

INA1607

**Desktop uCPE/SD-WAN Appliance
with Intel® Atom® x7405C**

User's Manual

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CE

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This product has been tested and found to comply with the limits for a Class A 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.

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Green IBASE



This product is compliant with the current RoHS 2 restrictions and prohibits use of the following substances in concentrations exceeding 0.1% by weight (1000 ppm) except for cadmium, limited to 0.01% by weight (100 ppm).

- 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

Important Safety Information

Carefully read the following safety information before using the device.

Setting up your system:

- Put the device horizontally on a stable and solid surface.
- Slots and openings on the chassis are for ventilation. Do not block or cover these openings. Make sure you leave plenty of space around the device for ventilation. NEVER INSERT OBJECTS OF ANY KIND INTO THE VENTILATION OPENINGS.
- Use this product in environments with ambient temperatures between 0°C and 40°C.
- AVOID PLACING THIS DEVICE IN ENVIRONMENTS WHERE THE STORAGE TEMPERATURE MAY FALL BELOW -20°C OR EXCEED 70°C, as this could damage the device. The device must be used in a controlled environment.

Care during use:

- Do not place heavy objects on the top of the device.
- Make sure to connect the correct voltage to the device. Failure to supply the correct voltage could damage the unit.
- Do not walk on the power cord or allow anything to rest on it.
- If you use an extension cord, make sure the total ampere rating of all devices plugged into the extension cord does not exceed the cord's ampere rating.
- Do not spill water or any other liquids on your device.
- Always unplug the power cord from the wall outlet before cleaning the device.
- Only use cleaning agents with a neutral pH level to clean the device.
- Vacuum dust and particles from the vents by using a computer vacuum cleaner.

Warranty Policy

- **IBASE standard products:**

24-month (2-year) warranty from the date of shipment. If the date of shipment cannot be ascertained, customers can use the product serial numbers to approximate the 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, memory, HDD, power adapter, panel and touchscreen.
- * PRODUCTS, HOWEVER, THAT FAIL DUE TO MISUSE, ACCIDENT, IMPROPER INSTALLATION, OR UNAUTHORIZED REPAIR WILL BE TREATED AS OUT OF WARRANTY, AND CUSTOMERS SHALL BE BILLED FOR REPAIR AND SHIPPING CHARGES.

Technical Support & Services

- Visit the IBASE website at www.ibase.com.tw to find the latest information about the product.
- If you encounter any technical problems and require assistance from your distributor or sales representative, please prepare and send the following information:
 - 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)
- If repair service is required, you can download the RMA (Return Merchandise Authorization) form from the IBASE's website. Fill out the form and contact your distributor or sales representative.

Table of Contents

| | | |
|------------------|---|-----------|
| Chapter 1 | General Information | 1 |
| 1.1 | Introduction | 2 |
| 1.2 | Features..... | 2 |
| 1.3 | Packing List | 3 |
| 1.4 | Optional Accessories | 3 |
| 1.5 | INA1607 Specifications | 4 |
| 1.6 | Product View..... | 5 |
| 1.7 | Dimensions | 10 |
| Chapter 2 | Hardware Configuration | 12 |
| 2.1 | Installation Procedure | 13 |
| 2.1.1 | System Cover Removal | 13 |
| 2.1.2 | M.2, Memory, and SATA Slot Reference | 14 |
| 2.1.3 | Component Installation | 15 |
| 2.1.4 | SIM Card Installation | 16 |
| 2.1.5 | Antenna Installation | 17 |
| 2.1.6 | Wall Mount Bracket Installation / Removal..... | 18 |
| 2.2 | Setting the Jumpers | 19 |
| 2.3 | Jumper & Connector Locations on Motherboard | 20 |
| 2.4 | Jumpers, Switches and LEDs | 21 |
| 2.4.1 | JP1: Flash Descriptor | 21 |
| 2.4.2 | JP2, JP3: Clear CMOS | 22 |
| 2.4.3 | JP4: ATX / AT Mode Select | 23 |
| 2.4.4 | JP5: Sierra/Telit M.2 LTE Module PCIe/USB Interface Select..... | 24 |
| 2.4.5 | JP6: M.2 LTE Module Function Select..... | 25 |
| 2.4.6 | SW1: GPIO Button | 26 |
| 2.4.7 | SW2: ATX Power Button | 26 |
| 2.4.8 | LED1: Power (Green)/HDD (Green)/Status (Yellow/Red) | 27 |
| 2.4.9 | LED7: Bypass LED | 27 |
| 2.4.10 | LED12~LED17: RJ45 LED | 28 |
| 2.5 | Connectors Quick Reference | 29 |
| 2.5.1 | J1: DDR5 SO-DIMM Socket | 30 |
| 2.5.2 | J2: SPI Debug Port (Factory use only)..... | 30 |
| 2.5.3 | J3: eSPI Debug Port (Factory use only)..... | 31 |
| 2.5.4 | J4: USB 2.0 Header..... | 31 |
| 2.5.5 | J5: M.2 B-Key Slot (3042/3052)..... | 32 |
| 2.5.6 | J6: M.2 M-Key Slot (2280)..... | 32 |

| | | |
|--------|---|----|
| 2.5.7 | J7: Mini-PCIe Slot..... | 33 |
| 2.5.8 | J8: SATA HDD Connector | 33 |
| 2.5.9 | J9: PCIe Switch UART Debug Port (Factory use only)..... | 34 |
| 2.5.10 | J10: MCU Debug Port (Factory use only) | 34 |
| 2.5.11 | J11: Front Panel Function Connector | 35 |
| 2.5.12 | J12: Power Debug Port (Factory use only) | 35 |
| 2.5.13 | CN1, CN2: Dual SIM Sockets..... | 36 |
| 2.5.14 | CN3, CN4: 2.5G Dual Port RJ45 Connectors | 36 |
| 2.5.15 | CN5: 1G Dual Port SFP Connector..... | 37 |
| 2.5.16 | CN7: Power Adapter Connector | 37 |
| 2.5.17 | RJ45COM1: Console Connector | 38 |
| 2.5.18 | RJ1: 1G Dual Port RJ45 Connector | 38 |
| 2.5.19 | USB_A1: USB 3.0/2.0 Connector | 39 |
| 2.5.20 | CPU_FAN1: CPU Fan Power Connector..... | 39 |

Chapter 3 BIOS Setup..... 40

| | | |
|-----|----------------------------|----|
| 3.1 | Introduction | 41 |
| 3.2 | BIOS Setup..... | 41 |
| 3.3 | Main Settings | 42 |
| 3.4 | Advanced Settings | 42 |
| 3.5 | Chipset Configuration..... | 58 |
| 3.6 | Security Settings | 60 |
| 3.7 | Boot Settings..... | 62 |
| 3.8 | Save & Exit Settings..... | 63 |

Chapter 1

General Information

The information provided in this chapter includes:

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

1.1 Introduction

The INA1607 is a compact yet powerful uCPE/SD-WAN appliance engineered to meet the connectivity demands of modern enterprises. At its core is the Intel® Atom® x7405C processor (formerly Amston Lake), ensuring efficient and reliable performance for diverse networking workloads. Equipped with a DDR5 SODIMM slot supporting up to 16GB ECC or non-ECC memory, the appliance delivers enhanced flexibility for various use cases.

Designed for optimized networking, the INA1607 integrates a versatile range of interfaces, including 4x 2.5GbE RJ45 ports and a mix of 2x GbE RJ45 and 2x GbE SFP ports. Expansion is supported through 1x Mini PCI-E slot and 2x M.2 slots, enabling users to tailor the device to specific needs. With built-in support for WiFi/WiFi 6, LTE, and 5G, and compatibility with up to 6 antennas, this appliance ensures seamless wireless connectivity.

The INA1607 serves as a robust and flexible solution for a wide range of applications such as:

- uCPE deployments
- SD-WAN solutions
- Edge networking

1.2 Features

- Intel® Atom® x7405C processor (formerly Amston Lake)
- 1x DDR5 SODIMM; Max. 16GB (ECC/non-ECC)
- 4x 2.5GbE RJ45
- 2x GbE RJ45 and 2x GbE SFP
- 1x Mini PCI-E slot
- 2x M.2 slots
- Supports WiFi/WiFi 6, LTE/5G, with up to 6 antennas

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.

- INA1607 System Unit
- Power Adapter
- AC Power Cord
- M.2 Screw Kit

1.4 Optional Accessories

The following items are available depending on system configuration or sales package:

- Antennas
- SATA Data Cable
- LTE/5G Module
- Wi-Fi Module

1.5 INA1607 Specifications

| | |
|----------------------|--|
| CPU | Intel® Atom® x7405C Processor (formerly Amston Lake) |
| Memory | <ul style="list-style-type: none"> • 1x DDR5 SODIMM • Up to 4800MHz • Max. 16GB (ECC/non-ECC) |
| Ethernet | <ul style="list-style-type: none"> • 4x Intel® I226-V 2.5 GbE • 1x Intel® i350-AM4 (2x GbE RJ45 and 2x GbE SFP) |
| Bypass | Bypass 1x segment, LAN 1/2 |
| Expansion | <ul style="list-style-type: none"> • 1x Mini PCI-E slot • 1x M.2 slot (B-key 3042 and 3052, PCI-E(x1) & USB 3.0 signal) for LTE/5G • 2x Micro SIM for M.2 LTE/5G module • 1x M.2 slot (M-key 2280) for SATA/NVME storage |
| IPMI | N/A |
| Storage | <ul style="list-style-type: none"> • 1x 2.5" SATA drive bay • 1x 16GB/32GB/64GB eMMC |
| TPM | TPM 2.0 |
| I/O | <ul style="list-style-type: none"> • 3x LED (Status/HDD/Power) • 1x Factory default button (GPIO) • 1x RJ45 console • 2x USB 3.0 |
| Power Supply | Full-range 84W power adaptor / 12V |
| Dimensions | 210 mm(W) x 231 mm(D) x 44 mm(H) 8.26" (W) x 9.09" (D) x 1.73" (H) |
| Weight | 2.4 kg |
| Temperature | <ul style="list-style-type: none"> • Operating: 0°C ~ 40°C (32°F ~ 104°F) • Storage: -20° ~ 70°C (-4°F ~ 158°F) |
| Humidity | 10% ~ 90% at 45°C (non-condensing) |
| Certification | CE/FCC |

All specifications are subject to change without prior notice.

1.6 Product View

Front View





Front View



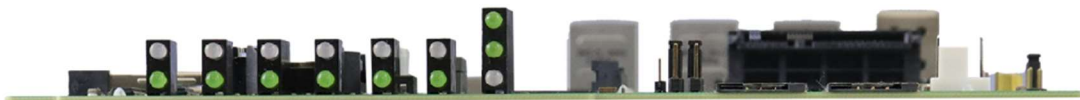
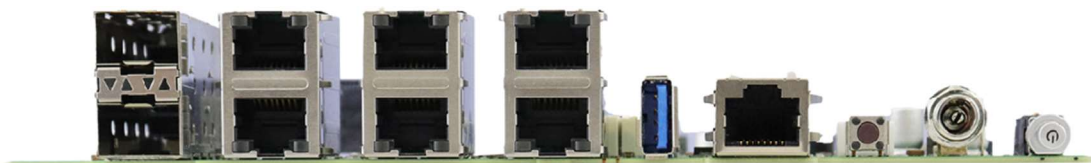
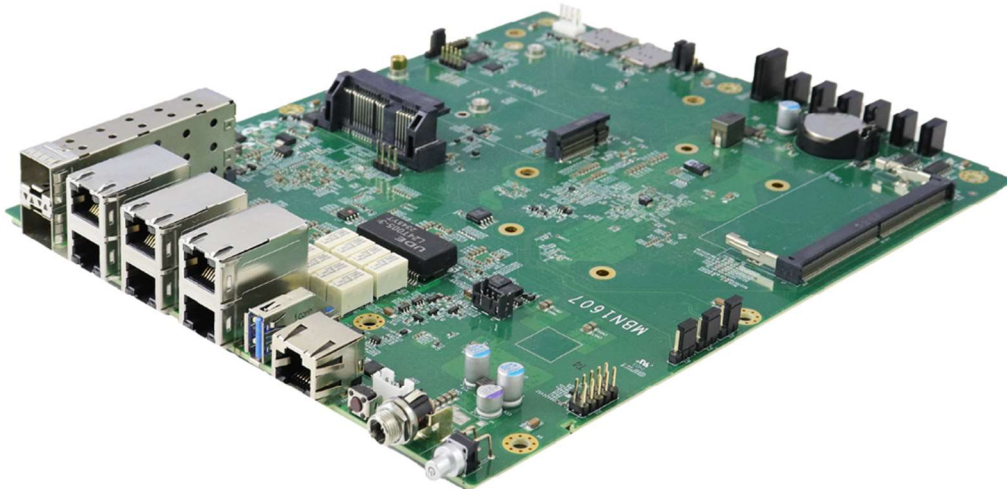
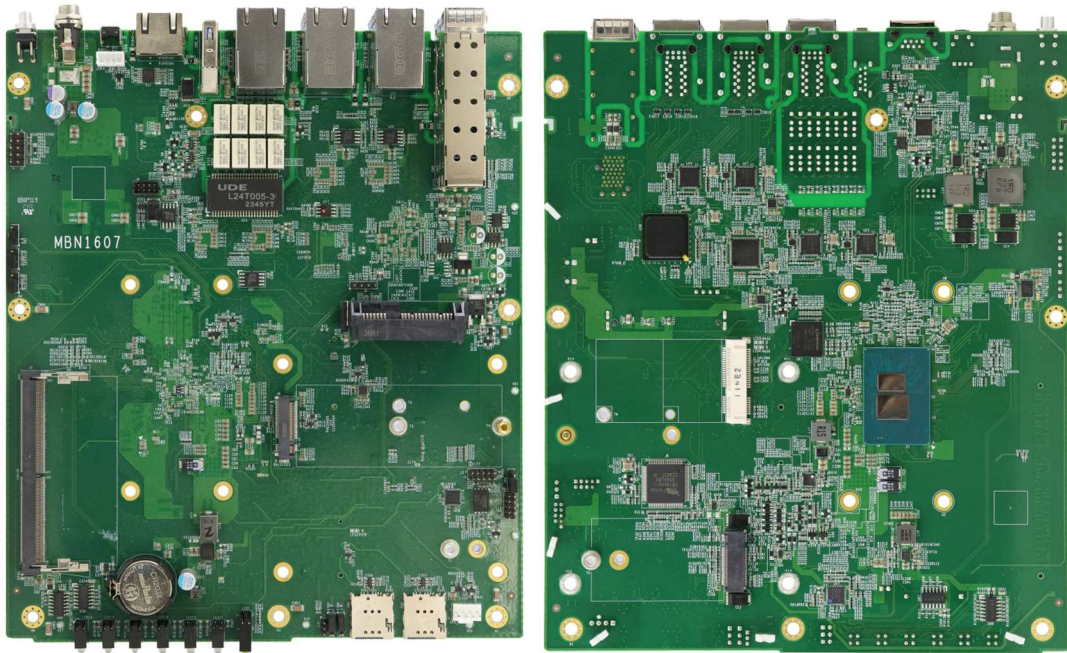
| No. | Name | Description |
|-----|-------------------|---|
| 1 | Antenna Connector | SMA connector for LTE/5G/Wi-Fi antennas |
| 2 | SIM Slot Cover | Cover for 2x Micro SIM card slots (used with LTE/5G module) (accessible after removing retaining screw) |
| 3 | LED Indicators | System Status LED, HDD Activity LED, Power LED |
| 4 | LAN LEDs | Link/Speed LEDs for six Ethernet ports (Eth1–Eth6) |

