
| A8 | RxN3 | B8 | RxN2 | C8 | TxN3 | D8 | TxN2 |
| A9 | GND | B9 | GND | C9 | GND | D9 | GND |






SL 1 Slimline PCIe x8

| Pin | Definition | Pin | Definition |
|---|---|---|---|
| B1 | GND | A1 | GND |
| B2 | TxP0 | A2 | RxP0 |
| B3 | TxN0 | A3 | RxN0 |
| B4 | GND | A4 | GND |
| B5 | TxP1 | A5 | RxP1 |
| B6 | TxN1 | A6 | RxN1 |
| B7 | GND | A7 | GND |
| B8 | RST#1 | A8 | CLKP1 |
| B9 | RST#2 | A9 | CLKN1 |
| B10 | GND | A10 | GND |
| B11 | RST#3 | A11 | CLKP2 |
| B12 | RST#4 | A12 | CLKN2 |
| B13 | GND | A13 | GND |
| B14 | TxP2 | A14 | RxP2 |
| B15 | TxN2 | A15 | RxN2 |

| Pin | Definition | Pin | Definition |
|---|---|---|---|
| B16 | GND | A16 | GND |
| B17 | TxP3 | A17 | RxP3 |
| B18 | TxN3 | A18 | RxN3 |
| B19 | GND | A19 | GND |
| B20 | TxP4 | A20 | RxP4 |
| B21 | TxN4 | A21 | RxN4 |
| B22 | GND | A22 | GND |
| B23 | TxP5 | A23 | RxP5 |
| B24 | TxN5 | A24 | RxN5 |
| B25 | GND | A25 | GND |
| B26 | PRSNT#1 | A26 | CLKP3 |
| B27 | PRSNT#2 | A27 | CLKN3 |
| B28 | GND | A28 | GND |
| B29 | RST#3 | A29 | CLKP4 |
| B30 | PRSNT#4 | A30 | CLKN4 |
| B31 | GND | A31 | GND |
| B32 | TxP6 | A32 | RxP6 |
| B33 | TxN6 | A33 | RxN6 |
| B34 | GND | A34 | GND |
| B35 | TxP7 | A35 | RxP7 |
| B36 | TxN7 | A36 | RxN7 |
| B37 | GND | A37 | GND |

# Chapter 3

# System Setup

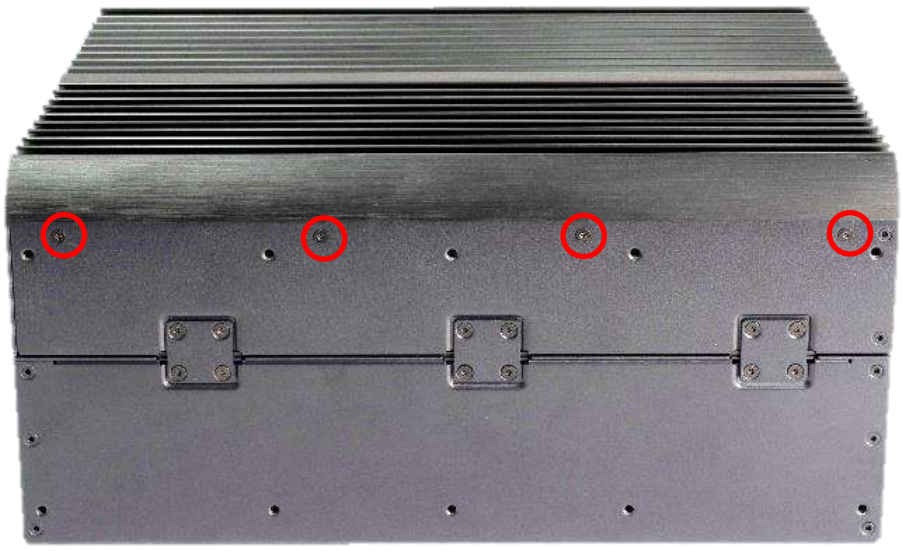
## 3.1 Set torque force to 3.5 kgf-cm to execute all the screwing and unscrewing.

## 3.2 Removing heat sink cover

**WARNING**

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

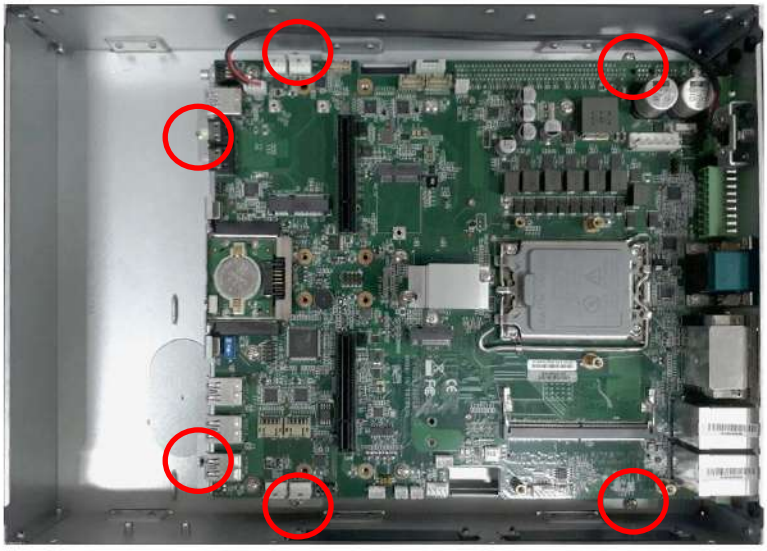
1. Unscrew four screws (M3x5L) on each of two sides located on the top



2. Now you can remove the heat sink cover.

3. Internal structure of the machine

4. Unscrew the six screws screws (M3x5L) highlighted below.

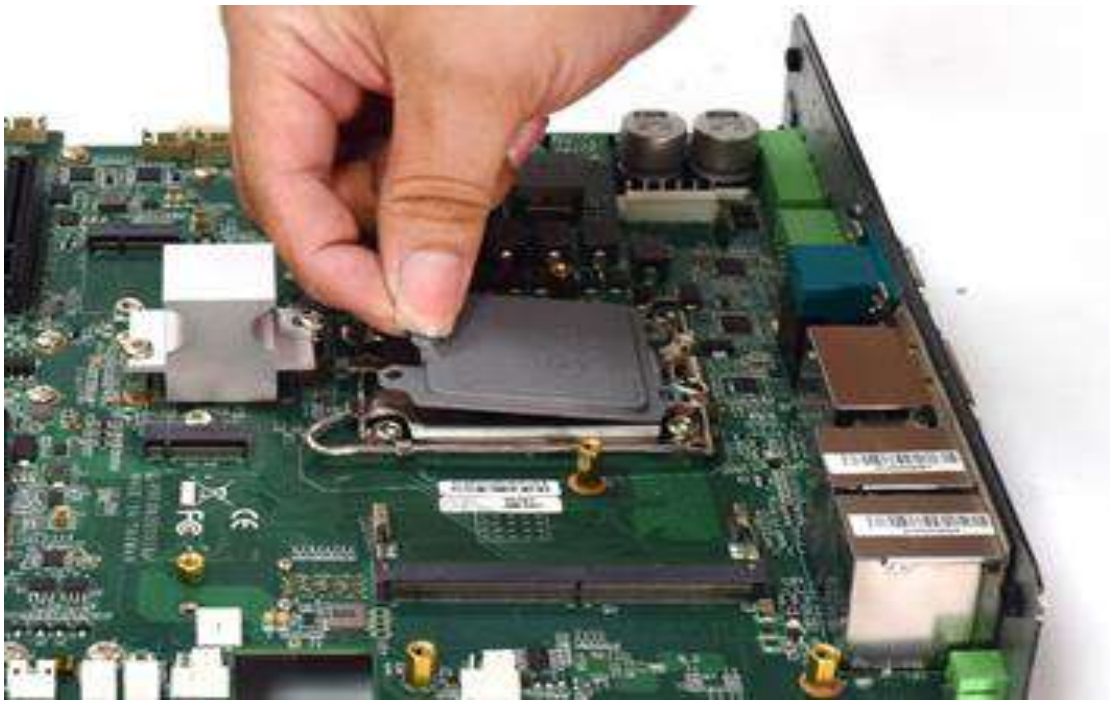


5. Unscrew four screws (M3x5L) on the front side.

6. Hold the body of the computer and lift it vertically away.

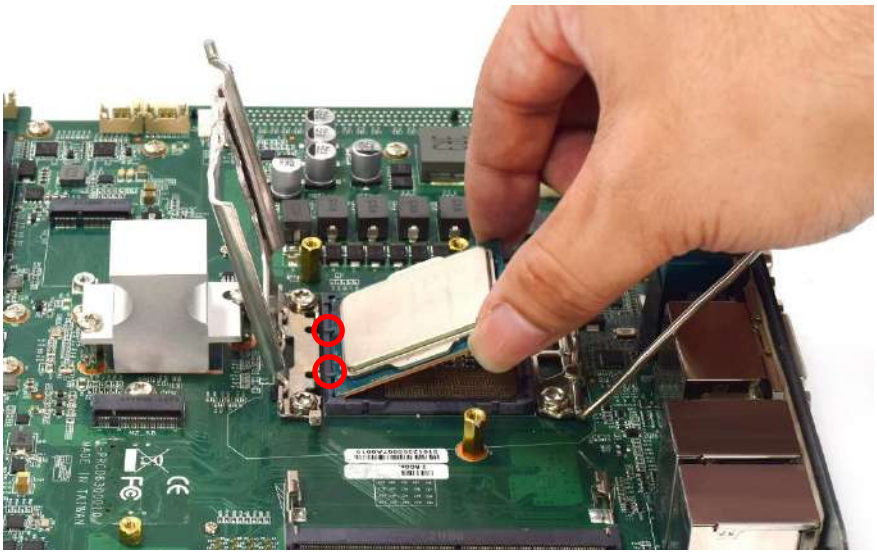
## 3.3 Install CPU

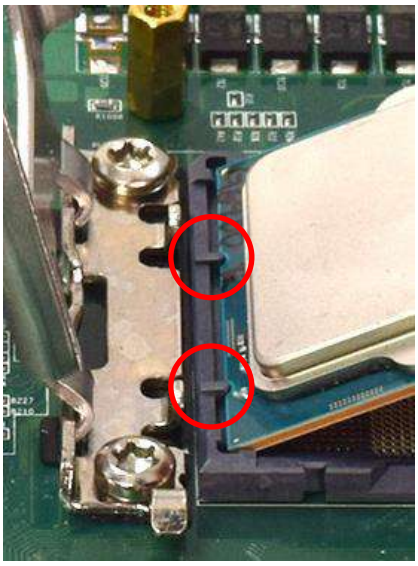
1. Remove the CPU protective cover.



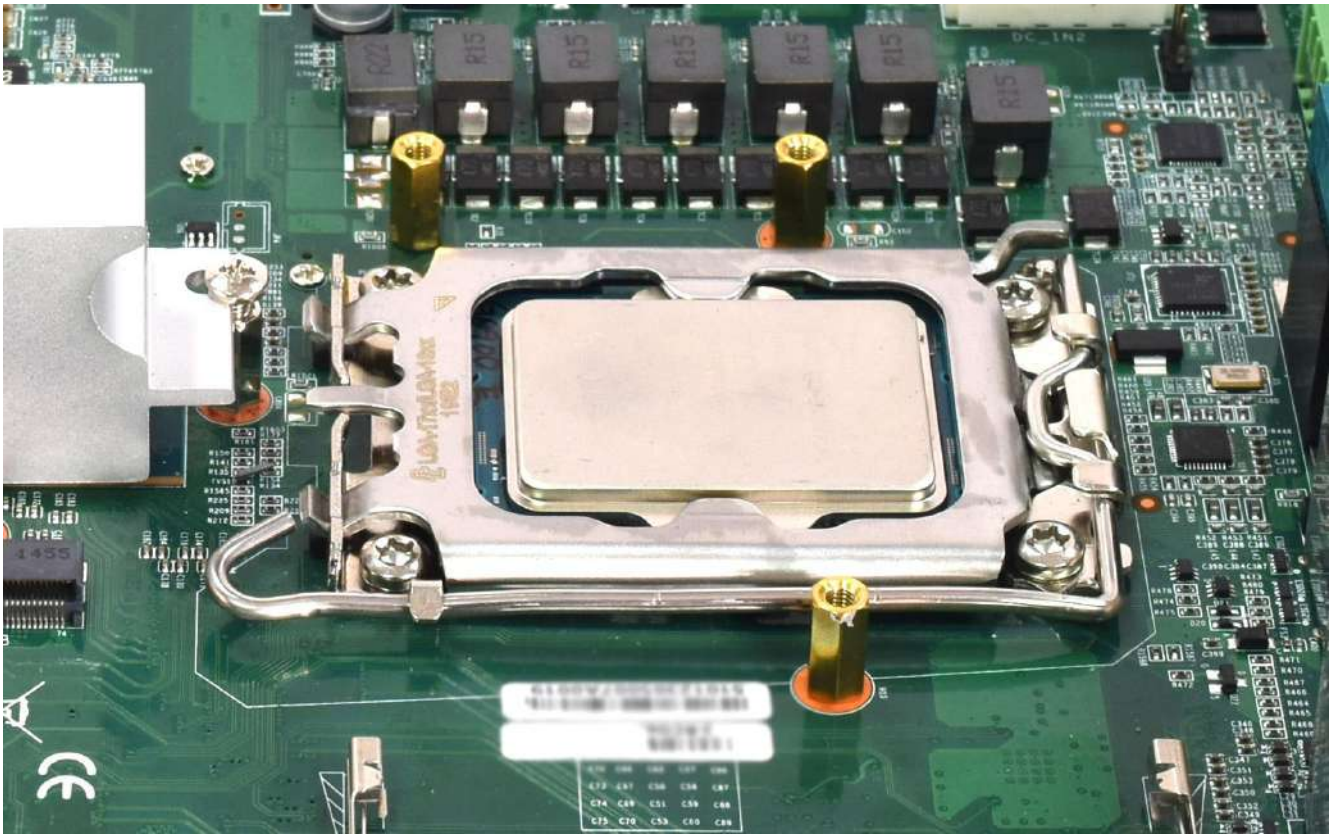
2. Press down on the lever in order to release the socket, as shown below.

3. Hold the CPU by its edges, and carefully align the notches on the CPU with the corresponding notches on the socket, as highlighted by the red circles in the pictures below. Gently set the CPU into the socket without any force.





4. Once the CPU has been placed, press the lever again to secure the socket. The final setup should resemble the picture provided below.



## 3.4 Install the first DRAM externally

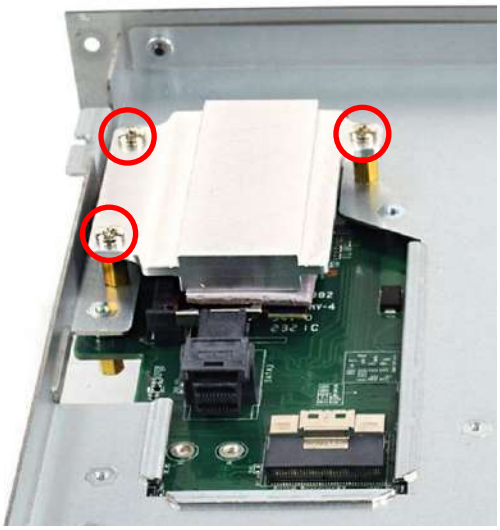
1. VCO-6000-RPL board has one SODIMM slot on both the front and back sides. The picture below shows the SODIMM slot on the back of the motherboard, and you should prioritize inserting the first DRAM.

2. Insert memory module at a 45-degree angle.

3. Push the memory module down against the board until you hear a "click" sound. Make sure the memory module is secure.

4. Paste the thermal pad on the heat block .

5. Apply the heat sink with a thermal pad to the memory and secure the heat sink using three screws (M3x5L). The screws can pass through the top holes and fasten onto the copper pillars.



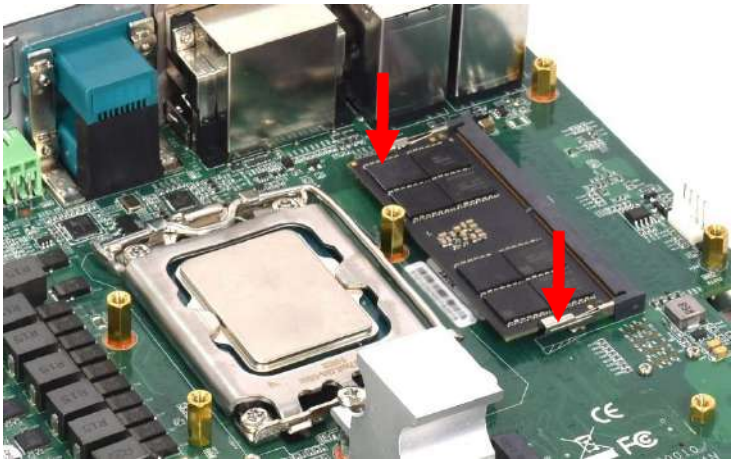
6. Paste the thermal pad onto the installed DRAM heat block.

## 3.5 Install the second DRAM externally

1. The picture below shows the SODIMM slot on the front of the motherboard. Insert the second DRAM in order.

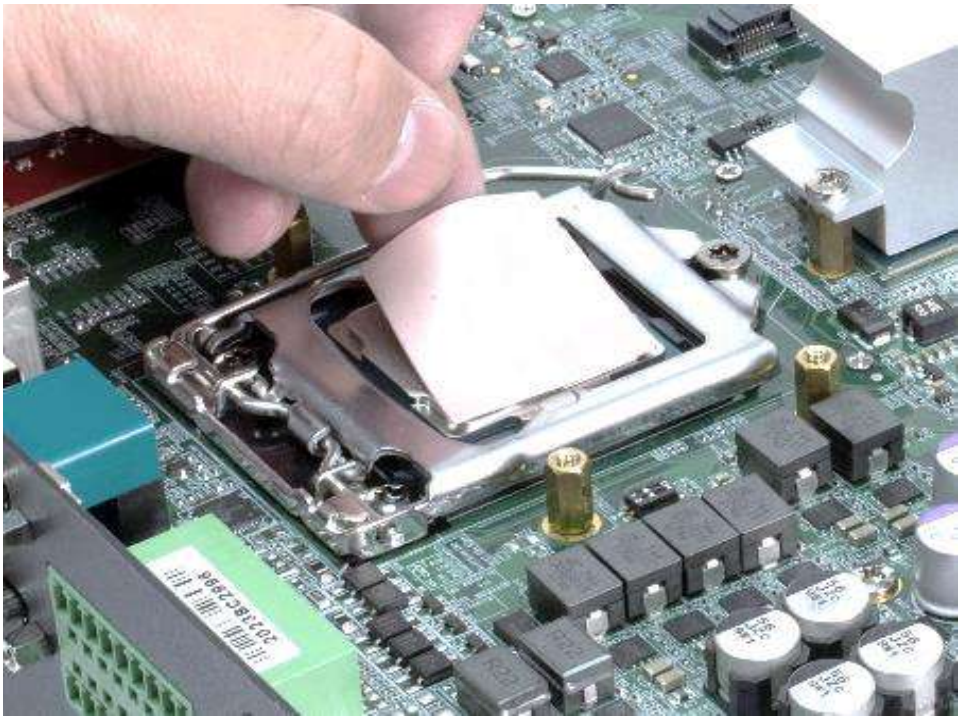
2. Insert the memory module at a 45-degree angle.

3. Gently push the memory module down against the board until you hear a "click" sound. Make sure the memory module is secured.



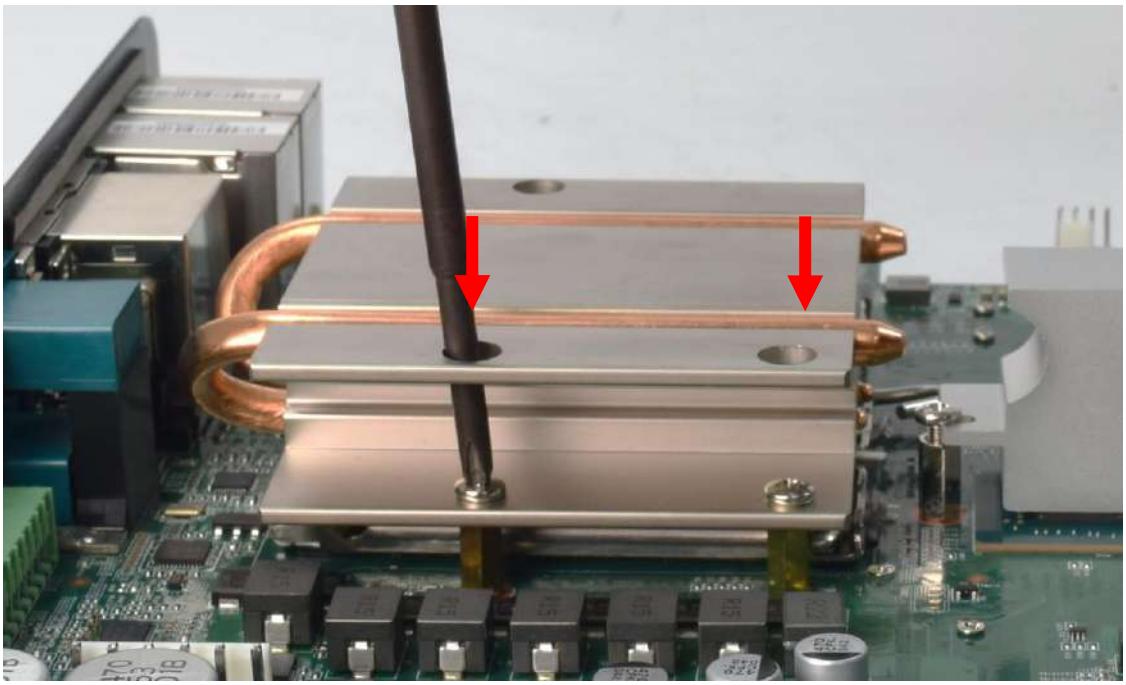
## 3.6 Install CPU & SODIMM heat block

1. Paste the thermal pad on the CPU.



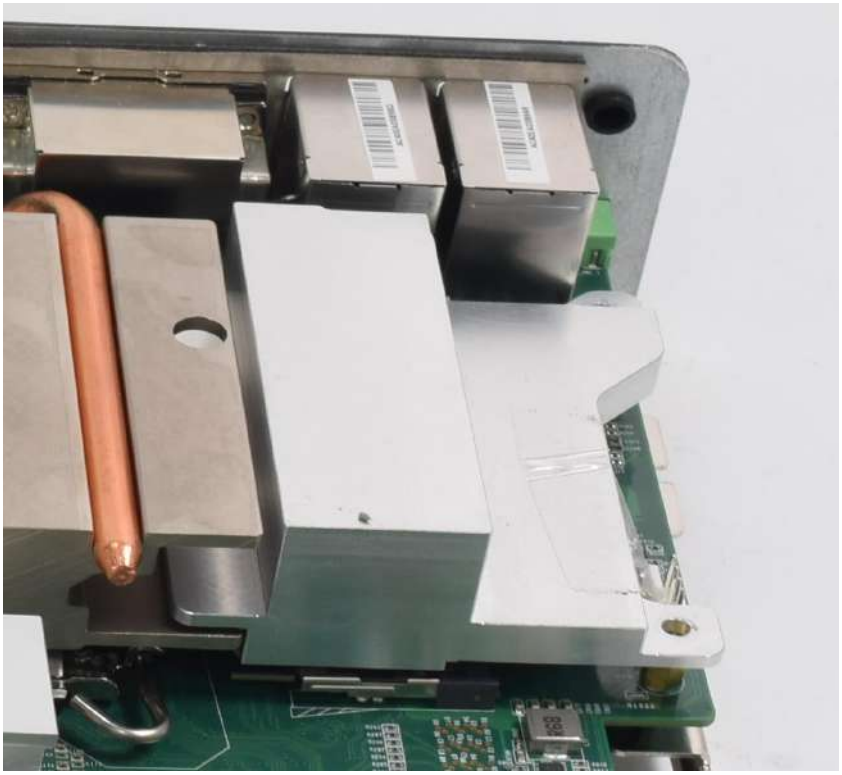
2. Place the designated heat block onto the CPU with thermal pad.

3. Secure the heat block using two screws (M3x8L). The screwdriver can go through the holes on top to fasten the screws below.

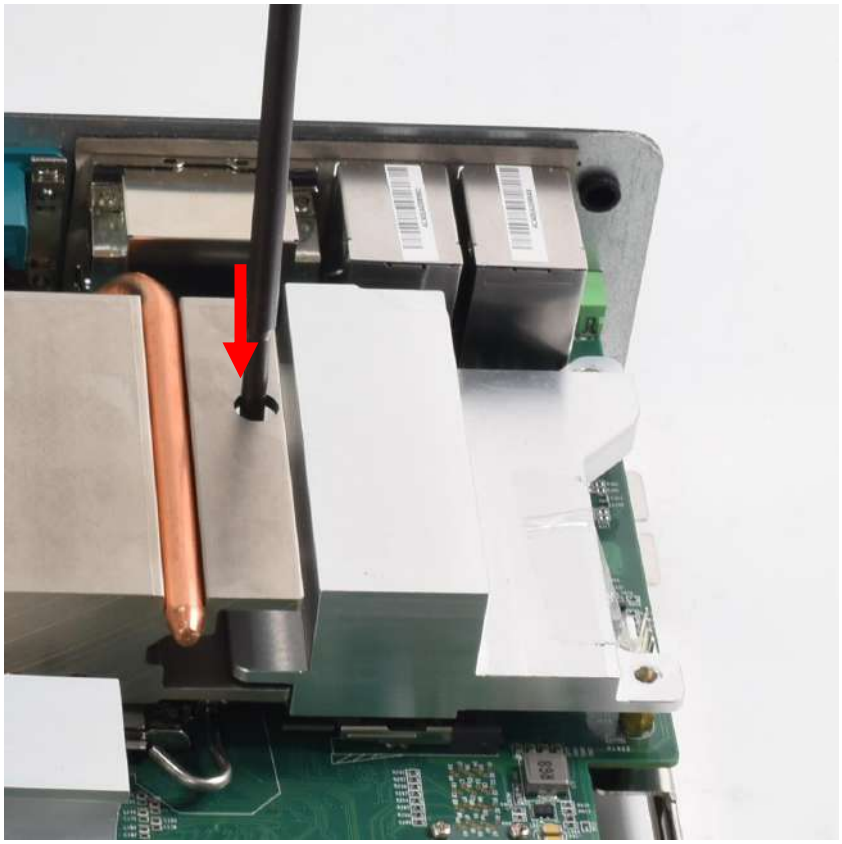


4. Paste the thermal pad on the DRAM.

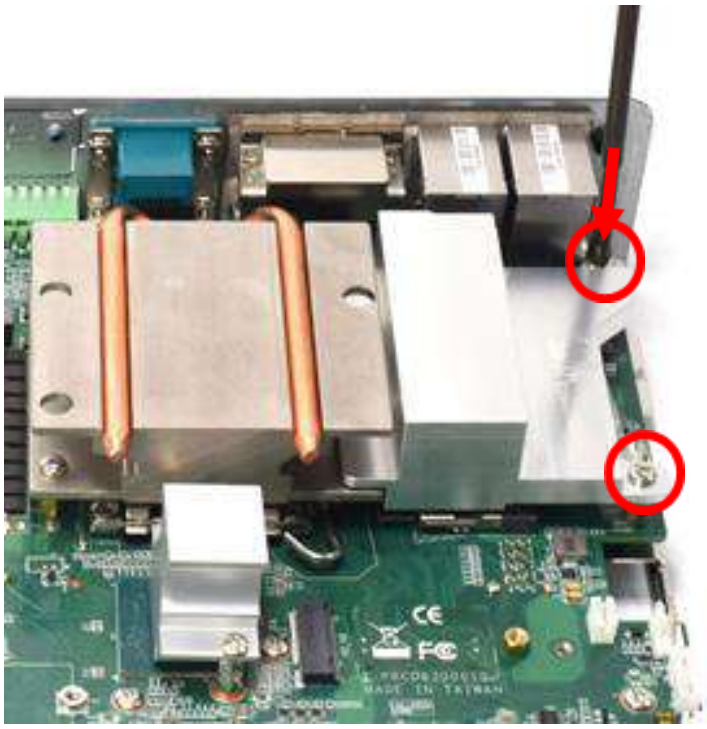
5. Place the designated heat block onto the DRAM with thermal pad.



6. Secure the heat block with one screw (M3x8L). The screwdriver can go through the hole on the top to fasten the screw below.



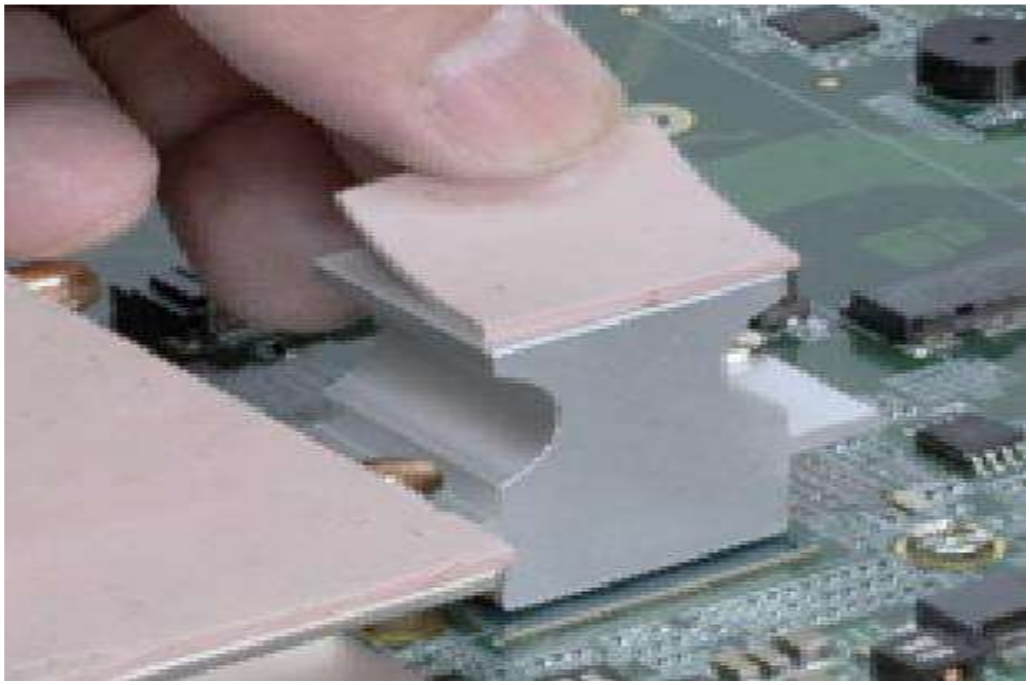
7. Secure the heat block with two screws (M3x5L). The screwdriver can go through the holes on top to order to fasten the screws below.



