

USER'S MANUAL

RCO-3000-CFL

Fanless Small Form Factor (SFF) Industrial Computer



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Prefaces

Revision

Revision	Description	Date
1.0	Manual Released	2022/02/16

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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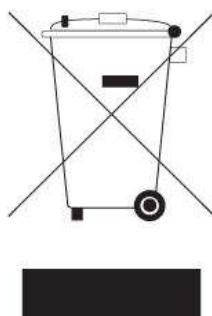
AMI is trademark of American Megatrend Inc.

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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 <https://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-CFL Series Embedded System	1
2	Utility DVD Driver	1
3	Wall Mount Kit	1
4	Accessory Kit	1
5	DVI to VGA Adapter	1

Ordering Information

Model No.	Product Description
RCO-3000-CFL	Advanced Fanless Embedded System w/ LGA 1151 for Intel® 8th/9th Gen CPU & Q370 PCH, 2x LAN
RCO-3000-CFL-4L	Advanced Fanless Embedded System w/ LGA 1151 for Intel® 8th/9th Gen CPU & Q370 PCH, 6x LAN
RCO-3000-CFL-4L-M12	Advanced Fanless Embedded System w/ LGA 1151 for Intel® 8th/9th Gen CPU & Q370 PCH, 2x LAN, 4x M12 LAN
RCO-3000-CFL-D10G	Advanced Fanless Embedded System w/ LGA 1151 for Intel® 8th/9th Gen CPU & Q370 PCH, 2x LAN, 2x 10G LAN
RCO-3000-CFL-4U3	Advanced Fanless Embedded System w/ LGA 1151 for Intel® 8th/9th Gen CPU & Q370 PCH, 2x LAN, 10x USB
RCO-3000-CFL-2E	Advanced Fanless Embedded System w/ LGA 1151 for Intel® 8th/9th Gen CPU & Q370 PCH, 2x LAN, 2x PCIe x8 Expansion
RCO-3000-CFL-2E-4L	Advanced Fanless Embedded System w/ LGA 1151 for Intel® 8th/9th Gen CPU & Q370 PCH, 6x LAN, 2x PCIe x8 Expansion
RCO-3000-CFL-2E-M12	Advanced Fanless Embedded System w/ LGA 1151 for Intel® 8th/9th Gen CPU & Q370 PCH, 2x LAN, 4x M12 LAN, 2x PCIe x8 Expansion
RCO-3000-CFL-2E-D10G	Advanced Fanless Embedded System w/ LGA 1151 for Intel® 8th/9th Gen CPU & Q370 PCH, 2x LAN, 2x 10G LAN, 2x PCIe x8 Expansion
RCO-3000-CFL-2E-4U3	Advanced Fanless Embedded System w/ LGA 1151 for Intel® 8th/9th Gen CPU & Q370 PCH, 2x LAN, 10x USB, 2x PCIe x8 Expansion

Optional Accessories

Model No.	Product Description
1-E09A22102	Adapter AC/DC 24V 9.2A 220W with 3pin Terminal Block Plug 5.0mm Pitch
1-E09A22801	Adapter AC/DC 24V/11.67A 280W with 3pin Terminal Block Plug 5.0mm Pitch
SFICBL022	Power Cord, 3-pin US Type, 180cm
1-TPCD00002	Power Cord, European Type, 180cm
1-TPCD00001	Power Cord, 3-pin UK Type, 180cm

Chapter 1

Product Introductions

1.1 Overview

The Advanced Fanless Embedded Systems RCO-3000-CFL series are designed with rich I/O, high flexibility and easy expansion capabilities which are ideal for diverse industrial applications. Support 9th Gen. Intel® Core™ i7-9700E (4.4GHz, 8 Cores) / i5-9500E (4.2GHz, 6 Cores) / i3-9100E (3.7GHz, 4 Cores) or i7-9700TE (3.8GHz, 8 Cores) / i5-9500TE (3.6GHz, 6 Cores) / i3-9100TE (3.2GHz, 4 Cores) or 8th Gen. Intel® Core™ i7-8700T (4.0GHz, 6 Cores) / i5-8500T (3.50Hz, 6 Cores) / i3-8100T (3.1GHz, 4 Cores) or Pentium® G5400T (3.1GHz, Dual Core) / Celeron® G4900T (2.9GHz, Dual Core) Desktop processor, RCO-3000-CFL 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 (-20°C ~ 60°C).



Key Features

- Support 8th/9th Gen Intel® CFL-R S Processor (LGA 1151, 65W/35W TDP)
- Intel® Q370 Chipset
- Triple Independent Display by 1x DVI-I and 2x DisplayPort
- 2x Intel® GbE supporting Wake-on-LAN and PXE
- 2x Full-size Mini PCIe (shared by 1x mSATA), and 2x SIM socket
- 2x 2.5" SATA HDD Bay with RAID 0, 1, 5 support, 1x mSATA (Shared by 1x Mini PCIe)
- 1x M.2 (E Key, PCIe x1, USB 2.0, 2230)
- 5x RS-232/422/485 (2x internal)
- 4x USB 3.2 Gen 2 (10 Gbps), 4x USB 2.0 (2x internal)
- 8x DI + 8x DO with isolation
- 9 to 48VDC Wide Range Power Input Supporting AT/ATX Mode
- Wide Operating Temperature (-25°C to 60°C)
- TPM 2.0 Supported
- 2x PCIe x 16 (8-Lane) (RCO-3000-CFL-2E only)

1.2 Hardware Specification

System		Storage	
Processor Support 8th/9th Gen Intel® CFL-R S Processor (LGA 1151, 65W/35W TDP) <ul style="list-style-type: none"> - Intel® Core™ i7-9700E, 8 Cores, 12MB cache, up to 4.4 GHz - Intel® Core™ i5-9500E, 6 Cores, 9MB Cache, up to 4.2 GHz - Intel® Core™ i3-9100E, 4 Core, 6MB Cache, 3.7 GHz - Intel® Core™ i7-9700TE, 8 Cores, 12MB cache, up to 3.8 GHz - Intel® Core™ i5-9500TE, 6 Cores, 9MB Cache, up to 3.6 GHz - Intel® Core™ i3-9100TE, 4 Core, 6MB Cache, 3.2 GHz - Intel® Core™ i7-8700T, 6 Cores, 12MB cache, up to 4.0 GHz - Intel® Core™ i5-8500T, 6 Cores, 9MB Cache, up to 3.5 GHz - Intel® Core™ i3-8100T, 4 Cores, 6MB Cache, 3.1 GHz - Intel® Pentium® G5400T, 2 Cores, 4MB Cache, up to 3.1 GHz - Intel® Celeron® G4900T, 2 Cores, 2MB Cache, up to 2.9 GHz 		SSD/HDD 1x Internal 2.5" SATA HDD Bay (support H=9mm); 1x Removable 2.5" SATA HDD Bay (support H=7mm, hot-swappable) Support RAID 0, 1, 5	
mSATA 1x mSATA (Shared by 1x Mini PCI Express)		M.2 1x M.2 (E Key, PCIe x1, USB 2.0, 2230, Support CNVi))	
SIM Socket 2x External SIM socket			
Expansion			
System Chipset Intel® Q370 Express Chipset		Mini PCI Express 2x Full-size Mini PCIe (1x shared by 1x mSATA)	
LAN Chipset GbE1 : Intel I219LM (Support Wake-on-LAN and PXE) GbE2: Intel I210-AT (Support Wake-on-LAN and PXE)		PCIe 2x PCIe x 16 (8-Lane) (RCO-3000-CFL-2E only)	
Audio Codec Realtek ALC888S		2-Port GbE (Optional) 2-Port RJ45 10GbE with Intel X710-AT2 Chipset Occupied one Universal I/O Slot	
System Memory 2x 260-Pin DDR4 2400/2666MHz SODIMM. Max. up to 64GB (Un-buffered and Non-ECC)		4-Port USB (Optional) 4-Port USB with Renesas uPD720201K8 host controller Occupied one Universal I/O Slot	
BIOS AMI 256Mbit SPI BIOS		Card Dimension 175 (L) x 111.15 (H) mm	
Operating System			
Windows Windows 10			
Linux Linux kernel			
Display			
VGA Yes (by optional split cable)			
DVI 1x DVI-I, support resolution 1920 x 1200			
DisplayPort 2x DisplayPort, support resolution 4096 x 2304			
Multiple Display Triple Display			
Power			
Power Mode AT, ATX			
Power Supply Voltage 9~48VDC			
Power Ignition Sensing Power Ignition Management			
Power Connector 3-pin Terminal Block			
Power Adaptor Optional AC/DC 24V/11.67A, 280W Optional AC/DC 24V/9.2A, 220W			
Power Protection OVP (Over Voltage Protection) ; OCP (Over Current Protection) Reserve Protection			

I/O	
COM	3x RS-232/422/485 ; 2x RS-232/422/485 (internal)
USB	4x USB 3.2 Gen 2 (10 Gbps), 4x USB 2.0 (2x internal)
LAN	2x RJ45
Audio	1x Line-out
DIO	8 in / 8 out (Isolated)
Universal I/O Bracket	1x Universal I/O Bracket (By mini PCIe interface)
Others	5x WiFi Antenna Holes 1x Power Switch, 1x AT/ATX Switch, 1x Remote Power On/Off 1x PC/Car Mode Switch, 1x Delay Time Switch

Environment		Physical	
Operating Temp.	-25°C to 60°C (35W CPU) ; -25°C to 50°C (65W CPU)	Construction	Extruded Aluminum with Heavy Duty Metal
Storage Temp.	-30°C to 85°C	Dimension	RCO-3000-CFL : 192 (W) x 197 (D) x 60.3 (H) mm RCO-3000-CFL-2E : 192 (W) x 197 (D) x 107.8 (H) mm
Relative Humidity	10% to 95% (non-condensing)	Weight	RCO-3000-CFL : 2.8 ~ 3.6 kg RCO-3000-CFL-2E : 3.6 ~ 4.3 kg
Vibration	With SSD: 5 Grms, 5 - 500 Hz, 0.5 hr/axis With HDD: 1 Grms, 5 - 500 Hz, 0.5 hr/axis	Mounting	Wall Mounting / DIN rail (Optional)
Shock	With SSD: 50G, half sine, 11ms		
Standards / Certification	CE, FCC Class A		

1.3 System I/O

RCO-3000-CFL

Rear Panel

DVI-I port

Used to connect a DVI 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 2.0 Port

Used to connect USB 2.0

LAN port

Used to connect the system to a local area network

Antenna hole

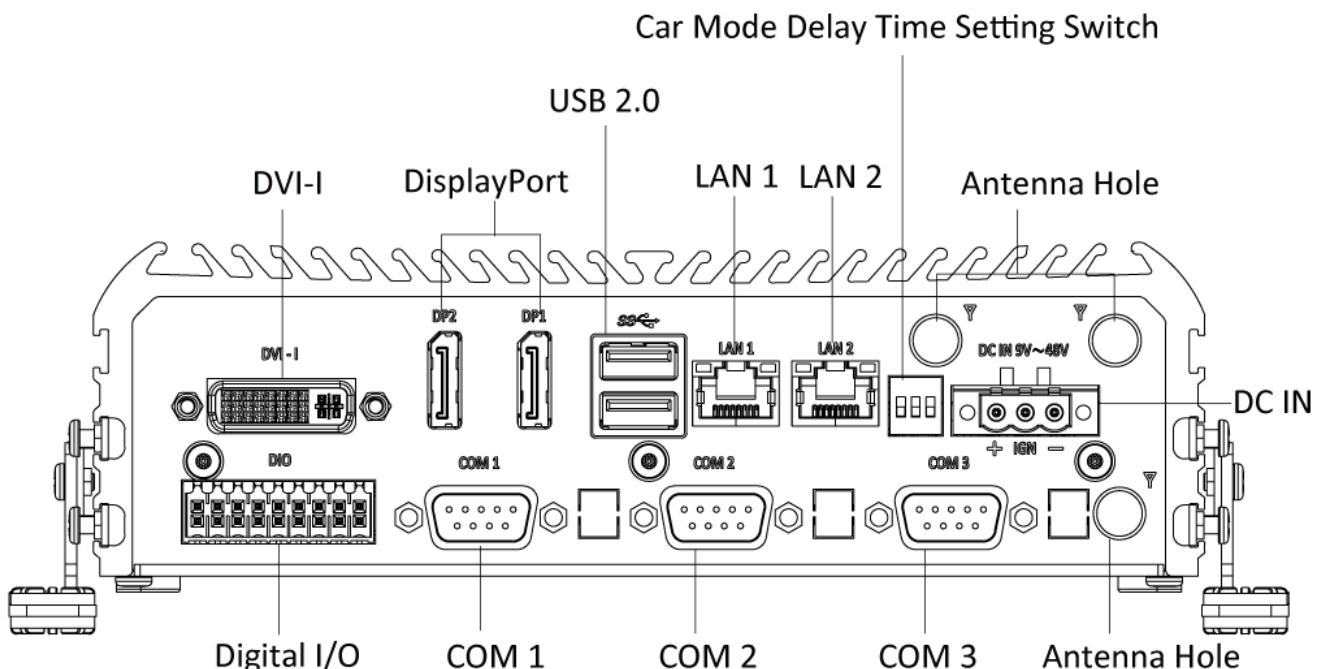
Used to connect an antenna for optional Mini-PCIe WiFi module

DC IN

Used to plug a DC power input with terminal block

Car Mode Delay time select switch

Used to select car mode PC turn off delay time



RCO-3000-CFL

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

【Universal I/O bracket】 optional

- LAN Port

Used to connect the system to a local area network

- M12 LAN Port

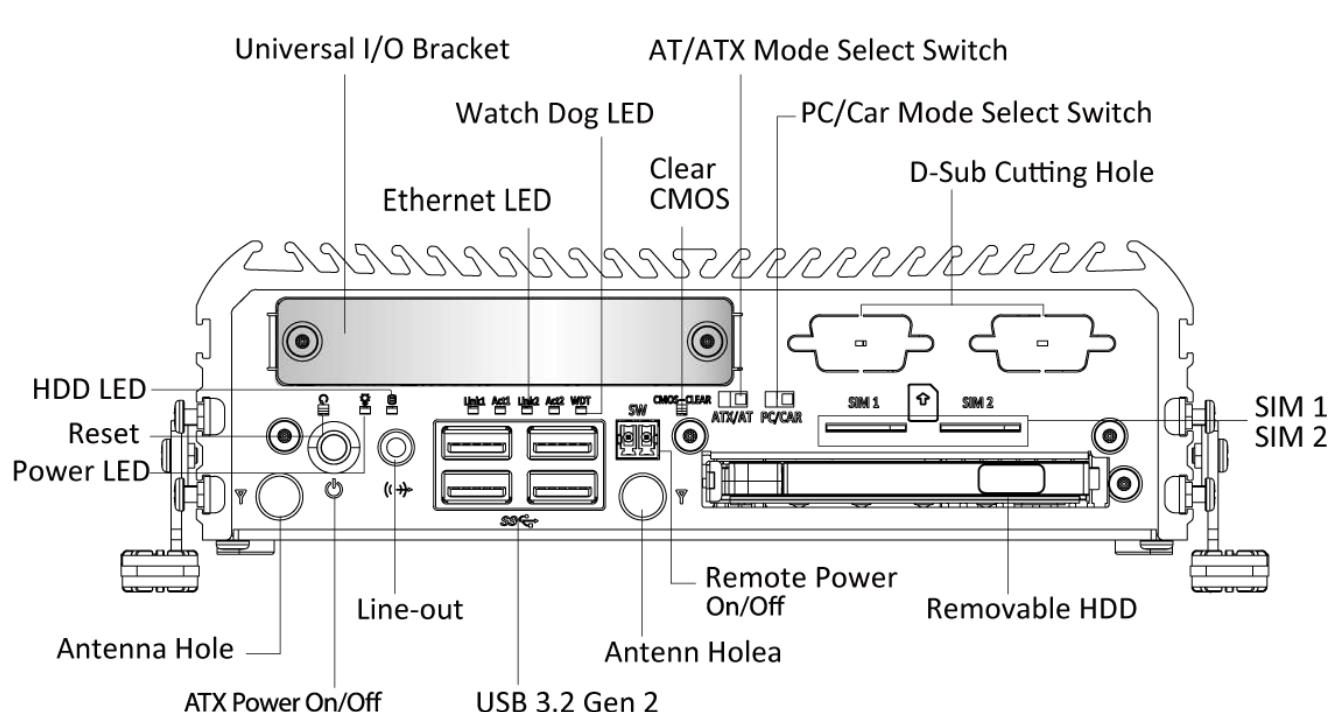
Used to connect the system to a local area network

- D10G Port

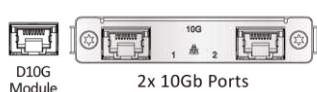
X710-10G-2T(2x 10GBase-T Port)

- 4x USB 3.2 Gen 1 Port

Used to connect USB 3.2 Gen 1 device



Available Modules



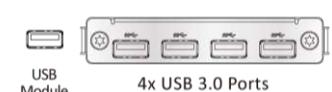
2x 10Gb Ports



LAN/POE Module



M12 Module



4x USB 3.0 Ports

RCO-3000-CFL-2E

Rear Panel

DVI-I port

Used to connect a DVI 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 2.0 Port

Used to connect USB 2.0

LAN port

Used to connect the system to a local area network

Antenna hole

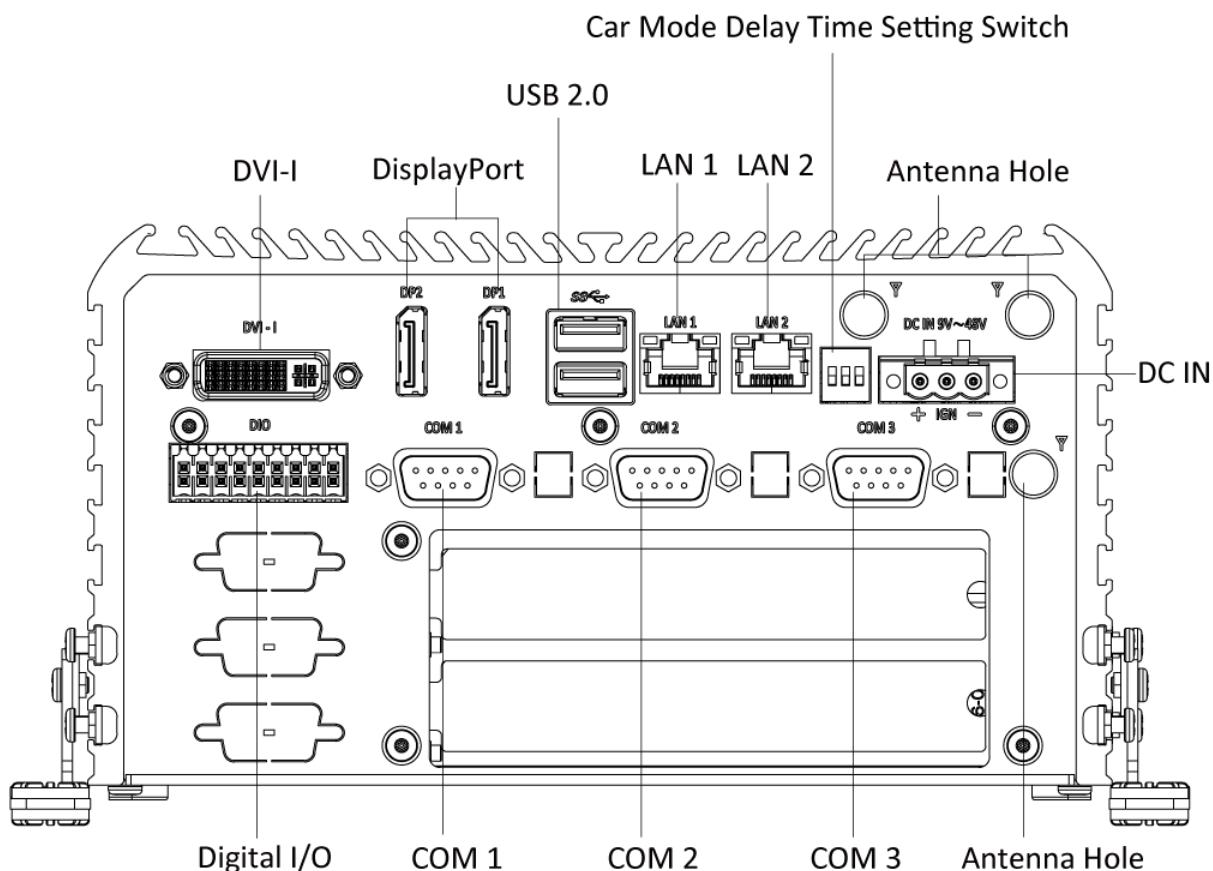
Used to connect an antenna for optional Mini-PCIe WiFi module

DC IN

Used to plug a DC power input with terminal block

Car Mode Delay time select switch

Used to select car mode PC turn off delay time



RCO-3000-CFL-2E

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

【Universal I/O bracket】 optional

- LAN Port

Used to connect the system to a local area network

- M12 LAN Port

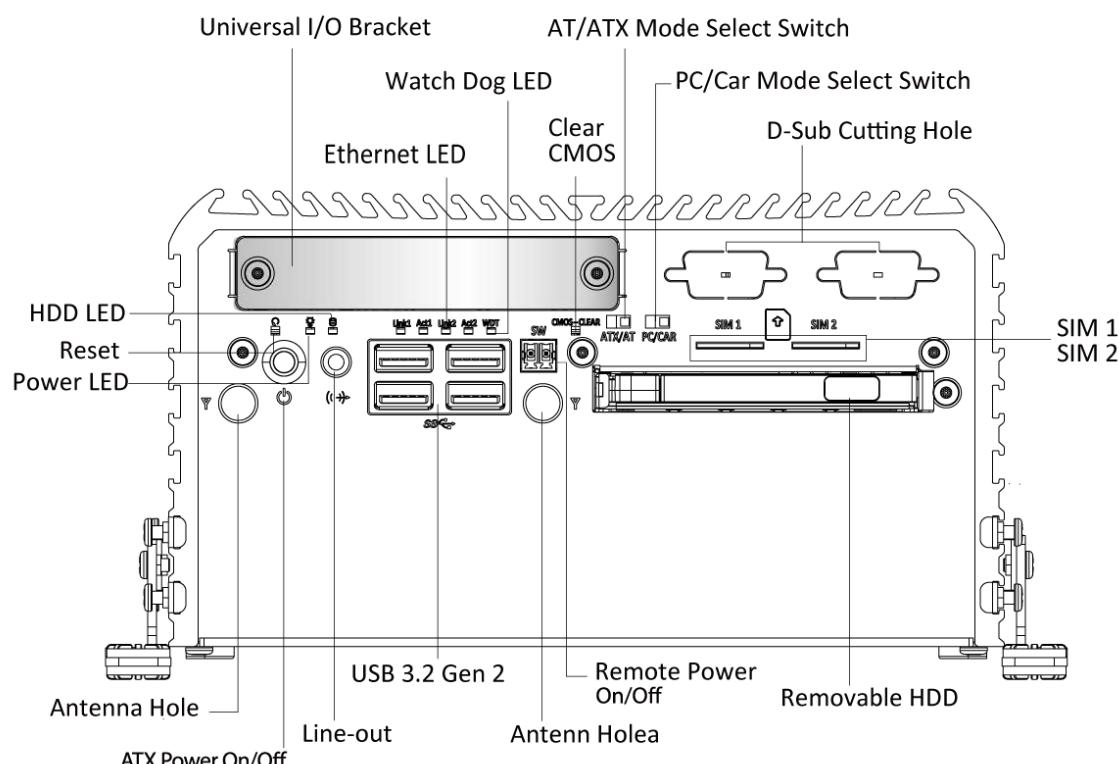
Used to connect the system to a local area network

- D10G Port

X710-10G-2T(2x 10GBase-T Port)