Rear View

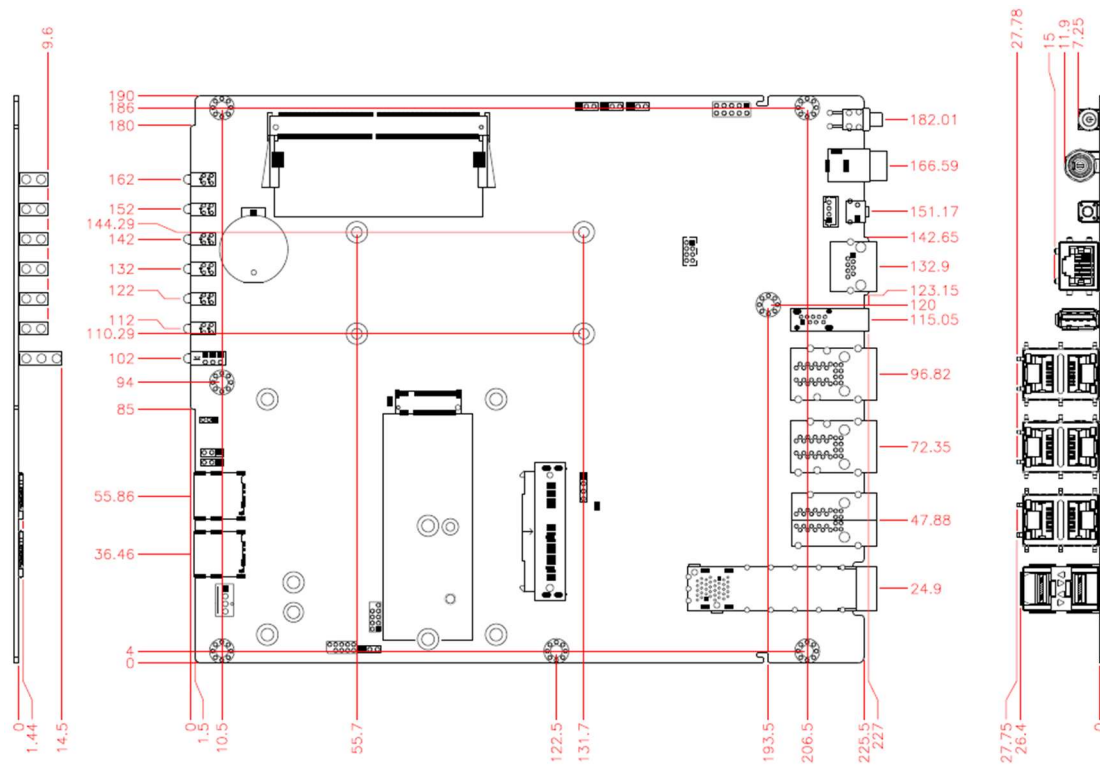


| No. | Name | Description |
|-----|-------------------|--|
| 1 | Antenna Connector | SMA connector for LTE/5G/Wi-Fi antennas |
| 2 | Power Button | System power button (On/Off) |
| 3 | DC +12V Input | 12V DC power input connector |
| 4 | Reset Button | Pinhole reset button (restore factory defaults) |
| 5 | Console Port | RJ45 serial console interface |
| 6 | USB 3.0 Port | USB 3.0 Type-A port |
| 7 | LAN1–LAN8 | Four 2.5GbE ports with Intel I226-V and Four GbE RJ45/SFP ports with Intel i350-AM4). Supports LAN1/2 bypass segment |

Motherboard View (MBN1607)



MBN1607 Motherboard



Chapter 2

Hardware Configuration

The information provided in this chapter includes:

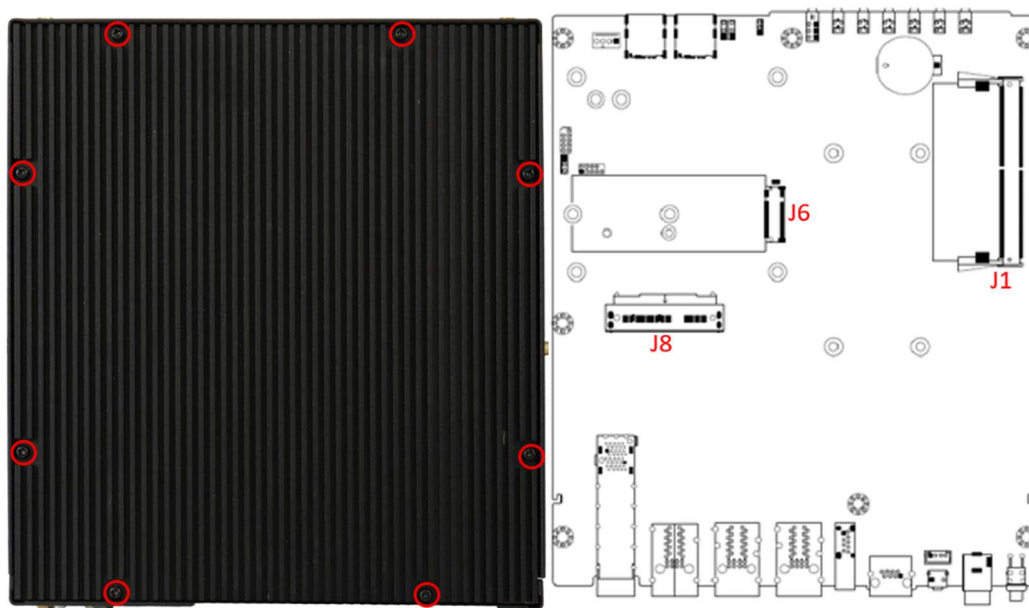
- Installation Procedure
- System Cover Removal
- M.2, Memory, and SATA Slot Reference
- Setting the Jumpers
- Jumper & Connector Locations on Motherboard
- Jumpers, Switches and LEDs
- Connectors Quick Reference

2.1 Installation Procedure

2.1.1 System Cover Removal

Step 1 – Remove the Top Cover

1. Power off the system and disconnect all external cables.
2. Place the unit on a stable, static-free surface with the top panel facing upward (see figure below).
3. Remove the eight Phillips screws circled in red on the top cover — four along the sides and four at the corners.
4. Carefully lift the top cover upward and set it aside.
5. The following slots are now visible on the top side of the motherboard:
 - J1 – DDR5 SO-DIMM socket (system memory slot)
 - J6 – M.2 M-Key slot for NVMe or SATA SSD (2280 size)
 - J8 – SATA HDD connector

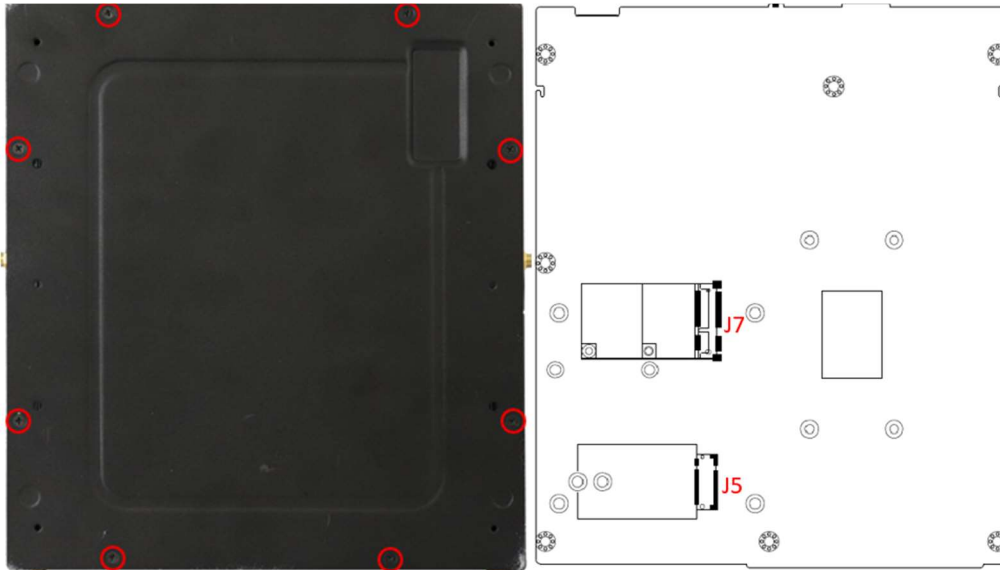


(Top View)

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Step 2 – Remove the Bottom Cover

1. Turn the system upside down so that the bottom panel faces upward.
2. Remove the eight Phillips screws circled in red on the bottom cover — four on each side.
3. Lift the bottom cover carefully and set it aside.
4. The following slots are now visible on the bottom side of the motherboard:
 - J5 – M.2 B-Key slot for LTE/WWAN module (3042 / 3052 size)
 - J7 – mini PCIe / mSATA slot (full-size card, supports PCIe or mSATA interface)



(Bottom View)

2.1.2 M.2, Memory, and SATA Slot Reference

| Slot Description | Interface | Location |
|---|-------------|-------------|
| J1 DDR5 SO-DIMM (System Memory) | DDR5 | Top side |
| J6 M.2 SSD (M-key) (2280) | NVMe / SATA | Top side |
| J8 SATA HDD Connector | SATA Data | Top side |
| J5 M.2 B-key for LTE/WWAN (3042 / 3052) | PCIe / USB | Bottom side |
| J7 mini PCIe / mSATA (Full-size) | PCIe / SATA | Bottom side |

Note:

- J8 provides only **SATA data** connectivity. **SATA power** must be connected separately from the **PSU harness**.
- The board supports up to **two SATA drives total** — one via **J8** (cabled) and one **mSATA** drive via **J7**.

2.1.3 Component Installation

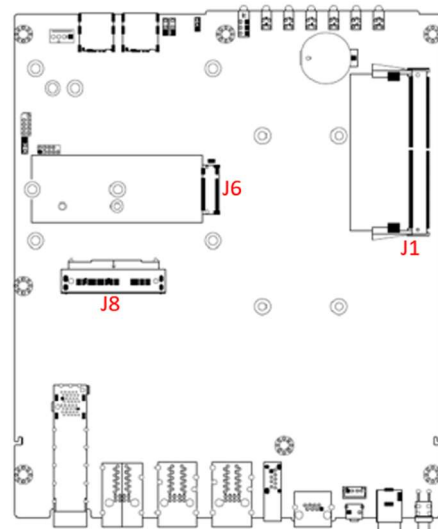
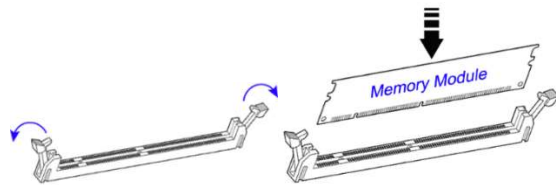
A. Top-Side Components

After removing the top cover, the following connectors are accessible:

| Ref | Component | Type / Key | Supported Device |
|-----|------------------------|----------------|----------------------|
| J1 | DDR5 SO-DIMM socket | — | DDR5 4800 MHz module |
| J6 | M.2 slot (M-Key, 2280) | PCIe x4 / SATA | NVMe or SATA SSD |
| J8 | SATA connector | SATA data | SSD or HDD |

Memory Installation (J1)

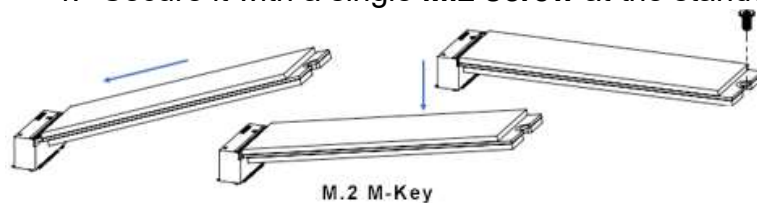
1. Press the **ejector tabs outward**.
2. Align the **notch** on the SO-DIMM with the **key** in the socket.
3. Insert at a slight angle and press down until the tabs **snap** into place.



M.2 SSD Installation (J6)

The system supports one M.2 (M-Key, 2280).

1. Locate the **M.2 slot (J6)** on the board.
2. Insert the module into the connector at about a **30° angle**.
3. Push the card down gently until it lies flat.
4. Secure it with a single **M.2 screw** at the standoff.



Note: J6 supports both PCIe NVMe and SATA M.2 SSDs (Type 2280).

SATA Drive Connection (J8)

1. Connect a **SATA data cable** to the J8 port.
2. Connect a **SATA power lead** from the PSU harness to the drive.

Note: 2.5" HDD/SSD directly plugs into the J8 connector.
J8 provides both data and power.

B. Bottom-Side Components

After removing the bottom cover, the following connectors are accessible:

| Ref | Component | Type / Key | Function | Supported Device |
|-----------|-------------------------------|-------------------|--------------------|--------------------------|
| J5 | M.2 slot (B-Key, 3042 / 3052) | PCIe x1 / USB 3.0 | LTE / 5G module | Cellular modem |
| J7 | mini-PCIe slot | PCIe / SATA | Wi-Fi or mSATA SSD | Wireless or storage card |

M.2 LTE / 5G Module Installation (J5)

1. Locate the **J5 M.2 slot** on the bottom side of the motherboard.
2. Insert the **LTE/5G module** into the slot at about a **30° angle**.
3. Push the module down gently until it lies flat.
4. Secure it with a **single M.2 screw** at the standoff.

J5 supports **M.2 B-Key modules** (Type **3042 / 3052**) for **LTE/5G** communication.

The interface operates over **PCIe x1** and **USB 3.0**, selectable via **JP5 / JP6** jumpers.

2.1.4 SIM Card Installation

The system provides two **external SIM sockets (CN1 and CN2)** for LTE/5G modules installed in the **M.2 B-Key slot (J5)** on the bottom side of the motherboard. These sockets are located behind a small **SIM access cover** on the chassis.

1. Place the unit with the **SIM cover facing upward**.
2. Remove the **retaining screw** securing the SIM cover.
3. Gently lift the cover to expose the **dual SIM slots (SIM1 and SIM2)**.
4. Insert each **Micro SIM card** with the **gold contacts facing down** and the **beveled edge aligned** to the slot corner.
5. Replace the cover and **re-secure it with the same screw**.



Notes:

- Only **Micro SIM** format cards are supported.
- Ensure the **LTE/5G module (J5)** is installed before inserting SIM cards.

2.1.5 Antenna Installation

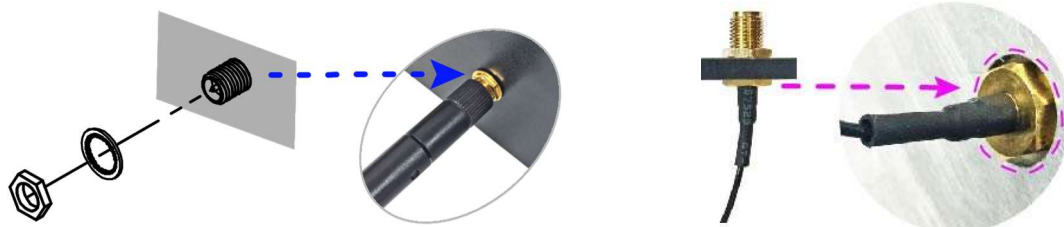
Antenna Installation

Remark: Reserved antenna holes are available on the chassis. If an optional M.2 wireless module is installed, external antennas can be mounted in these positions.

Installation:

Thread the antenna extension cable through an antenna hole of the front I/O cover and fasten the antenna as shown below. 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.



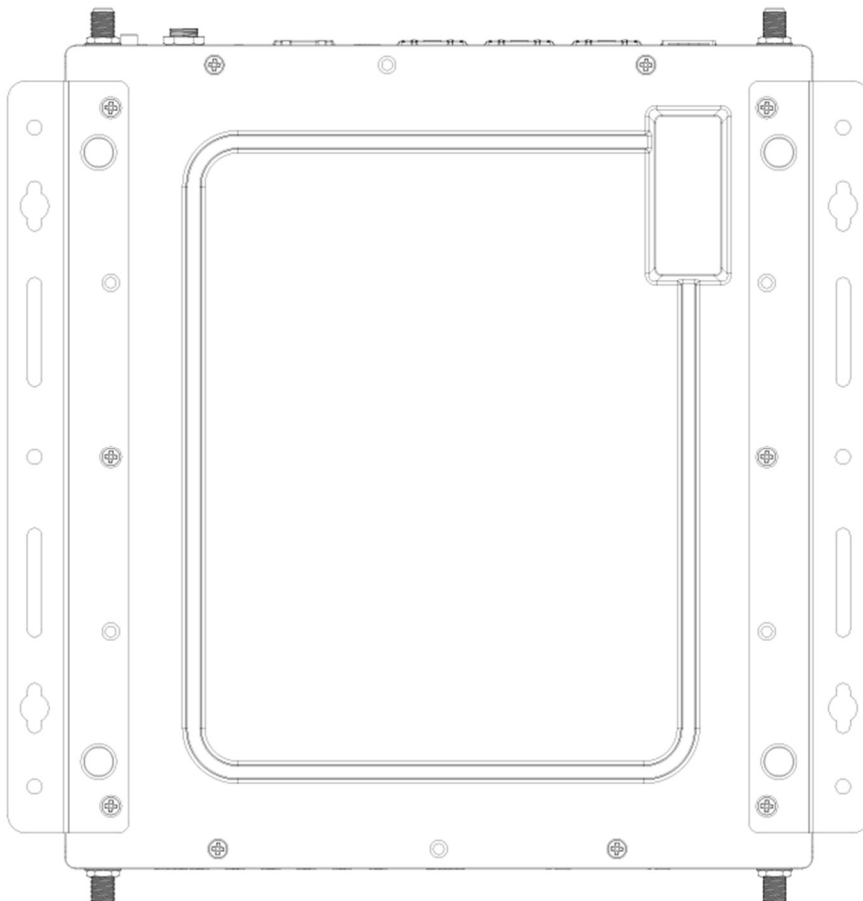
Info: The diameter of the nut is around 6.35 mm (0.25"-36UNC).