8. Paste the thermal pad onto the installed DRAM heat block.

9. Paste the thermal pad onto the installed CPU heat block.

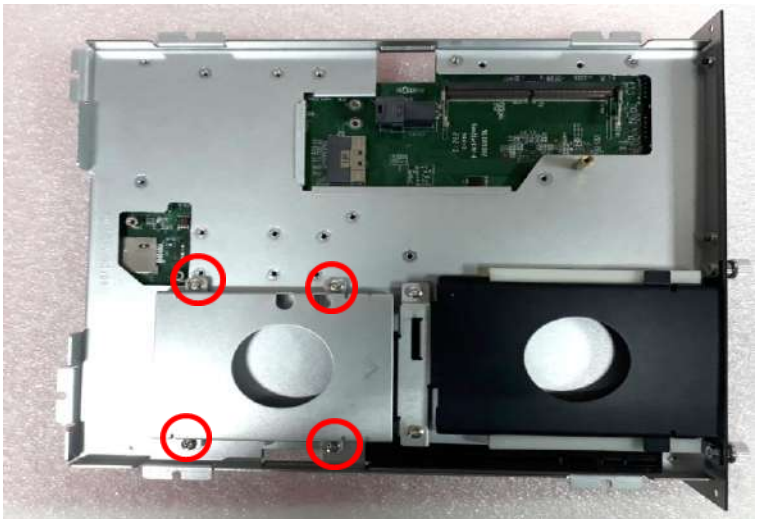
10. Paste the thermal pad onto the PCH heat block.



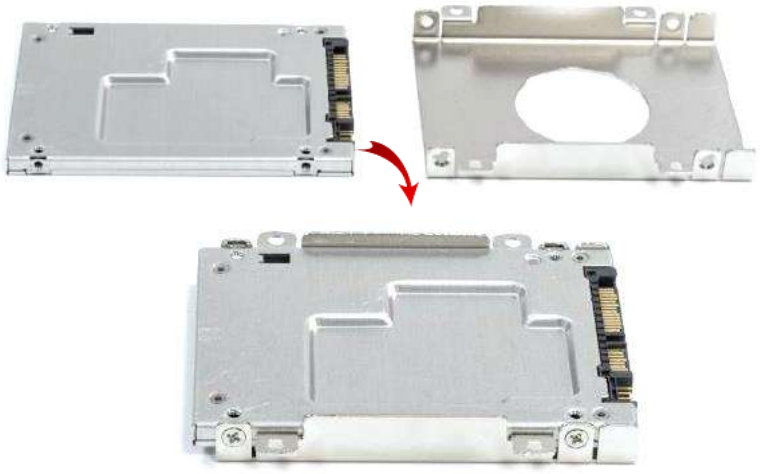
## 3.7 Install HDD/SSD on the internal SATA bay

1. One internal SATA HDD/SSD bays are available for VCO-6000-RPL series.

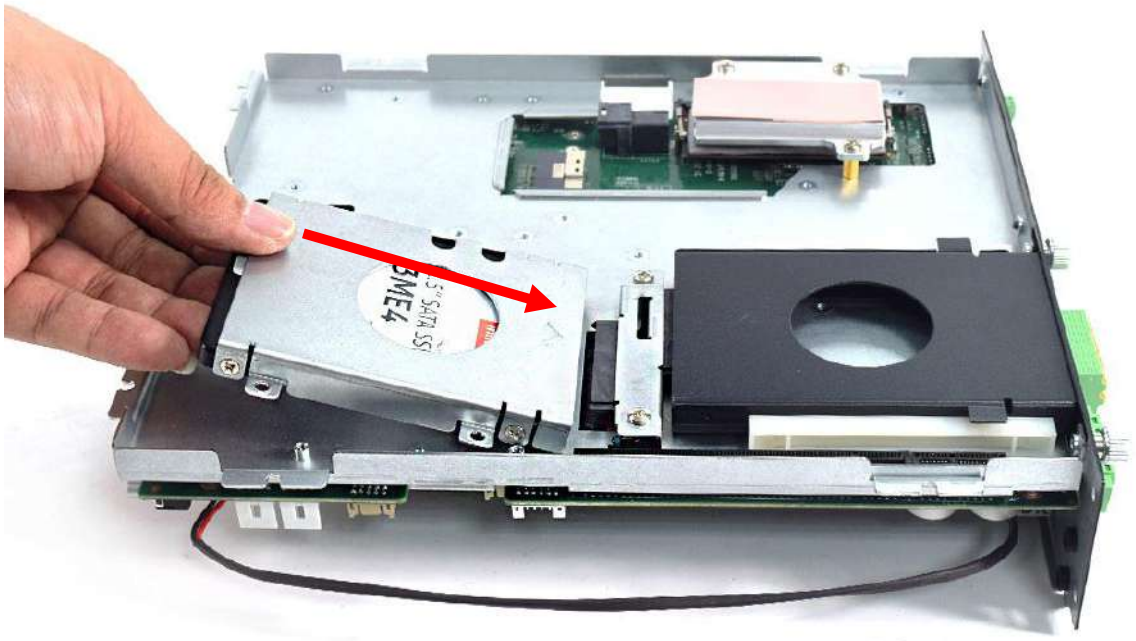
2. Unscrew the four screws (M3x5L) to remove the internal SATA HDD/SSD bay.



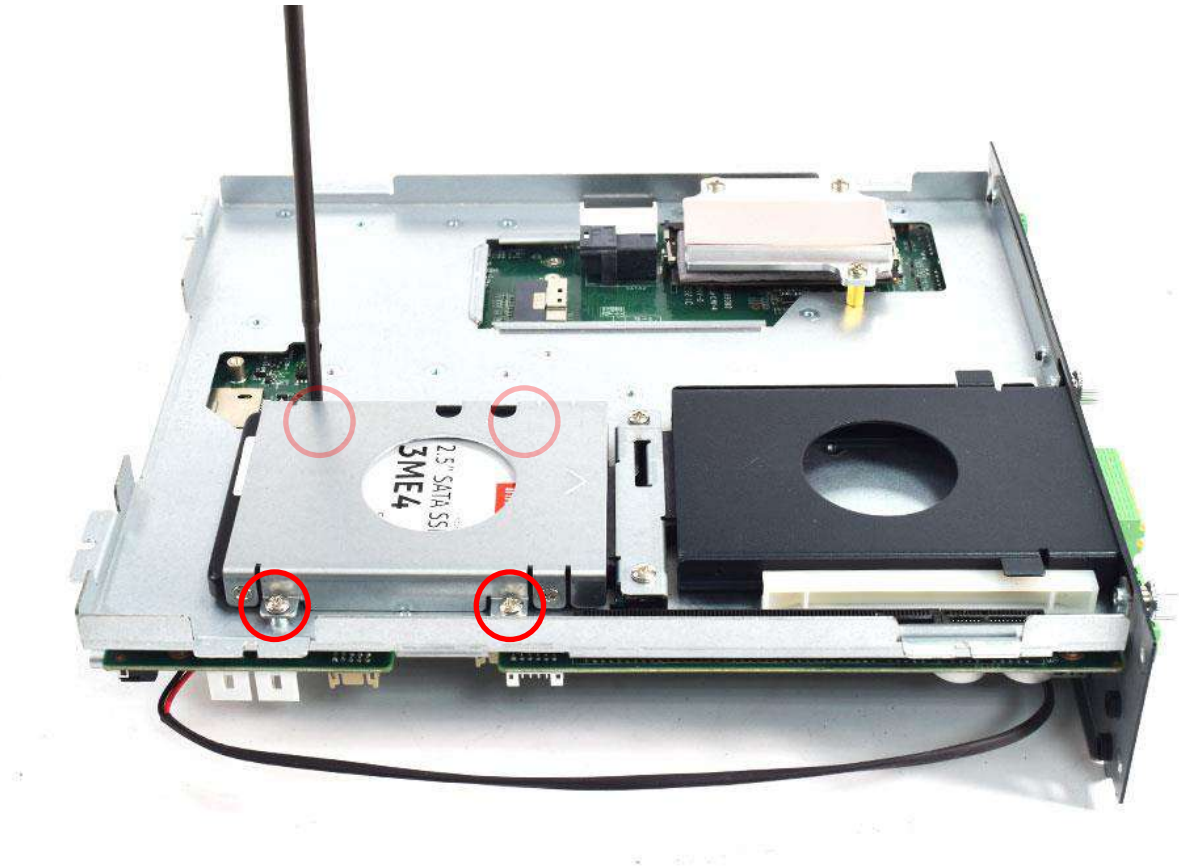
3. Lock the 2.5" HDD with HDD/SSD bracket using four screws (M3x4L).



4. Install the HDD/SSD bracket following the direction below.



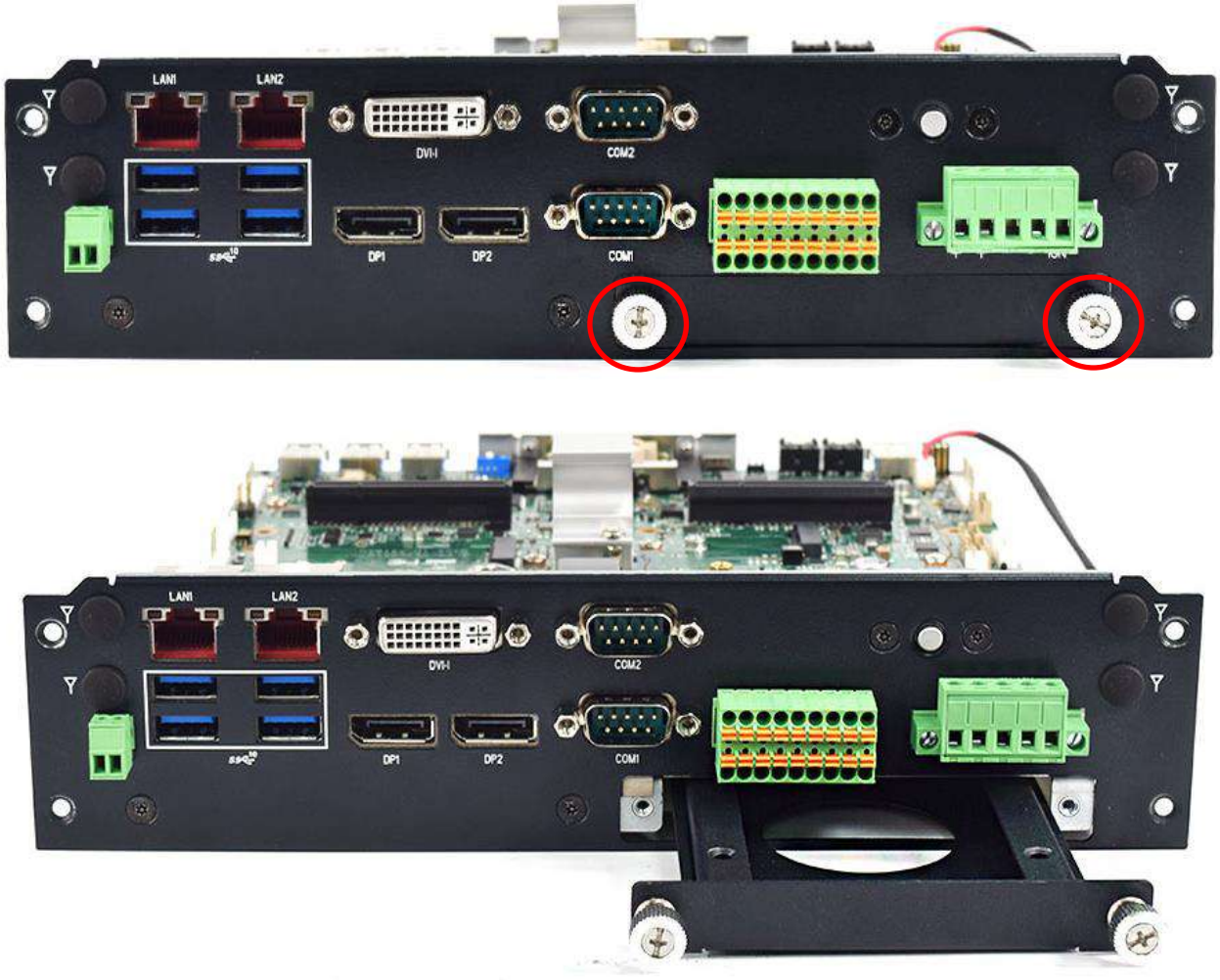
5. Fasten the 4 screws to lock the internal HDD/SSD bracket.



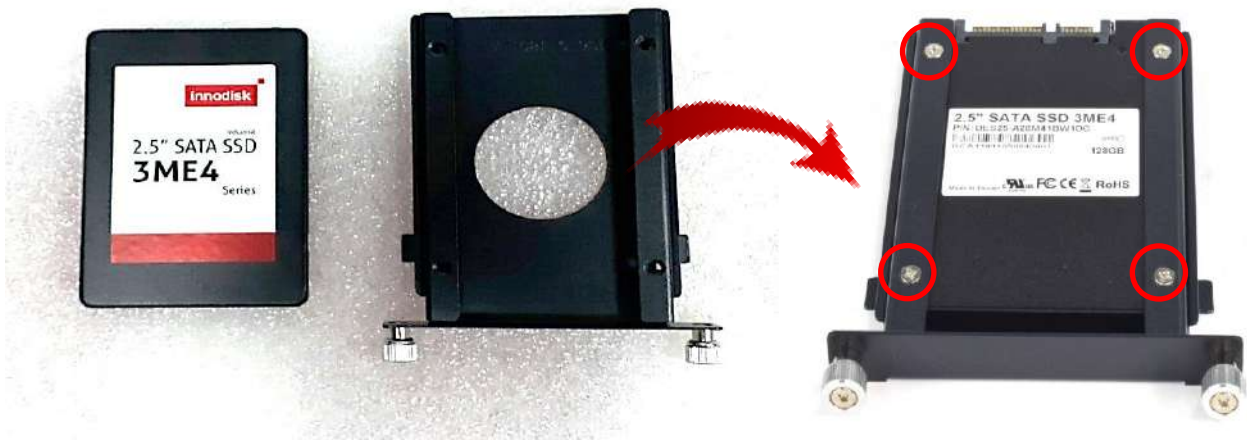
## 3.8 Install HDD on removable SATA HDD bay

**One removable SATA HDD bay is available for the VCO-6000-RPL Series.**

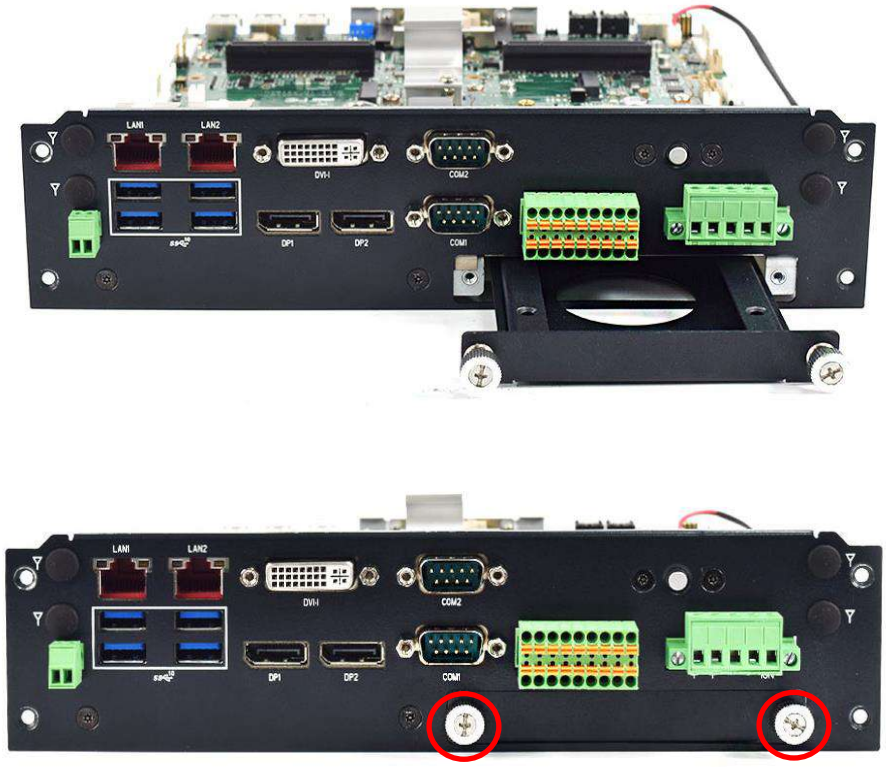
1. Unscrew the two sun screws circled below to take out the removable SATA HDD bay.




2. Lock the 2.5" HDD with HDD bracket using 4 screws.

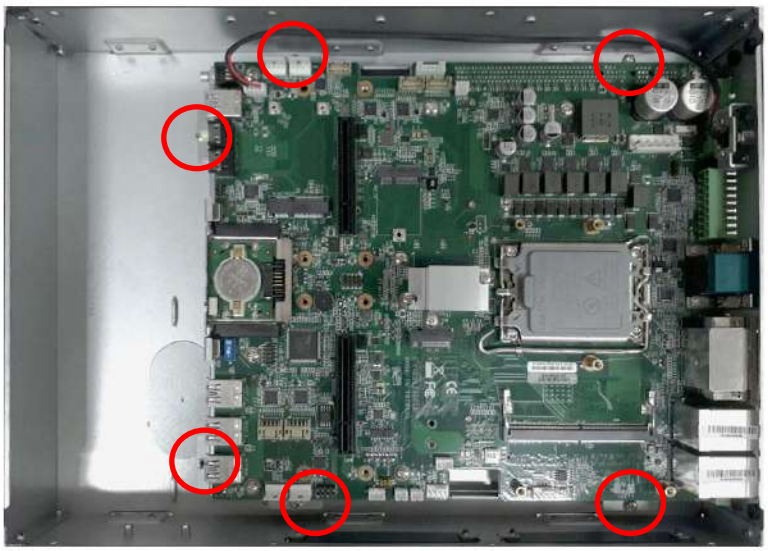


3. Push the HDD bracket back and then fasten the sun screws.

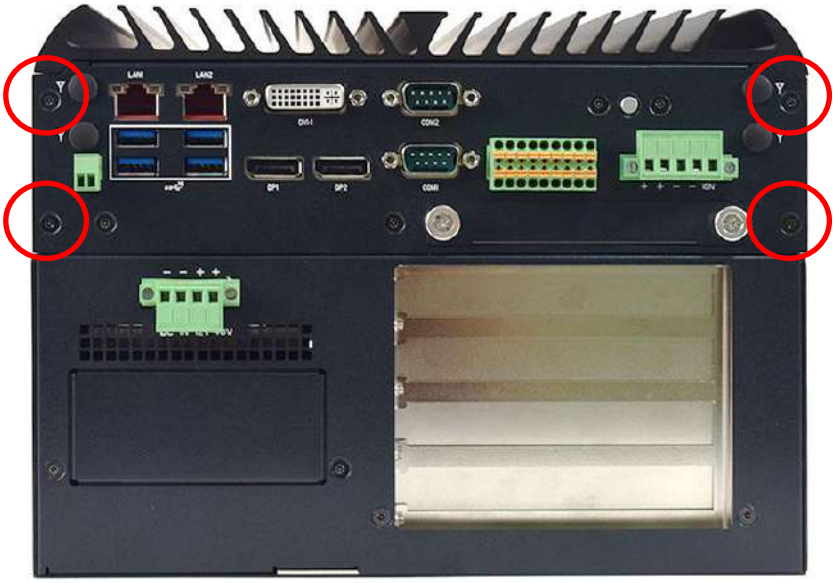



4. Hold the main system body and mount it vertically to the lower system

5. Unscrew the six screws screws (M3x5L) highlighted below.

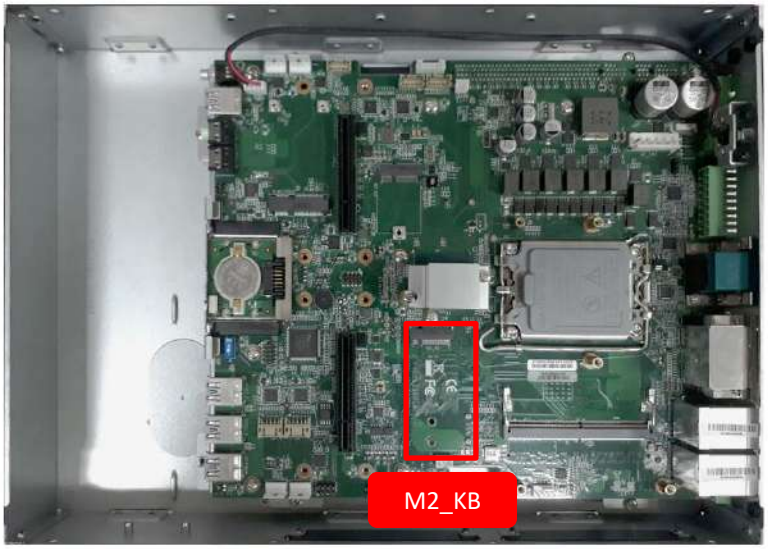


6. Unscrew 4 screws (M3x5L) on the front side.

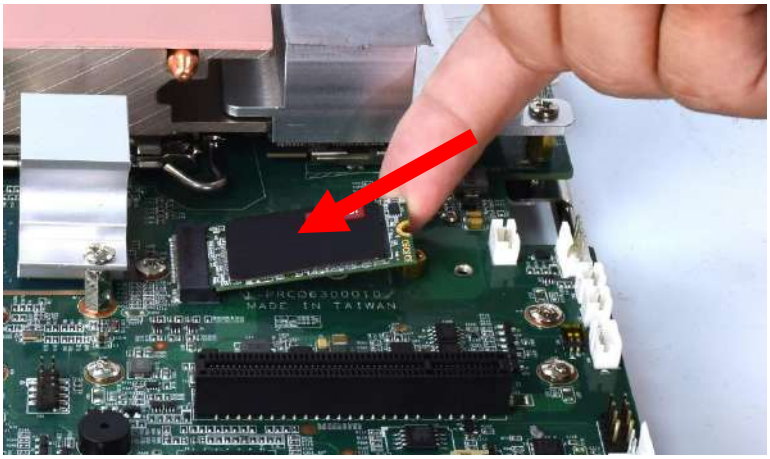


## 3.9 Install M.2 SSD card

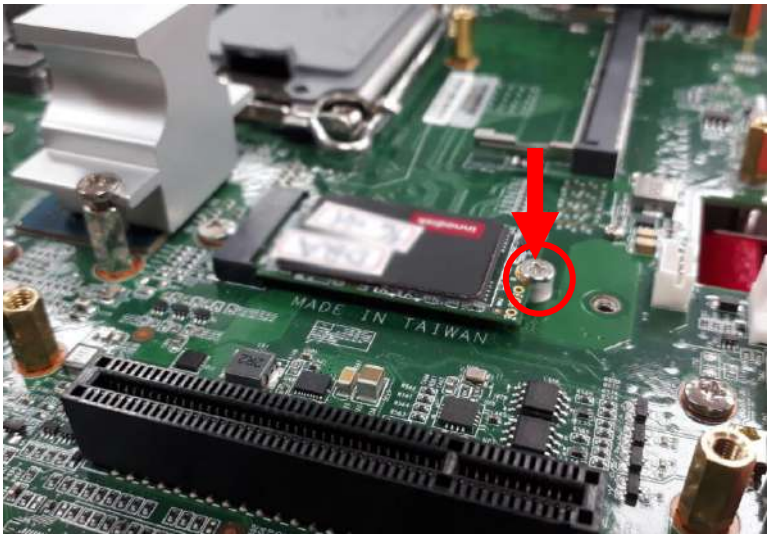
**VCO-6000-RPL series PCBA has an M.2 KB slot on the top, M2_B Key currently supports SSD application.**




1. Insert Mini PCIe card at a 45-degree angle.



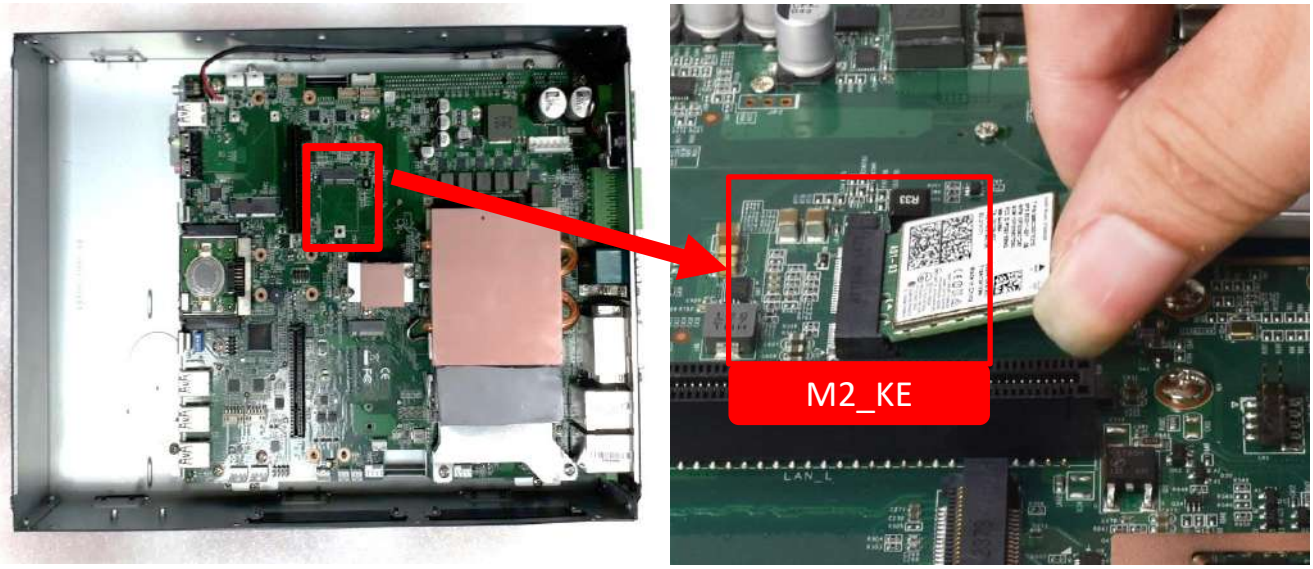
2. Gently press the Mini PCIe card down against the board and secure it with one screw (Round Spacer and M3x6L).



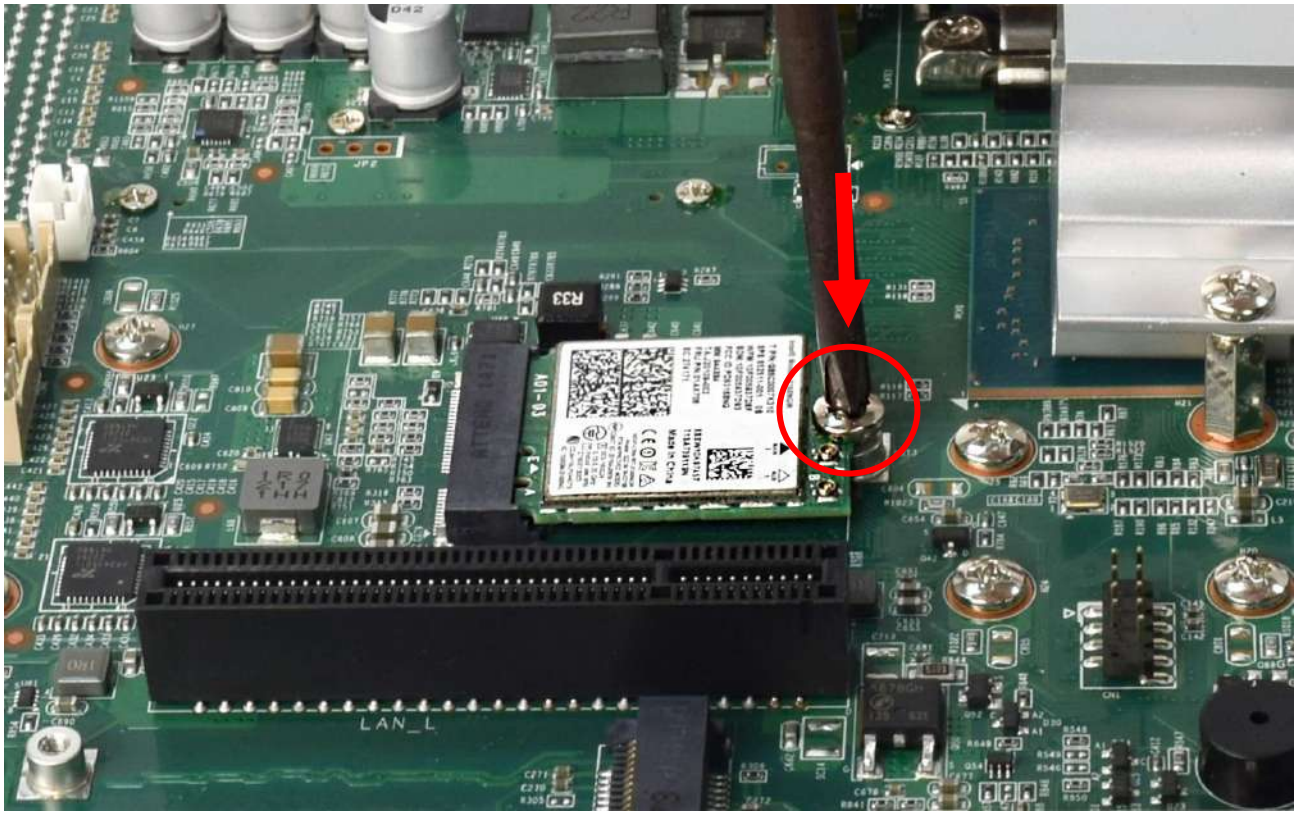
## 3.10 Install WiFi Module

**VCO-6000-RPL series PCBA has an M.2 KE slot on the top, M2_E Key currently supports WiFi application**

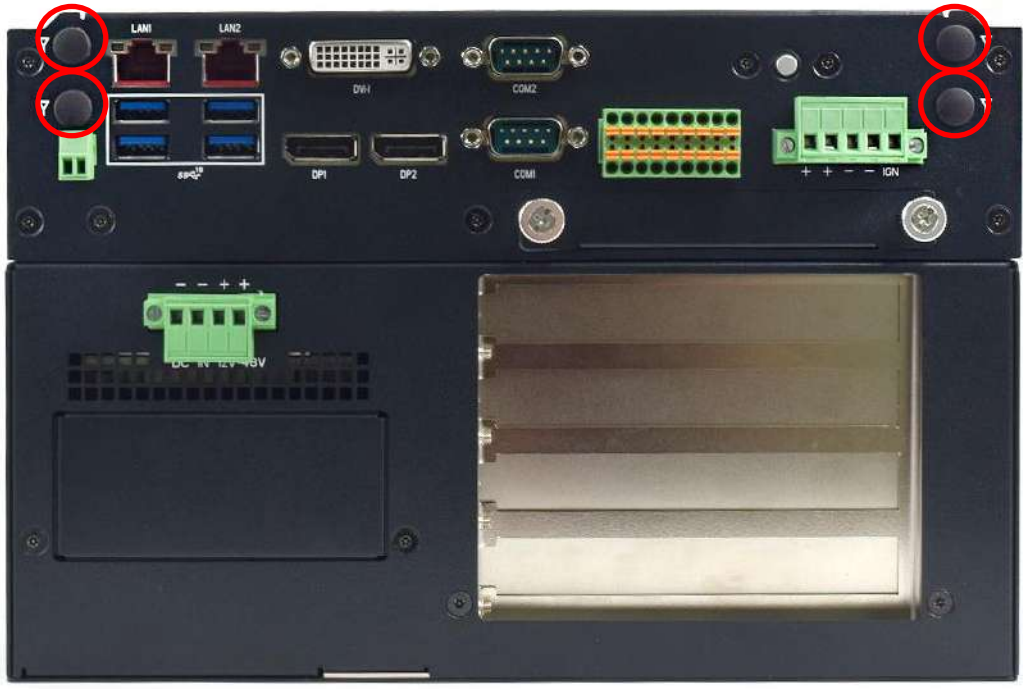
1. Insert M.2 E Key card at 45-degree angle.



