USER'S MANUAL

RCO-3600 Series
Advanced Fanless Embedded System

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Prefaces

Revision

Revision	Description	Date
1.0	Manual released	2019/08/13

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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	RCO-3600 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-3600	Advanced Fanless Embedded System with Intel® 6th/7th Gen Processor and Q170 PCH

Optional Accessories

Model No.	Product Description
1-E09A12002	Adapter AC/DC 24V 5A 120W 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

Based on 7th Gen. Intel® Core™ i7-7700T (3.8GHz, Quad Core) / i5-7500T (3.3GHz, Quad Core) / i3-7101TE (3.4GHz, Dual Core) or 6th Gen. Intel® Core™ i7-6700TE (3.4GHz, Quad Core) / i5-6500TE (3.3GHz, Quad Core) / i3-6100TE (2.7GHz, Dual Core) or Pentium® G4400TE (2.4GHz, Dual Core) / Celeron® G3900TE (2.3GHz, Dual Core) Desktop processor, RCO-3600 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 (9~50V) DC power input, and high reliability even operating in temperature extremes (-25°C ~ +60°C).

Featuring with completely cable-less designed, high functional, one-piece housing design, and anti-vibration, RCO-3600 series are ruggedized systems that can operate in harsh environments and easy to install and maintain. A build in over voltage protection (OVP), over current protection (OCP), reverse protection, and wide range DC power input makes RCO-3600 series are safety system for all industrial applications.

Front   Rear

1.1.1 Key Features

- LGA 1151 socket for 6th/7th Gen. Intel® Core™ i7/i5/i3 or Pentium® / Celeron® Desktop Processor

- Intel® Q170 chipset

- 2x DDR4 1866/2133MHz SODIMM. Max. up to 32GB

- Intel® HD Graphics 530 / 630

- Triple independent display supported by 1x DVI-I, 1x DisplayPort, 1x HDMI (Optional)

- 2x Intel® GbE supporting Wake-on-LAN and PXE

- 2x internal 2.5" SATA HDD bay with RAID 0, 1, 5, 10 support, 2x mSATA (shared by 2x Mini PCIe), 1x CFast

- 2x full-size Mini PCIe (shared by 2x mSATA) for communication or expansion modules, 2x external SIM socket

- 4x RS-232/422/485 (w/ 2x internal), 6x USB 3.0, 2x USB 2.0 (internal)

- 8x DI + 8x DO with isolation

- 9 to 50VDC wide range power input supporting AT/ATX mode

- -25°C to 60°C extended operating temperature

1.2 Hardware Specification

Processor System
- Support 6th & 7th Gen Intel® Core™ i7 / i5 / i3 / Pentium® / Celeron® Desktop Processor (LGA 1151) with AMI 128Mbit SPI BIOS
  - 7th Gen Intel® Core™ i7-7700T, Quad Core, 8MB cache, up to 3.8 GHz
  - 7th Gen Intel® Core™ i5-7500T, Quad Core, 6MB cache, up to 3.3 GHz
  - 7th Gen Intel® Core™ i3-7101TE, Dual Core, 3MB Cache, 3.4 GHz
  - 6th Gen Intel® Core™ i7-6700TE, Quad Core, 8MB cache, up to 3.4 GHz
  - 6th Gen Intel® Core™ i5-6500TE, Quad Core, 6MB Cache, up to 3.3 GHz
  - 6th Gen Intel® Core™ i3-6100TE, Dual Core, 4MB Cache, 2.7 GHz
  - Intel® Pentium® G4400TE, Dual Core, 3MB Cache, 2.4 GHz
  - Intel® Celeron® G3900TE, Dual Core, 2MB Cache, 2.3 GHz

Memory
- 1x 260-Pin DDR4 1866/2133MHz SODIMM. Max. up to 32GB

Display
Triple Display
- 1x VGA
- 1x DisplayPort, 1x HDMI (optional)

Expansion
- 2x Full-size Mini PCIe Socket (shared by 2x mSATA) for Wi-Fi / GSM / Expansion Module

Ethernet
- 1x Intel® i219LM GbE LAN port and 1x Intel® i210-AT GbE LAN port, Support Wake-on-LAN and PXE

Audio
- Codec: Realtek ALC888S
- 1x Mic-in and 1x Speaker-out

Watchdog Timer
- Software Programmable Supports 1~255 sec. System Reset

Storage
- 2x internal 2.5" SATA HDD Bay with RAID 0, 1, 5, 10 support
- 2x mSATA socket (shared by 2x Mini-PCIe)
- 1x CFast socket
- 2x External SIM Card Socket

I/O Ports
- 6x USB 3.0 Port
- 2x USB 2.0 Port (internal)
- 8 Isolated DI and 8 Isolated DO Port
- 4x DB9 Flow Control for COM1~4 (w/ 2x internal), support RS232/422/485 with Auto Flow Control
- 4x Antenna Hole
- 1x Power Switch
- 1x AT/ATX Switch
- 1x Remote Power on/off Connector

Digital Input & Output
- 8x Digital Input (Source Type)
  - Input Voltage (Dry Contact):
    - Logic 0: Close to GND
    - Logic 1: Open
  - Input Voltage:
    - Logic 0: 3V max.
    - Logic 1: 5V min. (DI to COM-)
- 8x Digital Output
  - Supply Voltage: 5~30VDC
  - Sink Current: 200 mA Max. Per Channel

Power
- Support AT, ATX Mode
- 1x 3-pin Terminal Block Connector with Power Input 9~50VDC
- 1x Optional AC/DC 24V/5A, 120W Power Adapter

Environment
- Operating Temperature: Ambient with Air Flow: -25°C to 60°C (with Industrial Grade Peripherals)
- Storage Temperature: -40°C to 85°C
- Relative humidity: 10%~95% (non-condensing)
- Vibration:
  - With SSD: 5 Grms, 10 - 500 Hz, 0.5 hr/axis
  - With HDD: 1 Grms, 10 - 500 Hz, 0.5 hr/axis
- Shock: With SSD: 20G, half sine, 11ms

Physical
- Dimension (WxDxH, mm): 185 x 197 x 57.4 mm
- Construction: Extruded Aluminum with Heavy Duty Metal
- Mounting: Wall Mounting, DIN-Rail Mounting (Optional)

Operating System
- 6th Gen CPU: Windows 10, Windows 7, WES7
- 7th Gen CPU: Windows 10
- Linux kernel 4.X

Certifications
- CE / FCC Class A

1.3 System I/O

Front Panel

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

Reset switch
Press to reset the system

AT/ATX mode select switch
Used to select AT or ATX power mode

CFast socket
Used to insert CFast card

SIM Card socket
Used to insert SIM card

HDD port
Removable 2.5" SATA HDD Area

USB 3.0 port
Used to connect USB 3.0/2.0/1.1 device

Power LED
Indicates the power status of the system

HDD LED
Indicates the status of the hard drive

Watchdog LED
Indicates the status of the watchdog active
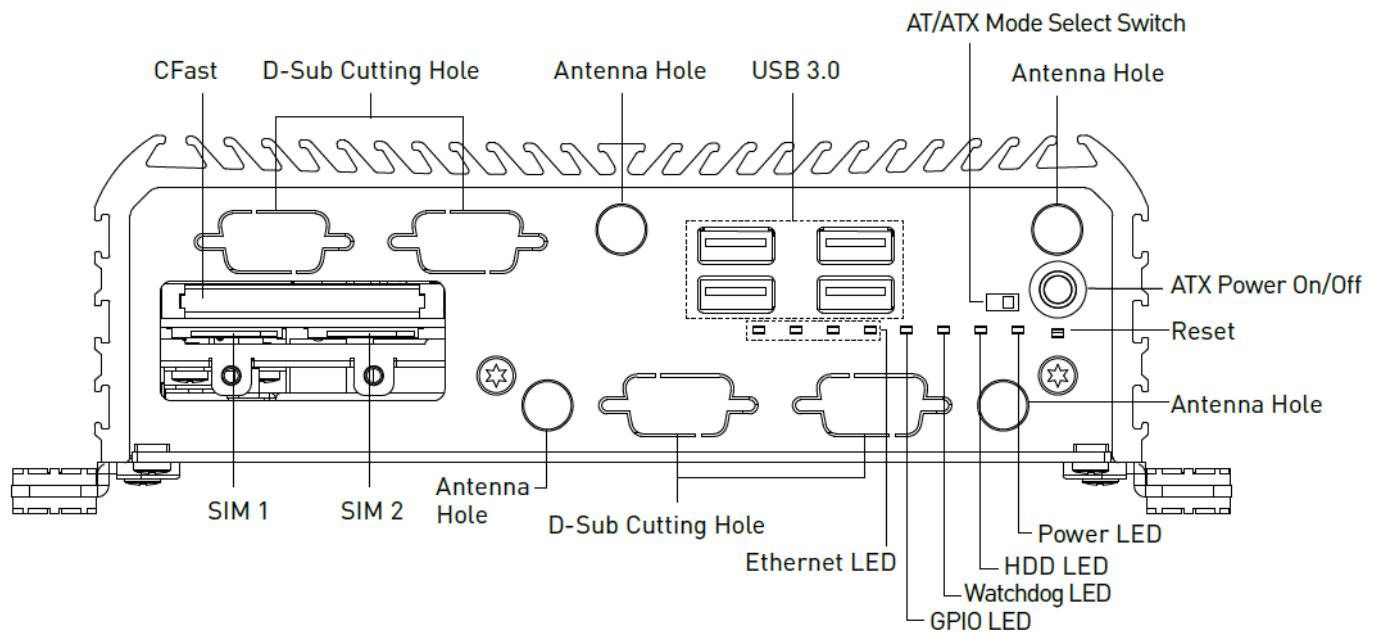
GPIO LED
Indicates the status of the customer define

Ethernet LEDs
Indicates the status of the LAN active

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

Rear Panel

DC IN
Used to plug a DC power input with terminal block

DVI-I port
Used to connect a DVI monitor or connect optional split cable for dual display mode

DisplayPort
Used to connect a DisplayPort monitor

Speaker-out
Used to connect a speaker

Mic-in
Used to connect a microphone

USB 3.0 port
Used to connect USB 3.0/2.0/1.1 device

LAN port
Used to connect the system to a local area network
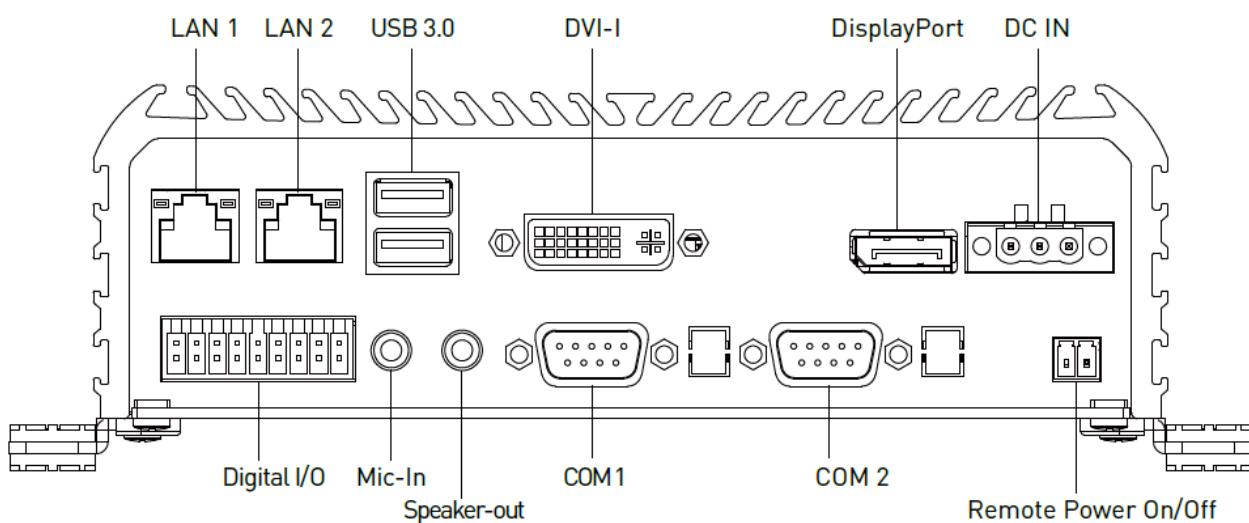
Remote Power on/off Terminal Block
Used to plug a remote power on/off terminal block

