USER'S MANUAL

DCO-1000-ASL

DIN-Rail Fanless Computer

Table of Contents

Prefaces

Revision

Revision	Description	Date
1.0	Manual Released	2025/3/19

Disclaimer

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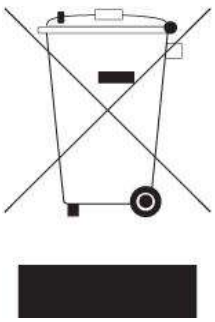
Environmental Protection Announcement

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 -40°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 be 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	DCO-1000-ASL Series Embedded System	1
2	DIN-Rail Mount Kit	1
3	Wall Mounting Kit	1
4	Accessory Kit	1

Ordering Information

Model No.	Product Description
DCO-1000-ASL-x7433RE	DIN-Rail Fanless Embedded Computer with Intel® x7433RE CPU, 2x DP, 2x COM, 4x USB, 4x LAN

Optional Accessories

Model No.	Product Description
1-E09A06007	Adapter AC/DC 12V 5A 60W with 3pin Terminal Block Plug 5.0mm Pitch
1-TPCD00005	Power Cord, 3-pin US Type, 180cm
1-TPCD00002	Power Cord, European Type
1-TPCD00001	Power Cord, 3-pin UK Type, 180cm

Chapter 1

Product Introductions

1.1 Overview

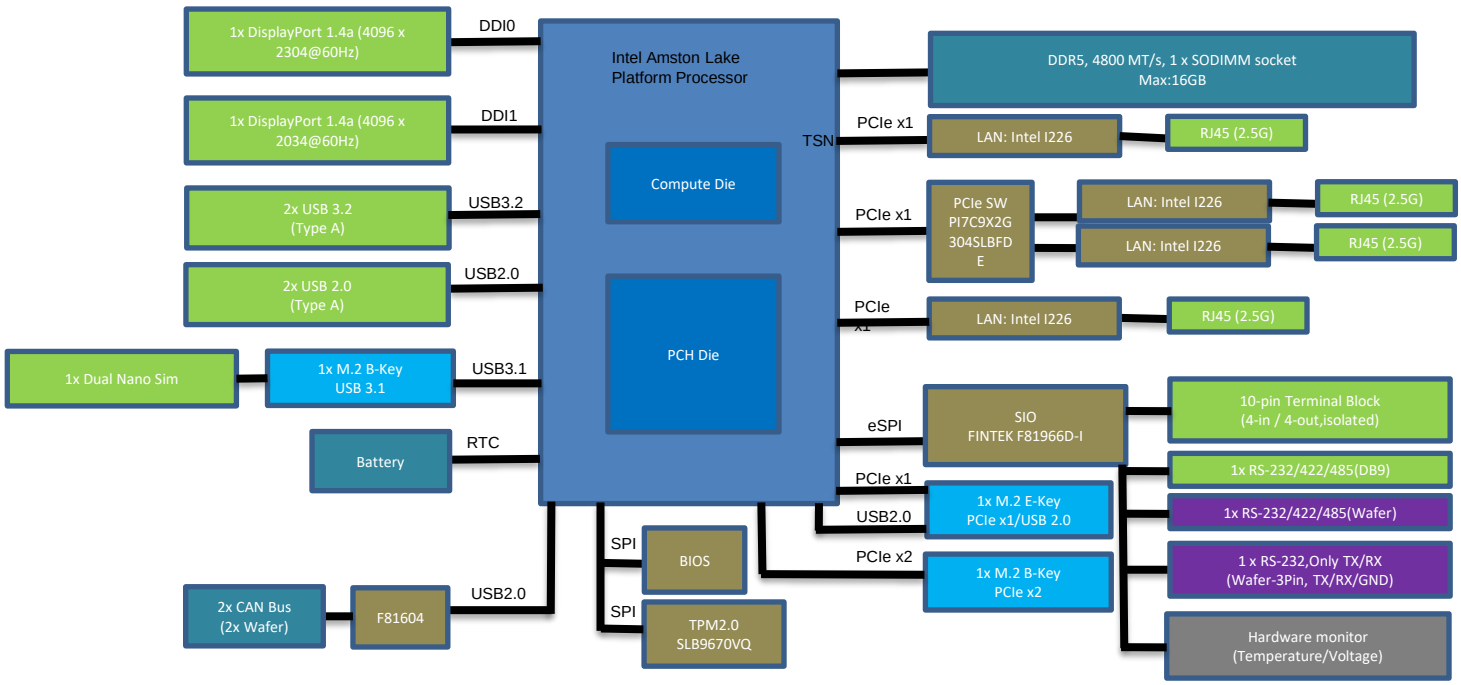
The DCO-1000-ASL stands out in the industrial computer market by uniquely combining an ultra-small form factor with Din-Rail mounting capabilities. This dual advantage allows for flexibility and efficiency in installation, especially suited for environments where space is a critical constraint.

Key Features

- Support Intel® Atom® x7433RE Processor
- 1x 262-pin DDR5 SODIMM. Max. up to 16GB
- Dual Independent Display by 2x Display Port
- 4x 2.5GbE LAN
- 1x M.2 (B Key, 3042/3052, USB 3.2 Gen2 & USB2.0, Support 4G/5G Module)
- 1x M.2 (B Key, 3042/3052, PCIex 2, Support NVMe)
- 2x RS-232/422/485, 2x USB 3.2 Gen2, 2x USB 2.0
- 9 to 36VDC Wide Range Power Input Supporting AT/ATX Mode
- Wide Operating Temperature -40°C to 55°C
- TPM 2.0 Supported
- CE, FCC, UL 61010-2-201, Edition 2

1.2 Block Diagram

External Connectors | Internal Connectors | Daughter Board



1.3 Hardware Specification

System

Processor	Support Intel® Atom® Processor (Up to 9W TDP)
	Intel® Atom® Processor x7433RE, Quad Core, CPU HFM 1.5 GHz/1C Turbo 3.2GHz, GPU 32EU, TDP 9W
System Chipset	SoC integrated
LAN Chipset	2.5 GbE1~4: Intel I226 (LAN #1-2 Shared PCIe Gen 2 x1 Lane bandwidth)
System Memory	1x 262-Pin DDR5 4800MHz SODIMM. Max. up to 16GB (In-Band ECC Supported)
Graphics	Intel® UHD Graphics
BIOS	AMI SPI BIOS
Watchdog	Software Programmable Supports 1~255 sec. System Reset
TPM	TPM 2.0

Display

Display Port	2x DisplayPort 1.4, DP (4096 x 2160@60Hz)
Multiple Display	Dual Display

Storage

M.2	1x M.2 (B Key, 3042/3052, PCIe x2, support NVMe), Default 128G SSD
SIM Socket	1x Dual Nano SIM Socket

Expansion

M.2	1x M.2 (B Key, 3042/3052, USB 3.2 Gen2 & USB2.0, support 4G/5G Module) 1x M.2 (E key, 2230, PCIe x1 & USB2.0, support Wifi/Bluetooth)

I/O

CAN	2x 2-pin Internal header (Optional)
COM	2x RS-232/422/485
DIO	4 in / 4 out (Isolated)
LAN	4x RJ45
OOB	1x RJ45 (Optional)
USB	2x USB 3.2 Gen 2 (10 Gbps) 2x USB 2.0
Others	4x WiFi Antenna Holes 1x Power Switch, 1x Reset Switch 1x AT/ATX Internal Switch Jumper 1x 2-PIN Remote Power On/Off 1x Internal CMOS Battery Cable

Operating System

Windows	Windows 10/Windows 11
Linux	Linux kernel 6.2

Power

Power Adapter	Optional AC/DC 12V/5A, 60W
Power Mode	AT/ ATX
Power Supply Voltage	9~36VDC
Power Connector	3-pin Terminal Block
Power Protection	OVP (Over Voltage Protection) OCP (Over Current Protection) Reverse Protection

Environment

Operating Temp.	-40°C to 55°C
Storage Temp.	-40°C to 85°C
Relative Humidity	10% to 95% (non-condensing)
Certification	CE, FCC Class A, UL 61010-2-201, Edition 2
Vibration	- Wall Mounting with NVMe SSD: 5 Grms, 5 - 500 Hz, 0.5 hr/axis - DIN Rail Mounting with NVMe SSD: 5 Grms, 5 - 500 Hz, 0.5 hr/axis
Shock	With SSD: 20G, half sine, 11ms Designed to comply with MIL-STD-810G Method 514.7 Procedure I

Physical

Dimensions	150 (D) x 105 (W) x 50 (H) mm
Weights	0.85 kg
Construction	Extruded Aluminum with Heavy Duty Metal
Mounting Opt.	DIN-Rail Mounting, Wall Mounting

1.4 System I/O

Front Panel

Power on/off switch
Press to power-on or power-off the system

Reset Hole
Used to reset the system

LAN port
Used to connect the system to a local area network

DisplayPort
Used to connect a DisplayPort monitor

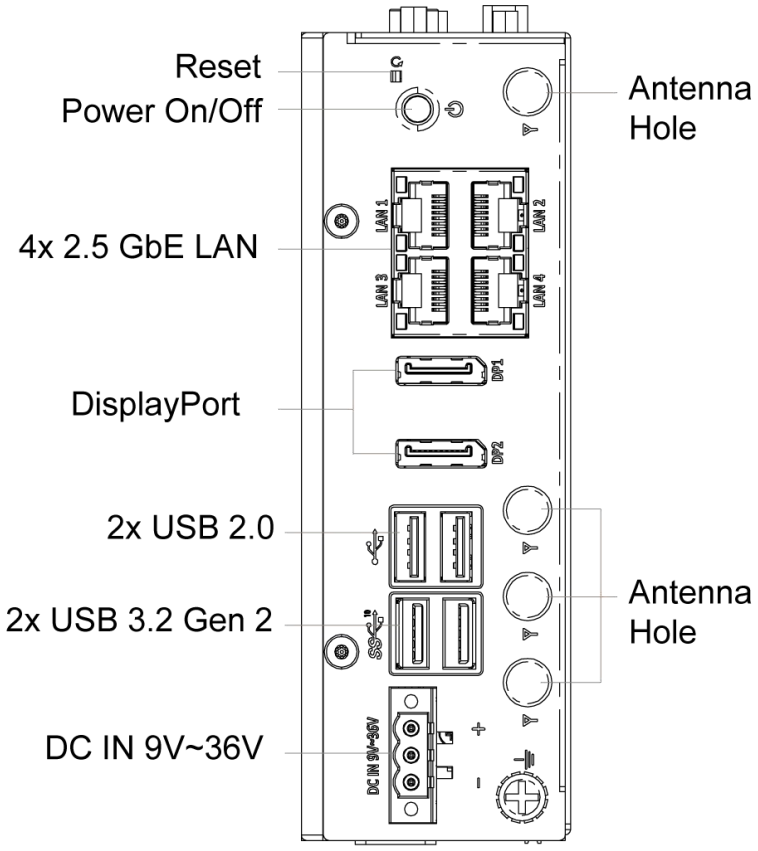
USB 3.2 Gen 2 port (10 Gbps)
Used to connect USB 3.2 device

USB 2.0 port
Used to connect USB 2.0 device

DC IN 9V~36V
Used to plug a DC power input with terminal block

Antenna hole
Used to connect an antenna for optional M.2 WiFi module

Front Panel



Top & Bottom Panel

Digital I/O Terminal Block
The Digital I/O terminal block supports 4 digital input and 4 digital output

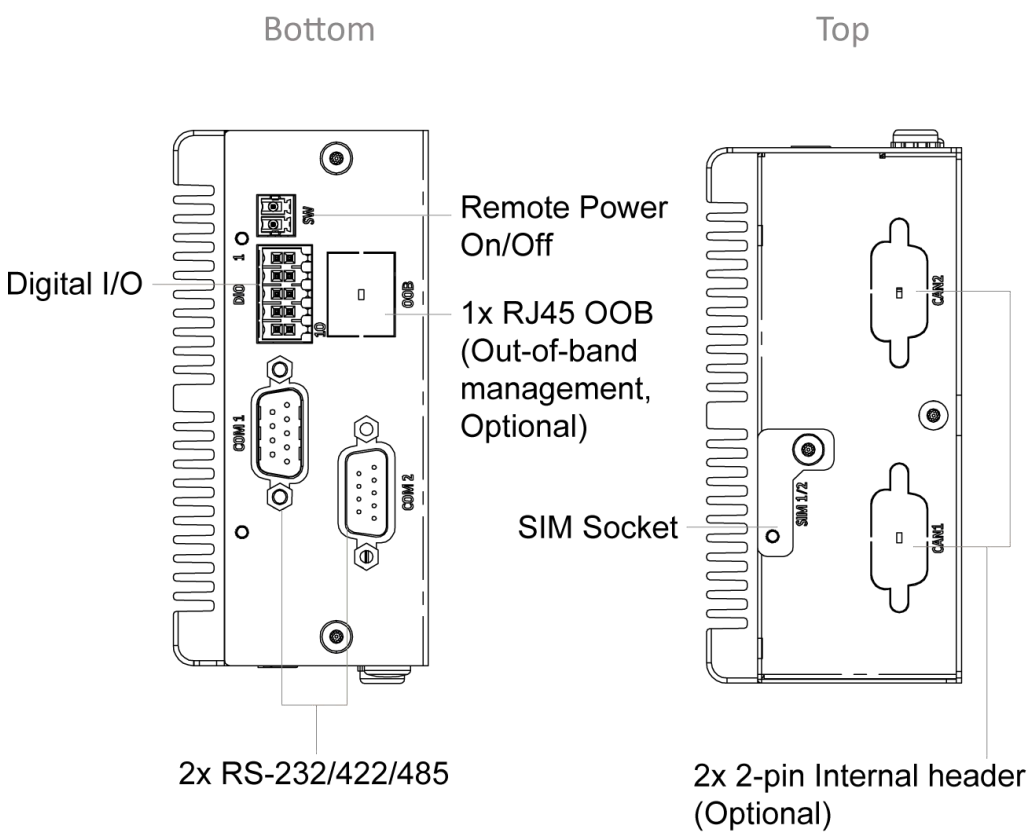
COM port
COM1 ~ COM2 support RS232/422/485 serial device

Remote Power on/off Terminal Block
Used to plug a remote power on/off terminal Block

RJ45 OOB (Optional)
OOB Management Module

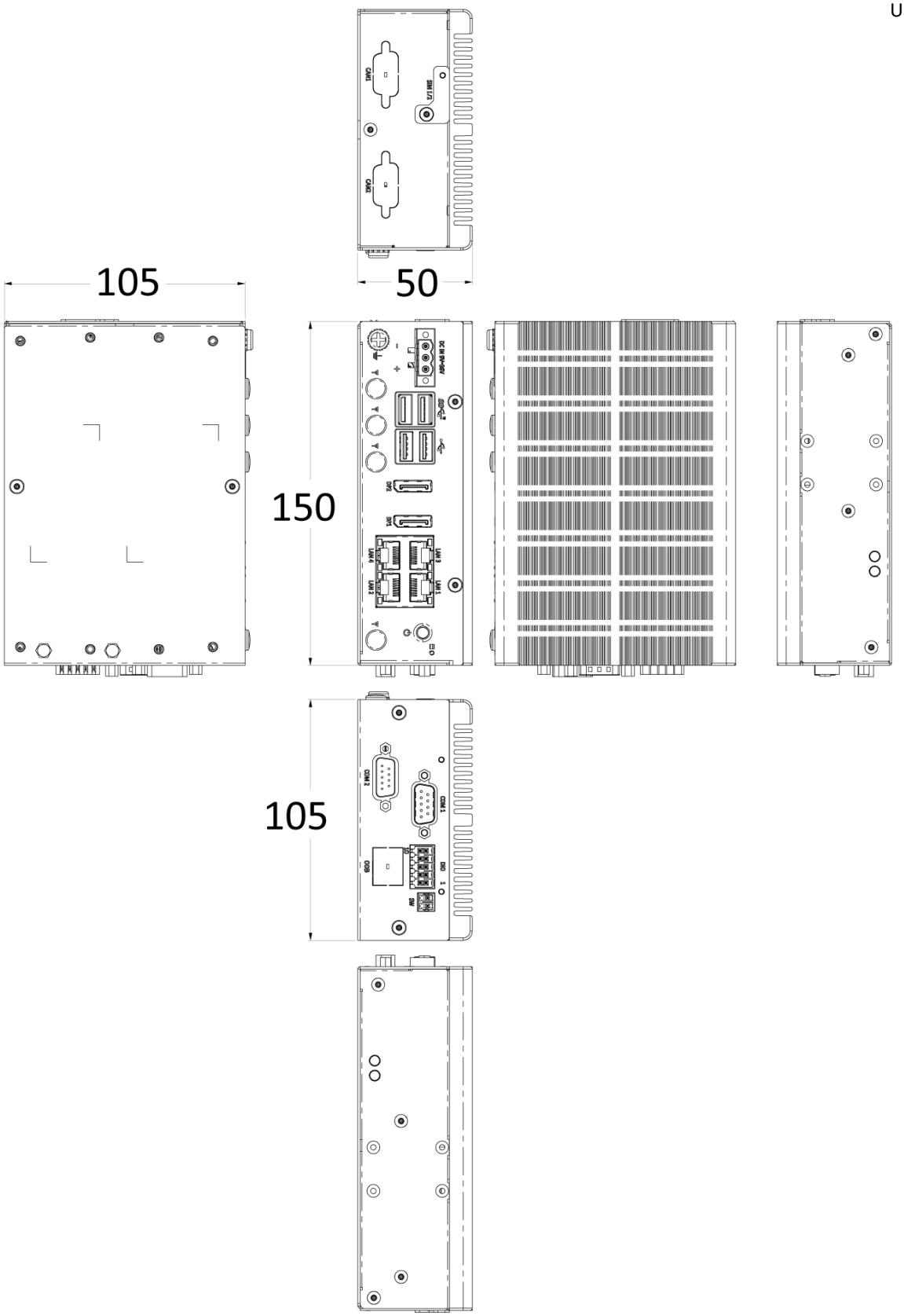
- **CAN (Optional)**
Used to connect an ECU (Electronic control unit) device with D-SUB 9 pin connector

- **SIM Socket**
Used to insert SIM Card



1.5 Mechanical Dimensions

Unit: mm

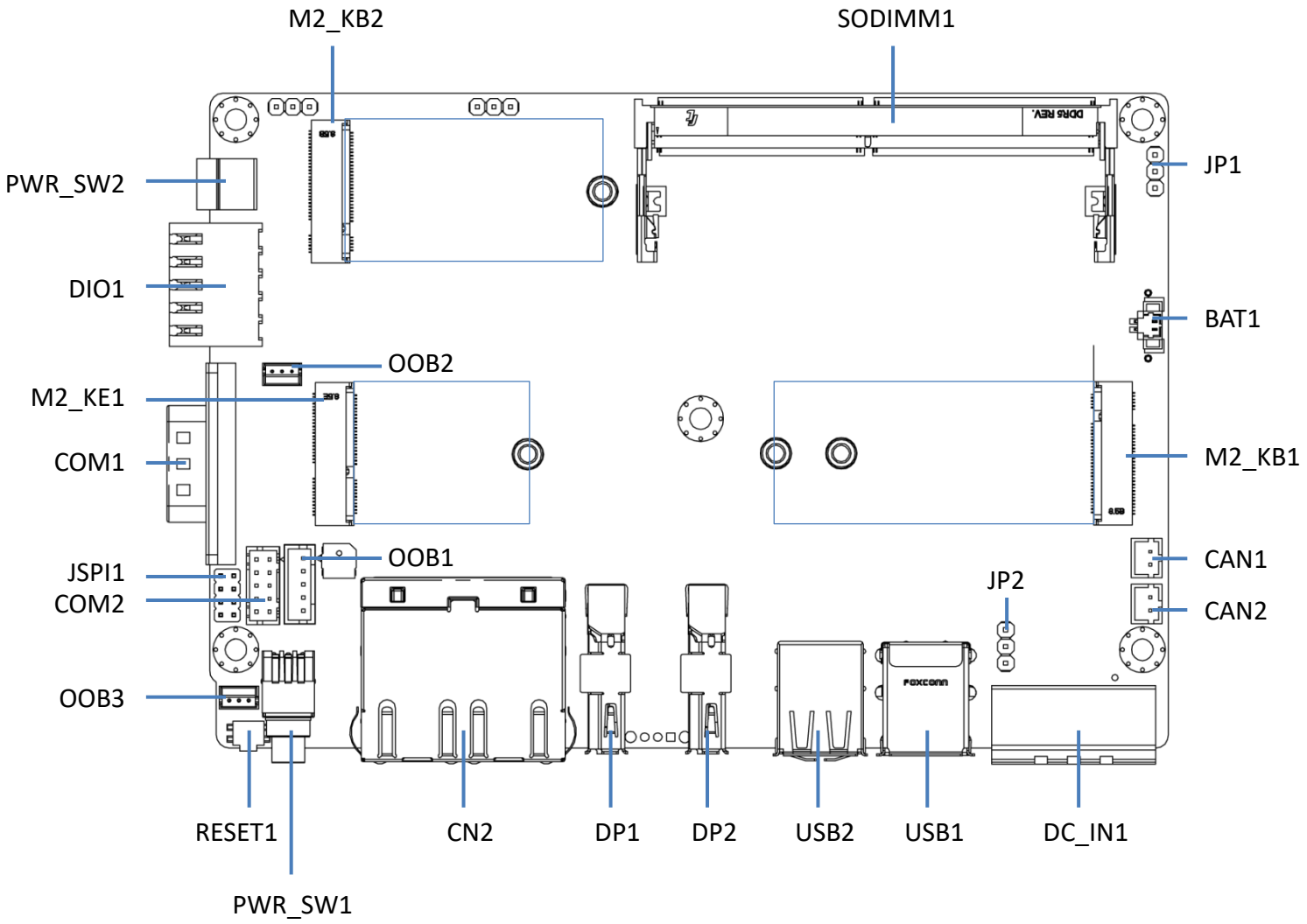


Chapter 2

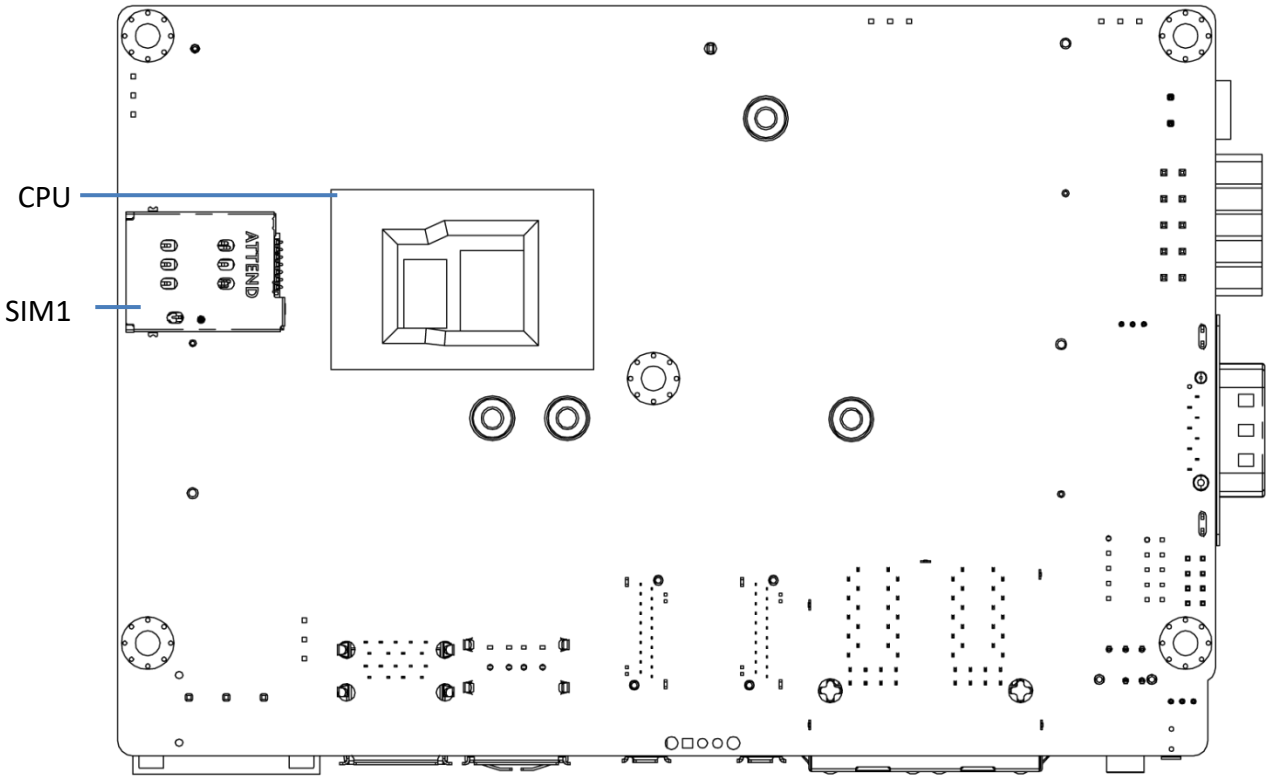
Mechanical Specifications

2.1 Switch and Connector Locations

2.1.1 Top View



2.1.2 Bottom View

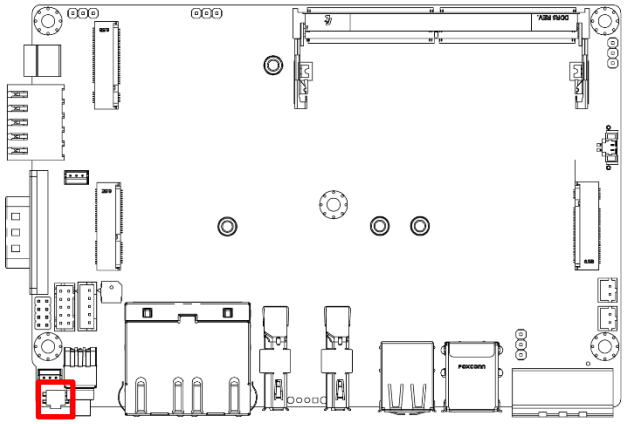


2.2 Connector / Switch Definition

Connector Location	Definition
RESET1	Reset function
PWR_SW1	Power Button switch with LED
PWR_SW2	Remote control
CN2	RJ45 for four 2.5G LANs
DP1	Display port 1
DP2	Display port 2
USB1	USB3.2 Gen2 Type A
USB2	USB2.0 Type A
DC_IN1	Only DC 9~36V Input
CAN1	CAN Bus 1
CAN2	CAN Bus 2
M2_KB1	M2_KB1 for 5G module
M2_KB2	M2_KB2 for PCIe/NVMe module
SODIMM1	Support DDR5 memory
M2_KE1	M2_KE1 for Wifi module
BAT1	Battery socket
DIO	Digital Input / Output
JP1	Clear CMOS
JP2	AT_ATX1: Default: AT mode
COM1	Signals from SIO's COM
COM2	2X5 PIN HEADER
OOB1	1X5 PIN HEADER
OOB2	For OOB debug
OOB3	For Auto Link
SIM1	Support dual nano sim card

