SI-212-N

Intel® Atom® x7000E & X7000RE Series/ N-series/ Core™ i3-N305 Processor
Fanless Signage Player

User's Manual

Version 1.0c
(June 2025)

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Copyright

Disclaimer

Trademarks

Compliance

$C\epsilon$

This product has passed CE tests for environmental specifications and limits. This product complies with the directives of the European Union (EU). If users modify and/or install other devices in this equipment, the CE conformity declaration may no longer apply.

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.

この装置は、クラスB機器です。この装置は、住宅環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。

取扱説明書に従って正しい取り扱いをして下さい。　　　　　VCCI － B

WEEE

This product must not be disposed of as normal household waste, in accordance with the EU directive of 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.

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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

Important Safety Information

Carefully read the precautions before using the device.

Environmental conditions:

- Make sure to leave plenty of space around the device for ventilation.
- 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 IS BELOW -20° C OR ABOVE 80° C. This could damage the device. The device must be used in a controlled environment.

Care for IBASE products:

- Before cleaning the device, turn it off and unplug all cables to prevent any electrical current from flowing.
- Use neutral cleaning agents or diluted alcohol with a cloth to clean the device chassis. Then, wipe the chassis with a dry cloth.
- Use a computer vacuum cleaner to remove dust and prevent the air vent or slots from being clogged.

 WARNING

Attention during use:

- Do not use this product near water.
- Do not spill water or any other liquids on the device.
- Do not place heavy objects on top of the device.
- Operate this device with the type of power indicated on the marking label. If unsure, consult your distributor or local power company.
- Ensure the correct power supply voltage is applied.
- Do not walk on the power cord or allow anything to rest on it.
- If using an extension cord, ensure the total ampere rating of the products plugged into it does not exceed its limits.

Avoid Disassembly

Disassembly, repair, or modification of the device is not recommended. Such actions can generate hazards, cause device damage or bodily injury, void the warranty, and lead to property damage.

 CAUTION

There is a risk of explosion if the internal lithium-ion battery is replaced with an incorrect type. Replace only with the same or an equivalent type recommended by the manufacturer. Dispose of used batteries in accordance with the manufacturer's instructions.

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Warranty Policy

- **IBASE standard products:**

  A 24-month (2-year) warranty applies from the date of shipment. If the shipment date cannot be determined, the product serial number will be used to estimate it.

- **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, storage device, power adapter, panel and touchscreen.

∗ **Note:** Products that fail due to misuse, accident, improper installation, or unauthorized repair will be considered out of warranty, and customers will be billed for repair and shipping charges.

Technical Support & Services

1. Visit the IBASE website at 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 of your product and elaborate upon the problem.

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

3. If repair service is needed, please log in to the RMA system on the IBASE website to apply for RMA authorization or contact your distributor or sales representative for assistance.

Table of Contents

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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

The SI-212-N is a compact digital signage player built to deliver excellent performance for entry-level applications. Designed for vibrant 4K displays across retail, public spaces, and transportation hubs, the SI-212-N is powered by the latest Intel® Atom® x7000E Series, N-series, and Core™ i3-N305 processors (formerly Alder Lake-N), providing the perfect blend of efficiency and power for dynamic digital signage.

The SI-212-N stands out with its dual HDMI 2.0 outputs, each capable of driving independent 4K displays, creating immersive and synchronized visuals. The fanless design ensures quiet, dust-free operation, making it ideal for 24/7 deployment. With built-in CEC (Consumer Electronics Control) and hardware EDID emulation functions, the device allows seamless display management through software settings, making it easier to set up and optimize for different display requirements.

1.2 Features

- iSMART intelligent energy-saving technology - enables power on/off scheduling and power resume functions
- Intel® Atom® x7000E & x7000RE Series / N-series / Core™ i3-N305 processors (formerly Alder Lake-N)
- 1x DDR5-5600 SO-DIMM, dual channel, Max. 16GB (Max data rate DDR5-4800)
- 2x HDMI 2.0 with independent audio output
- Built-in CEC and hardware EDID emulation functions with software setting mode
- Supports PDPC (Peripheral Device Power Control) function
- Supports OOB function via I210IT LAN port (optional)
- 1x M.2 E-Key (2230) for WiFi, Bluetooth options
- 1x M.2 M-Key (2280) for storage
- TPM 2.0 and watchdog timer
- Industrial-grade, robust and compact fanless design, with iSMART energy-saving and Observer remote monitoring technologies

1.3 Packing List

The 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-212-N Digital Signage Player
- Power Adaptor
- Power Cord

1.4 Specifications

Product	SI-212-N
Mainboard	
Mainboard	**MBD212**
CPU Type	Intel® Atom® x7000E & X7000RE Series/ N-series/ Core™i3-N305 processors (formerly Alder Lake N)
Operating System	Win10 IoT Enterprise (64-bit) Linux Ubuntu (64-bit)
Chipset	SoC Integrated
Memory	1x DDR5 5600 SODIMM /Max. 16GB (Max data rate DDR5-4800) (ECC not supported)
Graphics	Gen 12 UHD Gfx, up to 32EU
LAN	1x Gigabit LAN
Expansion Slots	1x M.2 2280 socket (M-key, supports NVMe with PCI-E (2x) or SATA) 1x M.2 2230 socket (E-key, supports CNVi X7000RE not supported) w/ PCI-E(1x) & USB 2.0)
I/O Interface	2x HDMI 2.0b 2x USB 3.2 (USB Type-A) 1x USB (Type-C) 1x RJ45 for Gigabit LAN 1x RJ45 for RS232 serial port 1x Audio connectors for Line out 1x Power button 1x Power jack (+12V DC) 2x LED for power & storage
Auto Control and Monitoring	Watchdog Timer: 256 segments, 0, 1, 2…255 (sec/ min)
Storage	1x M.2 M-Key (2280)
Power Requirement	+12V DC
Power Supply	50W power adapter (X7000RE series not supported)

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Chassis	Aluminum + SGCC, black & white
Mounting	Standard system bracket
Dimensions (W x H x D)	217mm (W) x 123mm (D) x 22.5mm (H) 8.54" (W) x 4.84" (D) x 0.88" (H)
Weight	1kg (2.2lb)
Certificate	CE, FCC Class-B, cULus, LVD and VCCI
Environment	
Operating Temperature	0°C~ 45°C (32°F~113°F)
Storage Temperature	-40°C ~ 85°C (-40°F~185°F)
Relative Humidity	5 ~ 90% (non-condensing)
Vibration Protection	M.2: 5 grms / 5~500Hz / random operation

All specifications are subject to change without prior notice.

1.5 Product View

The image shows the function of the connectors and buttons as indicated by the text on top of the connectors, (starting from the left) including L_OUT, COM, LAN, USB 3.2, USB 3.2, Type-C, HDMI, HDMI, EDID, PWR, HDD, and DC 12V.

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1.6   Dimensions

Unit: mm
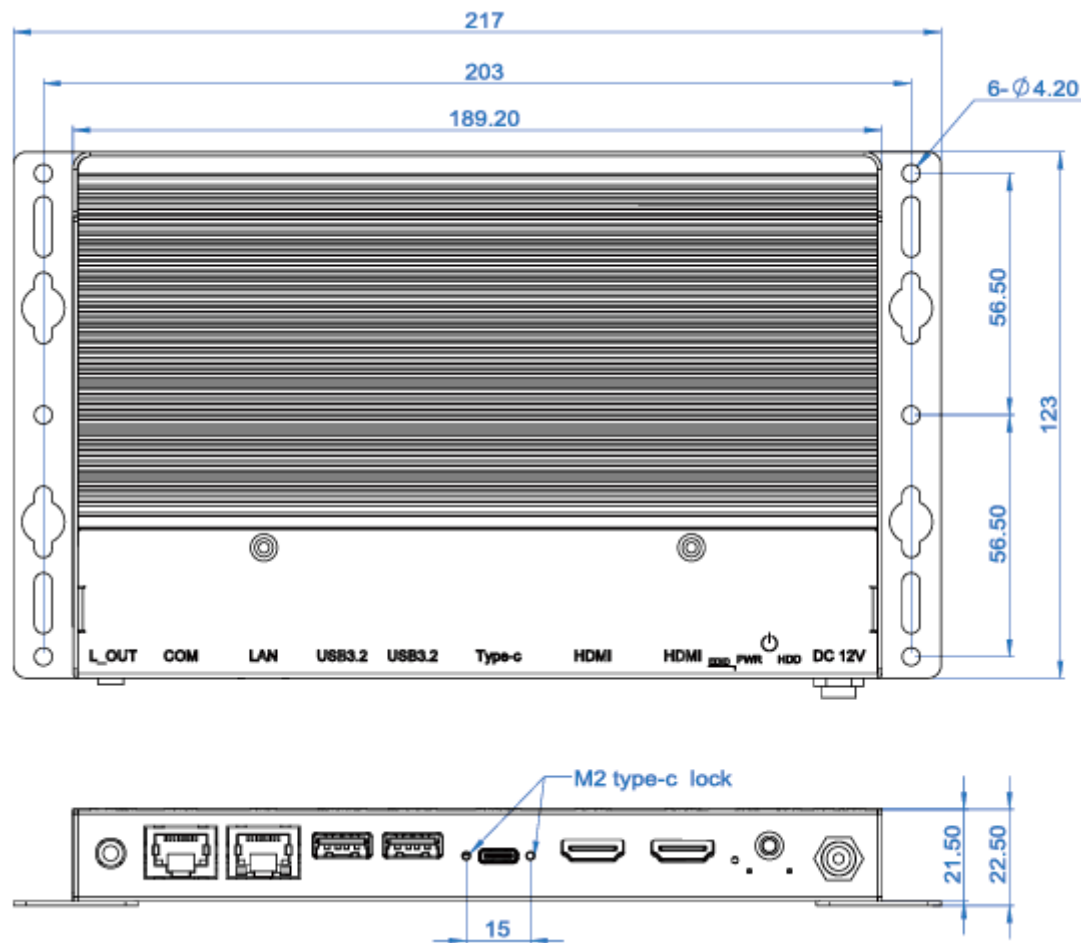
Chapter 2
Hardware Installation & Motherboard Information

The information provided in this chapter includes:

- Installation of memory, M.2 cards and antennas
- Information and locations of connectors

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2.1 Installation / Replacement

The following pictures show how to disassemble the SI-212-N.

