# SI-663-N

## 12th Gen Intel® Core™ Processor Fanless Signage Player with HDMI / DP / DVI-D

# User's Manual

Version 1.0a
(July 2024)

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## Copyright

## Disclaimer

## Trademarks

# Compliance

$C\epsilon$

In a domestic environment, this product may cause radio interference in which case users may be required to take adequate measures.

FC

This product has been tested and found to comply with the limits for a Class B device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to radio communications.

## WEEE

This product must not be disposed of as normal household waste, in accordance with the EU directive for waste electrical and electronic equipment (WEEE - 2012/19/EU). Instead, it should be disposed of by returning it to a municipal recycling collection point. Check local regulations for disposal of electronic products.

## Green IBASE

This product complies with RoHS 2 restrictions, which prohibit the use of certain hazardous substances in electrical and electronic equipment. The following substances must not exceed the specified concentrations:
• Hexavalent chromium: 1,000 ppm
• Poly-brominated biphenyls (PBBs): 1,000 ppm
• Poly-brominated diphenyl ethers (PBDEs): 1,000 ppm
• Cadmium: 100 ppm
• Mercury: 1,000 ppm
• Lead: 1,000 ppm
• Bis(2-ethylhexyl) phthalate (DEHP): 1,000 ppm
• Butyl benzyl phthalate (BBP): 1,000 ppm
• Dibutyl phthalate (DBP): 1,000 ppm
• Diisobutyl phthalate (DIBP): 1,000 ppm

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## Important Safety Information

Carefully read the precautions before using the device.

### Environmental conditions:

- Lay the device horizontally on a stable and solid surface in case the device may fall, causing serious damage.
- Leave plenty of space around the device and do not block the openings for ventilation. NEVER DROP OR INSERT ANY OBJECTS OF ANY KIND INTO THE VENTILATION OPENINGS.
- Use this product in environments with ambient temperatures between 0˚C and 45˚C.
- DO NOT LEAVE THIS DEVICE IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY FALL BELOW -20° C OR RISE ABOVE 80° C. This could damage the device. The device must be used in a controlled environment.

### Care for your IBASE products:

- Before cleaning the device, turn it off and unplug all cables such as power in case a small amount of electrical current may still flow.
- Use neutral cleaning agents or diluted alcohol to clean the device chassis with a cloth. Then wipe the chassis with a dry cloth.
- Vacuum the dust with a computer vacuum cleaner to prevent the air vent or slots from being clogged.

**WARNING**

### Attention during use:

- Do not place heavy objects on the top of the device.
- Operate this device using the type of power indicated on the marking label. If you are not sure of the type of power available, consult your distributor or local power company.
- Do not walk on the power cord or allow anything to rest on it.
- If you use an extension cord, make sure that the total ampere rating of the products plugged into the extension cord does not exceed the cord's limits.

### Avoid Disassembly

Do not disassemble, repair or make any modification to the device. Doing so could generate hazards and cause damage to the device, even bodily injury or property damage, and will void any warranty.

⚠️ **CAUTION**

There is danger of explosion if internal lithium-ion battery is replaced by an incorrect type. Only replace with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

## Warranty Policy

- **IBASE standard products:**

  24-month (2-year) warranty from the date of shipment. If the date of shipment cannot be ascertained, the product serial numbers can be used to determine the approximate shipping date.

- **3ʳᵈ-party parts:**

  12-month (1-year) warranty from delivery for the 3ʳᵈ-party parts that are not manufactured by IBASE, such as CPU, CPU cooler, memory, storage devices, power adapter, panel and touchscreen.

✱ PRODUCTS, HOWEVER, THAT FAIL DUE TO MISUSE, ACCIDENT, IMPROPER INSTALLATION OR UNAUTHORIZED REPAIR SHALL BE TREATED AS OUT OF WARRANTY AND CUSTOMERS SHALL BE BILLED FOR REPAIR AND SHIPPING CHARGES.

## Technical Support & Services

1. Visit the IBASE website at [www.ibase.com.tw](www.ibase.com.tw) to find the latest information about the product.
2. If you need any further assistance from your distributor or sales representative, prepare the following information about your product and elaborate upon the problem.

   - Product model name
   - Product serial number
   - Detailed description of the problem
   - The error messages in text or in screenshots if there is any
   - The arrangement of the peripherals
   - Software in use (such as OS and application software, including the version numbers)

3. If repair service is required, visit the eRMA page in the IBASE's website and follow the instructions to obtain RMA authorization or contact your distributor / sales representative for assistance.

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# Table of Contents

# Chapter 1
# General Information

The information provided in this chapter includes:

- Features
- Packing List
- Accessories
- Specifications
- Product View
- Dimensions

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## 1.1   Introduction

Introducing the SI-663-N, a cutting-edge 12th Gen Intel® Core™ Processor Fanless Signage Player from IBASE. Equipped with Intel® SoC Integrated Graphics, this powerhouse boasts unrivaled performance for dynamic signage applications. Featuring iSMART intelligent energy-saving technology, it facilitates seamless power on/off scheduling and power resume functions, ensuring optimal energy efficiency. Supporting 12th Gen Intel® Core™ processors, it delivers fast processing power for demanding tasks. With versatile connectivity options including 1x HDMI 2.0, 1x DP++ 1.4, and 1x DVI-D, alongside 2x DDR5-4800 SO-DIMM slots for a maximum of 64GB RAM, this signage player offers unparalleled versatility. Additionally, it comes equipped with Intel FTPM, and a watchdog timer for enhanced security and reliability. Designed with industrial-grade robustness and a compact, fanless form factor, the SI-663-N ensures seamless operation in diverse environments, making it the ultimate solution for signage applications requiring reliability, performance, and flexibility.

## 1.2   Features

- iSMART intelligent energy-saving technology - enables power on/off scheduling and power resume functions
- Supports 12th Gen Intel® Core™ processors
- 1x HDMI 2.0 / 1x DP++ 1.4 / 1x DVI-D
- 2x DDR5-4800 SO-DIMM, dual channel, Max. 64GB
- 1x M.2 B-Key (3052) for 5G connectivity
- 1x M.2 E-Key (2230) for WiFi, Bluetooth or capture card options
- Intel FTPM and watchdog timer
- Industrial-grade robust, fanless and compact design

## 1.3 Packing List

Your product package should include the items listed below. If any of the items below is missing, contact the distributor or the dealer from whom you purchased the product.

- SI-663-N Digital Signage Player
- Power Adapter
- Power Cord

## 1.4 Specifications

| Product | SI-663-N |
|---|---|
| **System** ||
| **Mainboard** | MBD663 |
| **CPU** | 12th Gen Intel® CoreTM i / CeleronTM series (Raptor Lake PS / Alder Lake PS) processor TDP<=15W |
| **CPU Socket** | LGA1700 |
| **Chipset** | Integrated |
| **Memory** | 2x DDR5 4800 SODIMM / Max. = 64GB (ECC not supported) |
| **Graphics** | Intel UHD Graphics, up to 96EU |
| **LAN Controller** | 1x Gigabit LAN (Isolation/PXE support) (Intel® 226LM 2.5Gb with LAN Wakeup) |
| **Expansion Slots** | 1x M.2 E-Key (2230) (WiFi-6E support) (2x PCI-E x1, USB 2.0)<br>1x M.2 B-Key (3052) (PCI-E x1; USB 2.0, USB 3.x) (supports Sierra LTE module)<br>1x UIM / SIM card slot<br>1x M.2 M-Key (2280) (PCIE4.0 X4)<br>1x M.2 NVMe (PCI-E 4.0 x4 / SATA) |
| **I/O Interface** | 1x HDMI 2.0 / 1x DP++ 1.4 /<br>1x DVI-D 3x USB 3.2 (USB Type-A)<br>1x USB 2.0 (USB Type-A)<br>1x RJ45 for Gigabit LAN<br>1x DB9 for RS232 serial port<br>2x Audio connectors for Line in/Line out<br>1x Power button<br>1x Power switch connector 1x Power jack (+12V DC)<br>2x LED for power & storage |
| **Storage** | 1x M.2 M-key (2280) |

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| | |
|---|---|
| **Watchdog** | Watchdog Timer: 256 segments, 0, 1, 2…255 (sec/ min) |
| **Power Requirement** | +12V DC |
| **Construction** | Aluminum + SGCC |
| **Chassis Color** | Black & White |
| **Power Supply** | 150W power adaptor |
| **Mounting** | Standard system bracket |
| **Dimensions (W x H x D)** | 175mm(W) x 212mm(D) x 37mm(H) |
| **Certificate** | CE, FCC Class-B, cULus & CCC |
| **Operating System** | Windows 10 IoT Enterprise RS5(64-bit) Linux Ubuntu(64-bit) |
| **Environment** | |
| **Temperature** | • Operating: 0 ~ 45 °C (32 ~ 113 °F)<br>• Storage: -20 ~ 80 °C (-4 ~ 176 °F) |
| **Relative Humidity** | 5 ~ 90% at 45 °C (non-condensing) |
| **Vibration Protection** | M.2: random operation 5 grms, 5~500 Hz |

All specifications are subject to change without prior notice.

**Note:** The product performance relies on the system functioning as a whole. The level of CPU/APU/GPU processor, the interaction among the processor and the memory and storage bandwidth, or the functionality of the digital signage application software may affect the product performance.

## 1.5 Product View

**Front View**



| No. | Function | No. | Function |
|-----|----------|-----|----------|
| 1 | DC-in Connector | 5 | Power Button |
| 2 | USB Ports | 6 | Power LED |
| 3 | COM Port | 7 | Extension Power Button |
| 4 | HDD Status LED | 8 | Antenna Holes |

**Rear View**



| No. | Function | No. | Function |
|-----|----------|-----|----------|
| 1 | Line-in and Line-out | 4 | DP Port |
| 2 | DVI-D Port | 5 | LAN Port |
| 3 | HDMI Port | 6 | Antenna Holes |

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**Oblique View**

## 1.6 Dimensions

Unit: mm
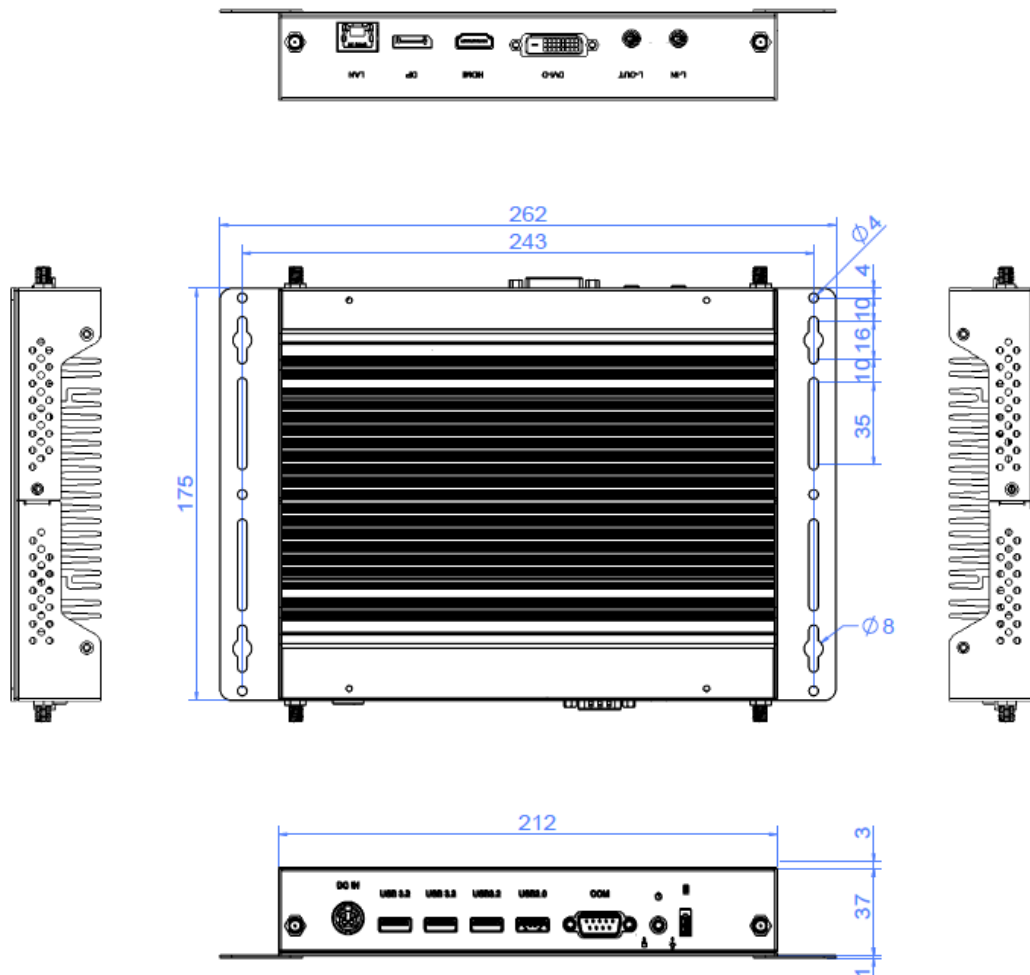
# Chapter 2
# Hardware Installation &
# Motherboard Information

The information provided in this chapter includes:

- Installation /Replacement
- Jumpers and Connectors

## 2.1   Installation / Replacement

The following pictures show how to disassemble the SI-663-N.

1. Remove the bracket screws and then the cover plate screws as shown below.

# iBASE
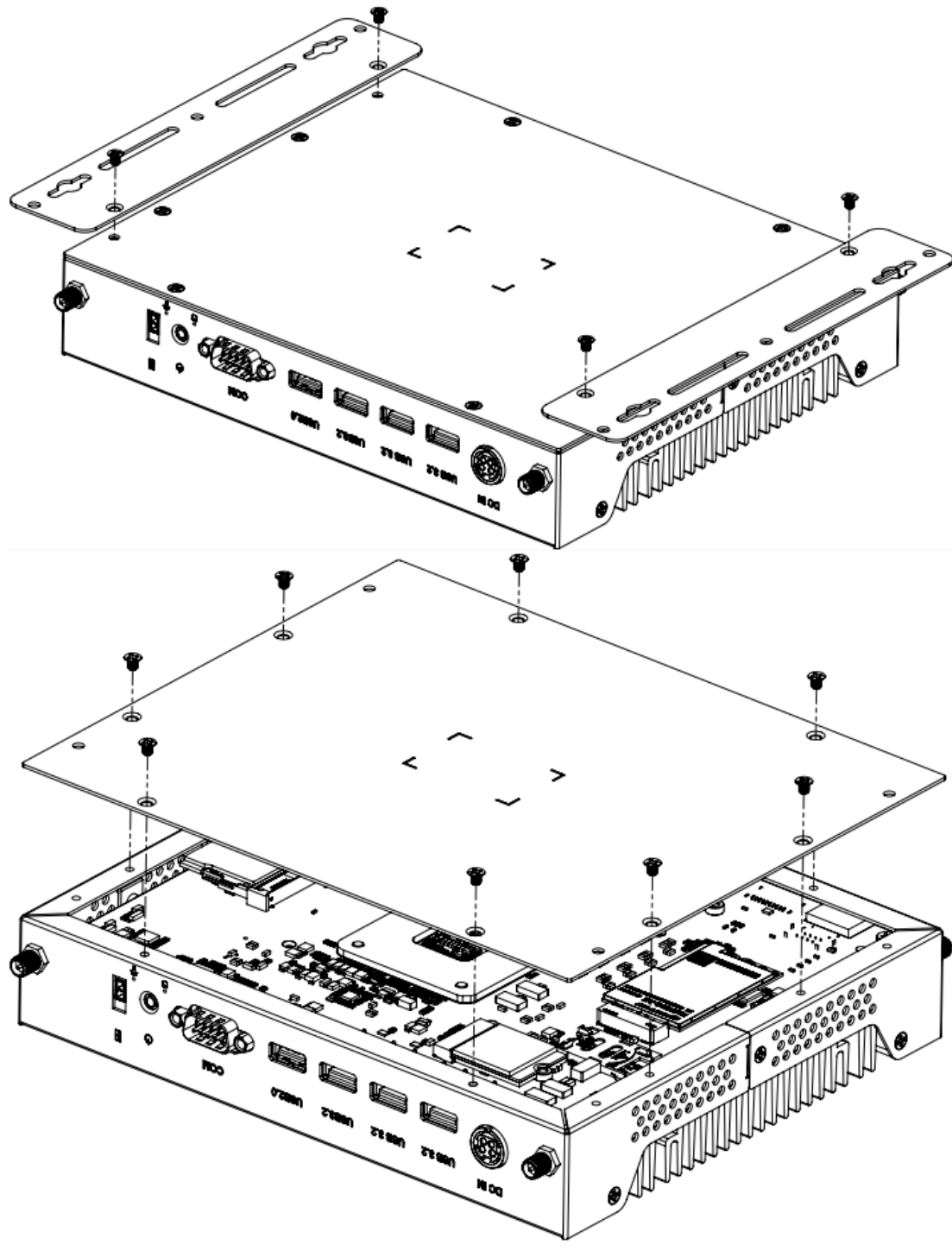
2. Remove the side plate by releasing the screws shown below.
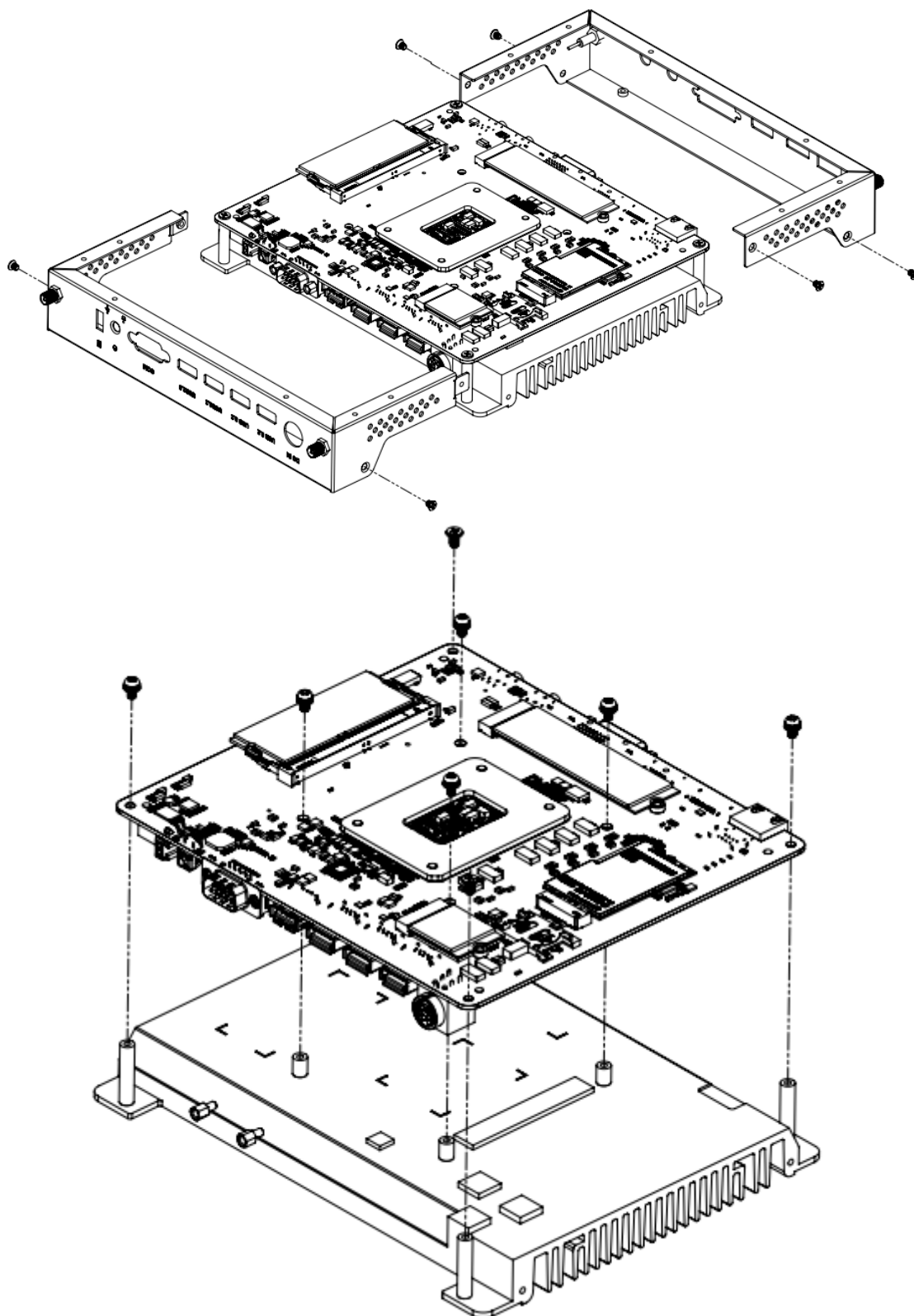
3.  Remove the I/O connector cover plates by releasing the five (5) screws shown below.
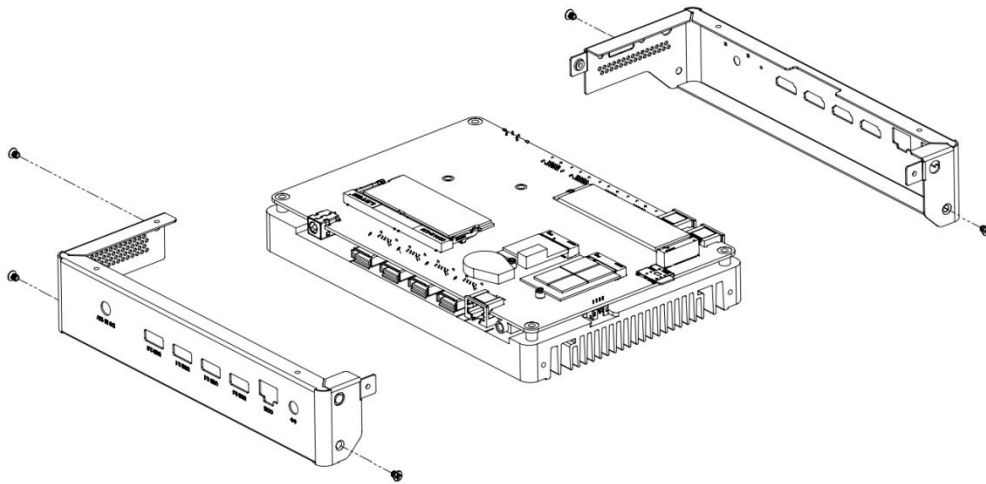


