

USER'S MANUAL

RCO-3000-RPL Small Form Factor Computer



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Prefaces

Revision

Revision	Description	Date
1.0	Manual Released	2024/5/23

Disclaimer

All specifications and information in this User's Manual are believed to be accurate and up to date. Premio Inc. does not guarantee that the contents herein are complete, true, accurate or non-misleading. The information in this document is subject to change without notice and does not represent a commitment on the part of Premio Inc.

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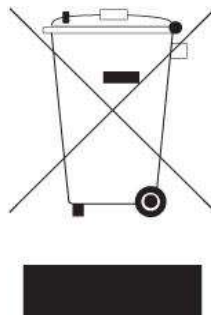
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Environmental Protection Announcement

Do not dispose this electronic device into the trash while discarding. Please recycle to minimize pollution and ensure environment protection.



Safety Precautions

Before installing and using the equipment, please read the following precautions:

- Put this equipment on a reliable surface during installation. Dropping it or letting it fall could cause damage.
- The power outlet shall be installed near the equipment and shall be easily accessible.
- Turn off the system power and disconnect the power cord from its source before making any installation. Be sure both the system and the external devices are turned OFF. Sudden surge of power could ruin sensitive components. Make sure the equipment is properly grounded.
- When the power is connected, never open the equipment. The equipment should be opened only by qualified service personnel.
- Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
- Disconnect this equipment from the power before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
- Avoid the dusty, humidity and temperature extremes.
- Do not place heavy objects on the equipment.
- If the equipment is not used for long time, disconnect it from the power to avoid being damaged by transient over-voltage.
- The storage temperature shall be above -30°C and below 85°C.
- The computer is provided with a battery-powered real-time clock circuit. There is a danger of explosion if incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.
- If one of the following situation arises, get the equipment checked by service personnel:
 - The power cord or plug is damaged.
 - Liquid has penetrated into the equipment.
 - The equipment has been exposed to moisture.
 - The equipment does not work well or it cannot work according the user's manual.
 - The equipment has been dropped and damaged.
 - The equipment has obvious signs of breakage.

Technical Support and Assistance

1. Visit the Premio Inc website at www.premioinc.com where you can find the latest information about the product.
2. Contact your distributor, our technical support team or sales representative for technical support if you need additional assistance. Please have following information ready before you call:
 - Model name and serial number
 - Description of your peripheral attachments
 - Description of your software (operating system, version, application software, etc.)
 - A complete description of the problem
 - The exact wording of any error messages

Conventions Used in this Manual

**WARNING**

This indication alerts operators to an operation that, if not strictly observed, may result in severe injury.

**CAUTION**

This indication alerts operators to an operation that, if not strictly observed, may result in safety hazards to personnel or damage to equipment.

**NOTE**

This indication provides additional information to complete a task easily.

Package Contents

Before installation, please ensure all the items listed in the following table are included in the package.

Item	Description	Q'ty
1	RCO-3000-RPL Series	1
2	Wall Mounting kit with Vibration Isolation	1
3	Accessory Kit	1

Ordering Information

Model No.	Product Description
RCO-3000-RPL	Small Form Factor Computer with LGA 1700 for 12/13/14th Gen Intel CPU & Q670 PCH, 2x LAN
RCO-3000-RPL-4L	Small Form Factor Computer with LGA 1700 for 12/13/14th Gen Intel CPU & Q670 PCH, 6x LAN
RCO-3000-RPL-4LM12	Small Form Factor Computer with LGA 1700 for 12/13/14th Gen Intel CPU & Q670 PCH, 2x LAN, 4x M12 LAN
RCO-3000-RPL-4P	Small Form Factor Computer with LGA 1700 for 12/13/14th Gen Intel CPU & Q670 PCH, 2x LAN, 4x PoE
RCO-3000-RPL-4PM12	Small Form Factor Computer with LGA 1700 for 12/13/14th Gen Intel CPU & Q670 PCH, 2x LAN, 4x M12 PoE
RCO-3000-RPL-D10G	Small Form Factor Computer with LGA 1700 for 12/13/14th Gen Intel CPU & Q670 PCH, 2x LAN, 2x 10G LAN
RCO-3000-RPL-4U3	Small Form Factor Computer with LGA 1700 for 12/13/14th Gen Intel CPU & Q670 PCH, 2x LAN, 10x USB
RCO-3000-RPL-2M2BK	Small Form Factor Computer with LGA 1700 for 12/13/14th Gen Intel CPU & Q670 PCH, 2x LAN, 3x M.2 B-Key
RCO-3000-RPL-M2MK	Small Form Factor Computer with LGA 1700 for 12/13/14th Gen Intel CPU & Q670 PCH, 2x LAN, 1x M.2 M-Key

Optional Accessories

Model No.	Product Description
1-E09A12002	Adapter AC/DC 24V 9.2A 220W with 3pin Terminal Block Plug 5.0mm Pitch
1-E09A22801	Adapter AC/DC 24V 11.6A 280W with 3pin Terminal Block Plug 5.0mm Pitch
1-TPCD00005	Power Cord, 3-pin US Type, 180cm
1-TPCD00002	Power Cord, European Type, 180cm
1-TPCD00001	Power Cord, 3-pin UK Type, 180cm
3-DINR-0004	DinRail-2MountingKit

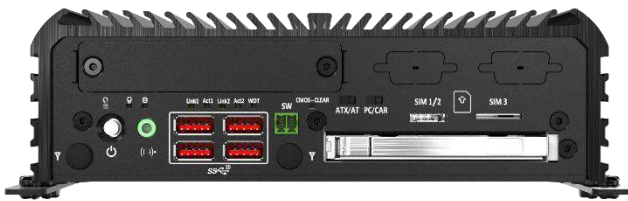
Chapter 1

Product Introductions

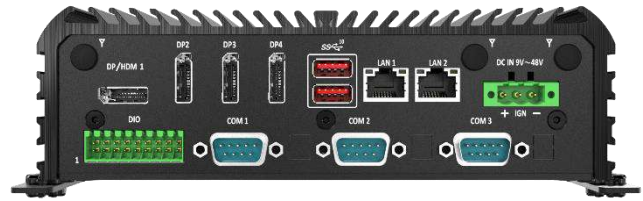
1.1 Overview

The Advanced Fanless Embedded Systems RCO-3000-RPL series are designed with rich I/O, high flexibility and easy expansion capabilities which are ideal for diverse industrial applications. Support 12/13/14th Gen. Intel® Core™ processor, RCO-3000-RPL Series is an extreme features integration, outstanding system performance, versatile I/O connections, and rugged reliability fanless embedded systems. It offers dramatically enhanced CPU and graphics performance, wide power and feature advanced features, rich connectivity interfaces, wide range 9~48 VDC power input, and high reliability even operating in temperature extremes (-25°C to 70°C).

Rear Panel



Front Panel



Key Features

- Support 12/13/14th Gen Intel® RPL S / ADL Processor (LGA 1700, 35W TDP)
- Intel® Q670 Express Chipset
- 4x Independent Displays
- 2x Intel® 2.5GbE supporting Wake-on-LAN and PXE, 3x External SIM socket
- 2x 2.5" SATA SSD Bay (1x Internal) with RAID 0, 1, 5 support
- 1x M.2 E Key, 2230 (PCIe x1, USB 2.0)
- 1x M.2 B Key, 2242/3042/3052 (PCIe x2, or PCIe x1 & USB 3.2 Gen1; Support AI Module/NVMe Storage/4G/5G)
- 1x M.2 B Key, 2242/3042/3052 (PCIe x2 or SATA; Support AI Module/NVMe/SATA Storage/4G/5G)
- 3x RS-232/422/485, 6x USB 3.2 Gen 2 (10 Gbps)
- 8x DI + 8x DO with isolation
- 9 to 48VDC Wide Range Power Input Supporting AT/ATX Mode
- Wide Operating Temperature (-25°C to 70°C)
- TPM 2.0 Supported

1.2 Hardware Specification

System

Processor

Support 12/13/14th Gen Intel® ADL & RPL S Processor (LGA 1700, 35W TDP)

- Intel® Core™ i9-14900T/i9-13900TE/i9-12900TE, up to 24 Cores, 36MB Cache, up to 5.5 GHz
- Intel® Core™ i7-14700T, up to 20 Cores, 33MB Cache, up to 5.2 GHz
- Intel® Core™ i7-13700TE/i7-12700TE, up to 16 Cores, 30MB cache, up to 4.8 GHz
- Intel® Core™ i5-14500T/i5-13500TE/i5-12500TE, up to 14 Core, 24MB Cache, up to 4.8 GHz
- Intel® Core™ i3-14100T/i3-13100TE/i3-12100TE, up to 4 Cores, 12MB Cache, up to 4.4 GHz
- Intel® Core™ 300T, up to 2 Cores, 6MB Cache, up to 3.4 GHz
- Intel® Pentium® G7400TE, 2 Cores, 6MB Cache, 3.0 GHz
- Intel® Celeron® G6900TE, 2 Cores, 4MB Cache, 2.4 GHz

System Chipset	Intel® Q670 Express Chipset
LAN Chipset	<ul style="list-style-type: none"> • 2.5 GbE1: Intel I226 (Support Wake-on-LAN and PXE, Support TSN) • 2.5 GbE2: Intel I226 (Support Wake-on-LAN and PXE, Support TSN)
Audio Codec	Realtek ALC888S
System Memory	1x DDR5 4800/5600MHz SODIMM. Max. up to 32GB
Graphics	Integrated Intel® UHD Graphics 770/730
BIOS	AMI 256Mbit SPI BIOS
Watchdog	Software Programmable Supports 1~255 sec. System Reset
TPM	TPM 2.0

Display

Display Port	4x DisplayPort, support resolution 4096 x 2304, Up to 7680 x 4320 (1x DP Port Co-layout HDMI Connector)
HDMI	Yes, Shared by 1x DP port
Multiple Display	4x Independent Displays

Power

Power Adaptor	Optional AC/DC 24V/9.2A, 220W Optional AC/DC 24V/11.67A, 280W
Power Mode	AT, ATX (ATX Default)
Power Ignition Sensing	Power Ignition Management
Power Supply Voltage	9~48VDC
Power Connector	3-pin Terminal Block
Power Protection	OVP (Over Voltage Protection) OCP (Over Current Protection) Reverse Protection

Storage

SSD/HDD	<ul style="list-style-type: none"> • 1x 9mm 2.5" SATA SSD Bay (Internal) • 1x 7mm 2.5" SATA SSD Bay (Hot-swappable) Support RAID 0, 1, 5
---------	--

Operating System

Windows	Windows 10
Linux	Linux kernel 5.x

Expansion

M.2	<p>1x M.2 B key Type: 2242/3042/3052</p> <ul style="list-style-type: none"> • Support PCIe x2/PCIe x1 & USB 3.2 Gen1 • Support NVMe Storage/AI Module/4G/5G <p>1x M.2 B key Type: 2242/3042/3052</p> <ul style="list-style-type: none"> • Support PCIe x2/SATA signal • Support NVMe/SATA Storage/AI Module/4G/5G <p>1x M.2 E key slot (2230)</p> <ul style="list-style-type: none"> • Support PCIe x1 & USB 2.0; Support CNVi • Support Wifi Module
SIM Socket	<p>1x External Standard SIM socket</p> <p>1x External Dual Nano SIM socket</p>
Expansion Modules	<p>Occupied One Universal I/O Slot:</p> <ul style="list-style-type: none"> • 4-port 1GbE module with Intel® I350 Chipset, RJ-45 or M12 connector (PoE optional) • 2-Port 10GbE RJ45 with Intel X710 Chipset • 4-Port USB with Renesas uPD720201K8 host controller (share PCIe Gen2 x1 bandwidth) • 1x RJ45 port for OOB Management Module • 1x M.2 M-Key (PCIe x4 Lane, 2242/2260) for NVMe/AI Module • 2x M.2 B-Key 2242/3042/3052: <ul style="list-style-type: none"> - 2x M.2 (PCIe x2 Lane) for NVMe/AI Module - 1x M.2 (PCIe x2 Lane) for NVMe/AI Module and 1x M.2 (PCIe x1 Lane + USB 3.2 Gen 1) for 4G/5G Module, 1x External SIM socket (M.2 attached)

I/O

Audio	1x Line-out
CAN	2x CAN 2.0 A/B 2-pin Internal header
COM	3x RS-232/422/485 (Optional Isolation)
DIO	8 in / 8 out (Isolated)
LAN	2x 2.5GbE RJ45
USB	6x USB 3.2 Gen 2 (10Gbps)
Others	<p>5x WiFi Antenna Holes</p> <p>1x Power Switch, 1x AT/ATX Switch</p> <p>1x Remote Power On/Off</p> <p>1x PC/Car Mode Switch</p> <p>1x Delay Time Switch</p> <p>1x Clear CMOS Switch</p> <p>1x Mic In Header (Internal)</p>

Environment

Operating Temp.	-25°C to 70°C (35W CPU)
Storage Temp.	-30°C to 85°C
Relative Humidity	10% to 95% (non-condensing)
Vibration	<p>With SSD: 5 Grms, 5 - 500 Hz, 0.5 hr/axis</p> <p>With HDD: 1 Grms, 5 - 500 Hz, 0.5 hr/axis</p>
Shock	With SSD: 50G, half sine, 11ms
Certification	UL, CE, FCC Class A, EMC Conformity with EN50155 & EN50121-3-2

Physical

Construction	Extruded Aluminum with Heavy Duty Metal
Dimension	192 (W) x 227 (D) x 60.3 (H) mm
Weight	2.8kg - 3.6 kg
Mounting	<ul style="list-style-type: none"> · Wall Mounting kit with Vibration Isolation · DIN-rail mounting (optional)

1.3 System I/O

RCO-3000-RPL

Rear Panel

DP/HDMI port

Used to connect a DP/HDMI monitor or connect optional split cable for dual display mode

Digital I/O Terminal Block

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

DisplayPort

Used to connect a DisplayPort monitor

COM port

COM1 ~ COM3 support RS232/422/485 serial device

USB 3.2 Gen 2 Port

Used to connect USB 3.2 Gen 2

LAN port

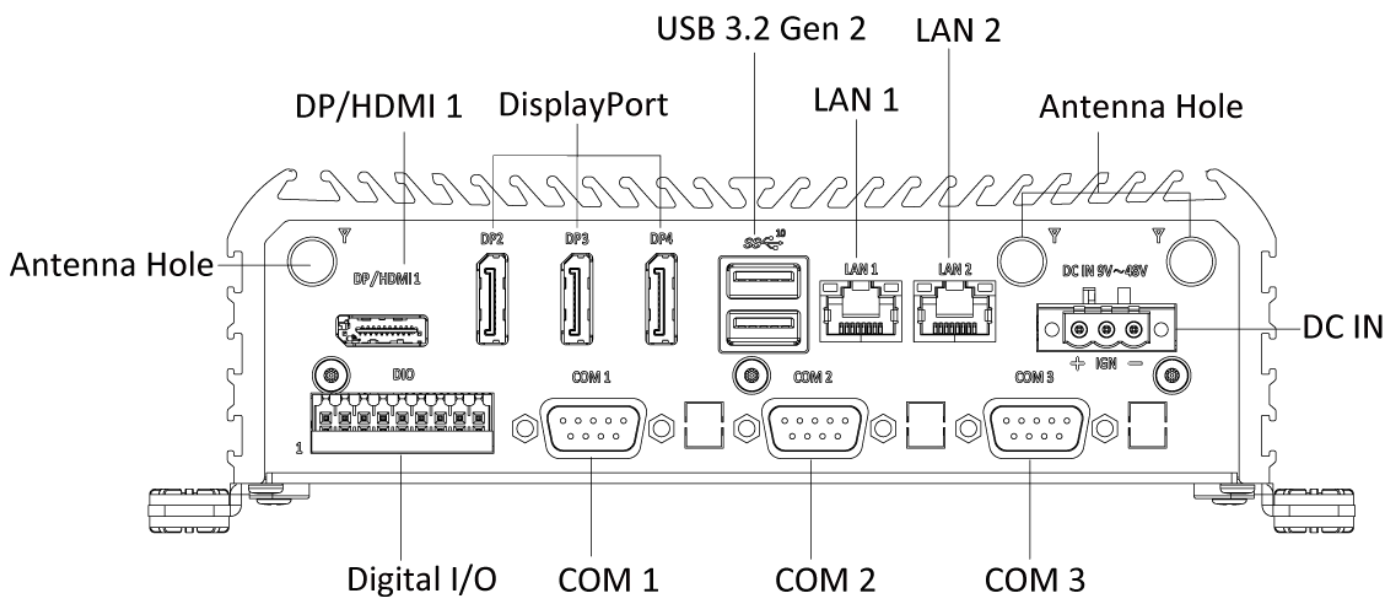
Used to connect the system to a local area network

Antenna hole

Used to connect an antenna for optional Mini-PCIe WiFi module

DC IN

Used to plug a DC power input with terminal block



Rear Panel

RCO-3000-RPL

Front Panel

ATX power on/off switch

Press to power-on or power-off the system

Power LED

Indicates the power status of the system

HDD LED

Indicates the status of the hard drive

Antenna hole

Used to connect an antenna for optional Mini-PCIe WiFi module

USB 3.2 Gen 2 port (10 Gbps)

Used to connect USB 3.2 device

Removable HDD

Removable 2.5" SATA HDD Bay
(support H=7mm, hot-swappable)
Support RAID 0, 1, 5

AT/ATX mode select switch

Used to select AT or ATX power mode

Remote Power on/off Terminal Block

Used to plug a remote power on/off terminal block

PC/Car mode select switch

Used to select PC or Car mode

Clear CMOS

Used to clear CMOS

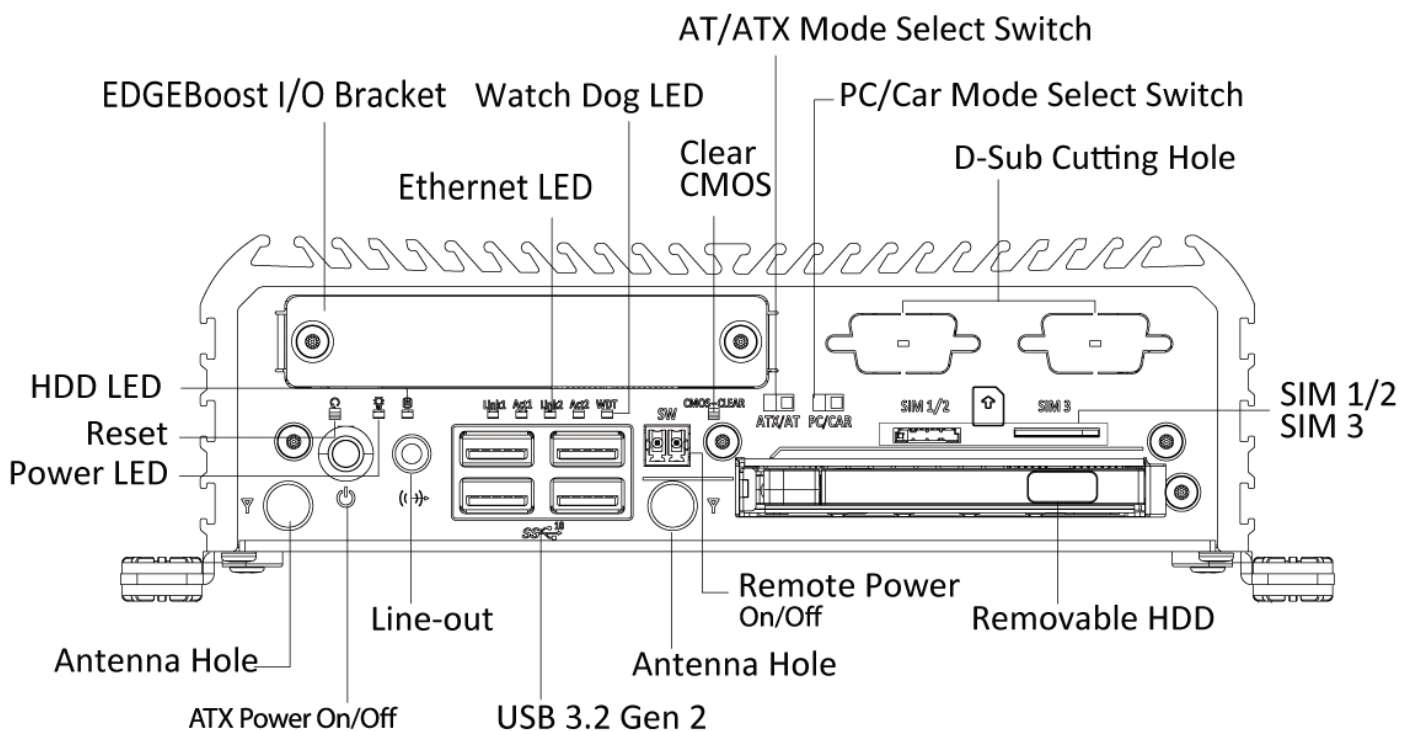
Line-out

Used to connect a speaker

SIM card

Used to insert SIM card

EDGEBoost I/O bracket (optional)

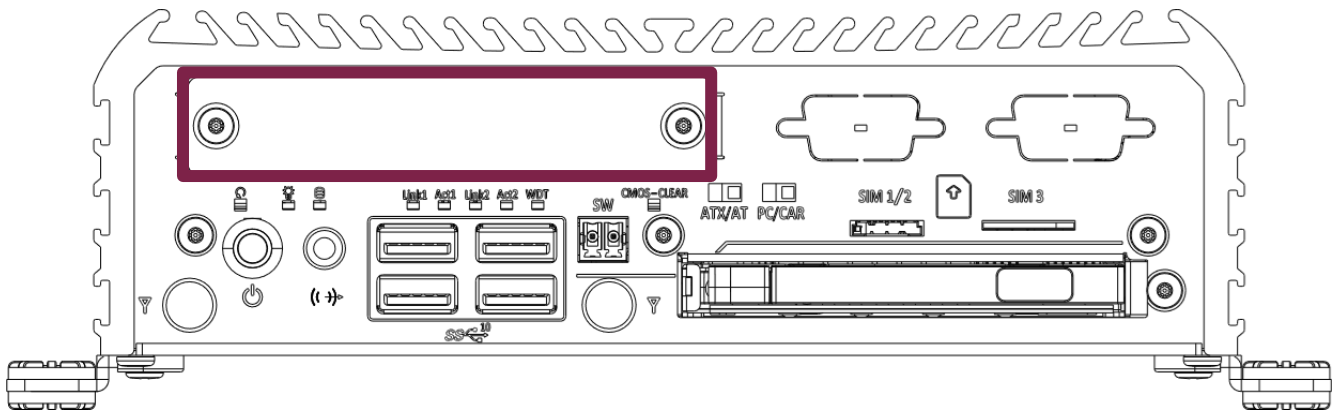


Front Panel

1.3.1 EDGEBoost I/O Bracket [EBIO]

Model No :

- RCO-3000-RPL-4L
- RCO-3000-RPL-4LM12
- RCO-3000-RPL-4P
- RCO-3000-RPL-4PM12
- RCO-3000-RPL-D10G
- RCO-3000-RPL-4U3
- RCO-3000-RPL-2M2BK
- RCO-3000-RPL-M2MK



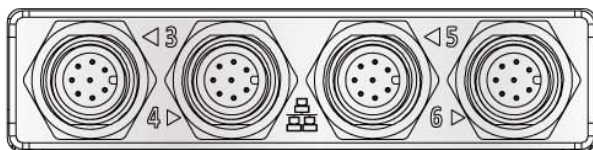
Available EDGEBoost I/O



1x M.2 M-Key (4-Lane)



2x M.2 B-Key (1x 5G SIM)
(Right Universal Slot Only)



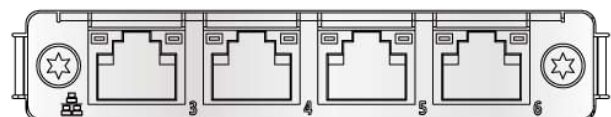
4x M12 LAN/POE Ports



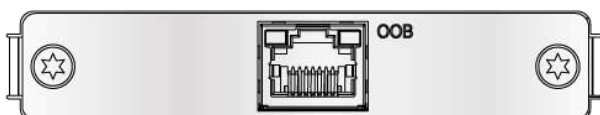
4x USB 3.0 Ports



2x 10GbE LAN Ports



4x RJ45 LAN/POE Ports

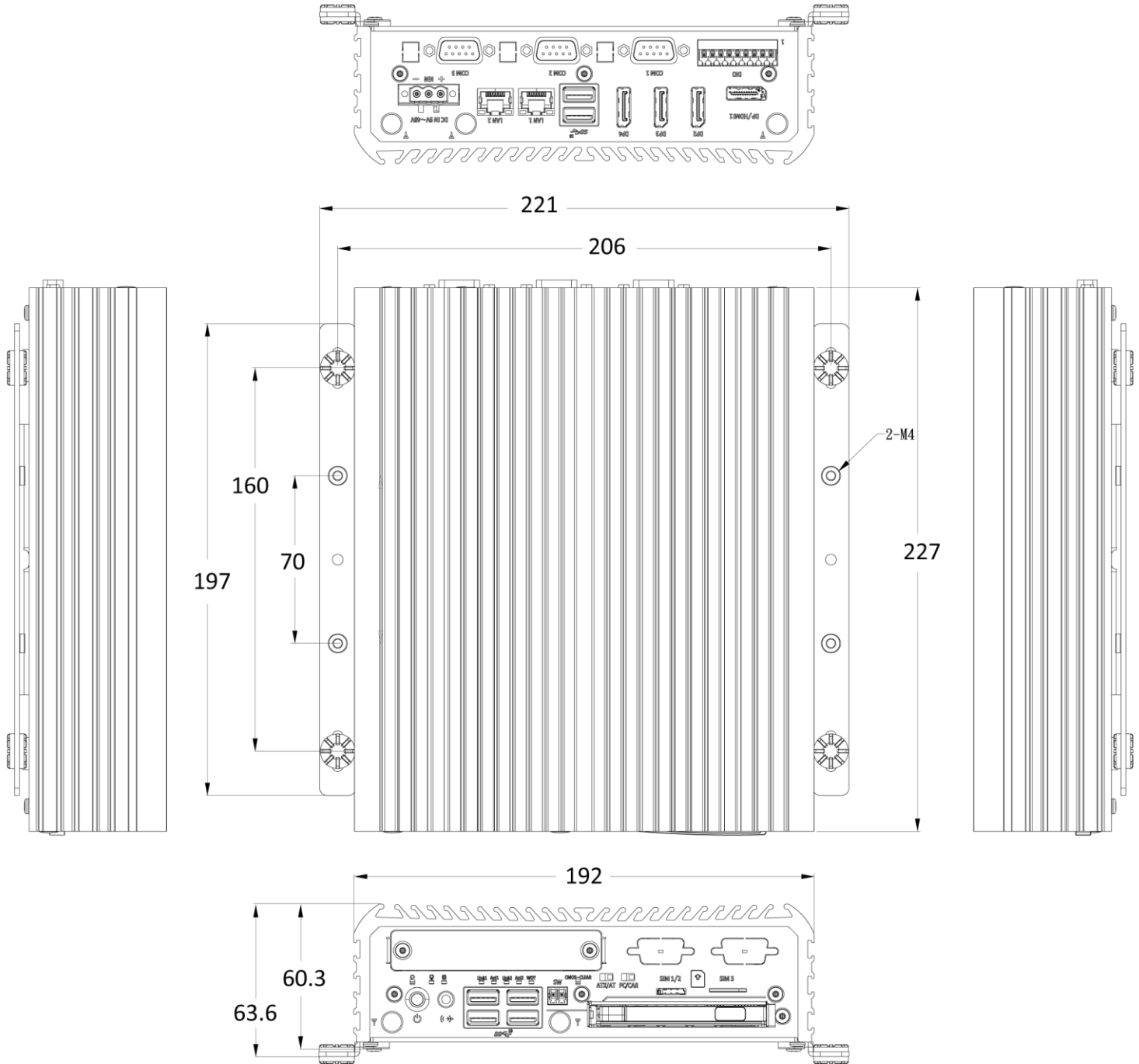


1x RJ45 OOB Port

1.4 Mechanical Dimensions

RCO-3000-RPL

Unit: mm

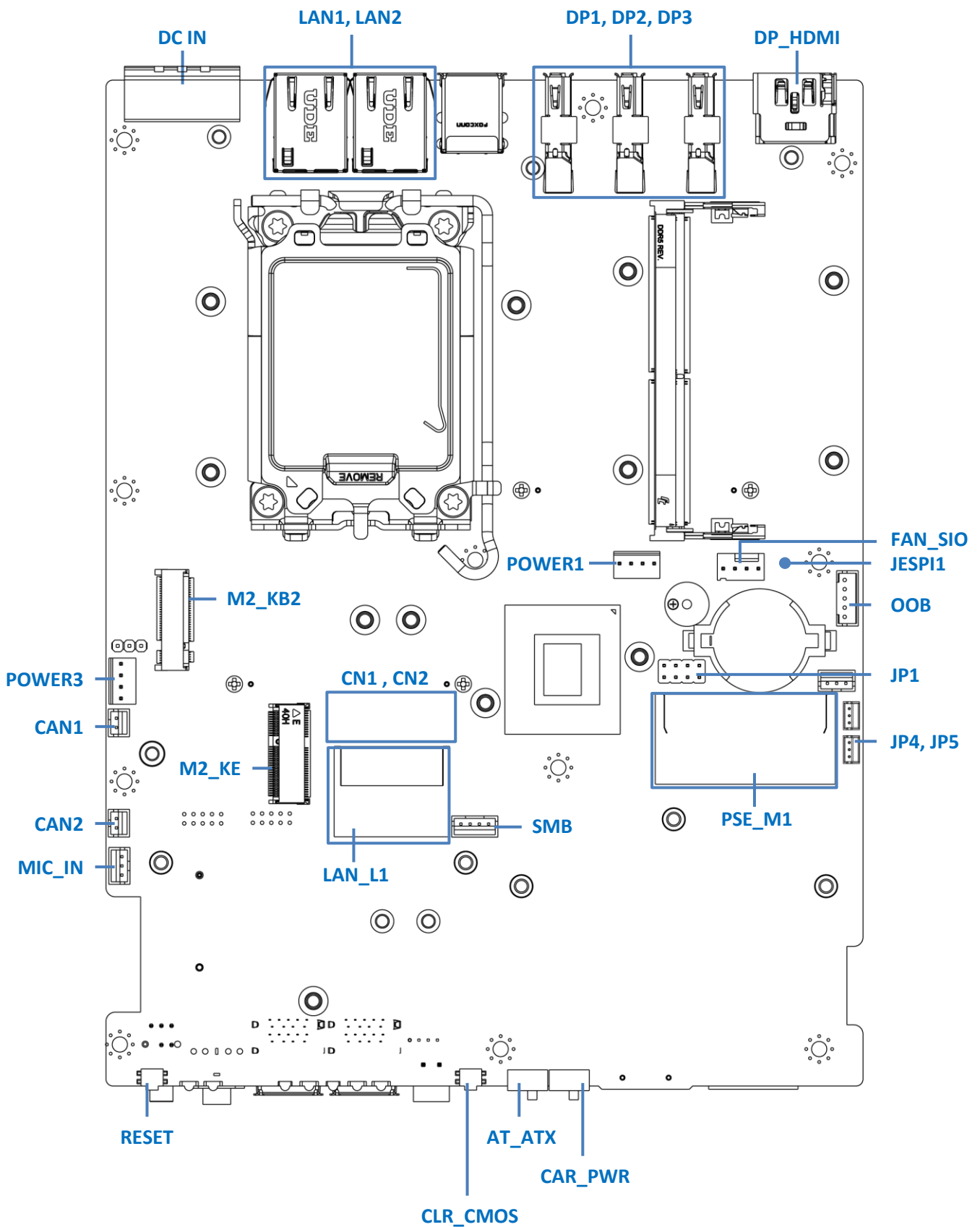


Chapter 2

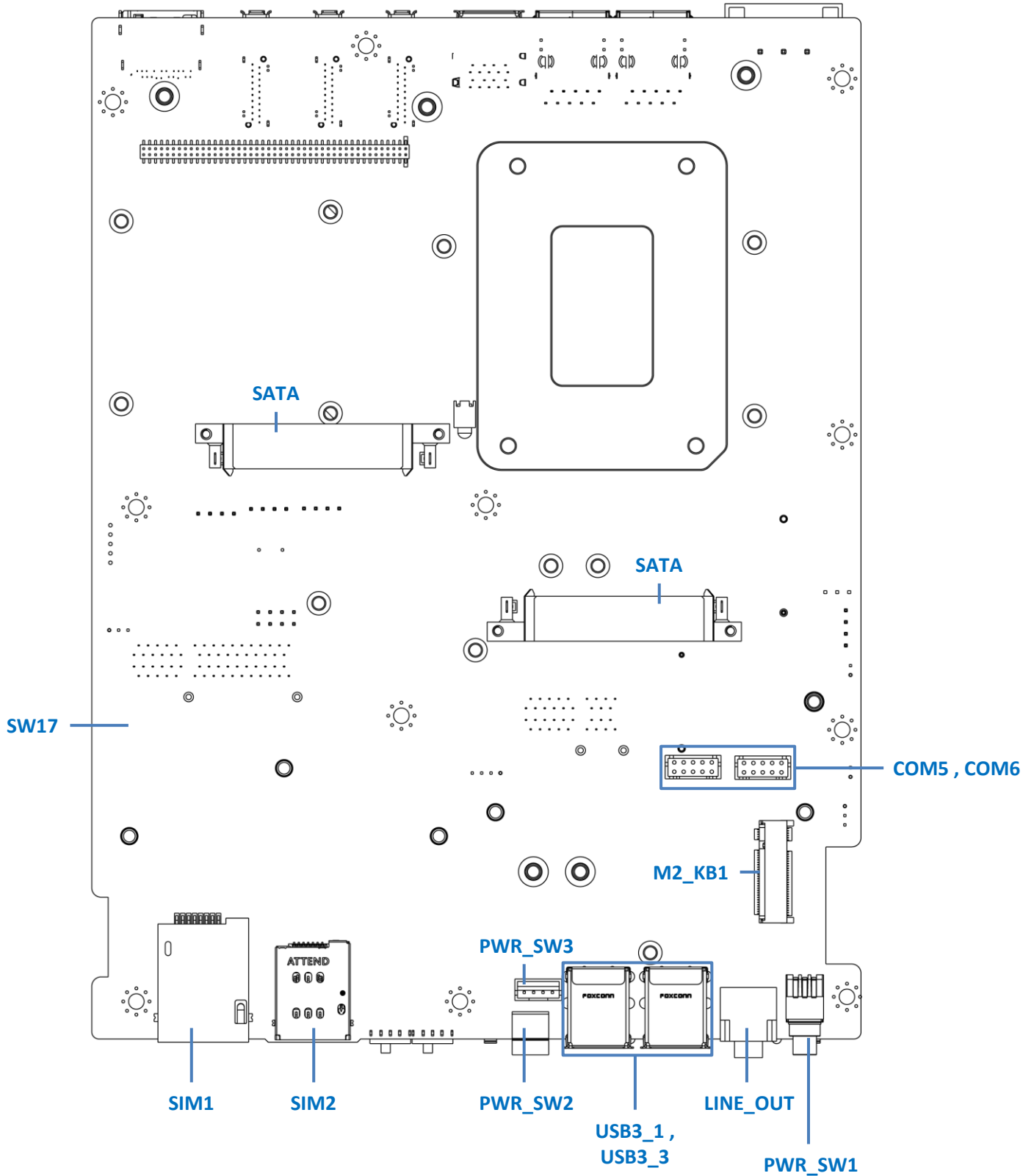
Mechanical Specifications

2.1 Switch and Connector Locations

2.1.1 Top View



2.1.2 Bottom View

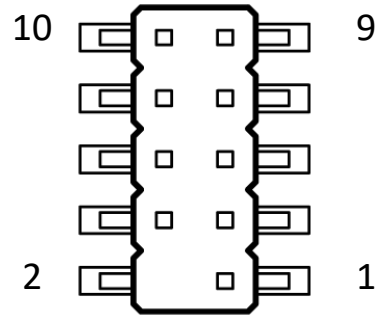
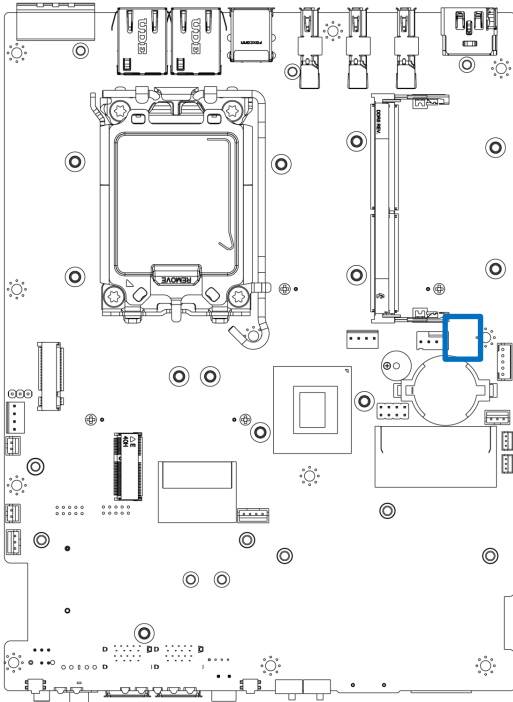