2.3 I/O Interface Descriptions

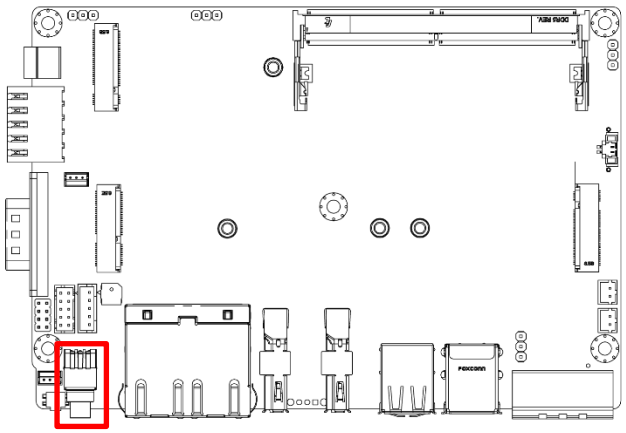
2.3.1 Reset function



RESET1

Pin	Definition
1	RESET
2	GND

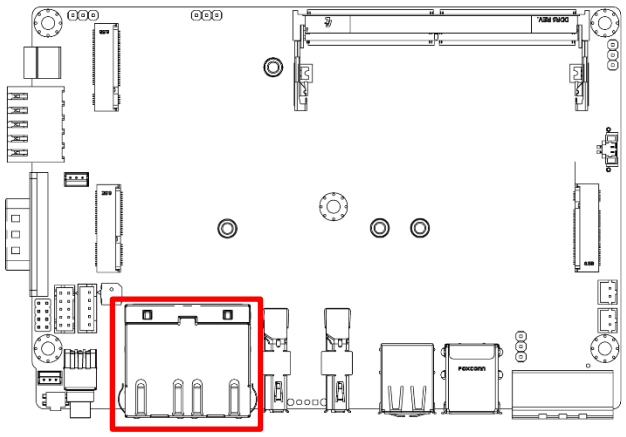
2.3.2 Power Button switch with LED

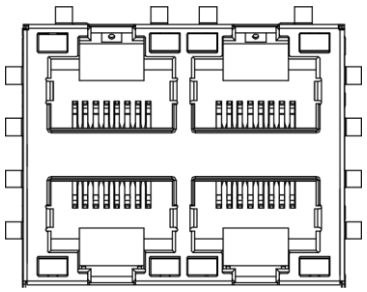


PWR_SW1

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

2.3.3 RJ45 for four 2.5G LANs

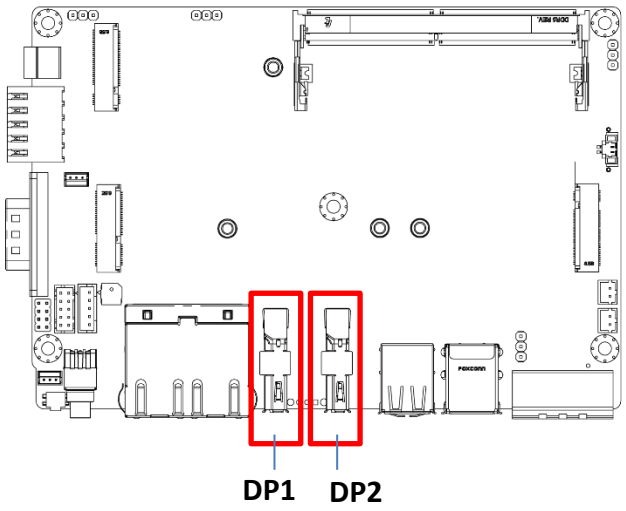


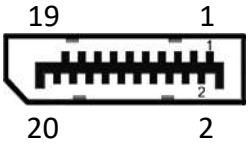


CN2

Pin		LED 1 (Right side)	LED 2 (Left side)
		Link Speed	Activity
Network link is not established (without LAN Cable connected) or system power off		OFF	OFF
10/100 Mbps	LED color	OFF	Green
	Link/Active	OFF	On/Blinking
1 Gbps	LED color	Yellow	Green
	Link/Active	On/Yellow	On/Blinking
2.5 Gbps	LED color	Green	Green
	Link/Active	On/Green	On/Blinking

2.3.4 Display port 1 and 2

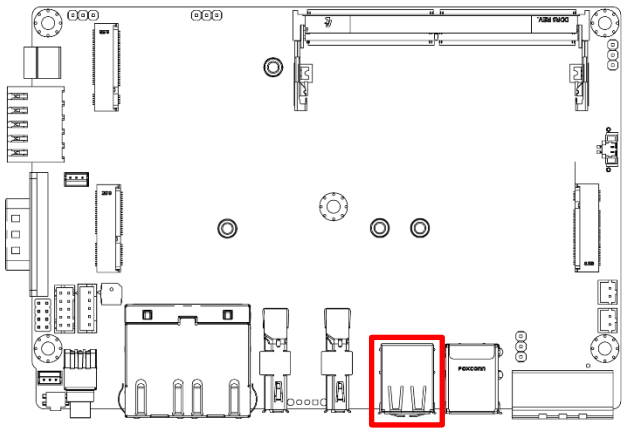


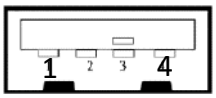


DP1, DP2

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_HPD
9	DP_LANE2_N	19	GND
10	DP_LANE3_P	20	DP_PWR

2.3.5 USB 2.0 Type A

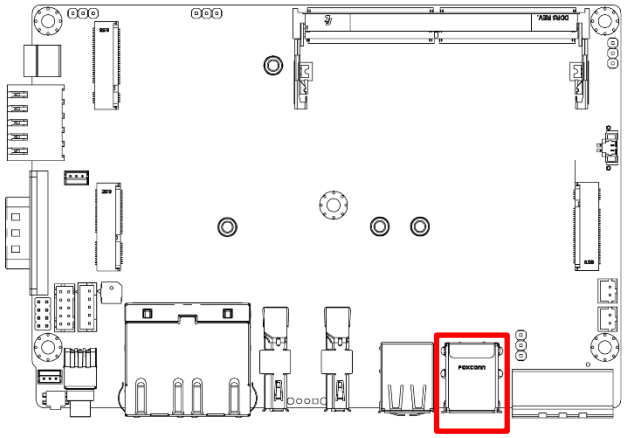


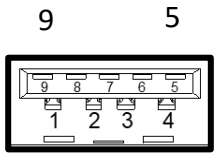


USB2

Pin	Definition
1	+5V
2	USB2_D2-
3	USB2_D2+
4	GND

2.3.6 USB 3.2 Gen 2 Type A

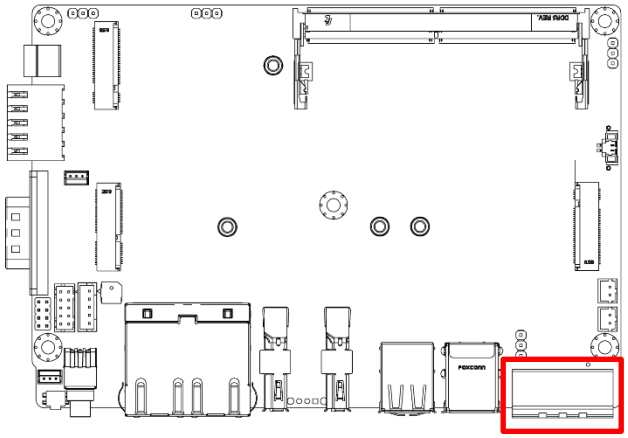


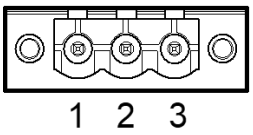


USB1

Pin	Definition	Pin	Definition
1	+5V	6	USB3_RX+
2	USB2_DATA1-	7	GND
3	USB2_DATA1+	8	USB3_TX-
4	GND	9	USB3_TX+
5	USB3_RX-		

2.3.7 Only DC 9~36V Input

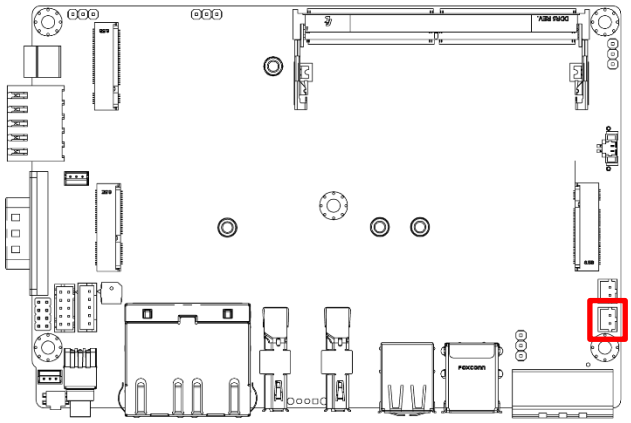


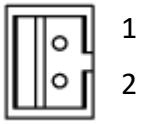


DC_IN1

Pin	Signal
1	Power 9-36V_IN
2	NC
3	GND_IN

2.3.8 CAN Bus 2

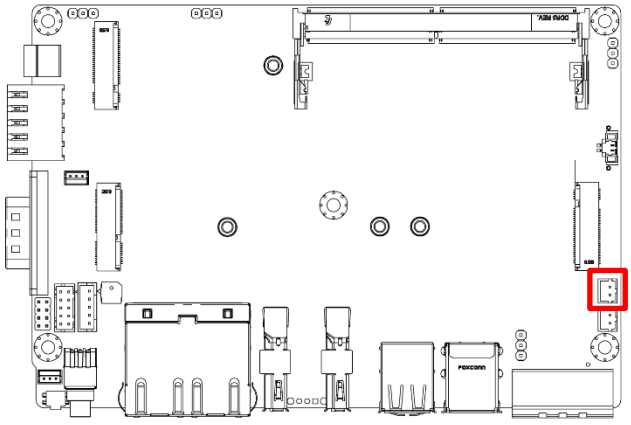


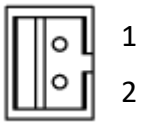


CAN2

Pin	Signal
1	CAN2_L
2	CAN2_H

2.3.9 CAN Bus 1

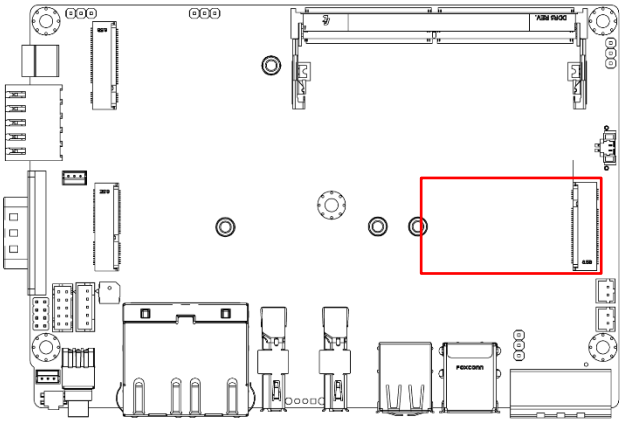


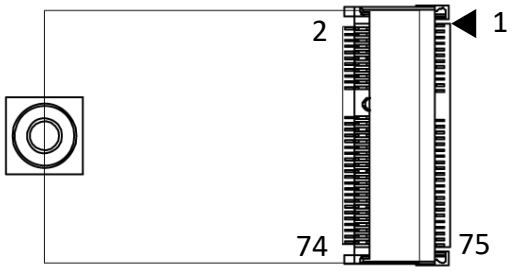


CAN1

Pin	Signal
1	CAN2_L
2	CAN2_H

2.3.10 M2_KB1 for 5G module



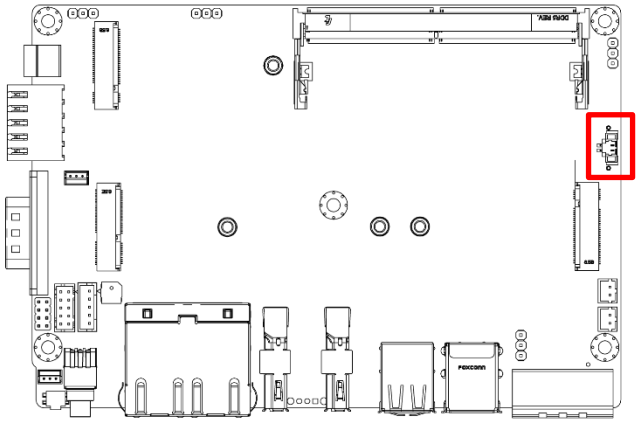


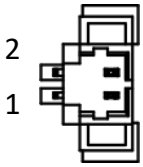
M2_KB1

Pin	Signal	Pin	Signal
1	CONFIG_3	2	VCC1
3	GND	4	VCC2
5	GND	6	FULL_CARD_POWER_OFF#
7	USB_D+	8	W_DISABLE1#
9	USB_D	10	WWAN_LED#
11	GND	12	NOTCH
13	NOTCH	14	NOTCH
15	NOTCH	16	NOTCH
17	NOTCH	18	NOTCH
19	NOTCH	20	GPIO_5(0/1.8V)
21	CONFIG_0	22	GPIO_6(0/1.8V)
23	GPIO_11(0/1.8V)	24	GPIO_7(0/1.8V)
25	DPR	26	GPIO_10(0/1.8V)
27	GND	28	GPIO_8(0/1.8V)
29	USB3.0-Rx	30	USIM1_RST
31	USB3.0-Rx+	32	USIM1_CLK
33	GND	34	USIM1_DATA
35	USB3.0-Tx-	36	USIM1_VDD
37	USB3.0-Tx+	38	DEVSLP (O)

Pin	Signal	Pin	Signal
39	GND	40	USIM2_DET
41	NC	42	USIM2_DATA
43	NC-	44	USIM2_CLK
45	GND	46	USIM2_RST
47	NC-	48	USIM2_VDD
49	NC	50	PCIE_RST_N
51	GND	52	NC
53	NC	54	PCIE_WAKE_N
55	NC	56	N/C
57	GND	58	N/C
59	ANTCTL0	60	COEX3(O/1.8V)
61	ANTCTL1	62	COEX2(O/1.8V)
63	ANTCTL2	64	COEX1(O/1.8V)
65	ANTCTL3	66	USIM1_DET
67	RESET_N	68	SUSCLK(32kHz)
69	CONFIG_1	70	VCC3
71	GND	72	VCC4
73	GND	74	VCC5
75	CONFIG_2	76	

2.3.11 Battery socket

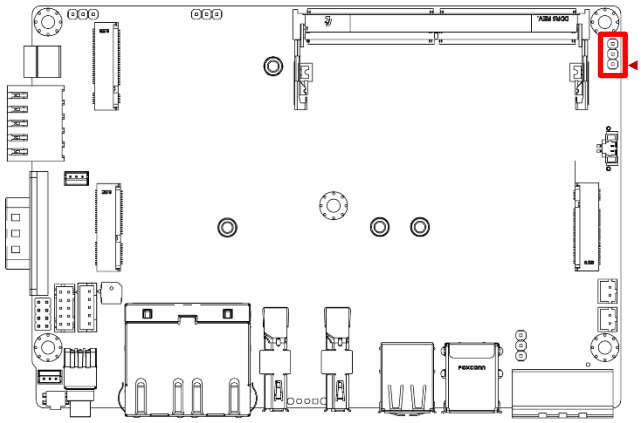


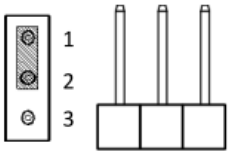


BAT1

Pin	Signal
1	Battery power positive
2	GND

2.3.12 Clear CMOS

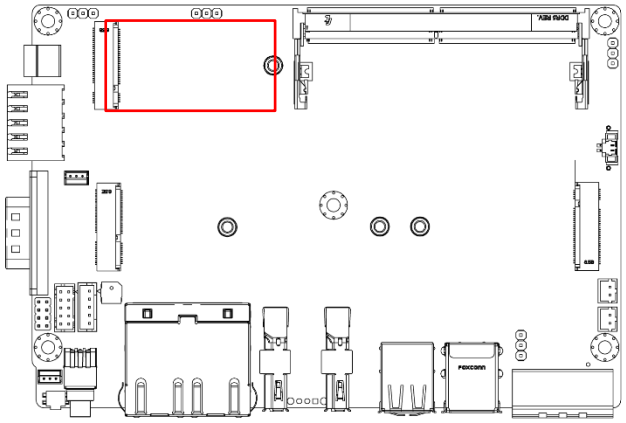


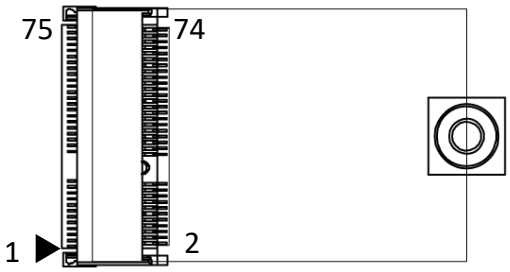


JP1

Pin	Signal
1-2	Default*
2-3	Clear CMOS

2.3.13 M2_KB2 Socket



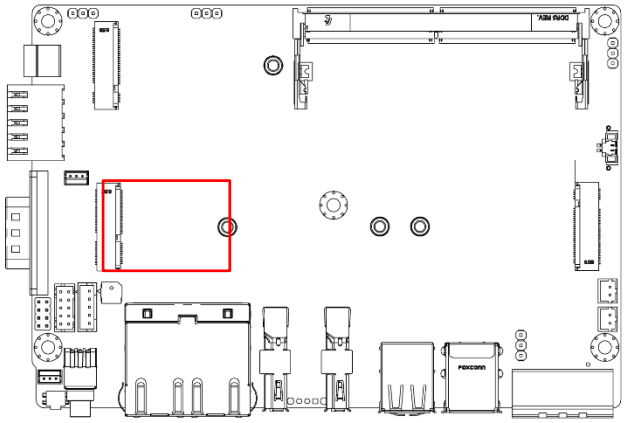


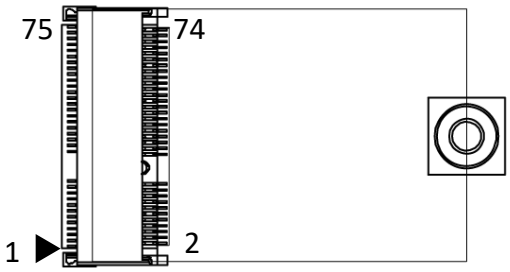
M2_KB2

Pin	Signal	Pin	Signal
1	CONFIG_3	2	VCC1
3	GND	4	VCC2
5	GND	6	FULL_CARD_POWER_OFF#
7	USB_D+	8	W_DISABLE1#
9	USB_D-	10	WWAN_LED#
11	GND	12	NOTCH
13	NOTCH	14	NOTCH
15	NOTCH	16	NOTCH
17	NOTCH	18	NOTCH
19	NOTCH	20	N/C
21	CONFIG_0	22	N/C
23	GPIO_11(0/1.8V)	24	N/C
25	DPR	26	N/C
27	GND	28	N/C
29	PCIE_10_RX_DN	30	N/C
31	PCIE_10_RX_DP	32	N/C
33	GND	34	N/C
35	PCIE_10_TX_DN-	36	N/C
37	PCIE_10_TX_DP	38	N/C

Pin	Signal	Pin	Signal
39	GND	40	N/C
41	PCIE_9_RX_DN	42	N/C
43	PCIE_9_RX_DP	44	N/C
45	GND	46	N/C
47	PCIE_9_TX_DN	48	N/C
49	PCIE_9_TX_DP	50	M.2_B2_RST#
51	GND	52	SRCCLKREQ4_N
53	CLKOUT_PCIE_N4	54	M.2_B2_WAKE_L
55	CLKOUT_PCIE_P4	56	N/C
57	GND	58	N/C
59	ANTCTL0	60	COEX3(O/1.8V)
61	ANTCTL1	62	COEX2(O/1.8V)
63	ANTCTL2	64	COEX1(O/1.8V)
65	ANTCTL3	66	USIM1_DET
67	RESET_N	68	SUSCLK(32kHz)
69	CONFIG_1	70	VCC3
71	GND	72	VCC4
73	GND	74	VCC5
75	CONFIG_2	76	

2.3.14 M.2 E-Key Socket



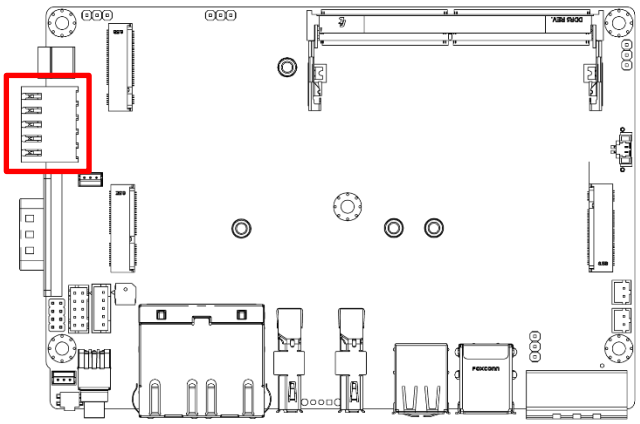


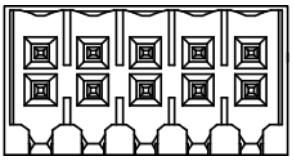
M2_KE1

Pin	Signal	Pin	Signal
1	GND	2	+V3.3A
3	USB_D+	4	+V3.3A
5	USB_D-	6	NC
7	GND	8	NC
9	NC	10	NC
11	NC	12	NC
13	NC	14	NC
15	NC	16	NC
17	NC	18	GND
19	NC	20	NC
21	NC	22	NC
23	NC	24	NOTCH
25	NOTCH	26	NOTCH
27	NOTCH	28	NOTCH
29	NOTCH	30	NOTCH
31	NOTCH	32	NC
33	NOTCH	34	NC
35	PCIE_1_TX_DP	36	NC
37	PCIE_1_TX_DN	38	NC

Pin	Signal	Pin	Signal
39	GND	40	NC
41	PCIE_1_RX_DP	42	NC
43	PCIE_1_RX_DN	44	NC
45	GND	46	NC
47	CLKOUT_PCIE_P1	48	NC
49	CLKOUT_PCIE_N1	50	NC
51	GND	52	M.2_E_RST#
53	SRCCLKREQ1_N	54	NC
55	M.2_E_WAKE_L	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	GND	64	NC
65	NC	66	M.2_E_RST#
67	NC	68	NC
69	GND	70	M.2_E1_WAKE_L
71	NC	72	+V3.3A
73	NC	74	+V3.3A
75	GND	76	

2.3.15 Digital Input / Output Connector





1

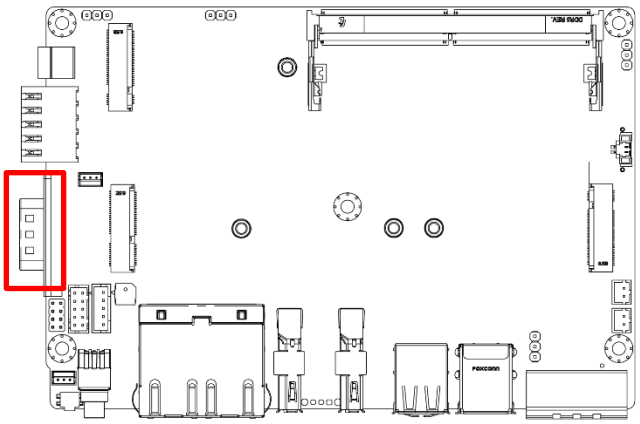
10

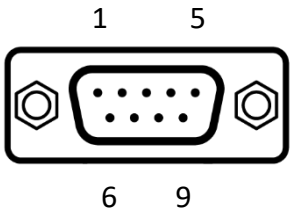
(cable side pinout)

DIO

Pin	Signal	Pin	Signal
1	IN1_1	2	OUT1_1
3	IN2_1	4	OUT2_1
5	IN3_1	6	OUT3_1
7	IN4_1	8	OUT4_1
9	XCOM+	10	XCOM-

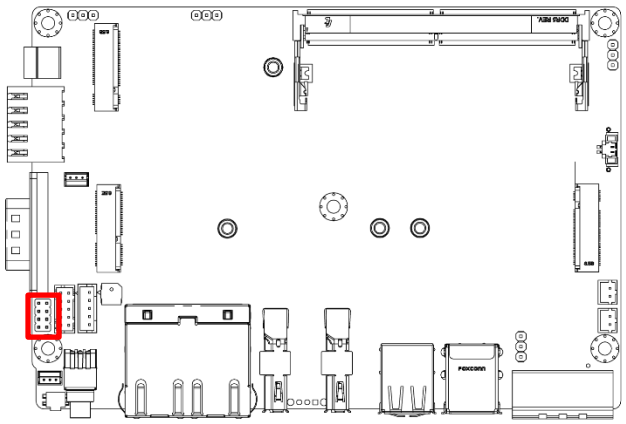
2.3.16 Signals from SIO's COM3

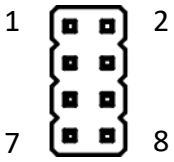




COM1

Pin	Signal	Pin	Signal
1	NDCD3	6	NDSR3
2	NRXD3	7	NRTS3
3	NTXD3	8	NCTS3
4	NDTR3	9	NRI3
5	GND		

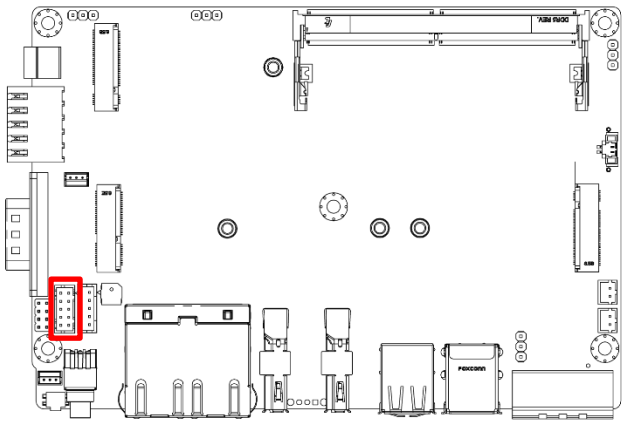


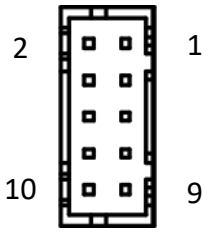


JSPI1

Pin	Signal	Pin	Signal
1	+V3.3A_SPI	5	GND
2	SPI_CS0_N_R	6	SPI_CLK_R
3	SPI_MISO_R	7	SPI_MOSI_R
4	SPI_IO3	8	SPI_IO2

2.3.17 2X5 PIN HEADER

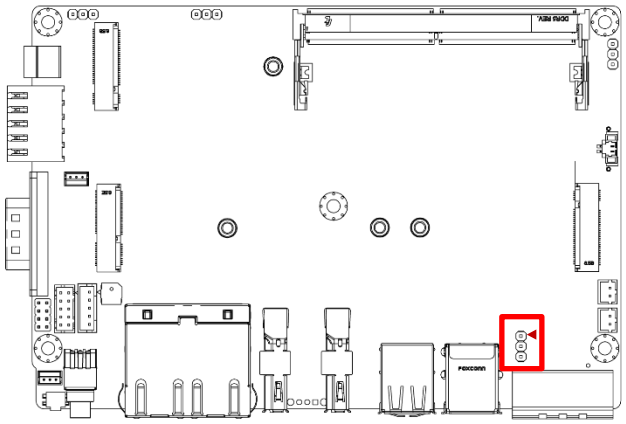


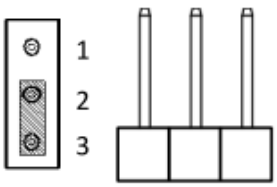


COM2

Pin	Signal	Pin	Signal
1	NDCD2	6	NDSR2
2	NRXD2	7	NRTS2
3	NTXD2	8	NCTS2
4	NDTR2	9	NRI2
5	GND		