1. Removing the mounting kit.
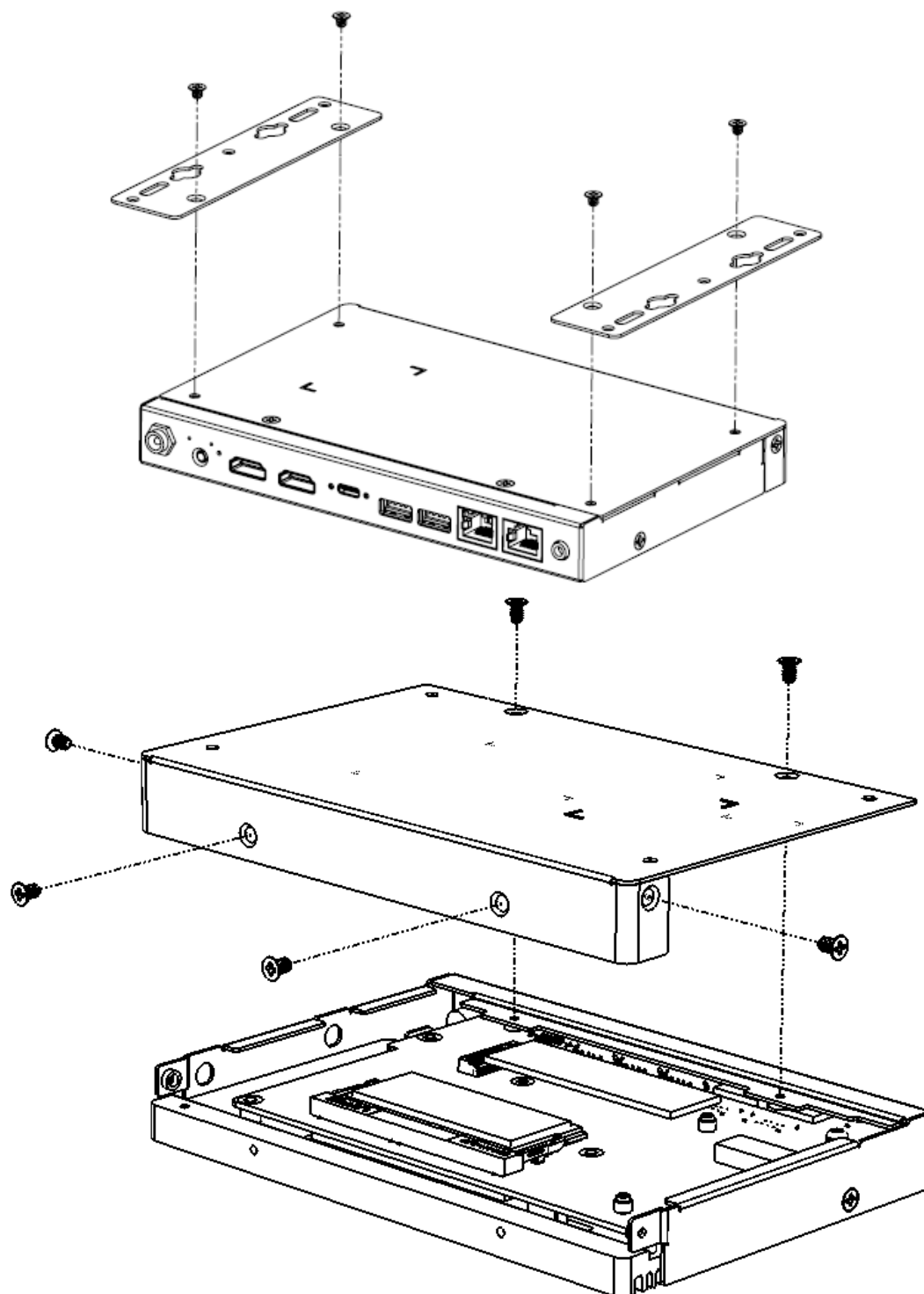
2.1.1   Memory Module

To install memory modules, locate the memory slot on the motherboard and perform the following steps:
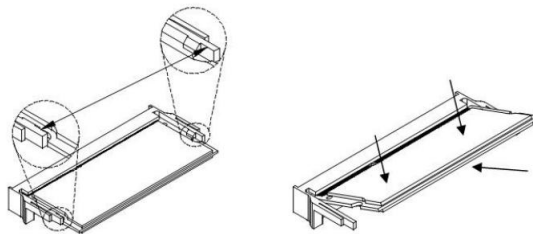
1. Align the key of the memory module with that on the memory slot and insert the module slantwise.
2. Gently push the module in an upright position until the clips of the slot close to hold the module in place when the module touches the bottom of the slot.

To remove the module, press the ejector tabs outwards with your fingertips to eject the module.

2.1.2   M.2 Card

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

    Align the key of the M.2 card to the interface, and insert the card slantwise. Secure the M.2 card with a screw.

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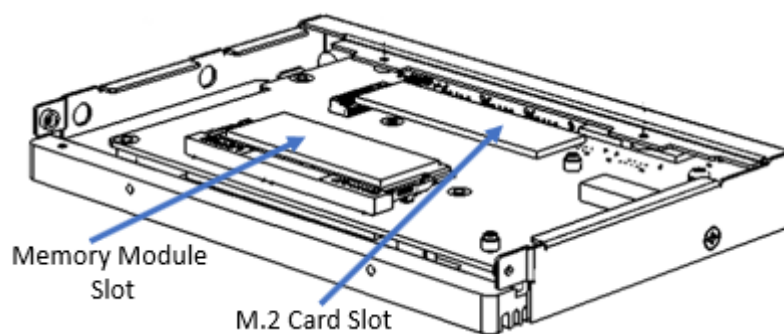
2.1.3   WiFi / 5G Antenna Installation

Thread the WiFi /5G 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 loosening and falling.

1. Thread and fasten the hex nut and the washer. Then install the antenna.
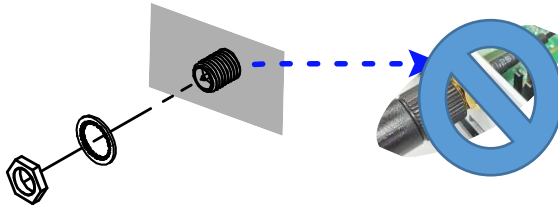
2. Apply adhesive around here.
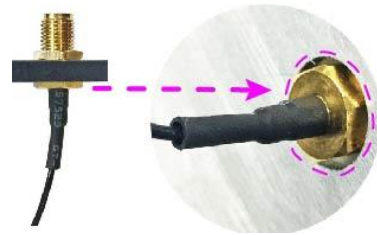
Info: The diameter of the nut is around 6.35 mm (0.25"-36UNC).
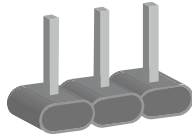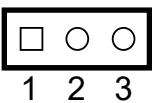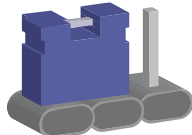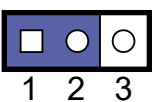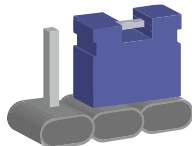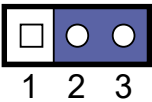
2.2   Setting the Jumpers

Set up and configure the SI-212-N by using jumpers for various settings and features according to the application requirements. Contact your supplier if you have doubts about the best configuration.

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 short either PIN 1–2 or PIN 2–3.

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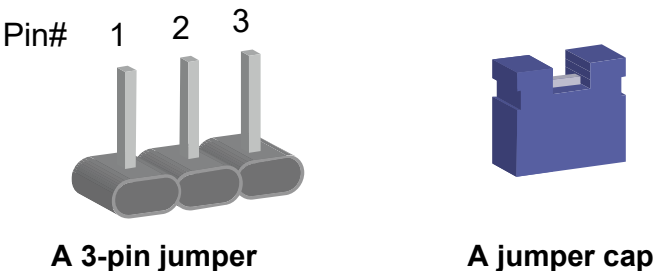
Refer to the illustration below to set jumpers.

Pin closed	Oblique view	Illustration
Open		
1-2		
2-3		

When pins of a jumper are covered by a jumper cap, the jumper is considered closed (ON).

When he jumper cap is removed, the jumper is considered open (OFF).

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2.3 Jumpers, Switches, & Connectors

Motherboard: MBD212

2.3.1 OOB Booting (SW1)
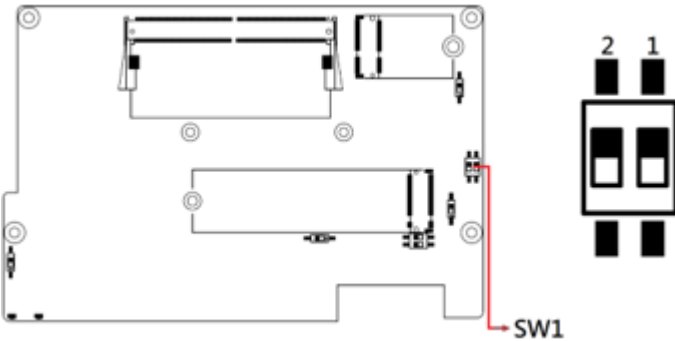
Function	Setting
QSPI Flash (default)	P1-OFF P2-OFF
USB	P1-ON P2-ON

Remarks: Factory use only.

2.3.2 Clear CMOS Data (SW2-1)
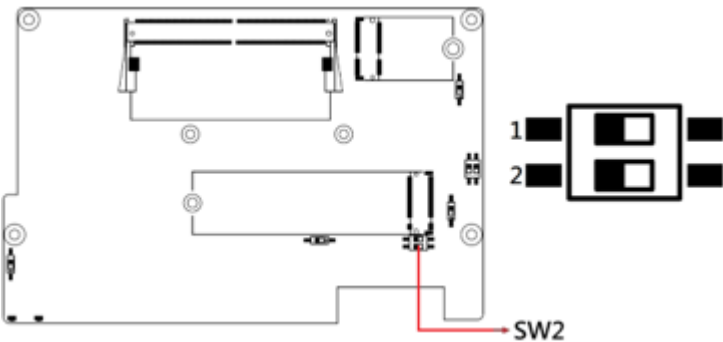
Function	Setting
Normal (default)	P1-OFF
Clear CMOS	P1-ON

2.3.3   Clear ME Register (SW2-2)
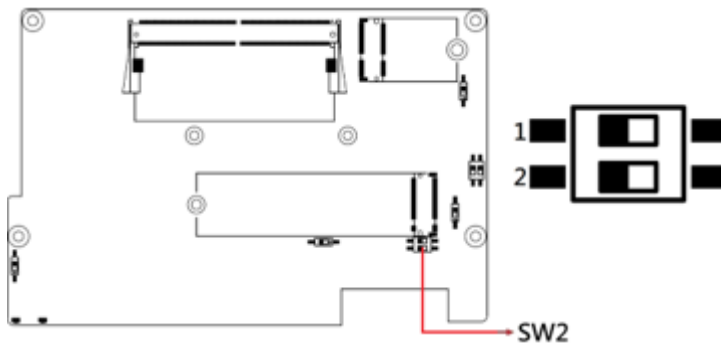
Function	Setting
Normal (default)	P2-OFF
Clear ME Register	P2-ON

2.3.4   OOB Scheduled for Power on/off (SW3)
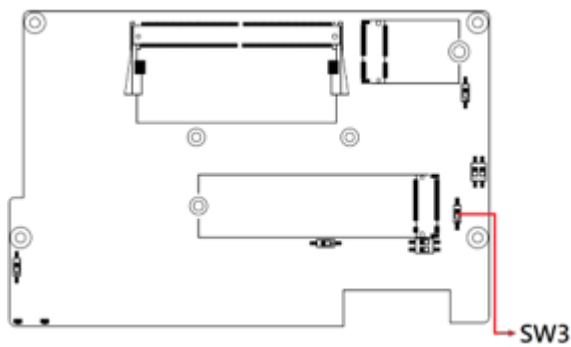
Function	Setting
Disable (default)	P1-OFF
Enable	P1-ON

2.3.5   Power Button (SW4)

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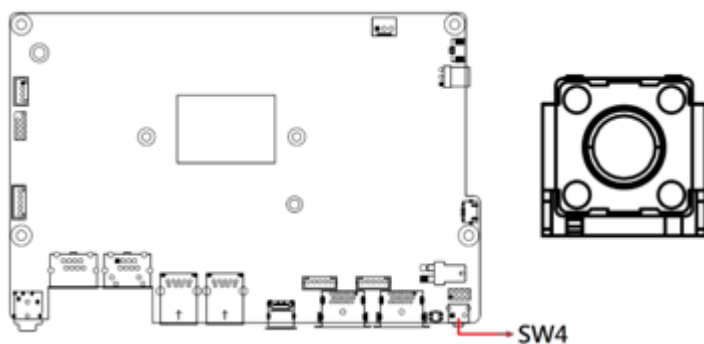
2.3.6 EDID Clear Button (SW5)

SW5
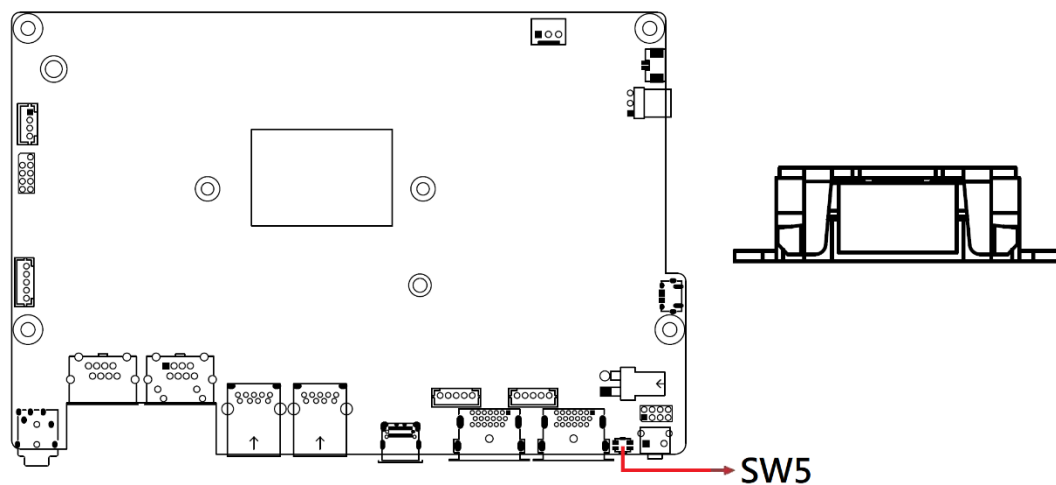
2.3.7 AT / ATX Mode Selection (SW6)