2.2 Connector / Switch Definition

Connector Location	Definition
AT_ATX	AT / ATX Power Mode Switch
PWR_SW 1~3	Power Switch
RESET	Reset Switch
DC_IN	3-pin DC +9V~48V Power Input Connector
DIO1	8DI / 8DO Connector
COM 1~6	RS232 / RS422 / RS485 Connector
DP 1~3	DP Connector
DP_HDMI	DP / HDMI Connector
LAN 1~2	LAN Connector
FAN_SIO	Smart FAN Connector
Power1	+12V /+5V Power Connector
USB3_1~3	USB 3 Gen2 , USB 3 Gen1 , USB2.0
CN 1 ~2	USB 3 Gen1 , USB2.0
SIM 1~2	SIM Card Socket
CAR_PWR	PC mode / CAR mode select
MIC	Mic-in Connector
LINE_OUT	LINE-OUT Jack
LAN_L1	PCIe x4 Slot
M2_KB1	M.2 B Key Socket for PCIe / SATA
M2_KB2	M.2 B Key Socket for PCIe / USB3
M2_KE	M.2 E Key Socket for PCIe / CNVI
PWR_LED	Power LED Status
HDD_LED	HDD Access LED Status
WDT_LED	Watchdog LED Status
SATA 1~2	SATA with Power Connector
OOB	OOB control signal
JP4	OOB Auto Link
JP5	OOB Remote Debug port
SW17	COM1 or OOB Remote Debug port selection

2.3 I/O Interface Descriptions

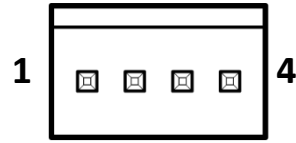
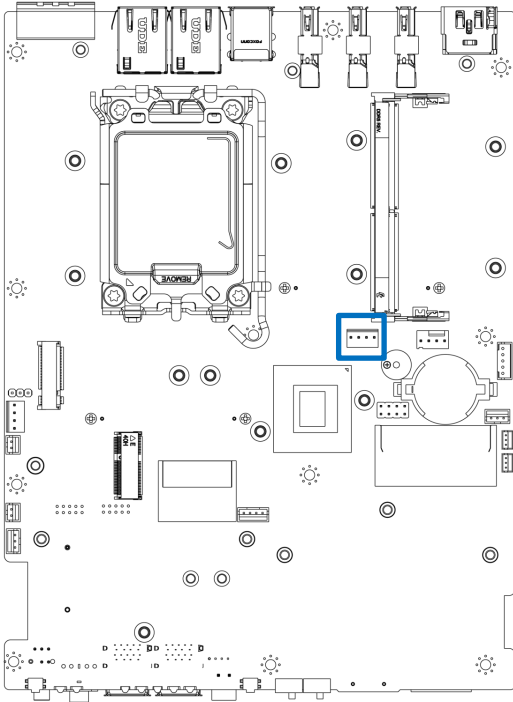
2.3.1 ESPI Debug Con



JESPI1

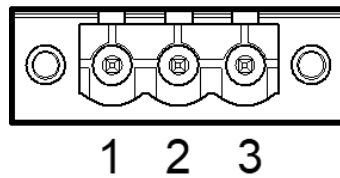
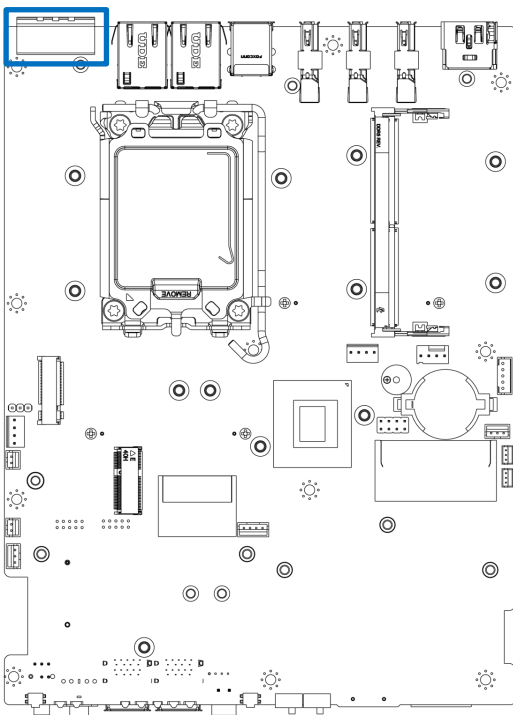
Pin	Signal	Pin	Signal
1	ESPI_IO_0	2	3.3V
3	ESPI_IO_1	4	ESPI_RESET#
5	ESPI_IO_2	6	ESPI_CS#
7	ESPI_IO_3	8	ESPI_CLOCK
9	N/A	10	GND

2.3.2 Power Con



POWER1

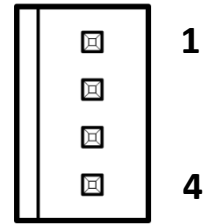
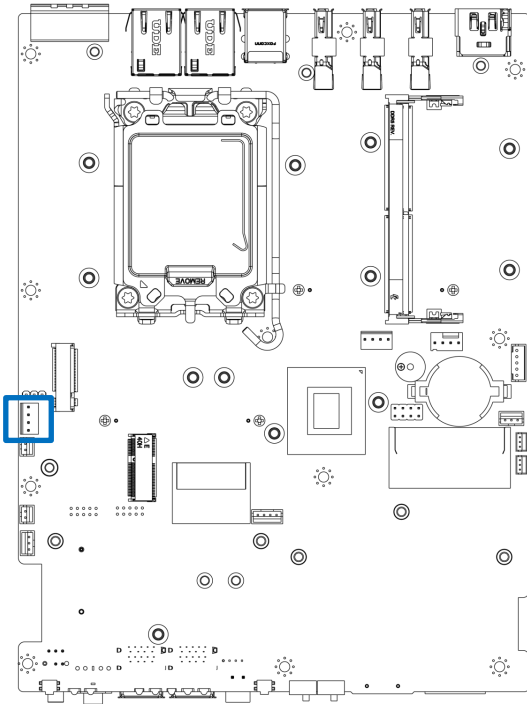
Pin	Signal
1	+5V
2	GND
3	GND
4	+12V



DC IN : +9V ~ +48V

3-pin DC Power Input Connector

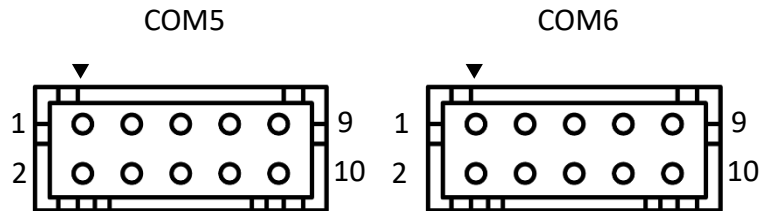
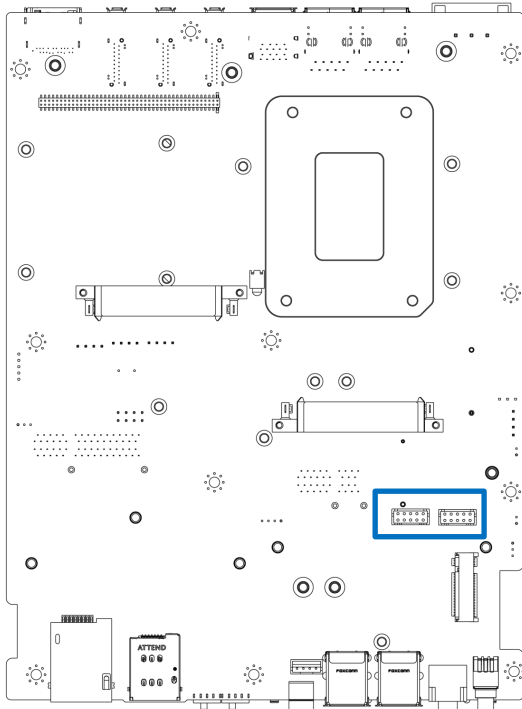
Pin	Signal
1	+9V ~ +48V
2	IGN
3	GND



POWER3 : +9V ~ +36V

Pin	Signal
1	+9V ~ +36V
2	GND
3	GND
4	+9V ~ +36V

2.3.3 COM Con



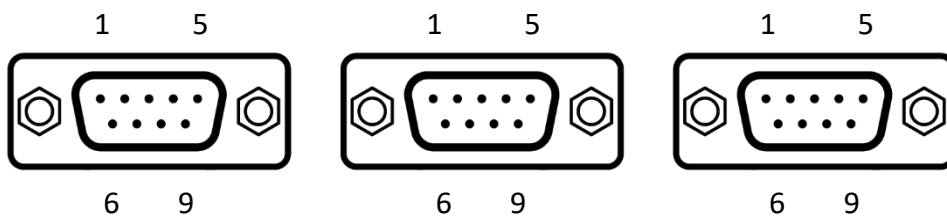
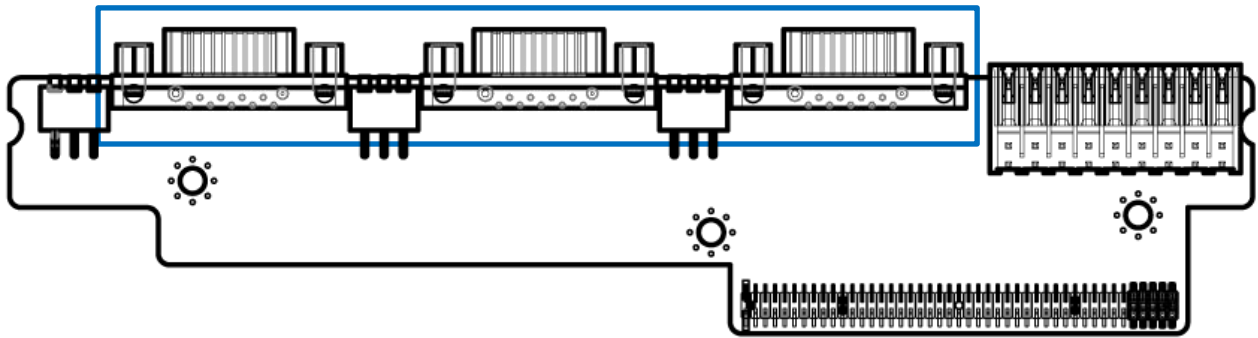
COM5 , COM6

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

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

Pin	RS232 Definition	RS422 / 485 Full Duplex Definition	RS485 Half Duplex Definition
1	DCD#	TX-	DATA-
2	DSR#		
3	RxD	TX+	DATA+
4	RTS#		
5	TxD	RX+	
6	CTS#		
7	DTR#	RX-	
8	RI#		
9	GND	GND	GND
10	GND	GND	GND

COM1 , COM2 , COM3

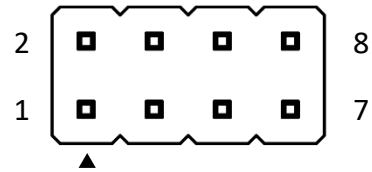
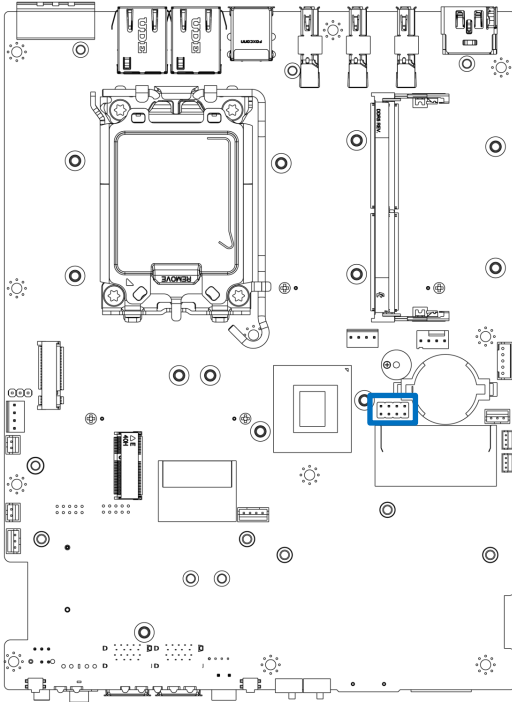


COM1_2_3

RS232 / RS422 / RS485 Connector Type: 9-pin D-Sub

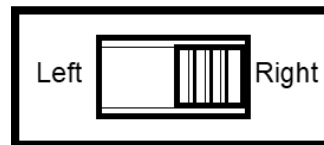
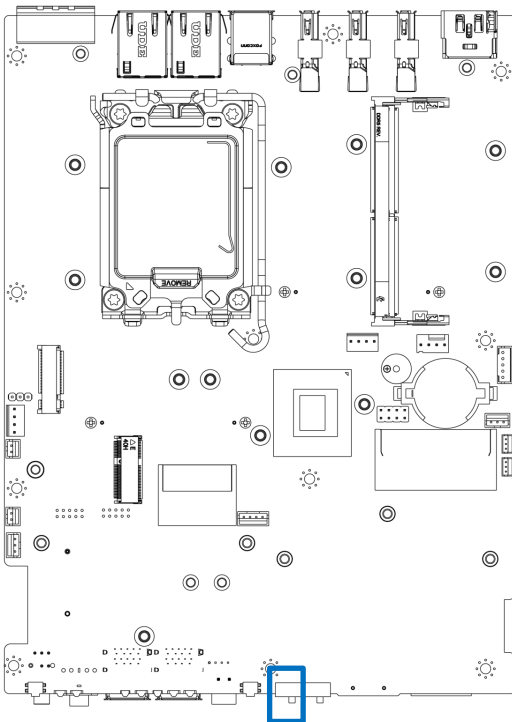
Pin	RS232 Definition	RS422 / 485 Full Duplex Definition	RS485 Half Duplex Definition
1	DCD#	TX-	DATA-
2	RxD	TX+	DATA+
3	TxD	RX+	
4	DTR#	RX-	
5	GND	GND	GND
6	DSR#		
7	RTS#		
8	CTS#		
9	RI#		

2.3.4 SF100 SPI Con



JP1

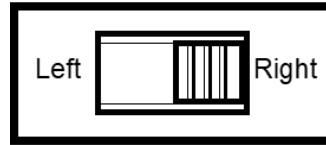
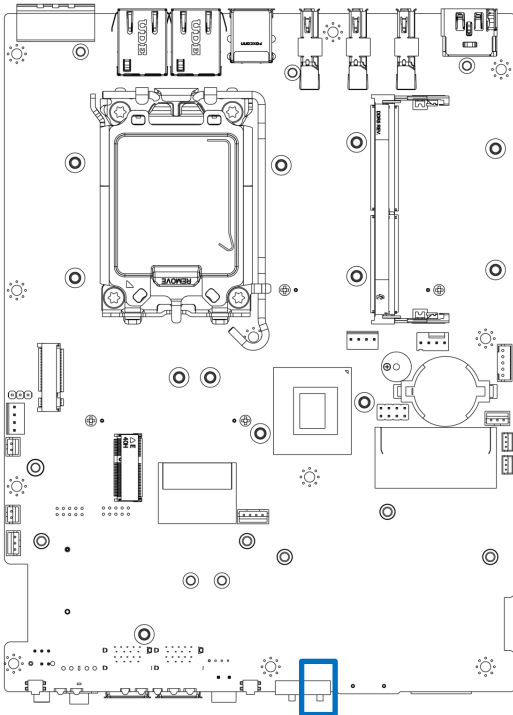
Pin	Signal	Pin	Signal
1	Power (3V)	2	GND
3	CS#	4	CLK
5	MISO	6	MOSI
7	NC	8	SPI_GATE#



AT_ATX

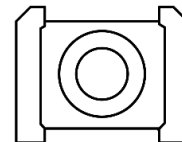
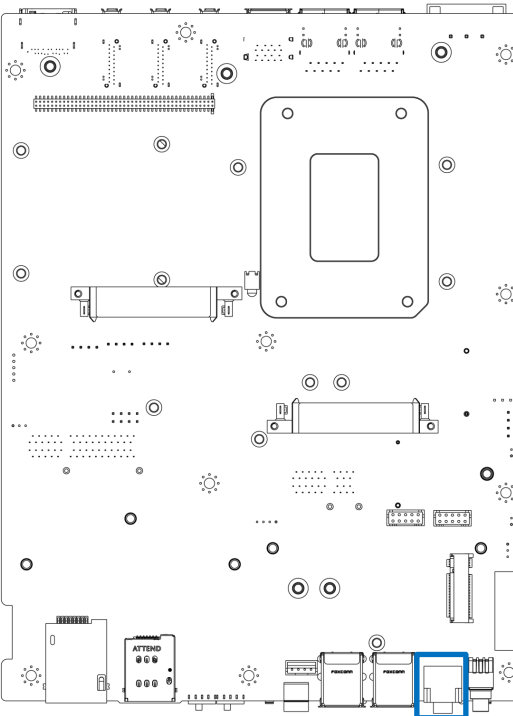
AT / ATX Power Mode Switch

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



CAR_PWR
PC / Car Mode Switch

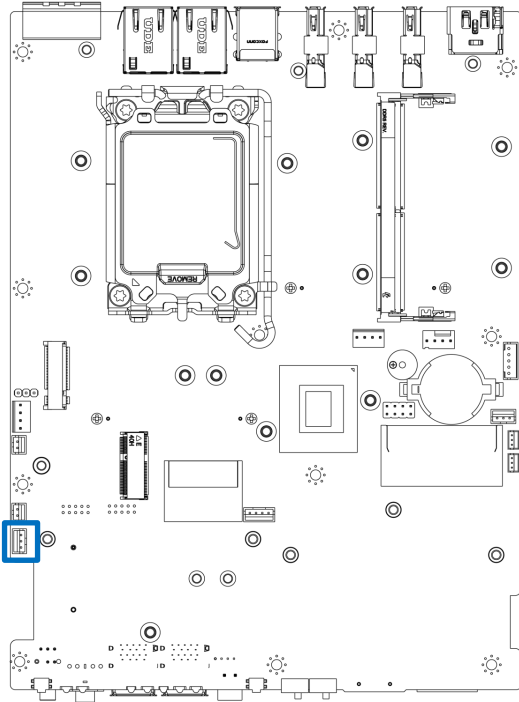
Switch	Definition
1-2 (Left)	PC Power Mode (Default)
2-3 (Right)	Power Ignition Mode



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

Pin	Definition
1	GND
2	OUT_R
3	GND
4	GND
5	OUT_L

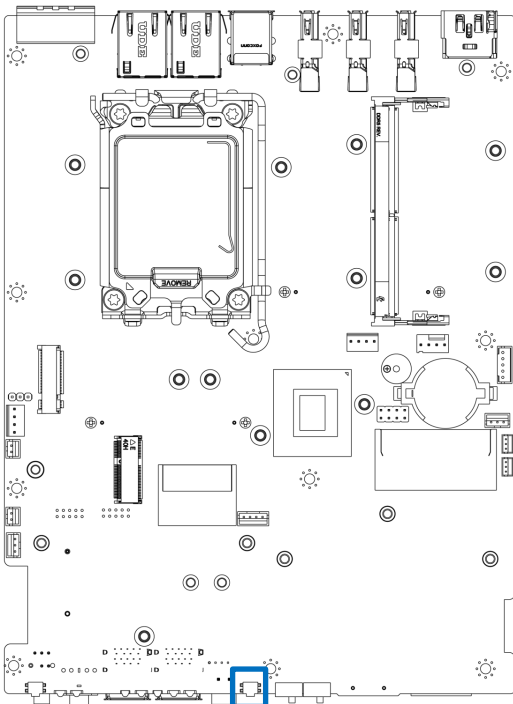
Mic-in Connector



MIC_IN

Pin	Definition
1	MICIN_L
2	GND
3	MICIN_R

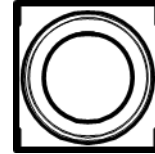
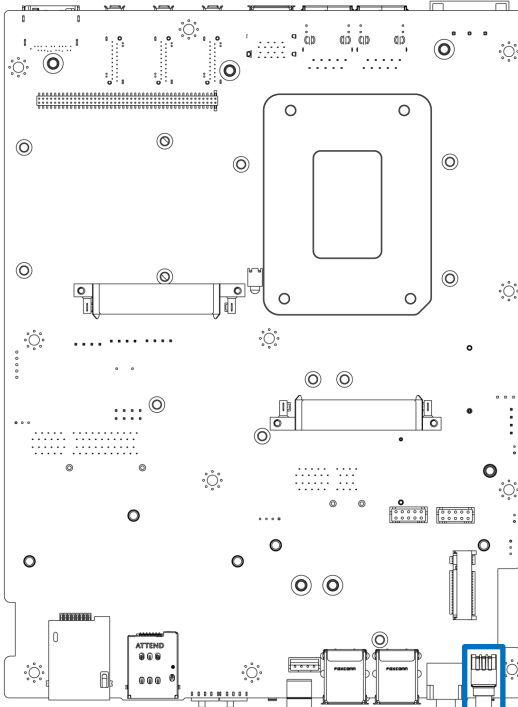
Clear BIOS Switch



CLR_CMOS

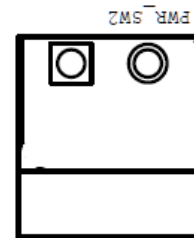
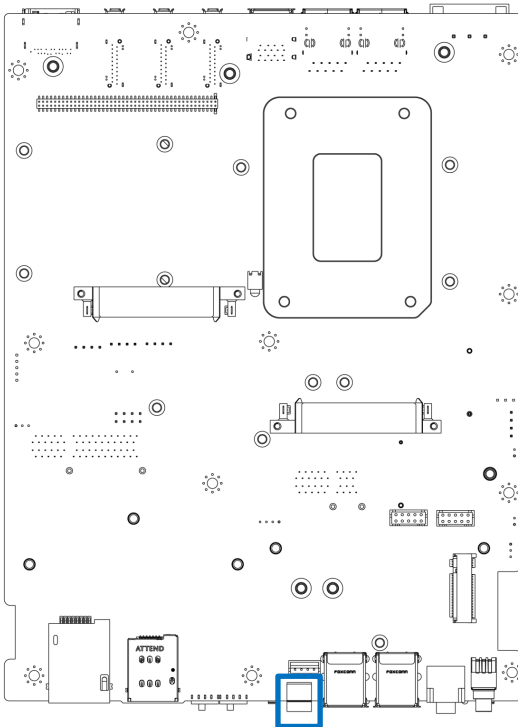
Switch	Definition
1, 2	RTCST-L
3, 4	GND

Power Switch



PWR_SW1
Power Button

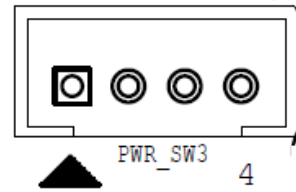
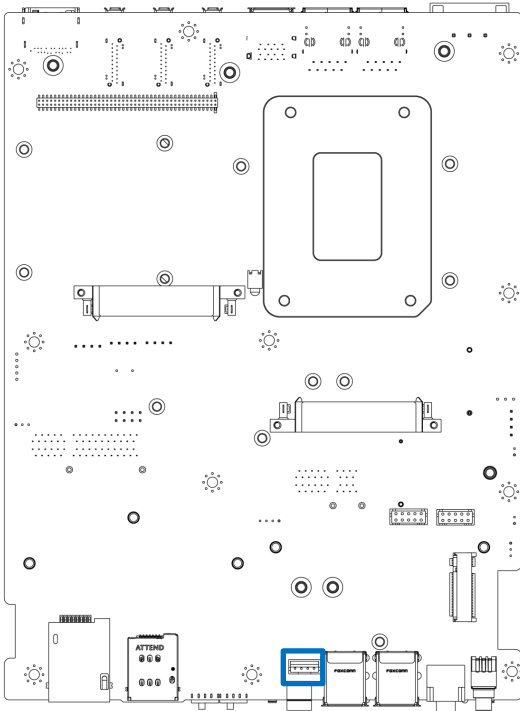
Pin	Definition	Pin	Definition
1	NC	4	GND
2	Power Button	5	NC
3	NC	6	GND



PWR_SW2
Remote Power Switch Type:
Terminal Block 1x2 2-pin, 3.5mm pitch

Pin	Definition
1	Power Button
2	GND

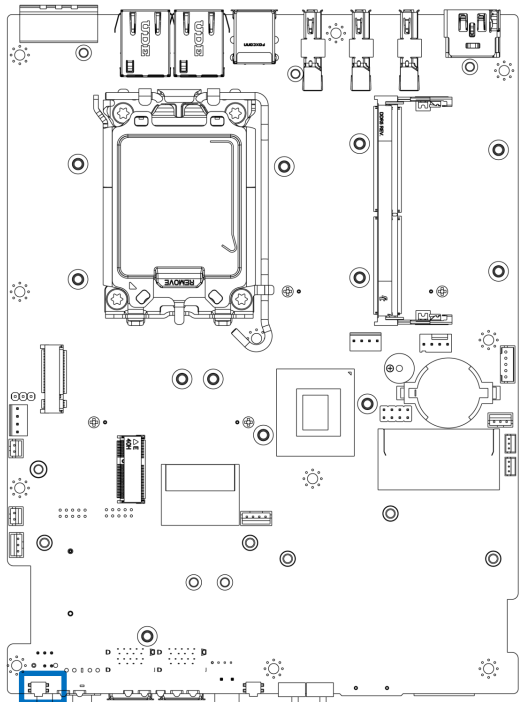
Power Switch



PWR_SW3
For RCO-3000-RPL

Pin	Definition
1	Power Button
2	PWR_LED
3	HDD_LED
4	GND

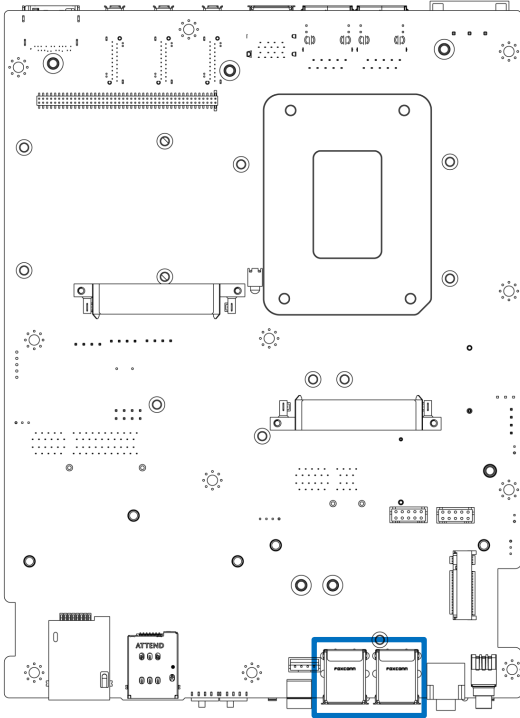
Reset Switch



RESET

Pin	Definition
1,2	RESET
3,4	GND

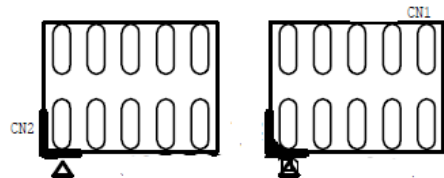
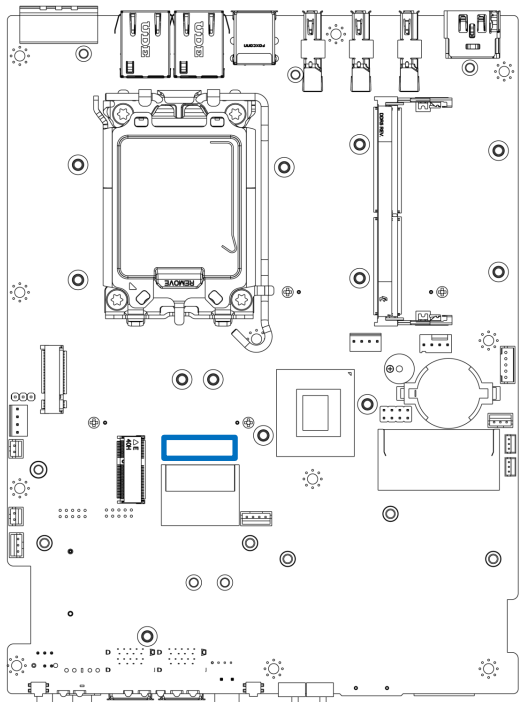
USB Connector



USB3_1 , USB3_2 , USB3_3 :

USB3.1 Connector, GEN2 x6 ports, Type A

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

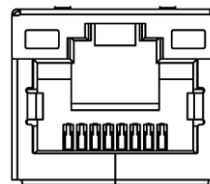
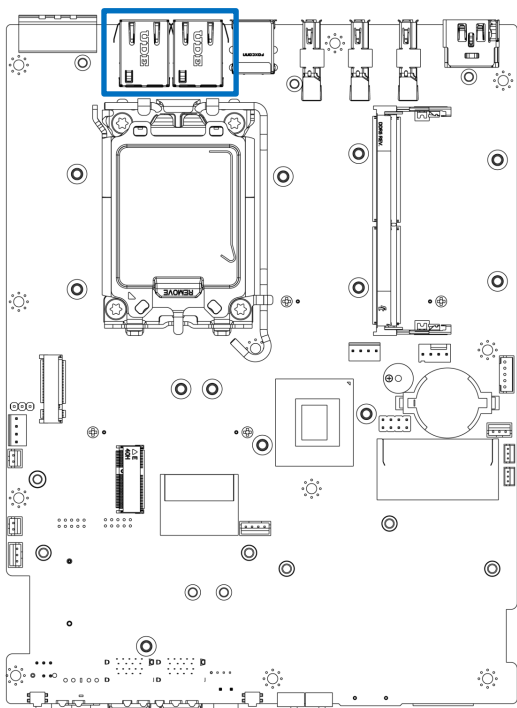


CN1 , CN2

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

Pin	Definition	Pin	Definition
1	+5V	2	USB3_TX-
3	USB_D-	4	USB3_TX+
5	USB_D+	6	GND
7	GND	8	USB3_RX-
9	NC	10	USB3_RX+

LAN Connector



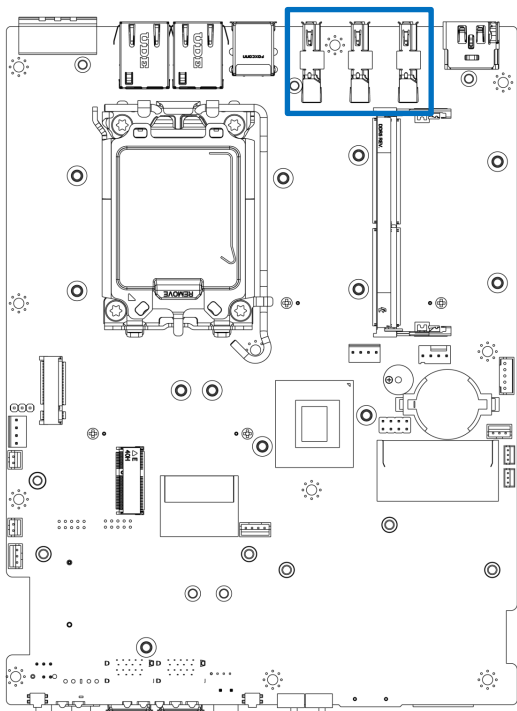
8 1

LAN1 LAN2

LAN Ports Connector Type:RJ45 port with LEDs

Pin	Definition
1	LAN1_MDI0P
2	LAN1_MDI0N
3	LAN1_MDI1P
4	LAN1_MDI2P
5	LAN1_MDI2N
6	LAN1_MDI1N
7	LAN1_MDI3P
8	LAN1_MDI3N

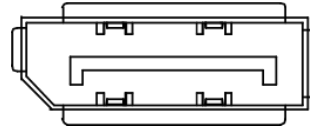
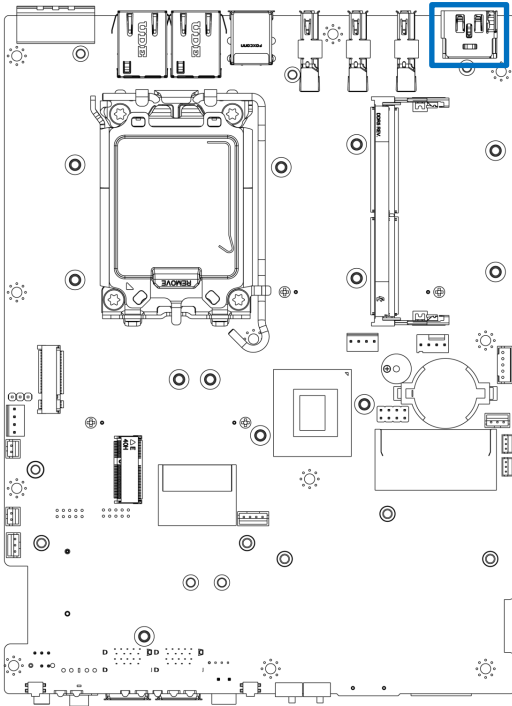
Display Port Connector



DP1 , DP2 , DP3

Pin	Definition	Pin	Definition
1	DP_LANE0_P	11	GND
2	GND	12	DP_LANE3_N
3	DP_LANE0_N	13	GND
4	DP_LANE1_P	14	GND
5	GND	15	DP_AUX_P
6	DP_LANE1_N	16	GND
7	DP_LANE2_P	17	DP_AUX_N
8	GND	18	DP_HPDP
9	DP_LANE2_N	19	GND
10	DP_LANE3_P	20	+3.3V

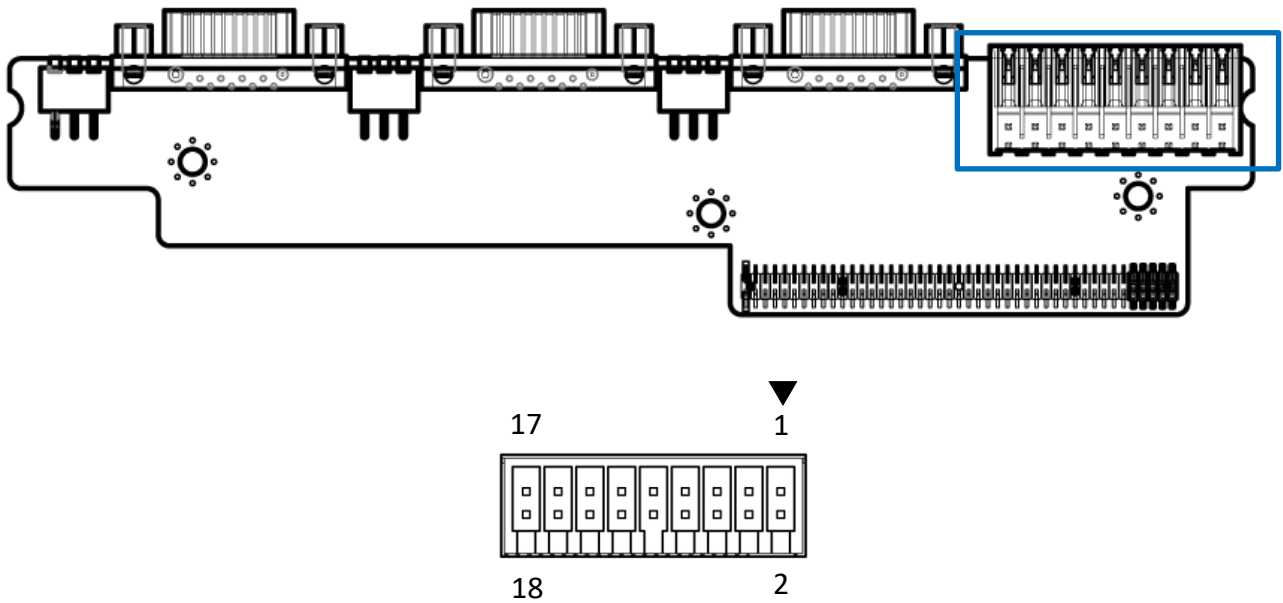
Display Port / HDMI Connector



DP_HDMI

Pin	Definition	Pin	Definition
1	DP 0_P / HDMI 2_P	11	GND
2	GND	12	DP 3_N / HDMI CK_N
3	DP 0_N / HDMI 2_N	13	GND / CEC
4	DP 1_P / HDMI 1_P	14	GND / Reserved
5	GND	15	DP_AUX_P / SCL
6	DP 1_N / HDMI 1_N	16	GND / SDA
7	DP 2_P / HDMI 0_P	17	DP_AUX_N / GND
8	GND	18	DP_HPD / +5V
9	DP 2_N / HDMI 0_N	19	GND / HPD
10	DP 3_P / HDMI CK_P	20	+3.3V / NC