4.  Separate the system board from the base heat sink by releasing the screws shown below.

# iBASE
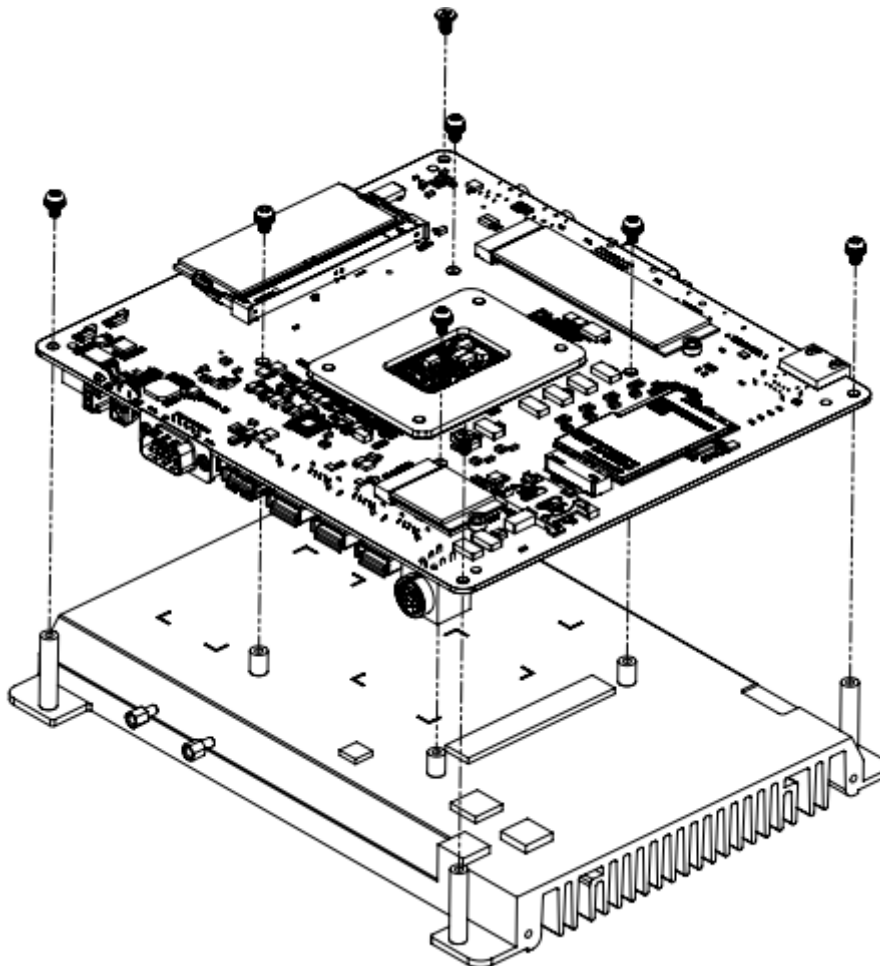
## 2.1.1    Memory

To install the modules, locate the memory slot on the motherboard.
The MBD663 supports two DDR5 memory sockets. To install the modules, locate the memory slot on the board and perform the following steps:
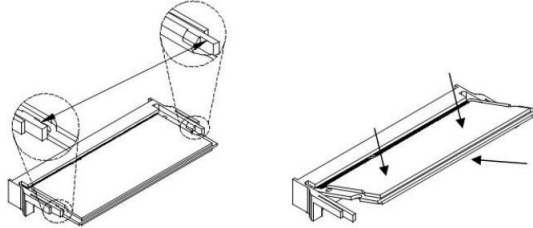


1. Align the key of the memory module with that on the memory slot and insert the module slantwise.
2. Gently push the module in an upright position until the clips of the slot close to hold the module in place when the module touches the bottom of the slot.
3. To remove the module, press the ejector tabs outwards with your fingertips to eject the module.

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## 2.1.2    Mini-PCIe & M.2 Cards

1. Locate the M.2 slot inside the device.

2. Align the key of the M.2 card to the interface, and insert the card slantwise.

3. Fix the M.2 card with an M3 screw.

**M.2:**
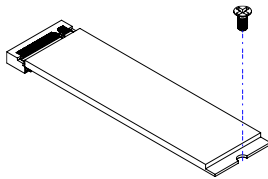


## 2.1.3    WiFi / 3G / 4G Antenna Installation

Thread the WiFi / 3G / 4G antenna extension cable through an antenna hole of the front I/O cover and fasten the antenna as shown below. Then apply adhesive to the edge of the hex nut behind the front I/O cover to prevent the extension cable from falling if the cable becomes loose.

1. Thread and fasten the hex nut and the washer. Then install the antenna.
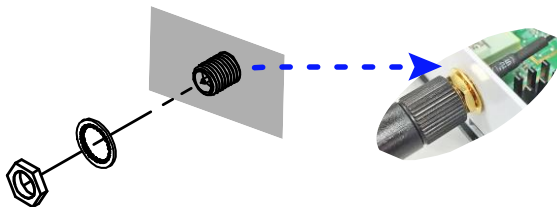
2. Apply adhesive around here.
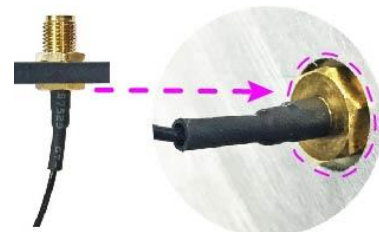


**Info:** The diameter of the nut is around 6.35 mm (0.25"-36UNC).

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## 2.2 Setting the Jumpers

Set up and configure your SI-663-N by using jumpers for various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your use.

### 2.2.1 How to Set Jumpers

Jumpers are short-length conductors consisting of several metal pins with a non-conductive base mounted on the circuit board. Jumper caps are used to have the functions and features enabled or disabled. If a jumper has 3 pins, you can connect either PIN1 to PIN2 or PIN2 to PIN3 by shorting.

Pin#   1   2   3

**A 3-pin jumper**               **A jumper cap**
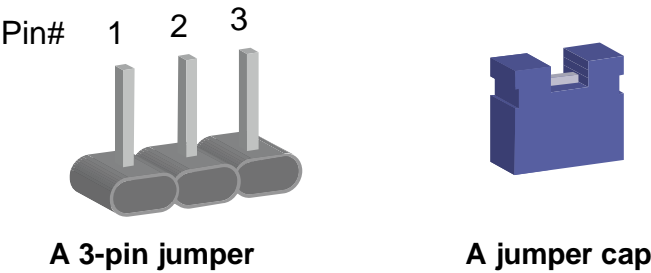
Refer to the illustration below to set jumpers.

| Pin closed | Oblique view | Illustration |
|:---:|:---:|:---:|
| Open | | □ ○ ○ <br> 1 2 3 |
| 1-2 | | □ ○ ○ <br> 1 2 3 |
| 2-3 | | □ ○ ○ <br> 1 2 3 |

When two pins of a jumper are encased in a jumper cap, this jumper is **closed**, i.e. turned **On**.

When a jumper cap is removed from two jumper pins, this jumper is **open**, i.e. turned **Off**.

## 2.3 Motherboard Dimensions

Motherboard: MBD663

# iBASE
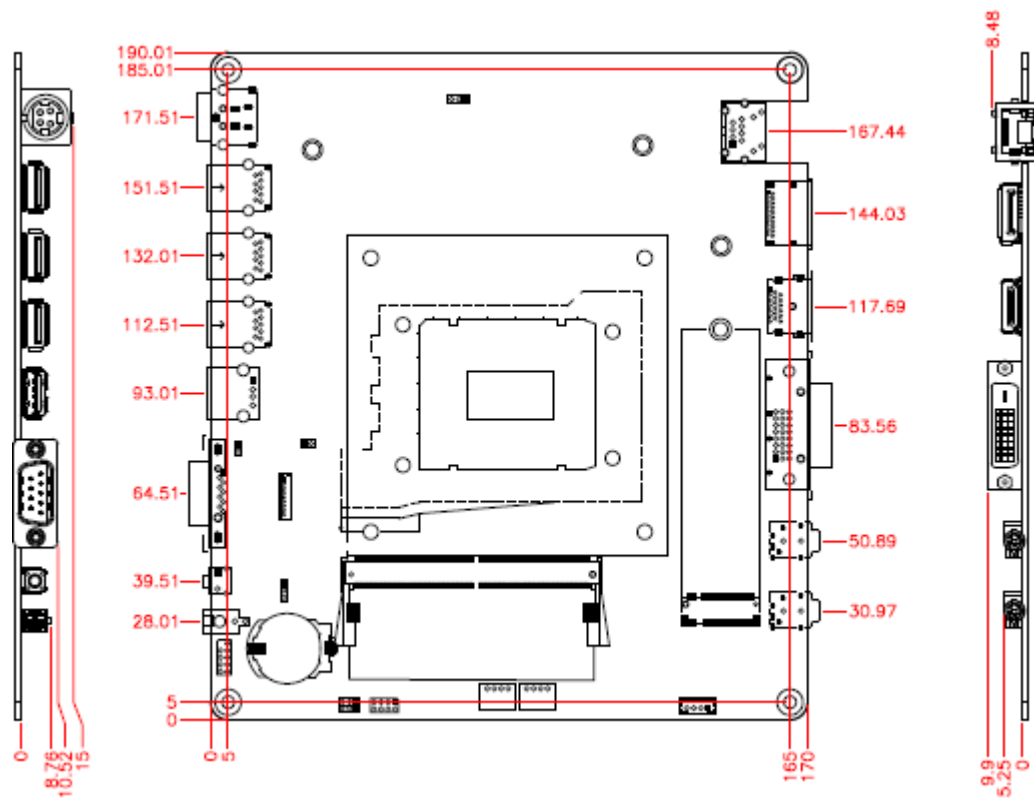
## 2.4 Jumper & Connector Locations

Motherboard: MBD663
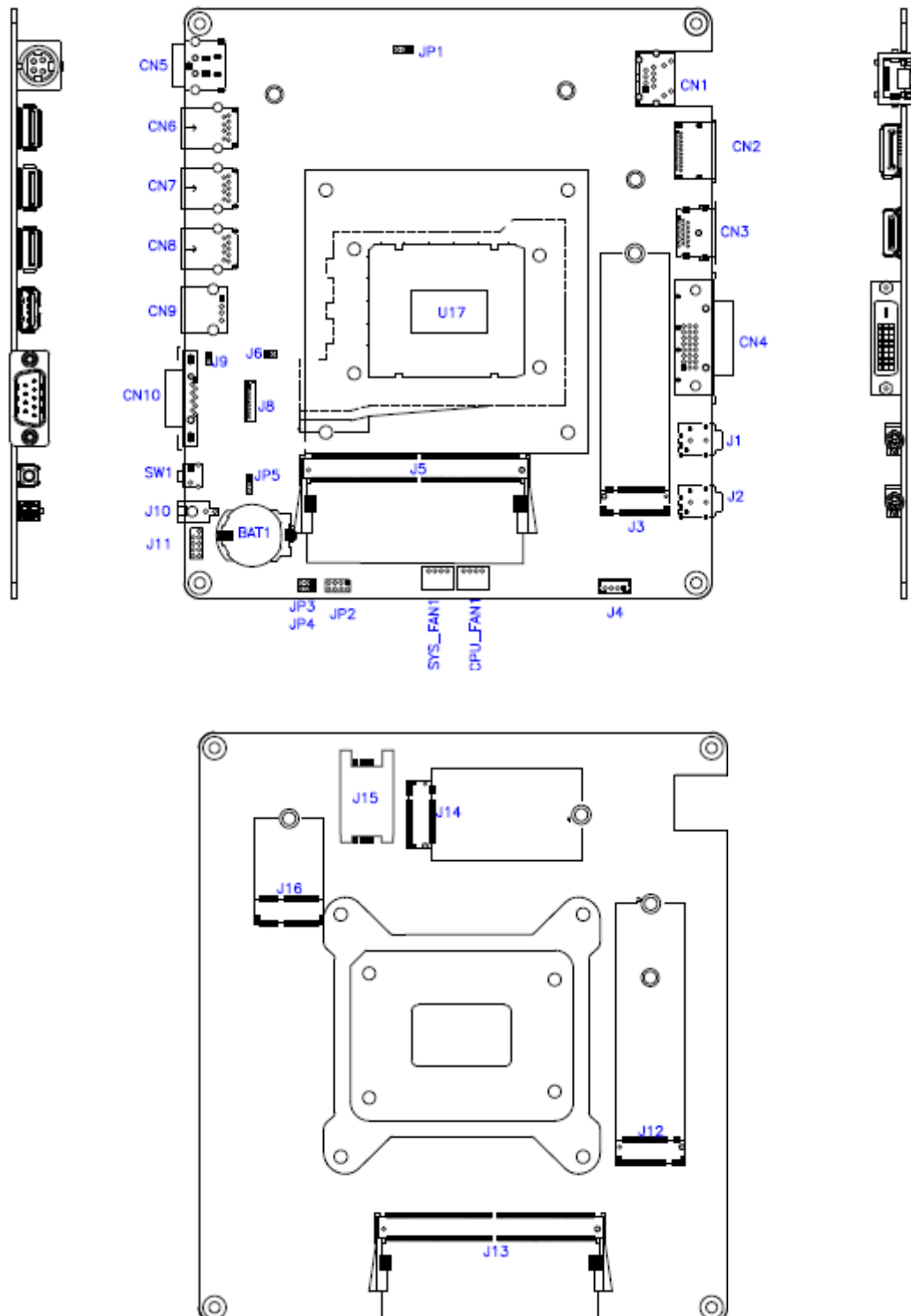
## 2.4.1    Jumper Quick Reference

| Jumper | Function |
|--------|----------|
| JP1 | Sierra EM919x 5G card USB/PCIe Select |
| JP3 | Clear ME |
| JP4 | Clear CMOS |
| JP5 | AT/ATX Select |
| J6 | Flash Descriptor Security Override |
| J7 | PWM Programming |

## 2.4.2    Sierra EM9191 5G Card USB/PCIe Select (JP1)
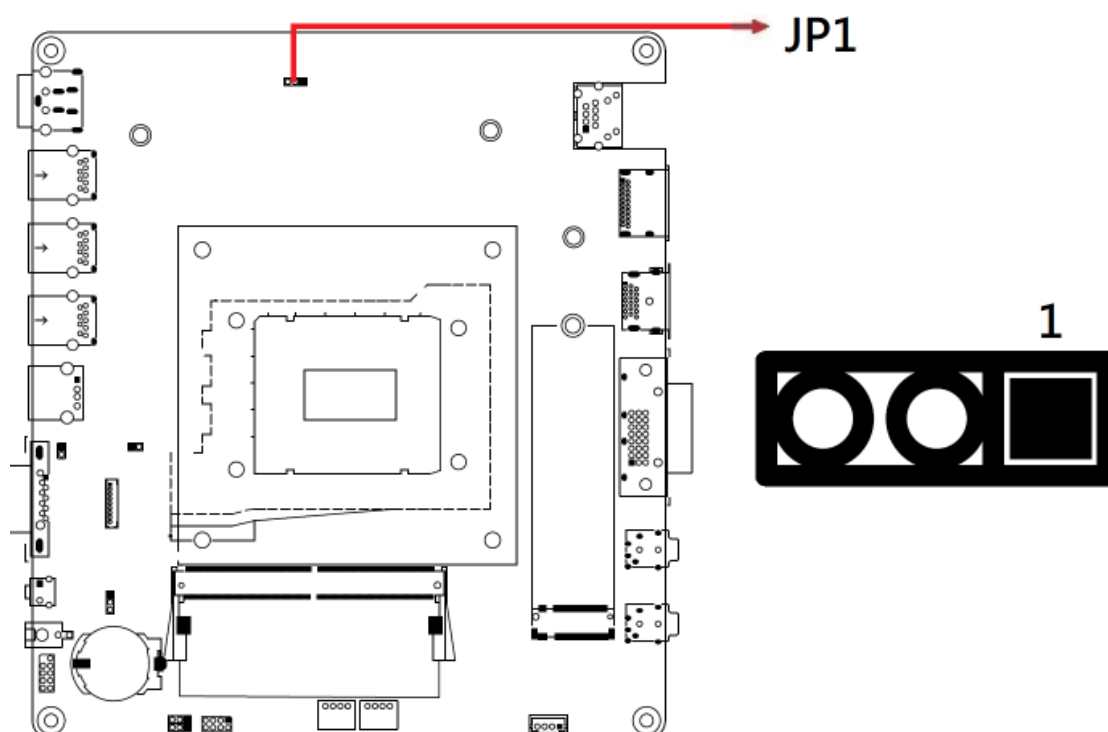


| Function | Pin closed | Illustration |
|----------|-----------|--------------|
| USB | 1-2 |  |
| PCIe (default) | 2-3 |  |

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## 2.4.3 Clear ME Contents (JP3)
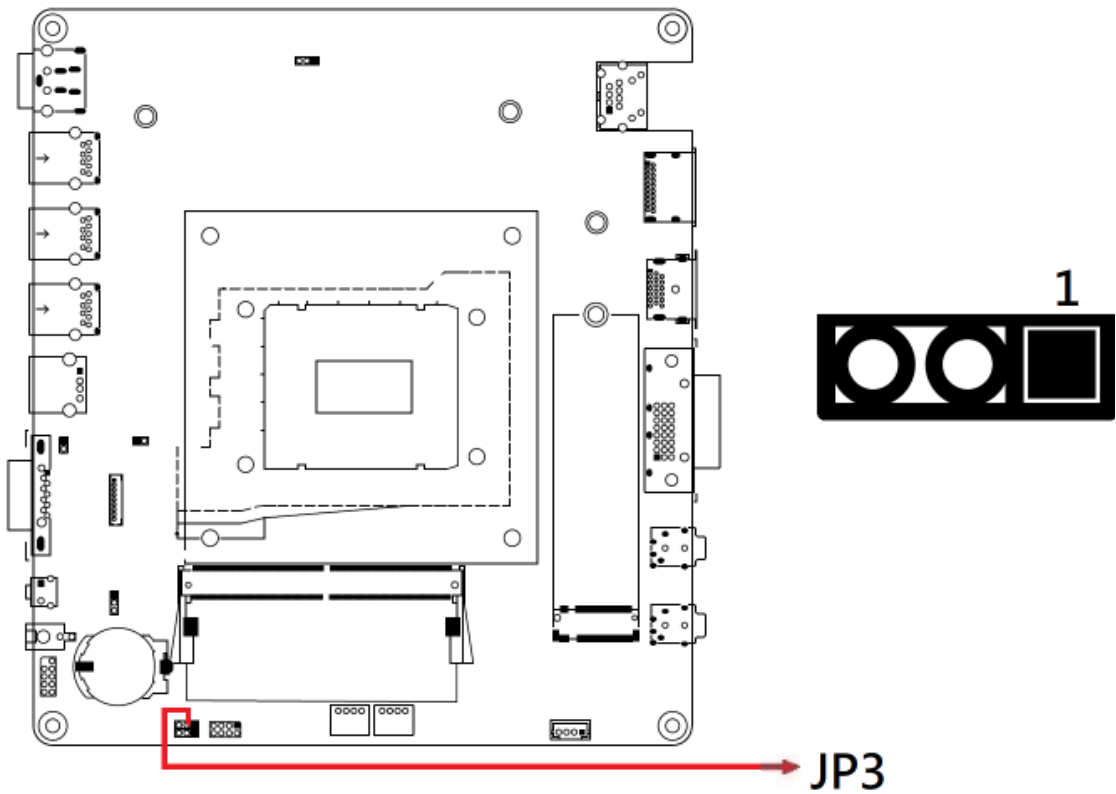


| Function | Pin closed | Illustration |
|----------|-----------|--------------|
| Normal | 1-2 | |
| Clear ME | 2-3 | |