Antenna mounting points support both **LTE/5G** and **Wi-Fi** modules.

⚠ Caution: Do not overtighten the hex nut. Excessive torque may damage the antenna connector or front I/O panel.

2.1.6 Wall Mount Bracket Installation / Removal

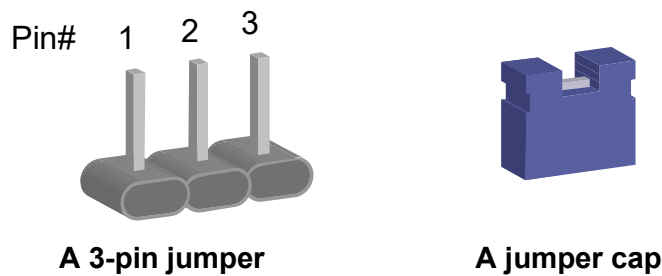
1. Prepare the system
 - Power off the system, disconnect all cables, and place it on a clean, stable surface.
 - Turn the chassis upside down so that the bottom panel is facing upward.
2. Remove the screws
 - Locate the two wall-mount brackets attached to the bottom panel.
 - Remove the six screws (three per bracket) that secure the brackets to the chassis.
 - Keep the screws for re-installation if needed.
3. Bracket removal or installation
 - To remove: Lift each bracket away from the chassis after all screws are removed.
 - To install: Align each bracket with the screw holes on the bottom panel, then fasten it using three screws per bracket (six total). Tighten the screws firmly but do not overtighten.



2.2 Setting the Jumpers

Set up and configure your device 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.

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, shorting either PIN1 to PIN2 or PIN2 to PIN3 will enable the desired function or feature.



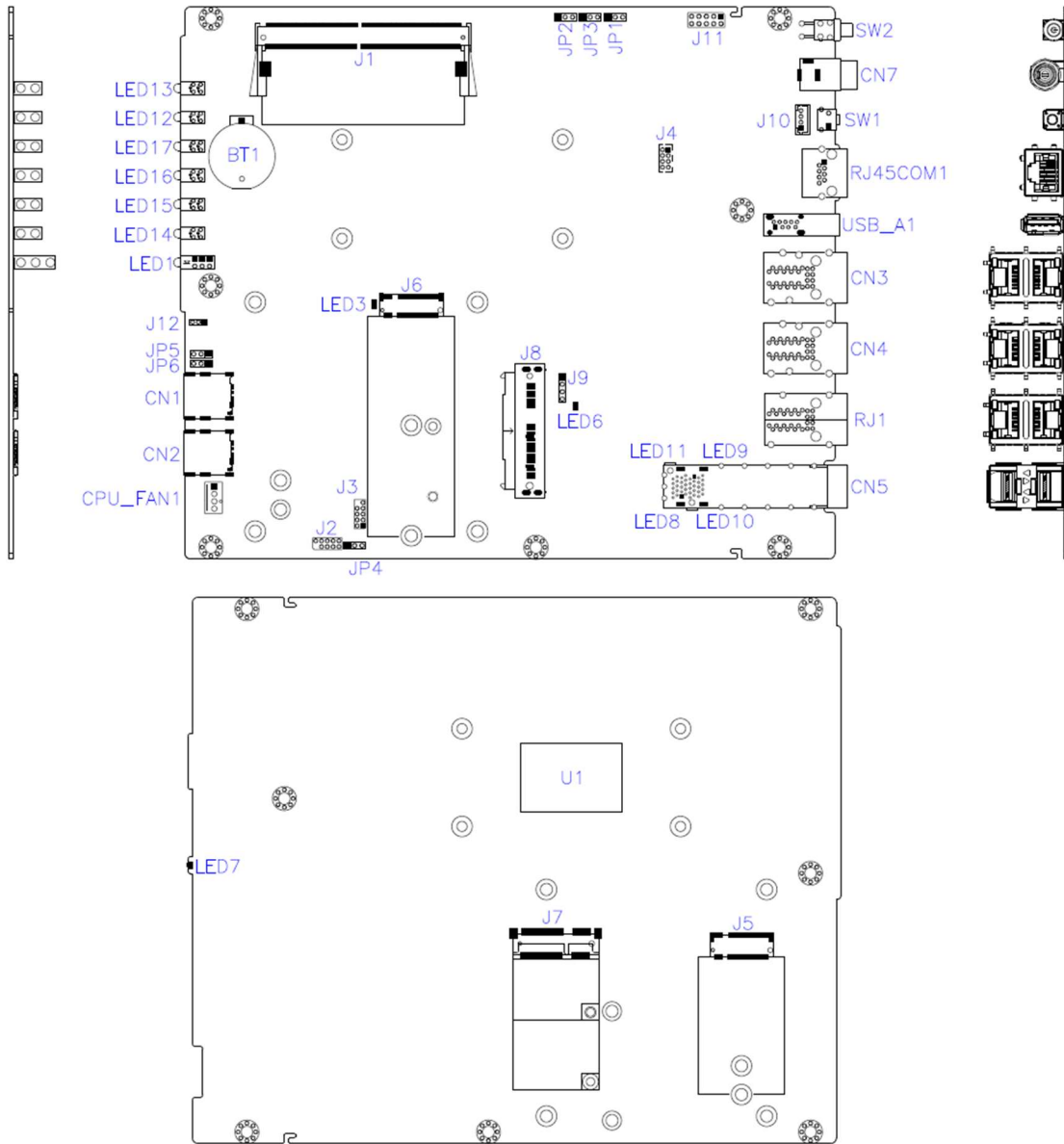
Refer to the illustration below to set jumpers.

| Pin closed | Oblique view | Jumper Settings |
|------------|--------------|-----------------|
| Open | | |
| 1-2 | | |
| 2-3 | | |

- Closed: Jumper cap encased in pins (turned On).
- Open: Jumper cap removed from pins (turned Off).

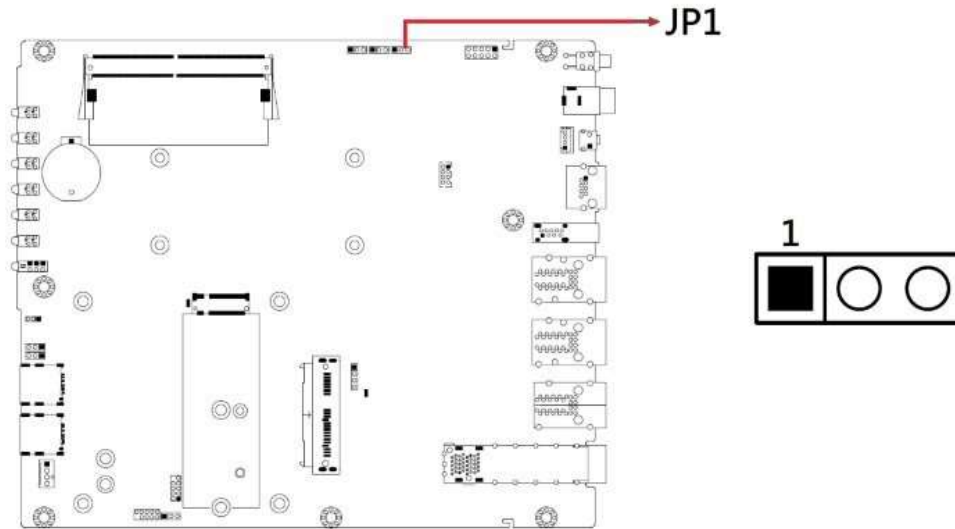
2.3 Jumper & Connector Locations on Motherboard

Motherboard: MBN1607



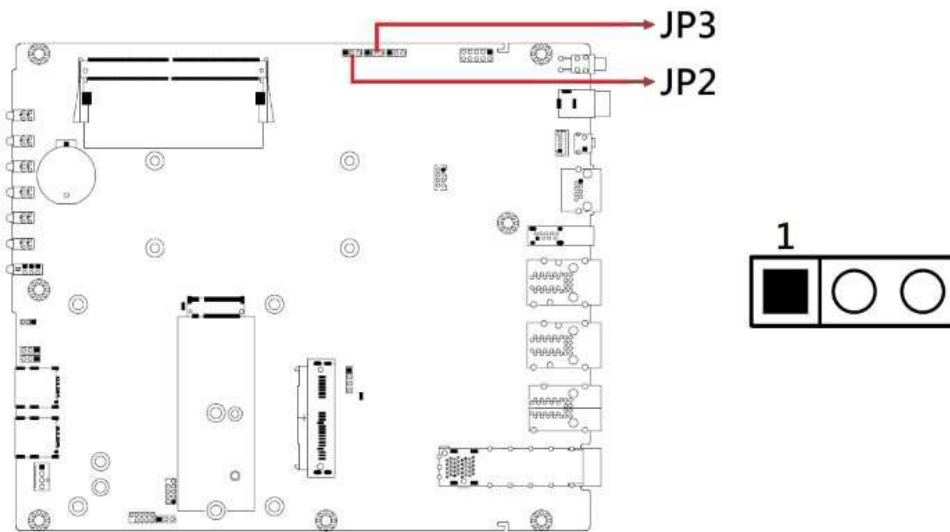
2.4 Jumpers, Switches and LEDs

2.4.1 JP1: Flash Descriptor



| Pin closed | Setting | Function |
|------------|---------|--|
| 1-2 | | Flash descriptor security override (default) |
| 2-3 | | Flash descriptor no security override |

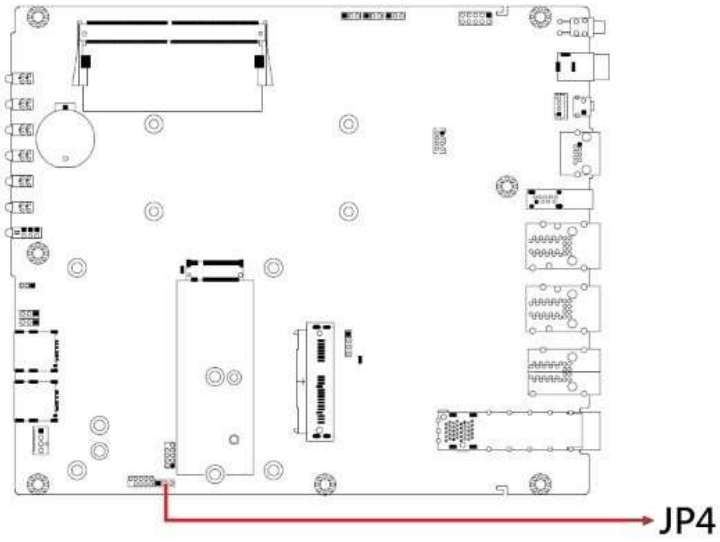
2.4.2 JP2, JP3: Clear CMOS



Remark: Use JP2, JP3 to clear the CMOS contents. Note that the ATX-power connector should be disconnected from the board before clearing CMOS.

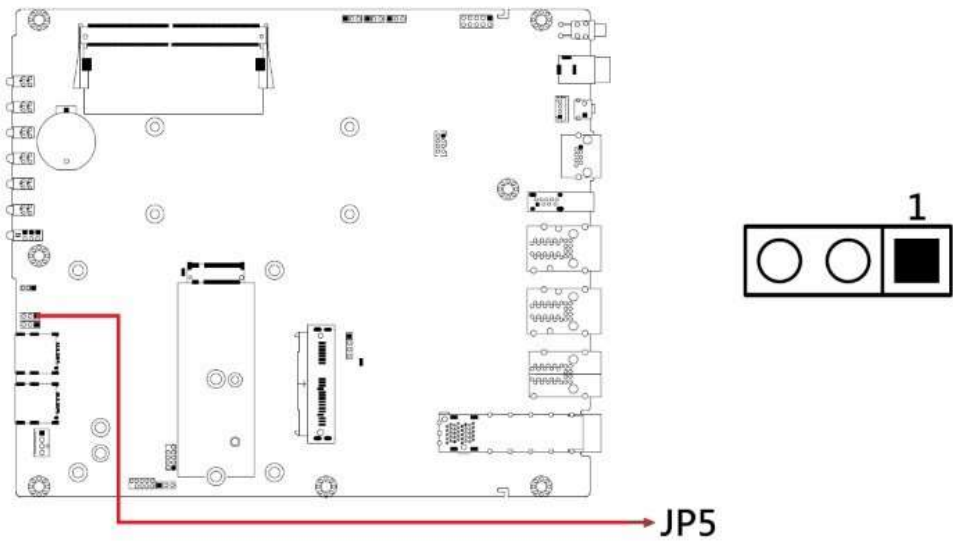
| Pin closed | Setting | Function |
|------------|---------|---------------------|
| 1-2 | | Normal (Default) |
| 2-3 | | Clear CMOS |



2.4.3 JP4: ATX / AT Mode Select



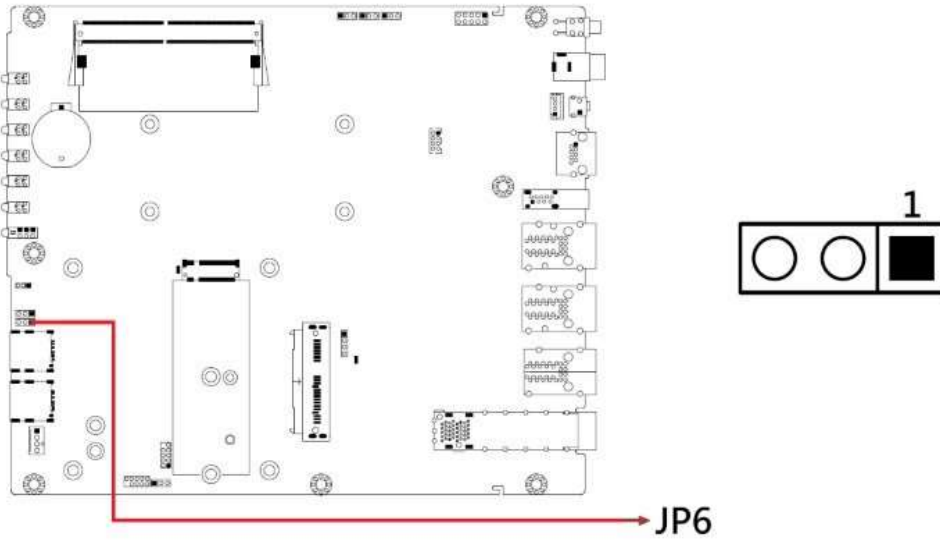
| Pin closed | Setting | Function |
|------------|---------|-------------------|
| 1-2 | 1 | AT Mode (Default) |
| 2-3 | 1 | ATX Mode |



2.4.4 JP5: Sierra/Telit M.2 LTE Module PCIe/USB Interface Select



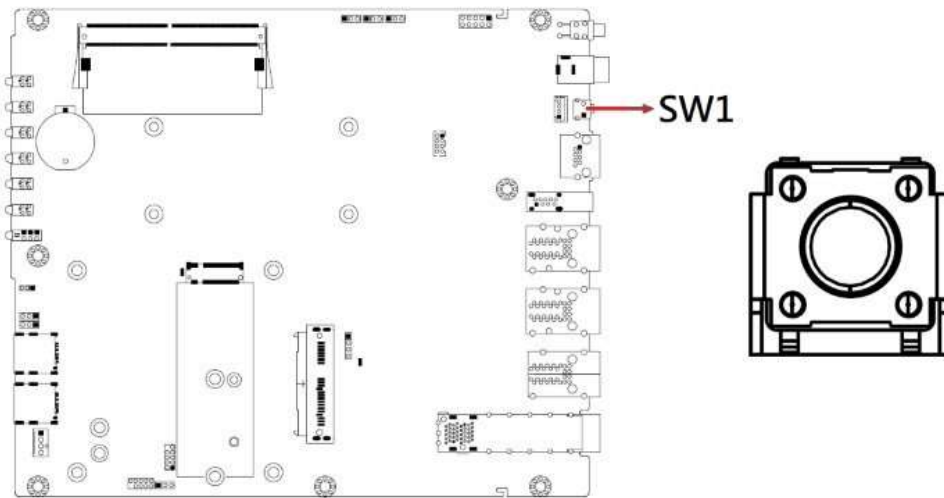
| Pin closed | Setting | Function |
|------------|---|-------------------------|
| 1-2 | 1  | USB Interface (Default) |
| 2-3 | 1  | PCIe Interface |