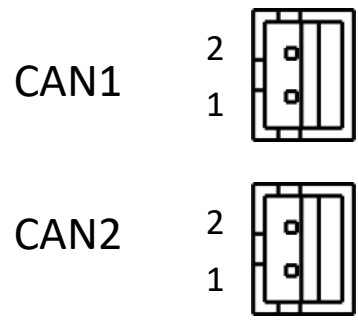
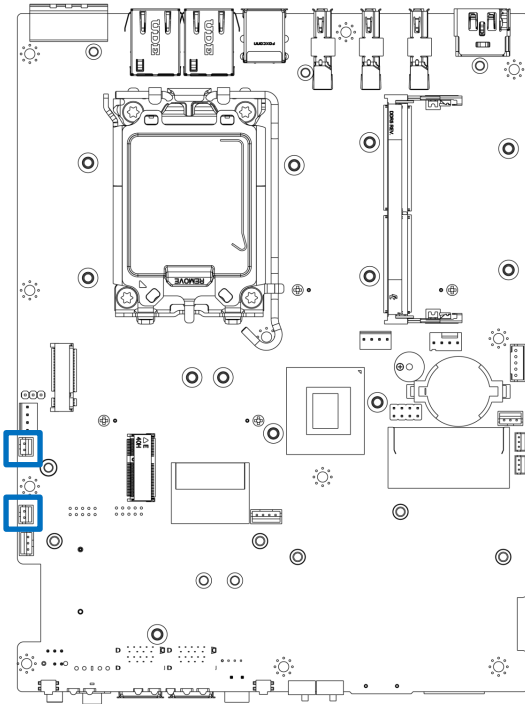
Digital Input / Output Connector



DIO : Digital Input / Output Connector

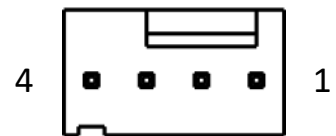
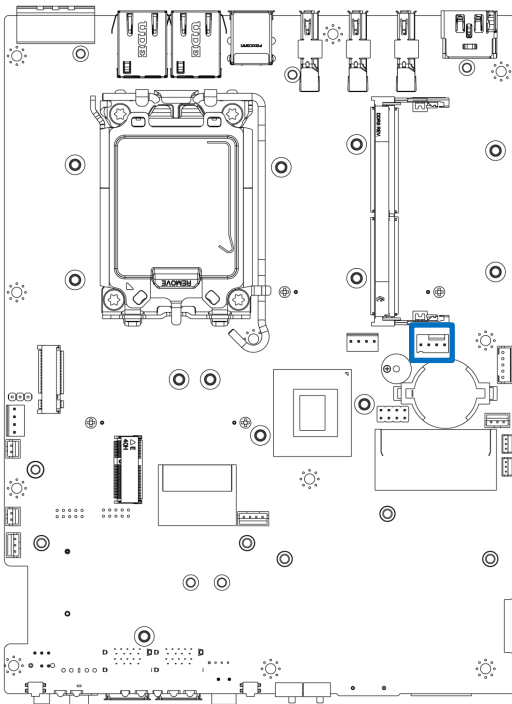
Type: Terminal Block 2x9 18-pin, 3.5mm pitch

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



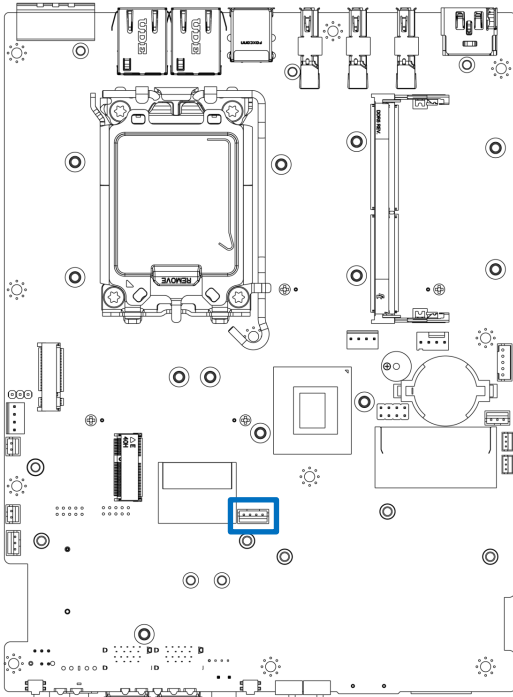
CAN1 CAN2

Pin	Signal
1	CAN_L
2	CAN_H



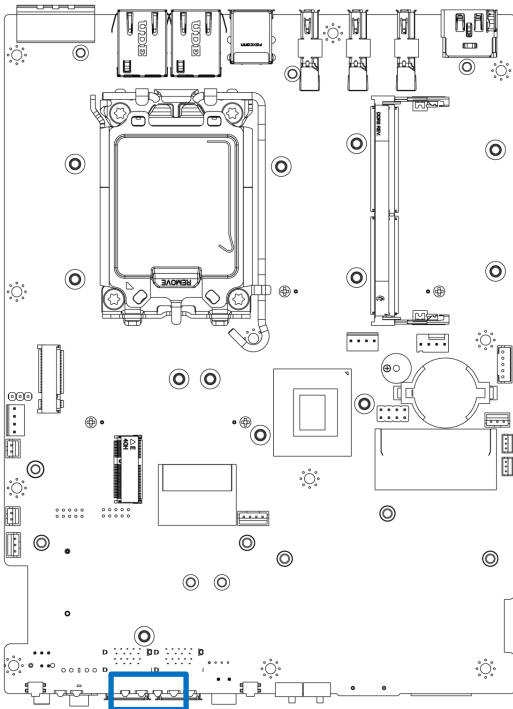
FAN_SIO

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



SMB

Pin	Signal
1	NC
2	SMB_CLK
3	SMB_DATA
4	GND



LED Status

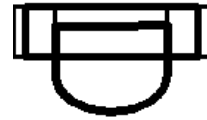
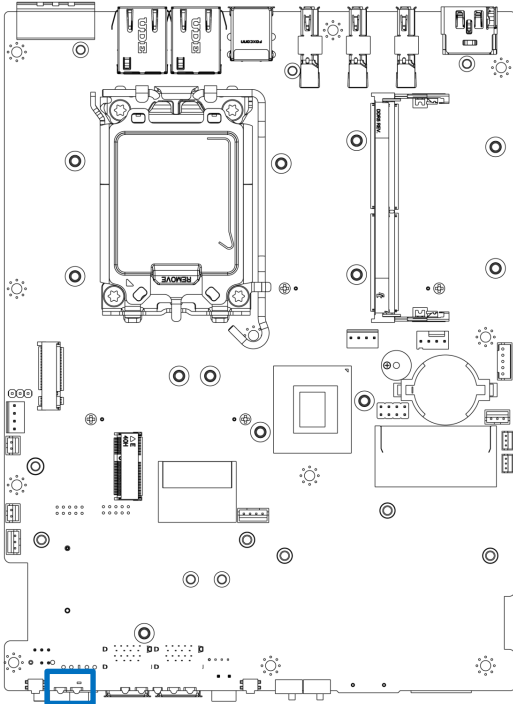


Act LED Status	Definition
Blinking Yellow	Data Activity
Off	No Activity



Link LED Status	LAN1	LAN2
Steady Green	2.5Gbps Network Link	2.5Gbps Network Link
Steady Orange	1Gbps Network Link	1Gbps Network Link
Off	100Mbps Network Link	100Mbps Network Link

LED Status

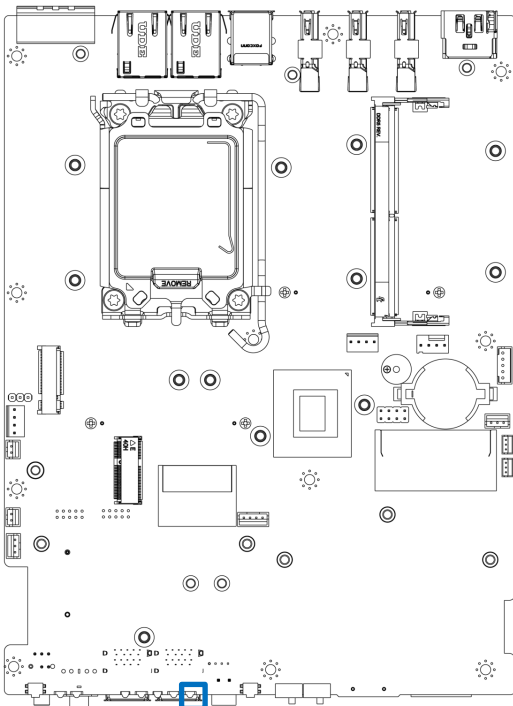


PWR_LED1
Power LED Status

Pin	Definition
1	POWER LED +
2	POWER LED -

HDD_LED1
HDD Access LED Status

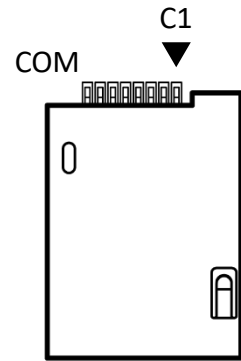
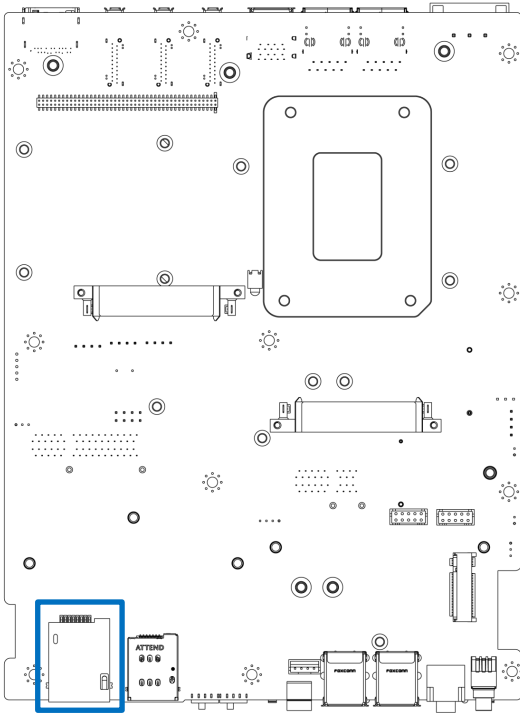
Pin	Definition
1	HDD LED+
2	HDD LED-



WDT_LED
WDTOUT LED Status

Pin	Definition
1	WDTOUT LED+
2	WDTOUT LED-

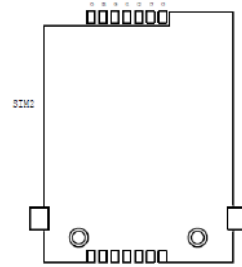
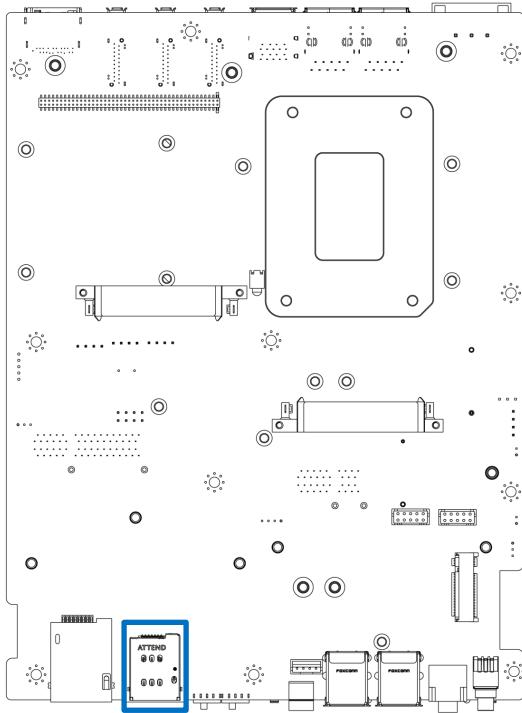
SIM Card Socket



SIM1 (for Bottom size M.2 B Key)

Pin	Definition	Pin	Definition
C1	UIM_PWR	C6	UIM_VPP
C2	UIM_RESET	C7	UIM_DATA
C3	UIM_CLK	CD	NC
C5	GND	COM	GND

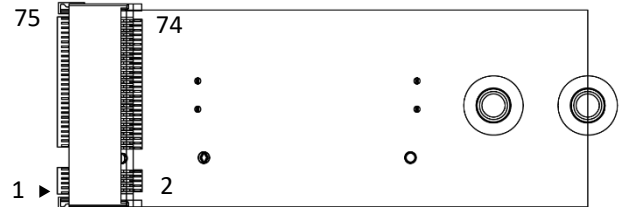
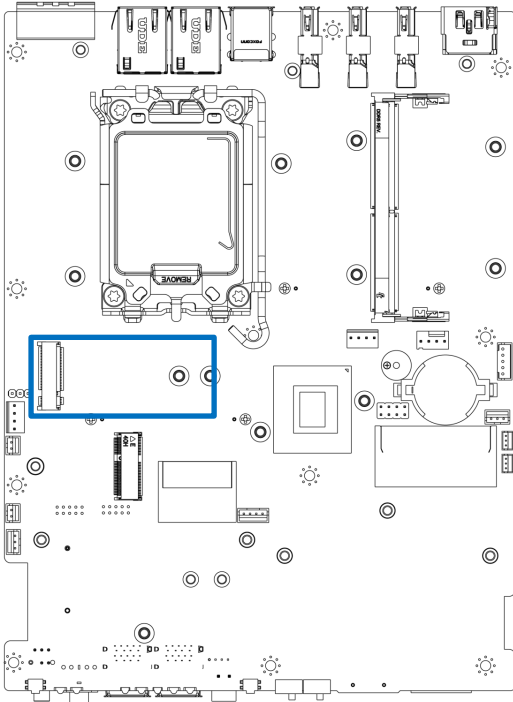
Dual Nano SIM Card Socket



SIM2 (for Top size M.2 B Key)

Pin	Definition	Pin	Definition
C1	UIM_PWR	C6	UIM_VPP
C2	UIM_RESET	C7	UIM_DATA I/O
C3	UIM_CLK	CD	Card Detect Switch
C5	GND		

M.2 B Key Socket

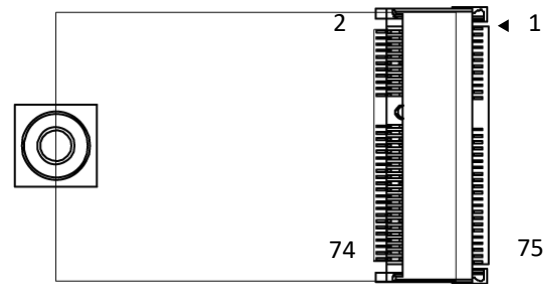
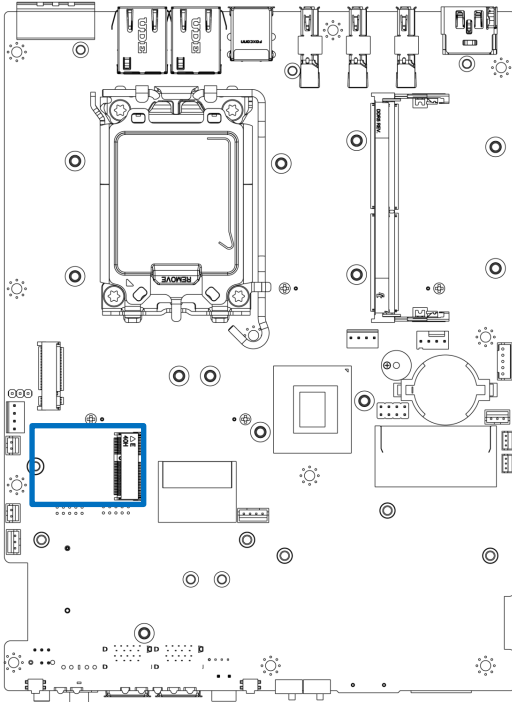


M2_KB2

Pin	Definition	Pin	Definition
1	CONFIG_3	2	+3.3V
3	GND	4	+3.3V
5	GND	6	FULL_CARD_POWER_OFF#
7	USB_D+	8	W_DISABLE1#
9	USB_D-	10	WWAN_LED#
11	GND	20	NC
21	CONFIG_0	22	NC
23	GPIO_11(0/1.8V)	24	NC
25	DPR	26	W_DISABLE2#
27	GND	28	NC
29	PERn1/USB3.0-Rx-	30	USIM1_RST
31	PERp1/USB3.0-Rx+	32	USIM1_CLK
33	GND	34	USIM1_DATA

35	PETn1/USB3.0-Tx-	36	USIM1_VDD
37	PETp1/USB3.0-Tx+	38	NC
39	GND	40	USIM2_DET
41	PERn0	42	USIM2_DATA
43	PERp0	44	USIM2_CLK
45	GND	46	USIM2_RST
47	PETn0	48	USIM2_VDD
49	PETp0	50	PCIE_RST_N
51	GND	52	PCIE_CLKREQ_N
53	PCIE_REFCLK_M	54	PCIE_WAKE_N
55	PCIE_REFCLK_P	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	USIM1_DET
67	NC	68	SUSCLK(32kHz)
69	CONFIG_1	70	+3.3VAUX
71	GND	72	+3.3VAUX
73	GND	74	+3.3VAUX
75	CONFIG_2		

M.2 E Key Socket

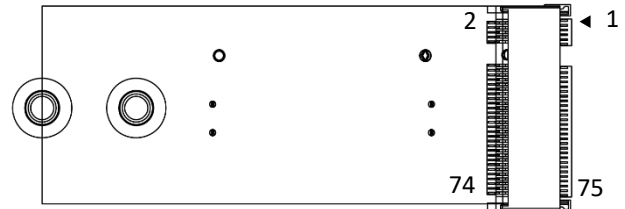
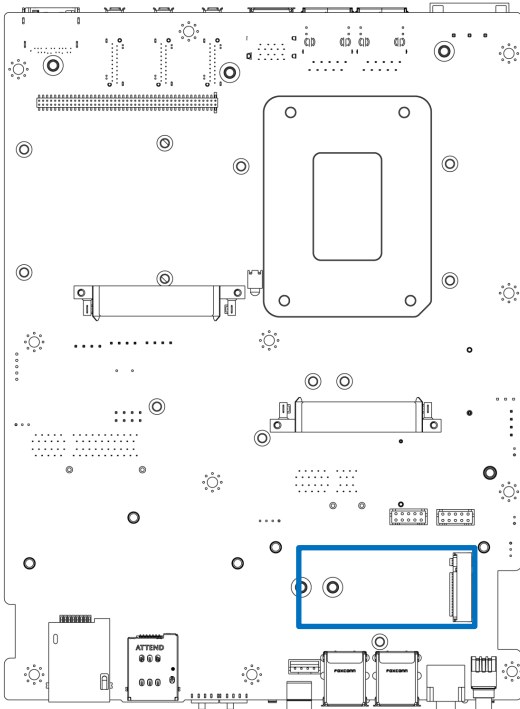


M2_KE

Pin	Definition	Pin	Definition
1	GND	2	+3.3VAUX
3	USB2_D+	4	+3.3VAUX
5	USB2_D-	6	NC
7	GND	8	I2S2_SCLK
9	CNV_WR_1_DN	10	CNV_RF_RESET#
11	CNV_WR_1_DP	12	I2S2_RXD
13	GND	14	MODEM_CLKREQ
15	CNV_WR_0_DN	16	NC
17	CNV_WR_0_DP	18	GND
19	GND	20	UART_WAKE_L
21	CNV_WR_CLK_DN	22	CNV_BRI_RSP
23	CNV_WR_CLK_DP	32	CNV_RGI_DT
33	GND	34	CNV_RGI_RSP

35	TxP0	36	CNV_BRI_DT
37	TxN0	38	CL_RST#
39	GND	40	CL_DATA
41	RxP0	42	CL_CLK
43	RxN0	44	CNV_PA_BLANKING
45	GND	46	CNV_MFUART2_TXD
47	REFCLK0+	48	CNV_MFUART2_RXD
49	REFCLK0-	50	SUSCLK
51	GND	52	PERST0#
53	NC	54	M2_KEY-E_BT_DIS2#
55	WAKE0#	56	M2_KEY-E_WIFI_DIS1#
57	GND	58	SMBDATAS_DUAL
59	CNV_WT_1_DN	60	SMBCLKS_DUAL
61	CNV_WT_1_DP	62	SMBALERT#
63	GND	64	Pull Low
65	CNV_WT_0_DN	66	PERST1#
67	CNV_WT_0_DP	68	NC
69	GND	70	WAKE1#
71	CNV_WT_CLK_DN	72	+3.3VAUX
73	CNV_WT_CLK_DP	74	+3.3VAUX
75	GND		

M.2 B Key Socket

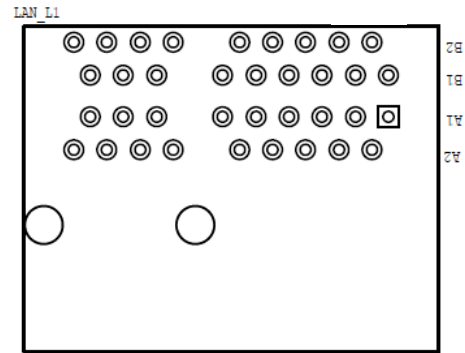
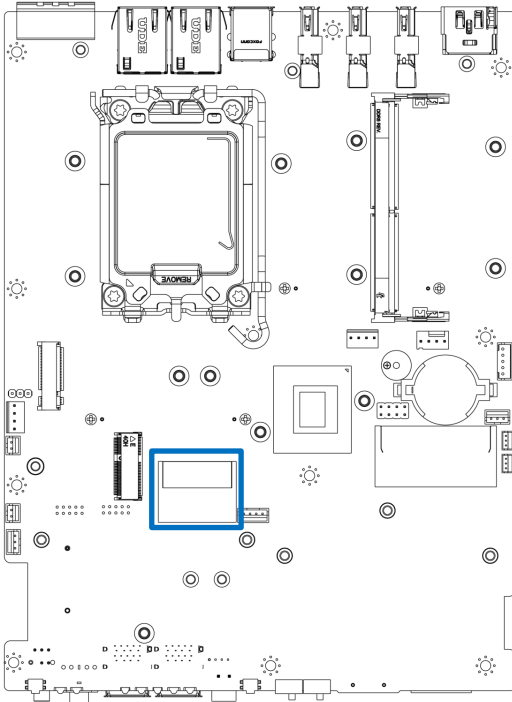


M2_KB1

Pin	Definition	Pin	Definition
1	CONFIG_3	2	+3.3V
3	GND	4	+3.3V
5	GND	6	FULL_CARD_POWER_OFF#
7	USB_D+	8	W_DISABLE1#
9	USB_D-	10	WWAN_LED#
11	GND	20	NC
21	CONFIG_0	22	NC
23	GPIO_11(0/1.8V)	24	NC
25	DPR	26	NC
27	GND	28	P_UIM_VPP
29	PERn1	30	USIM1_RST
31	PERp1	32	USIM1_CLK
33	GND	34	USIM1_DATA

35	PETn1	36	USIM1_VDD
37	PETp1	38	NC
39	GND	40	NC
41	PERn0/SATA-B+	42	NC
43	PERp0/SATA-B-	44	NC
45	GND	46	NC
47	PETn0/SATA-A-	48	NC
49	PETp0/SATA-A+	50	PCIE_RST_N
51	GND	52	PCIE_CLKREQ_N
53	PCIE_REFCLK_M	54	PCIE_WAKE_N
55	PCIE_REFCLK_P	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	USIM1_DET
67	NC	68	SUSCLK(32kHz)
69	CONFIG_1	70	+3.3VAUX
71	GND	72	+3.3VAUX
73	GND	74	+3.3VAUX
75	CONFIG_2		

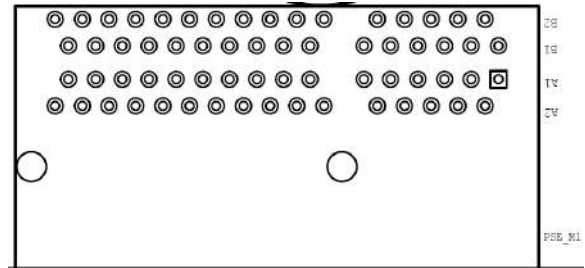
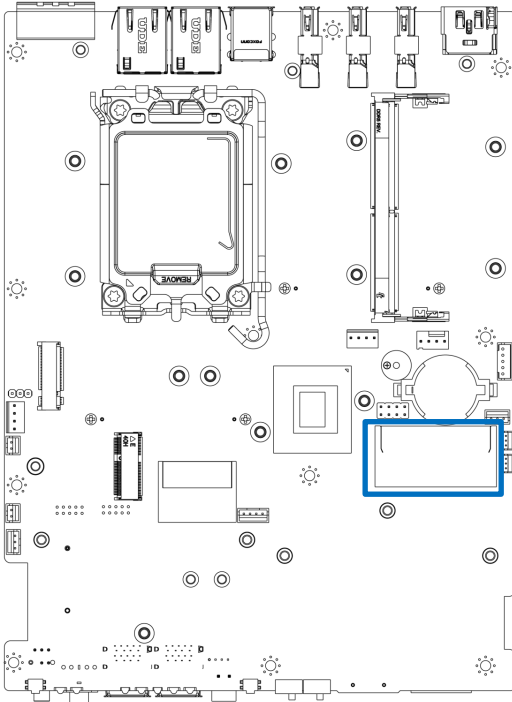
PCI-Express x1 Slot R/A



LAN_L1

Pin	Definition	Pin	Definition
B1	TxP0	A1	RxP0
B2	TxN0	A2	RxN0
B3	GND	A3	PSE_OUT1
B4	TxP1	A4	RxP1
B5	TxN1	A5	RxN1
B6	GND	A6	PSE_OUT2
B7	TxP2	A7	RxP2
B8	TxN2	A8	RxN2
B9	NC	A9	PSE_OUT3
B10	TxP3	A10	RxP3
B11	TxN3	A11	RxN3
B12	WAKE#	A12	PSE_OUT4
B13	RESET#	A13	REFCLK+
B14	+3.3V	A14	REFCLK-
B15	+3.3V	A15	SMB_DATA
B16	+5V	A16	SMB_CLK
B17	+56V	A17	+3.3VAUX
B18	+56V	A18	+3.3VAUX

PCI-Express x4 Slot

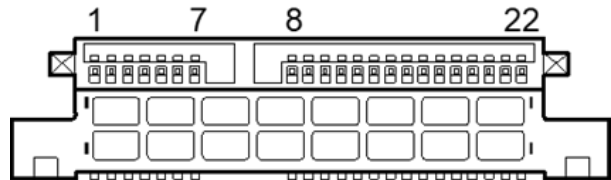
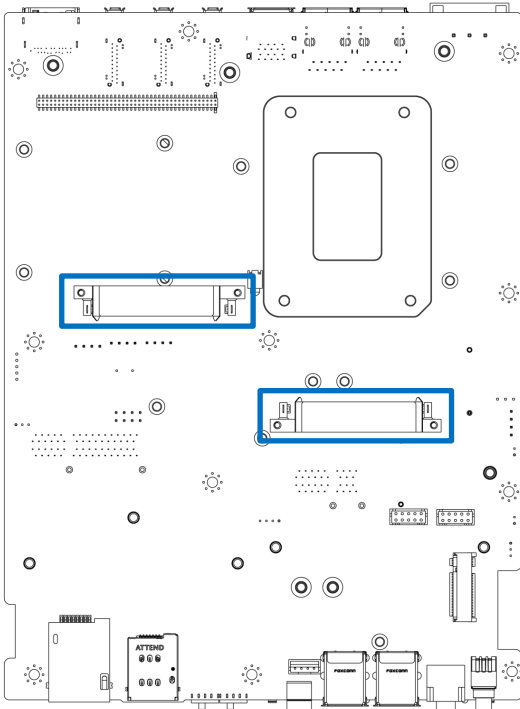


PSE_M1

Pin	Definition	Pin	Definition
B1	9_48VSB_IN	A1	9_48VSB_IN
B2	9_48VSB_IN	A2	9_48VSB_IN
B3	9_48VSB_IN	A3	9_48VSB_IN
B4	9_48VSB_IN	A4	9_48VSB_IN
B5	9_48VSB_IN	A5	9_48VSB_IN
B6	9_48VSB_IN	A6	9_48VSB_IN
B7	9_48VSB_IN	A7	9_48VSB_IN
B8	9_48VSB_IN	A8	9_48VSB_IN
B9	9_48VSB_IN	A9	9_48VSB_IN
B10	9_48VSB_IN	A10	9_48VSB_IN
B11	GND	A11	GND
B12	GND	A12	GND
B13	GND	A13	GND

B14	GND	A14	GND
B15	GND	A15	GND
B16	GND	A16	GND
B17	GND	A17	GND
B18	GND	A18	GND
B19	GND	A19	GND
B20	GND	A20	GND
B21	I2C DATA	A21	5V
B22	I2C CLOCK	A22	5V
B23	12V	A23	5V
B24	12V	A24	3.3V
B25	PSE_OUT1	A25	3.3V
B26	PSE_OUT2	A26	3.3V
B27	PSE_OUT3	A27	56V
B28	PSE_OUT4	A28	56V
B29	PSE_OUT5	A29	56V
B30	PSE_OUT6	A30	56V
B31	PSE_OUT7	A31	56V
B32	PSE_OUT8	A32	56V

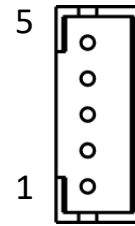
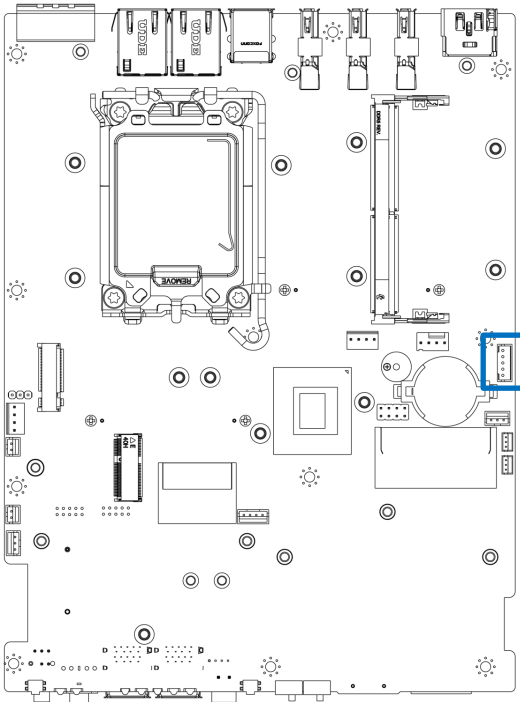
SATA with Power Connector



SATA

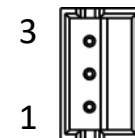
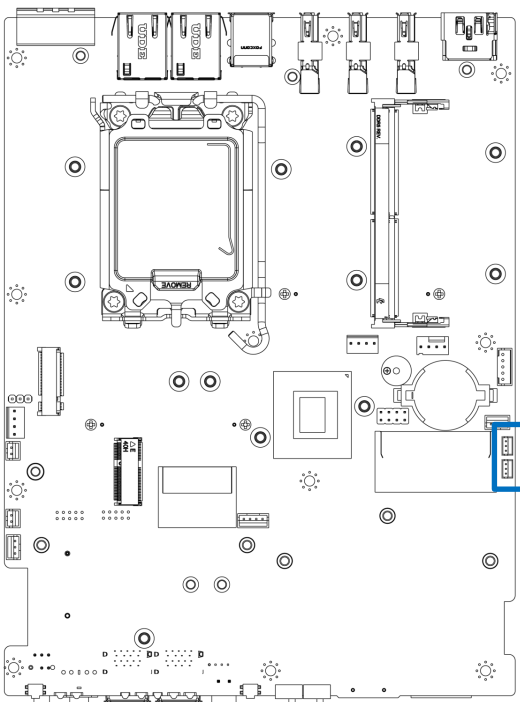
Pin	Definition	Pin	Definition
1	GND	12	GND
2	TxP	13	GND
3	TxN	14	+5V
4	GND	15	+5V
5	RxN	16	+5V
6	RxP	17	GND
7	GND	18	GND
8	NC	19	GND
9	NC	20	+12V
10	DEVSLP	21	+12V
11	GND	22	+12V

OOB control signal



OOB

Pin	Signal
1	5V
2	GND
3	PWRBTN#
4	SLP_RSTBTN#
5	SYS_PWROK



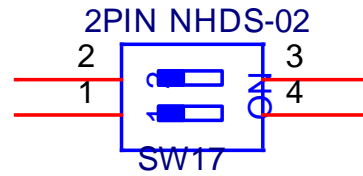
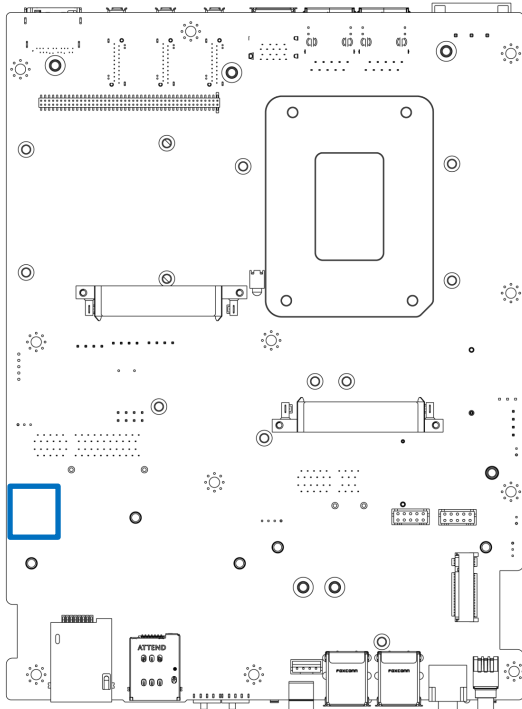
JP4 OOB Auto Link

Pin	Signal
1	COM4_Rx
2	COM4_Tx
3	GND

JP5 OOB Remote Debug port

Pin	Signal
1	COM1_Rx
2	COM1_Tx
3	GND

COM1 or OOB Remote Debug port selection



SW17

Pin	ON	OFF
1,4	COM1 Tx	OOB Remote Tx
2,3	COM1 Rx	OOB Remote Rx

Chapter 3

System Setup

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

3.2 Removing chassis bottom cover

**WARNING**

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

1. Place the system faced upside down and unscrew the 6 screws (M3x5L) on the bottom cover.

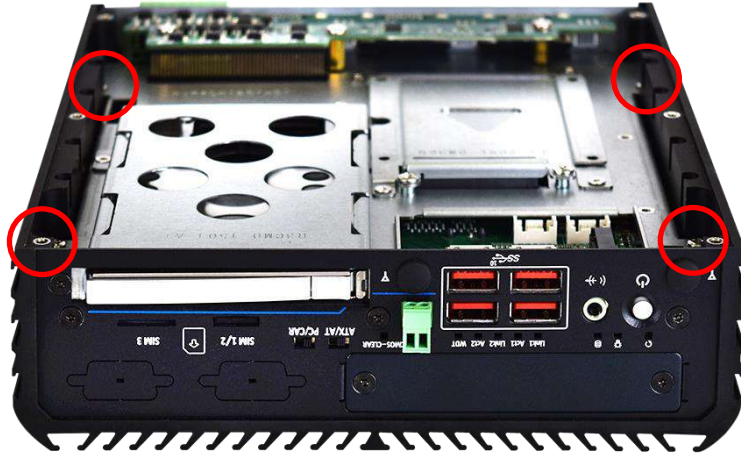


2. Now you can remove the bottom cover.

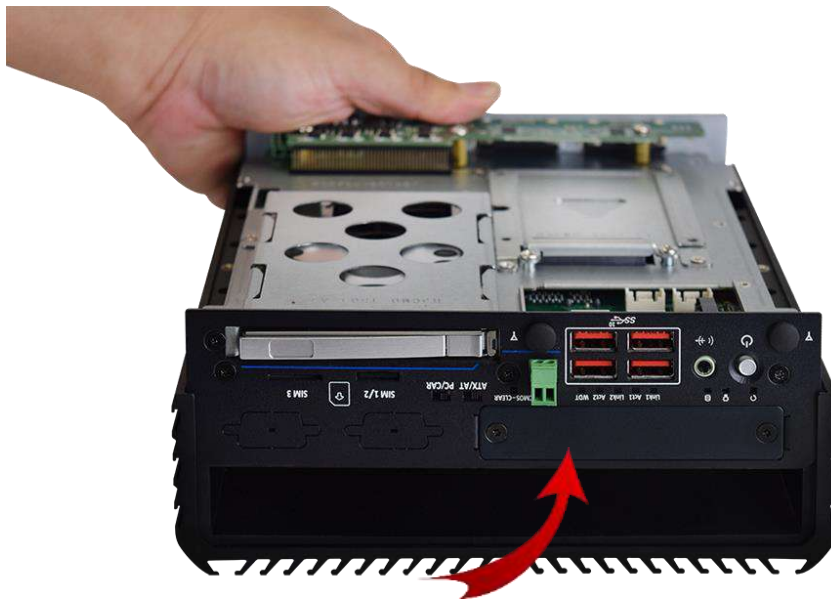


3.3 Removing chassis top cover

1. Unscrew the four screws (M3x5L) as highlighted below.



2. Hold the body of the system and remove from the external cover in an upward motion away from the external cover as pictured below.