COM port
COM1 ~ COM2 support RS232/422/485 serial device
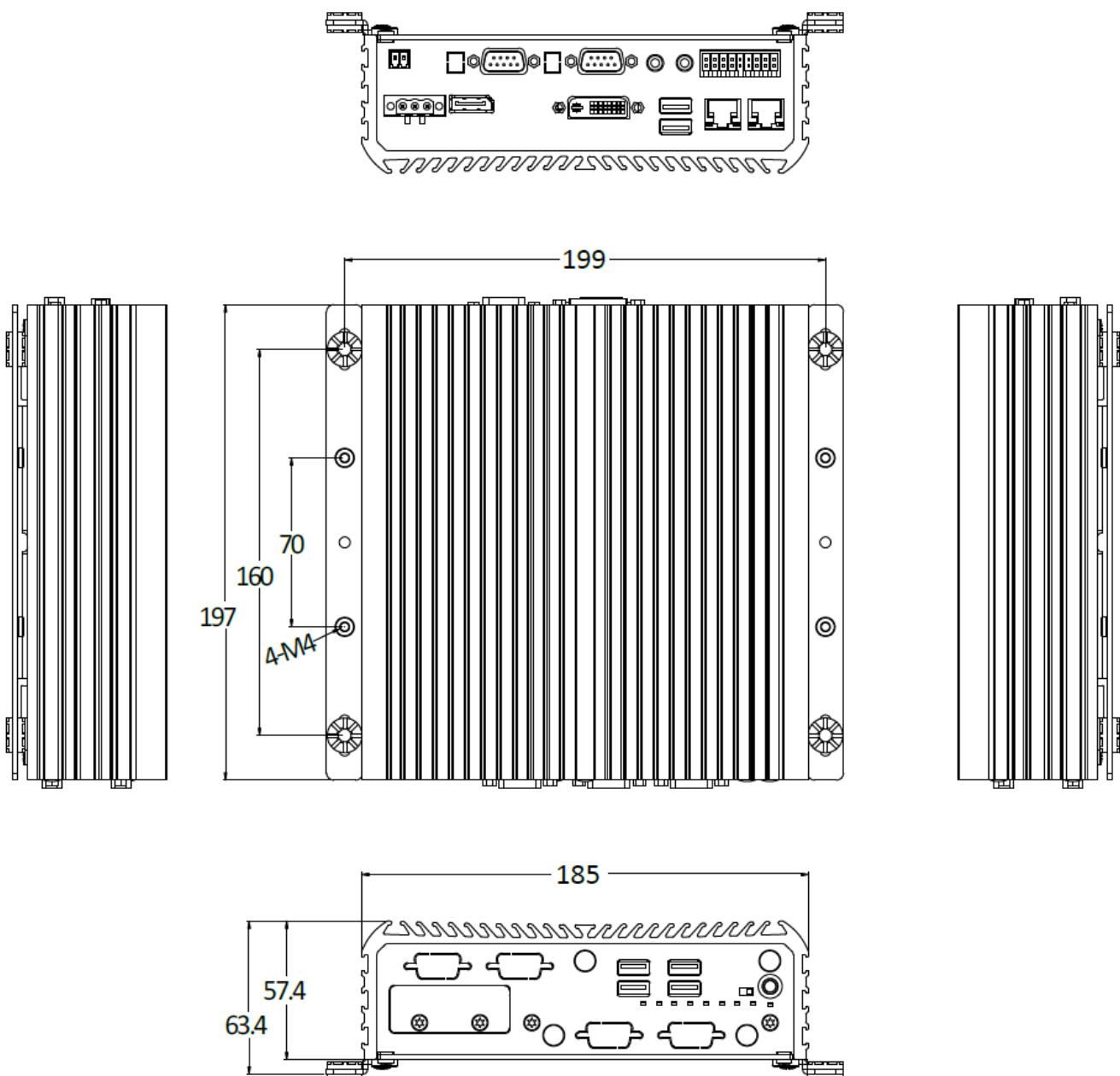
Digital I/O Terminal Block
The Digital I/O terminal block supports 8 digital input and 8 digital output

1.4 Mechanical Dimensions

Unit: mm
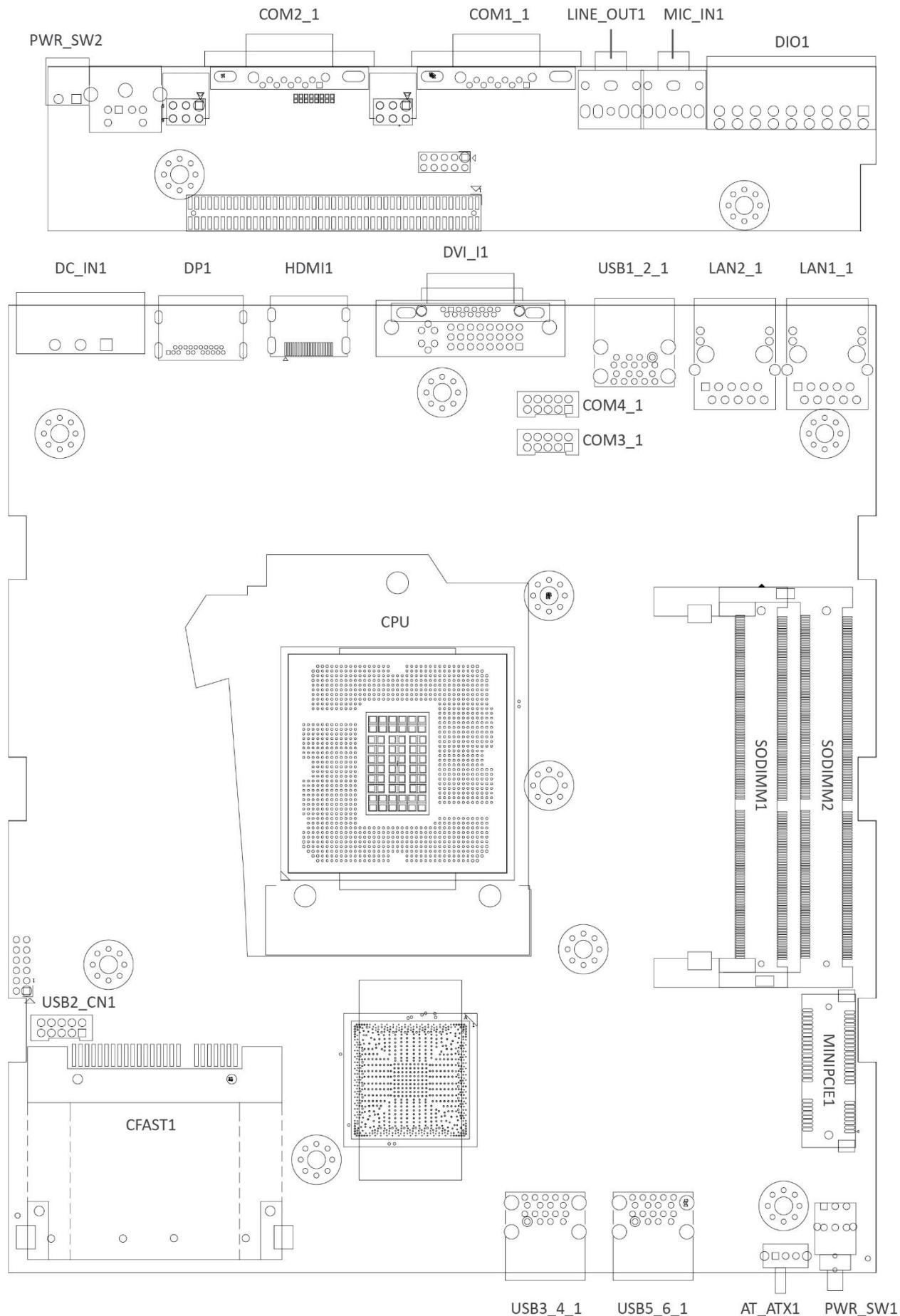
Chapter 2
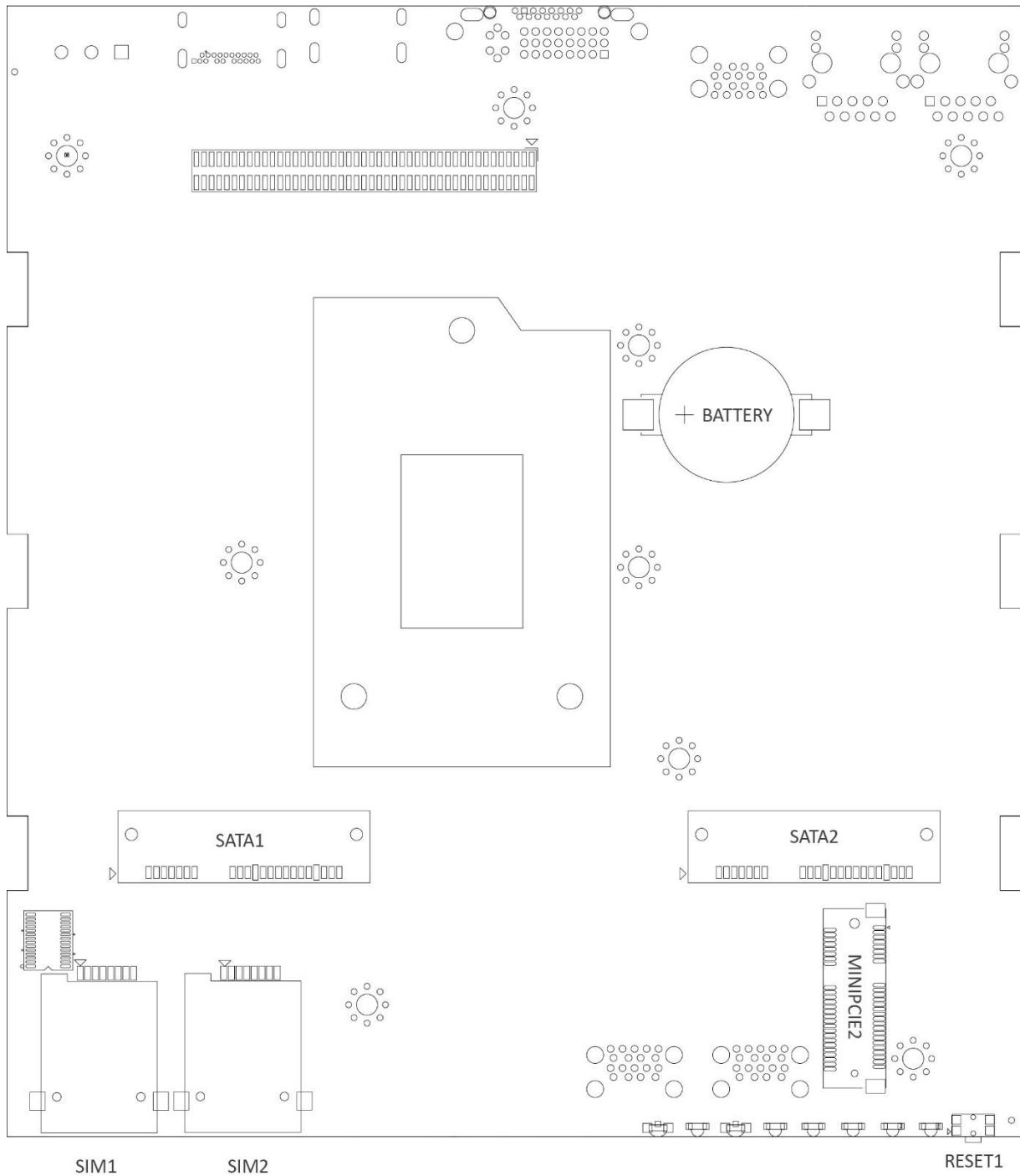
Switches and Connectors

2.1 Switch and Connector Locations

2.1.1 Top View

2.1.2 Bottom View

2.2 Connector / Switch Definition
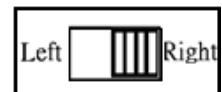
List of Connector / Switch

Connector Location	Definition
AT_ATX1	AT / ATX Power Mode Switch
CLR_CMOS1	Clear BIOS Switch
CFAST1	CFast Socket
PWR_SW1	Power Switch
RESET1	Reset Switch
USB1_2_1, USB3_4_1, USB5_6_1	USB 3.0 Port
USB2_CN1	USB 2.0 Port
SIM1, SIM2	SIM Card Socket
COM1_1, COM2_1	RS232 / RS422 / RS485 Connector
COM3_1, COM4_1	RS232 / RS422 / RS485 Connector
LAN1_1, LAN2_1	LAN Port
DC_IN1	3-pin DC 9~50V Power Input Connector
DP1	DisplayPort Connector
HDMI1	HDMI Connector
DVI_I1	DVI-I Connector
LINE_OUT1	Line-out Jack
MIC_IN1	Mic-in Jack
DIO1	8DI / 8DO Connector
PWR_SW2	Remote Power Switch
MINIPCIE1, MINIPCIE2	Mini PCI-Express / mSATA Socket
SATA1, SATA2	SATA with Power Connector
PWR_LED1	Power LED Status
HDD_LED1	HDD Access LED Status
LAN1_LINK1, LAN2_LINK1	LAN Link LED
LAN1_ACT1, LAN2_ACT1	LAN Active LED
GPIO_LED1	GPIO LED Status
WDT_LED1	Watchdog LED Status

2.3 Switches Definitions
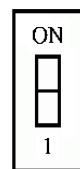
AT_ATX1: AT / ATX Power Mode Switch

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

CLR_CMOS1: Clear BIOS Switch
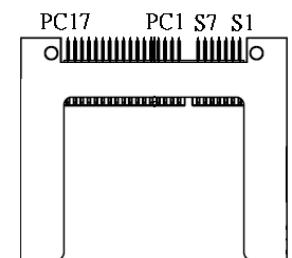
Switch	Definition
Off	Normal Status (Default)
ON	Clear BIOS
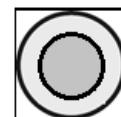
2.4 Connectors Definitions

CFAST1_2: CFast Socket

Pin	Definition	Pin	Definition	Pin	Definition
S1	GND	PC1	NC	PC10	NC
S2	SATA_TXP1	PC2	GND	PC11	NC
S3	SATA_TXN1	PC3	NC	PC12	NC
S4	GND	PC4	NC	PC13	+3.3V
S5	SATA_RXN1	PC5	NC	PC14	+3.3V
S6	SATA_RXP1	PC6	NC	PC15	GND
S7	GND	PC7	GND	PC16	GND
		PC8	NC	PC17	NC
		PC9	NC		

