ASB210-962H

Slim System with IBASE IB962 3.5” Disk-Size SBC

User’s Manual

Version 1.0
(March 2025)

Disclaimer

IBASE reserves the right to make changes and improvements to the products described in this document without prior notice. Every effort has been made to ensure the information in the document is correct; however, IBASE does not guarantee this document is error-free. IBASE assumes no liability for incidental or consequential damages arising from misapplication or inability to use the product or the information contained herein, nor for any infringements of rights of third parties, which may result from its use.

Trademarks

All the trademarks, registrations and brands mentioned herein are used for identification purposes only and may be trademarks and/or registered trademarks of their respective owners.

Compliance

CE

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

FC

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

WEEE

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

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:

- Lay the device horizontally on a stable and solid surface in case the device may fall, causing serious damage.
- Leave plenty of space around the device and do not block the openings for ventilation. NEVER DROP OR INSERT ANY OBJECTS OF ANY KIND INTO THE VENTIILATION OPENINGS.
- 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 -10˚C ~ 45˚C.
- DO NOT LEAVE THIS DEVICE IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -20˚C OR ABOVE 80˚C. This could damage the device. The device must be used in a controlled environment.

Care for your IBASE products:

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

WARNING

Attention during use:

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

Avoid Disassembly

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

CAUTION

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

Warranty Policy

- **IBASE standard products:**

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

- **3rd-party parts:**

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

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

Technical Support & Services

1. Visit the IBASE website at www.ibase.com.tw 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
   - The error messages in text or in screenshots if there is any
   - The arrangement of the peripherals
   - Software in use (such as OS and application software, including the version numbers)
3. If repair service is required, please log in to the RMA system of the website or and contact your distributor or sales representative for assistance.

iBASE

Table of Contents

Chapter 1
General Information

The information provided in this chapter includes:

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

1.1 Introduction

The ASB210-962H is a slim and high-performance box PC built with IBASE's IB962 3.5-inch SBC, powered by Intel® Core™ Ultra 100H Series processors with a 28W TDP threshold. Designed for industrial automation and embedded applications, it offers efficient computing power in a compact chassis. With multiple M.2 sockets (B-Key, E-Key, M-Key), 2x DDR5-5600 SO-DIMM slots supporting up to 64GB, and rich connectivity options including 2.5G LAN, USB 3.2, USB 2.0, HDMI, DP, and COM, the ASB210-962H ensures versatility and expandability. The system features a cooling fan for thermal stability an optional VESA mount kit for flexible installation. With its compact size, industrial-grade reliability, and low power consumption, the ASB210-962H is ideal for smart automation, factory control, and AI-driven applications.

ASB210-962H

1.2 Features

- Onboard Intel® Core™ Ultra 100H Series Processor (TDP@28W)
- Multiple M.2 sockets (B-Key/ E-Key and M-Key)
- 2x DDR5-5600 SO-DIMM, Max. 64GB
- 2.5G LAN, USB 3.2, USB 2.0, TPM 2.0
- Supports HDMI, DP & COM, External GPIO
- Optional VESA mount bracket
- Supports Windows 11

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.

• ASB210-962H	x 1
• 3-pin Terminal Block (for power)	x 1
• 10-pin Terminal Block (for GPIO connector)	x 1
• Side Brackets	x 1
• Screws for Side Brackets	x 4

1.4 Optional Accessories

- 180W (24V@7.5A) power adaptor, bare wire-type compatible with IEC62368-1/EN62368-1 [PN: A005PS180W0100800P]
- VESA mount kit [PN: SC2ASB2----0A1200R]
- WiFi antenna kit [PN: A024MDWIFI0042400P (Intel® 9260) + SC2WIFI----A10M00R (WiFi Kit)]

1.5 Specifications

Model	Description
ASB210-962H-7M	Chassis with IB962AF-165H, Intel® CoreTM Ultra7 CPU (TDP@28W), w/ system fan, 1x COM, 2x DDR5 memory slot, desktop stand & mounting bracket, w/o memory / power adaptor and VESA mount bracket
ASB210-962H-5M	Chassis with IB962AF-135H, IIntel® CoreTM Ultra5 CPU (TDP@28W), w/ system fan, 1x COM, 2x DDR5 memory slot, desktop stand & mounting bracket, w/o memory / power adaptor and VESA mount bracket

System	
Mainboard	IB962AF-165H / IB962AF-135H
CPU	Intel® Core™ Ultra 100H Series Mobile Processors
System Speed	Up to 5.0GHz
Memory	2x DDR5-5600 SO-DIMM, Max. 64GB
Front Panel External I/O	• 3x USB 3.2 • 1x USB 2.0 • 1x DisplayPort • 1x HDMI • 1x DB9 for COM#1 (RS232/422/485) • 2x 2.5G LAN • 2x Antenna holes
Rear Panel External I/O	• 1x Power button • 1x Digital I/O (4-in/4-out) • 2x Antenna holes • 1x HDD LED • 1x Power LED • 1x 3-pin DC-in terminal block for 24V power adaptor
Expansion	• 3x M.2 sockets (B-Key/ E-Key and M-Key)
Storage	Watchdog Timer 256 segments, 0, 1, 2…255 sec/min
Construction	• Aluminum & steel (with system fan)
Chassis Color	Black
Mounting Type	• Desktop & wall mount bracket • Optional VESA mounting kit
Dimensions	180mm (W) x 150mm (D) x 72mm (H) 7.08” (W) x 5.9” (D) x 2.83” (H)
Weight	1.6 kg
Certification	CE/LVD/FCC Class B

Environment	
Temperature	• **Operating:** -10°C ~ 45°C (14°F ~ 113°F) • **Storage:** -20°C ~ 80°C (-4°F ~ 176°F)
Relative Humidity	5% ~ 90% at 45 °C (non-condensing)
Vibration Protection	• **Operating:** 1 Grms / 3 ~ 500 Hz
Shock Protection	• **Operating:** 20 g / 11 ms • **Non-operating:** 40 g / 11 ms

All specifications are subject to change without prior notice.

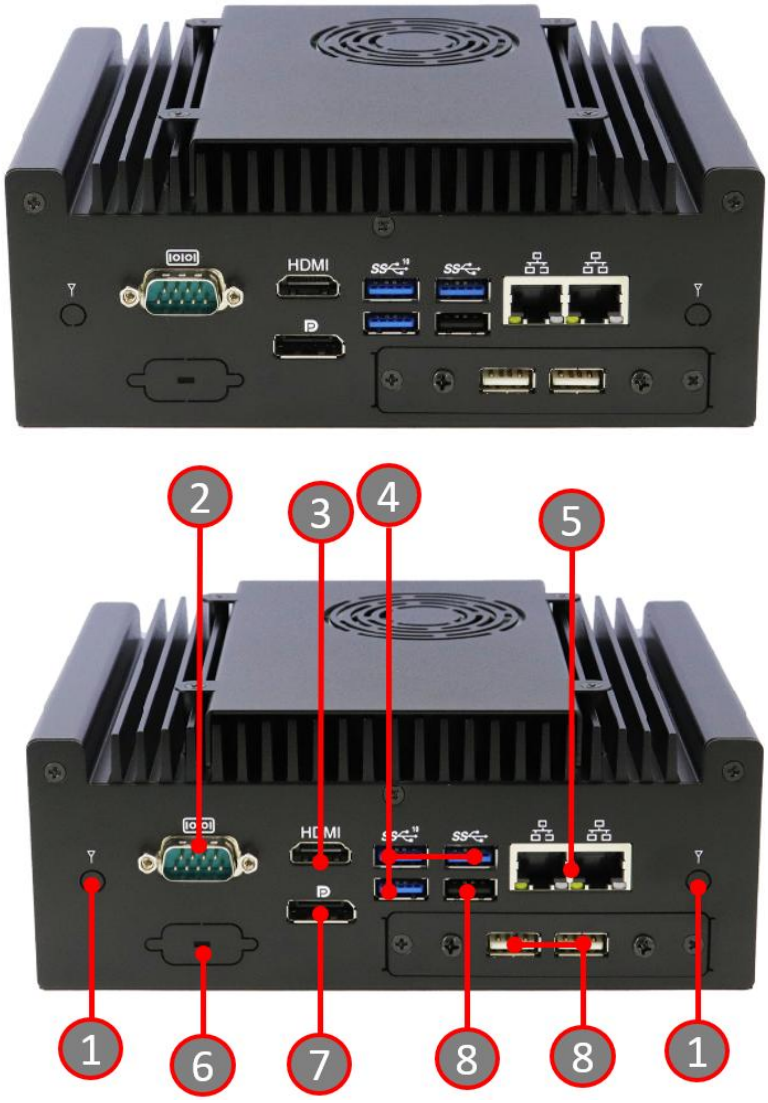
1.6 Product View

Front View

ASB210-962H

No.	Name	No.	Name
1	Antenna Holes	4	Power Switch
2	HDD LED	5	Digital I/O (4-In / 4-Out)
3	Power Status	6	DC +12V~ +24V Power Input

Rear View

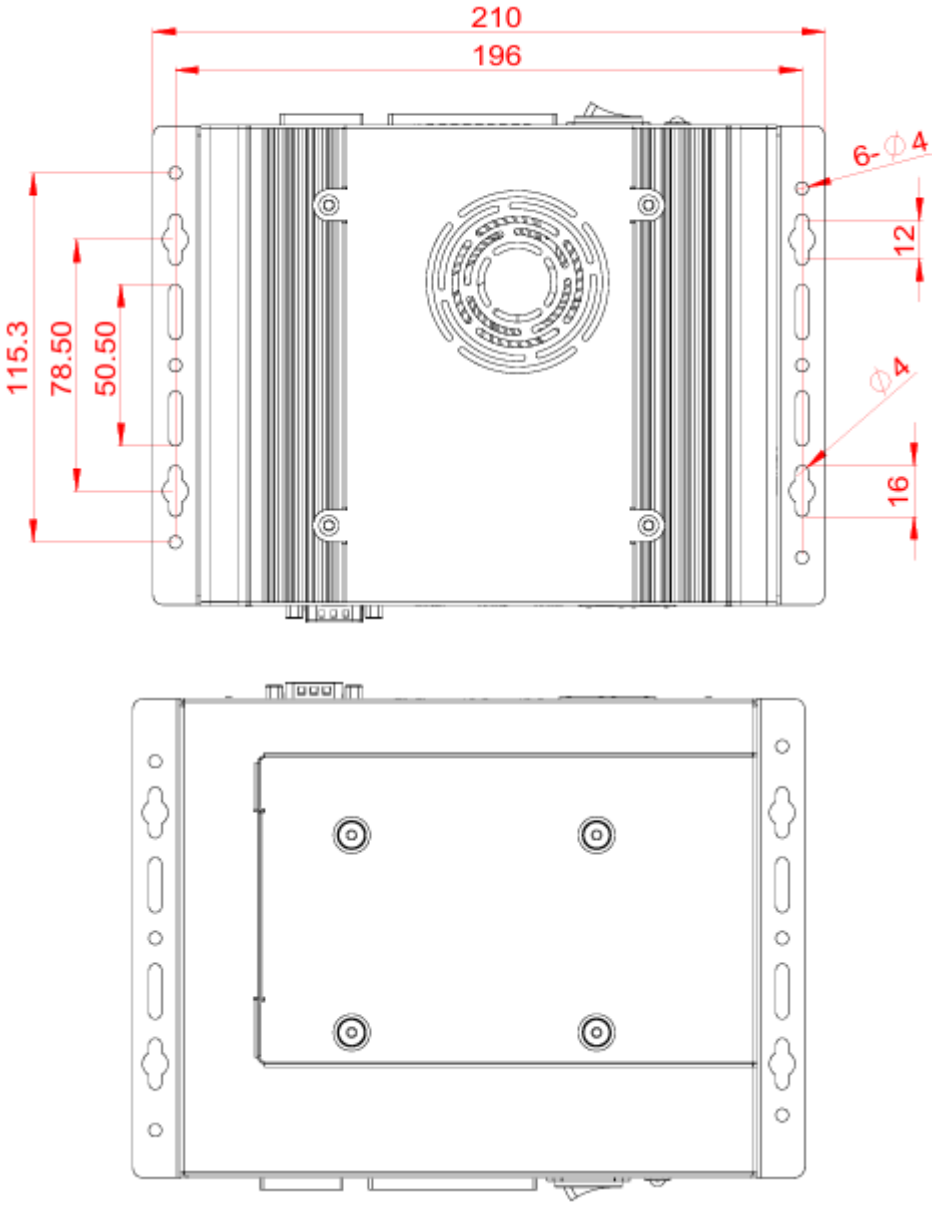


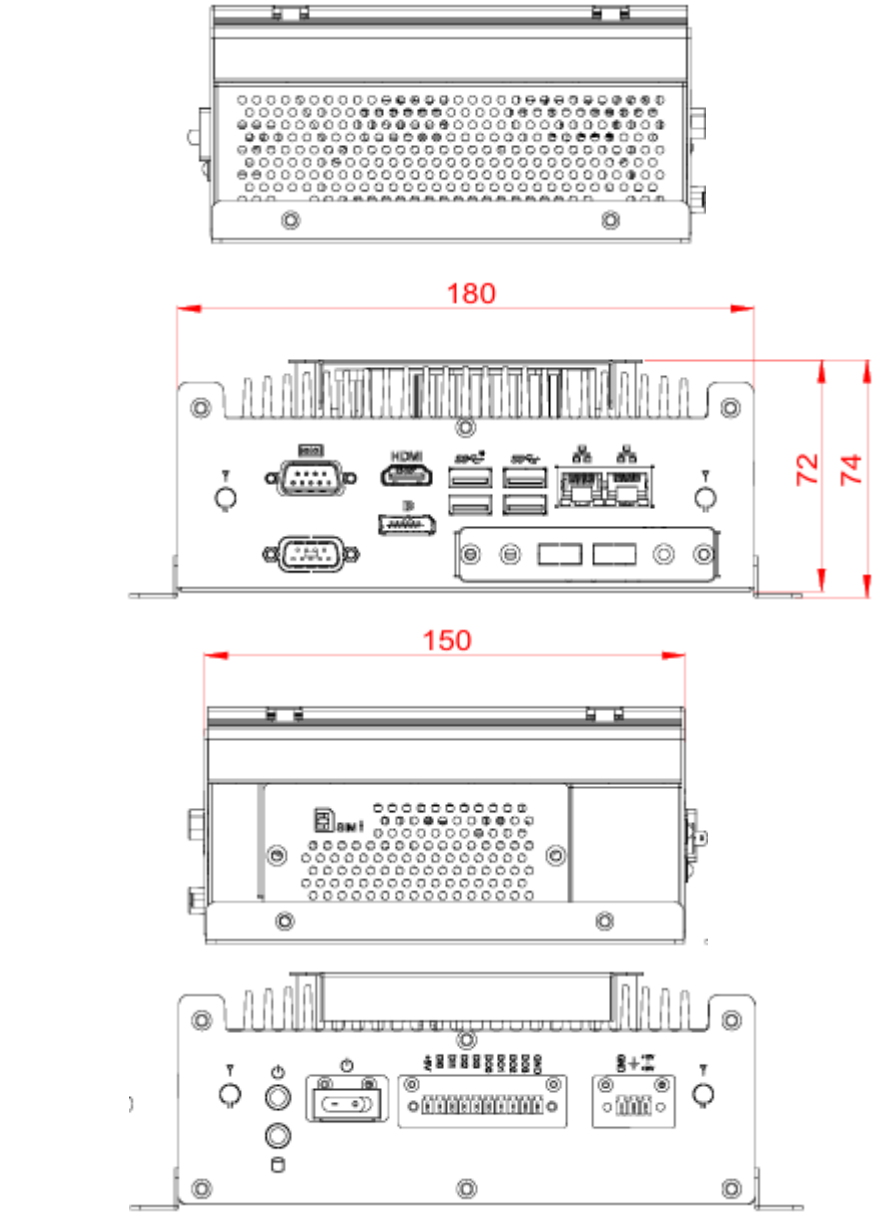
No.	Name	No.	Name
1	Antenna Holes	5	LAN Ports
2	COM Port	6	Reserved (COM)
3	HDMI	7	Display Port
4	USB 3.1 Ports	8	USB 2.0 Port

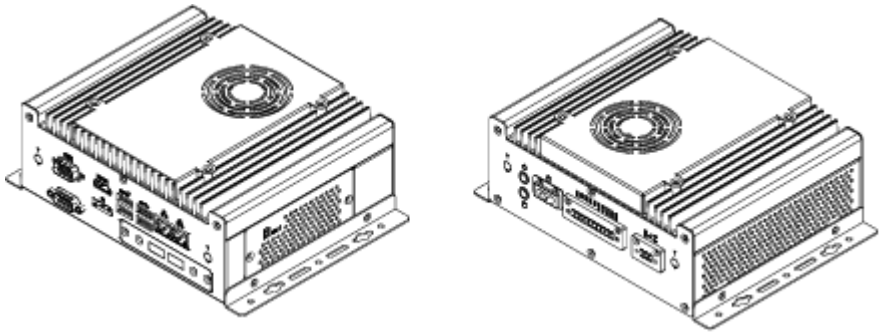
Oblique View

1.7 Dimensions

Unit: mm







ASB210-962H

Chapter 2
Hardware Configuration

The information provided in this chapter includes:

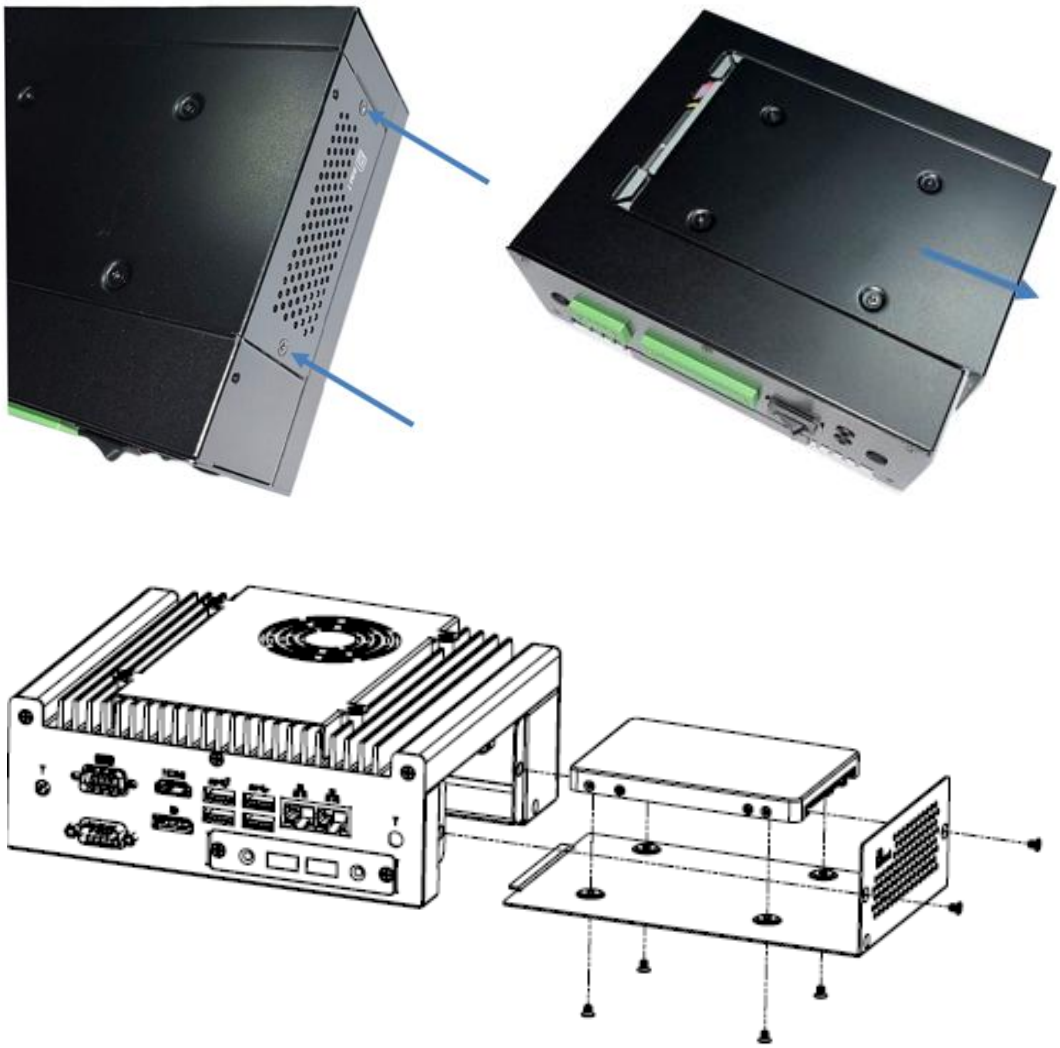
- Installations
- Descriptions and locations of connectors

2.1 Installations

2.1.1 HDD Installation

If you need to install or replace an SSD or HDD, follow these steps:

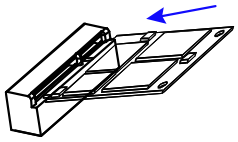
1. Remove the two screws shown below, then slide off the cover.
2. To install or remove the SSD/HDD, use the four screws indicated (circled in the image).



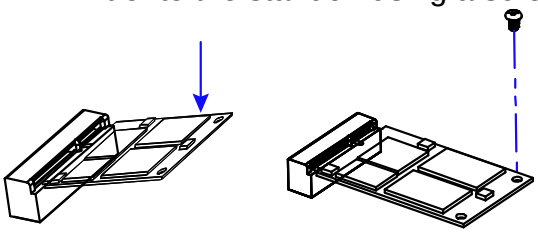
2.1.2 M.2 Card and SD Card Installation

1. Remove the Cover:
   - There are only two screws that need to be removed.
   - These screws also secure the cover that holds the SSD drive in place, which is shown in 2.1.1.
   - Once the cover is removed, you will see the two M.2 sockets and memory sockets (as shown in the image below). ***The third M.2 socket is located on the rear side of the mainboard.***

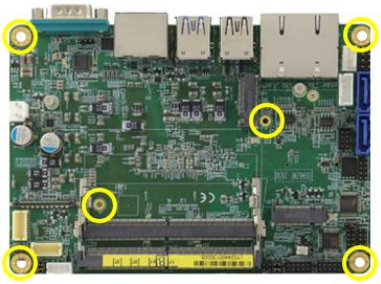
2. Install the M.2 Card:
   - Locate the M.2 card slot.
   - Align the key of the M.2 card with the M.2 interface, and insert the card at a slight angle.

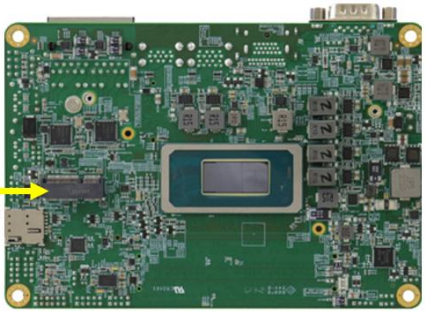


3. Secure the M.2 Card:
   - Push the M.2 card down.
   - Fix it onto the standoff using a screw.

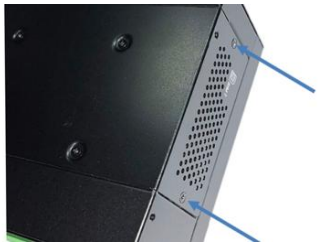


4. Locating the M2. 2230 Socket at the Rear of the Board:
   - To locate the socket, remove:
     - ✧ 11 screws on the front and rear IO panel
     - ✧ 6 screws on the board (as shown in the images below).
   - After removing the six screws on the board, turn the board upside down to access the M.2 2230 socket, which supports WiFI/4G/5G modules.





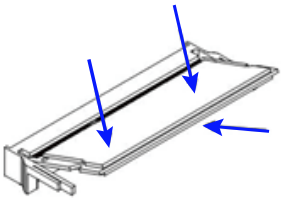
5. Locating the SIM card socket:
   - After removing the two screws as mention in 2.1.1 and taking off the cover holding the SSD drive, the SIM card socket will be exposed (as seen in the image below).

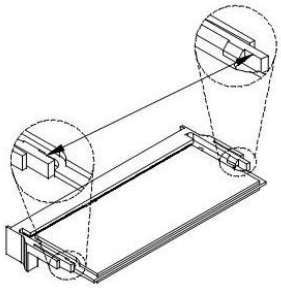


2.1.3 Memory Installation

1. Remove the Cover:
   - There are only two screws that need to be removed.
   - These screws also secure the cover that holds the SSD drive in place, as shown in 2.1.1.
   - Once the cover is removed, you will see the two M.2 sockets and memory sockets (as shown in the image below).
2. Locate the Memory Slot:
   - Identify the memory slot on the board.
   - There are two memory slots on board (as shown in the image below).

3. Insert the Memory Module:
   - Align the key of the memory module with the notch in the memory slot.
   - Insert the module at a slight angle.



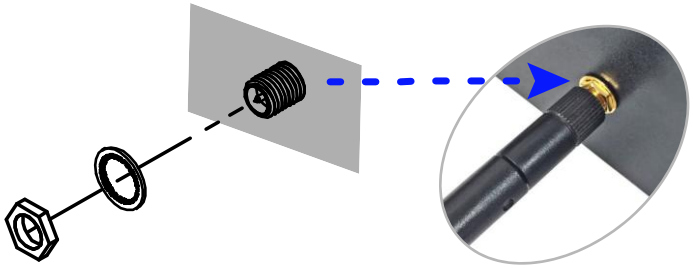


4. Secure the Memory Module:
   - Gently push the module downward into an upright position until it clicks into place.
   - The clips on both sides should automatically lock the module when fully inserted.
5. Removing the Memory Module:
   - To remove the module, press the clips outward with both hands.
   - The module will pop up, allowing you to carefully pull it out.

2.1.4 WiFi / 4G / 5G Antenna Installation

This step follows the installation of the WiFi / 4G / 5G module where the antenna cables are to be connected.

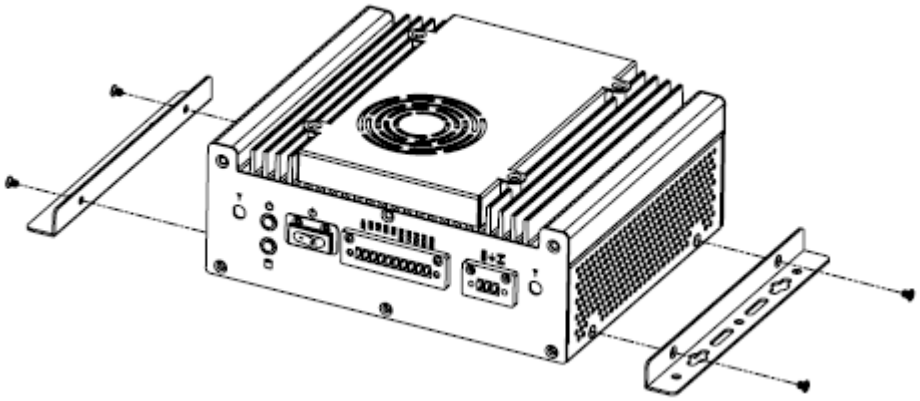
- Once the antenna(s) is connected, locate the target antenna hole.
- Thread the WiFi / 4G / 5G antenna cable through an antenna hole.
- Fasten the antenna as shown below.



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

2.1.5 Side Bracket Installation

Use the screws provided in the accessory kit to install the brackets.



2.1.6 Pinout for COM Ports, DC Power & Digital I/O Connectors

- **COM1 RS232/422/485 Port**

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

Pin	Assignment		
	RS-232	RS-422	RS-485
1	DCD	TX-	DATA-
2	RX	TX+	DATA+
3	TX	RX+	NC
4	DTR	RX-	NC
5	Ground	Ground	Ground
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC

- **DC Power Input Connector (terminal block)**

Pin	Assignment	Pin	Assignment
1	Ground	3	+12V ~ +24V
2	Chassis Ground		

- **Digital I/O Connector (terminal block)**

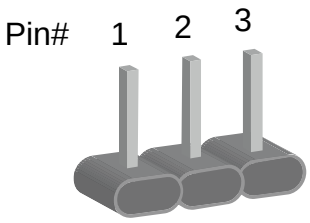
CX

Pin	Assignment	Pin	Assignment
1	Ground	6	DI3
2	DO3	7	DI2
3	DO2	8	DI1
4	DO1	9	DI0
5	DO0	10	+5V

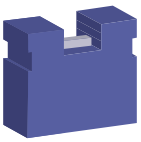
2.2 Setting the Jumpers

Set up and configure your product 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, you can connect either PIN1 to PIN2 or PIN2 to PIN3 by shorting.

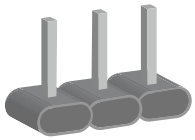
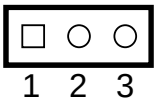
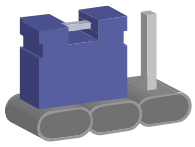
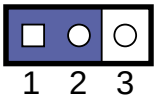
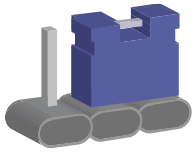
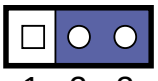


A 3-pin jumper



A jumper cap

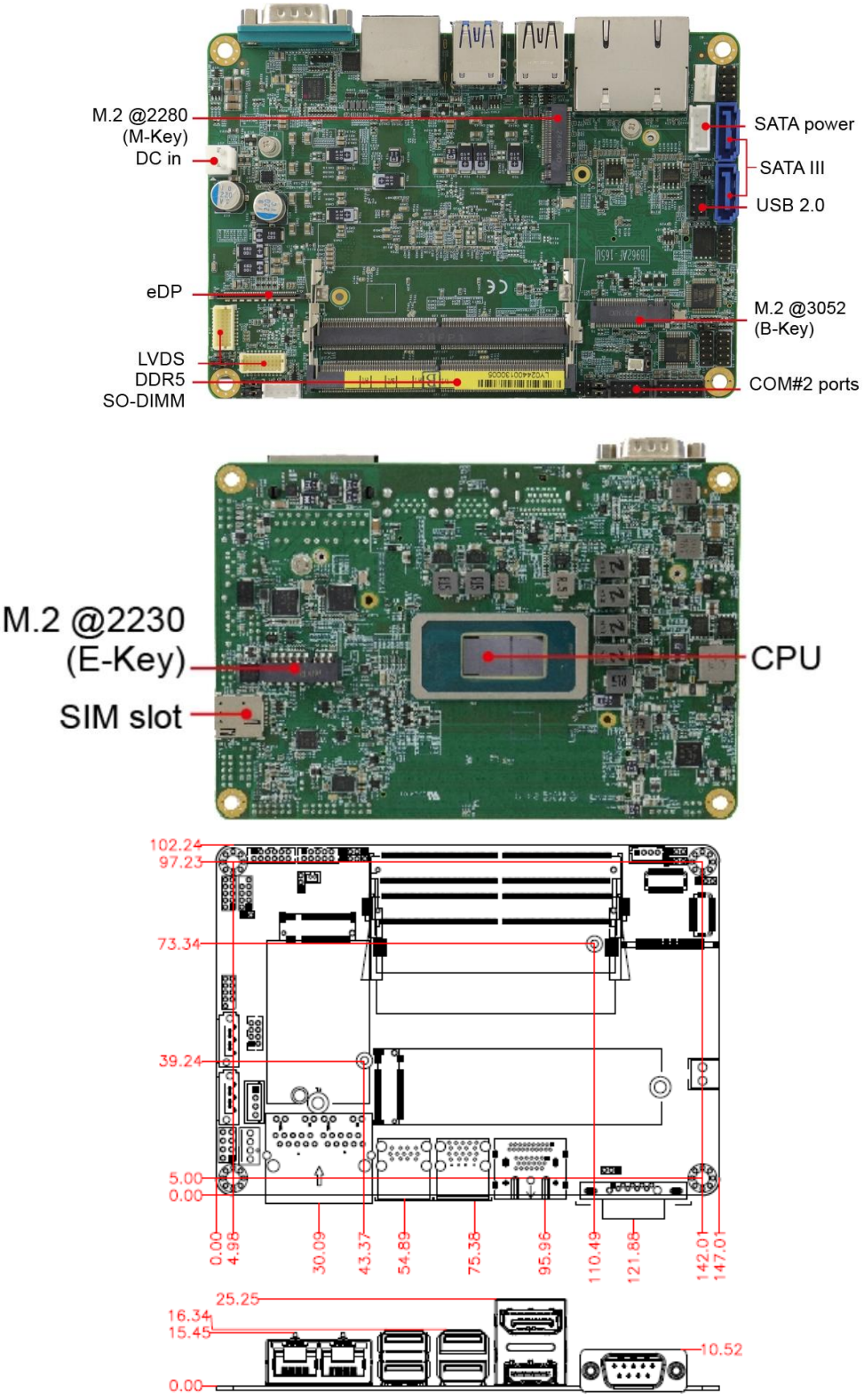
Refer to the illustration below to set jumpers.

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

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

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

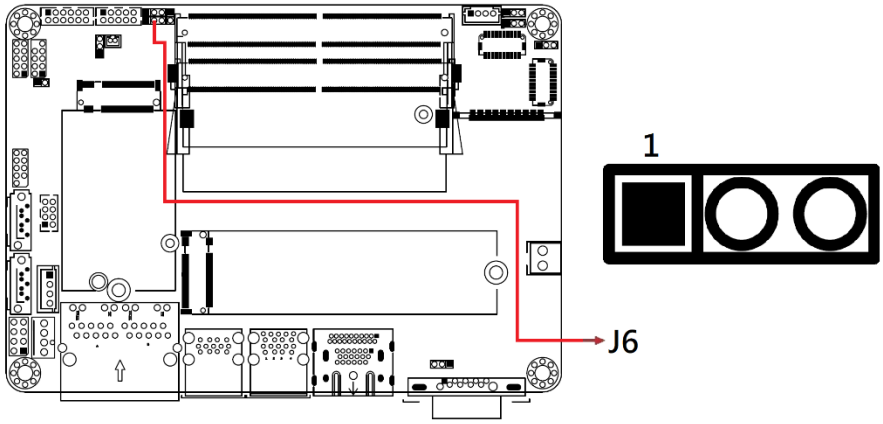
2.3 Jumper & Connector Locations on IB962H

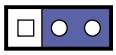


2.4 Jumpers Quick Reference

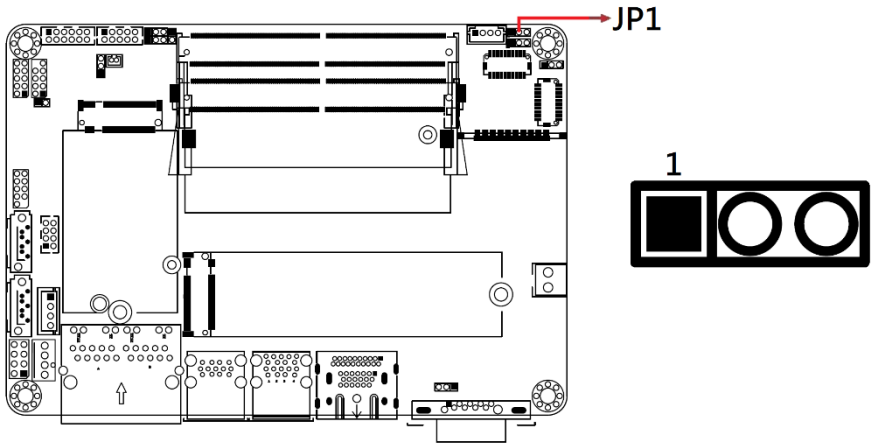
Jumper	Function
J1	Clear RTC
JP1	LVDS Brightness Power Selection
JP2	eDP Power Selection
JP3	LVDS Power Selection
JP4	Sierra EM919x 5G card USB/PCIe Select
JP5	AT/ATX Selection
J5	Flash Descriptor Security Override
J6	Clear CMOS Data