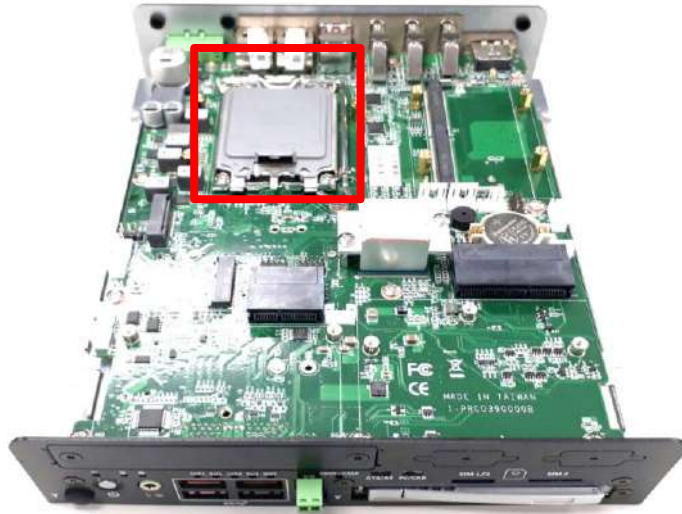


3. Pictured below is the separated system body (left) and external cover (right).

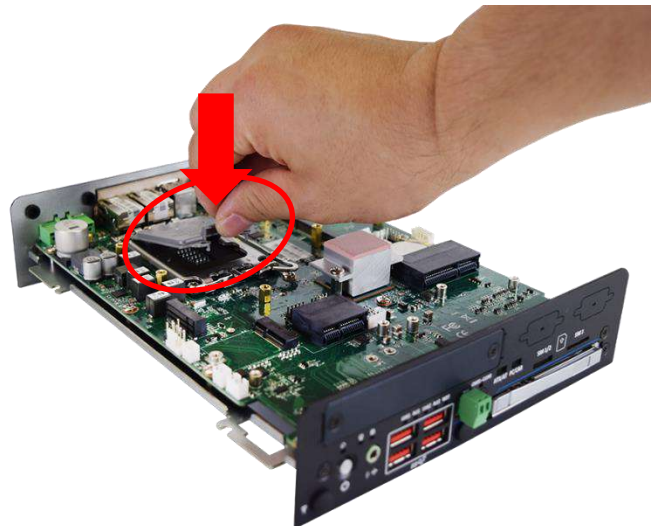


3.4 Installing CPU

1. CPU socket is located at the top side, as highlighted below.



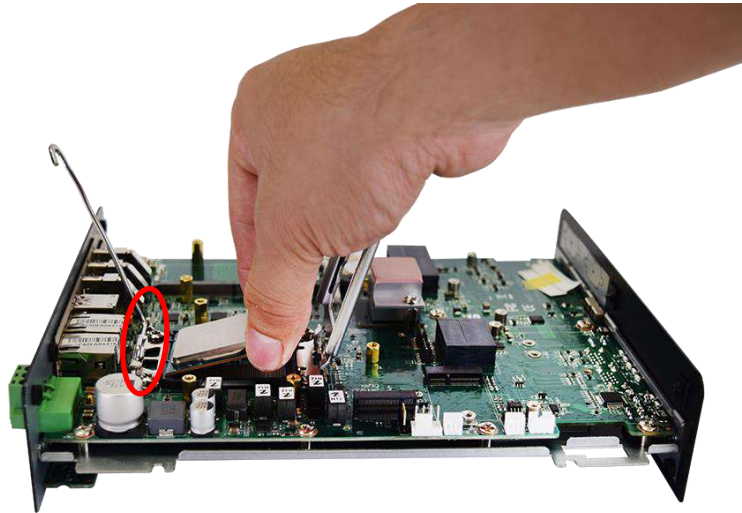
2. Remove the CPU protective cover.



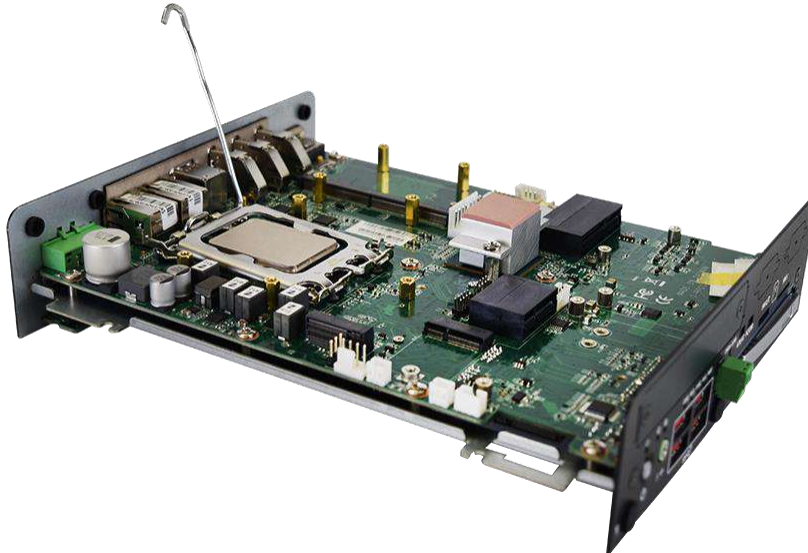
3. Press down the CPU socket lever in order to release the socket.



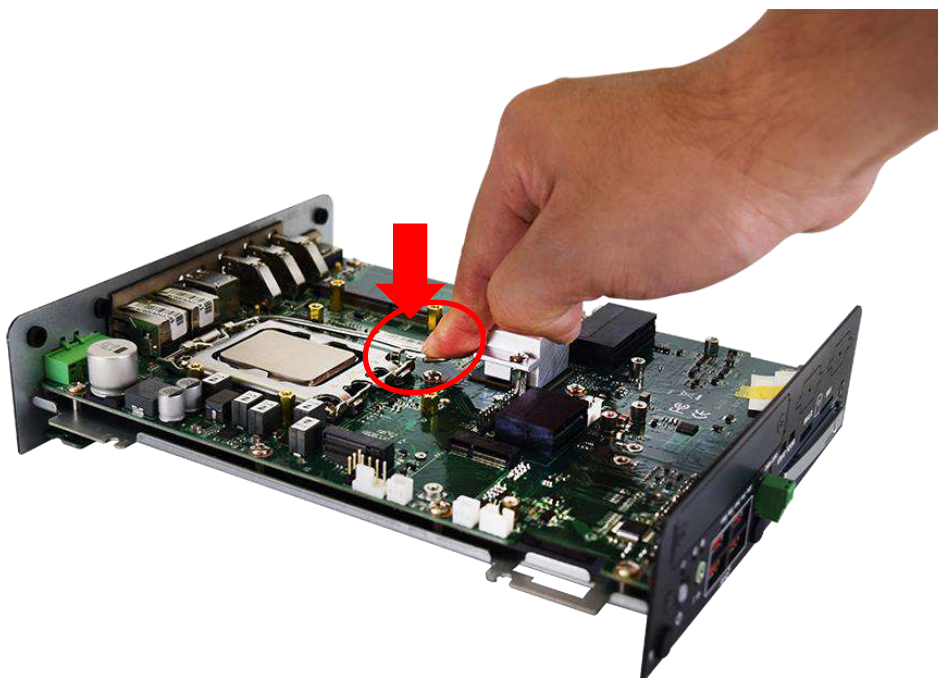
4. Insert CPU gently. (Pay attention to the CPU fool-proof notch)



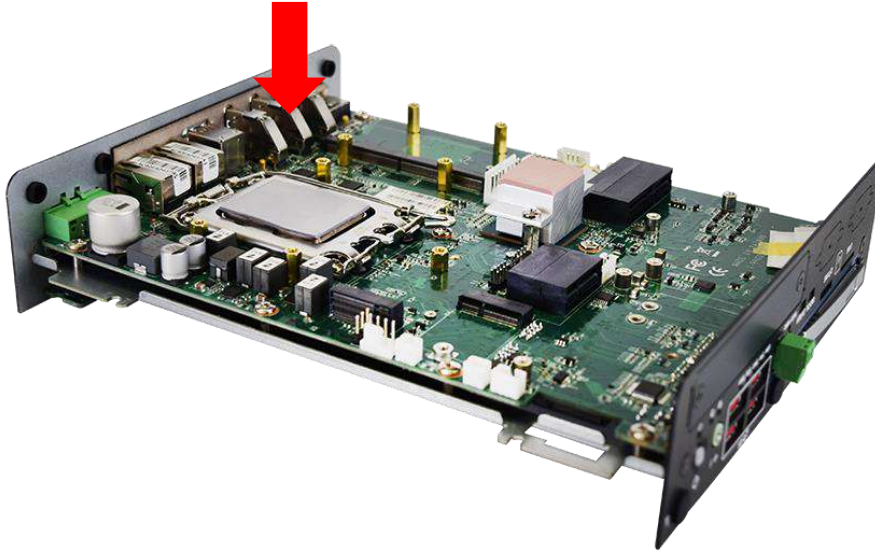
5. Put the CPU retainer bracket back in place.



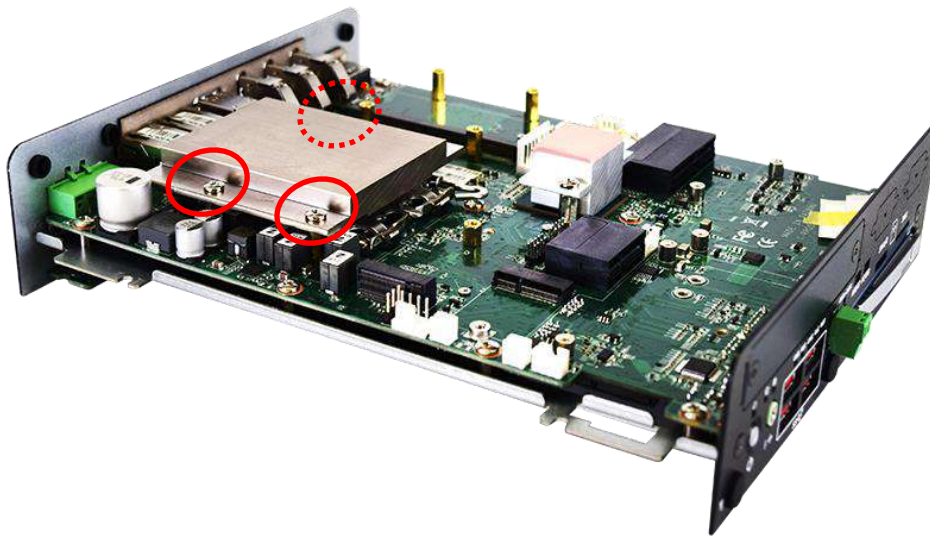
6. Press down the CPU socket lever in order to secure the socket.



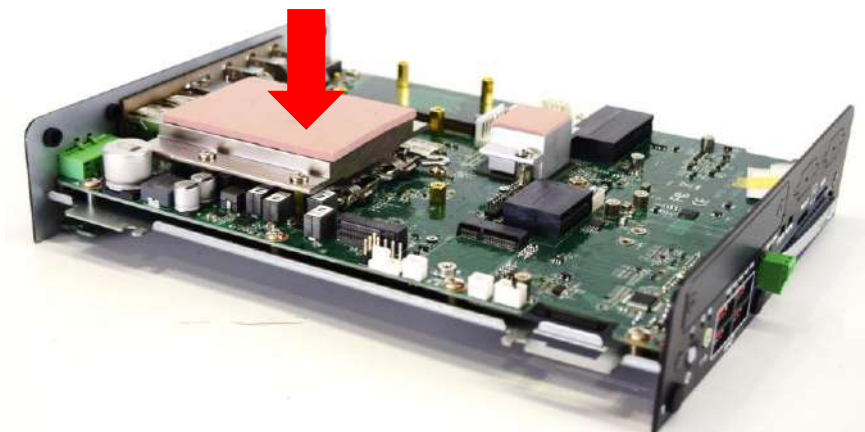
7. Attach the thermal pad to the CPU and remove the plastic mold.
(Note: Remove the plastic film of the thermal pad before attaching it to the CPU)



8. Place the designated heat block onto the CPU with thermal pad. Lock the heat block with three screws (M3x5L) as highlighted in red circles below. The three screws will safely lock the heat block onto the three copper studs that are screwed into the motherboard.

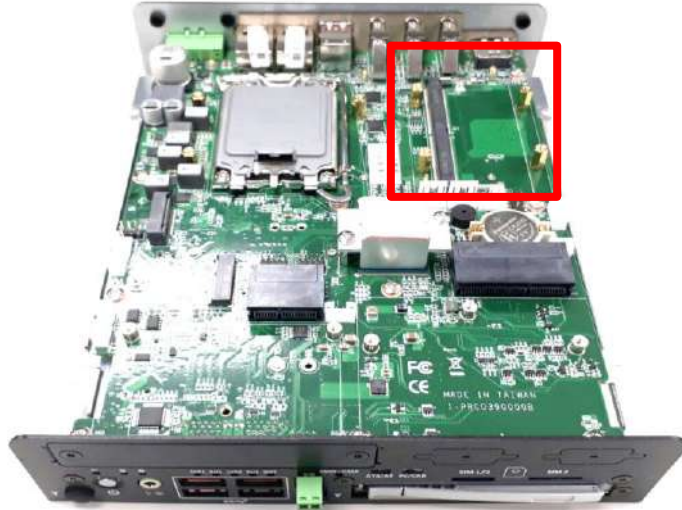


9. Attach the thermal pad to the CPU heat sink and remove the plastic mold.
(Note: Remove the plastic film of the thermal pad before attaching it to the CPU heat sink)

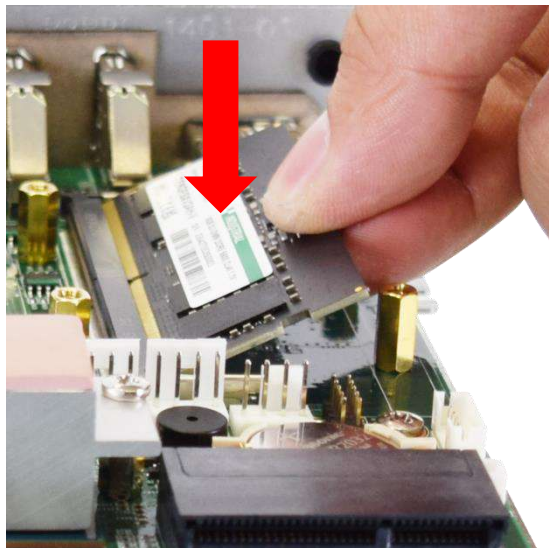


3.5 Installing SODIMM

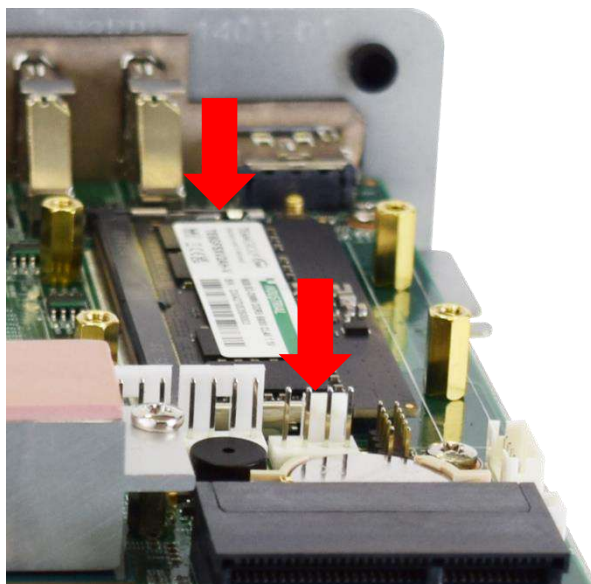
1. Place the system body with SODIMM socket facing upward.



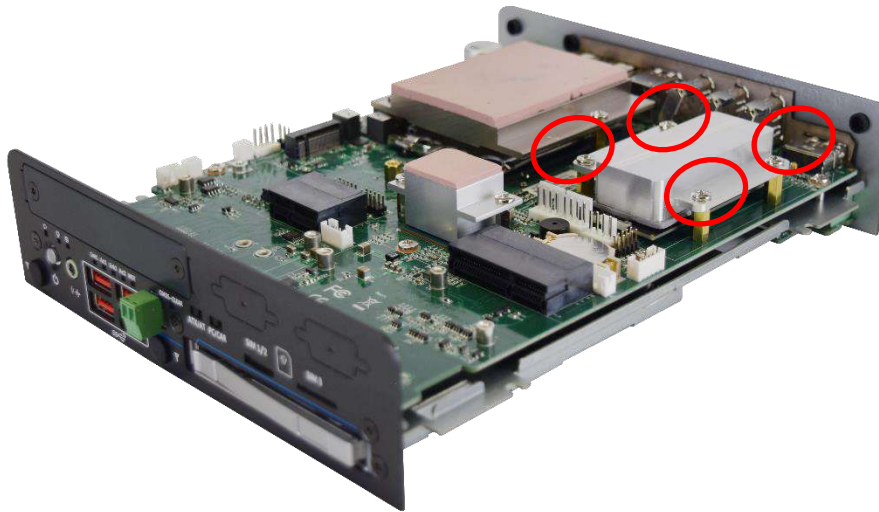
2. Insert memory module at a 45-degree angle.



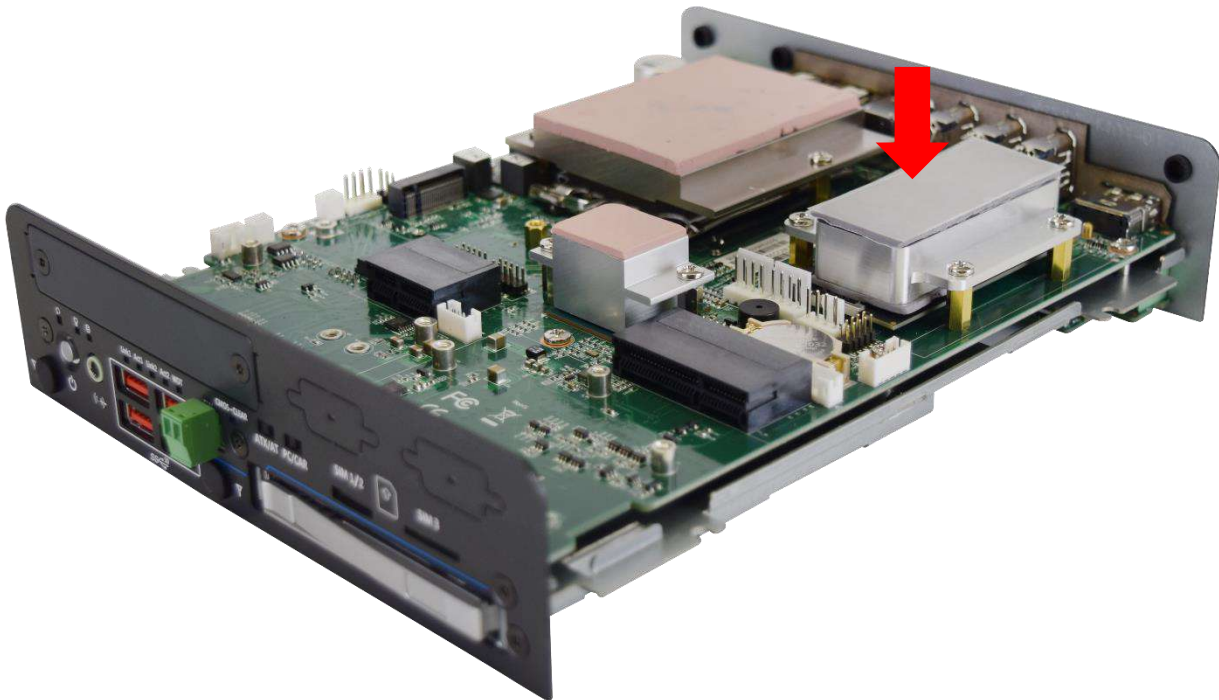
3. Press the memory module vertically downward until you hear the “click” sound. Make sure the memory module is firmly in place.



- Place the designated thermal pad heat block onto the Memory with thermal pad. Lock the heat block with four screws (M3x5L) as highlighted in red circles below. The four screws will safely lock the heat block onto the four copper studs that are screwed into the motherboard.

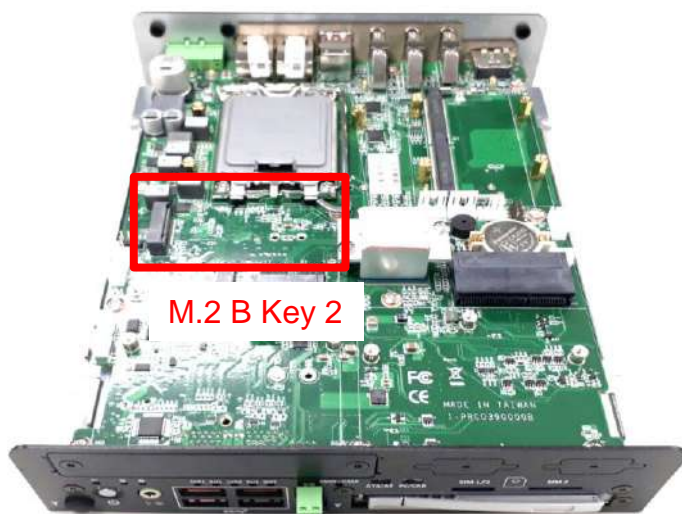


- Attach the thermal pad to the Memory heat sink and remove the plastic mold. (Note: Remove the plastic film of the thermal pad before attaching it to the Memory heat sink)

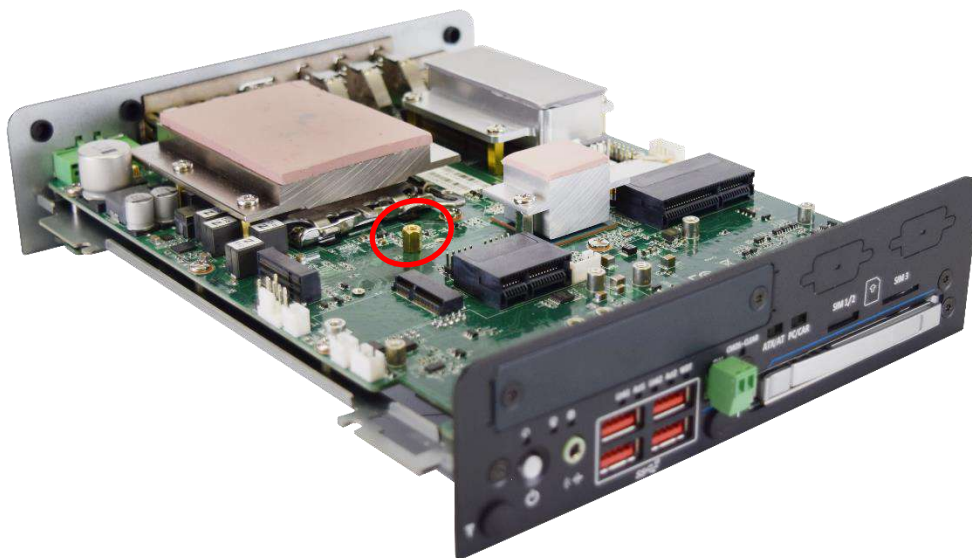


3.6 Installing 4G/5G Module and Antenna

RCO-3000-RPL Series PCBA features two M.2 B Key slots, with the first one located on the top (M.2 B Key 2) and the second on the back (M.2 B Key 1). We will focus on the M.2 B Key 2 slot at the top first.



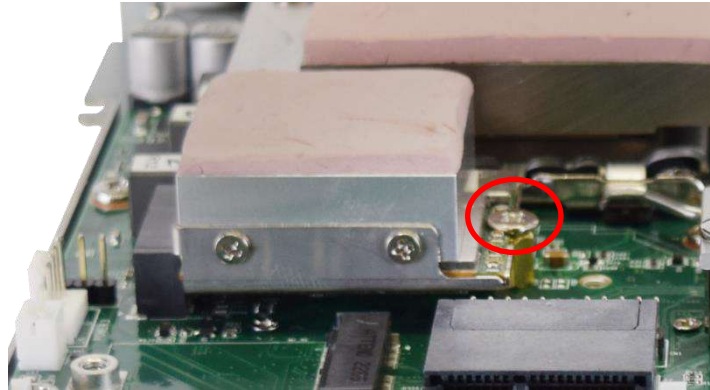
1. Place a copper pillar (M3x6.6L) at the location highlighted in the picture below.



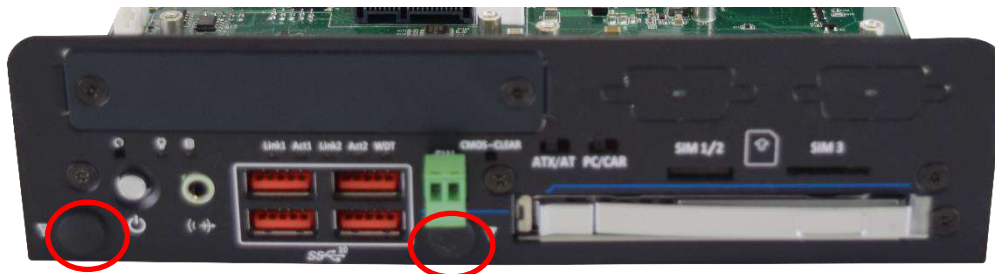
2. Insert 4G/5G card at a 45-degree angle.



3. Press the 4G/5G card down and secure with one screw (M2x4L).



4. RCO-3000-RPL Series system has 5 antenna holes, 2 are located on the rear panel and the other 3 are located on the front panel as pictured below.



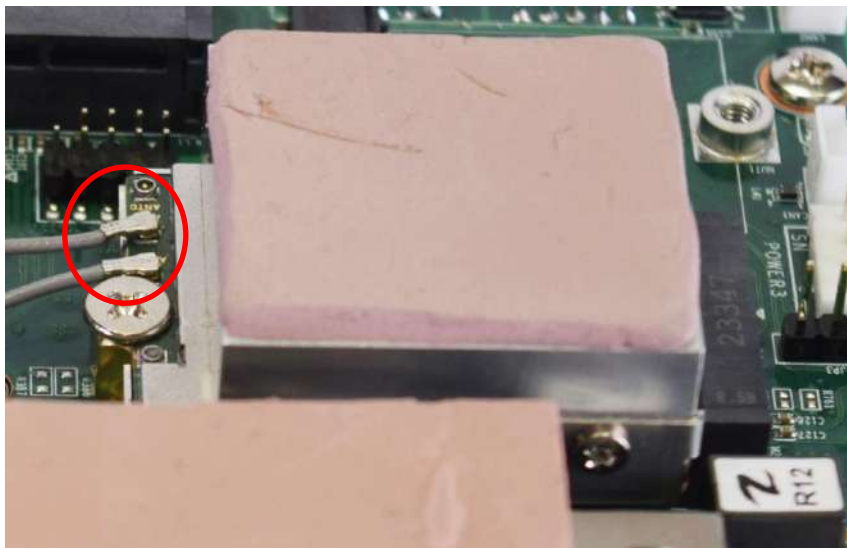
5. Remove antenna hole cover on the system panel.



6. Install the SMA female jack through the antenna holes, and then fasten on the SMA male plug.



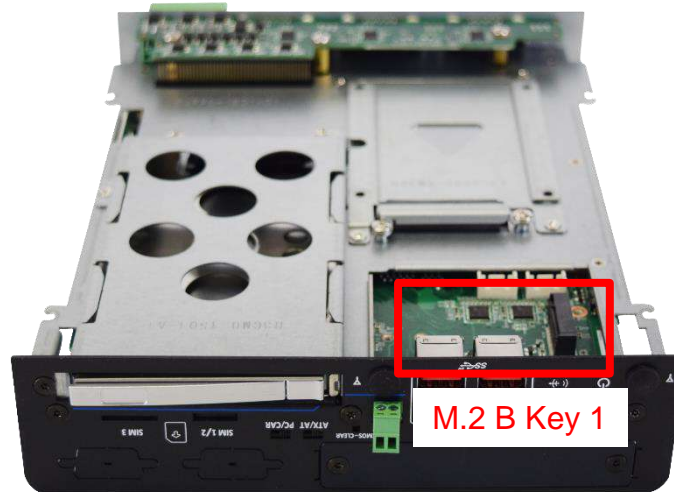
7. Fix the end of the cable of the Wireless RF connector onto the communication module as shown in the picture below.



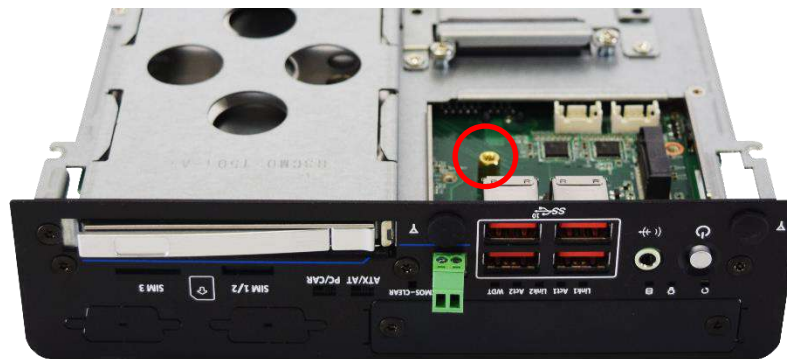
8. Assemble the antenna and SMA jack together, the outcome should look like the picture below.



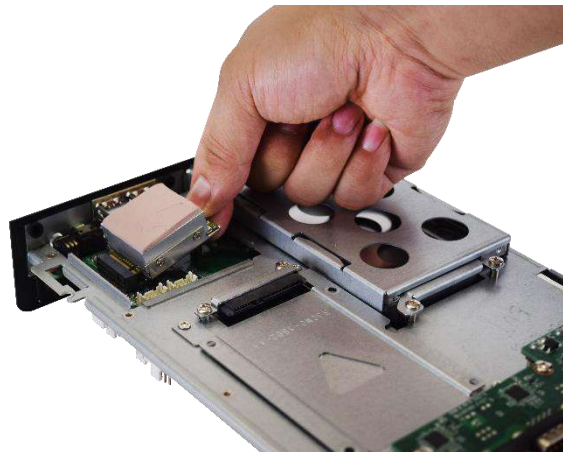
Now, let's set up the other M.2 B Key slot at the back.



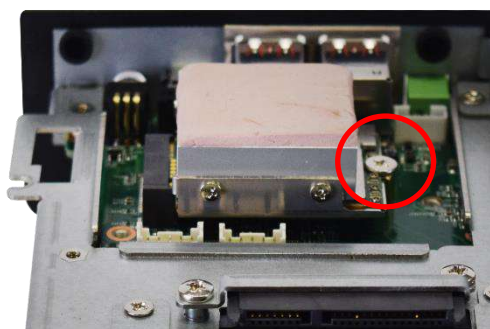
1. Place a copper pillar (M.3x6.6L) at the location highlighted below.



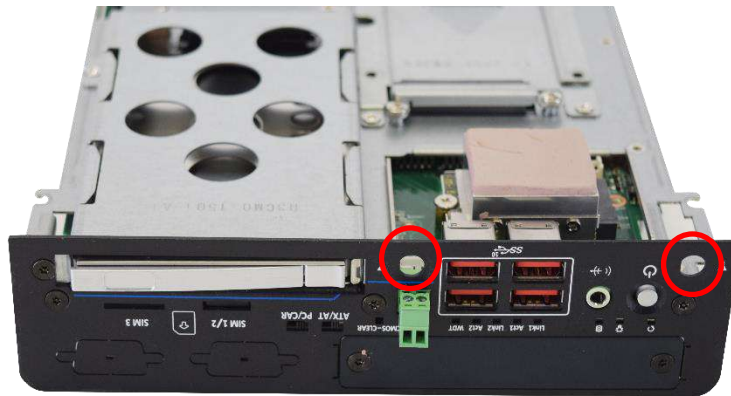
2. Insert 4G/5G card at a 45-degree angle.



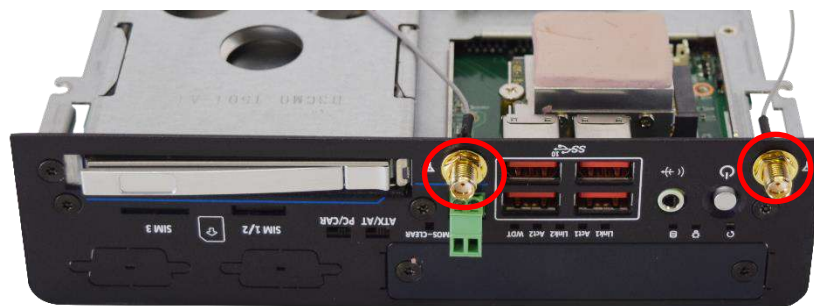
3. Press the 4G /5G card down and secure with one screw (M2x4L).



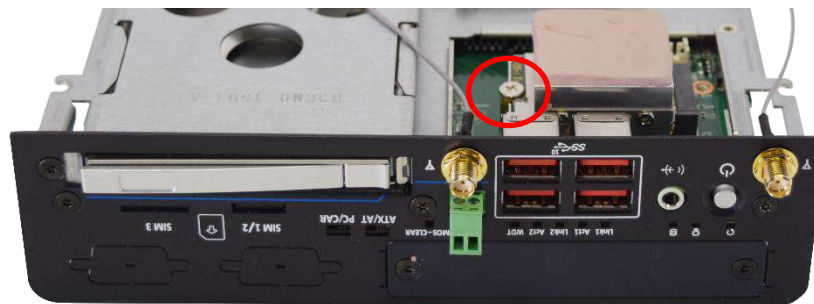
- Remove antenna hole cover on the system panel.



- Install the SMA female jack through the antenna holes, and then fasten on the SMA male plug.



- Fix the end of the cable of the Wireless RF connector onto the communication module as shown in the picture below.

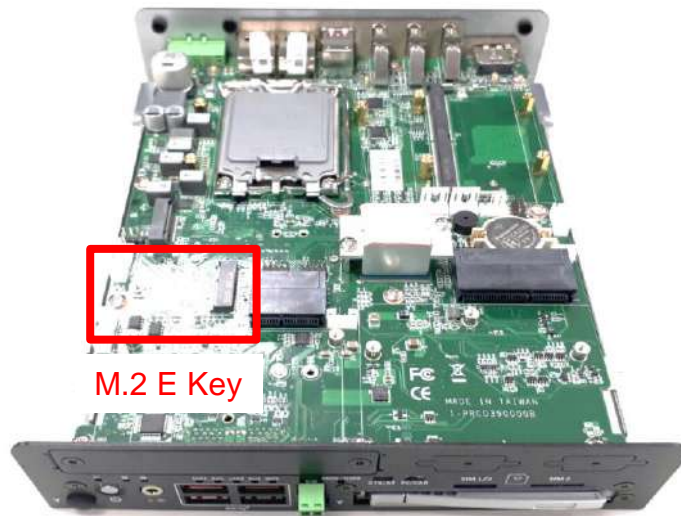


- Assemble the antenna and SMA jack together, the outcome should look like the picture below.



3.7 Installing Wi-Fi Module and Antenna

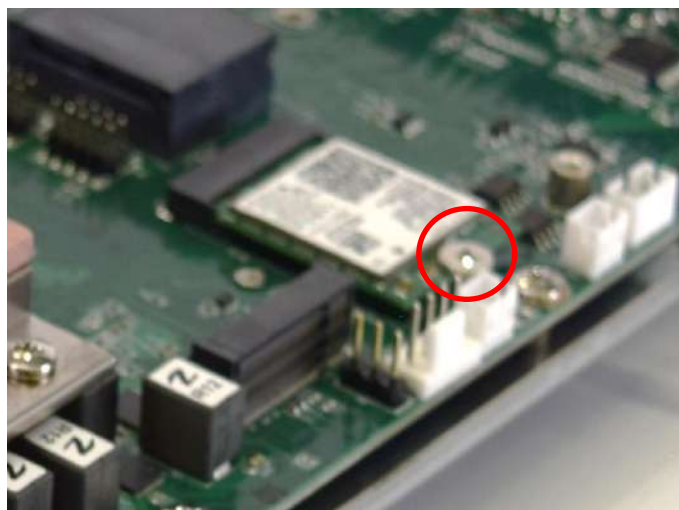
RCO-3000-RPL Series PCBA has an M.2 E Key slot on the top, which currently supports Wi-Fi application.