## 2.4.4    Clear CMOS Contents (JP4)



| Function | Pin closed | Illustration |
|----------|-----------|--------------|
| Normal | 1-2 | |
| Clear CMOS | 2-3 | |

# iBASE
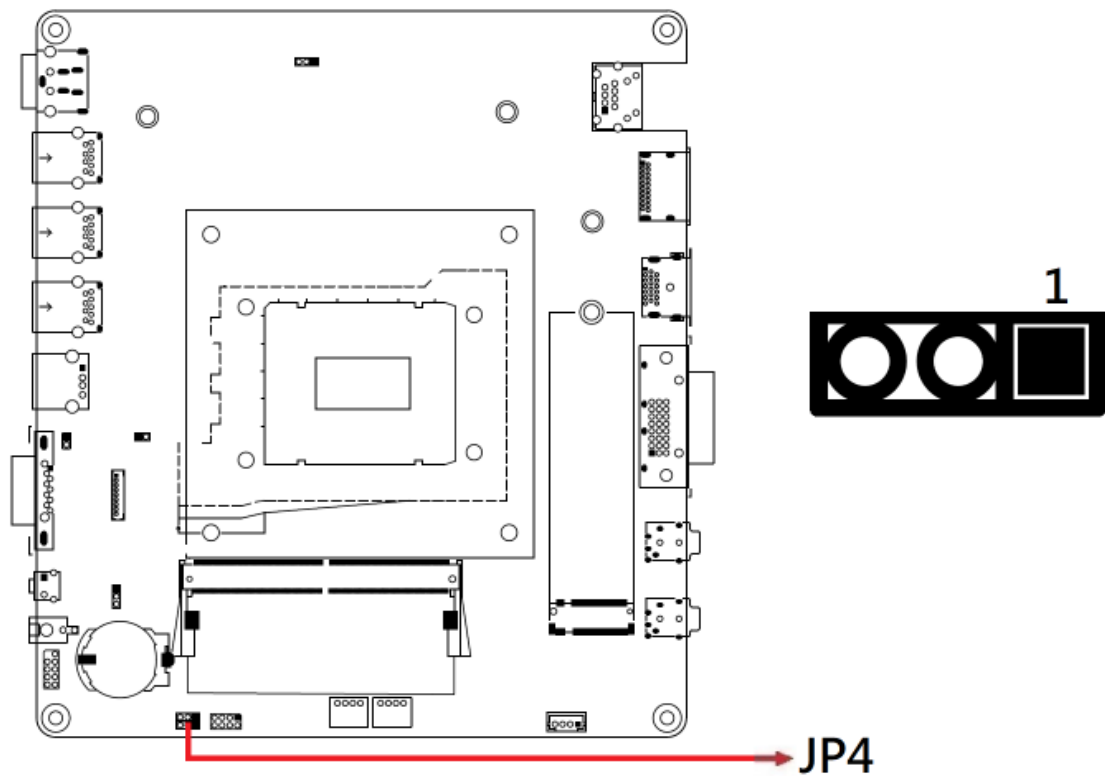
## 2.4.5 ATX & AT Power Mode Selection (JP5)
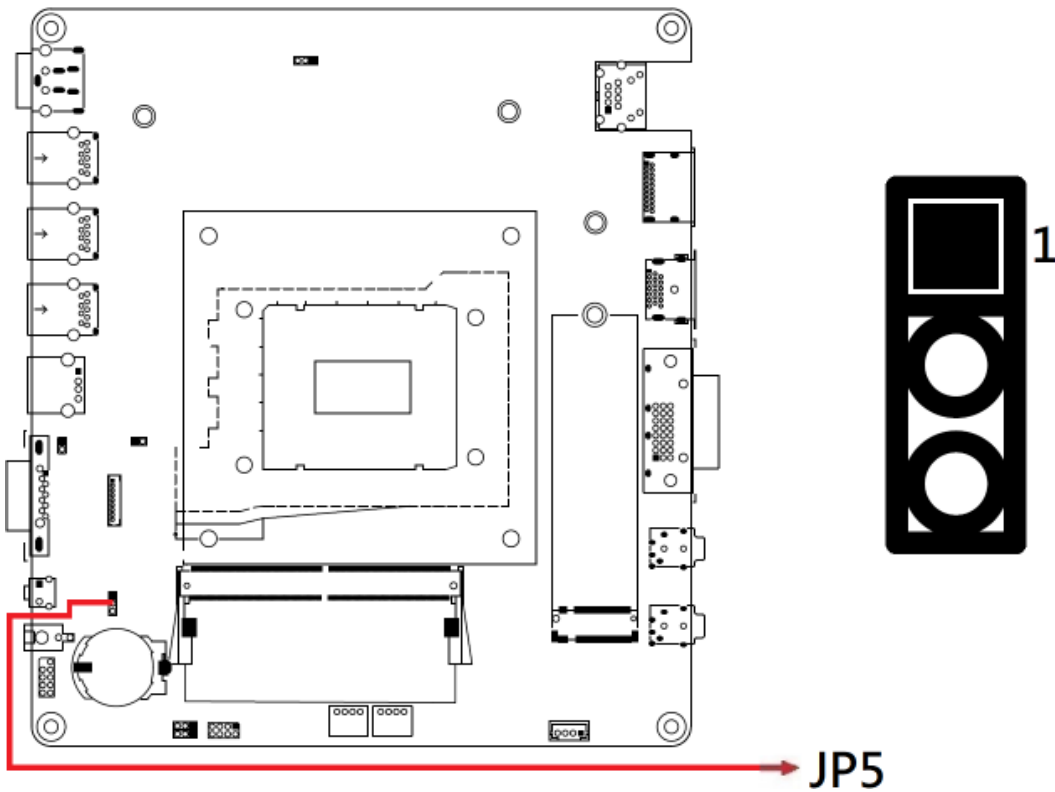


| Function | Pin closed | Illustration |
|:---:|:---:|:---:|
| ATX   (default) | 1-2 | |
| AT | 2-3 | |

## 2.4.6 Flash Descriptor Security Override(J6)
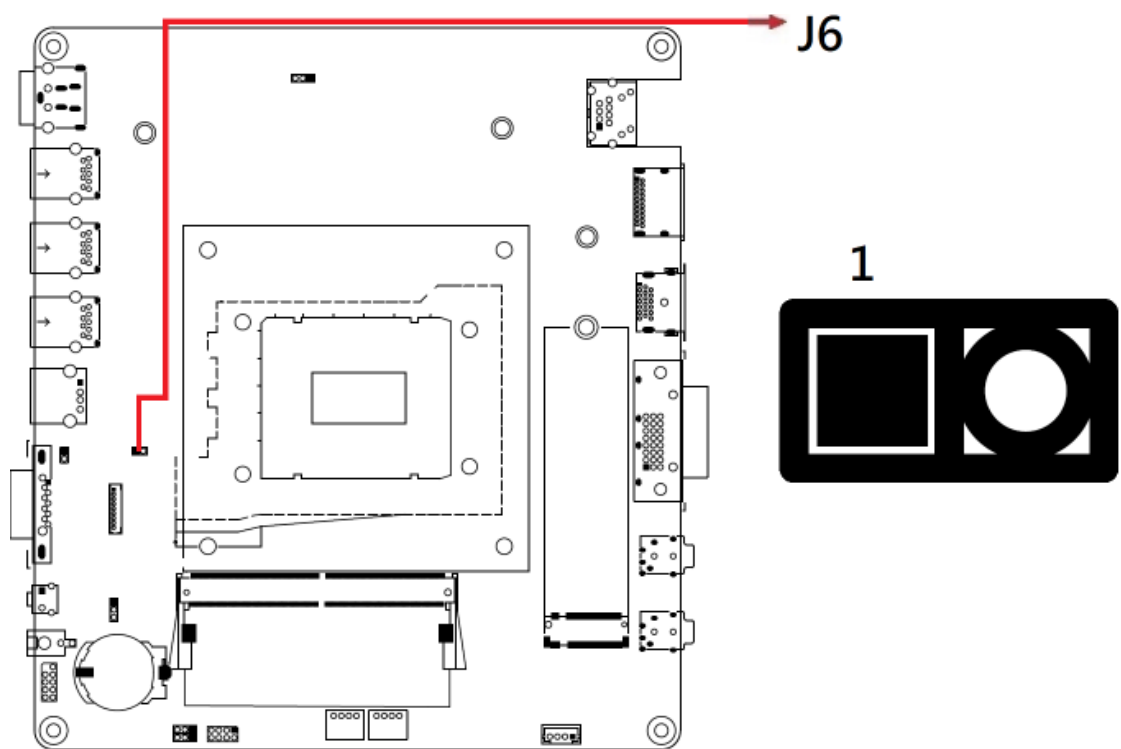


| Flash Descriptor Security Override | Pin | Illustration |
|---|---|---|
| Disabled (default) | Open | ○ □ 1 |
| Enabled | Close | ● □ 1 |

Note:    J6 is for factory use only.

### 2.4.7 PWM Programming (J7)
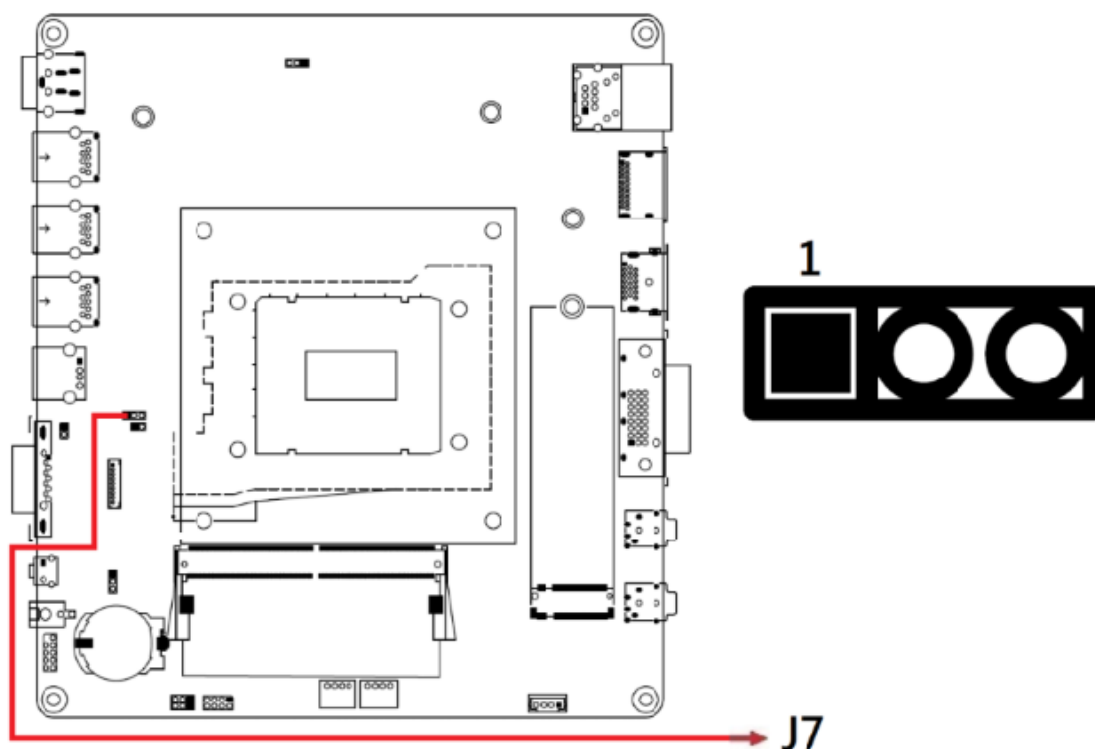


Note: J7 is for factory use only.

## 2.4.8 Connector Quick Reference

| Connector | Function |
|---|---|
| CN1 | 2.5 Gigabit LAN (Intel I226-LM) |
| CN2 | DisplayPort |
| CN3 | HDMI Connector |
| CN4 | DVI-D Connector |
| CN5 | DC_IN Connector |
| CN6, CN7, CN8 | USB3.1 Connector |
| CN9 | USB2.0 Connector |
| CN10 | COM1 Connector |
| J1 | LINE OUT Connector |
| J2 | LINE IN Connector |
| J14 | M.2 B-key 3052 Slot |
| J4 | iSMART PROG |
| J5, J13 | DDR5 SO-DIMM Slots |
| J11 | SPI Flash Connector (Factory use only) |
| J8 | 80 Port Debug (Factory use only) |
| J3, J12 | M.2 M2280 Slots |
| J15 | SIM Slot |
| J16 | M.2 E2230 Slot |
| JP2 | Front Panel Connector |
| SW1, J10 | Power Buttom |
| CPU_FAN1, SYS_FAN1 | Fan Power Connectors |

### 2.4.9 2.5 Gigabit LAN (Intel I226-LM) (CN1)
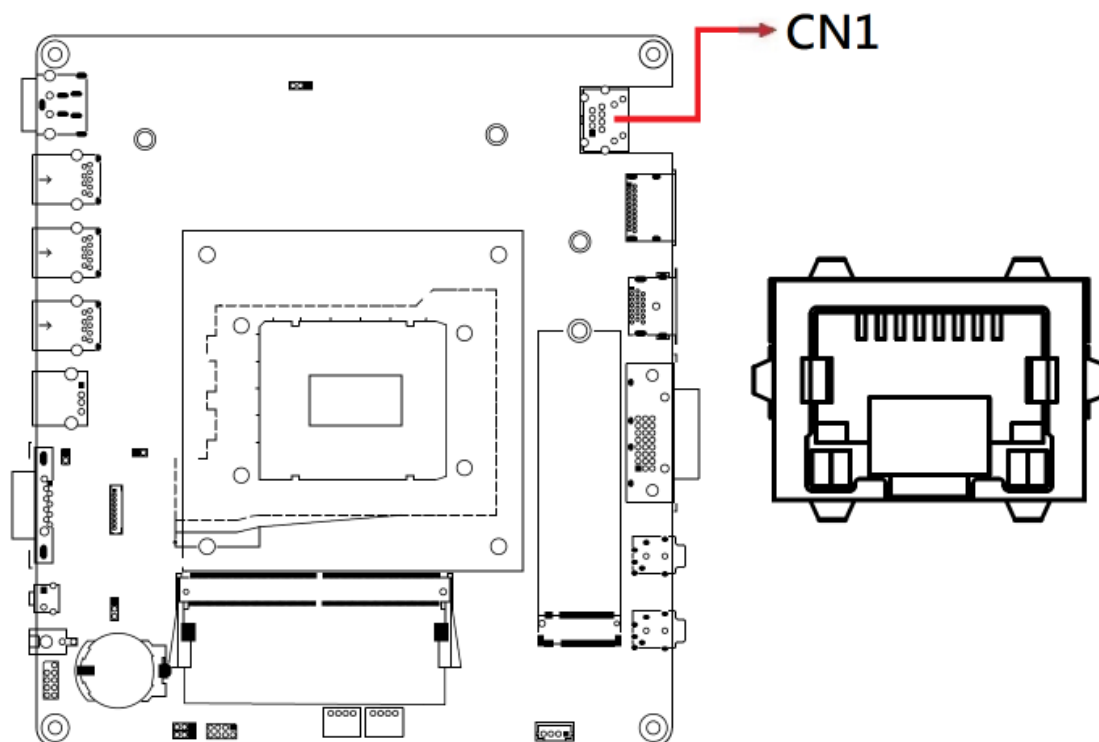


### 2.4.10 DisplayPort (CN2)
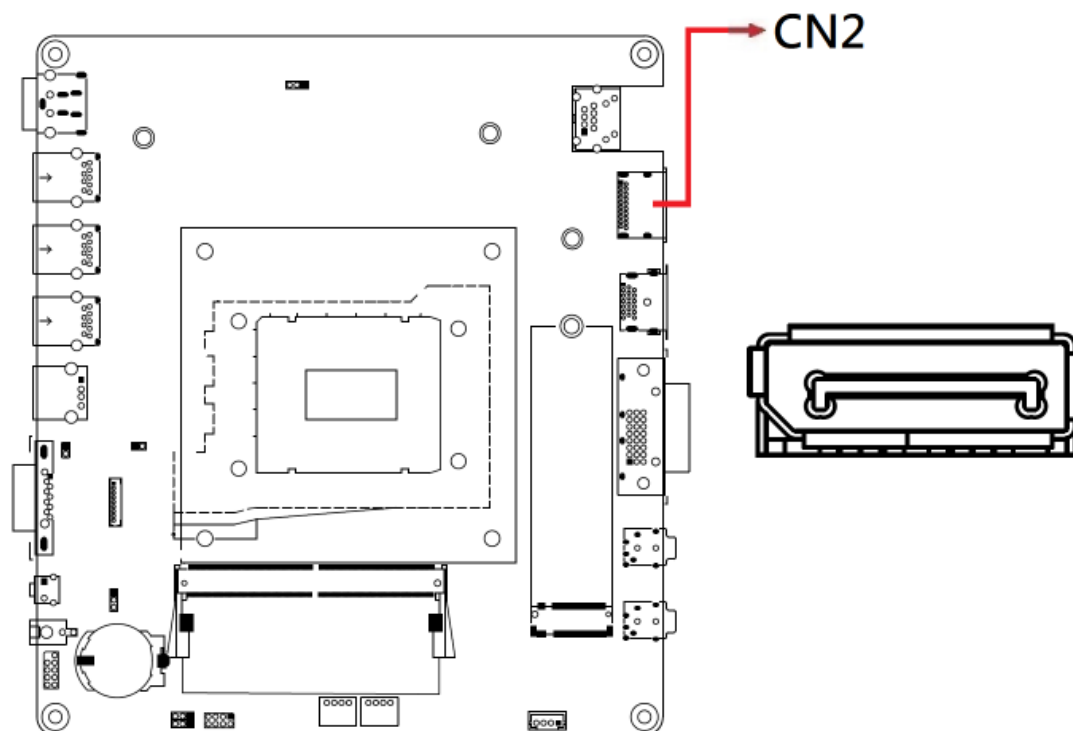
## 2.4.11    HDMI Connector (CN3)
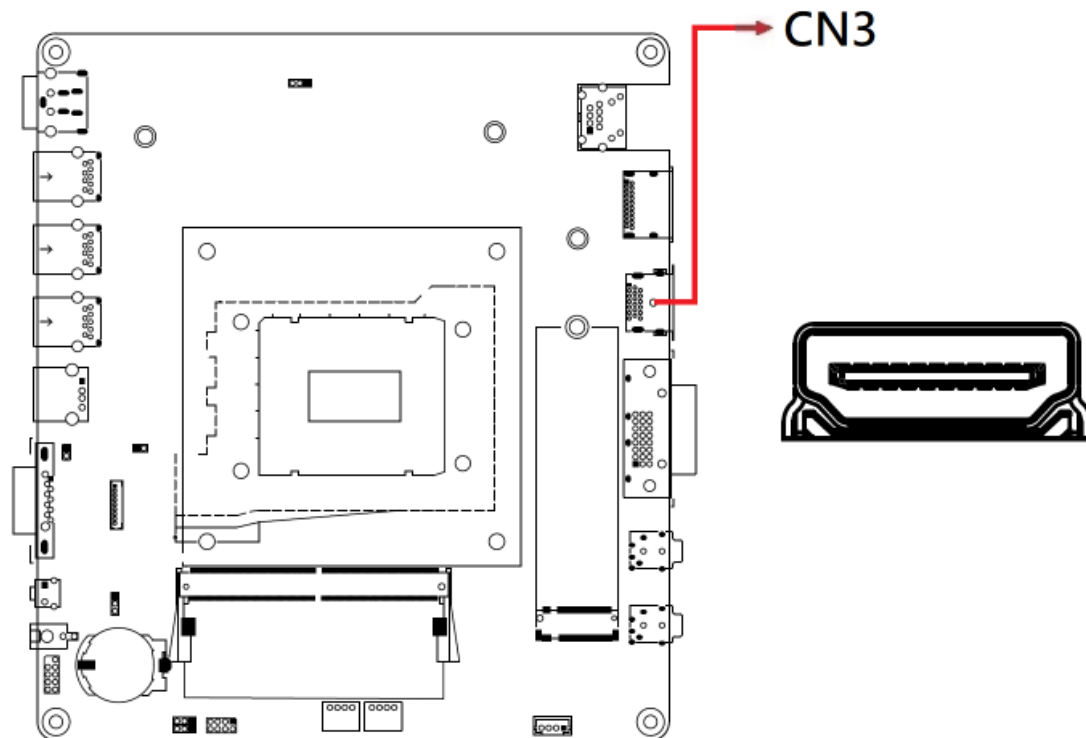