- 4x USB 3.2 Gen 1 Port

Used to connect USB 3.2 Gen 1 device



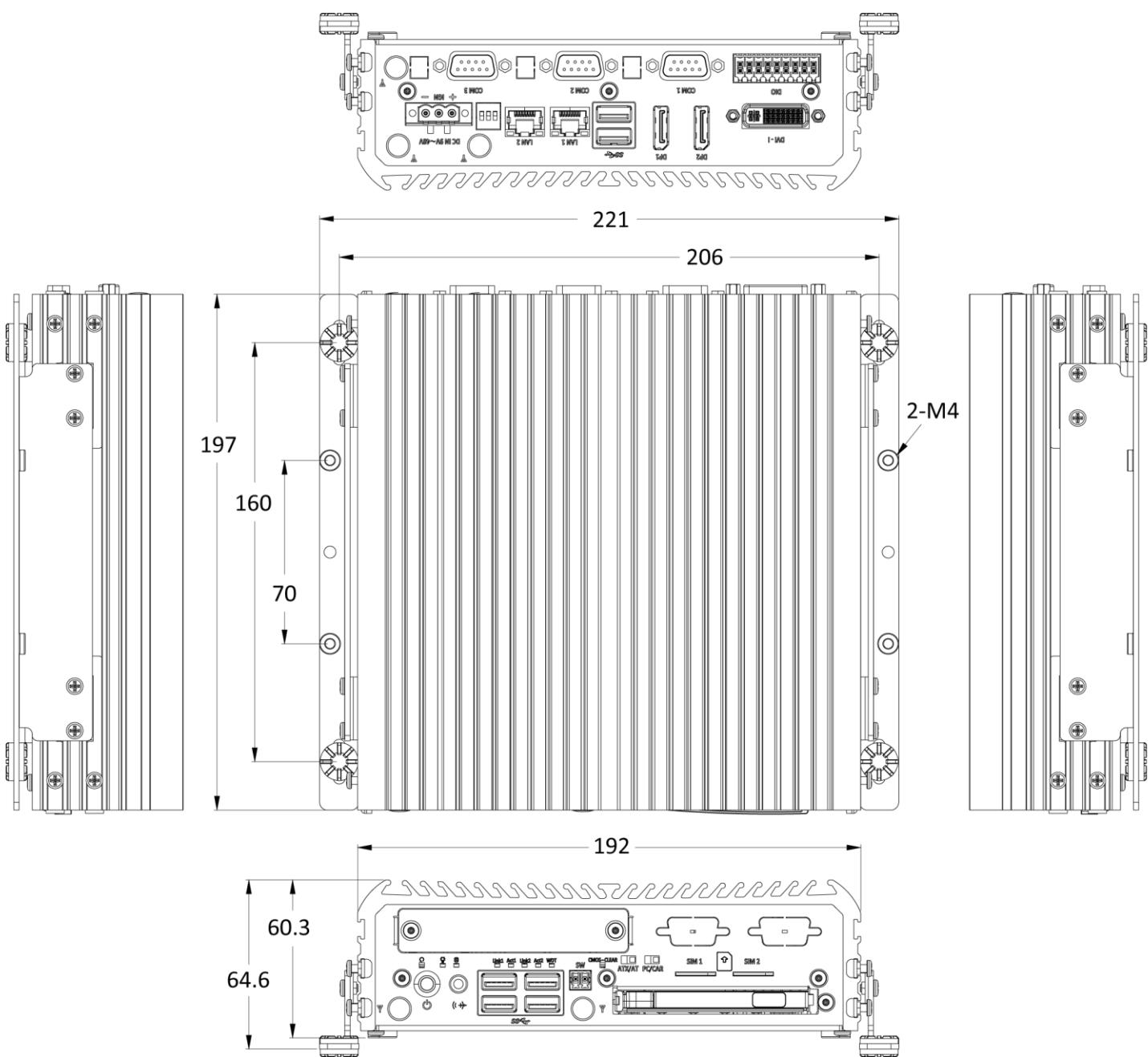
Available Modules



1.4 Mechanical Dimensions

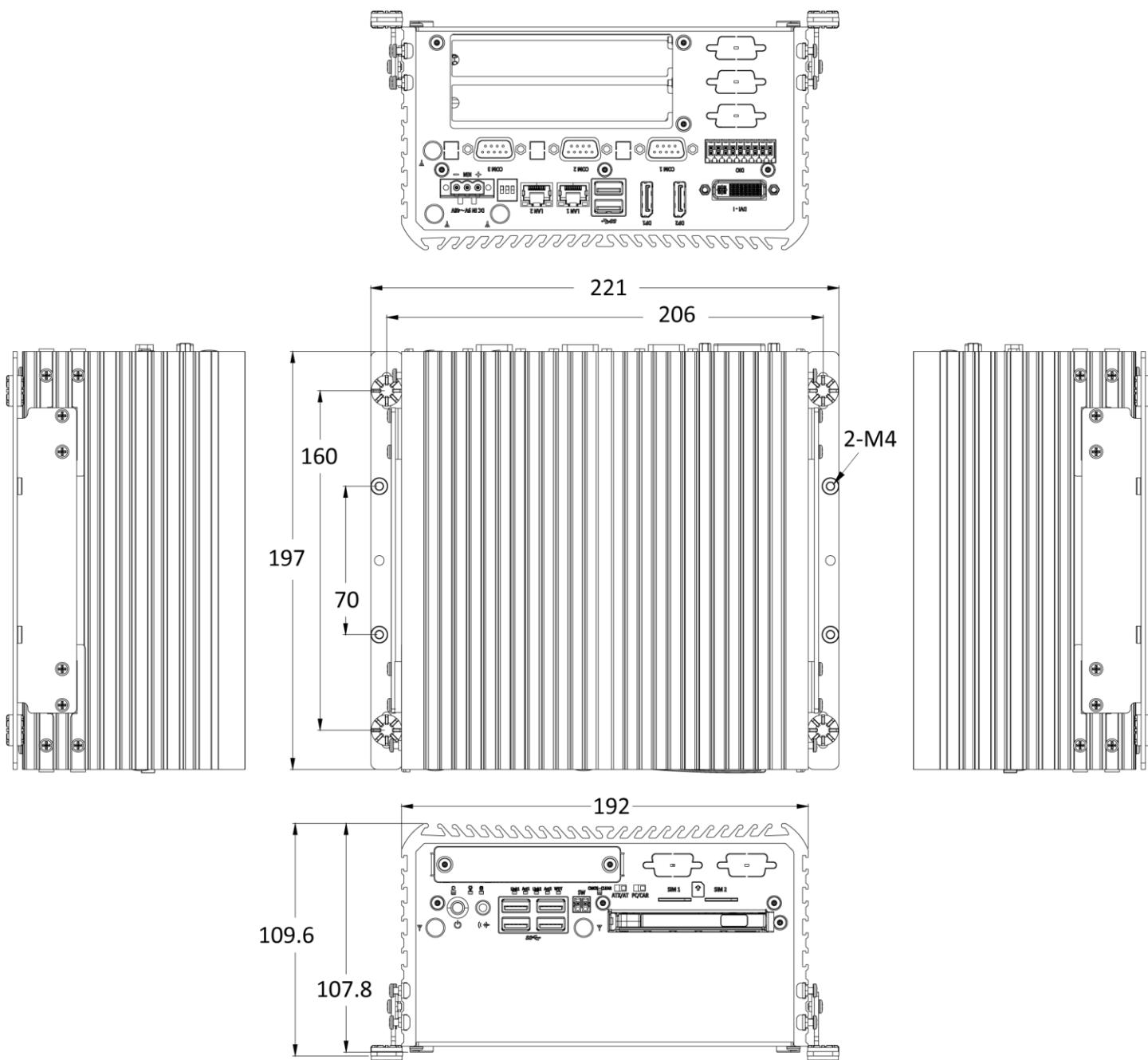
RCO-3000-CFL

Unit: mm



RCO-3000-CFL-2E

Unit: mm

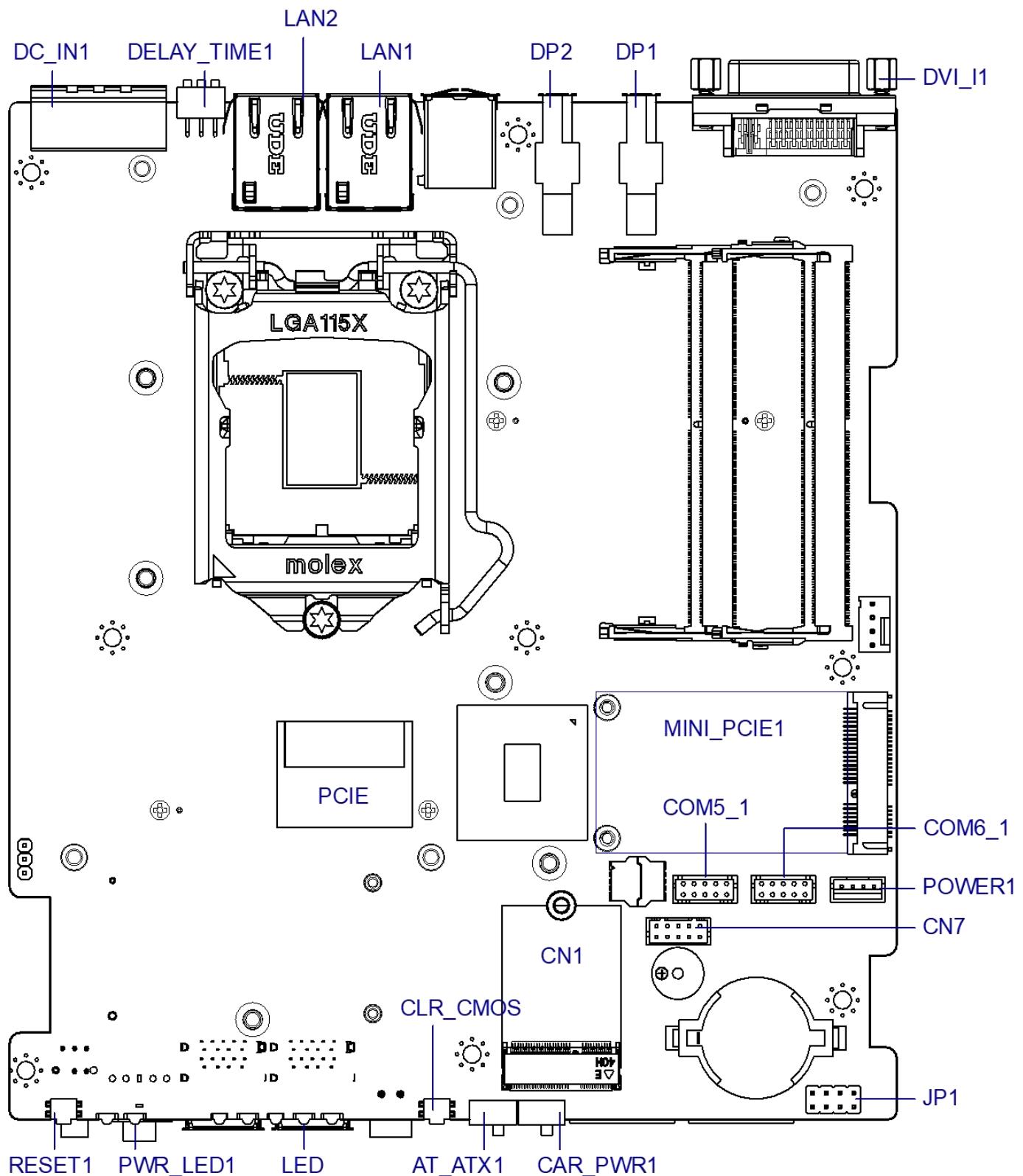


Chapter 2

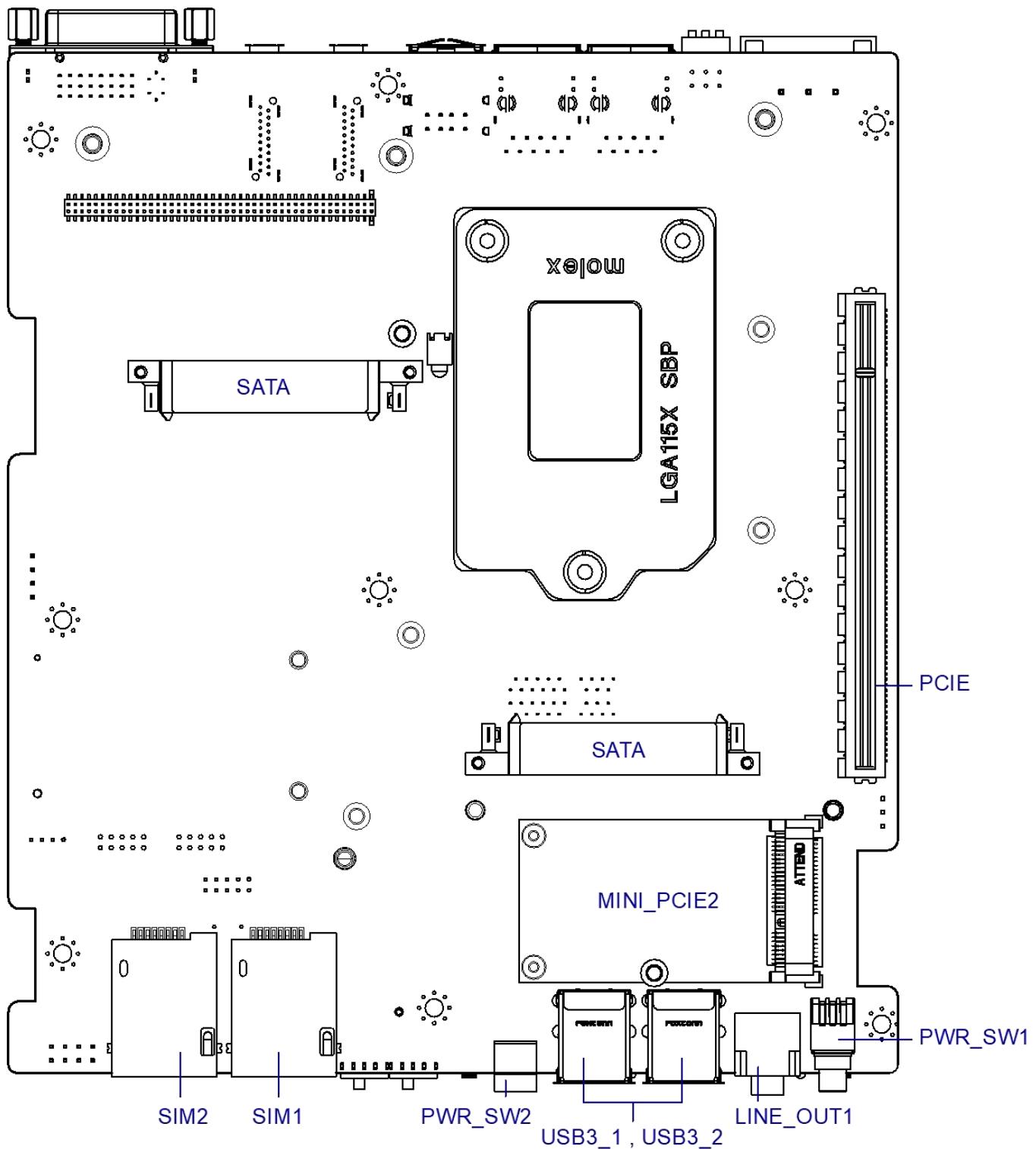
Mechanical Specifications

2.1 Switch and Connector Locations

2.1.1 Top View



2.1.2 Bottom View

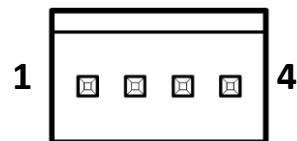
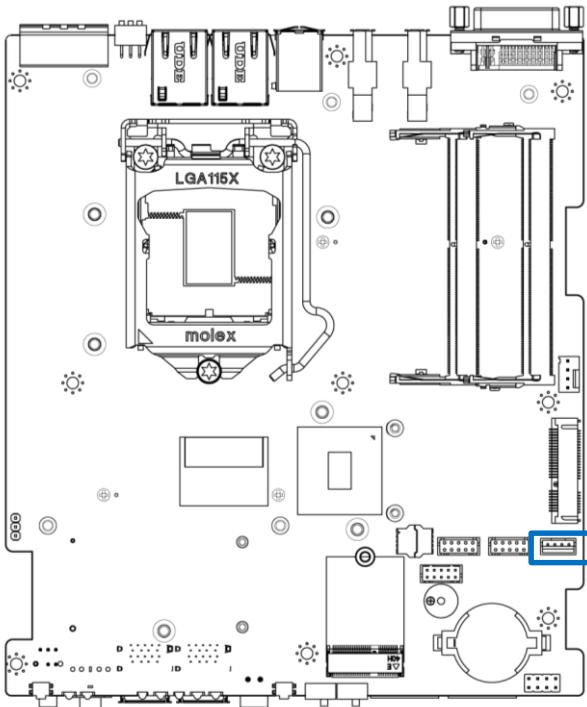


2.2 Connector / Switch Definition

Connector Location	Definition
CLR_CMOS	Clear CMOS button
AT ATX1	AT/ATX setting switch
USB3_1	USB 3.2 Gen 2 port
USB3_2	USB 3.2 Gen 2 port
COM1	COM1 Serial Port
COM2	COM2 Serial Port
COM3	COM3 Serial Port
COM5_1, COM6_1	COM Serial Port header
DIO1	8IN/8OUT GPIO Connector
SATA1	SATA Port 1 signal connector
SATA2	SATA Port 2 signal connector
USB2_1	USB 2.0 Port
MINI_PCIE1	Mini PCI Express slot 1 with SIM and mSATA
MINI_PCIE2	Mini PCI Express slot 2 with SIM
DC_IN1	Power connector
FAN1	FAN Power connector
LAN1, LAN2	LAN1/2 ports
DVI-I1	DVI-I signal connector
DP1, DP2	DP signal connector
BAT1	Battery connector

2.3 I/O Interface Descriptions

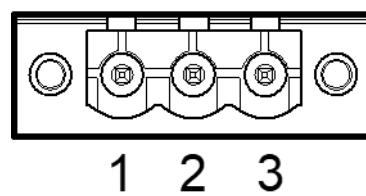
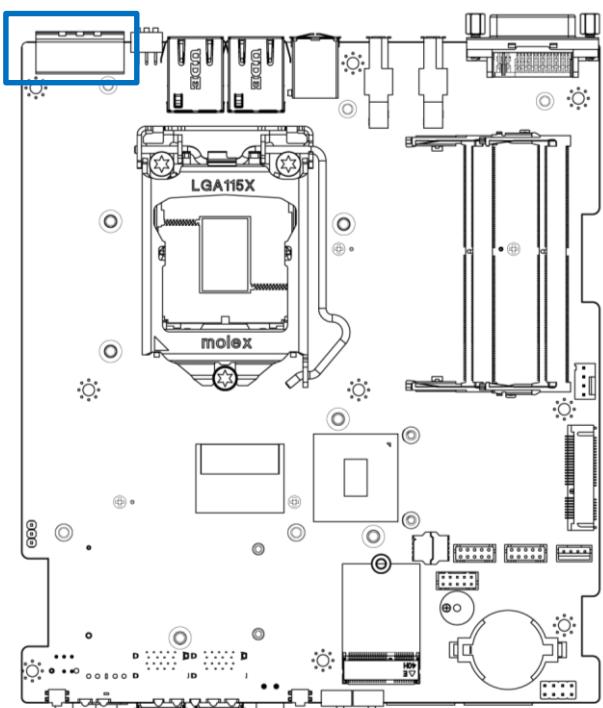
2.3.1 Power Con



POWER1

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

2.3.2 DC IN/IGN IN (+9V ~ +48V)

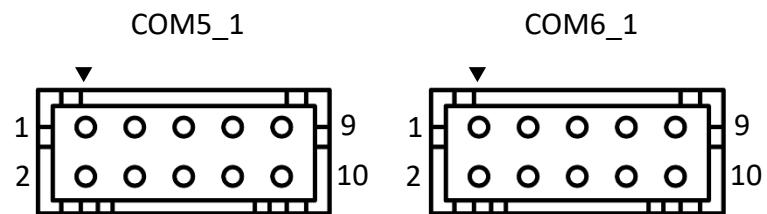
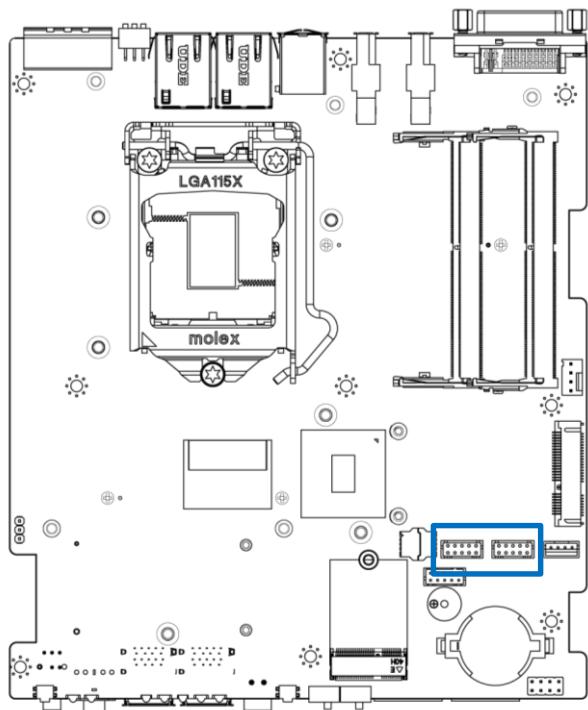


DC_IN1

Pin	Signal
1	+DC_IN
2	IGN_SENSE
3	GND

2.3 I/O Interface Descriptions

2.3.3 COM Con



COM5_1 , COM6_1

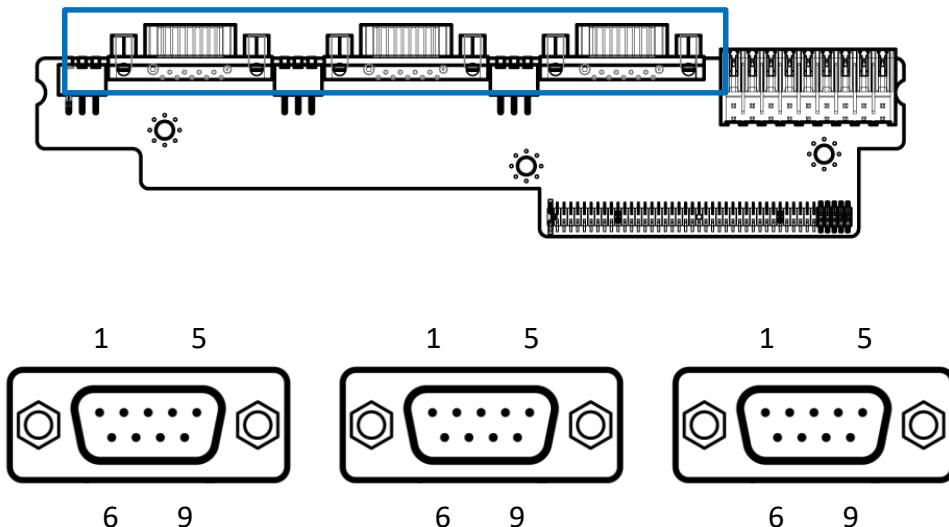
Pin	Signal	Pin	Signal
1	DCD#	2	DSR#
3	RXD	4	RTS#
5	TXD	6	CTS#
7	DTR#	8	RI#
9	GND	10	NC

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

Pin	Signal	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	NC	NC	NC

2.3 I/O Interface Descriptions

2.3.4 COM1 , COM2 , COM3

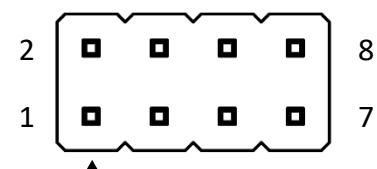
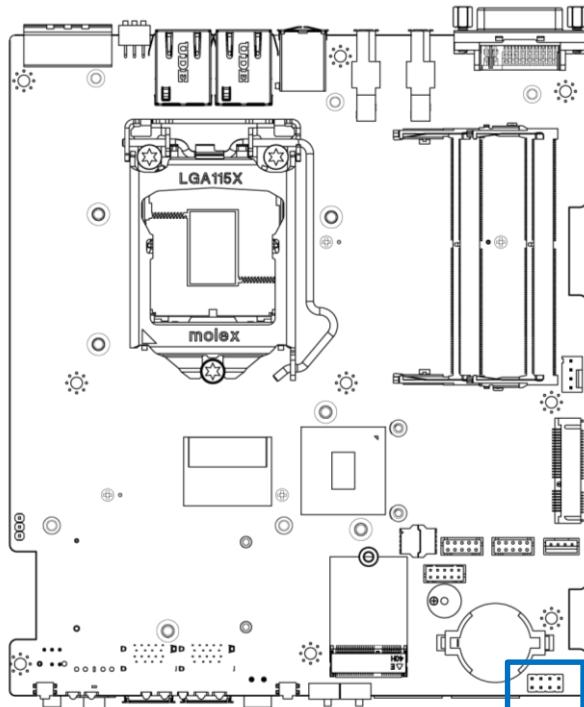


RS232 / RS422 / RS485 Connector Type: 9-pin D-Sub

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 I/O Interface Descriptions

2.3.5 SF100 SPI Con

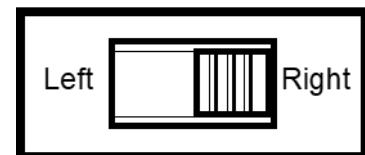
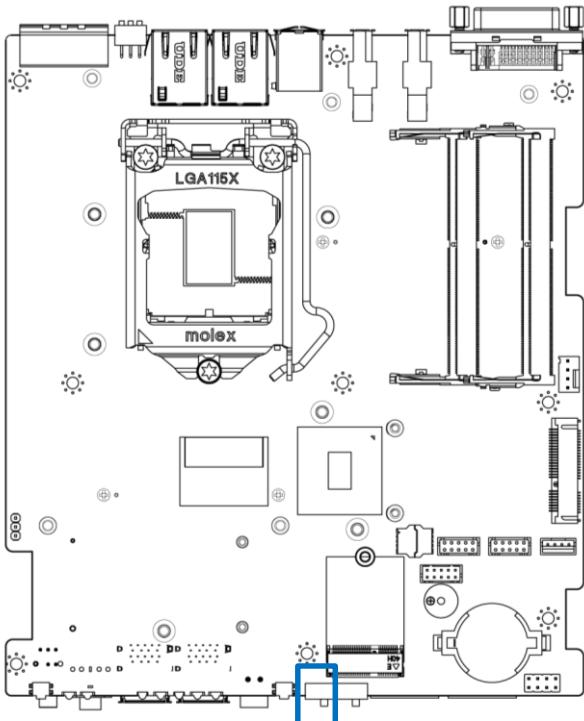


JP1

Pin	Signal	Pin	Signal
1	Power (3.3V)	2	GND
3	CS#	4	CLK
5	MISO	6	MOSI
7	NC	8	SPI_GATE#

2.3 I/O Interface Descriptions

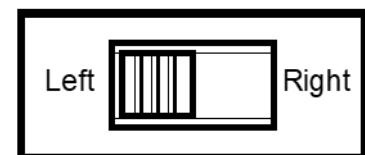
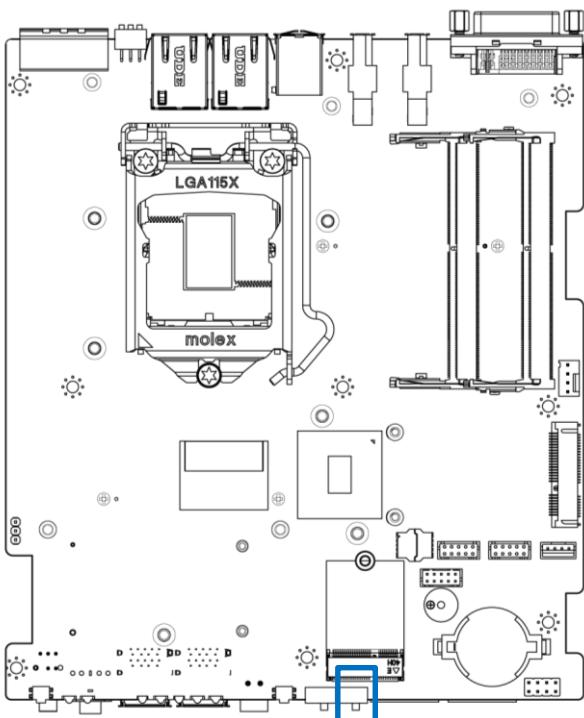
2.3.6 AT / ATX Power Mode Switch



AT_ATX1

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

2.3.7 PC/Car Mode Switch

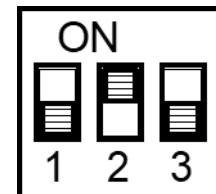
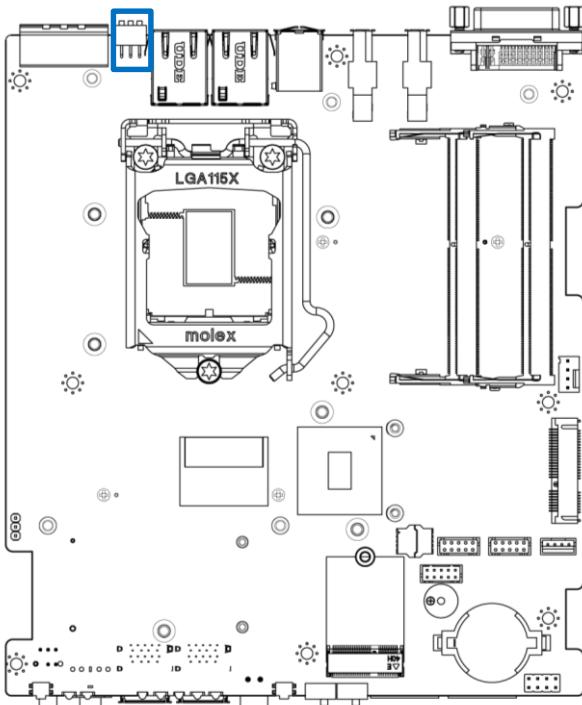


CAR_PWR

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

2.3 I/O Interface Descriptions

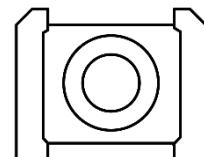
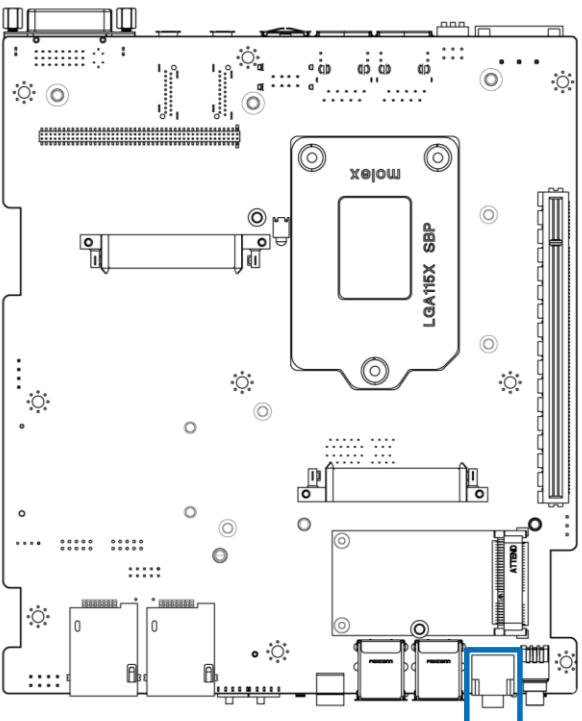
2.3.8 Power off delay time setup Switch



DELAY_TIME1

Switch 1 / 2 / 3	Definition
ON / ON / ON	3 sec. (Default Shutdown Timer by O.S.)
ON / ON / OFF	1 min.
ON / OFF / ON	5 min.
ON / OFF / OFF	10 min.
OFF / ON / ON	30 min.
OFF / ON / OFF	1 hour
OFF / OFF / ON	2 hour

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

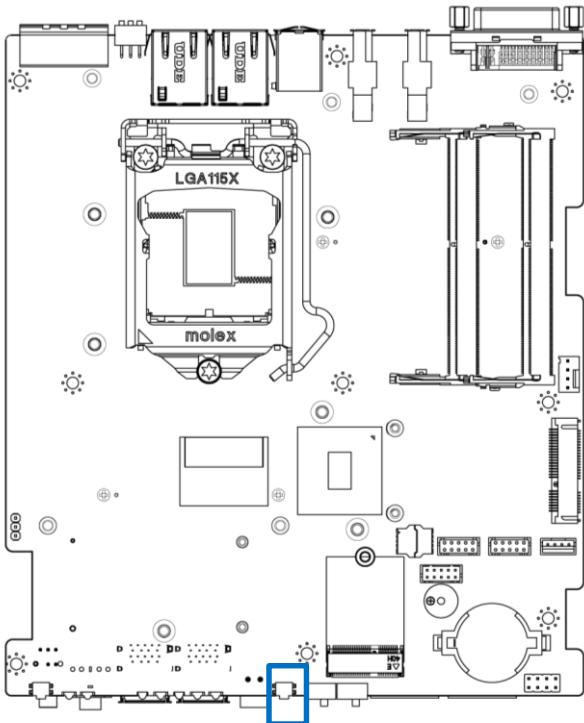


LINE_OUT1

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

2.3 I/O Interface Descriptions

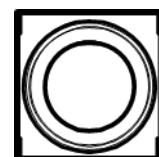
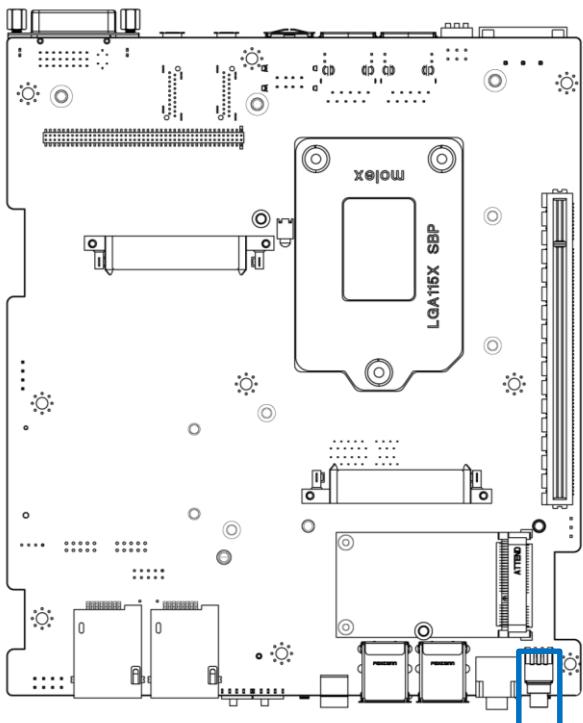
2.3.10 Clear BIOS Switch



CLR_CMOS

Switch	Definition
Push	Clear BIOS
open	Normal Status (Default)

2.3.11 Power Button

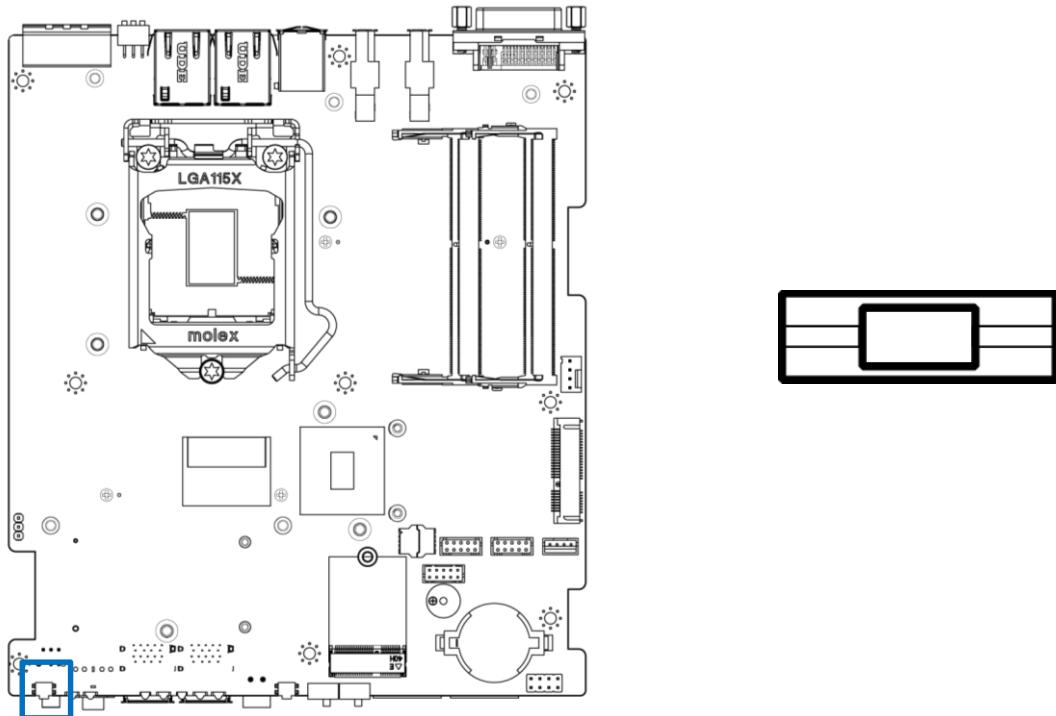


PWR_SW1

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

2.3 I/O Interface Descriptions

2.3.12 Reset Button

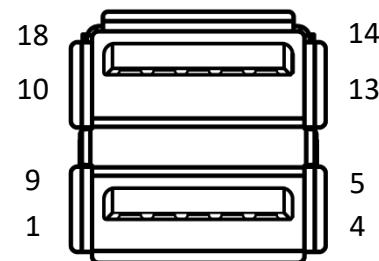
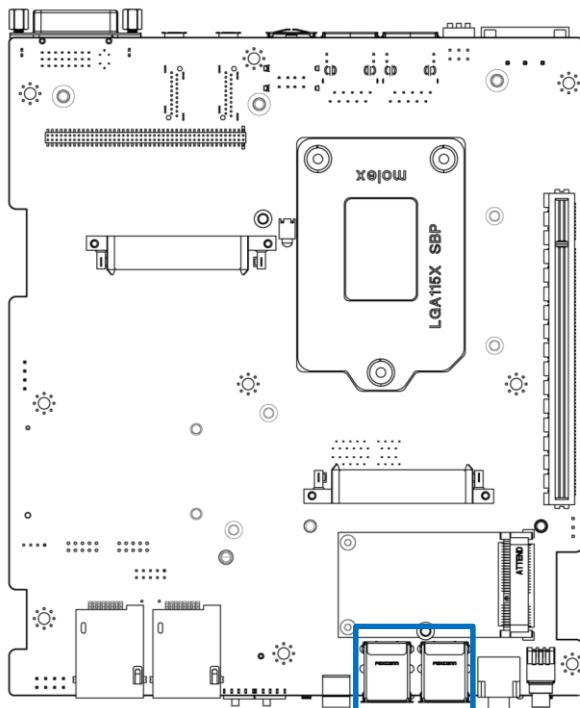