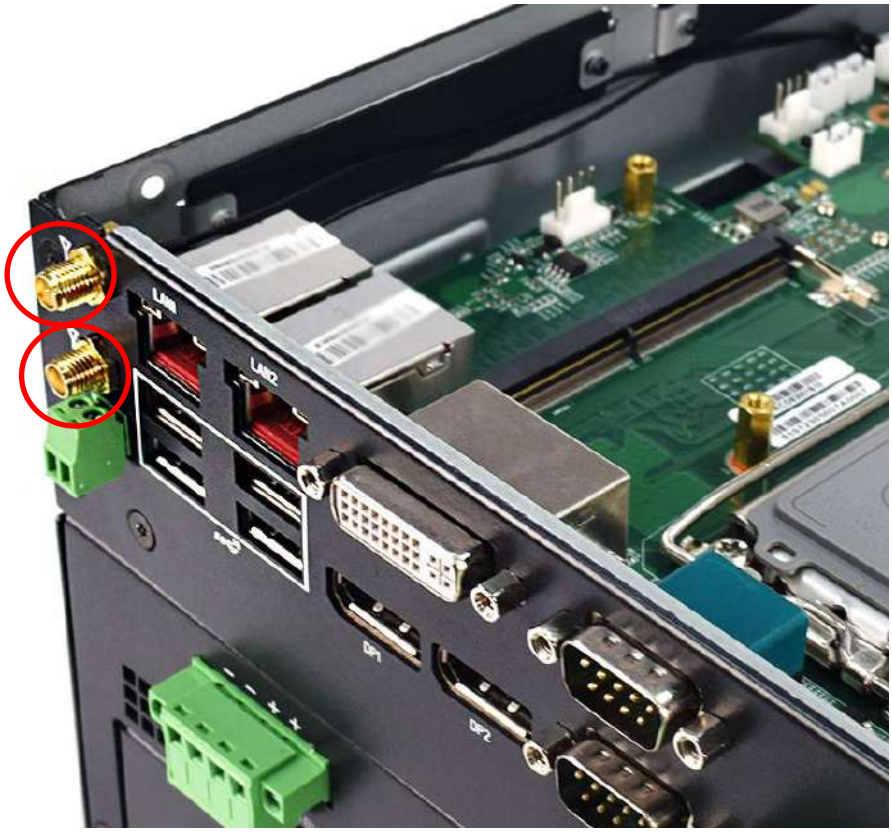

2. Press the M.2 E Key card down and secure it with one screw (M3x5L).



3. VCO-6000-RPL series system has four antenna holes. First, remove two left antenna hole plugs on the system panel.




4. Have the antenna jack penetrate through the hole, and fasten the nut with SMA jack.

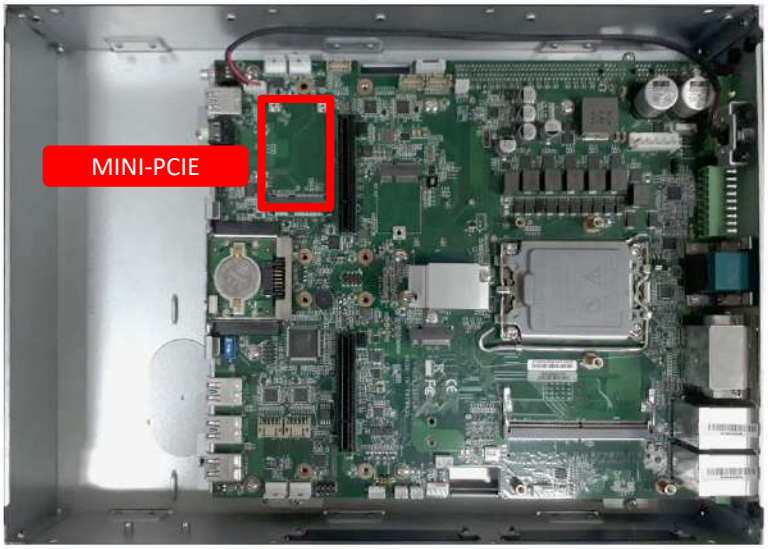


5. Assemble the antenna and SMA jack together.

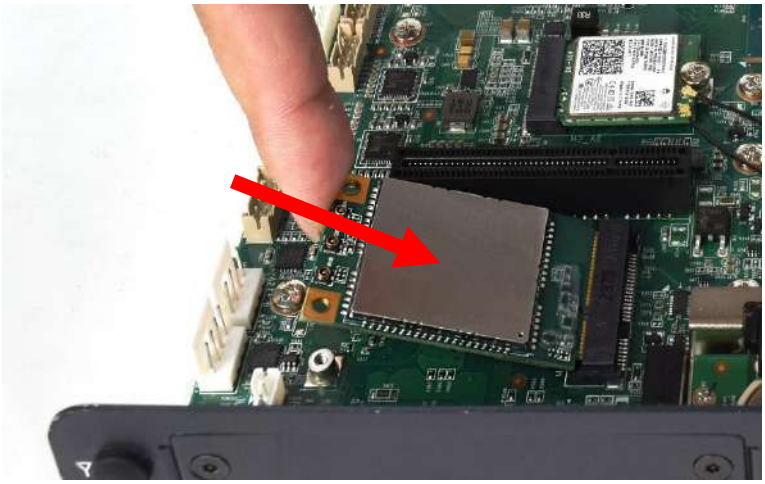
6. Attach the RF connector at the cable-end onto the communication module.

## 3.11 Install Mini PCIe card / 4G LTE

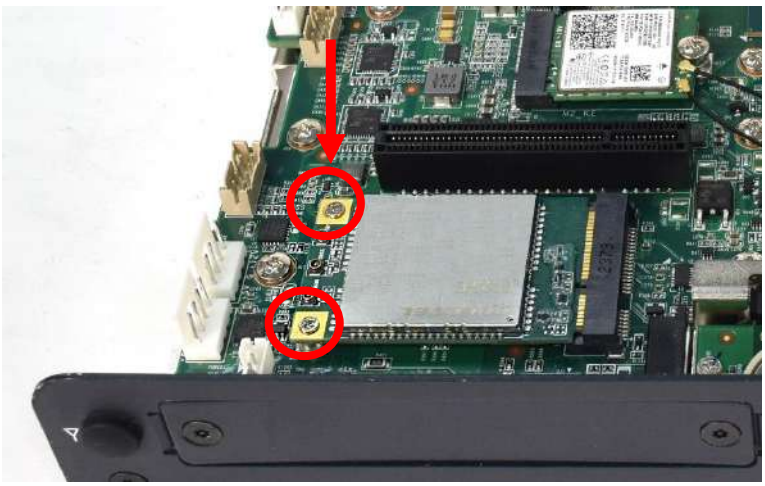
**The VCO-6000-RPL Series PCBA has Mini PCIe slots on the top. It currently supports 4G LTE applications.**




1. Insert Mini PCIe card at a 45-degree angle.

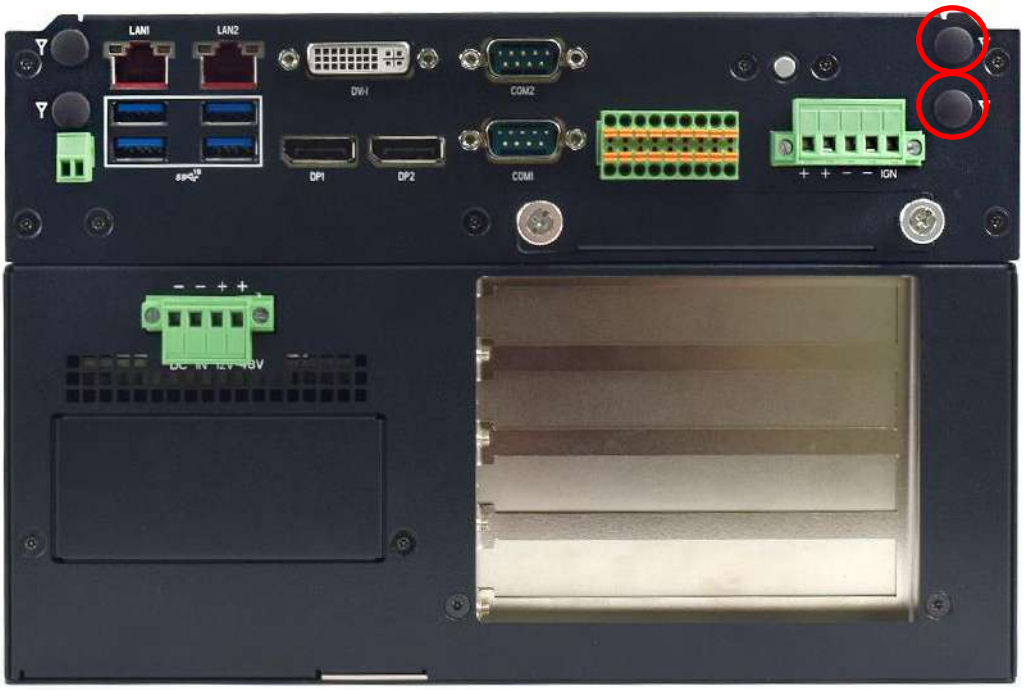


2. Gently press the Mini PCIe card against the board and secure it with two screws (M2x3.7L).



## 3.12 Install Antenna

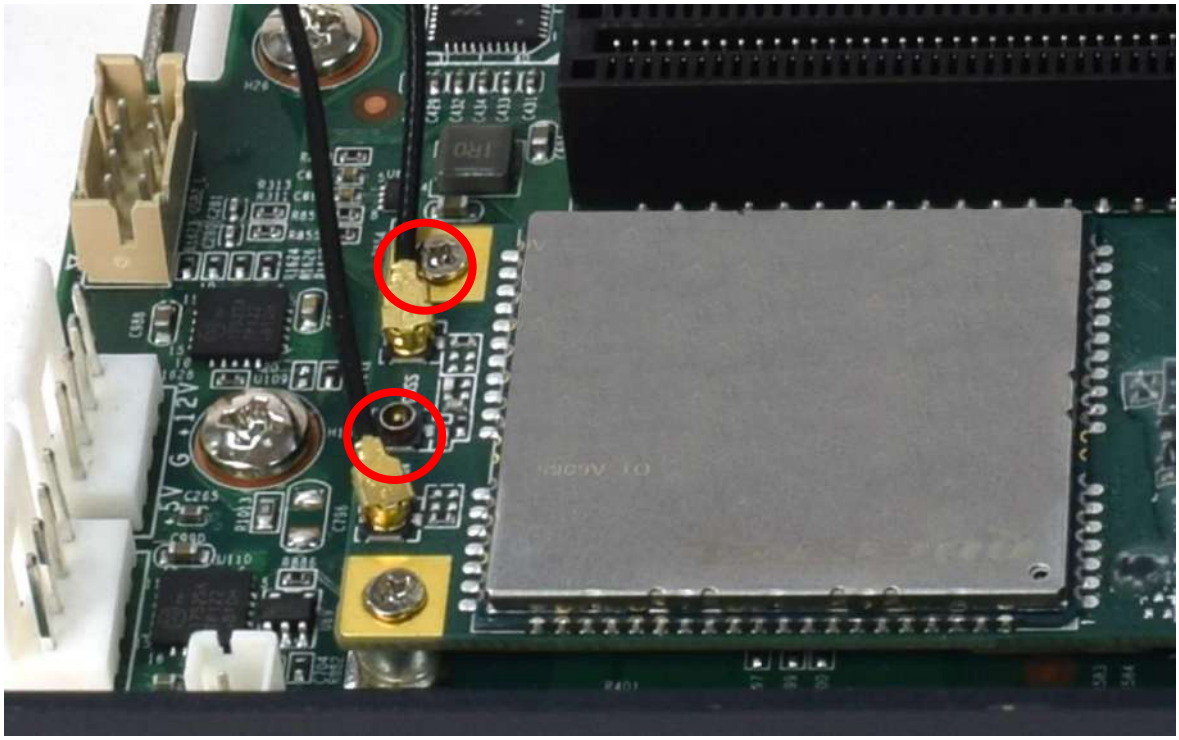
1. Remove two right antenna hole cover on the system panel.




2. ack penetrate through the hole, and fasten the nut with SMA jack.

3. Assemble the antenna and SMA jack together.

4. Attach the RF connector at the cable-end onto the communication module.



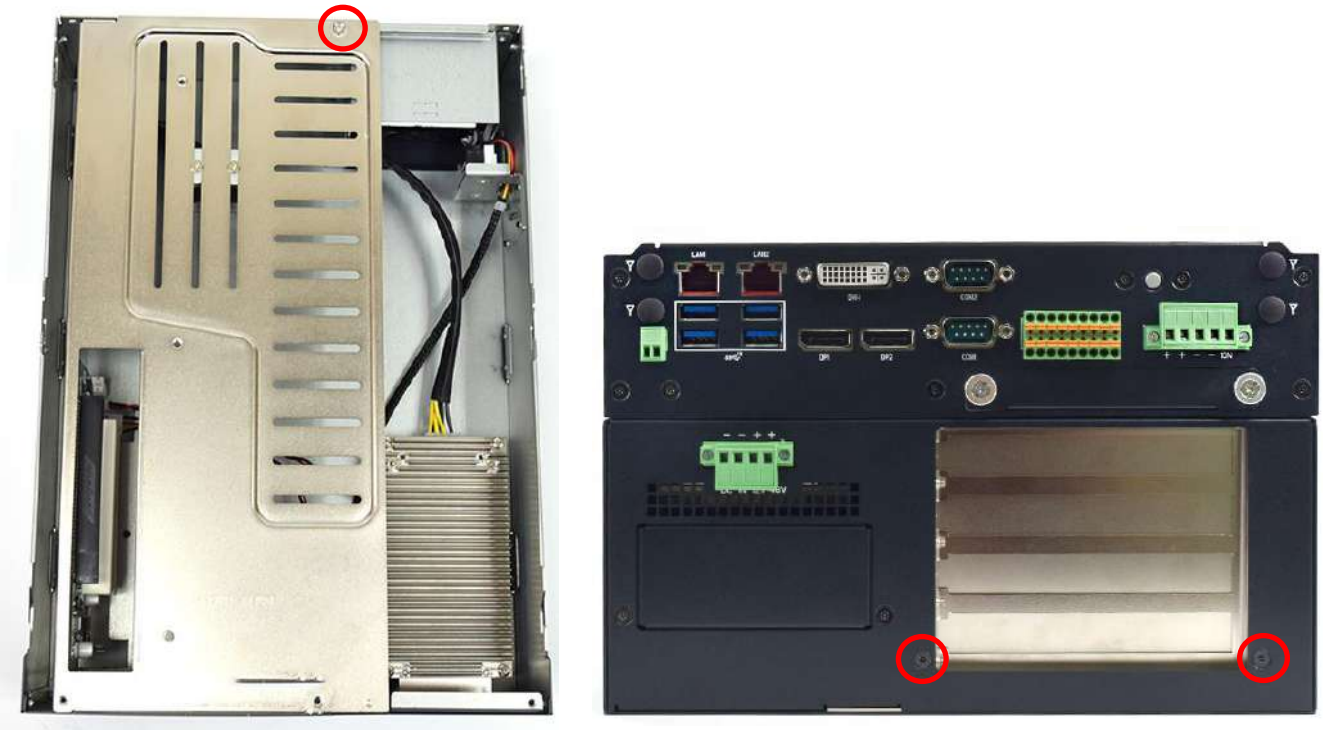
## 3.13 Install graphic Card (For Superior Machine Vision System)

1. Loosen and remove the three screws from the base

2. Slide the base backward

3. Lift the base vertically upward

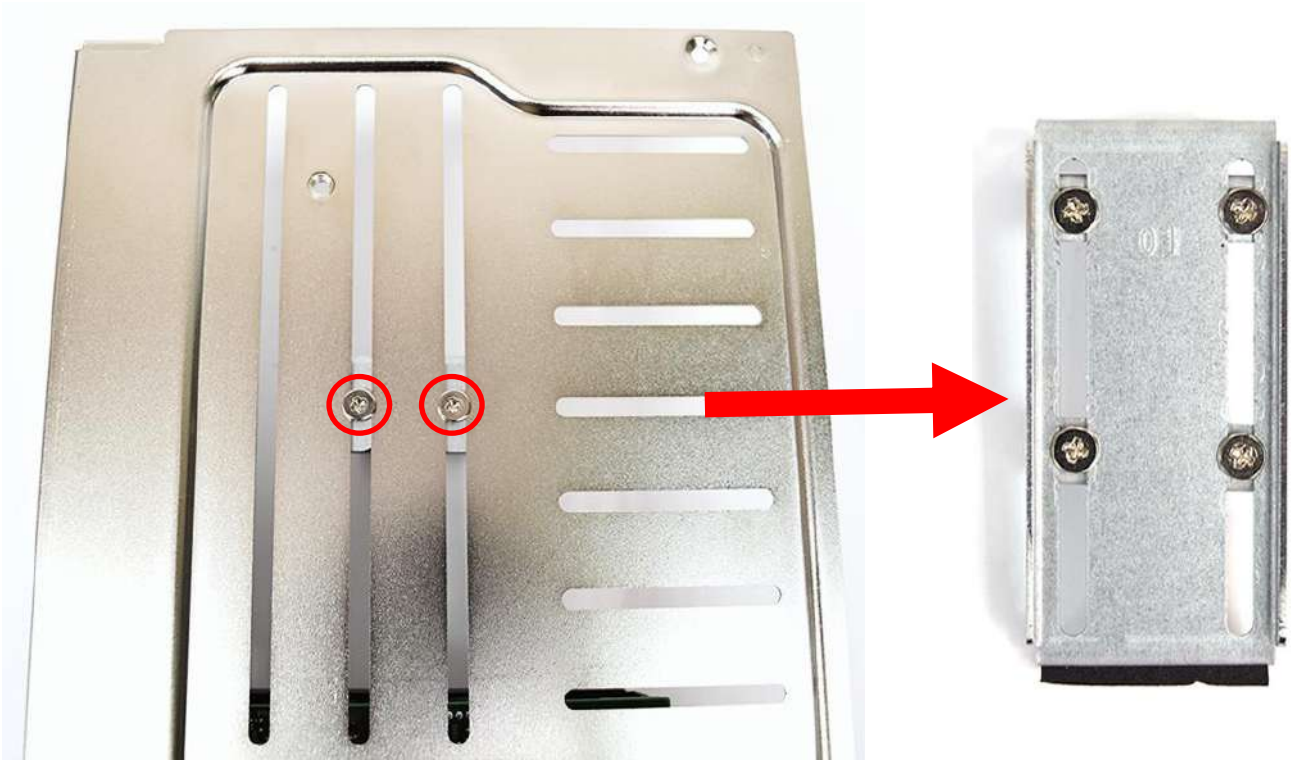
4. Remove the three screws in the circle below.



5. Disconnect the fan and the temperature power control cable.

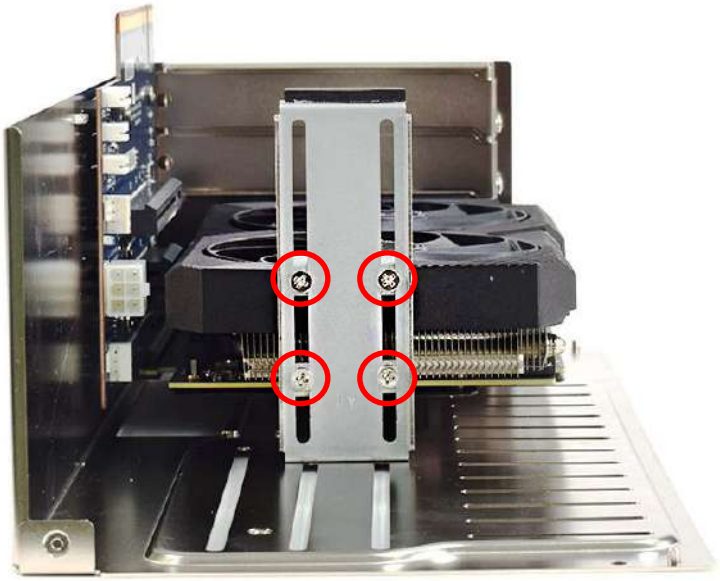
6. Unscrew the two screws to remove the I/O shield.

7. Unscrew the card bracket screws to remove the bracket from the expansion slots.

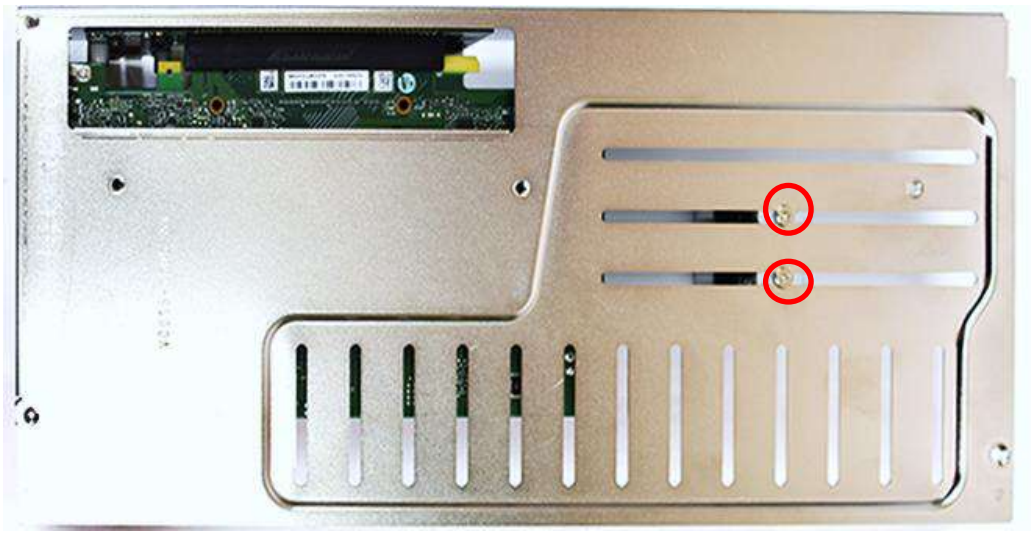


8. Install the graphic card and ensure the gold finger is inserted into the slot. and then fasten the screws.

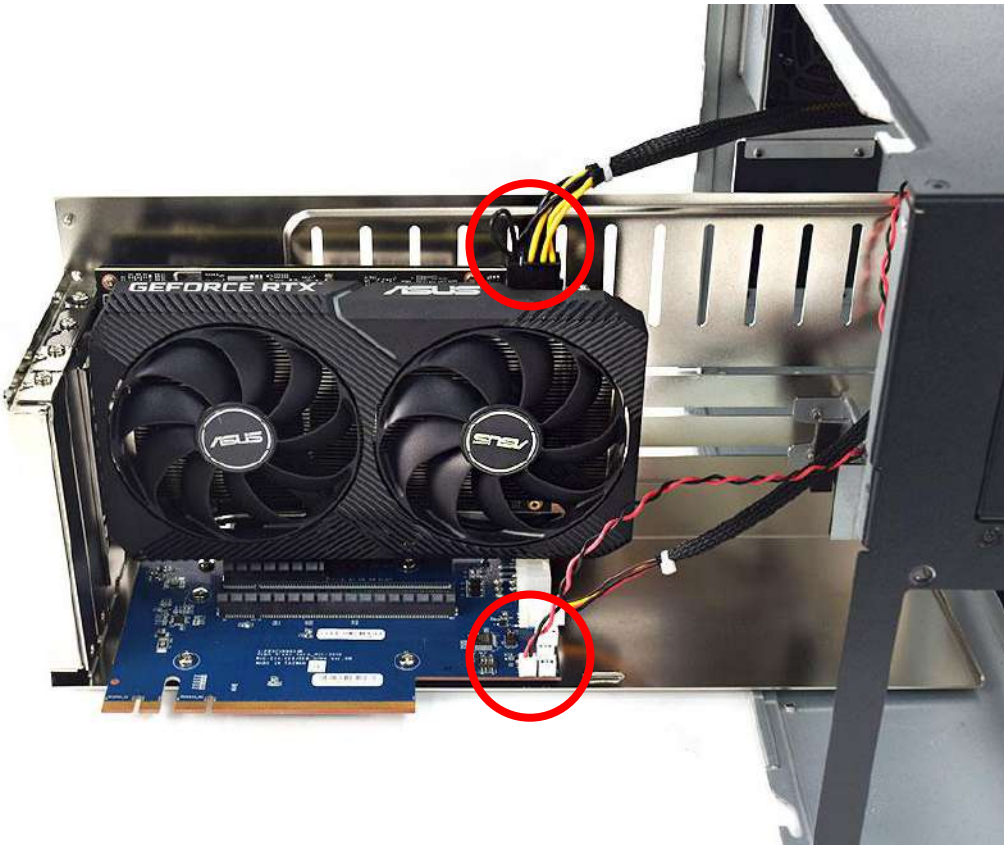

9. Adjust the arm until it holds the card firmly in place. Then fasten the Four screw on the holder.



10. Fasten the two screws.

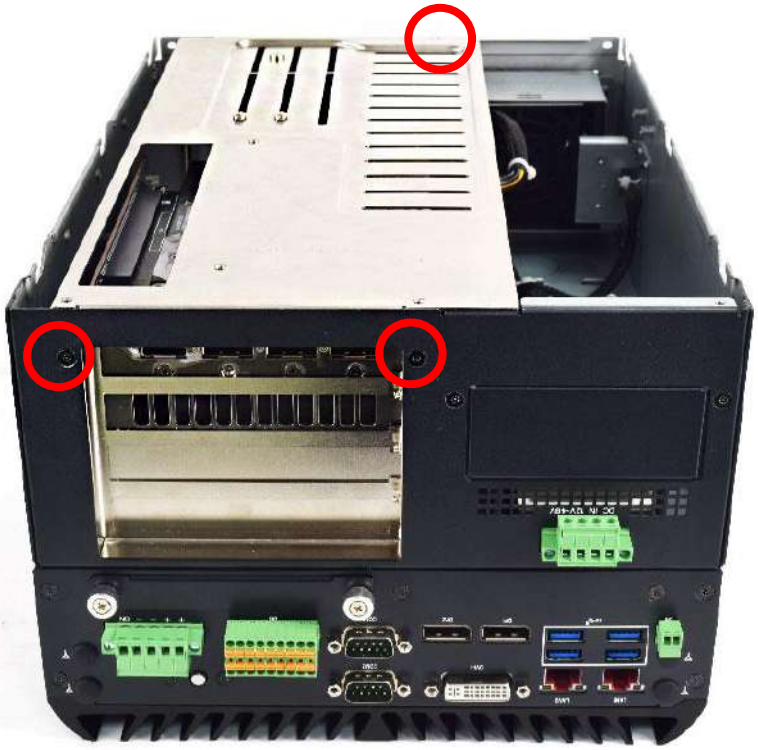


11. Insert the temperature power control and fan cables into the Riser Card, then connect the power cord from the power board to the graphics card.