## 2.4.12    DVI-D Connector (CN4)
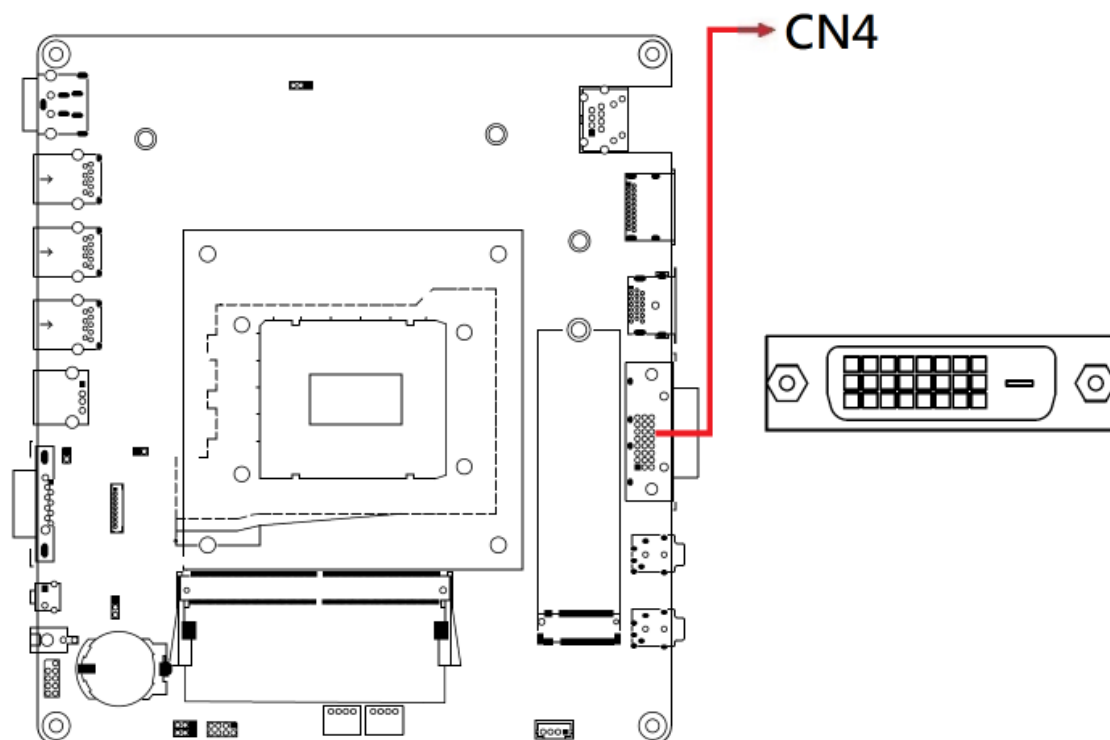
## 2.4.13 DC_IN Connector (CN5)
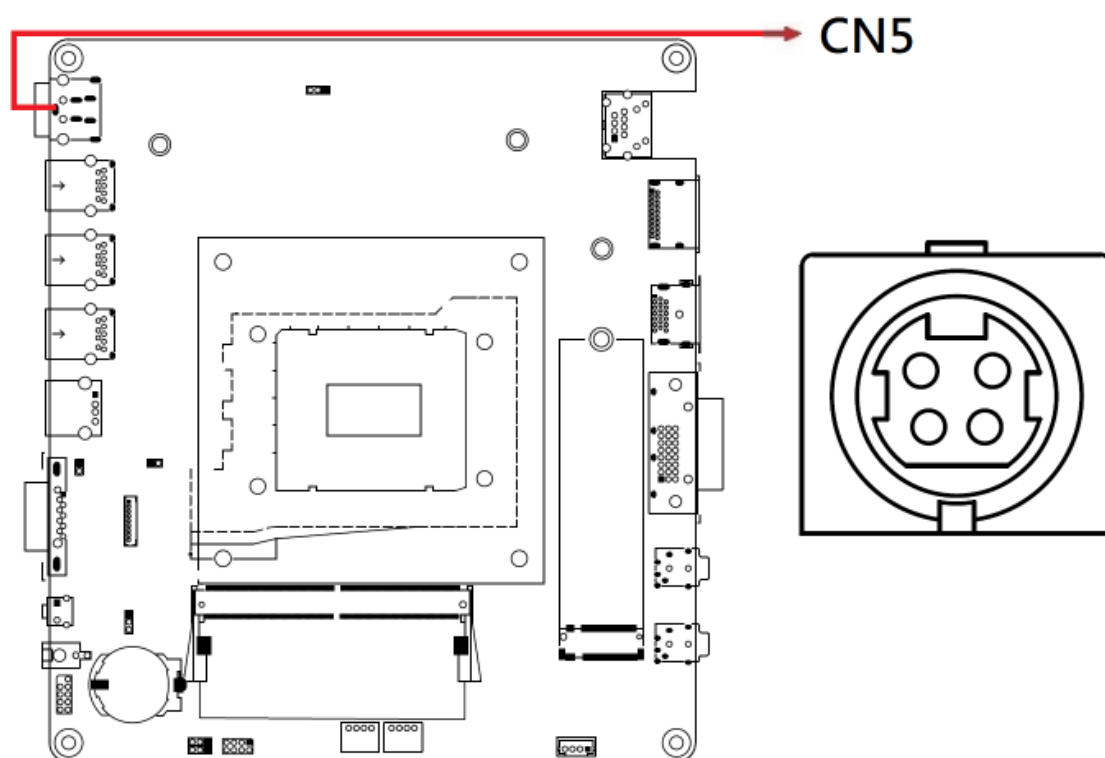


## 2.4.14 USB 3.2 Connector (CN6, CN7, CN8)
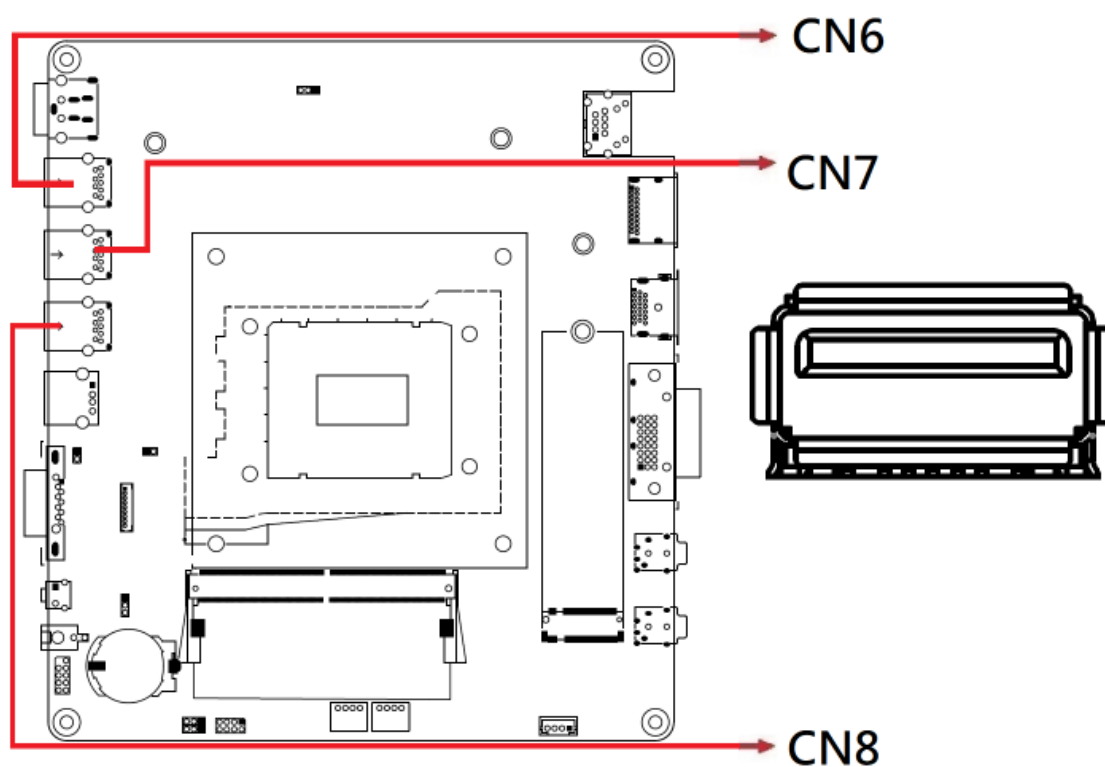
## 2.4.15 USB 2.0 Connector (CN9)

# iBASE
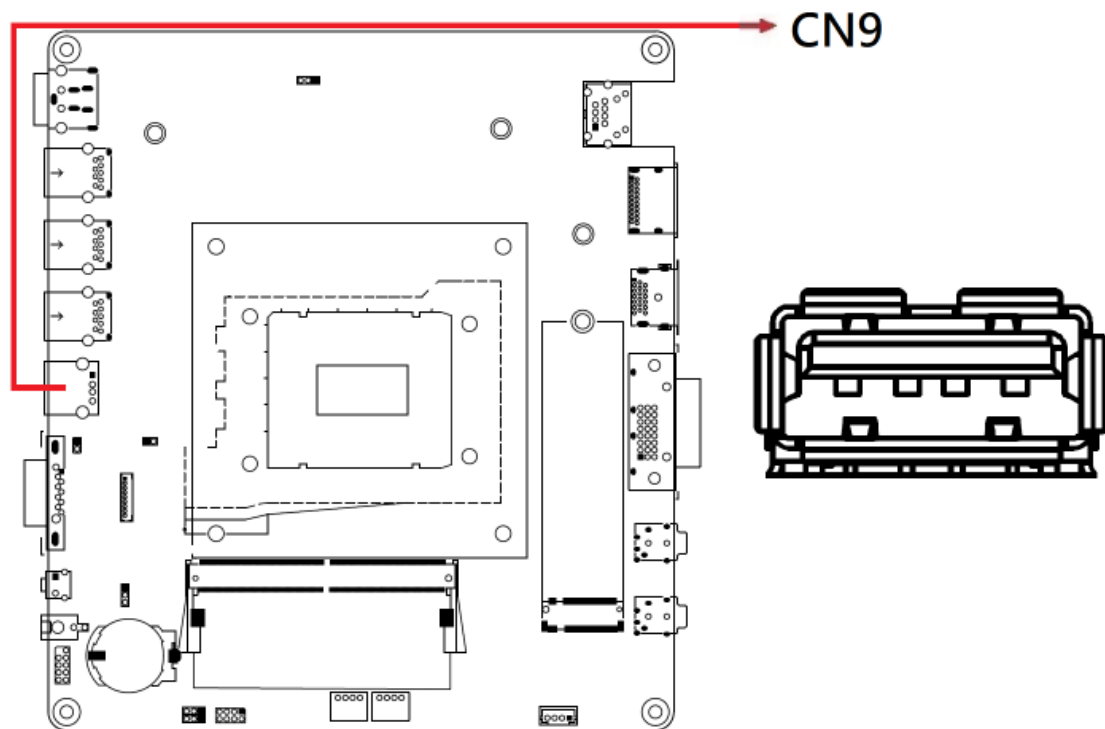
## 2.4.16 COM1 Ports (CN10)



CN10
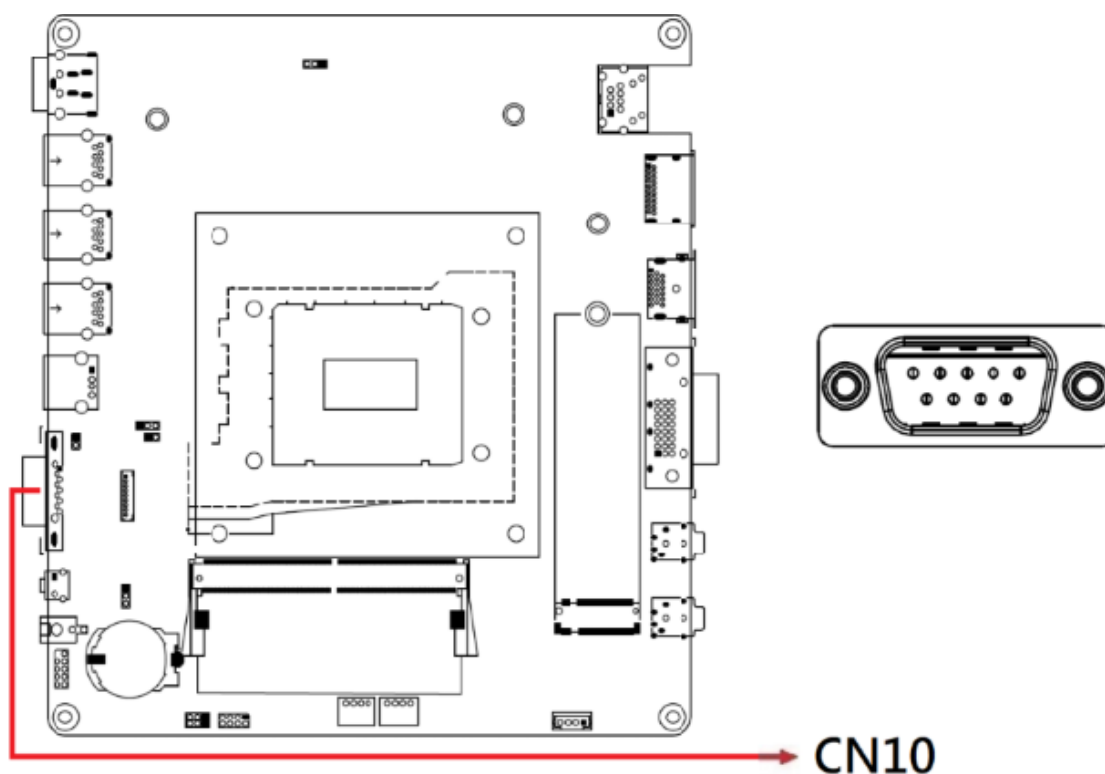
| Pin | Signal Name | Pin | Signal Name |
|-----|-------------|-----|-------------|
| 1 | DCD, Data carrier detect | 6 | DSR, Data set ready |
| 2 | RXD, Receive data | 7 | RTS, Request to send |
| 3 | TXD, Transmit data | 8 | CTS, Clear to send |
| 4 | DTR, Data terminal ready | 9 | RI, Ring indicator |
| 5 | Ground | | |

## 2.4.17　Front Panel Connector (JP2)



JP2
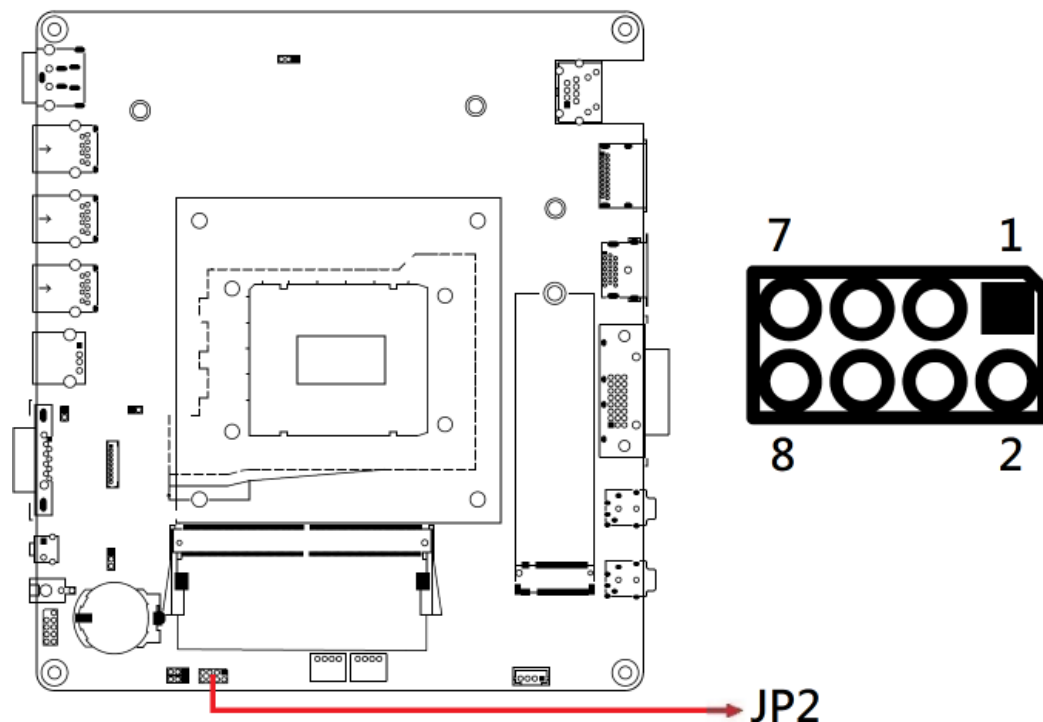
| Pin | Signal | Pin | Signal |
|-----|--------|-----|--------|
| 1 | Power BTN- | 2 | Power BTN+ |
| 3 | HDD LED+ | 4 | HDD LED- |
| 5 | Reset BTN- | 6 | Reset BTN+ |
| 7 | Power LED+ | 8 | Power LED- |

JP2 is utilized for system indicators to provide light indication of the computer activities and switches to change the computer status. It provides interfaces for the following functions:

ATX Power ON Switch (Pins 1 and 2)

Pins 1 and 2 make an "ATX Power Supply On/Off Switch" for the system that connects to the power switch on the case. When pressed, the power switch will force the system to power on. When pressed again, it will power off the system.

Hard Disk Drive LED Connector (Pins 3 and 4)

This connector connects to the hard drive activity LED on control panel. This LED will flash when the HDD is being accessed.

Reset Switch (Pins 5 and 6)

The reset switch allows you to reset the system without turning the main power switch off and then on again. Orientation is not required when making a connection to this header.

Power LED (Pins 7 and 8)

This connector connects to the system power LED on control panel. This LED will light when the system turns on.