RESET1

Pin	Signal
1,2	RESET
3,4	GND

2.3 I/O Interface Descriptions

2.3.13 USB3_1 , USB3_2 : USB3.1 Connector

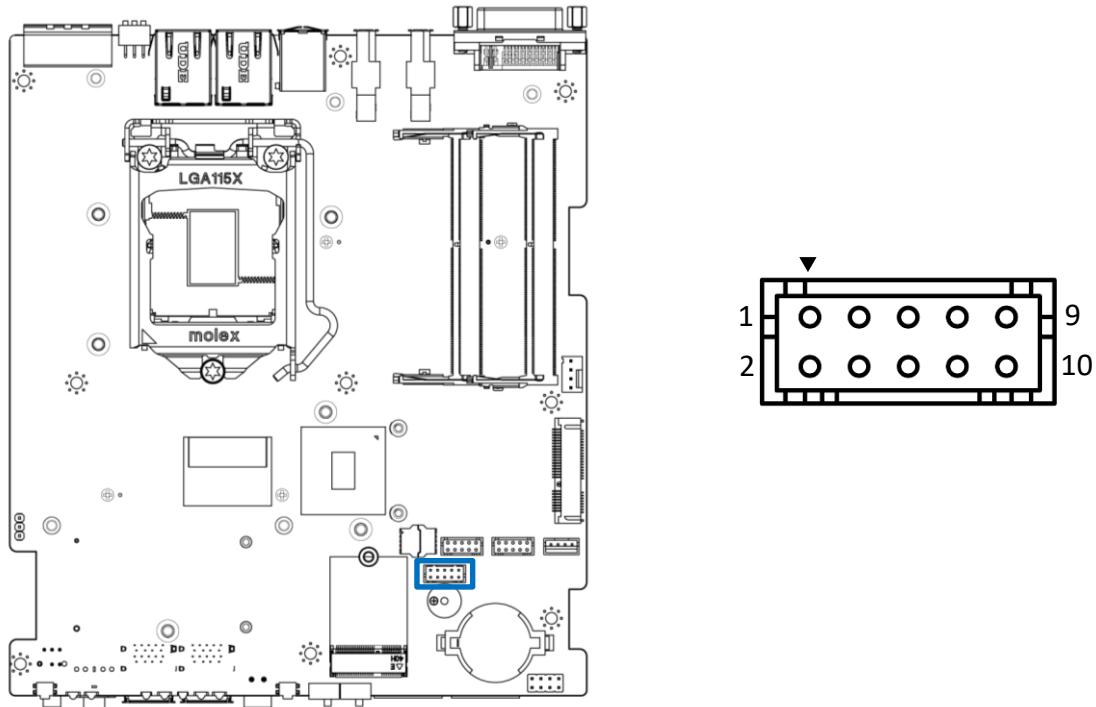


GEN2 x4 ports, Type A

Pin	Definition	Pin	Definition
1 (10)	+5V	6 (15)	USB3_RX+
2 (11)	USB2_D-	7 (16)	GND
3 (12)	USB2_D+	8 (17)	USB3_TX-
4 (13)	GND	9 (18)	USB3_TX+
5 (14)	USB3_RX-		

2.3 I/O Interface Descriptions

2.3.14 USB 2.0 Connector 2x5 10-pin box header, 2.0mm pitch

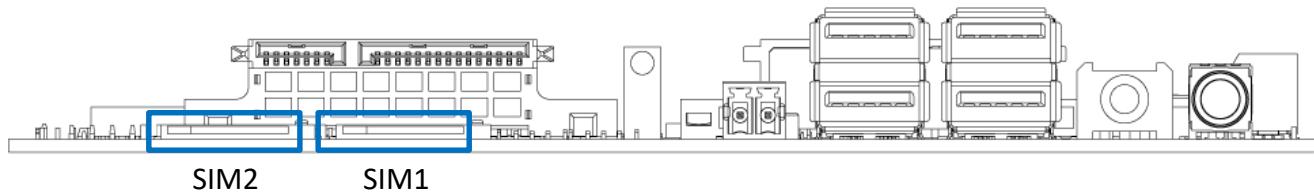
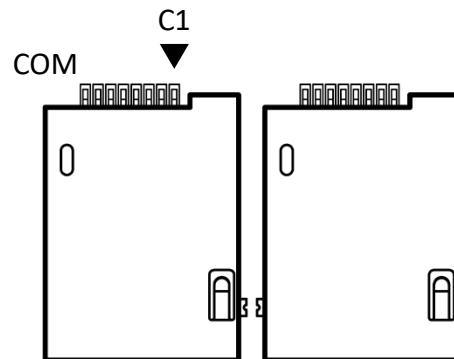
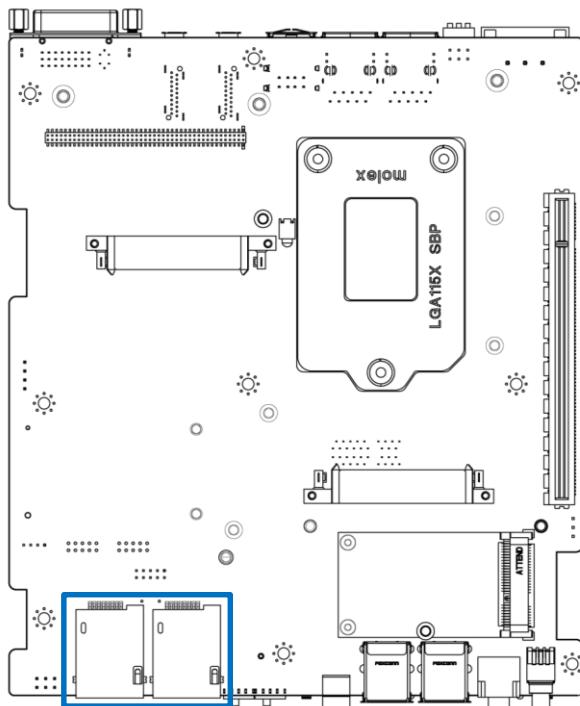


CN7

Pin	Definition	Pin	Definition
1	+5V	2	+5V
3	USB2_D-	4	USB2_D-
5	USB2_D+	6	USB2_D+
7	GND	8	GND
9	GND	10	GND

2.3 I/O Interface Descriptions

2.3.15 Bottom size SIM Card Socket

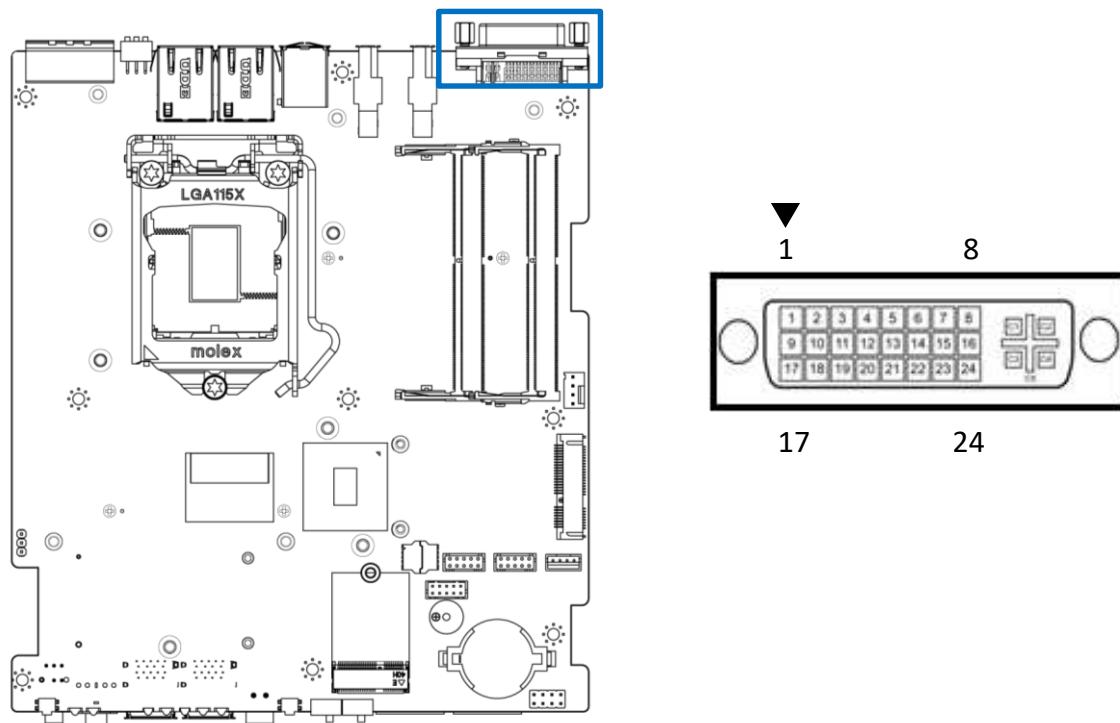


SIM1 , SIM2

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

2.3 I/O Interface Descriptions

2.3.16 DVI-I Connector

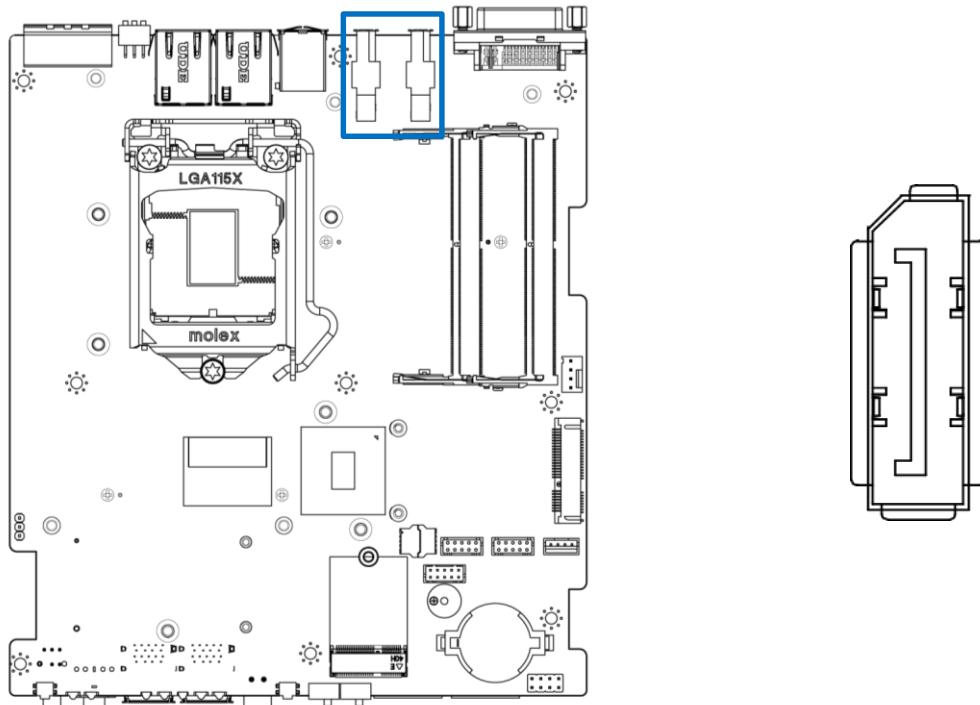


DVI_I1

Pin	Definition	Pin	Definition
1	DVI_TX2-	16	DVI Hot Plug Detect
2	DVI_TX2+	17	DVI_TX0-
3	GND	18	DVI_TX0+
4	NC	19	GND
5	NC	20	VGA_DDC_CLOCK
6	DVI_DDC_CLOCK	21	VGA_DDC_DATA
7	DVI_DDC_DATA	22	GND
8	VGA_VSYNC	23	DVI_TXCLK+
9	DVI_TX1-	24	DVI_TXCLK-
10	DVI_TX1+	C1	VGA_RED
11	GND	C2	VGA_GREEN
12	NC	C3	VGA_BLUE
13	NC	C4	VGA_HSYNC
14	+5V	C5	GND
15	GND		

2.3 I/O Interface Descriptions

2.3.17 Display Port Connector

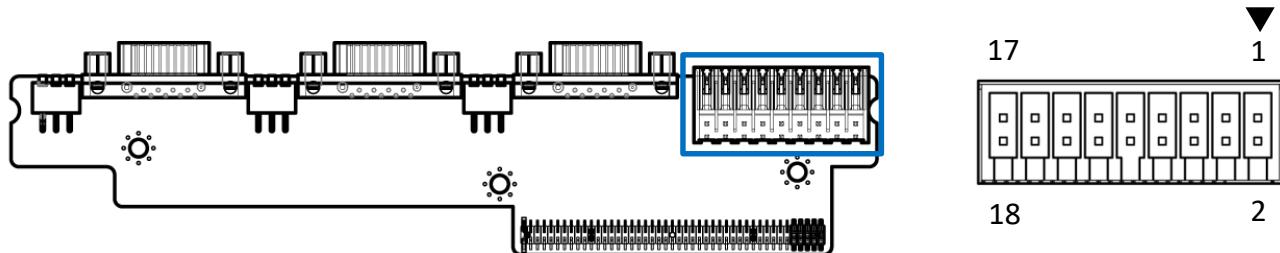


DP1 DP2

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	+3.3V

2.3 I/O Interface Descriptions

2.3.18 Digital Input / Output Connector Type: Terminal Block 2x9 18-pin, 3.5mm pitch

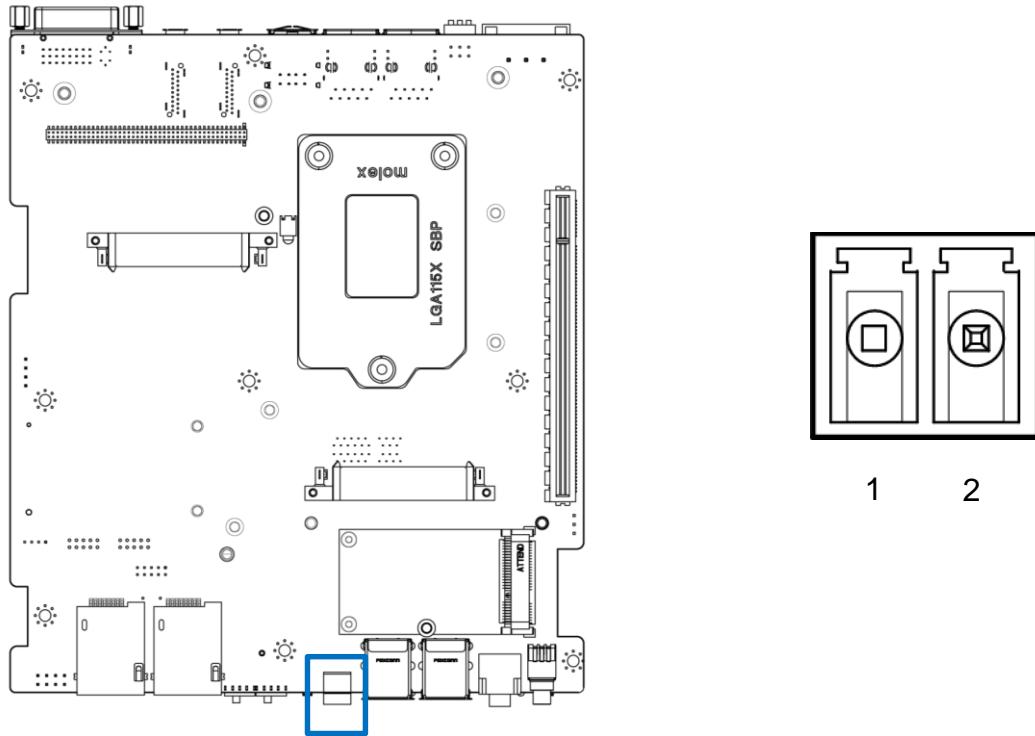


DIO

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 (+9V~+24V)	18	GND

2.3 I/O Interface Descriptions

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

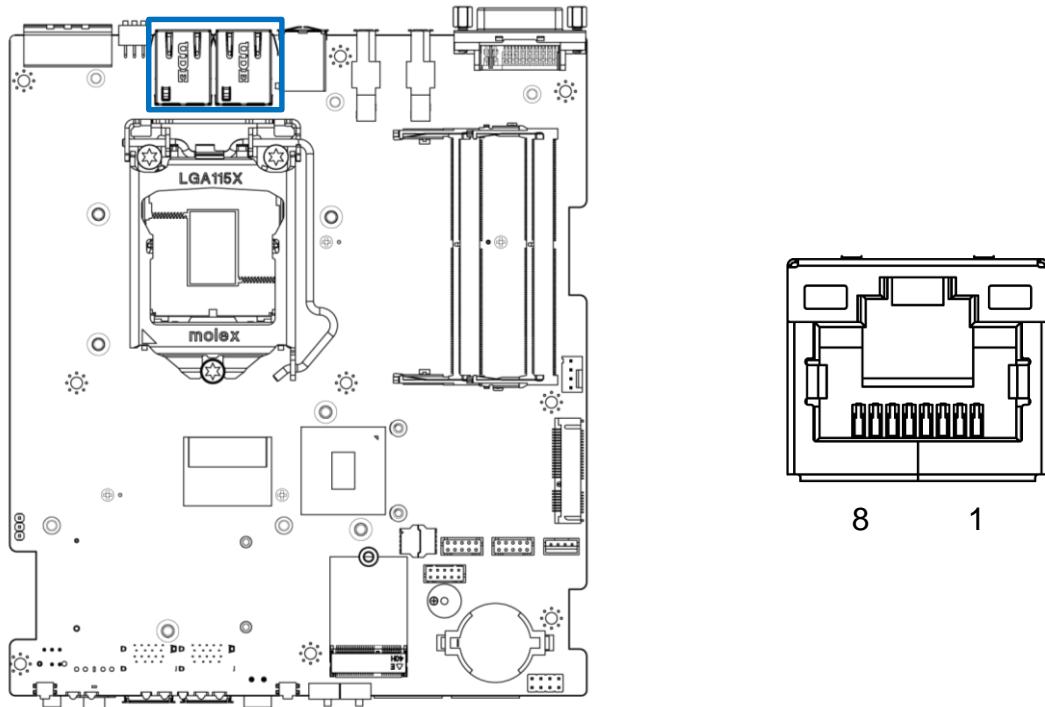


PWR_SW2

Pin	Definition
1	Power Button
2	GND

2.3 I/O Interface Descriptions

2.3.20 Connector Type, RJ45 port with LEDs

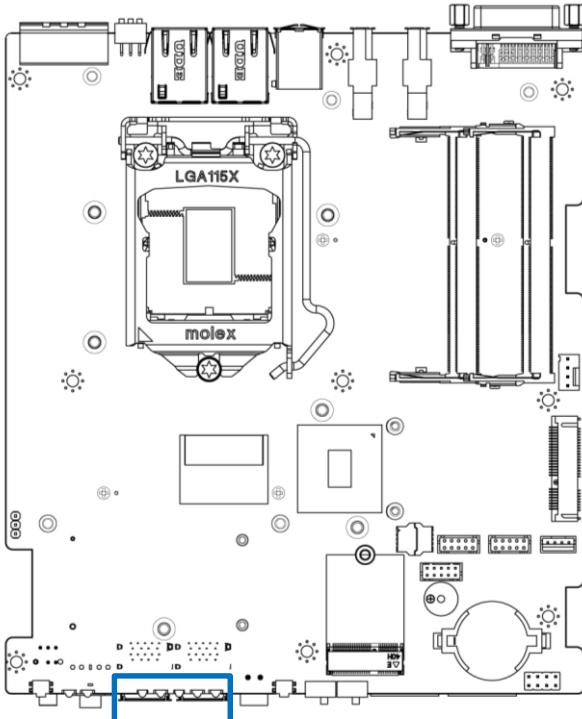


LAN1 LAN2

Pin	Definition
1	LAN1_MDIOP
2	LAN1_MDION
3	LAN1_MDI1P
4	LAN1_MDI2P
5	LAN1_MDI2N
6	LAN1_MDI1N
7	LAN1_MDI3P
8	LAN1_MDI3N

2.3 I/O Interface Descriptions

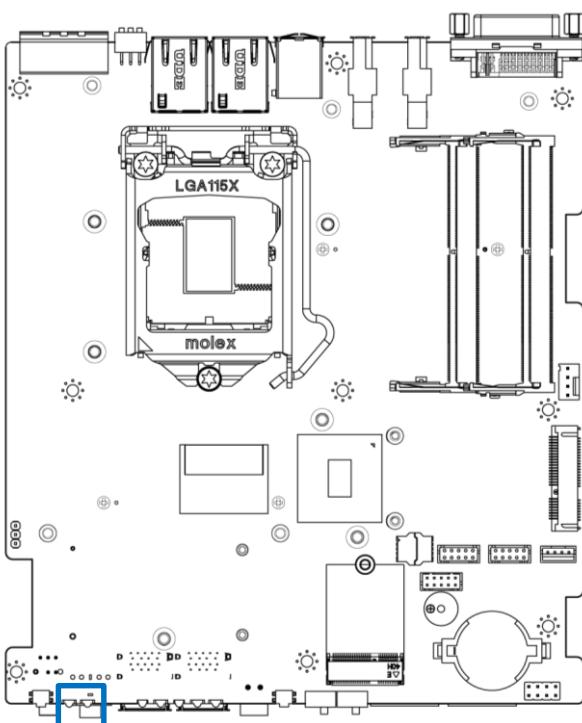
2.3.21 LED Status



Act LED Status	Definition
Blinking Yellow	Data Activity
Off	No Activity



Link LED Status	Definition
Steady Orange	1Gbps Network Link
Steady Green	100Mbps Network Link
Off	10Mbps Network Link



PWR_LED1: Power LED Status

Pin	Definition
1	POWER LED +
2	POWER LED -

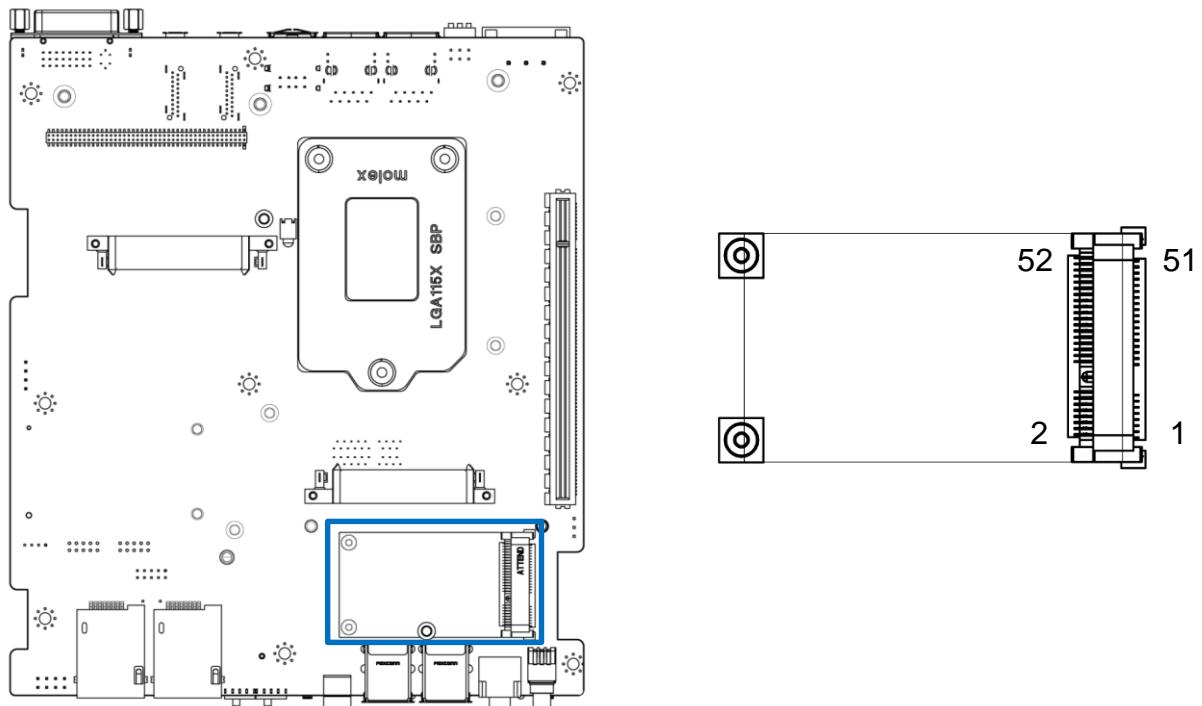


HDD_LED1: HDD Access LED Status

Pin	Definition
1	HDD LED+
2	HDD LED-

2.3 I/O Interface Descriptions

2.3.22 Mini PCI-Express Socket



MINIPCIE2

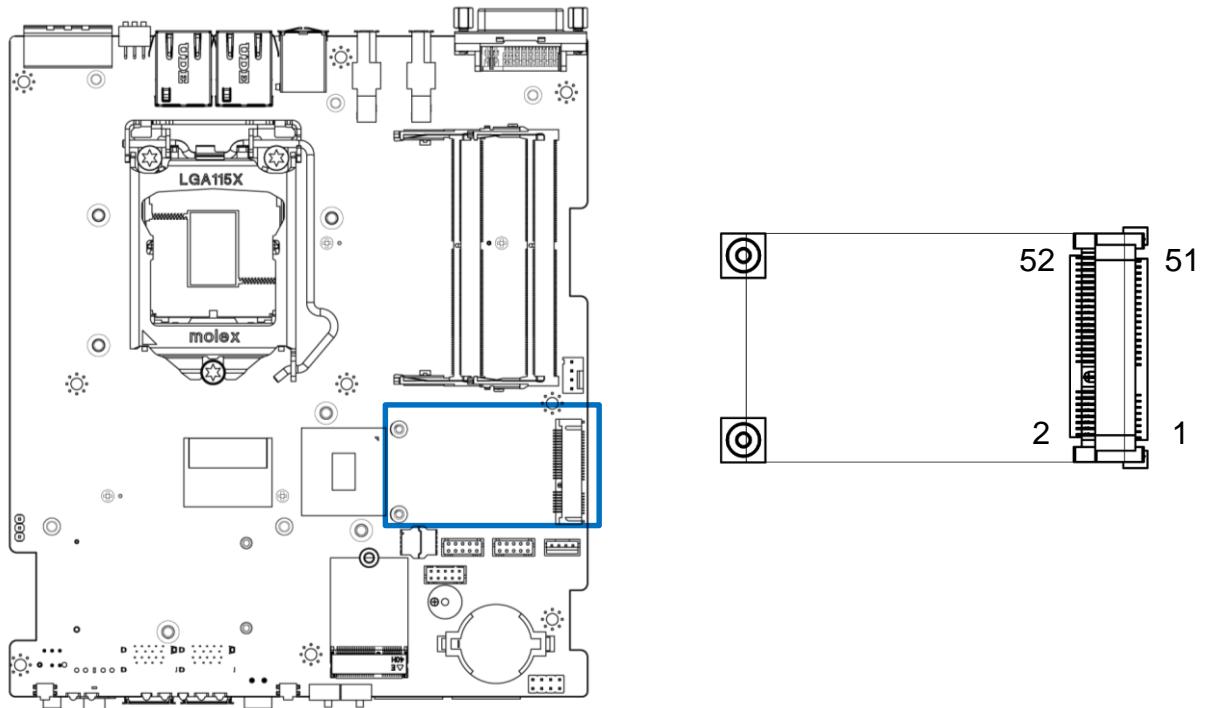
Pin	Definition	Pin	Definition
1	WAKE#	2	+3.3V
3	NC	4	GND
5	NC	6	+1.5V
7	CLKREQ#	8	UIM_PWR
9	GND	10	UIM_DATA
11	REFCLK-	12	UIM_CLK
13	REFCLK+	14	UIM_RST
15	GND	16	UIM_VPP
17	NC	18	GND
19	NC	20	NC
21	GND	22	RESET#
23	RxN	24	+3.3VAUX
25	RxP	26	GND
27	GND	28	+1.5V

2.3 I/O Interface Descriptions

Pin	Definition	Pin	Definition
29	GND	30	SMB_CLK
31	TxN	32	SMB_DATA
33	TxP	34	GND
35	GND	36	USB2_D-
37	GND	38	USB2_D+
39	+3.3V	40	GND
41	+3.3V	42	NC
43	GND	44	NC
45	NC	46	NC
47	NC	48	+1.5V
49	NC	50	GND
51	NC	52	+3.3V

2.3 I/O Interface Descriptions

2.3.23 Mini PCI-Express / mSATA Socket



MINIPIE1

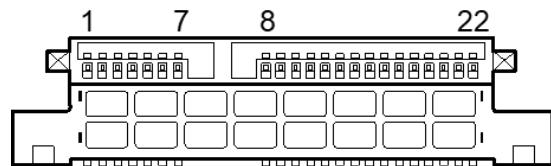
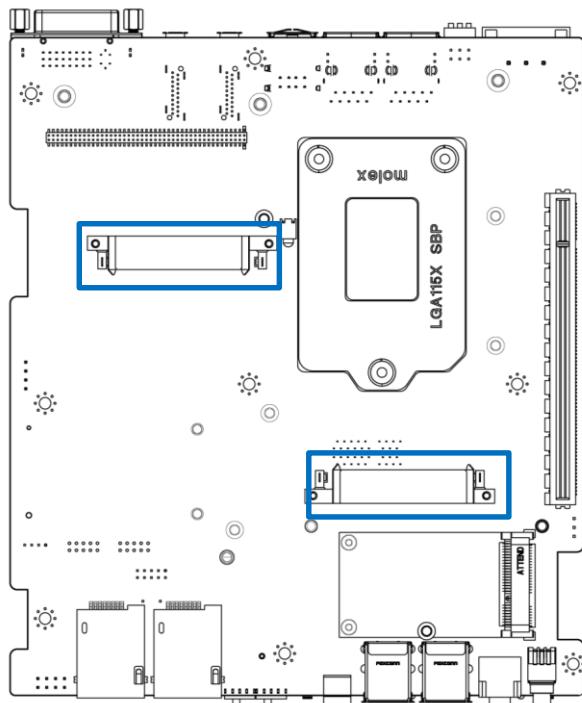
Pin	Definition	Pin	Definition
1	WAKE#	2	+3.3V
3	NC	4	GND
5	NC	6	+1.5V
7	CLKREQ#	8	UIM_PWR
9	GND	10	UIM_DATA
11	REFCLK-	12	UIM_CLK
13	REFCLK+	14	UIM_RST
15	GND	16	UIM_VPP
17	NC	18	GND
19	NC	20	NC
21	GND	22	RESET#
23	RxN	24	+3.3VAUX
25	RxP	26	GND
27	GND	28	+1.5V

2.3 I/O Interface Descriptions

Pin	Definition	Pin	Definition
29	GND	30	SMB_CLK
31	TxN	32	SMB_DATA
33	TxP	34	GND
35	GND	36	USB2_D-
37	GND	38	USB2_D+
39	+3.3V	40	GND
41	+3.3V	42	NC
43	GND	44	DEVSLP
45	NC	46	NC
47	NC	48	+1.5V
49	NC	50	GND
51	PCIE_MSATA_SEL	52	+3.3V

2.3 I/O Interface Descriptions

2.3.24 SATA with Power Connector

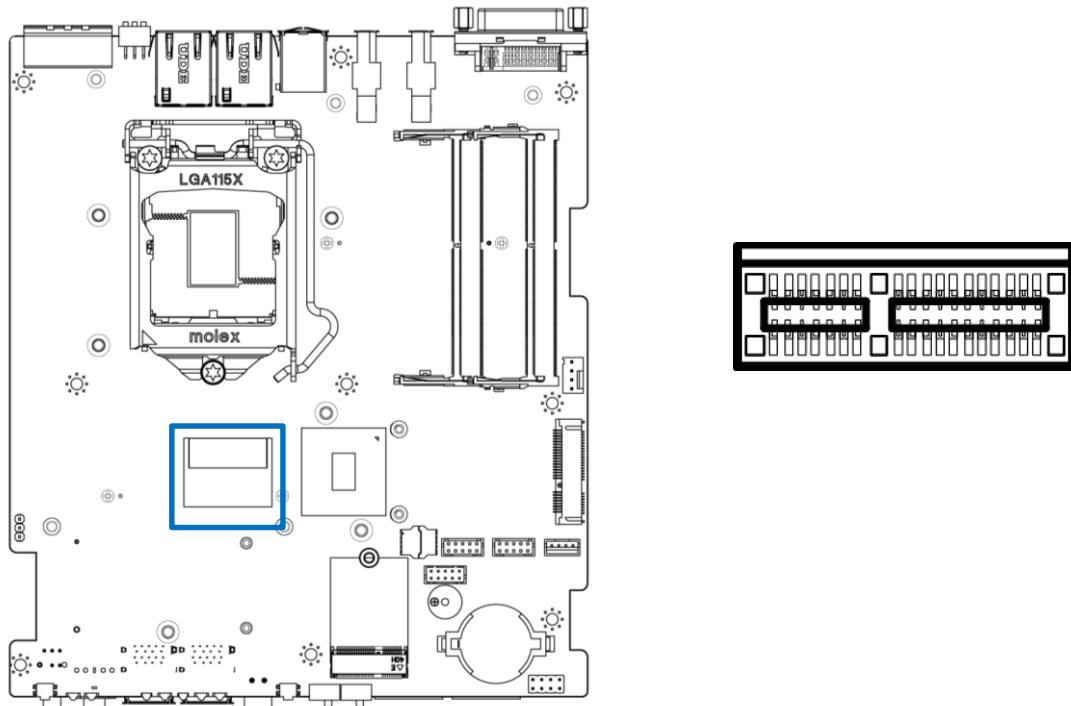


Pin	Definition
1	GND
2	TxP
3	TxN
4	GND
5	RxN
6	RxP
7	GND
8	NC
9	NC
10	DEVSLP
11	GND