2.4.1 J1: Clear RTC



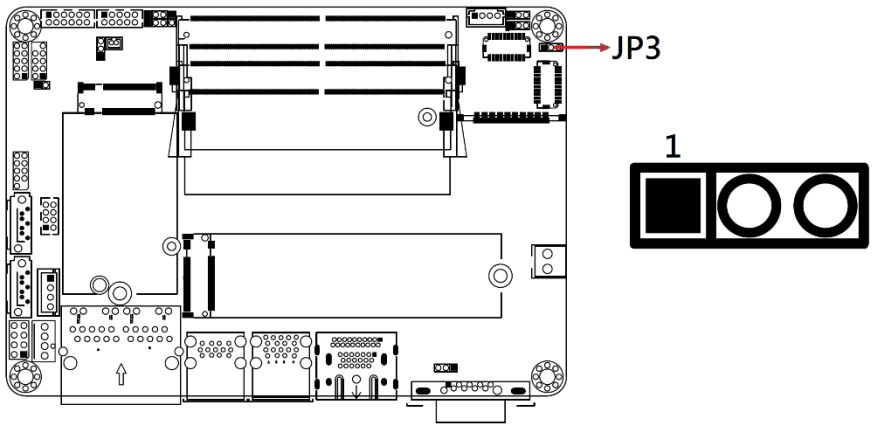
Function	Pin closed	Setting
Normal (default)	1-2	
Clear RTC	2-3	

2.4.2 JP1: LVDS Brightness Power Selection



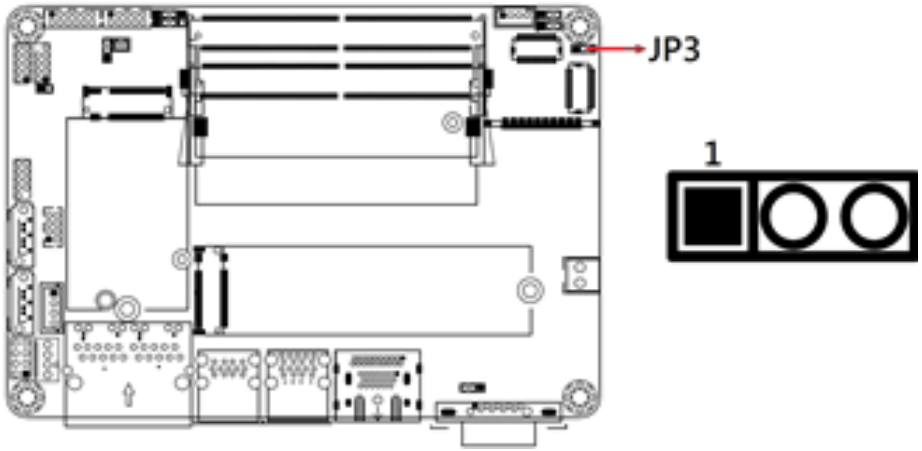
Function	Pin closed	Setting
3.3V (default)	1-2	1
5V	2-3	1

2.4.3 JP2: eDP Power Selection



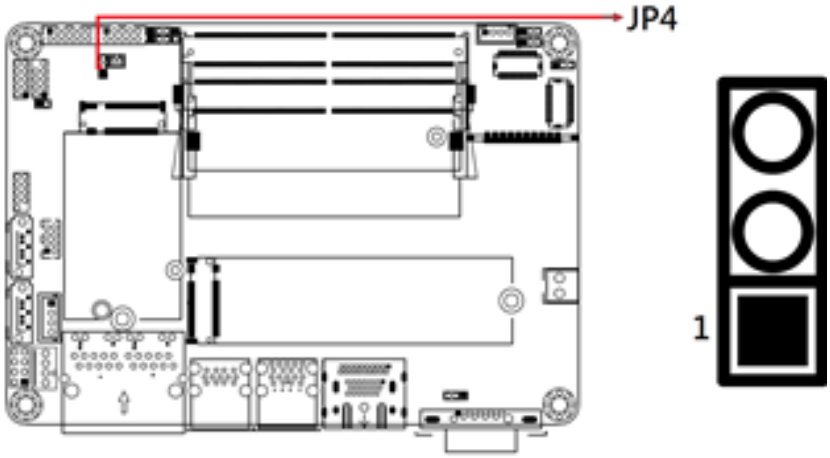
Function	Pin closed	Setting
3.3V (default)	1-2	1
5V	2-3	1

2.4.4 JP3: LVDS Power Selection



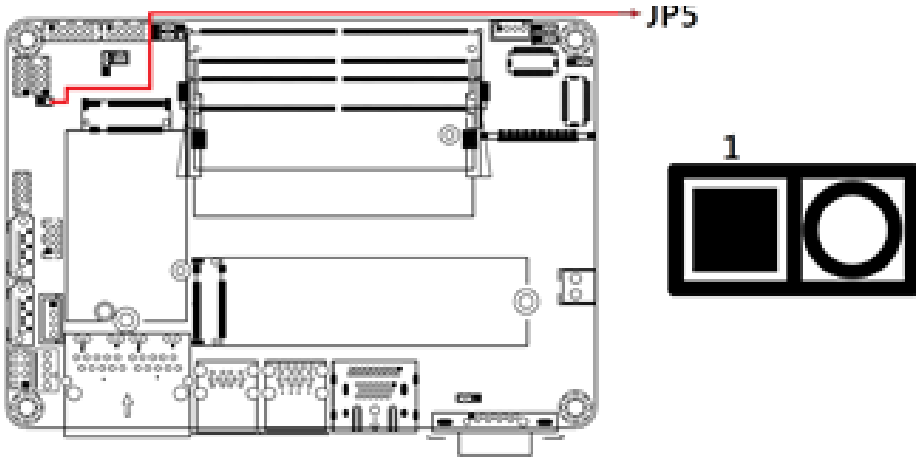
Function	Pin closed	Setting
3.3V (default)	1-2	1
5V	2-3	1

2.4.5 JP4: Sierra EM919x 5G card USB/PCIe Select



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

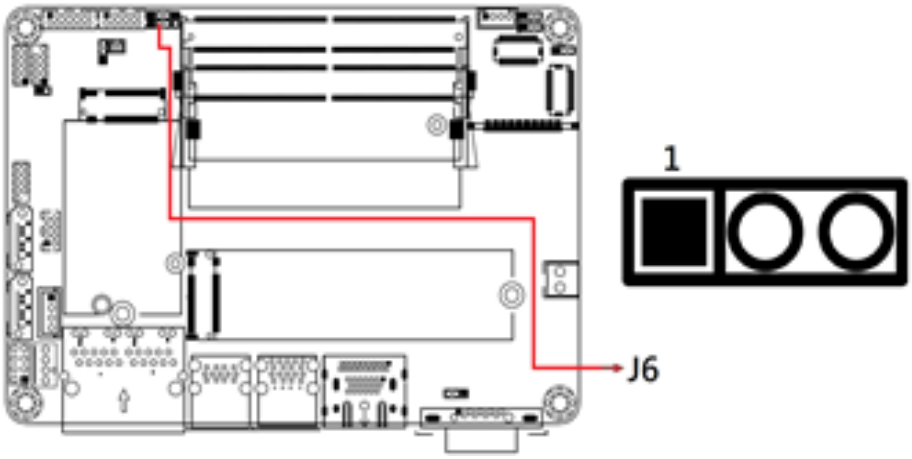
2.4.6 JP5: AT/ATX Select



Function	Pin closed	Setting
ATX	Open (default)	
AT	Close	

2.4.7 J5: Flash Descriptor Security Override (Factory use only)

2.4.8 J6: Clear CMOS

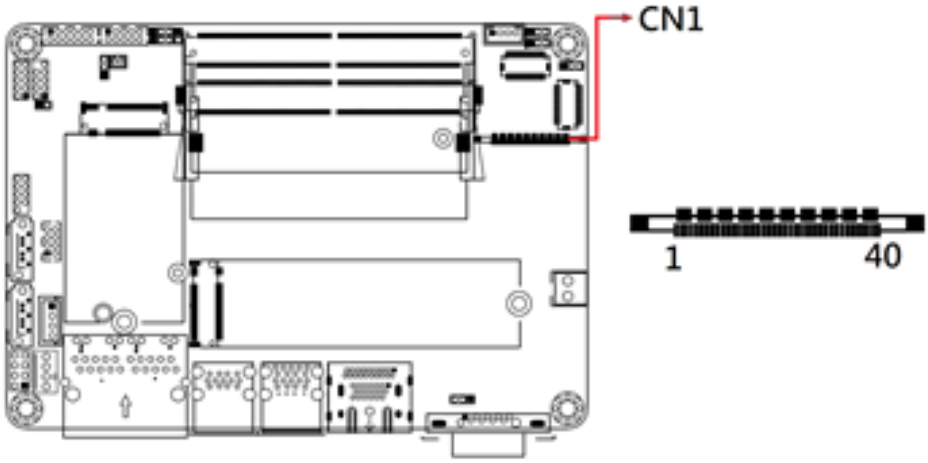


Function	Pin closed	Setting
Normal	1-2	1
Clear CMOS	2-3	1

2.5 Connectors Quick Reference

Connectors	Function
CN1	eDP Connector
CN2, CN3	SATA #0 / #1 Ports
CN4	2.5G LAN i226LM/i226V Ports
CN5	USB3 #2 / USB2 #2 Ports
CN6	DP++ /HDMI
CN7	USB3 TCP#2 #3
CN8	COM1 Port
CN9	SIM Card Socket
J1	Clear RTC
J2	LVDS Backligh Connector
J3	Audio Connector
J4	COM2 Port
J7	DDR5 SO-DIMM CHA
J8	Battery Connector
J9	LVDS CH-B
J10	Digital I/O (4in, 4out)
J11	eSPI DEBUG (Factory use only)
J12	DDR SO-DIMM CHB
J13	LVDS CH-A
J14	M.2 B-Key 3052
J15	SPI Flash Connector (Factory use only)
J16	USB2 #5/#6
J17	DC-In Connector (12V-24V)
J18	M.2 M-key 2280
J19	SATA Power Connector
J20	Front Panel Connector
J21	PWM Programming (Factory use only)
J22	M.2 E-Key 2230 W/CNVI
CPU_FAN1	CPU Fan Power Connector

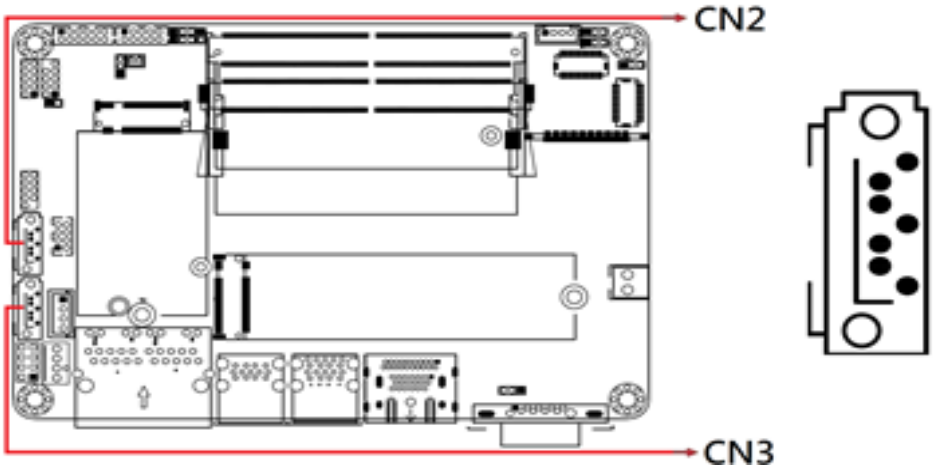
2.5.1 CN1: eDP Connector



Pin	Assignment	Pin	Assignment
1	eDP Vcc	21	TXN0
2	eDP Vcc	22	TXP1
3	eDP Vcc	23	Ground
4	eDP Vcc	24	AUXP
5	eDP Vcc	25	AUXN
6	Ground	26	NC
7	Ground	27	+3.3V
8	Ground	28	EDP BKLT (+12V)
9	Ground	29	NC
10	Hot Plug detect	30	Ground
11	Ground	31	+5V
12	TXN3	32	NC
13	TXP3	33	Back Light Control
14	Ground	34	Back Light Enable
15	TXN2	35	EDP BKLT (+12V)
16	TXP2	36	+3.3V
17	Ground	37	Ground
18	TXN1	38	NC
19	TXP1	39	NC
20	Ground	40	NC