PWR_SW1: Power Button
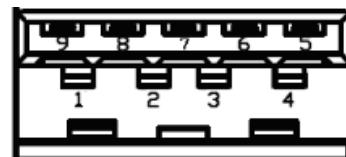
Pin	Definition	Pin	Definition
1	NC	4	GND
2	Power Button	5	NC
3	NC	6	GND

RESET1 : Reset Button

Pin	Definition
1	RESET
2	GND

USB3.0 Connector, Type A

Pin	Definition	Pin	Definition
1	+5V	6	USB3_RX+
2	USB2_D-	7	GND
3	USB2_D+	8	USB3_TX-
4	GND	9	USB3_TX+
5	USB3_RX-		
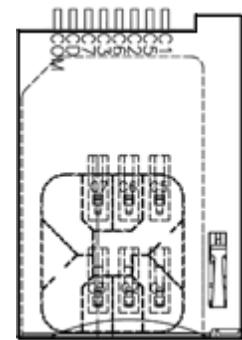
USB2.0 Connector, Type A

Pin	Definition
1	+5V
2	USB2_D-
3	USB2_D+
4	GND
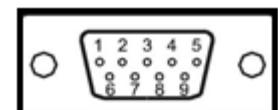
SIM1, SIM2: SIM Card Socket

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

COM: RS232 / RS422 / RS485 Connector
Connector Type: 9-pin D-Sub
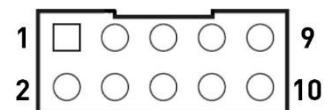
Pin	RS232 Definition	RS422 / 485 Full Duplex Definition	RS485 Half Duplex Definition
1	DCD	TX-	DATA-
2	RxD	TX+	DATA+
3	TxD	RX+	
4	DTR	RX-	
5	GND	GND	GND
6	DSR		
7	RTS		
8	CTS		
9	RI		
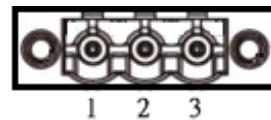
COM: RS232 / RS422 / RS485 Connector
Connector Type: 2X5 10-pin box header, 2.54mm pitch

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

DC_IN1: DC Power Input Connector (+9~50V)
Connector Type: Terminal Block 1X3 3-pin, 5.0mm pitch
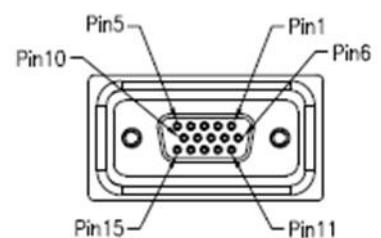
Pin	Definition
1	+9~50VIN
2	Car power detect (ACC in)
3	GND

VGA: Standard VGA Connector
Connector Type: 15-pin D-Sub
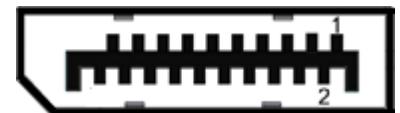
Pin	Definition	Pin	Definition
1	RED	9	+5V
2	GREEN	10	S_GND
3	BLUE	11	NC
4	NC	12	SDA
5	GND	13	HSYNC
6	R_GND	14	VSYNC
7	G_GND	15	SCL
8	B_GND		

DP: DisplayPort Connector

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

LINE_OUT1 : Line-out Jack (Green)
Connector Type: 5-pin Phone Jack

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

MIC_IN1: Microphone Jack (Pink)
Connector Type: 5-pin Phone Jack
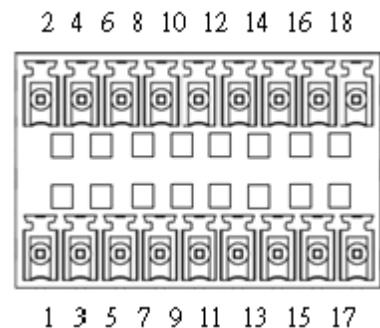
Pin	Definition
1	GND
2	MIC_R
3	NC
4	GND
5	MIC_L
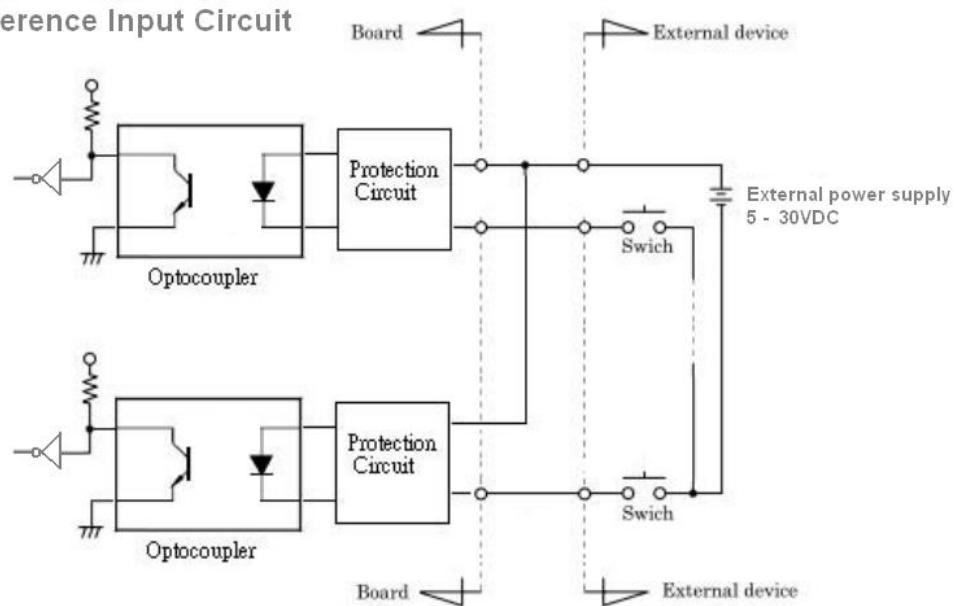
DIO1: Digital Input / Output Connector
Connector Type: Terminal Block 2X9 18-pin, 3.5mm pitch
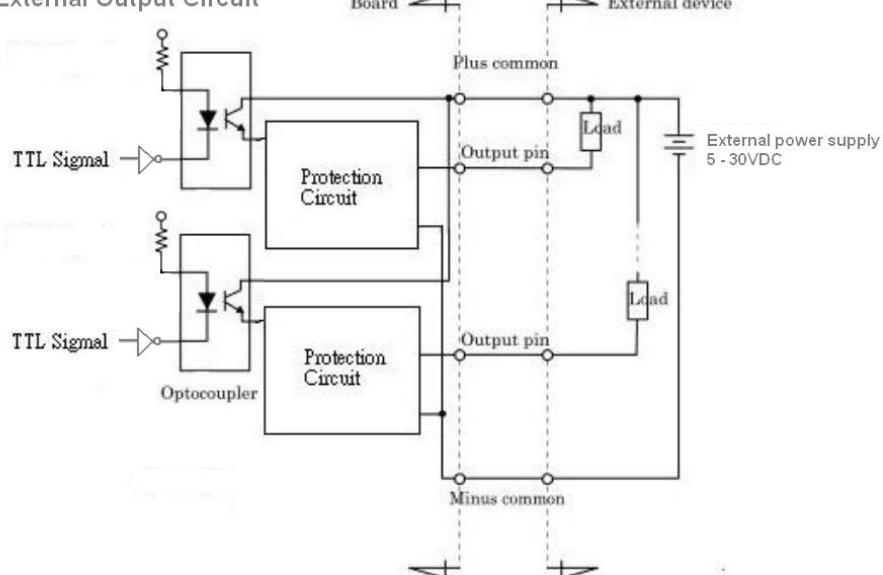
Pin	Definition	Pin	Definition
1	DIN1	2	DOUT1
3	DIN2	4	DOUT2
5	DIN3	6	DOUT3
7	DIN4	8	DOUT4
9	DIN5	10	DOUT5
11	DIN6	12	DOUT6
13	DIN7	14	DOUT7
15	DIN8	16	DOUT8
17	DC power input (+5V~+30V)	18	GND
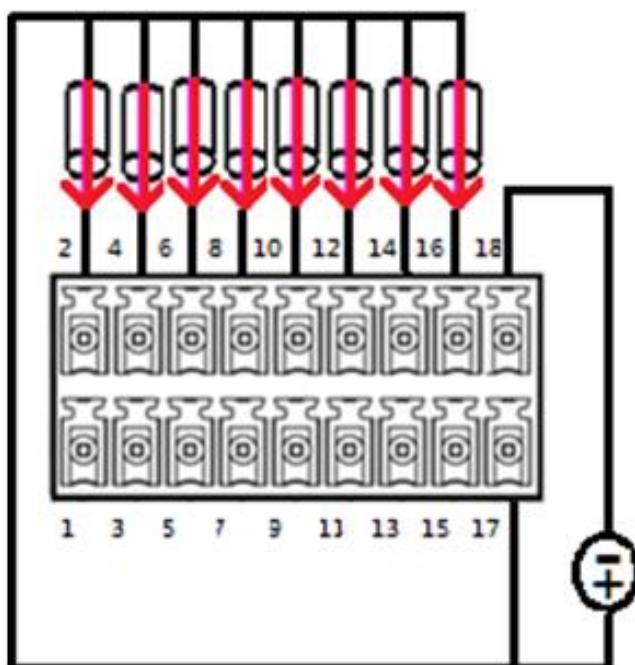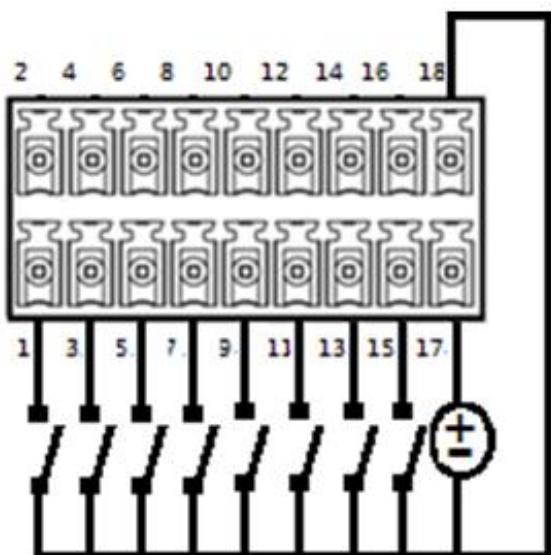
Reference Input Circuit

External Output Circuit

PWR_SW1 : Remote Power Switch
Connector Type: Terminal Block 1X2 2-pin, 3.5mm pitch
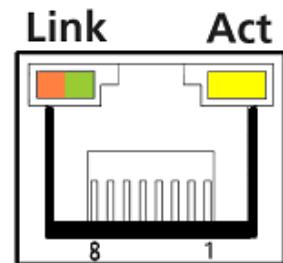
Pin	Definition
1	Power Button
2	GND

LAN1, LAN2: RJ45 with LEDs Port

Connector Type: RJ45 Connector

Pin	Definition	Pin	Definition
1	LAN_MDI0P	5	LAN_MDI2N
2	LAN_MDI0N	6	LAN_MDI1N
3	LAN_MDI1P	7	LAN_MDI3P
4	LAN_MDI2P	8	LAN_MDI3N
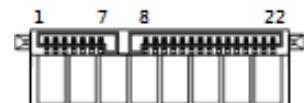
Act LED Status	Definition
Blinking Yellow	Data Activity
Off	No Activity

Link LED Status	Definition
Steady Orange	1Gbps Network Link
Steady Green	100Mbps Network Link
Off	10Mbps Network Link
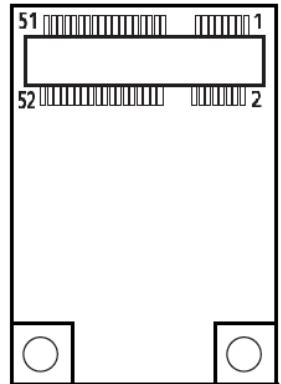
SATA with Power Connector

Pin	SATA1_1 Definition	Pin	SATA1_1 Definition
1	GND	12	GND
2	TxP	13	GND
3	TxN	14	+5V
4	GND	15	+5V
5	RxN	16	+5V
6	RxP	17	GND
7	GND	18	GND
8	NC	19	GND
9	NC	20	+12V
10	DEVSLP	21	+12V
11	GND	22	+12V
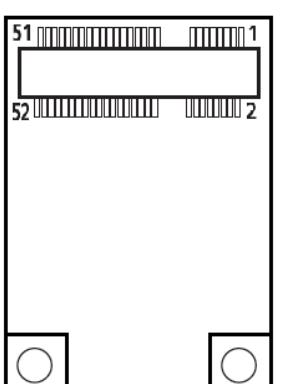
MINIPCIE1: Mini PCI-Express / mSATA Socket

Pin	Definition	Pin	Definition	Pin	Definition
1	WAKE#	19	NC	37	GND
2	+3.3V	20	NC	38	USB2_D+
3	NC	21	GND	39	+3.3V
4	GND	22	RESET#	40	GND
5	NC	23	RxN	41	+3.3V
6	+1.5V	24	+3.3VAUX	42	NC
7	CLKREQ#	25	RxP	43	GND
8	UIM_PWR	26	GND	44	DEVSLP
9	GND	27	GND	45	NC
10	USIM_DATA	28	+1.5V	46	NC
11	REFCLK-	29	GND	47	NC
12	UIM_CLK	30	SMB_CLK	48	+1.5V
13	REFCLK+	31	TxN	49	NC
14	UIM_RST	32	SMB_DATA	50	GND
15	GND	33	TxP	51	PCIE_MSATA_SEL
16	USIM_VPP	34	GND	52	+3.3V
17	NC	35	GND		
18	GND	36	USB2_D-		