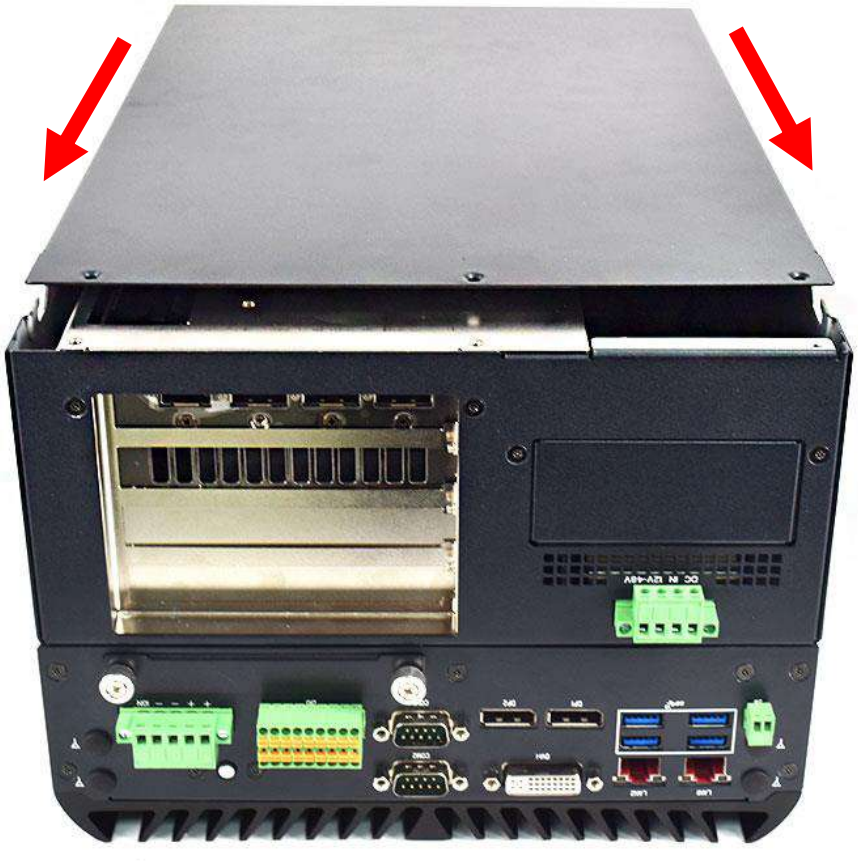



12. Put the graphic expansion module into the expansion chassis.

13. Fasten the three screws in the circle below.

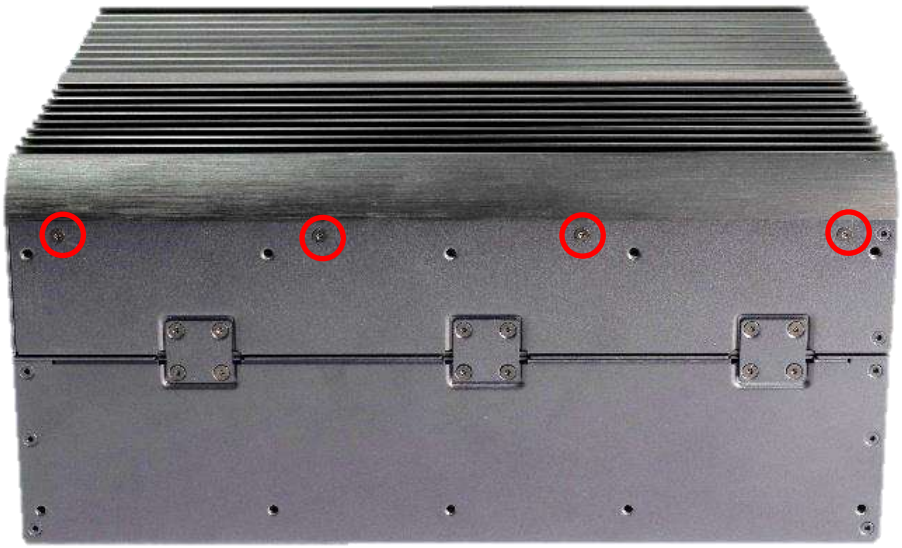


14. Install the base cover and slide it forward to secure



15. Install the three screws on the base.

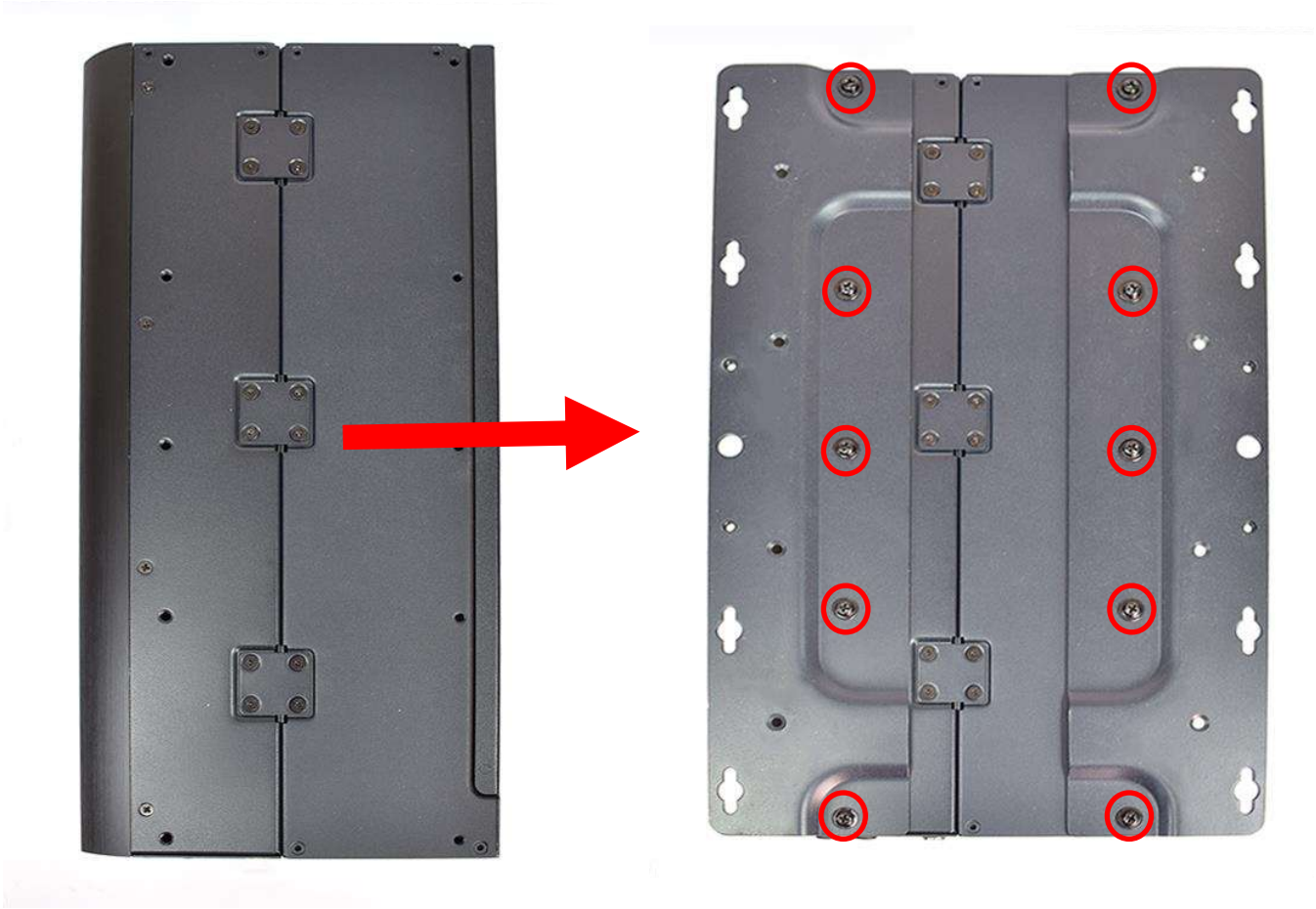
16. Lock the top cover and install 4 screws (M3x5L) on both top sides



## 3.14 Install wall mount kit

1. Wall mount kit is available for the VCO-6000-RPL included in the standard package.

2. Lock the wall mount kit with ten screws



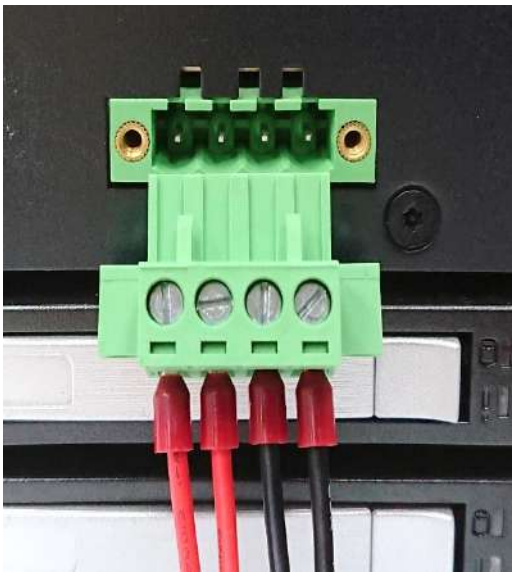
## 3.15 AC Adapter with 4P terminal block

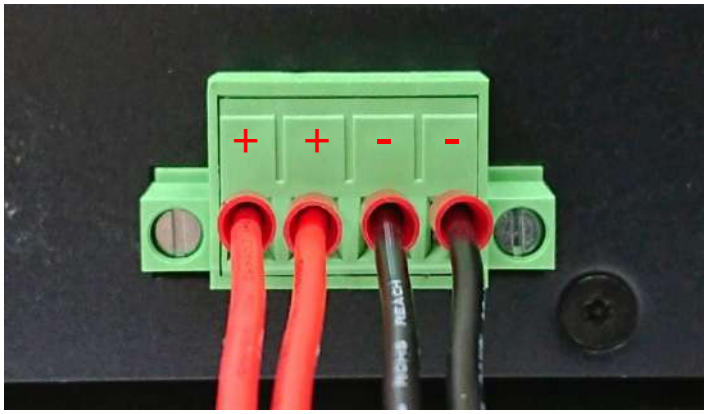
* 24V requires 4-pin terminal block for card/storage expansion

1. AC adapter 4P wiring diagram



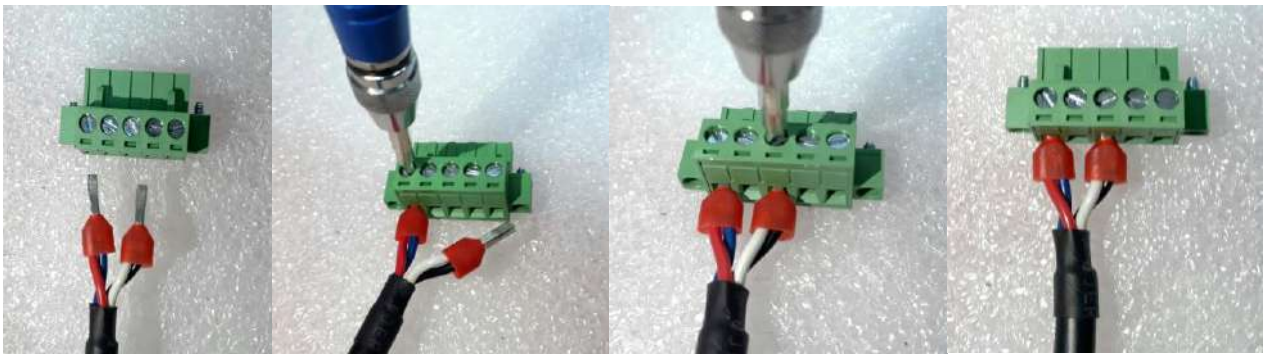
2. DC power input 4P wiring diagram



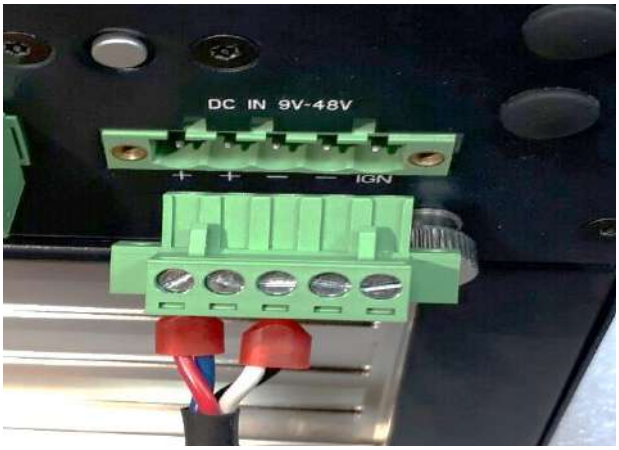


## 3.16 AC Adapter with 5P terminal block

1. 5P Wiring Diagram of AC Adapter



2. DC power input 5P wiring diagram




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**

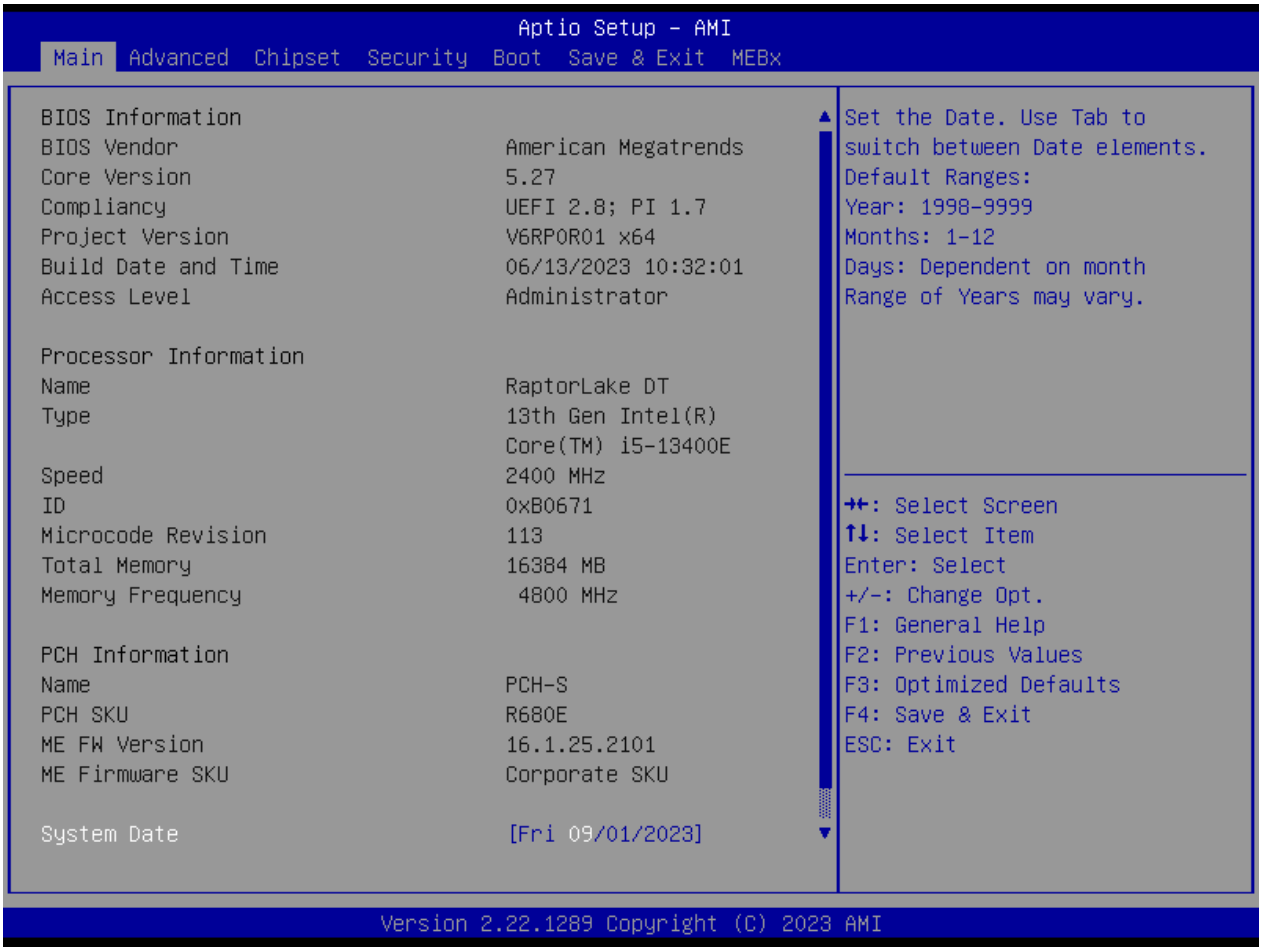
The main menu lists the setup functions you can make changes to. You can use the arrow keys ( ↑↓ ) to select the item. The on-line description of the highlighted setup function is displayed at the bottom of the screen.

**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.



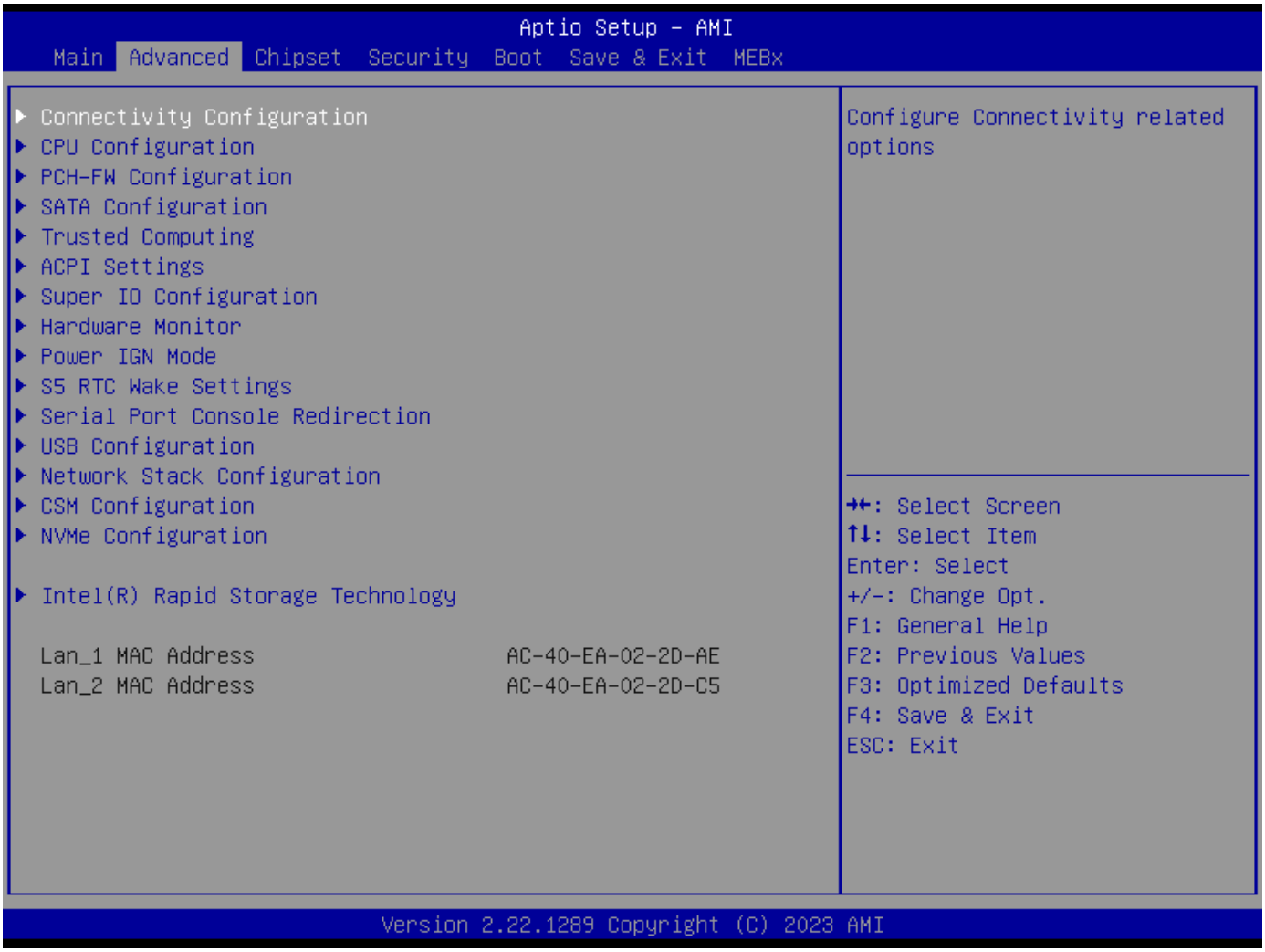

### ■ System Date

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

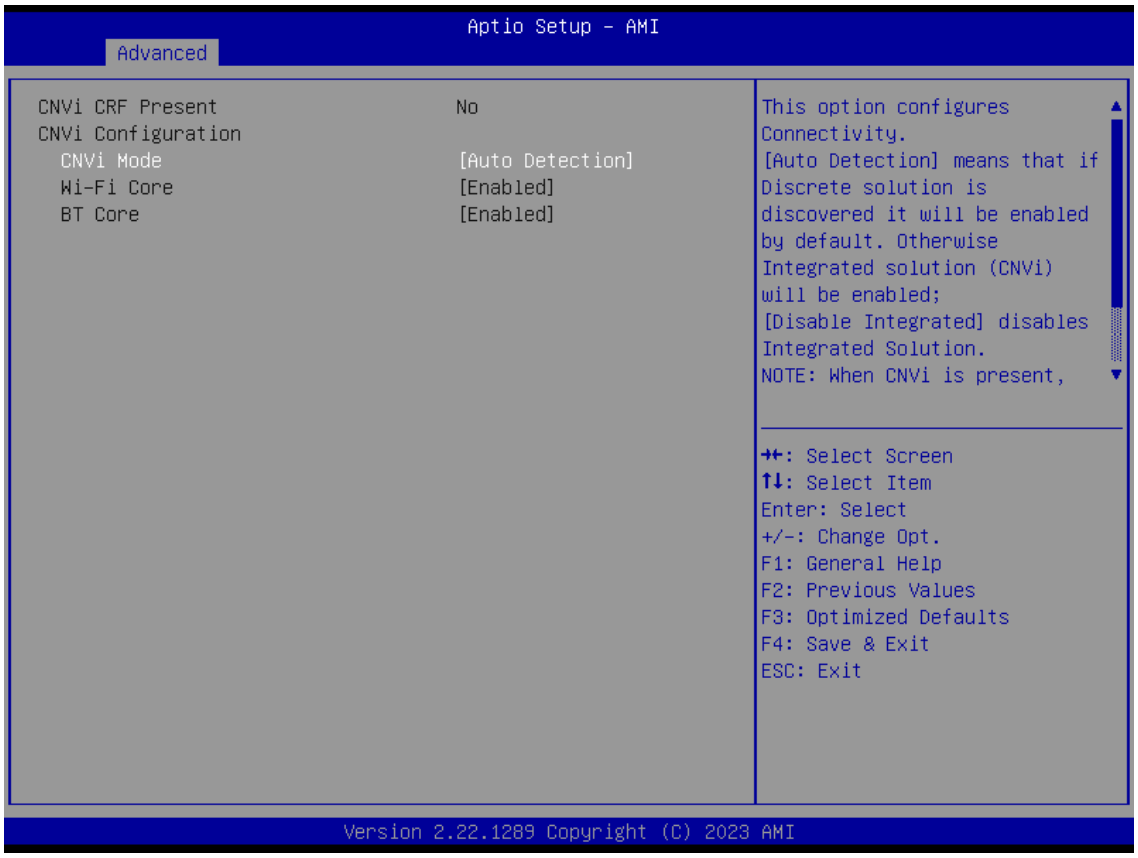
### ■ System Time

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

## 4.3 Advanced Setup

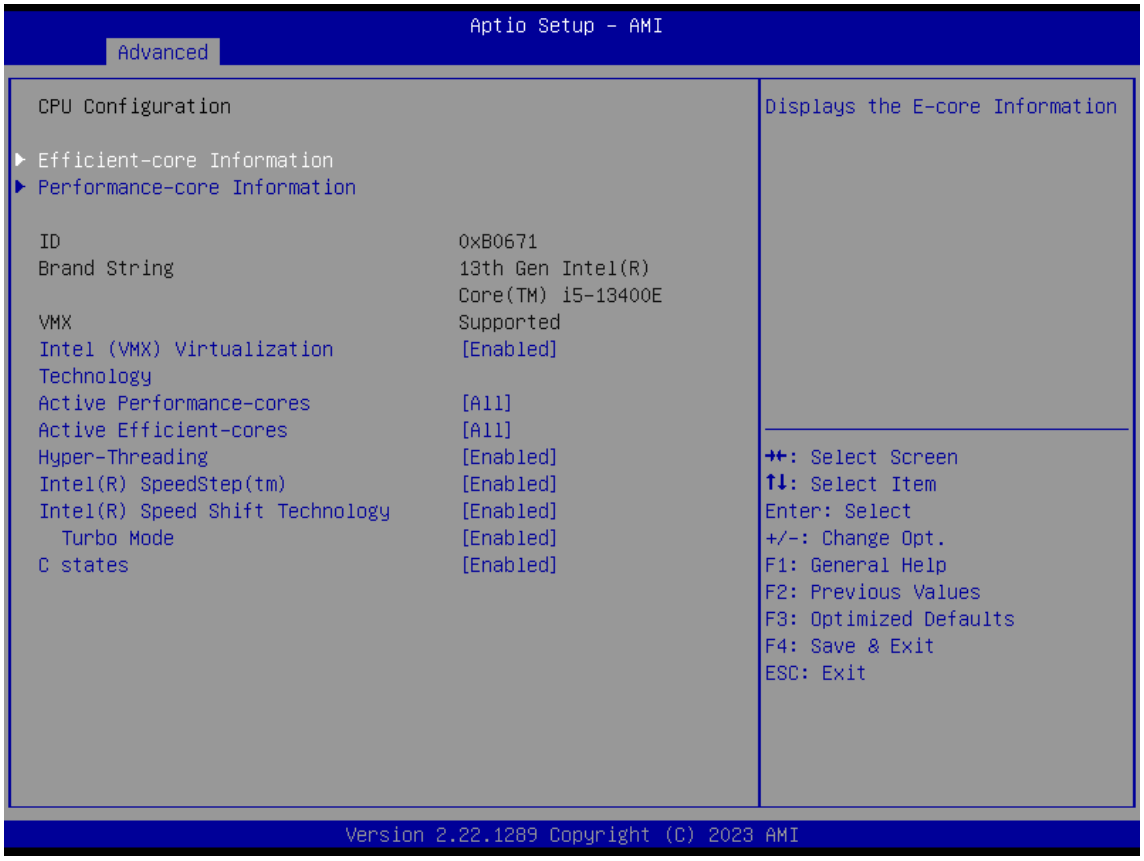


### 4.3.1 Connectivity Configuration



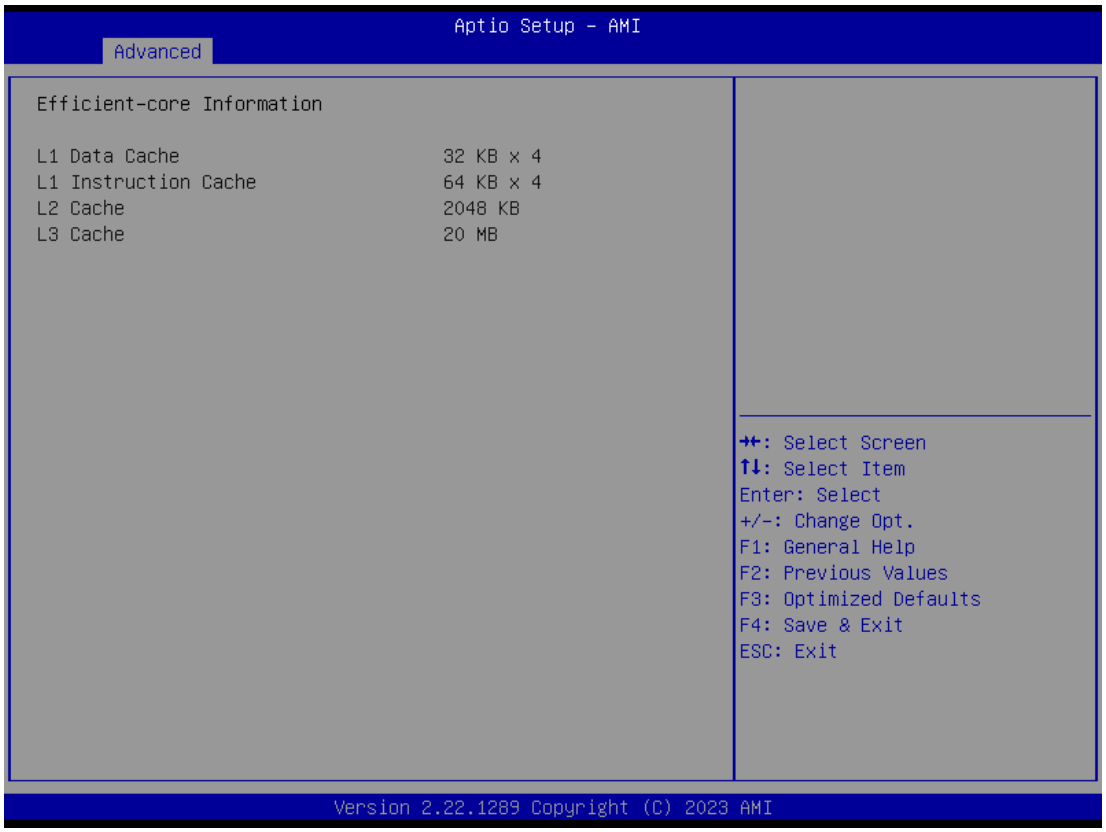

| Item | Options | Description |
|---|---|---|
| **CNVi Mode** | Disable Integrated,<br>Auto Detection**[Default]** | This option configures Connectivity. [Auto Detection] means that if Discrete solution is discovered it will be enabled by default. Otherwise Integrated solution (CNVi) will be enabled;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

## 4.3.2 CPU Configuration

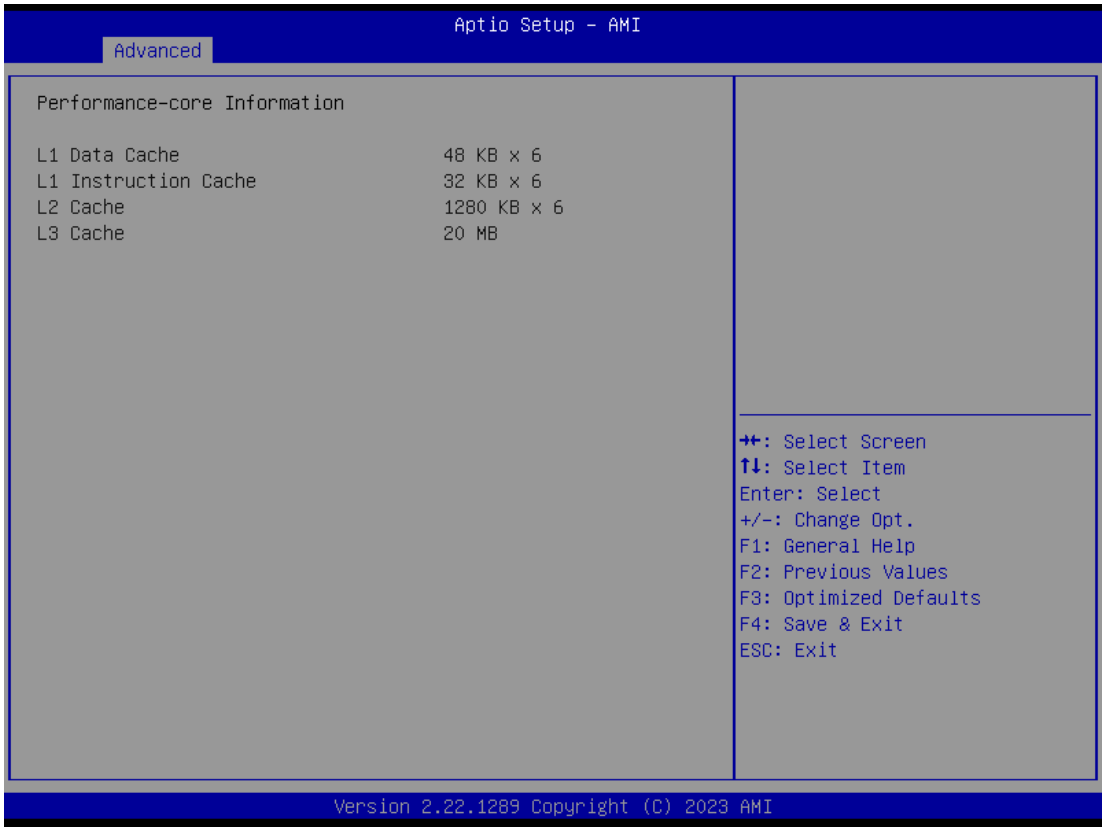



| Item | Options | Description |
|---|---|---|
| **Intel (VMX) Virtualization Technology** | Disabled, Enabled**[Default]** | When enabled, a VMM can utilize the additional hardware capabilities provided by Virtualization Technology. |
| **Active Performance-cores** | All**[Default]** , 5,4,3, 2,1 | 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. |
| **Active Efficient-cores** | All**[Default]** , 3,2, 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. |
| **Hyper-Threading** | 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). |
| **Intel(R) SpeedStep(tm)** | Disabled, Enabled**[Default]** | Allows more than two frequency ranges to be supported. |
| **Intel(R) Speed Shift Technology** | 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. |
| **Turbo Mode** | Disabled, Enabled**[Default]** | Enable/Disable processor Turbo Mode. |
| **C states** | Disabled, Enabled**[Default]** | Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized. |