2.3.18 AT_ATX1: Default: AT mode

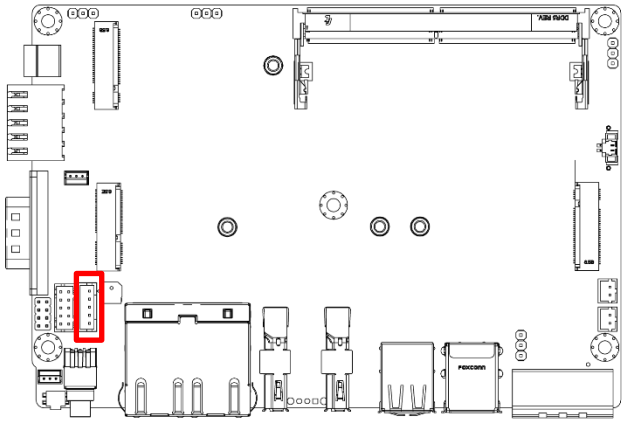


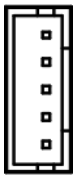


JP2

Switch	Setting
1-2	ATX mode
*2-3	*AT mode

2.3.19 1X5 PIN HEADER

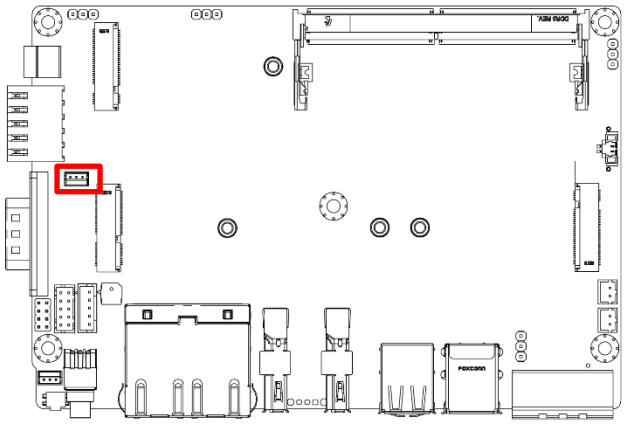


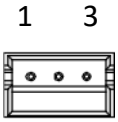


OOB1

Pin	Signal
1	+V5A
2	GND
3	PWRBTN#
4	RESET_BUT_N
5	Power_ON_OFF

2.3.20 For OOB debug

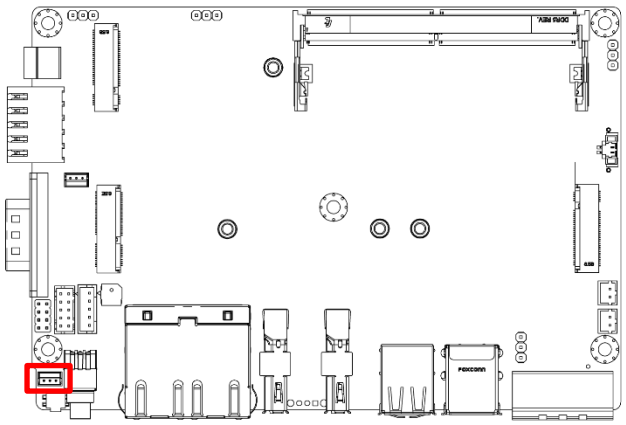


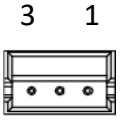


OOB2

Pin	Signal
1	RX
2	TX
3	GND

2.3.21 For Auto Link

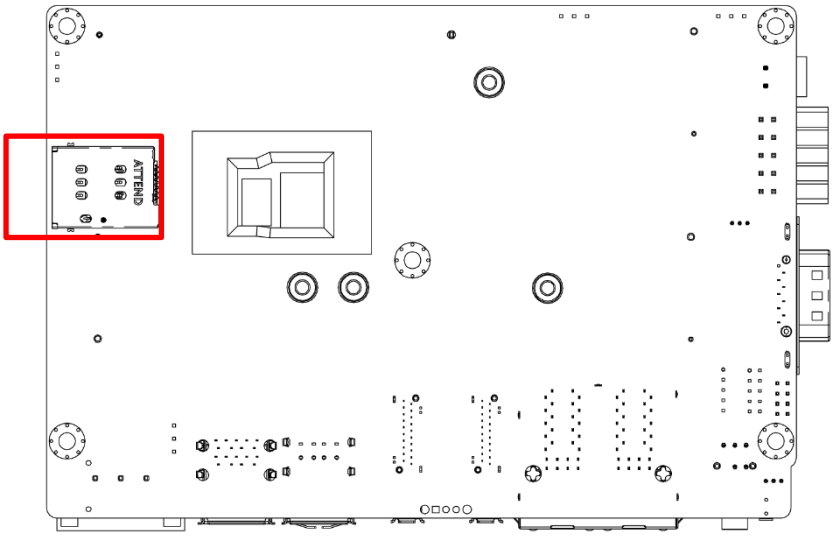




OOB3

Pin	Signal
1	RX
2	TX
3	GND

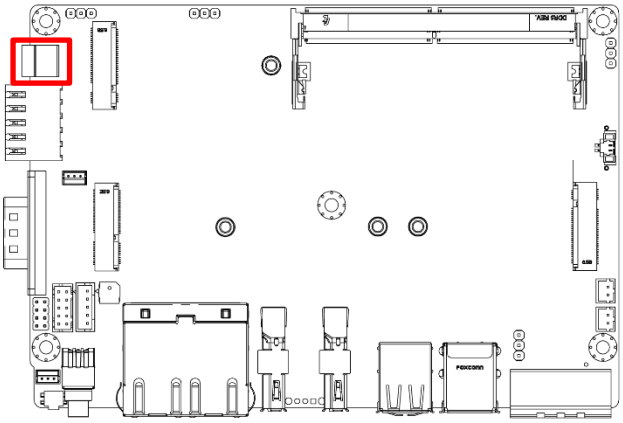
2.3.22 Support dual nano sim card

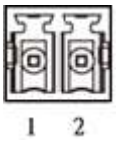


SIM1

Pin	Signal	Pin	Signal
1	P1_UIM_VDD	8	P2_UIM_VDD
2	P1_UIM_RST	9	P2_UIM_RST
3	P1_UIM_CLK	10	P2_UIM_CLK
4	Detect	11	DETECT
5	GND	12	P2_UIM_VDD
6	P1_UIM_VPP	13	P2_UIM_VPP
7	P1_UIM_DATA	14	P2_UIM_DATA

2.3.23 Remote control





PWR_SW2

Pin	Signal
1	PWRBTN#
2	GND

Chapter 3

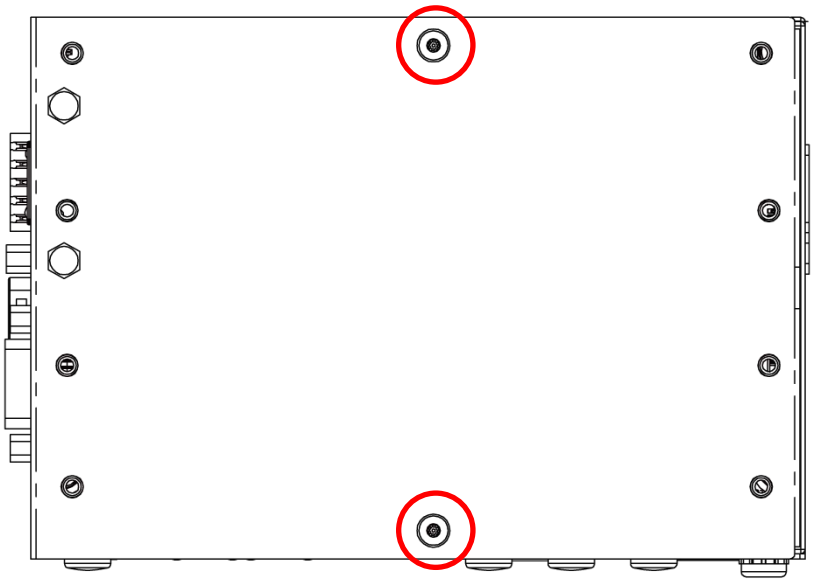
System Setup

3.1 Removing the chassis bottom cover

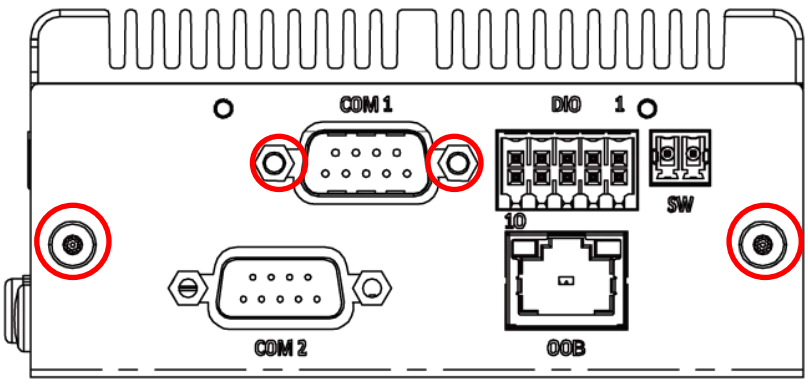
WARNING

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.

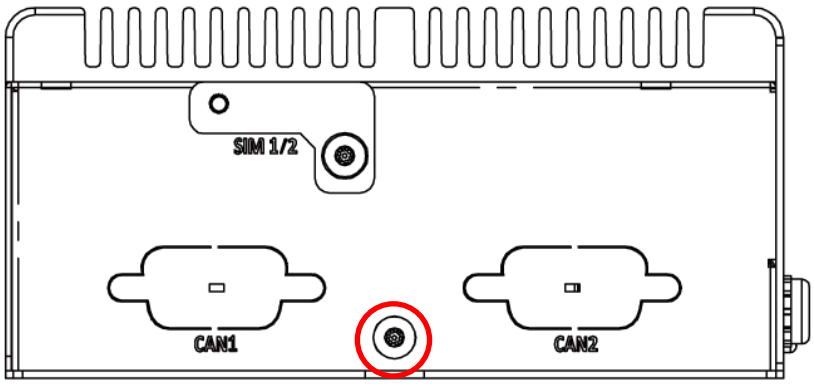
1. Turn the computer upside down. Remove the two screws on the bottom cover, as highlighted in the picture below.



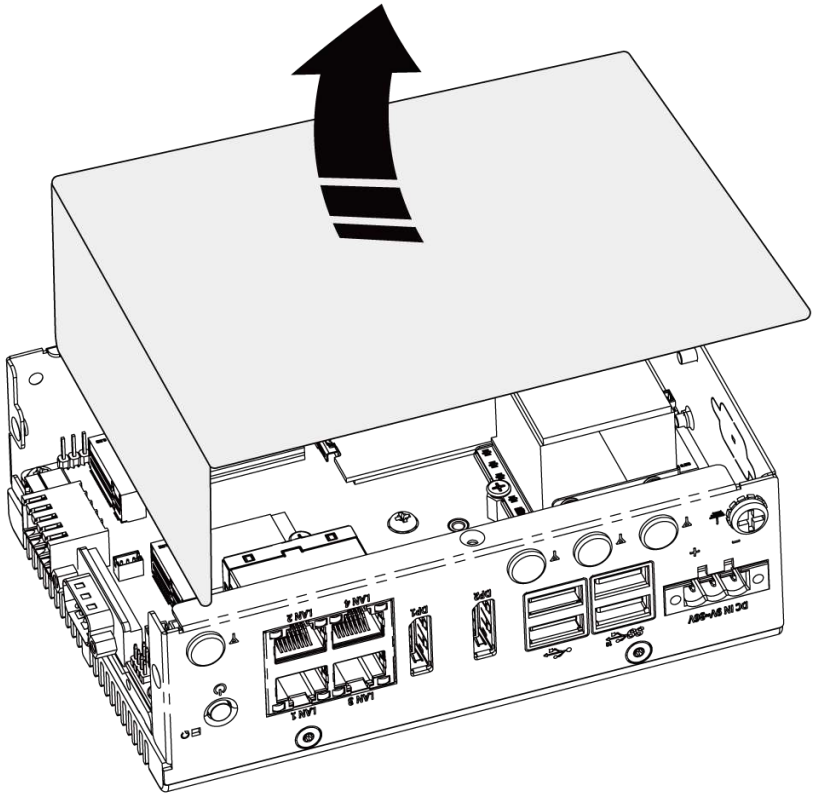
2. Remove the four screws on the left side of the computer.



3. Remove the one screw on the right side of computer.

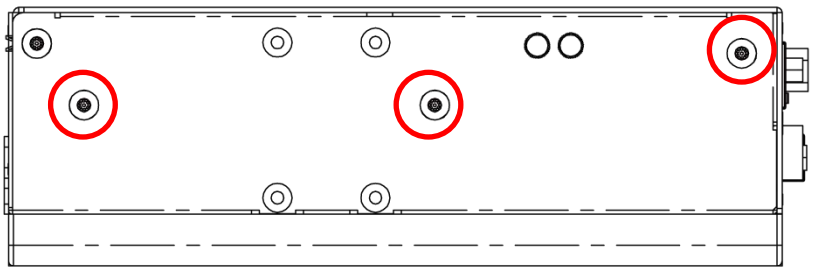


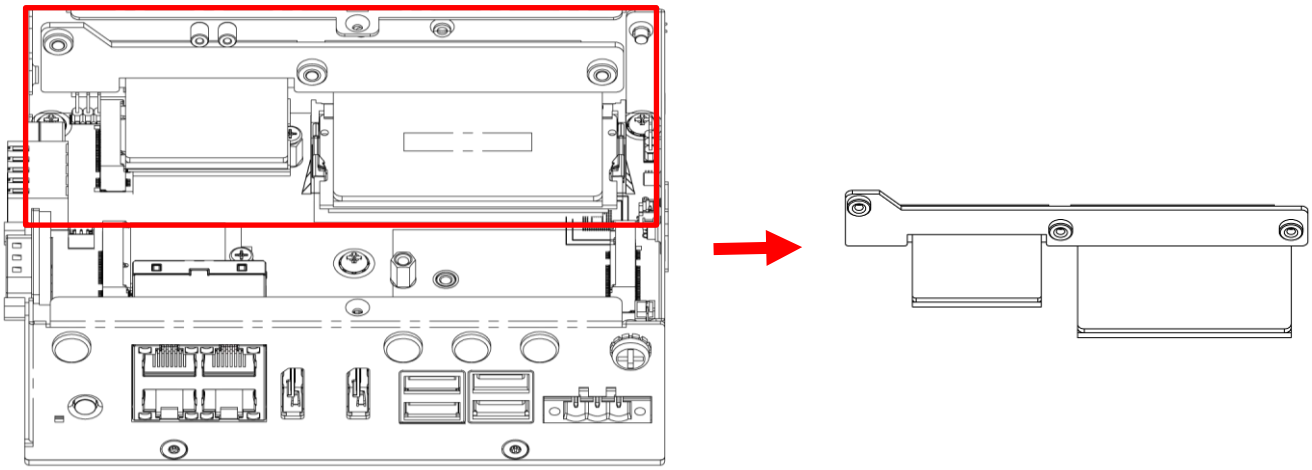
4. Now you can remove the bottom cover.



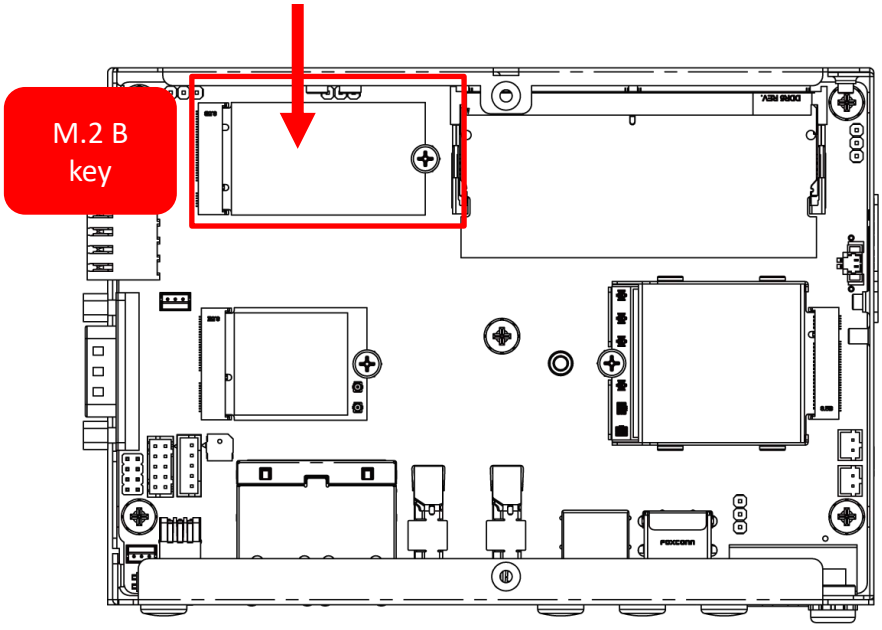
3.2 Install SSD

1. Remove the three screws on the back side and then remove the L-Shaped bracket, as shown in the picture below.



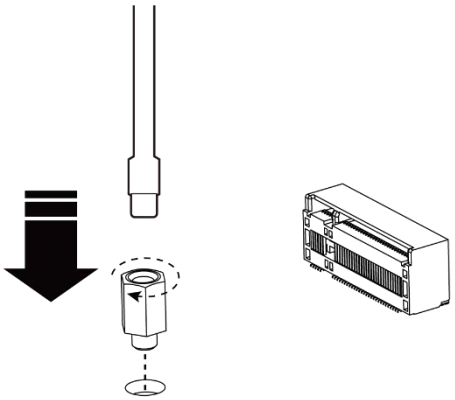


2. The M.2 B Key slot supports NVMe SSD, as highlighted in the picture below.

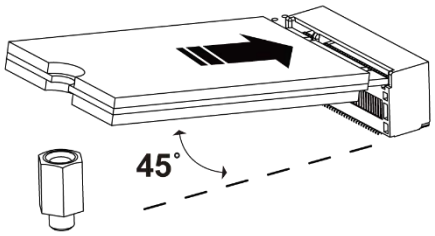


3.2.1 Install NVMe SSD- Step by Step

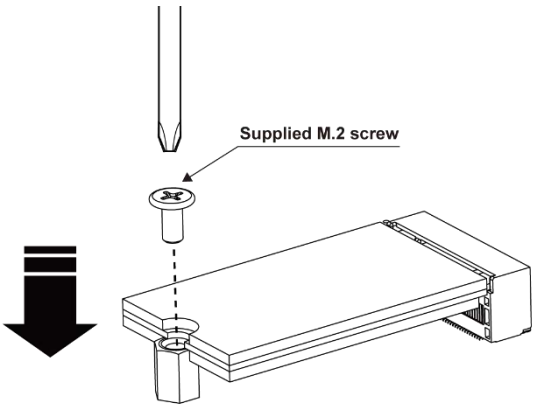
1. Assemble the copper stud



2. Insert the NVMe SSD at a 45-degree angle into the M.2 B-Key slot.

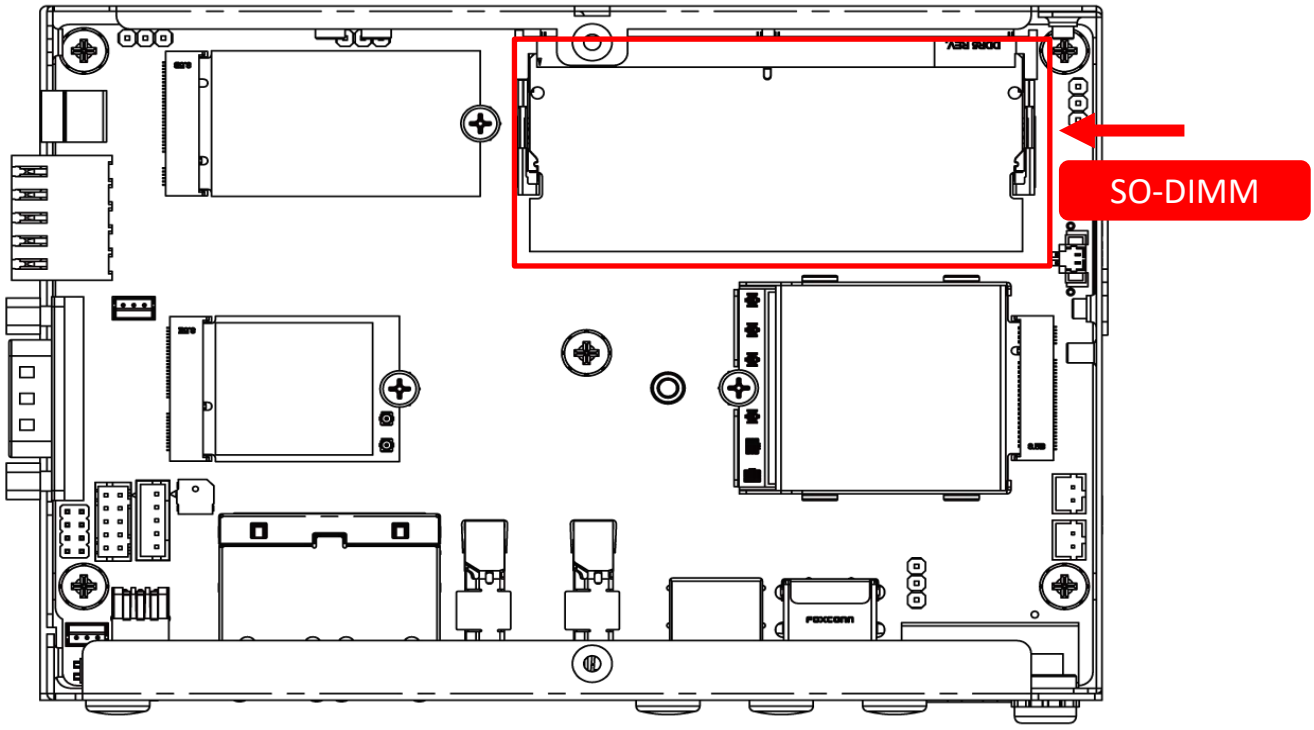


3. Press the NVMe SSD down and secure it with one screw.



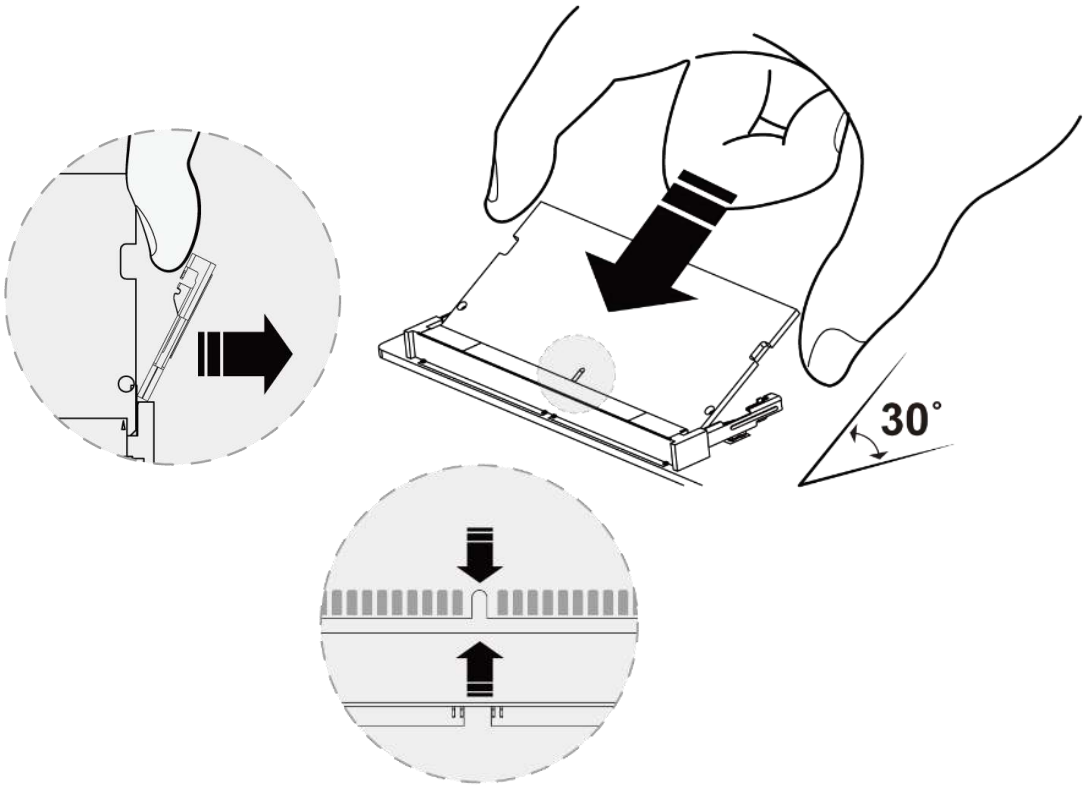
3.3 Install SO-DIMM

1. The SO-DIMM slot supports DRR5 RAM, as highlighted in the picture below.

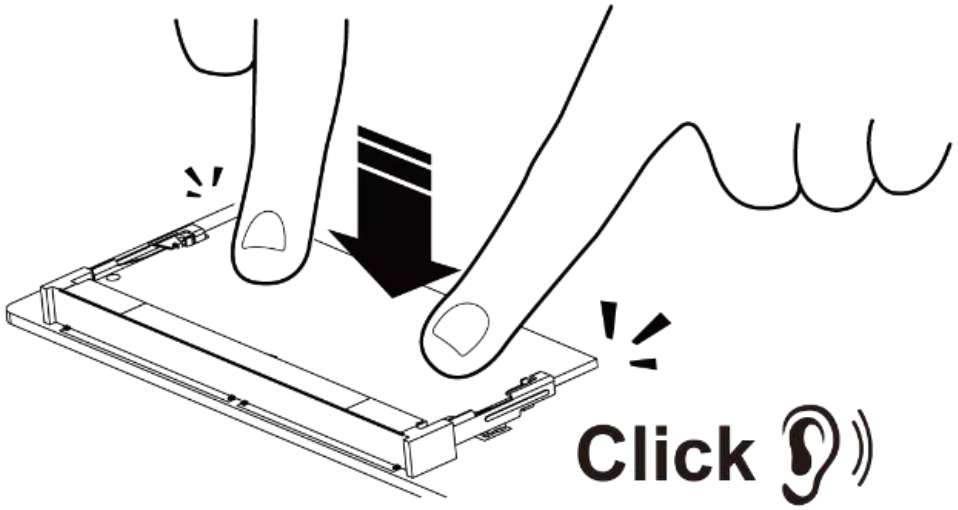


3.3.1 Install SO-DIMM- Step by Step

1. Gently pull the locking tabs on either side of the SO-DIMM slot. Insert the SO-DIMM module at a 30-degree angle.

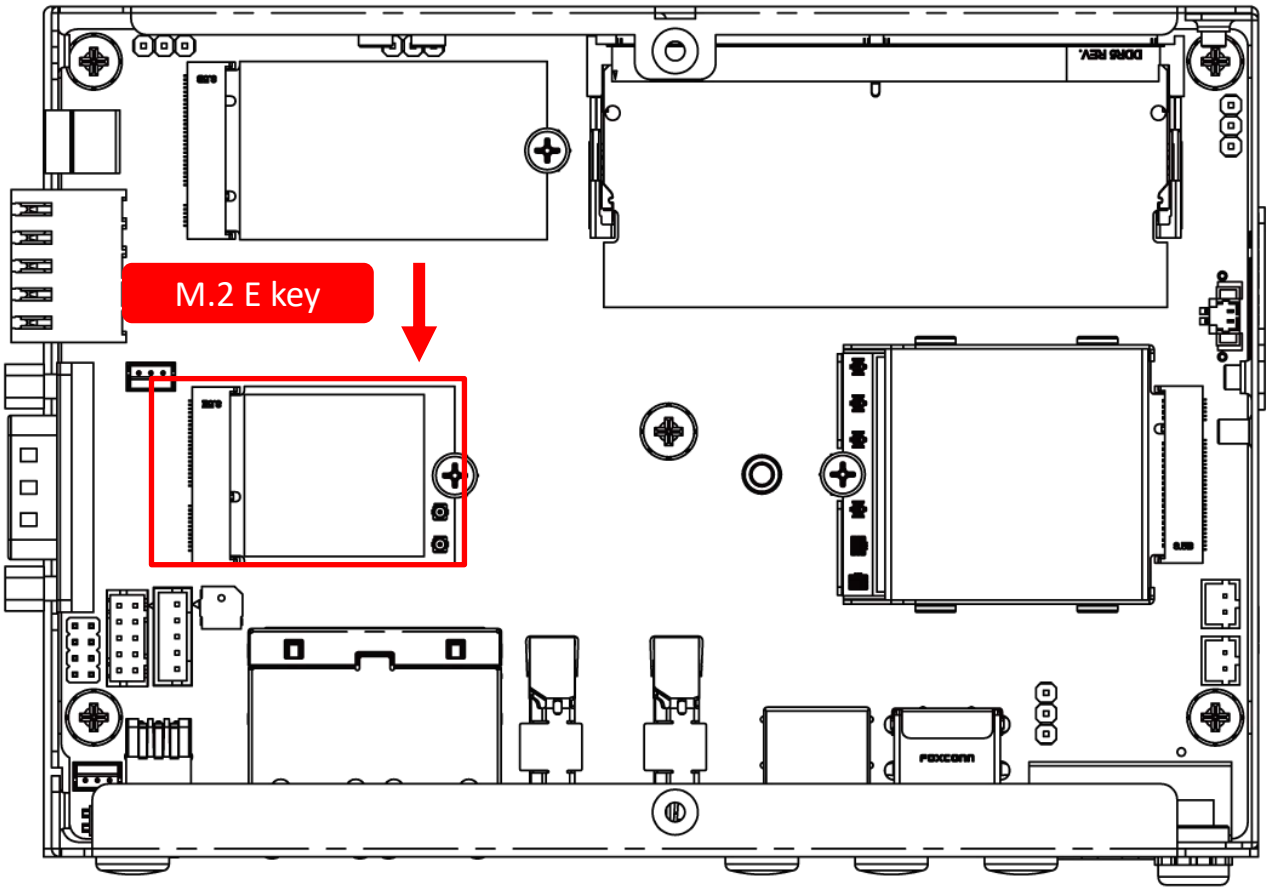


2. Press down gently until you hear a "click" sound and the tabs lock it into place.

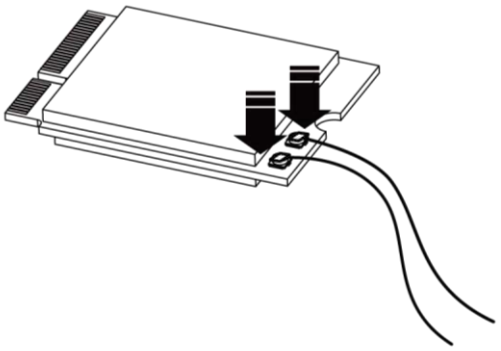


3.4 Installing Wi-Fi Module and Antenna

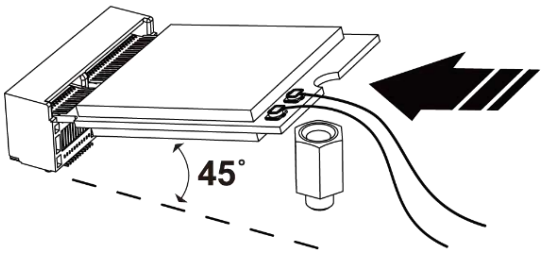
1. The M.2 E-Key supports Wi-Fi module, , as highlighted in the picture below.