MINIPCIE2: Mini PCI-Express Socket
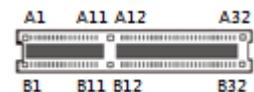
Pin	Definition	Pin	Definition	Pin	Definition
1	WAKE#	19	NC	37	GND
2	+3.3V	20	NC	38	USB2_D+
3	NC	21	GND	39	+3.3V
4	GND	22	RESET#	40	GND
5	NC	23	RxN	41	+3.3V
6	+1.5V	24	+3.3VAUX	42	NC
7	CLKREQ#	25	RxP	43	GND
8	UIM_PWR	26	GND	44	NC
9	GND	27	GND	45	NC
10	UIM_DATA	28	+1.5V	46	NC
11	REFCLK-	29	GND	47	NC
12	UIM_CLK	30	SMB_CLK	48	+1.5V
13	REFCLK+	31	TxN	49	NC
14	UIM_RST	32	SMB_DATA	50	GND
15	GND	33	TxP	51	NC
16	UIM_VPP	34	GND	52	+3.3V
17	NC	35	GND		
18	GND	36	USB2_D-		

PCIE1: PCI-Express x4 Socket
Connector Type: PCI-Express x4 Slot

Pin	Definition	Pin	Definition
A1	FAN_P4	B1	+12V
A2	+12V	B2	+12V
A3	+12V	B3	+12V
A4	GND	B4	GND
A5	NC	B5	SMB_CLK
A6	NC	B6	SMB_DATA
A7	NC	B7	GND
A8	NC	B8	+3.3V
A9	+3.3V	B9	NC
A10	+3.3V	B10	+3.3VAUX
A11	RESET#	B11	WAKE#
A12	GND	B12	FAN_P3
A13	REFCLK+	B13	GND
A14	REFCLK-	B14	TxP0
A15	GND	B15	TxN0
A16	RxP0	B16	GND
A17	RxN0	B17	FAN_P2
A18	GND	B18	GND
A19	NC	B19	TxP1
A20	GND	B20	TxN1
A21	RxP1	B21	GND
A22	RxN1	B22	GND
A23	GND	B23	TxP2
A24	GND	B24	TxN2
A25	RxP2	B25	GND
A26	RxN2	B26	GND
A27	GND	B27	TxP3
A28	GND	B28	TxN3
A29	RxP3	B29	GND
A30	RxN3	B30	NC
A31	GND	B31	NC
A32	NC	B32	GND

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-

LAN1_LINK1, LAN2_LINK1 : LAN Link LED Status

Pin	Definition
1	LINK LED+
2	LINK LED-100Mbps-
3	LINK LED 100Mbps-

LAN1_ACT1, LAN2_ACT1 : LAN Active LED Status

Pin	Definition
1	ACTIVE LED+
2	ACTIVE LED-

GPIO_LED1: GPIO LED Status

Pin	Definition
1	GPIO LED+
2	GPIO LED-

WDT_LED1: Watchdog LED Status

Pin	Definition
1	WATCHDOG LED+
2	WATCHDOG LED-

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
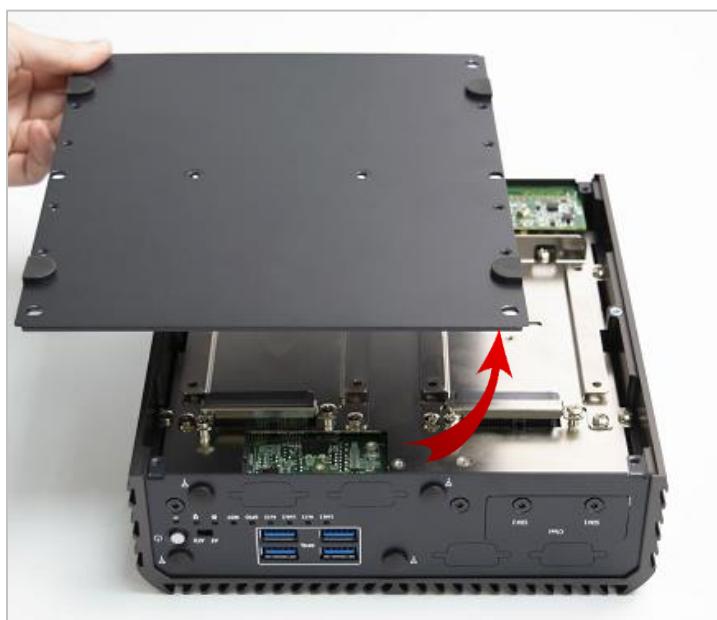
⚠️ **WARNING**

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.
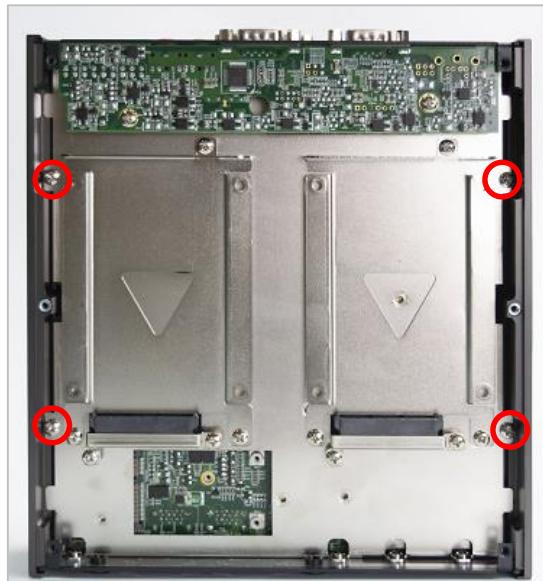
2. Now you can remove the bottom cover.
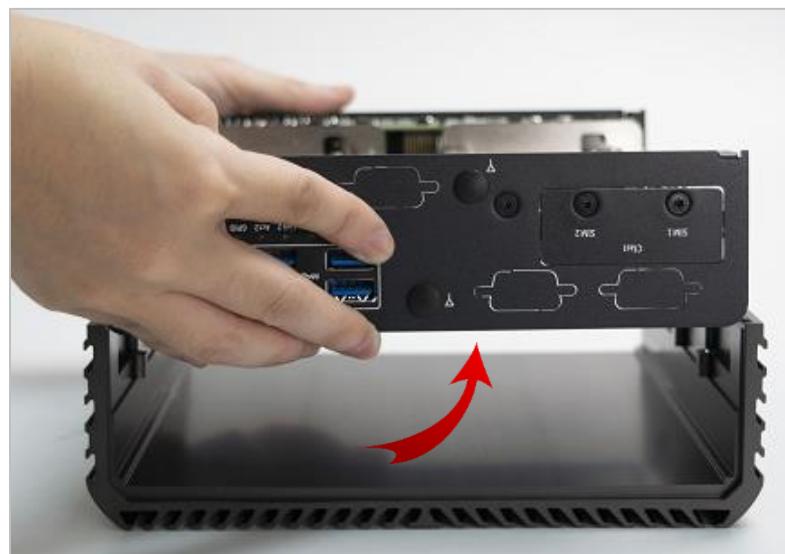
3.3 Removing chassis top cover

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

2. Hold the body of the system and lift it vertically away from the top cover.
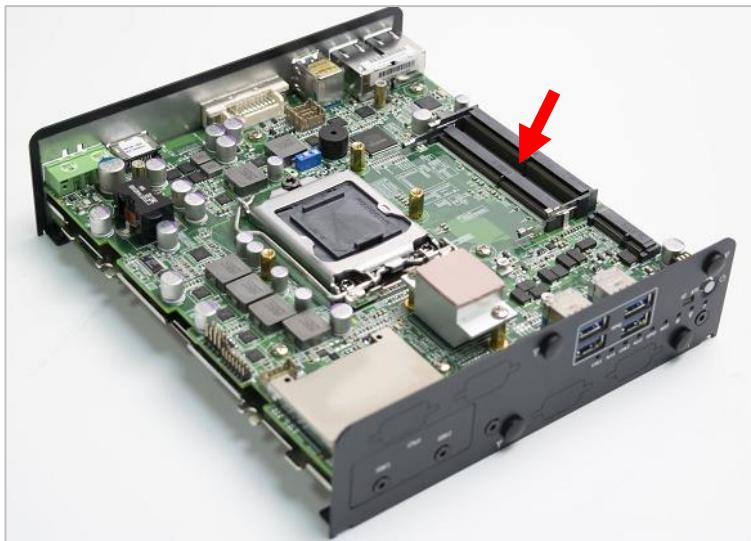
3. Top cover separated from the system body.
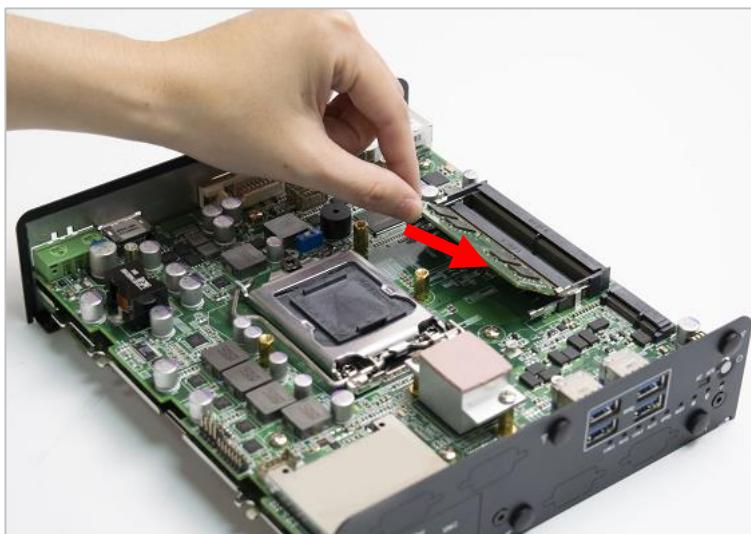
3.4 Installing SODIMM
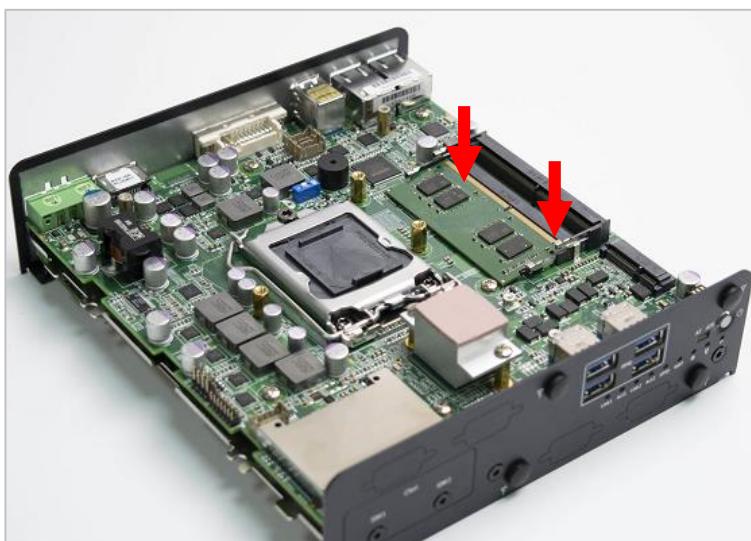
1. Place the system body with SODIMM socket facing upward. Two SODIMM sockets are available for RCO-3600 Series on the top side.

2. Insert memory module from 45 degree direction.
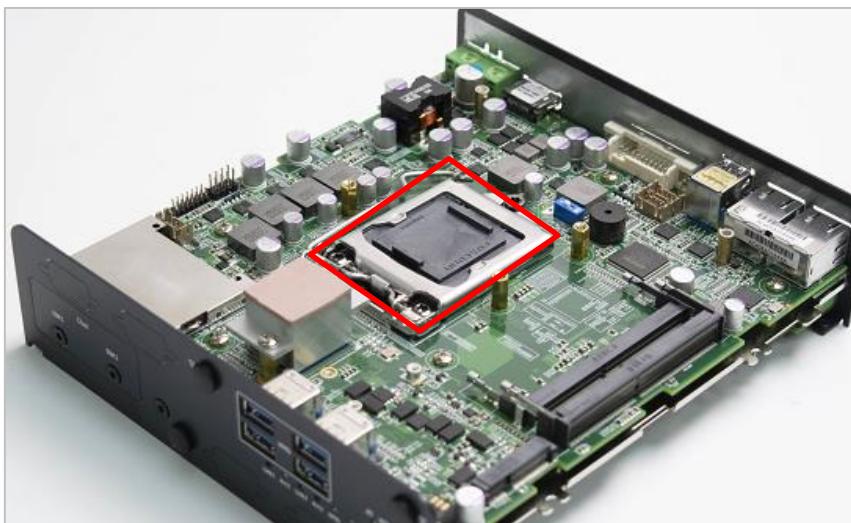
3. Press the memory module vertically downward until you hear the "click" sound. Make sure the memory module is firmly in place.