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## 2.4.18    DDR5 SO-DIMM Slot (J5 / J13)
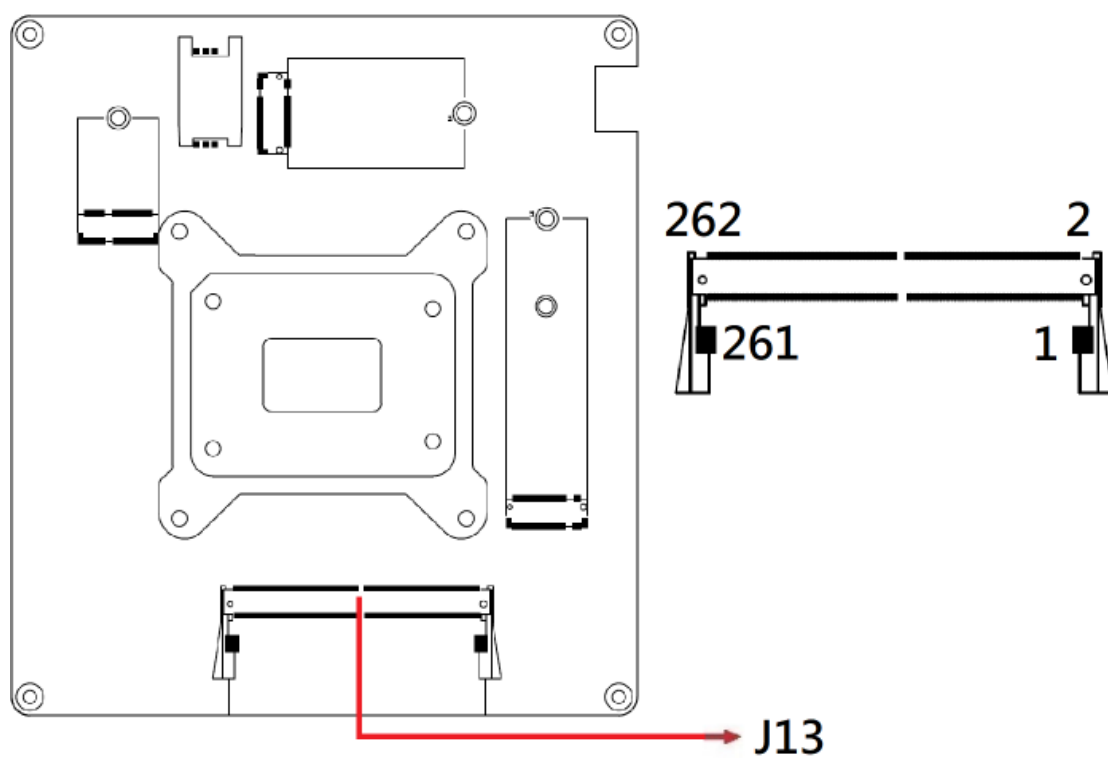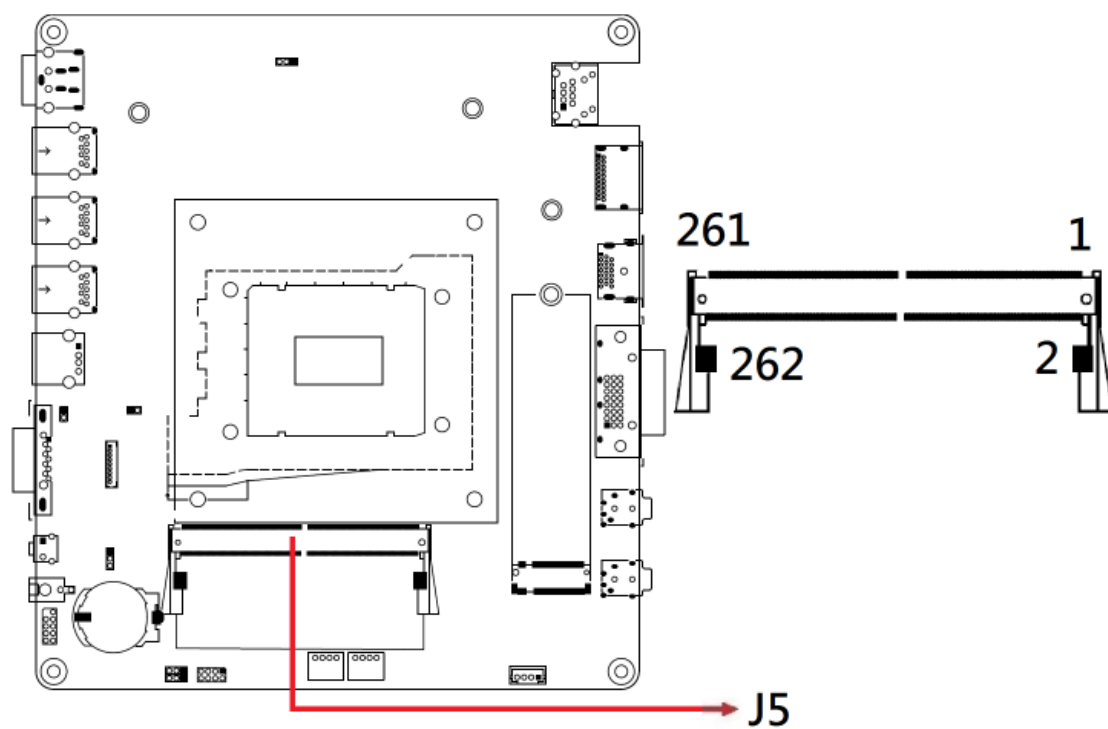
### 2.4.19  80 Port Debug (J8)
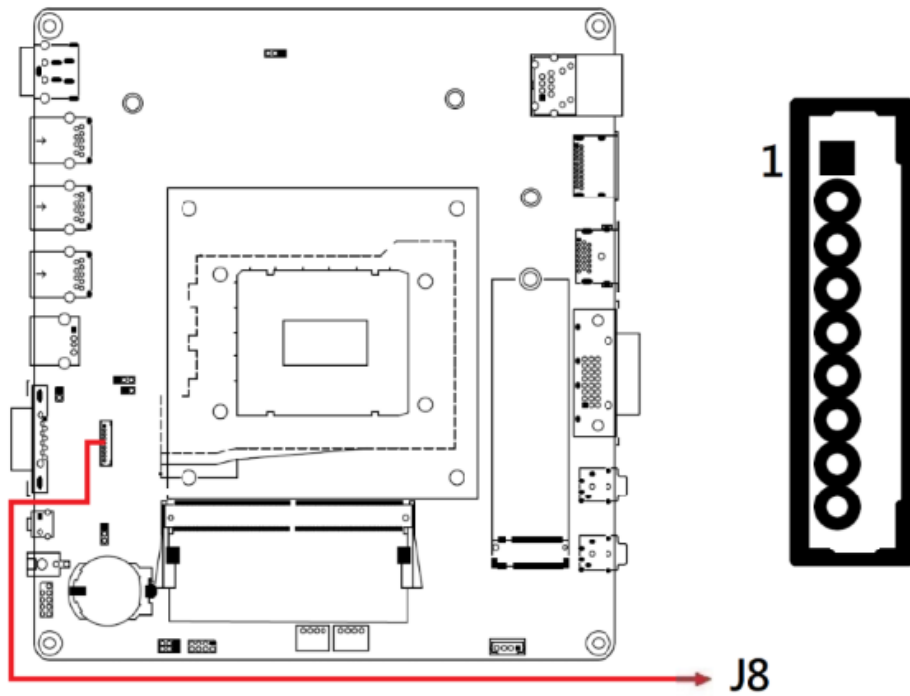


Note:  J8 is for factory use only.

### 2.4.20  M.2 M2280 Slot (J3)
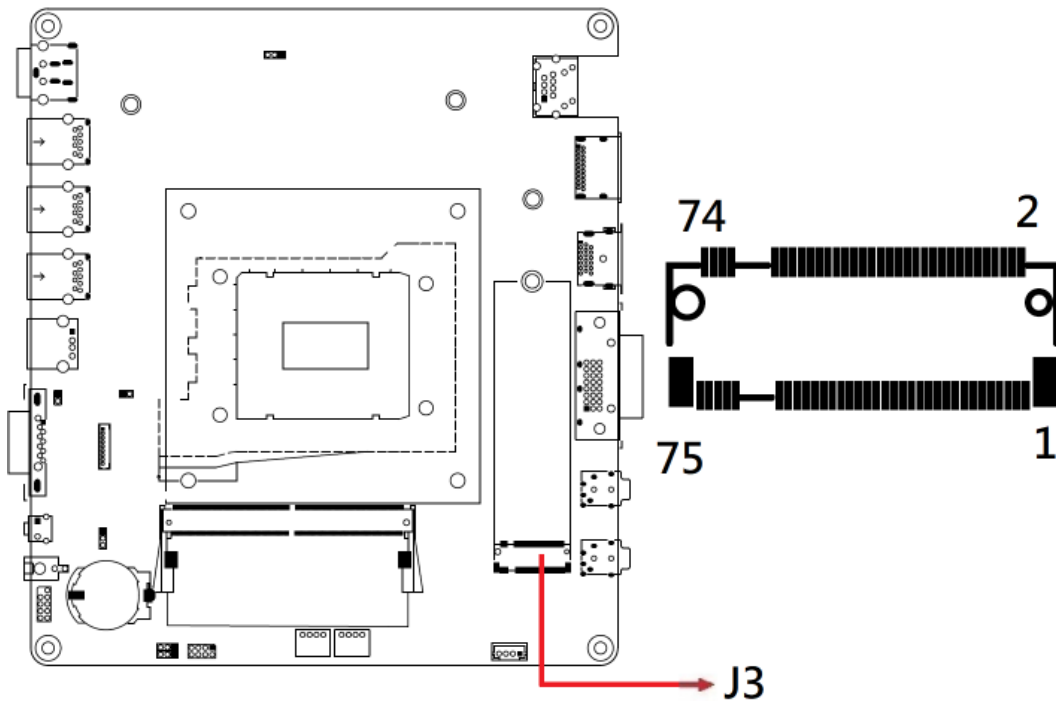


*J3/J12 supports NVME

## 2.4.21   M.2 E2230 Slot (J12)



*J12

\* supports USB2.0 & PCIE x1
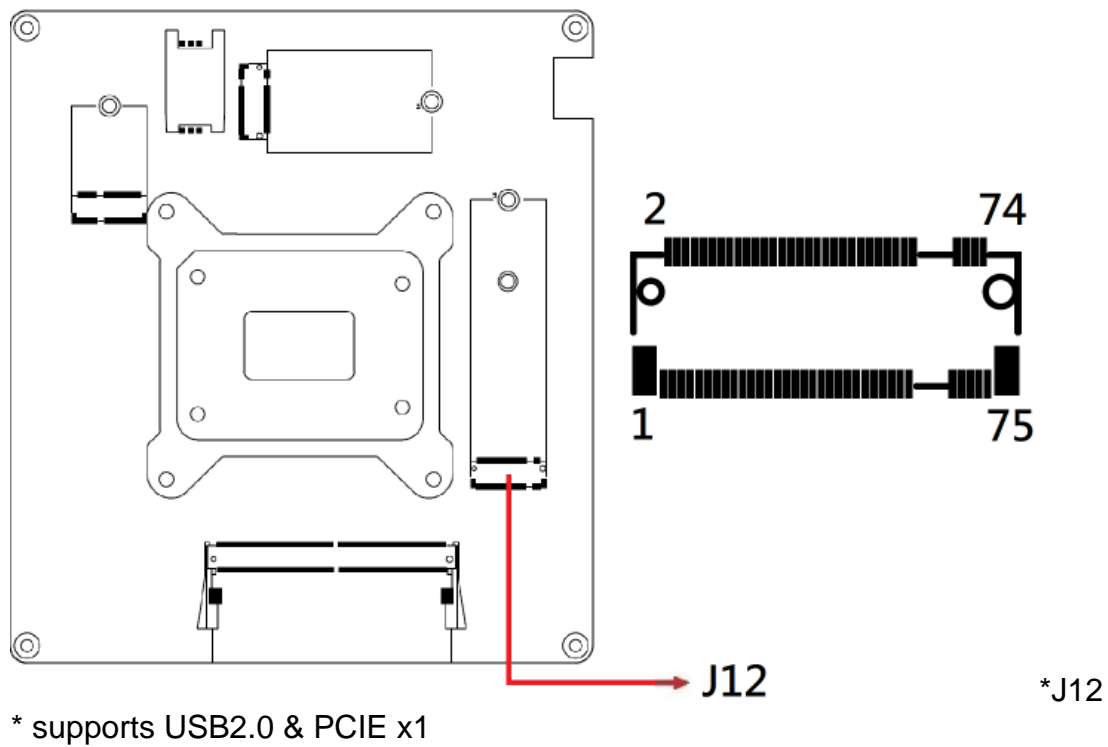
## 2.4.22   SPI Flash Connector (J11)
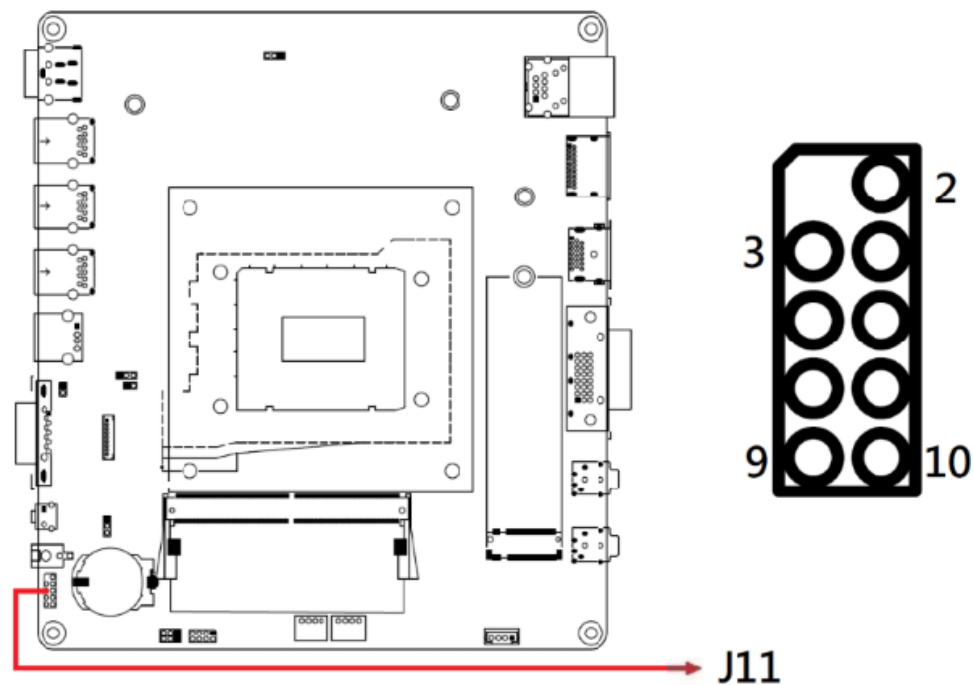


Note:   J11 is for factory use only.

## 2.4.23 SIM Slot (J15)
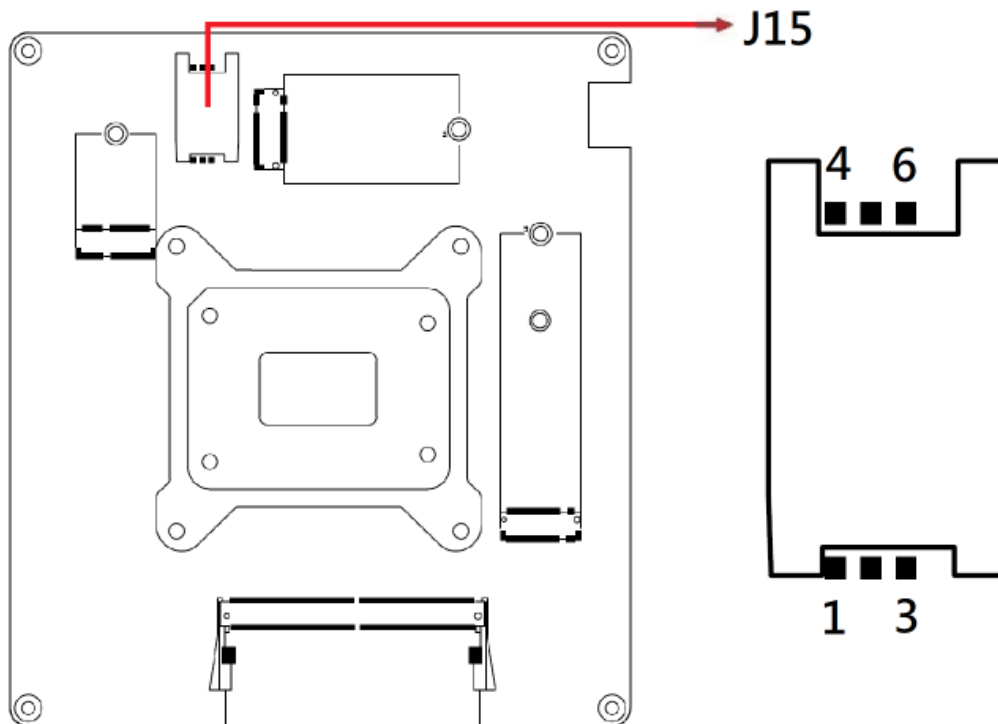


## 2.4.24 M.2 B-key 3052 Slot (J14)
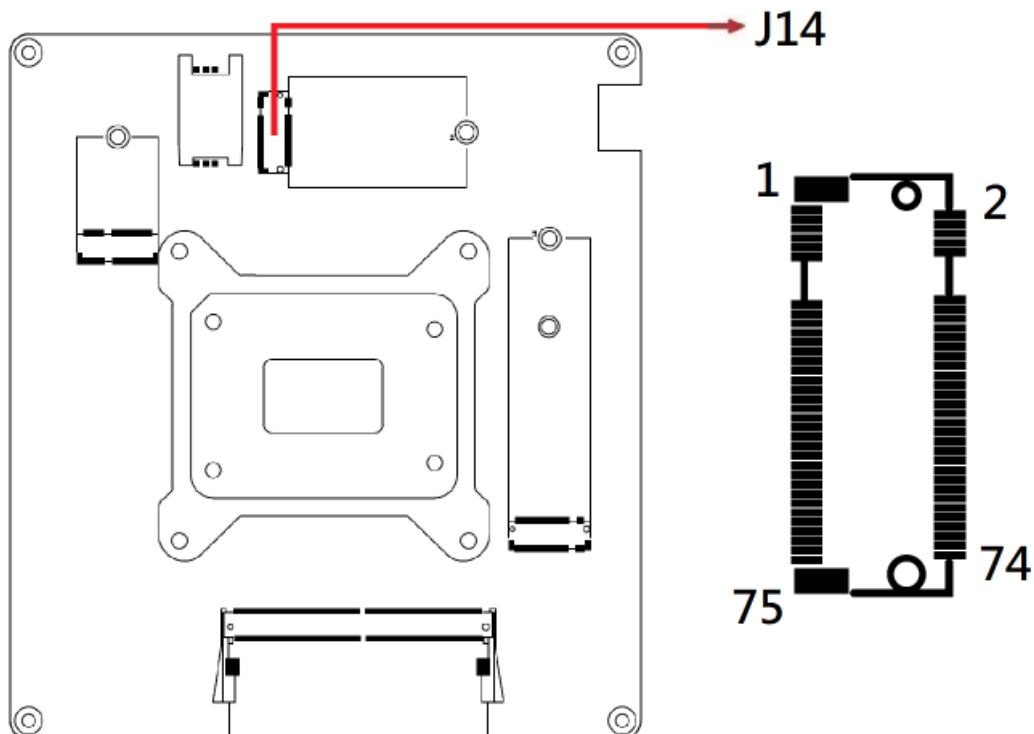


*J14 supports Sierra EM9191 5G modules.

# iBASE

## 2.4.25 Fan Power Connectors (CPU_FAN1, SYS_FAN1)
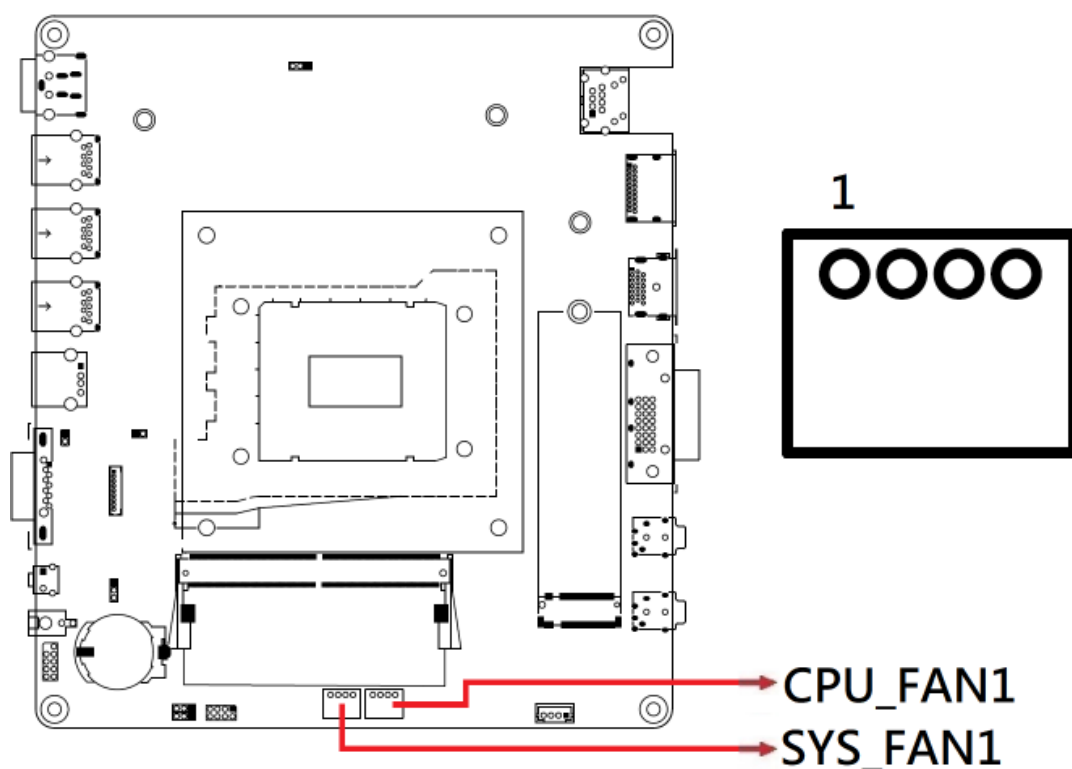


| Pin | Signal Name |
|-----|-------------------|
| 1 | Ground |
| 2 | +12V |
| 3 | Rotation detection |
| 4 | Control |

# Chapter 3
# Driver Installation


The information provided in this chapter includes:

- Intel® Chipset Software Installation Utility
- HD Audio Driver Installation
- LAN Driver Installation
- Intel® Management Engine Components Drivers Installation

**iBASE**

## 3.1 Introduction

This section describes the installation procedures for software drivers. The software drivers are available on IBASE website www.ibase.com.tw. Go to the download page of the product. Copy the compressed drivers file to your computer. Double click the file to decompress it. Run "CDGuide" to go to the main drivers page.

**Note:** After installing the Windows operating system, install the Intel® Chipset Software Installation Utility before proceeding with driver installation.

## 3.2 Intel® Chipset Software Installation Utility

The Intel® Chipset drivers should be installed first before the software drivers to install INF files for Plug & Play function for the chipset components. Follow the instructions below to complete the installation.

1. Click **Intel** on the left pane and then **Intel(R) AlderLake-P/PS/U Chipset Drivers** on the right pane, and click **Intel(R) Chipset Software Installation Utility**.



2. When the *Welcome* screen for the Intel® Chipset Device Software appears, click **Next** to continue.

3. **Accept** the software license agreement.