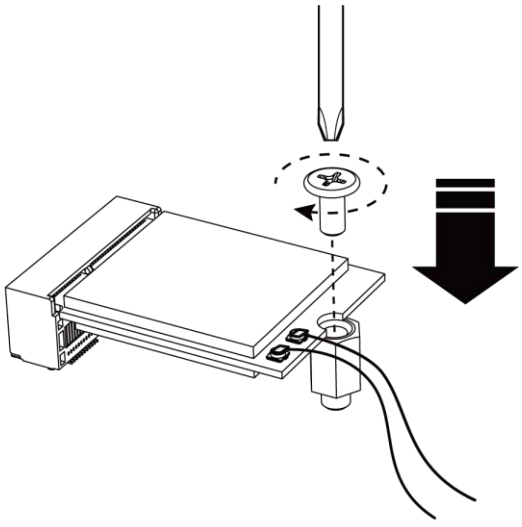
2. Connect the SMA cables to the Wi-Fi module.

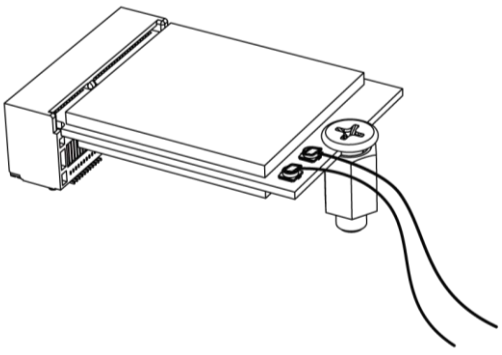


3. Insert the Wi-Fi module at a 45-degree angle.

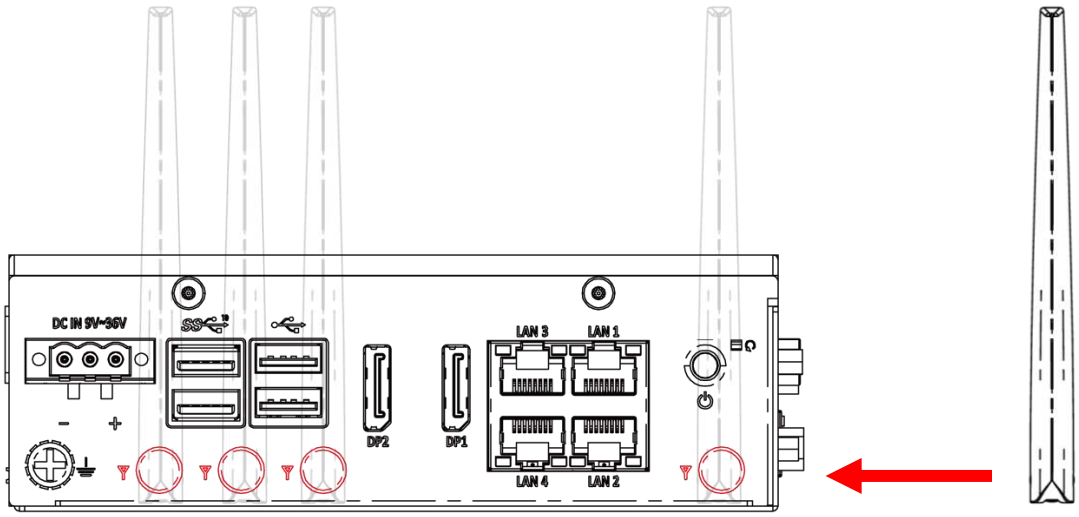


4. Press the Wi-Fi module down and secure it with one screw.



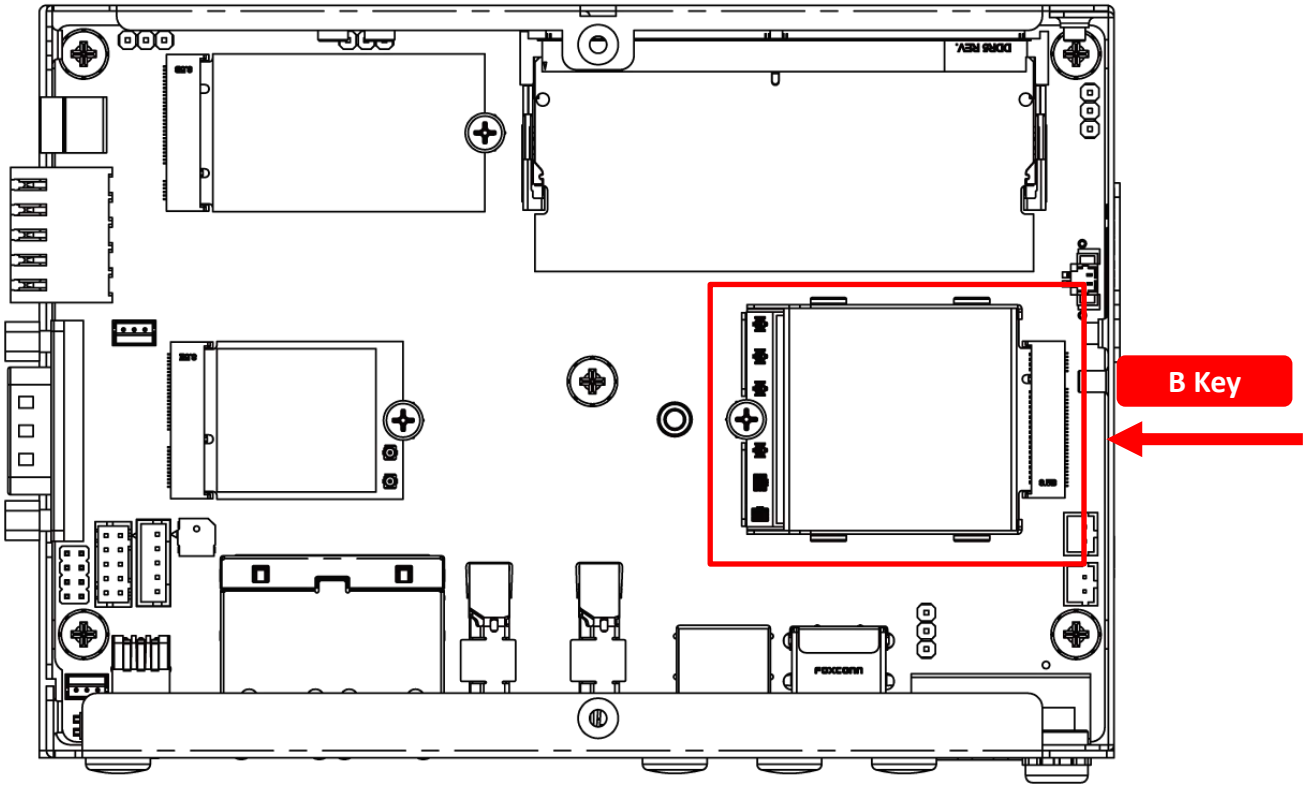


6. Attach the external antenna to the SMA jack by securely threading them together.

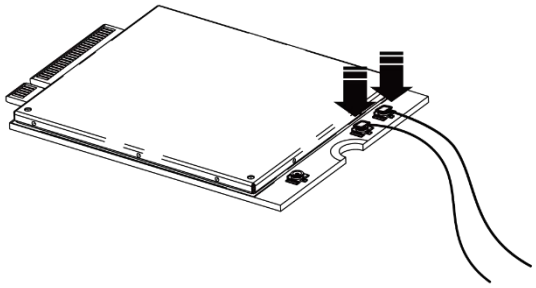


3.5 Installing Communication Module and Antenna

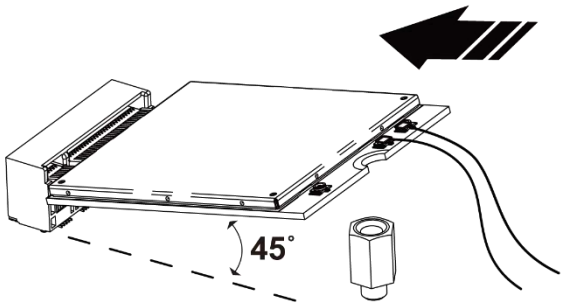
1. The M.2 B-Key supports communication (4G/5G) module, as highlighted in the picture below.



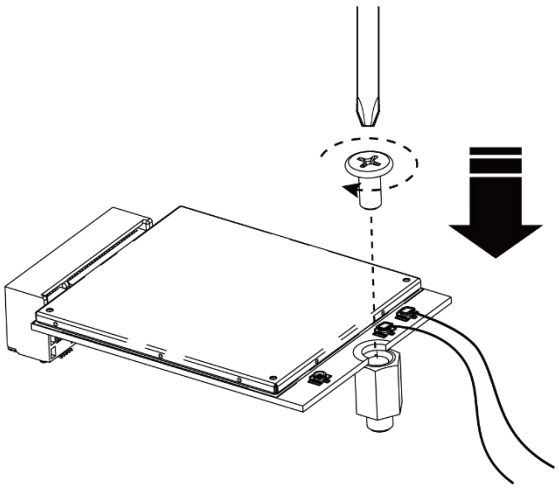
2. Connect the SMA cables to the communication (4G/5G) module.

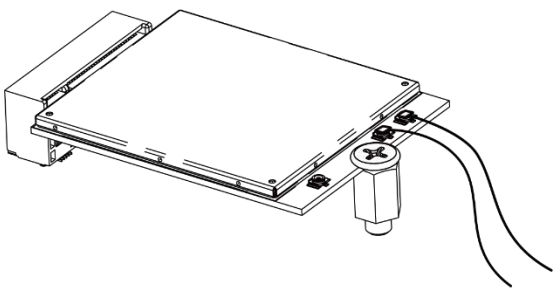


3. Insert the communication (4G/5G) module at a 45-degree angle.

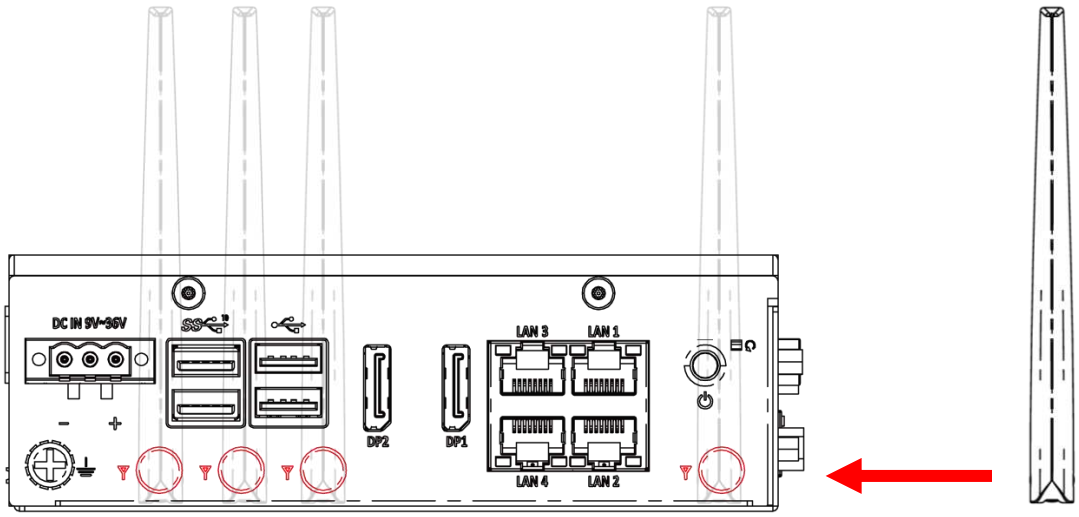


4. Press the communication module down and secure it with one screw.

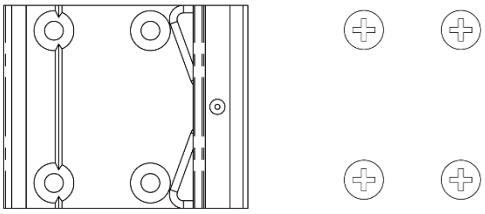




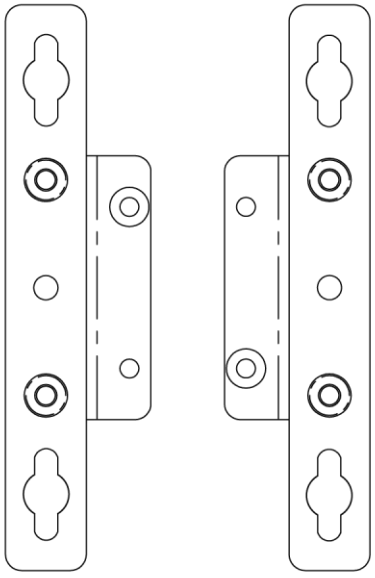
5. Assemble the antenna and SMA jack together; the outcome should resemble the picture below.



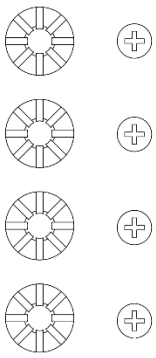
Din Rail



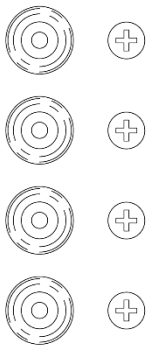
Wall Mount



Wall Mount Pads

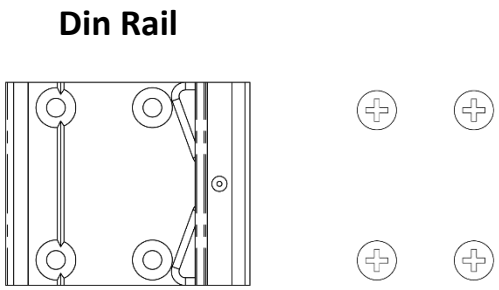


Foot Pads

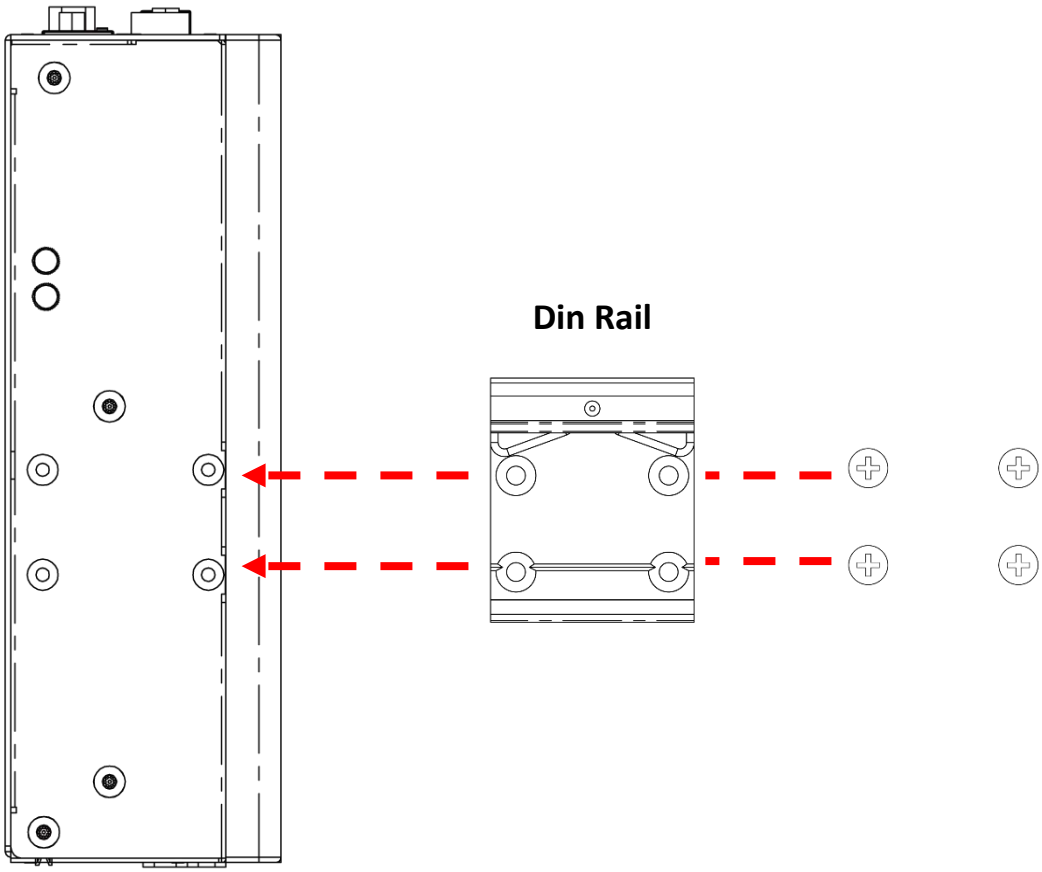


3.6 Installing DIN Rail Holder

1. Din Rail holder is available for DCO-1000-ASL series.

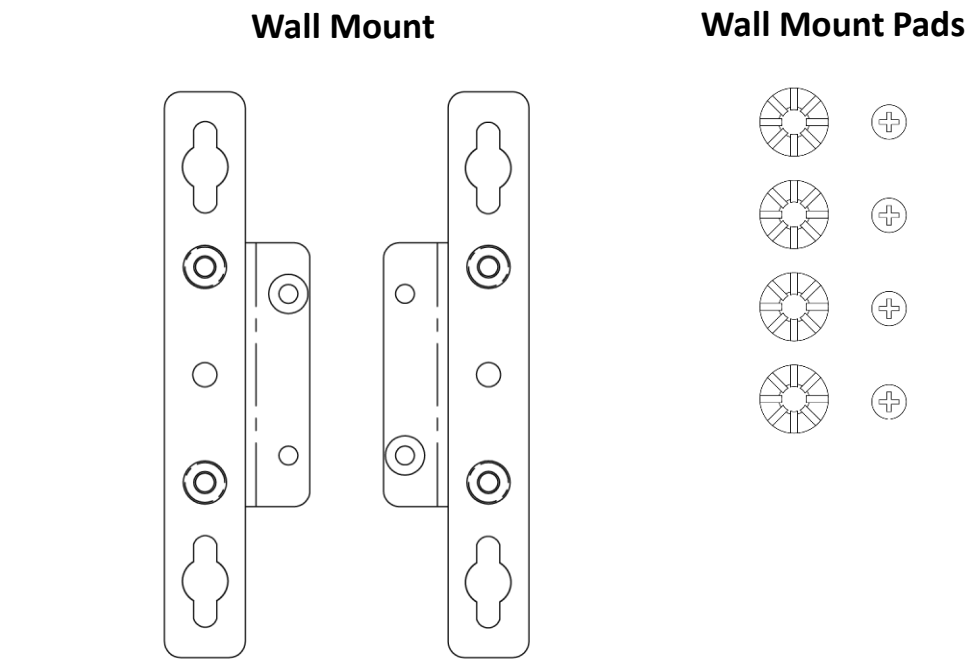


2. Place Din rail holder on the back of computer and secure it with four screws.

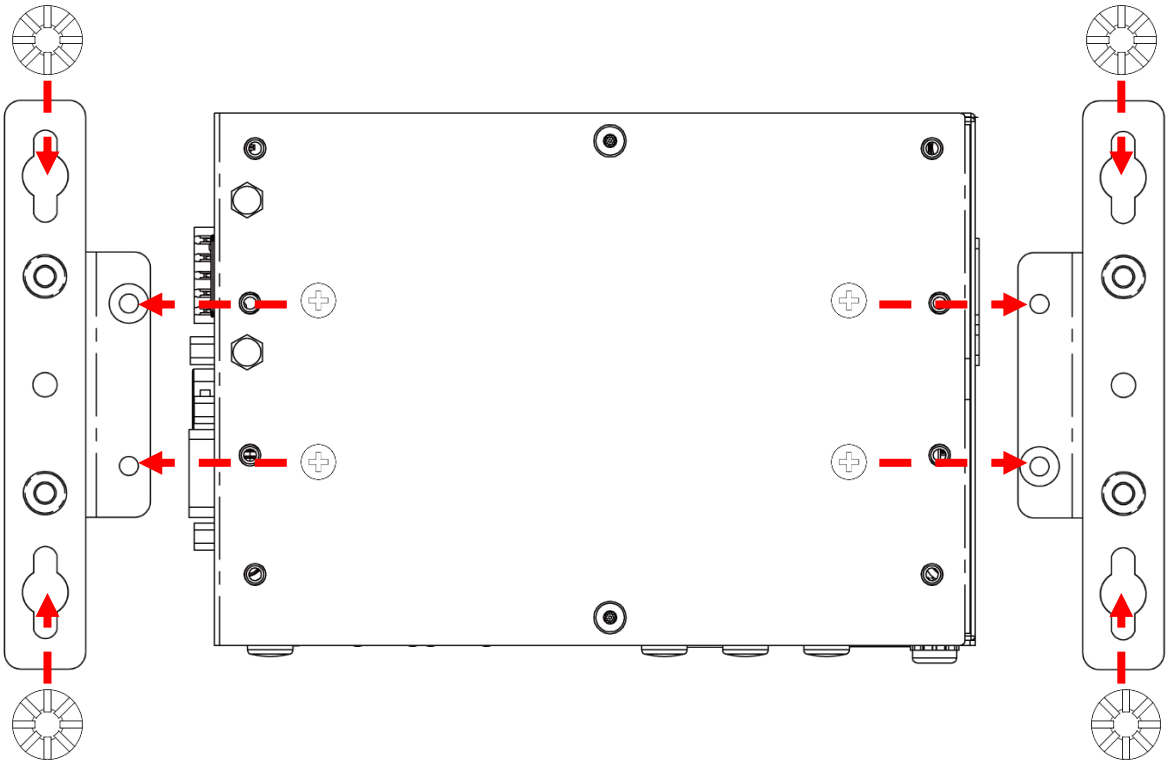


3.7 Installing Wall Mount

1. Wall Mount holder is available for DCO-1000-ASL series.

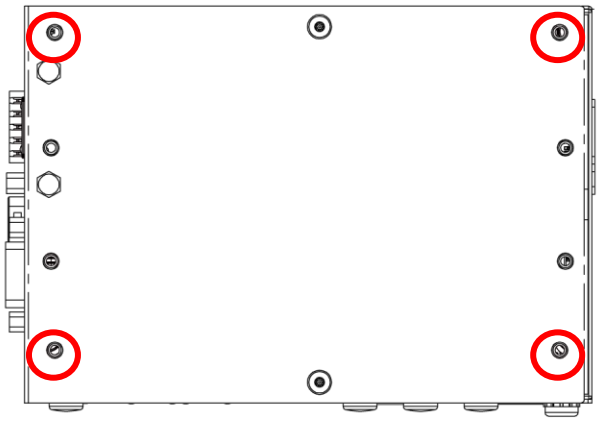


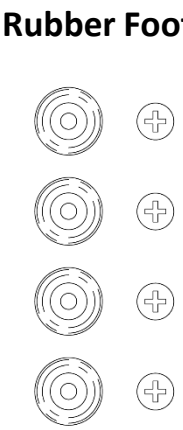
2. Assemble the anti-vibration grommets and screws together.



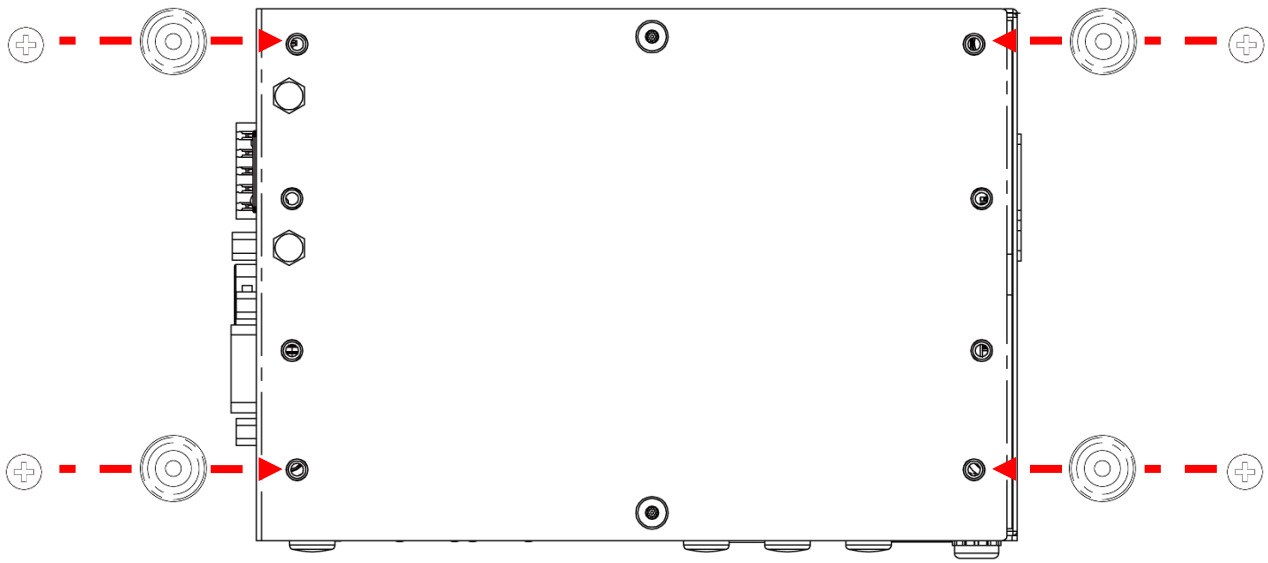
3.8 Installing Foot Pads

1. Below is the rubber foot accessory.





2. Assemble the rubber foots and screws together



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 <Del> 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

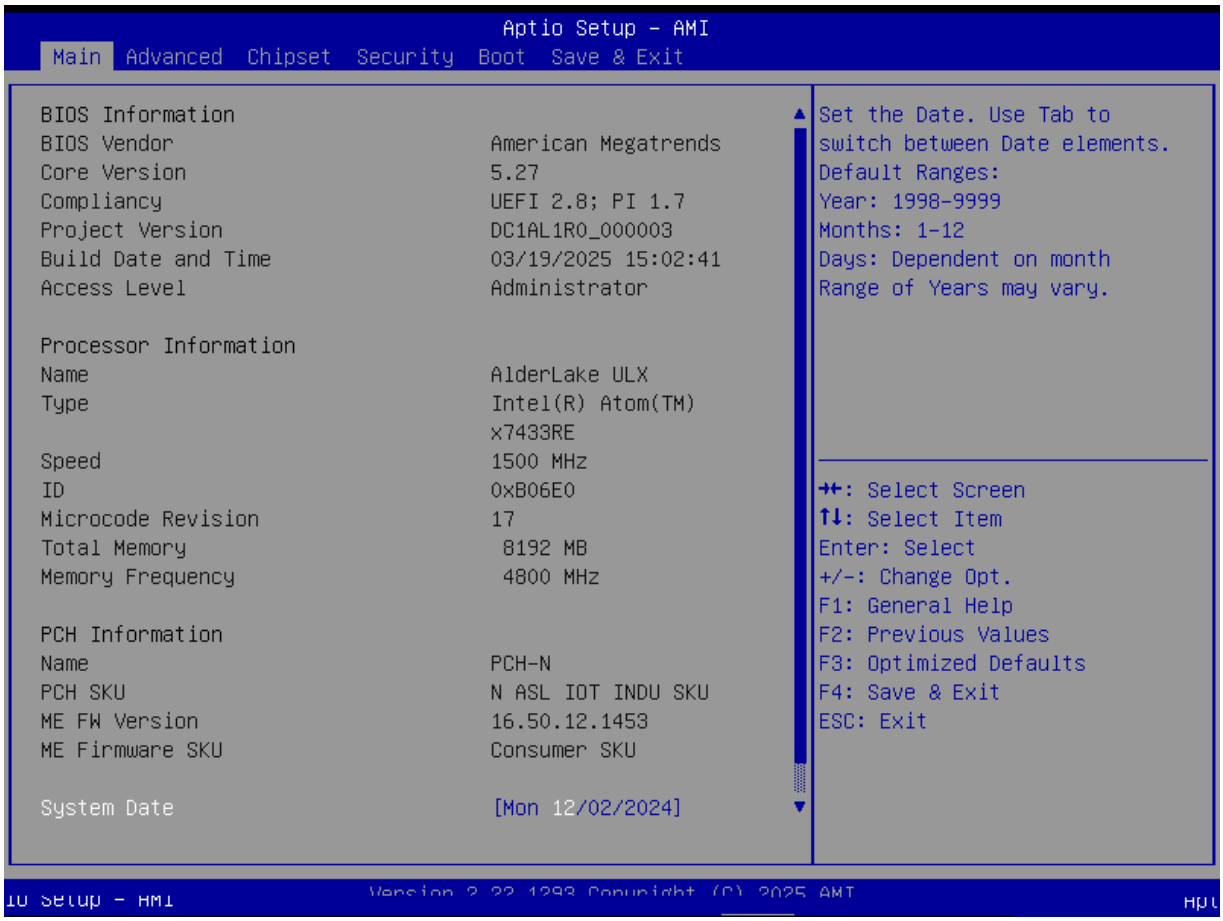
The main menu lists the setup functions you can make changes to. You can use the arrow keys (↑↓) to select the item. The on-line description of the highlighted setup function is displayed at the bottom of the screen.