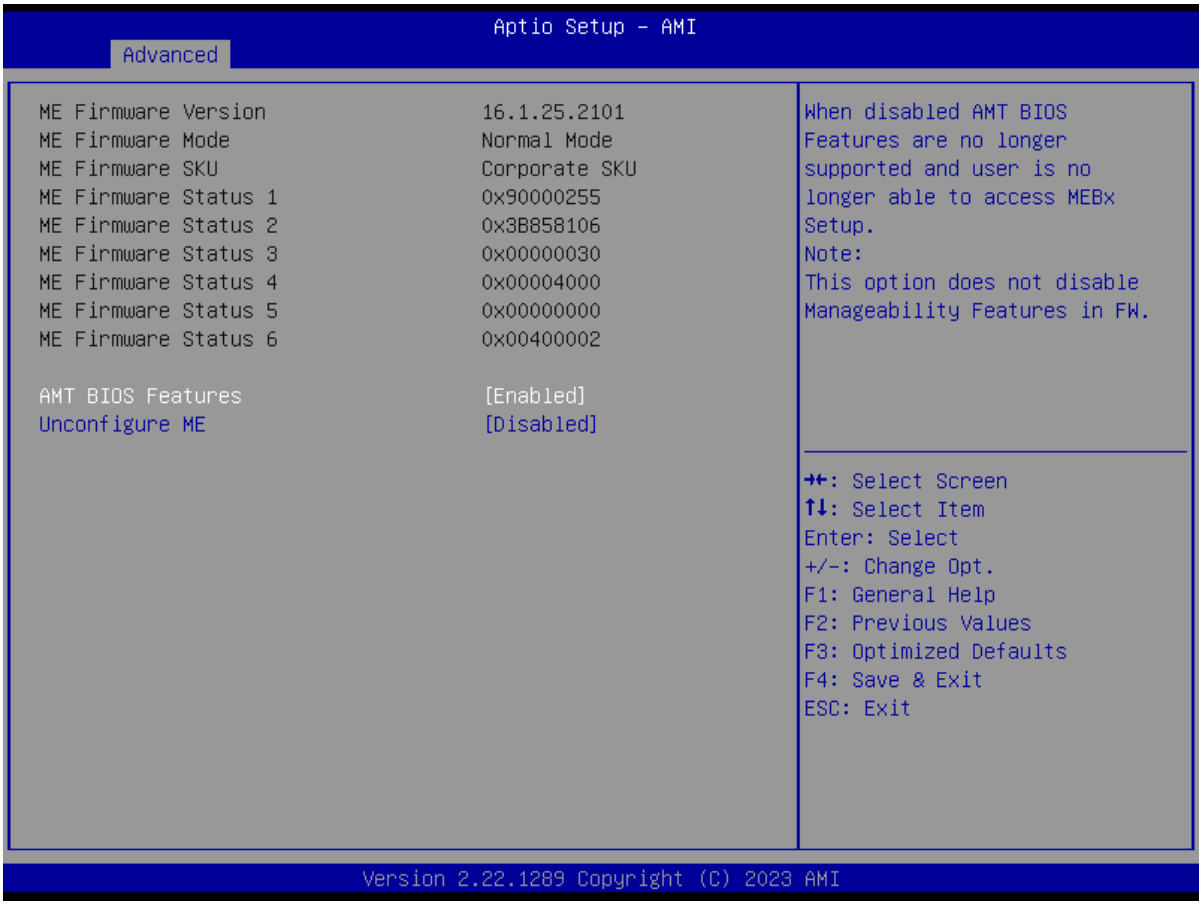
### 4.3.2.1 Efficient-core Information




### 4.3.2.2 Performance-core Information

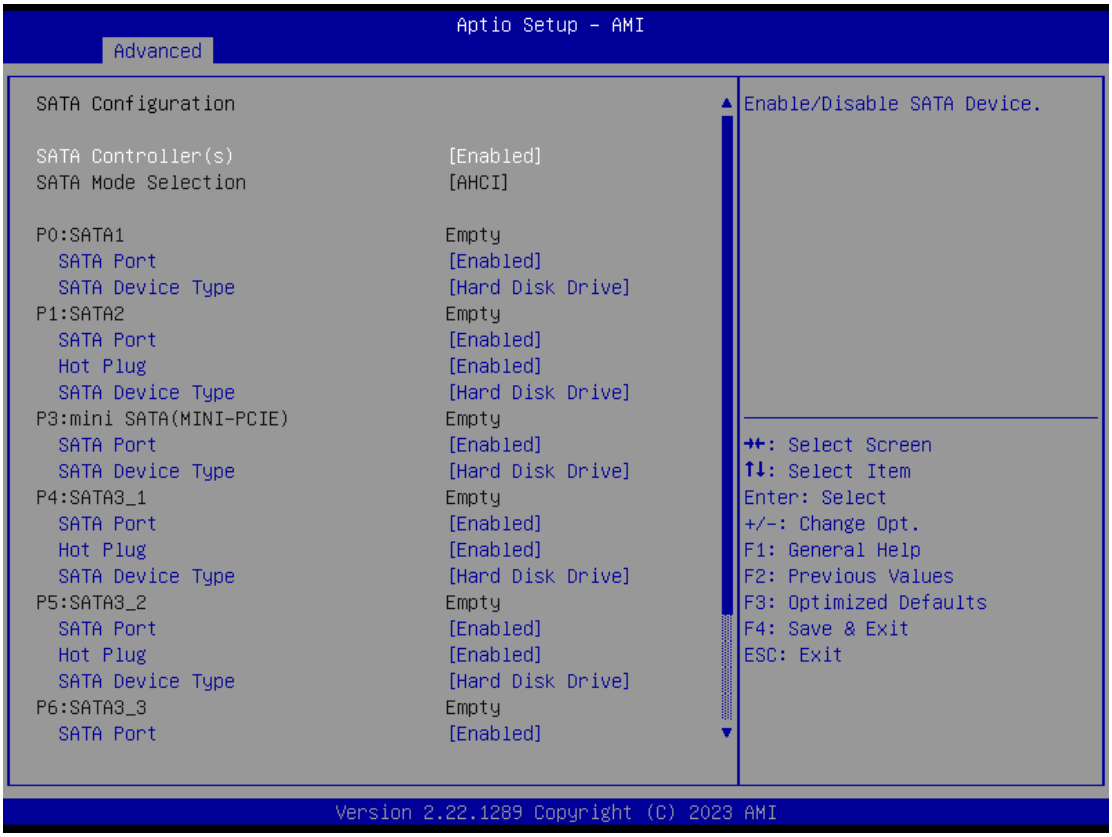


### 4.3.3 PCH-FW Configuration




| Item | Options | Description |
|---|---|---|
| **AMT BIOS Features** | Disabled,<br>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]** ,<br>Enabled | Unconfigure ME with resetting MEBx password to default on next boot. |

### 4.3.4 SATA and RST Configuration



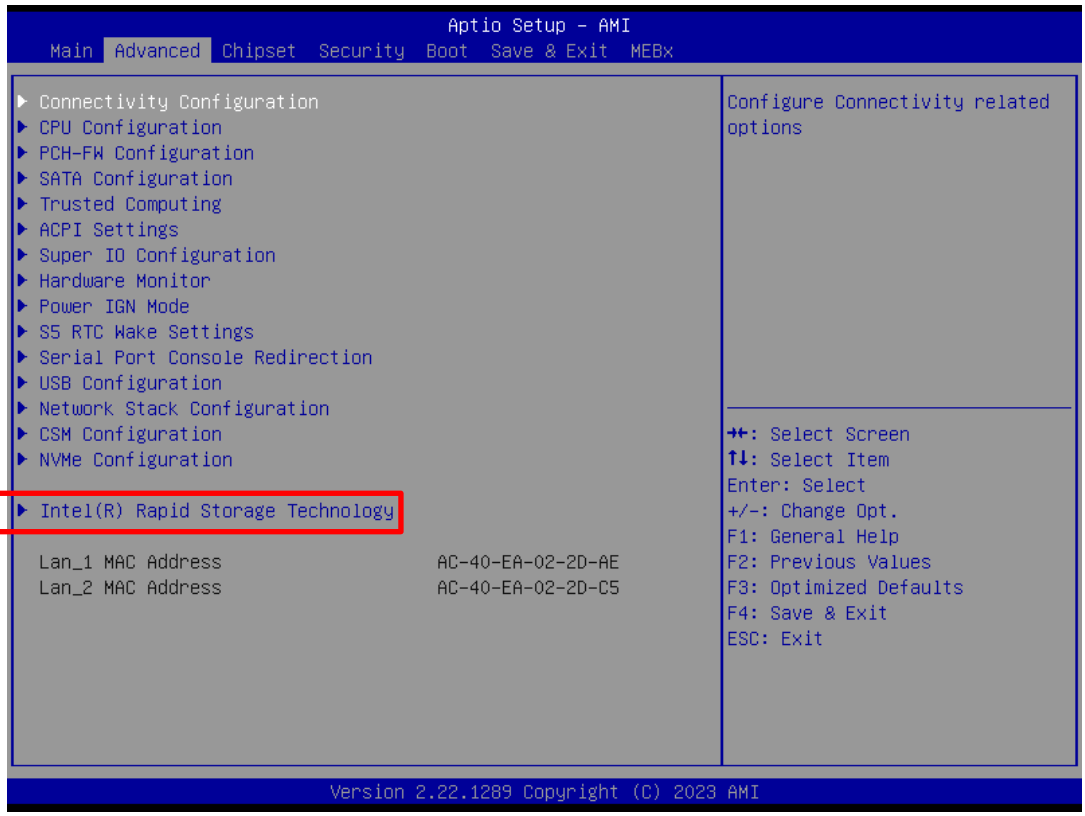

| Item | Options | Description |
|---|---|---|
| **SATA Controller(s)** | Enabled**[Default]**<br>Disabled | Enable/Disable SATA Device. |
| **SATA Port** | Disabled,<br>Enabled**[Default]** | Enable/Disable SATA Port. |
| **Hot Plug** | Disabled,<br>Enabled**[Default]** | Designates this port as Hot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

### 4.3.5 RST (UEFI RAID) Configuration

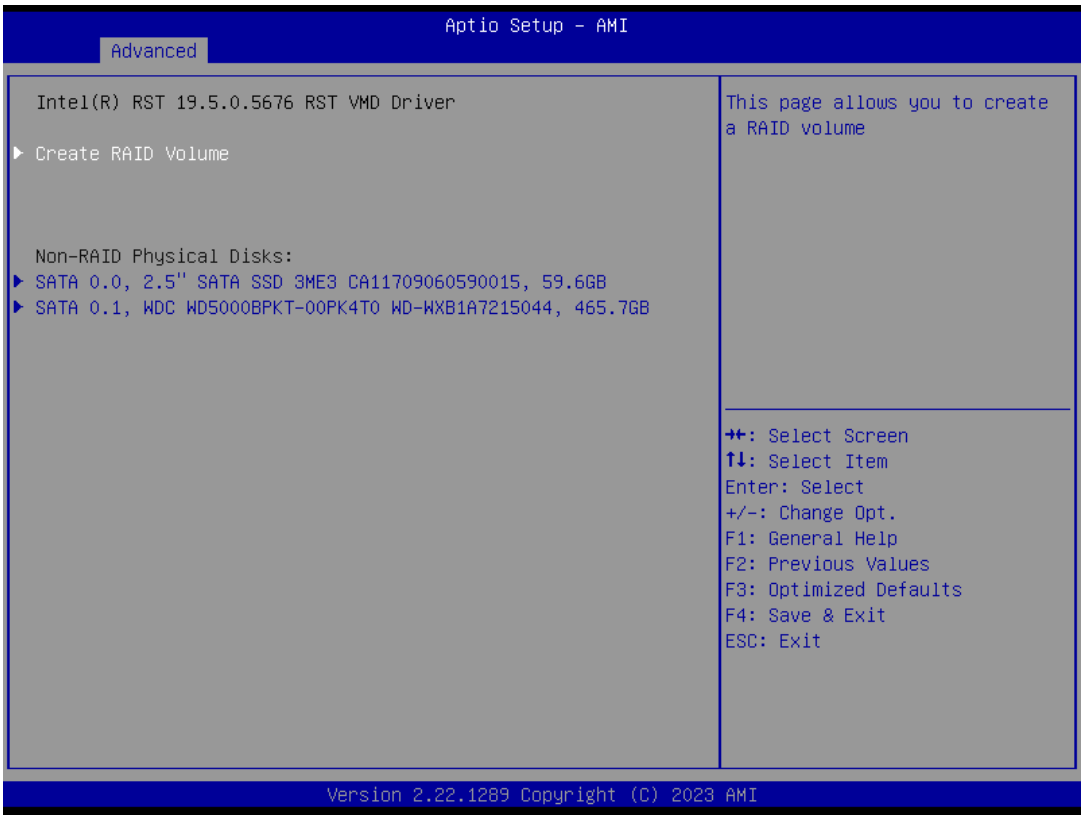
**How to set the UEFI RAID:**

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

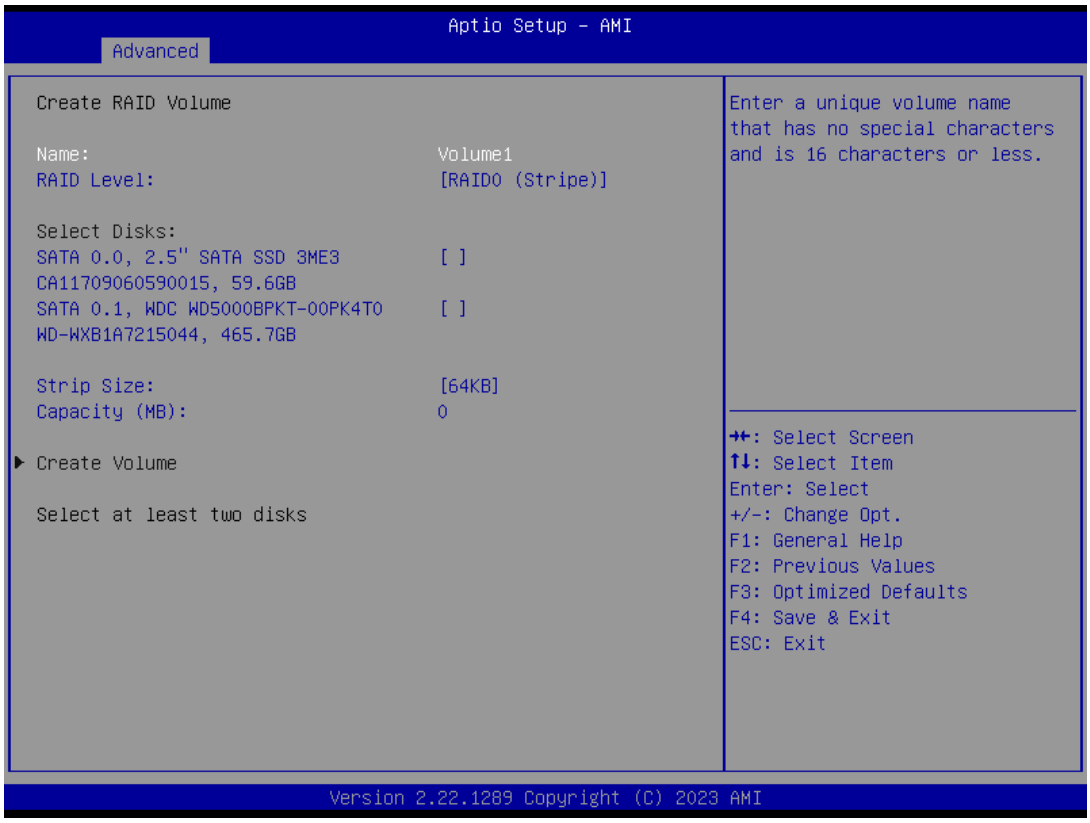

2. After reboot the system, please into BIOS utility and then will see "Intel (R) Rapid Storage Technology"



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




4. Start Create the RAID



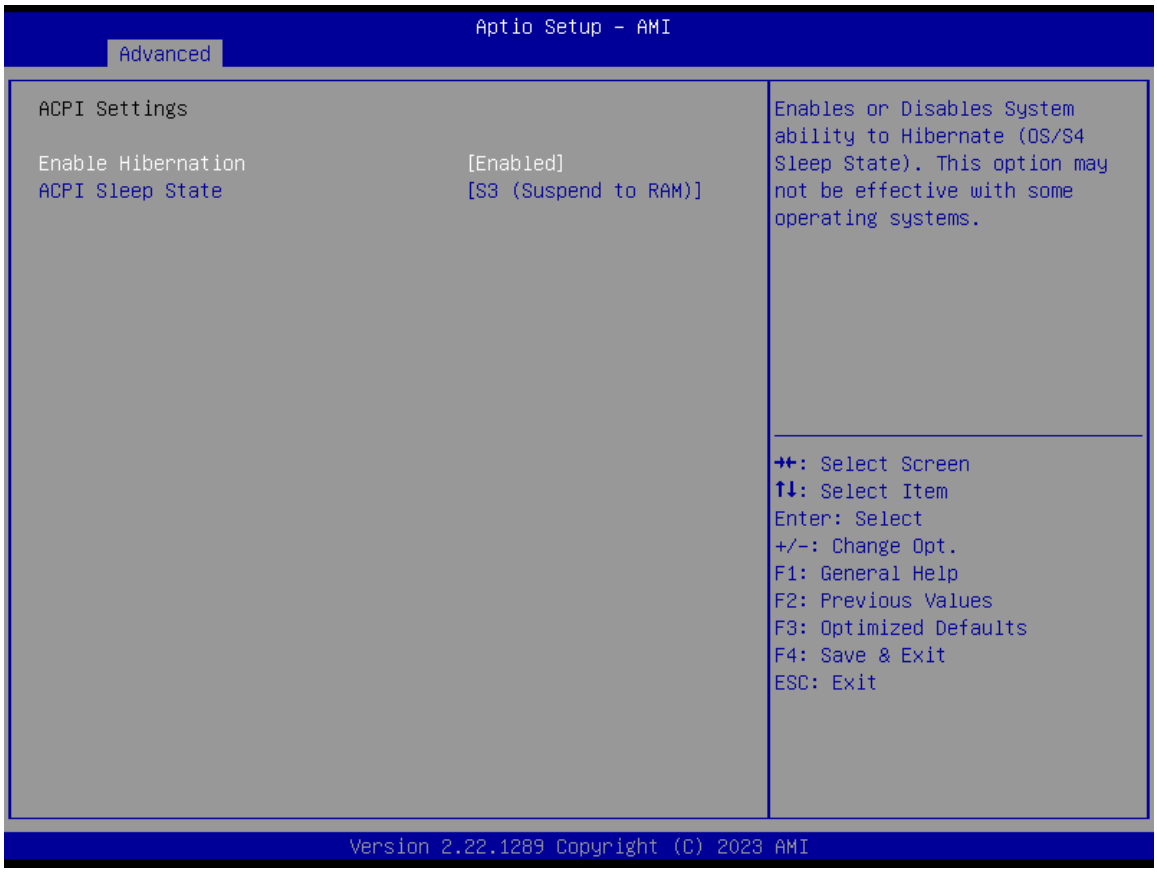

■ Select Disk that you want to do the RAID

■ Select [x]; No-Select [ ]

## 4.3.6 Trusted Computing


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

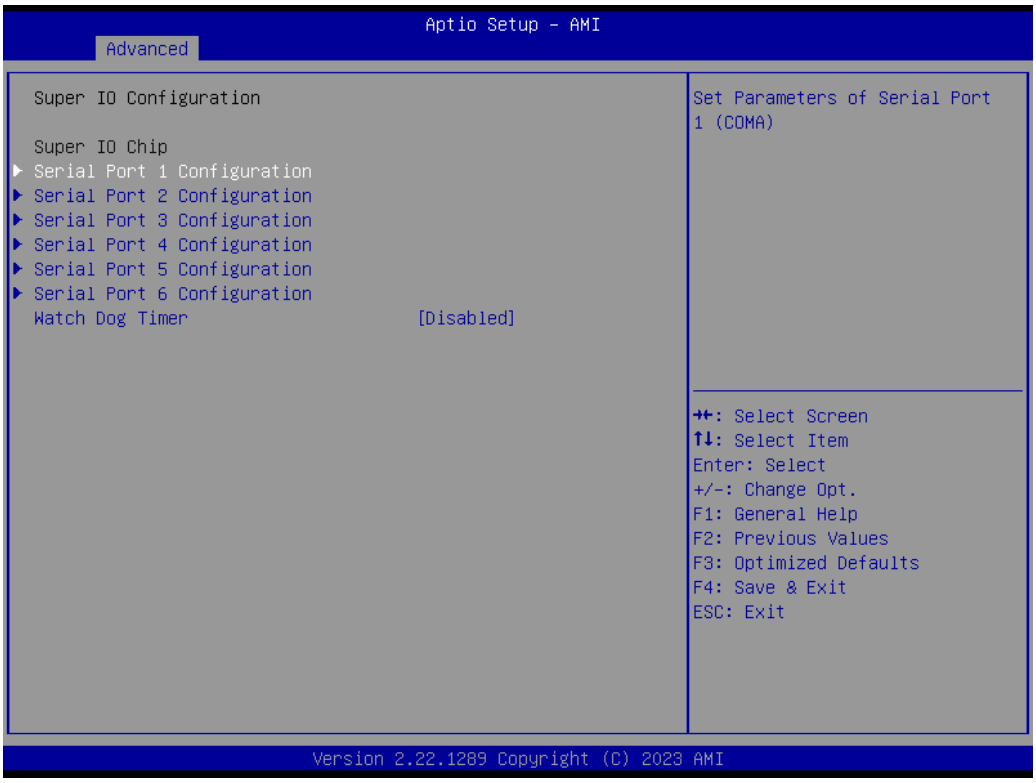
### 4.3.7 ACPI Settings




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

## 4.3.8 Super IO Configuration

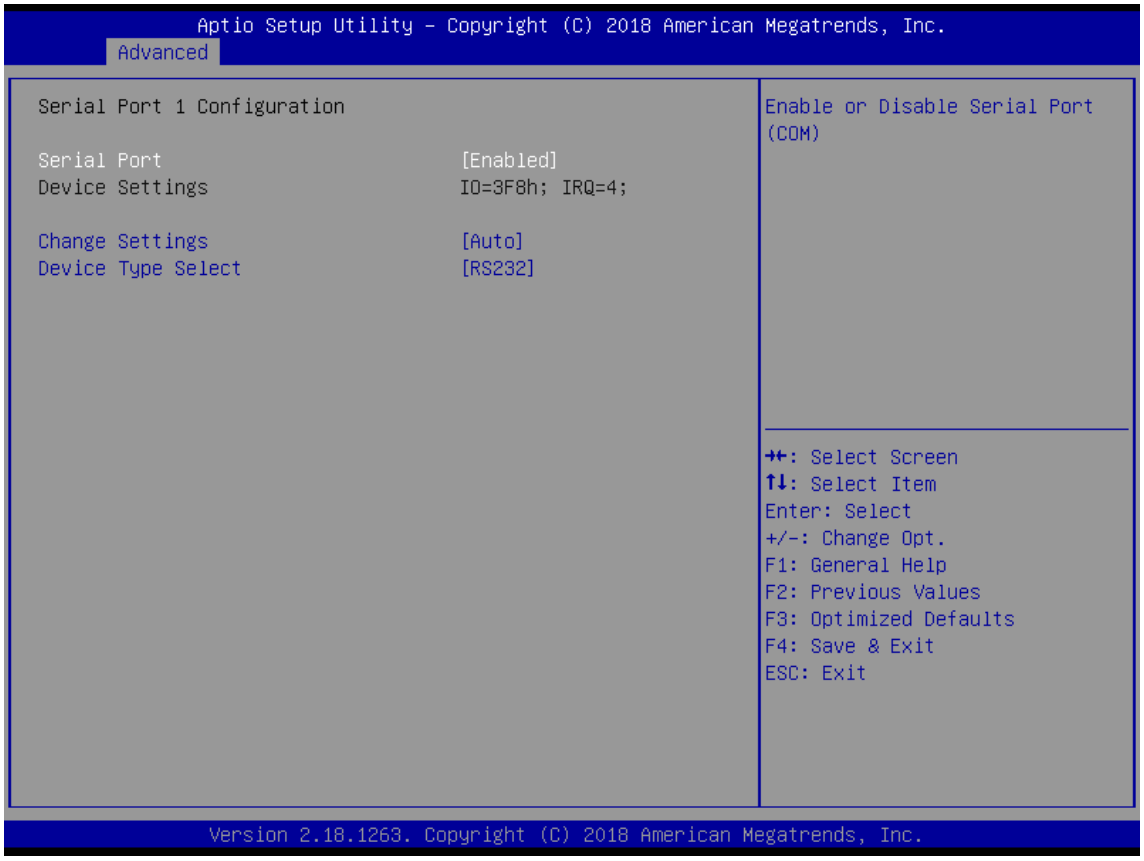
This setting allows you to select options for the Super IO Configuration, and change the value of the selected option.




| Item | Description |
|---|---|
| **Serial Port 1 Configuration** | Set Parameters of Serial Port 1 (COMA). |
| **Serial Port 2 Configuration** | Set Parameters of Serial Port 2 (COMB). |
| **Serial Port 3 Configuration** | Set Parameters of Serial Port 3 (COMC). |
| **Serial Port 4 Configuration** | Set Parameters of Serial Port 4 (COMD). |
| **Serial Port 5 Configuration** | Set Parameters of Serial Port 5 (COME). |
| **Serial Port 6 Configuration** | Set Parameters of Serial Port 6 (COMF). |

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

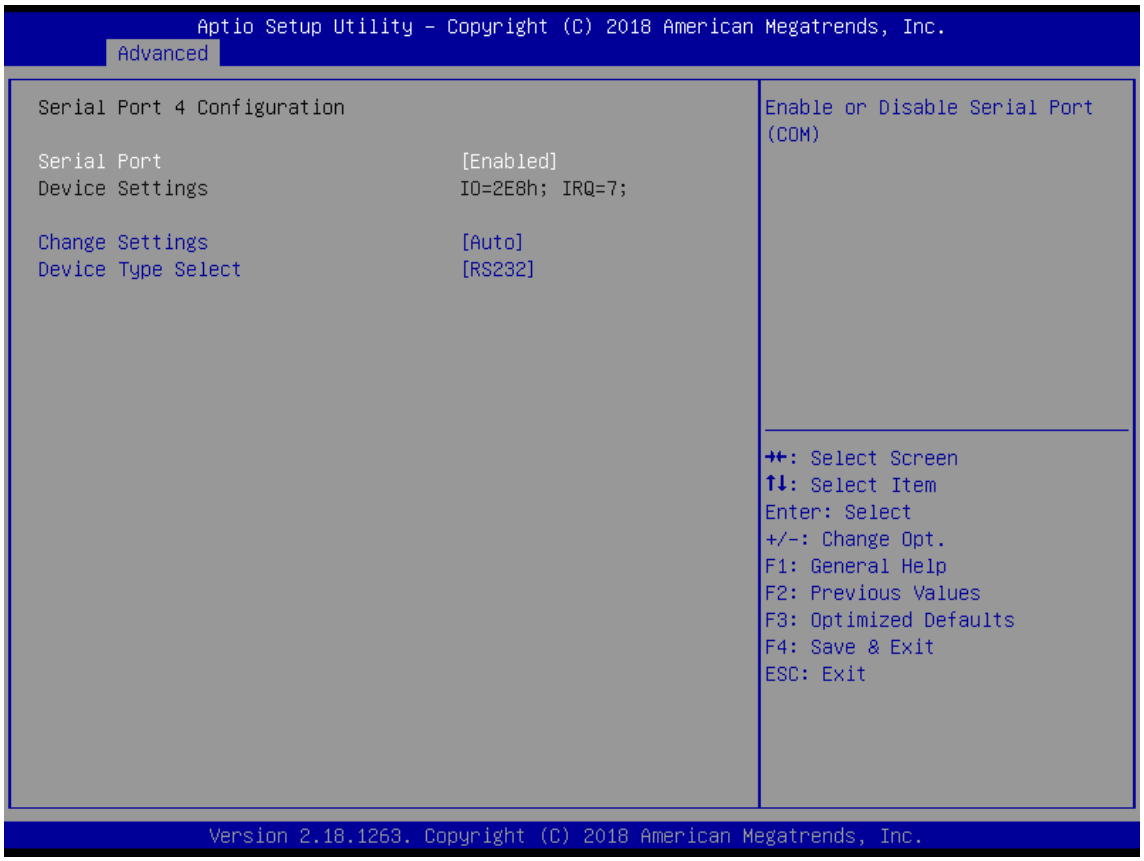
## Serial Port 2 Configuration


| 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

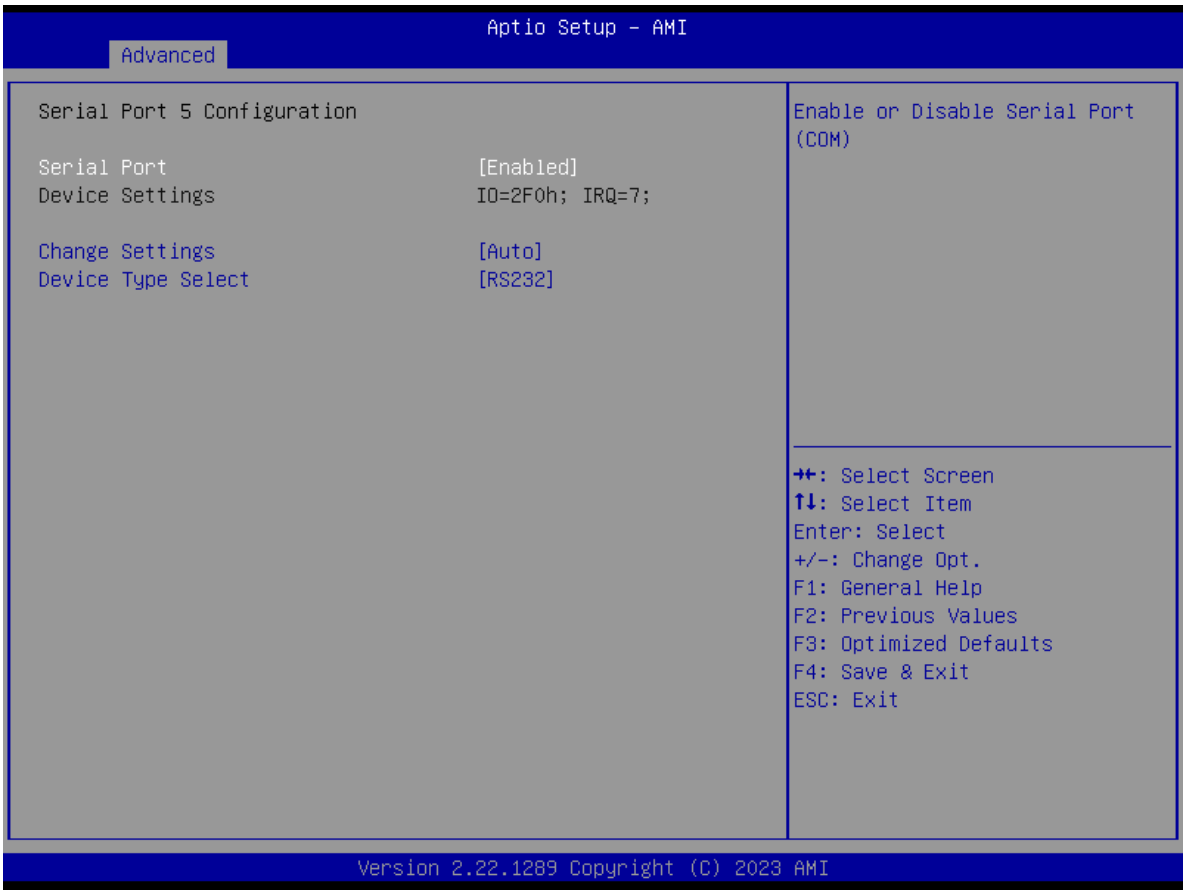

| Item | Options | Description |
|---|---|---|
| **Serial Port** | Disabled,<br>Enabled**[Default]** | Enable or Disable Serial Port (COM). |
| **Change Settings** | Auto**[Default]**,<br>IO=3E8h; IRQ=7; ,<br>IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; ,<br>IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;,<br>IO=2F0h; IRQ=3,4,5,6,7,9,10,11,12;,<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**[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 4 Configuration