2.4.5 JP6: M.2 LTE Module Function Select

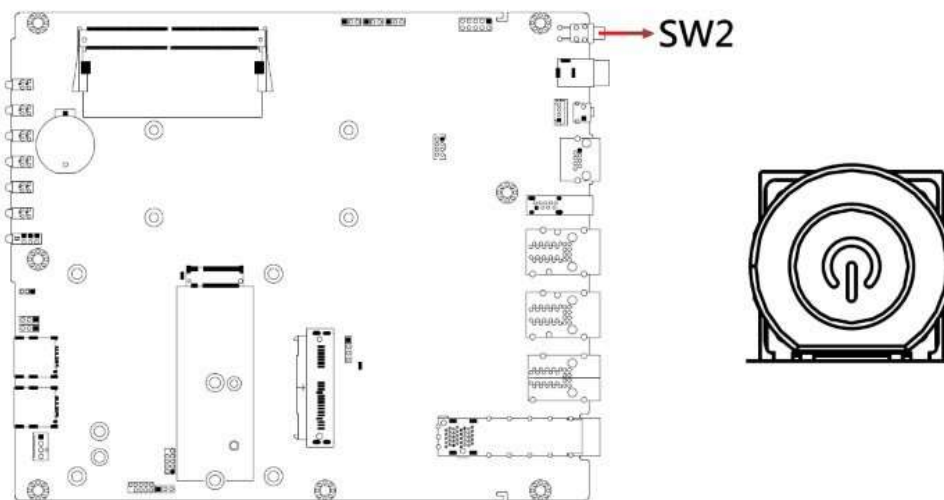


| Pin closed | Setting | Function |
|------------|---|---|
| 1-2 | 1  | Fibocom:USB force boot (Default) |
| 2-3 | 1  | VCC pins 24/38/68 for Sierra EM91xx |

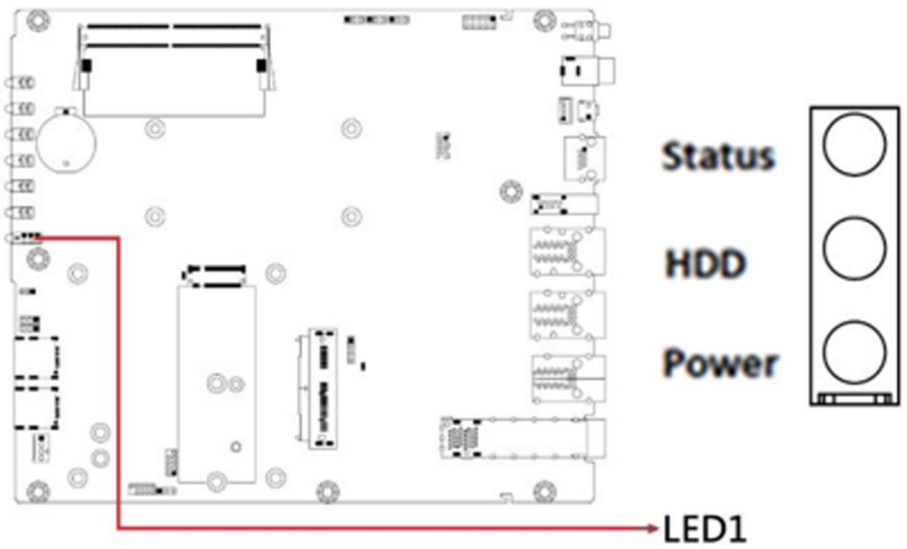
2.4.6 SW1: GPIO Button



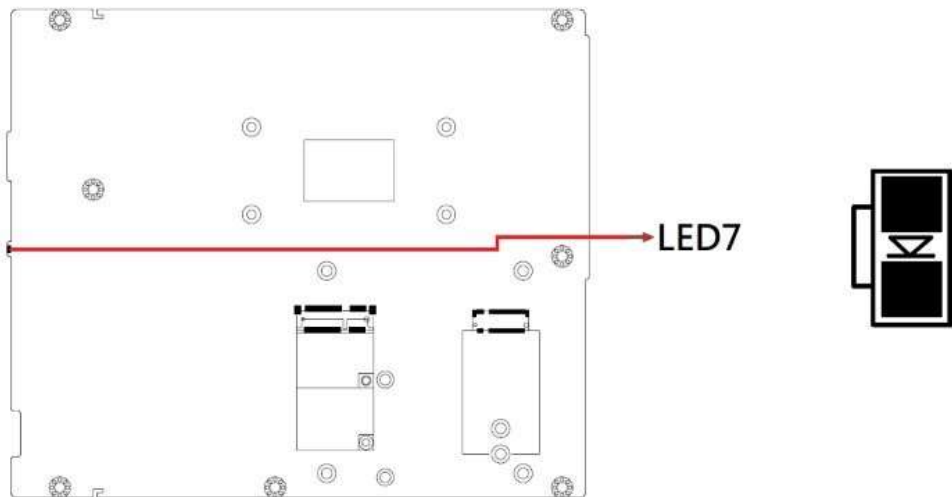
2.4.7 SW2: ATX Power Button



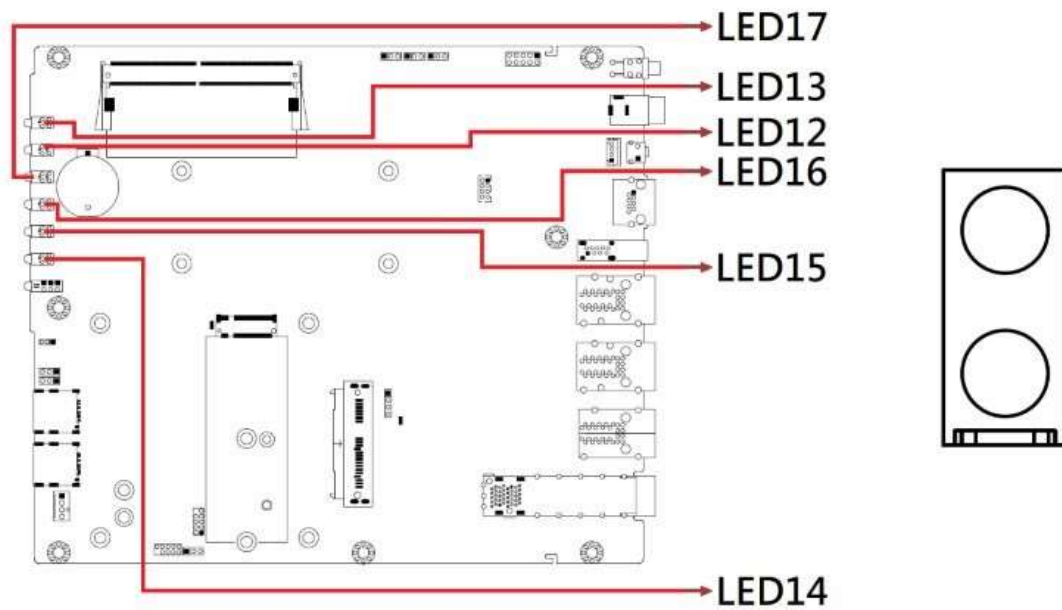
2.4.8 LED1: Power (Green)/HDD (Green)/Status (Yellow/Red)



2.4.9 LED7: Bypass LED



2.4.10 LED12~LED17: RJ45 LED



Remarks:

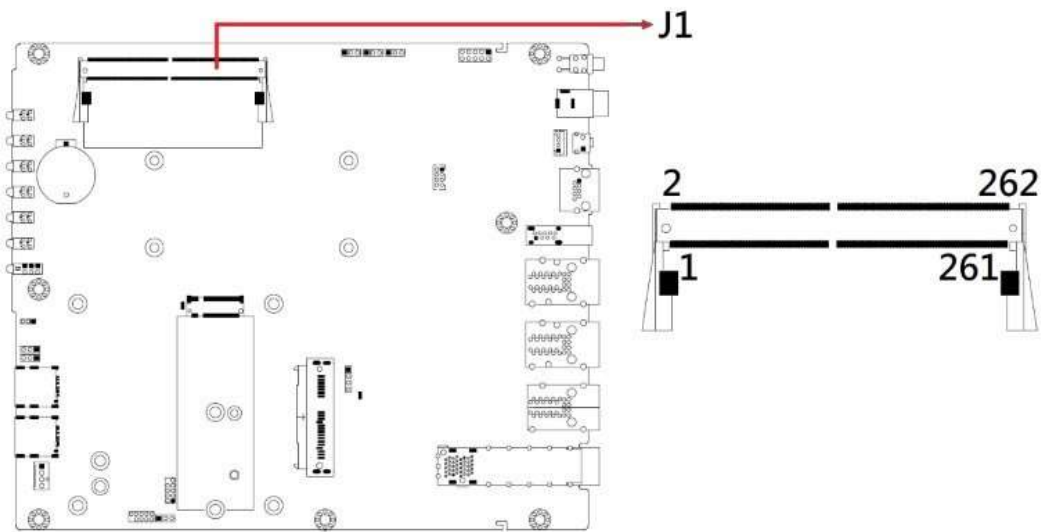
Top Green: ACT/Link

Bottom G/O: Speed Orange Color (High speed), Green Color (Low Speed)

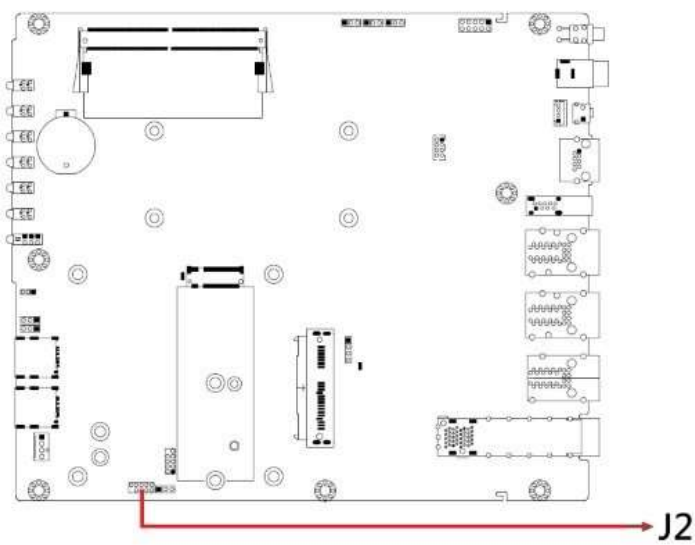
2.5 Connectors Quick Reference

- 2.5.1 J1: DDR5 SO-DIMM Socket
- 2.5.2 J2: SPI Debug Port (Factory use only)
- 2.5.3 J3: eSPI Debug Port (Factory use only)
- 2.5.4 J4: USB 2.0 Header
- 2.5.5 J5: M.2 B-Key Slot (3042/3052)
- 2.5.6 J6: M.2 M-Key Slot (2280)
- 2.5.7 J7: Mini-PCIe Slot
- 2.5.8 J8: SATA HDD Connector
- 2.5.9 J9: PCIe Switch UART Debug Port (Factory use only)
- 2.5.10 J10: MCU Debug Port (Factory use only)
- 2.5.11 J11: Front Panel Function Connector
- 2.5.12 J12: Power Debug Port (Factory use only)
- 2.5.13 CN1, CN2: Dual SIM Sockets
- 2.5.14 CN3, CN4: 2.5G Dual Port RJ45 Connectors
- 2.5.15 CN5: 1G Dual Port SFP Connector
- 2.5.16 CN7: Power Adapter Connector
- 2.5.17 RJ45COM1: Console Connector
- 2.5.18 RJ1: 1G Dual Port RJ45 Connector
- 2.5.19 USB_A1: USB 3.0/2.0 Connector
- 2.5.20 CPU_FAN1: CPU Fan Power Connector

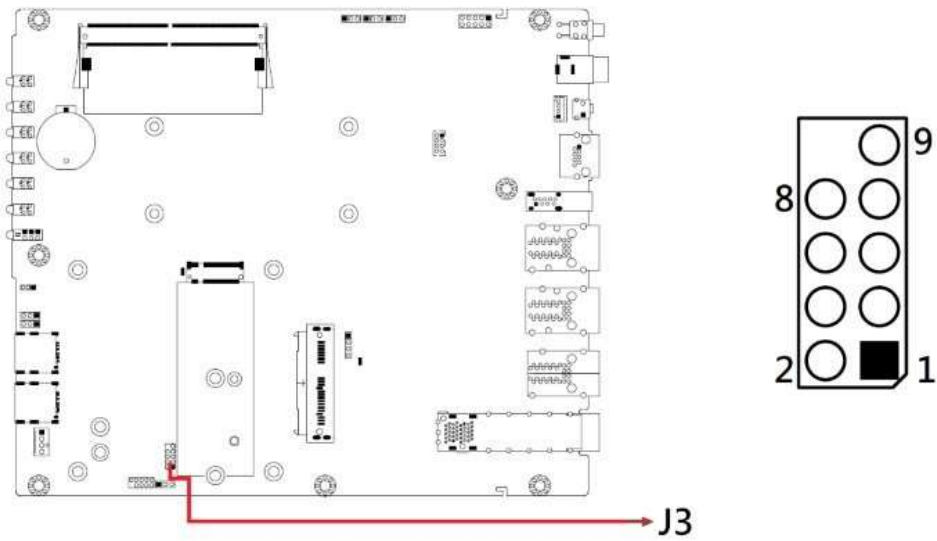
2.5.1 J1: DDR5 SO-DIMM Socket



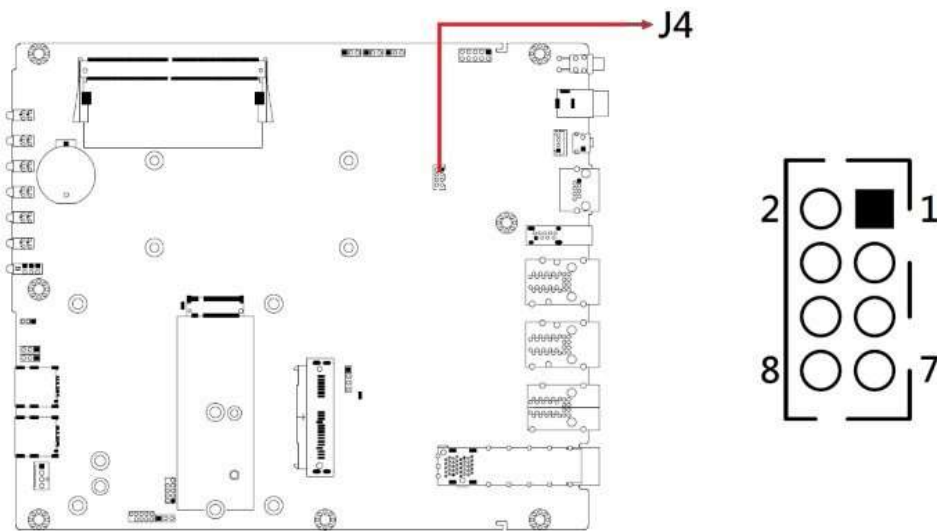
2.5.2 J2: SPI Debug Port (Factory use only)