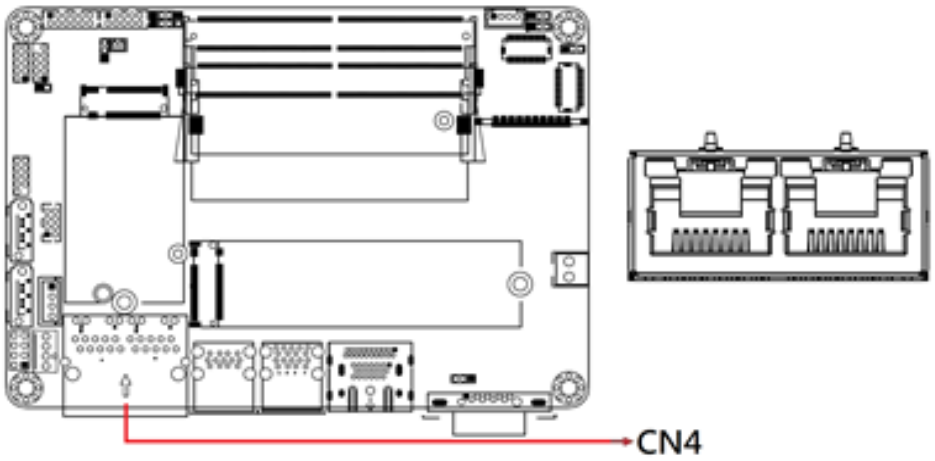
* KEL_SSL00-40S

2.5.2 CN2, CN3: SATA #0 / SATA #1

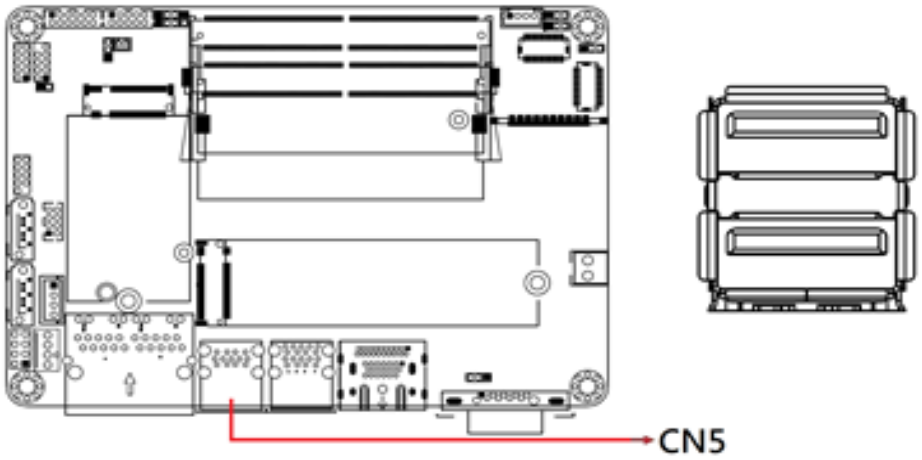


Pin	Assignment
1	Ground
2	TX+
3	TX-
4	Ground
5	RX-
6	RX+
7	Ground

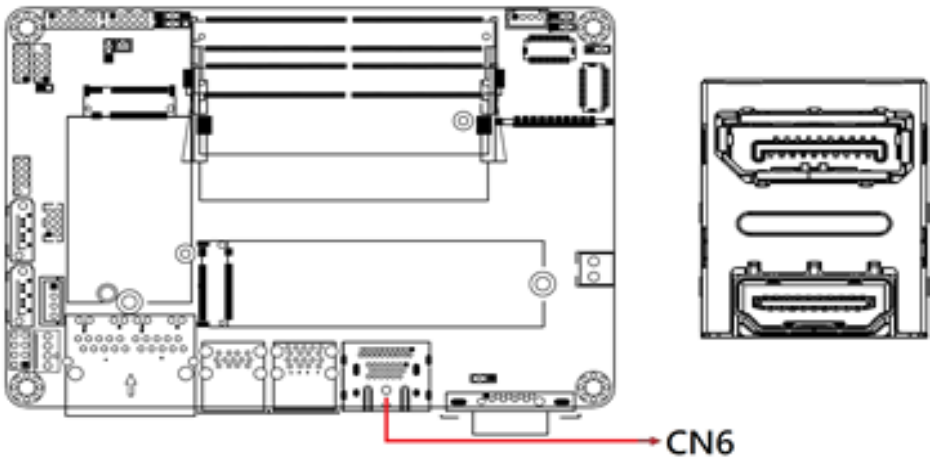
2.5.3 CN4: 2.5G LAN i226LM/i226V



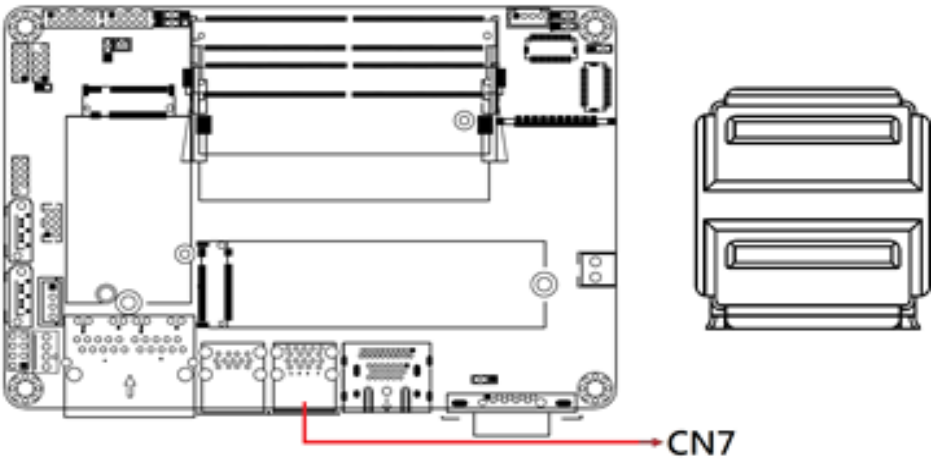
2.5.4 CN5: USB3 #2 / USB2 #2



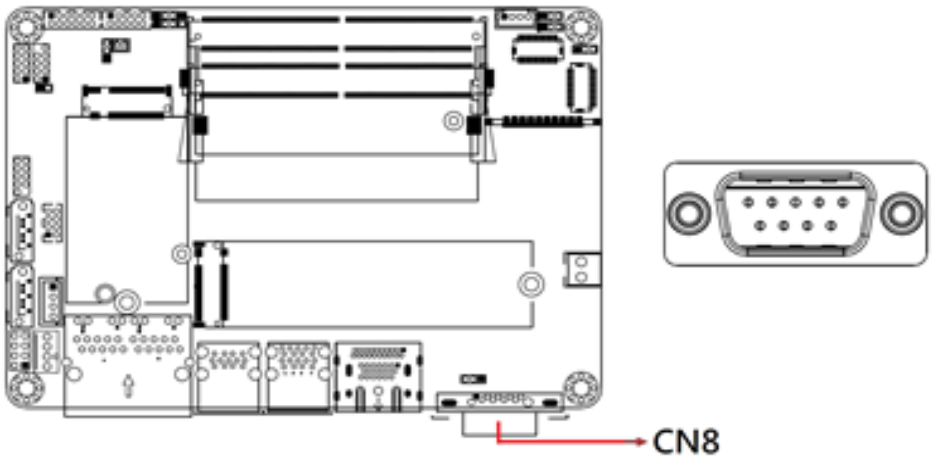
2.5.5 CN6: DP++ / HDMI



2.5.6 CN7: USB3 TCP#2 #3

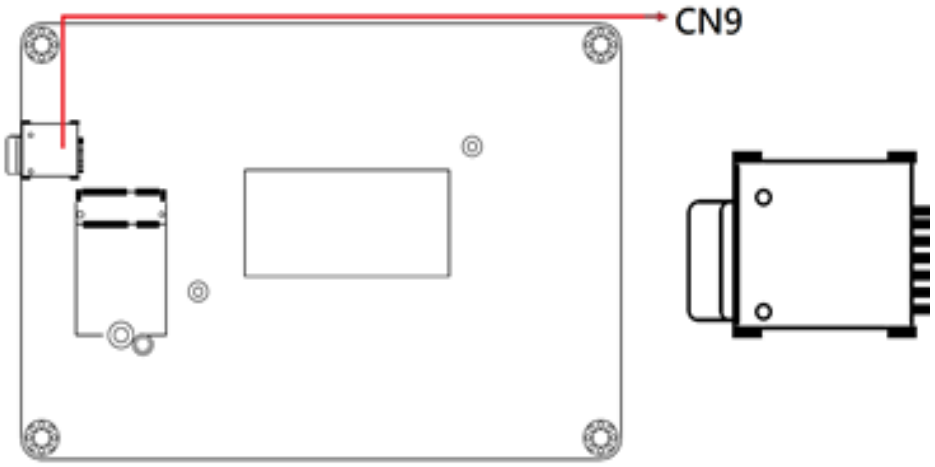


2.5.7 CN8: COM1 Port



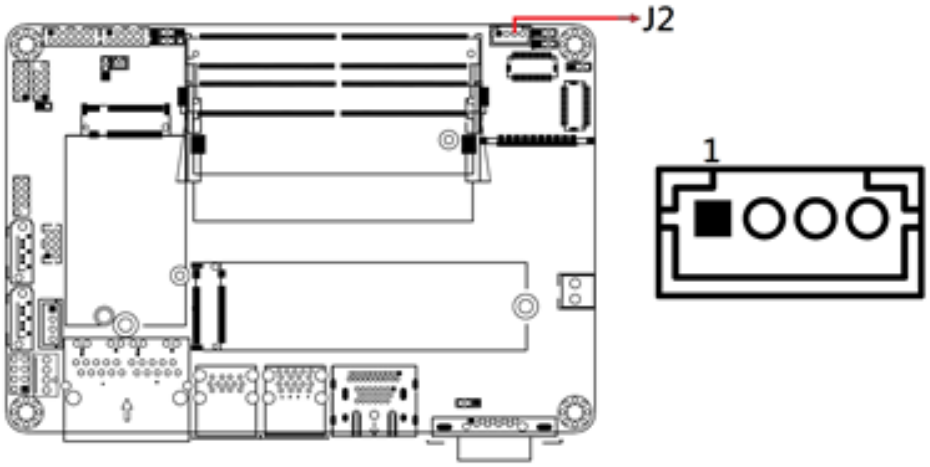
Pin	Assignment		
	RS-232	RS-422	RS-485
1	DCD	TX-	DATA-
2	RX	TX+	DATA+
3	TX	RX+	NC
4	DTR	RX-	NC
5	Ground	Ground	Ground
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC
10	NC	NC	NC

2.5.8 CN9: SIM Card Socket



The SIM card slot can be immediately accessed after removing the cover that is holding the SSD drive.

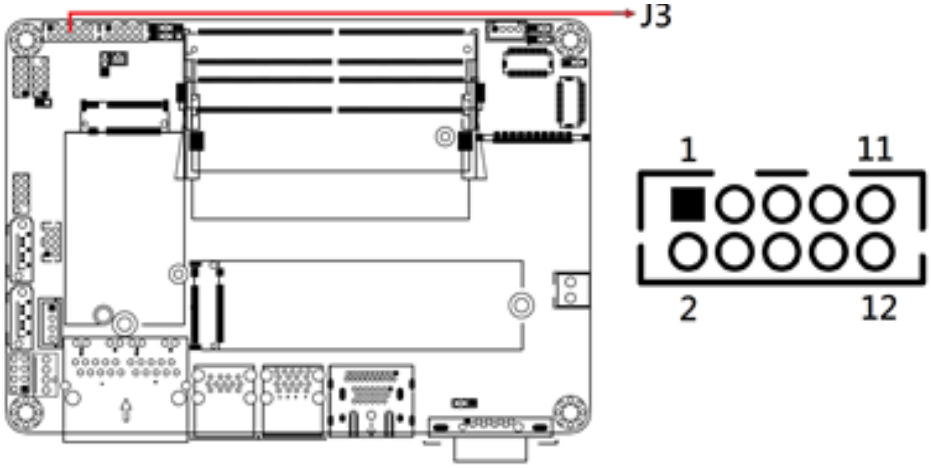
2.5.9 J2: LVDS Backlight Connector



* E-Call_0110-161-040

Pin	Assignment
1	+12V
2	Backlight Enable
3	Brightness Control
4	GND

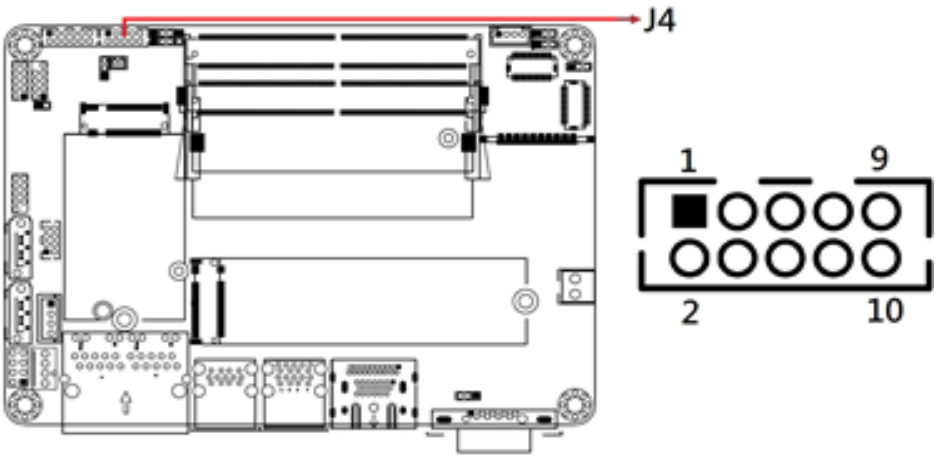
2.5.10 J3: Audio Connector



* HK_DF11-12S-PA66H

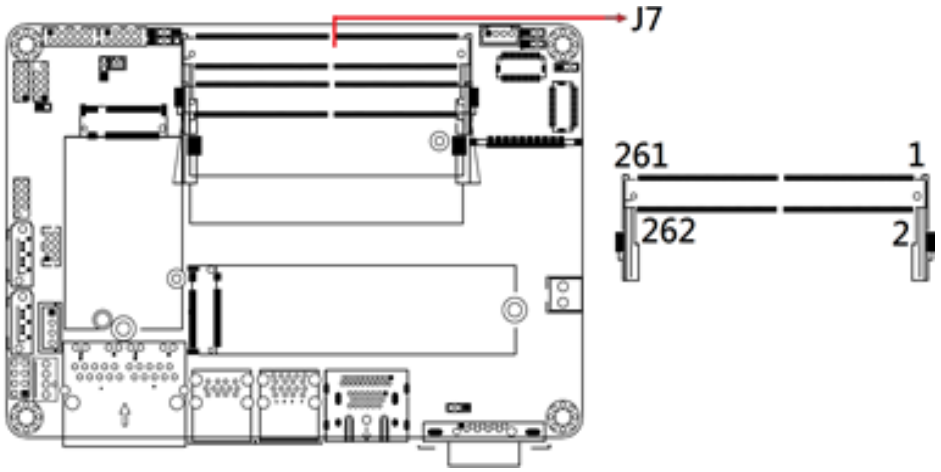
Pin	Assignment	Pin	Assignment
1	LINE OUT_L	2	LINE OUT_R
3	FRONT_JD	4	GND
5	LINE IN_L	6	LINE IN_R
7	LINE _JD	8	GND
9	MIC_L	10	MIC_R
11	MIC_JD	12	GND

2.5.11 J4: COM2 Port

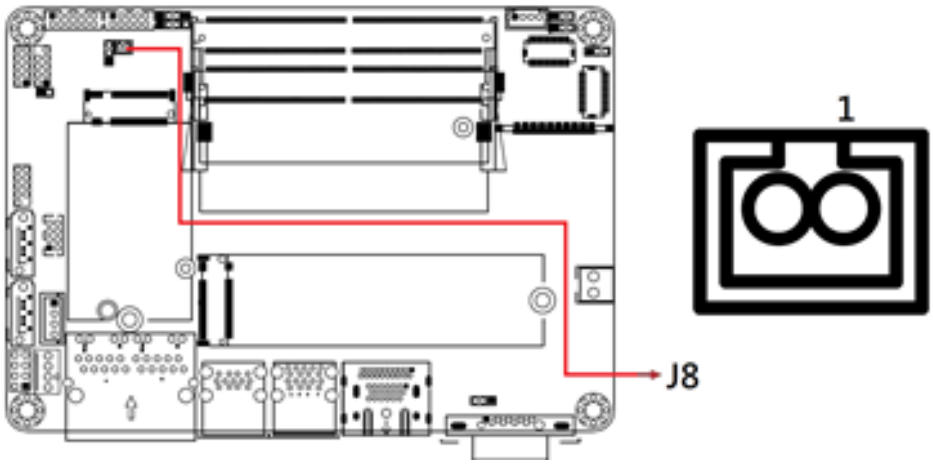


Pin	Assignment		
	RS-232	RS-422	RS-485
1	DCD	TX-	DATA-
2	RX	TX+	DATA+
3	TX	RX+	NC
4	DTR	RX-	NC
5	Ground	Ground	Ground
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC
10	NC	NC	NC

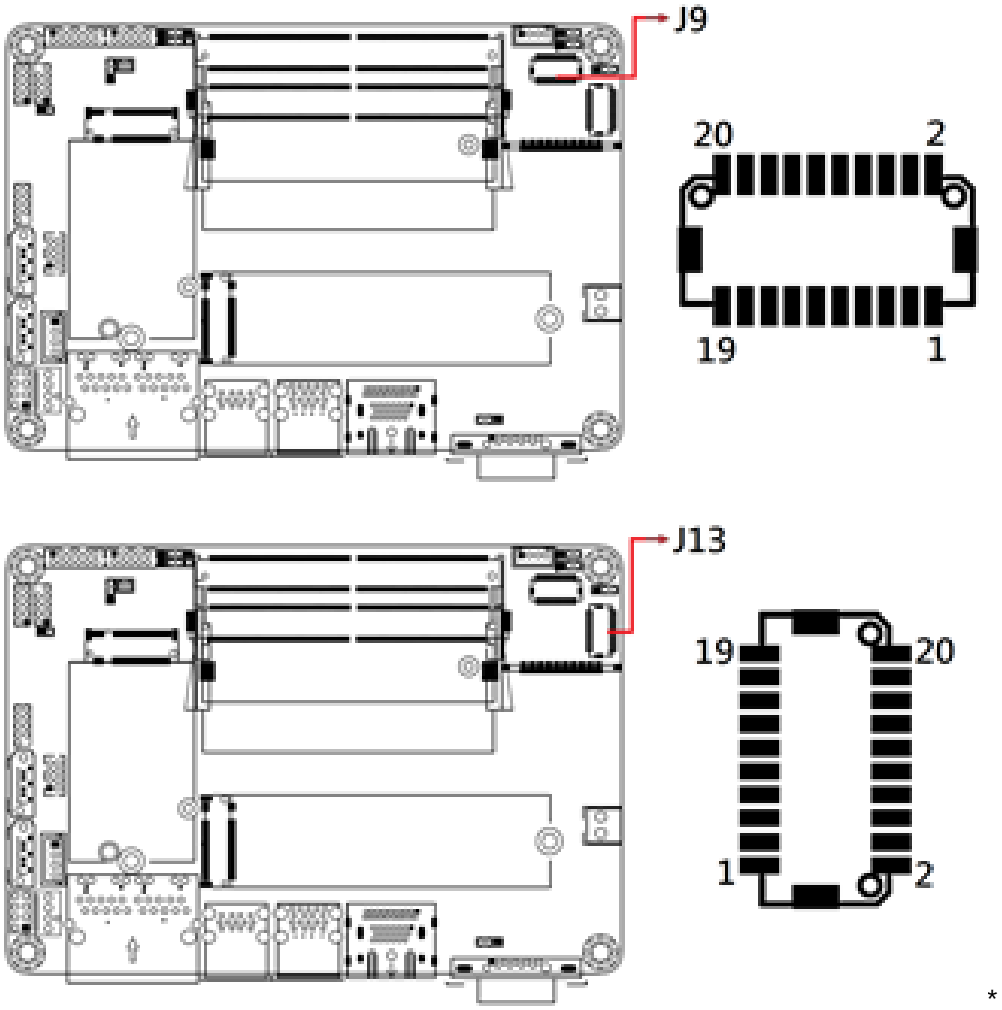
2.5.12 J7: DDR5 SO-DIMM CHA



2.5.13 J8: Battery Connector



2.5.14 J9, J13: LVDS CH-B / CH-A

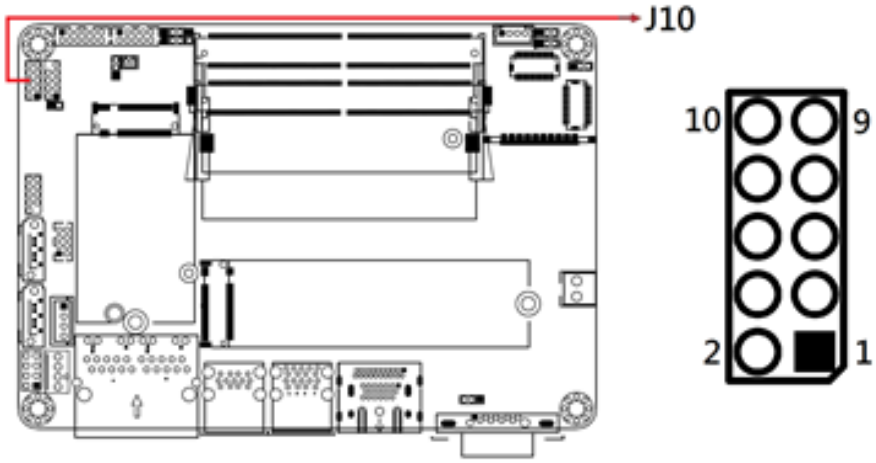


*

Hirose_DF20G-20DP-1V(56)

Pin	Assignment	Pin	Assignment
1	TX0P	2	TX0N
3	GND	4	GND
5	TX1P	6	TX1N
7	GND	8	GND
9	TX2P	10	TX2N
11	GND	12	GND
13	CLKP	14	CLKN
15	GND	16	GND
17	TX3P	18	TX3N
19	+3.3V	20	+3.3V

2.5.15 J10: Digital I/O (4in, 4out)

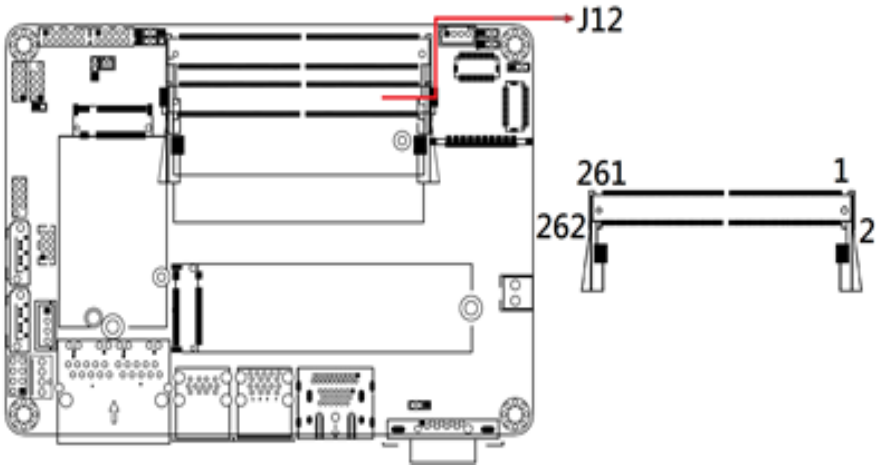


* E-Call_0196-01-200-100

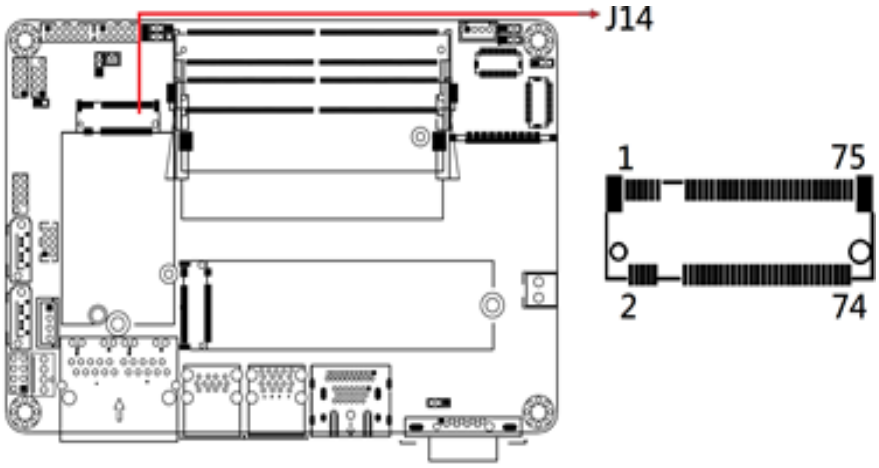
Pin	Assignment	Pin	Assignment
1	Ground	2	+5V
3	Out3	4	Out1
5	Out2	6	Out0
7	IN3	8	IN1
9	IN2	10	IN0