1

ON

SW6
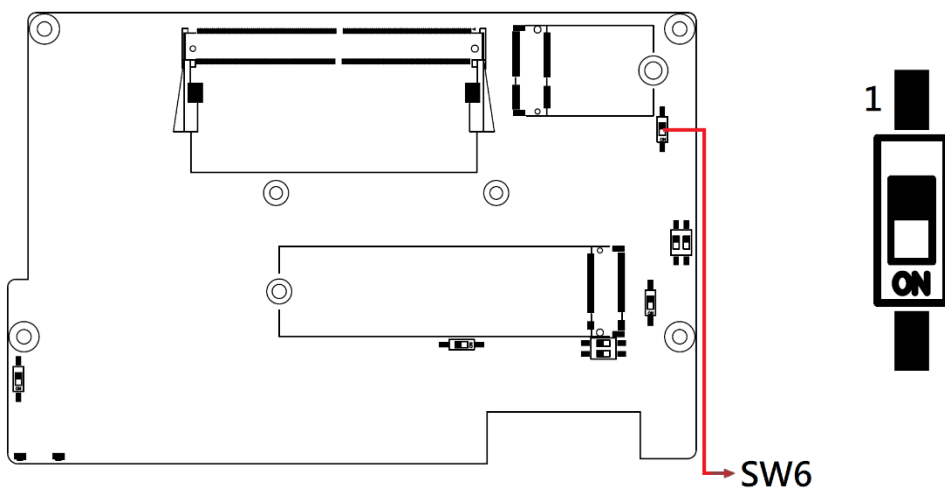
Function	Pin closed	Setting
ATX (default)	1-2	1 ▢ ◯ ◯
AT	2-3	1 ▢ ◯ ◯

Note: AT: Auto power on; ATX: Manual power on

2.3.8   S/W EDID Bypass (SW7)
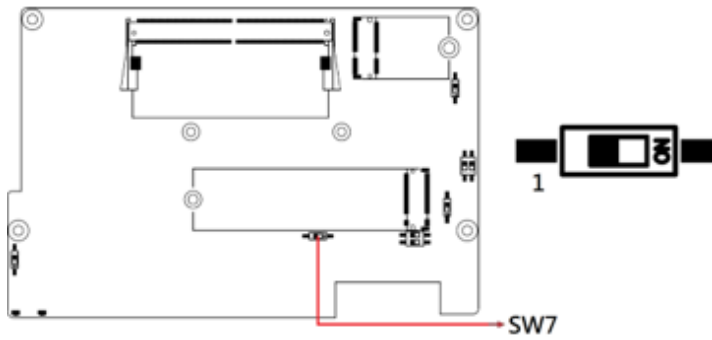
Function	Pin closed
Emulator(H)* (default)	P1-OFF
Bypass(L)	P1-ON

2.3.9   LED HW/SW Control Function (SW8)
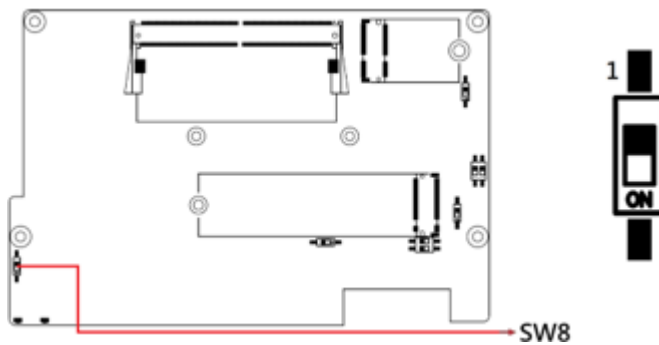
Function	Pin closed
S/W	P1-OFF
H/W (default)	P1-ON

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2.3.10　Pin Assignment for COM1 (CN10) Port

Pin	Signal Name
	RS-232
1	RTS
2	DTR
3	TX
4	Ground
5	DCD
6	DSR
7	RX
8	CTS

2.3.11   Micro USB Connector (CN1)

CN1
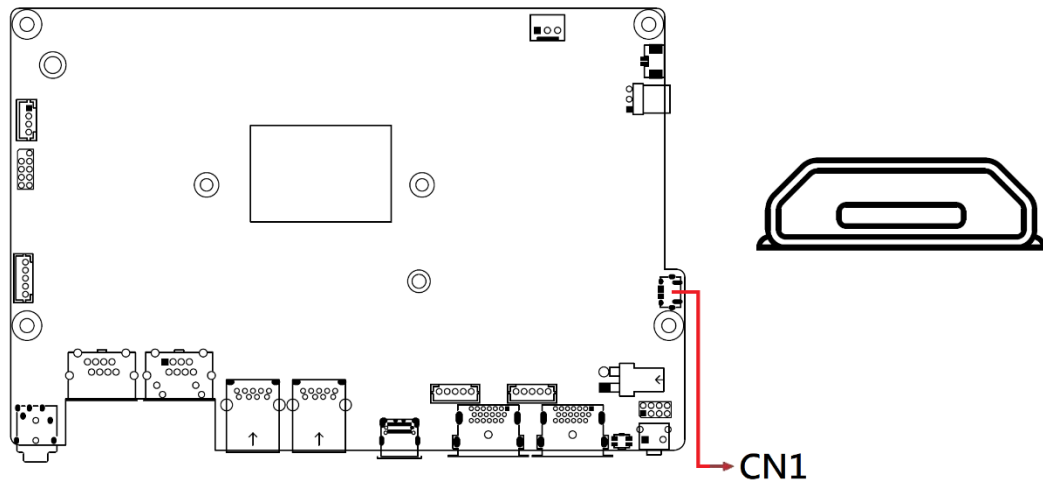
OOB FW upgrade.
Remarks: Factory use only.

2.3.12   DC Power Input Connector (CN2)

1

CN2
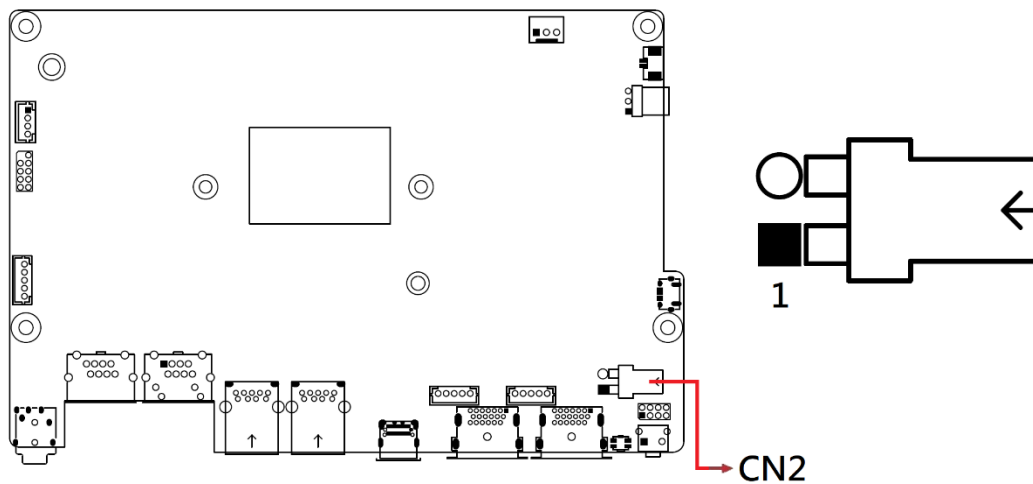
Pin	Assignment
1	+12V
2	Ground

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2.3.13   COM1 RS-232 Port RJ-45 Connector (CN3)

CN3
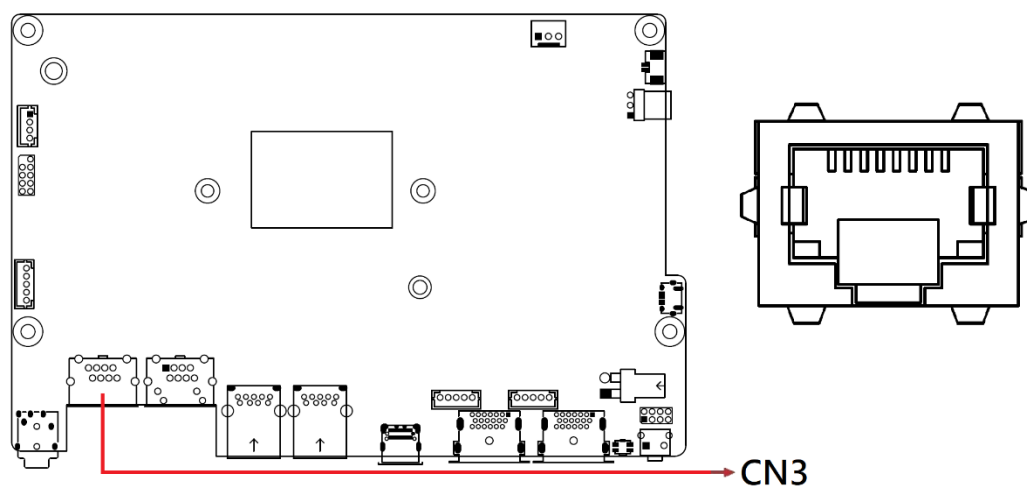
2.3.14   LAN Connector (CN4)

CN4
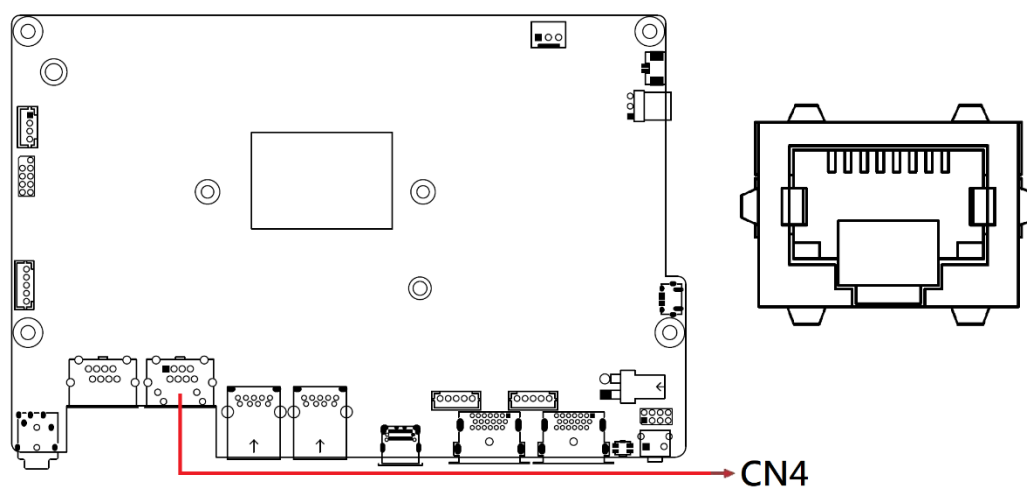
2.3.15 USB 3.2 Connector (CN5, CN6)
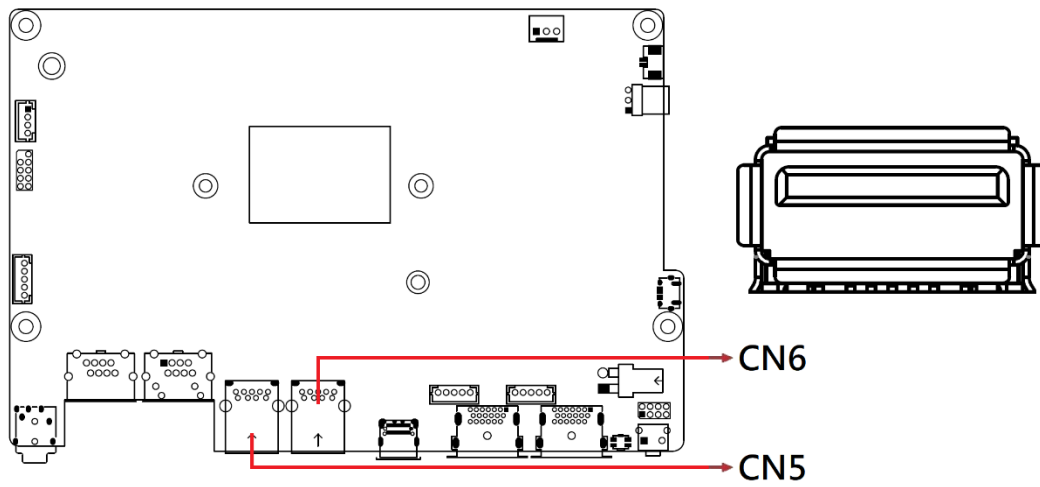
Note: CN6 supports PDPC (Peripheral Device Power Control). Setting Bit 5 enables/disables USB power on CN6.