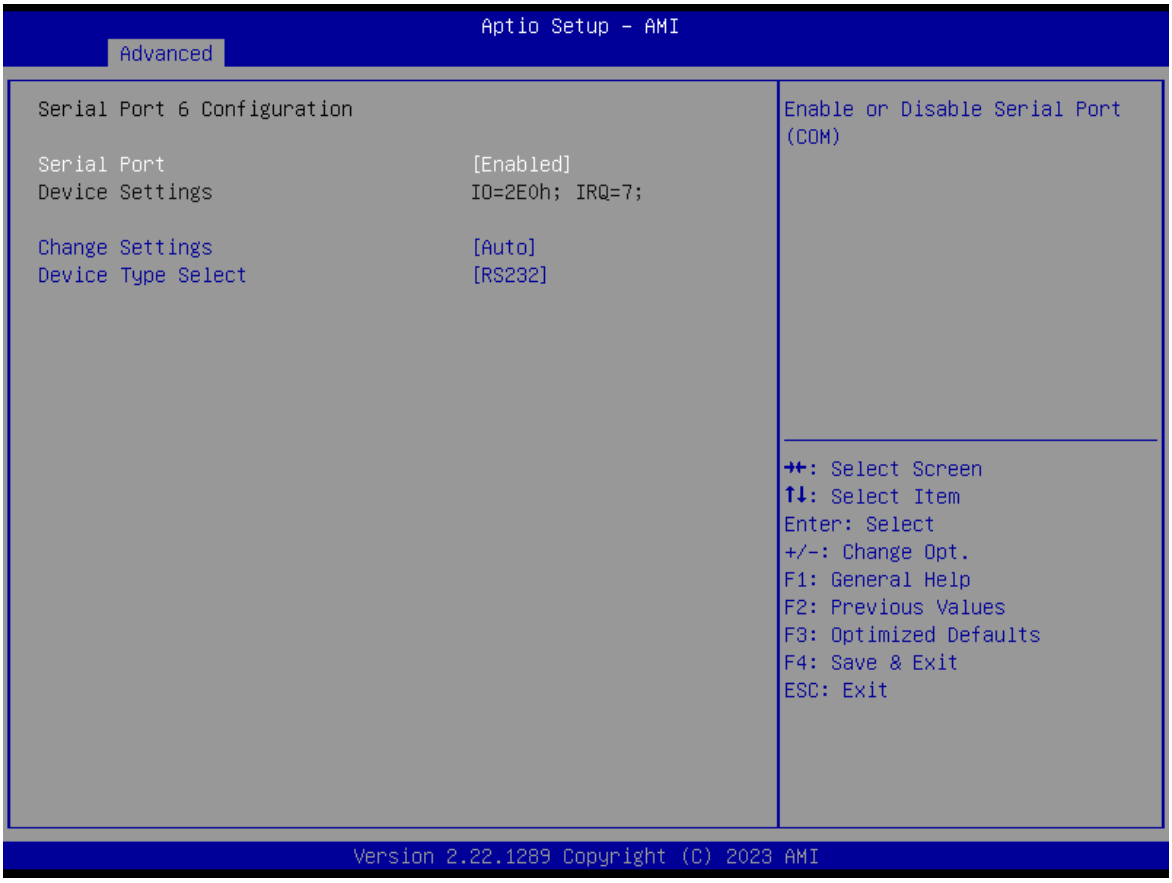

| Item | Options | Description |
|---|---|---|
| **Serial Port** | Disabled,<br>Enabled**[Default]** | Enable or Disable Serial Port (COM). |
| **Change Settings** | Auto**[Default]**,<br>IO=2E8h; IRQ=7; ,<br>IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; ,<br>IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;,<br>IO=2F0h; IRQ=3,4,5,6,7,9,10,11,12;,<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. |
| **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 5 Configuration




| Item | Options | Description |
|---|---|---|
| **Serial Port** | Disabled,<br>Enabled**[Default]** | Enable or Disable Serial Port (COM). |
| **Change Settings** | Auto**[Default]**,<br>IO=2F0h; 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**[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 |

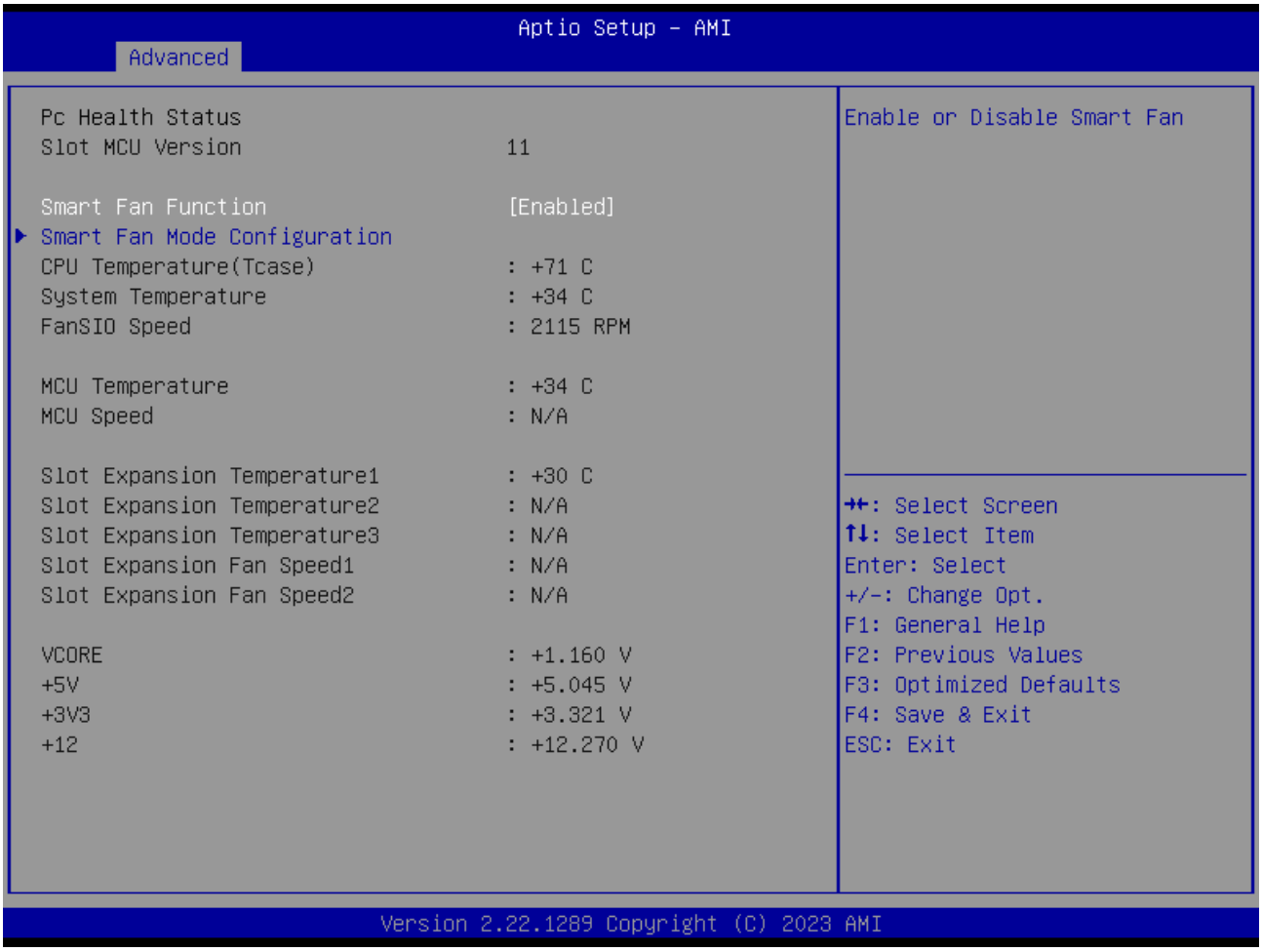
## Serial Port 6 Configuration




| Item | Options | Description |
|---|---|---|
| **Serial Port** | Disabled,<br>Enabled**[Default]** | Enable or Disable Serial Port (COM). |
| **Change Settings** | Auto**[Default]**,<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**[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 |
| **RS-422/RS-485 Terminal Function** | Disabled,<br>Enabled**[Default]** | RS-422/RS-485 Terminal Function |

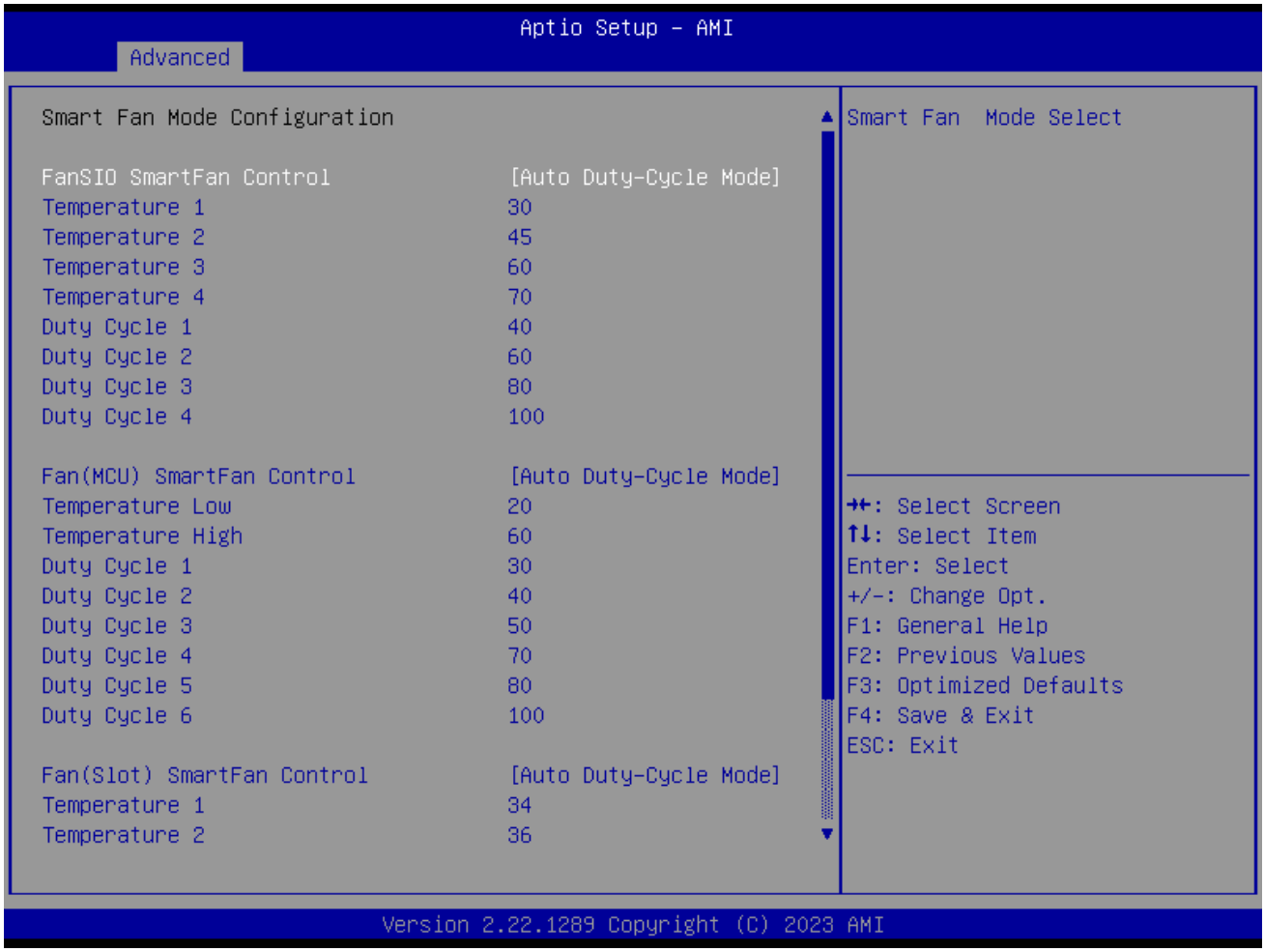
### 4.3.9 Hardware Monitor

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



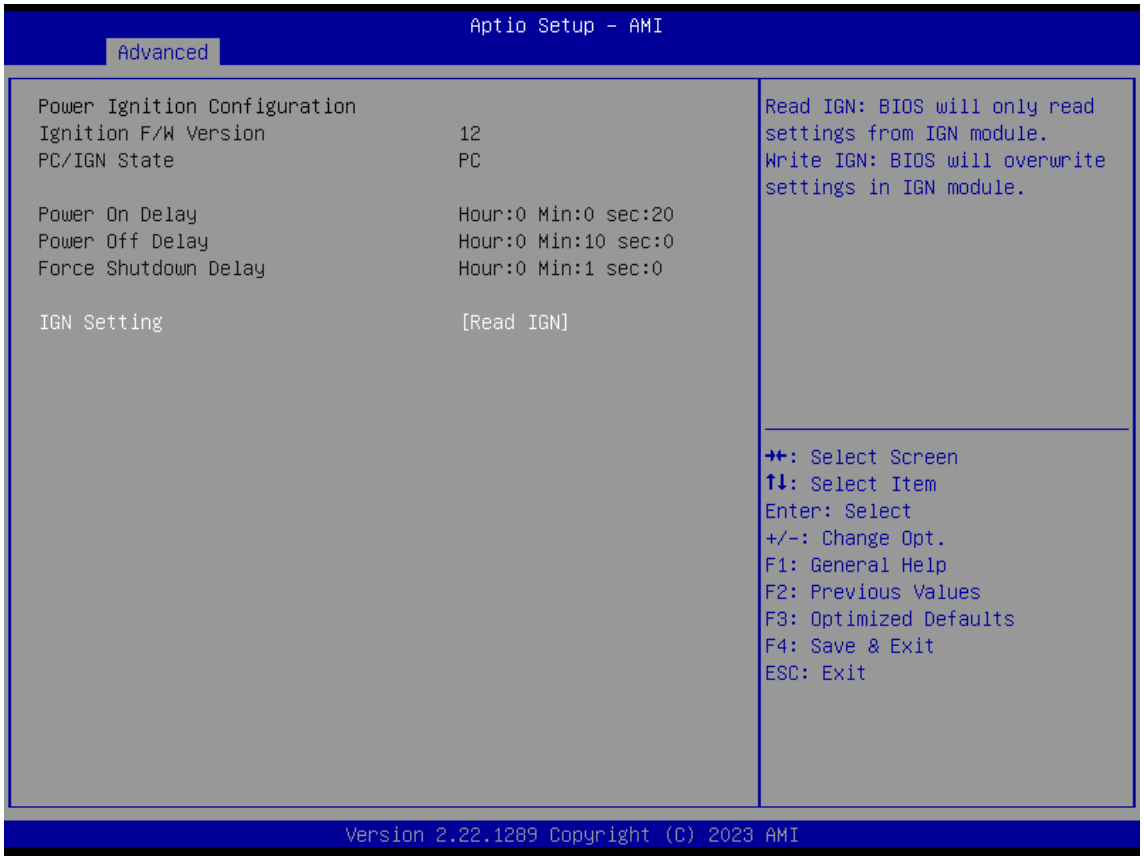

| Item | Options | Description |
|---|---|---|
| **Smart Fan Function** | Disabled**[Default],**<br>Enabled | Enabled or Disable Smart Fan |

## Smart Fan Mode Configuration



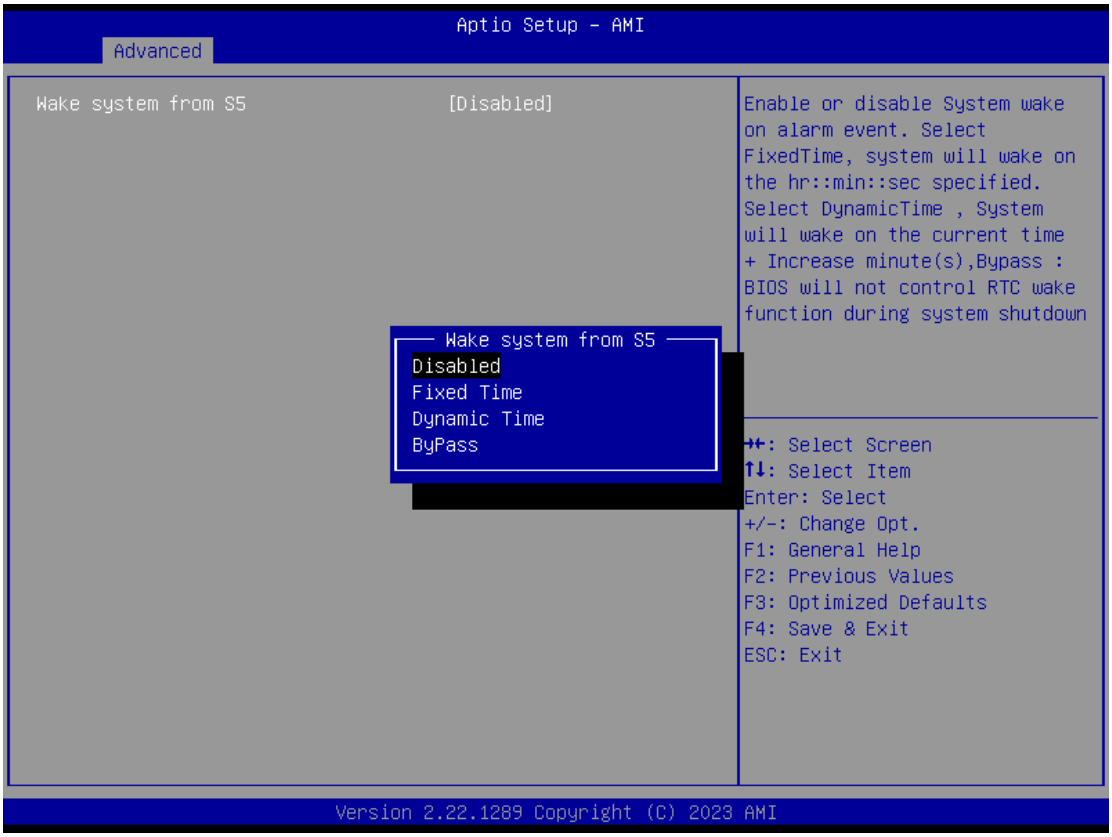

| Item | Options | Description |
|---|---|---|
| **FanSIO SmartFan Control** | Manual Mode,<br>Auto Duty-Cycle Mode**[Default],** | Smart Fan Mode Select |
| **Temperature 1~4** | 1~100 | Auto fan speed control. Temperature 1-100 |
| **Duty Cycle 1~4** | 20~100 | Auto fan speed control. Duty 20-100 |

## 4.3.10. Power IGN Mode



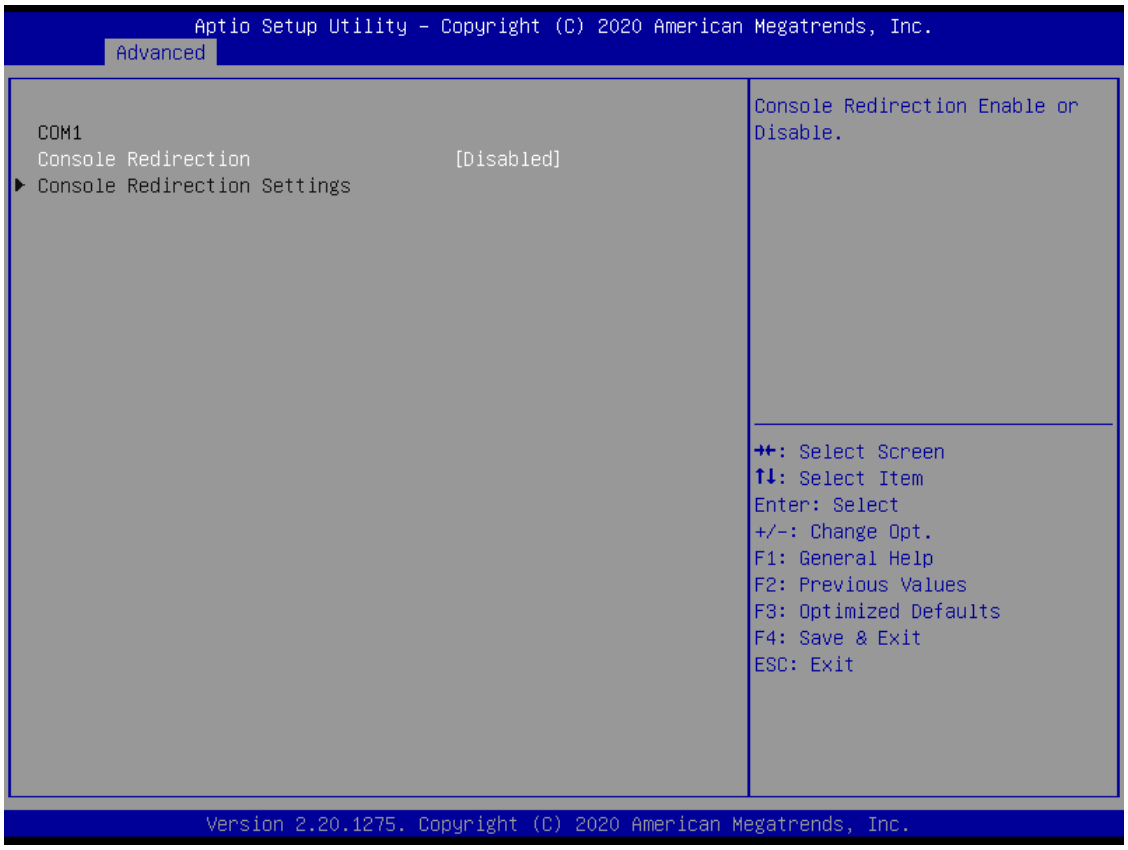

| Item | Options | Description |
|---|---|---|
| **IGN Setting** | Read mode**[Default]**<br>Write IGN | Read IGN: BIOS will only read settings from IGN module. Write IGN: BIOS will overwrite settings in IGN module. |
| **Power On Delay** | 10 Sec**[Default]**<br>20 Sec<br>30 Sec<br>40 Sec<br>50 Sec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

## 4.3.11. Wake system from S5



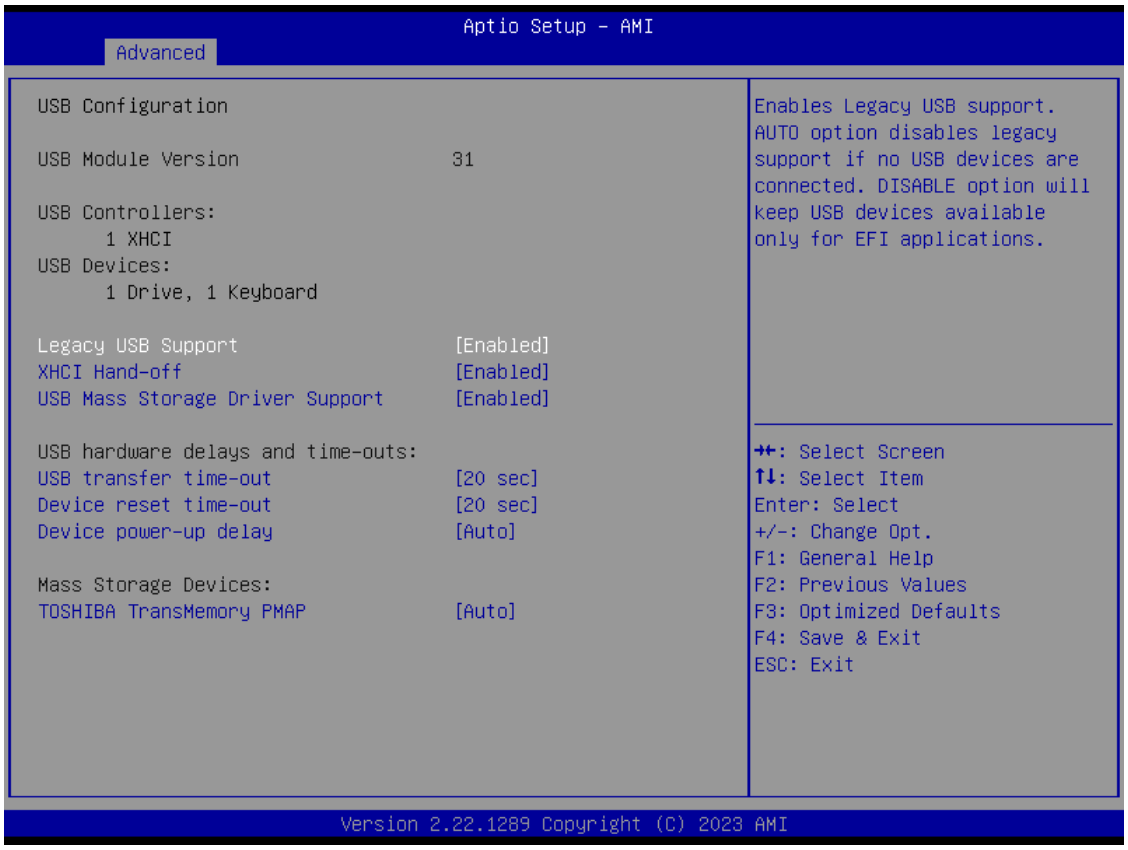

| Item | Options | Description |
|---|---|---|
| **Wake system from S5** | Disabled**[Default] ,**<br>Fixed Time,<br>Dynamic Time,<br>ByPass | Enable or disable System wake on alarm event. Select FixedTime, system will wake on the hr::min::sec specified. Select DynamicTime , System will wake on the current 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 |

## 4.3.12 Serial Port Console Redirection



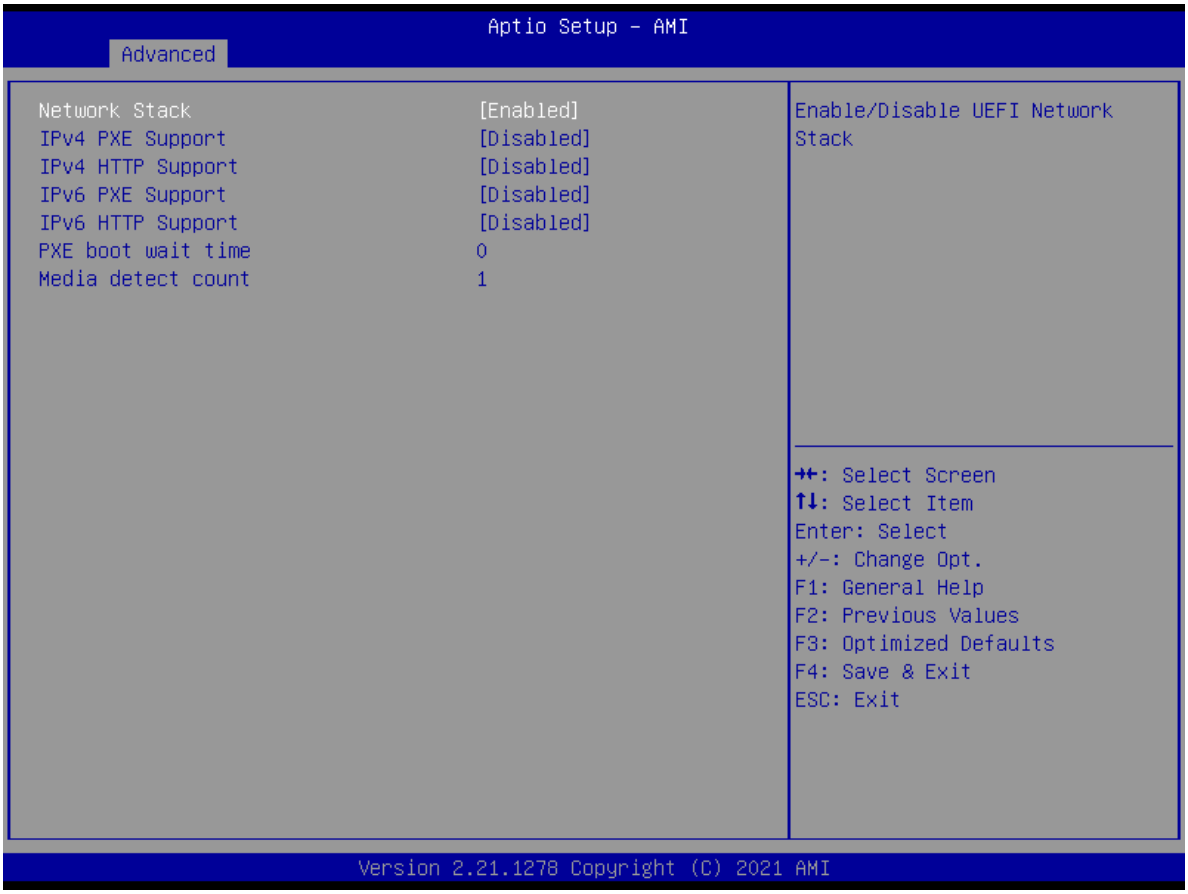

| Item | Options | Description |
|---|---|---|
| **Console Redirection** | Disabled**[Default],**<br>Enabled | These items allows you to enable or disable COM1 console redirection |

## 4.3.13 USB Configuration



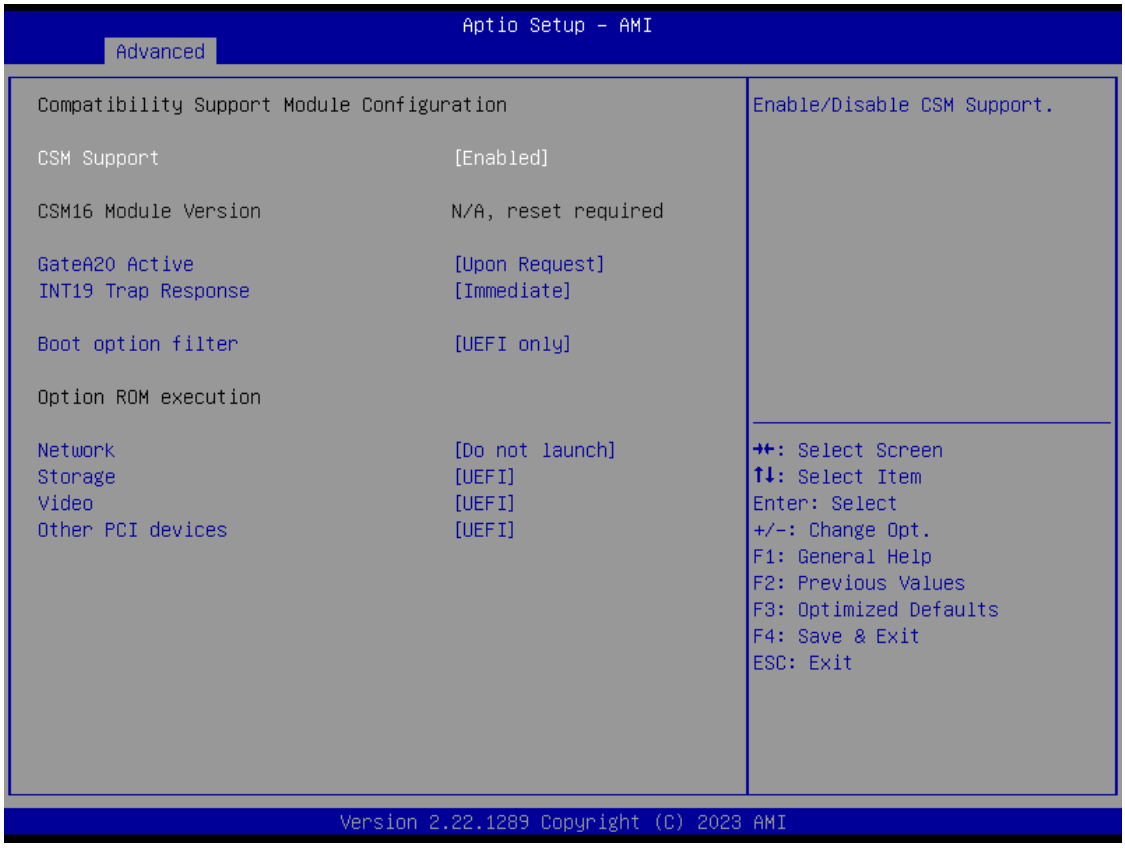

| Item | Options | Description |
|---|---|---|
| **Legacy USB Support** | Enabled**[Default]**<br>Disabled<br>Auto | Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications. |
| **XHCI Hand-off** | 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. |
| **USB Mass Storage Driver Support** | Enabled**[Default]**<br>Disabled | Enable/Disable USB Mass Storage Driver Support. |
| **USB transfer time-out** | 1 sec ,<br>5 sec ,<br>10 sec ,<br>20 sec**[Default]** | The time-out value for Control, Bulk, and Interrupt transfers. |
| **Device reset time-out** | 10 sec ,<br>20 sec**[Default] ,**<br>30 sec,<br>40 sec | USB mass storage device Start Unit command time-out. |
| **Device power-up delay** | 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 form Hub descriptor. |