3.5 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.
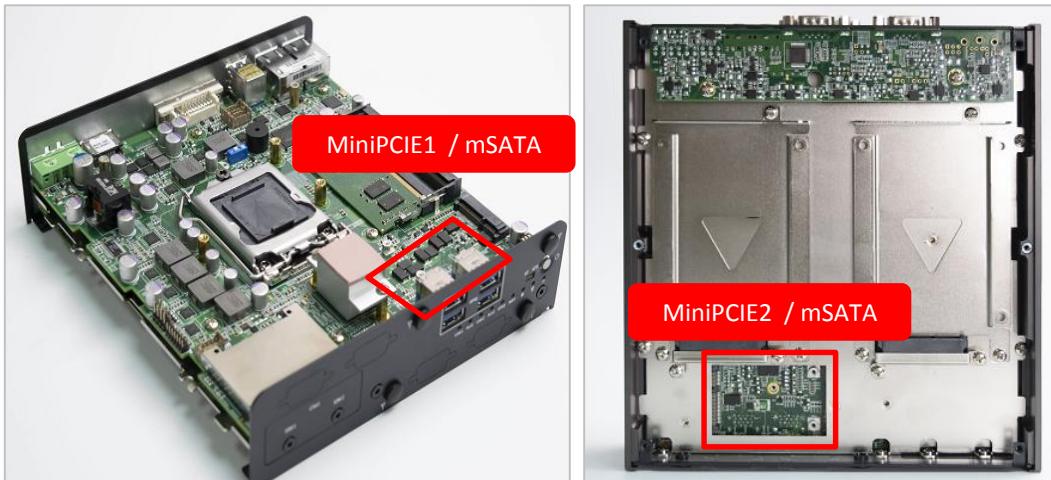
6. Paste thermal pad (1-BR0500040, 29x29x0.5mm) on the CPU.

3.6 Installing mini PCIe card / mSATA
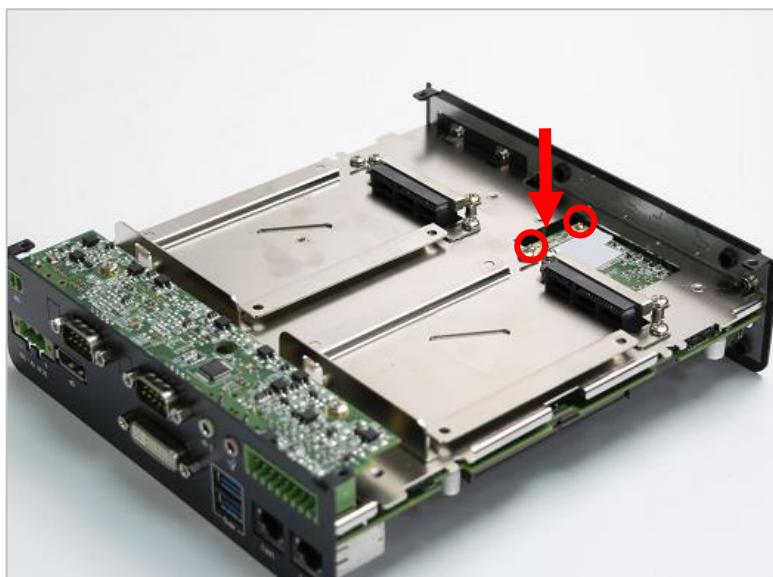
1. Two mini PCIe slots are available for RCO-3600 series. Both slots can supports mSATA.

2. Insert mini PCIe card from 45 degree direction.
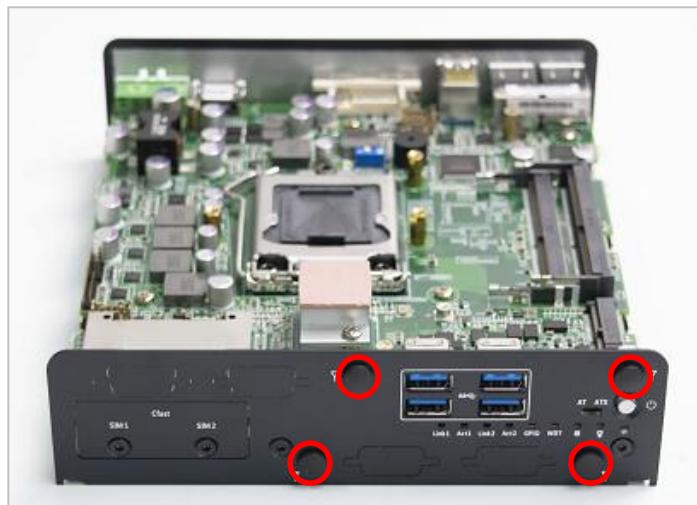
3. Press the mini PCIe card down and lock it with two screws (M2x3.7L).

3.7 Installing antenna

1. Four antenna holes are available for RCO-3600 series on the rear panel.

2. Remove antenna hole cover on the system panel.

3. Have antenna jack penetrate through the hole.

4. Put on washer and fasten the nut with antenna jack.

5. Assemble the antenna and antenna jack together.
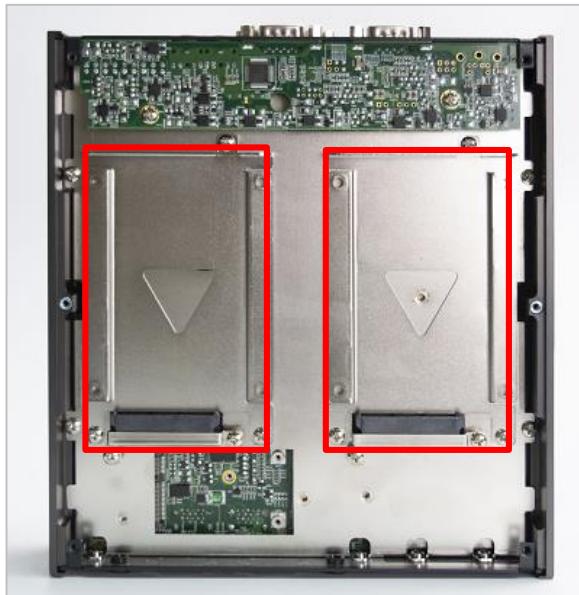
6. Attach the RF connector at the cable-end onto the communication module.
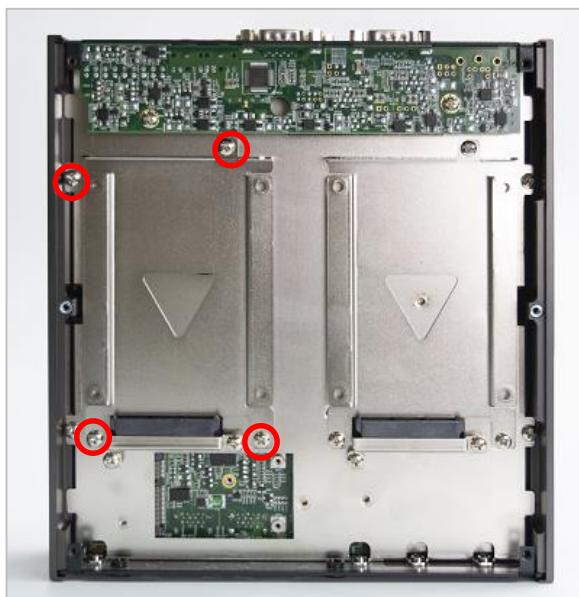
3.8 Installing HDD on internal SATA HDD bay

1. Two internal SATA HDD bays are available for RCO-3600 series.
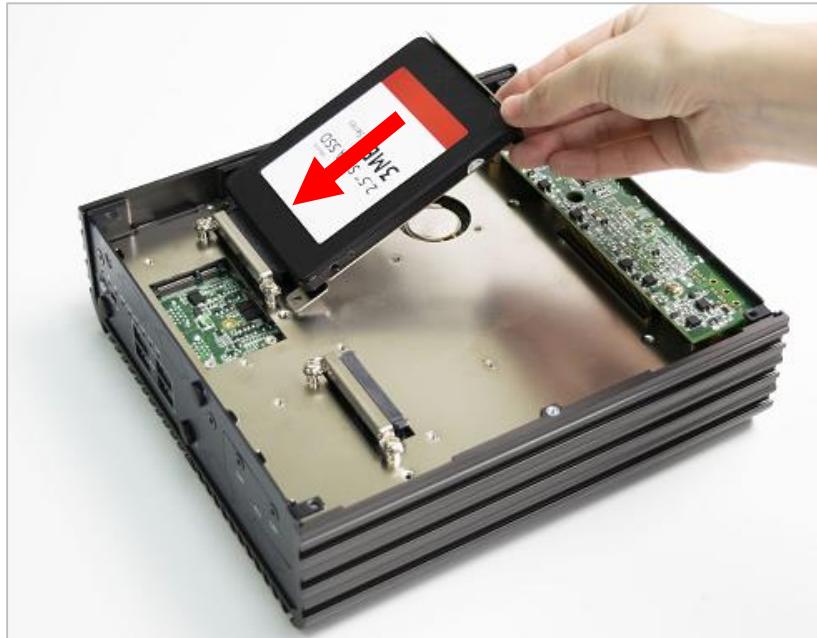
2. Unscrew the four screws (M3x5L) to remove the internal SATA HDD bay.
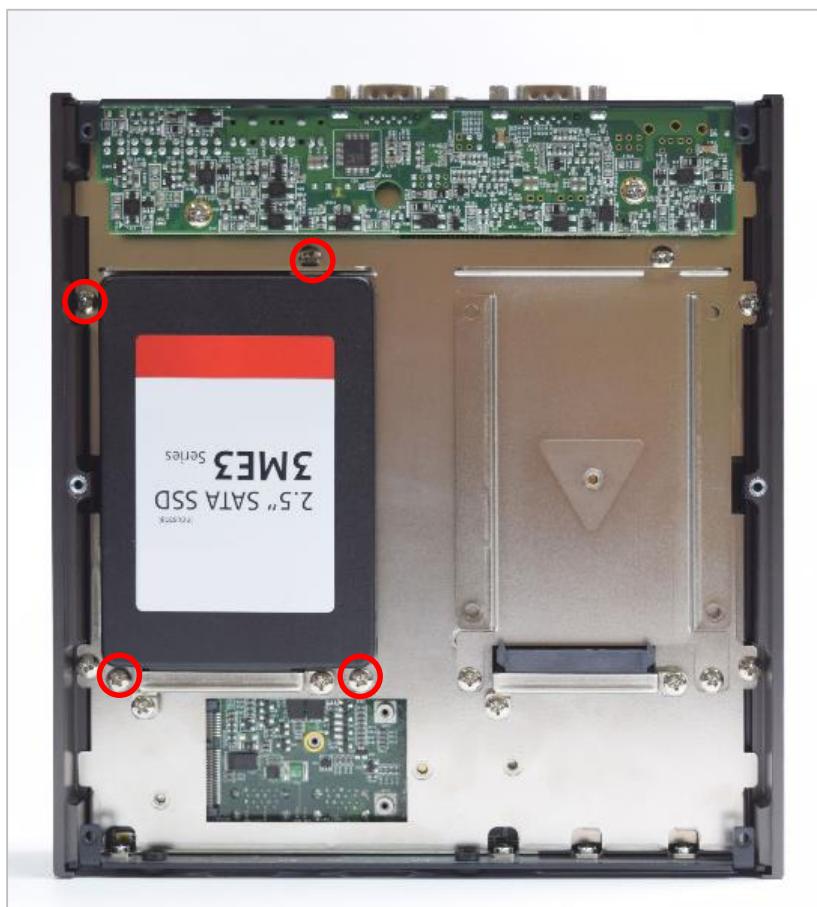
3. Lock the 2.5" HDD with HDD bracket using four screws (M3x4L).

4. Install the HDD bracket following the direction below.

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

3.9 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).

3.10 Installing SIM card

1. For RCO-3600 Series, SIM card slot is located inside the control area. Unscrew the two screws below to remove the cover bracket.
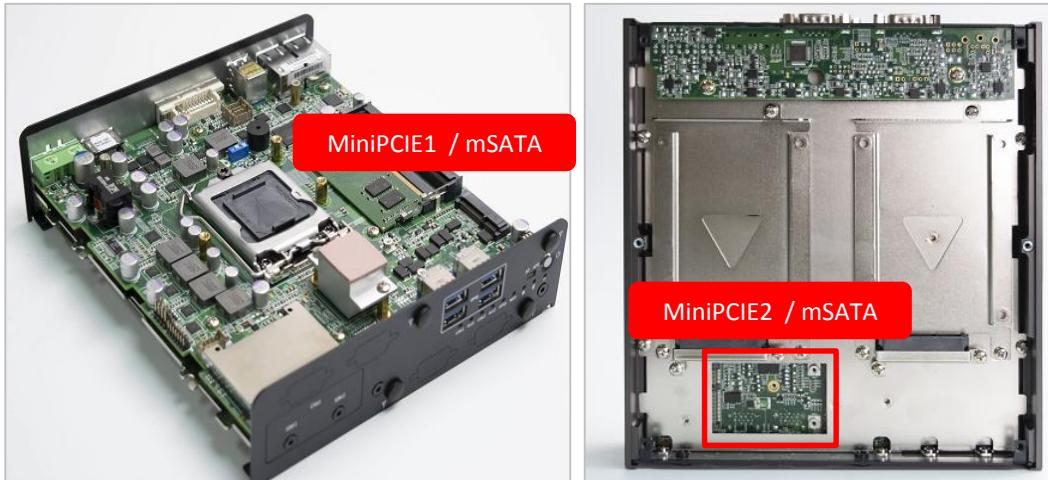
2. Now you can insert SIM card into the socket.