1. Insert Wi-Fi card at a 45-degree angle.



2. Press the Wi-Fi card down and secure with one screw (M2x4L).



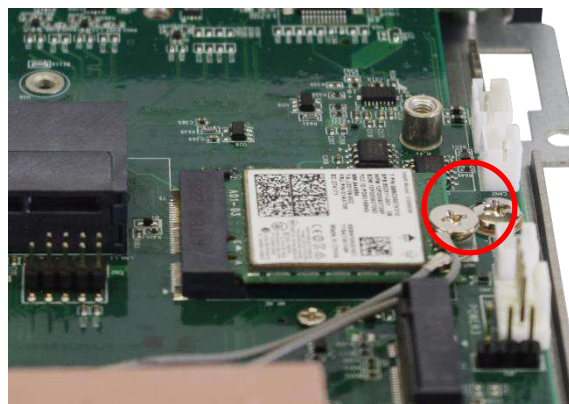
3. Remove antenna hole cover on the system panel.



4. Install the SMA female jack through the antenna holes, and then fasten on the SMA male plug.



5. Fix the end of the cable of the Wireless RF connector onto the communication module as shown in the picture below.

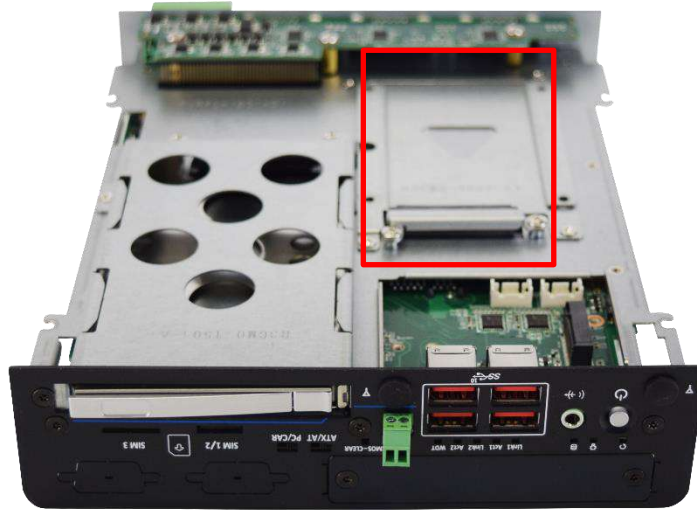


6. Assemble the antenna and SMA jack together, the outcome should look like the picture below.

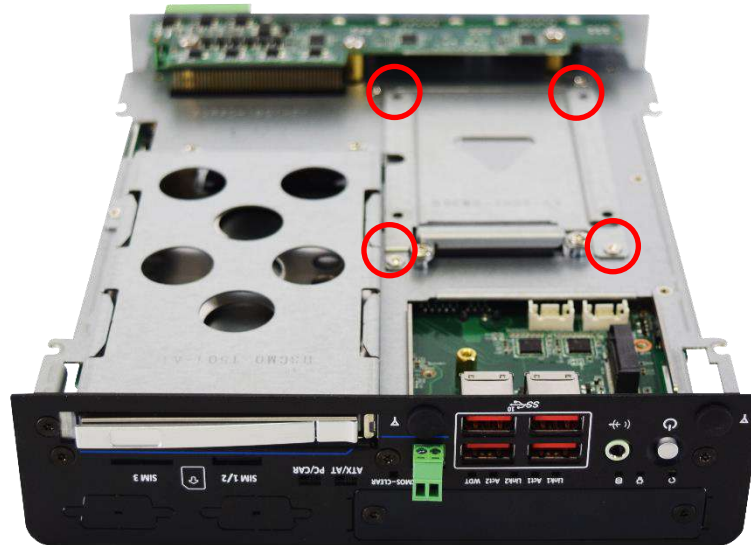


3.8 Installing HDD on internal SATA HDD bay

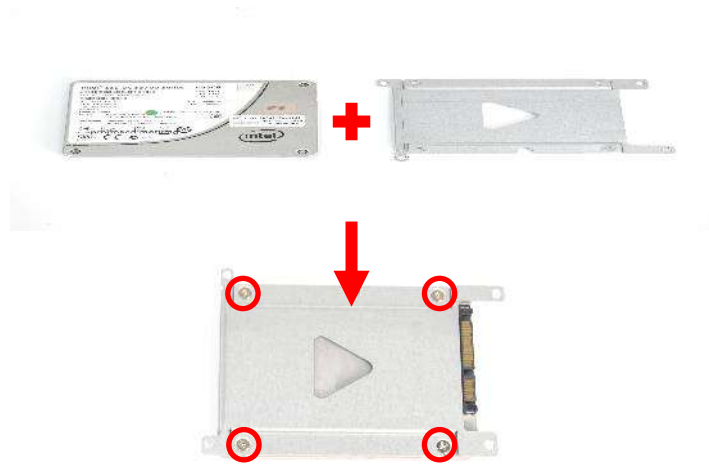
1. One internal SATA HDD bay is available for RCO-3000-RPL series.



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



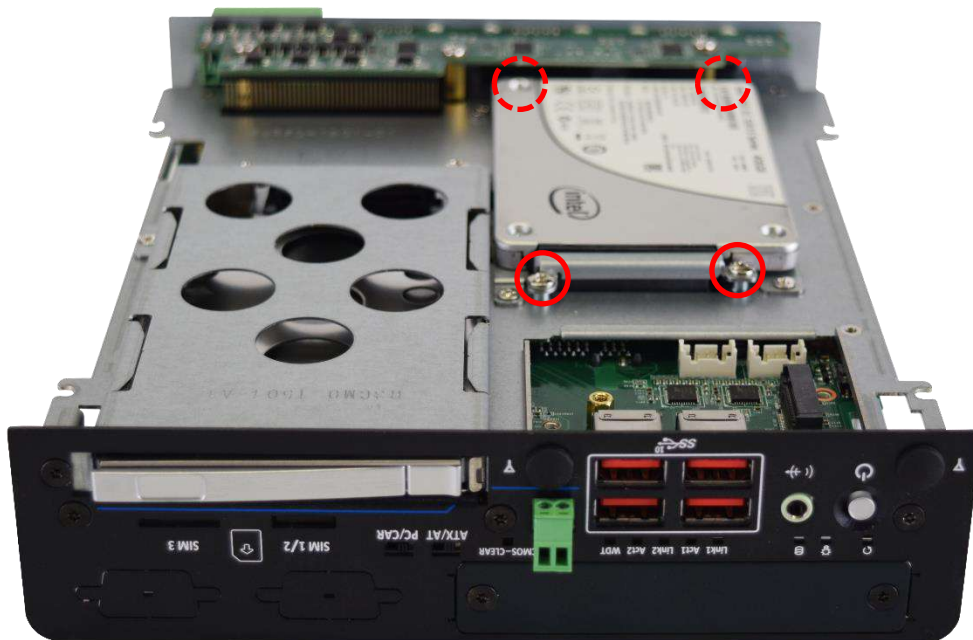
3. Lock the 2.5" HDD with HDD bracket using four screws (M3x4L).



4. Install the HDD bracket following the direction below.



5. Fasten the four screws to lock the internal HDD bracket.

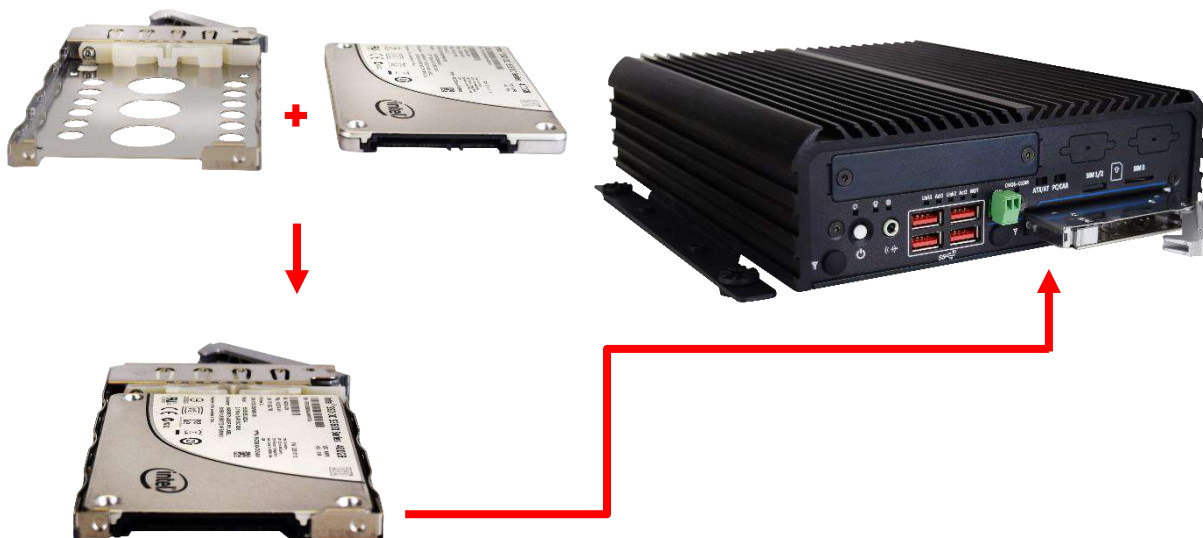


3.9 Installing HDD on removable SATA HDD tray

1. One removable SATA HDD tray available for RCO-3000-RPL Series.
Open the tray lock (as highlighted in red circle), and remove the tray.



2. Unlock the drive lock and insert the HDD/SSD.



3. Slide the HDD tray back and close the tray lock.

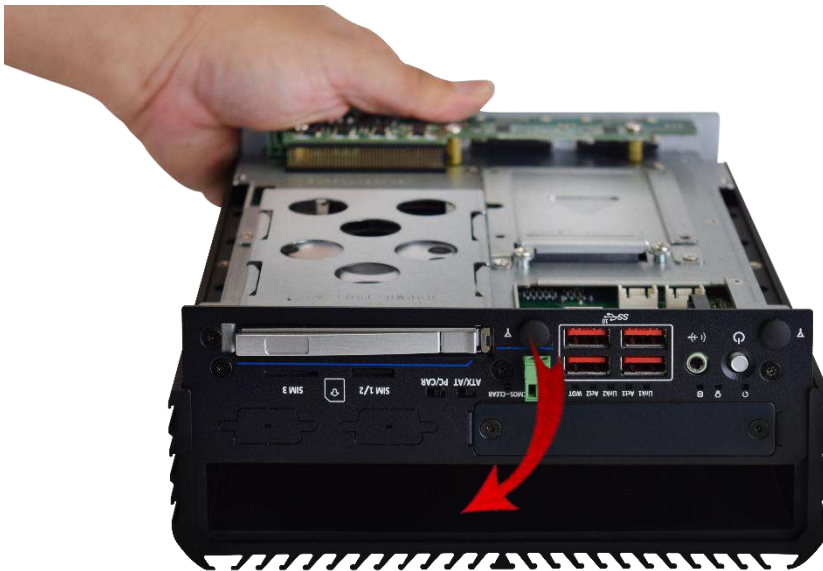


3.10 Assembling chassis top cover

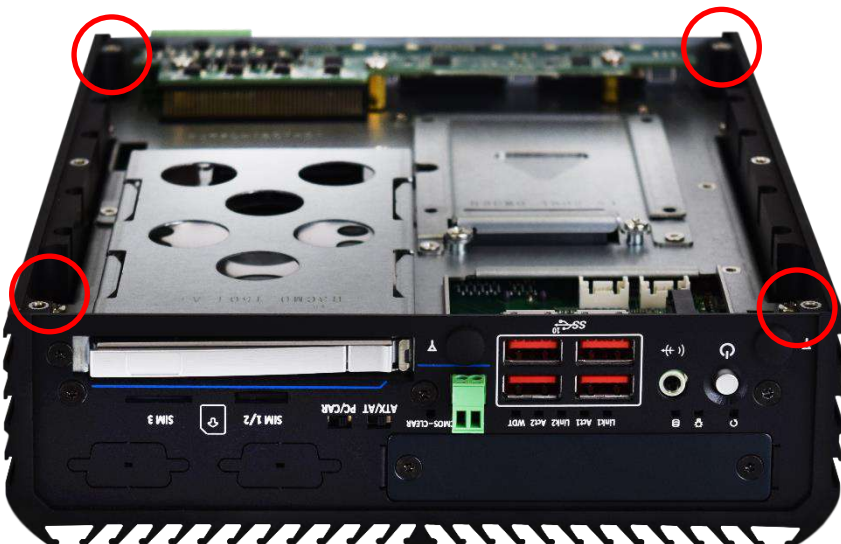
1. Pictured below is the separated system body (left) and external cover (right).



2. Turn the system body upside down and place it vertically towards the external cover.



3. Secure the system body with four screws (M3x5L).



3.11 Assembling chassis bottom cover

1. Place the bottom cover according to the below direction and make sure the rail is facing inside the system.



2. Secure the bottom cover with the six screws (M3x5L).



3.12 Installing SIM card

1. Pull out the SIM card tray in order to put the Mini SIM cards.



2. Place the Mini SIM card on the front of the tray for SIM1.



3. Place the Mini SIM card on the back of the tray for SIM2.



4. Insert SIM card into the socket for SIM3.

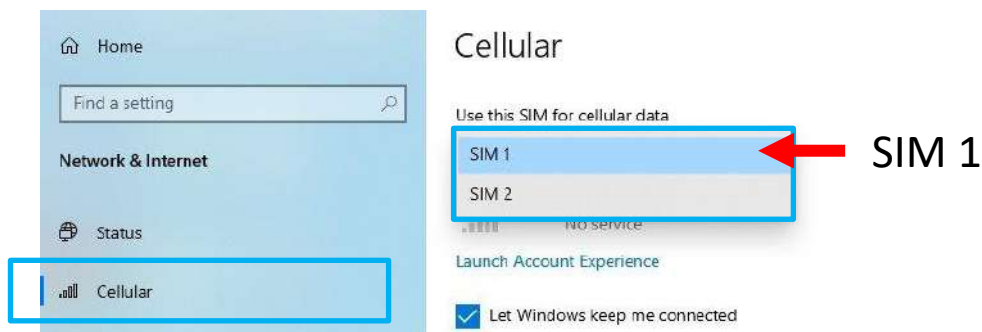


5. Please note that the installation of SIM cards has to match the installation of M.2 B Key slots

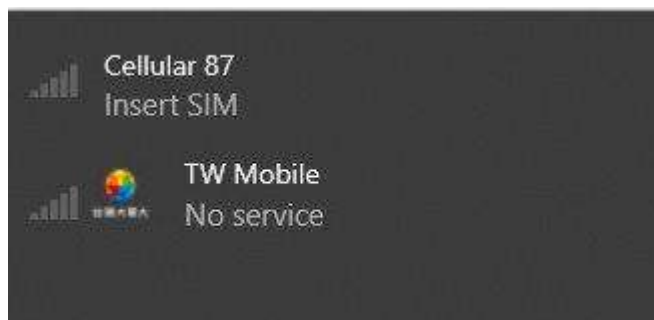
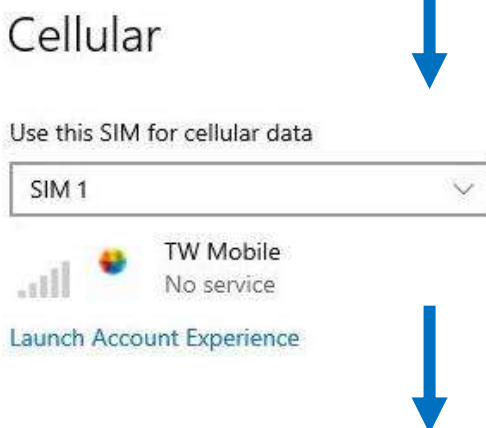
SIM Card Socket Number	Matching M.2 B Key slots
SIM 1/2	M.2 B Key 2
SIM 3	M.2 B Key 1

3.13 SIM OS Settings

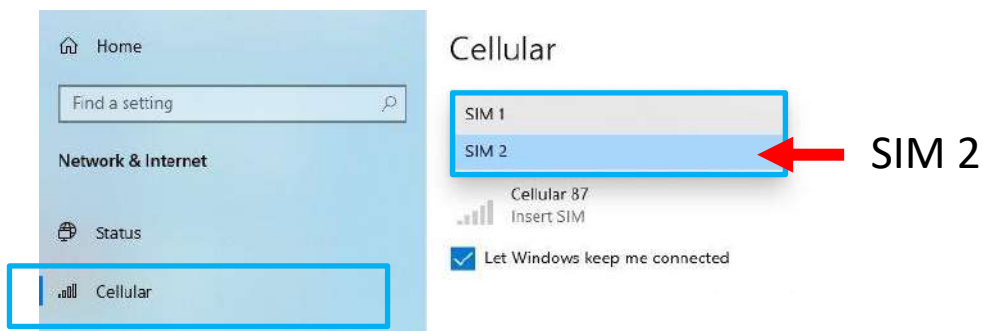
Place the Mini SIM card on front of the tray for SIM1. The Cellular menu will show the SIM 1/2 option.



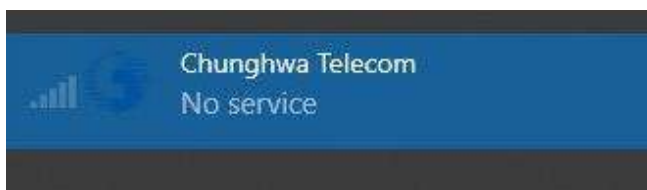
When the Mini SIM card on the front tray for SIM1 is inserted, the operating system will connect to SIM 1.



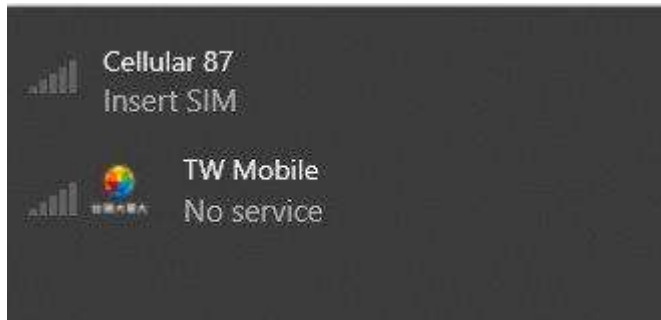
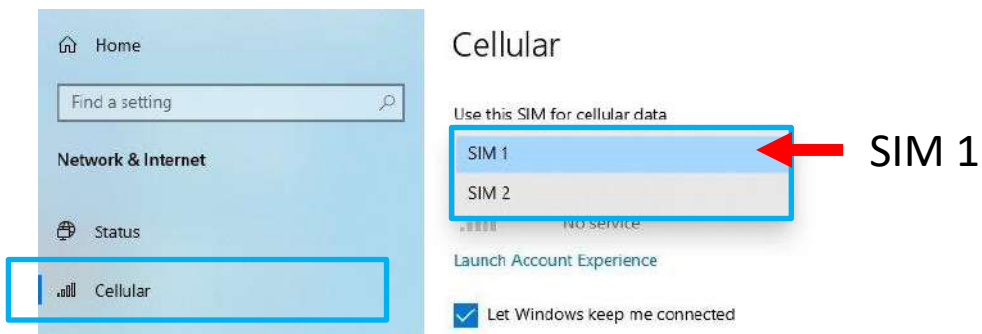
Place the Mini SIM card on back of the tray for SIM2. The Cellular menu will show the SIM 1/2 option.



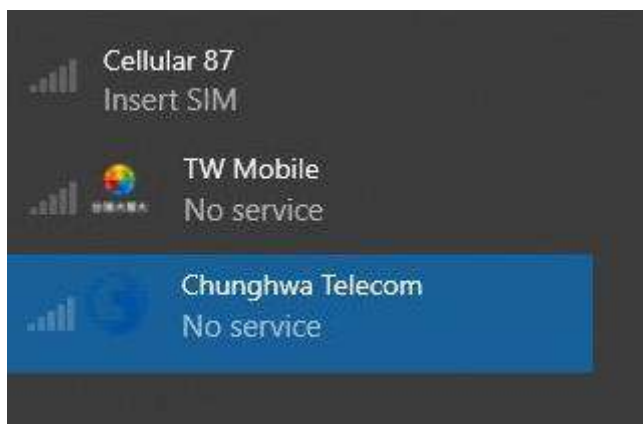
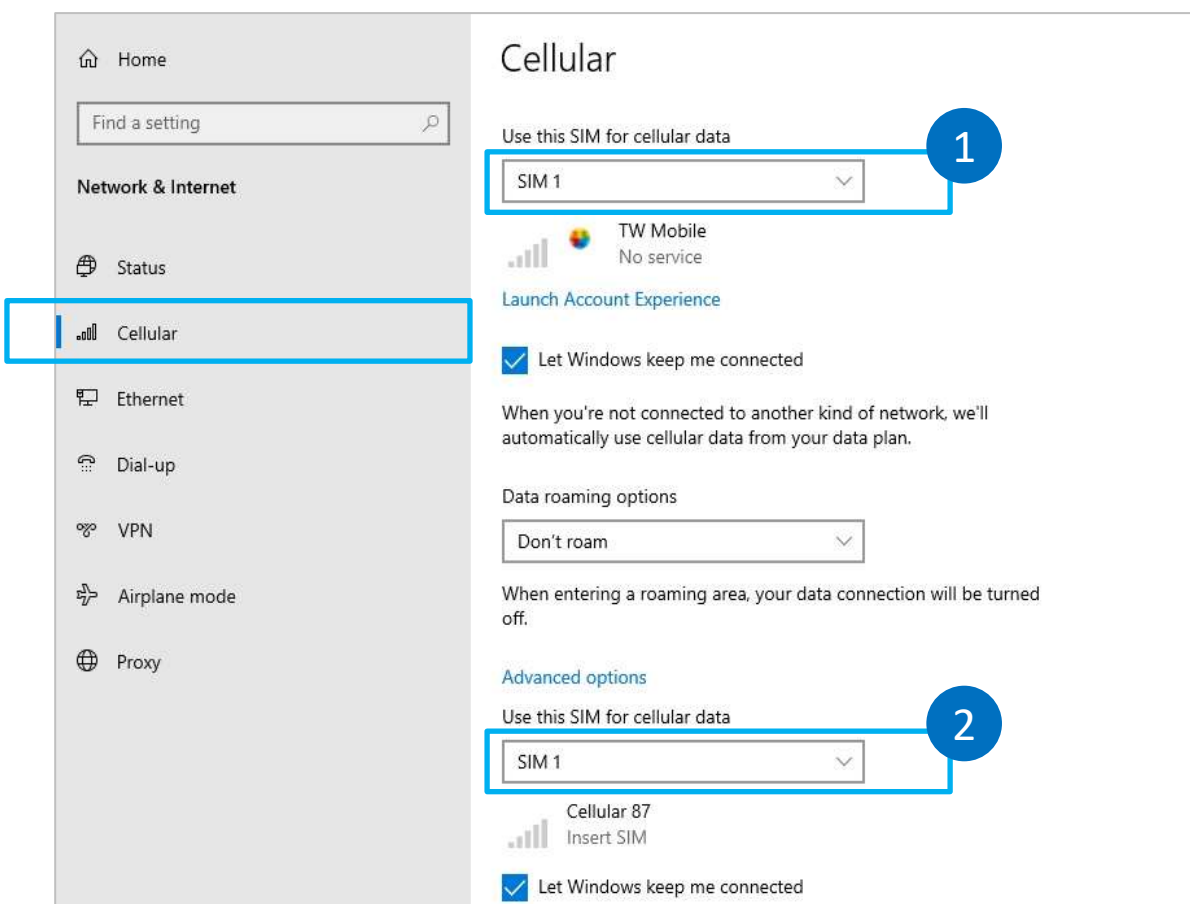
When the Mini SIM card on the back tray for SIM2 is inserted, the operating system will connect to SIM 2.



Insert a SIM card into the SIM 3 socket. The Cellular menu will show the SIM 1/2 option. Once the SIM card is inserted, the operating system will automatically connect to SIM1 (as shown in the image).



When SIM cards are inserted into both the SIM1/2 slot and the SIM3 socket, the Cellular menu will display two separate SIM options. Users can select which SIM card to use for external connections as shown in the image below.



3.14 Installing Wall-Mount Kit

1. The Wall-Mount Kit is provided with the RCO-3000-RPL as a standard package.



2. Place the system upside down so you can see the bottom cover. Secure the wall-mount kit with eight screws (M3x5L, Nylok) as highlighted in red circles below.



3.15 Installing DIN rail holder

1. Din rail holder is available for RCO-3000-RPL series as optional accessories.

(3-DINR-0004) DinRail-2MountingKit



2. Place the system upside down so you can see the bottom cover with two screw holes for din rail holder.



3. Place the din rail holder on top of the bottom cover and secure with two screws (M4x5L, Nylok).



Chapter 4

BIOS Setup

4.1 BIOS Introduction

The BIOS provides an interface to modify the configuration. When the battery is removed, all the parameters will be reset.

BIOS Setup

Power on the embedded system and by pressing immediately allows you to enter the setup screens. If the message disappears before you respond and you still wish to enter the Setup, restart the system by turning it OFF and ON or pressing the RESET button.

You may also restart the system by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys.

Control Keys	
<→> <←>	Select Screen
<↑> <↓>	Select Item
<Enter>	Select
<Page Up/+>	Increases the numeric value or makes changes
<Page Down/->	Decreases the numeric value or makes changes
<F1>	General Help
<F2>	Previous Value
<F3>	Load Optimized Defaults
<F4>	Save Configuration and Exit
<Tab>	Select Setup Fields
<Esc>	Exit BIOS Setup

Main Setup

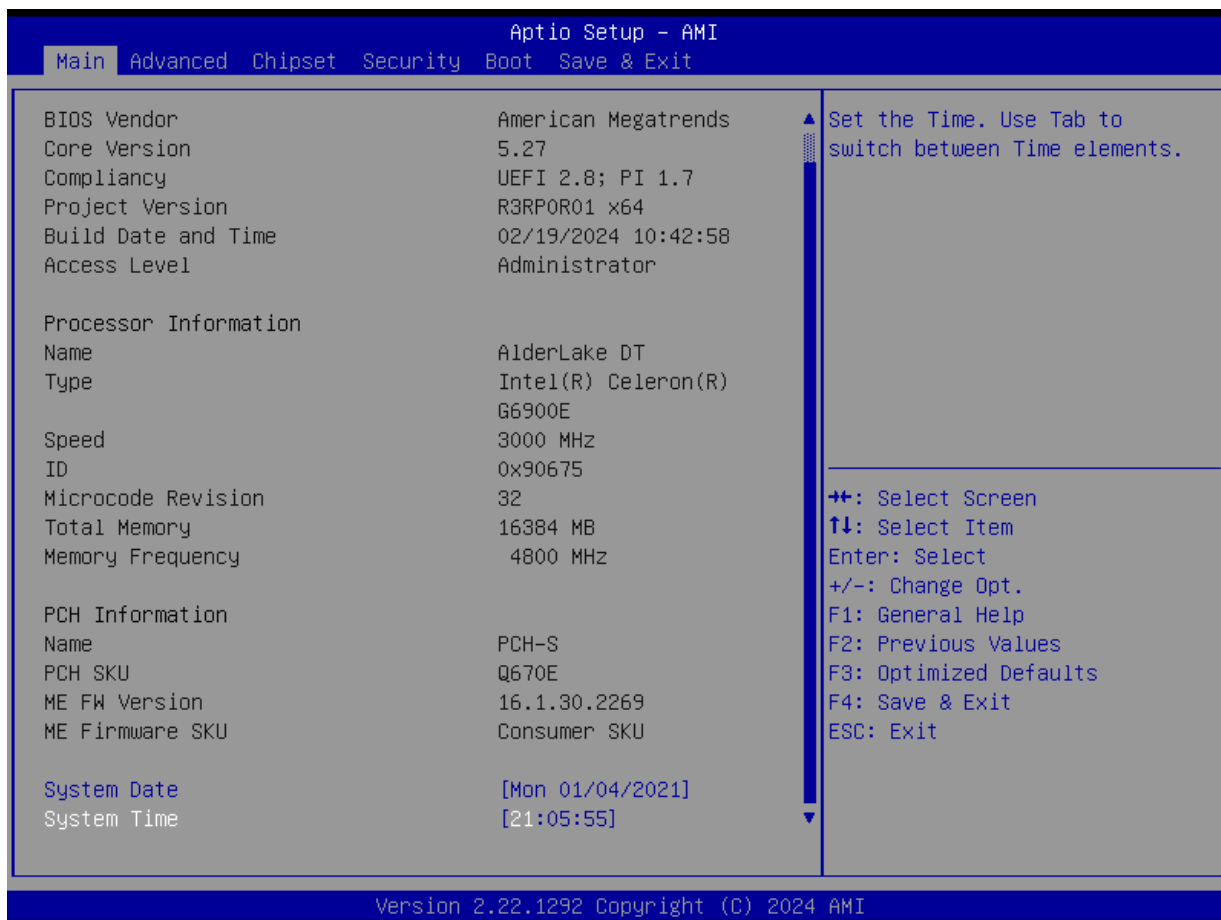
The main menu lists the setup functions you can make changes to. You can use the arrow keys (↑↓) to select the item. The on-line description of the highlighted setup function is displayed at the bottom of the screen.

General Help <F1>

The BIOS setup program provides a General Help screen. You can call up this screen from any menu by simply pressing <F1>. The Help screen lists the appropriate keys to use and the possible selections for the highlighted item. Press <Esc> to exit the Help screen.

4.2 Main Setup

Press to enter BIOS CMOS Setup Utility. The Main setup screen is showed as following when the setup utility is entered. System Date/Time is set up in the Main Menu.



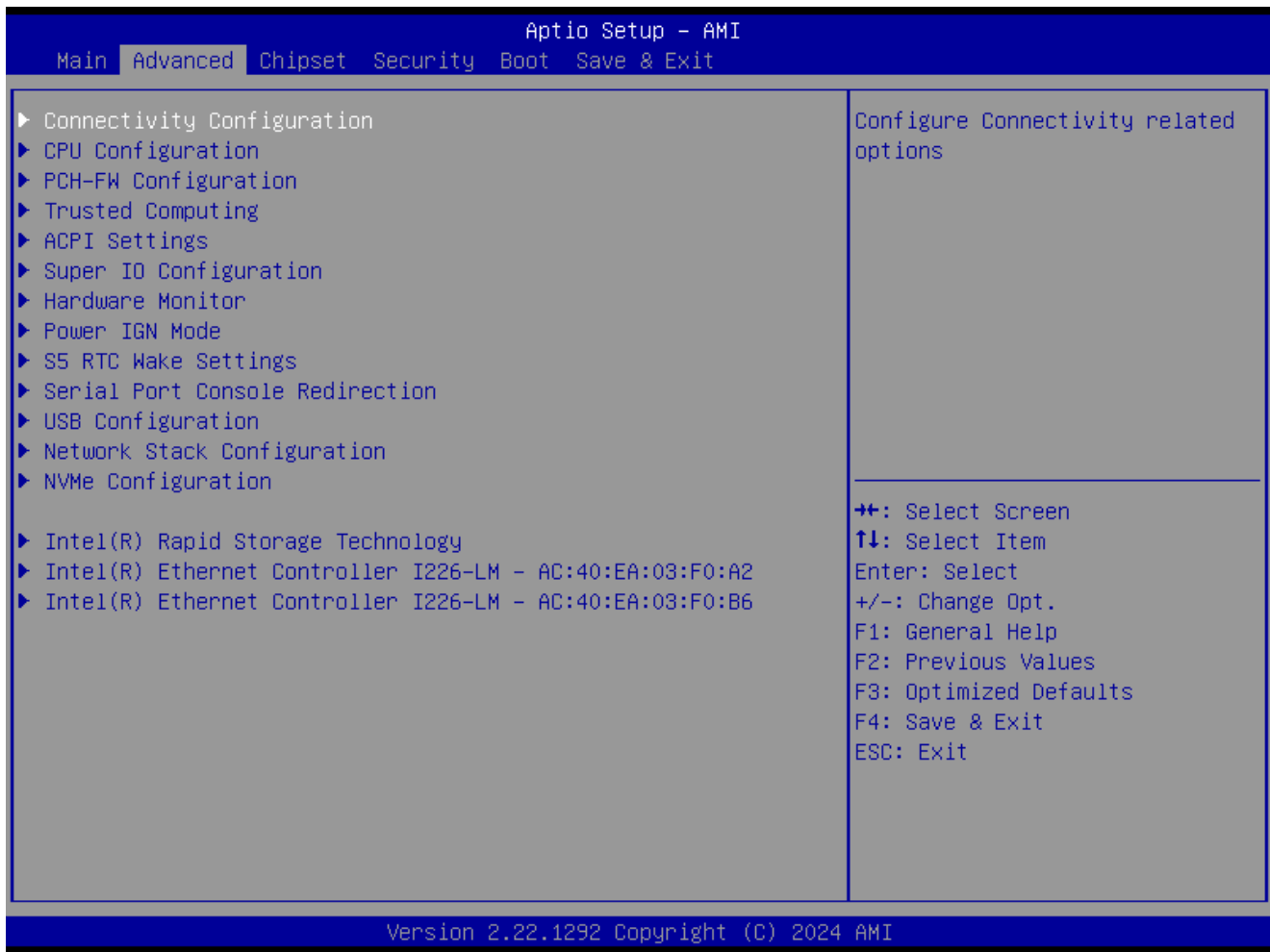
■ System Date

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

■ System Time

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

4.3 Advanced Setup

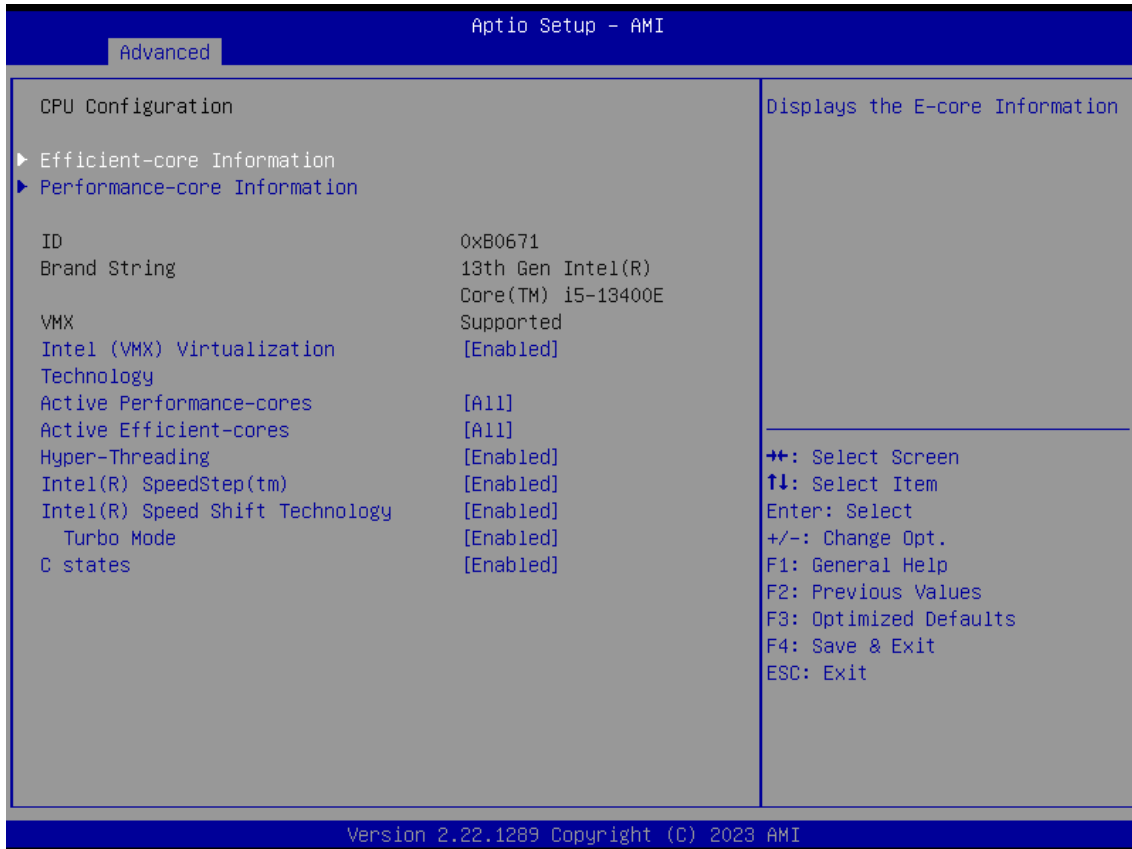


4.3.1 Connectivity Configuration



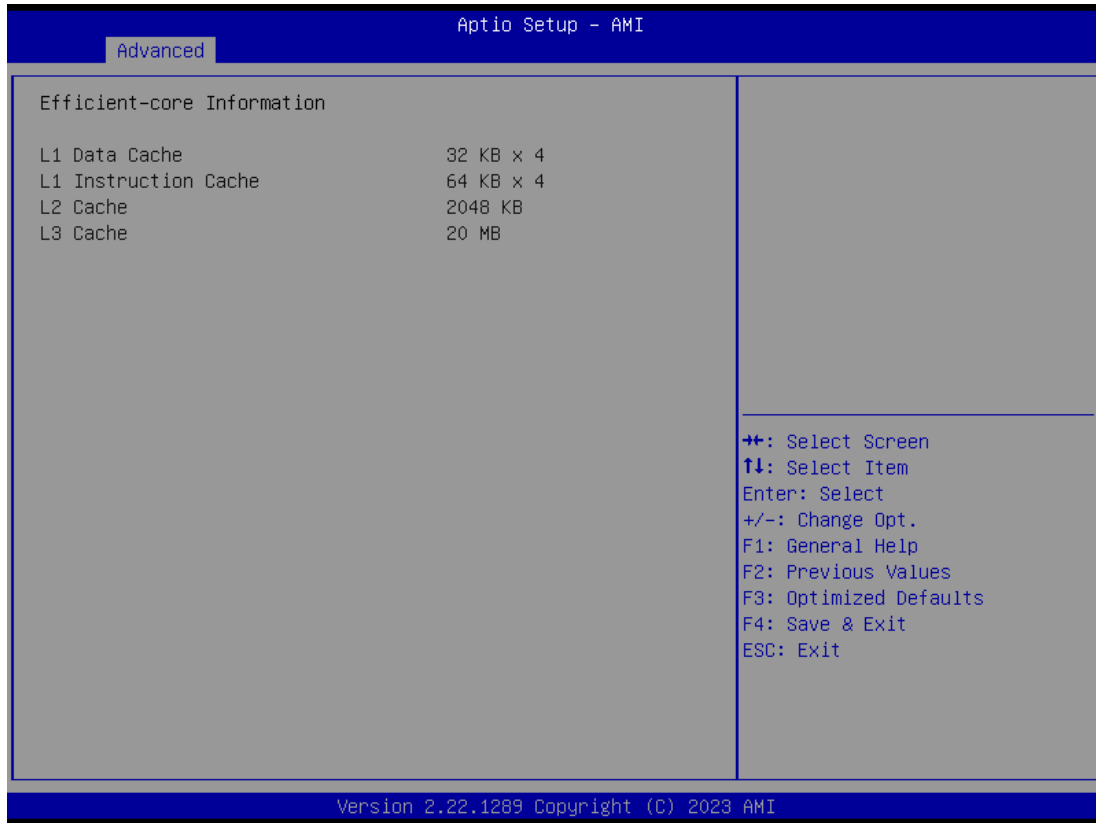
Item	Options	Description
CNVi Mode	Disable Integrated, Auto Detection [Default]	This option configures Connectivity. [Auto Detection] means that if Discrete solution is discovered it will be enabled by default. Otherwise Integrated solution (CNVi) will be enabled; [Disable Integrated] disables Integrated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