Pin	Definition
12	GND
13	GND
14	+5V
15	+5V
16	+5V
17	GND
18	GND
19	GND
20	NC
21	NC
22	NC

2.3 I/O Interface Descriptions

2.3.25 PCI-Express x1 Slot



PCIE

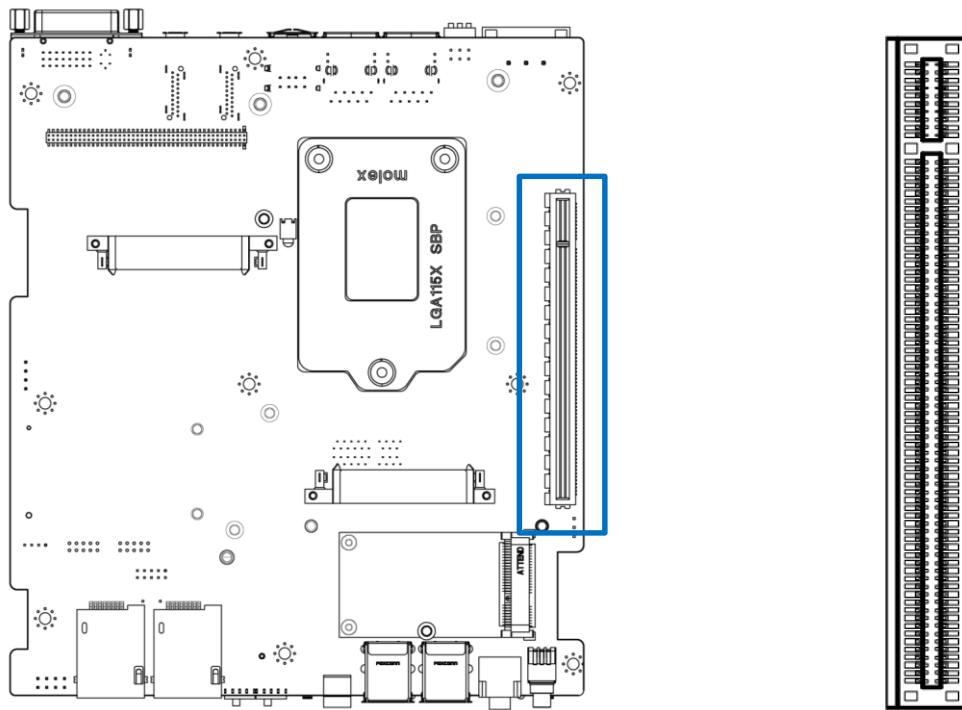
Pin	Definition	Pin	Definition
B1	TXP0	A1	RXP0
B2	TXN0	A2	RXN0
B3	GND	A3	NC
B4	TXP1	A4	RXP1
B5	TXN1	A5	RXN1
B6	GND	A6	NC
B7	TXP2	A7	RXP2
B8	TXN2	A8	RXN2
B9	NC	A9	NC
B10	TXP3	A10	RXP3
B11	TXN3	A11	RXN3
B12	WAKE#	A12	NC
B13	RESET#	A13	REFCLK+
B14	3.3V	A14	REFCLK-
B15	3.3V	A15	SMB_DATA

2.3 I/O Interface Descriptions

Pin	Definition	Pin	Definition
B16	5V	A16	SMB_CLK
B17	NC	A17	3.3V AUX
B18	NC	A18	3.3V AUX

2.3 I/O Interface Descriptions

2.3.26 PCI-Express x16 Slot



PCIE

Pin	Definition	Pin	Definition
B1	+12V	A1	FAN_P4
B2	+12V	A2	+12V
B3	+12V	A3	+12V
B4	GND	A4	GND
B5	SMB_CLK	A5	NC
B6	SMB_DATA	A6	NC
B7	GND	A7	NC
B8	+3.3V	A8	NC
B9	NC	A9	+3.3V
B10	+3.3VAUX	A10	+3.3V
B11	WAKE#	A11	RESET#
B12	FAN_P3	A12	GND
B13	GND	A13	REFCLK+

2.3 I/O Interface Descriptions

Pin	Definition	Pin	Definition
B14	TxP0	A14	REFCLK-
B15	TxN0	A15	GND
B16	GND	A16	RxP0
B17	FAN_PWR	A17	RxN0
B18	GND	A18	GND
B19	TxP1	A19	NC
B20	TxN1	A20	GND
B21	GND	A21	RxP1
B22	GND	A22	RxN1
B23	TxP2	A23	GND
B24	TxN2	A24	GND
B25	GND	A25	RxP2
B26	GND	A26	RxN2
B27	TxP3	A27	GND
B28	TxN3	A28	GND
B29	GND	A29	RxP3
B30	NC	A30	RxN3
B31	S3	A31	GND
B32	GND	A32	CFG_5
B33	TxP4	A33	CFG_6
B34	TxN4	A34	GND
B35	GND	A35	RxP4
B36	GND	A36	RxN4
B37	TxP5	A37	GND
B38	TxN5	A38	GND

2.3 I/O Interface Descriptions

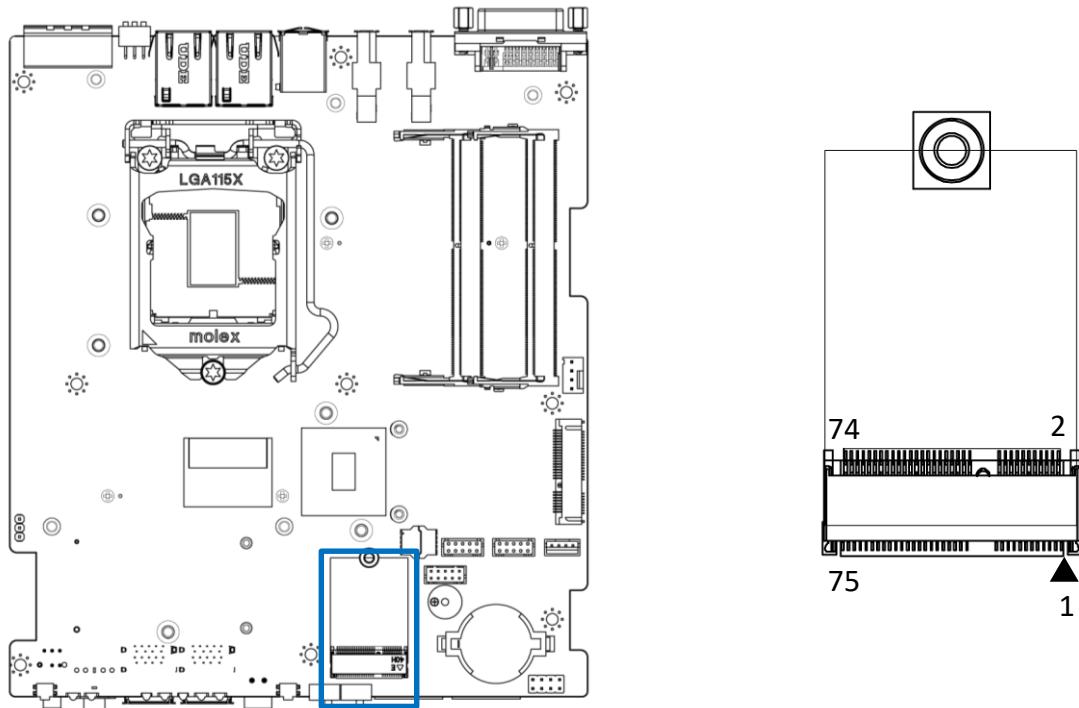
Pin	Definition	Pin	Definition
B39	GND	A39	RxP5
B40	GND	A40	RxN5
B41	TxP6	A41	GND
B42	TxN6	A42	GND
B43	GND	A43	RxP6
B44	GND	A44	RxN6
B45	TxP7	A45	GND
B46	TxN7	A46	GND
B47	GND	A47	RxP7
B48	NC	A48	RxN7
B49	GND	A49	GND
B50	TxP8	A50	NC
B51	TxN8	A51	GND
B52	GND	A52	RxP8
B53	GND	A53	RxN8
B54	TxP9	A54	GND
B55	TxN9	A55	GND
B56	GND	A56	RxP9
B57	GND	A57	RxN9
B58	TxP10	A58	GND
B59	TxN10	A59	GND
B60	GND	A60	RxP10
B61	GND	A61	RxN10
B62	TxP11	A62	GND
B63	TxN11	A63	GND

2.3 I/O Interface Descriptions

Pin	Definition	Pin	Definition
B64	GND	A64	RxP11
B65	GND	A65	RxN11
B66	TxP12	A66	GND
B67	TxN12	A67	GND
B68	GND	A68	RxP12
B69	GND	A69	RxN12
B70	TxP13	A70	GND
B71	TxN13	A71	GND
B72	GND	A72	RxP13
B73	GND	A73	RxN13
B74	TxP14	A74	GND
B75	TxN14	A75	GND
B76	GND	A76	RxP14
B77	GND	A77	RxN14
B78	TxP15	A78	GND
B79	TxN15	A79	GND
B80	GND	A80	RxP15
B81	NC	A81	RxN15
B82	NC	A82	GND

2.3 I/O Interface Descriptions

2.3.27 M.2 E Key Socket



CN1

Pin	Definition	Pin	Definition
1	GND	2	+3.3VAUX
3	USB2_D+	4	+3.3VAUX
5	USB2_D-	6	LED1#
7	GND	8	NC
9	NC	10	NC
11	NC	12	NC
13	NC	14	NC
15	NC	16	LED2#
17	NC	18	GND
19	NC	20	NC
21	NC	22	NC
23	NC	32	NC
33	GND	34	NC

2.3 I/O Interface Descriptions

Pin	Definition	Pin	Definition
35	TxP0	36	NC
37	TxN0	38	NC
39	GND	40	NC
41	RxP0	42	NC
43	RxN0	44	NC
45	GND	46	NC
47	REFCLK0+	48	NC
49	REFCLK0-	50	SUSCLK
51	GND	52	PERST0#
53	NC	54	NC
55	WAKE0#	56	NC
57	GND	58	NC
59	TxP1	60	NC
61	TxN1	62	NC
63	GND	64	Pull Low
65	RxP1	66	PERST1#
67	RxN1	68	NC
69	GND	70	WAKE1#
71	REFCLK1+	72	+3.3VAUX
73	REFCLK1-	74	+3.3VAUX
75	GND		

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. Turn the system upside down. Unscrew the 6 screws (M3x5L) on the bottom cover.

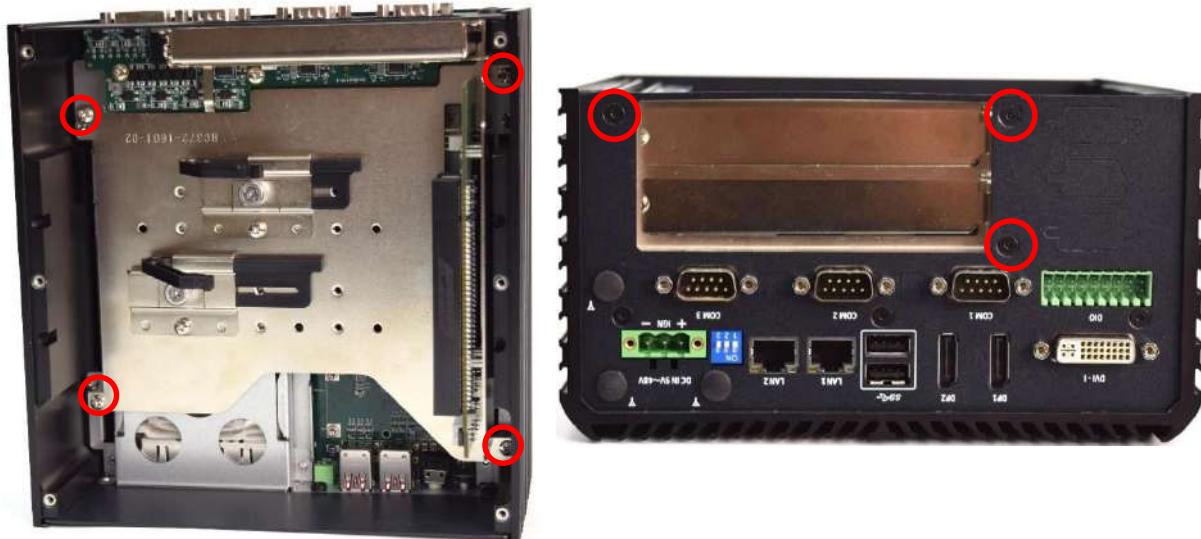


2. Now you can remove the bottom cover.

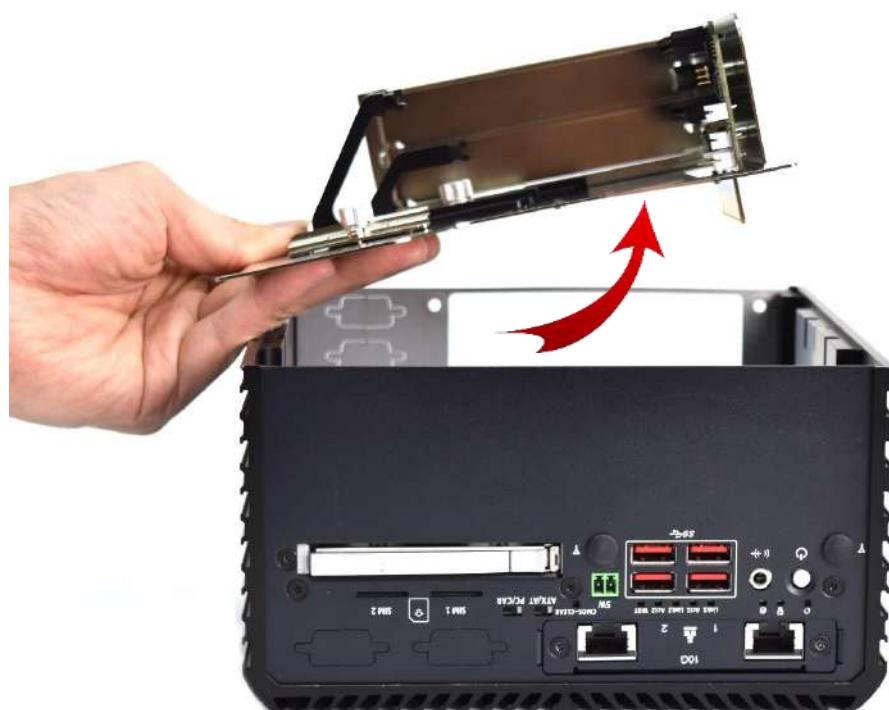


3.3 Removing PCIe/PCI expansion module

1. This step only applies to RCO-3000-CFL series, which is equipped with PCIe/PCI expansion module.
2. Unscrew seven screws (M3x5L) circled below.

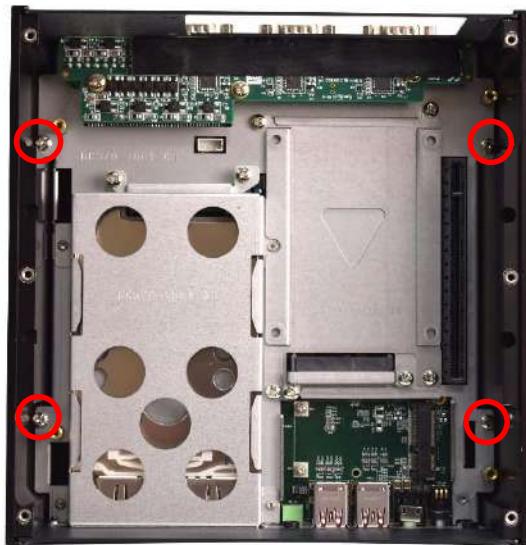


3. Now you can remove the PCIe/PCI expansion module.



3.4 Removing chassis top cover

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



2. Hold the body of the system and lift it vertically away from the top cover.

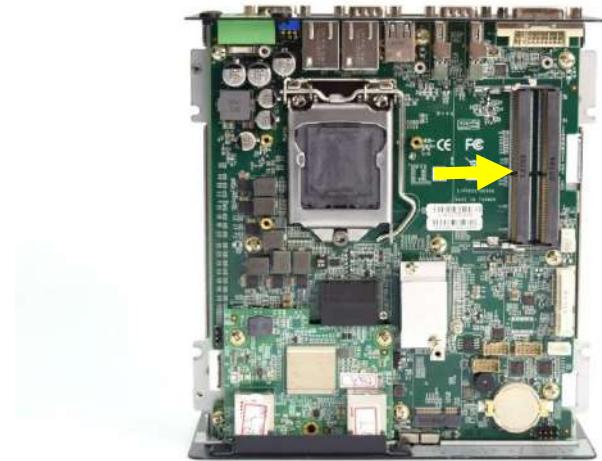


3. Top cover separated from the system body.



3.5 Installing SODIMM

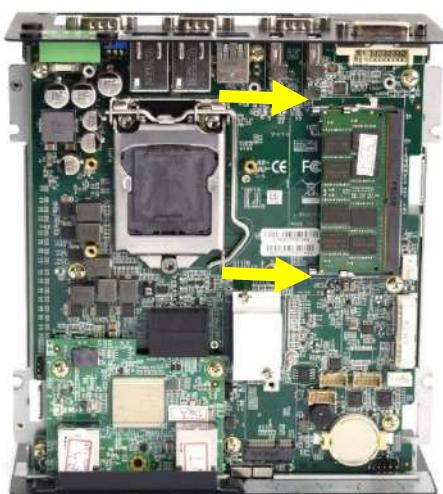
1. Place the system body with SODIMM socket facing upward. Two SODIMM sockets are available for RCO-3000-CFL Series on the top side.



2. Insert memory module from 45 degree direction.

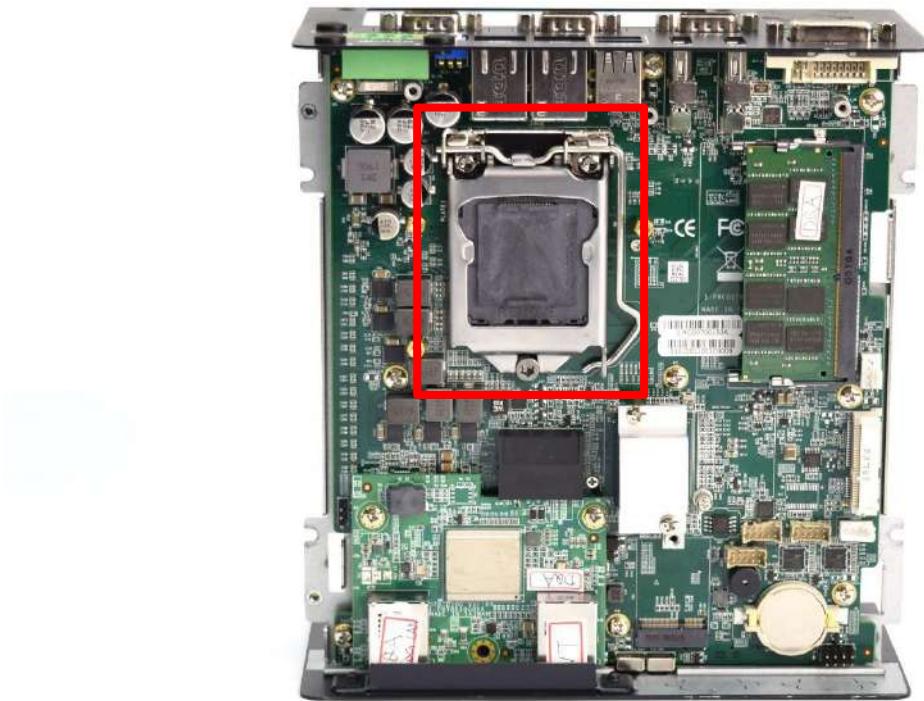


3. Press the memory module vertically downward until you hear the “click” sound. Make sure the memory module is firmly in place.



3.6 Installing CPU

1. CPU socket is located on the top side.



2. Press down the CPU socket lever in order to open the socket cover.



3. Remove the CPU protective cover.



4. Insert CPU gently.



5. Press down the lever again to hold the socket cover.



6. Paste thermal pad on the CPU.



7. Place the designated heat block onto the CPU with thermal pad.
Lock the heat block with three screws (M3x5L). Screw driver will able to penetrate through the holes on the top in order to fasten the screws with copper stud.



8. Paste the thermal pad onto the installed heat block.

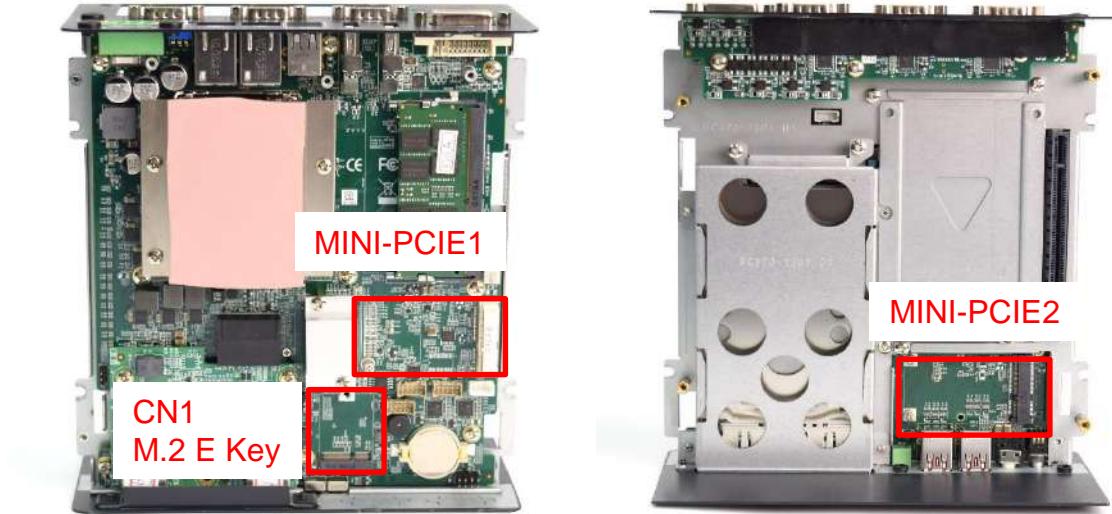


9. Installation complete.

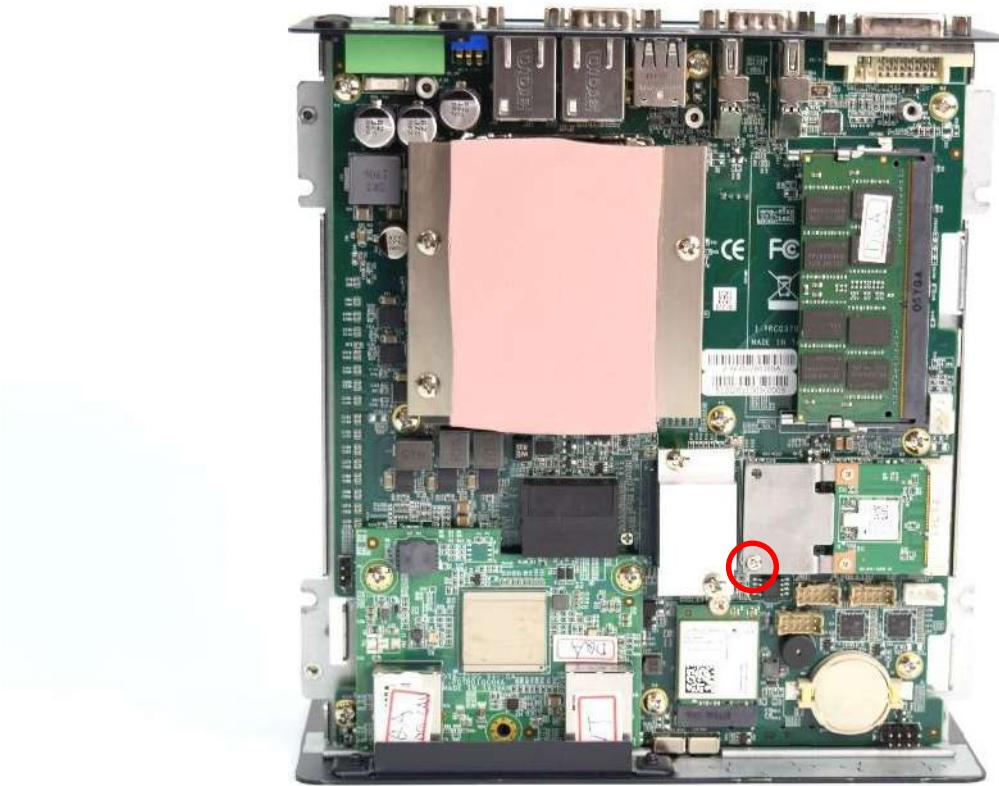


3.7 Installing mini PCIe card / mSATA / M.2

1. Two mini PCIe slots are available for RCO-3000-CFL series, one on top side and one on bottom side. MINI-PCIE1 on the top side support mSATA.

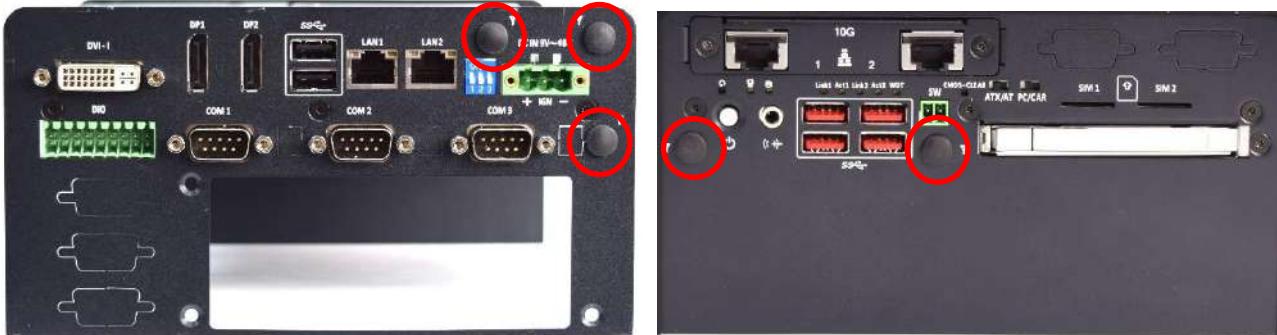


2. Insert mini PCIe card from 45 degree direction.
Press the mini PCIe card down and lock it with one screws (M2x4L).



3.8 Installing antenna

1. Three antenna holes are available for RCO-3000-CFL series on the rear panel and two holes are on the front panel.



2. Remove antenna hole cover on the system panel.



3. Have antenna jack penetrate through the hole.
Put on washer and fasten the nut with antenna jack



4. Assemble the antenna and antenna jack together.



5. Attach the RF connector at the cable-end onto the communication module.

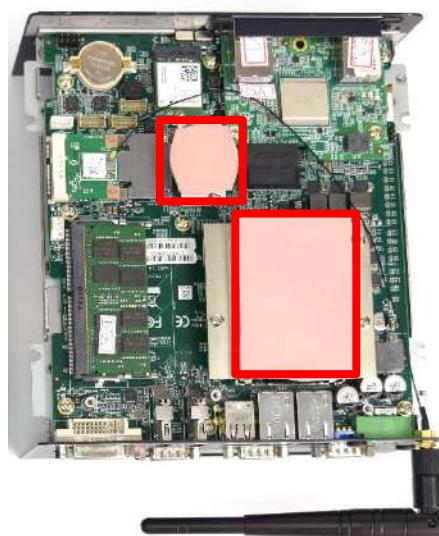


3.9 Assembly chassis top cover

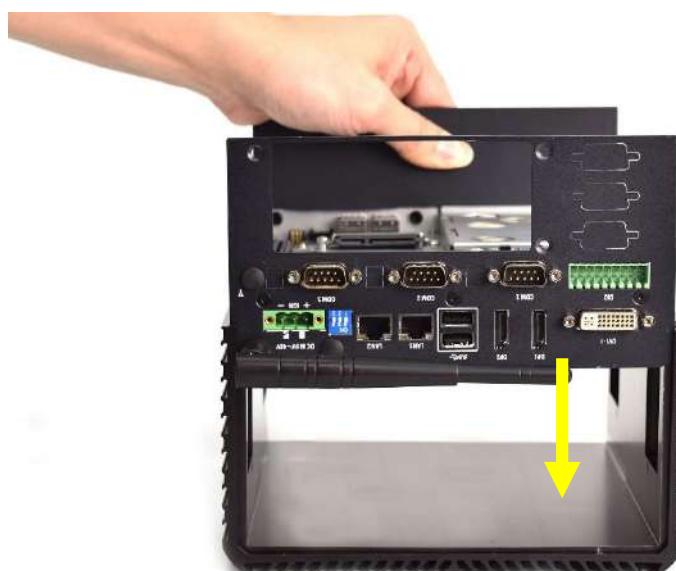
1. Place the top cover upside down as shown below.



2. Ensure thermal pad is in place on both the CPU thermal block and PCH thermal block.



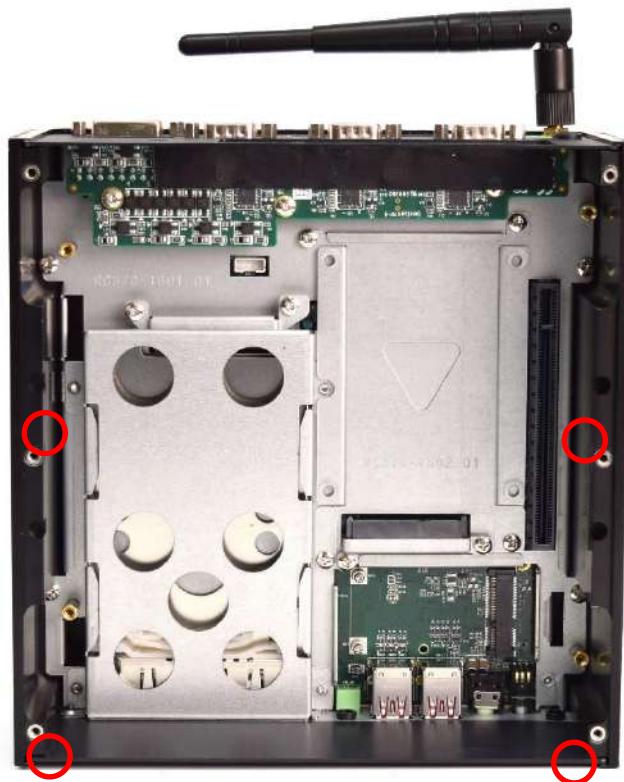
3. Hold the system body and slide the front/rear panel into the slide rail on the top cover.