2.5.3 J3: eSPI Debug Port (Factory use only)

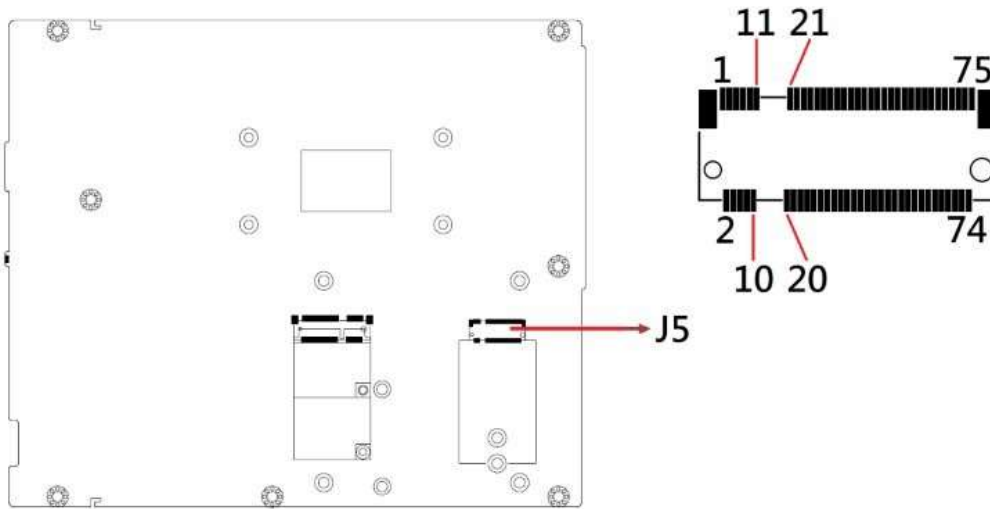


2.5.4 J4: USB 2.0 Header



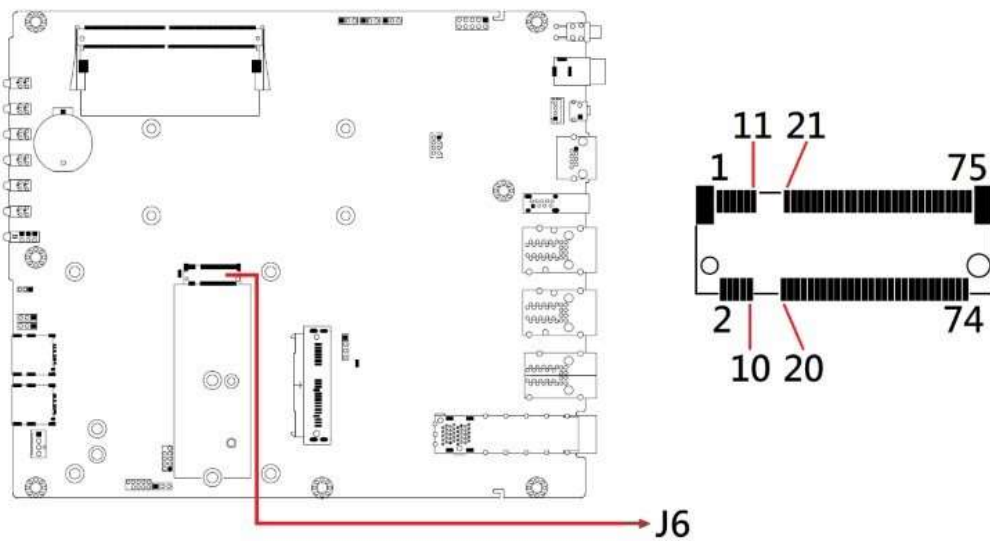
| Signal Name | Pin | Pin | Signal Name |
|-------------|-----|-----|-------------|
| VCC | 1 | 2 | Ground |
| USB1- | 3 | 4 | USB2+ |
| USB1+ | 5 | 6 | USB2- |
| Ground | 7 | 8 | VCC |

2.5.5 J5: M.2 B-Key Slot (3042/3052)



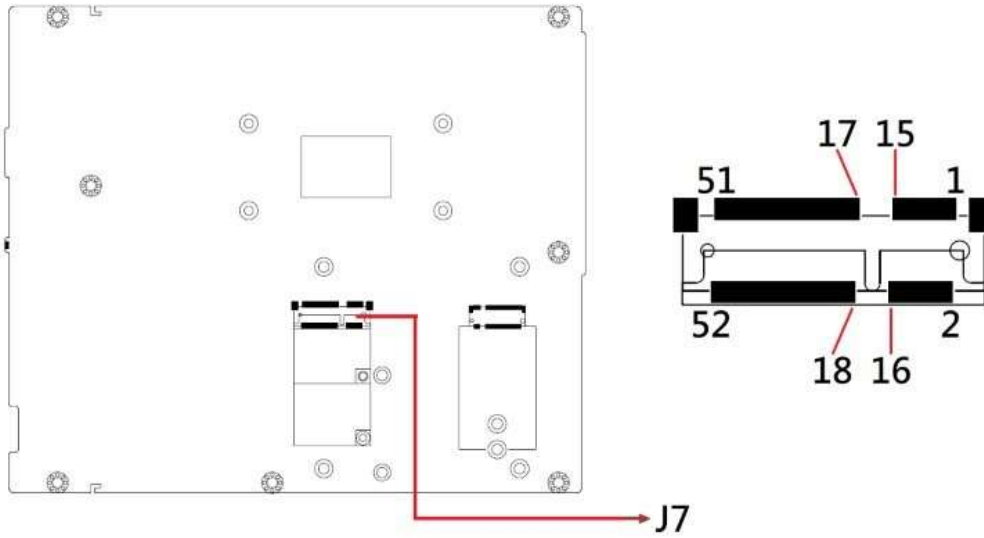
Remarks: Supports PCIe x1 & USB 3.0 interfaces. Works with SIM sockets CN1 and CN2 for LTE/5G modules.

2.5.6 J6: M.2 M-Key Slot (2280)



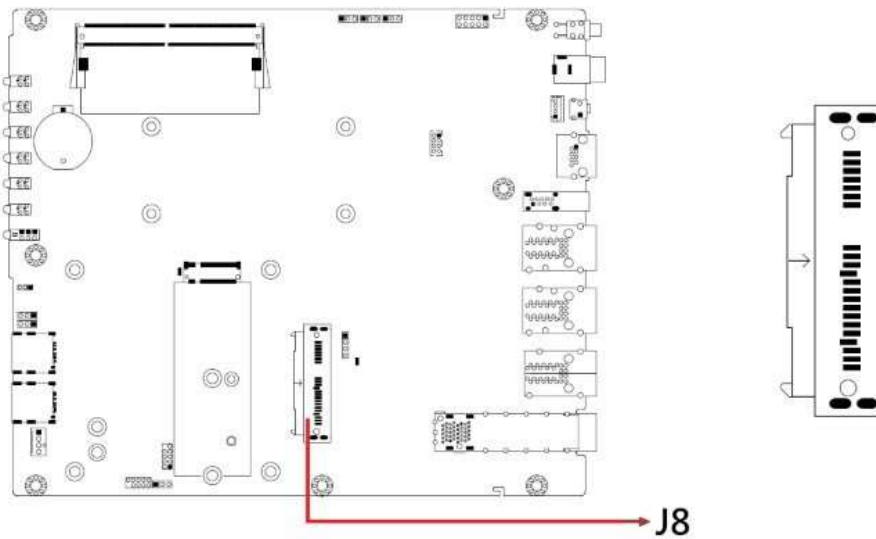
Remarks: Supports SATA or PCIe x2 SSD devices.

2.5.7 J7: Mini-PCle Slot

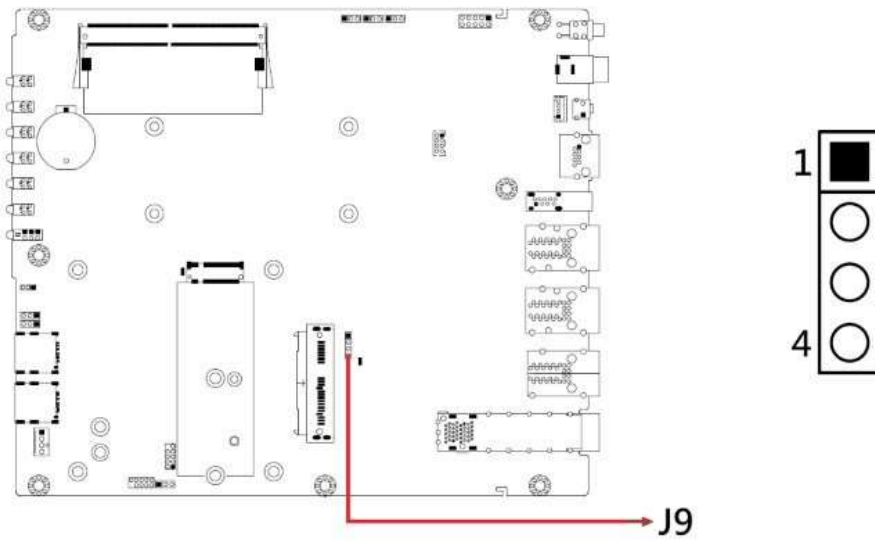


Remarks: Supports PCIe x1 or mSATA devices.

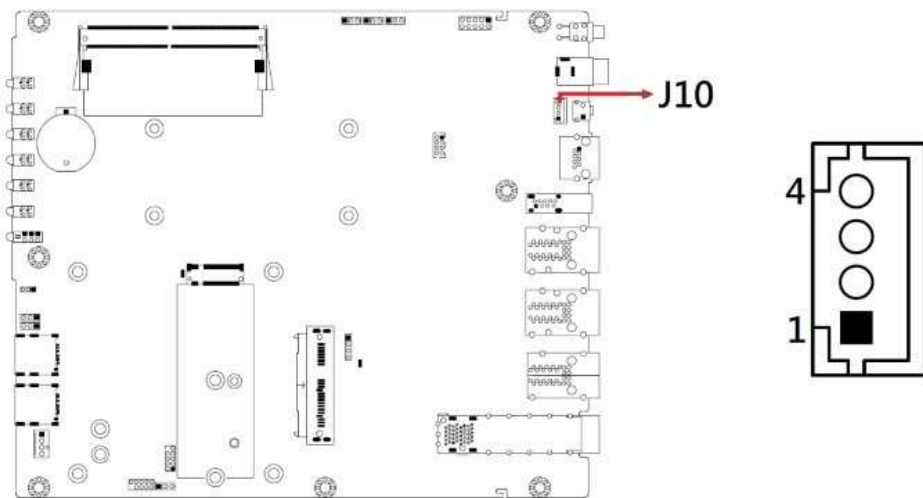
2.5.8 J8: SATA HDD Connector



2.5.9 J9: PCIe Switch UART Debug Port (Factory use only)

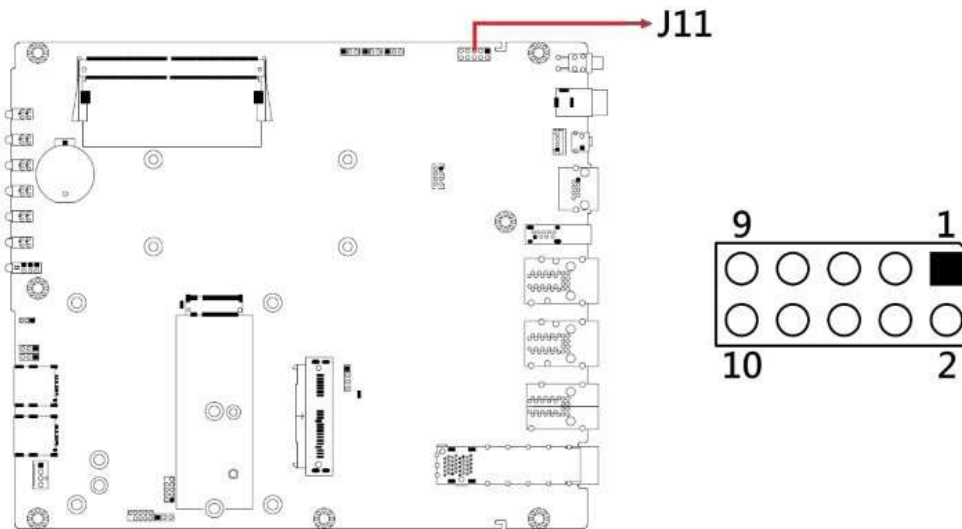


2.5.10 J10: MCU Debug Port (Factory use only)



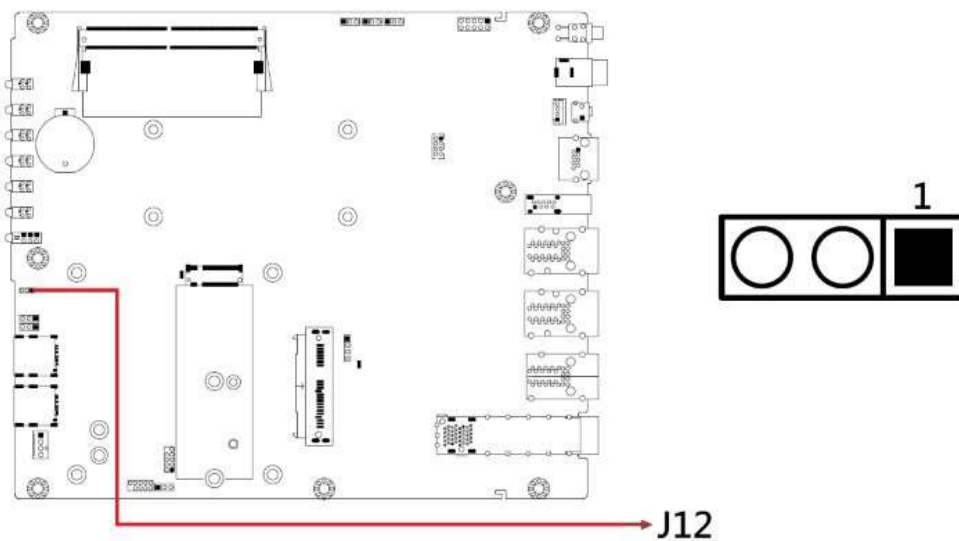
| Pin | Signal Name |
|-----|-------------|
| 1 | MCU_3V |
| 2 | SBWTCK |
| 3 | SBWTDIO |
| 4 | Ground |

2.5.11 J11: Front Panel Function Connector

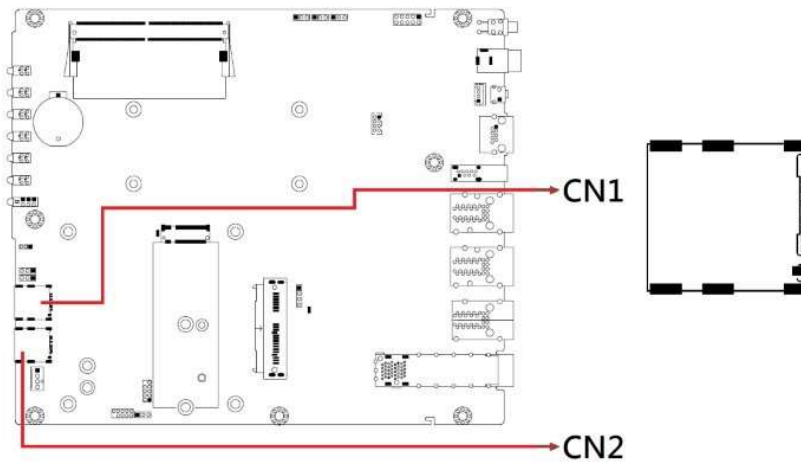


| Signal Name | Pin | Pin | Signal Name |
|-------------|-----|-----|-------------|
| Ground | 1 | 2 | Power On |
| Ground | 3 | 4 | PM_SYSRST# |
| +5V | 5 | 6 | Ground |
| +3.3V | 7 | 8 | HDD LED |
| +3.3V | 9 | 10 | Bypass LED |

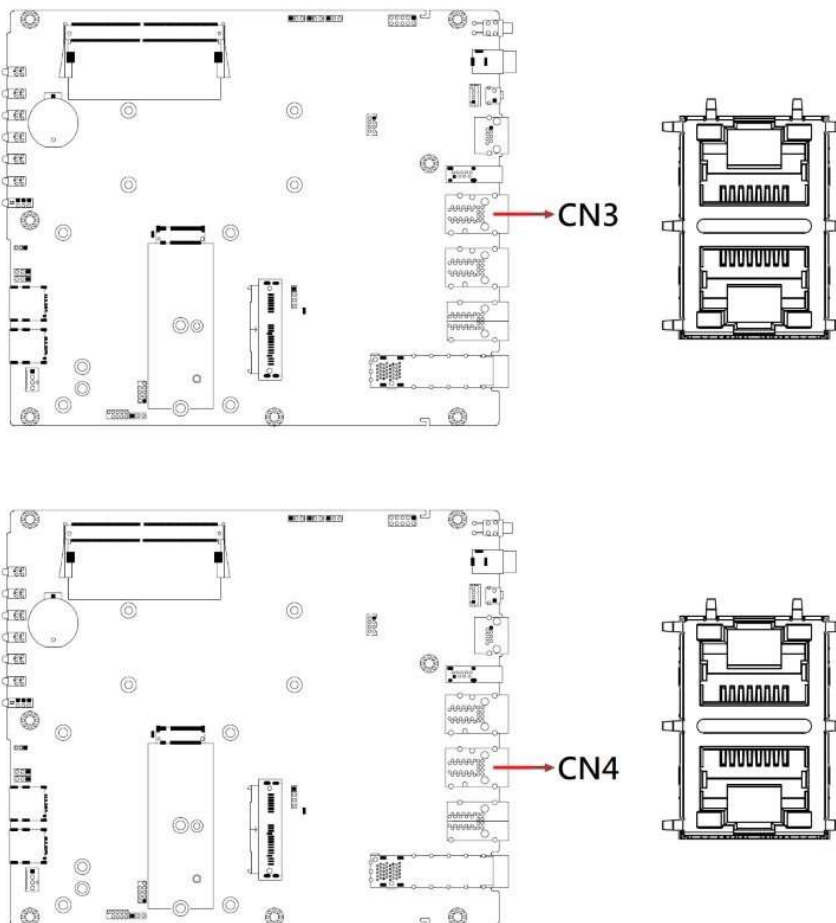
2.5.12 J12: Power Debug Port (Factory use only)