2.3.16 Type-C Connector (CN7)
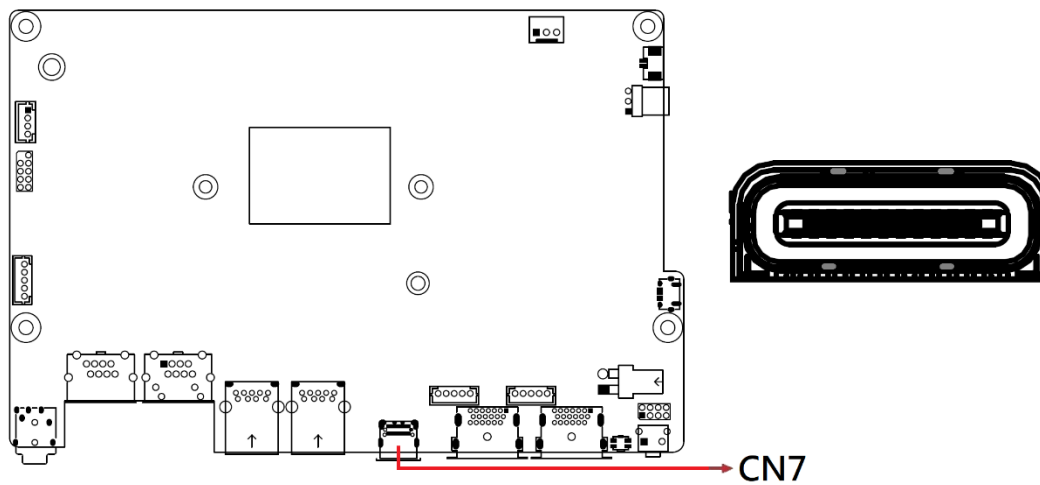
Note: DP, USB 3.2, DC Output: +5V/3A

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2.3.17 HDMI Connector (CN8, CN9)
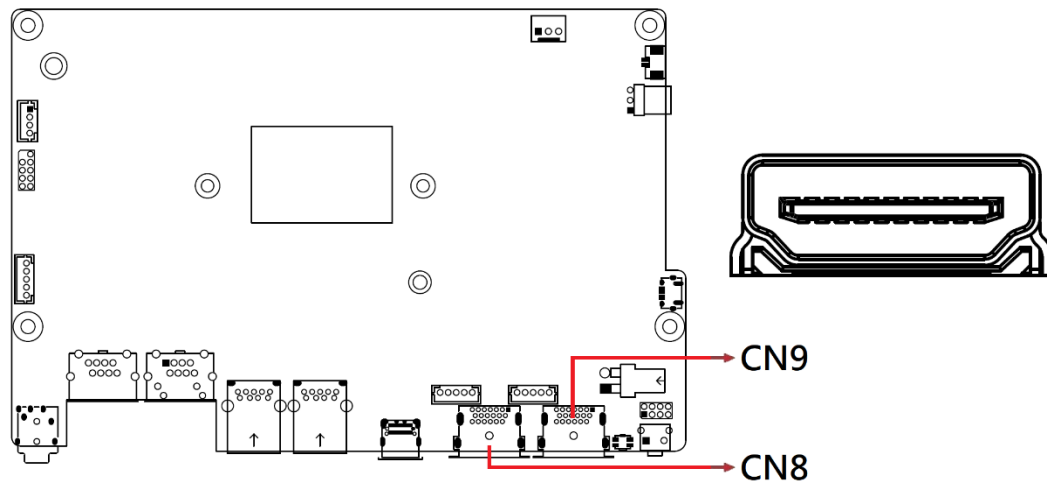
2.3.18 RTC Battery Connector (J1)
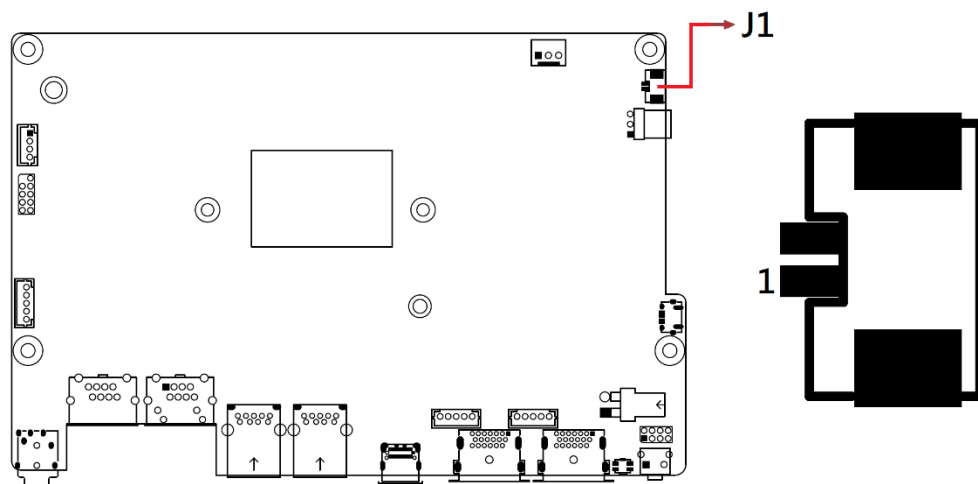
Note: Coin battery with cable.

Pin	Assignment
1	+3V
2	Ground

2.3.19 ismart FW Upgrade Connector (J3)
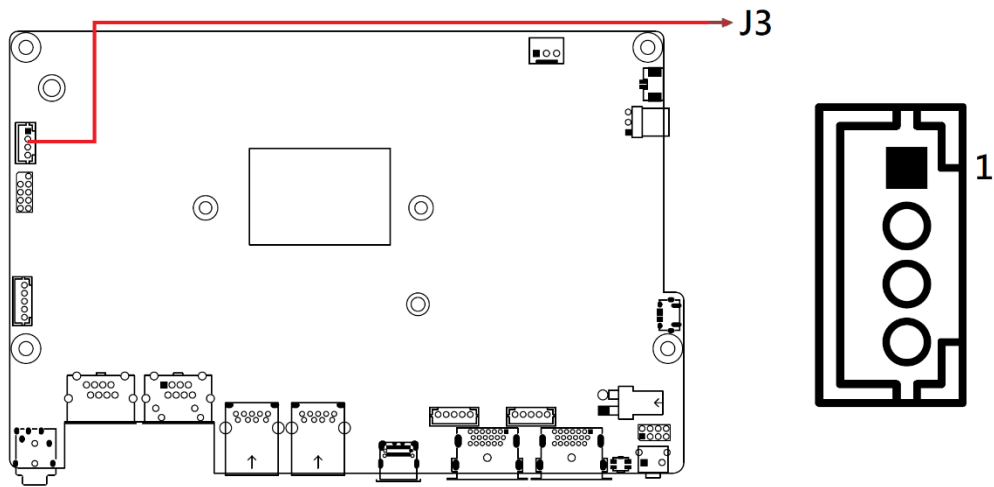
Remarks: Factory use only.

Pin	Assignment	Pin	Assignment
1	+3.3V	3	SBWTDIO
2	SBWTCK	4	Ground

2.3.20 SPI Flash Tool Connector (J4)

Remarks: Factory use only.

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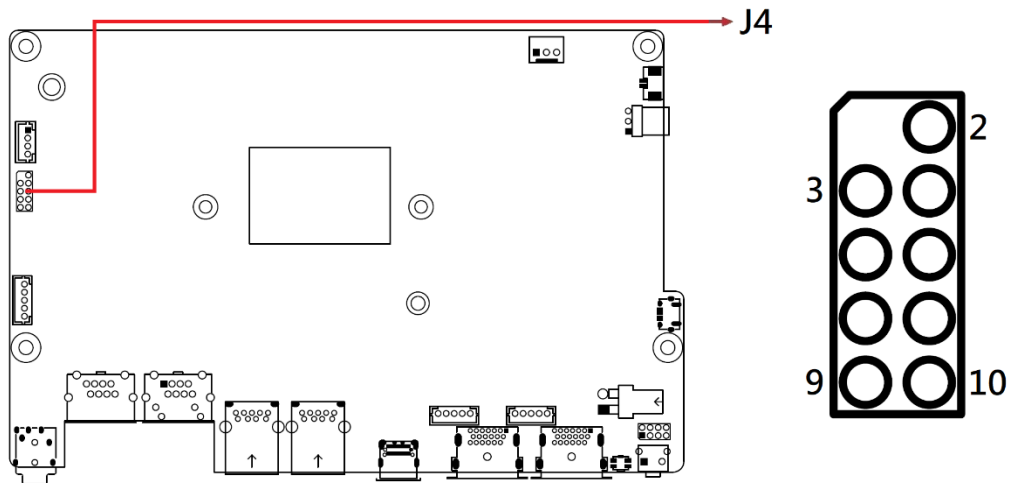
2.3.21 EDID Switch FW Upgrade (J8)
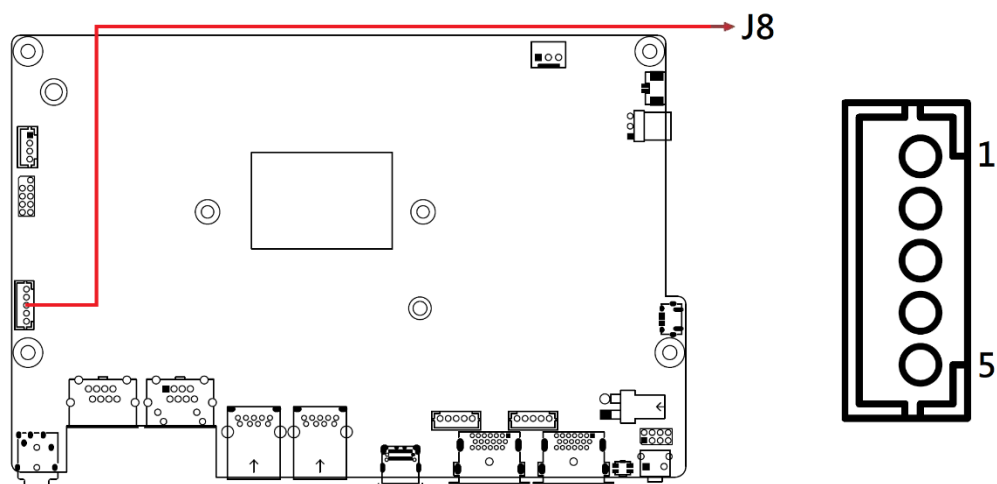
Remarks: Factory use only.

2.3.22 CEC0,1 FW Upgrade (J9,J10)
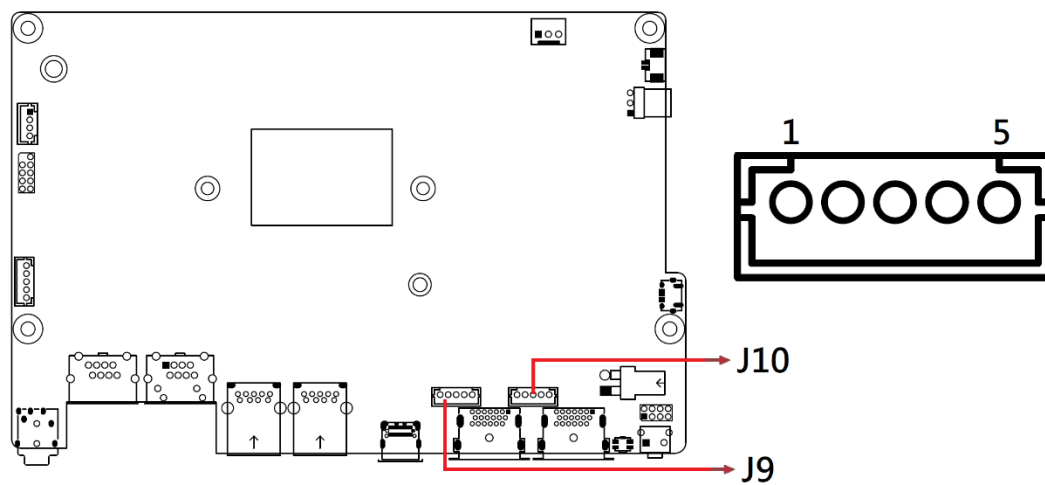
Remarks: Factory use only.

2.3.23   Front Panel Connector (J11)
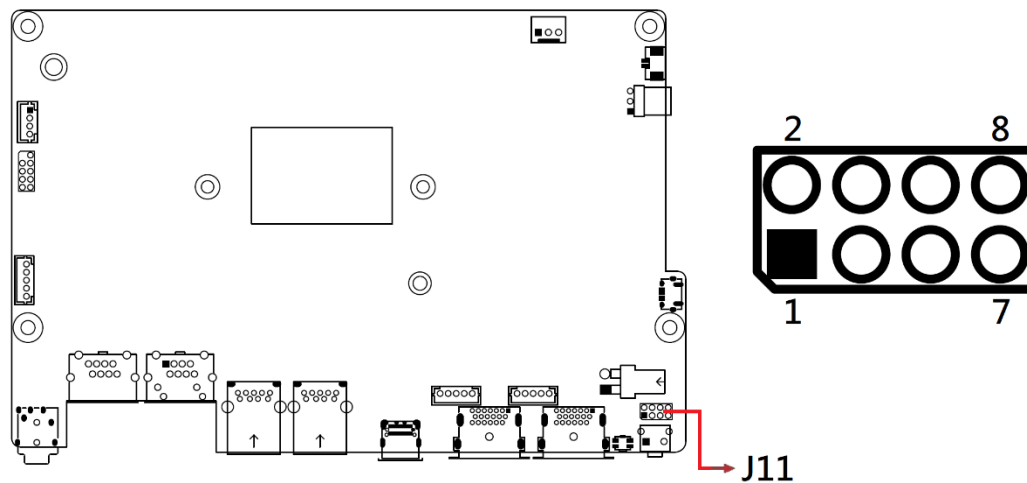
Pin	Assignment	Pin	Assignment
1	Ground	2	PWR_BTN+
3	HDD_LED+, 3.3V	4	HDD Active
5	Ground	6	Reset
7	POWER_LED+, 5V	8	Ground