4. Push the system body down until it is firmly in place.

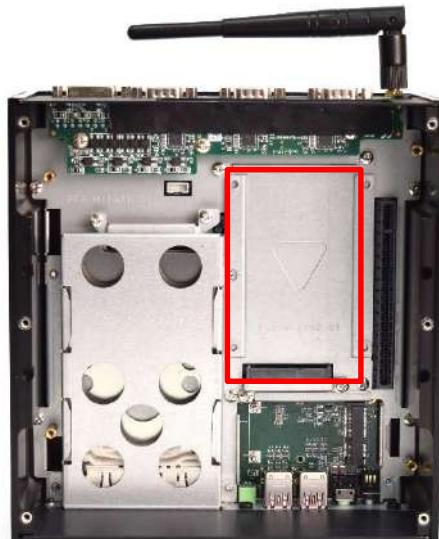


5. Fasten the four screws (M3x5L) to lock the system body with top cover.

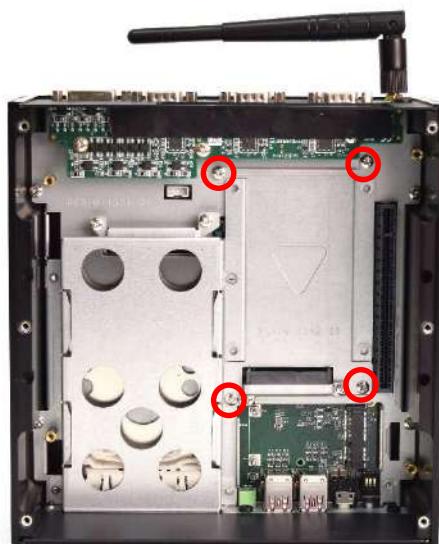


3.10 Installing HDD on internal SATA HDD bay

1. One internal SATA HDD bays are available for RCO-3000-CFL series.



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



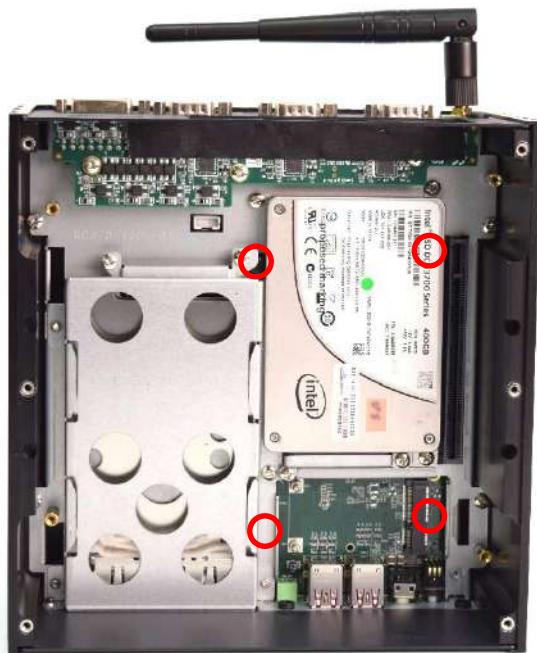
3. Lock the 2.5" HDD with HDD bracket using four screws (M3x4L).



4. Install the HDD bracket following the direction below.



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

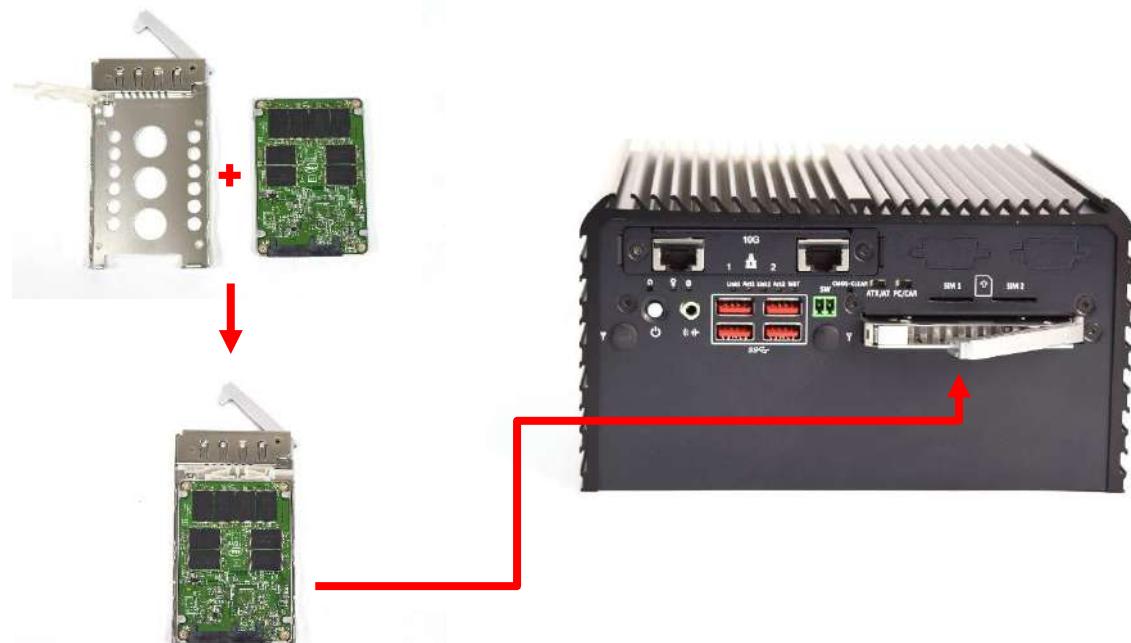


3.11 Installing HDD on removable SATA HDD tray

1. One removable SATA HDD tray available for RCO-3000-CFL Series.
2. Open the tray lock (red circle), and remove the tray.



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

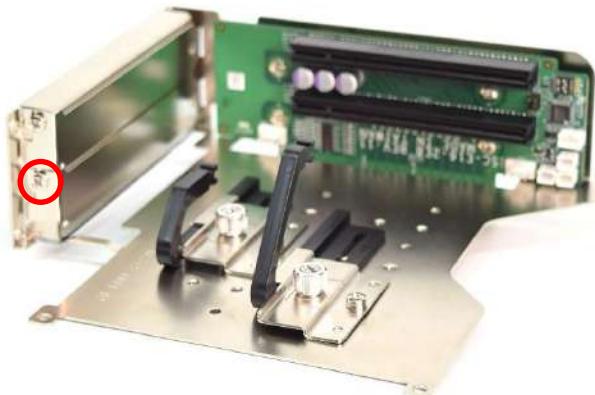


4. Slide the HDD tray back and close the tray lock.



3.12 Installing PCIe/PCI expansion card

1. Unscrew the screw (M3x5L) to remove the plane bracket.



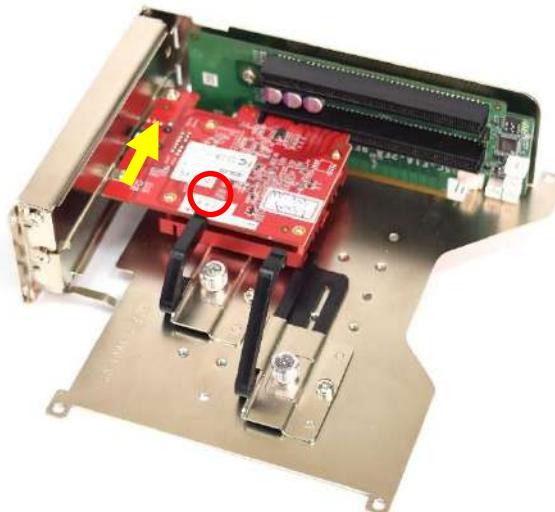
2. Loose the sun screw (circled below) on the holder so the pairing arm can be adjustable.



3. Install the PCIe/PCI card according to the below direction and ensure the gold finger is inserted into the slot. Then fasten the screw in the circle.



4. Adjust the arm until it holds the card firmly in place. Then fasten the sun screw on the holder. For RCO-3000-CFL-2E series, which has two expansion slots, follow the same procedure to install the second card.

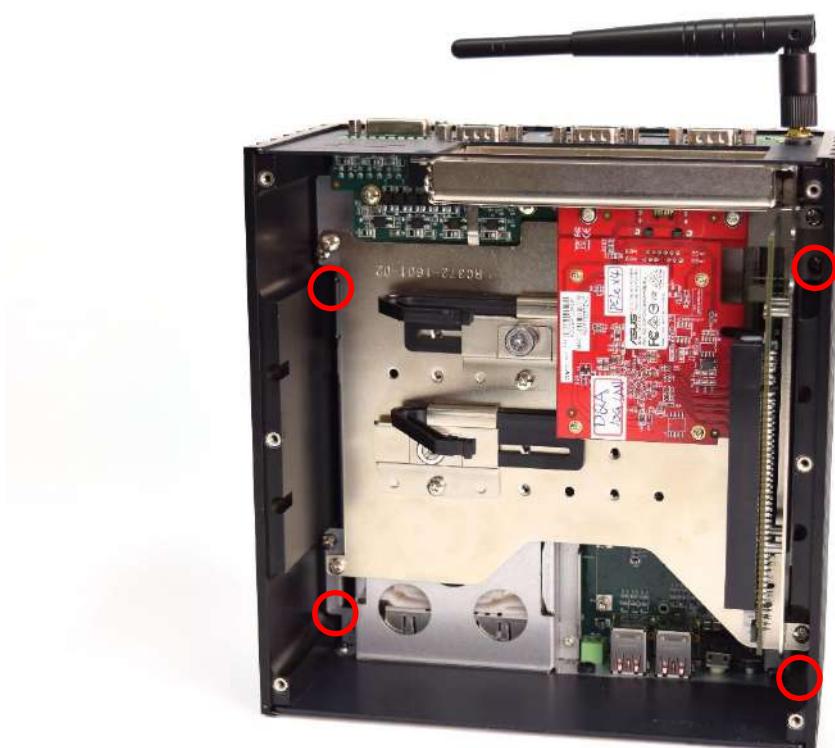


3.13 Assemble PCIe/PCI expansion module

1. Install the expansion module back in place and ensure the golden finger is inserted into the expansion slot.



2. Fasten the four screws (M3x5L) below to lock the expansion module.



3.14 Assemble chassis bottom cover

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



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



3.15 Installing SIM card

1. Insert SIM card into the socket.



2. Please note that the installation of SIM cards has to match the installation of mini PCIe slots

SIM Card Socket Number	Matching Mini PCIe Slot
SIM 1	MINI PCIe1
SIM 2	MINI PCIe2

3.16 Installing wall mount kit

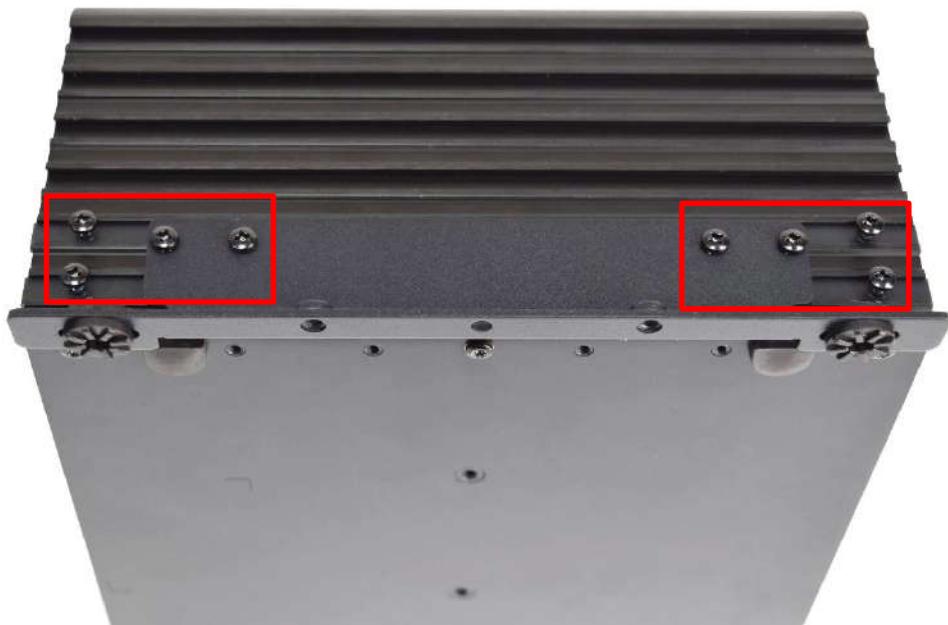
1. L-Shaped Wall mount kit is available for RCO-3000-CFL series included in the standard package.



2. Turn the system to the side. Slide in the side kit through the top cover fin.



3. The highlighted eight screw holes below will be used.
Lock the wall mount kit with eight screws (M3x5L, Nylok).

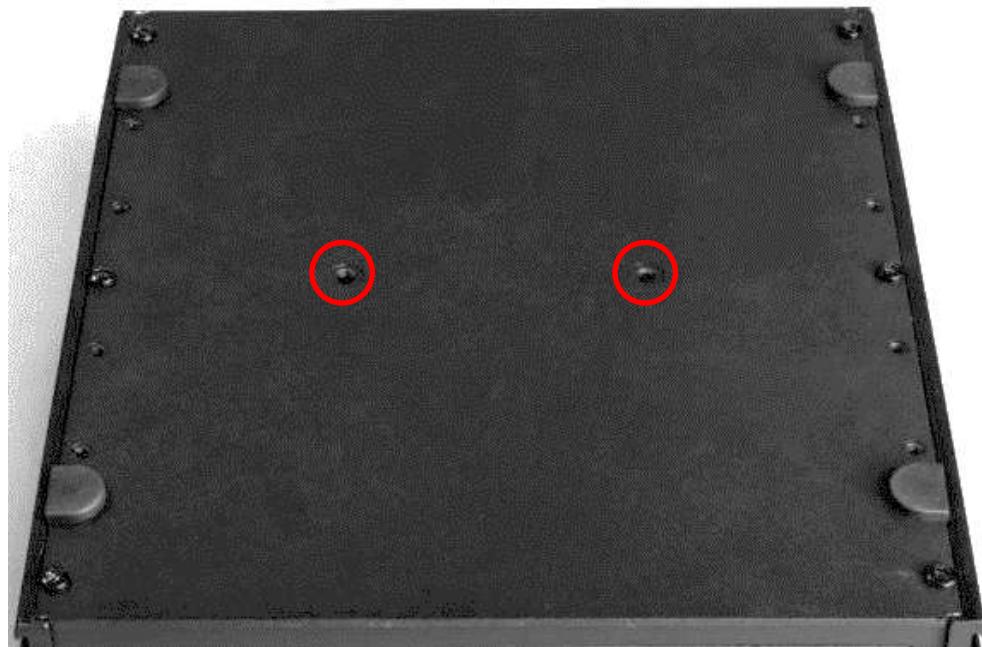


3.17 Installing DIN rail holder

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



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 lock it 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.



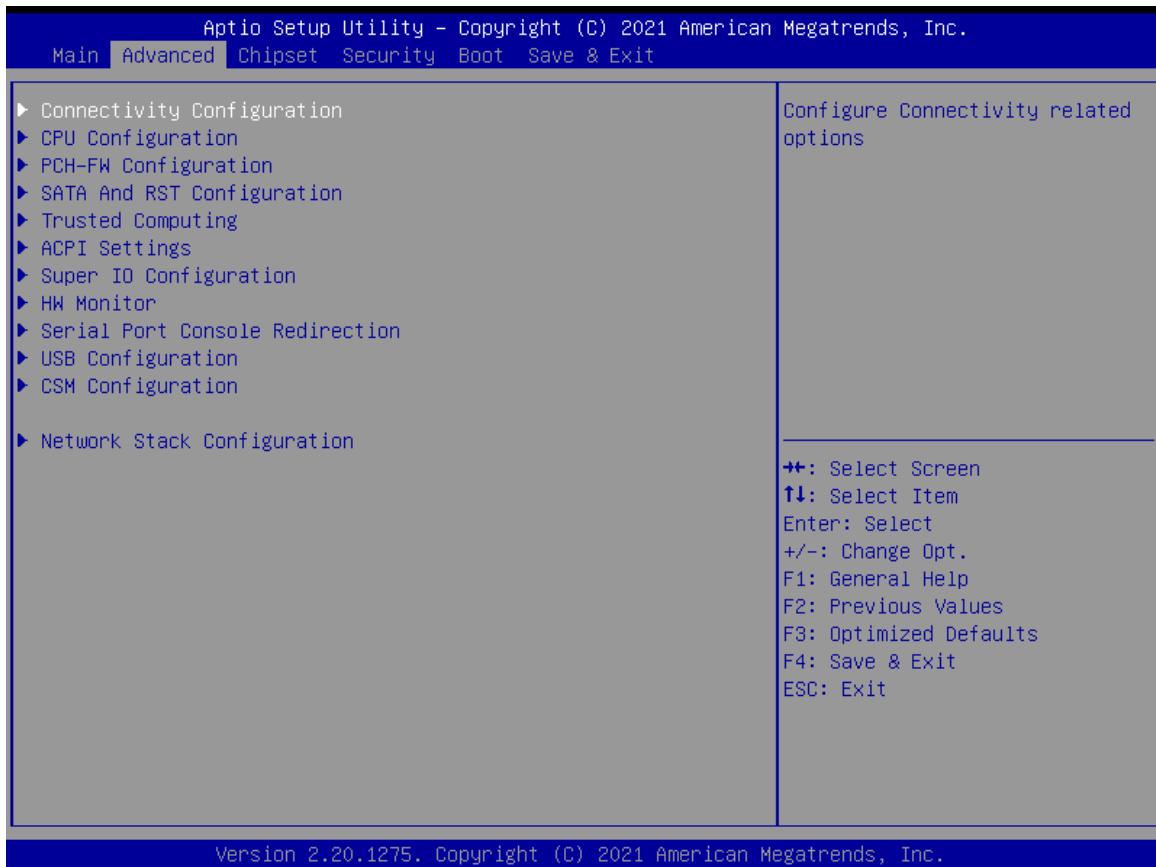
■ System Date

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

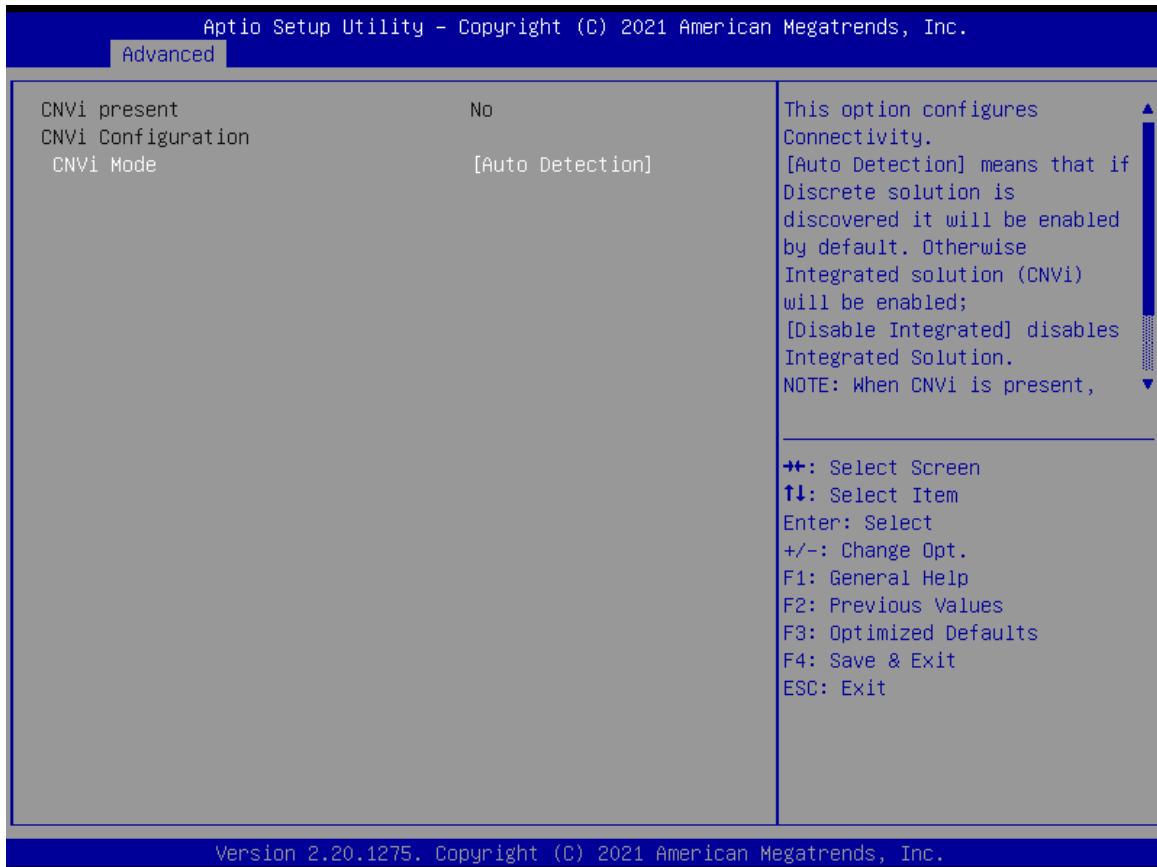
■ System Time

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

4.3 Advanced Setup

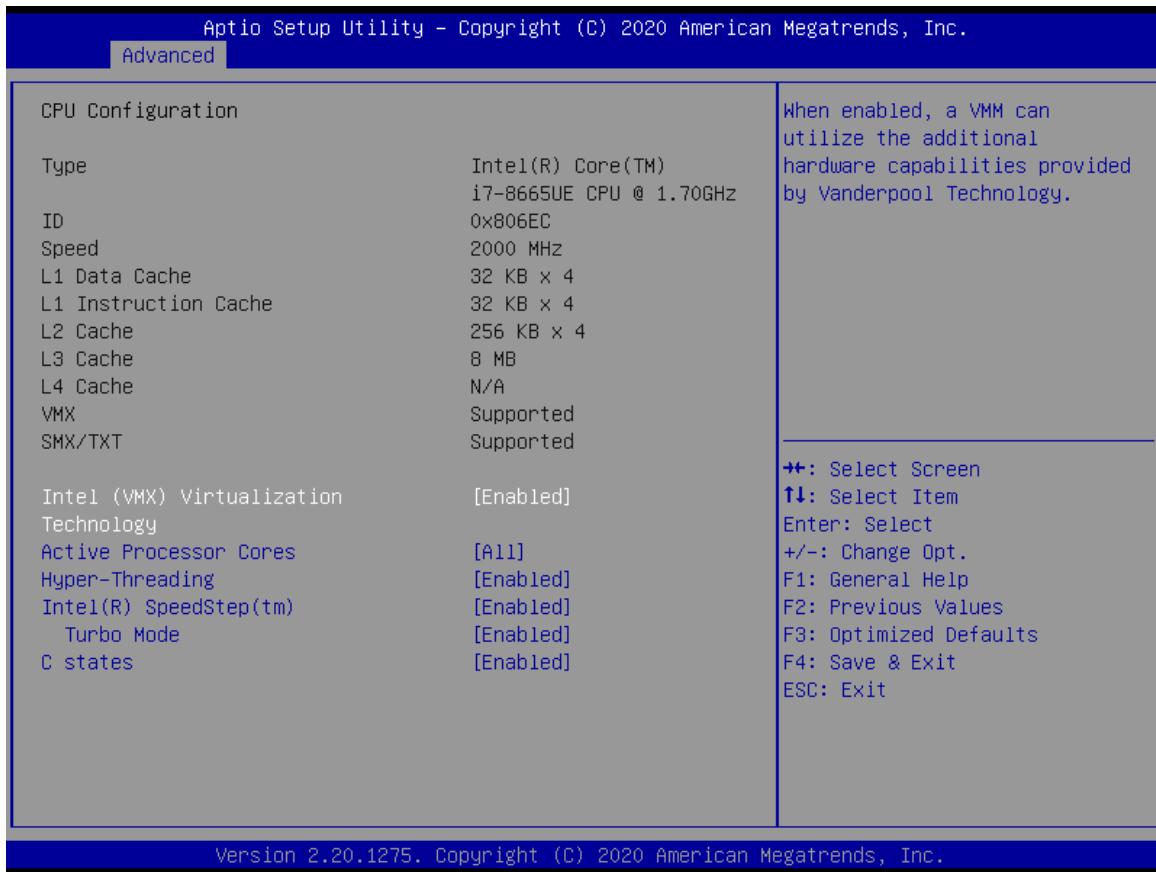


4.3.1 Connectivity Configuration



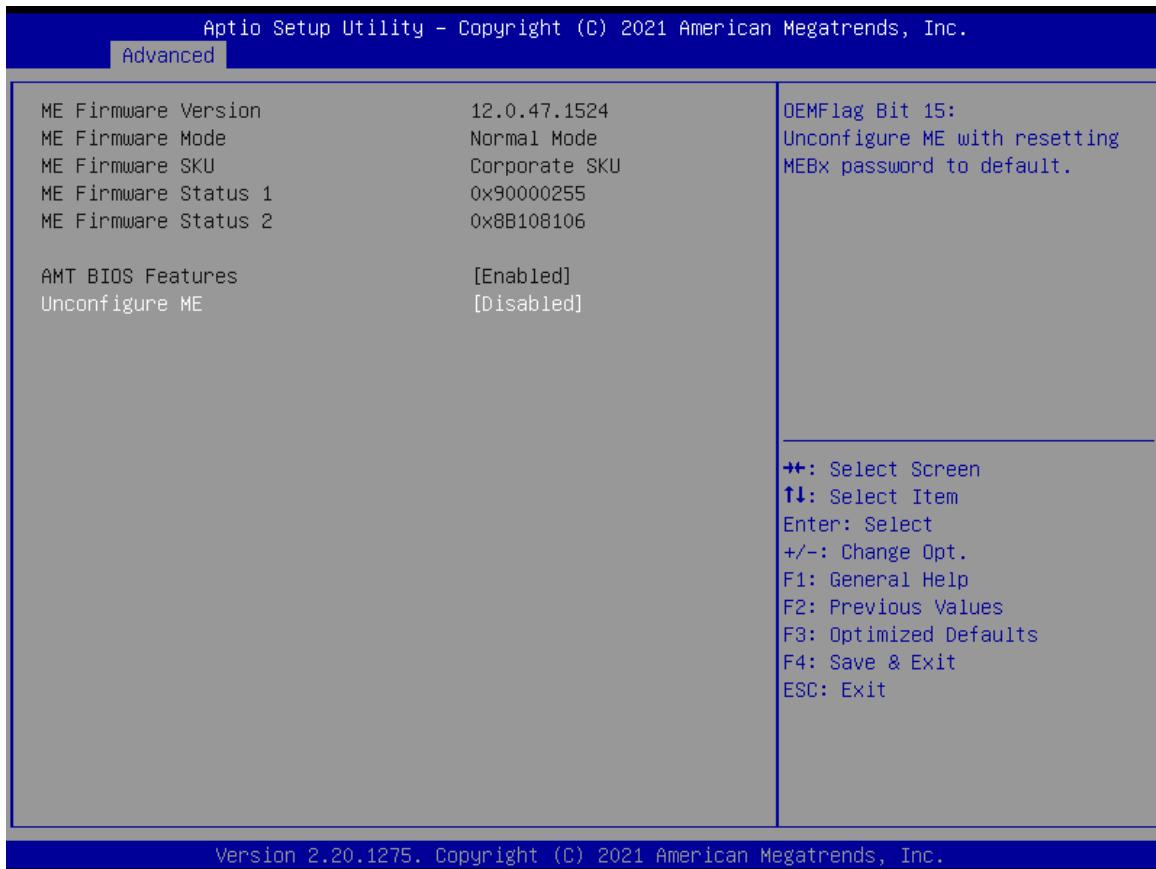
Item	Options	Description
CNVi Mode	Disable Integrated, Auto Detection[Default]	This option configures Connectivity. [Auto Detection] means that if Discrete solution is discovered it will be enabled by default. Otherwise Integrated solution (CNVi) will be enabled; [Disable Integrated] disables Integrated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

4.3.2 CPU Configuration



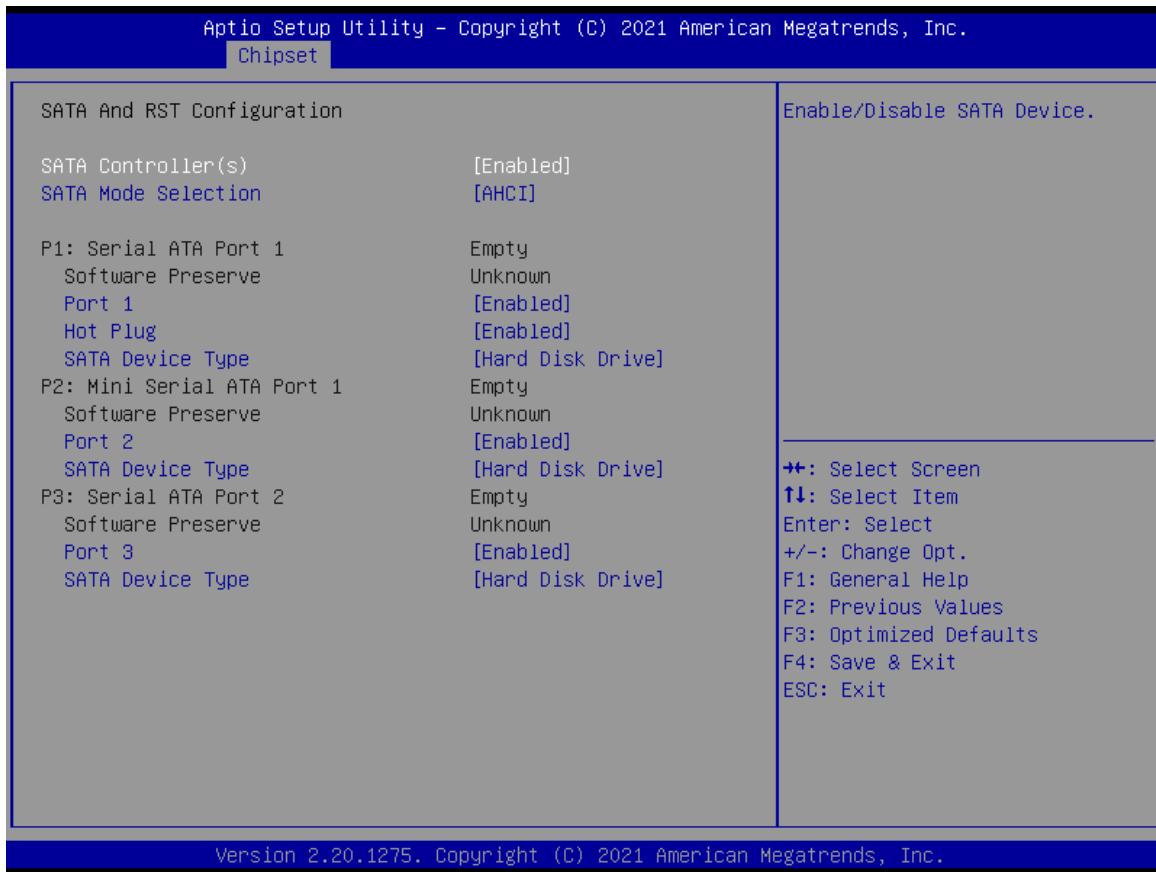
Item	Options	Description
Intel (VMX) Virtualization Technology	Disabled, Enabled[Default]	When enabled, a VMM can utilize the additional hardware capabilities provided by Virtualization Technology.
Active Processor Cores	All[Default] 1 2 3	Number of cores to enable in each processor package.
Hyper-Threading	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 SpeedStep	Disabled, Enabled[Default]	This item allows you to enable or disable the Intel SpeedStep.
Turbo Mode	Disabled, Enabled[Default]	This item allows you to enable or disable the 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.

4.3.3 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	OEMFlag Bit 15: Unconfigure ME with resetting MEBx password to default.