4. On the *Readme File Information* screen, click **Install**.

5. After the installation has been completed, click **Finish** to complete the setup process.

## 3.3   VGA Driver Installation

1. Click **Intel** on the left pane and then **Intel(R) AlderLake-P/PS/U Chipset Drivers** on the right pane. Run the drivers disk. Click **Intel** on the left pane and then **Intel(R) AlderLake-P/PS/U Chipset Drivers**, and **Intel(R) HD Graphics Driver** on the right pane.



2. When the *Intel Graphics Driver Installer* screen appears, click **Begin installation**.

3.  Click **I agree** to accept the INTEL SOFTWARE LICENSE AGREEEMENT.

4.  In the Pre-Install stage, "The installer will install the following components:
    - Intel® Graphics Driver
    - Intel® Graphics Command Center
    Click **Start** to start installing the new graphics driver.

5.  The next screen will indicate that the new graphics driver is being installed. When the message "**Installation complete!**" appears, restart your system in order to apply the driver changes.
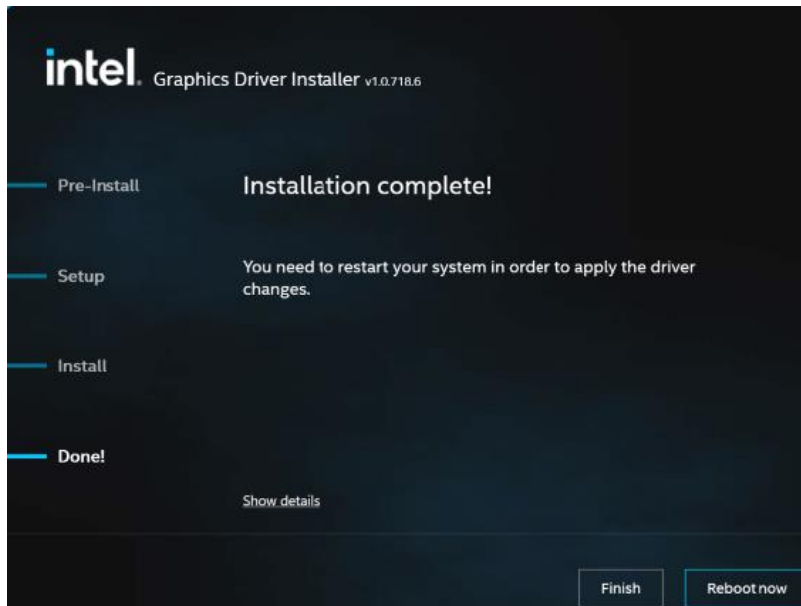
## 3.4    Realtek HD Audio Driver Installation

1. Before installing the audio drivers in the disk provided, run the batch file - **Intel_Sound.bat** in the directory shown in the picture below:
  **I-12_Gen-P-1.0\Intel\AlderLake-P\Sound\Windows 10_11**
Right-click Intel_Sound.bat and **run the batch file as administrator**.

# iBASE
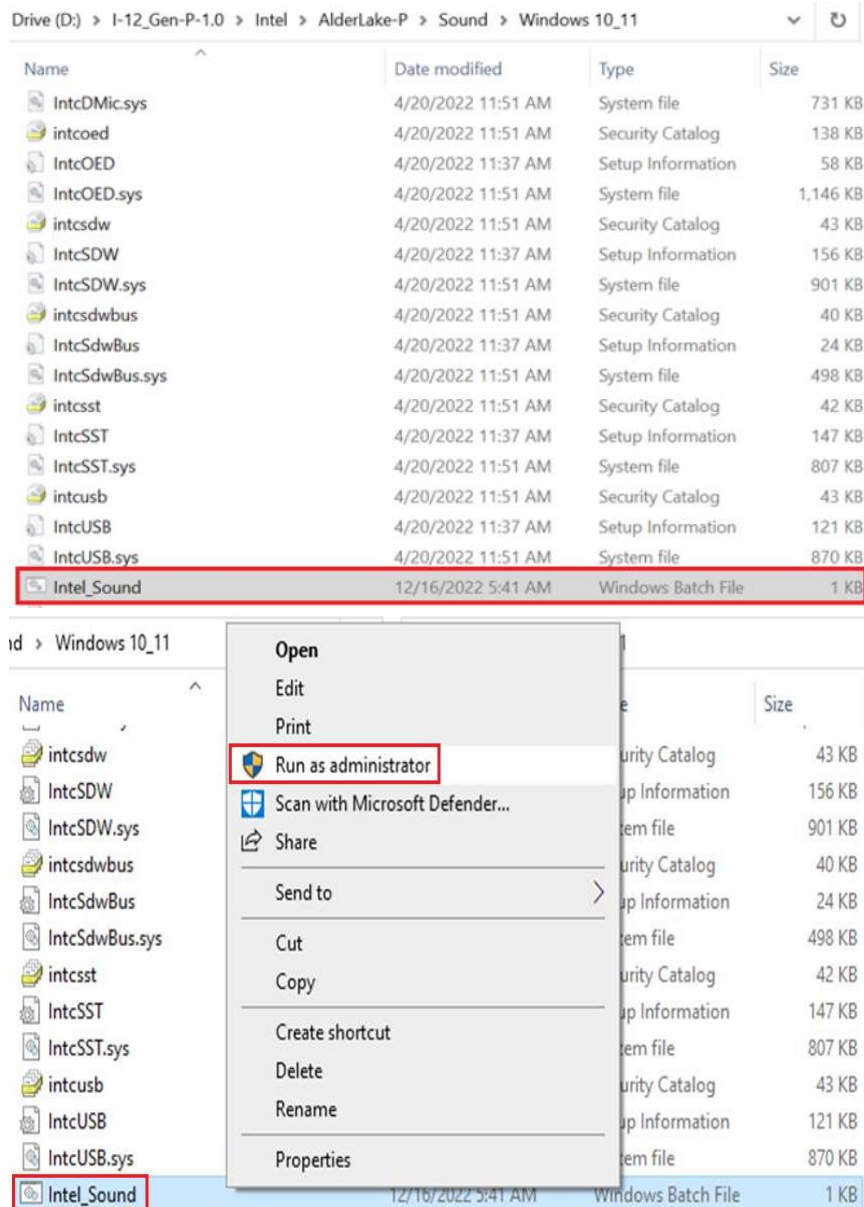
2. After running the batch file, install the audio drivers. Click **Intel** on the left pane and then **Intel(R) AlderLake-P/PS/U Chipset Drivers** on the right.Click **Intel** on the left pane and then **Intel(R) AlderLake-P/PS/U Chipset Drivers**, and **Realtek High Definition Audio Driver** on the right pane.



3. On the *Welcome* screen of the InstallShield Wizard, click **Next** to install the drivers.
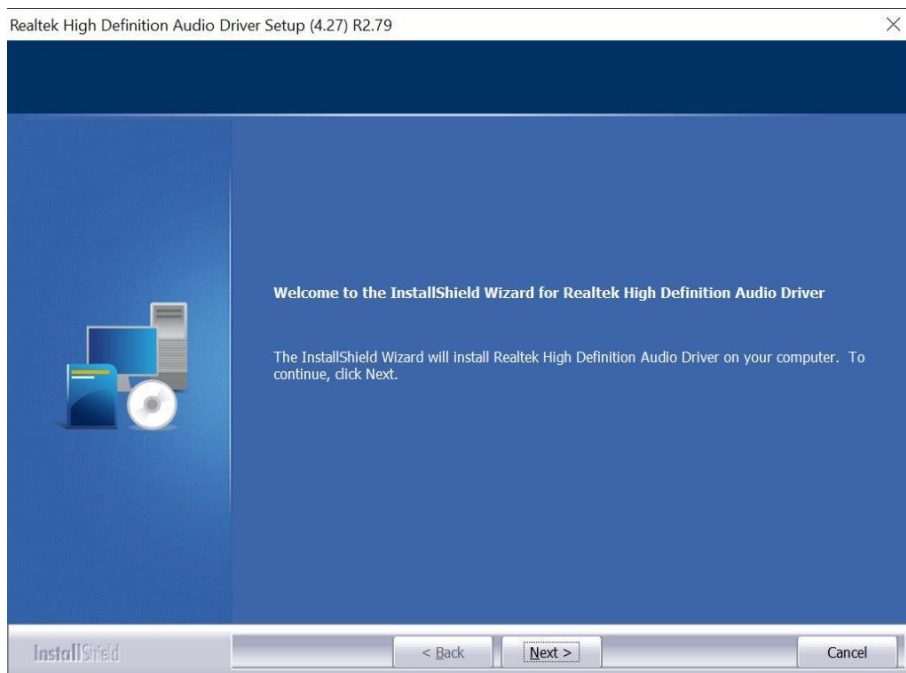


4. When the audio driver has been installed, click **Finish** to restart the computer.

## 3.5   LAN Drivers Installation

1. Click **Intel** on the left pane and then **Intel(R) AlderLake-P/PS/U Chipset Drivers**, and **Intel PRO LAN Network Drivers** on the right pane.



2. Click **Intel Drivers and Software**.

**iBASE**
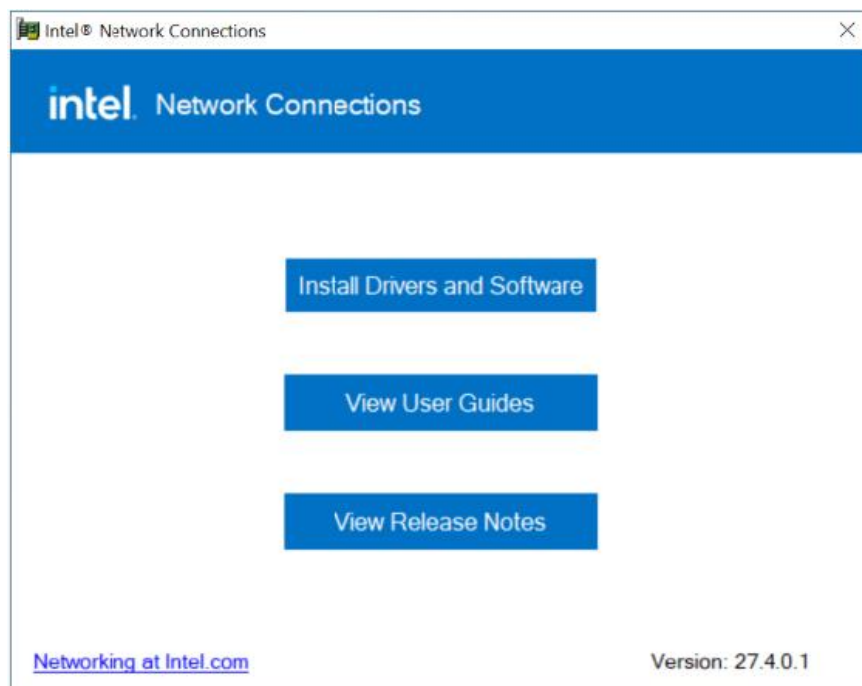
3. When the *Welcome to the install wizard for Intel(R) Network Connection* screen appears, click **Next**. On the next screen, accept the terms in the License Agreement and click **Next**.

4. On the *Setup Options* screen, select the program features you want to be installed. Then click **Next** to continue.
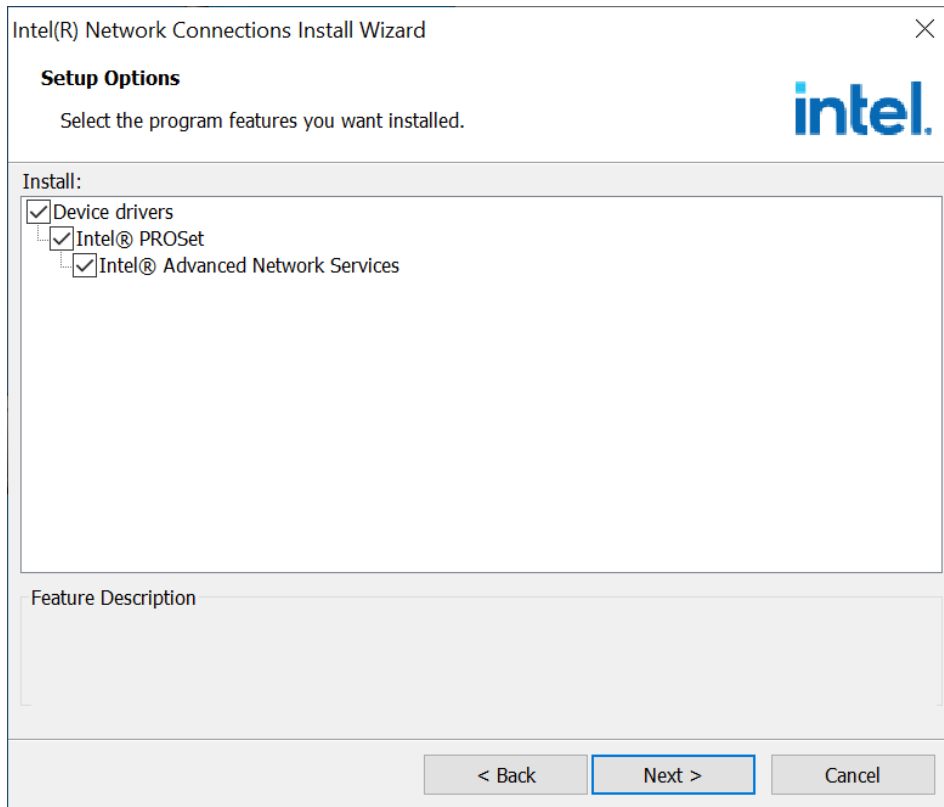


5. On the *Ready to Install the Program* screen, click **Install** to begin the installation. When the *Install wizard Completed* screen appears, click **Finish**.

## 3.6   Intel® Management Engine Components Drivers Installation

1.  Click **Intel** on the left pane and then **Intel(R) AlderLake-P/PS/U Chipset Drivers,** and **Intel(R) ME Drivers** on the right pane..



2.  When the *Welcome* screen appears, click **Next**.
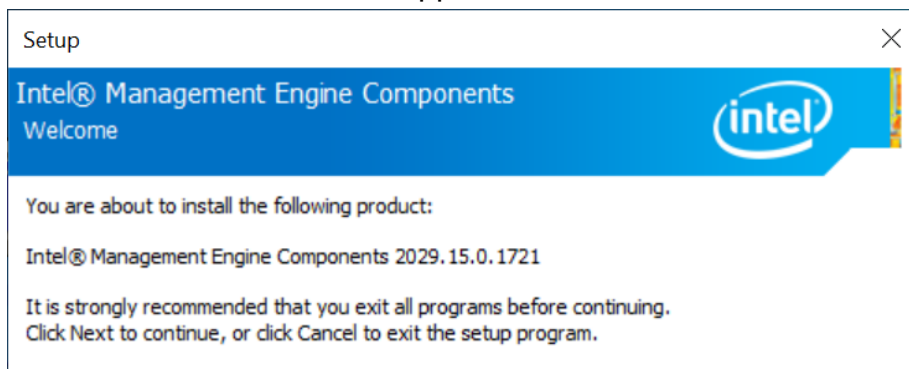


3.  Accept the license agreement and click **Next**.

4.  On the Destination Folder screen, click **Next**.

5.  After Intel Management Engine Components have been successfully installed, click **Finish**.

# iBASE

## 3.7  Intel® Serial I/O Drivers Installation

1. Click **Intel** on the left pane and then **Intel(R) AlderLake-P/PS/U Chipset Drivers,** and **Intel(R) Serial IO Drivers** on the right pane.



2. When the *Welcome* screen to the Intel® Serial IO appears, click **Next**.

You are about to install the following product:

Intel® Serial IO 30.100.2148.1

3. Accept the terms in the license agreement and click **Next**.
4. On the **Readme File Information** and **Confirmation** screens, click **Next**.



5. Click **Finish** when the **Completion** screen appears.

## 3.8   Intel® Thunderbolt Drivers Installation

1. Click **Intel** on the left pane and then **Intel(R) AlderLake-P/PS/U Chipset Drivers,** and **Intel(R) Thunderbolt Drivers** on the right pane.



2. Accept the terms in the license agreement and click **Install**.

3. When installation has been completed, click **Restart**.
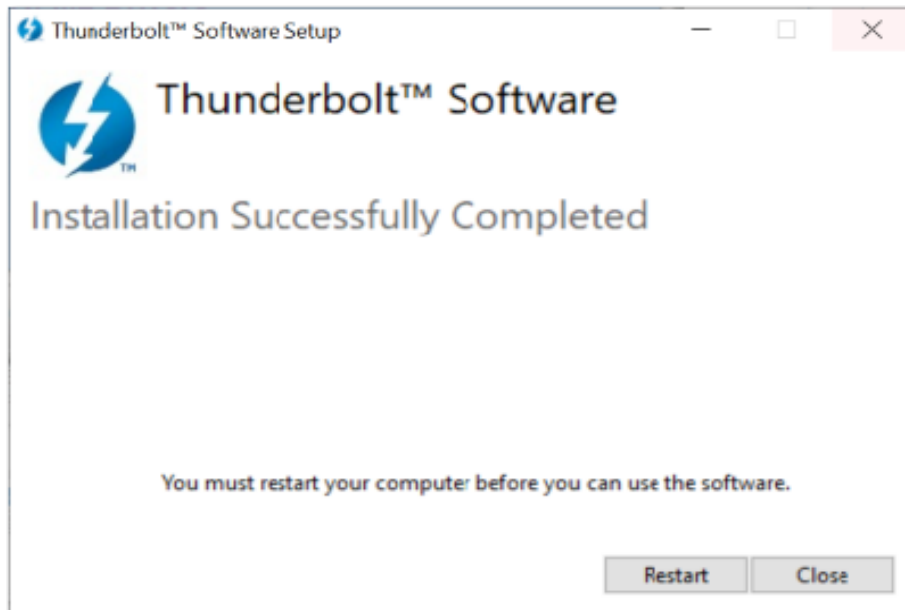
# Chapter 4
# BIOS Setup

This chapter describes the different settings available in the AMI BIOS that comes with the board. The topics covered in this chapter are as follows:

- Main Settings
- Advanced Settings
- Chipset Settings
- Security Settings
- Boot Settings
- Save & Exit

# iBASE

## 4.1 Introduction

The BIOS (Basic Input/Output System) installed in the ROM of your computer system supports Intel® processors. The BIOS provides critical low-level support for standard devices such as disk drives, serial ports and parallel ports. It also provides password protection as well as special support for detailed fine-tuning of the chipset controlling the entire system.

## 4.2 BIOS Setup

The BIOS provides a Setup utility program for specifying the system configurations and settings. The BIOS ROM of the system stores the Setup utility. When you turn on the computer, the BIOS is immediately activated. Press the <Del> key immediately allows you to enter the Setup utility. If you are a little bit late pressing the <Del> key, POST (Power On Self Test) will continue with its test routines, thus preventing you from invoking the Setup.

If you still need to enter Setup, restart the system by pressing the "Reset" button or simultaneously pressing the <Ctrl>, <Alt> and <Delete> keys. You can also restart by turning the system Off and back On again.

The following message will appear on the screen:

```
Press <DEL> to Enter Setup
```

In general, press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help, and <Esc> to quit.

When you enter the BIOS Setup utility, the *Main Menu* screen will appear on the screen. The Main Menu allows you to select from various setup functions and exit choices.

---

**Warning:** It is strongly recommended that you avoid making any changes to the chipset defaults.

These defaults have been carefully chosen by both AMI and your system manufacturer to provide the absolute maximum performance and reliability. Changing the defaults could make the system unstable and crash in some cases.