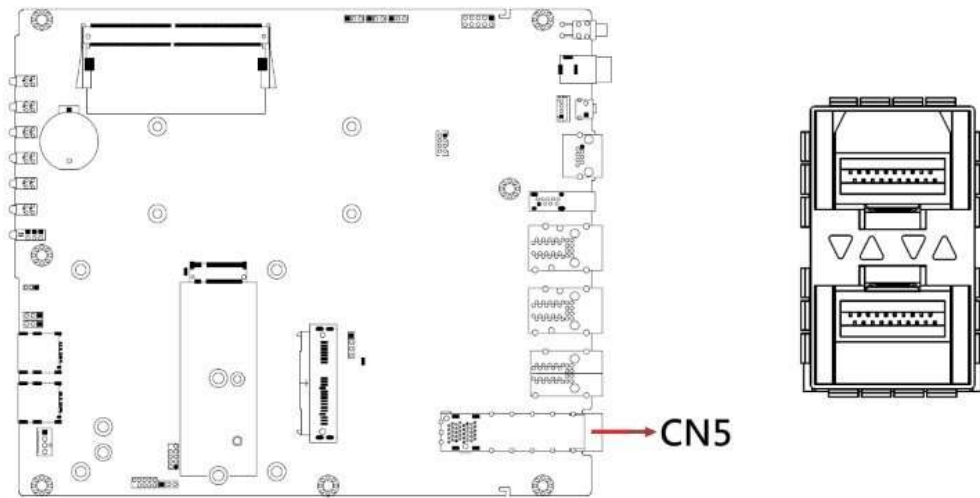
2.5.13 CN1, CN2: Dual SIM Sockets



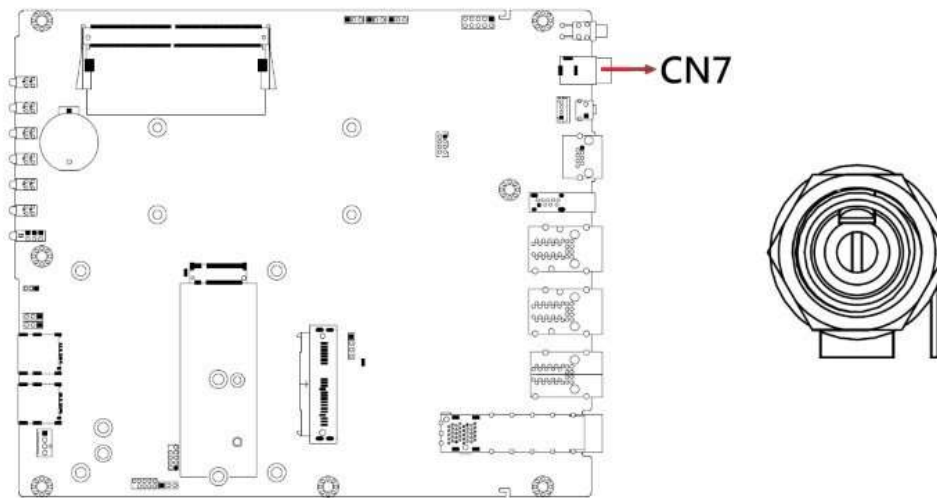
2.5.14 CN3, CN4: 2.5G Dual Port RJ45 Connectors



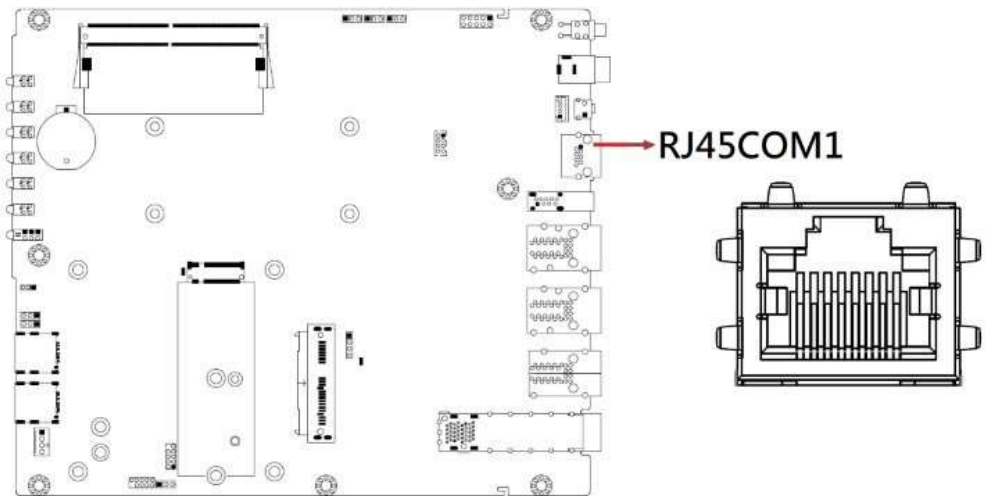
2.5.15 CN5: 1G Dual Port SFP Connector



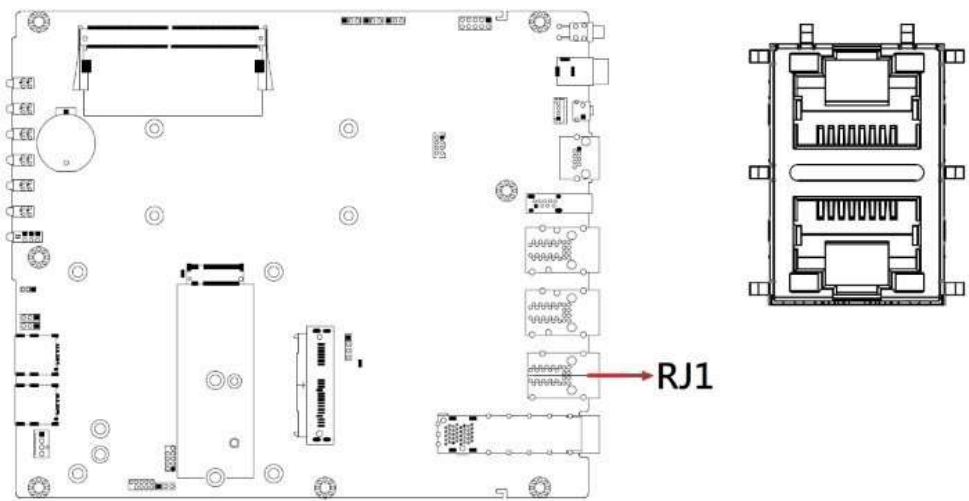
2.5.16 CN7: Power Adapter Connector



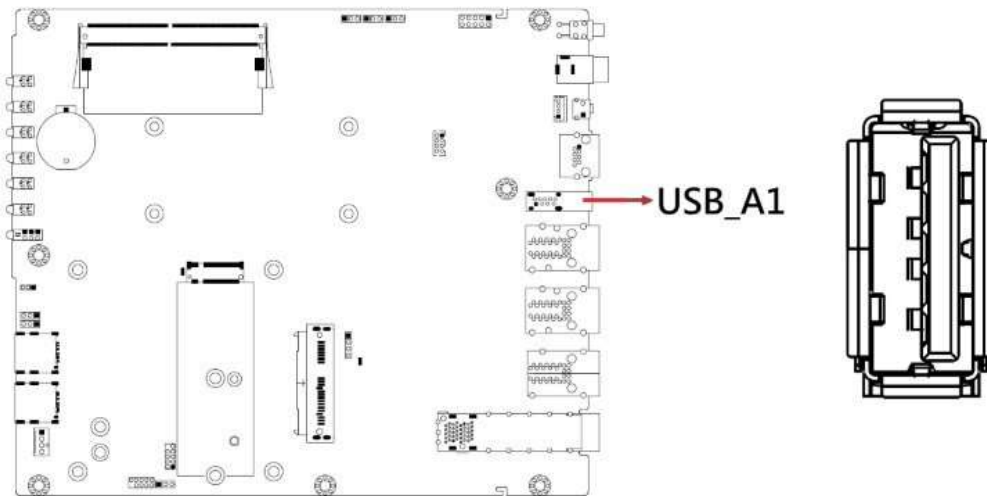
2.5.17 RJ45COM1: Console Connector



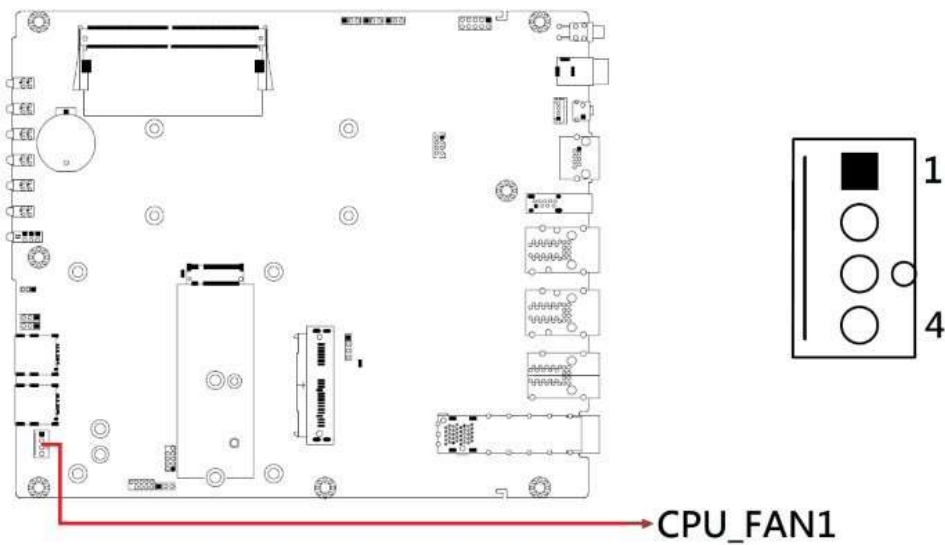
2.5.18 RJ1: 1G Dual Port RJ45 Connector



2.5.19 USB_A1: USB 3.0/2.0 Connector



2.5.20 CPU_FAN1: CPU Fan Power Connector



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

Chapter 3

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

3.1 Introduction

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

3.2 BIOS Setup

The BIOS includes a Setup utility program for specifying system configuration and settings. The Setup utility is stored in the system's BIOS ROM. When the computer is powered on, the BIOS is activated immediately. Pressing the key during startup allows you to enter the Setup utility. If you do not press the key in time, POST (Power-On Self Test) will continue and the Setup utility will not be invoked.

If you still need to enter Setup, restart the system by pressing the Reset button, pressing <Ctrl>+<Alt>+<Delete>, or by turning the system off and then back on.

The following message will appear on the screen:

Press to Enter Setup

In general:

- Use the arrow keys to highlight items.
- Press <Enter> to select.
- Use <PgUp> and <PgDn> to change entries.
- Press <F1> for help.
- Press <Esc> to quit.

Warning: It is strongly recommended not to change the chipset defaults. These settings have been carefully chosen by AMI and your system manufacturer to ensure maximum performance and reliability. Modifying them may cause the system to become unstable or crash.

3.3 Main Settings

In the main settings section, the BIOS version and system memory information are shown. It also allows you to configure the date and time settings.

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

3.4 Advanced Settings

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



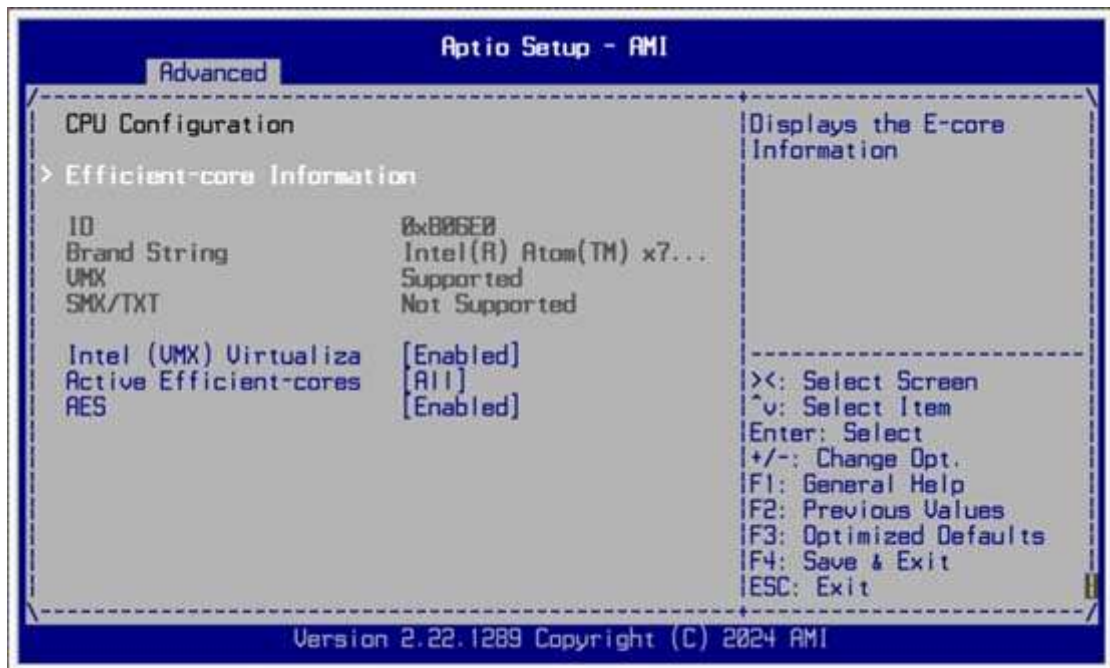


```
> CPU Configuration
> Power & Performance
> PCH-FW Configuration
> Trusted Computing
> ACPI Settings
> F8196x Super IO Configuration
> F8196x Hardware Monitor
> LAN Bypass Configuration
> Serial Port Console Redirection
> USB Configuration
> Network Stack Configuration
> NVMe Configuration
> SDIO Configuration
```

Advanced Menu (Top-Level Items)

1. CPU Configuration – Opens settings for CPU features such as virtualization, power-saving states, and core management.
2. Power & Performance – Adjusts processor power technology, speed scaling, and performance modes.
3. PCH-FW Configuration – Provides options for Intel® Management Engine (ME) firmware and related security features.
4. Trusted Computing – Configures TPM (Trusted Platform Module) settings for security and encryption.
5. ACPI Settings – Sets system power management behavior, such as sleep states and wake-up events.
6. F8196x Super IO Configuration – Configures Super I/O chip functions, such as serial/parallel ports and watchdog timer.
7. F8196x Hardware Monitor – Displays and controls system health information like temperatures, voltages, and fan speeds.
8. LAN Bypass Configuration – Configures LAN bypass functionality, used in network appliances to keep traffic flowing even during system faults.
9. Serial Port Console Redirection – Redirects BIOS and OS-level text output to a serial port for headless management.
10. USB Configuration – Manages USB ports, legacy USB support, and hand-off between BIOS and OS.
11. Network Stack Configuration – Enables network booting via PXE, with IPv4/IPv6 support.
12. NVMe Configuration – Displays attached NVMe SSDs and allows NVMe controller settings.
13. SDIO Configuration – Configures the Secure Digital I/O controller, used for SD/SDIO cards in embedded systems.