4.3.4 SATA and RST Configuration

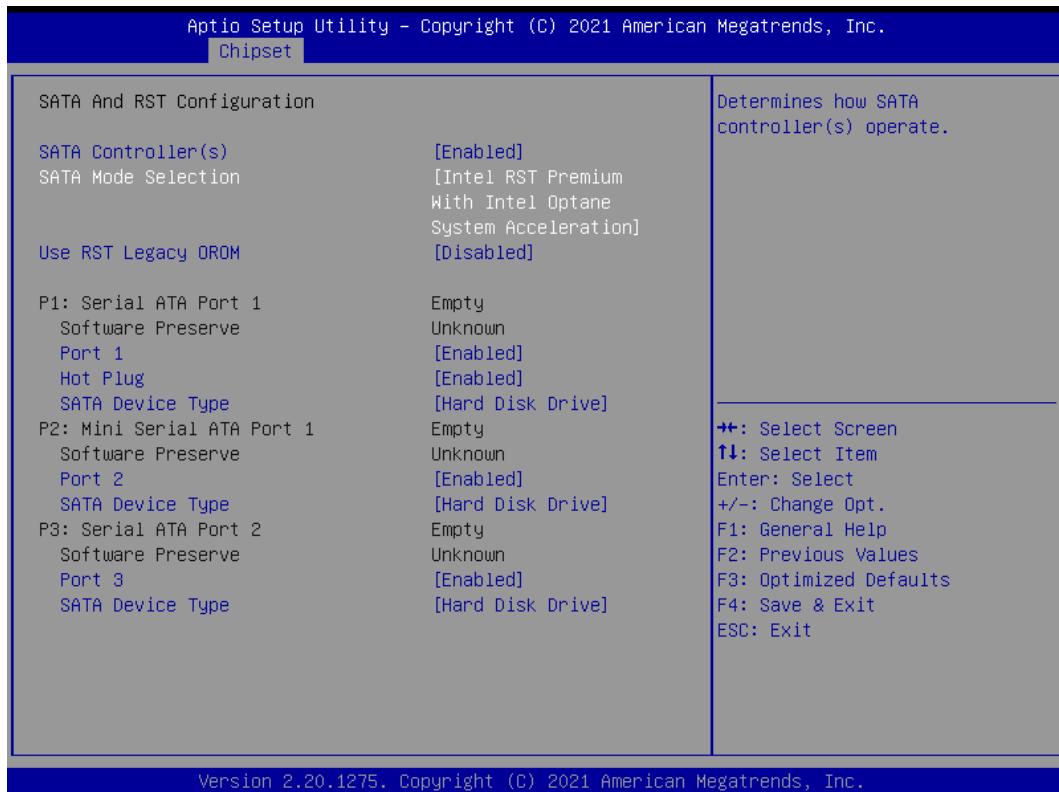


Item	Options	Description
SATA Controller(s)	Disabled, Enabled [Default]	Enable/Disable SATA Device.
SATA Mode Selection	AHCI[Default] , Intel RST Premium With Intel Optane System Acceleration	Determines how SATA controller(s) operate.
Use RST Legacy OROM	Disabled [Default] , Enabled	Use RST Legacy OROM when CSM is Enabled. Note: When you see the POST screen, Please press <CTRL-I> to into Legacy RAID setting interface.
Port1 ~3	Disabled, Enabled [Default]	Enable/Disable SATA Port.
SATA Device Type	Hard Disk Drive Solid State Drive [Default]	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.
Hot Plug	Disabled, Enabled [Default]	Designates this port as Hot Pluggable.

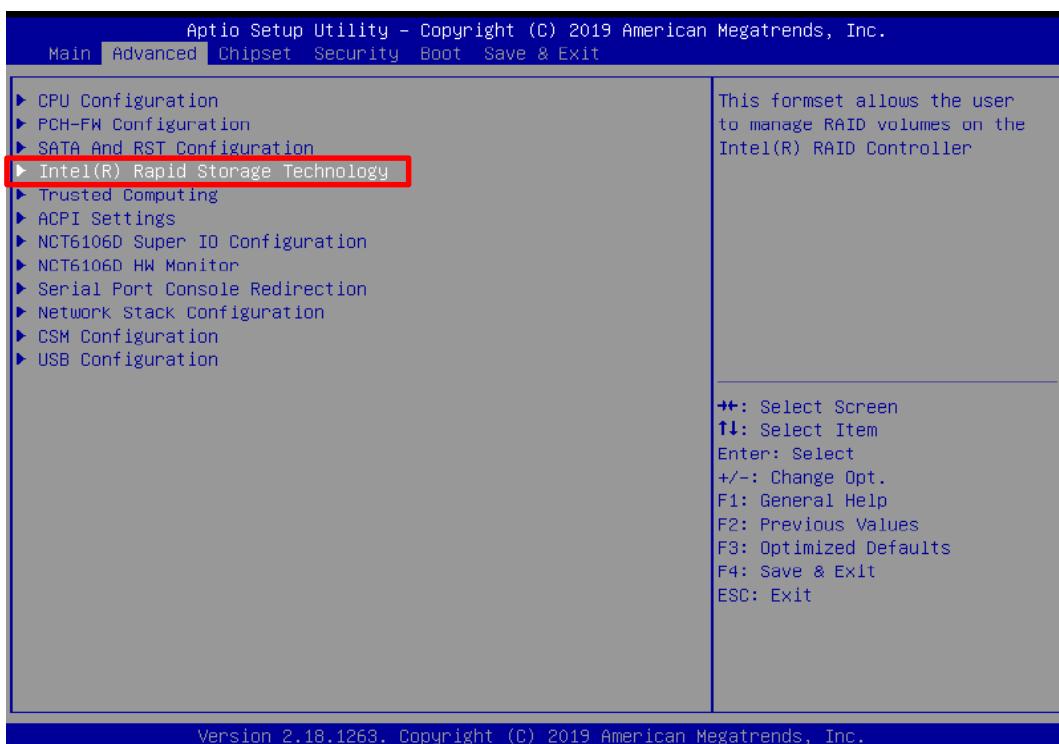
4.3.5 RST (UEFI RAID) Configuration

How to set the UEFI RAID:

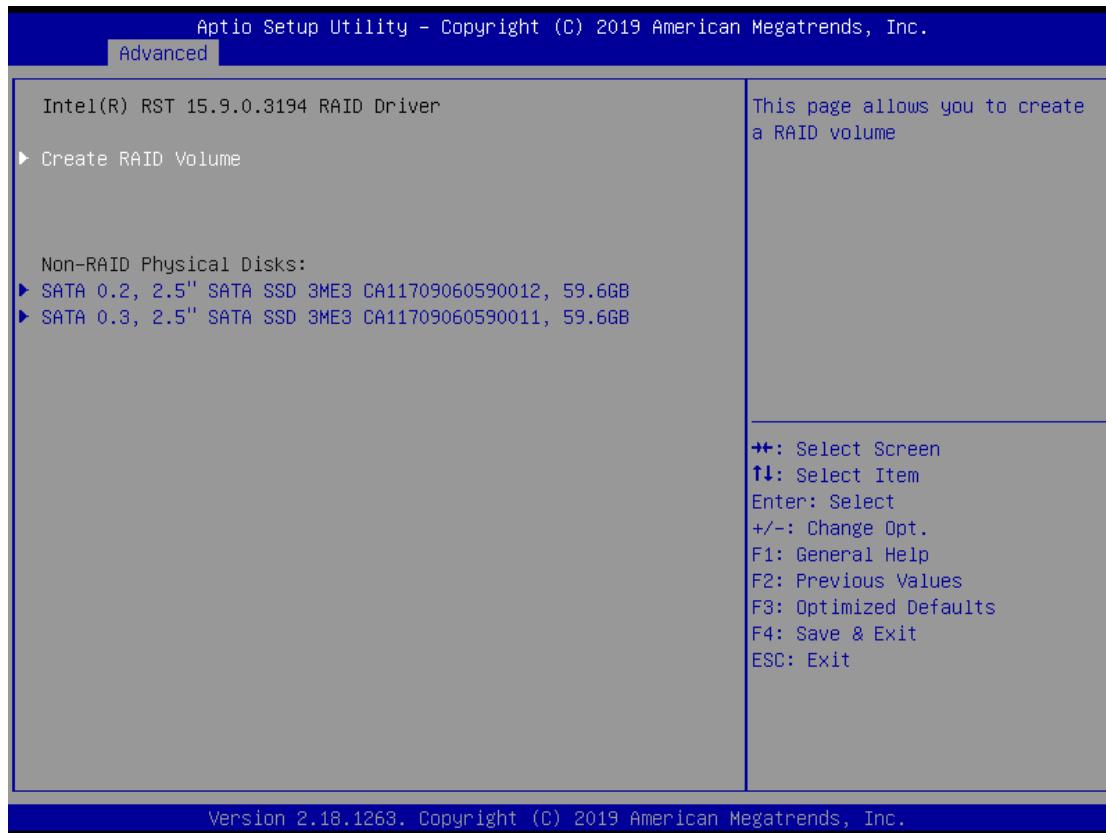
- When set to “Intel RST Premium With Intel Optane System Acceleration”, please save change reset system.



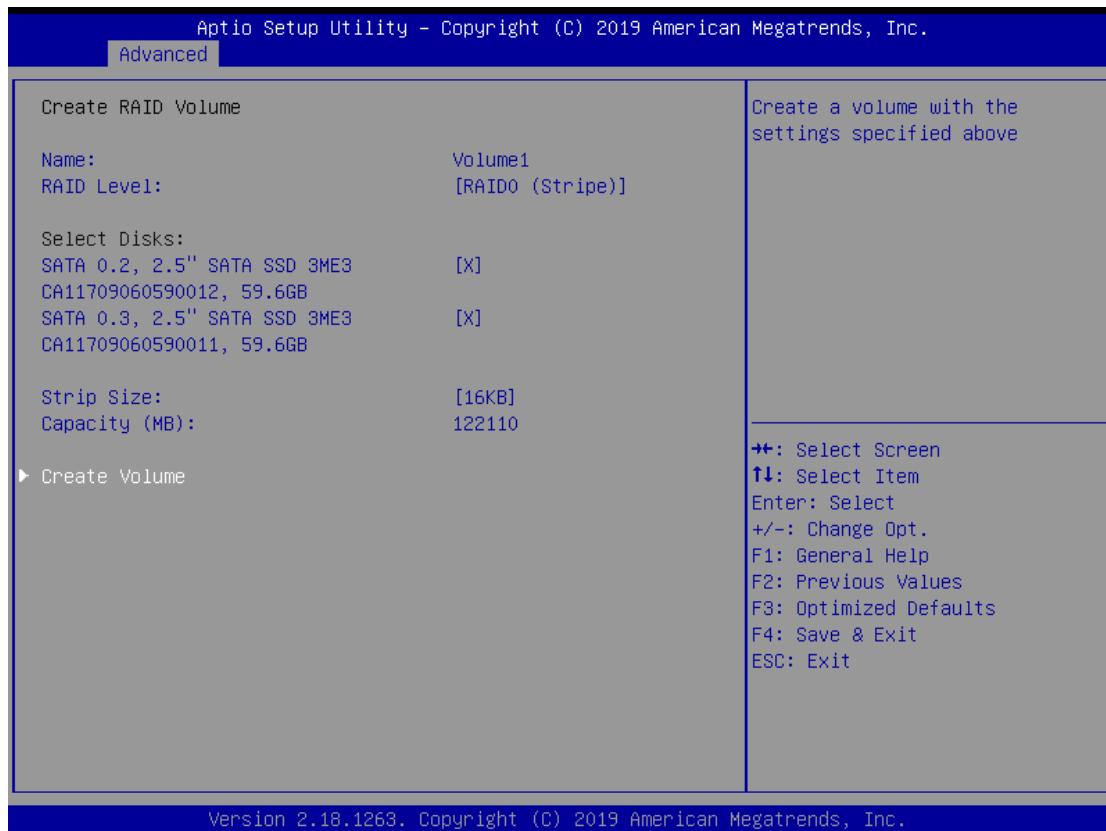
- After reboot the system, please into BIOS utility and then will see “Intel (R) Rapid Storage Technology”



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

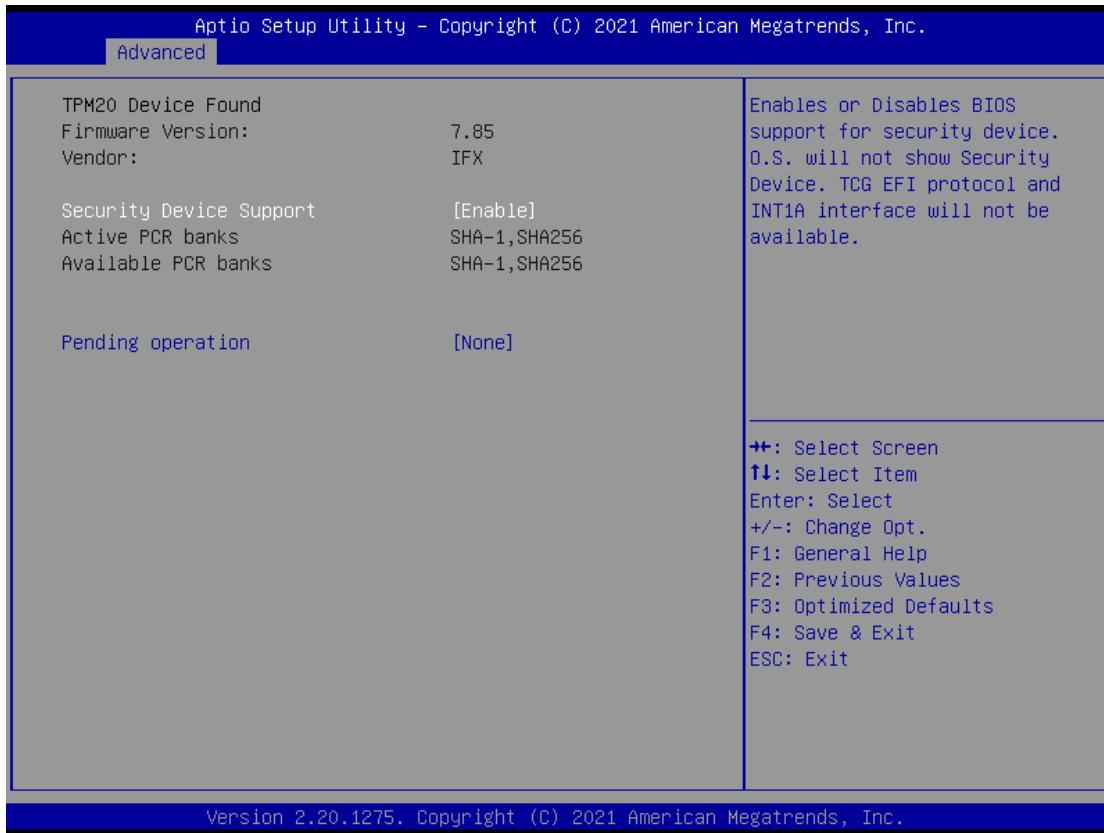


4. Start Create the RAID



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

4.3.6 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.

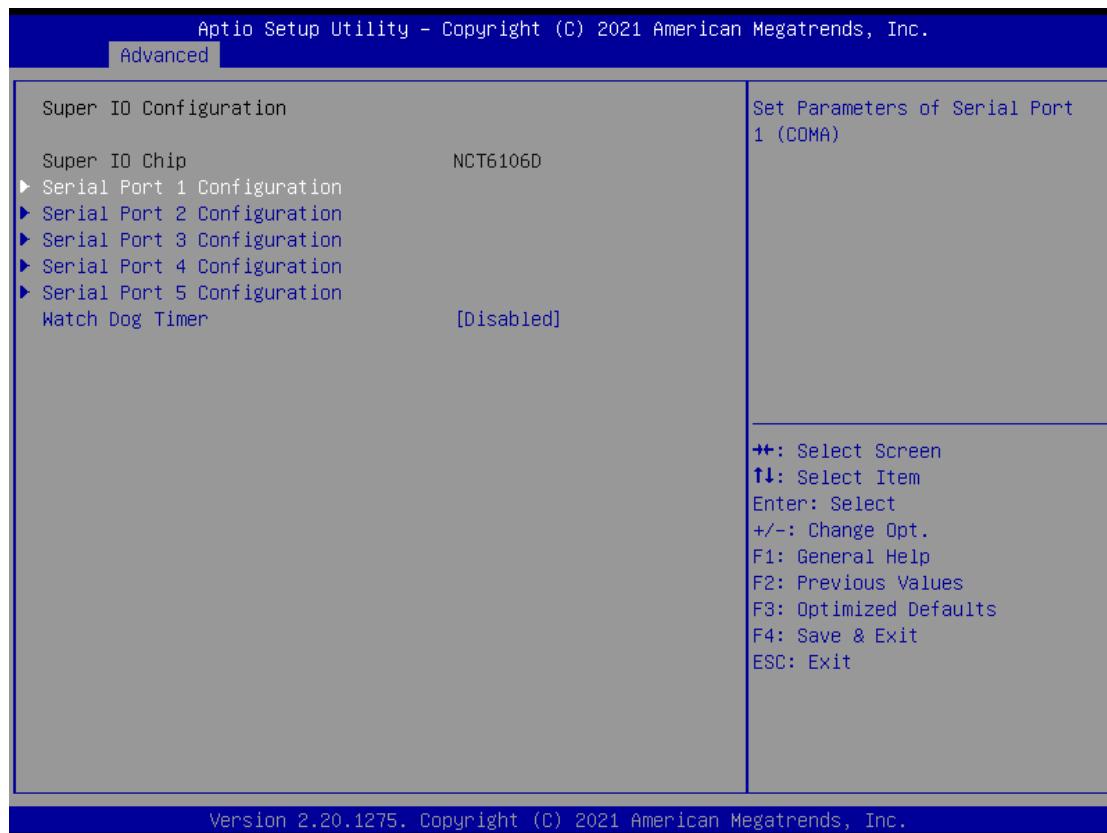
4.3.7 ACPI Settings



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 SUSPEND button is pressed.

4.3.8 Super IO Configuration

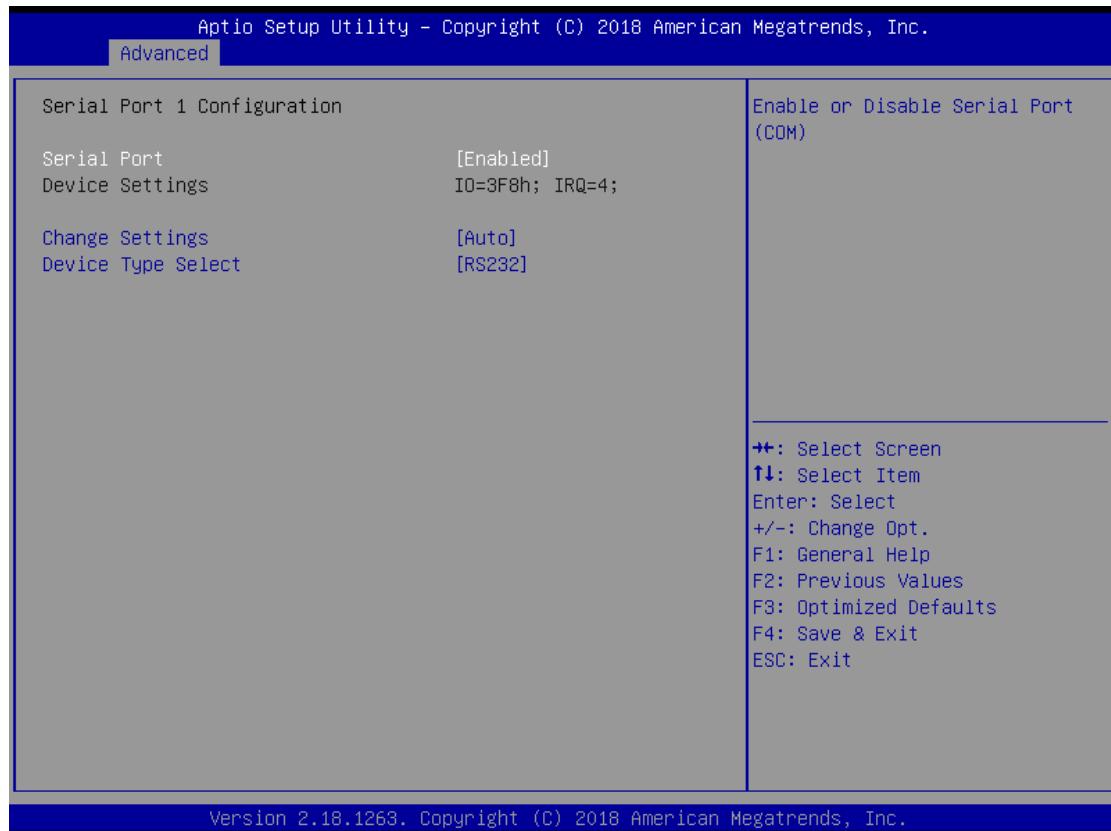
This setting allows you to select options for the Super IO Configuration, and change the value of the selected option.



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).

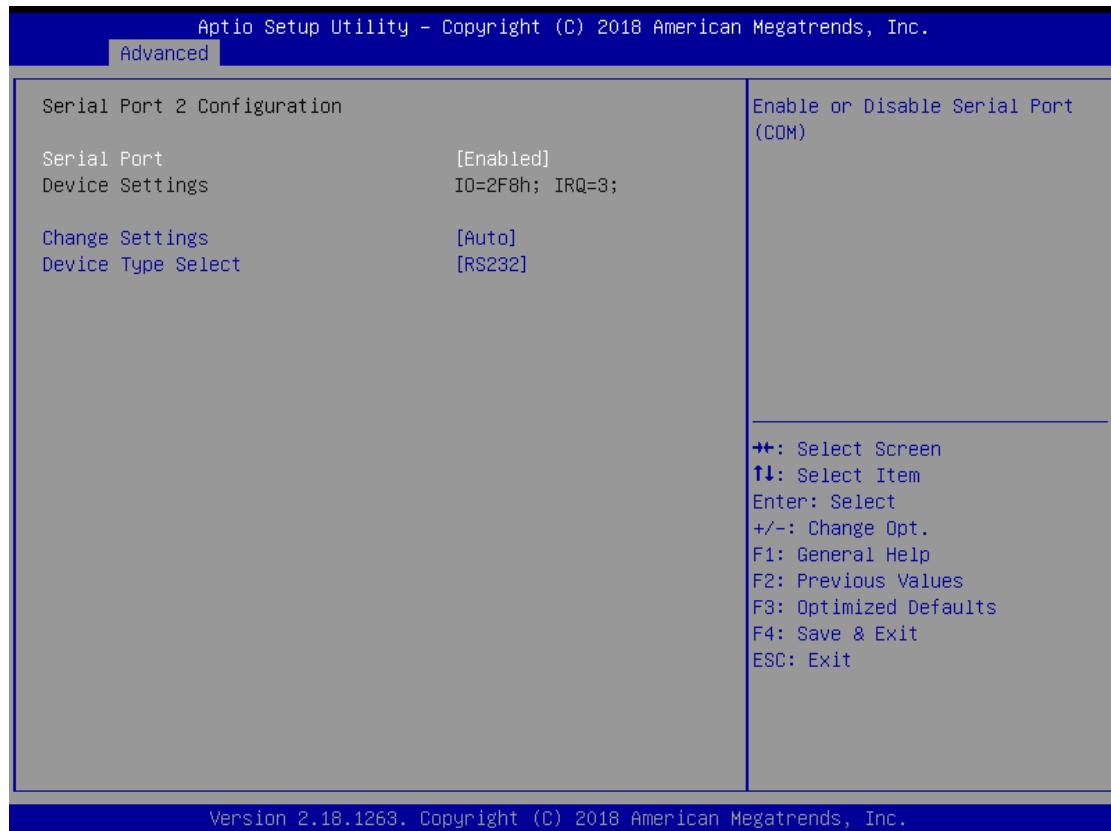
Item	Options	Description
Watch Dog Timer	Disabled [Default], Enabled	Enabled or Disabled Watch Dog Timer function.
Watch Dog Timer Count Mode	Second Mode [Default], Minute Mode	Select Second Mode or Minute Mode.
Watch Dog Timer Time out Value	20~255(Second)[Default], 1~255(Minute)	Watch Dog Timer Time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

■ Serial Port 1 Configuration



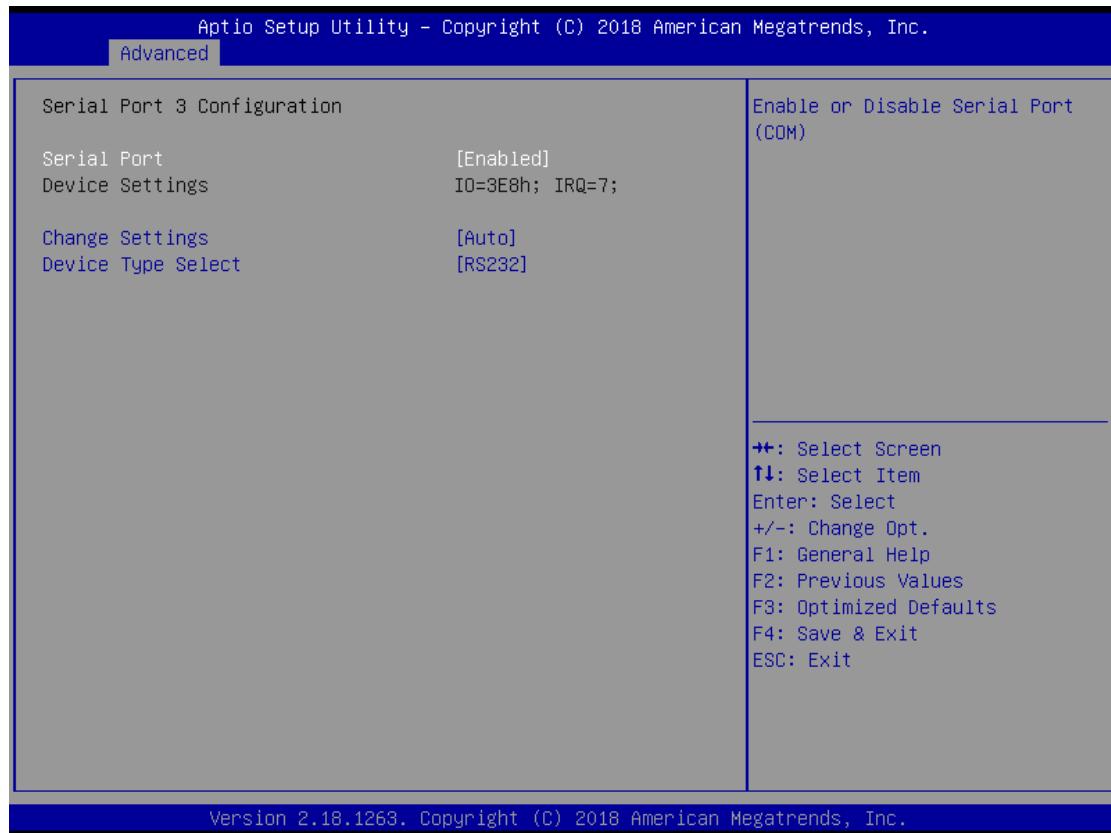
Item	Options	Description
Serial Port	Disabled, Enabled [Default]	Enable or Disable Serial Port (COM).
Change Settings	Auto [Default] , IO=3F8h; IRQ=4; , IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; , IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; , IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;	This item allows you to change the address & 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

■ Serial Port 2 Configuration



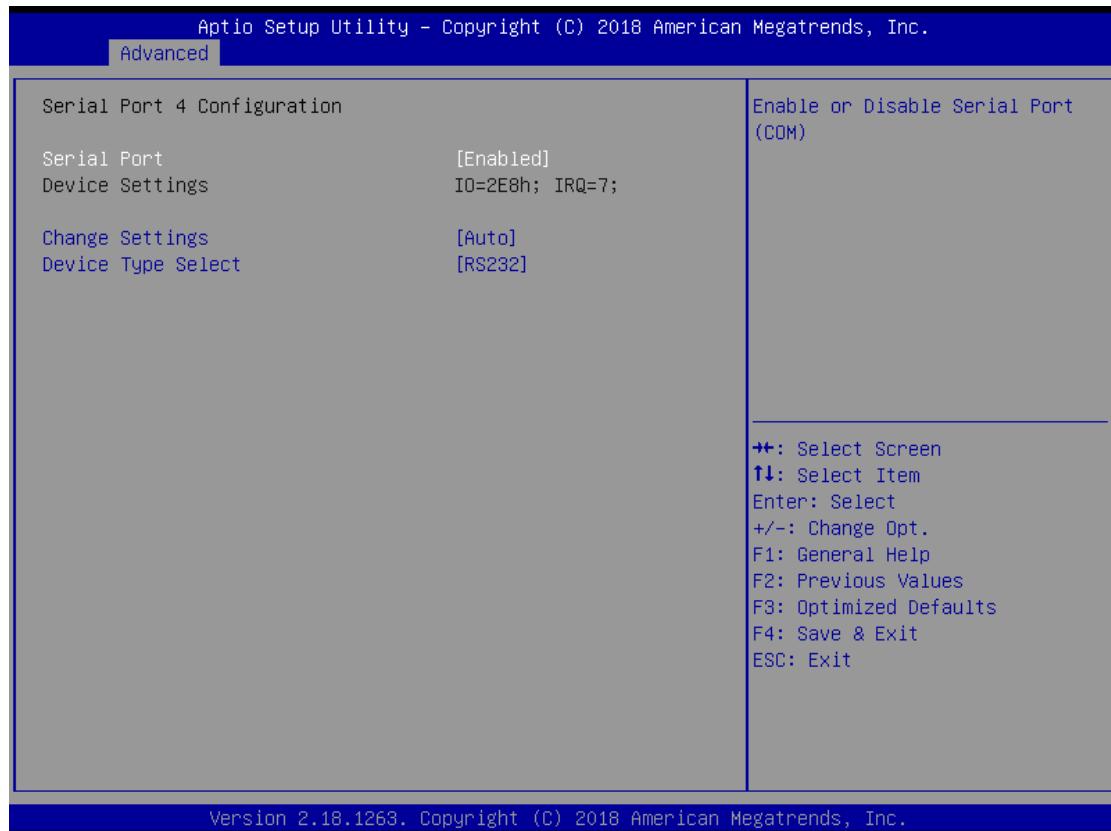
Item	Options	Description
Serial Port	Disabled, Enabled[Default]	Enable or Disable Serial Port (COM).
Change Settings	Auto[Default], IO=2F8h; IRQ=3; , IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; , IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; , IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; , IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;	This 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