3. Please note that the installation of SIM 1 and SIM 2 has to match the installation of mini PCIe slots.

SIM Card Socket Number	Matching Mini PCIe Slot
SIM 1	Mini PCIe 1 / mSATA (CN1)
SIM 2	Mini PCIe 2 / mSATA (CN2)

4. To uninstall SIM card, simply press the installed SIM card and then the card will be pushed out.

3.11 Installing CFast card

1. CFast socket is located on the system top side.

2. Insert CFast card into the socket until you hear the "click" sound.

3. The socket is push-push type. Push the installed CFast card again to remove it.
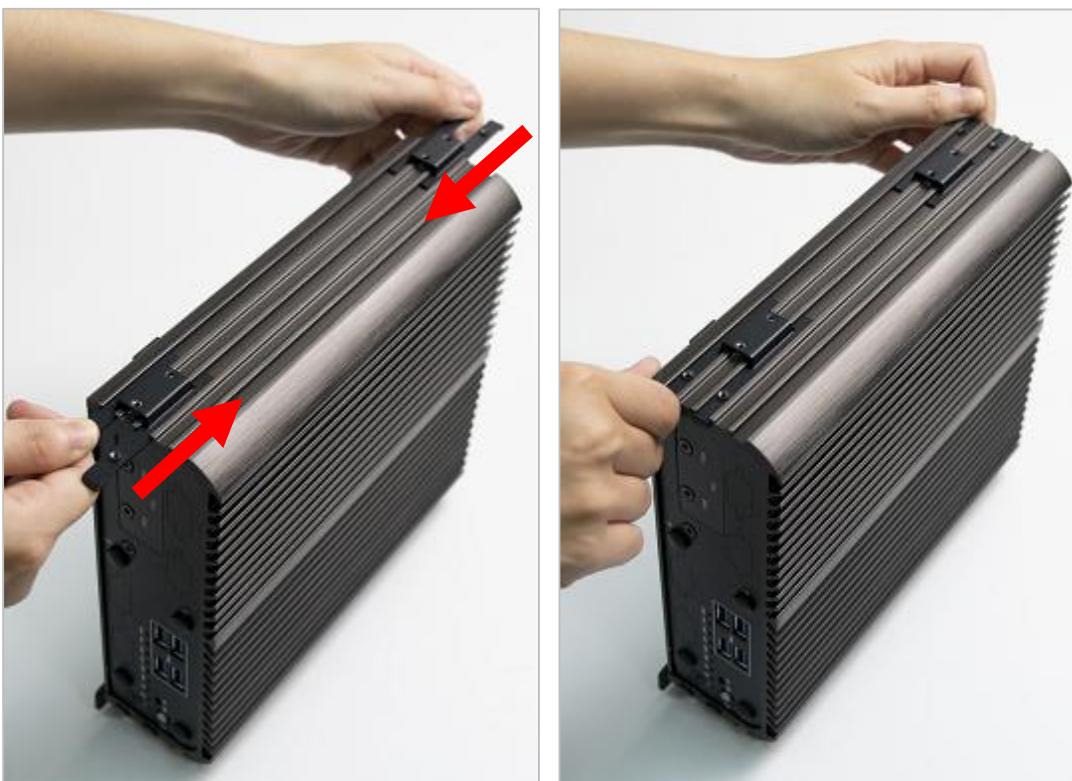
3.12 Installing wall mount kit

1. L-Shaped Wall mount kit is available for RCO-3600 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.

4. Lock the wall mount kit with eight screws (M3x5L, Nylok).

3.13 Installing DIN rail holder

1. Din rail holder is available for RCO-3000 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 system BIOS software is stored on EEPROM. 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 Menu (as shown below) will appears on the screen. Use arrow keys to move among the items and press <Enter> to accept or enter a sub-menu.

```
            Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
   Main  Advanced  Chipset  Security  Boot  Save & Exit

   BIOS Information                                      Choose the system default
   BIOS Vendor                   American Megatrends     language
   Core Version                  5.12
   Compliancy                    UEFI 2.6; PI 1.4
   Project Version               RC360R01 x64
   Build Date and Time           04/19/2019 11:35:18
   Access Level                  Administrator

   Processor Information
   Name                          Kabylake DT
   Type                          Intel(R) Core(TM)
                                 i7-7700 CPU @ 3.60GHz
   Speed                         3600 MHz
   Number of Processors          4Core(s) / 8Thread(s)   →←: Select Screen
   Microcode Revision            84                      ↑↓: Select Item
                                                         Enter: Select
   Total Memory                   4096 MB                +/-: Change Opt.
   Memory Frequency               2133 MHz               F1: General Help
   ME FW Version                 11.8.50.3399            F2: Previous Values
   ME Firmware SKU               Corporate SKU           F3: Optimized Defaults
                                                         F4: Save & Exit
   System Language               [English]               ESC: Exit

   System Date                   [Wed 01/14/2009]
   System Time                   [06:40:01]


            Version 2.18.1263. Copyright (C) 2019 American Megatrends, Inc.
```

■ **System Language**

Language setup allows the user to configure the language. Please use <Tab> to switch between language elements.

■ **System Date**
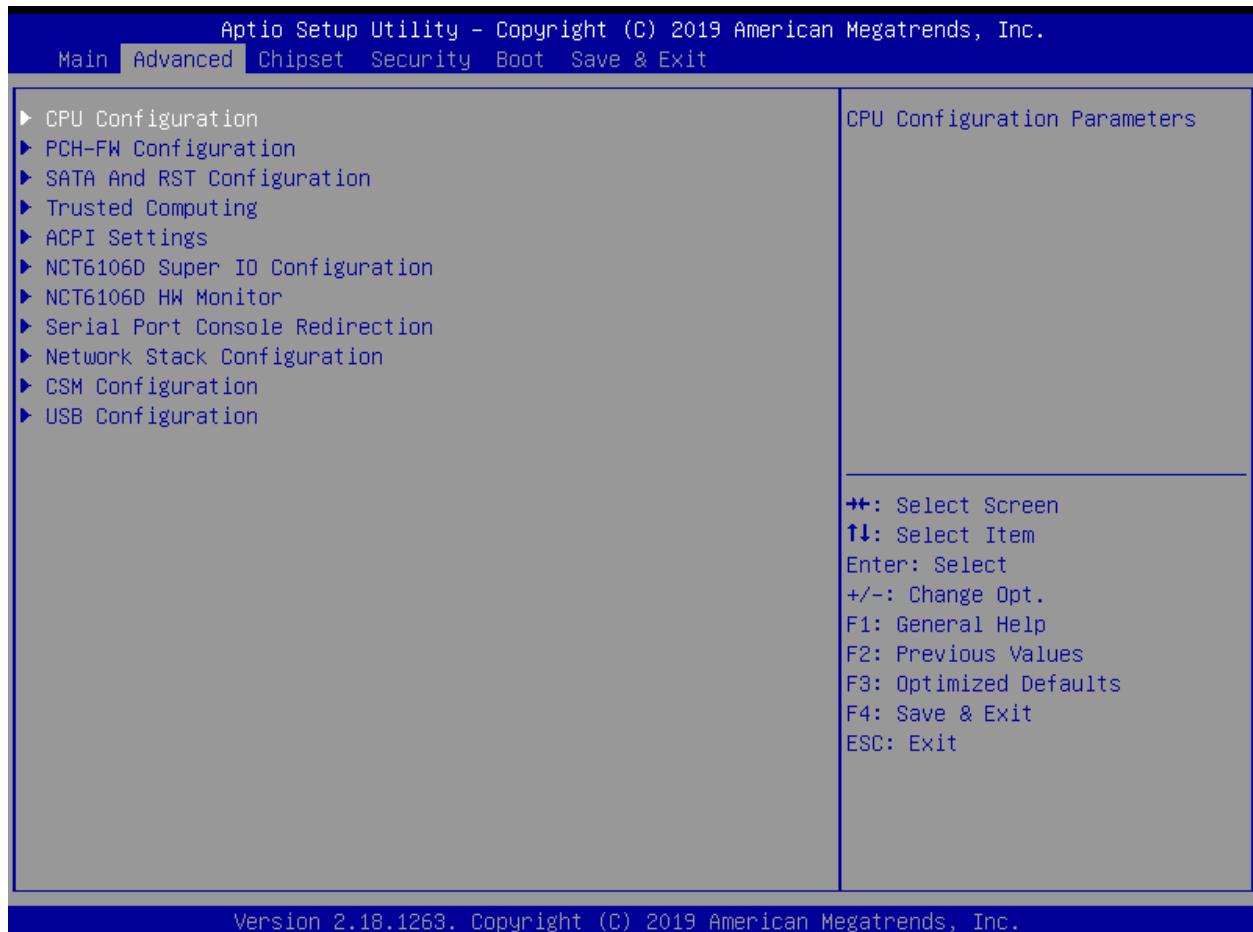
Set the date. Please use <Tab> to switch between date elements.

■ **System Time**

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

4.3 Advanced Setup

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

```
           Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
     Main  Advanced  Chipset  Security  Boot  Save & Exit

   ▶ CPU Configuration                             CPU Configuration Parameters
   ▶ PCH-FW Configuration
   ▶ SATA And RST Configuration
   ▶ Trusted Computing
   ▶ ACPI Settings
   ▶ NCT6106D Super IO Configuration
   ▶ NCT6106D HW Monitor
   ▶ Serial Port Console Redirection
   ▶ Network Stack Configuration
   ▶ CSM Configuration
   ▶ USB Configuration


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


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```

4.3.1 CPU Configuration

```
          Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
   Advanced

  CPU Configuration                                        When enabled, a VMM can
                                                           utilize the additional
  Type                          Intel(R) Core(TM)          hardware capabilities provided
                                i7-7700 CPU @ 3.60GHz      by Vanderpool Technology.
  Speed                         3600 MHz
  L1 Data Cache                 32 KB x 4
  L1 Instruction Cache          32 KB x 4
  L2 Cache                      256 KB x 4
  L3 Cache                      8 MB
  L4 Cache                      N/A
  VMX                           Supported
  SMX/TXT                       Supported


  Intel (VMX) Virtualization    [Enabled]                  →←: Select Screen
  Technology                                               ↑↓: Select Item
  Active Processor Cores        [All]                      Enter: Select
  Hyper-Threading               [Enabled]                  +/-: Change Opt.
  Intel Trusted Execution Technology  [Disabled]           F1: General Help
  Intel(R) SpeedStep(tm)        [Enabled]                  F2: Previous Values
    Turbo Mode                  [Enabled]                  F3: Optimized Defaults
  C states                      [Enabled]                  F4: Save & Exit
    Enhanced C-states           [Enabled]                  ESC: Exit
  Package C State Limit         [Auto]




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```

■ **Intel Virtualization Technology**

Virtualization enhanced by Intel Virtualization Technology will allow a platform to run multiple operating systems and applications in independent partitions. With virtualization, one computer system can function as multiple Virtual systems.

■ **Active Processor Cores**

Set number of cores to be enabled. Select <All>, <1>, <2>, <3>, <4>, <5>, <6>, <7>, or <8> mode.

■ **Hyper-Threading**

This item allows you to enable or disable the Intel Hyper-Threading Technology.

■ **Intel Trusted Execution Technology**

This item allows you to enable or disable the Intel Trusted Execution Technology.

■ **Intel SpeedStep**

This item allows you to enable or disable the Intel SpeedStep.
- **Turbo Mode**
  This item allows you to enable or disable the Turbo Mode.

■ **CPU C states**

This item allows you to set the power saving of the CPU states.
- **Enhanced C States**
  This item allows your CPU reduce power consumption.

■ **Package C State limit**

Select Auto for the AMI BIOS to automatically set the limit on the C-State package register. The options are C0/ C1, C2, C3, C6, C7, C7s, C8 and No Limit.

4.3.2 PCH-FW Configuration

```
         Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
  Advanced

  ME Firmware Version          11.8.50.3399          Configure Intel(R) Active
  ME Firmware Mode             Normal Mode           Management Technology
  ME Firmware SKU              Corporate SKU         Parameters
  ME File System Integrity Value  2
  ME Firmware Status 1         0x90000255
  ME Firmware Status 2         0x82108306

▶ AMT Configuration

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

         Version 2.18.1263. Copyright (C) 2019 American Megatrends, Inc.
```

```
         Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
  Advanced

  Unconfigure ME              [Disabled]            OEMFlag Bit 15:
                                                    Unconfigure ME with resetting
                                                    MEBx password to default.

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

         Version 2.18.1263. Copyright (C) 2019 American Megatrends, Inc.
```
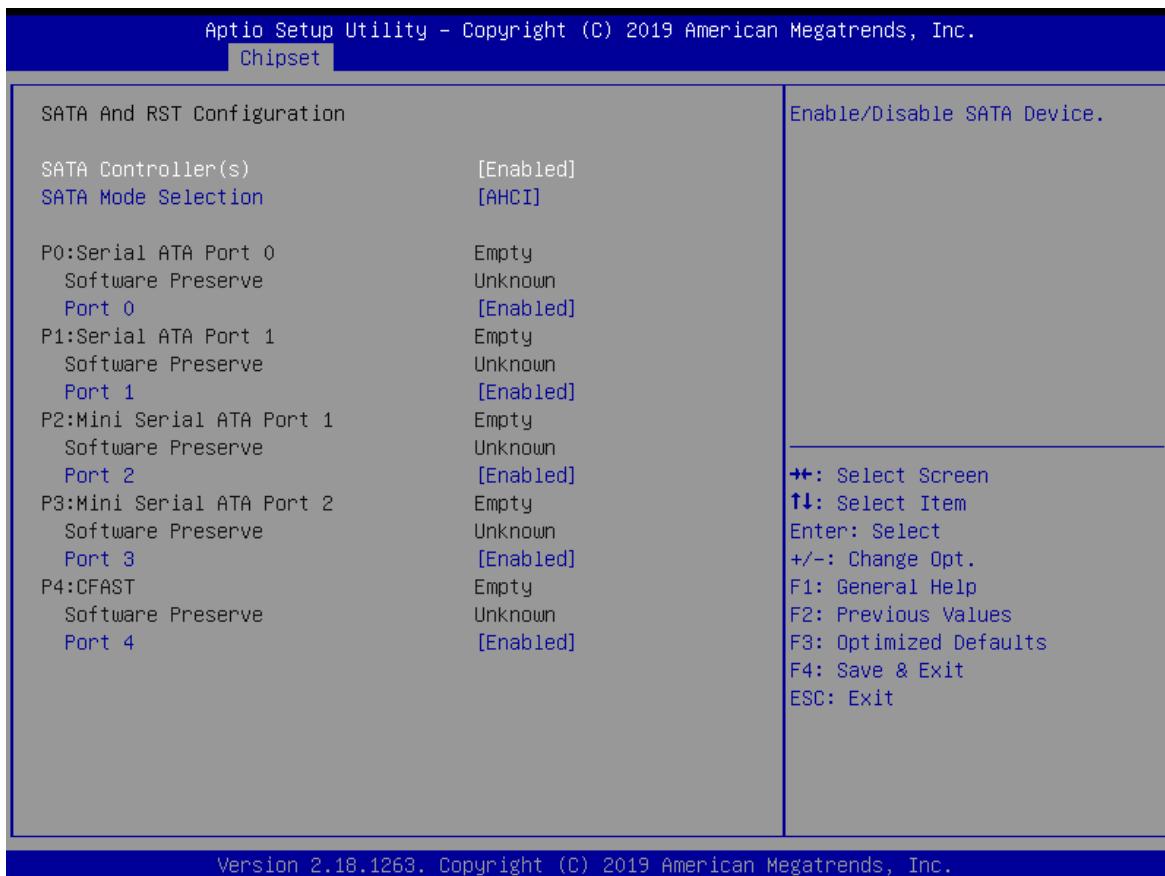
■ **AMT Configuration**
Intel Active Management Technology (AMT) is hardware-based technology for remotely managing and securing PCs out-of-band.