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 <Del> 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.



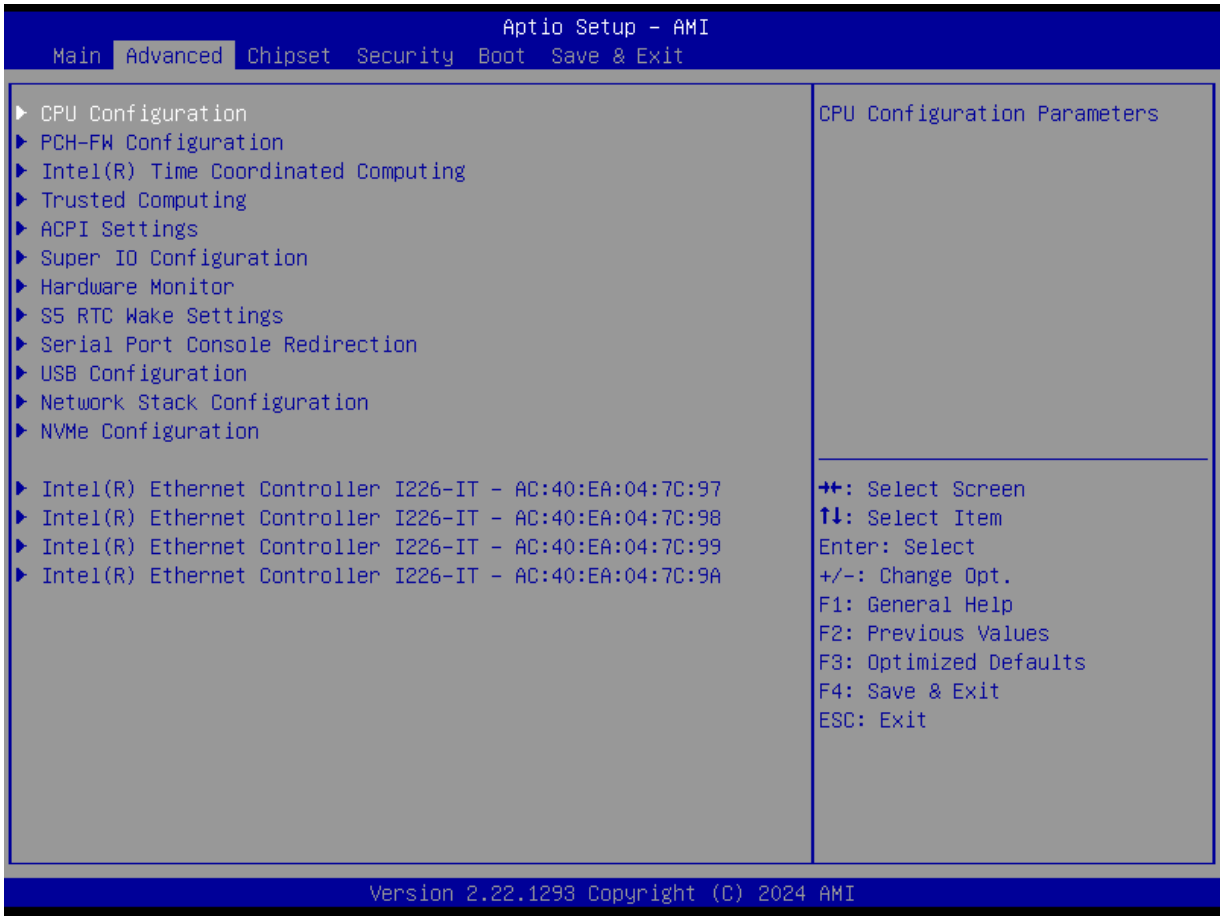
■ System Date

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

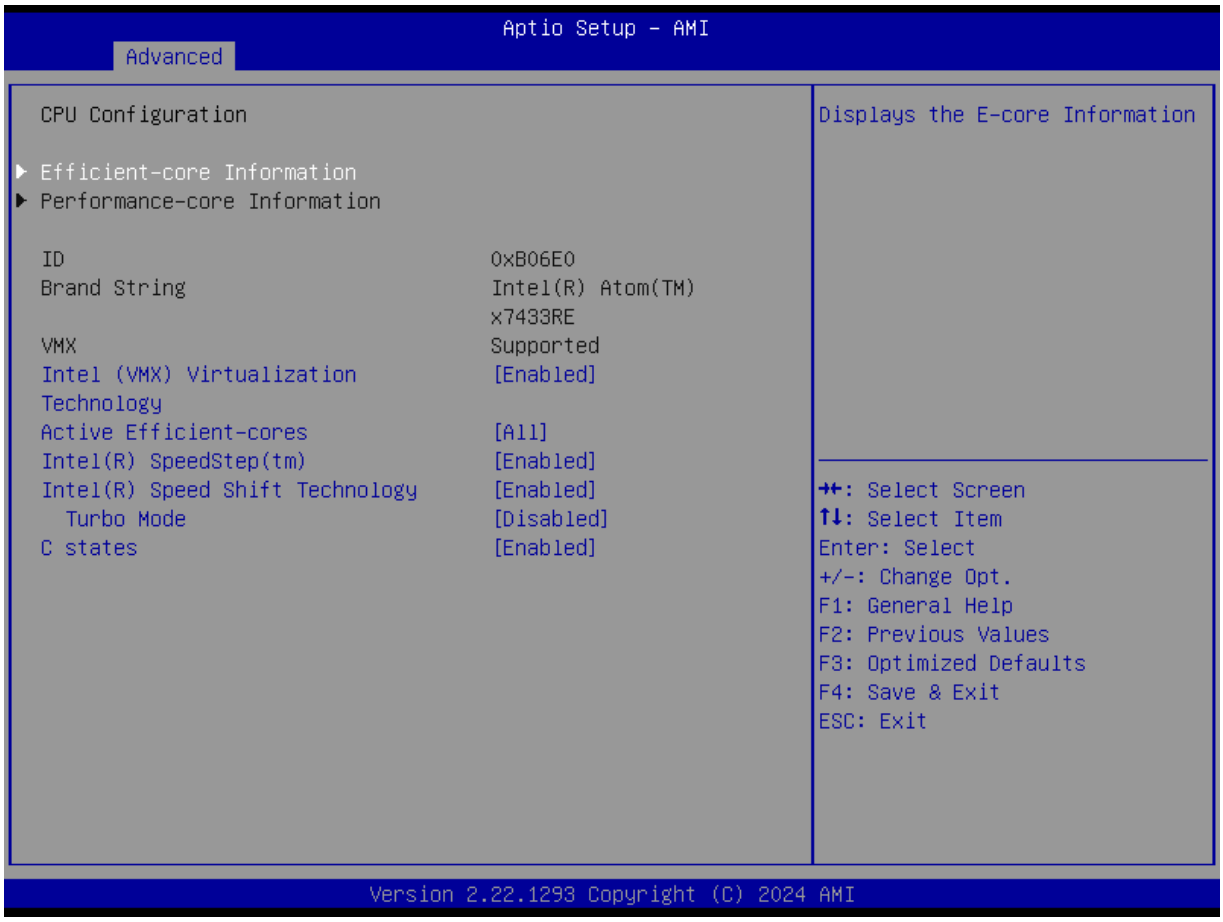
■ System Time

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

4.3 Advanced Setup

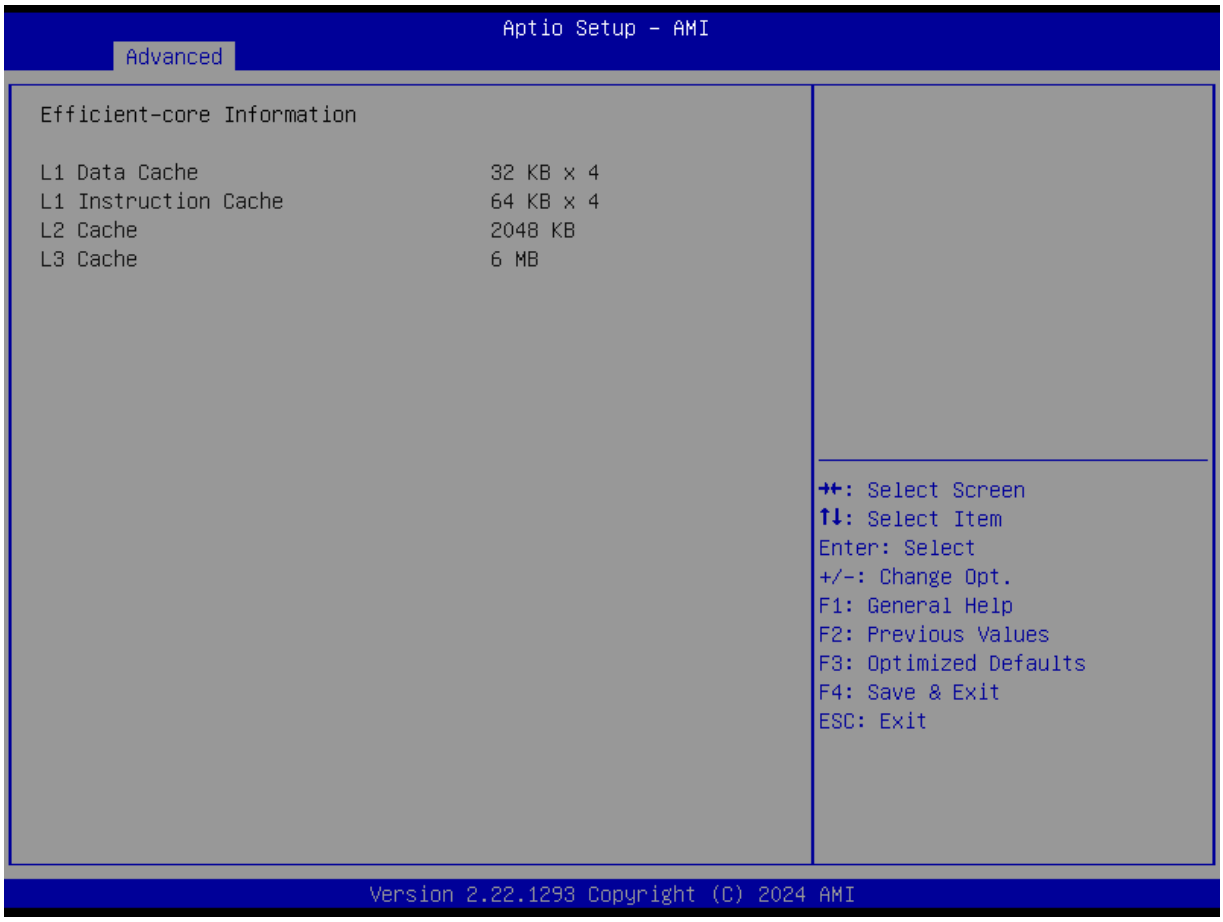


4.3.1 CPU Configuration

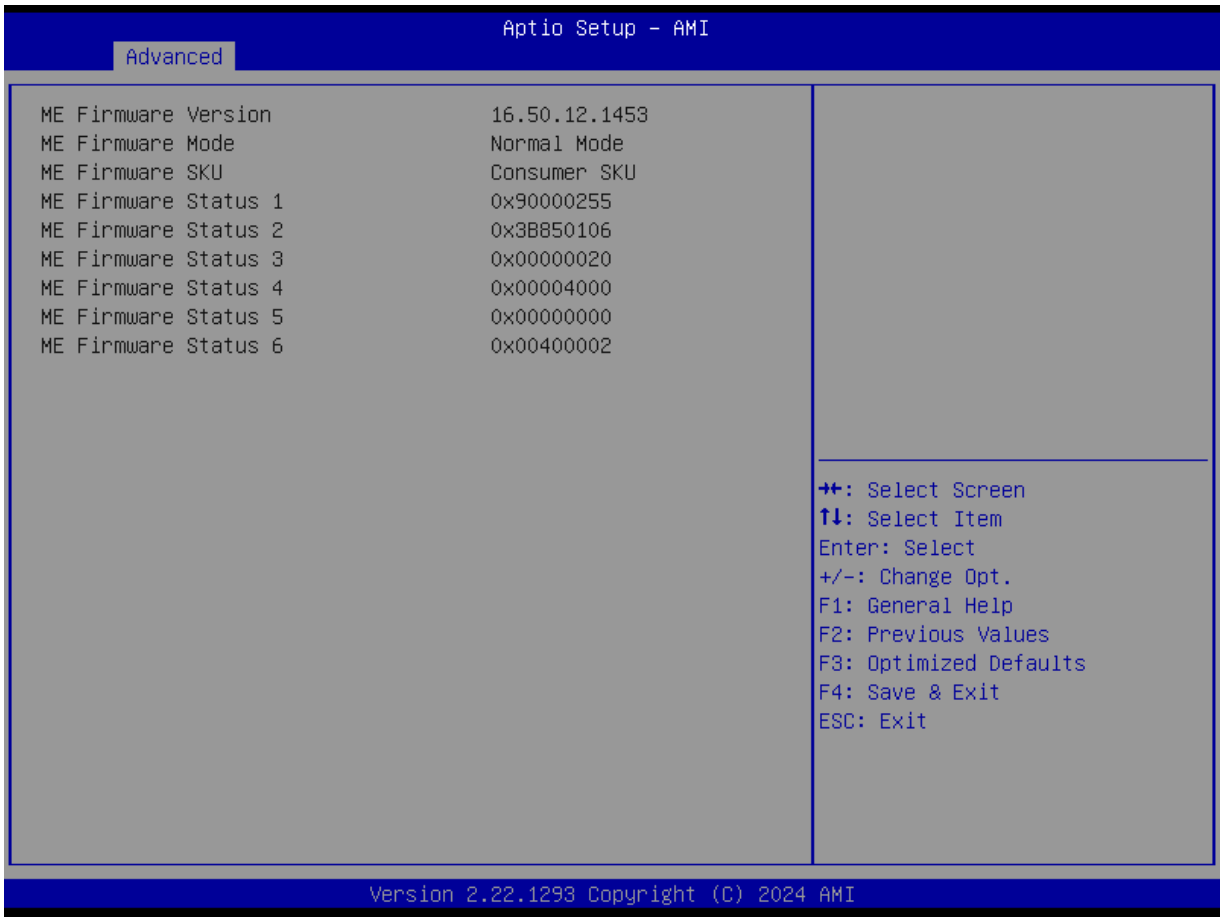


Item	Options	Description
Intel (VMX) Virtualization Technology	Disabled, Enabled**[Default]**	When enabled, a VMM can utilize the additional hardware capabilities provided by Virtualization Technology.
Active Processor Cores	All**[Default]** 0 1 2 3	Number of cores to enable in each processor package.
Intel® SpeedStep™	Disabled, Enabled**[Default]**	Allows more than two frequency ranges to be supported.
Intel® Speed Shift Technology	Disabled, Enabled**[Default]**	Enable/Disable Intel® Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.
Turbo Mode	Disabled**[Default]**, Enabled	Enable/Disable processor Turbo Mode (requires EMTTM enabled too). AUTO means enabled.
C states	Disabled, Enabled**[Default]**	Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.

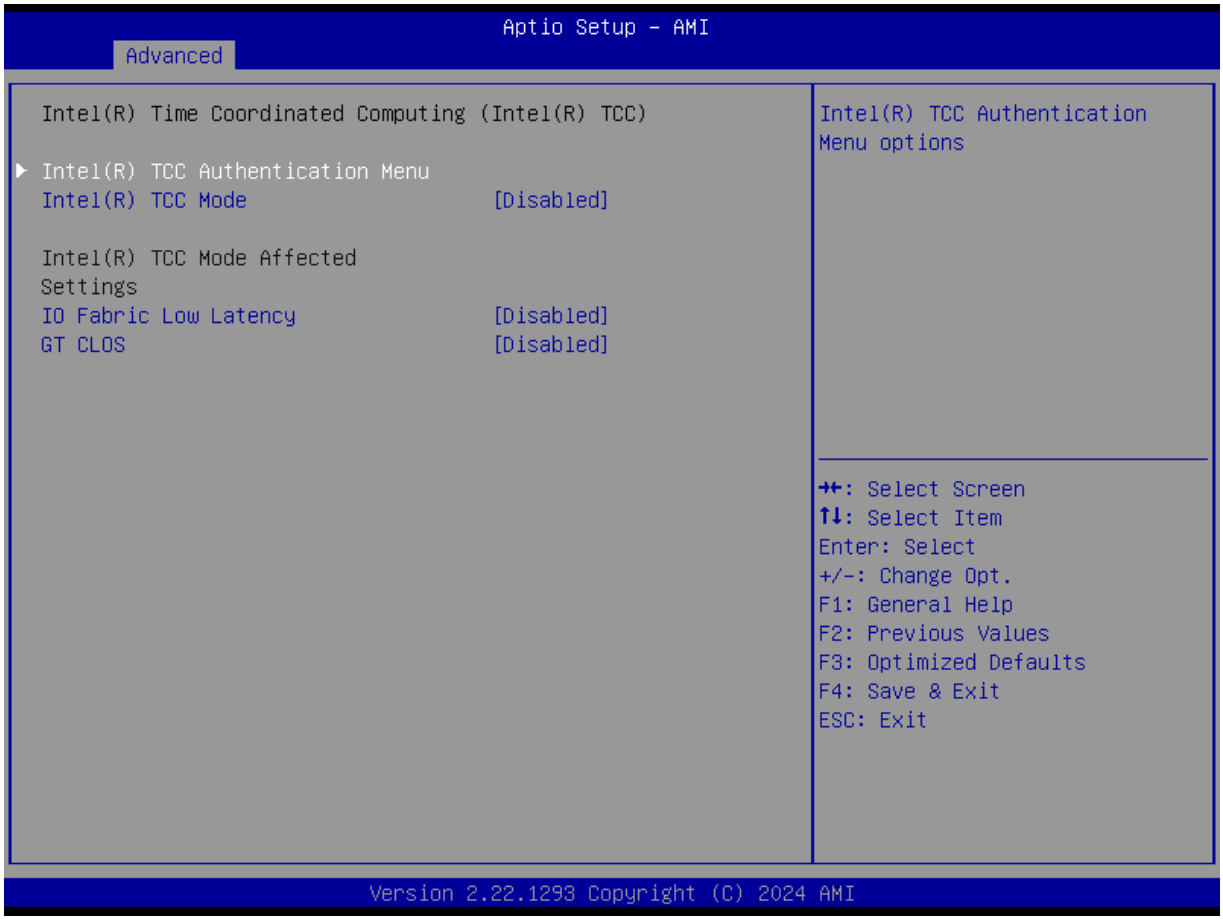
Efficient-core Information



4.3.2 PCH-FW Configuration



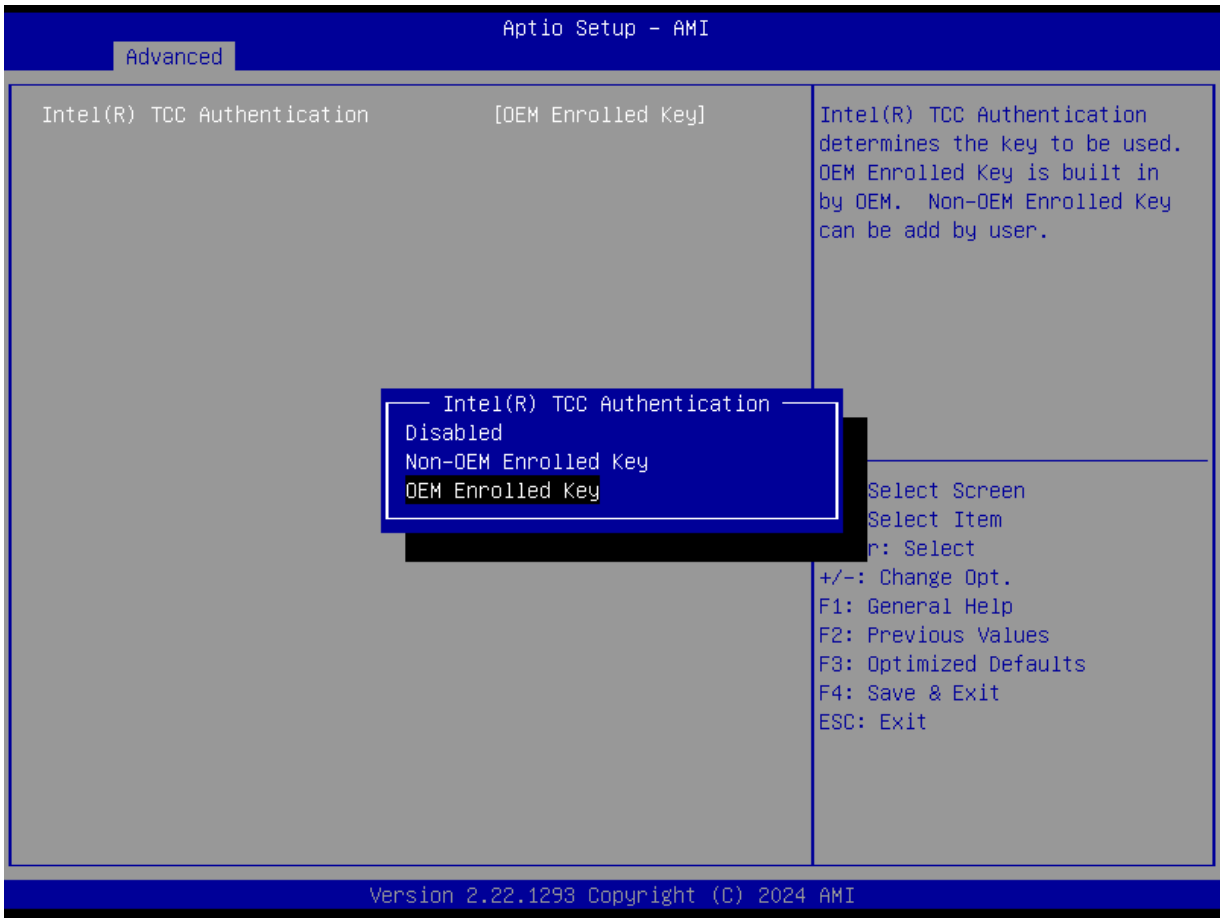
4.3.3 Intel® Time Coordinated Computing



Item	Description
Intel® TCC Authentication Menu	Intel® TCC Authentication Menu options

Item	Options	Description
Intel® TCC Mode	Disabled**[Default]** , Enabled	Enable or Disable Intel® TCC Mode. When enabled, this will modify system settings to improve real-time performance. The full list of settings and their current state are displayed below when Intel® TCC mode is enabled.
IO Fabric Low Latency	Disabled**[Default]** , Enabled	Enable or Disable IO Fabric Low Latency. This will turn off some power management in the PCH IO fabrics. This option provides the most aggressive IO Fabric performance setting. S3 state is NOT supported.
GT CLOS	Disabled**[Default]** , Enabled	Enable or Disable Graphics Technology(GT) Class of Service. Enable will reduce Gfx LLC allocation to minimize impact of Gfx workload on LLC

Intel® TCC Authentication Menu

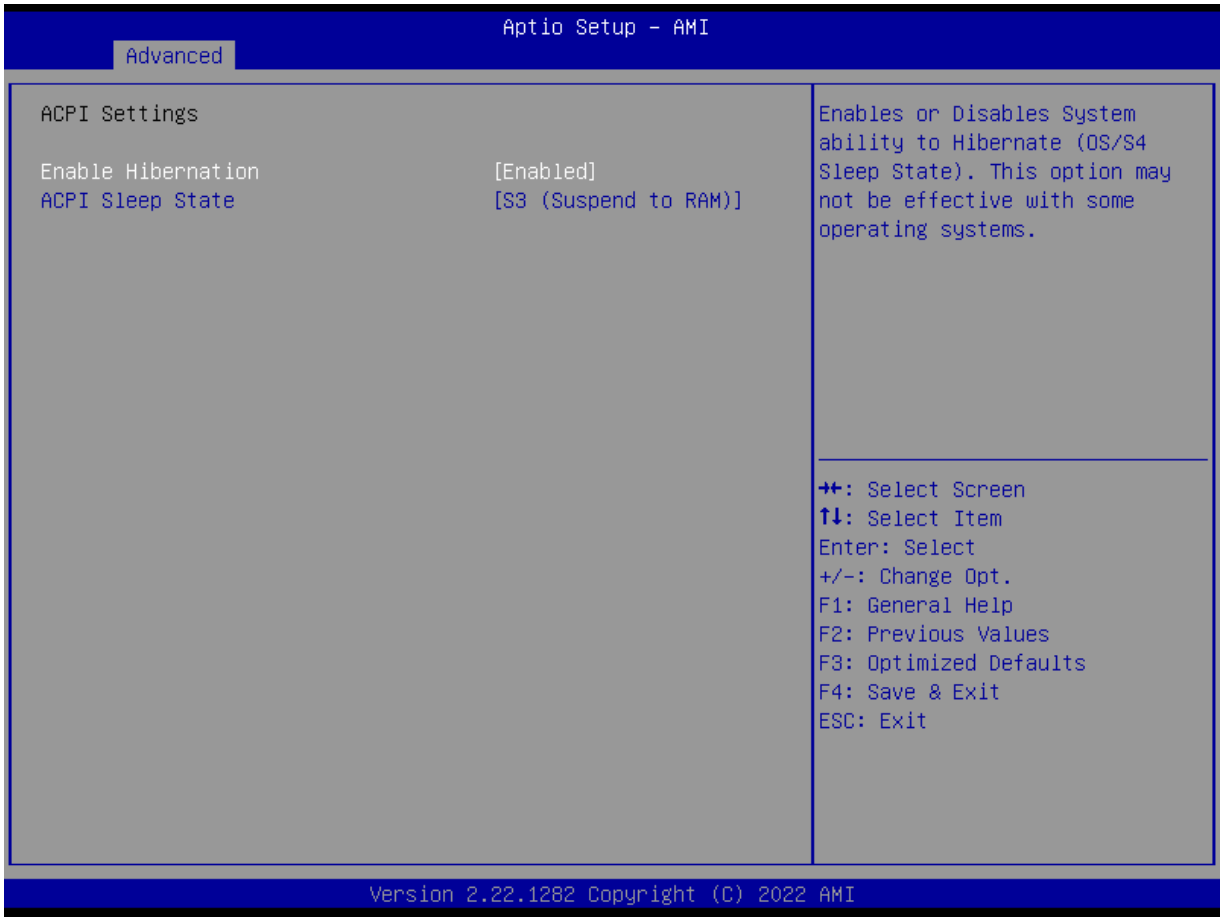


Item	Options	Description
Intel® TCC Authentication	Disabled, Non-OEM Enrolled Key, OEM Enrolled Key**[Default]**	Intel(R) TCC Authentication determines the key to be used. OEM Enrolled Key is built in by OEM. Non-OEM Enrolled Key can be add by user.

4.3.4 Trusted Computing

Item	Options	Description
Security Device Support	Enabled**[Default]** , Disabled,	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.