## 4.3.14 Network Stack Configuration



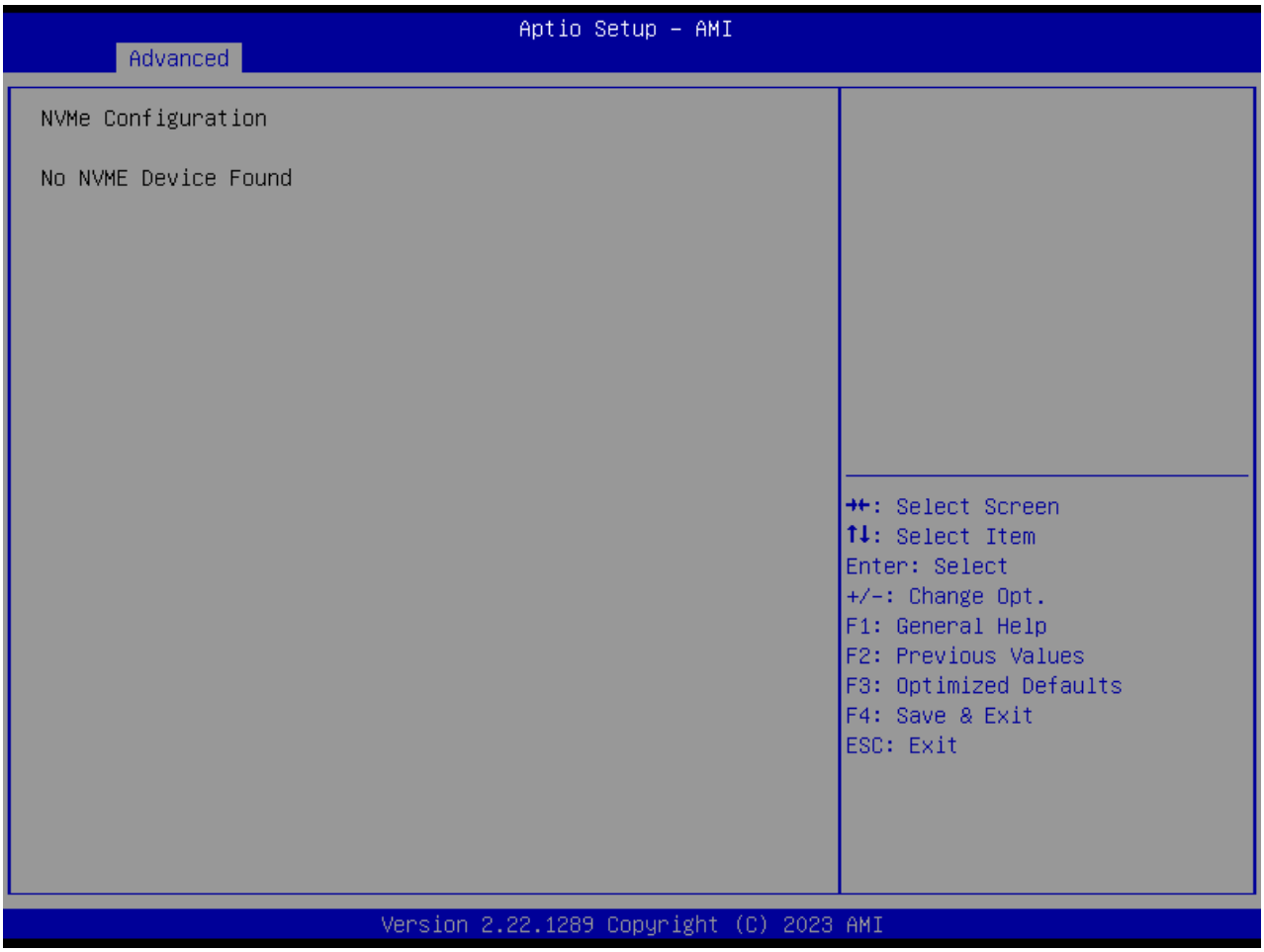

| Item | Options | Description |
|---|---|---|
| **Network Stack** | Disabled**[Default]** ,<br>Enabled | Enable/Disable UEFI Network Stack. |
| **IPv4 PXE Support** | Disabled**[Default]** ,<br>Enabled | Enable/Disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.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

## 4.3.15 CSM Configuration




| Item | Options | Description |
|---|---|---|
| **CSM Support** | Disabled**[Default]** ,<br>Enabled | This item allows users to enable or disable for "CSM Support". |
| **GateA20 Active** | Upon Request**[Default]** ,<br>Always | This item allows users to set Upon Request or Always for "GateA20 Active". |
| **INT19 Trap Response** | Immediate**[Default]** ,<br>Immediate | This item allows users to set the BIOS reaction to INT19 trapping by Option ROM: "Immediate" - execute the trap right away;<br>"postponed" - execute the trap during legacy boot. |
| **Boot option filter** | UEFI and Legacy**,**<br>Legacy only,<br>UEFI only**[Default]** | This item allows users to select which type of operating system to boot by option.<br>This item is configurable only when CSM Support is set to Enabled. |
| **Network PXE** | Do not launch**[Default]** ,<br>UEFI,<br>Legacy | Controls the execution of UEFI and Legacy Video OpROM. |
| **Storage** | Do not launch,<br>UEFI**[Default]** ,<br>Legacy | Controls the execution of UEFI and Legacy Storage OpROM. |
| **Other PCI devices** | Do not launch,<br>UEFI**[Default]** ,<br>Legacy | Determines OpROM execution policy for devices other than Network, Storage, or Video. |

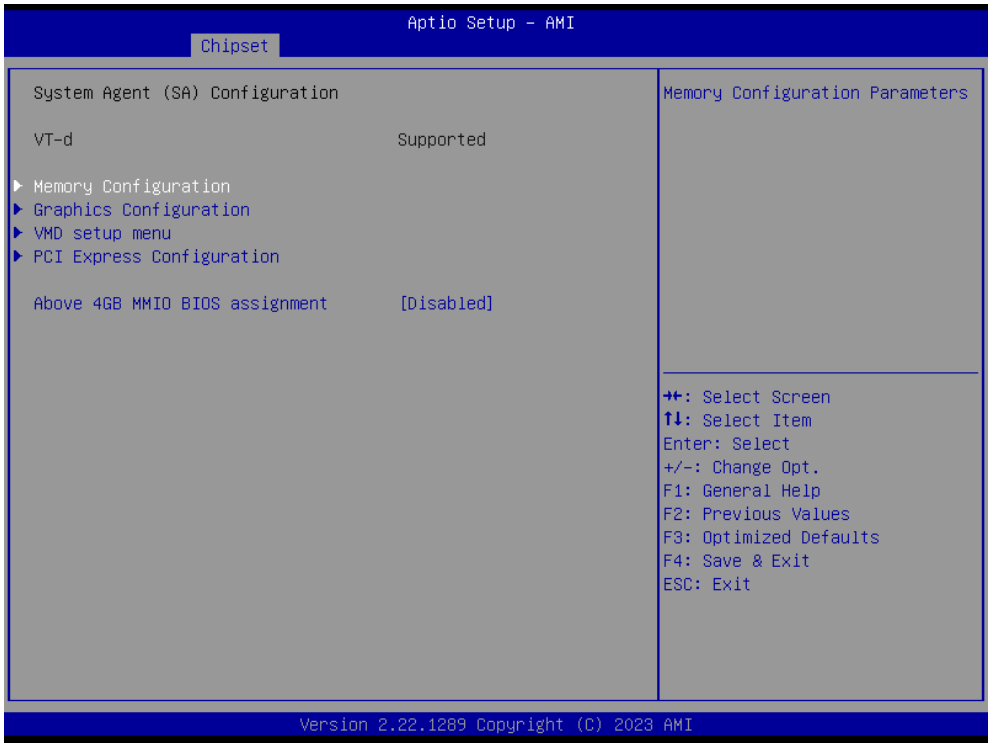
### 4.3.16 NVMe Configuration



# 4.4 Chipset

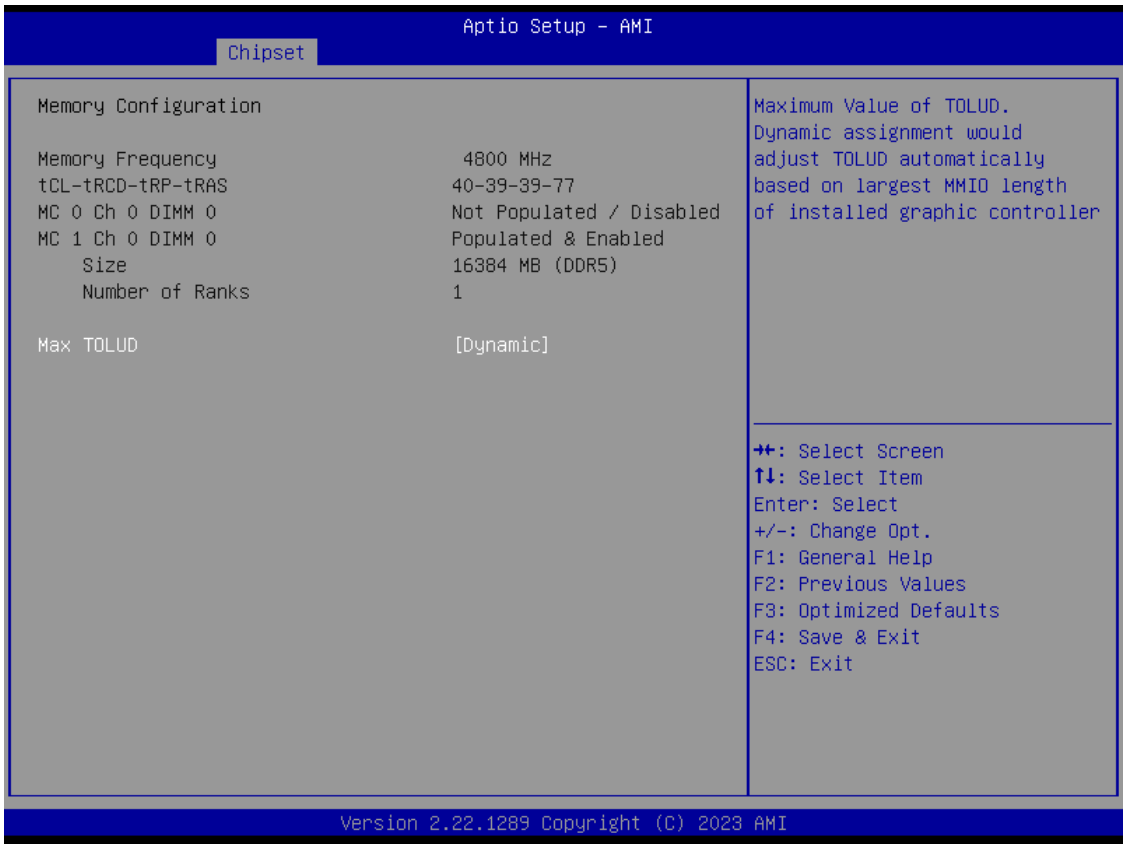
This section allows you to configure and improve your system and allows you to set up some system features according to your preference.


## 4.4.1 System Agent (SA) Configuration



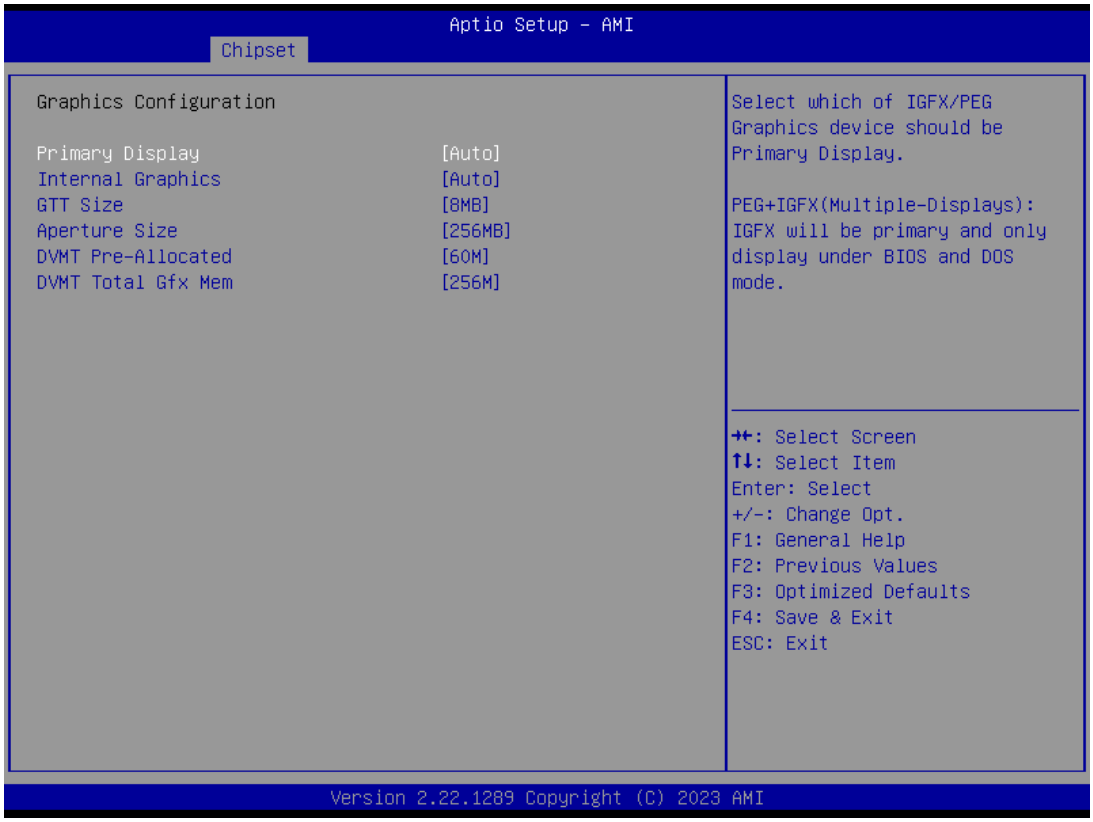

| Item | Options | Description |
|---|---|---|
| **Above 4GB MMIO BIOS assignment** | Enabled,<br>Disabled**[Default]** | Enable/Disable above 4GB MemoryMappedIO BIOS assignment<br>This is enabled automatically when Aperture Size is set to 2048MB. |

## Memory Configuration



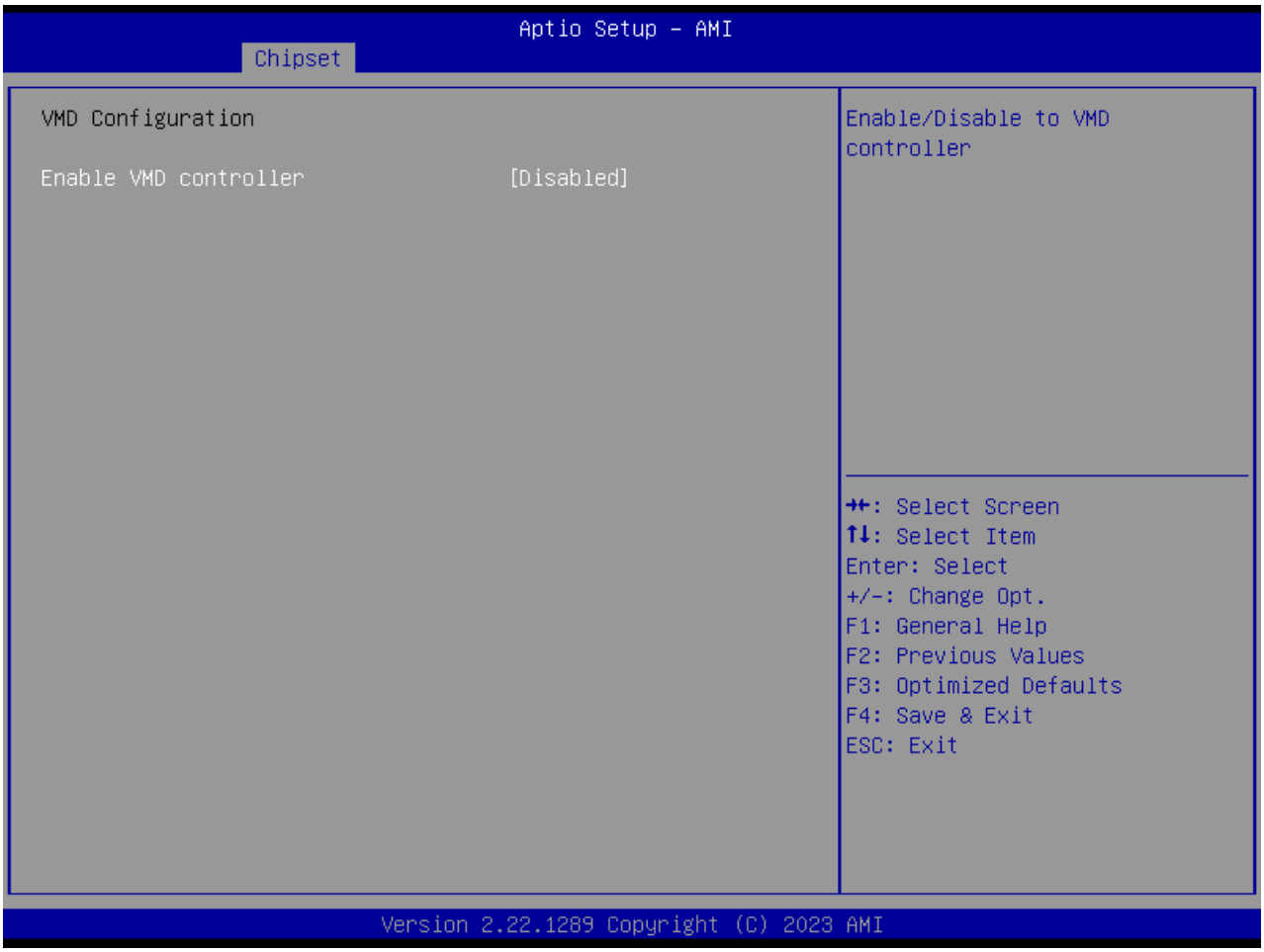

| Item | Options | Description |
|---|---|---|
| **Max TOLUD** | Dynamic**[Default],**<br>1GB,<br>1.25GB,<br>1.5 GB,<br>1.75 GB,<br>2 GB,<br>2.25 GB,<br>2.5 GB,<br>2.75 GB,<br>3 GB,<br>3.25 GB,<br>3.5 GB | Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller |

## Graphic Configuration



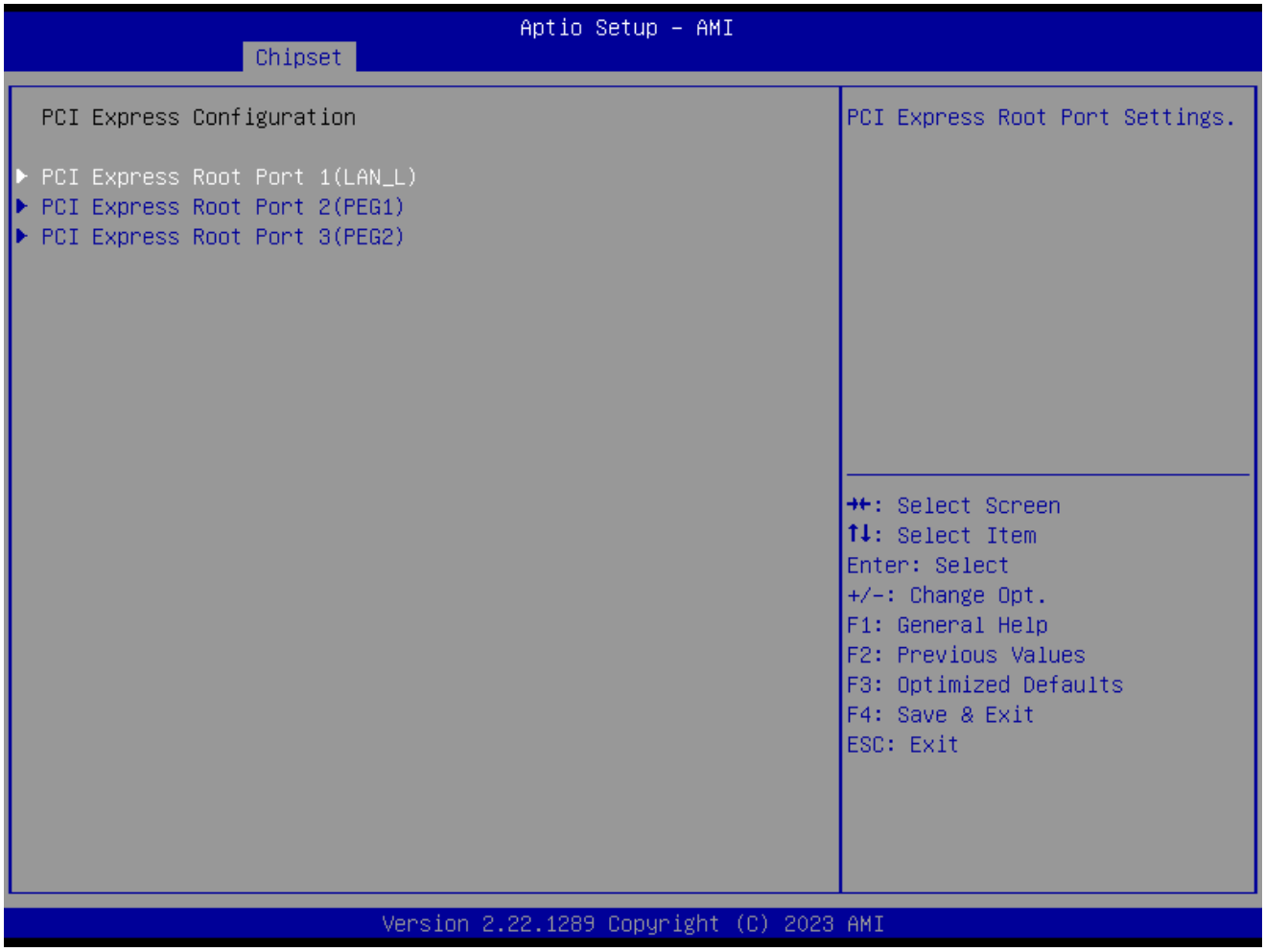

| Item | Options | Description |
|---|---|---|
| **Primary Display** | Auto**[Default] ,**<br>PEG + IGFX | Select which of IGFX/PEG Graphics device should be Primary Display.<br>PEG+IGFX(Multiple-Displays):<br>IGFX will be primary and only display under BIOS and DOS mode. |
| **Internal Graphics** | Auto**[Default] ,**<br>Disabled,<br>Enabled | Keep IGFX enabled based on the setup options. |
| **GTT Size** | 2MB,<br>4MB,<br>8MB**[Default]** | Select the GTT Size . |
| **Aperture Size** | 128MB,<br>256MB**[Default] ,**<br>512MB,<br>1024MB | Select the Aperture Size.<br>Note : Above 4GB MMIO BIOS assignment is automatically enabled when selecting 2048MB aperture. To use this feature, please disable CSM Support. |
| **DVMT Pre-Allocated** | 32M,64M,4M,8M,<br>12M,16M, 20M,<br>24M, 28M,32M/F7,<br>36M, 40M,44M,<br>48M,52M,56M,<br>60M**[Default]** | Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device. |
| **DVMT Total Gfx Mem** | 128M,<br>256M**[Default] ,**<br>MAX | Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device. |

## VMD Configuration

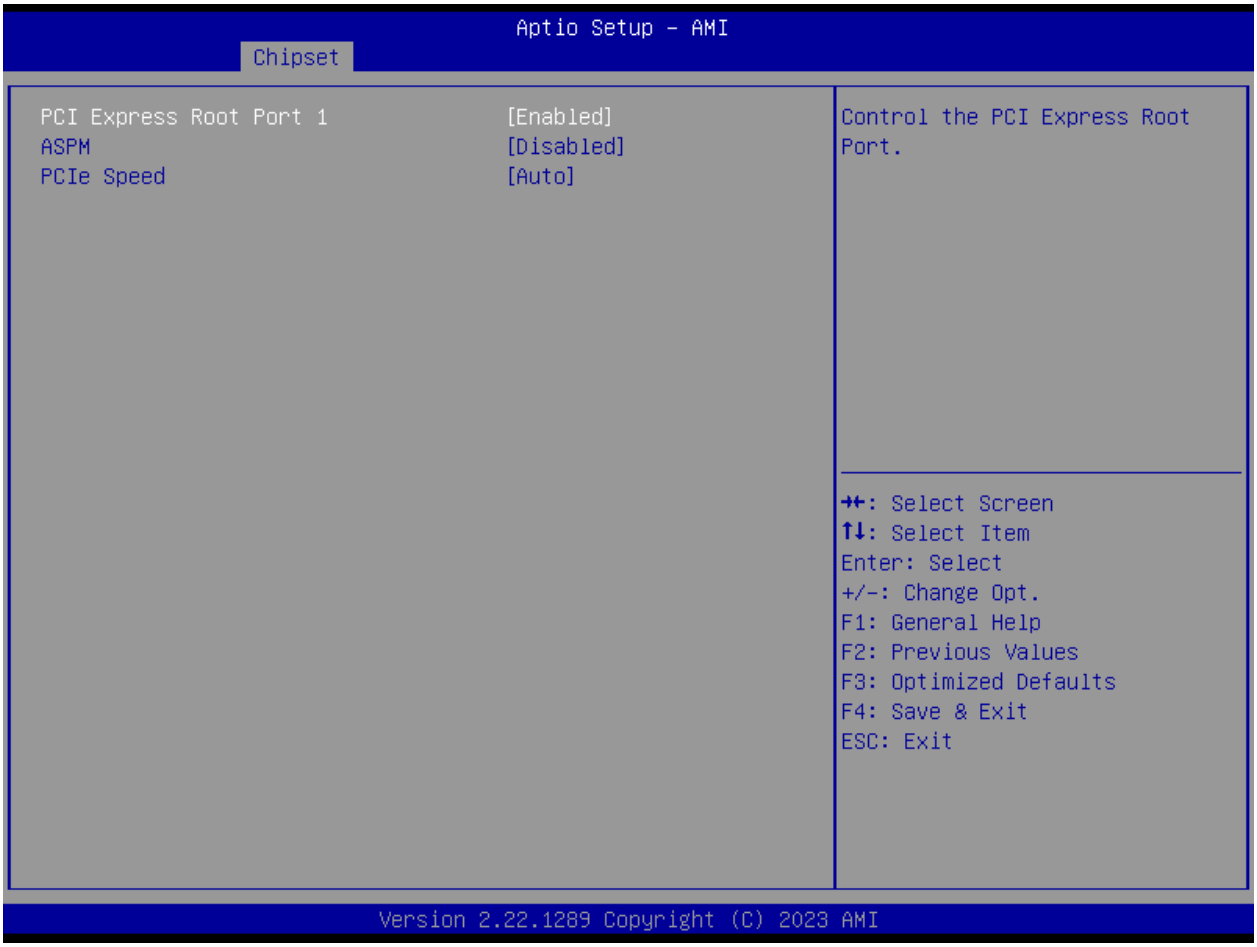



| Item | Options | Description |
|---|---|---|
| **Enable VMD controller** | Enabled**[Default] ,** Disabled | Enable/Disable to VMD controller |