■ Serial Port 3 Configuration



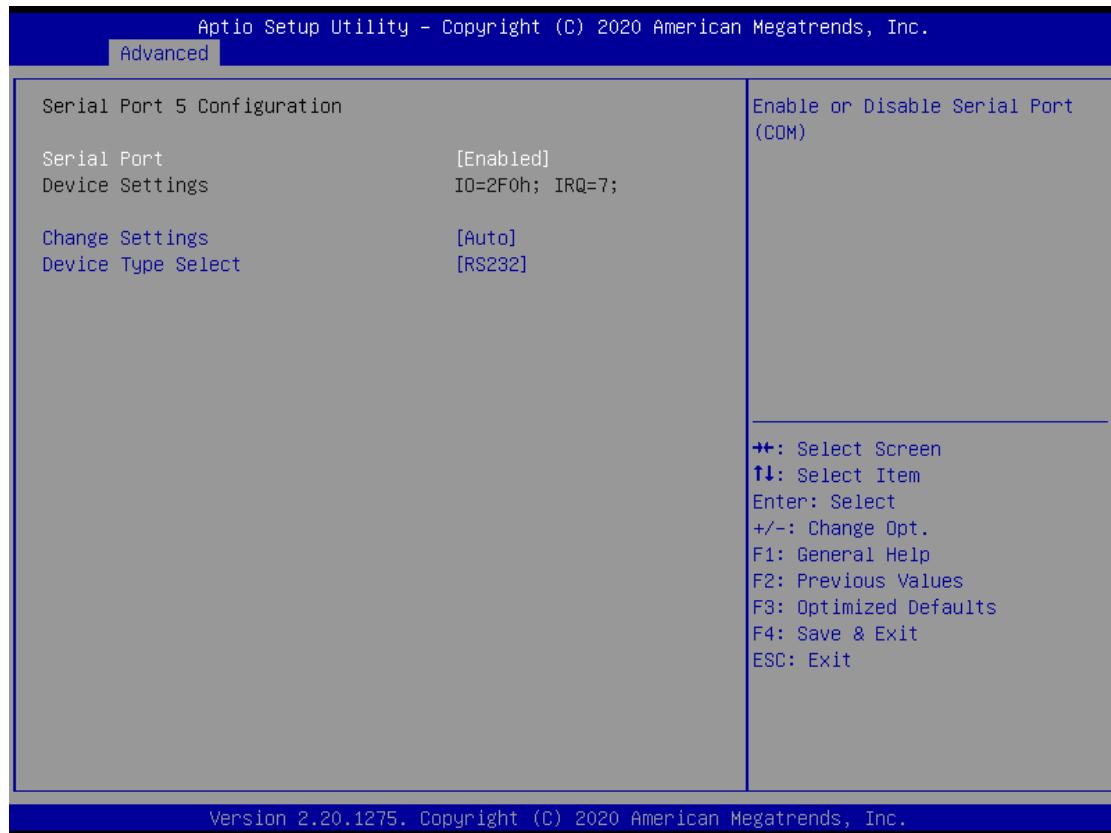
Item	Options	Description
Serial Port	Disabled, Enabled [Default]	Enable or Disable Serial Port (COM).
Change Settings	Auto [Default] , IO=3E8h; IRQ=7; , IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; , IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12; , IO=2F0h; IRQ=3,4,5,6,7,9,10,11,12; , IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12;	This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

■ Serial Port 4 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.
Device Type Select	UART 232 [Default] , UART 422, UART 485	Set the Serial Port to RS232 & RS422 & RS485

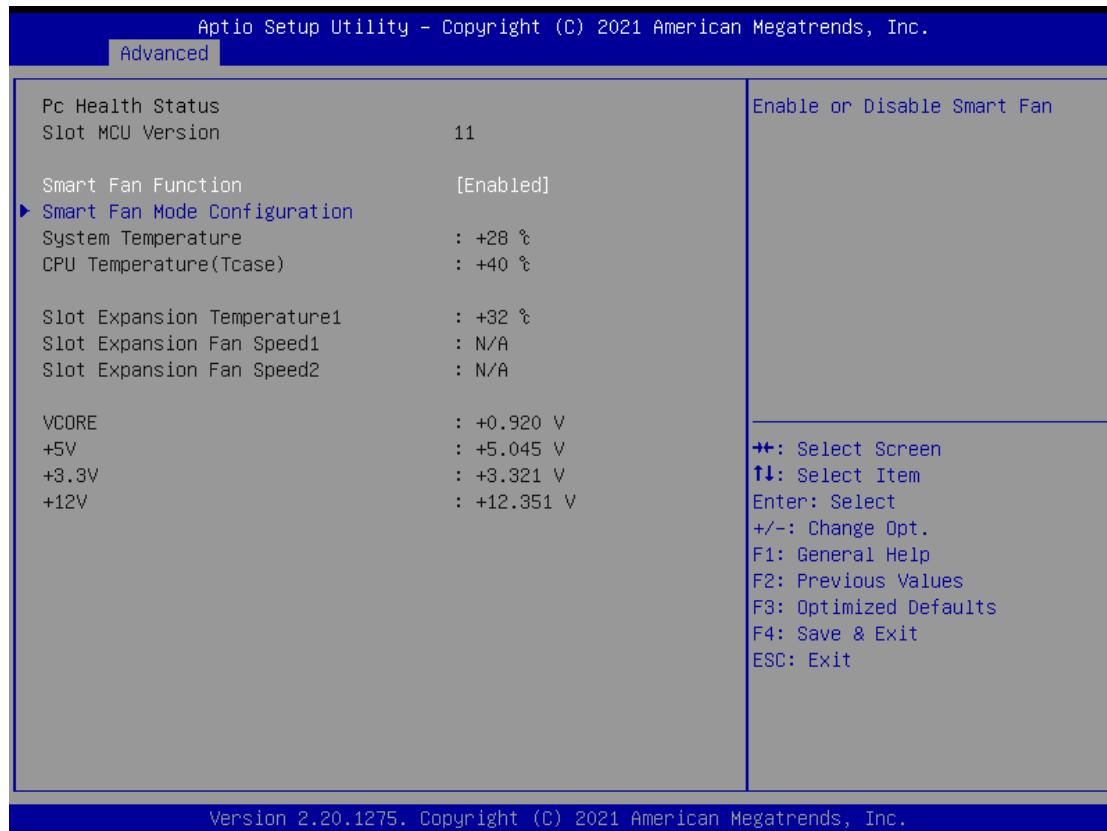
■ Serial Port 5 Configuration



Item	Options	Description
Serial Port	Disabled, Enabled [Default]	Enable or Disable Serial Port (COM).
Change Settings	Auto [Default] , IO=2F0h; IRQ=7; , IO=2E8h; 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

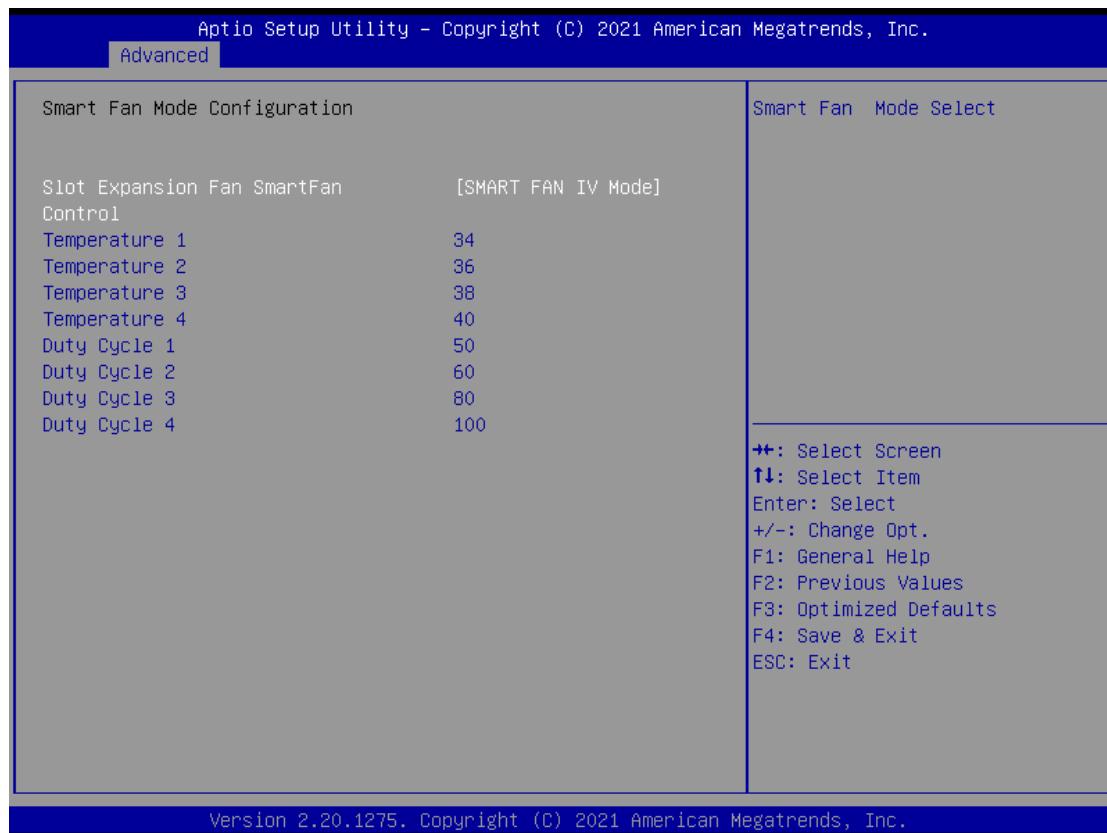
4.3.9 Hardware Monitor

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



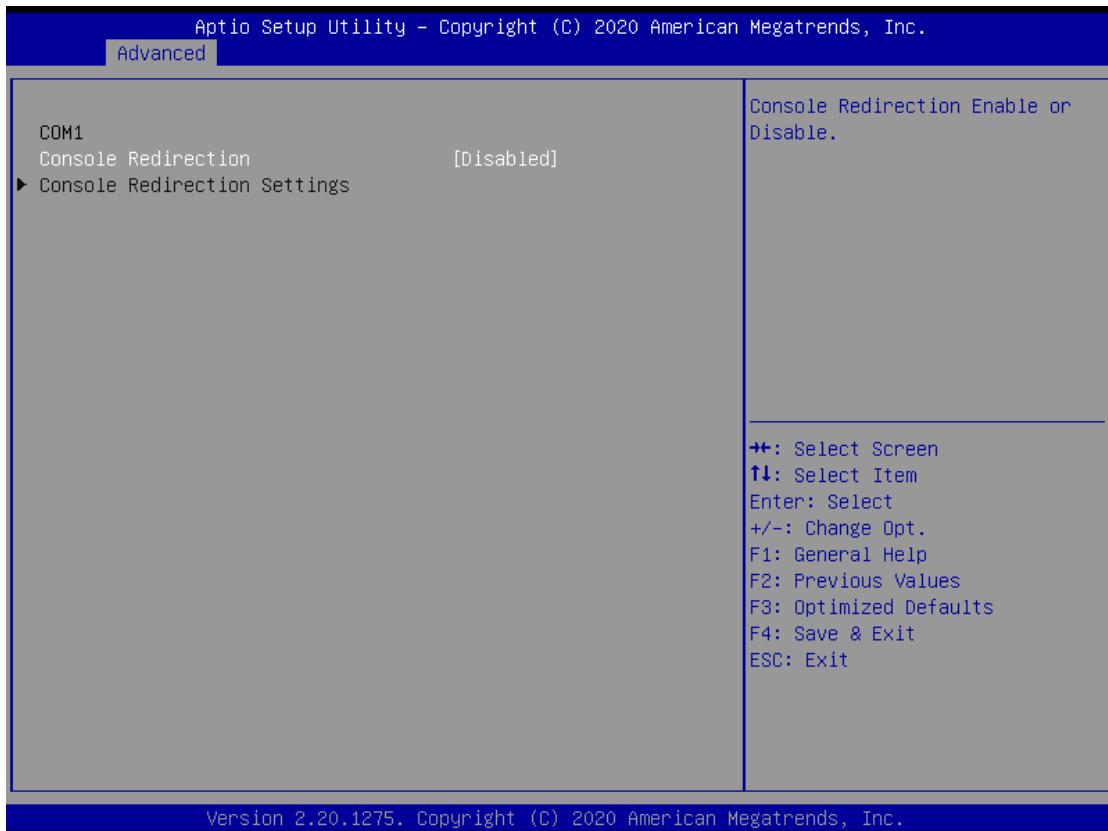
Item	Options	Description
Smart Fan Function	Disabled[Default], Enabled	Enabled or Disable Smart Fan

■ Smart Fan Mode Configuration



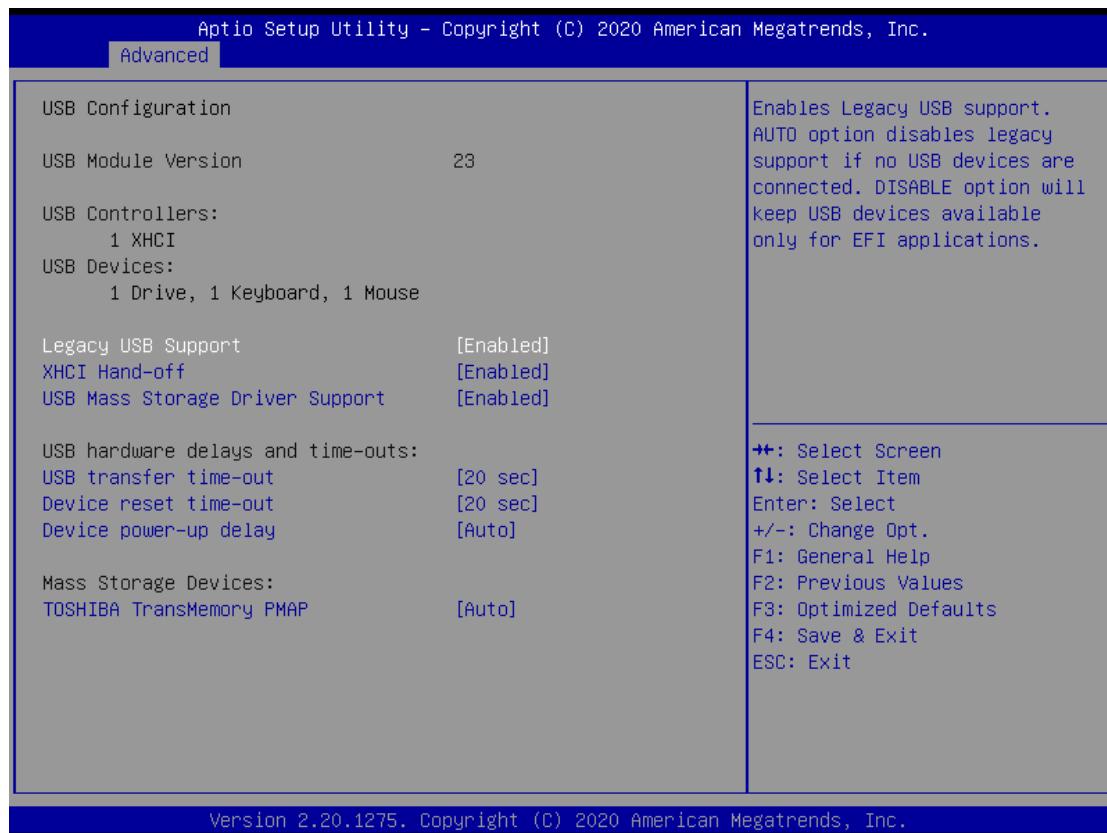
Item	Options	Description
Expansion Fan SmartFan Control	Manual Mode, SMART FAN IV Mode [Default] ,	Smart Fan Mode Select
Temperature 1~4	1~100	Auto fan speed control. SMART FAN IV
Duty Cycle 1~4	20~100	Auto fan speed control. SMART FAN IV

4.3.10 Serial Port Console Redirection



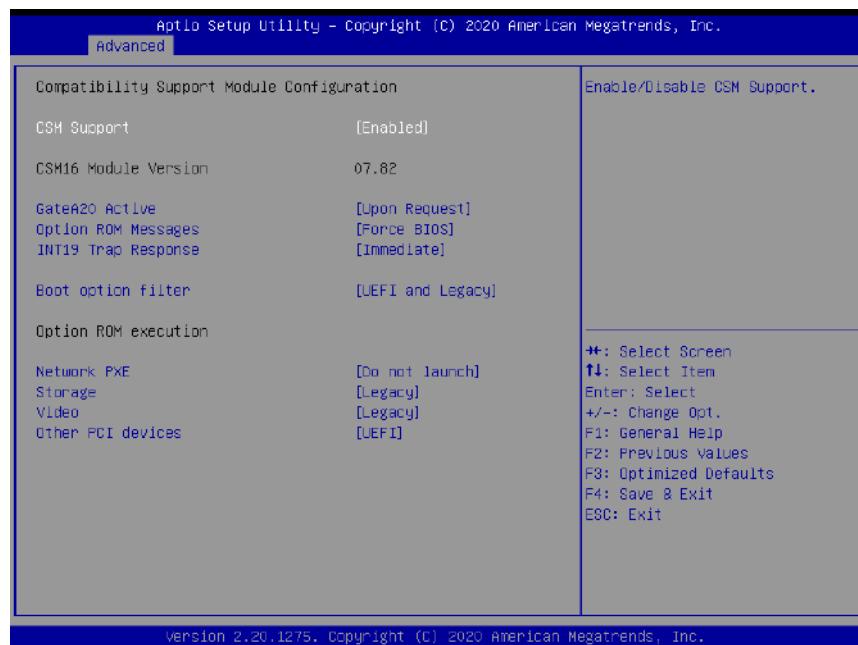
Item	Options	Description
Console Redirection	Disabled[Default], Enabled	These items allows you to enable or disable COM1 console redirection

4.3.11 USB Configuration



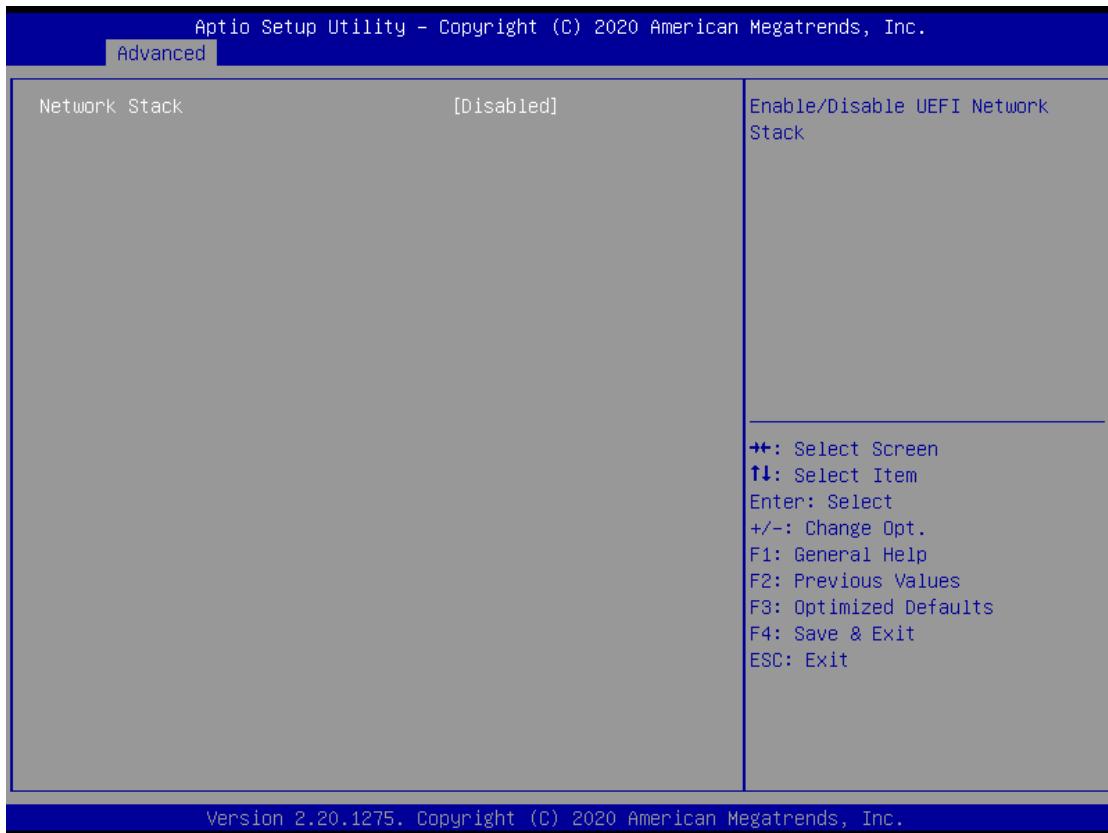
Item	Options	Description
Legacy USB Support	Enabled[Default] Disabled Auto	Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
XHCI Hand-off	Enabled[Default] Disabled	This is a workaround for OSes 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 CSM Configuration



Item	Options	Description
CSM Support	Disabled, Enabled[Default]	This item allows users to enable or disable for "CSM Support".
GateA20 Active	Upon Request[Default] , Always	This item allows users to set Upon Request or Always for "GateA20 Active".
Option ROM Messages	Force BIOS[Default] , Keep Current	This item allows users to set Force BIOS or Keep Current for "Option ROM Messages".
INT19 Trap Response	Immediate[Default] , Immediate	This item allows users to set the BIOS reaction to INT19 trapping by Option ROM: "Immediate" - execute the trap right away; "postponed" - execute the trap during legacy boot.
Boot option filter	UEFI and Legacy[Default] , Legacy only, UEFI only	This item allows users to select which type of operating system to boot by option. This item is configurable only when CSM Support is set to Enabled.
Network PXE	Do not launch[Default] , UEFI, Legacy	Controls the execution of UEFI and Legacy Video OpROM.
Storage	Do not launch, UEFI, Legacy[Default]	Controls the execution of UEFI and Legacy Storage OpROM.
Video	Do not launch, UEFI, Legacy[Default]	Controls the execution of UEFI and Legacy Video OpROM.
Other PCI devices	Do not launch, UEFI[Default] , Legacy	Determines OpROM execution policy for devices other than Network, Storage, or Video.

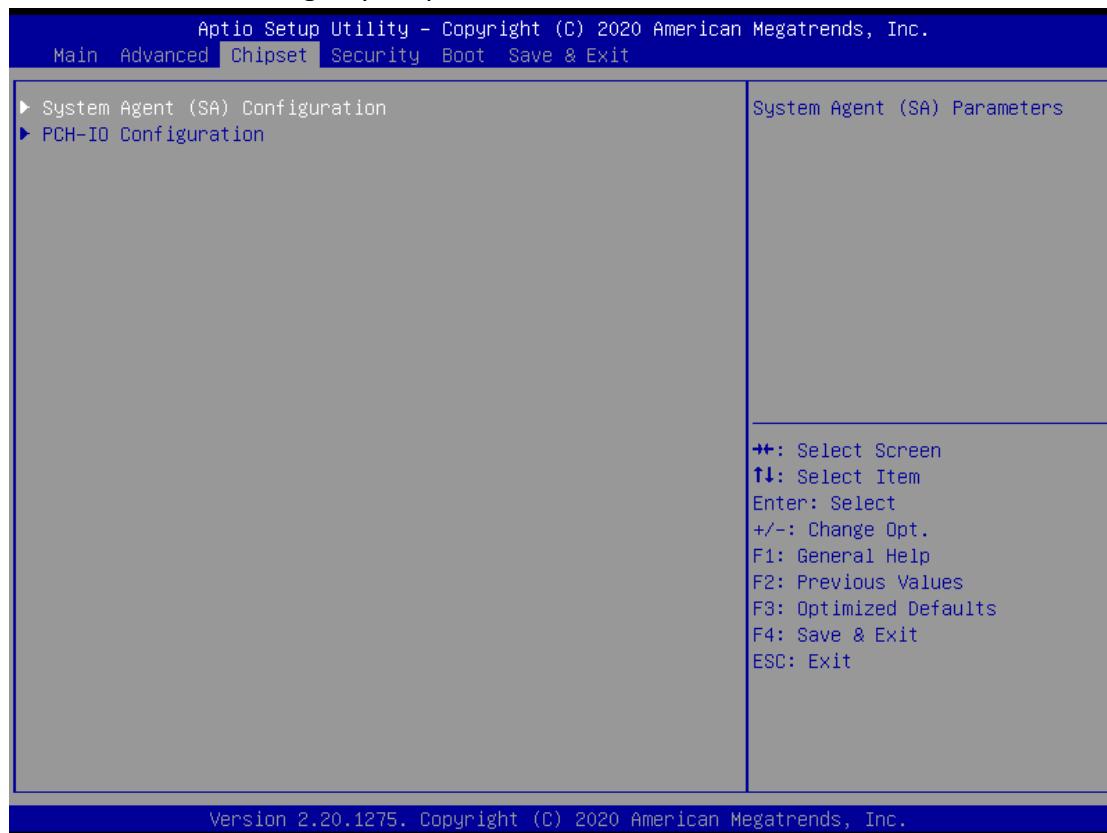
4.3.13 Network Stack Configuration



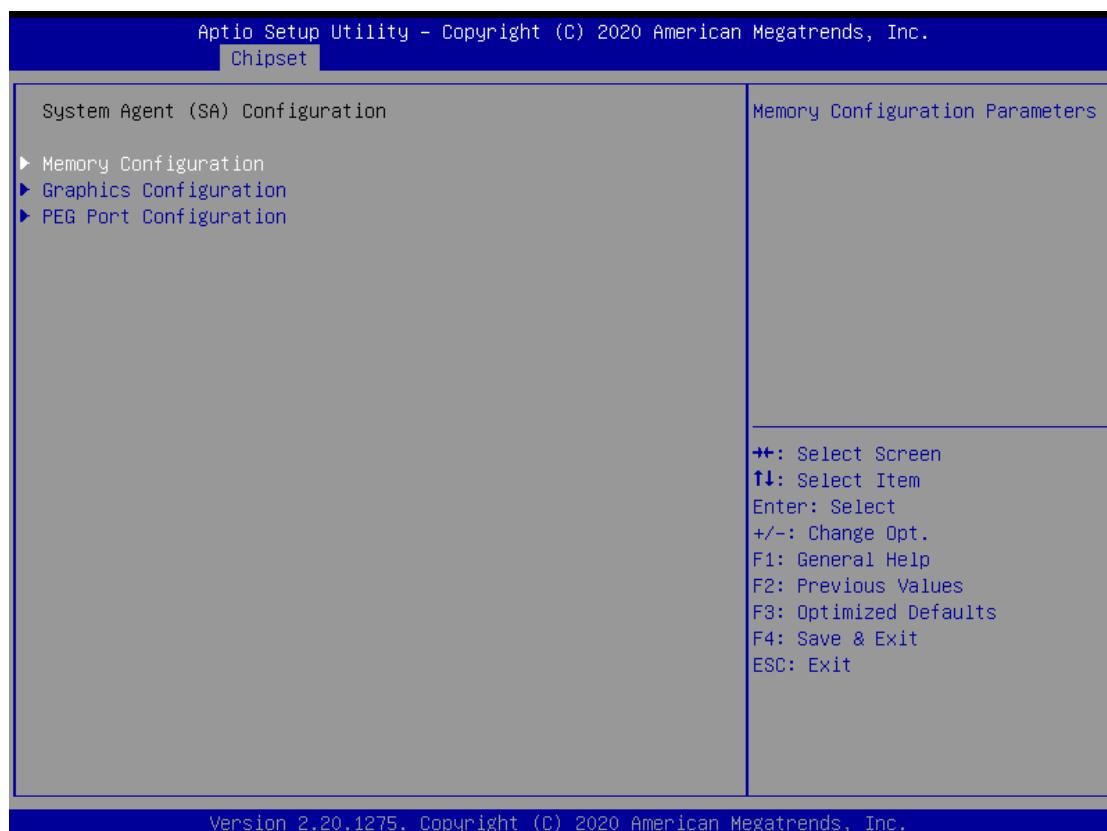
Item	Options	Description
Network Stack	Disabled[Default] , Enabled	Enable/Disable UEFI Network Stack.

4.4 Chipset

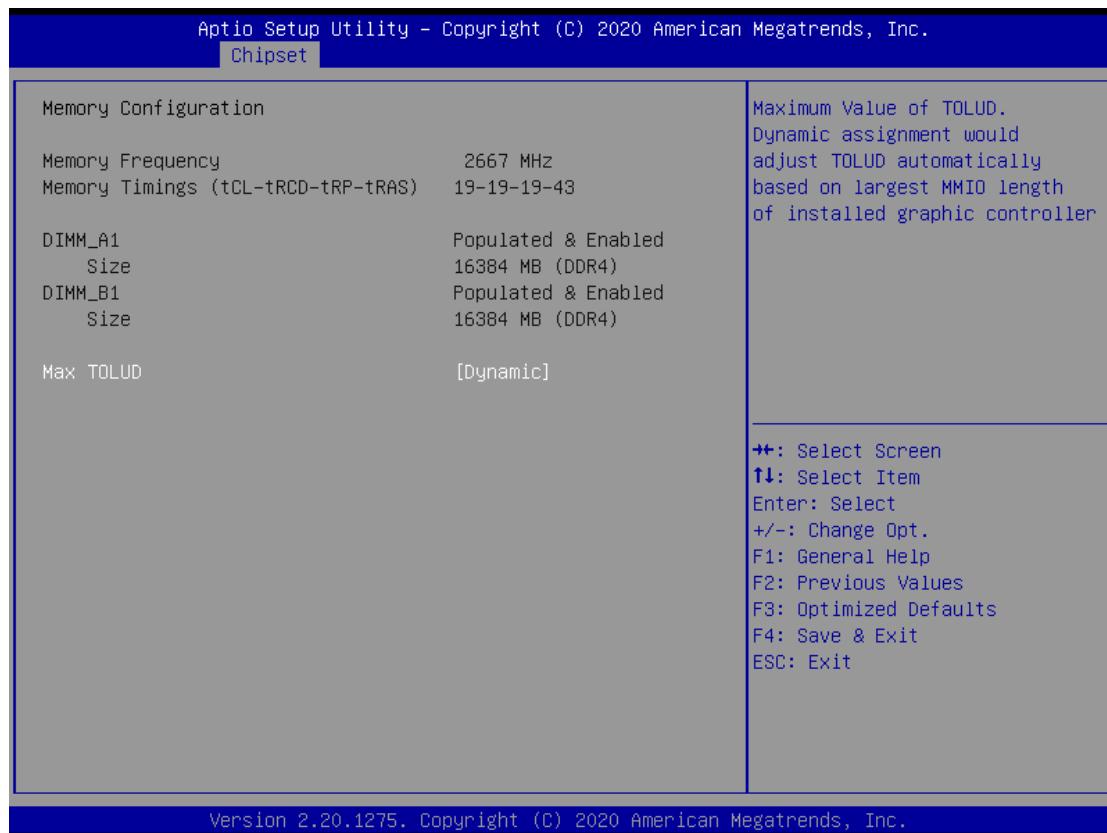
This section allows you to configure and improve your system and allows you to set up some system features according to your preference.