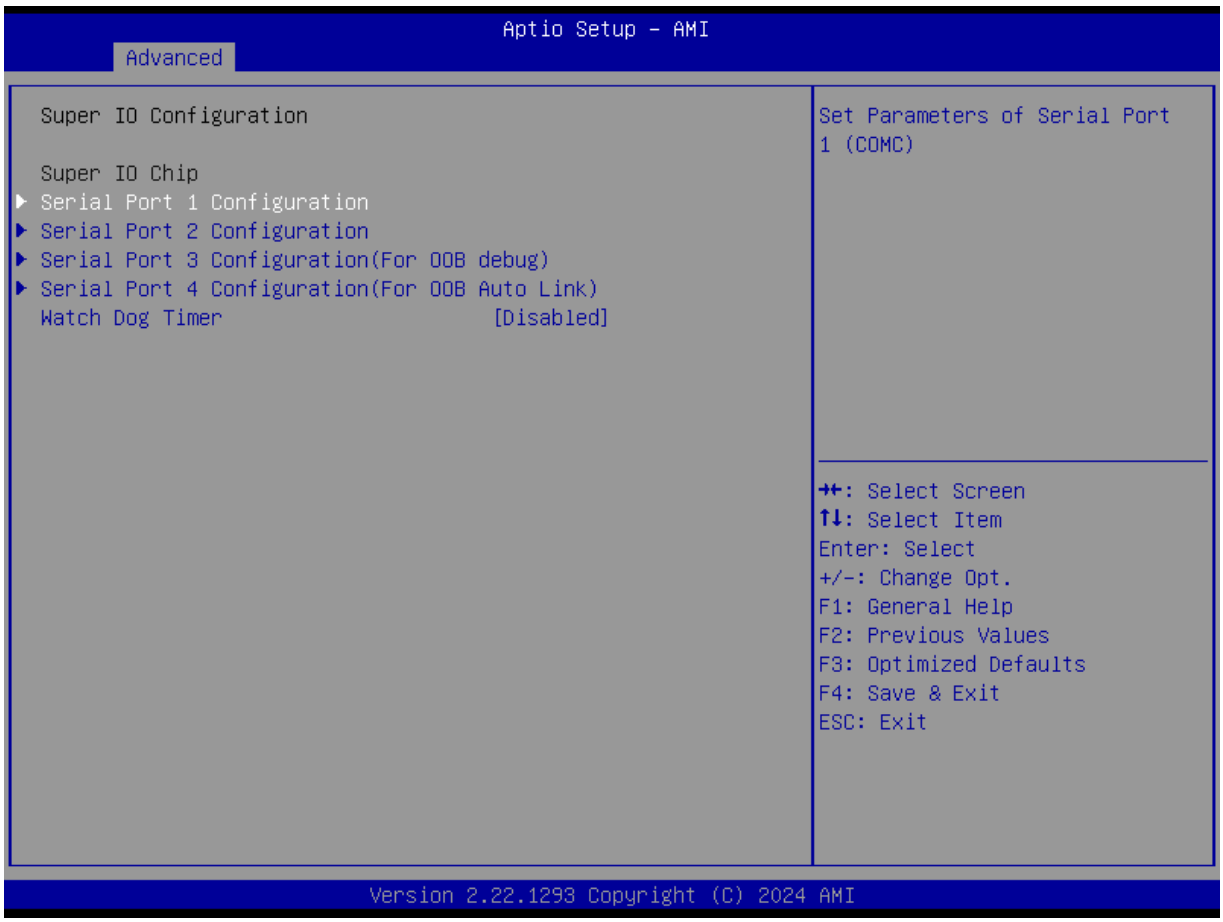
4.3.5 ACPI Settings



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

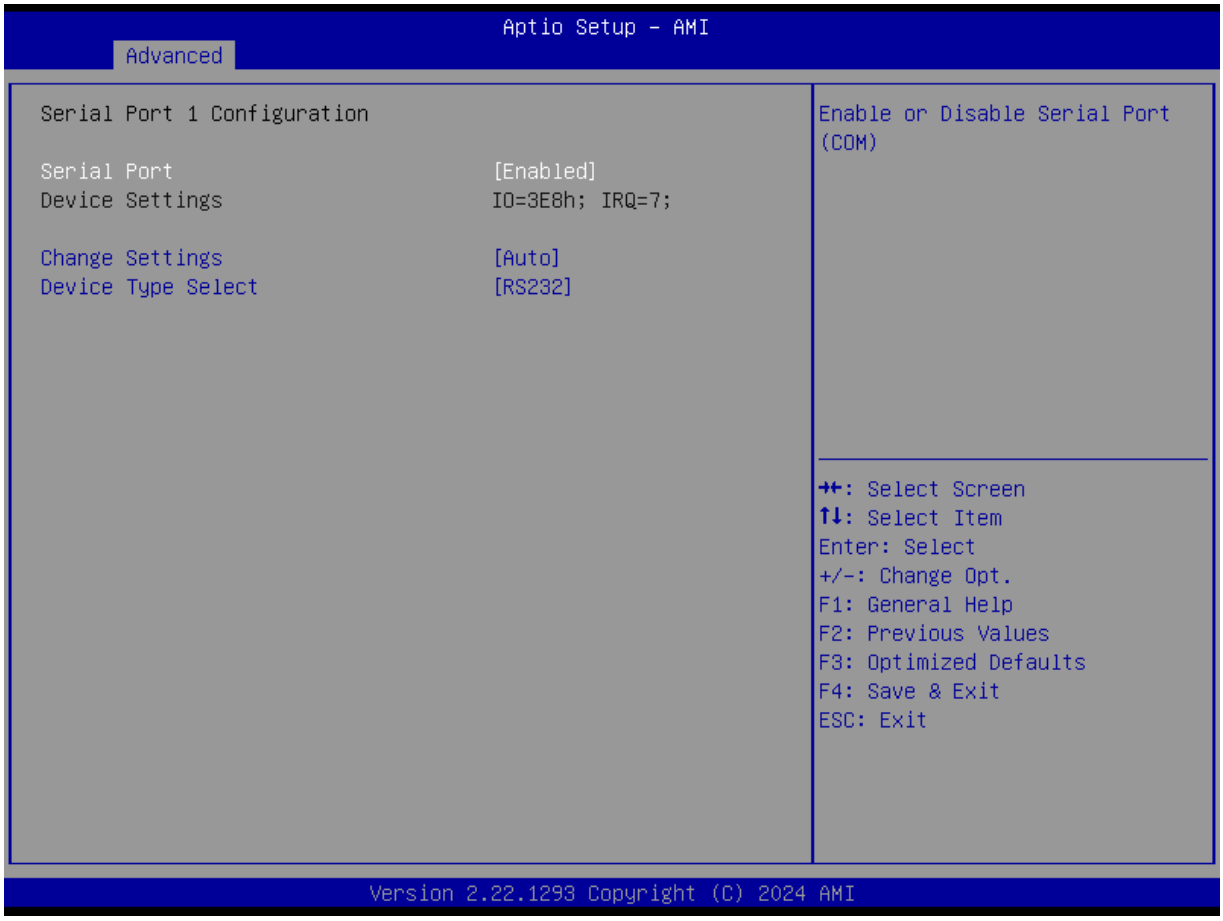
This setting allows you to select options for the Super IO Configuration, and change the value of the selected option.



Item	Description
Serial Port 1 Configuration	Set Parameters of Serial Port 1 (COMC).
Serial Port 2 Configuration	Set Parameters of Serial Port 2 (COMB).
Serial Port 3 Configuration(For OOB debug)	Set Parameters of Serial Port 3 (COMA).
Serial Port 4 Configuration(For OOB Auto Link)	Set Parameters of Serial Port 4 (COMD).

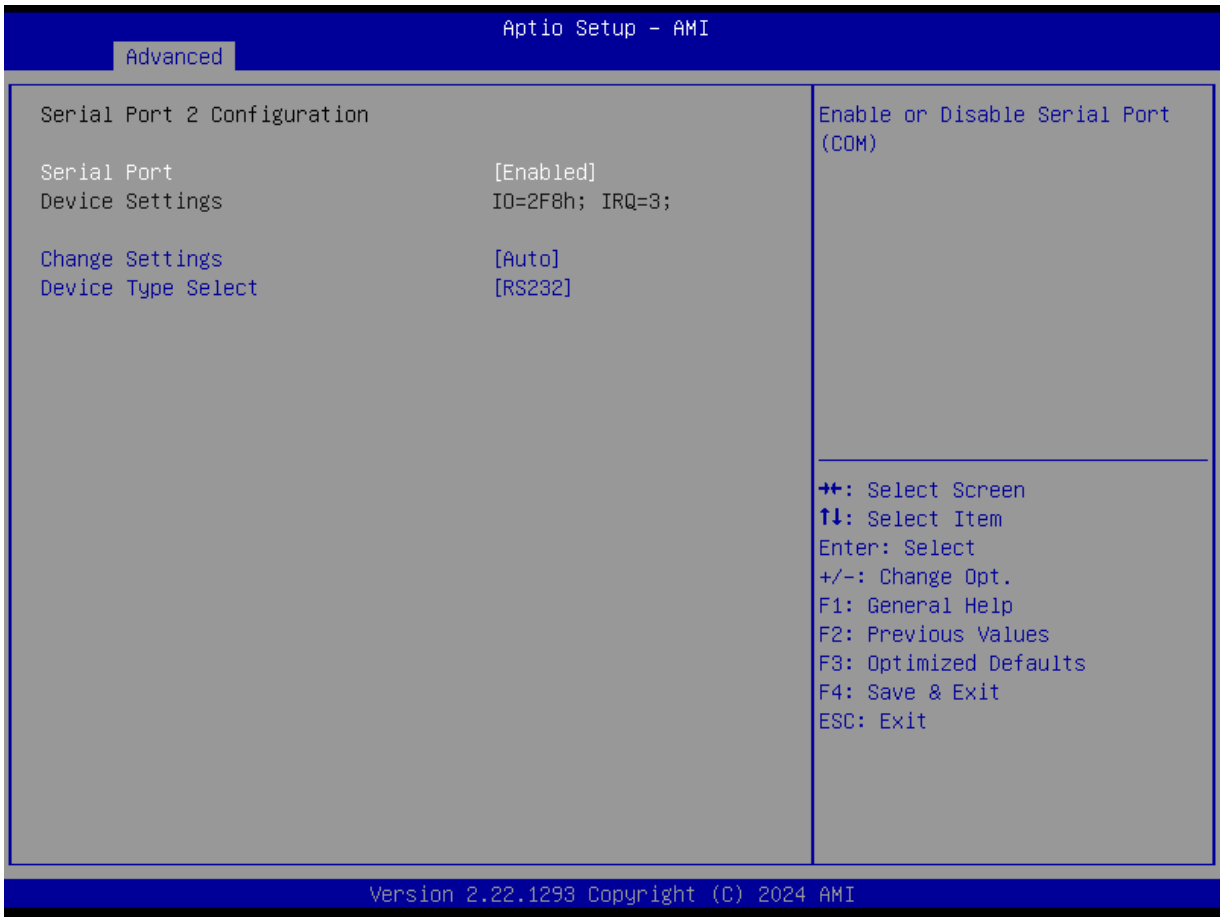
Item	Options	Description
Watch Dog Timer	Disabled **[Default],** Enabled	Enabled or Disabled Watch Dog Timer function.
Watch Dog Timer Count Mode	Second Mode**[Default]**, Minute Mode	Select Second Mode or Minute Mode.
Watch Dog Timer Time out Value	20~255(Second)**[Default],** 1~255(Minute)	Watch Dog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

Serial Port 1 Configuration



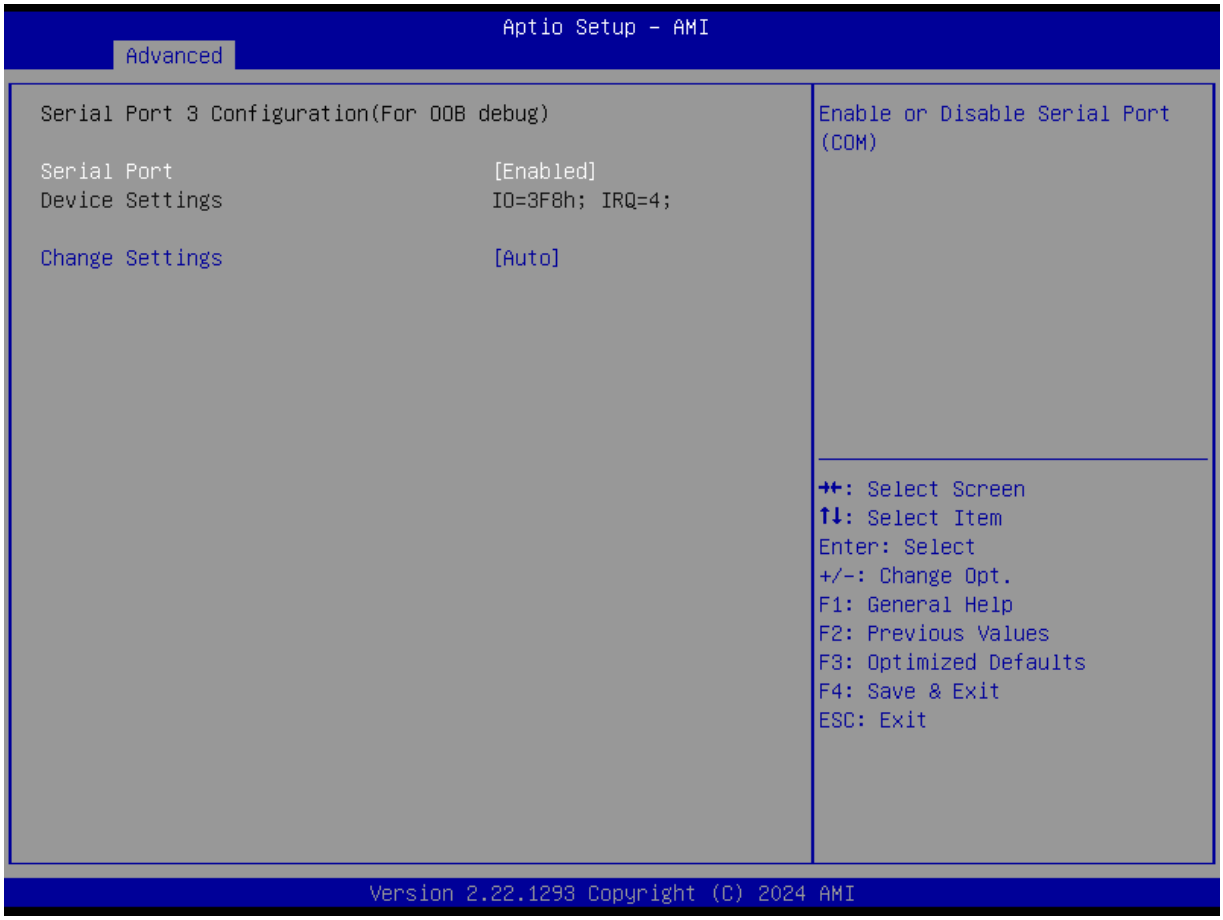
Item	Options	Description
Serial Port	Disabled, Enabled**[Default]**	Enable or Disable Serial Port (COM).
Change Settings	Auto**[Default]**, IO=3E8h; IRQ=7; , IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12;, IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;, IO=2F0h; IRQ=3,4,5,6,7,9,10,11,12;, IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12;	Select an optimal settings for Super IO Device.
Device Type Select	RS232**[Default],** RS422, RS485	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



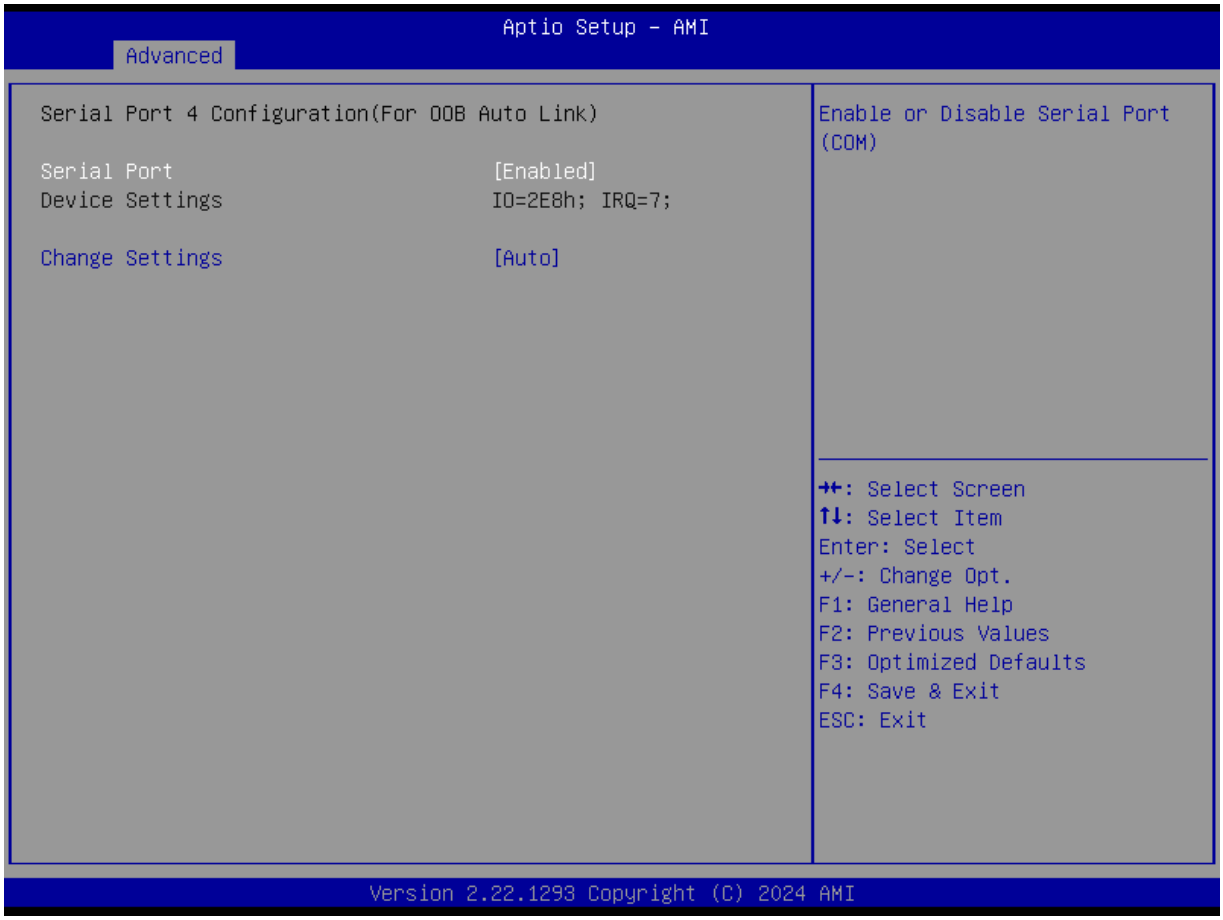
Item	Options	Description
Serial Port	Disabled, Enabled**[Default]**	Enable or Disable Serial Port (COM).
Change Settings	Auto**[Default]**, IO=2F8h; IRQ=3; , IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; , IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12;, IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12;, IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;	Select an optimal settings for Super IO Device.
Device Type Select	RS232**[Default],** RS422, RS485	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(For OOB debug)



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;	Select an optimal settings for Super IO Device.

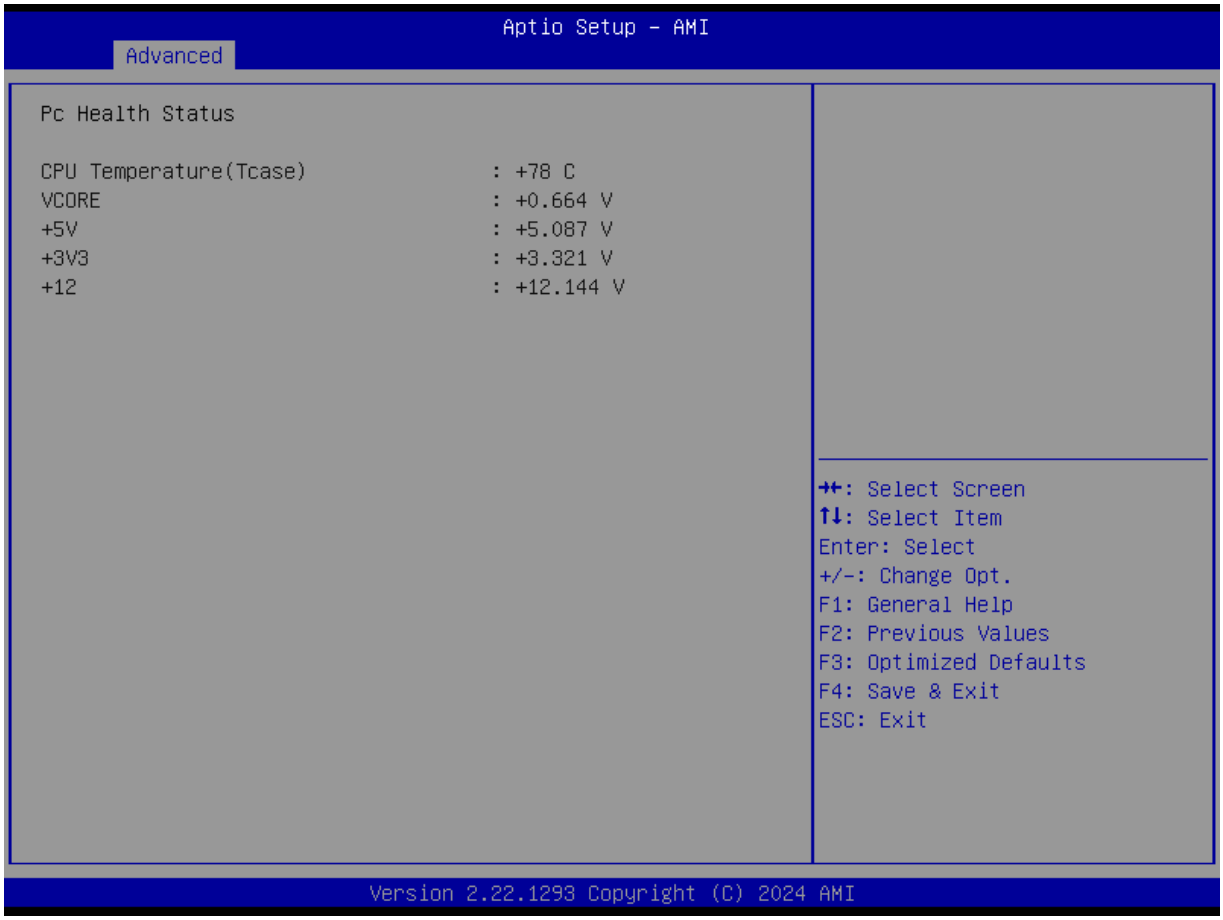
Serial Port 4 Configuration(For OOB Auto Link)



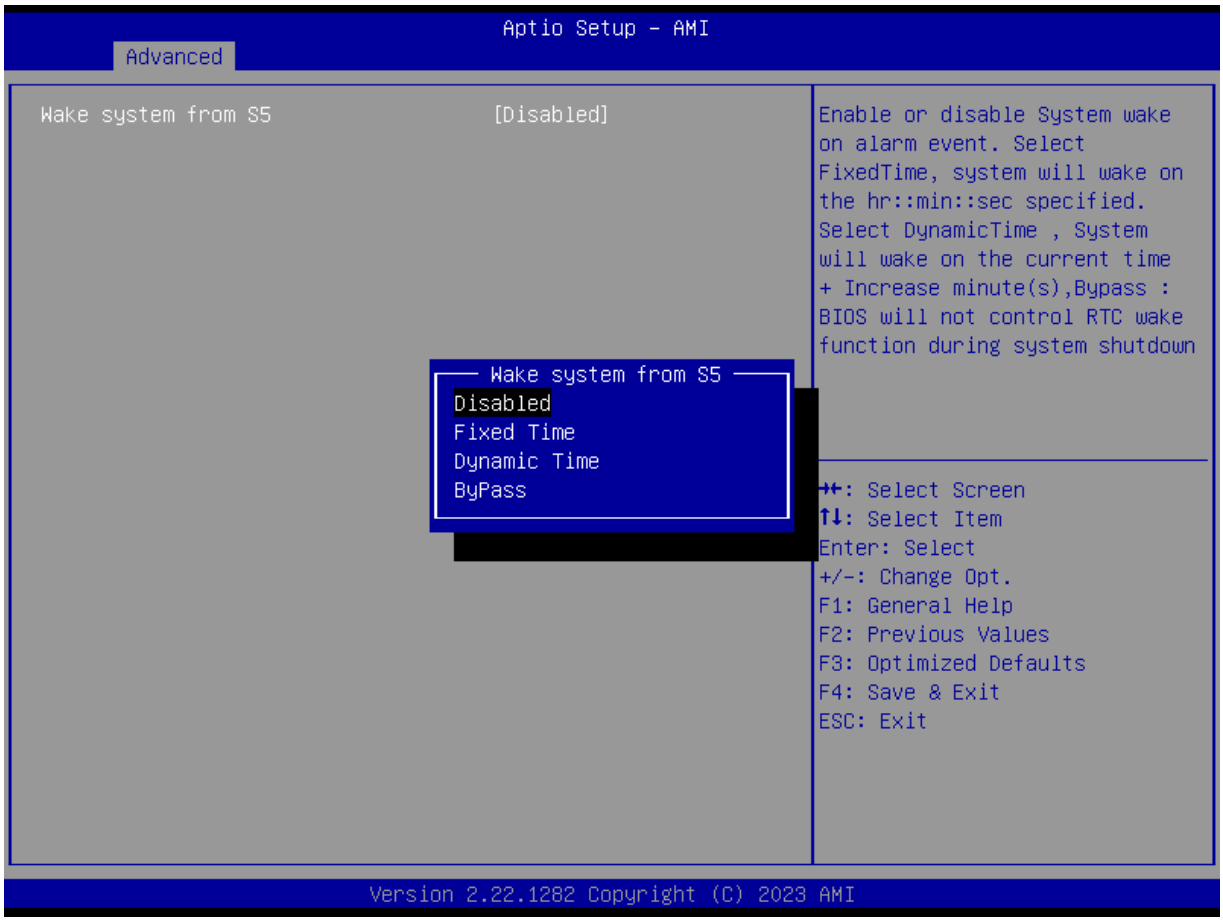
Item	Options	Description
Serial Port	Disabled, Enabled**[Default]**	Enable or Disable Serial Port (COM).
Change Settings	Auto**[Default]**, IO=2E8h; IRQ=7; , IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; , IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;, IO=2F0h; IRQ=3,4,5,6,7,9,10,11,12;, IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12;	Select an optimal settings for Super IO Device.