2.5.16 J11: eSPI Debug (Factory Use Only)

2.5.17 J12: DDR5 SO-DIMM CHB

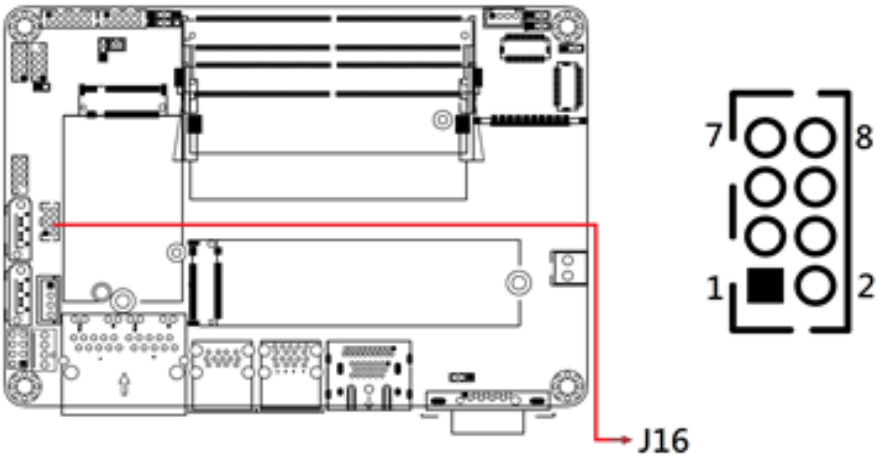


2.5.18 J14: M.2 B-Key 3052



2.5.19 J15: SPI Flash Connector (Factory use only)

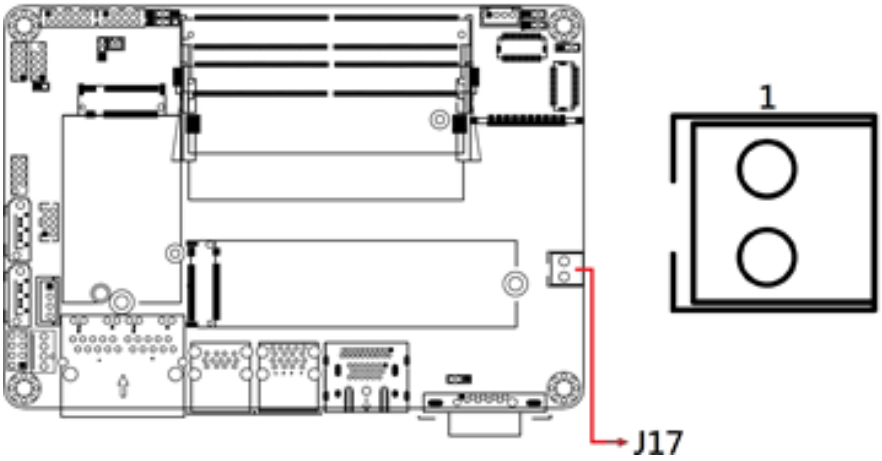
2.5.20 J16: USB2 #5/#6



* HK_DF11-8S-PA66H

Pin	Assignment	Pin	Assignment
1	+5V	2	GND
3	USB_PN	4	USB_PP
5	USB_PP	6	USB_PN
7	GND	8	+5V

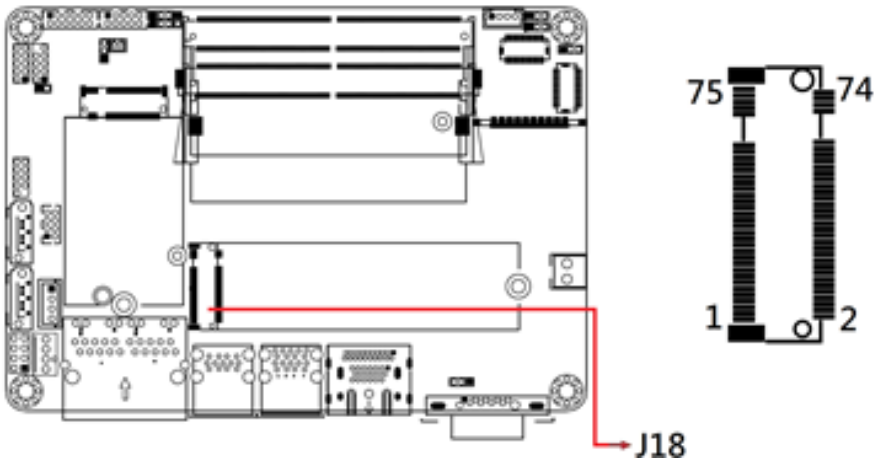
2.5.21 J17: DC-In Connector (12V-24V)



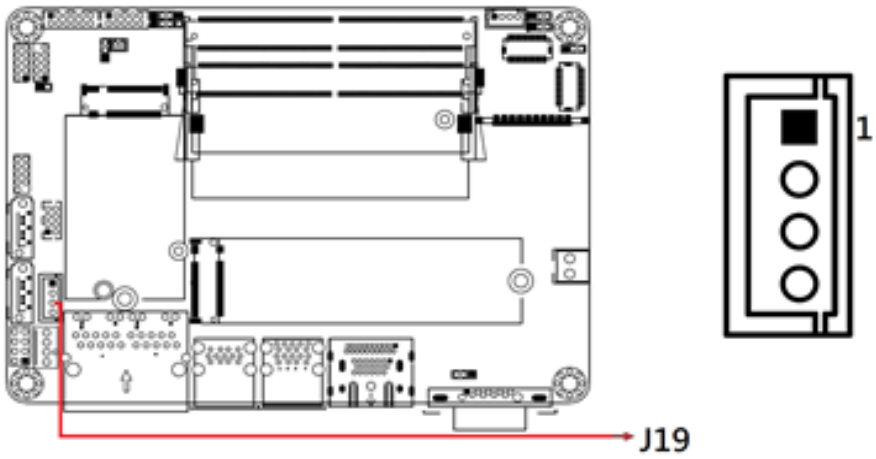
* HK_WAFER396-2S-WV

Pin	Assignment
1	DC_IN
2	GND

2.5.22 J18: M.2 M-Key 2280



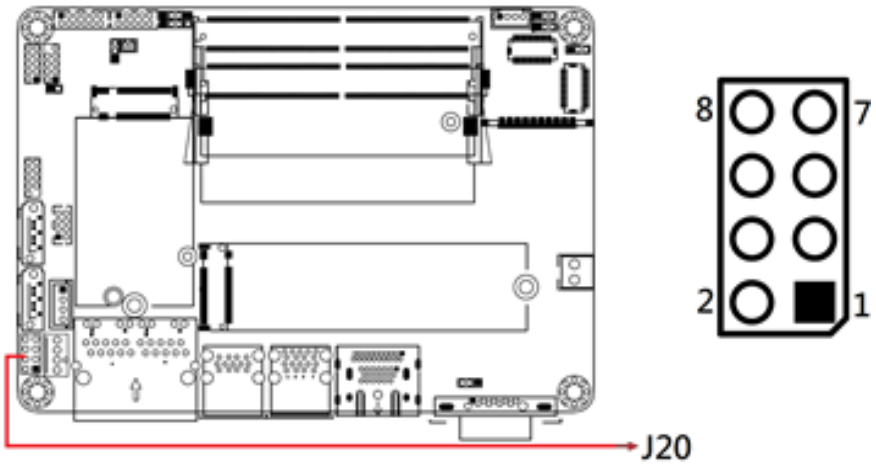
2.5.23 J19: SATA Power Connector



* E-Call_0110-071-040

Pin	Assignment
1	+5V
2	GND
3	GND
4	NC

2.5.24 J20: Front Panel Connector



* E-Call_0126-01-203-080

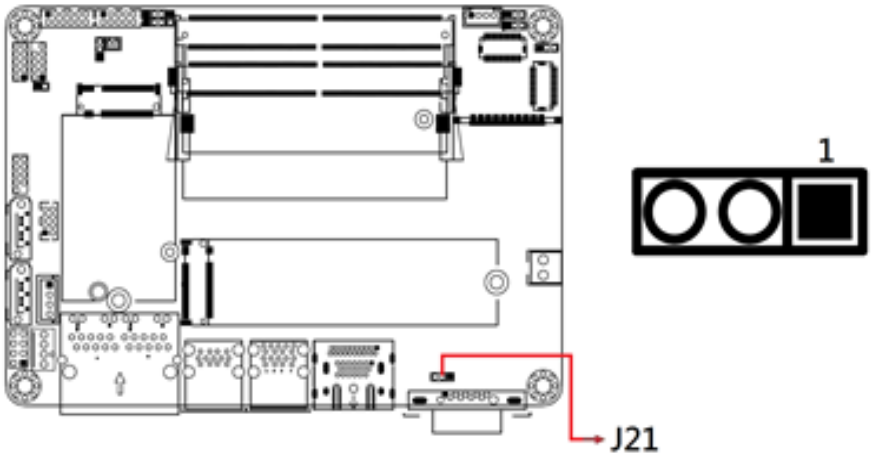
Pin	Assignment	Pin	Assignment
1	Power BTN	2	Power BTN
3	HDD LED+	4	HDD LED-
5	Reset BTN	6	Reset BTN
7	Power LED+	8	Power LED-

This connector provides interfaces for the following functions.

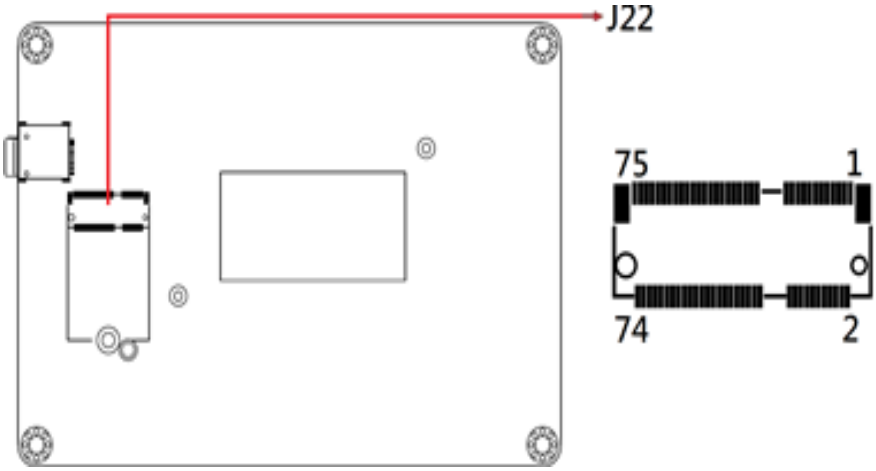
- **ATX Power ON Switch (Pins 1 and 2)**
  The 2 pins make an “ATX Power Supply On/Off Switch” for the system that connects to the power switch on the case. When pressed, the power switch will force the system to power on. When pressed again, it will power off the system.
- **Hard Disk Drive LED Connector (Pins 3 and 4)**
  This connector connects to the hard drive activity LED on control panel. This LED will flash when the HDD is being accessed.
- **Reset Switch (Pins 5 and 6)**
  The reset switch allows you to reset the system without turning the main power switch off and then on again. Orientation is not required when making a connection to this header.
- **Power LED: Pins 7 and 8**
  This connector connects to the system power LED on control panel. This LED will light when the system turns on.

◆

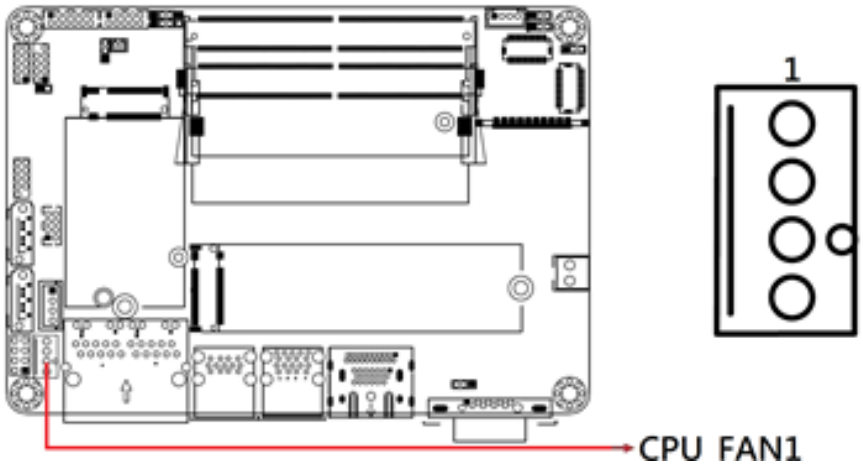
2.5.25 J21: PWM programming (Factory use only)



2.5.26 J22: M.2 E-Key 2230 W/CNVI



2.5.27 CPU_FAN1: CPU Fan Power Connector



* PWM Only

Pin	Assignment
1	Ground
2	+12V
3	Rotation detection
4	Control

Chapter 3
Driver Installation

The information provided in this chapter includes:

- Intel® Chipset Software Installation Utility
- HDD Graphics Drivers
- Smartsound Drivers
- HD Audio Drivers
- LAN Drivers
- Intel® ME Drivers
- Intel® Serial I/O Drivers
- Intel® PMT Drivers
- Intel® NPU IO Drivers

3.1 Introduction

This section describes the installation procedures for software and drivers. 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.

Note: After installing your Windows operating system, you must install the Intel® Chipset Software Installation Utility first before proceeding with the drivers installation.

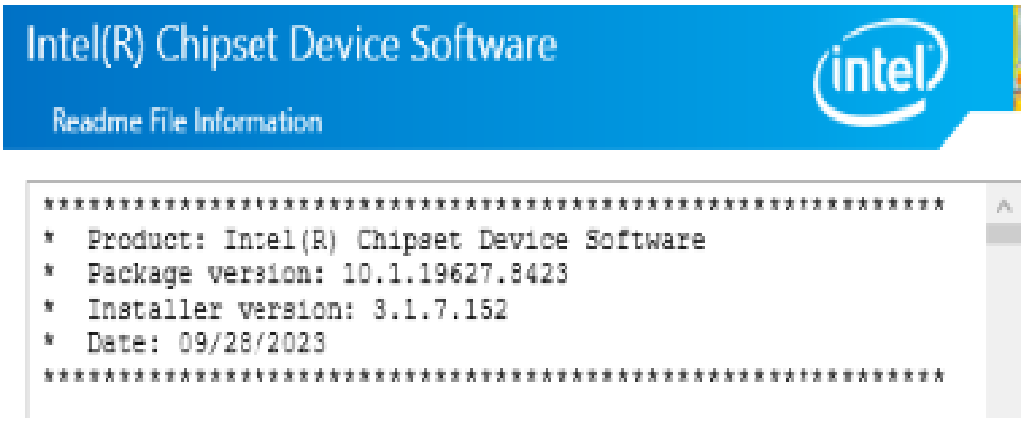
3.2 Intel® Chipset Software Installation Utility

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

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

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 terms in the software license agreement.
5. On the *Readme File Information* screen, click **Install**.



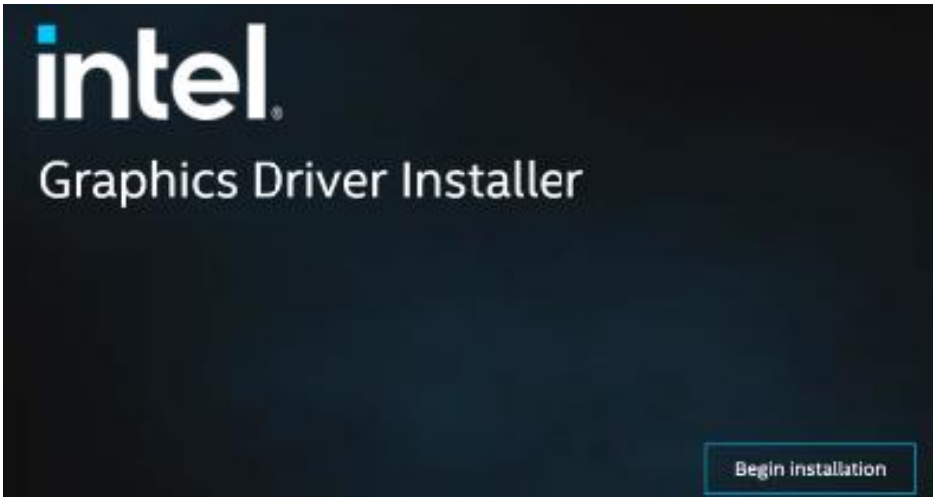
6. After completing the installation, click **Finish** to complete the setup process.