3.4.1 CPU Configuration

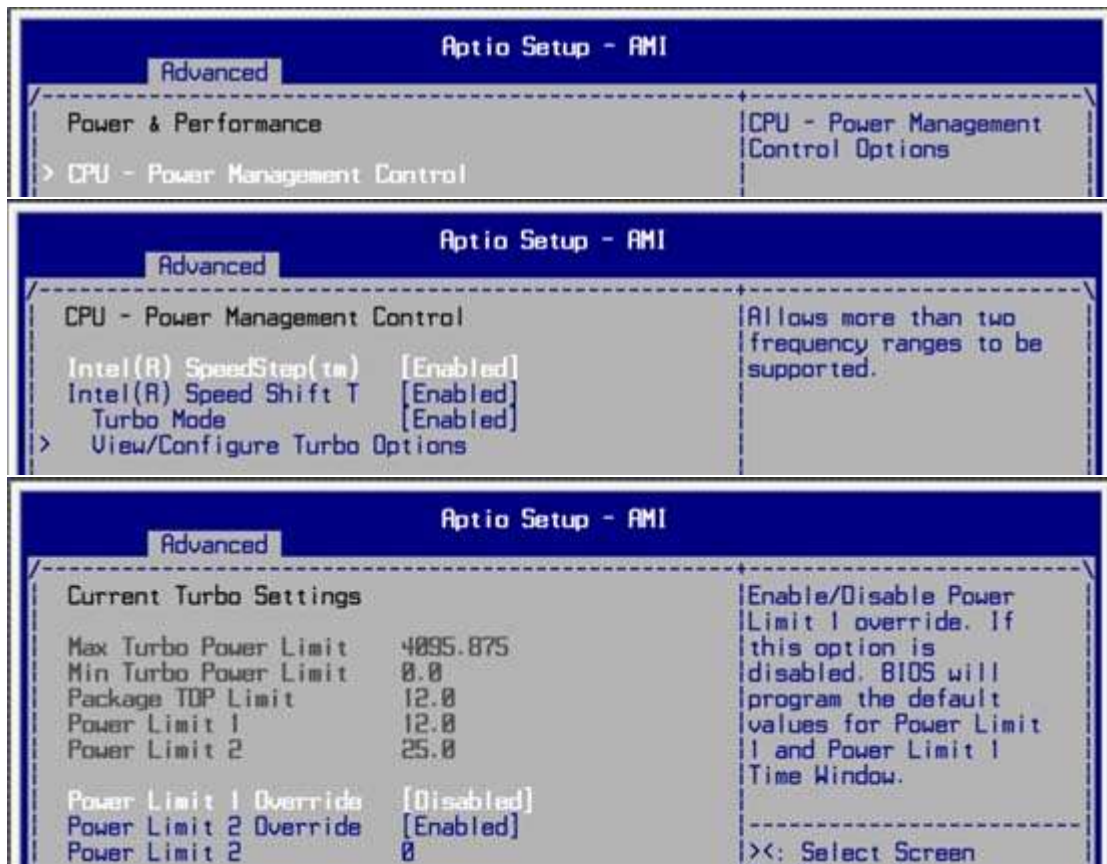


| BIOS Setting | Description |
|---------------------------------------|---|
| Efficient-core Information | Displays details about the system's Efficient-cores (E-cores). |
| ID | Shows the processor identification number (hex value). |
| Brand String | Displays the processor model name (e.g., Intel® Atom™). |
| VMX | Indicates whether Intel® Virtualization Technology (VMX) is supported. |
| SMX/TXT | Indicates whether Intel® Trusted Execution Technology (TXT) is supported. |
| Intel (VMX) Virtualization Technology | Enables or disables Intel Virtualization Technology for running virtual machines. |
| Active Efficient-cores | Allows enabling or disabling specific Efficient-cores (E-cores) for power or performance optimization. |
| AES | Enables or disables the processor's AES (Advanced Encryption Standard) instruction set for hardware-accelerated encryption. |



| BIOS Setting | Description |
|----------------------|--|
| L1 Data Cache | Shows the size of the Level 1 (L1) data cache per core (e.g., 32 KB x 4). |
| L1 Instruction Cache | Shows the size of the Level 1 (L1) instruction cache per core (e.g., 64 KB x 4). |
| L2 Cache | Displays the size of the Level 2 (L2) cache, typically shared by core clusters (e.g., 2048 KB). |
| L3 Cache | Displays the size of the Level 3 (L3) cache (Last Level Cache), shared among all cores (e.g., 6 MB). |

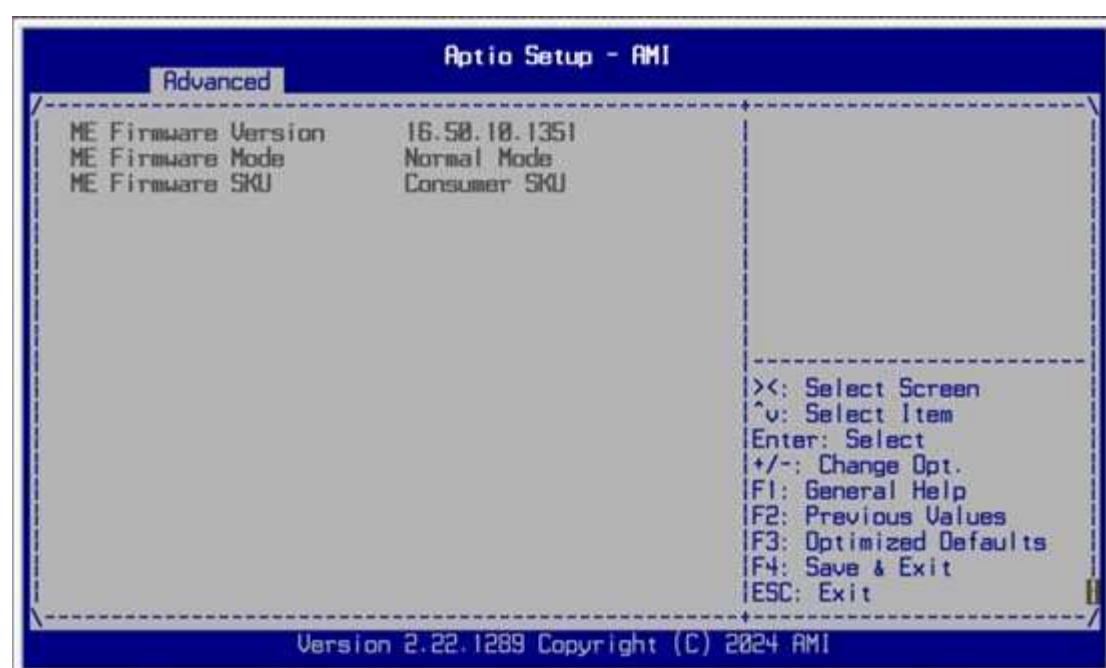
3.4.2 Power & Performance



| BIOS Setting | Description |
|--------------------------------|--|
| Power & Performance | Opens the menu for processor power and performance settings. |
| CPU - Power Management Control | Opens options to configure CPU power management features. |
| Intel SpeedStep | Enables or disables Intel SpeedStep technology, which dynamically adjusts CPU frequency and voltage for power efficiency. |
| Intel Speed Shift | Enables or disables Intel Speed Shift technology, allowing the processor to control frequency and voltage for faster responsiveness. |
| Turbo Mode | Enables or disables Turbo Mode, which allows processor cores to run above their base operating frequency. |
| View/Configure Turbo Options | Opens submenu for viewing or configuring CPU Turbo settings. |

| | |
|------------------------|--|
| Power Limit 1 Override | Enables/disables manual override of Power Limit 1 (PL1). If disabled, BIOS uses default PL1 value and time window. |
| Power Limit 2 Override | Enables/disables manual override of Power Limit 2 (PL2). If disabled, BIOS uses default PL2 value. |
| Power Limit 2 | Sets the value for Power Limit 2 (PL2), the maximum turbo power limit the processor can draw for short durations. |

3.4.3 PCH-FW Configuration



| BIOS Setting | Description |
|---------------------|---|
| ME Firmware Version | Displays the version number of the Intel Management Engine (ME) firmware installed on the system. |
| ME Firmware Mode | Indicates the current operating mode of the Intel ME firmware (e.g., Normal Mode, Recovery Mode). |
| ME Firmware SKU | Displays the SKU (Stock Keeping Unit) type of the ME firmware, which defines its feature set (e.g., Consumer, Corporate). |

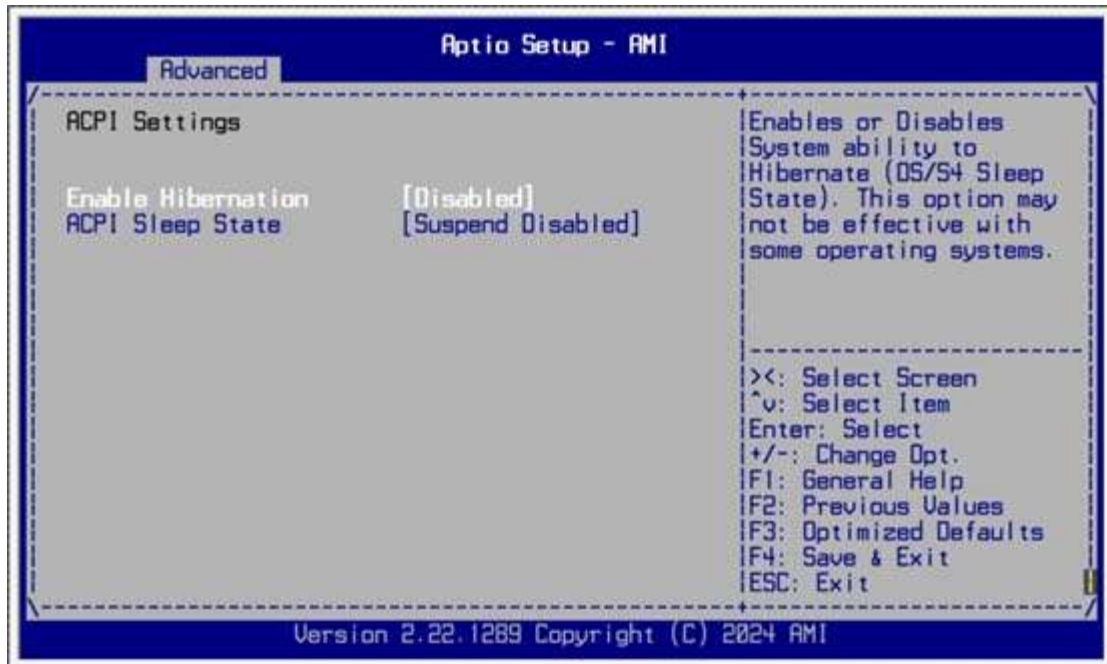
3.4.4 Trusted Computing



| BIOS Setting | Description |
|--------------------------------|---|
| TPM 2.0 Device Found | Indicates whether a TPM 2.0 device is detected in the system. |
| Firmware Version | Displays the firmware version of the TPM device. |
| Vendor | Shows the vendor or manufacturer of the TPM device (e.g., IFX). |
| Security Device Support | Enables or disables BIOS support for the TPM security device. |
| Active PCR Banks | Lists the currently active PCR (Platform Configuration Register) banks used for measurements. |
| Available PCR Banks | Displays the available PCR banks supported by the TPM device. |
| SHA256 PCR Bank | Enables or disables the SHA256 PCR bank for TPM measurements. |
| SHA384 PCR Bank | Enables or disables the SHA384 PCR bank for TPM measurements. |
| Pending Operation | Specifies if there is a pending TPM operation, such as clearing ownership. |
| Platform Hierarchy | Enables or disables the TPM platform hierarchy, which controls overall TPM access. |
| Storage Hierarchy | Enables or disables the TPM storage hierarchy for managing TPM storage keys. |
| Endorsement Hierarchy | Enables or disables the TPM endorsement hierarchy for authentication and identity keys. |
| Physical Presence Spec Version | Displays the version of the physical presence interface specification supported (e.g., 1.3). |
| TPM 2.0 Interface Type | Specifies the TPM interface type used (e.g., TIS). |

| | |
|---------------|--|
| Device Select | Selects which TPM device to use when multiple are available. |
|---------------|--|

3.4.5 ACPI Settings



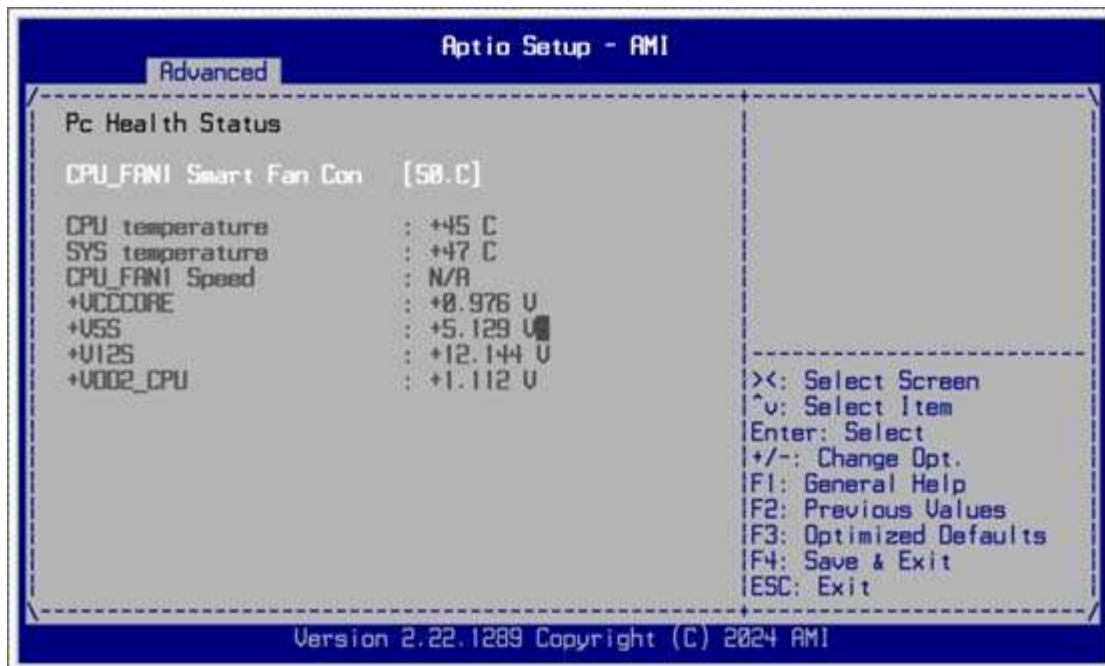
| BIOS Setting | Description |
|--------------------|--|
| Enable Hibernation | Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some operating systems. |
| ACPI Sleep State | Suspend Disabled |

3.4.6 F8196x Super IO Configuration



| BIOS Setting | Description |
|-------------------------------|---|
| F8196x Super IO Configuration | Opens configuration options for the Super IO chip (F8196x) and Serial Port (COMA). |
| Super IO Chip | Identifies the installed Super IO chip. (Fixed value: F8196x.) |
| Serial Port 1 Configuration | Opens settings for configuring Serial Port 1 (COMA). |
| Serial Port | Enables or disables Serial Port (COMA). Options: Enabled / Disabled. Default: Enabled. |
| Device Settings | Shows and allows adjustment of I/O address and IRQ used by the serial port. Default: I/O = 3F8h; IRQ = 4. |
| Change Settings | Sets how serial port resources are configured. Options: Auto (BIOS assigns resources) / Manual. Default: Auto. |