J11 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)**

  The 2 pins makes 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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2.3.24 Audio Phone Jack (J12)
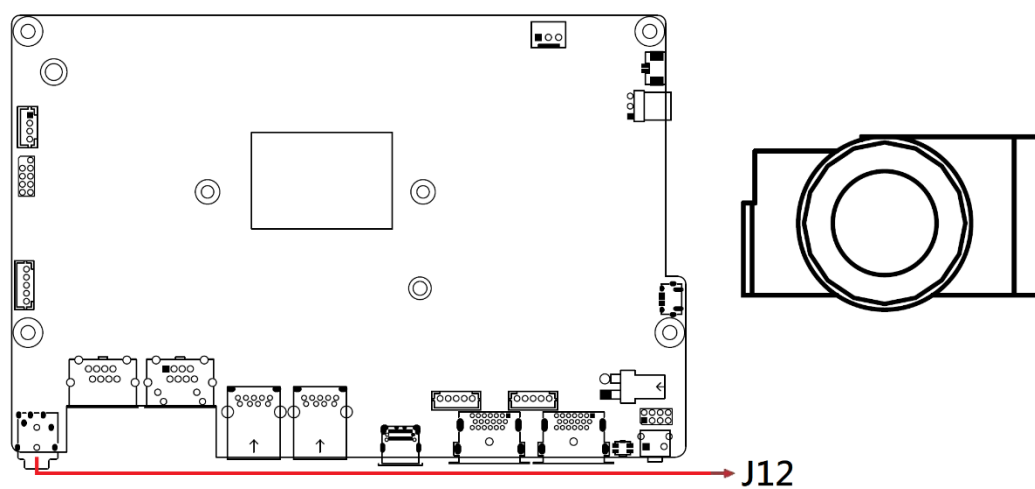
Note: Line out only.

2.3.25 DDR5 SO-DIMM Connector (J13)
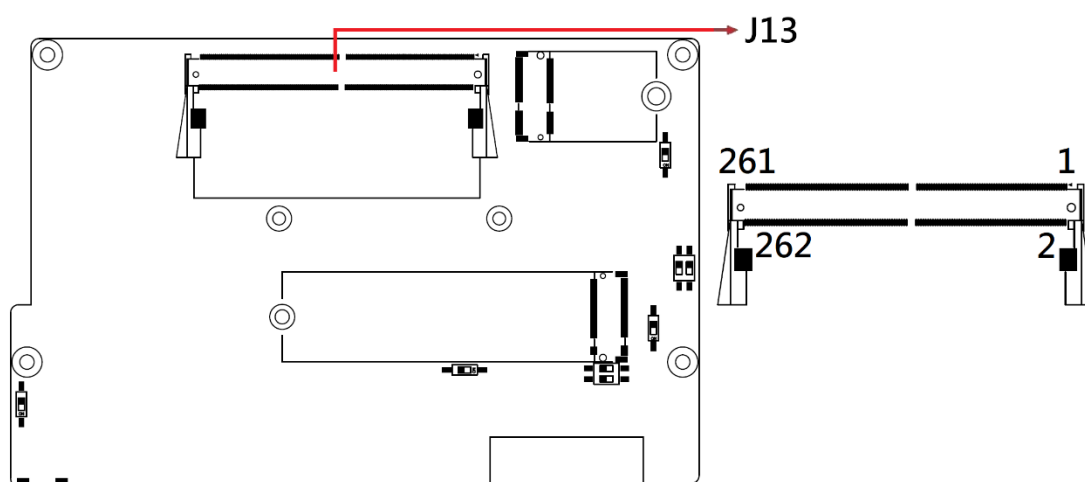
2.3.26 M.2 E-Key 2230 Connector (J14)
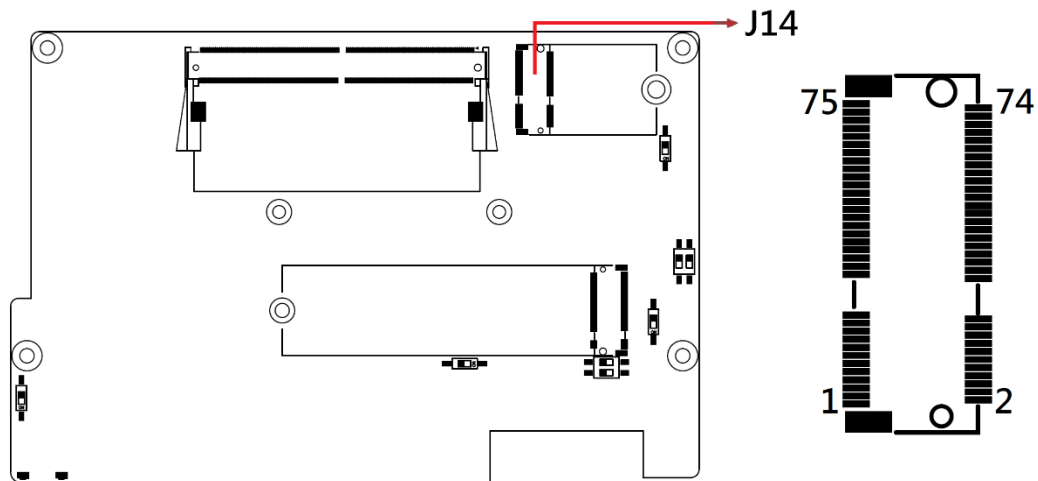
*J14 supports CNVI Card

2.3.27 M.2 M-Key 2280 Connector (J15)
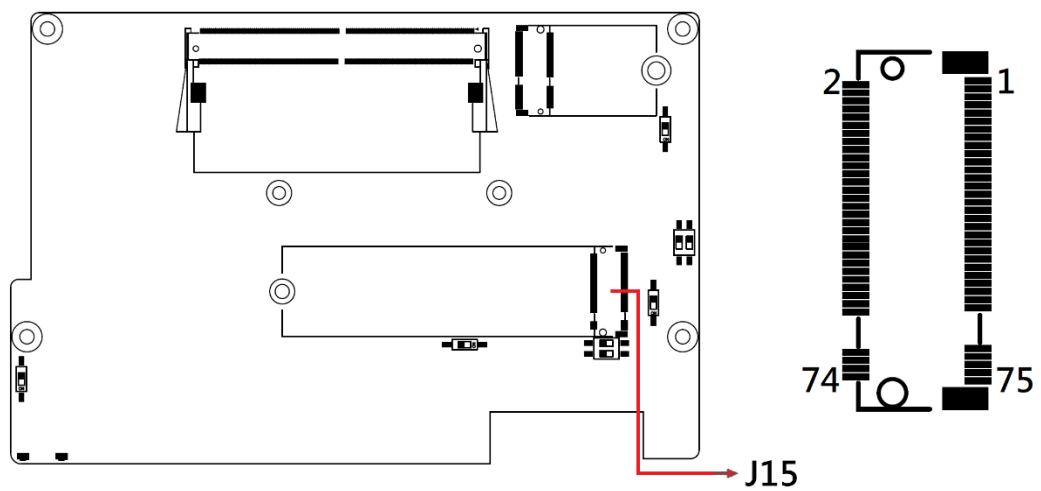
Note: PCIE-E x2, SATA

2.3.28   OOB Debug Com Port (J16)
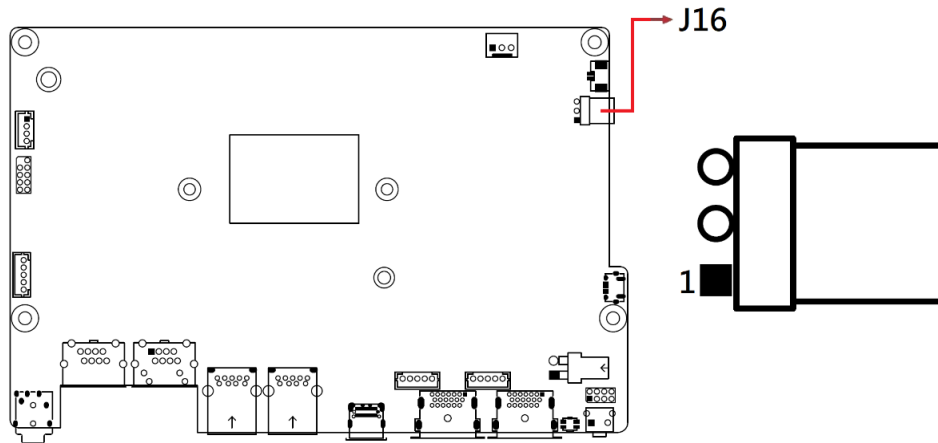
Pin	Assignment
1	TXD
2	RXD
3	Ground

Remarks: Factory use only.

2.3.29   Indicator Lights (LED4, LED5)
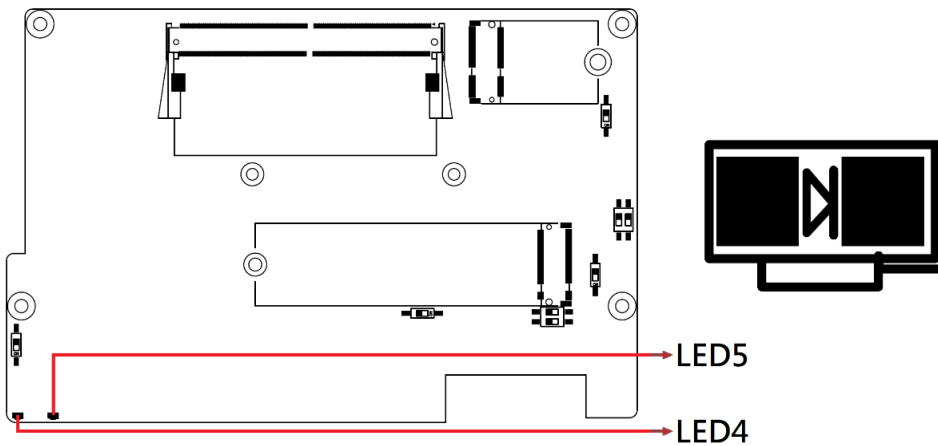
Note: Use SW8 to set LED function.
Hardware Control (Default)
LED4: HDD LED (Green)
LED5: POWER LED (Red)

Software Control by Super-IO GPO
LED4: Green LED   LED5: Red LED
GPO_L：LED_ON
GPO_H：LED_OFF*

Chapter 3
Drivers Installation

The information provided in this chapter includes:

- Intel® Chipset Software Installation Utility
- Graphics Drivers Installation
- HD Audio Drivers Installation
- LAN Drivers Installation
- Intel® ME Drivers Installation
- Intel® Serial IO Drivers Installation

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3.1   Introduction

This section describes the installation procedures for software drivers.

Note: After installing your Windows OS, install the Intel® Chipset Software Installation Utility first before proceeding with the drivers 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.

1. 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 as shown. Click **Intel** and then **Intel(R) AlderLake Chipset Drivers**.