4.3.2 CPU Configuration

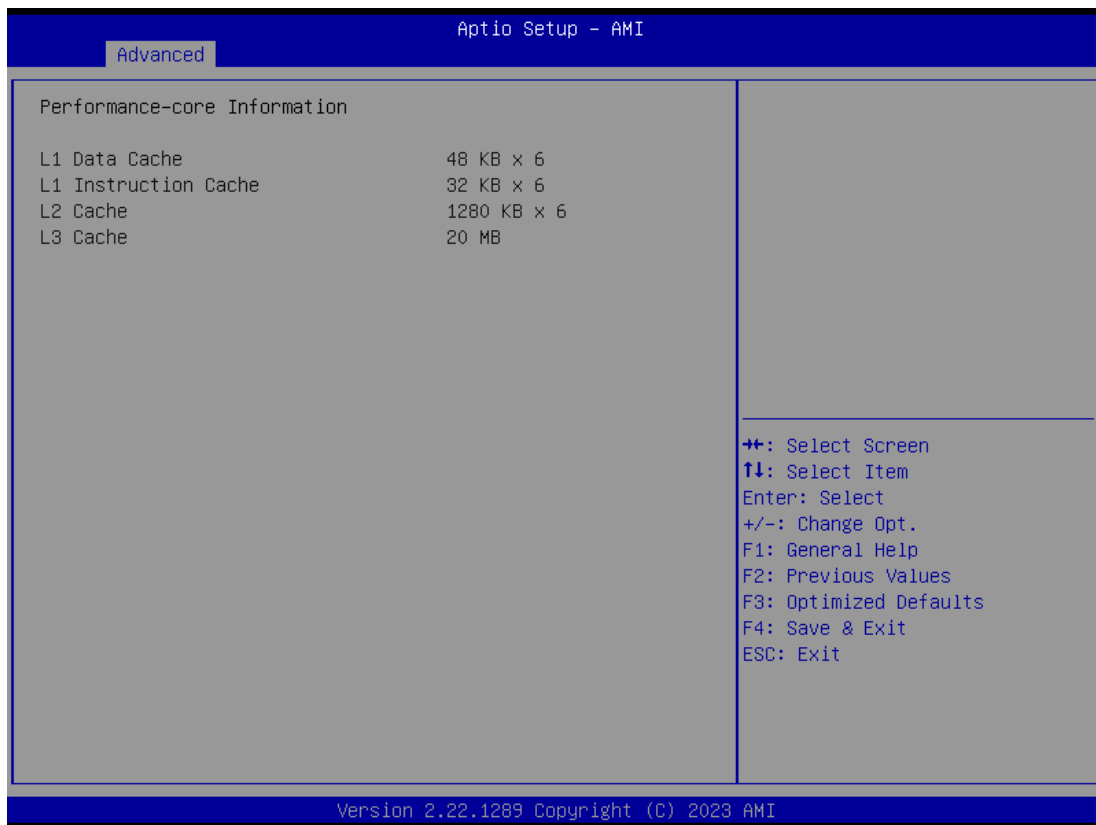


Item	Options	Description
Intel (VMX) Virtualization Technology	Disabled, Enabled[Default]	When enabled, a VMM can utilize the additional hardware capabilities provided by Virtualization Technology.
Active Performance-cores	All[Default], 5,4,3, 2,1	Number of P-cores to enable in each processor package. Note: Number of Cores and E-cores are looked at together. When both are {0,0}, Pcode will enable all cores.
Active Efficient-cores	All[Default], 3,2, 1,0	Number of E-cores to enable in each processor package. Note: Number of Cores and E-cores are looked at together. When both are {0,0}, Pcode will enable all cores.
Hyper-Threading	Disabled, Enabled[Default]	Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading Technology).
Intel(R) SpeedStep(tm)	Disabled, Enabled[Default]	Allows more than two frequency ranges to be supported.
Intel(R) Speed Shift Technology	Disabled, Enabled[Default]	Enable/Disable Intel(R) Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.
Turbo Mode	Disabled, Enabled[Default]	Enable/Disable processor Turbo Mode.
C states	Disabled, Enabled[Default]	Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.

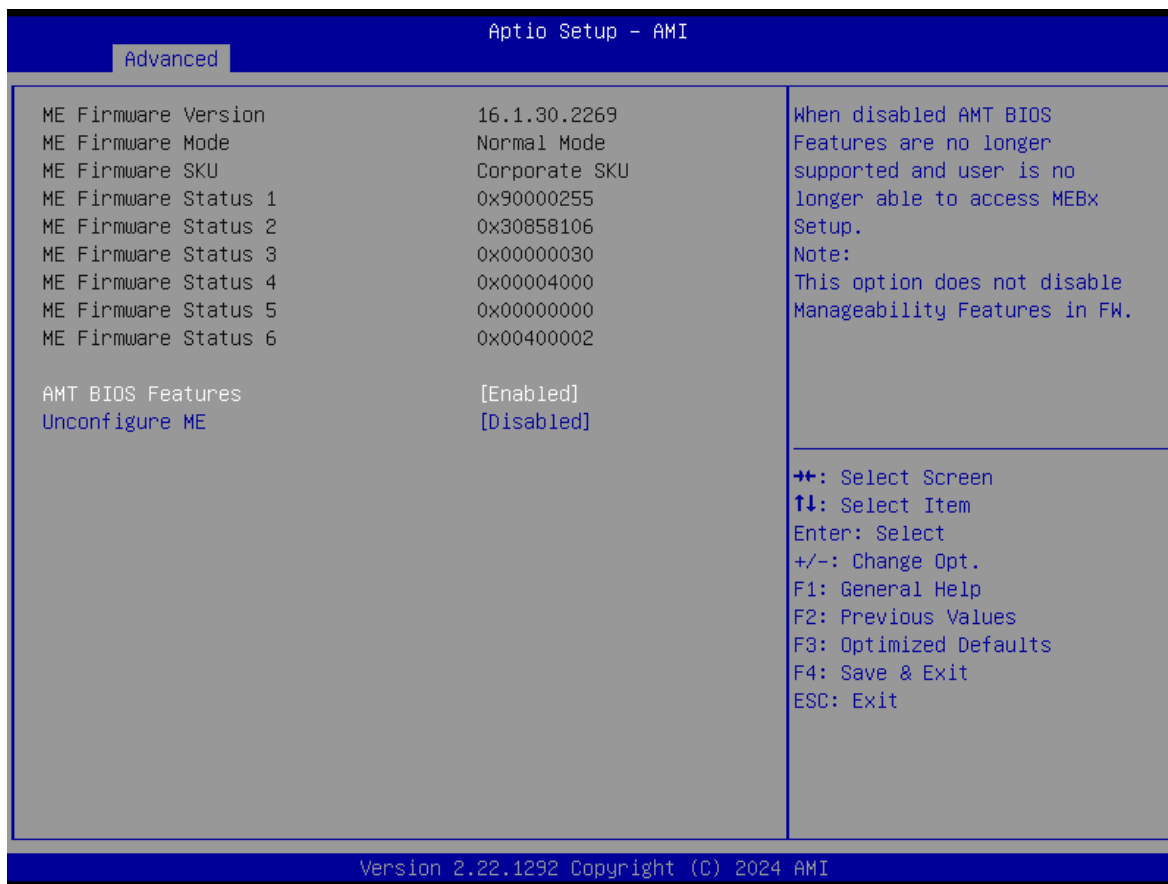
4.3.2.1 Efficient-core Information



4.3.2.2 Performance-core Information



4.3.3 PCH-FW Configuration



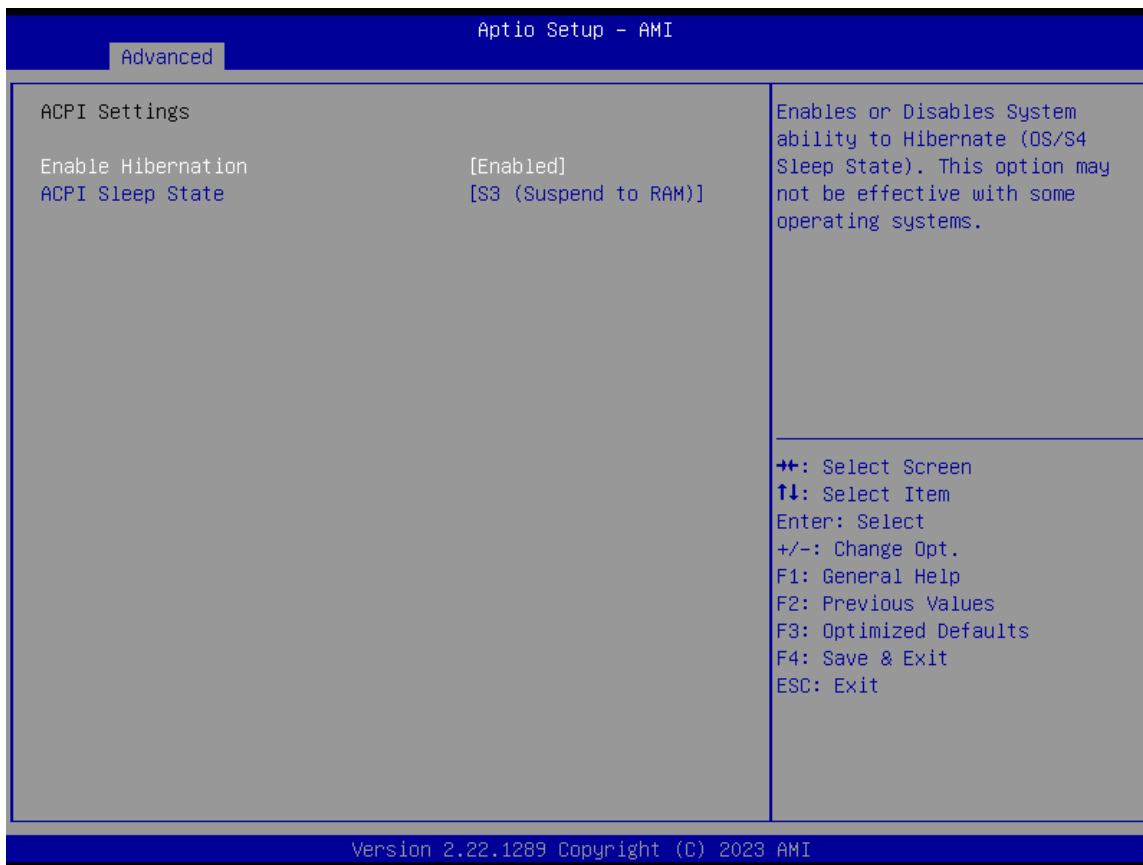
Item	Options	Description
AMT BIOS Features	Disabled, Enabled[Default]	When disabled AMT BIOS Features are no longer supported and user is no longer able to access MEBx Setup. Note:This option does not disable Manageability Features in FW.
Unconfigure ME	Disabled[Default] , Enabled	Unconfigure ME with resetting MEBx password to default on next boot.

4.3.4 Trusted Computing



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

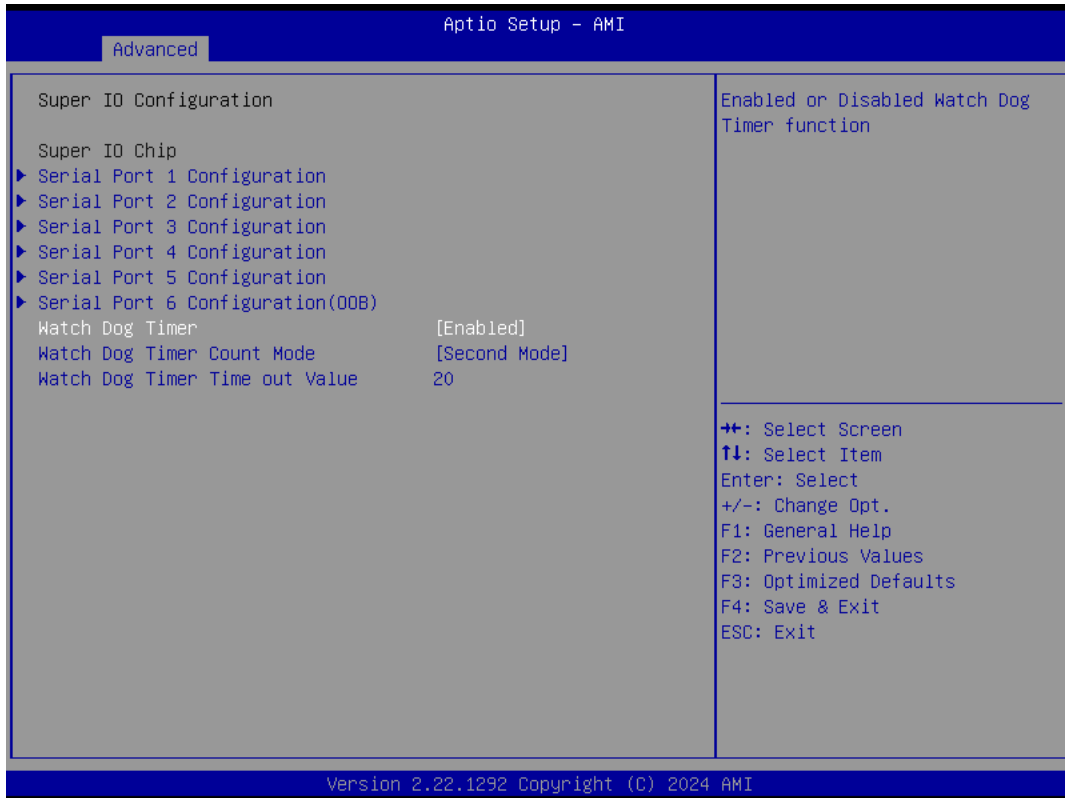
4.3.5 ACPI Settings



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

4.3.6 Super IO Configuration

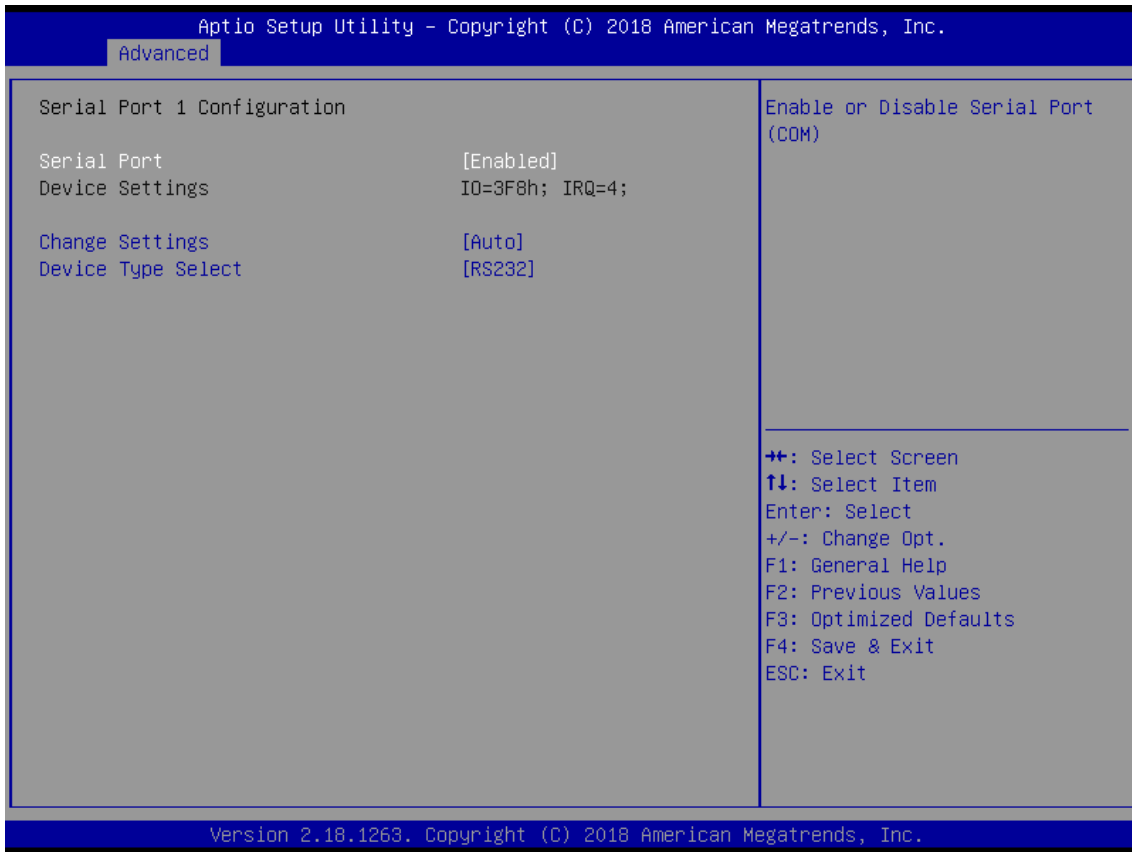
This setting allows you to select options for the Super IO Configuration, and change the value of the selected option.



Item	Description
Serial Port 1 Configuration	Set Parameters of Serial Port 1 (COMA).
Serial Port 2 Configuration	Set Parameters of Serial Port 2 (COMB).
Serial Port 3 Configuration	Set Parameters of Serial Port 3 (COMC).
Serial Port 4 Configuration	Set Parameters of Serial Port 4 (COMD).
Serial Port 5 Configuration	Set Parameters of Serial Port 5 (COME).
Serial Port 6 Configuration(OOB)	For OOB(Out-of-Band) only

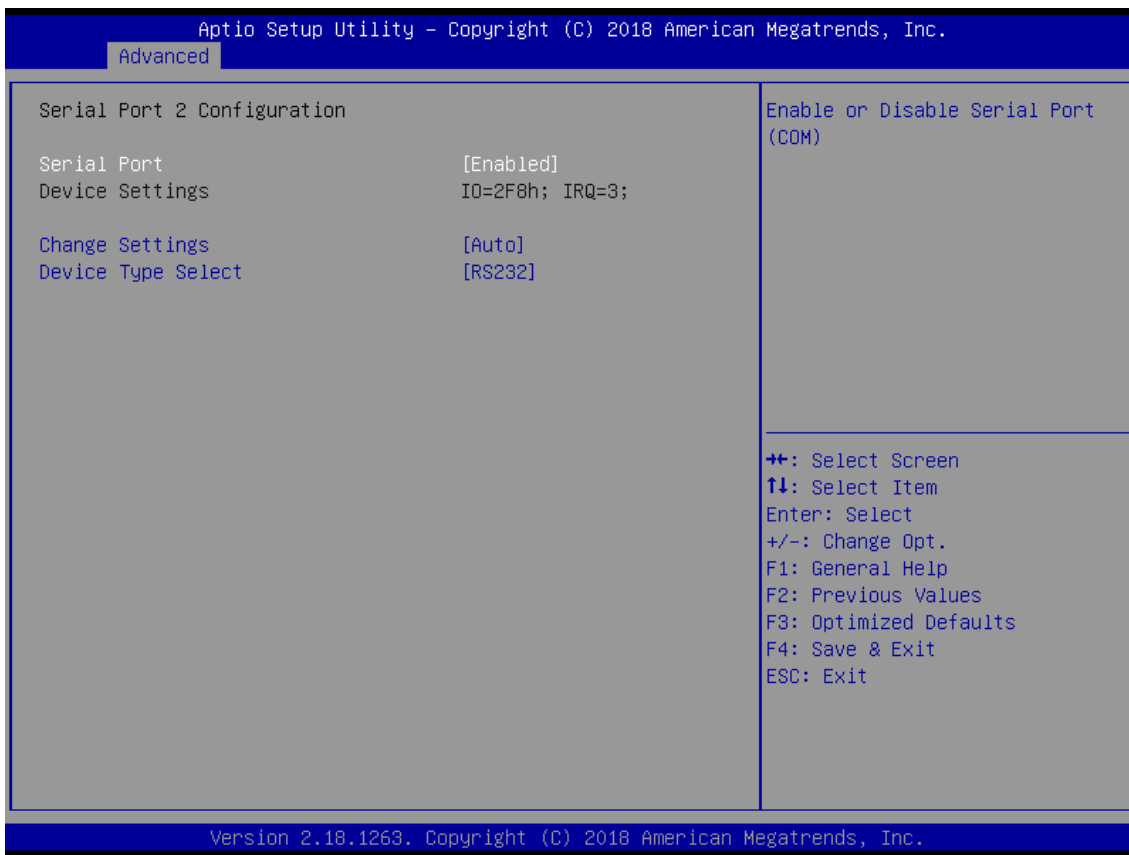
Item	Options	Description
Watch Dog Timer	Disabled [Default], Enabled	Enabled or Disabled Watch Dog Timer function.
Watch Dog Timer Count Mode	Second Mode[Default], Minute Mode	Select Second Mode or Minute Mode.
Watch Dog Timer Time out Value	20~255(Second)[Default], 1~255(Minute)	Watch Dog Timer Time out Value.

Serial Port 1 Configuration



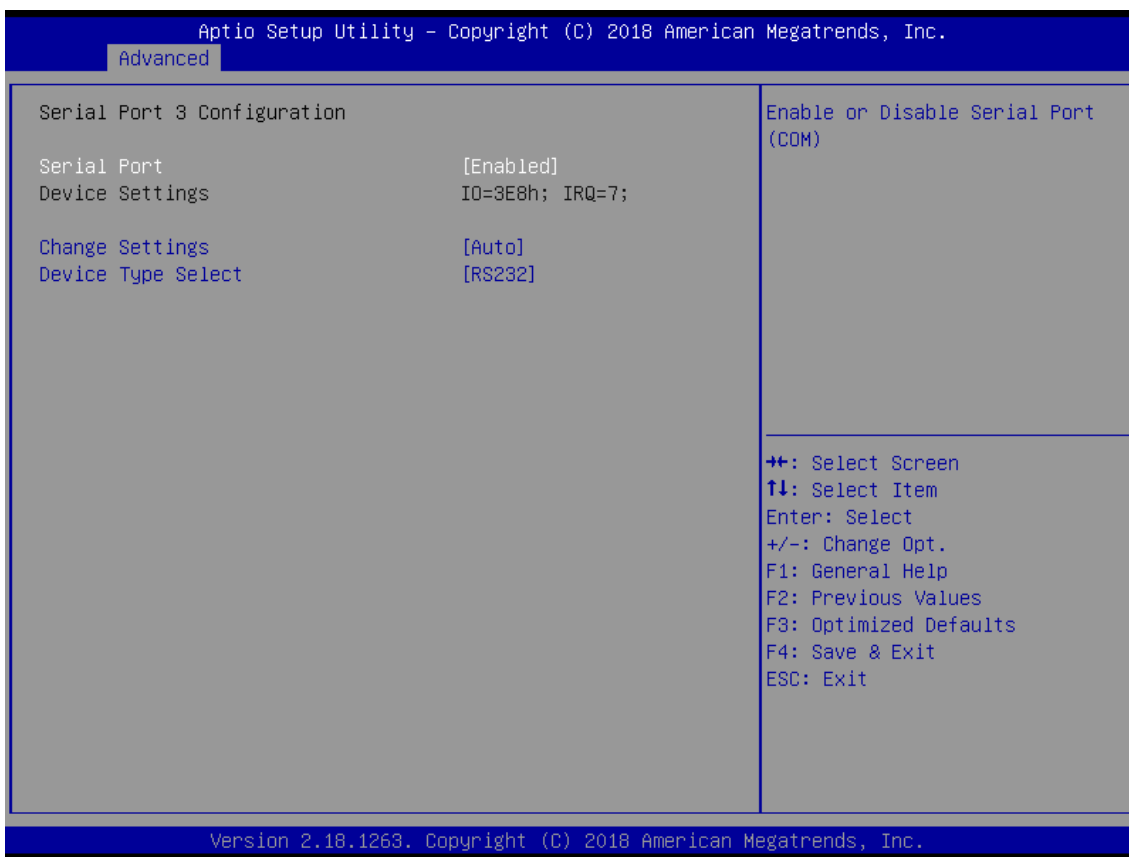
Item	Options	Description
Serial Port	Disabled, Enabled[Default]	Enable or Disable Serial Port (COM).
Change Settings	Auto[Default], IO=3F8h; IRQ=4; , IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; , IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12;; IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12;; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;	This item allows you to change the address & IRQ settings of the specified serial port.
Device Type Select	UART 232[Default], UART 422, UART 485	Set the Serial Port to RS232 & RS422 & RS485
RS-485 Auto Flow Function	Disabled, Enabled[Default]	Enabled/Disabled RS485 Autoflow Function

Serial Port 2 Configuration



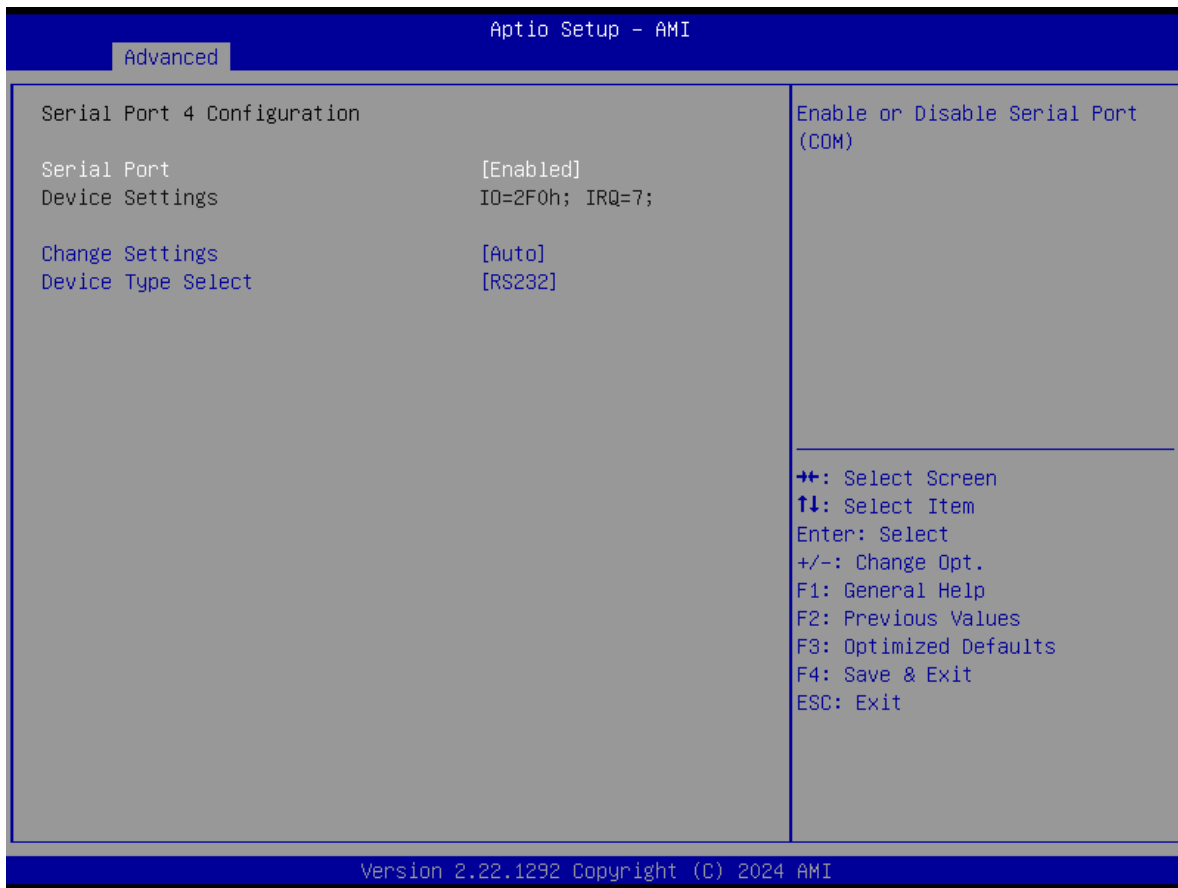
Item	Options	Description
Serial Port	Disabled, Enabled[Default]	Enable or Disable Serial Port (COM).
Change Settings	Auto[Default], IO=2F8h; IRQ=3; , IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; , IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12;; IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12;; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;	This item allows you to change the address & IRQ settings of the specified serial port.
Device Type Select	UART 232[Default], UART 422, UART 485	Set the Serial Port to RS232 & RS422 & RS485
RS-485 Auto Flow Function	Disabled, Enabled[Default]	Enabled/Disabled RS485 Autoflow Function

Serial Port 3 Configuration



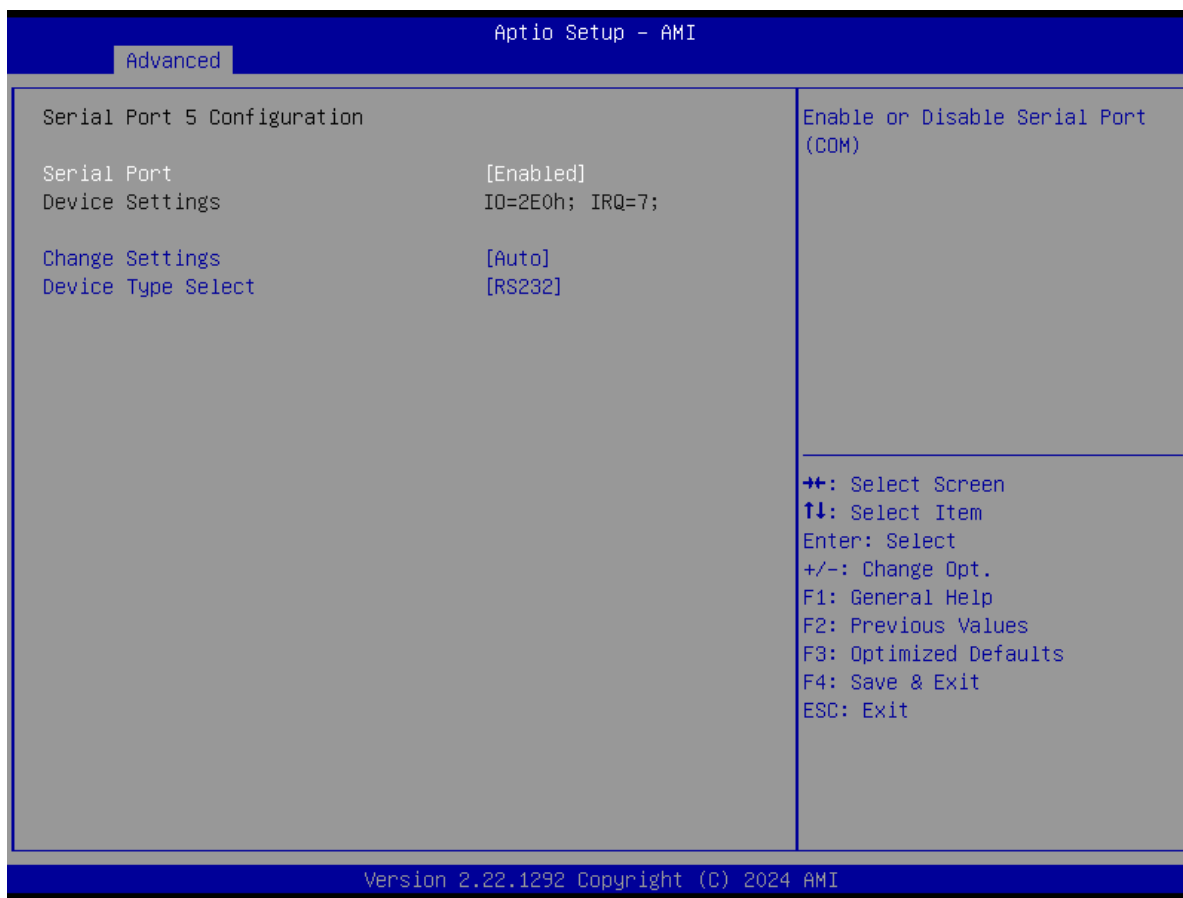
Item	Options	Description
Serial Port	Disabled, Enabled[Default]	Enable or Disable Serial Port (COM).
Change Settings	Auto[Default], IO=3E8h; IRQ=7; , IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; , IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;; IO=2F0h; IRQ=3,4,5,6,7,9,10,11,12;; IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12;	This item allows you to change the address & IRQ settings of the specified serial port.
Device Type Select	UART 232[Default], UART 422, UART 485	Set the Serial Port to RS232 & RS422 & RS485
RS-485 Auto Flow Function	Disabled, Enabled[Default]	Enabled/Disabled RS485 Autoflow Function

Serial Port 4 Configuration



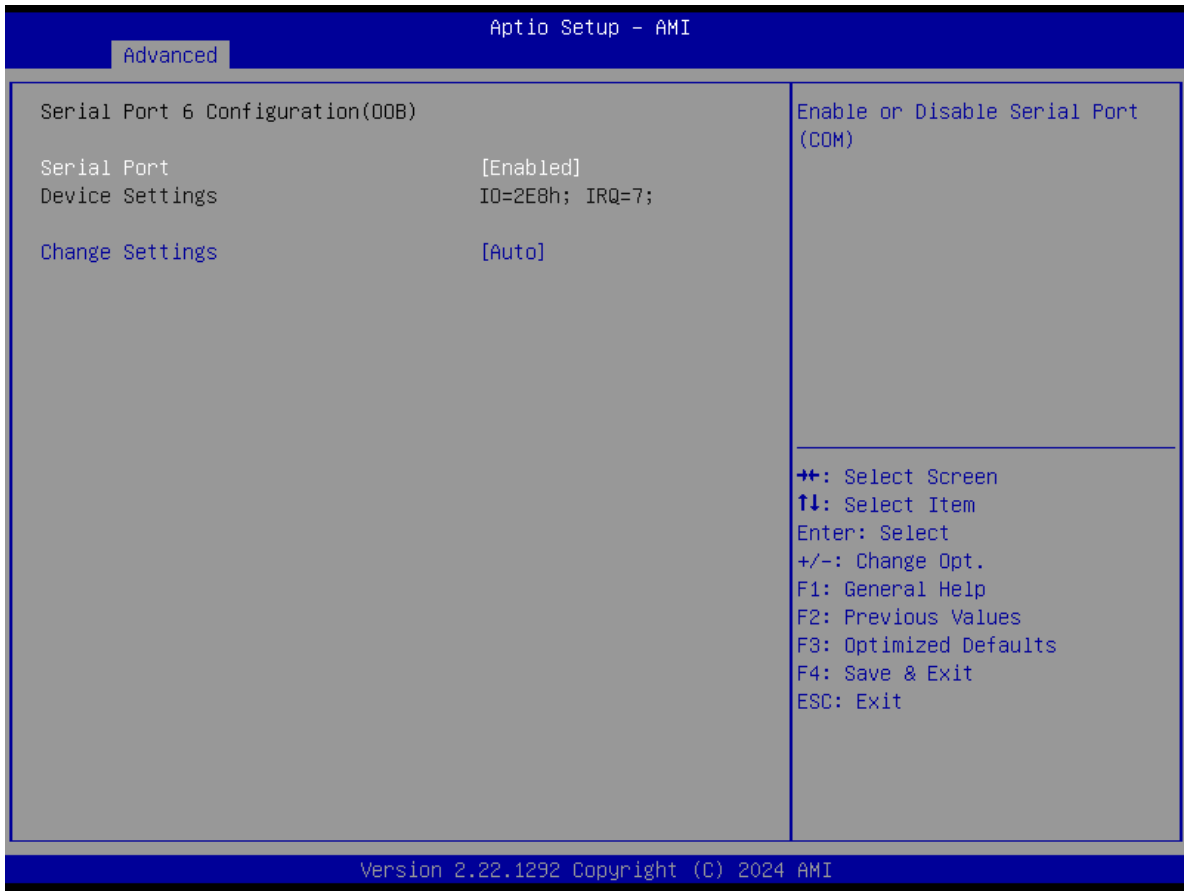
Item	Options	Description
Serial Port	Disabled, Enabled[Default]	Enable or Disable Serial Port (COM).
Change Settings	Auto[Default], IO=2F0h; IRQ=7; , IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; , IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12; , IO=2F0h; IRQ=3,4,5,6,7,9,10,11,12; , IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12;	This item allows you to change the address & IRQ settings of the specified serial port.
Device Type Select	UART 232[Default], UART 422, UART 485	Set the Serial Port to RS232 & RS422 & RS485
RS-485 Auto Flow Function	Disabled, Enabled[Default]	Enabled/Disabled RS485 Autoflow Function