---

## 4.3 Main Settings
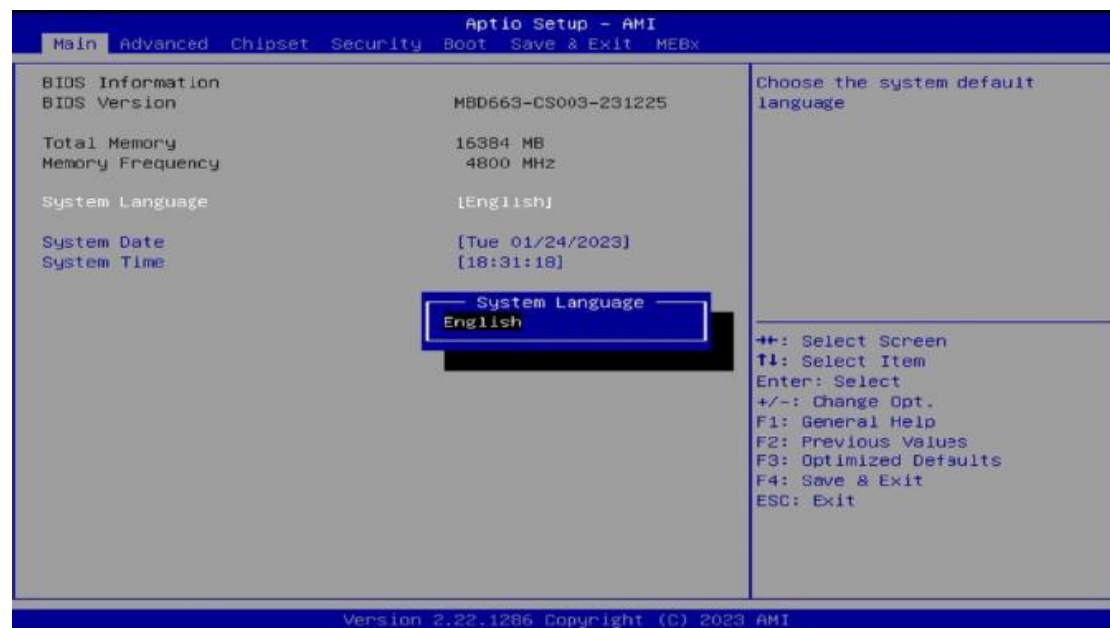


| BIOS Setting | Description |
|---|---|
| System Date | Sets the date.<br>Use the <Tab> key to switch between the date elements. |
| System Time | Set the time.<br>Use the <Tab> key to switch between the time elements. |

## 4.4 Advanced Settings

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

# iBASE

## 4.4.1    CPU Configuration

```
                           Aptio Setup - AMI
         Advanced

  CPU Configuration                                  Displays the E-core Information

▶ Efficient-core Information
▶ Performance-core Information

  ID                          0x906A4
  Brand String                12th Gen Intel(R) Cor...
  VMX                         Supported
  SMX/TXT                     Supported

  Intel (VMX) Virtualization Technol    [Enabled]
  Active Performance-cores              [All]
  Active Efficient-cores                [All]           →←: Select Screen
  AES                                   [Enabled]       ↑↓: Select Item
```
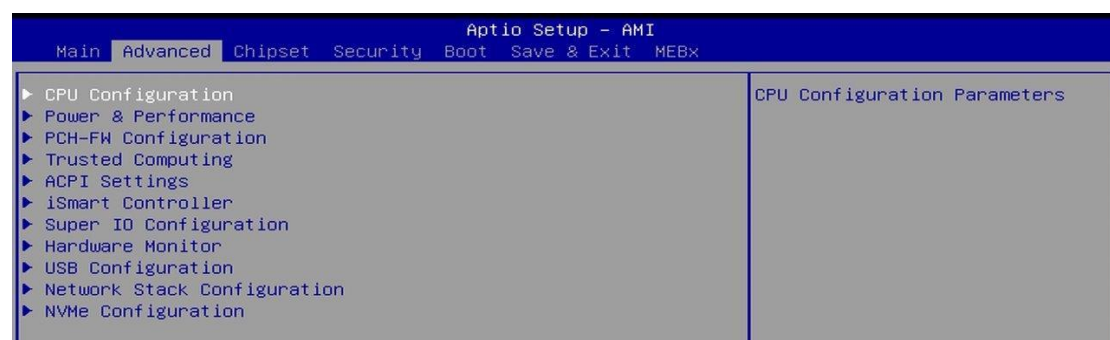
```
Efficient-core Information

L1 Data Cache                    32 KB x 8
L1 Instruction Cache             64 KB x 8
L2 Cache                         2048 KB x 2
L3 Cache                         12 MB
```

```
Performance-core Information

L1 Data Cache                    48 KB x 2
L1 Instruction Cache             32 KB x 2
L2 Cache                         1280 KB x 2
L3 Cache                         12 MB
```

| BIOS Setting | Description |
|---|---|
| Efficient-core Information | Displays the E-core information. |
| Performance-core Information | Displays the P-core information. |
| Intel (VMX) Virtualization Technology | When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology. |
| Active Procesor Cores | Number of cores to enable in each processor package. Number of Core and E-cores are looked at together. When both are [0,0], Pcode will enable all cores. |
| Hyper-Threading | Enable or Disable Hyper-Threading Technology |
| AES | Enable/Disable AES (Advanced Encryption Standard) |

## 4.4.2    Power & Performance

```
                              Aptio Setup – AMI
        Advanced

    Power & Performance                                    CPU – Power Management Control
                                                           Options
  ▶ CPU – Power Management Control
```

```
                              Aptio Setup – AMI
        Advanced

    CPU – Power Management Control                          Allows more than two frequency
                                                           ranges to be supported.
    Intel(R) SpeedStep(tm)            [Enabled]
    Intel(R) Speed Shift Technology   [Enabled]
      Turbo Mode                      [Enabled]
  ▶   Config TDP Configurations
```

```
                              Aptio Setup – AMI
        Advanced

    Config TDP Configurations                              Configurable Processor Base
                                                           Power (cTDP) Mode as
    Configurable TDP Boot Mode        [Nominal]            Nominal/Level/Leve2/Deactivate
    Power Limit 1                     15.0W (MSR:15.0)      TDP selection. Deactivate
    Power Limit 2                     55.0W (MSR:55.0)      option will set MSR to Nominal
                                                           and MMIO to Zero.
```

| BIOS Setting | Description |
| --- | --- |
| CPU – Power Management Control | CPU power management control options. |
| Intel(R) SpeedStep(tm) | Allows more than two frequency ranges to be supported |
| Intel(R) Speed Shift Technology | Enable/Disable Intel(R) Speed Shift Technology support. Enabling will expose the CPPC V2 interface to allow for hardware controlled P-states. |
| Turbo Mode | Enable/Disable processor Turbo mode (requires EMTTM enabled too). AUTO means enabled. |
| Config TDP Configuration | Configurable processor base power (cTDP) configuration |

# iBASE

## 4.4.3 PCH-FW Configuration

```
                        Aptio Setup - AMI
   Advanced

ME Firmware Version          16.1.27.2238
ME Firmware Mode             Normal Mode
ME Firmware SKU              Corporate SKU




                                                →←: Select Screen
                                                ↑↓: Select Item
                                                Enter: Select
                                                +/-: Change Opt.
                                                F1: General Help
                                                F2: Previous Values
                                                F3: Optimized Defaults
                                                F4: Save & Exit
                                                ESC: Exit



             Version 2.22.1286 Copyright (C) 2023 AMI
```

## 4.4.4    Trusted Computing

```
                          Aptio Setup - AMI
  ┌──────────┐
  │ Advanced │
  └──────────┘
   TPM 2.0 Device Found                              Enables or Disables BIOS
   Firmware Version:         600.18                  support for security device.
   Vendor:                   INTC                    O.S. will not show Security
                                                     Device. TCG EFI protocol and
   Security Device Support   [Enable]                INT1A interface will not be
   Active PCR banks          SHA256                  available.
   Available PCR banks       SHA256,SHA384,SM3

   SHA256 PCR Bank           [Enabled]
   SHA384 PCR Bank           [Disabled]
   SM3_256 PCR Bank        ┌──── Security Device Support ────┐
                           │ Disable                         │
   Pending operation       │ Enable                          │
   Platform Hierarchy      └─────────────────────────────────┘
   Storage Hierarchy                                 Select Screen
   Endorsement Hierarchy     [Enabled]               Select Item
   Physical Presence Spec Version  [1.3]             Enter: Select
   TPM 2.0 InterfaceType     [CRB]                   +/-: Change Opt.
   Device Select             [Auto]                  F1: General Help
   Disable Block Sid         [Disabled]              F2: Previous Values
                                                     F3: Optimized Defaults
                                                     F4: Save & Exit
                                                     ESC: Exit

                   Version 2.22.1286 Copyright (C) 2023 AMI
```

| BIOS Setting | Description |
|---|---|
| Security Device Support | Enables / Disables BIOS support for security device. OS will not show security device. TCG EFI protocol and INTIA interface will not be available. |
| SHA256 PCR Bank<br>SHA384 PCR Bank<br>SM3_256 PCR Bank | Options: Enable / Disable |
| Pending operation | Schedule an operation for the security device.<br>Note: Your computer will reboot during restart in order to change state of security device. |
| Platform / Storage / Endorsement Hierarchy | Options: Enable / Disable |
| Physical Presence Spec Version | Select to tell OS to support PPI Spect Version 1.2 or 1.3. Some HCK tests might not support 1.3. |
| TPM 2.0 InterfaceType | Default: CRB |
| Device Select | TPM 1.2 will restrict support to TPM 1.2 devices. TPM 2.0 will restrict support to TPM 2.0 devices. Auto will support both with the default set to TPM 2.0 devices. If not found, TPM 1.2 devices will be enumerated. |
| Disable Block Sid | Override to allow SID authentication in TCG storage device. |

## iBASE

### 4.4.5    ACPI Settings

```
                            Aptio Setup – AMI
   [Advanced]
══════════════════════════════════════════════════════════════════════════════
 ACPI Settings                                       Enables or Disables System
                                                     ability to Hibernate (OS/S4
 Enable Hibernation               [Disabled]         Sleep State). This option may
 ACPI Sleep State                 [Suspend Disabled] not be effective with some
                                                     operating systems.



                  ┌──── Enable Hibernation ────┐
                  │ Disabled                    │
                  │ Enabled                     │
                  └─────────────────────────────┘     →←: Select Screen
                                                     ↑↓: Select Item
                                                     Enter: Select
                                                     +/–: Change Opt.
                                                     F1: General Help
                                                     F2: Previous Values
                                                     F3: Optimized Defaults
                                                     F4: Save & Exit
                                                     ESC: Exit



══════════════════════════════════════════════════════════════════════════════
                Version 2.22.1286 Copyright (C) 2023 AMI
```

| BIOS Setting | Description |
|---|---|
| Enable Hibernation | Enables / Disables system ability to hibernate (OS/S4 Sleep State). This option may not be effective with some operating systems. |
| ACPI Sleep State | Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed. |

## 4.4.6    iSmart Controller

```
                              Aptio Setup - AMI
   Advanced

   iSmart Controller

   Power-On after Power failure        [Enable]
   PWR Resume Delay                    [Disable]
   Temperature Guardian                [Disable]
   Schedule Slot 1                     [None]
   Schedule Slot 2                     [None]


                  ┌──── Power-On after Power failure ────┐
                  │ Disable                              │
                  │ Enable                               │
                                                          Select Screen
                                                          Select Item
                                                         Enter: Select
                                                         +/-: Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
                                                         F3: Optimized Defaults
                                                         F4: Save & Exit
                                                         ESC: Exit



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```

| BIOS Setting | Description |
|---|---|
| Power-On after Power failure | Enables / Disables the system to be turned on automatically after a power failure. |
| PWR Resume Delay | Enables / Disables Power on resume delay. |
| Temperature Guardian | Options: Disable / Enable |
| Schedule Slot 1 / 2 | Sets up the hour / minute for system powe-on.<br><br>**Important:** If you would like to set up a schedule between adjacent days, configure two schedule slots.<br><br>For example, if setting up a schedule from Wednesday 5 p.m. to Thursday 2 a.m., configure two schedule slots. But if setting up a schedule from 3 p.m to 5 p.m. on Wednesday, configure only a schedule slot. |

# iBASE

## 4.4.7     F81804 Super IO Configuration

```
                            Aptio Setup – AMI
    Advanced

 Super IO Configuration                               Set Parameters of Serial Port
                                                      1 (COMA)
 Super IO Chip                    F81804
▶ Serial Port 1 Configuration



                                                      →←: Select Screen
                                                      ↑↓: Select Item
                                                      Enter: Select
                                                      +/-: Change Opt.
                                                      F1: General Help
                                                      F2: Previous Values
                                                      F3: Optimized Defaults
                                                      F4: Save & Exit
                                                      ESC: Exit


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```

```
                            Aptio Setup – AMI
    Advanced

 Serial Port 1 Configuration                          Select an optimal settings for
                                                      Super IO Device
 Serial Port                      [Enabled]
 Device Settings                  IO=3F8h; IRQ=4;

 Change Settings                  [Auto]

                  ┌──────── Change Settings ────────┐
                  │ Auto                             │
                  │ IO=3F8h;  IRQ=4;                 │
                  │ IO=3F8h;  IRQ=3,4,5,6,7,9,10,11,12;│
                  │ IO=2F8h;  IRQ=3,4,5,6,7,9,10,11,12;│
                  │ IO=3E8h;  IRQ=3,4,5,6,7,9,10,11,12;│ Select Screen
                  │ IO=2E8h;  IRQ=3,4,5,6,7,9,10,11,12;│ Select Item
```

| BIOS Setting | Description |
| --- | --- |
| Serial Port 1 Configuration | Sets parameters of Serial Port 1 (COMA). |
| Serial Port | Enable / Disable the serial port. |
| Change Settings | Select an optimal setting for the Super IO device. |

## 4.4.8    Hardware Monitor

```
                              Aptio Setup - AMI
   Advanced

 Pc Health Status                                        Smart Fan  Mode Select

 CPU Smart Fan Function             [Disabled]
 SYS Smart Fan Function             [Disabled]
 CPU Temperature                    : +40 C
 SYS Temperature                    : +36 C
 CPU Fan Speed                      : N/A
 SYS Fan Speed                      : N/A
 VCORE                    ─── CPU Smart Fan Function ───
 VCC5V                   Disabled
                         50 C
                         60 C
                         70 C
                         80 C                    ←: Select Screen
                         90 C                    ↓: Select Item
                                                 nter: Select
                                                 /-: Change Opt.
                                                 F1: General Help
                                                 F2: Previous Values
                                                 F3: Optimized Defaults
                                                 F4: Save & Exit
                                                 ESC: Exit


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```

| BIOS Setting | Description |
|---|---|
| Temperatures / Voltages | These fields are the parameters of the hardware monitoring function feature of the motherboard. The values are read-only values as monitored by the system and show the PC health status. |
| CPU Smart Fan Function SYS Smart Fan Function | Smart Fan Mode Select |

### 4.4.9    USB Configuration

```
                              Aptio Setup - AMI
    Advanced

 USB Configuration                                      Enables Legacy USB support.
                                                        AUTO option disables legacy
 USB Module Version               28                    support if no USB devices are
                                                        connected. DISABLE option will
 USB Controllers:                                       keep USB devices available
     2 XHCIs                                            only for EFI applications.
 USB Devices:
     1 Keyboard, 1 Mouse

 Legacy USB Support              [Enabled]
 XHCI Hand-off               ┌─── Legacy USB Support ───┐
 USB Mass Storage Driver Support │ Enabled                │
                                 │ Disabled               │
 USB hardware delays and time-out│ Auto                   │
 USB transfer time-out           └────────────────────────┘ →←: Select Screen
 Device reset time-out                                  ↑↓: Select Item
 Device power-up delay           [Auto]                 Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit



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```

| BIOS Setting | Description |
| --- | --- |
| Legacy USB Support | • **Enable:** Enables Ledacy USB Support.<br>• **Auto:** Disables legacy support if no USB devices are connected.<br>• **Disable:** Keeps USB devices available only for EFI applications. |
| XHCI Hand-off | This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver. |
| USB Mass Storage Driver Support | Enables / Disables the support for USB mass storage driver. |
| USB Transfer time-out | The time-out value for Control, Bulk, and Interrupt transfers. |
| Device reset time-out | Seconds of delaying execution of start unit command to USB mass storage device. |
| Device power-up delay | The maximum time the device will take before it properly reports itself to the Host Controller.<br><br>"Auto" uses default value for a Root port it is 100ms. But for a Hub port, the delay is taken from Hub descriptor. |

## 4.4.10   Network Stack Configuration

```
                            Aptio Setup — AMI
    Advanced

 Network Stack                    [Disabled]            Enable/Disable UEFI Network
                                                        Stack




                        ┌─── Network Stack ───┐
                        │ Disabled            │
                        │ Enabled             │
                        └─────────────────────┘       →←: Select Screen
                                                       ↑↓: Select Item
                                                       Enter: Select
                                                       +/−: Change Opt.
                                                       F1: General Help
                                                       F2: Previous Values
                                                       F3: Optimized Defaults
                                                       F4: Save & Exit
                                                       ESC: Exit




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```

```
                            Aptio Setup — AMI
    Advanced

 Seg:Bus:Dev:Func                00:01:00:00
 Model Number                    M.2 (P80) 3TE4
 Total Size                      240.0 GB
 Vendor ID                       126F
 Device ID                       2263

 Namespace: 1                    Size: 240.0 GB
```

| BIOS Setting | Description |
| --- | --- |
| Network Stack | Enables / Disables UEFI Network Stack. |

# iBASE

## 4.4.11　NVMe Configuration

```
                          Aptio Setup - AMI
 ┌──────────┐
 │ Advanced │
 └──────────┘

   NVMe Configuration

 ▶ M.2 (P80) 3TE4


                                              →←: Select Screen
                                              ↑↓: Select Item
                                              Enter: Select
                                              +/-: Change Opt.
                                              F1: General Help
                                              F2: Previous Values
                                              F3: Optimized Defaults
                                              F4: Save & Exit
                                              ESC: Exit


                 Version 2.22.1286 Copyright (C) 2023 AMI
```

## 4.5 Chipset Settings

```
                              Aptio Setup - AMI
      Main  Advanced  Chipset  Security  Boot  Save & Exit  MEBx
 ▶ System Agent (SA) Configuration              System Agent (SA) Parameters
 ▶ PCH-IO Configuration




                                               →←: Select Screen
                                               ↑↓: Select Item
                                               Enter: Select
                                               +/-: Change Opt.
                                               F1: General Help
                                               F2: Previous Values
                                               F3: Optimized Defaults
                                               F4: Save & Exit
                                               ESC: Exit



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```

| BIOS Setting | Description |
|---|---|
| System Agent (SA) Configuration | System Agent (SA) parameters |
| PCH-IO Configuration | PCH parameters |

# iBASE

## 4.5.1　System Agent (SA) Configuration

```
                          Aptio Setup - AMI
        Chipset

System Agent (SA) Configuration                         Graphics Configuration

VT-d                               Supported

▶ Graphics Configuration

VT-d                               [Enabled]


                                                        ↔: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit



                   Version 2.22.1286 Copyright (C) 2023 AMI
```
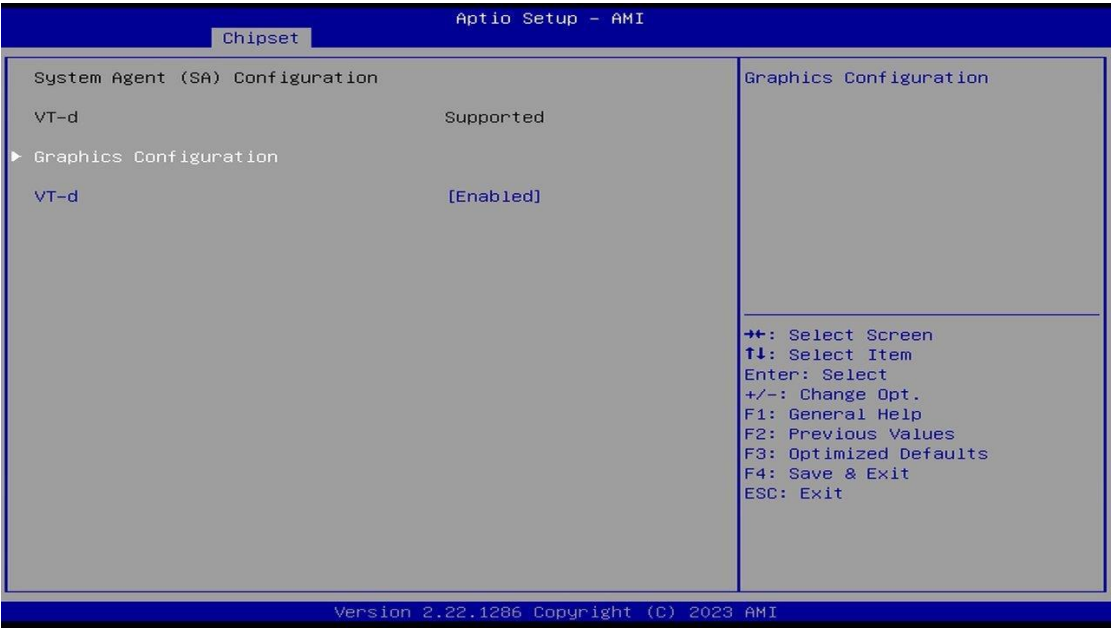
| BIOS Setting | Description |
|---|---|
| System Agent (SA) Configuration | System Agent (SA) Parameters |
| Graphics Configuration | Configures the graphics settings. |
| VT-d | Checks if VT-d function on MCH is supported. |