4.3.7 Hardware Monitor

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

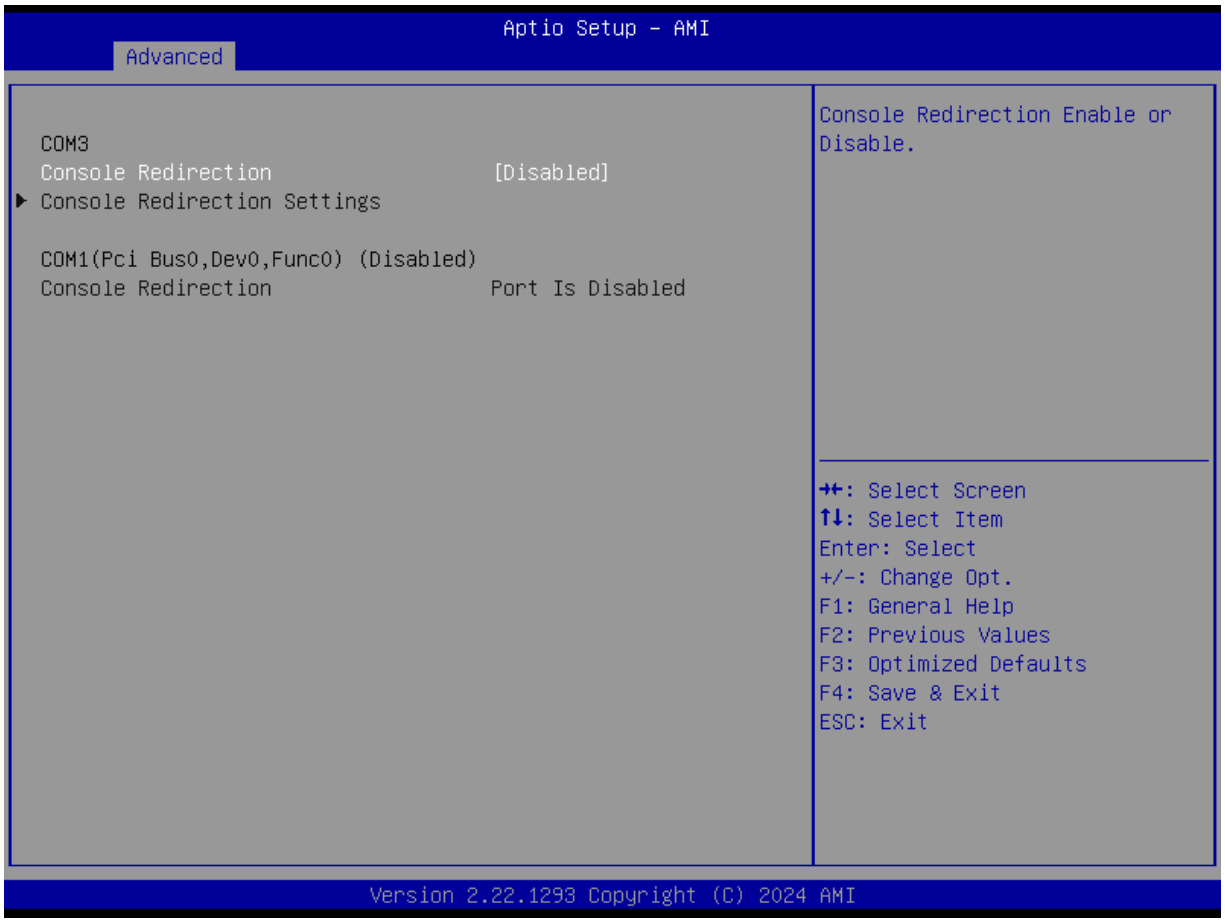


4.3.8 S5 RTC Wake Settings



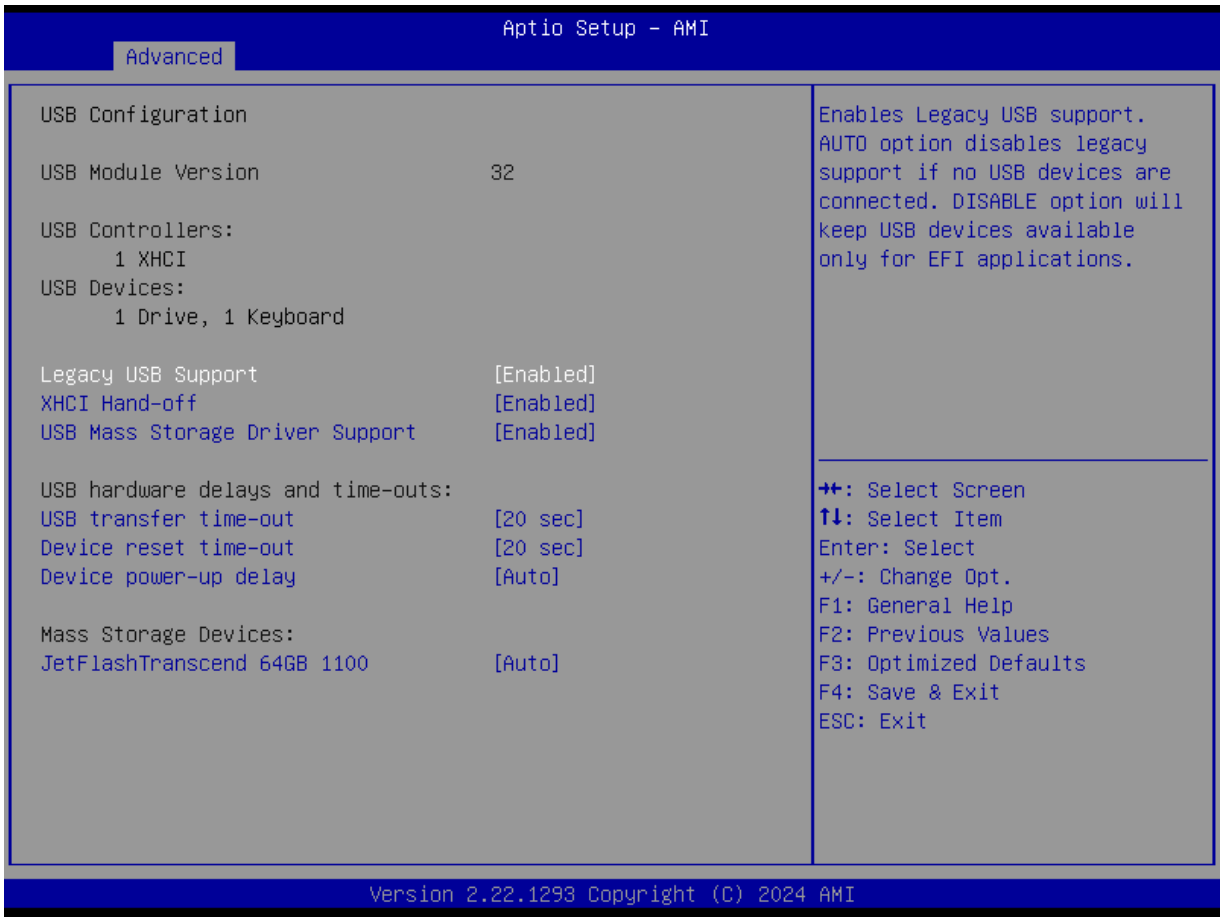
Item	Options	Description
Wake system from S5	Disabled**[Default]** Fixed Time Dynamic Time Bypass	Enable or disable System wake on alarm event. Select FixedTime, system will wake on the hr::min::sec specified. Select DynamicTime , System will wake on the current time + Increase minute(s), Select Bypass : BIOS will not control RTC wake function during system shutdown

4.3.9 Serial Port Console Redirection



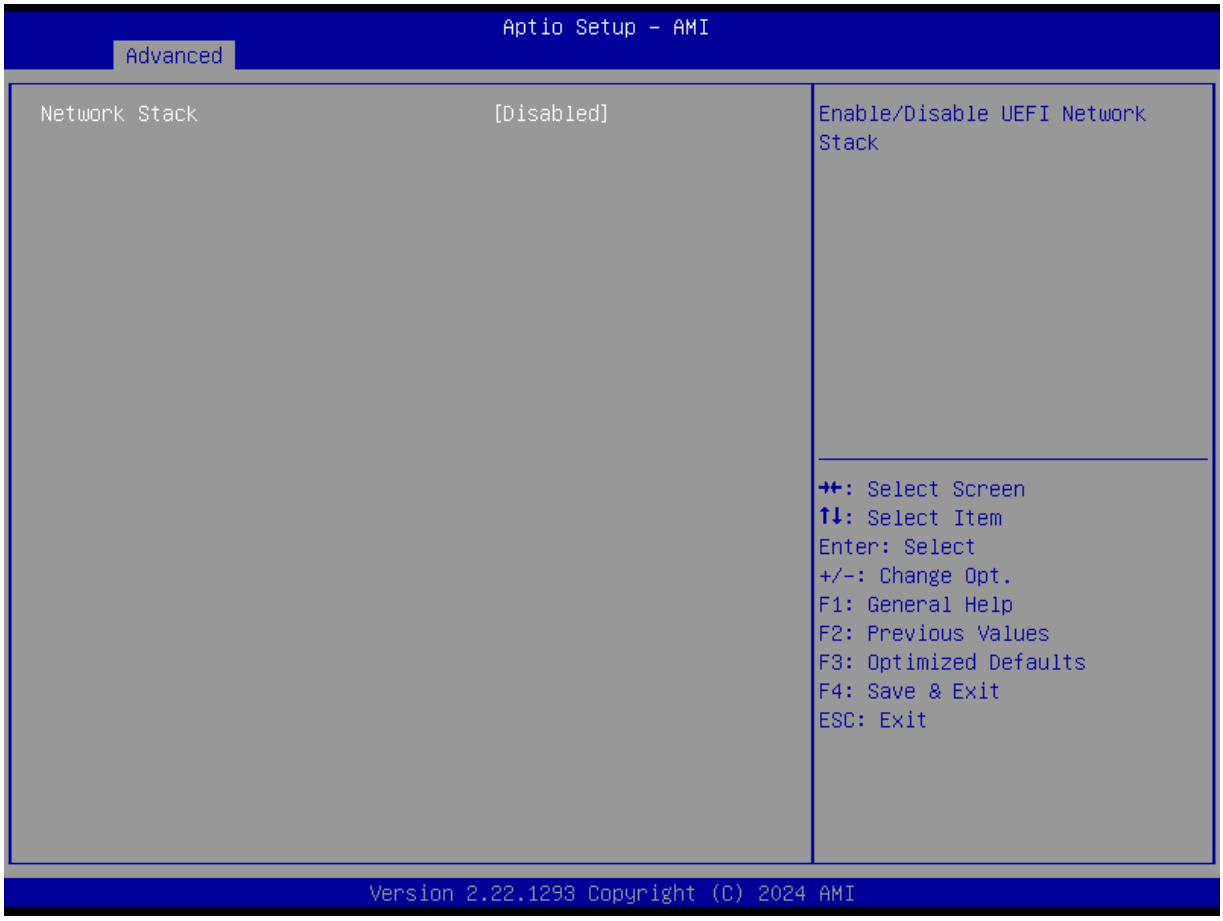
Item	Options	Description
Console Redirection	Disabled**[Default],** Enabled	Console Redirection Enable or Disable.

4.3.10 USB Configuration



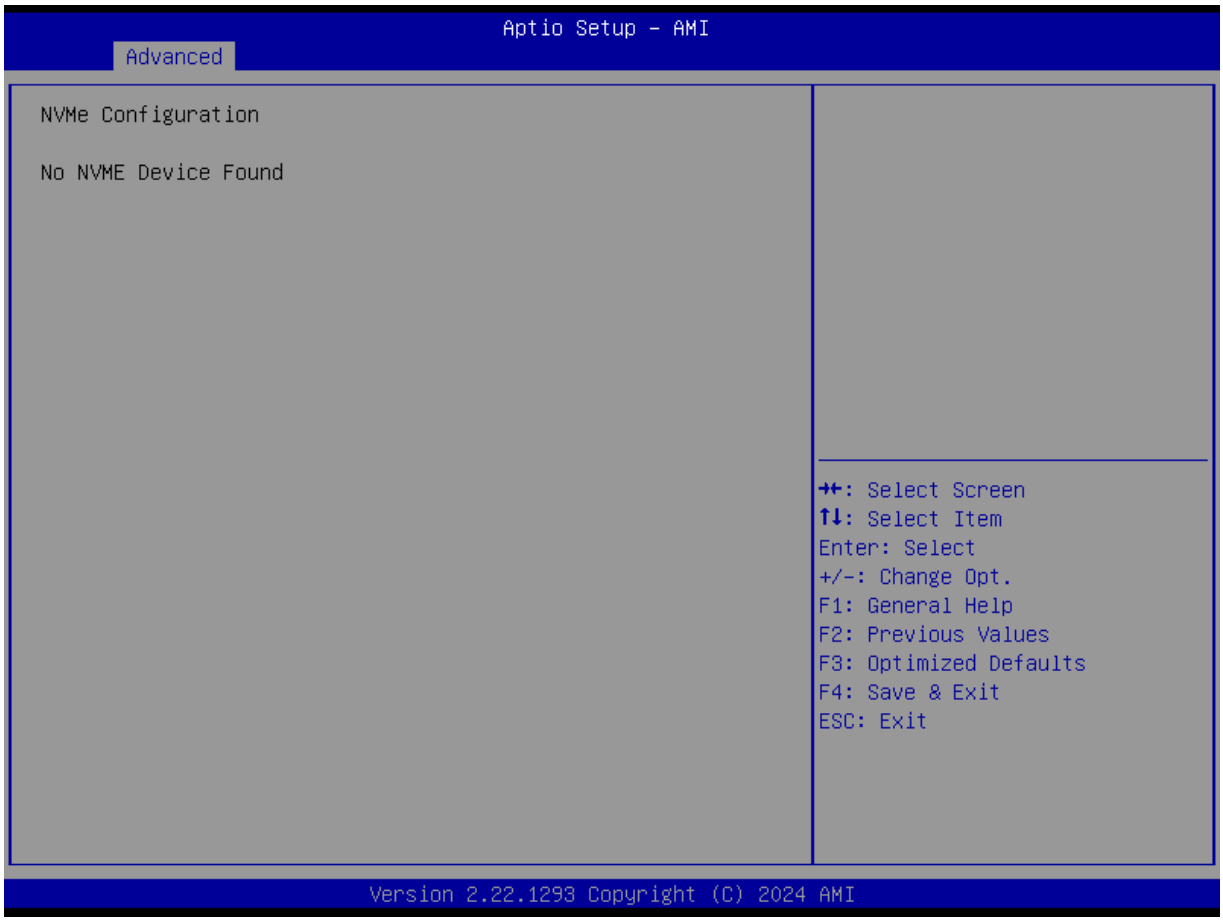
Item	Options	Description
Legacy USB Support	Enabled**[Default]**, Disabled Auto	Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
XHCI Hand-off	Enabled**[Default]**, Disabled	This 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	Disabled, Enabled**[Default]**	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 form Hub descriptor.

4.3.11 Network Stack Configuration



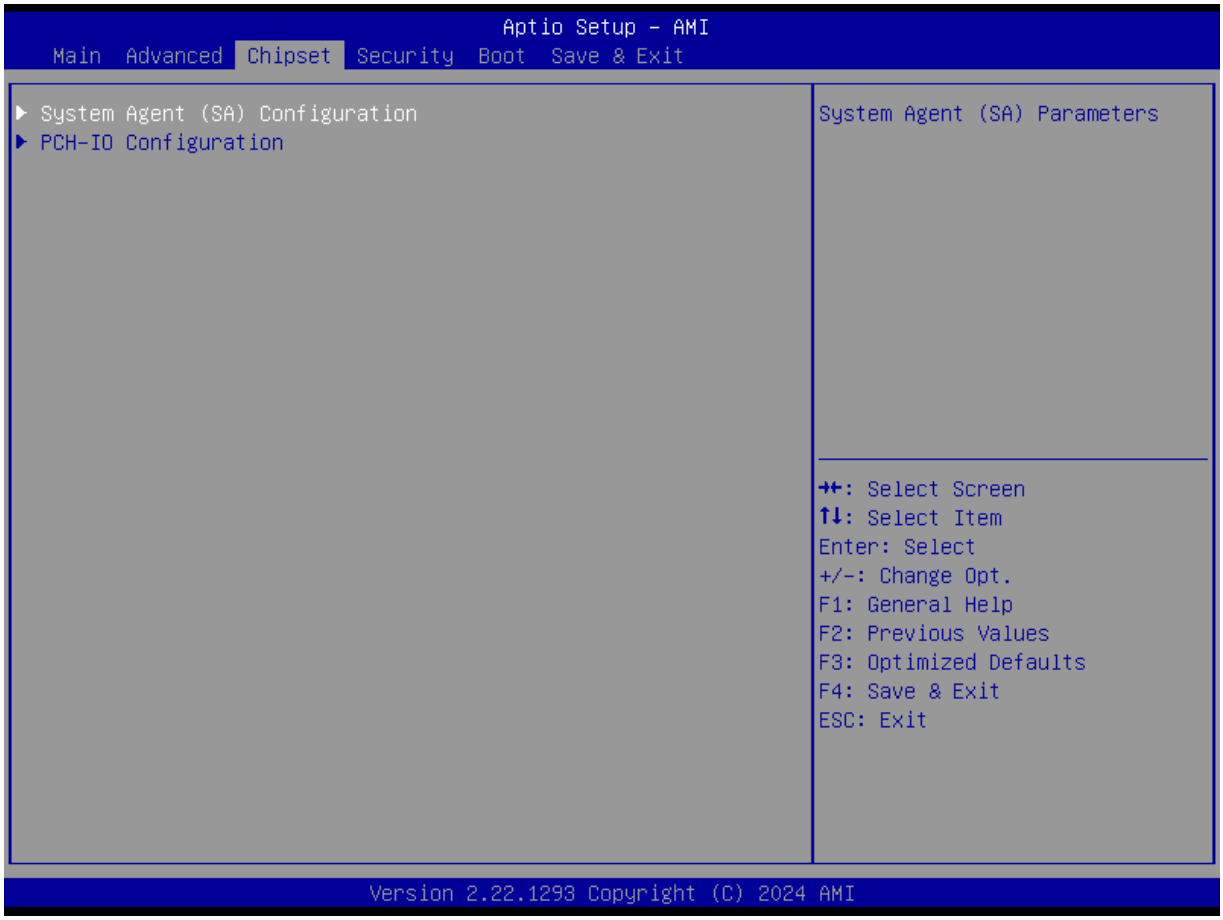
Item	Options	Description
Network Stack	Disabled**[Default] ,** Enabled	Enable/Disable UEFI Network Stack.

4.3.12 NVMe Configuration

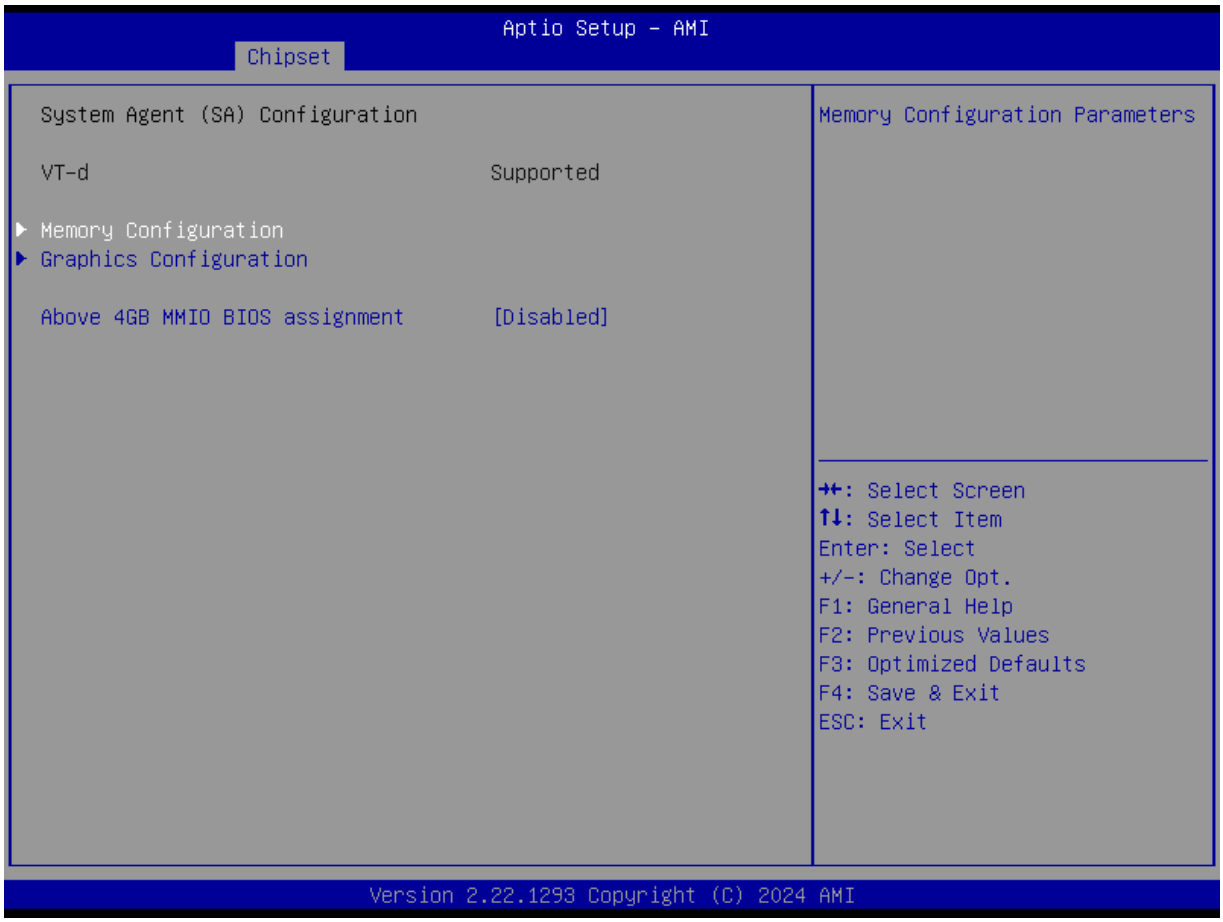


4.4 Chipset

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



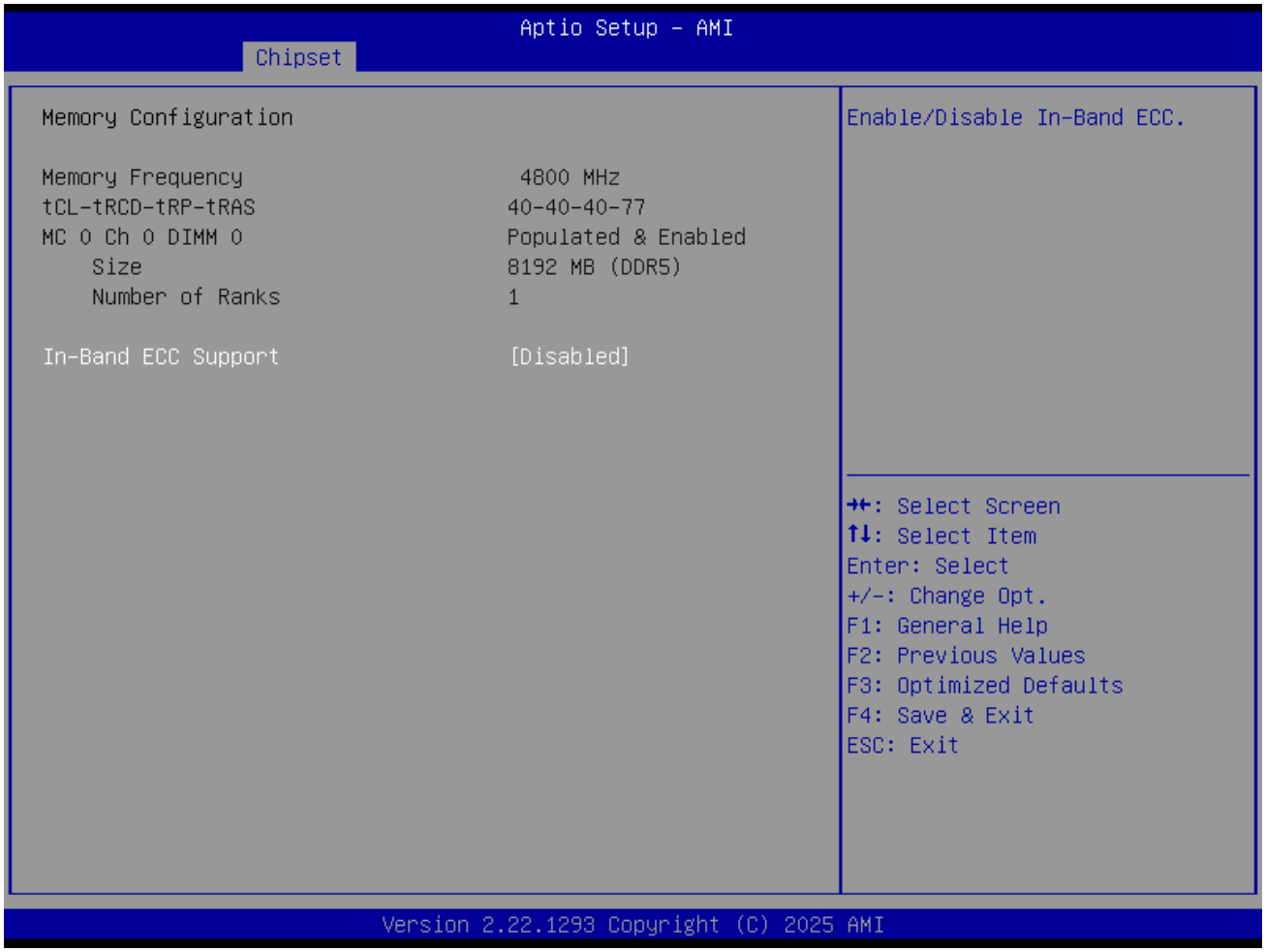
4.4.1 System Agent (SA) Configuration



Item	Description
Memory Configuration	Memory Configuration Parameters
Graphics Configuration	Graphics Configuration

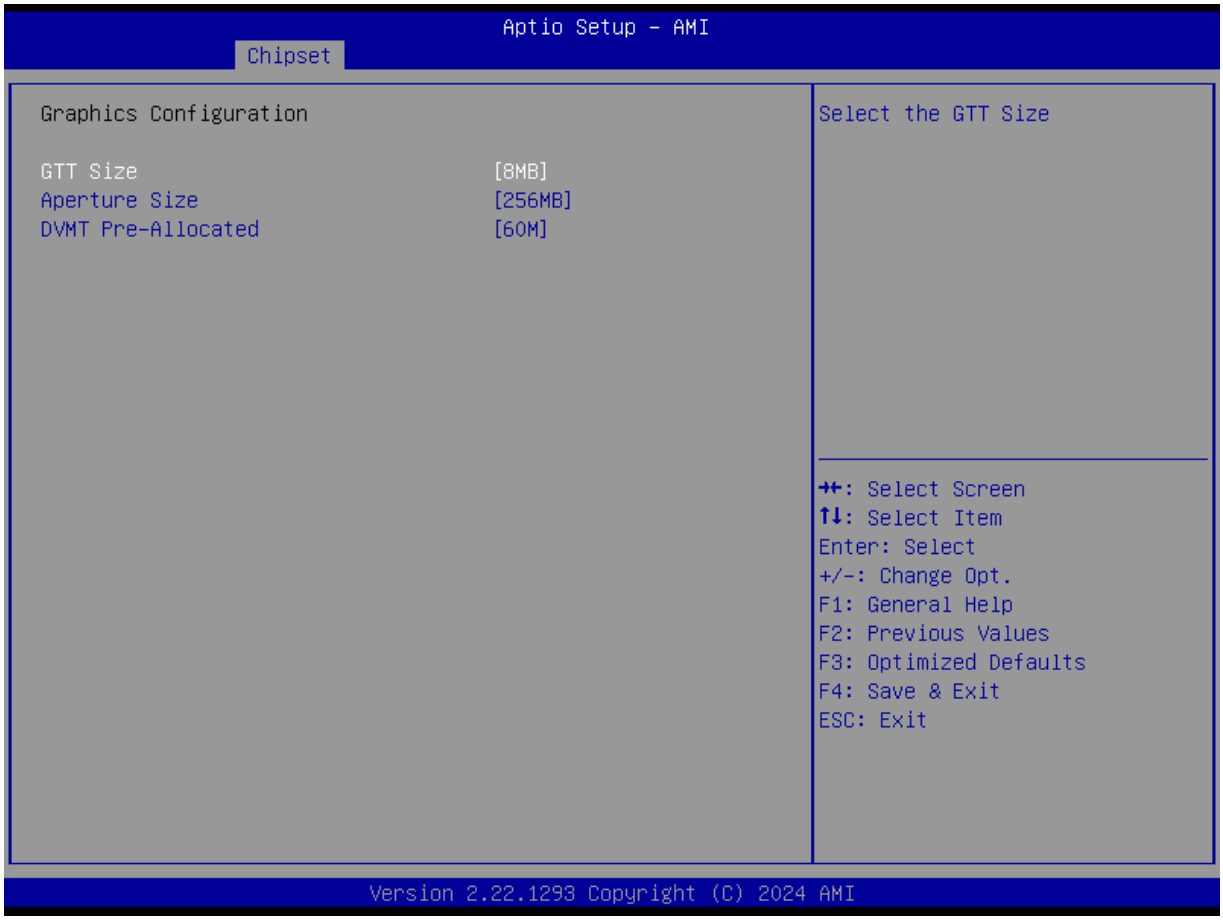
Item	Options	Description
Above 4GB MMIO BIOS assignment	Enabled**[Default]** , Disabled	Enable/Disable above 4GB MemoryMappedIO BIOS assignment\n\nThis is enabled automatically when Aperture Size is set to 2048MB.

Memory Configuration



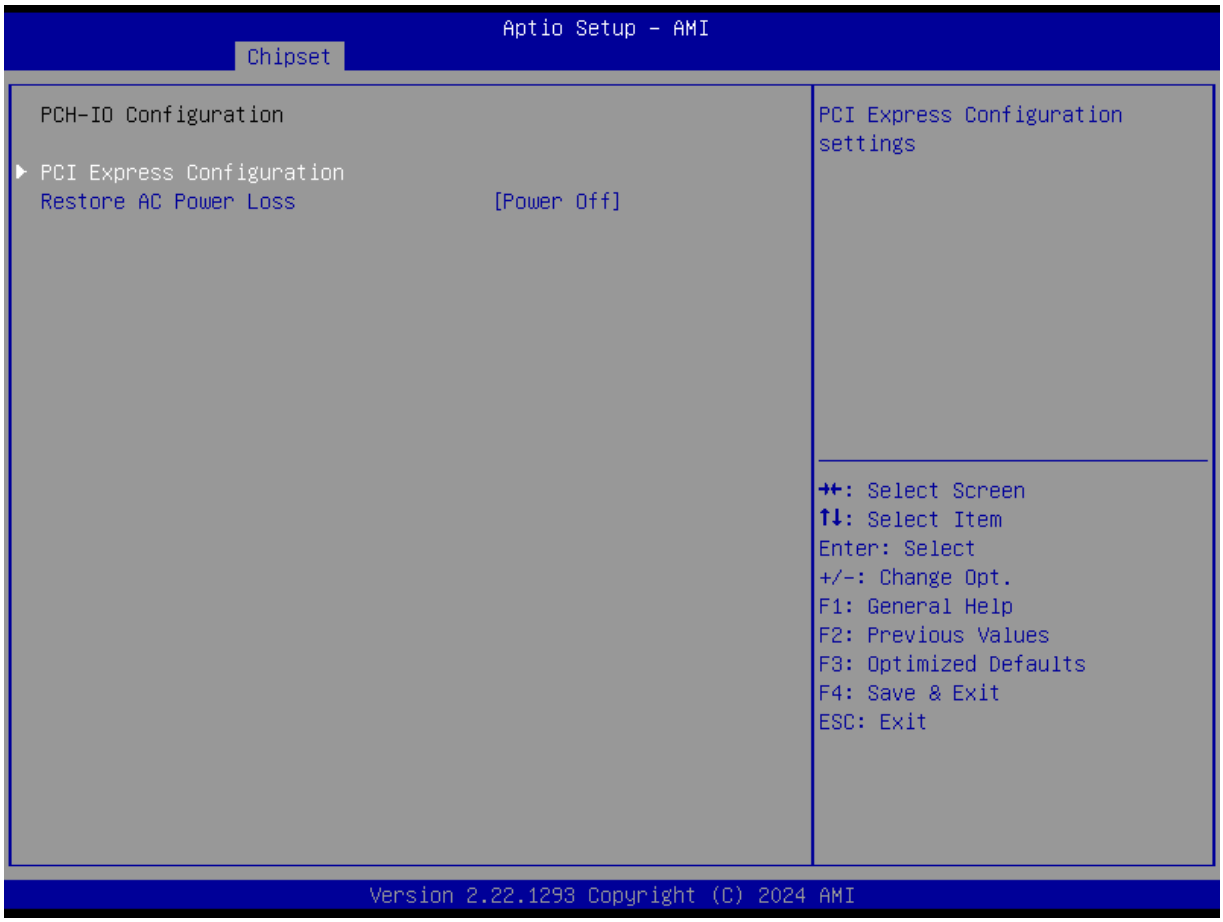
Item	Options	Description
In-Band ECC Support	Disabled**[Default]**, Enabled	Enable/Disable In-Band ECC.