3.3 VGA Driver Installation

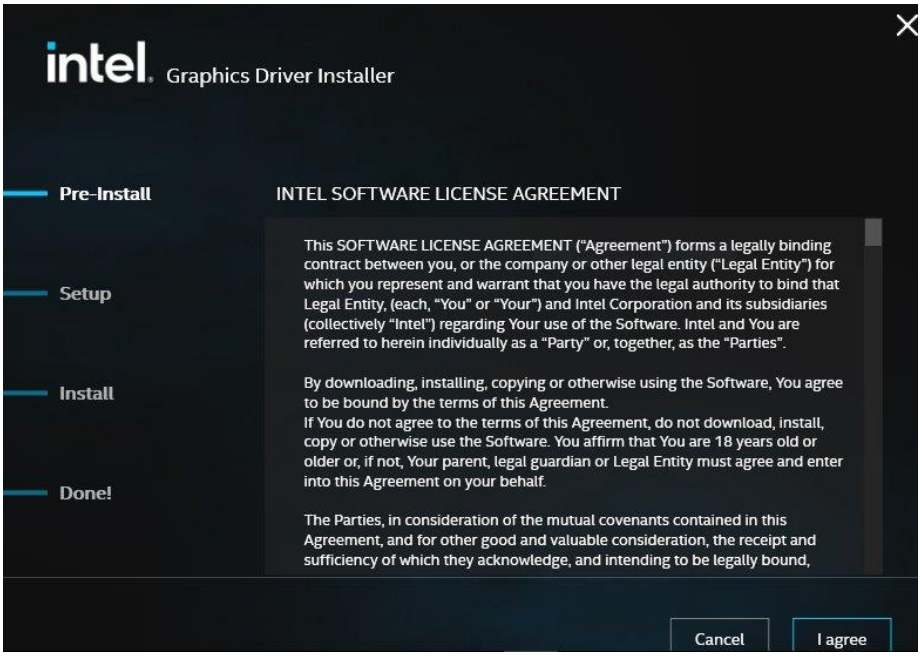
1. Click **Intel** on the left pane and then **Intel(R) Meteor Lake-P/PS/U Chipset Drivers** on the right pane.

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

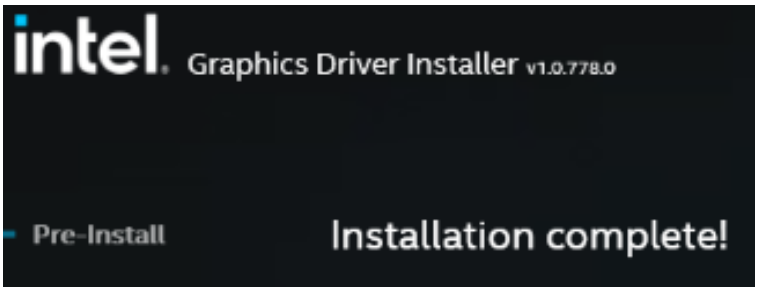
3. Click **Begin installation**.



4. Click **I agree** in the INTEL SOFTWARE LICENSE AGREEMENT screen.



5. Click **Start** for the installer to install the following components:
   - Intel Graphics Driver
   - Intel Graphics Command Center
6. When installation has been completed, click **Finish**.



3.4 Intel(R) Smartsound Drivers Installation

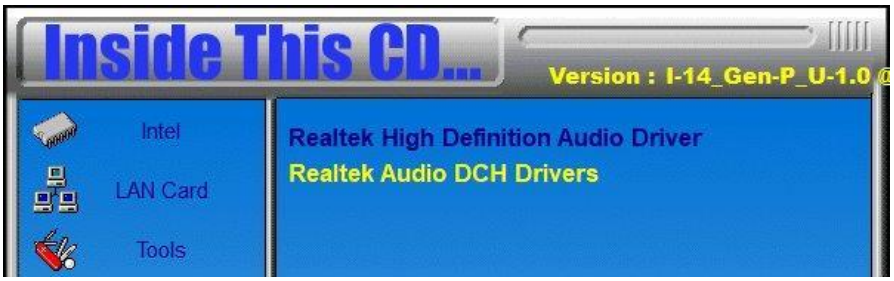
1. Click **Intel** on the left pane and then **Intel(R) Meteor Lake-P/PS/U Chipset Drivers** on the right pane. Click **Intel(R) Smartsound Drivers** on the right page.

2. Run the file in the path shown below for the InstallShield Wizard to start and complete the installation of the Intel Smartsound drivers. When installation has been completed, press any key to continue.

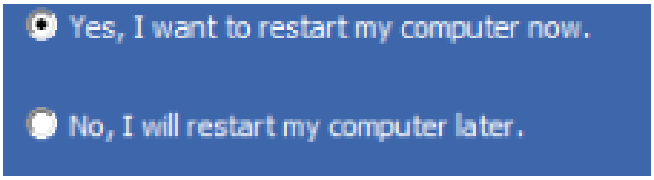
3.5 HD Audio Driver Installation

1. Click **Intel** on the left pane and then **Intel(R) Meteor Lake-P/PS/U Chipset Drivers** on the right pane. Click **Realtek Audio Drivers**.

2. Click **Realtek Audio DCH Drivers**.



3. Click **Next** when the Welcome to the InstallShield Wizard for Realtek Audio Driver screen appears. After the Installshield Wizard has completed the installation, restart the computer.

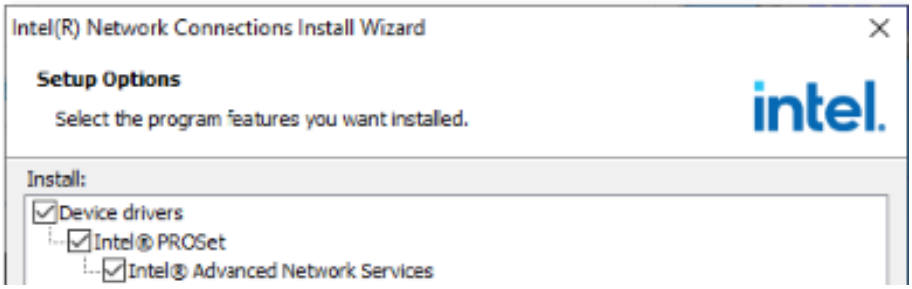


3.6 LAN Driver Installation

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

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

3. On the *Intel® Network Connections* screen, click **Install Drivers and Software**.
4. When the Welcome to the install wizard for Intel(R) Network Connections screen appears, click **Next**.
5. Accept the terms in the software license agreement and click **Next**.
6. On the *Setup Options* screen, click the checkbox to select the desired driver(s) for installation. Then click **Next** to continue.

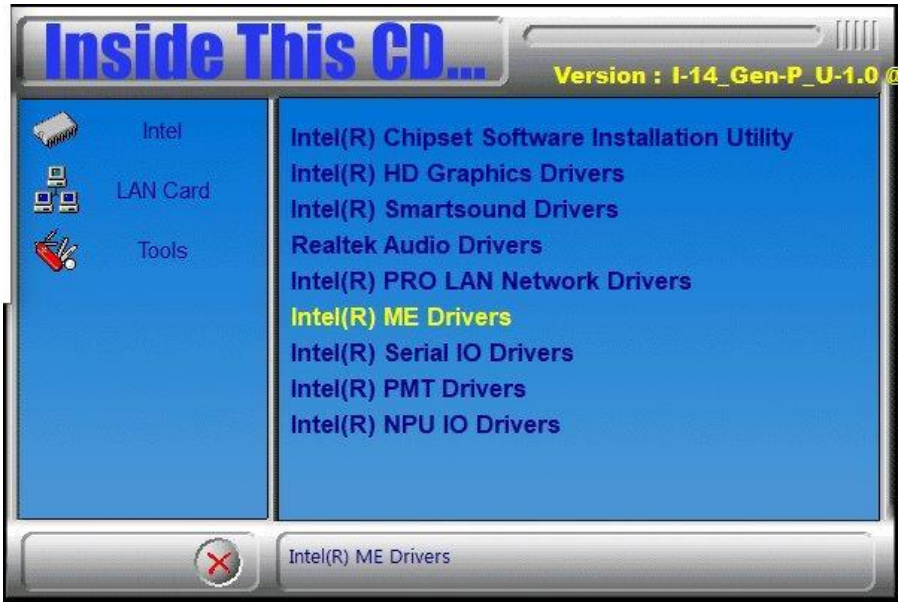


7. On the *Ready to Install the Program* screen, click **Install** to begin the installation. When the Install wizard has completed the installation, click **Finish**.
8. On the *Ready to Install the Program* screen, click **Install** to begin the installation. When the Install wizard hascompleted, click **Finish**.

3.7 Intel® Management Engine Drivers Installation

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

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



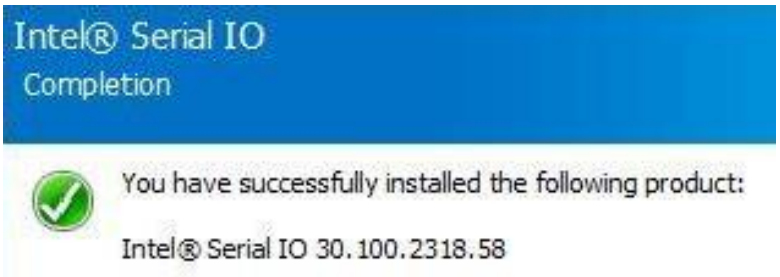
3. When the Welcome screen appears, click **Next**.
4. Accept the terms in the license agreement and click **Next**.
5. In the Destination Folder screen, click **Next** to install to the default folder, or click Change to choose another destination folder.
6. After Intel Management Engine Components have been successfully installed, click **Finish**.

3.8 Intel® Serial IO Drivers Installation

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

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

3. When the Welcome screen appears, click **Next**.
4. Accept the terms in the license agreement and click **Next**.
5. In both the Readme File Information and Confirmation screens, click **Next**. When you successfully finished the installation, click **Finish**.

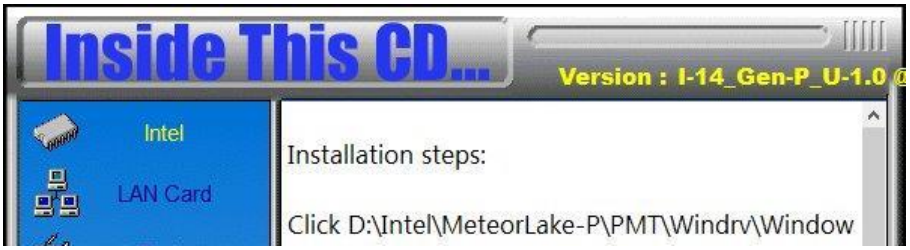


3.9 Intel® PMT Drivers Installation

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

2. Click **Intel(R) PMT Drivers**.

3. Run the file in the path shown below for the InstallShield Wizard to start and complete the installation of the Intel PMT drivers. When installation has been completed, press any key to continue.

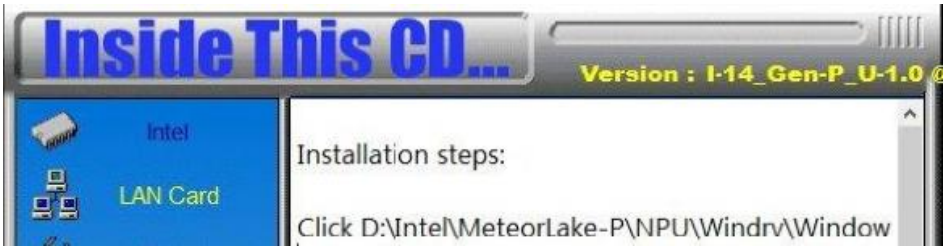


3.10 Intel® NPU IO Drivers Installation

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

2. Click **Intel(R) NPU IO Drivers**.

3. Run the file in the path shown below for the InstallShield Wizard to start and complete the installation of the drivers. When installation has been completed, press any key to continue.



Chapter 4
BIOS Setup

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

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

4.1 Introduction

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

4.2 BIOS Setup

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

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

The following message will appear on the screen:

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

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

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

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

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

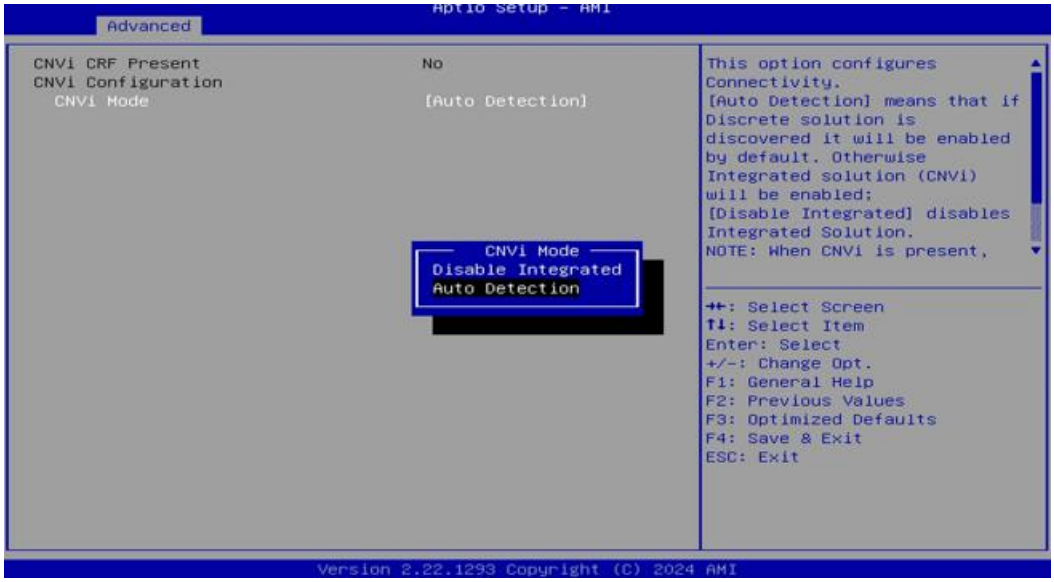
4.3 Main Settings

BIOS Setting	Description
System Date	Sets the date. 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.

4.4 Advanced Settings

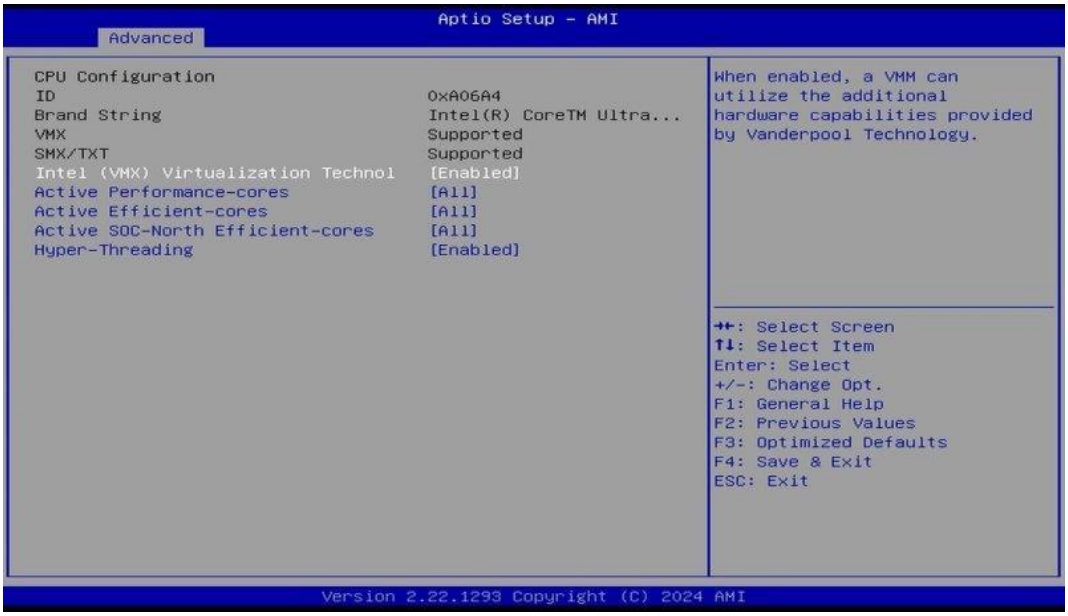
This section allows you to configure system features according to your preference.

4.4.1 Connectivity Configuration



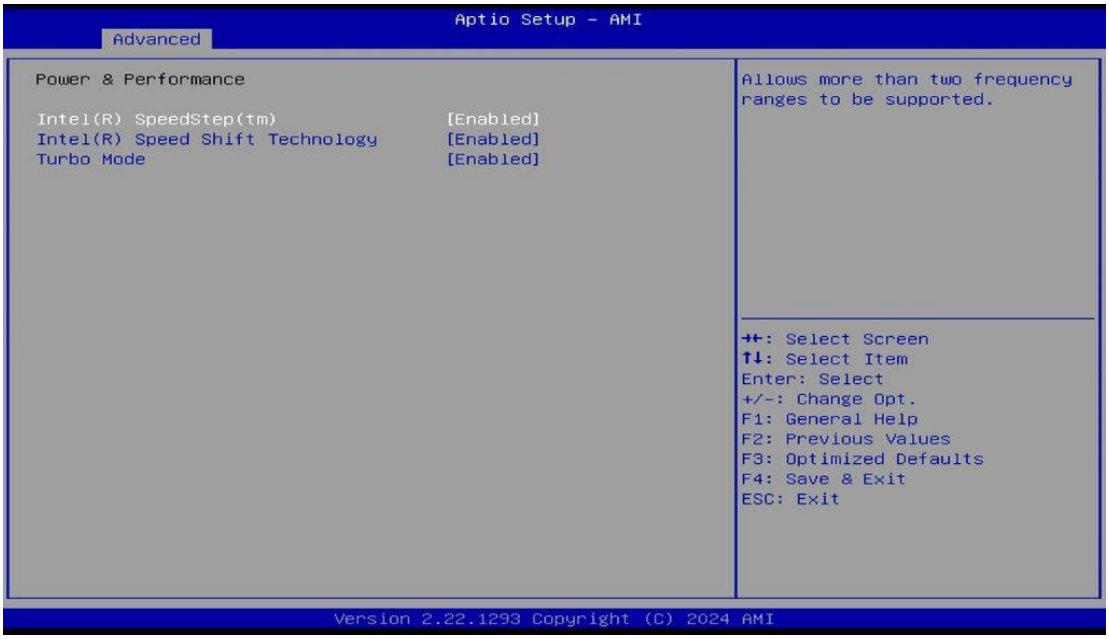
BIOS Setting	Description
CNVI Mode	This option configures Connectivity. ***Auto Detection*** – means that if Discrete solution is discovered it will be enabled by default. Otherwise Integrated solution (CNVi) will be enabled; ***Disable Integrated*** – disables Integrated Solution.