Serial Port 5 Configuration



Item	Options	Description
Serial Port	Disabled, Enabled[Default]	Enable or Disable Serial Port (COM).
Change Settings	Auto[Default], IO=2E0h; IRQ=7; , IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; , IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12;, IO=2F0h; IRQ=3,4,5,6,7,9,10,11,12;, IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12;	This item allows you to change the address & IRQ settings of the specified serial port.
Device Type Select	UART 232[Default], UART 422, UART 485	Set the Serial Port to RS232 & RS422 & RS485
RS-485 Auto Flow Function	Disabled, Enabled[Default]	Enabled/Disabled RS485 Autoflow Function

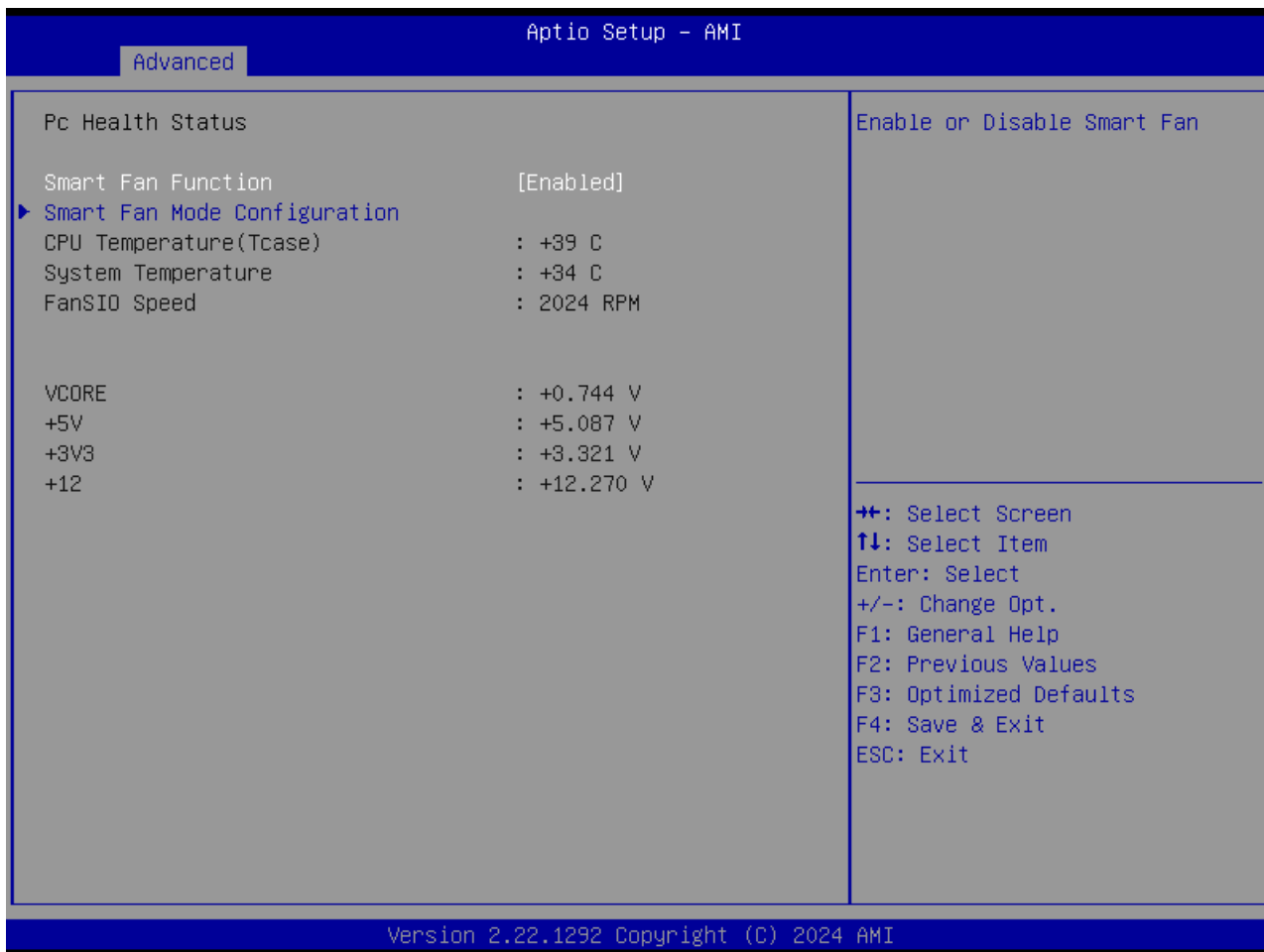
Serial Port 6 Configuration



Item	Options	Description
Serial Port	Disabled, Enabled[Default]	Enable or Disable Serial Port (COM).
Change Settings	Auto[Default], IO=2E8h; IRQ=7; , IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; , IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;; IO=2F0h; IRQ=3,4,5,6,7,9,10,11,12;; IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12;	This item allows you to change the address & IRQ settings of the specified serial port.

4.3.7 Hardware Monitor

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



Item	Options	Description
Smart Fan Function	Disabled, Enabled [Default],	Enabled or Disable Smart Fan

Smart Fan Mode Configuration

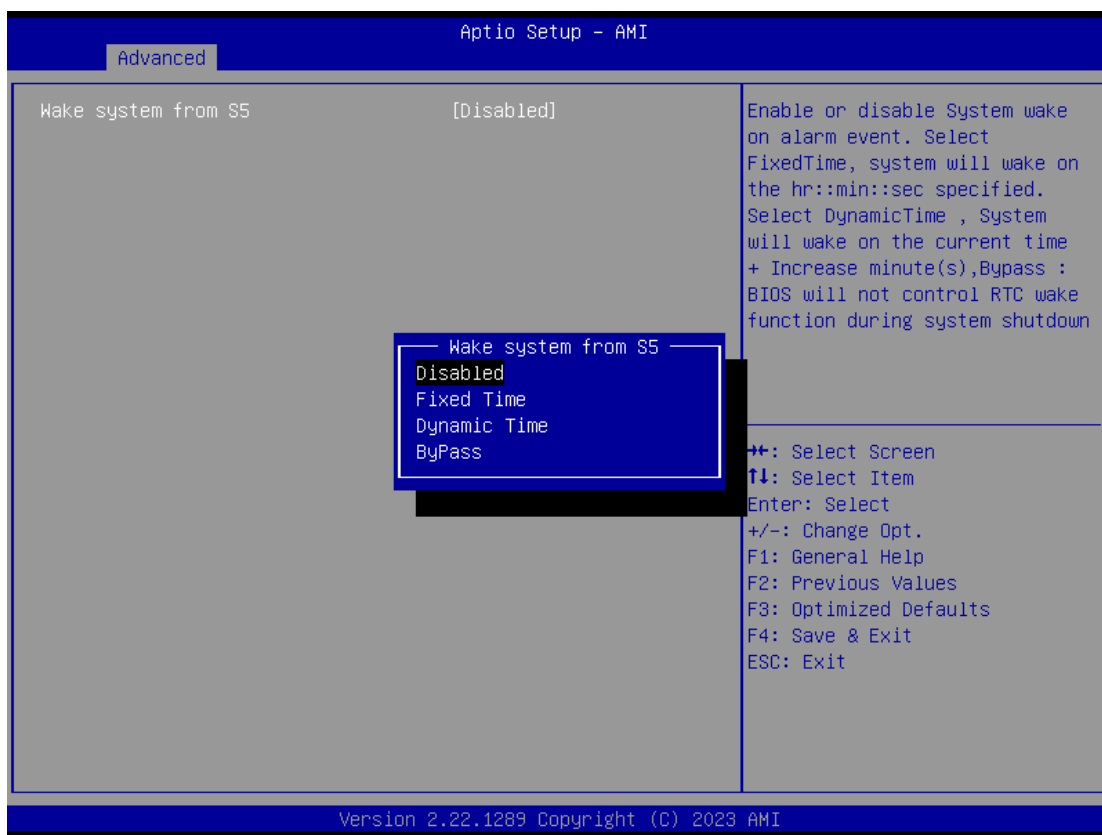
Item	Options	Description
FanSIO SmartFan Control	Manual Mode, Auto Duty-Cycle Mode[Default],	Smart Fan Mode Select
Temperature 1~4	1~100	Auto fan speed control. Temperature 1-100
Duty Cycle 1~4	20~100	Auto fan speed control. Duty 20-100

4.3.8. Power IGN Mode



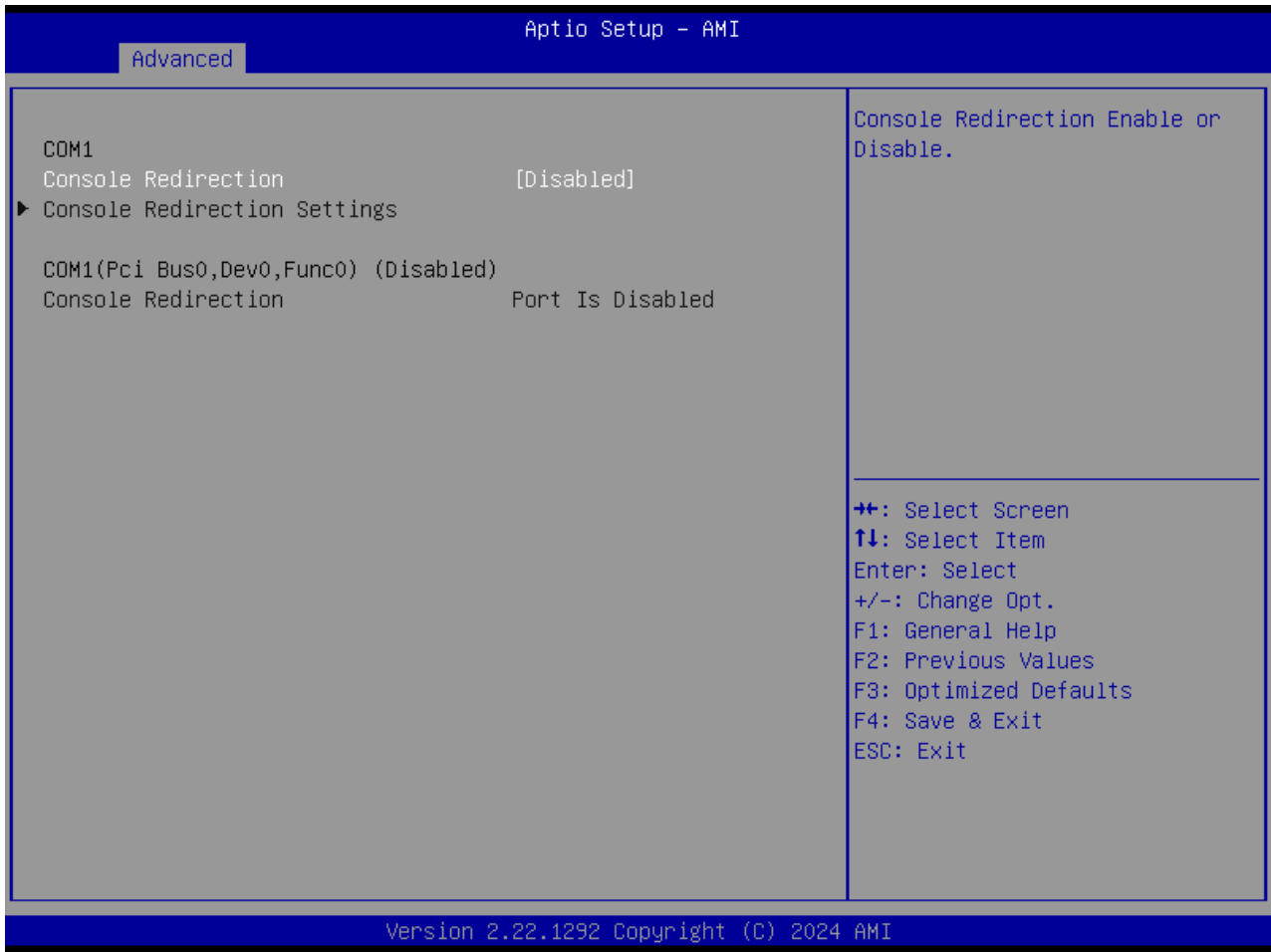
Item	Options	Description
IGN Setting	Read mode[Default] Write IGN	Read IGN: BIOS will only read settings from IGN module. Write IGN: BIOS will overwrite settings in IGN module.
Power On Delay	10 Sec[Default] 20 Sec 30 Sec 40 Sec 50 Sec 1 Min Manual Mode	Power On Delay Select
Manual Mode	10 Sec[Default]	10~60 Sec
Power Off Delay	3 Sec[Default] , 1 Min, 5 Min, 10 Min, 30 Min, 1 Hour, 2 Hour, Manual Mode	Power Off Delay Select
Manual Mode	3 Sec[Default]	3~7200 Sec

4.3.9. Wake system from S5



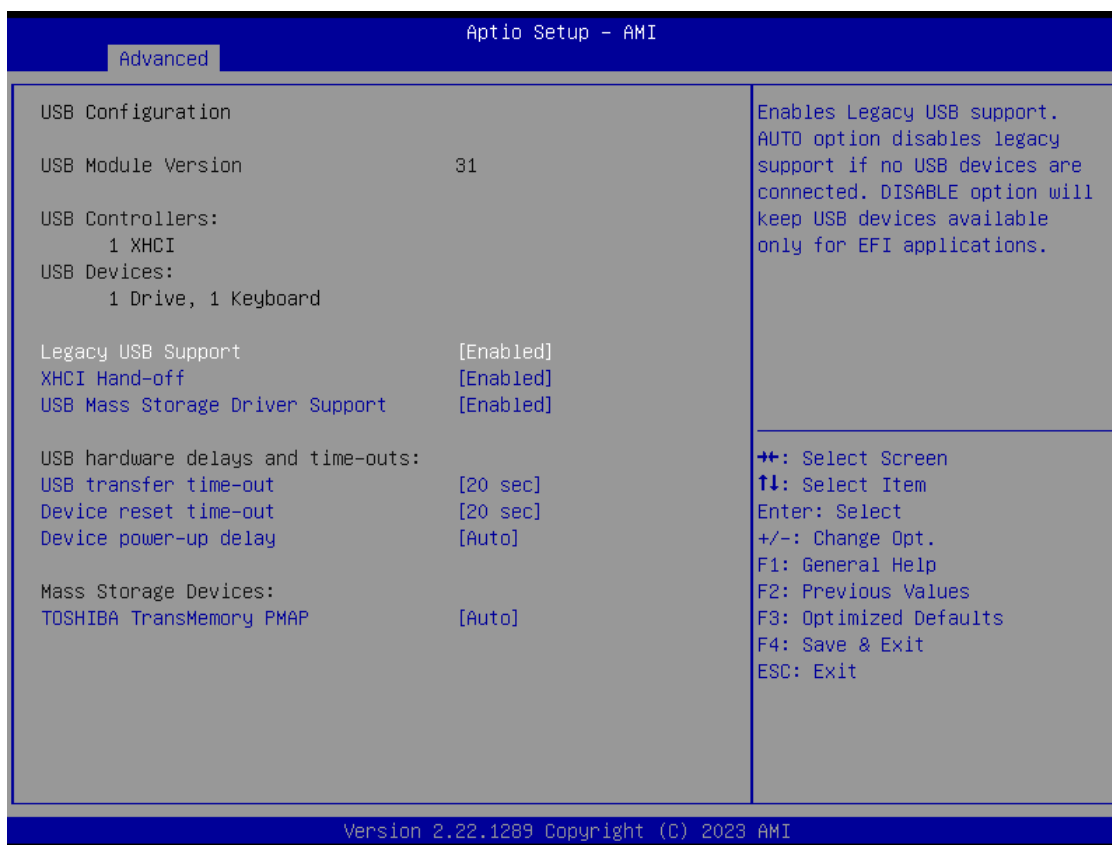
Item	Options	Description
Wake system from S5	Disabled[Default], Fixed Time, Dynamic Time, ByPass	Enable or disable System wake on alarm event. Select FixedTime, system will wake on the hr::min::sec specified. Select DynamicTime, System will wake on the current time + Increase minute(s), Bypass: BIOS will not control RTC wake function during system shutdown
Wake up day	0[Default]	Date (of month) Alarm (0 is mean daily or you can setup a specific month)
Wake up hour	0[Default]	select 0-23 For example enter 3 for 3am and 15 for 3pm
Wake up minute	0[Default]	select 0-59 for Minute
Wake up second	0[Default]	select 0-59 for Second
Wake up minute increase	0[Default]	1 - 5

4.3.10 Serial Port Console Redirection



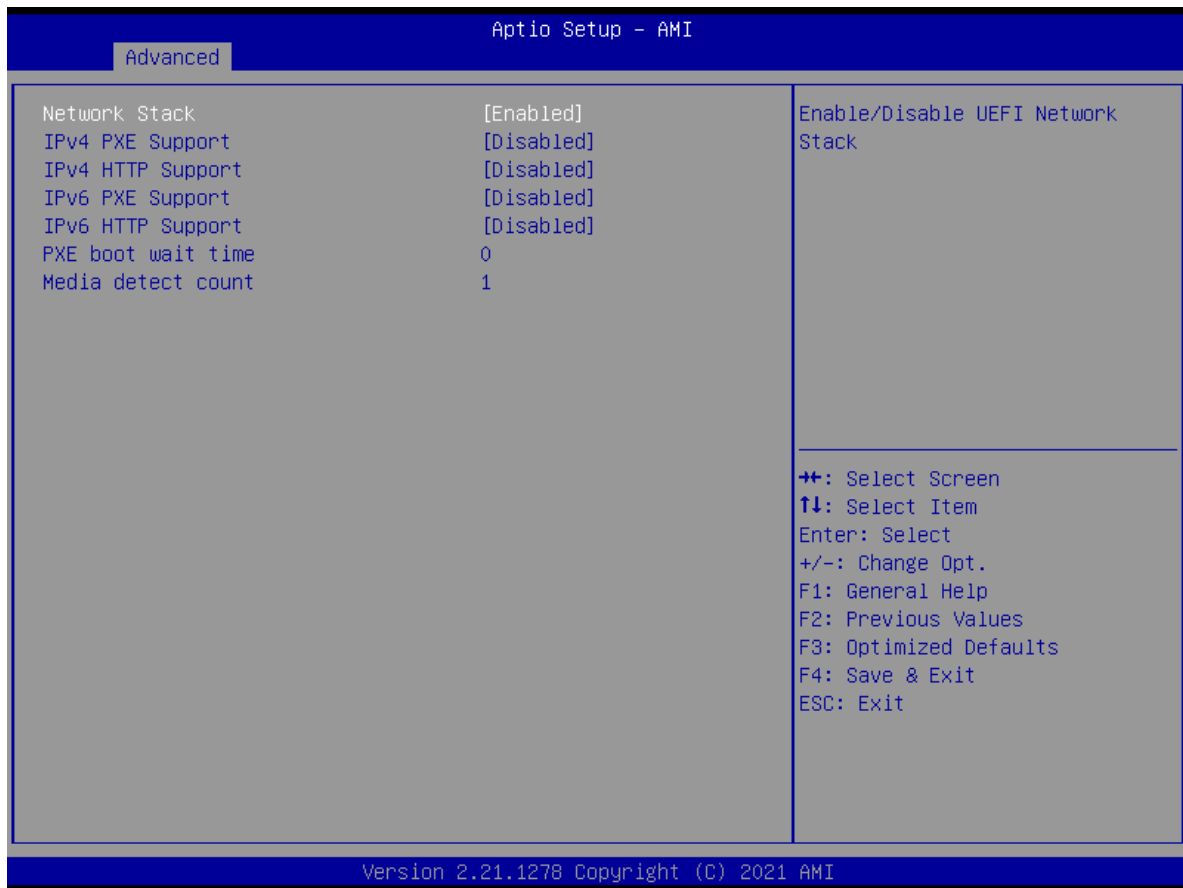
Item	Options	Description
Console Redirection	Disabled[Default], Enabled	These items allows you to enable or disable COM1 console redirection

4.3.11 USB Configuration



Item	Options	Description
Legacy USB Support	Enabled[Default] Disabled Auto	Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
XHCI Hand-off	Enabled[Default] Disabled	This is a workaround for OSeW without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Enabled[Default] Disabled	Enable/Disable USB Mass Storage Driver Support.
USB transfer time-out	1 sec , 5 sec , 10 sec , 20 sec[Default]	The time-out value for Control, Bulk, and Interrupt transfers.
Device reset time-out	10 sec , 20 sec[Default] , 30 sec, 40 sec	USB mass storage device Start Unit command time-out.
Device power-up delay	Auto[Default] Manual	Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100ms, for a Hub port the delay is taken from Hub descriptor.

4.3.12 Network Stack Configuration



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

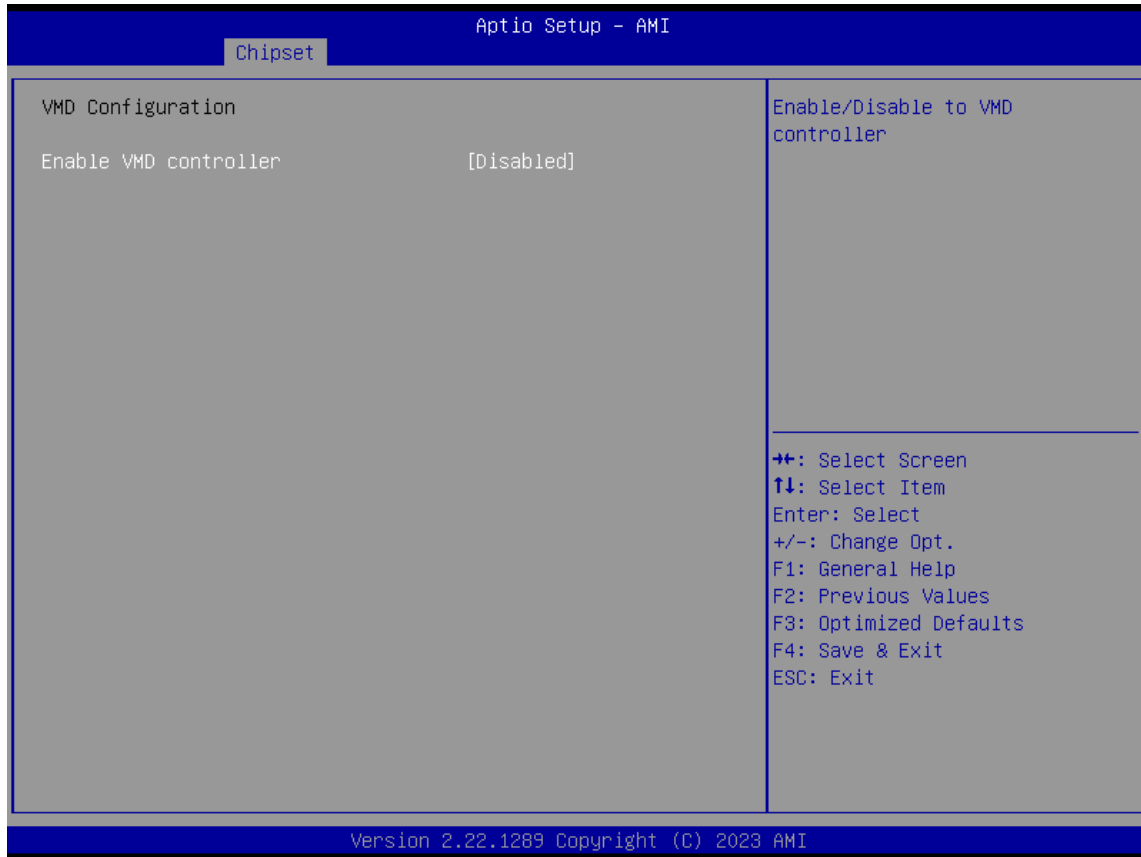
4.3.13 NVMe Configuration



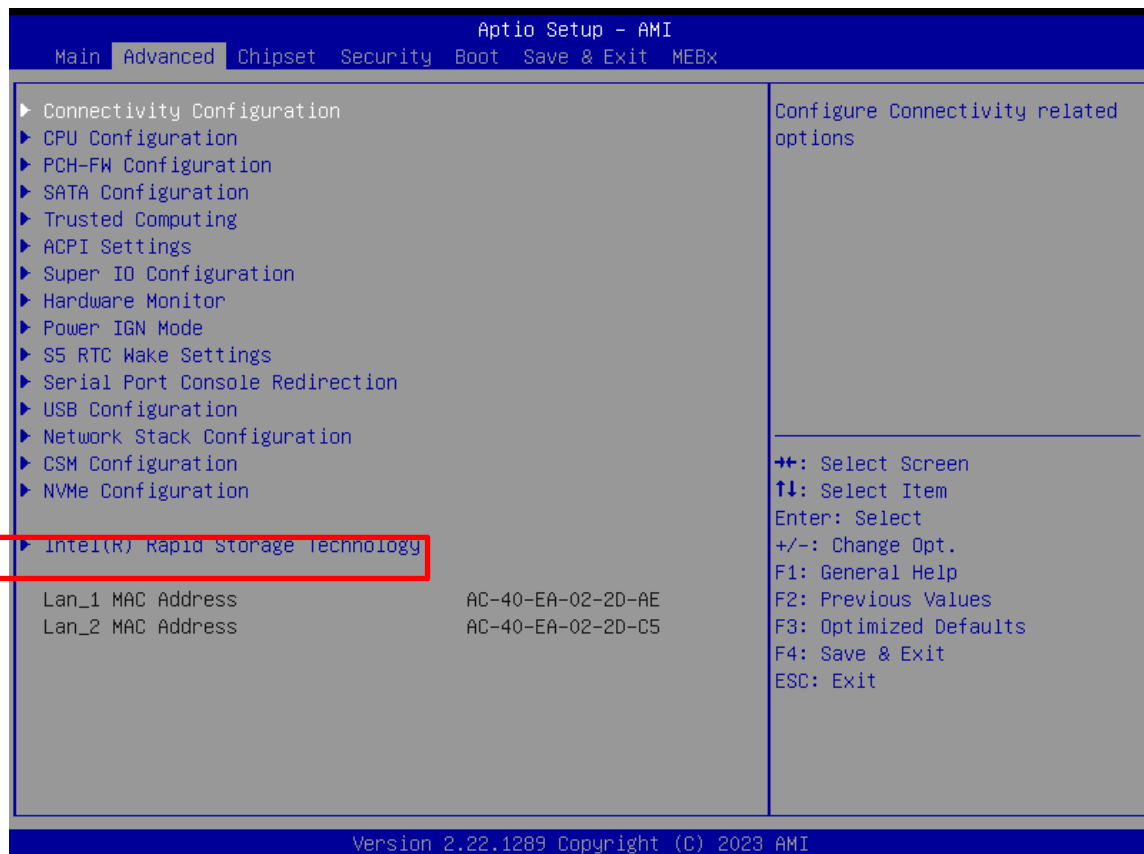
4.3.14 RST (UEFI RAID) Configuration

How to set the UEFI RAID:

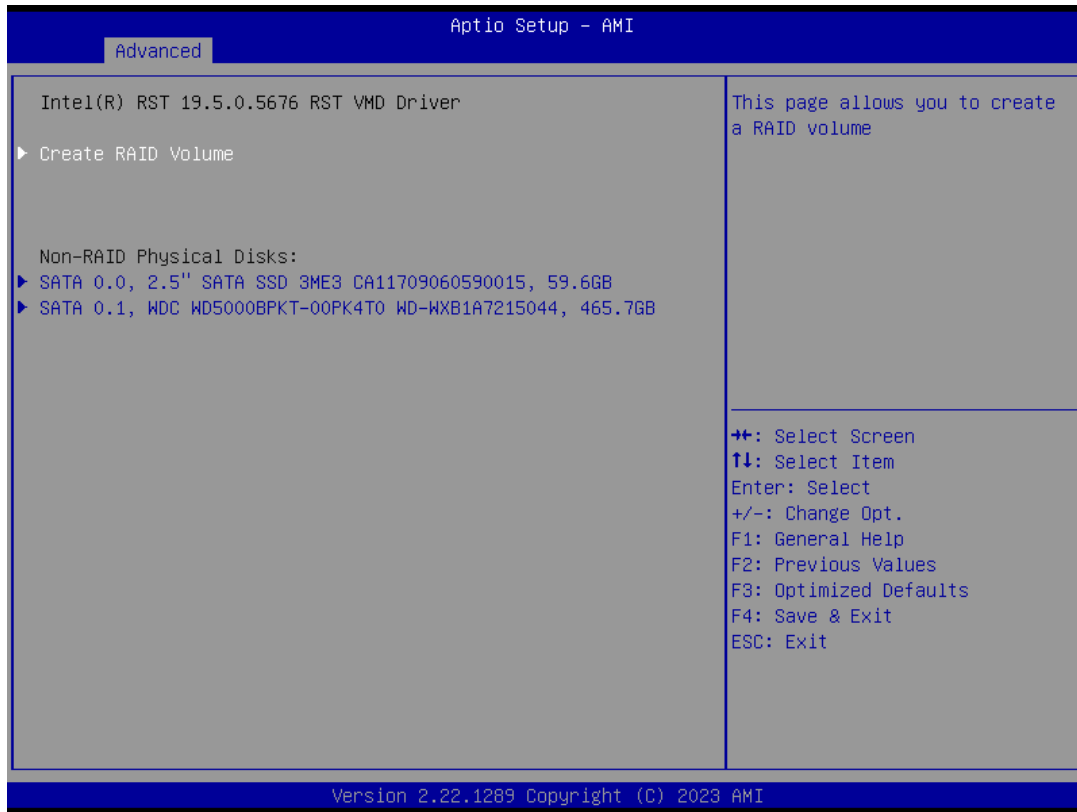
1. When set to "Enable VMD controller", please save change reset system.



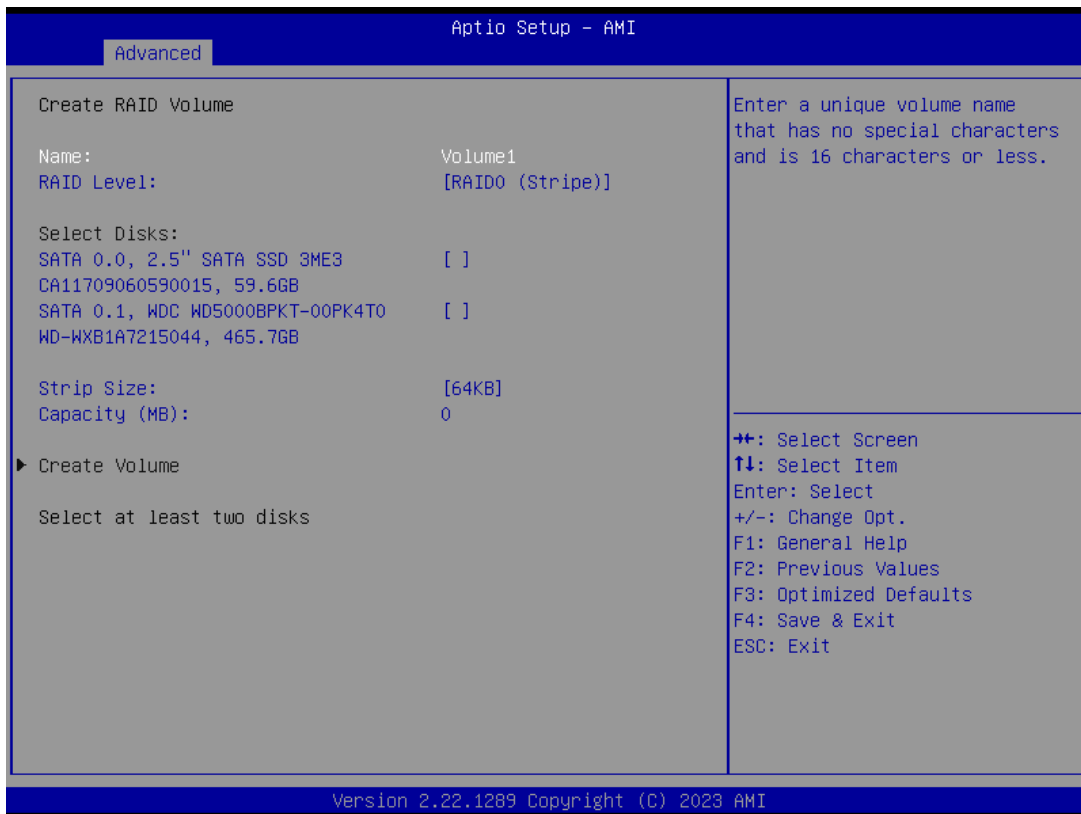
2. After reboot the system, please into BIOS utility and then will see "Intel (R) Rapid Storage Technology"



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



4. Start Create the RAID



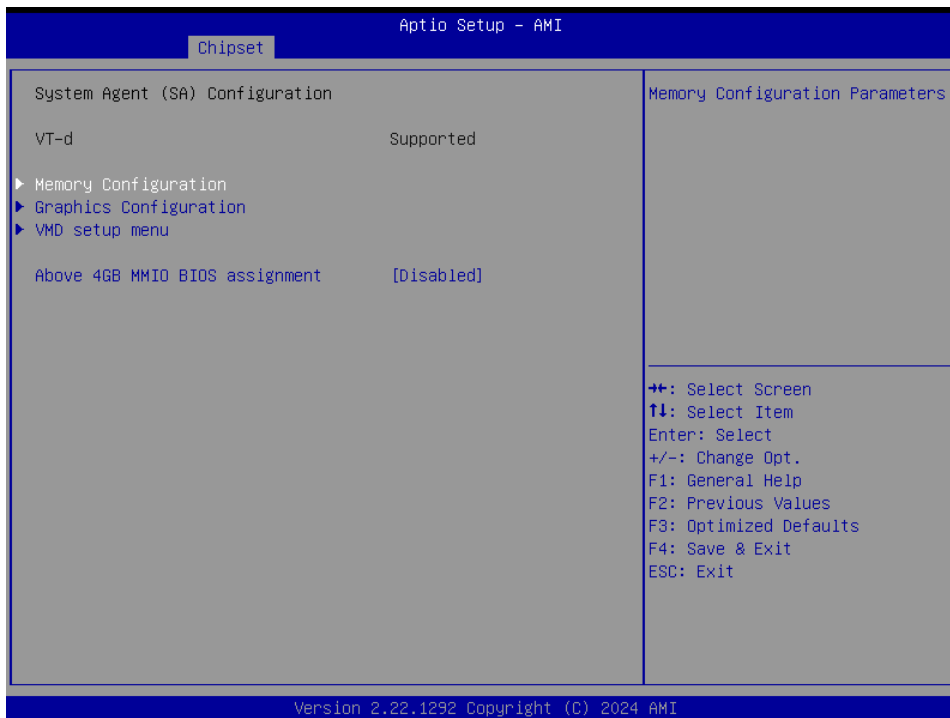
- Select Disk that you want to do the RAID
- Select [x]; No-Select []