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.

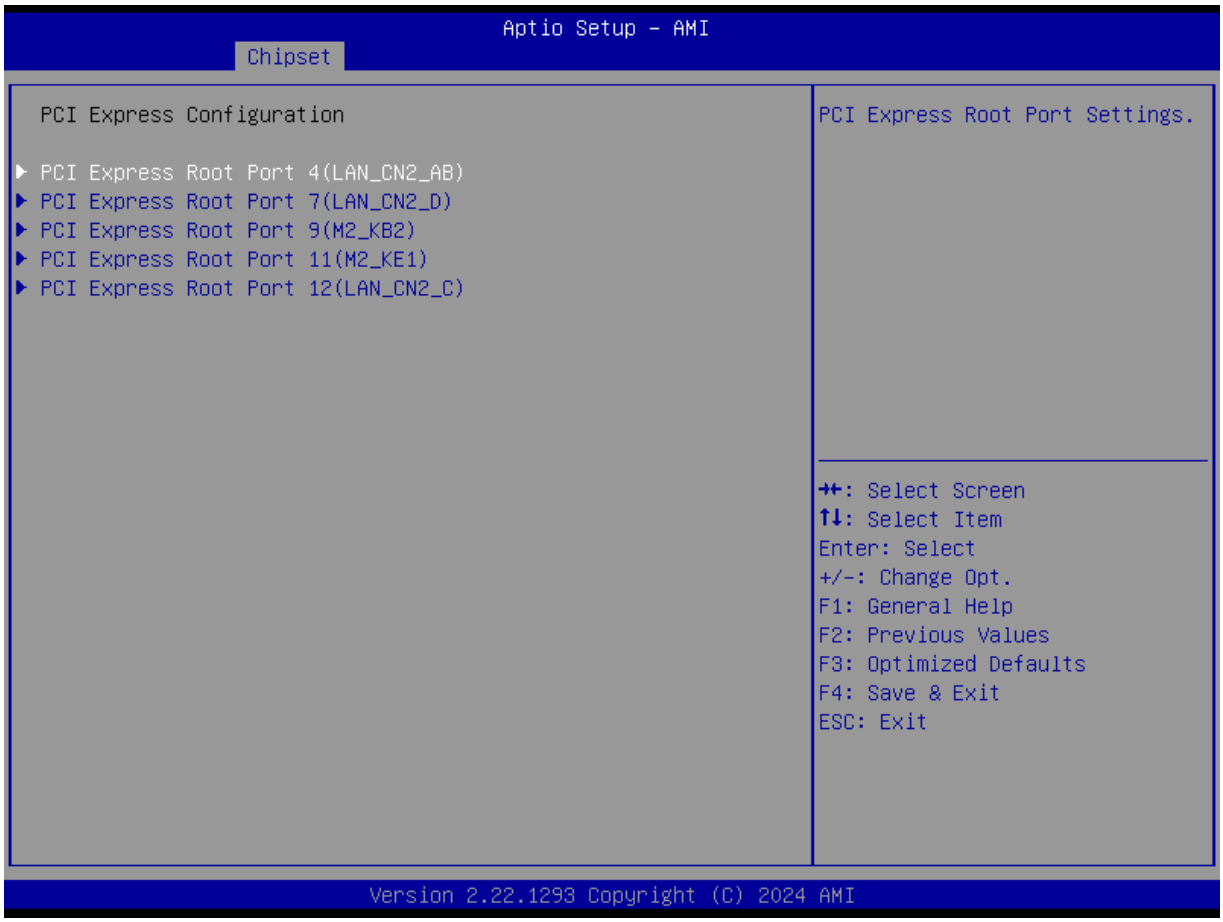
4.4.2 PCH-IO Configuration



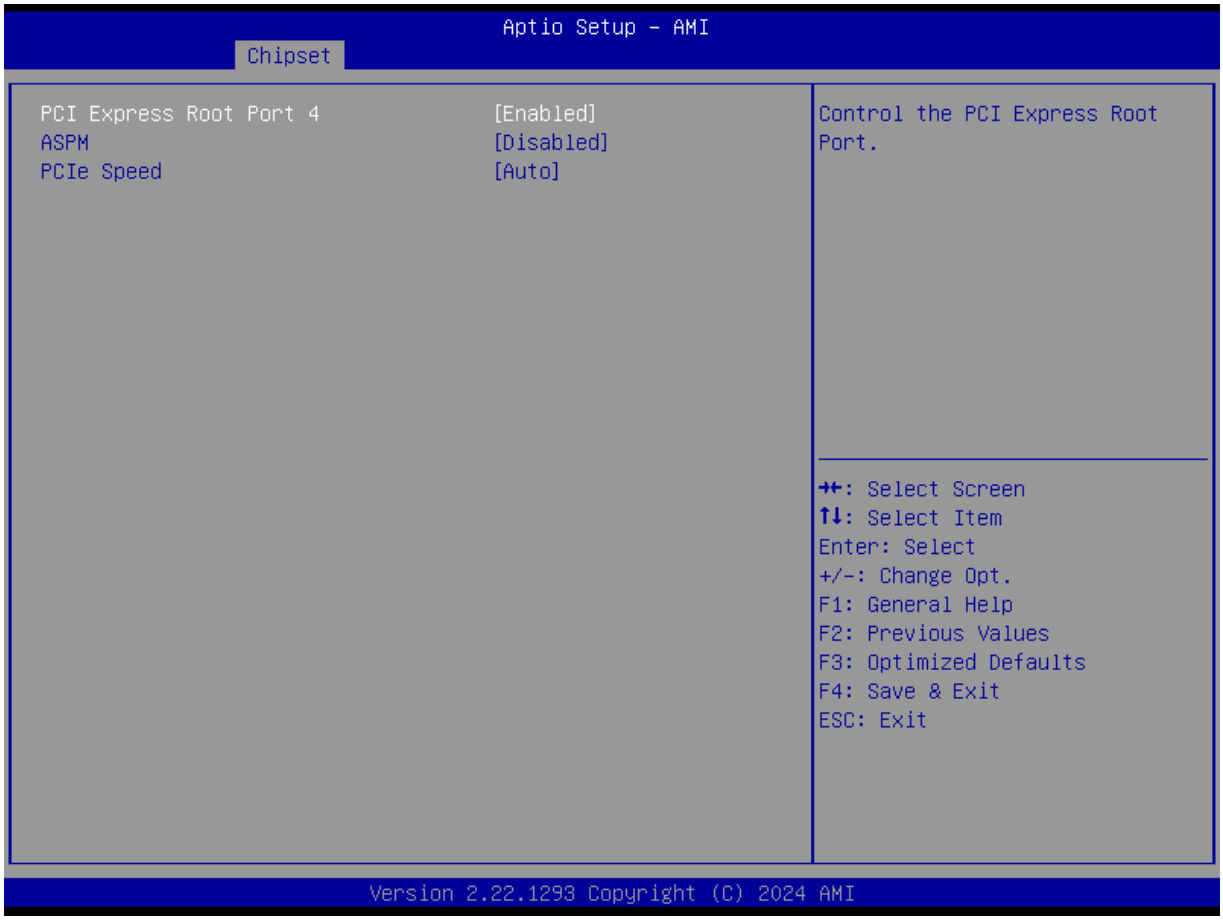
Item	Description
PCI Express Configuration	PCI Express Configuration settings.

Item	Options	Description
Restore AC Power Loss	Power On, Power Off **[Default]** , Lase State	Specify what state to go to when power is re-applied after a power failure (G3 state).

■ PCI Express Configuration



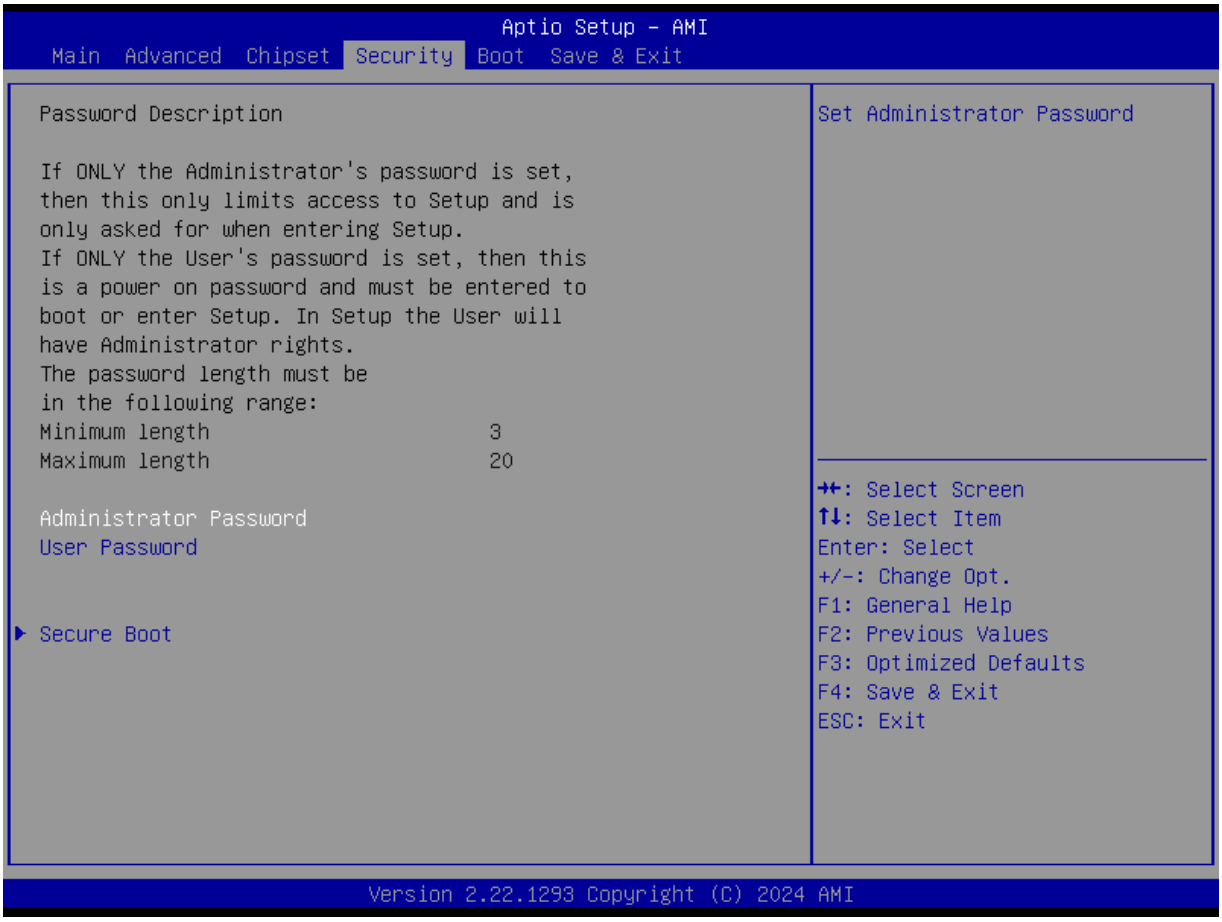
- **PCI Express Root Port 4/7/9/11/12**



Item	Options	Description
PCI Express Root Port 4/7/9/11/12	Disabled, Enabled **[Default]**	Control the PCI Express Root Port.
ASPM	Disabled **[Default]** , L1, Auto	Set the ASPM Level: Force L0s - Force all links to L0s State, AUTO - BIOS auto configure, DISABLE - Disables ASPM,
PCIe Speed	Auto**[Default]** , Gen1, Gen2, Gen3	Configure PCIe speed.

4.5 Security

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



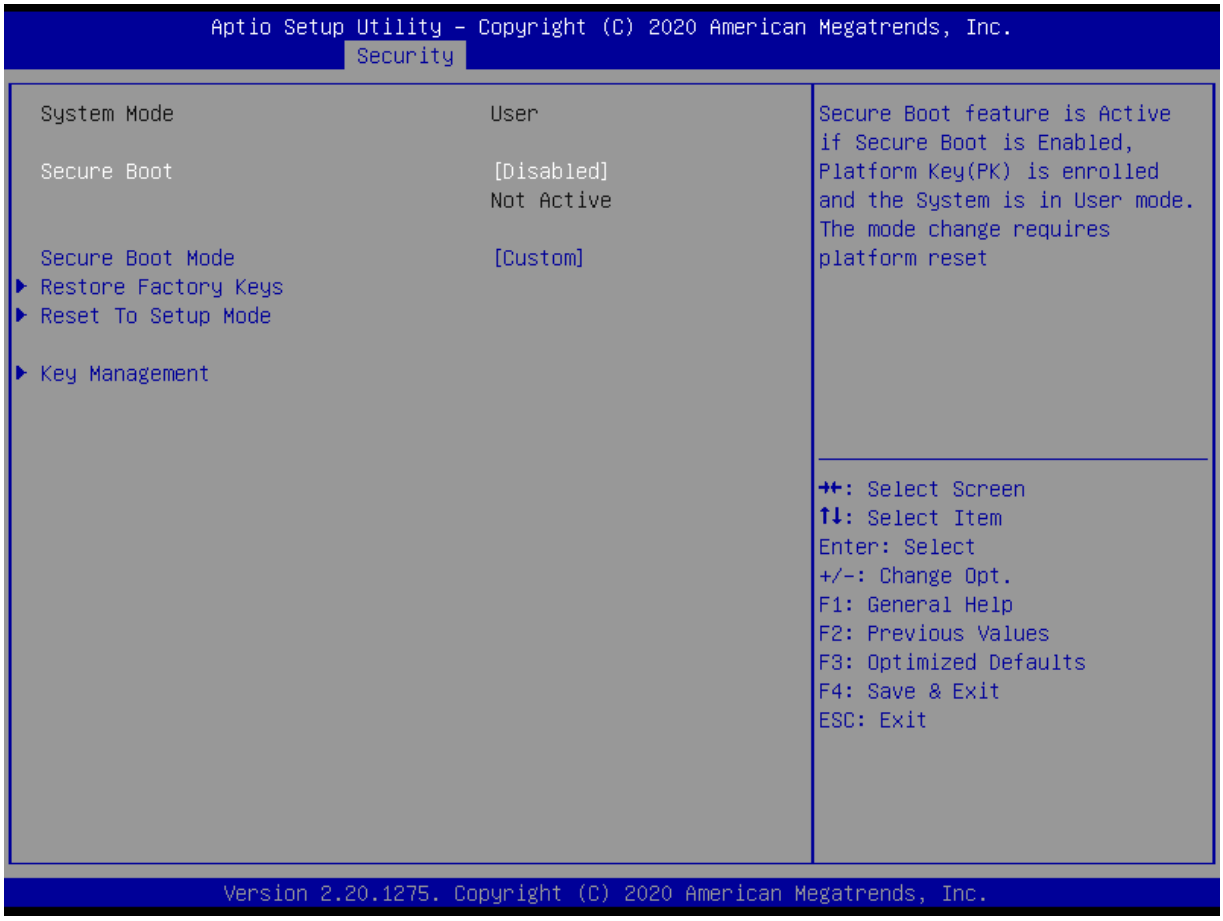
■ Administrator Password

This item allows you to set Administrator Password.

■ User Password

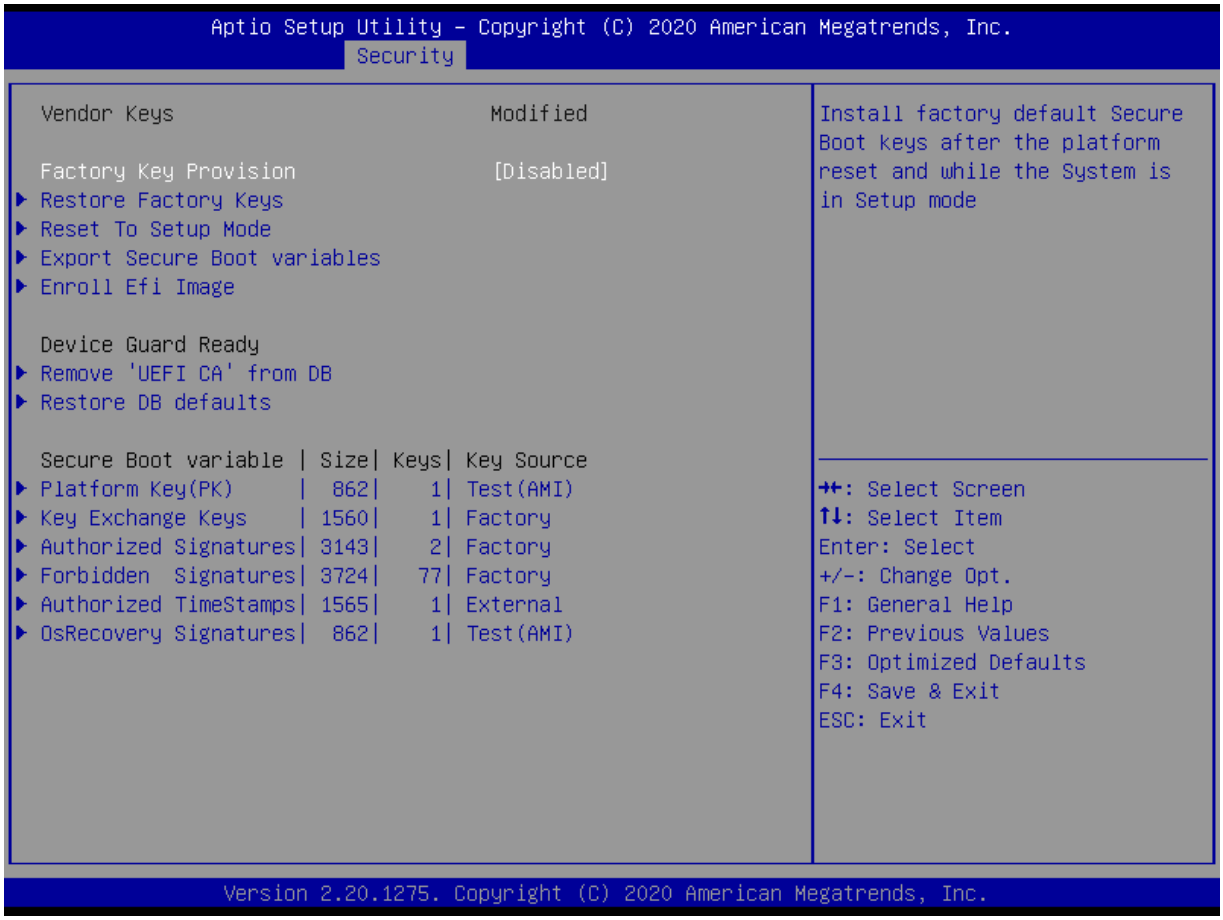
This item allows you to set User Password.

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

Item	Description
Restore Factory Keys	Force system to User Mode. Install factory default Secure Boot key databases
Key Management	Enables expert users to modify Secure Boot Policy variables without variable authentication

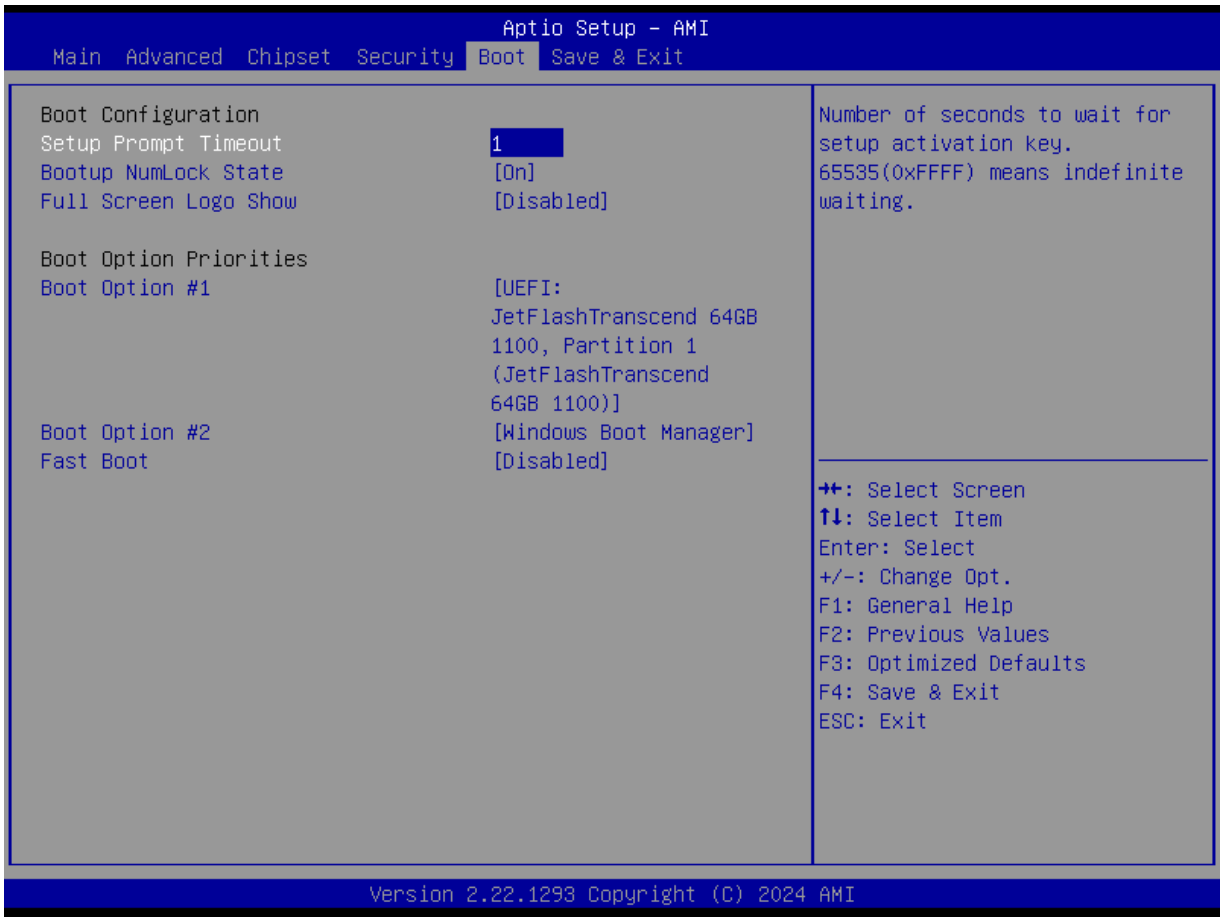


Item	Options	Description
Factory Key Provision	Disabled **[Default]** , Enabled	Install factory default Secure Boot keys after the platform reset and while the System is in Setup mode

Item	Description
Restore Factory Keys	Force System to User Mode. Install factory default Secure Boot key databases
Enroll Ffi Image	Allow Efi image to run in Secure Boot mode. Enroll SHA256 Hash certificate of a PE image into Authorized Signature Database (db)

4.6 Boot

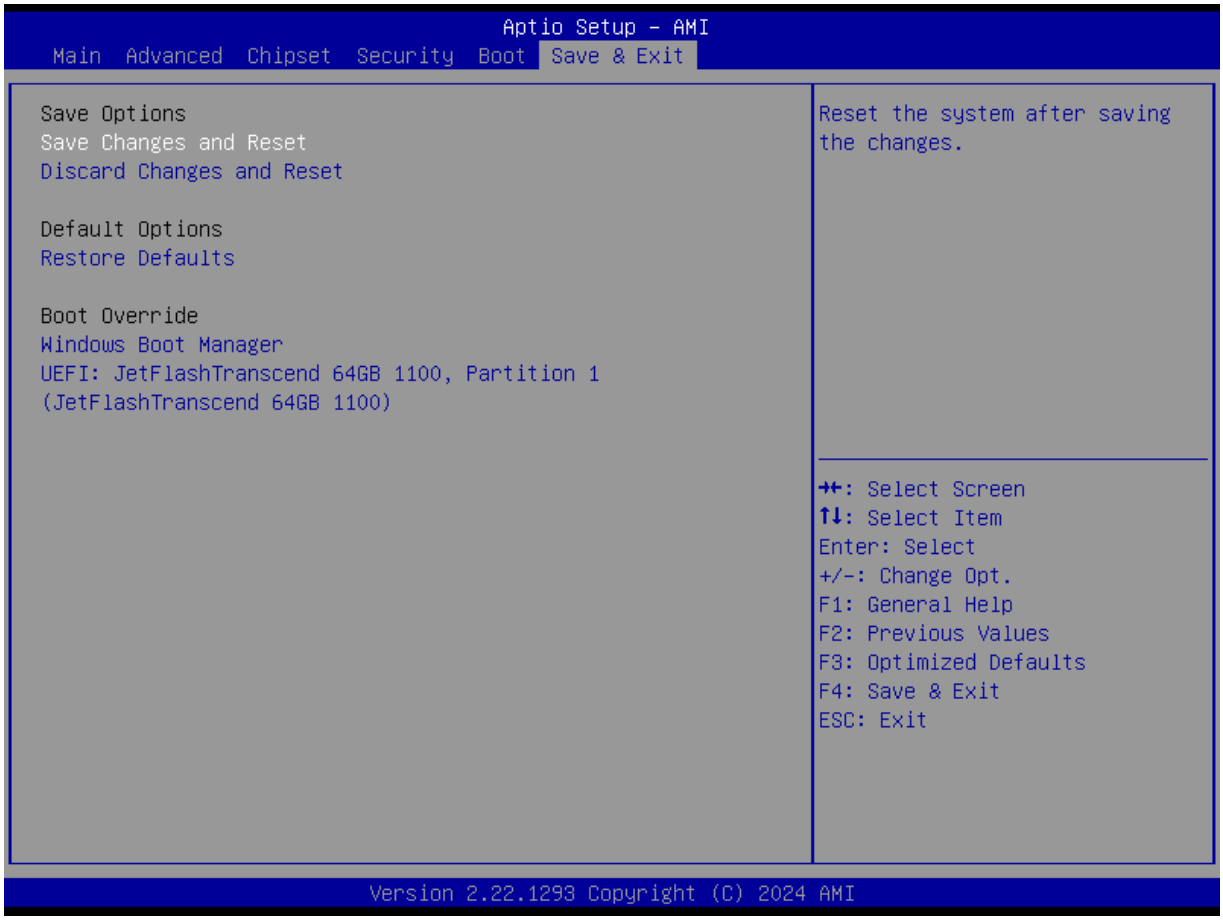
This menu allows you to setup the system boot options.



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.
Full Screen Logo Show	Disabled**[Default]** , Enabled	Enables or disables Full Screen Logo Show option.
Fast Boot	Disabled**[Default]** , Enabled	Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.
Boot Option #1		Set the system boot order.

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.

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

IO_DO4	I/O 0xA02h Bit3
IO_DO3	I/O 0xA02h Bit2
IO_DO2	I/O 0xA02h Bit1
IO_DO1	I/O 0xA02h Bit0
IO_DI4	I/O 0xA03h Bit3
IO_DI3	I/O 0xA03h Bit2
IO_DI2	I/O 0xA03h Bit1
IO_DI1	I/O 0xA03h Bit0

The GPIO function is provided by SIO, and it can be accessed through its GPIO port. To access the GPIO register, write value to data port. The configuration on the DCO1000-ASL is described as below.

Psuedo Code

```
#define GPI_ADDR    0xA03h
#define GPO_ADDR  0xA02h

// 0xA03h is Pin Status(default 0x5F )(at IO_DI1(Bit0) ~  IO_DI4(Bit3))
ByteData = ReadByte (GPI_ADDR)      //Read current Pin Status

//Offset 0xA02h default setting is 0x5F (output pin set to output high) (at IO_DO1(Bit0) ~  IO_DO4(Bit3))
ByteData = 0x0F                          //set IO_DO1~ IO_DO4 to high
WriteByte (GPO_ADDR, ByteData)
```

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