4.4.1 System Agent (SA) Configuration

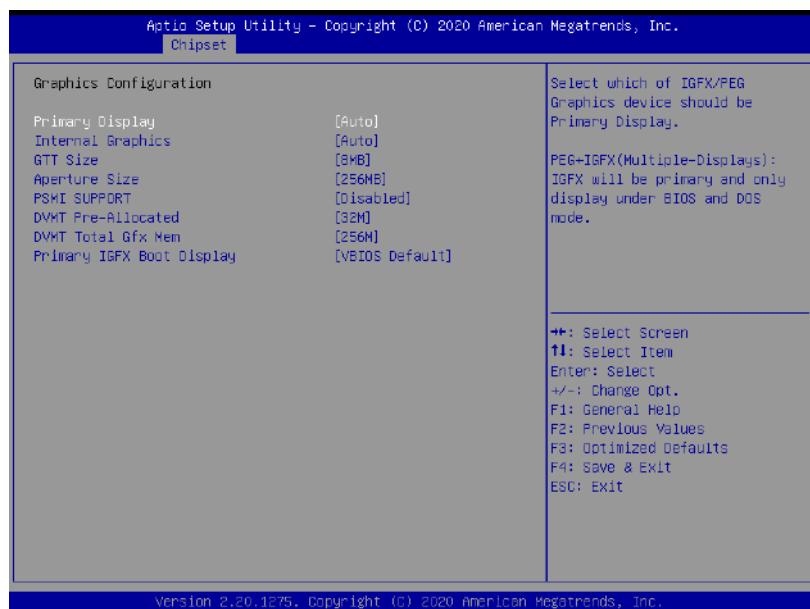


■ Memory Configuration



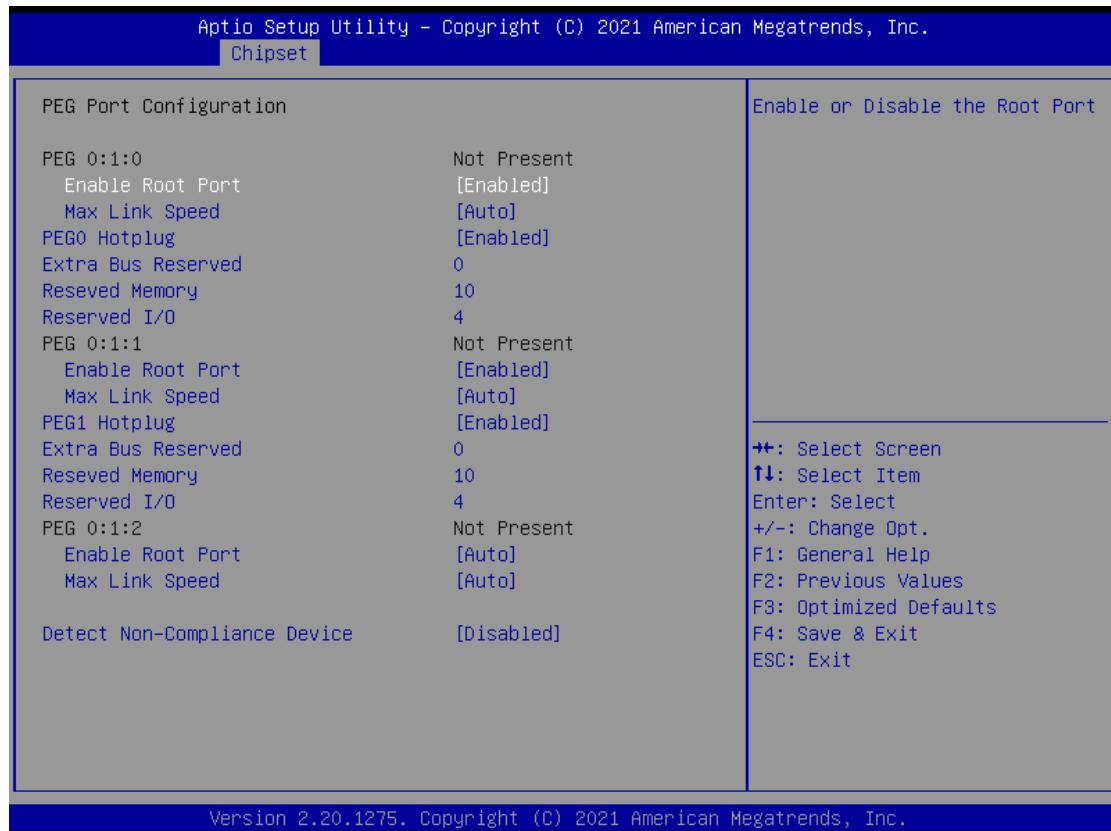
Item	Options	Description
Max TOLUD	Dynamic [Default] , 1GB, 1.25GB, 1.5 GB, 1.75 GB, 2 GB, 2.25 GB, 2.5 GB, 2.75 GB, 3 GB, 3.25 GB, 3.5 GB	Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller

■ Graphic Configuration



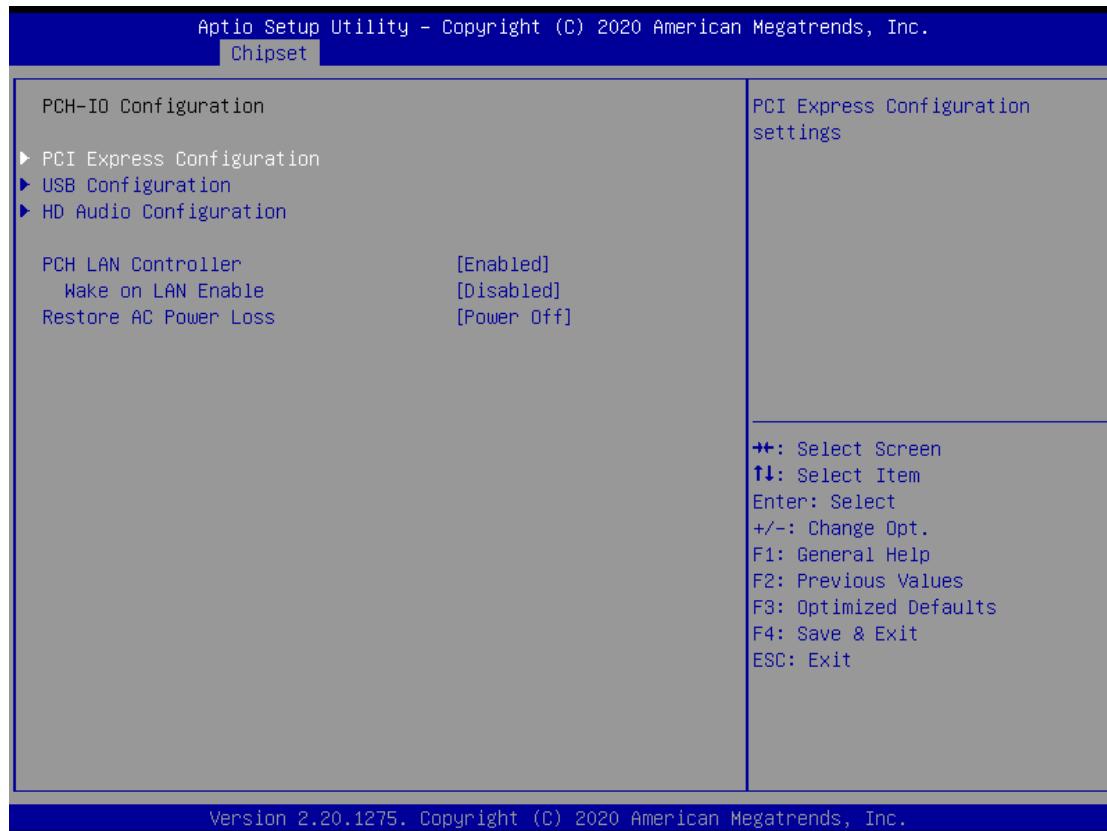
Item	Options	Description
Primary Display	Auto[Default] , PEG + IGFX	Select which of IGFX/PEG Graphics device should be Primary Display. PEG+IGFX(Multiple-Displays): IGFX will be primary and only display under BIOS and DOS mode.
Internal Graphics	Auto[Default] , Disabled, Enabled	Keep IGFX enabled based on the setup options.
GTT Size	2MB, 4MB, 8MB[Default]	Select the GTT Size .
Aperture Size	128MB, 256MB[Default] , 512MB, 1024MB, 2048MB	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.
PSMI SUPPORT	Disabled [Default] , Enabled	PSMI Enable/Disable.
DVMT Pre-Allocated	32M [Default] , 64M,4M,8M, 12M,16M, 20M, 24M, 28M,32M/F7, 36M, 40M,44M, 48M,52M,56M,60M	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.
Primary IGFX Boot Display	VBIOS Default[Default] , DP2, CRT, DVI, DP1	Select the Video Device which will be activated during POST. This has no effect if external graphics present. Secondary boot display selection will appear based on your selection.VGA modes will be supported only on primary display

■ PEG Port Configuration



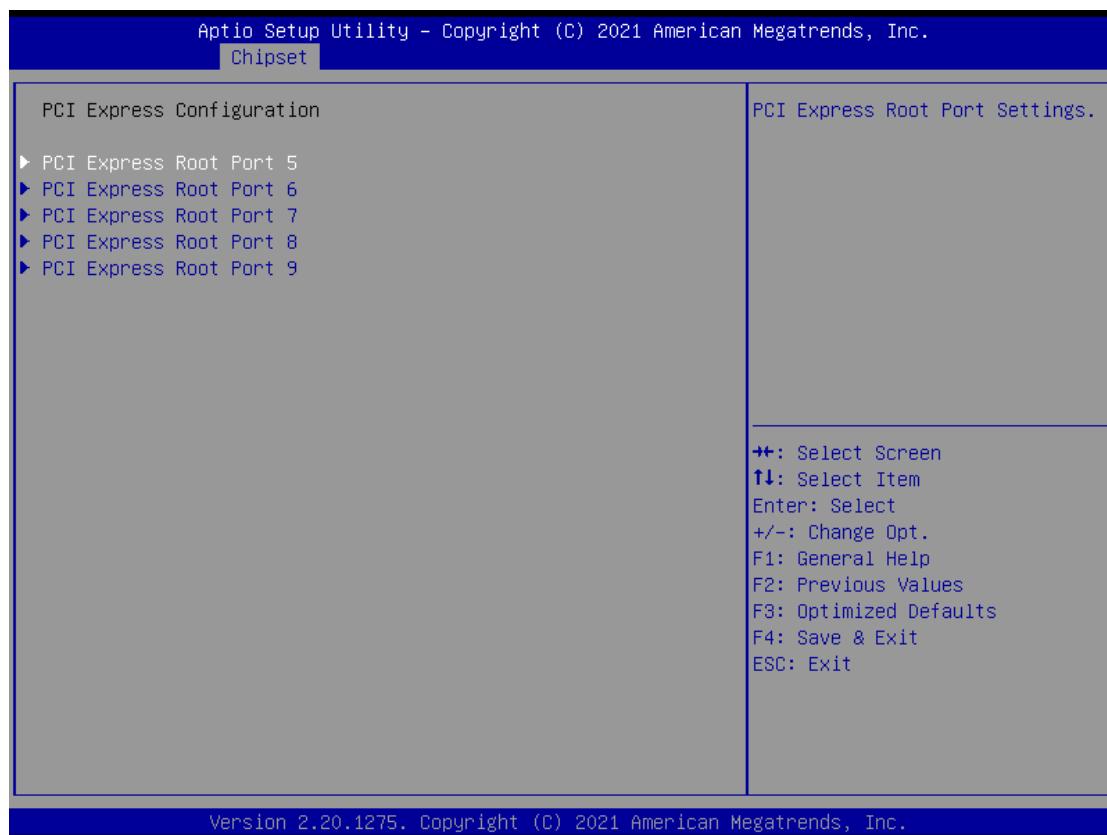
Item	Options	Description
Enable Root Port	Enabled[Default] , Disabled	Enable or Disable the Root Port
Max Link Speed	Auto[Default] , Gen1, Gen3, Gen3,	Configure PEG 0:X:X Max Speed
PEG0 Hotplug	Disabled[Default] , Enabled,	PCI Express Hot Plug Enable/Disable
Extra Bus Reserved	(0-7)	Extra Bus Reserved (0-7) for bridges behind this Root Bridge.
Reseved Memory	(1-4096)	Reserved Memory for this Root Bridge (1-4096) MB
Reserved I/O	(4K/8K/12K/16K/20K)	Reserved I/O (4K/8K/12K/16K/20K) Range for this Root Bridge.
Detect Non-Compliance Device	Disabled[Default] , Enabled,	Detect Non-Compliance PCI Express Device in PEG

4.4.2 PCH-IO Configuration

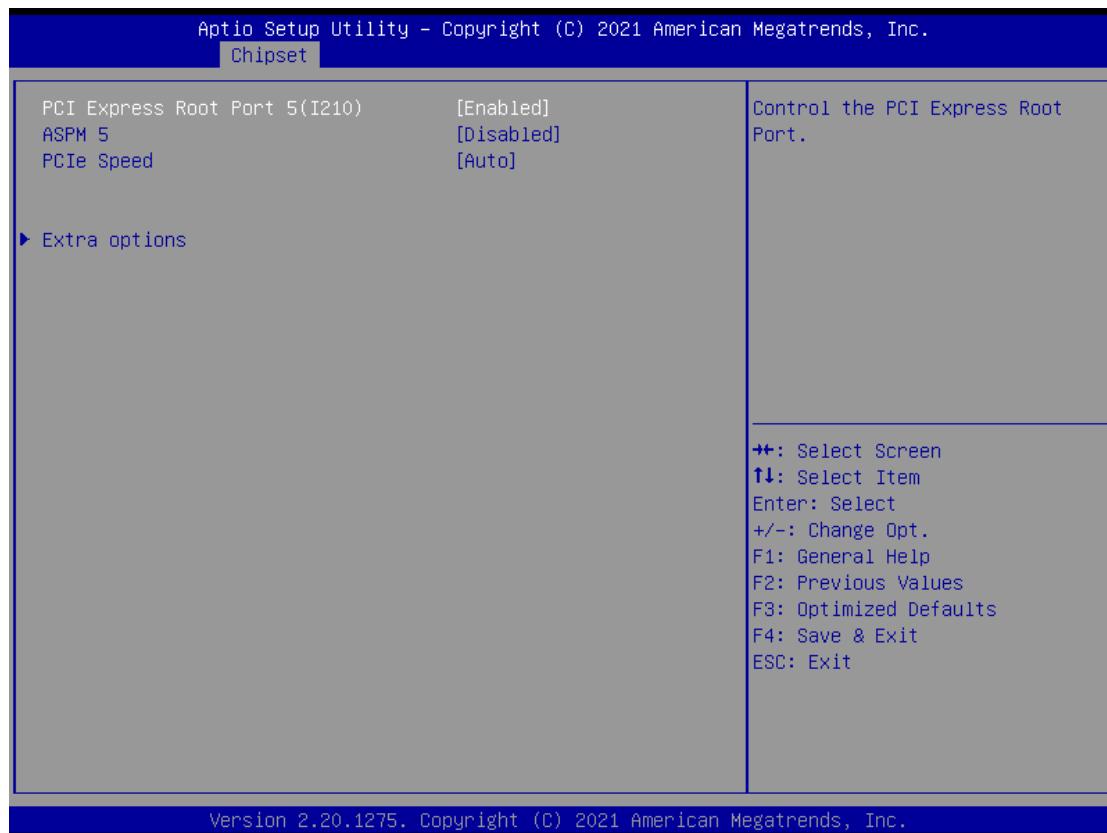


Item	Options	Description
PCH LAN Controller	Enabled [Default], Disabled	Enable/Disable onboard NIC.
Wake on LAN Enable	Enabled, Disabled [Default]	Enable/Disable integrated LAN to wake the system.
Restore AC Power Loss	Power On, Power Off [Default], Last State	Specify what state to go to when power is re-applied after a power failure (G3 state).

■ PCI Express Configuration

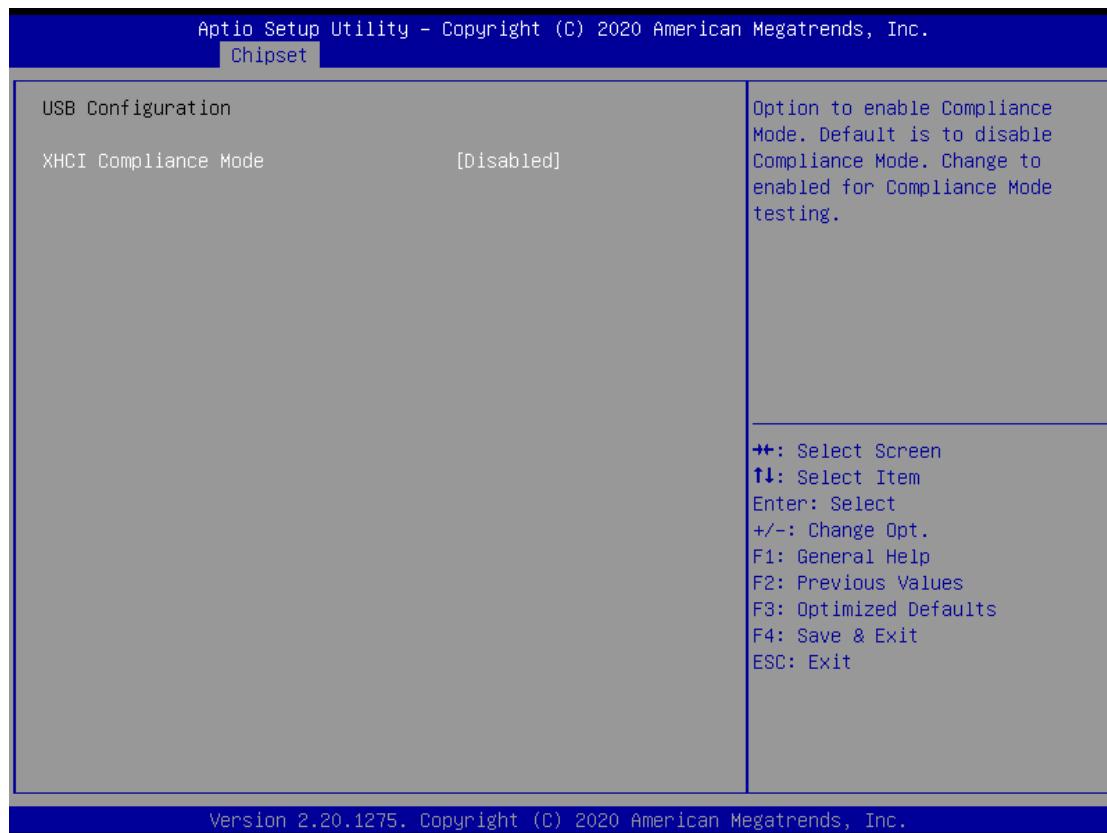


■ PCI Express Root Port 5/6/7/8/9



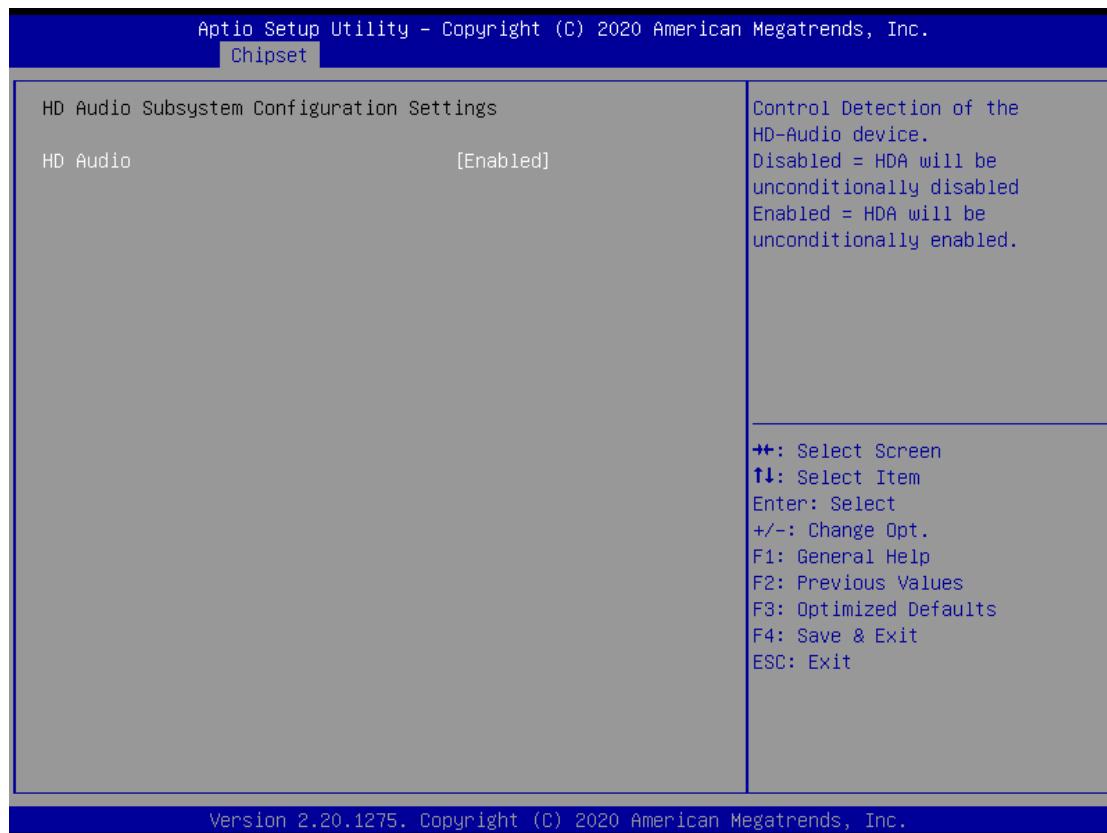
Item	Options	Description
PCI Express Root Port 5 /10 /14/15/16/19/21	Disabled [Default] , Enabled	Control the PCI Express Root Port.
ASPM	Disabled [Default] , L0s, L1, L0sL1, Auto	Set the ASPM Level: Force L0s - Force all links to L0s State, AUTO - BIOS auto configure, DISABLE - Disables ASPM,
PCIe Speed	Auto[Default] , Gen1, Gen2, Gen3	Configure PCIe speed.
Detect Non- Compliance Device	Disabled [Default] , Enabled	Detect Non-Compliance PCI Express Device. If enable, it will take more time at POST time.

█ USB Configuration



Item	Options	Description
XHCI Disable Compliance mode	Disabled [Default] , Enabled	Option to enable Compliance Mode. Default is to disable Compliance Mode. Change to enabled for Compliance Mode testing.

■ 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

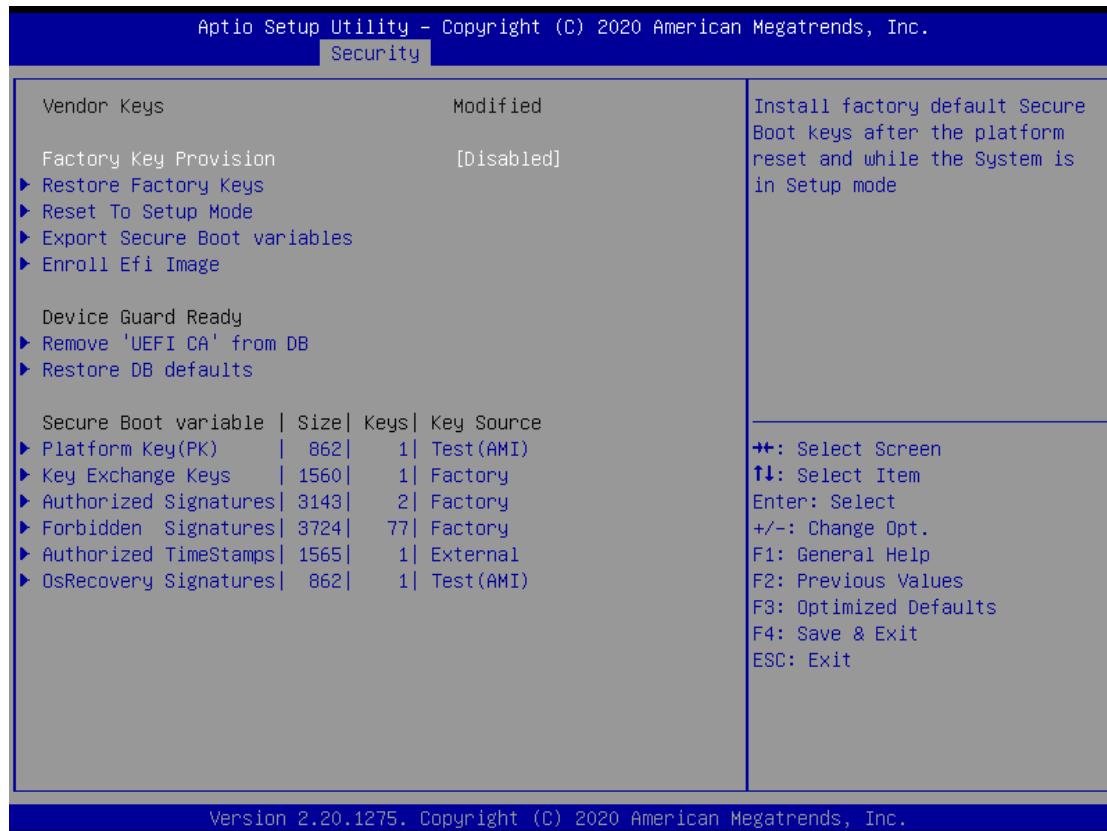
This item allows you to set User Password.

■ 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

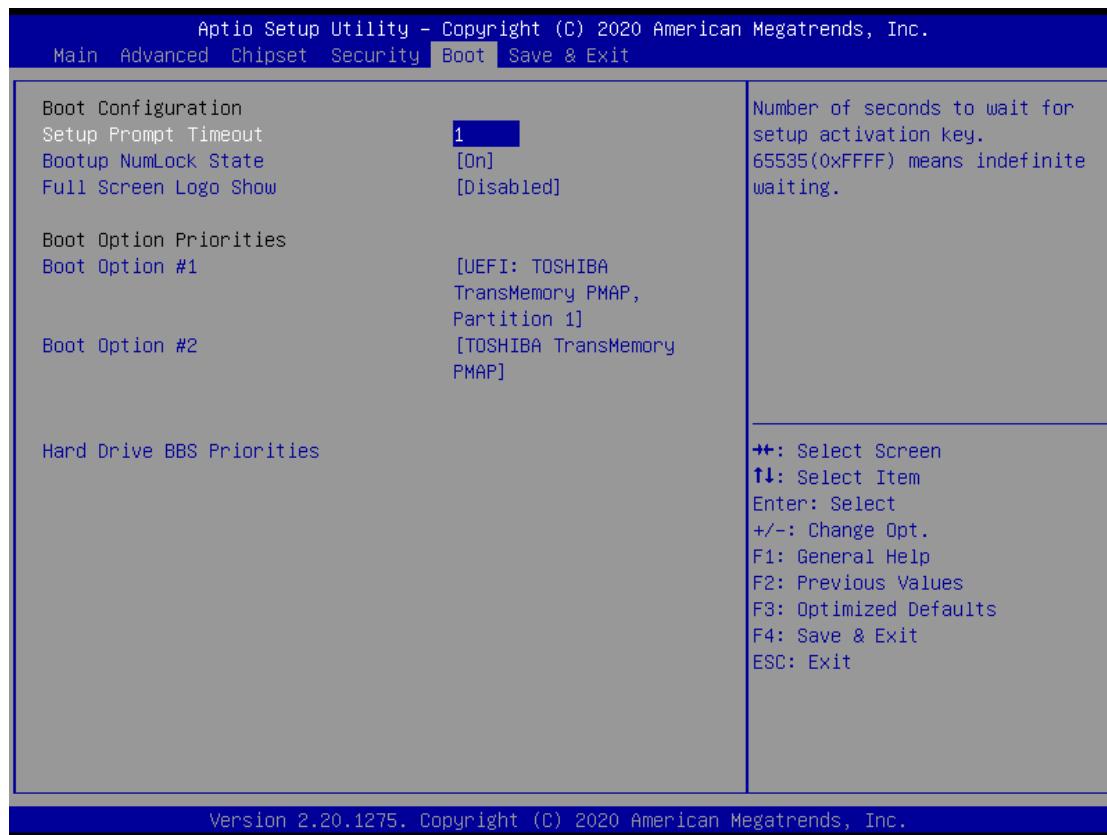


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Item	Options	Description
Factory Key Provision	Disabled [Default], Enabled	Install factory default Secure Boot keys after the platform reset and while the System is in Setup mode

4.6 Boot

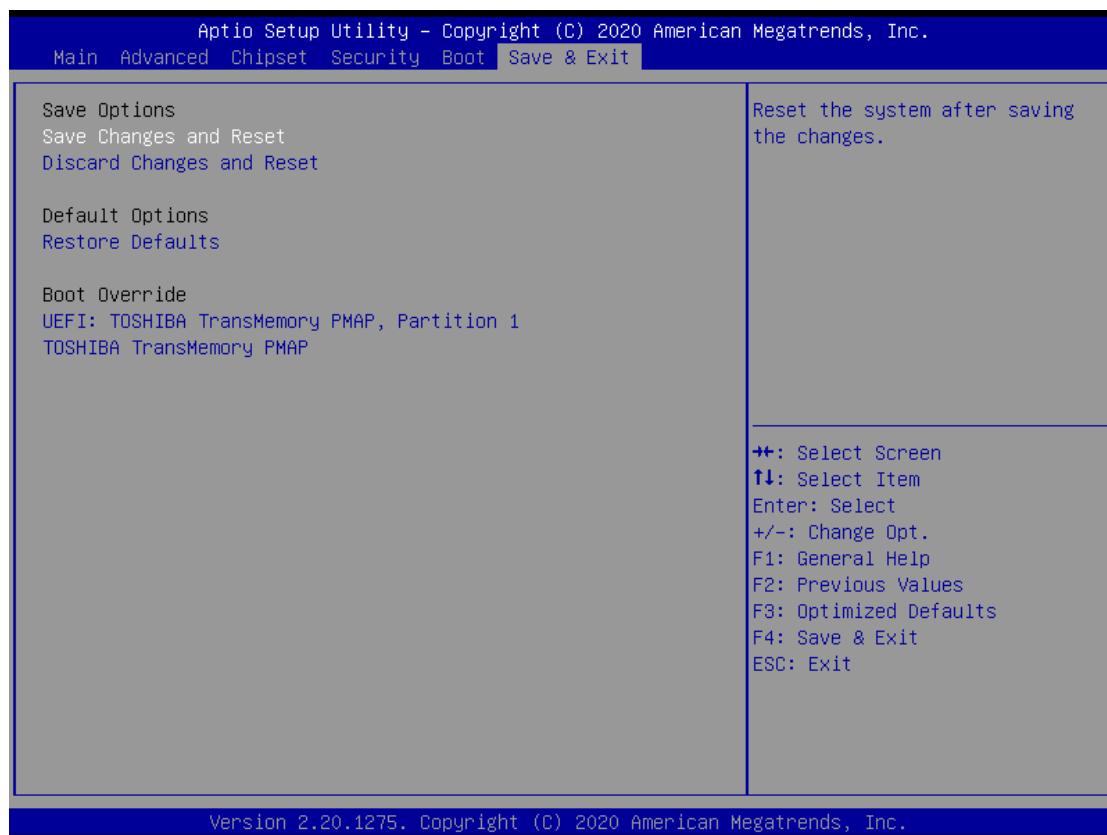
This menu allows you to setup the system boot options.



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.
Full Screen Logo Show	Disabled[Default], Enabled	Enables or disables Full Screen Logo Show option.
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

Pseudo Code

```
#define AddrPort          0x2e
#define DataPort           0x2f
#define SIO_UnLock_Value   0x87
#define SIO_Lock_Value      0xaa
#define WATCHDOG_LDН        0x08
#define GPIO_Port           0xF1

//Enter_Config
WriteByte (AddrPort, SIO_UnLock_Value);
WriteByte (AddrPort, SIO_UnLock_Value);

//Enter WATCHDOG LDН
WriteByte (AddrPort, 0x07);
WriteByte (DataPort, WATCHDOG_LDН);

//Set count mode
WriteByte (AddrPort, 0xf0);
buf2 = ReadByte (DataPort) & 0xf4; //clear "Select Watchdog Timer I count mode
buf2 |= 0x02; //Enable the Watchdog Timer I output low pulse to the KBRST# pin
// buf2 |= 0x08; //Bit3 = (1:Minute Mode/0:Second Mode)
WriteByte (DataPort, buf2); //Write back

//Set watch dog time value
WriteByte (AddrPort, 0xf1)
WriteByte (DataPort, Time) //Set watch dog time value

// close config mode
WriteByte (AddrPort, 0xaa);
```

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 NCT6106D, and it can be accessed through its GPIO index/data port. To access the GPIO register, write index to the index port, and then read/write from/to data port. The configuration on the RCO-6000 is described as below.

Pseudo Code

```
#define AddrPort          0x2e
#define DataPort           0x2f
#define SIO_UnLock_Value  0x87
#define SIO_Lock_Value     0xaa
#define SIO_LDN_GPIO       0x07
#define GPIO_Port          0xF1
```

```
//Enter_Config
WriteByte (AddrPort, SIO_UnLock_Value);
WriteByte (AddrPort, SIO_UnLock_Value);

WriteByte (AddrPort, 0x07);
WriteByte (DataPort, SIO_LDN_GPIO);
```

```
//Set OUT1~OUT8Value
WriteByte (AddrPort, GPIO_Port);
WriteByte (DataPort, 0x00); //set OUT1~OUT8 value, OUT1=Bit0, OUT2=Bit1
```

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

```
// Read In1~In8 value
WriteByte (AddrPort, 0xED);
Data= ReadByte (DataPort); //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

```
// close config mode
WriteByte (AddrPort, SIO_Lock_Value);
```