4.4.2 CPU Configuration



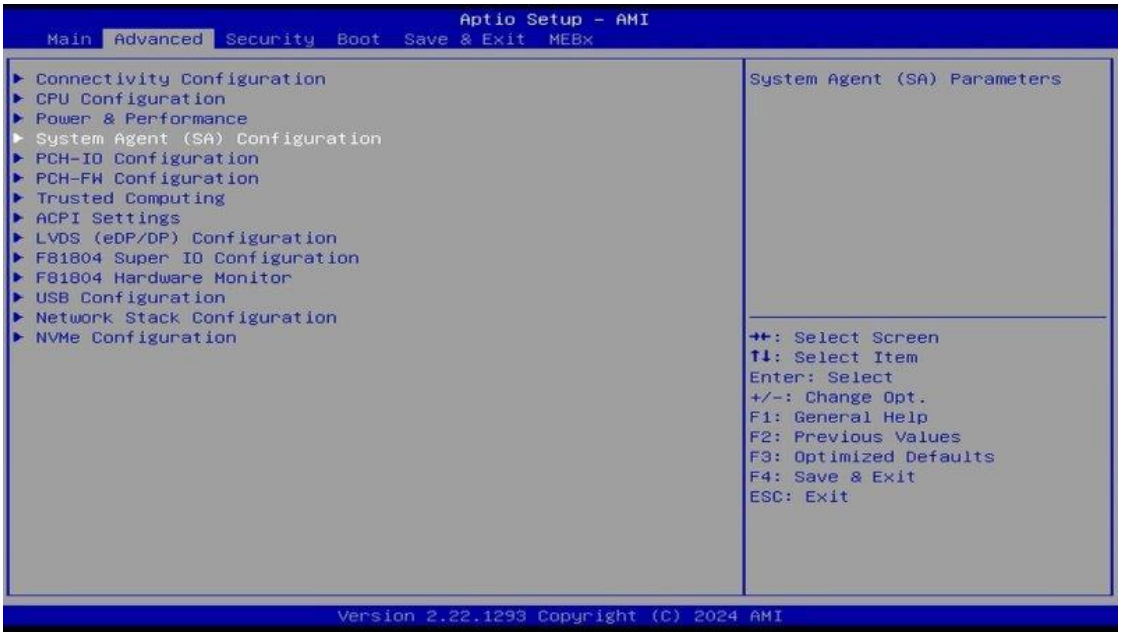
BIOS Setting	Description
Intel (VMX) Virtualization Technology	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Active Performance Cores	Number of P-cores to enable in each processor package. Note: Number of cores and E-cores are looked at together. When both are (0,0), Pcode will enable all cores.
Active Efficient Cores	Number of E-cores to enable in each processor package. Note: Number of cores and E-cores are looked at together. When both are (0,0), Pcode will enable all cores.
Active SOC-North Efficient-cores	Number of SOC-North Efficient-cores to enable in SOC North
Hyper-Threading	Options; Enabled or Disabled

4.4.3 Power & Performance

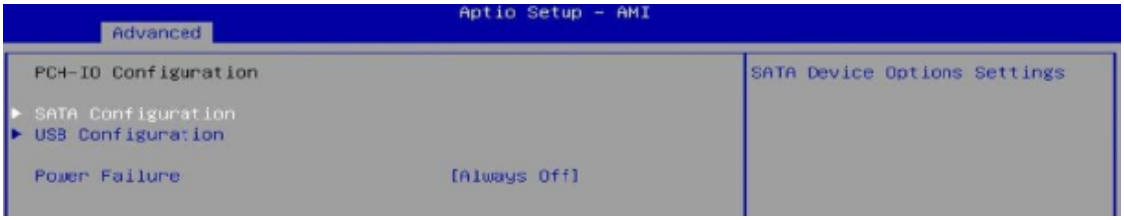


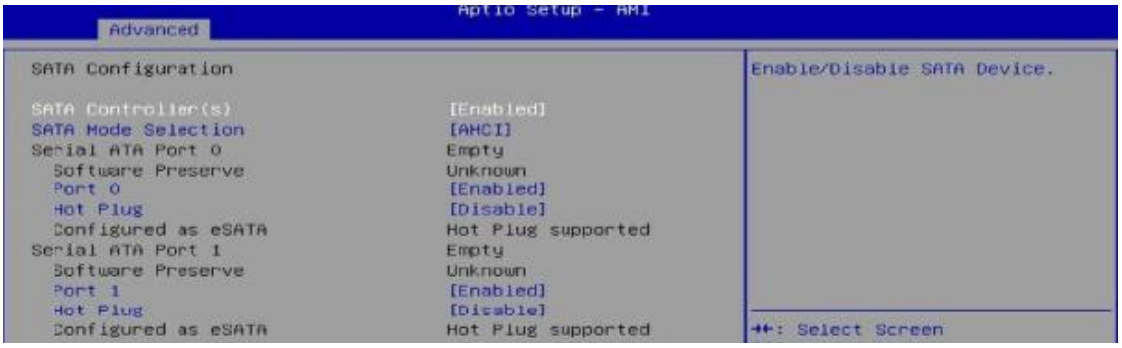
BIOS Setting	Description
Intel Speedstep	Allows more than two frequency ranges to be supported
Intel Speed Shift Technology	Enable/Disable Intel Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.
Turbo Mode	Enable/disable processor turbo mode.

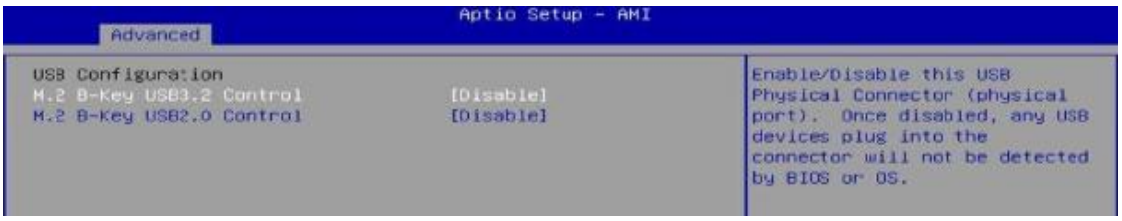
4.4.4 System Agent (SA) Configuration

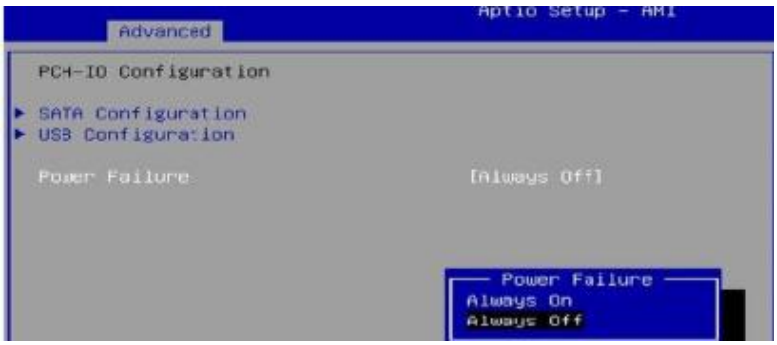


4.4.5 PCH-IO Configuration

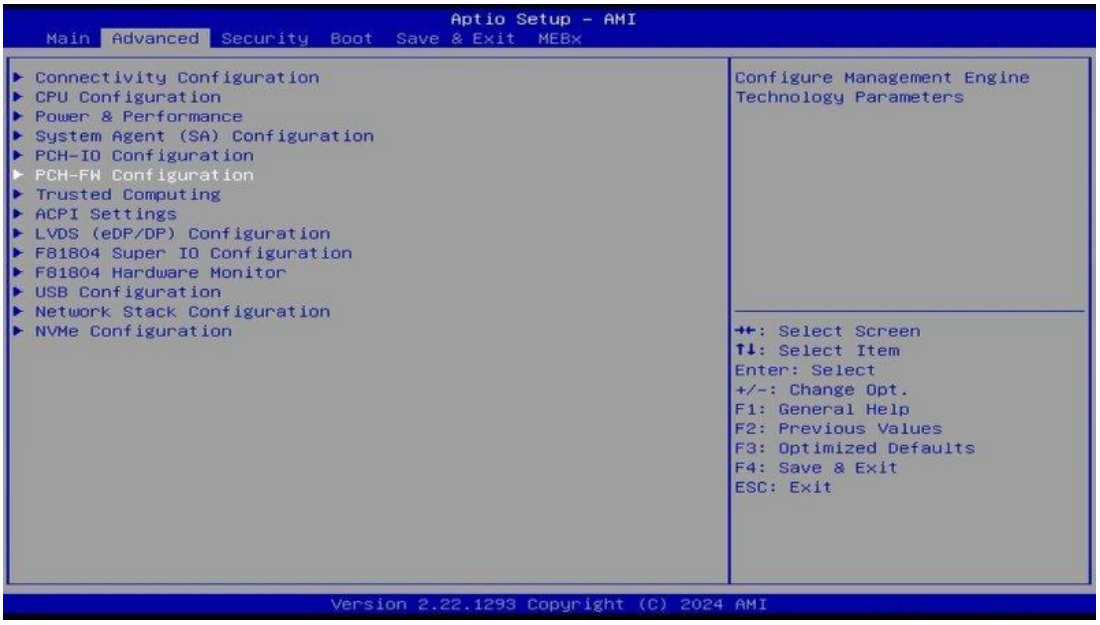


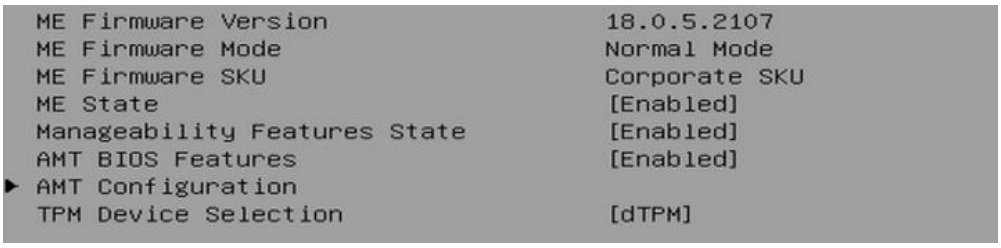






4.4.6 PCH-FW Configuration





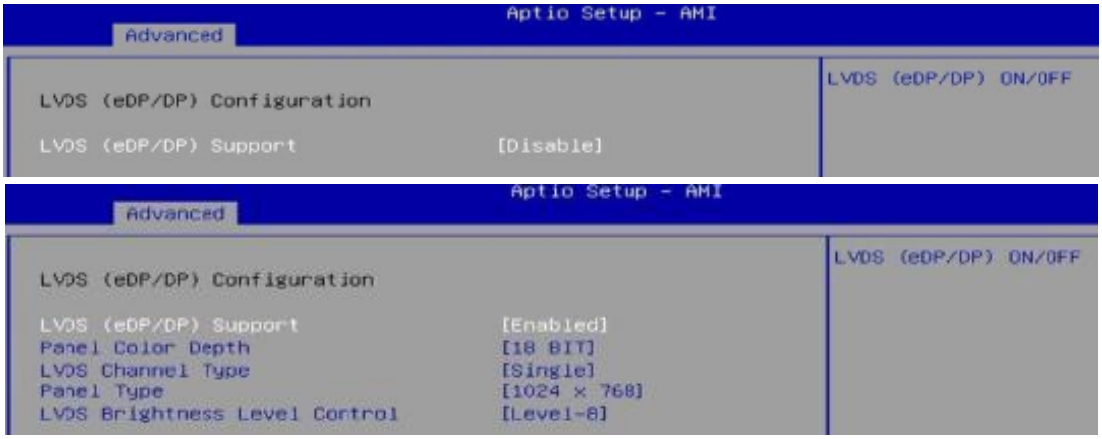
4.4.7 Trusted Computing

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.
SHA256/384 PCR Bank	Enables / Disables PCR Bank.
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.

4.4.8 ACPI Settings

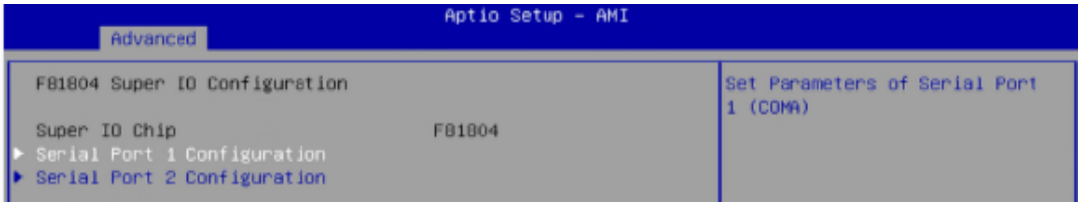
BIOS Setting	Description
Enable ACPI Auto Configuration	Enables or disables system ability to hibernate (OS/S4 sleep state). This option may not be effective with some operating systems
Enable Hibernation	Enables / Disables the system ability to hibernate (OS/S4 Sleep State). This option may be not effective with some OS.

4.4.9 LVDS Configuration



BIOS Setting	Description
LVDS (eDP/DP) Support	*LVDS (eDP/DP) ON/OFF*
Panel Color Depth	Selects the panel color depth. Options: 18 bit, 24bit (VESA/JEIDA)
LVDS Channel Type	Chooses the LVDS as single or dual channel.
Panel Type	Panel Type (Resolution) Options: 800 x 480, 800 x 600, 1024 x 768, 1280 x 768, 1280 x 800, 1280 x 960, 1280 x 1024, 1366 x 768, 1440 x 900, 1600 x 900, 1600 x 1200, 1680 x 1050, 1920 x 1080, 1920 x 1200
LVDS Brightness Level Control	Options: Level-1 to Level-8

4.4.10 F81804 Super IO Configuration

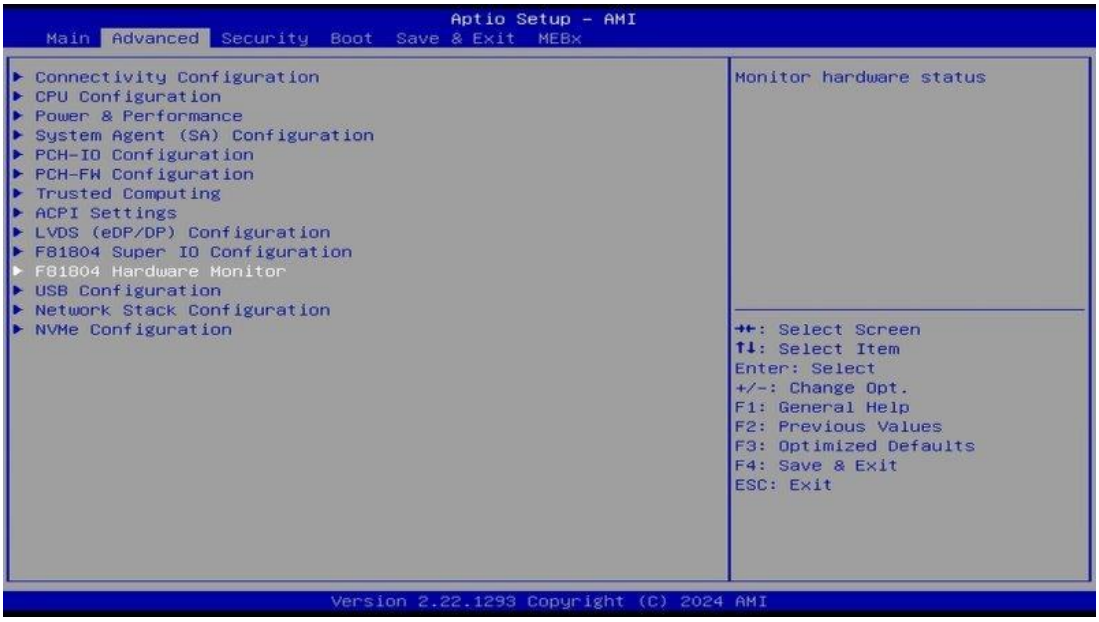


BIOS Setting	Description
Serial Ports Configuration	Sets parameters of serial ports. Enables / Disables the serial port and select an optimal setting for the Super IO device.