3.4.7 F8196x Hardware Monitor



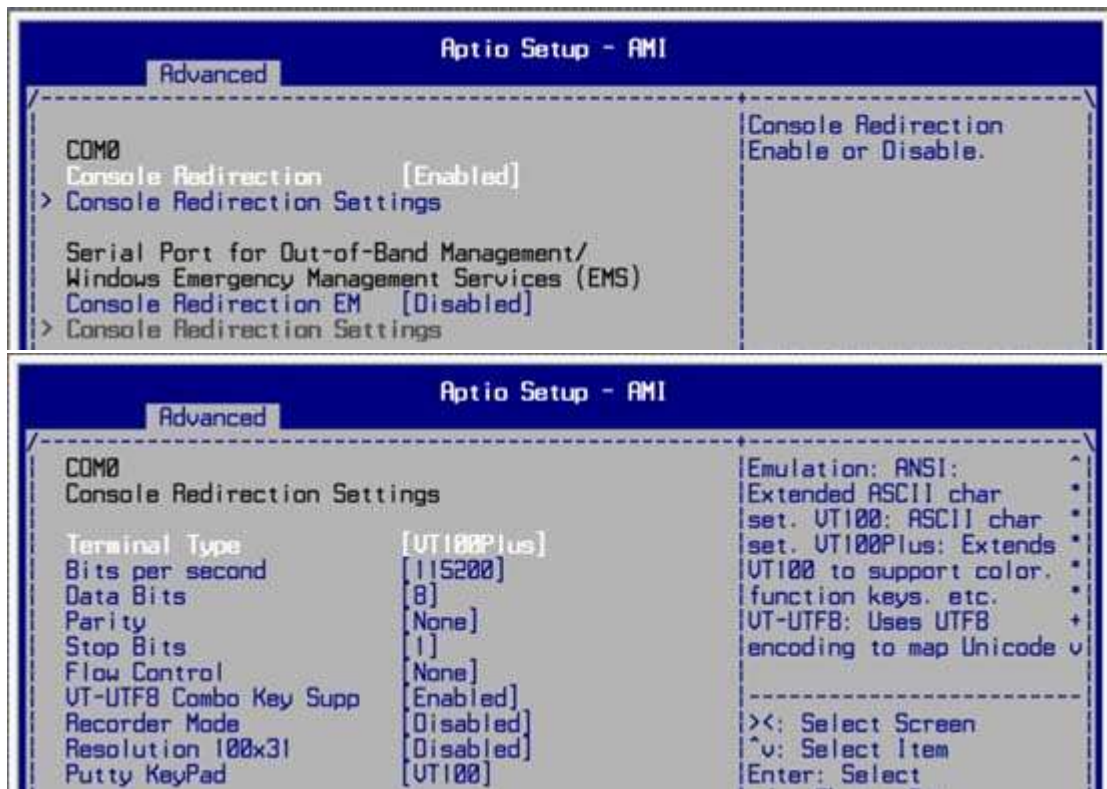
| BIOS Setting | Description |
|-------------------------|---|
| Smart Fan Control | Disable or setting smart fan control start up temperature. |
| Temperatures / Voltages | These fields are the parameters of the hardware monitoring function feature of the motherboard. The values are read-only values as monitored by the system and show the PC health status. |

3.4.8 LAN Bypass Configuration



| BIOS Setting | Description |
|--------------------------|--|
| LAN Bypass Configuration | Opens configuration options for LAN bypass behavior. |
| Bypass Quick Setting | Sets LAN port behavior mode. Options: - Normal: All LAN ports operate normally. Watchdog Timer (WDT) monitors system hang and initiates a reboot. - Bypass: All LAN ports switch to bypass mode during power-off or when the WDT initiates a bypass.(Hardware bypass applies to LAN1/2 only) |

3.4.9 Serial Port Console Redirection



| BIOS Setting | Description |
|------------------------------|---|
| Console Redirection | Allows you to enable or disable the console redirection feature. |
| Console Redirection Settings | These items become configurable only when you enable the Console Redirection item. The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings. |
| Terminal Type | Emulation: ANSI: Extended ASCII charset. VT100: ASCII charset. VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode. |
| Bits per second | Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds. Options: 9600, 19200, 38400, 57600, 115200 |
| Data Bits | Options: 7, 8 |

| | |
|---------------------------|--|
| Parity | A parity bit can be sent with the data bits to detect some transmission errors. Even: parity bit is 0 if the num of 1's in the data bits is even. Options: None, Even, Odd, Mark, Space |
| Stop Bits | Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Options: 1, 2 |
| Flow Control | Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a "stop" signal can be sent to stop the data flow. Options: None, Hardware RTS/CTS |
| VT-UTF8 Combo Key Support | Enables / Disables VT-UTFB combination key support for ANSI/VT100 terminals. |
| Recorder Mode | With this mode enabled, only text will be sent. This is to capture terminal data. |
| Resolution 100x31 | Enables / Disables extended terminal resolution. |
| Putty Keypad | Select FunctionKey and keyPad on Putty. Options: VT100, LINUX, XTERMR6, SC0, ESCN, VT400 |

3.4.10 USB Configuration

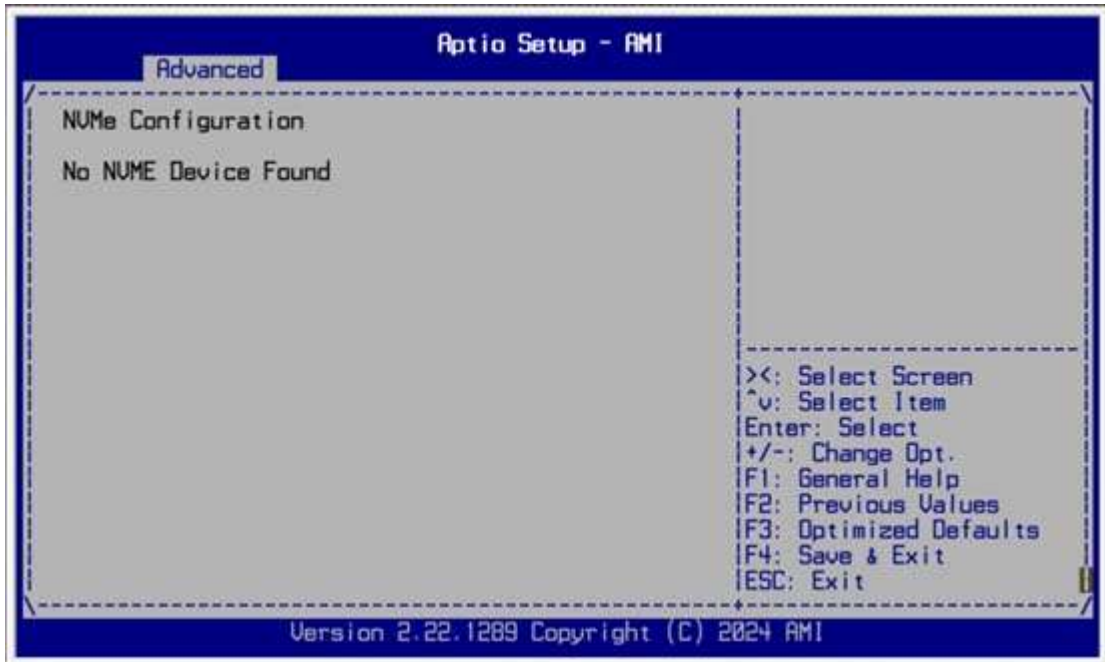


| BIOS Setting | Description |
|---------------------------------|---|
| Legacy USB Support | <ul style="list-style-type: none"> • Enable: Enables Legacy USB Support. • Auto: Disables legacy support if no USB devices are connected. • Disable: Keeps USB devices available only for EFI applications. |
| 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. "Auto" uses default value for a Root port it is 100ms. But for a Hub port, the delay is taken from Hub descriptor. |

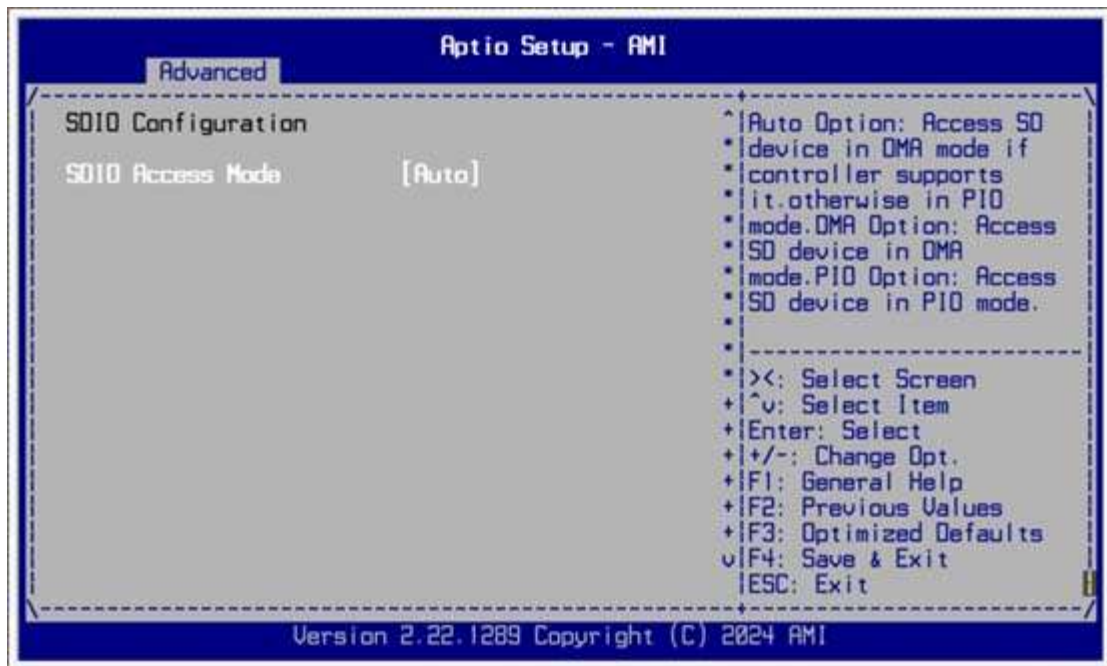
3.4.11 Network Stack



3.4.12 NVMe Configuration



3.4.13 SDIO Configuration



| BIOS Setting | Description |
|--------------------|---|
| SDIO Configuration | Opens configuration options for Secure Digital Input Output (SDIO) device settings. |
| SDIO Access Mode | <p>Selects the access mode for SDIO devices.</p> <p>Options:</p> <ul style="list-style-type: none"> - Auto: Uses DMA mode if supported by the controller; otherwise falls back to PIO mode. - DMA: Forces SDIO device to use Direct Memory Access mode. - PIO: Forces SDIO device to use Programmed Input/Output mode. |

3.5 Chipset Configuration



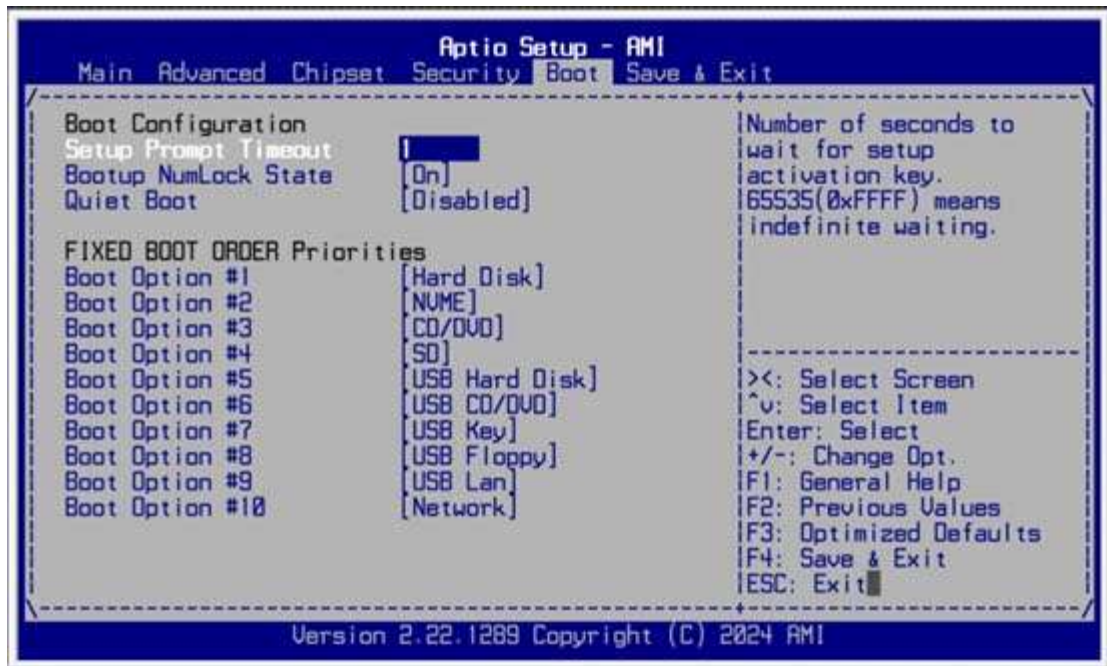
| BIOS Setting | Description |
|-----------------------------------|--|
| System Agent (SA) Configuration | Enables or disables Intel® Virtualization Technology for Directed I/O. Required for advanced virtualization and passthrough. |
| VT-d | Displays the current IMON value used for graphics turbo power management (read-only). |
| Graphics Configuration | Sets the Graphics Translation Table (GTT) memory size. Options: 2 MB / 4 MB / 8 MB. |
| Graphics Turbo IMON Current Value | Sets the aperture size for the graphics translation lookaside buffer (GTLB). Options typically: 128 MB / 256 MB / 512 MB. |
| GTT Size | Enables or disables PSMI (Power Saving Mode Interface) support for integrated graphics. |
| Aperture Size | Pre-allocates a fixed amount of system memory for integrated graphics. Options: 32 MB / 64 MB / 128 MB. |
| PSMI Support | Enables or disables the onboard SATA controller. |
| DVMT Pre-Allocated | Enables or disables Serial ATA Port 0. |
| PCH-IO Configuration | Enables or disables Serial ATA Port 1. |
| SATA Configuration | Selects the mode for the SATA controller. Options: AHCI / RAID (if supported). |
| SATA Controller(s) | Enables or disables hot-plug capability for SATA Port 0. |
| Serial ATA Port 0 | Enables or disables hot-plug capability for SATA Port 1. |
| Serial ATA Port 1 | Enables or disables the embedded MultiMediaCard (eMMC) 5.1 controller. |
| SATA Mode Selection | Enables or disables Intel® Virtualization Technology for Directed I/O. Required for advanced virtualization and passthrough. |
| Port 0 Hot Plug | Displays the current IMON value used for graphics turbo power management (read-only). |
| Port 1 Hot Plug | Sets the Graphics Translation Table (GTT) memory size. Options: 2 MB / 4 MB / 8 MB. |
| SCS Configuration | Sets the aperture size for the graphics translation lookaside buffer (GTLB). Options typically: 128 MB / 256 MB / 512 MB. |
| eMMC 5.1 Controller | Enables or disables PSMI (Power Saving Mode Interface) support for integrated graphics. |

3.6 Security Settings



| BIOS Setting | Description |
|----------------------------|---|
| Administrator Password | Sets a password that restricts access to the BIOS setup. If only the Administrator password is set, it limits access to setup only (prompted when entering BIOS). Password length: 3–20 characters. |
| User Password | Sets a power-on password that must be entered to boot or enter setup. When set, the user has Administrator rights inside BIOS. Password length: 3–20 characters. |
| Secure Boot | Enables or disables Secure Boot feature. Options: Enabled / Disabled. Default: Disabled. Requires platform keys to be enrolled. |
| Secure Boot Mode | Defines Secure Boot mode. Options: Standard / Custom. In Custom mode, keys can be manually managed. |
| Restore Factory Keys | Restores default Secure Boot keys. |
| Reset To Setup Mode | Clears Secure Boot keys and places the system in Setup Mode. Requires reboot. |
| Key Management | Opens the Secure Boot Key Management menu for enrolling, deleting, or viewing keys. |
| Platform Key (PK) | Defines the Platform Key (PK), which establishes the trust relationship for Secure Boot. Only one PK can be installed. |
| Key Exchange Keys (KEK) | Stores Key Exchange Keys (KEK), which are used to update PK and db/dbx contents. Multiple KEKs may be enrolled. |
| Authorized Signatures (db) | Contains the database of authorized signatures (db). Only signed executables and drivers listed here are allowed to run when Secure Boot is enabled. |
| Forbidden Signatures (dbx) | Contains the database of forbidden signatures (dbx). Executables or drivers listed here are blocked from loading. |

3.7 Boot Settings



| BIOS Setting | Description |
|-----------------------------|--|
| Setup Prompt Timeout | Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting. |
| Bootup NumLock State | Turns on/off the keyboard NumLock state. |
| Quiet Boot | Enables / Disables Quiet Boot option. |
| FIXED BOOT ORDER PRIORITIES | Sets the system boot order. |

3.8 Save & Exit Settings



| BIOS Setting | Description |
|---|--|
| Save Changes and Exit | Exit system setup after saving the changes. |
| Discard Changes and Exit | Exit system setup without saving the changes. |
| Save Changes and Reset | Save changes and reset the system. |
| Discard Changes and Reset | Discard changes and reset the system. |
| Save Changes | Save changes without exiting the setup. |
| Discard Changes | Discard changes without exiting the setup. |
| Restore Defaults | Restore factory default settings. |
| Save as User Defaults | Save current settings as user defaults. |
| Restore User Defaults | Restore previously saved user defaults. |
| Launch EFI Shell from filesystem device | Boots directly into the EFI shell if available on a filesystem device. |