## PCI Express Configuration

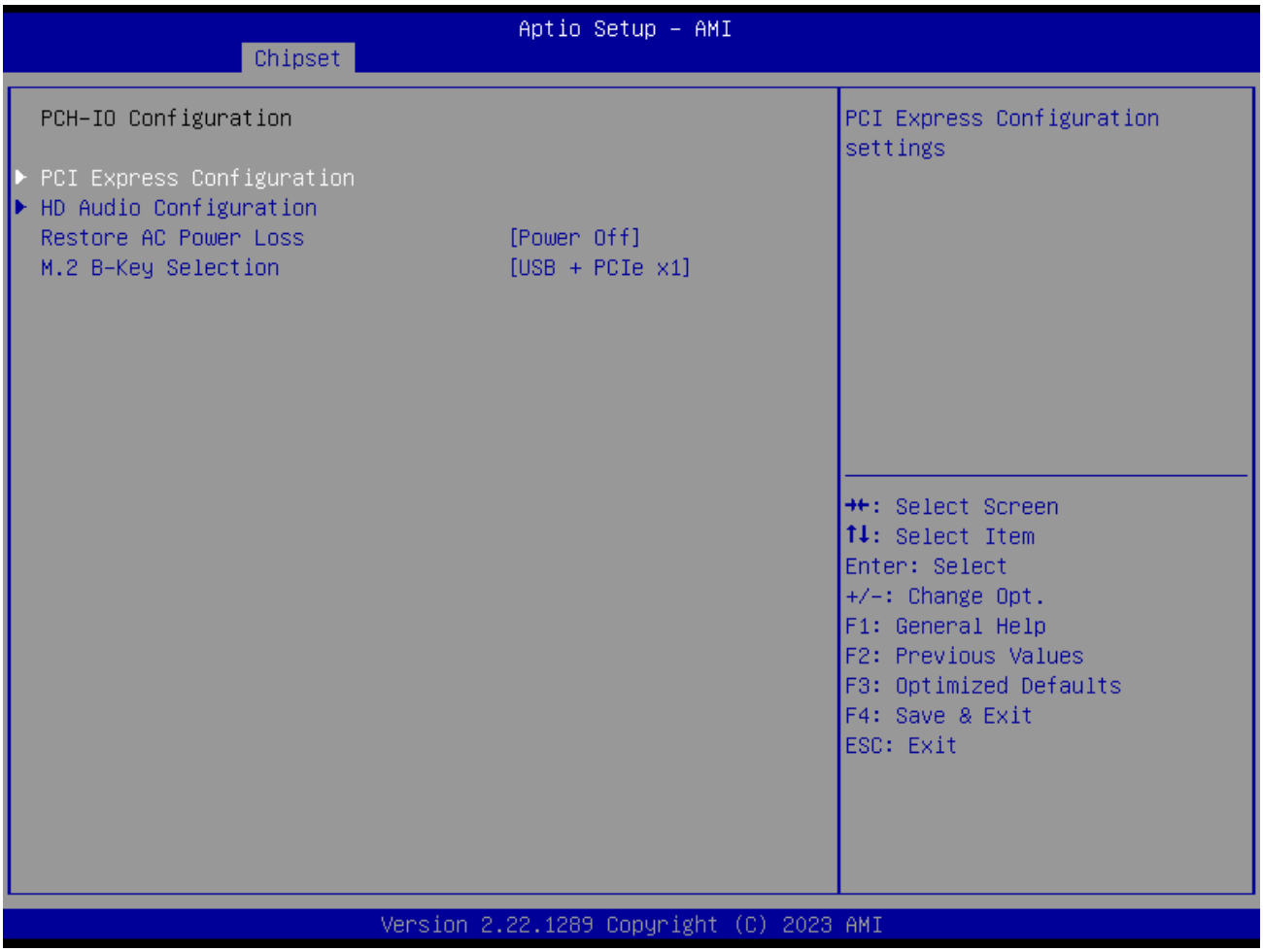


## PCI Express Configuration



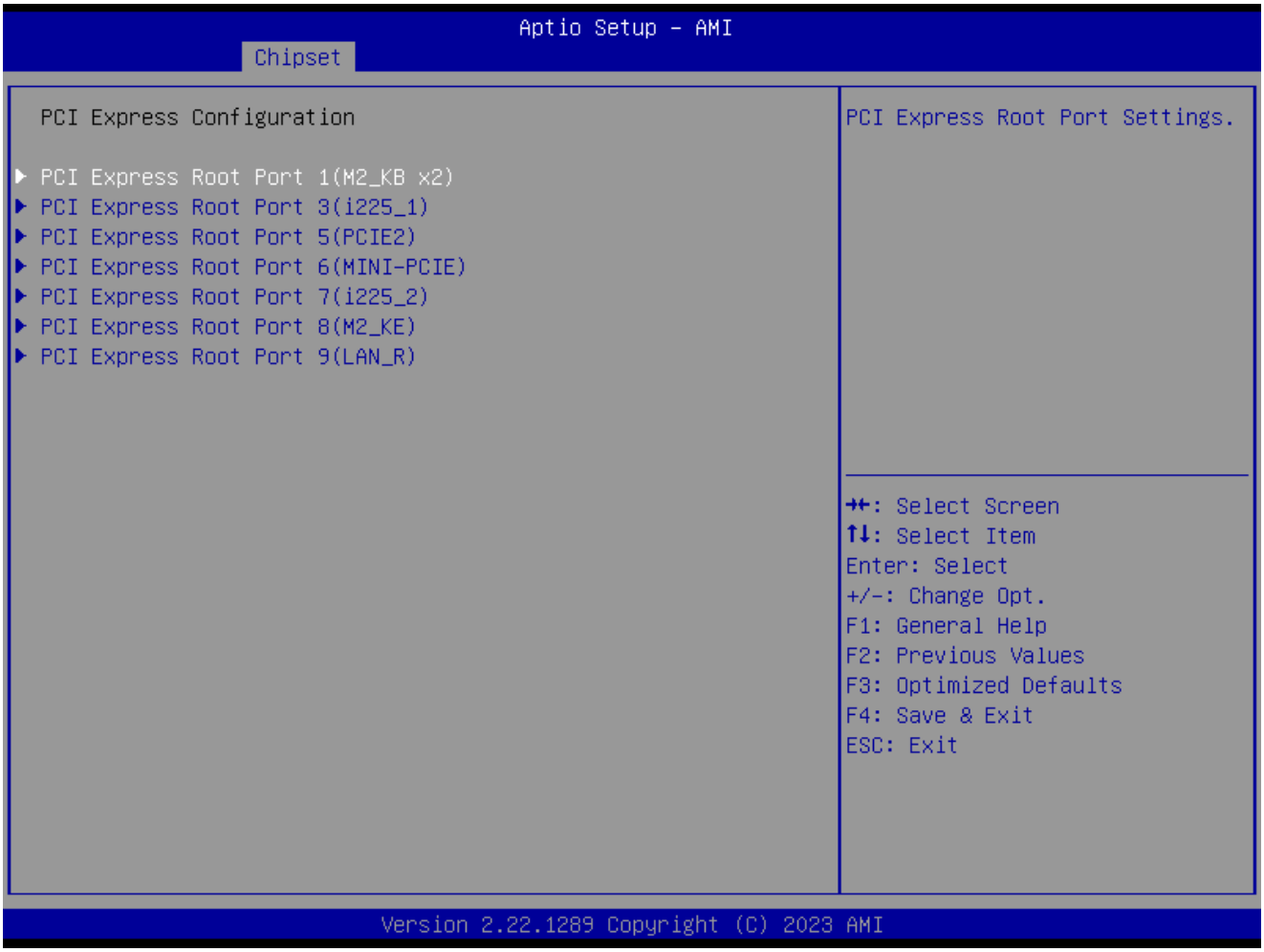

| Item | Options | Description |
|---|---|---|
| **PCI Express Root Port 1~3** | Disabled,<br>Enabled**[Default] ,** | Control the PCI Express Root Port. |
| **ASPM** | Disabled**[Default]** ,<br>L0s,<br>L1,<br>L0sL1 | Set the ASPM Level. |
| **PCIe Speed** | Aut0**[Default]** ,<br>Gen1,<br>Gen2,<br>Gen3,<br>Gen4,<br>Gen5, | Configure PCIe Speed |

### 4.4.2 PCH-IO Configuration

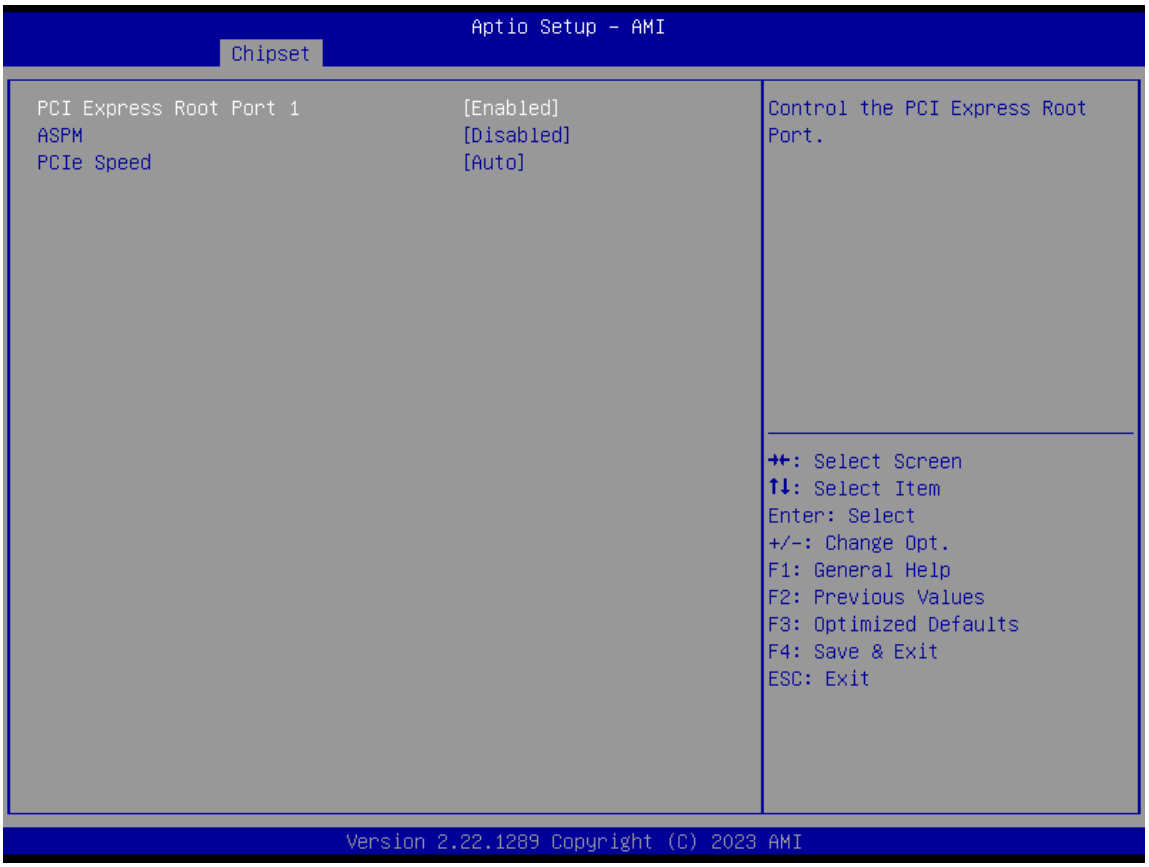



| Item | Options | Description |
|---|---|---|
| **Restore AC Power Loss** | Power On,<br>Power Off **[Default] ,**<br>Lase State | Specify what state to go to when power is re-applied after a power failure (G3 state). |
| **M.2 B-Key Selection** | USB + PCIe x1**[Default],**<br>PCIe x2 | Selects M.2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

## PCI Express Configuration

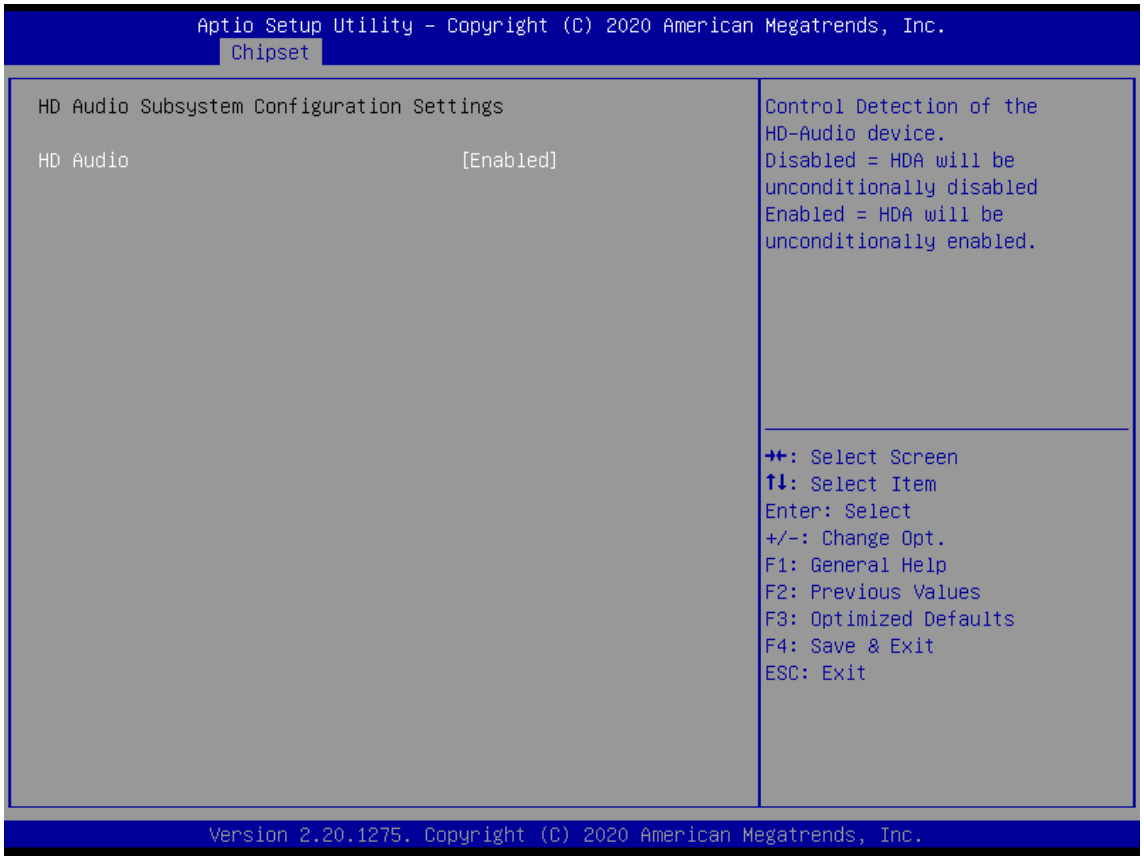


## PCI Express Root Port 1 /3 /5 /6 /7 /8 /9




| Item | Options | Description |
|---|---|---|
| **PCI Express Root Port 1 /3 /5 /6 /7 /8 /9** | Disabled,<br>Enabled **[Default]** | Control the PCI Express Root Port. |
| **ASPM** | Disabled **[Default]** ,<br>L1,<br>Auto | Set the ASPM Level. |
| **PCIe Speed** | Auto**[Default]** ,<br>Gen1,<br>Gen2,<br>Gen3,<br>Gen4 | Configure PCIe speed. |

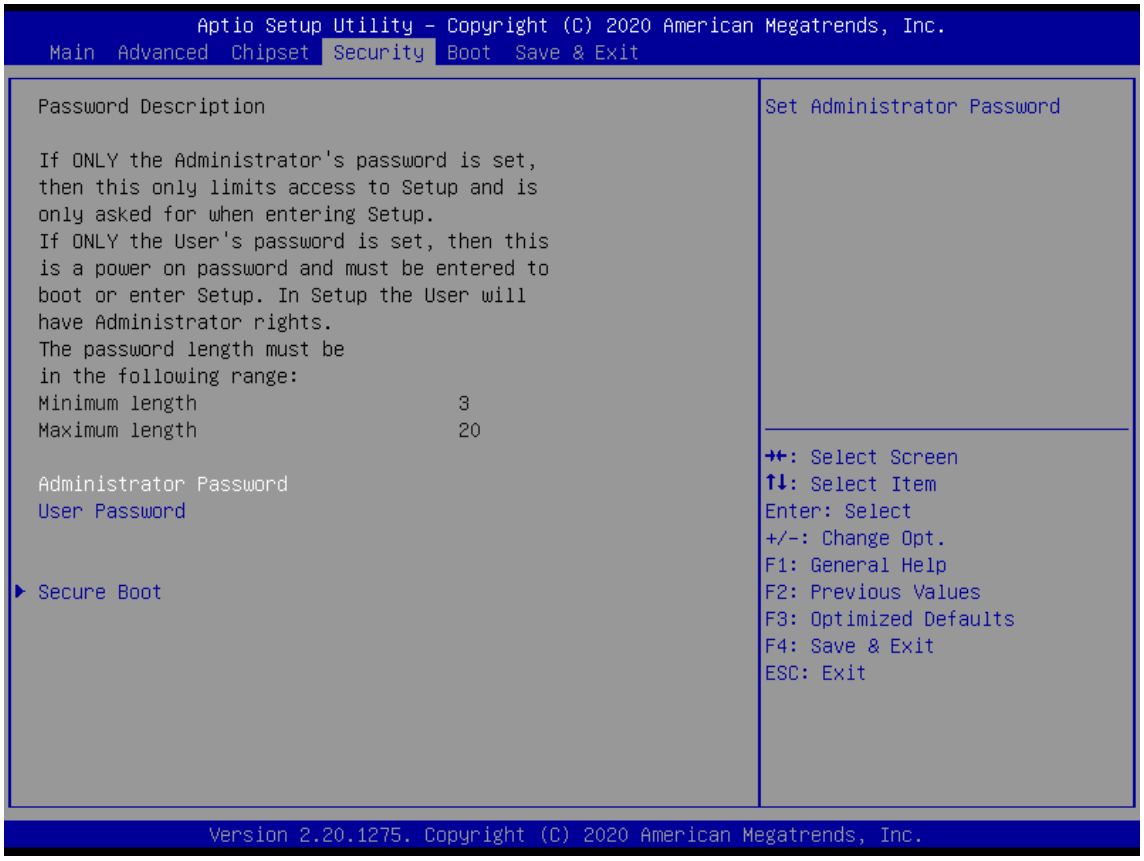
## HD Audio Configuration




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

# 4.5 Security

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



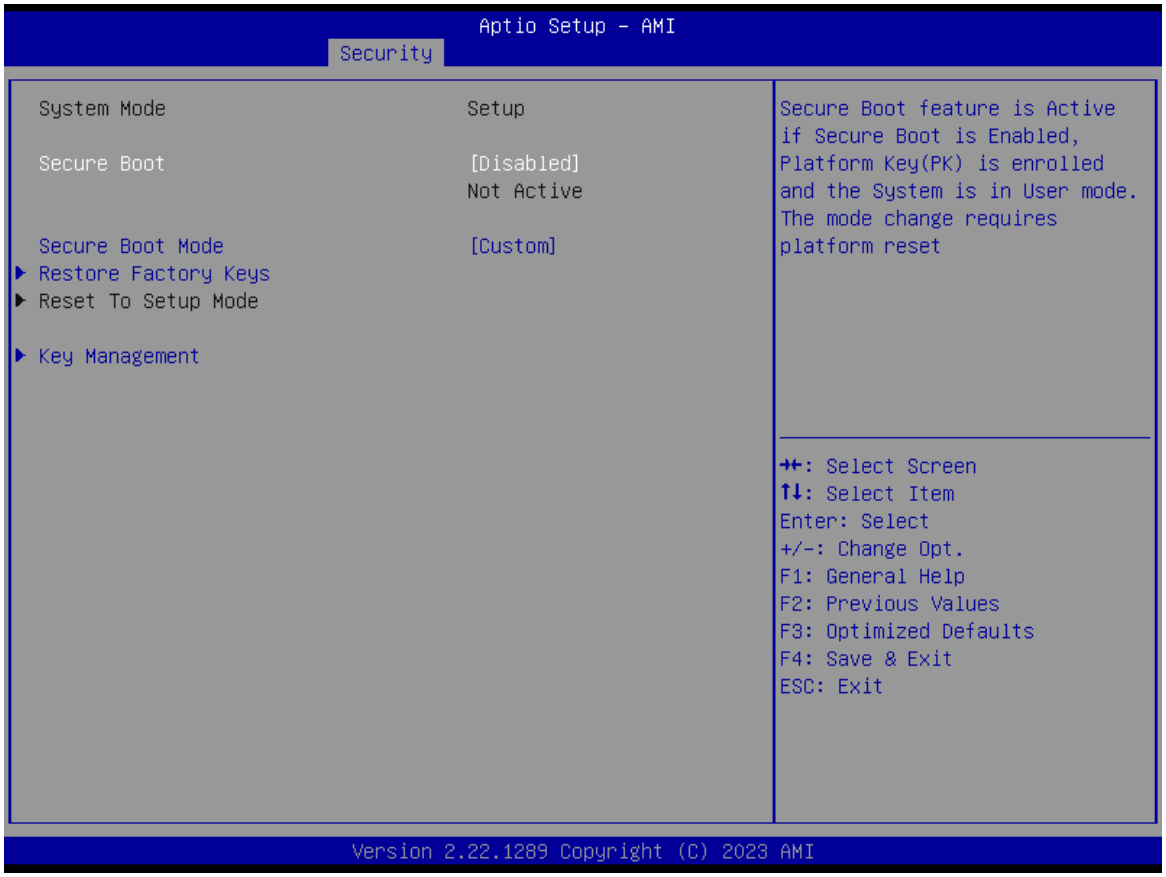

### ■ Administrator Password

This item allows you to set Administrator Password.

### ■ User Password

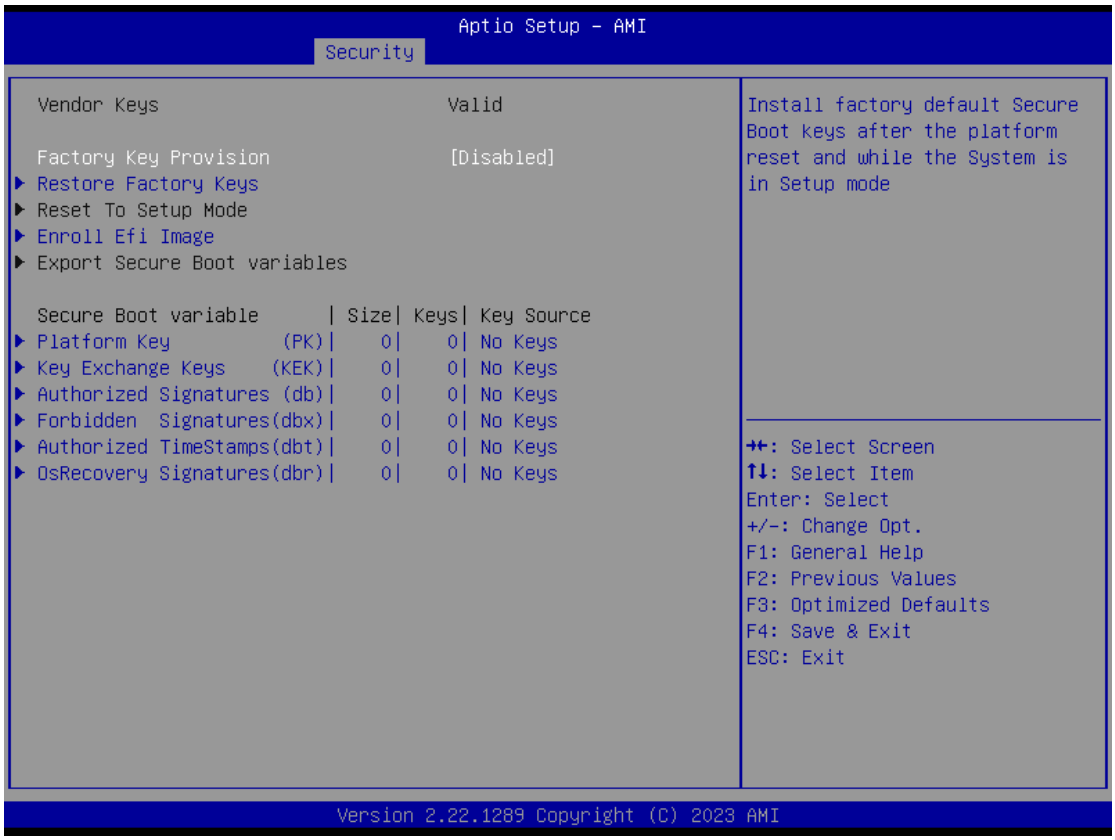
This item allows you to set User Password.

## Security Boot




| Item | Options | Description |
|---|---|---|
| Secure Boot | Disabled **[Default]** ,<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>The mode change requires platform reset |
| Secure Boot Mode | Standard,<br>Custom**[Default]** | Secure Boot mode options:Standard or Custom.<br>In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication |

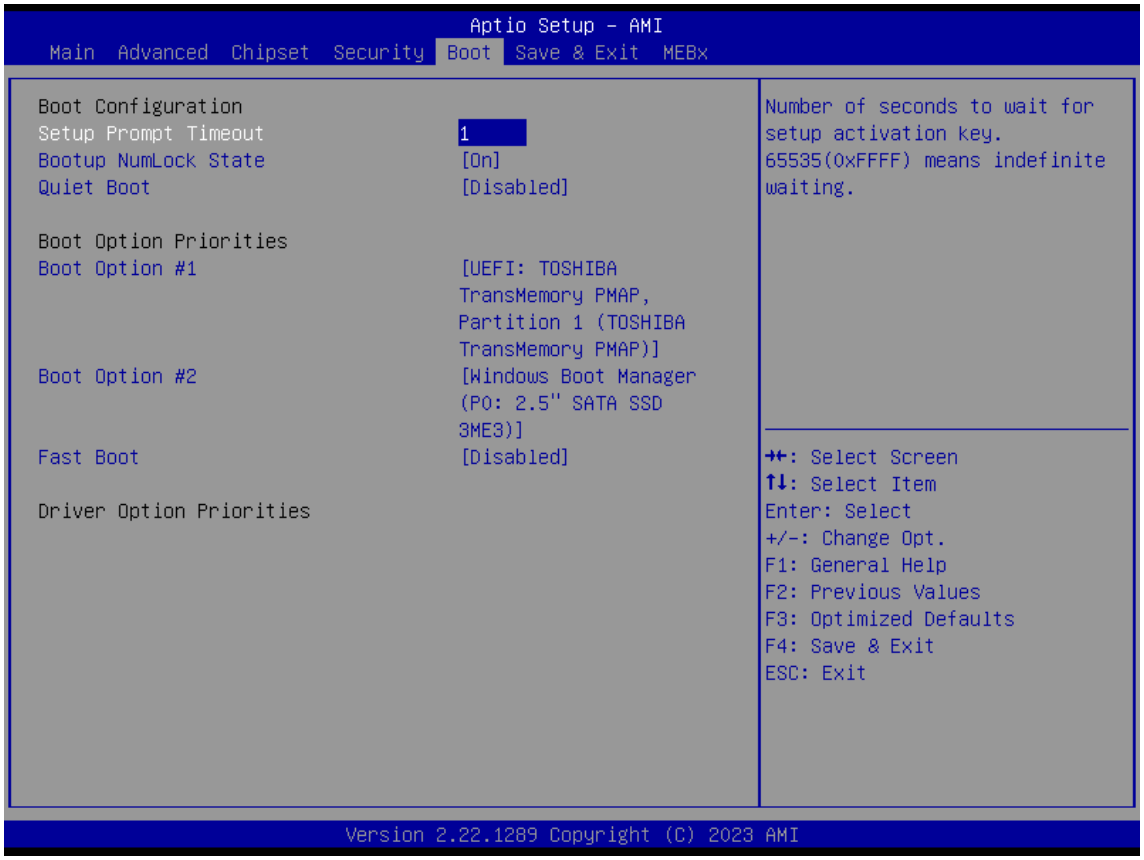
## Key Management




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

## 4.6 Boot

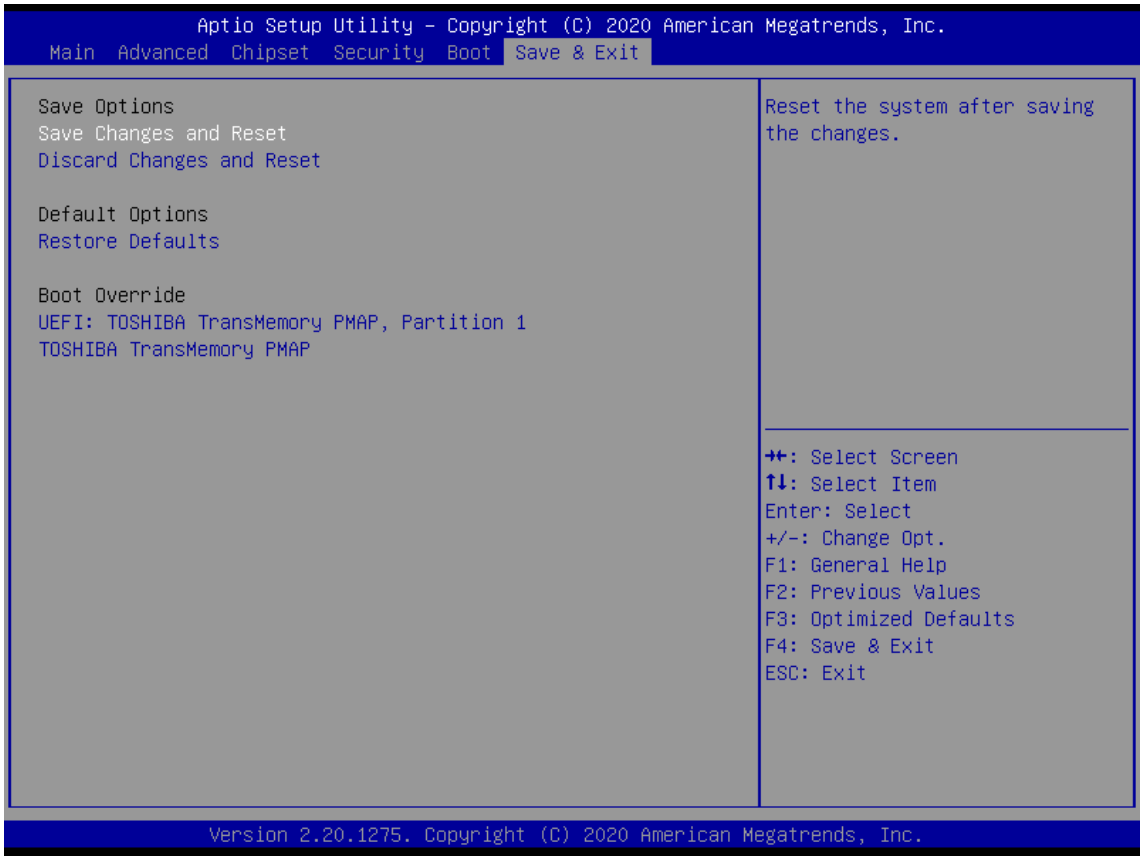
This menu allows you to setup the system boot options.




| Item | Options | Description |
|---|---|---|
| **Setup Prompt Timeout** | 1**[Default]** | Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting. |
| **Bootup NumLock State** | On**[Default]** ,<br>Off | Select the Keyboard NumLock state. |
| **Quiet Boot** | Disabled**[Default]** ,<br>Enabled | Enables or disables Quiet Boot option. |
| **Fast Boot** | 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

The WDT function is provided by Fintek F81966 , and it can be accessed through IO Address. The configuration on the VCO-6000 –RPL is described as below.

### Psuedo Code

```
// IO Address 0xA16 is time value(second)
// IO Address 0xA15 is WDT enable and configuration
Example, Set 0xA16=-0x03, 0xA15=0x31, it will reset after 3 seconds

#define TimePort          0xA16
#define TimeEnablePort  0xA15

WriteByte (TimePort,0x03)
WriteByte (TimeEnablePort,0x31)
```

**GPIO Sample Code**

GPIO Setting

| PIN# | GPIO# | Default Configuration |
|---|---|---|
| 18 | XCOM- | |
| 17 | XCOM+ | |
| 16 | OUT8 | DIO Output8 |
| 15 | IN8 | DIO Input8 |
| 14 | OUT7 | DIO Output7 |
| 13 | IN7 | DIO Input7 |
| 12 | OUT6 | DIO Output6 |
| 11 | IN6 | DIO Input6 |
| 10 | OUT5 | DIO Output5 |
| 9 | IN5 | DIO Input5 |
| 8 | OUT4 | DIO Output4 |
| 7 | IN4 | DIO Input4 |
| 6 | OUT3 | DIO Output3 |
| 5 | IN3 | DIO Input3 |
| 4 | OUT2 | DIO Output2 |
| 3 | IN2 | DIO Input2 |
| 2 | OUT1 | DIO Output1 |
| 1 | IN1 | DIO Input1 |

The GPIO function is provided by Nuvoton M058SSAN , and it can be accessed through Smbus/I2C port. The configuration on the VCO-6000 –RPL is described as below.

**Psuedo Code**

```
#define GPI_ADDR    0x02          // Define Input port Address
#define GPO_ADDR  0x01            // Define Output port Address
#define Slave_ADDR  0x80          //Slave Address = 0x80( 7-bit address)
```

//Set OUT1~OUT8 Value

| Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|---|---|---|---|---|---|---|---|
| OUT8 | OUT7 | OUT6 | OUT5 | OUT4 | OUT3 | OUT2 | OUT1 |

```
//Set GPO to 0x55
//set IO_DO1,IO_DO3,IO_DO5,IO_DO7 to high; Set IO_DO2,IO_DO4,IO_DO6,IO_DO8 to Low
 SmbusWrite (Slave_ADDR, GPO_ADDR, 0x55);
```

// Read In1~In8 value

| Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|---|---|---|---|---|---|---|---|
| IN8 | IN7 | IN6 | IN5 | IN4 | IN3 | IN2 | IN1 |

```
Data= SmbusReads (Slave_ADDR, GPI_ADDR); //Read In1~In8 value
```