Serial Port 1 Configuration

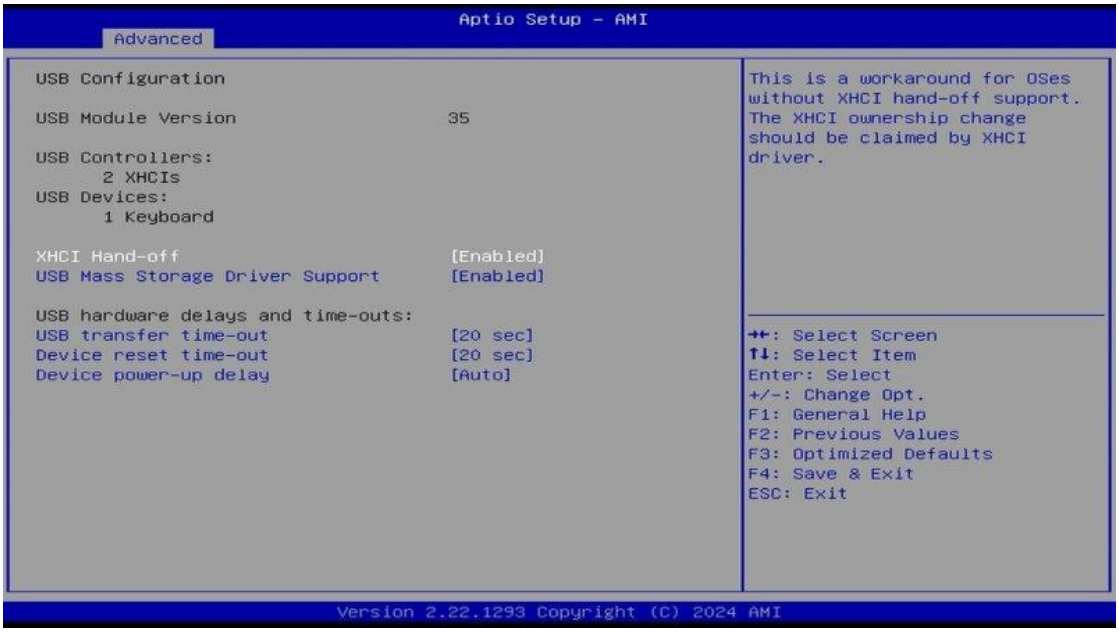
Serial Port 2 Configuration

4.4.11 F81804 Hardware Monitor



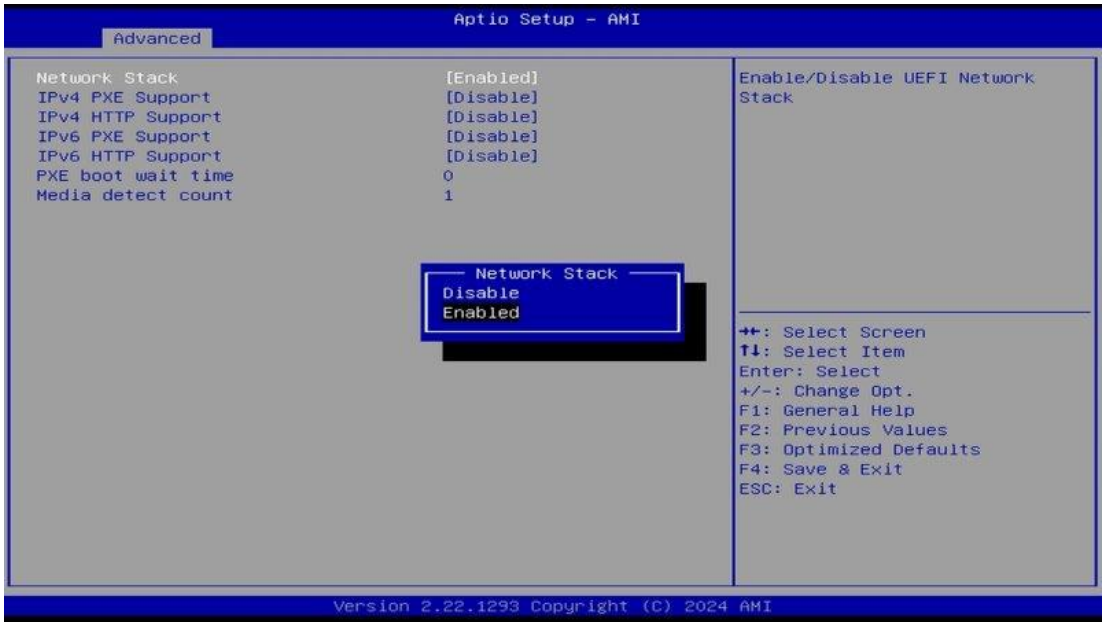
BIOS Setting	Description
CPU Smart Fan Control	Options include Disabled, 50ºC, 60ºC, 70ºC and 80ºC.
Temperatures / Voltages	These fields are the parameters of the hardware monitoring function feature of the motherboard. The values are read-only values as monitored by the system and show the PC health status.

4.4.12 USB Configuration



BIOS Setting	Description
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	Gives seconds (10 / 20 / 30 / 40 secs) to delay execution of Start Unit command to USB mass storage device.
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.

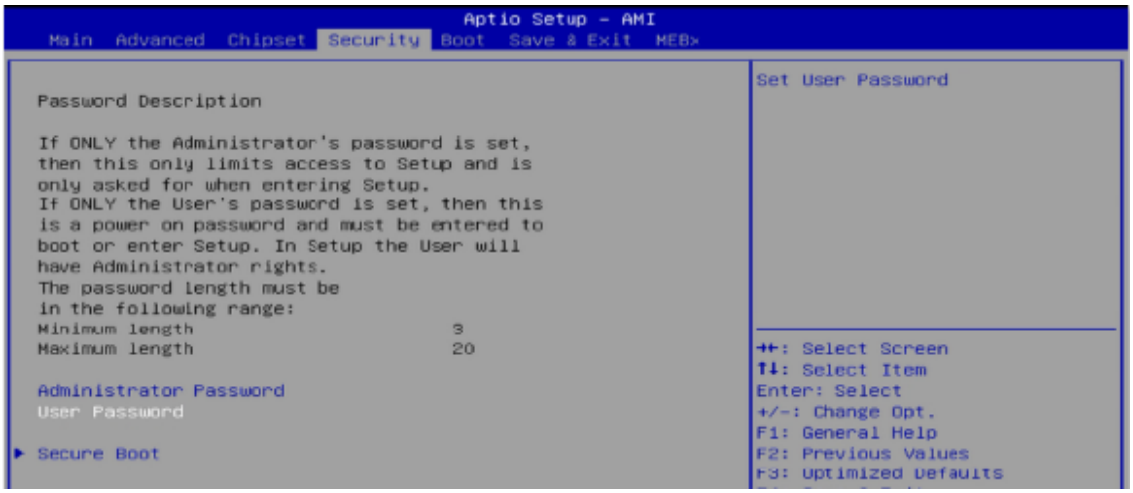
4.4.13 Network Stack Configuration



BIOS Setting	Description
Network Stack	Enable/Disable UEFI Network Stack
IPv4 PXE Support	If disabled, IPv4 PXE boot support will not be available.
IPv4 HTTP Support	If disabled, IPv4 HTTP boot support will not be available.
Ipv6 PXE Support	If disabled, IPv6 PXE boot support will not be available.
Ipv6 HTTP Support	If disabled, IPv6 HTTP boot support will not be available.
PXE boot wait time	Wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the value
Media detect count	Number of times the presence of media will be checked. Use either +/- nurmeric keys to set the value.

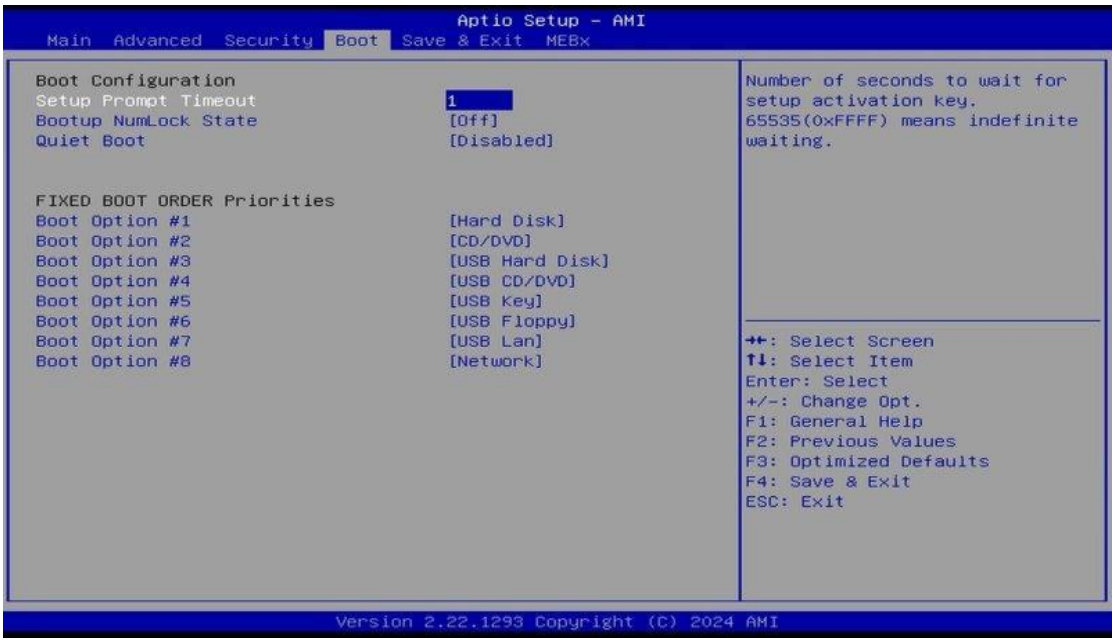
4.4.14 NVMe Configuration

4.5 Security Settings



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.
Secure Boot Mode	Secure Boot mode options: Standard or Custom. In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication.
Restore Factory Keys	Forces system to user mode. Install factory default Secure Boot key databases.
Reset to Setup Mode	Delete all Secure Boot key databases from NVRAM
Expert Key Management	Enables expert users to modify Secure Boot Policy variables without variable authentication.

4.6 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	Selects the keyboard NumLock state.
Quiet Boot	Enables / Disables Quiet Boot option.
FIXED BOOT ORDER Priorities	Sets the system boot order.

4.7 Save & Exit Settings

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.
Launch EFI Shell from filesystem device	Attempts to launch EFI shell application (Shell.efi) from one of the available filesystem devices.

Appendix

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

A. I/O Port Address Map

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

Address	Device Description
0x0000EFA0-0x0000EFBF	SM Bus Controller
0x00000A00-0x00000A0F	Motherboard resources
0x00000A10-0x00000A1F	Motherboard resources
0x00000290-0x0000029F	Motherboard resources
0x0000002E-0x0000002F	Motherboard resources
0x0000004E-0x0000004F	Motherboard resources
0x00000061-0x00000061	Motherboard resources
0x00000063-0x00000063	Motherboard resources
0x00000065-0x00000065	Motherboard resources
0x00000067-0x00000067	Motherboard resources
0x00000070-0x00000070	Motherboard resources
0x00000080-0x00000080	Motherboard resources
0x00000092-0x00000092	Motherboard resources
0x000000B2-0x000000B3	Motherboard resources
0x00000680-0x0000069F	Motherboard resources
0x0000164E-0x0000164F	Motherboard resources
0x00000020-0x00000021	Programmable interrupt controller
0x00000024-0x00000025	Programmable interrupt controller
0x00000028-0x00000029	Programmable interrupt controller
0x0000002C-0x0000002D	Programmable interrupt controller
0x00000030-0x00000031	Programmable interrupt controller
0x00000034-0x00000035	Programmable interrupt controller
0x00000038-0x00000039	Programmable interrupt controller
0x0000003C-0x0000003D	Programmable interrupt controller
0x000000A0-0x000000A1	Programmable interrupt controller
0x000000A4-0x000000A5	Programmable interrupt controller
0x000000A8-0x000000A9	Programmable interrupt controller
0x000000AC-0x000000AD	Programmable interrupt controller
0x000000B0-0x000000B1	Programmable interrupt controller
0x000000B4-0x000000B5	Programmable interrupt controller
0x000000B8-0x000000B9	Programmable interrupt controller
0x000000BC-0x000000BD	Programmable interrupt controller
0x000004D0-0x000004D1	Programmable interrupt controller
0x00003050-0x00003057	Standard SATA AHCI Controller
0x00003040-0x00003043	Standard SATA AHCI Controller
0x00003020-0x0000303F	Standard SATA AHCI Controller

Address	Device Description
0x000003F8-0x000003FF	Communications Port (COM1)
0x000002F8-0x000002FF	Communications Port (COM2)
0x00000000-0x00000CF7	PCI Express Root Complex
0x00000D00-0x0000FFFF	PCI Express Root Complex
0x00000040-0x00000043	System timer
0x00000050-0x00000053	System timer
0x0000FFF8-0x0000FFFF	Intel(R) Active Management Technology - SOL (COM11)
0x00002000-0x000020FE	Motherboard resources
0x00001854-0x00001857	Motherboard resources

B. Interrupt Request Lines (IRQ)

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

Level	Function
IRQ 4294967289~77	Intel(R) Ethernet Controller I226-LM #2
IRQ 4	Communications Port (COM1)
IRQ 3	Communications Port (COM2)
IRQ 4294967291	Intel(R) USB 3.20 eXtensible Host Controller - 1.20 (Microsoft)
IRQ 4294967293	PCI Express Root Port
IRQ 55-204	Microsoft ACPI-Compliant System
IRQ 256-511	Microsoft ACPI-Compliant System
IRQ 19	Intel(R) Active Management Technology - SOL (COM11)
IRQ 4294967290	Intel(R) USB 3.20 eXtensible Host Controller - 1.20 (Microsoft)
IRQ 4294967263	Intel(R) Management Engine Interface #1
IRQ 16	High Definition Audio Controller
IRQ 4294967294	PCI Express Root Port
IRQ 4294967276	Intel(R) Ethernet Controller I226-V #2

C. Watchdog Timer Configuration

The Watchdog Timer (WDT) is used to generate a variety of output signals after a user programmable count. The WDT is suitable for use in the prevention of system lock-up, such as when software becomes trapped in a deadlock. Under these sorts of circumstances, the timer will count to zero and the selected outputs will be driven.

Under normal circumstance, you will need to restart the WDT at regular intervals before the timer counts to zero.

Sample Code:

```
//---------------------------------------------------------------------------
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A
PARTICULAR
// PURPOSE.
//
//---------------------------------------------------------------------------
#include <dos.h>
#include <conio.h>
#include <stdio.h>
#include <stdlib.h>
#include " F81804.H"
//---------------------------------------------------------------------------
int main (int argc, char *argv[]);
void EnableWDT(int);
void DisableWDT(void);
//---------------------------------------------------------------------------
int main (int argc, char *argv[])
{
        unsigned char bBuf;
        unsigned char bTime;
        char **endptr;

        char SIO;

        printf("Fintek 81866 watch dog program\n");
        SIO = Init_ F81804();
        if (SIO == 0)
        {
                printf("Can not detect Fintek 81866, program abort.\n");
                return(1);
        }//if (SIO == 0)

        if (argc != 2)
        {
                printf(" Parameter incorrect!!\n");
                return (1);
```

```
        }

        bTime = strtol (argv[1], endptr, 10);
        printf("System will reset after %d seconds\n", bTime);

        if (bTime)
        {  EnableWDT(bTime); }
        else
        {  DisableWDT();  }
        return 0;
}
//-------------------------------------------------------------------------
void EnableWDT(int interval)
{
        unsigned char bBuf;

        bBuf = Get_ F81804_Reg(0x2B);
        bBuf &= (~0x20);
        Set_ F81804_Reg(0x2B,     bBuf); //Enable WDTO

        Set_ F81804_LD(0x07);              //switch to logic device 7
        Set_ F81804_Reg(0x30,     0x01); //enable timer

        bBuf = Get_ F81804_Reg(0xF5);
        bBuf &= (~0x0F);
        bBuf |= 0x52;
        Set_ F81804_Reg(0xF5,     bBuf); //count mode is second

        Set_ F81804_Reg(0xF6,     interval);     //set timer

        bBuf = Get_ F81804_Reg(0xFA);
        bBuf |= 0x01;
        Set_ F81804_Reg(0xFA,     bBuf); //enable WDTO output

        bBuf = Get_ F81804_Reg(0xF5);
        bBuf |= 0x20;
        Set_ F81804_Reg(0xF5,     bBuf); //start counting
}
//-------------------------------------------------------------------------
void DisableWDT(void)
{
        unsigned char bBuf;

        Set_ F81804_LD(0x07);              //switch to logic device 7

        bBuf = Get_ F81804_Reg(0xFA);
        bBuf &= ~0x01;
        Set_ F81804_Reg(0xFA,     bBuf); //disable WDTO output

        bBuf = Get_ F81804_Reg(0xF5);
        bBuf &= ~0x20;
        bBuf |= 0x40;
        Set_ F81804_Reg(0xF5,     bBuf); //disable WDT
}
```

```
//---------------------------------------------------------------------------


//---------------------------------------------------------------------------
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A
PARTICULAR
// PURPOSE.
//
//---------------------------------------------------------------------------
#include " F81804.H"
#include <dos.h>
//---------------------------------------------------------------------------
unsigned int   F81804_BASE;
void Unlock_ F81804 (void);
void Lock_ F81804 (void);
//---------------------------------------------------------------------------
unsigned int Init_ F81804(void)
{
        unsigned int result;
        unsigned char ucDid;

          F81804_BASE = 0x4E;
        result =   F81804_BASE;

        ucDid = Get_ F81804_Reg(0x20);
        if   (ucDid == 0x07)            //Fintek 81866
        { goto     Init_Finish;    }

          F81804_BASE = 0x2E;
        result =   F81804_BASE;

        ucDid = Get_ F81804_Reg(0x20);
        if   (ucDid == 0x07)            //Fintek 81866
        { goto     Init_Finish;    }

          F81804_BASE = 0x00;
        result =   F81804_BASE;

Init_Finish:
        return (result);
}
//---------------------------------------------------------------------------
void Unlock_ F81804 (void)
{
        outportb( F81804_INDEX_PORT,   F81804_UNLOCK);
        outportb( F81804_INDEX_PORT,   F81804_UNLOCK);
}
//---------------------------------------------------------------------------
void Lock_ F81804 (void)
{
        outportb( F81804_INDEX_PORT,   F81804_LOCK);
```

```
}
//-----------------------------------------------------------------------------
void Set_ F81804_LD( unsigned char LD)
{
        Unlock_ F81804();
        outportb( F81804_INDEX_PORT,    F81804_REG_LD);
        outportb( F81804_DATA_PORT, LD);
        Lock_ F81804();
}
//-----------------------------------------------------------------------------
void Set_ F81804_Reg( unsigned char REG, unsigned char DATA)
{
        Unlock_ F81804();
        outportb( F81804_INDEX_PORT, REG);
        outportb( F81804_DATA_PORT, DATA);
        Lock_ F81804();
}
//-----------------------------------------------------------------------------
unsigned char Get_ F81804_Reg(unsigned char REG)
{
        unsigned char Result;
        Unlock_ F81804();
        outportb( F81804_INDEX_PORT, REG);
        Result = inportb( F81804_DATA_PORT);
        Lock_ F81804();
        return Result;
}
//-----------------------------------------------------------------------------
```

```
//---------------------------------------------------------------------------
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A
PARTICULAR
// PURPOSE.
//
//---------------------------------------------------------------------------
#ifndef        F81804_H
#define        F81804_H            1
//---------------------------------------------------------------------------
#define       F81804_INDEX_PORT    ( F81804_BASE)
#define       F81804_DATA_PORT     ( F81804_BASE+1)
//---------------------------------------------------------------------------
#define       F81804_REG_LD    0x07
//---------------------------------------------------------------------------
#define       F81804_UNLOCK    0x87
#define       F81804_LOCK0xAA
//---------------------------------------------------------------------------
unsigned int Init_ F81804(void);
void Set_ F81804_LD( unsigned char);
void Set_ F81804_Reg( unsigned char,
unsigned char); unsigned char
Get_ F81804_Reg( unsigned char);
//---------------------------------------------------------------------------
#endif   //       F81804_H
```