2. Click **Intel(R) Chipset Software Installation Utility**.

3. When the *Welcome* screen to the Intel® Chipset Device Software appears, click **Next** to continue.
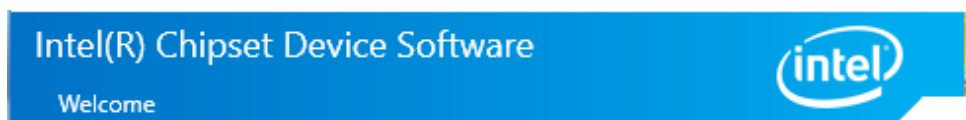
4. Accept the software license agreement and proceed with the installation process.
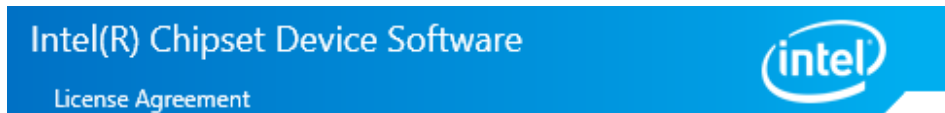
5. On the *Readme File Information* screen, click **Install**.


```
**************************************************************
*   Product: Intel(R) Chipset Device Software
*   Package version: 10.1.19199.8340
*   Installer version: 3.1.7.143
*   Date: 07/26/2022
..............................................................
```
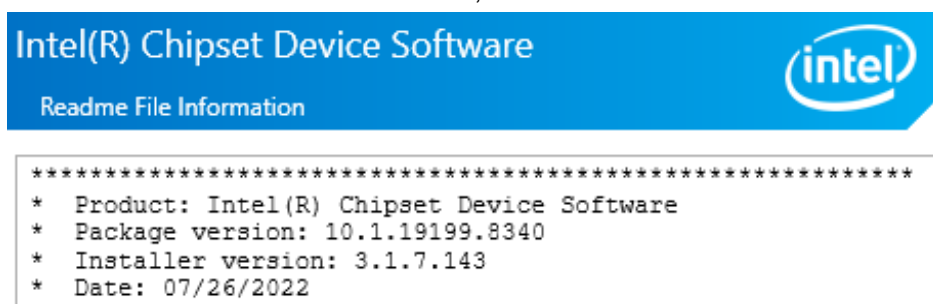
6. After completing the installation, click **Finish** to complete the setup process.

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3.3 Graphics Drivers Installation

1. Click **Intel** and then **Intel(R) AlderLake Chipset Drivers**.

2. Click **Intel(R) HD Graphics Drivers**.

3. Click **Begin installation**.
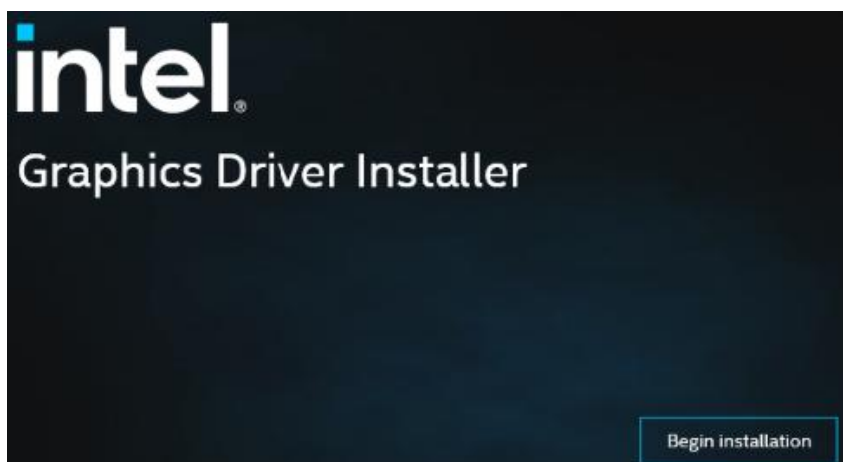
4. Click **I agree** to accept the license agreement.

INTEL SOFTWARE LICENSE AGREEMENT

Agreement. Any change to or deletion of a provision or part of this Agreement
under this Section will not affect the validity or enforceability of the remainder
of this Agreement, which will continue in full force and effect.
The failure of a Party to require performance by the other Party of any
provision hereof will not affect the full right to require such performance at
any time thereafter; nor will waiver by a Party of a breach of any provision
hereof constitute a waiver of the provision itself.

18. PRIVACY. YOUR PRIVACY RIGHTS ARE SET FORTH IN INTEL'S PRIVACY
NOTICE, WHICH FORMS A PART OF THIS AGREEMENT. PLEASE REVIEW THE
PRIVACY NOTICE AT HTTP://WWW.INTEL.COM/PRIVACY TO LEARN HOW
INTEL COLLECTS, USES AND SHARES INFORMATION ABOUT YOU.

19. THIRD PARTIES. This software uses libraries from the FFmpeg project
under the LGPLv2.1.

I agree

5. On the next screen, click **Start and** then click **Finish** when installation has
been completed.

The installer will install the following components:
- Intel® Graphics Driver
- Intel® Graphics Command Center

☐ Execute a clean installation
A clean installation removes all old drivers and restores Intel settings to the
default value

Start ›

.

iBASE

3.4 HD Audio Drivers Installation

1. To complete the audio drivers installation, go to the system's Device Manager to **Update driver** of the **High Definition Audio Controller**.
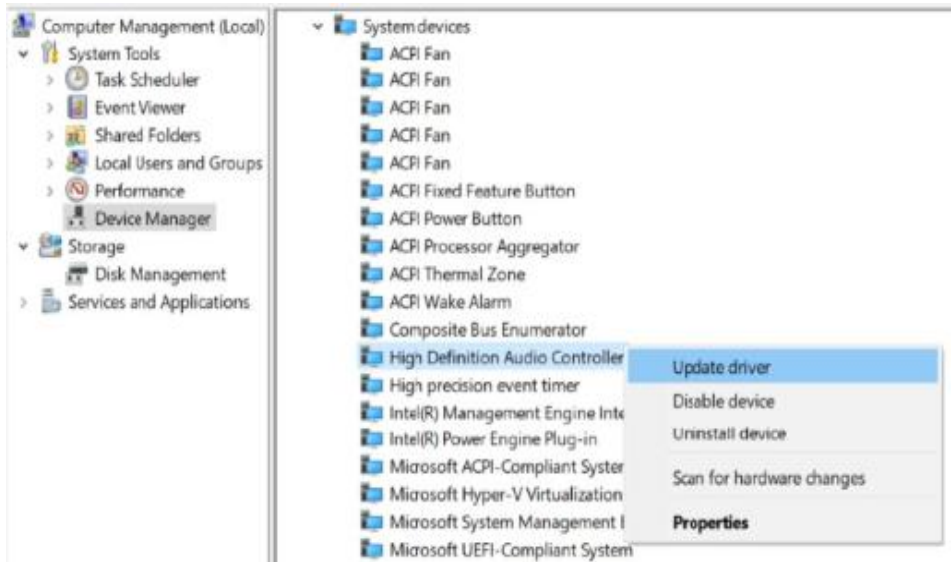
2. Locate and install the driver manually.

3. Go to the subfolder shown below and click **Next**.

Update Drivers - High Definition Audio Controller

Browse for drivers on your computer

Search for drivers in this location:

D:\Intel\AlderLake-N\Sound   ∨   Browse...

☑ Include subfolders

∨ 🖥️ DVD RW Drive (D:) DRIVER
    > 📁 COM
    ∨ 📁 Intel
        ∨ 📁 AlderLake-N
            > 📁 Audio
            > 📁 INF
            > 📁 LAN
            > 📁 ME
            > 📁 SIO
            > 📁 Sound
            > 📁 VGA
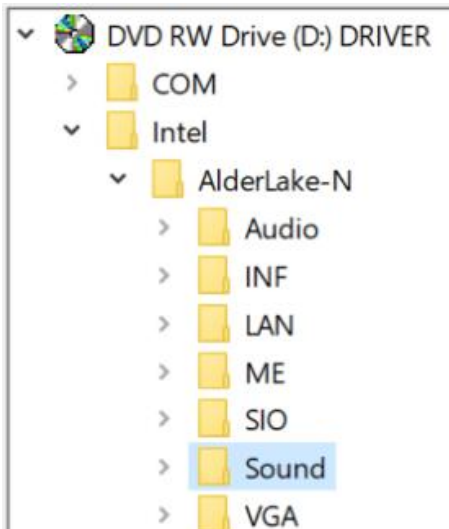
4. Windows has finished installing the drivers. Click **Close**.

Update Drivers - Intel ® Smart Sound Technology BUS

Windows has successfully updated your drivers

Windows has finished installing the drivers for this device:

🖥️ Intel® Smart Sound Technology BUS

5. Click Intel and then Intel(R) AlderLake Chipset Drivers.

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6. Click **Realtek High Definition Audio Drivers**.