## 4.5.1.1. Graphics Configuration

```
                              Aptio Setup - AMI
    Chipset

 Graphics Configuration                               Graphics turbo IMON current
                                                      values supported (14-31)
 Graphics Turbo IMON Current        31

 GTT Size                           [8MB]
 Aperture Size                      [256MB]
 PSMI SUPPORT                       [Disabled]
 DVMT Pre-Allocated                 [60M]




                                                      →←: Select Screen
                                                      ↑↓: Select Item
                                                      Enter: Select
                                                      +/-: Change Opt.
                                                      F1: General Help
                                                      F2: Previous Values
                                                      F3: Optimized Defaults
                                                      F4: Save & Exit
                                                      ESC: Exit



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```
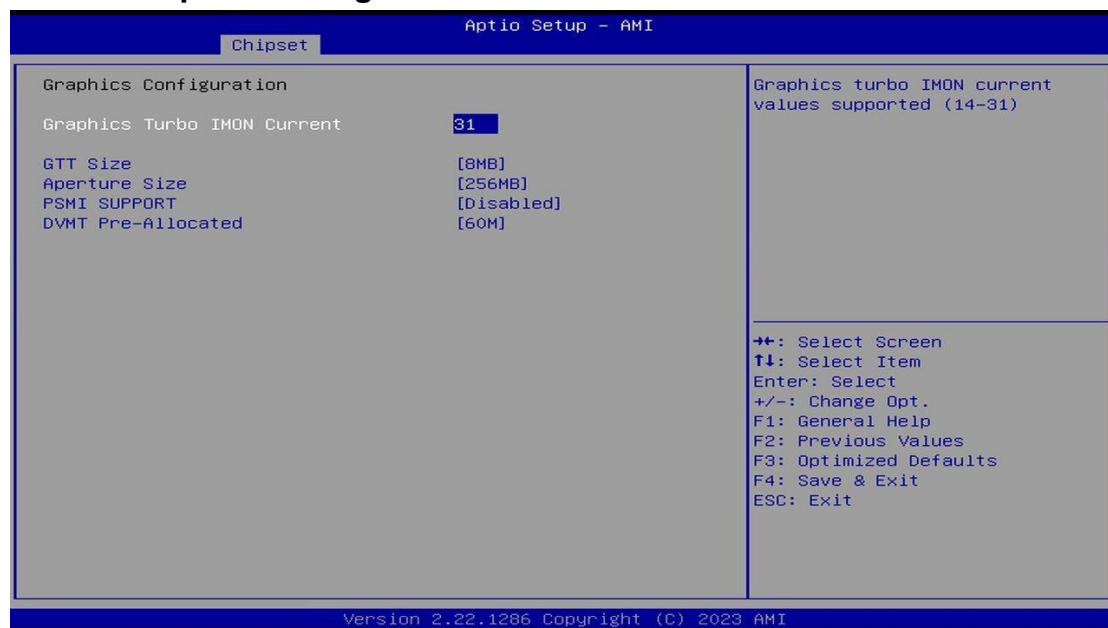
| BIOS Setting | Description |
|---|---|
| Graphics Turbo IMON Current | Graphics turbo IMON current values supported (14-31) |
| GTT Size | Sets the GTT size as 2 MB, 4 MB, or 8 MB. |
| Aperture Size | Sets the aperture size as 128 MB, 256 MB, 512 MB, 1024 MB or 2048 MB.<br>**Note:** Above 4 GB MMIO BIOS assignment is automatically enabled when selecting 2048 MB aperture. To use this feature, disable CSM support. |
| PSMI Support | Options: Enable / Disable |
| DVMT Pre-Allocated | Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the internal graphics device. |

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## 4.5.2 PCH-IO Configuration

```
                            Aptio Setup - AMI
        Chipset

  PCH-IO Configuration                              SATA Device Options Settings

▶ SATA Configuration
```

| BIOS Setting | Description |
|---|---|
| SATA Configuration | Configures SATA devices. |

## 4.5.2.1. SATA Configuration:

```
                            Aptio Setup - AMI
        Chipset

  SATA Configuration                                Enable/Disable SATA Device.

  SATA Controller(s)            [Enabled]

  Serial ATA Port 0             Empty
    Software Preserve           Unknown
    Port 0                      [Enabled]
    Hot Plug                    [Disabled]
  Serial ATA Port 1             Empty
    Software Preserve           Unknown
    Port 1                      [Enabled]
    Hot Plug                    [Disabled]
  Serial ATA Port 2             Empty
    Software Preserve           Unknown          ──────────────────────────
    Port 2                      [Enabled]        →←: Select Screen
    Hot Plug                    [Disabled]       ↑↓: Select Item
                                                 Enter: Select
                                                 +/-: Change Opt.
                                                 F1: General Help
                                                 F2: Previous Values
                                                 F3: Optimized Defaults
                                                 F4: Save & Exit
                                                 ESC: Exit



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```

| BIOS Setting | Description |
|---|---|
| SATA Controller(s) | Enables / Disables the SATA device. |
| Serial ATA Ports | Enables / Disables serial ATA ports. |
| SATA Ports Hot Plug | Enables / Disables SATA Ports Hot Plug. |

## 4.6   Security Settings

```
                            Aptio Setup - AMI
    Main  Advanced  Chipset  Security  Boot  Save & Exit  MEBx

  Password Description                        Set Administrator Password

  If ONLY the Administrator's password is set,
  then this only limits access to Setup and is
  only asked for when entering Setup.
  If ONLY the User's password is set, then this
  is a power on password and must be entered to
  boot or enter Setup. In Setup the User will
  have Administrator rights.
  The password length must be
  in the following range:
  Minimum length            — Create New Password —
  Maximum length            _
                                                      →←: Select Screen
  Administrator Password                              ↑↓: Select Item
  User Password                                       Enter: Select
                                                      +/-: Change Opt.
▶ Secure Boot                                         F1: General Help
                                                      F2: Previous Values
                                                      F3: Optimized Defaults
                                                      F4: Save & Exit
                                                      ESC: Exit



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```

| BIOS Setting | Description |
|---|---|
| Administrator Password | Sets an administrator password for the setup utility. |
| User Password | Sets a user password. |
| Secure Boot | Configures Secure Boot. |

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## 4.6.1    Secure Boot



| BIOS Setting | Description |
|---|---|
| Secure Boot | Secure Boot feature is Active if Secure Boot is enabled. Platform Key (PK) Is enrolled and the system is in User mode. The mode change requires platform reset. |
| Secure Boot Mode | Secure Boot mode options: Standard or Custom. In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication. |
| Restore Factory Keys | Forces system to user mode. Install factory default Secure Boot key databases. |
| Key Management | Enables expert users to modify Secure Boot Policy variables without full authentication. |

## 4.7   Boot Settings

```
                             Aptio Setup - AMI
    Main  Advanced  Chipset  Security  Boot  Save & Exit  MEBx

    Boot Configuration                                 Number of seconds to wait for
    Setup Prompt Timeout          1                    setup activation key.
    Bootup NumLock State          [On]                 65535(0xFFFF) means indefinite
    Quiet Boot                    [Disabled]           waiting.


    FIXED BOOT ORDER Priorities
    Boot Option #1                [Hard Disk]
    Boot Option #2                [NVME:Windows Boot ...]
    Boot Option #3                [CD/DVD]
    Boot Option #4                [SD]
    Boot Option #5                [USB Hard Disk]
    Boot Option #6                [USB CD/DVD]
    Boot Option #7                [USB Key]            →←: Select Screen
    Boot Option #8                [USB Floppy]         ↑↓: Select Item
    Boot Option #9                [USB Lan]            Enter: Select
    Boot Option #10               [Network]            +/-: Change Opt.
                                                       F1: General Help
  ▶ UEFI NVME Drive BBS Priorities                     F2: Previous Values
                                                       F3: Optimized Defaults
                                                       F4: Save & Exit
                                                       ESC: Exit




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```
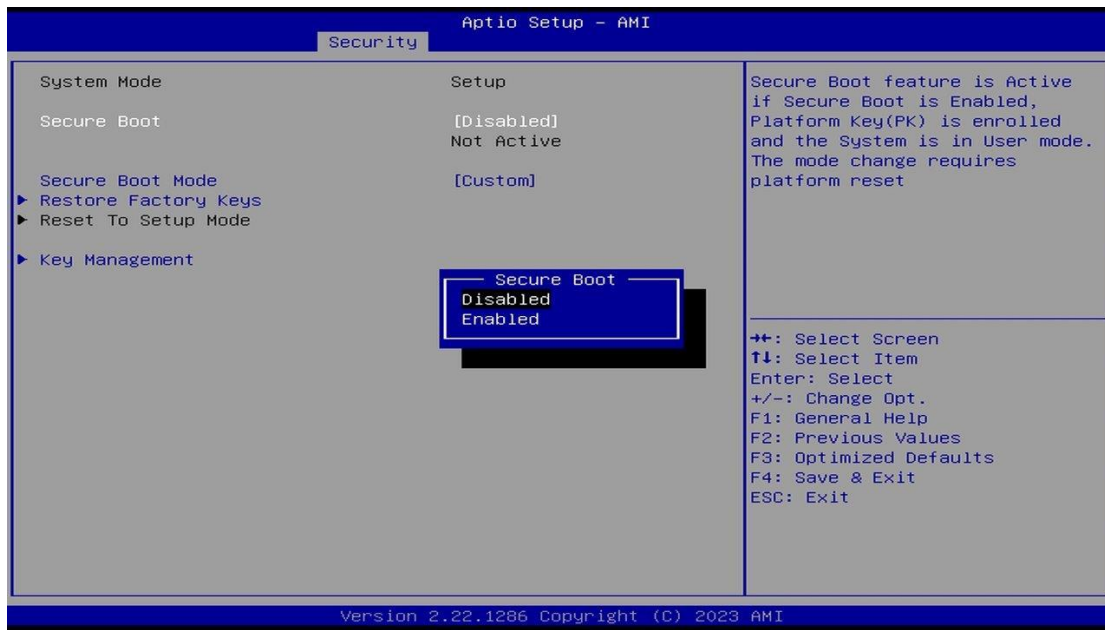
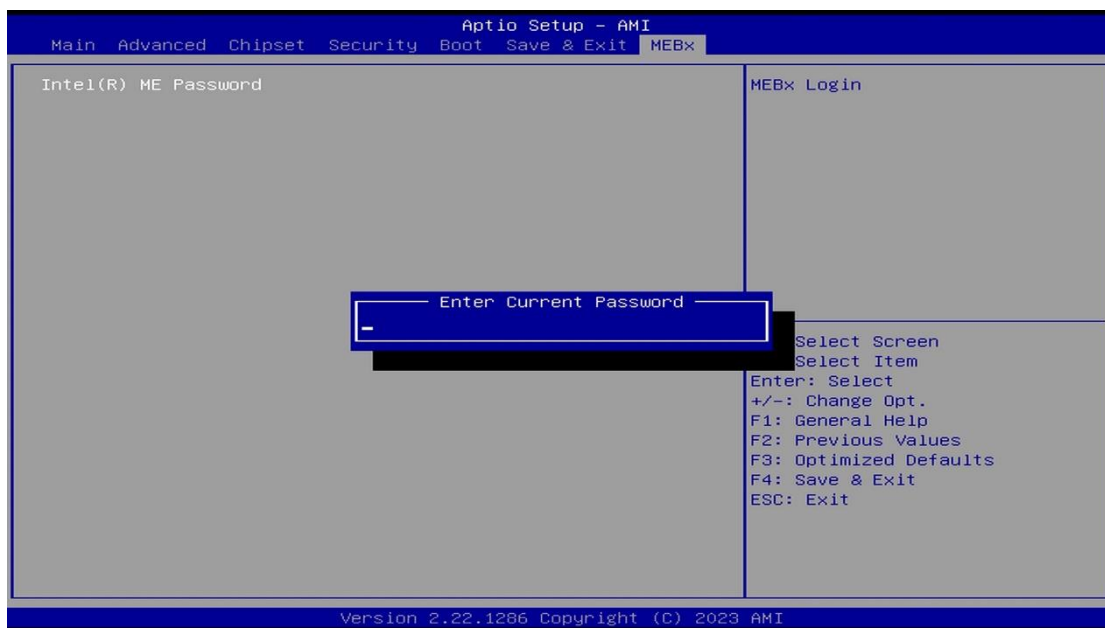| BIOS Setting | Description |
|---|---|
| Setup Prompt Timeout | Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting. |
| Bootup NumLock State | Selects the keyboard NumLock state. |
| Quiet Boot | Enables / Disables Quiet Boot option. |
| Boot Option Priorities | Sets the system boot order. |
| UEFI NVME Drive BBS Priorities | Specifies the boot device priority sequence from available UEFI NVME drives. |

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## 4.8 Save & Exit Settings

```
                            Aptio Setup – AMI
   Main  Advanced  Chipset  Security  Boot  Save & Exit  MEBx

  Save Options                                Exit system setup after saving
  Save Changes and Exit                       the changes.
  Discard Changes and Exit

  Save Changes and Reset
  Discard Changes and Reset

  Save Changes
  Discard Changes

  Default Options
  Restore Defaults
  Save as User Defaults                       ➔←: Select Screen
  Restore User Defaults                       ↑↓: Select Item
                                              Enter: Select
                                              +/−: Change Opt.
                                              F1: General Help
                                              F2: Previous Values
                                              F3: Optimized Defaults
                                              F4: Save & Exit
                                              ESC: Exit


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```

| BIOS Setting | Description |
|---|---|
| Save Changes and Exit | Exits system setup after saving the changes. |
| Discard Changes and Exit | Exits system setup without saving any changes. |
| Save Changes and Reset | Resets the system after saving the changes. |
| Discard Changes and Reset | Resets system setup without saving any changes. |
| Save Changes | Saves changes done so far to any of the setup options. |
| Discard Changes | Discards changes done so far to any of the setup options. |
| Restore Defaults | Restores / Loads defaults values for all the setup options. |
| Save as User Defaults | Saves the changes done so far as User Defaults. |
| Restore User Defaults | Restores the user defaults to all the setup options. |

## 4.9 MEBx

```
                          Aptio Setup - AMI
    Main  Advanced  Chipset  Security  Boot  Save & Exit  MEBx

    Intel(R) ME Password                              MEBx Login




                    ┌───── Enter Current Password ─────┐
                    │ _                                │
                    └──────────────────────────────────┘ Select Screen
                                                      Select Item
                                                 Enter: Select
                                                 +/-: Change Opt.
                                                 F1: General Help
                                                 F2: Previous Values
                                                 F3: Optimized Defaults
                                                 F4: Save & Exit
                                                 ESC: Exit




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```

# Appendix

This section provides the mapping addresses of peripheral devices and the sample code of watchdog timer configuration.

- I/O Port Address Map
- Interrupt Request Lines (IRQ)

## A. I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses which also becomes the identity of the device. The following table lists the I/O port addresses used.

| Address | Device Description |
|---|---|
| 0x00000A00-0x00000A0F | Motherboard resources |
| 0x00000A10-0x00000A1F | Motherboard resources |
| 0x00000A20-0x00000A2F | Motherboard resources |
| 0x0000002E-0x0000002F | Motherboard resources |
| 0x0000004E-0x0000004F | Motherboard resources |
| 0x00000061-0x00000061 | Motherboard resources |
| 0x00000063-0x00000063 | Motherboard resources |
| 0x00000065-0x00000065 | Motherboard resources |
| 0x00000067-0x00000067 | Motherboard resources |
| 0x00000070-0x00000070 | Motherboard resources |
| 0x00000070-0x00000070 | System CMOS/real time clock |
| 0x00000080-0x00000080 | Motherboard resources |
| 0x00000092-0x00000092 | Motherboard resources |
| 0x000000B2-0x000000B3 | Motherboard resources |
| 0x00000680-0x0000069F | Motherboard resources |
| 0x0000FFFF-0x0000FFFF | Motherboard resources |
| 0x0000FFFF-0x0000FFFF | Motherboard resources |
| 0x0000FFFF-0x0000FFFF | Motherboard resources |
| 0x00001800-0x000018FE | Motherboard resources |
| 0x0000164E-0x0000164F | Motherboard resources |
| 0x00000800-0x0000087F | Motherboard resources |
| 0x000000F0-0x000000F0 | Numeric data processor |
| 0x0000F050-0x0000F057 | Standard SATA AHCI Controller |
| 0x0000F040-0x0000F043 | Standard SATA AHCI Controller |
| 0x0000F020-0x0000F03F | Standard SATA AHCI Controller |
| 0x000003F8-0x000003FF | Communications Port (COM1) |
| 0x00000040-0x00000043 | System timer |
| 0x00000050-0x00000053 | System timer |

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| Address | Device Description |
|---|---|
| 0x00000000-0x00000CF7 | PCI Express Root Complex |
| 0x00000020-0x00000021 | Programmable interrupt controller |
| 0x00000024-0x00000025 | Programmable interrupt controller |
| 0x00000028-0x00000029 | Programmable interrupt controller |
| 0x0000002C-0x0000002D | Programmable interrupt controller |
| 0x0000002E-0x0000002F | Motherboard Resources |
| 0x00000030-0x00000031 | Programmable interrupt controller |
| 0x00000034-0x00000035 | Programmable interrupt controller |
| 0x00000038-0x00000039 | Programmable interrupt controller |
| 0x0000003C-0x0000003D | Programmable interrupt controller |
| 0x00000040-0x00000043 | System timer |
| 0x00000060-0x00000060 | Standard PS/2 Keyboard |
| 0x00000061-0x00000061 | Motherboard resources |
| 0x00000063-0x00000063 | Motherboard resources |
| 0x00000064-0x00000064 | Standard PS/2 Keyboard |
| 0x00000067-0x00000067 | Motherboard resources |
| 0x00000070-0x00000070 | Motherboard resources |
| 0x00000080-0x00000080 | Motherboard resources |
| 0x00000092-0x00000092 | Motherboard resources |
| 0x000000A0-0x000000A1 | Programmable interrupt controller |
| 0x000000A4-0x000000A5 | Programmable interrupt controller |
| 0x000000A8-0x000000A9 | Programmable interrupt controller |
| 0x000000AC-0x000000AD | Programmable interrupt controller |
| 0x000000B0-0x000000B1 | Programmable interrupt controller |
| 0x000000B2-0x000000B3 | Motherboard resources |
| 0x000000B4-0x000000B5 | Programmable interrupt controller |
| 0x000000B8-0x000000B9 | Programmable interrupt controller |
| 0x000000BC-0x000000BD | Programmable interrupt controller |
| 0x000002F8-0x000002FF | Communication Port (COM2) |
| 0x000003F8-0x000003FF | Communication Port (COM1) |
| 0x000004D0-0x000004D1 | Programmable interrupt controller |
| 0x00000680-0x0000069F | Motherboard resources |
| 0x00000A00-0x00000A0F | Motherboard resources |

| 0x00000A20-0x00000A2F | Motherboard resources |
|---|---|
| 0x00000D00-0x0000FFFF | PCI Express Root Complex |
| 0x0000164E-0x0000164F | Motherboard resources |
| 0x00001800-0x000018FE | Motherboard resources |
| 0x00001854-0x00001857 | Motherboard resources |
| 0x00002000-0x000020FE | Motherboard resources |
| 0x00004000-0x0000403F | Intel(R) Iris (R) Xe Graphics |
| 0x00004060-0x0000407F | Standard SATA AHCI Controller |
| 0x00004080-0x00004083 | Standard SATA AHCI Controller |
| 0x00004090-0x00004097 | Standard SATA AHCI Controller |
| 0x00004060-0x0000407F | Standard SATA AHCI Controller |
| 0x0000EFA0-0x0000EFBF | Intel(R) SMBus – A0A3 |
| 0x0000FFF8-0x0000FFFF | Intel(R) Active Management Technology SOL (COM3) |

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## B. Interrupt Request Lines (IRQ)

Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

| Level | Function |
|---|---|
| IRQ 0 | System timer |
| IRQ 1 | Standard PS/2 Keyboard |
| IRQ 3 | Communications Port (COM2) |
| IRQ 4 | Communications Port (COM1) |
| IRQ 12 | Microsoft PS/2 Mouse |
| IRQ 14 | Intel(R) GPIO Controller 34Cs |
| IRQ 16 | High Definition Audio Controller |
| IRQ 17 | USB Synopsys Controller |
| IRQ 19 | Intel(R) Active Management Technology SOL (COM3) |
| IRQ 28 | Trusted Platform Module 2.0 |
| IRQ 55 ~ IRQ 204 | Microsoft ACPI-Compliant System |
| IRQ 256 ~ IRQ 511 | Microsoft ACPI-Compliant System |
| IRQ 4294967246 | Intel(R) Management Engine Interface |
| IRQ 4294967247 | Intel(R) Ethernet Connection (132) I219-V |
| IRQ 4294967248~53 | Intel(R) I211 Gigabit Network Connection |
| IRQ 4294967254~85 | Standard SATA AHCI Controller |
| IRQ 4294967256 | Intel(R) Iris (R) Xe Graphics |
| IRQ 4294967287~88 | Intel(R) USB 3.10 eXtensible Host Controller - 1.20 (Microsoft) |
| IRQ 4294967289 | Intel(R) PCI Express Root Port #7 – A0Be |
| IRQ 4294967289 | Intel(R) Management Engine Interface |
| IRQ 4294967291~94 | PCI Express Root Port |