4.4 Chipset

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



4.4.1 System Agent (SA) Configuration



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

■ Memory Configuration

Aptio Setup - AMI

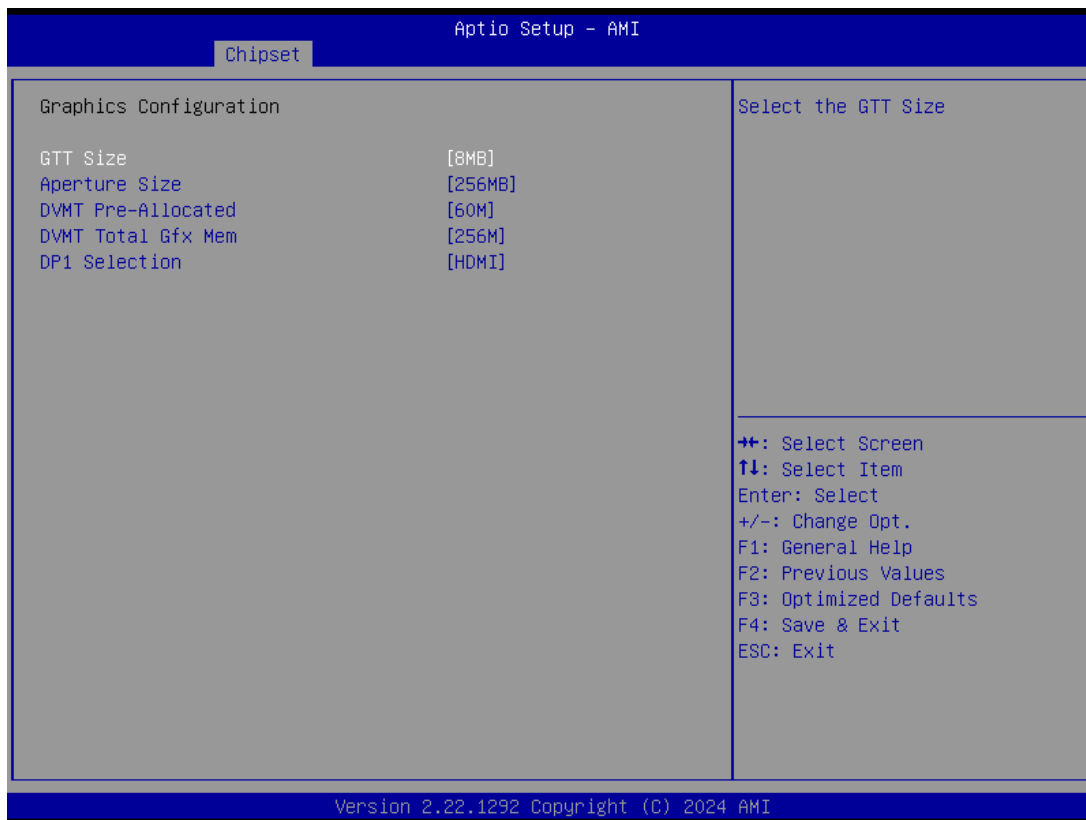
Chipset

Memory Configuration	
Memory Frequency	4800 MHz
tCL-tRCD-tRP-tRAS	40-39-39-77
MC 1 Ch 0 DIMM 0	Populated & Enabled
Size	16384 MB (DDR5)
Number of Ranks	1

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

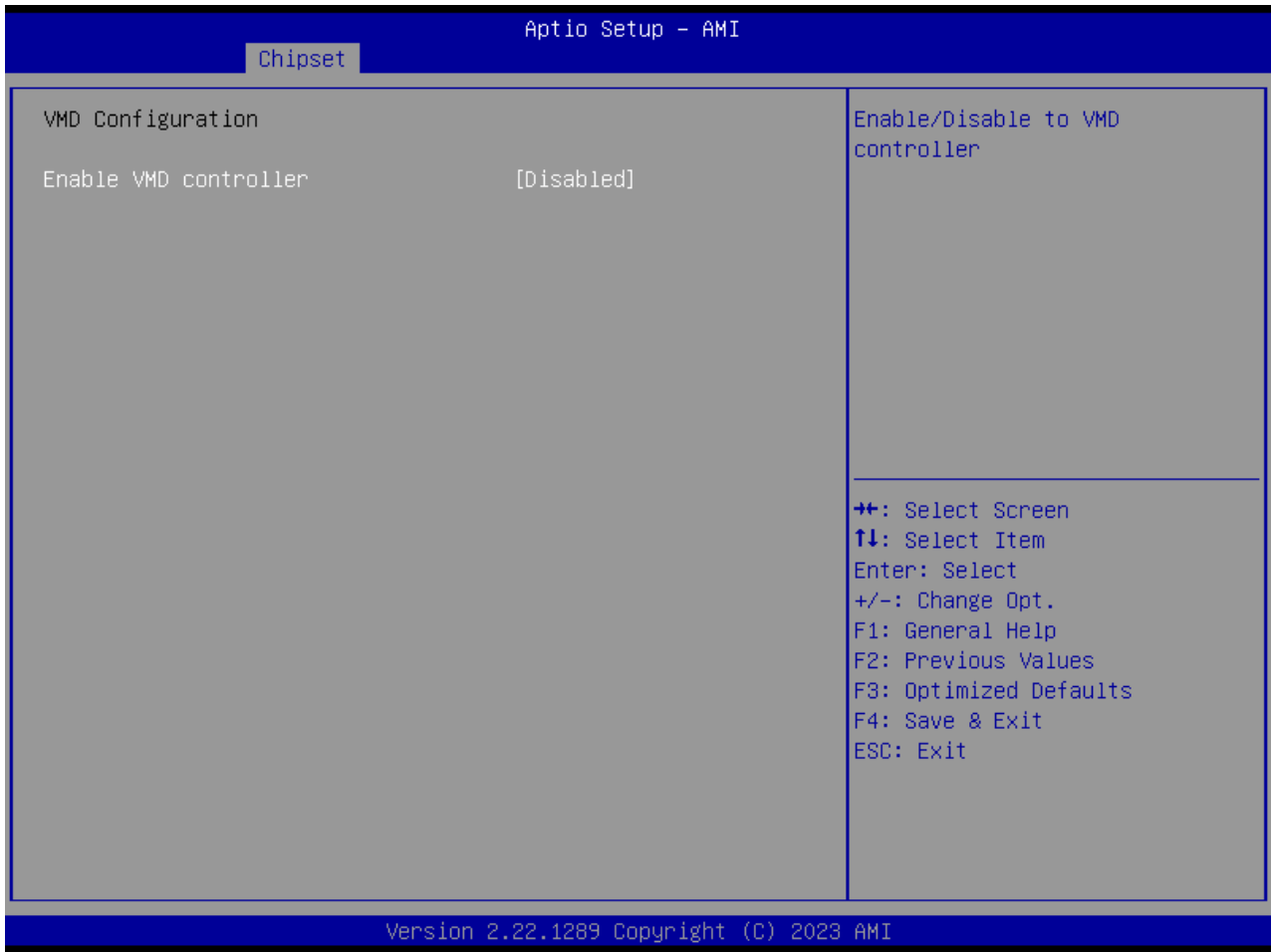
Version 2.22.1292 Copyright (C) 2024 AMI

■ Graphic Configuration



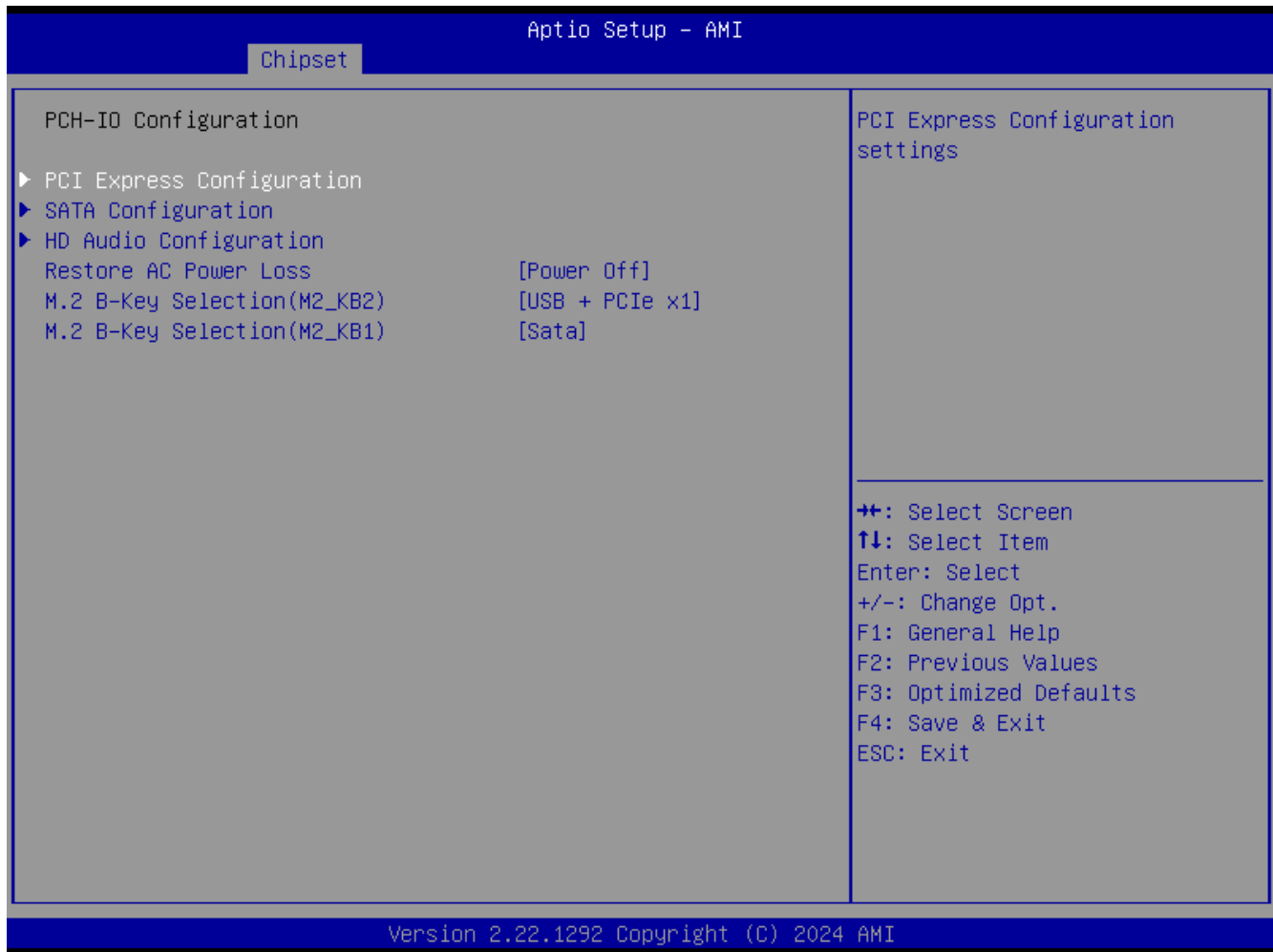
Item	Options	Description
GTT Size	2MB, 4MB, 8MB[Default]	Select the GTT Size .
Aperture Size	128MB, 256MB[Default] , 512MB, 1024MB	Select the Aperture Size. Note : Above 4GB MMIO BIOS assignment is automatically enabled when selecting 2048MB aperture. To use this feature, please disable CSM Support.
DVMT Pre-Allocated	32M,64M,96M,128M, 160M, 36M, 40M,44M, 48M,52M,56M, 60M[Default]	Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.
DVMT Total Gfx Mem	128M, 256M[Default] , MAX	Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device.
DP1 selection	DP, HDMI[Default]	Selects DP1 function: DP or HDMI

■ VMD Configuration



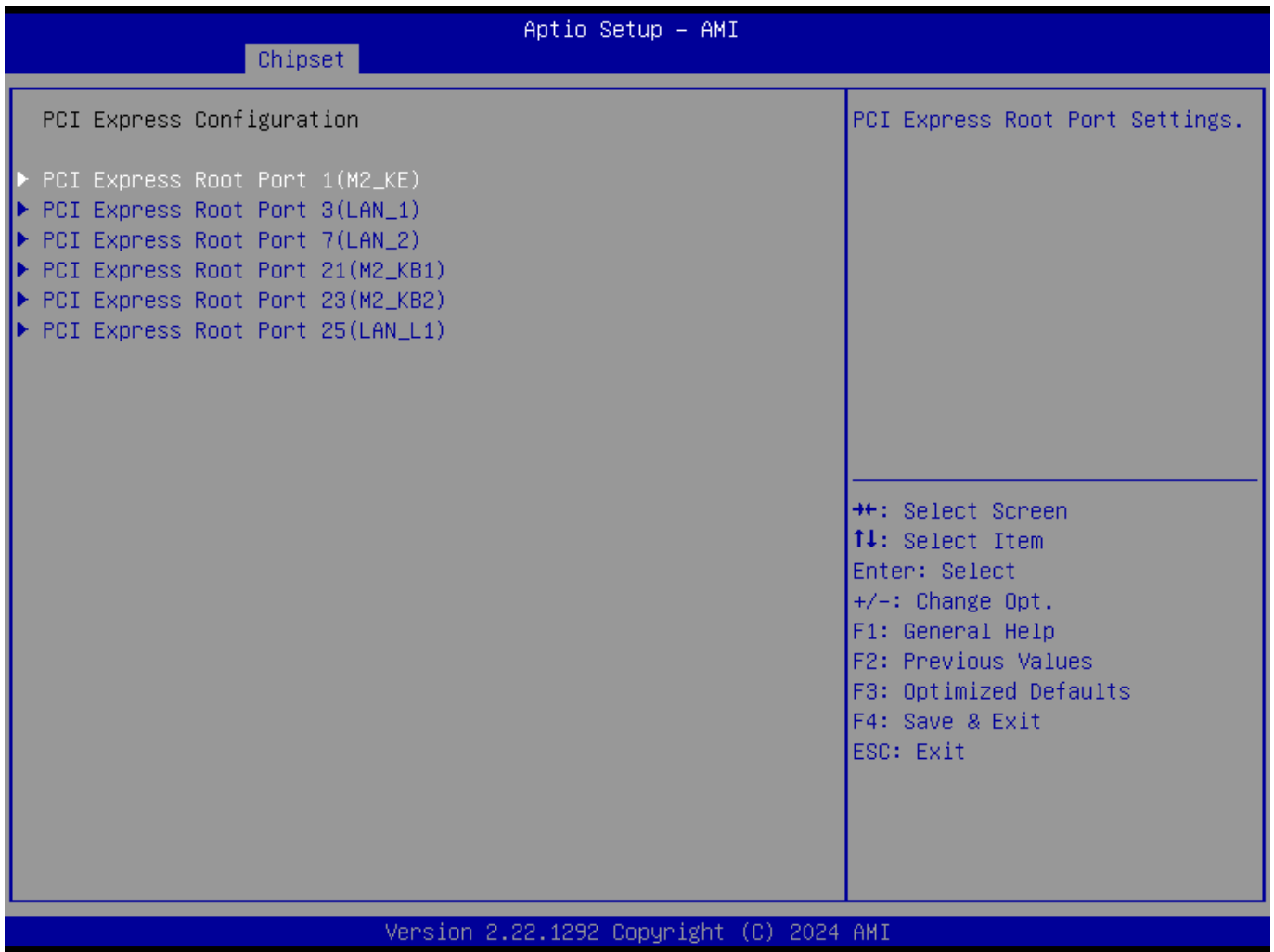
Item	Options	Description
Enable VMD controller	Enabled[Default], Disabled	Enable/Disable to VMD controller

4.4.2 PCH-IO Configuration

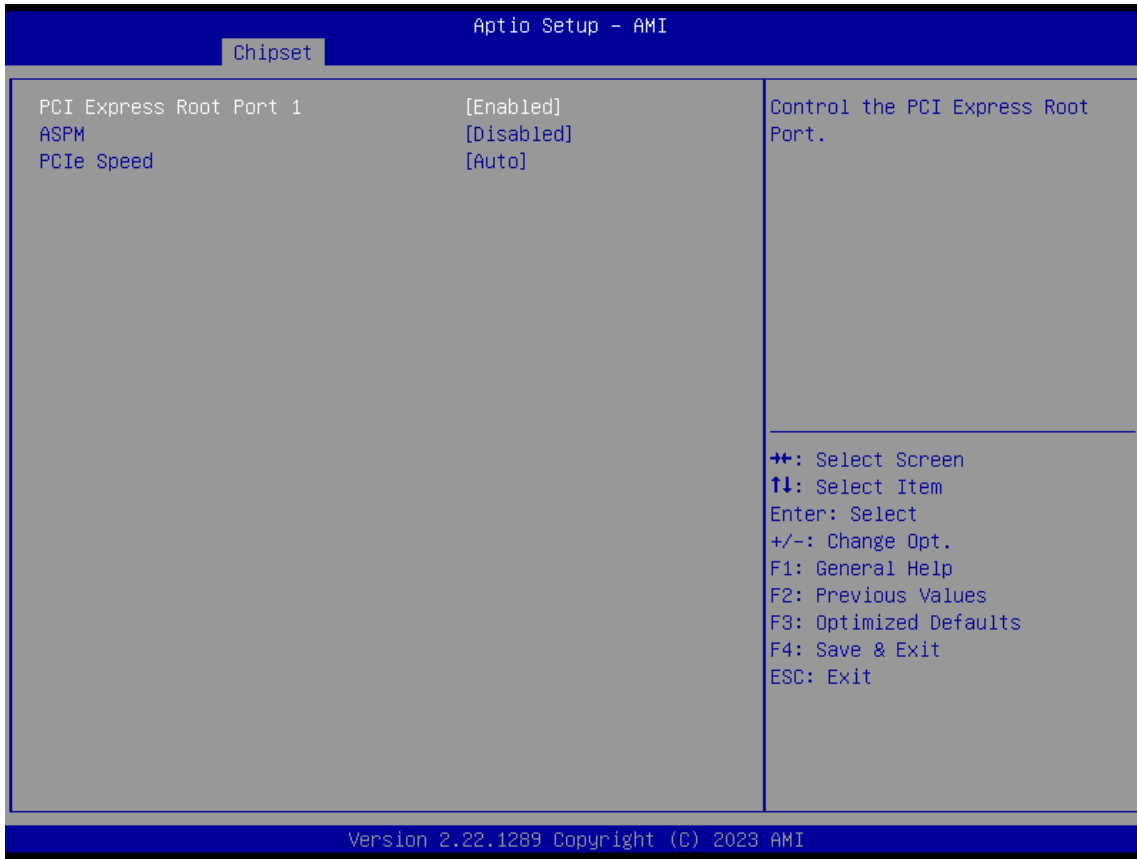


Item	Options	Description
Restore AC Power Loss	Power On, Power Off [Default] , Last State	Specify what state to go to when power is re-applied after a power failure (G3 state).
M.2 B-Key Selection(M2_KB2)	USB + PCIe x1 [Default] , PCIe x2	Selects M.2 B-KEY function: PCIe x2 or USB + PCIe x1.
M.2 B-Key Selection(M2_KB1)	Sata [Default] , PCIe x2	Selects M.2 B-Key(KB1) function: PCIe x2 or Sata.

■ PCI Express Configuration

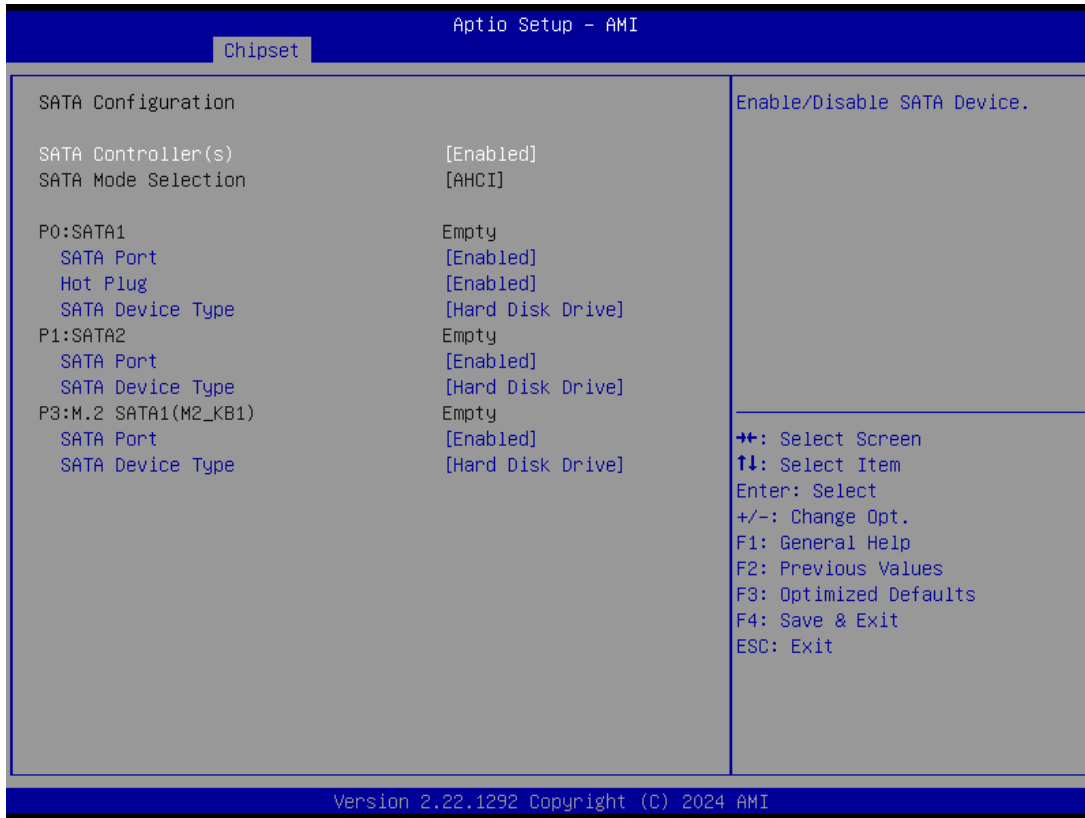


■ PCI Express Root Port 1 /3 /7 /21 /23 /27



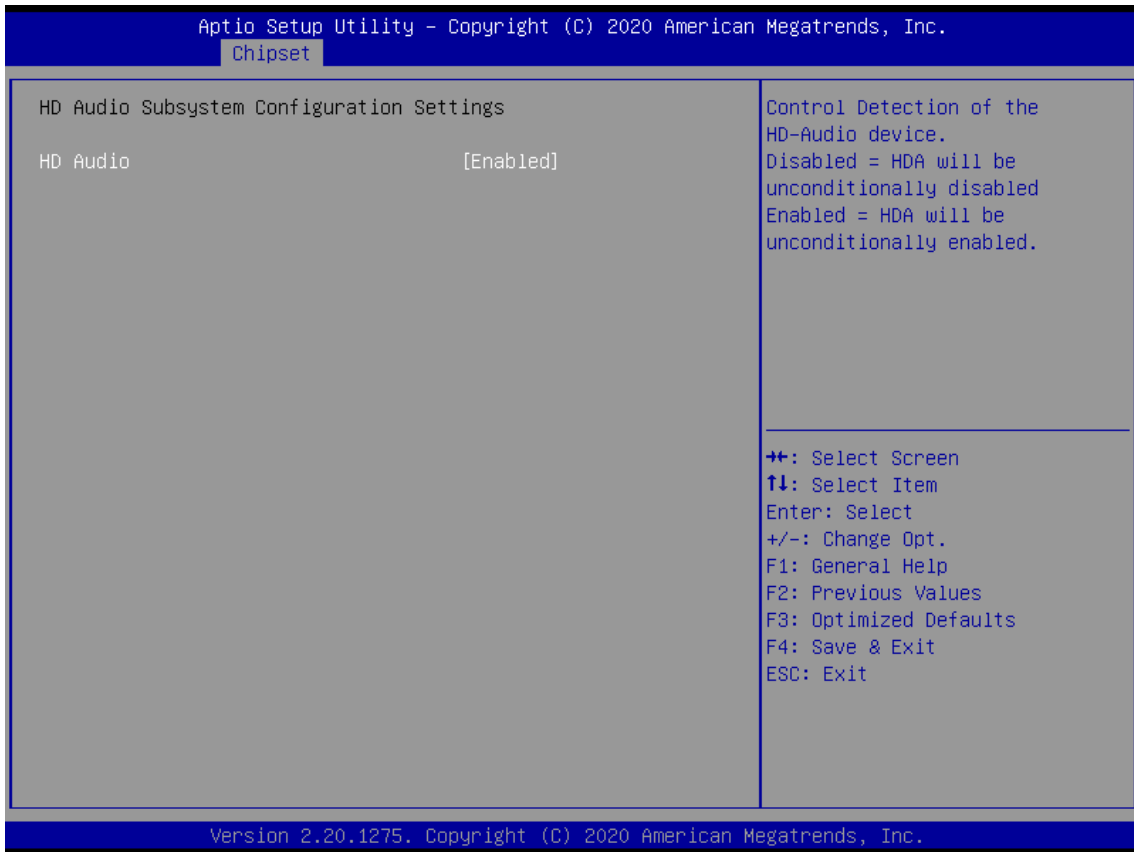
Item	Options	Description
PCI Express Root Port 1 /3 /7 /21 /23 /27	Disabled, Enabled [Default]	Control the PCI Express Root Port.
ASPM	Disabled [Default] , L1, Auto	Set the ASPM Level.
PCIe Speed	Auto [Default] , Gen1, Gen2, Gen3, Gen4	Configure PCIe speed.

SATA Configuration



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

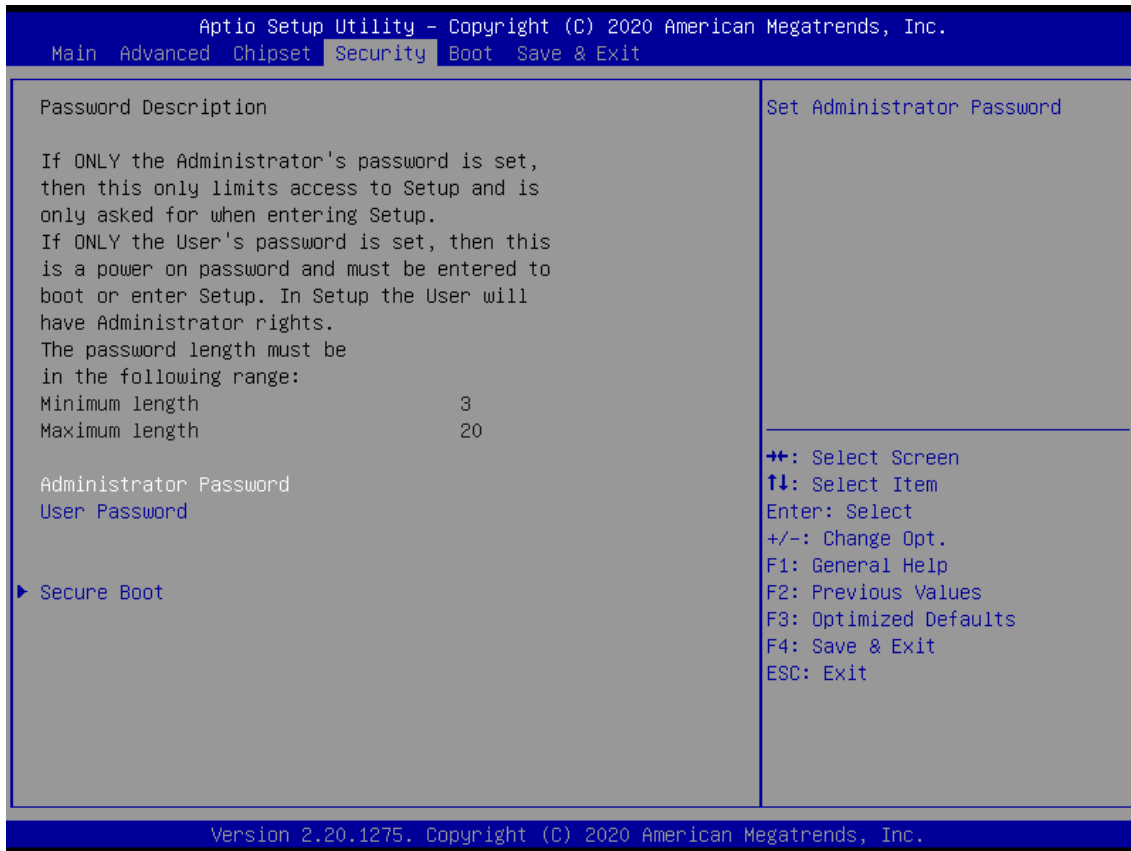
■ HD Audio Configuration



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

4.5 Security

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



■ Administrator Password

This item allows you to set Administrator Password.

■ User Password

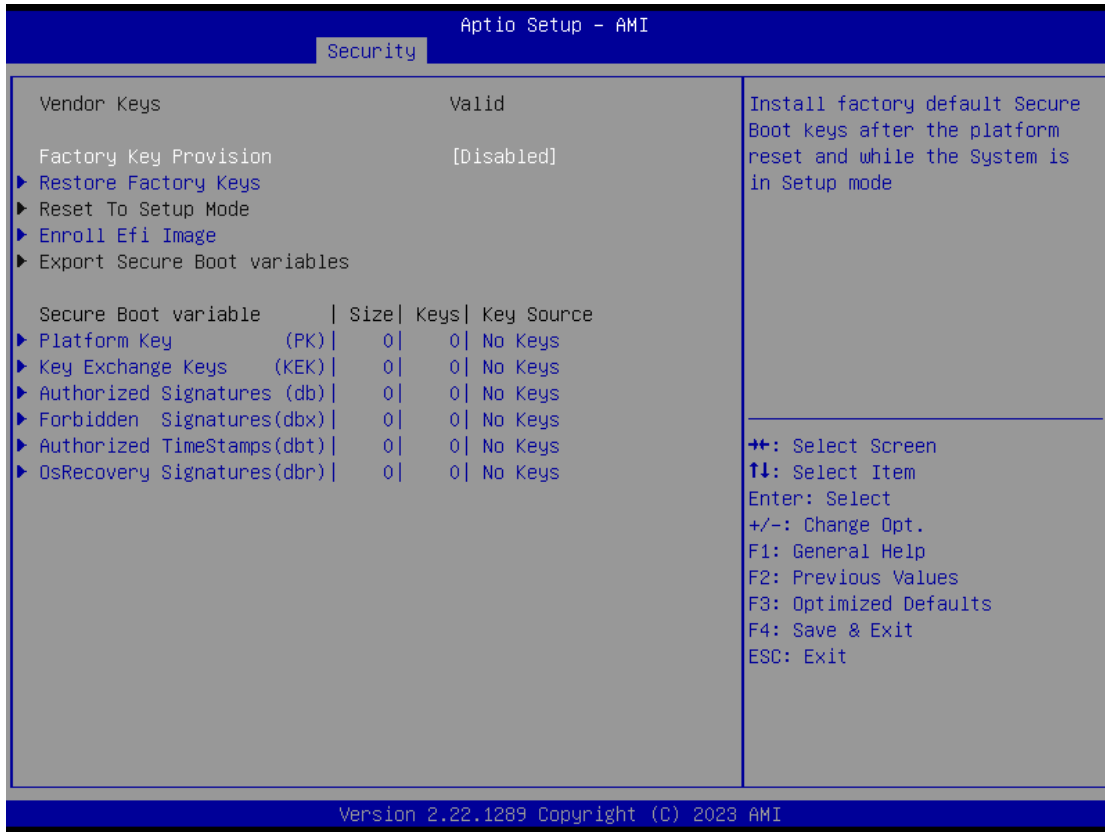
This item allows you to set User Password.

Security Boot



Item	Options	Description
Secure Boot	Disabled [Default] , Enabled	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	Standard, Custom [Default]	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

Key Management



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

4.6 Boot

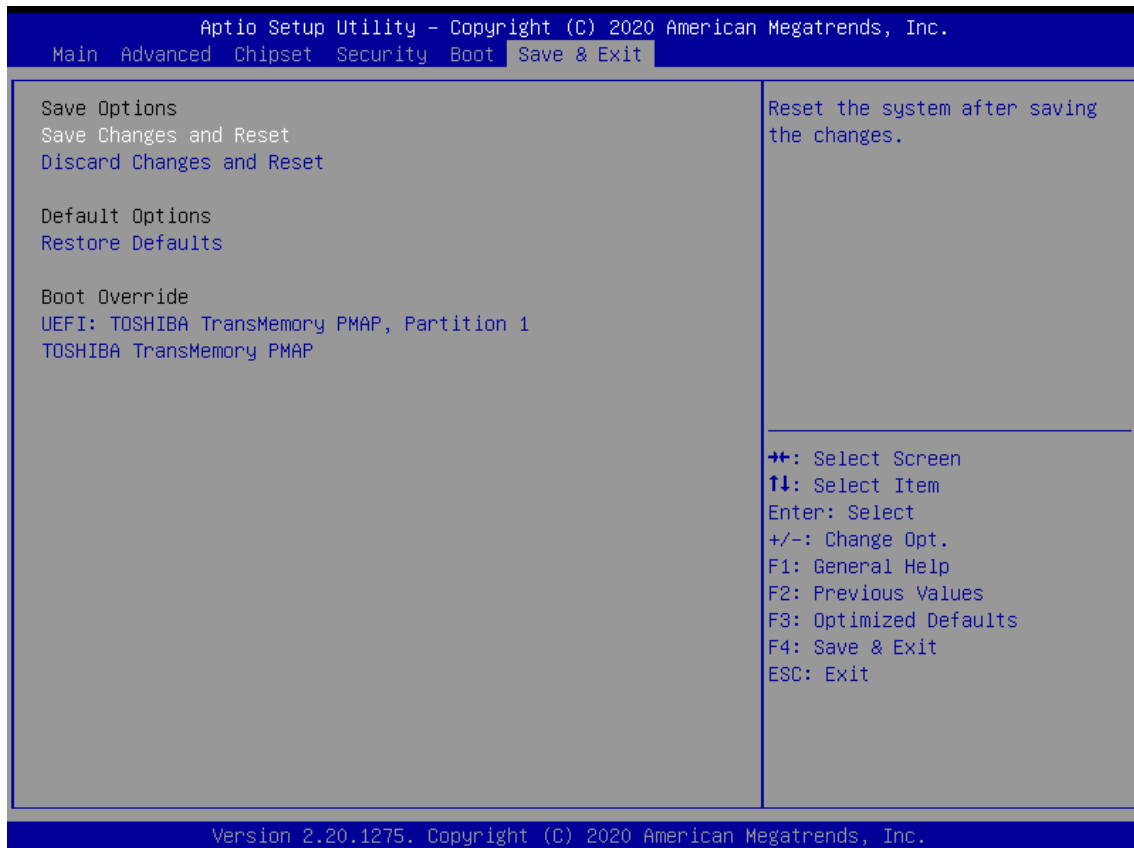
This menu allows you to setup the system boot options.



Item	Options	Description
Setup Prompt Timeout	1[Default]	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
Bootup NumLock State	On[Default] , Off	Select the Keyboard NumLock state.
Quiet Boot	Disabled[Default] , Enabled	Enables or disables Quiet Boot option.
Fast Boot	Disabled[Default] , Enabled	Enables/Disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.

4.7 Save & Exit

This setting allows users to configure the boot settings.



■ Save Changes and Reset

This item allows user to reset the system after saving the changes. This item allows user to reset the system after saving the changes.

■ Discard Changes and Reset

This item allows user to reset the system without saving any changes.

■ Restore Defaults

Use this item to restore /load default values for all the setup options.

4.8 MEBx



Item	Options	Description
Intel(R) ME Password		MEBx Login

Appendix

WDT & GPIO

This appendix provides the sample codes of WDT (Watch Dog Timer) and GPIO (General Purpose Input/ Output).

WDT Sample Code

WDT Setting

Psuedo Code

// IO Address 0xA16 is time value(second)

// IO Address 0xA15 is WDT enable and configuration

Example, Set 0xA16=-0x02, 0xA15=0x31, it will reset after 2 seconds

```
#define TimePort          0xA16
```

```
#define TimeEnablePort  0xA15
```

//Set WDT Time Unit

```
buf1 = ReadByte(TimeEnablePort) & 0xf7; //Clear WDT mode.
```

```
// buf1 |= 0x08; //Bit3 :(1:Minute Mode/0:Second Mode)
```

```
WriteByte(TimeEnablePort, buf1);
```

//Set WDT Time Value

```
WriteByte (TimePort , 0x02); // Set 2 seconds
```

//Enable WDT

```
buf1 = ReadByte(TimeEnablePort);
```

```
buf1 |= 0x31;
```

```
    //Bit5 :WD_EN,If this bit is set to 1, the counting of watchdog time is enabled.
```

```
    //Bit4 :WD_PULSE ,Select output mode (0: level, 1: pulse) of WDTRST# by setting this bit.
```

```
    //Bit1~0: Select output pulse width of WDTRST#. 0: 1 ms, 1: 25 ms, 2: 125 ms, 3: 5 sec.
```

```
WriteByte(TimeEnablePort, buf1);
```

// Disable WDT

```
buf1 = ReadByte(TimeEnablePort); // Read current WDT setting
```

```
buf1 = buf1 & 0xDF; // Disable WDT by set WD_EN (bit 5) to 0.
```

```
WriteByte(TimeEnablePort, buf1); // Write back WDT setting.
```

GPIO Sample Code

GPIO Setting

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

The GPIO function is provided by Nuvoton M058SSAN , and it can be accessed through [Smbus/I2C](#) port. The configuration on the RCO-3000-RPL is described as below.

Pseudo Code

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

```
//Set OUT1~OUT8 Value
```

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

```
//Set GPO to 0x55
```

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

```
// Read In1~In8 value
```

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

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