7. On the *Welcome* screen of the InstallShield Wizard, click **Next**.

8. On the next screen, click **Next**.
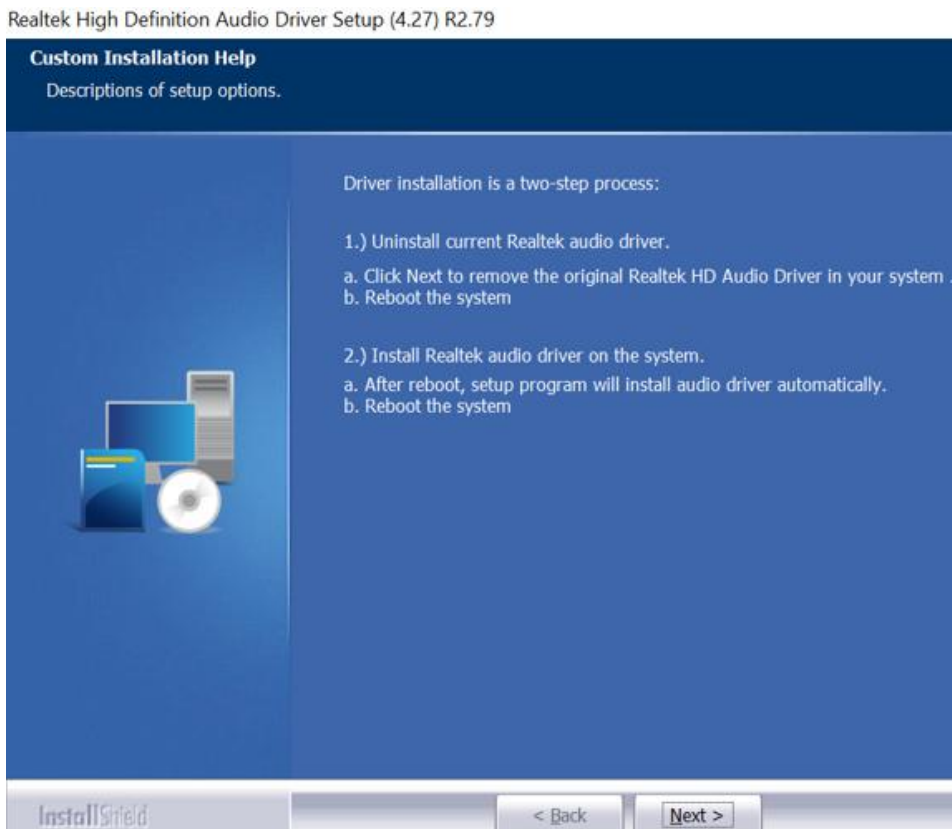
9. On the next screen, click Finish.

3.5 LAN Drivers Installation

1. Click **Intel** on the left pane and then **Intel(R) AlderLake-N Chipset Drivers** on the right pane.

2. Click **Intel(R) PRO LAN Network Drivers**..

3. On the Network Connections screen, click **Install Drivers and Software**.

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

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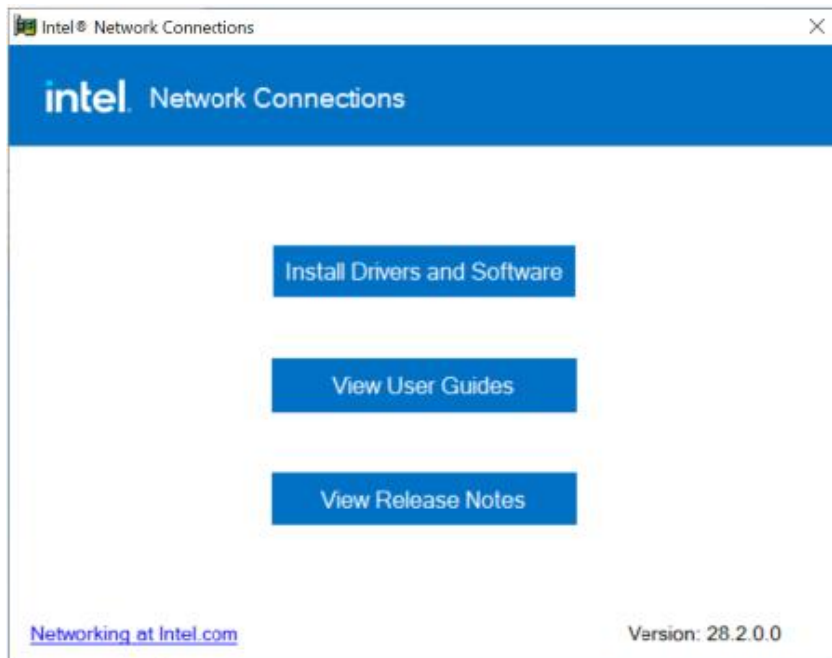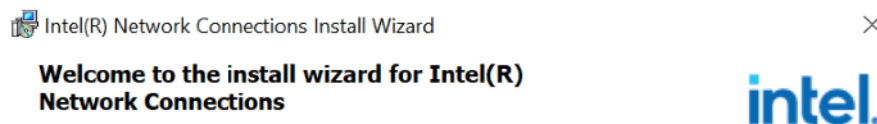
5. On the next screen, accept the license agreement and click **Next**.
6. On the *Setup Options* screen, click **Next** to continue.
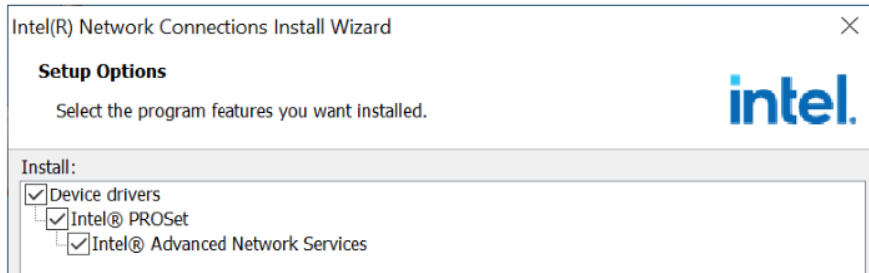
7. On the *Ready to Install the Program* screen, click **Install**.
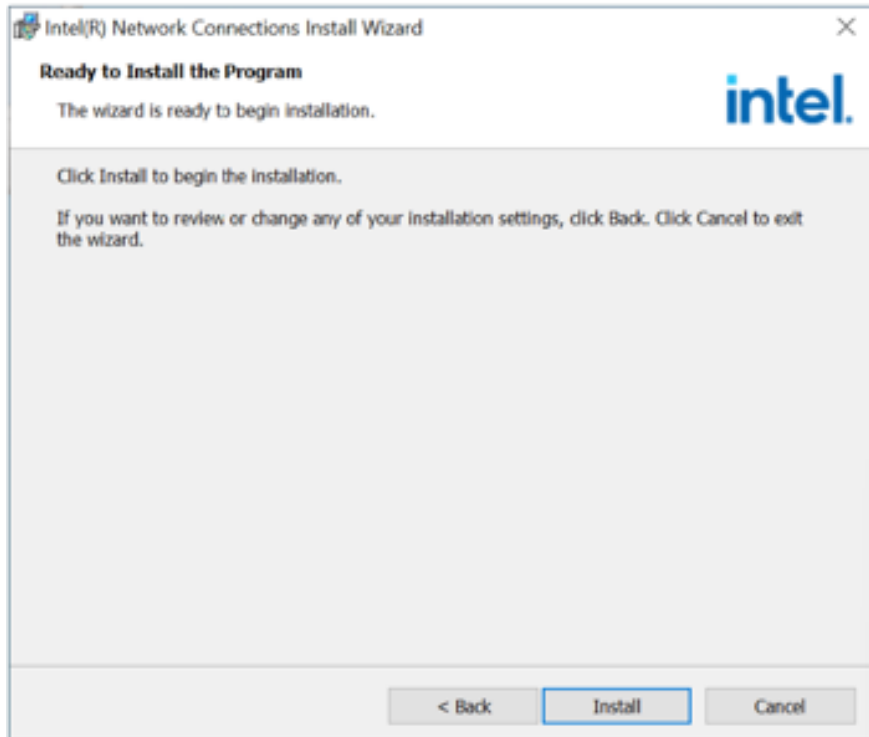
8. When the Install wizard has completed the installation, click **Finish**.
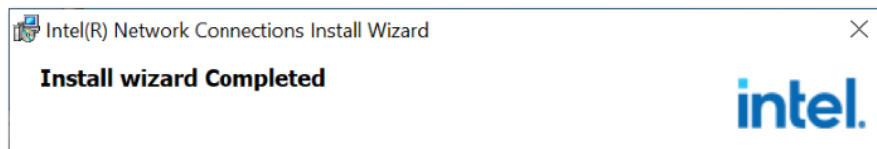
3.6 Intel® Management Engine Drivers Installation

1. Click **Intel** on the left pane and then **Intel(R) AlderLake-N Chipset Drivers** on the right pane.

2. Click **Intel(R) ME 15.x Drivers**.

3.

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

5. Accept the license agreement and click **Next**.
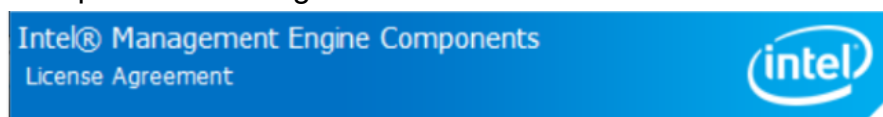
6. After Intel Management Engine Components have been successfully installed, click **Finish**.
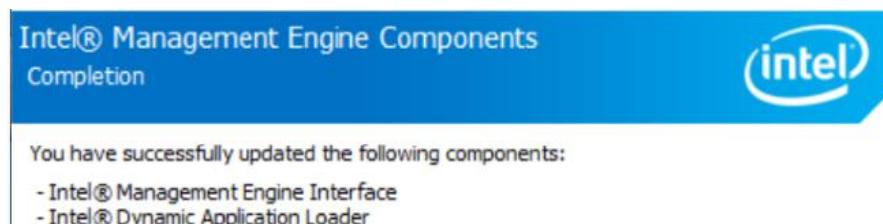
3.7 Intel® Serial IO Drivers Installation

1. Click **Intel** on the left pane and then **Intel(R) AlderLake-N Chipset Drivers** on the right pane.

2. Click **Intel(R) Serial IO Drivers Installation**.

3. In the Welcome screen, click **Next**.
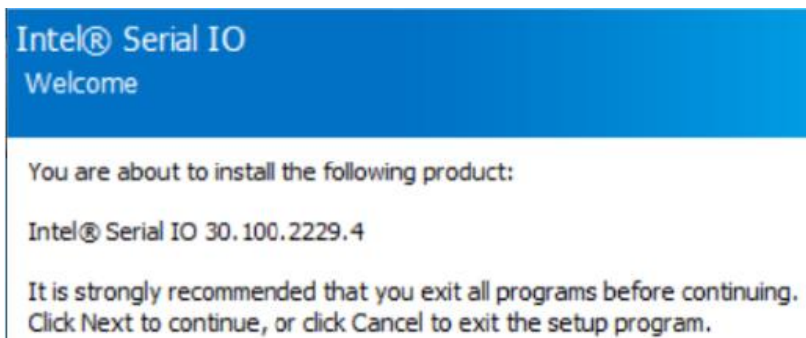
4. In the next screen, accept the license agreement and click **Next**.

5. In the Readme File Information screen, click **Next**.

6. In the Confirmation screen, click **Next**.

7. When installation has been completed, click **Finish**.

Chapter 4
BIOS Setup

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

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

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4.1 Introduction

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

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 press the <Del> key too late, 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 the 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

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

                                                      Set the Date. Use Tab to
 BIOS Version                    MBD212-ES004-241210  switch between Date elements.
                                                      Default Ranges:
 Total Memory                    8192 MB              Year: 1998-9999
 Memory Frequency                4800 MHz             Months: 1-12
                                                      Days: Dependent on month
                                                      Range of Years may vary.
 System Date                     [Thu 12/19/2024]
 System Time                     [14:34:11]



                                                      →←: 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 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.

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4.4 Advanced Settings

This section allows you to configure system features according to your preference.

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

 ▶ Connectivity Configuration                    Configure Connectivity related
 ▶ CPU Configuration                             options
 ▶ Power & Performance
 ▶ PCH-FW Configuration
 ▶ Trusted Computing
 ▶ ACPI Settings
 ▶ iSmart Controller
 ▶ F81964 Super IO Configuration
 ▶ Hardware Monitor
 ▶ USB Configuration
 ▶ Network Stack Configuration
 ▶ NVMe 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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```

4.4.1   Connectivity Configuration

BIOS Setting	Description
CNVI Mode	This option configures Connectivity. **Auto Detection** – means that if Discrete solution is discovered it will be enabled by default. Otherwise Integrated solution (CNVi) will be enabled; **Disable Integrated** – disables Integrated Solution.
RFI Mitigation	This is an option intended to enable/disable DDR-RFIM feature for Connectivity. This feature may result in temporary slowdown of the DDR speed.
Discrete Bluetooth Interface	Serial IO UART0 needs to be enabled to select BT interface.
BT Tile Mode	Options: Enabled/Disabled
Advanced Settings	Configure ACPI objects for wireless devices Default: Disabled
WWAN Configuration	Configure WWAN related options. WWAN Device: enable or disable M.2 WWAN device

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4.4.2 CPU Configuration
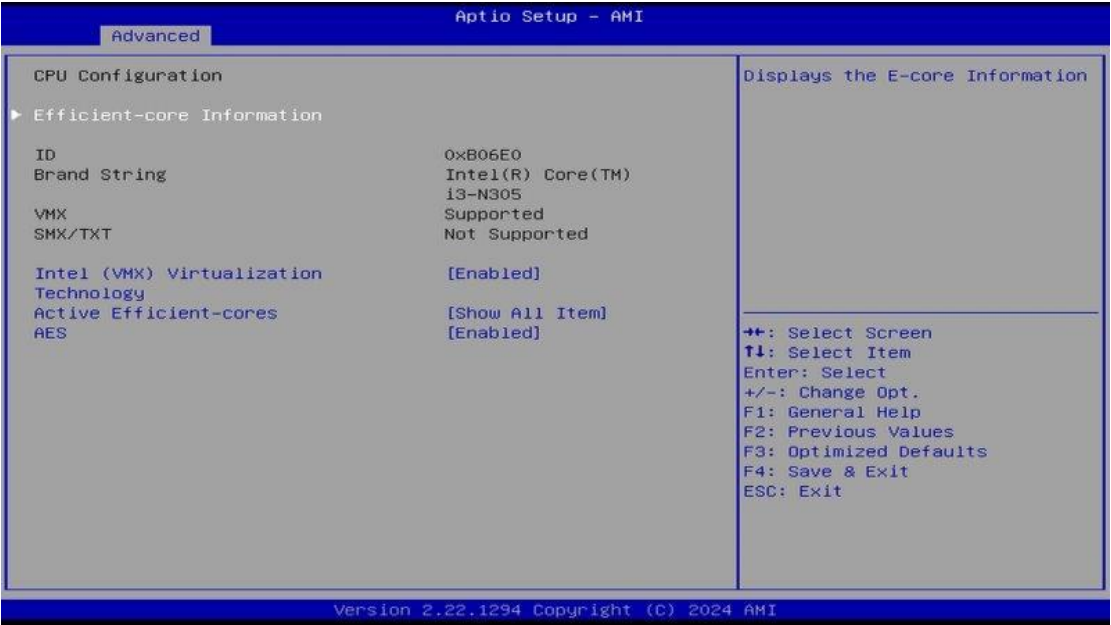
BIOS Setting	Description
Efficient-core Information	Displays the E-core Information.
Intel (VMX) Virtualization Technology	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Active Efficient-cores	Number of E-cores to enable in each processor package. Note: Number of cores and E-cores are looked at together. When both are (o,o), Pcode will enable all cores.
AES	Enable/Disable AES (Advanced Encryption Standard)

4.4.3   Power & Performance

```
                        Aptio Setup — AMI
  ┌─────────────┐
  │  Advanced   │
  └─────────────┘
  Power & Performance                          CPU — Power Management Control
                                               Options
► CPU — Power Management Control




                                               →←: 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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```

```
CPU — Power Management Contrcl

Intel(R) SpeedStep(tm)              [Enabled]
Intel(R) Speed Shift Technolcgy     [Enabled]
```

BIOS Setting	Description
CPU – Power Management Control	CPU – Power Management Control Options
Intel Speedstep	Allows more than two frequency ranges to be supported
Intel Speed Shift Technology	Enable/Disable Intel Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.

iBASE

4.4.4   PCH-FW Configuration

```
                         Aptio Setup - AMI
   Advanced

ME Firmware Version            16.50.10.1351
ME Firmware Mode               Normal Mode
ME Firmware SKU                Consumer SKU




                                               →←: 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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```

4.4.5 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           [Disabled]

 Pending operation          [None]
 Platform Hierarchy         [Enabled]              →←: Select Screen
 Storage Hierarchy          [Enabled]              ↑↓: Select Item
 Endorsement Hierarchy      [Enabled]              Enter: Select
 Physical Presence Spec Version [1.3]              +/-: Change Opt.
 TPM 2.0 InterfaceType      [CRB]                  F1: General Help
 Device Select              [Auto]                 F2: Previous Values
 Disable Block Sid          [Disabled]             F3: Optimized Defaults
                                                   F4: Save & Exit
                                                   ESC: Exit

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```

BIOS Setting	Description
Security Device Support	Enables / Disables BIOS support for security device. OS will not show security device. TCG EFI protocol and INT1A interface will not be available.
SHA256 PCR Bank	Options: Enabled / Disabled
SHA384 PCR Bank	Options: Enabled / Disabled
SM3_256 PCR Bank	Options: Enabled / Disabled
Pending operation	Schedule an operation for the security device. Note: Your computer will reboot during restart in order to change state of security device.
Platform Hierarchy	Enables / Disables platform hierarchy.
Storage Hierarchy	Enables / Disables storage hierarchy.
Endorsement Hierarchy	Enables / Disables endorsement hierarchy.
Physical Presence Spec Version	Select to tell O.S. to support PPI Spec Version 1.2 or 1.3. Note some HCK tests might not support 1.3.
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.
Device Block Sid	Override to allow SID authentication in TCG

iBASE

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]




                                              →←: 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	Default: Disable
Schedule Slot 1 / 2	Sets up the hour / minute for system powe-on. Important: If you would like to set up a schedule between adjacent days, configure two schedule slots. 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.