■ **Un-Configure ME**
Use this function to enable or disable Un-Configure ME without password function.

4.3.3 SATA And RST Configuration

```
          Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
          Chipset

 SATA And RST Configuration                                   Enable/Disable SATA Device.

 SATA Controller(s)                 [Enabled]
 SATA Mode Selection                [AHCI]

 P0:Serial ATA Port 0               Empty
   Software Preserve                Unknown
   Port 0                           [Enabled]
 P1:Serial ATA Port 1               Empty
   Software Preserve                Unknown
   Port 1                           [Enabled]
 P2:Mini Serial ATA Port 1          Empty
   Software Preserve                Unknown
   Port 2                           [Enabled]          →←: Select Screen
 P3:Mini Serial ATA Port 2          Empty              ↑↓: Select Item
   Software Preserve                Unknown            Enter: Select
   Port 3                           [Enabled]          +/-: Change Opt.
 P4:CFAST                           Empty              F1: General Help
   Software Preserve                Unknown            F2: Previous Values
   Port 4                           [Enabled]          F3: Optimized Defaults
                                                       F4: Save & Exit
                                                       ESC: Exit



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```

■ **SATA Controller(s)**
   Enable or disable Serial ATA controller.

■ **SATA Mode Selection**
   This item allows users to select mode of SATA controller.
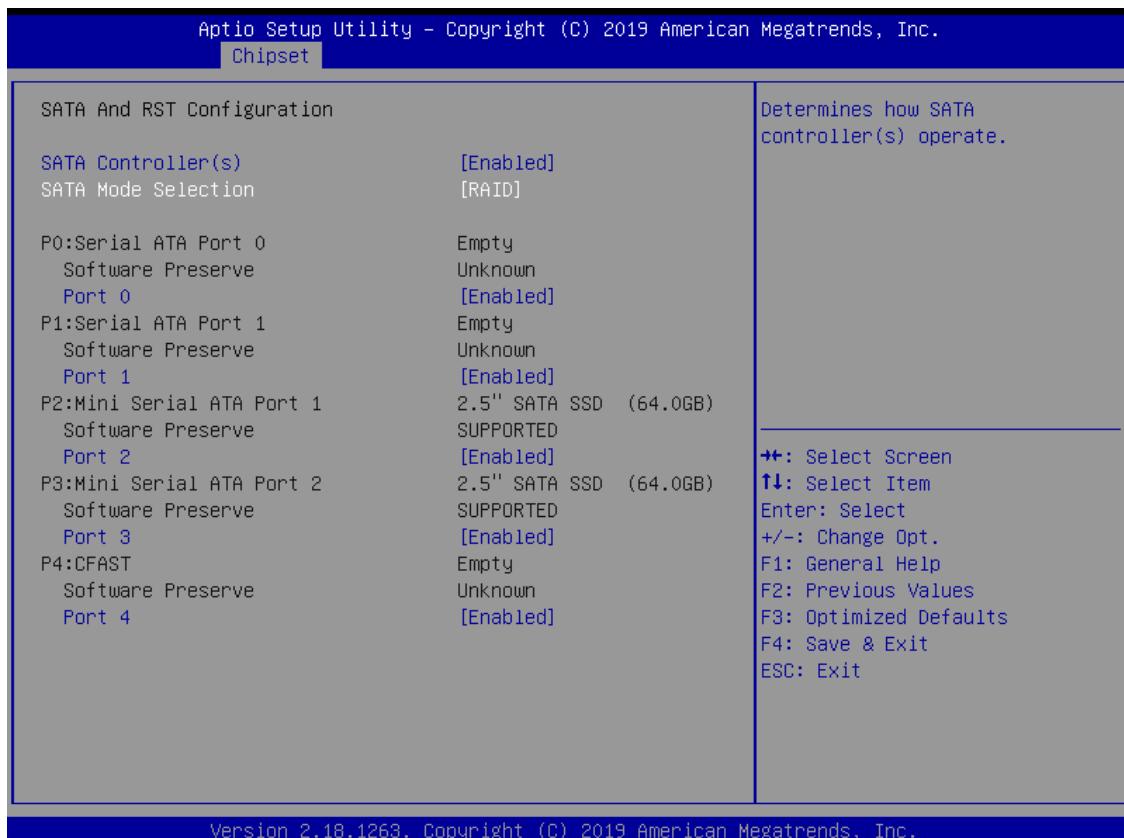
■ **Serial ATA Port 0 / 1 / 2 / 3 / 4**
   This item allows users to enable or disable Serial ATA Port 0 / 1 / 2 / 3 / 4.

4.3.4 RST (UEFI RAID) Configuration
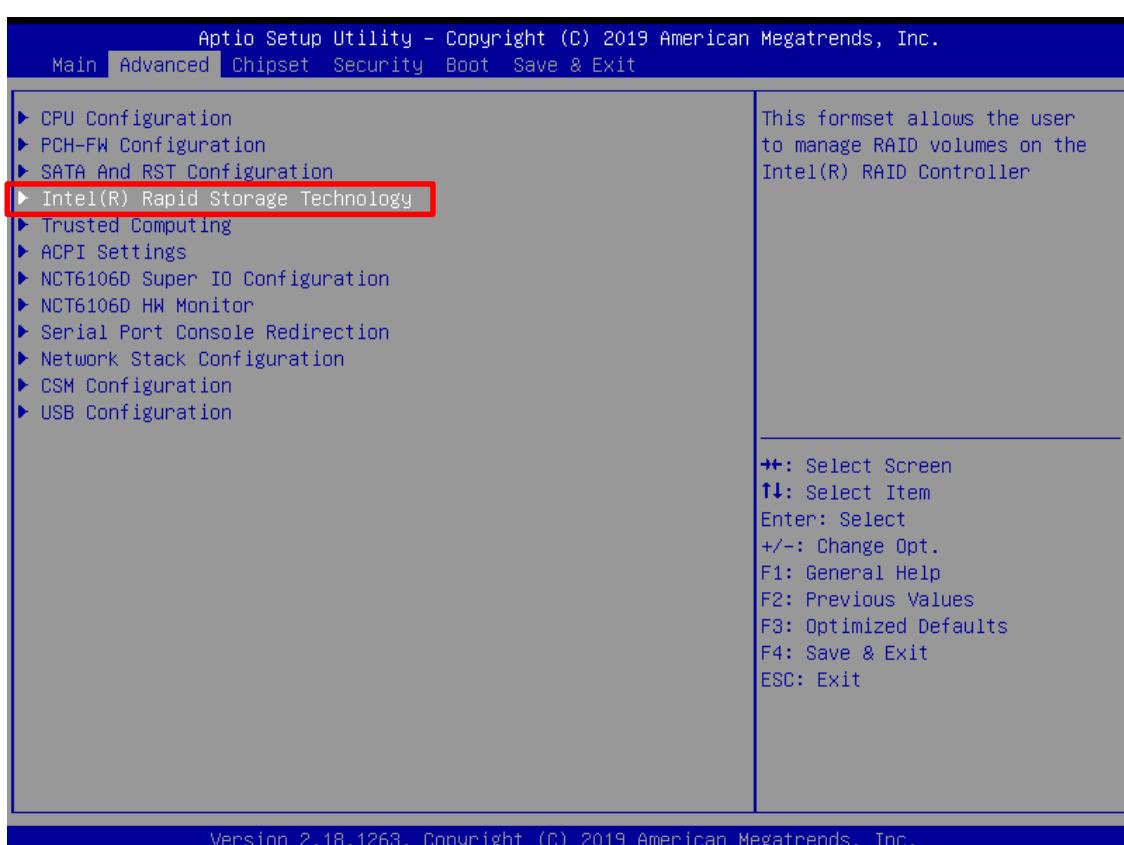
How to set the UEFI RAID:
1. When set to RAID, please save change reset system.
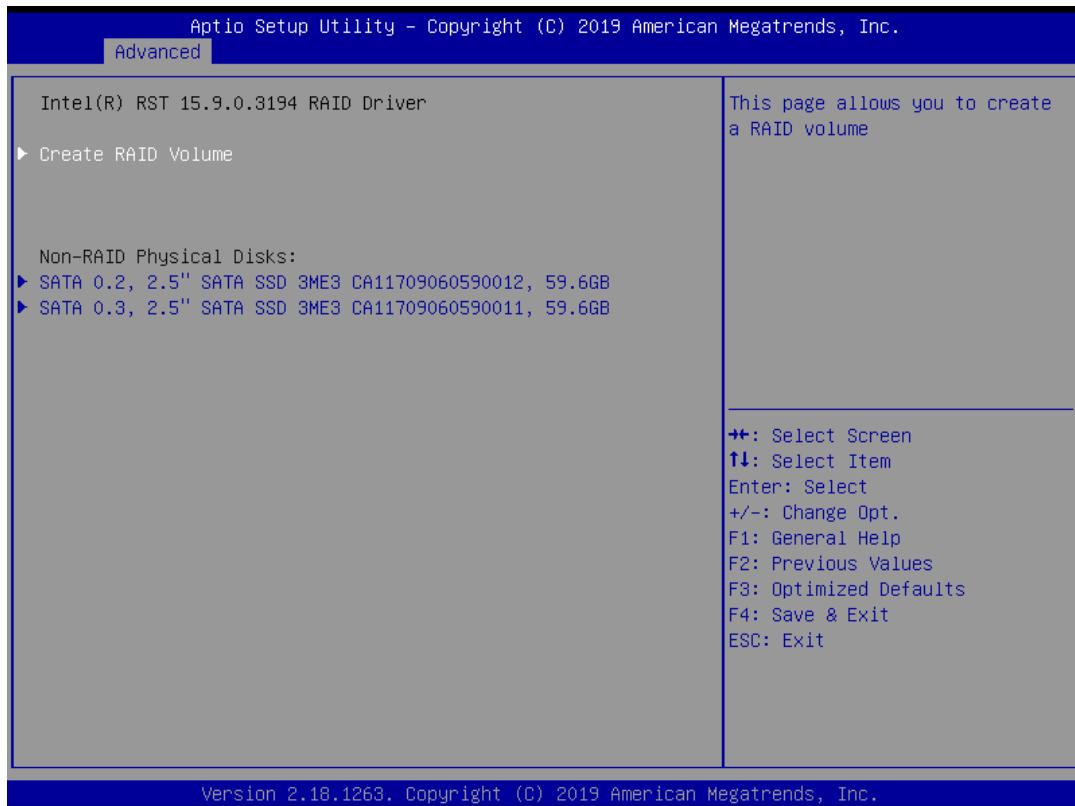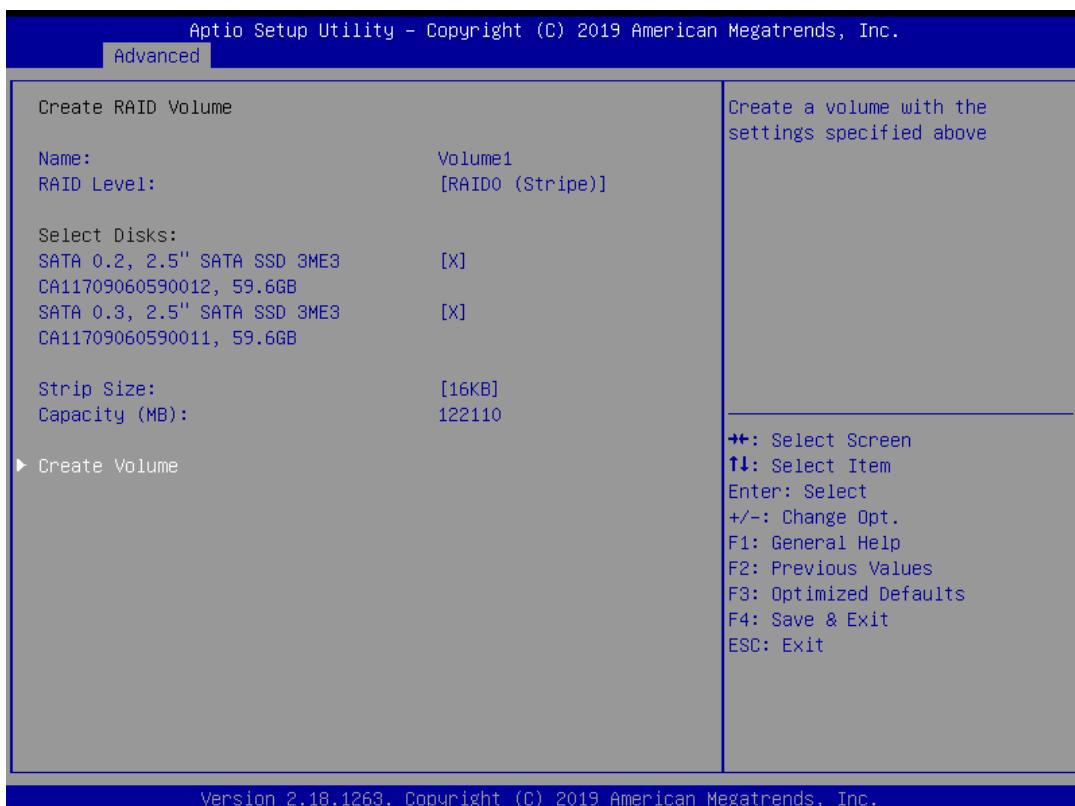
2. After reboot the system, please into BIOS utility and then will see "Intel (R) Rapid Storage Technology"

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