4.4.7   F81964 Super IO Configuration

```
                          Aptio Setup - AMI
    Advanced

    F81964 Super IO Configuration                            Set Parameters of Serial Port
                                                             1 (COMA)
    Super IO Chip                    F81964
  ▶ Serial Port 1 Configuration
  ▶ Serial Port 2 Configuration
  ▶ Serial Port 3 Configuration
```

Remarks: COM3 is for OOB model use only.

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. Options are: 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; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;
Serial Port Mode Select	Options are: RS232, RS485, RS422
Serial Port 2 Configuration	Sets parameters of Serial Port 2 (COMB).
Serial Port	Enable / Disable the serial port.
Change Settings	Select an optimal setting for the Super IO device. Options are: IO=2F8h; IRQ=3; 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; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;
Serial Port 3 Configuration	Sets parameters of Serial Port 3 (COM).
Serial Port	Enable / Disable the serial port.
Change Settings	Select an optimal setting for the Super IO device. Options are: IO=3E8h; IRQ=7; 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; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;
Serial Port 4 Configuration	Sets parameters of Serial Port 4 (COMD).
Serial Port	Enable / Disable the serial port.
Change Settings	Select an optimal setting for the Super IO device. Options are: IO=2E8h; IRQ=7; 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; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;
Standby Power on S5 (Eup)	Enable – provides standby power for devices. Disable – shuts down the standby power.

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4.4.8   Hardware Monitor

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

 Pc Health Status

 CPU temperature            : +37 C
 System temperature         : +34 C
 Vcore                      : +1.064 V
 5V                         : +5.003 V
 12V                        : +11.968 V
 Memory Voltage             : +1.104 V
 VCC3V                      : +3.328 V



                                          →←: 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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```
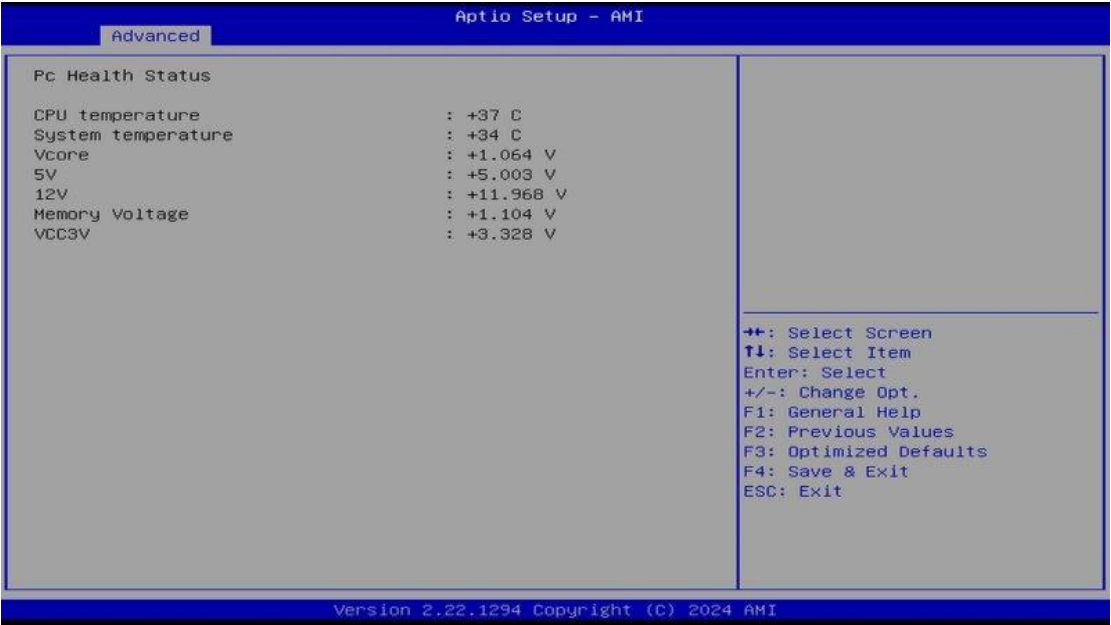
BIOS Setting	Description
Temperatures / Voltages	These fields are the parameters of the hardware monitoring function feature of the motherboard. The values are read-only values as monitored by the system and show the PC health status.

4.4.9 USB Configuration

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

 USB Configuration                                 Enables Legacy USB support.
                                                   AUTO option disables legacy
 USB Module Version          32                    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

 Legacy USB Support          [Enabled]
 XHCI Hand-off               [Enabled]
 USB Mass Storage Driver Support  [Enabled]

 USB hardware delays and time-outs:
 USB transfer time-out       [20 sec]             →←: Select Screen
 Device reset time-out       [20 sec]             ↑↓: 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	• **Enabled** enables Legacy USB support. • **Auto** disables legacy support if there is no USB device connected. • **Disabled** 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 (1 / 5 10 / 20 secs) for Control, Bulk, and Interrupt transfers.
Device reset time-out	USB mass storage device Start Unit command time-out
Device power-up delay	Max.time the device will take before it properly reports itself to the Host Controller. '**Auto**' uses default value: for a Root port it is 100ms, for a Hub port the delay is taken from Hub descriptor.

iBASE

4.4.10   Network Stack Configuration

```
                        Aptio Setup - AMI
    Advanced

Network Stack              [Disabled]           Enable/Disable UEFI Network
                                                Stack




                                                →←: 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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```

4.4.11   NVME Configuration

```
                        Aptio Setup - AMI
    Advanced

NVMe Configuration

▶ TS256GMTE712AI-VS1




                                                →←: 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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```

4.5 Chipset Settings

4.5.1 System Agent (SA) Configuration

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

► 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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```

4.5.1.1. Graphics Configuration:

```
   System Agent (SA) Configuration

   VT-d                                Supported

 ► Graphics Configuration

   VT-d                                [Enabled]
```

```
Graphics Configuration

Graphics Turbo IMON Current          31

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

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4.5.2 PCH-IO Configuration

4.5.3 SATA Configuration:
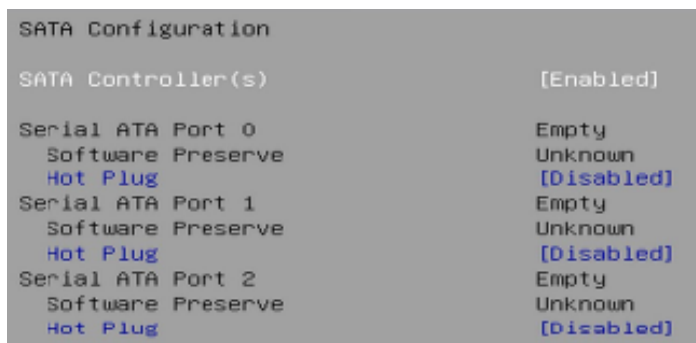
BIOS Setting	Description
SATA and RST Configuration	SATA device options and settings
SATA Controller(s)	Enables / Disables the Serial ATA.
SATA Mode Selection	Selects IDE or AHCI Mode.
Serial ATA Port 0~2	Enables / Disables Serial ATA Port 0 ~ 2.
SATA Ports Hot Plug	Enables / Disables SATA Ports HotPlug.

4.6 Security Settings

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

  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                3
  Maximum length                20

                                                 →←: Select Screen
  Administrator Password                         ↑↓: Select Item
  User Password                                  Enter: Select
                                                 +/-: Change Opt.
                                                 F1: General Help
                                                 F2: Previous Values
  ▶ Secure Boot                                  F3: Optimized Defaults
                                                 F4: Save & Exit
  TCG Storage Security Configuration:            ESC: Exit
  ▶ TS256GMTE712AI-VS1

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```

BIOS Setting	Description
Setup Administrator Password	Sets an administrator password for the setup utility.
User Password	Sets a user password.
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.

iBASE

4.7   Boot Settings

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

   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
                                   Manager
                                   (TS256GMTE712AI-VS1)]
   Boot Option #3                  [CD/DVD]
   Boot Option #4                  [SD]
   Boot Option #5                  [USB Hard Disk]    →←: Select Screen
   Boot Option #6                  [USB CD/DVD]       ↑↓: Select Item
   Boot Option #7                  [USB Key]          Enter: Select
   Boot Option #8                  [USB Floppy]       +/-: Change Opt.
   Boot Option #9                  [USB Lan]          F1: General Help
   Boot Option #10                 [Network]          F2: Previous Values
                                                      F3: Optimized Defaults
 ▶ UEFI NVME Drive BBS Priorities                     F4: Save & Exit
                                                      ESC: Exit



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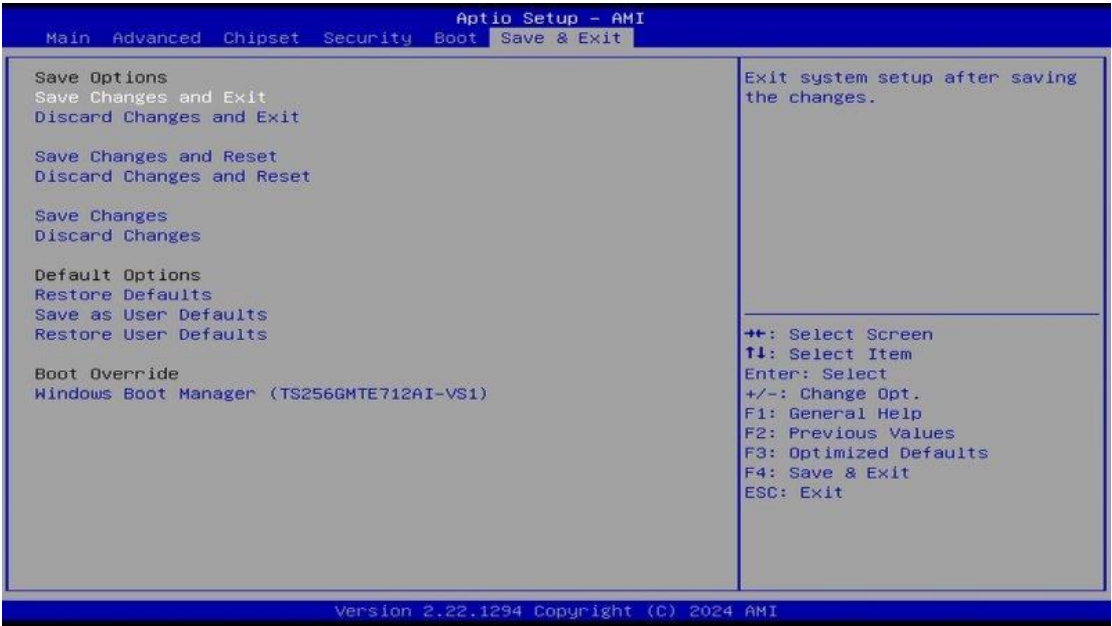
BIOS Setting	Description
Setup Prompt Timeout	Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting.
Bootup NumLock State	Selects the keyboard NumLock state.
Quiet Boot	Enables / Disables Quiet Boot option.
FIXED BOOT ORDER Priorities	Sets the system boot order.

4.8 Save & Exit Settings

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

 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
 Boot Override                             +/-: Change Opt.
 Windows Boot Manager (TS256GMTE712AI-VS1) 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.