```
             Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
           Advanced

    Intel(R) RST 15.9.0.3194 RAID Driver                    This page allows you to create
                                                            a RAID volume
  ▶ Create RAID Volume


    Non-RAID Physical Disks:
  ▶ SATA 0.2, 2.5" SATA SSD 3ME3 CA11709060590012, 59.6GB
  ▶ SATA 0.3, 2.5" SATA SSD 3ME3 CA11709060590011, 59.6GB




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



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```

4. Start Create the RAID

```
             Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
           Advanced

    Create RAID Volume                                      Create a volume with the
                                                            settings specified above
    Name:                          Volume1
    RAID Level:                    [RAID0 (Stripe)]

    Select Disks:
    SATA 0.2, 2.5" SATA SSD 3ME3      [X]
    CA11709060590012, 59.6GB
    SATA 0.3, 2.5" SATA SSD 3ME3      [X]
    CA11709060590011, 59.6GB

    Strip Size:                    [16KB]
    Capacity (MB):                 122110

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



             Version 2.18.1263. Copyright (C) 2019 American Megatrends, Inc.
```

■ Select Disk that you want to do the RAID

■ Select [x]; No-Select [ ]

4.3.5 Trusted Computing

```
             Aptio Setup Utility – Copyright (C) 2019 American Megatrends, Inc.
     Advanced

  Configuration                                      Enables or Disables BIOS
     Security Device Support        [Disable]        support for security device.
     NO Security Device Found                        O.S. will not show Security
                                                     Device. TCG EFI protocol and
                                                     INT1A interface will not be
                                                     available.


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



             Version 2.18.1263. Copyright (C) 2019 American Megatrends, Inc.
```

4.3.6 ACPI Settings

```
            Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
      Advanced

   ACPI Settings                                          Enables or Disables BIOS ACPI
                                                          Auto Configuration.
   Enable ACPI Auto Configuration        [Enabled]




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




            Version 2.18.1263. Copyright (C) 2019 American Megatrends, Inc.
```

■ **Enable ACPI Auto Configuration**
Enable or disable BIOS ACPI auto configuration.

4.3.7 NCT6106D Super IO Configuration

```
            Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
    Advanced

    NCT6106D Super IO Configuration                          Set Parameters of Serial Port
                                                             1 (COMA)
    Super IO Chip                     NCT6106D
    ▶ Serial Port 1 Configuration
    ▶ Serial Port 2 Configuration
    ▶ Serial Port 3 Configuration
    ▶ Serial Port 4 Configuration
    Watch Dog Timer                   [Disabled]




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




            Version 2.18.1263. Copyright (C) 2019 American Megatrends, Inc.
```

■ **Serial Port 1 Configuration**

```
            Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
    Advanced

    Serial Port 1 Configuration                              Enable or Disable Serial Port
                                                             (COM)
    Serial Port                       [Enabled]
    Device Settings                   IO=3F8h; IRQ=4;

    Change Settings                   [Auto]
    Device Type Select                [RS232]




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




            Version 2.18.1263. Copyright (C) 2019 American Megatrends, Inc.
```

❑ **Serial Port**

This item will allow users to enable or disable serial port.

❑ **Change Settings**

This setting is used to change the address & IRQ settings of the specified serial port.

❑ **Device Type Select**

Change the Serial interface. Select <RS232>, <RS422> or <RS485> interface.

■ **Serial Port 2 Configuration**

```
          Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
     Advanced

 Serial Port 2 Configuration                               Enable or Disable Serial Port
                                                           (COM)
 Serial Port                      [Enabled]
 Device Settings                  IO=2F8h; IRQ=3;

 Change Settings                  [Auto]
 Device Type Select               [RS232]




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



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```

❑ **Serial Port**

This item will allow users to enable or disable serial port.

❑ **Change Settings**

This setting is used to change the address & IRQ settings of the specified serial port.

❑ **Device Type Select**

Change the Serial interface. Select <RS232> ,<RS422> or <RS485> interface

■ **Serial Port 3 Configuration**

```
          Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
     Advanced

 Serial Port 3 Configuration                               Enable or Disable Serial Port
                                                           (COM)
 Serial Port                      [Enabled]
 Device Settings                  IO=3E8h; IRQ=7;

 Change Settings                  [Auto]
 Device Type Select               [RS232]




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



          Version 2.18.1263. Copyright (C) 2019 American Megatrends, Inc.
```

❑ **Serial Port**

This item will allow users to enable or disable serial port.

❑ **Change Settings**

This setting is used to change the address & IRQ settings of the specified serial port.

❑ **Device Type Select**

Change the Serial interface. Select <RS232> ,<RS422> or <RS485> interface.

■ **Serial Port 4 Configuration**

```
            Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
        Advanced

    Serial Port 4 Configuration                              Enable or Disable Serial Port
                                                             (COM)
    Serial Port                       [Enabled]
    Device Settings                   IO=2E8h; IRQ=7;

    Change Settings                   [Auto]
    Device Type Select                [RS232]




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




            Version 2.18.1263. Copyright (C) 2019 American Megatrends, Inc.
```

❑ **Serial Port**
This item will allow users to enable or disable serial port.

❑ **Change Settings**
This setting is used to change the address & IRQ settings of the specified serial port.

❑ **Device Type Select**
Change the Serial interface. Select <RS232> ,<RS422> or <RS485> interface.

■ **Watch dog Timer**

❑ **Watch Dog Timer Count Mode**
Change the Watch dog mode. Select <Second Mode> or <Minute Mode> mode.
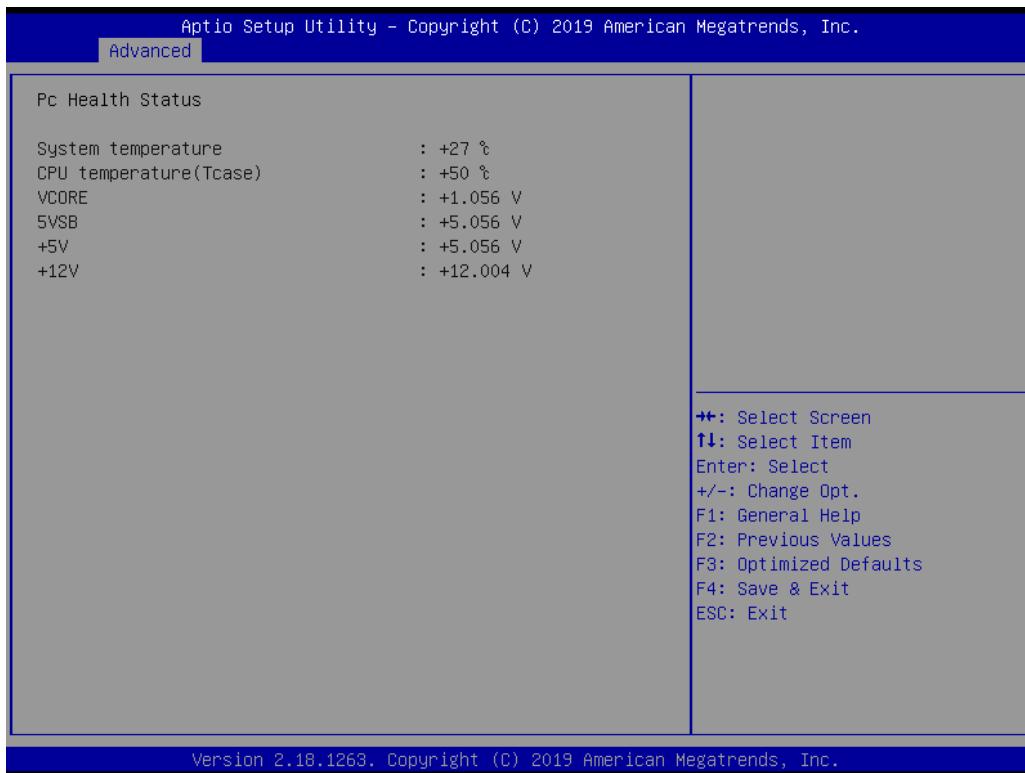
❑ **Watch Dog Timer Time Out Value**
User can set a value in the range of 0 to 255.

4.3.8 NCT6106D HW Monitor
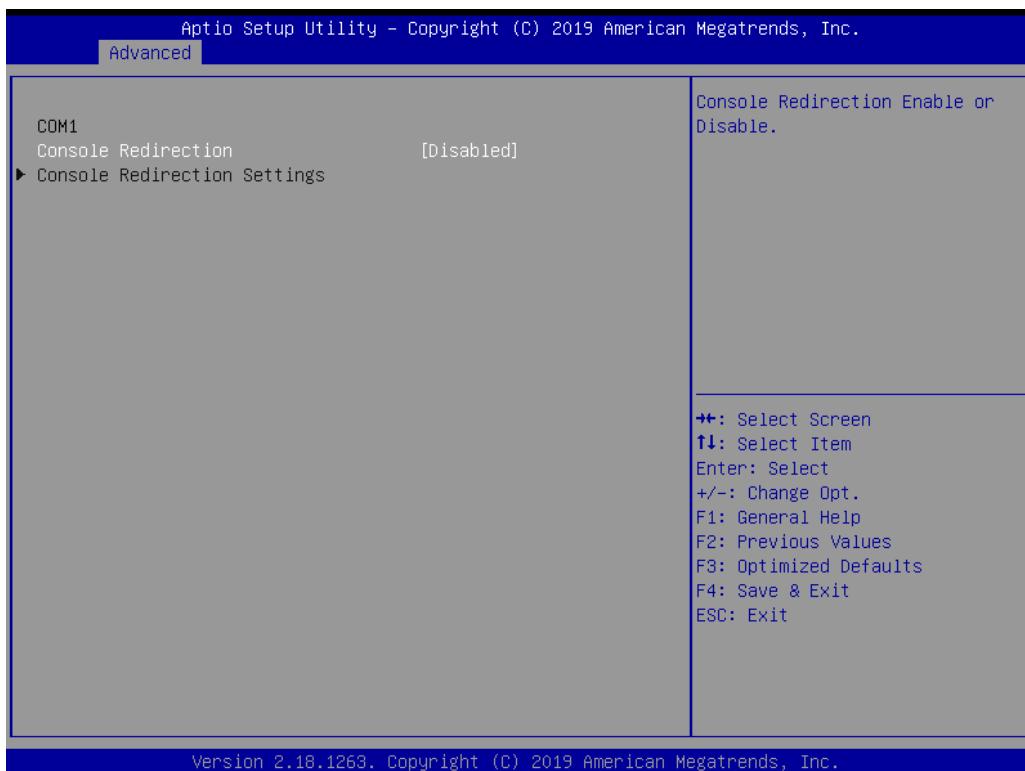
These items display the current status of all monitored hardware devices/components such as voltages, temperatures and all fans' speeds.

```
                Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
          Advanced

Pc Health Status

System temperature              : +27 ℃
CPU temperature(Tcase)          : +50 ℃
VCORE                           : +1.056 V
5VSB                            : +5.056 V
+5V                             : +5.056 V
+12V                            : +12.004 V




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




                Version 2.18.1263. Copyright (C) 2019 American Megatrends, Inc.
```

4.3.9 Serial Port Console Redirection

■ **Console Redirection**

This item allows users to enable or disable console redirection.

```
                Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
          Advanced
                                                    Console Redirection Enable or
                                                    Disable.
COM1
Console Redirection              [Disabled]
▶ Console Redirection Settings




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



                Version 2.18.1263. Copyright (C) 2019 American Megatrends, Inc.
```

4.3.10 Network Stack Configuration

```
            Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
      Advanced

 Network Stack                      [Disabled]              Enable/Disable UEFI Network
                                                            Stack




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



            Version 2.18.1263. Copyright (C) 2019 American Megatrends, Inc.
```

■ **Network Stack**

Use this item to enable or disable UEFI Network Stack.

4.3.11 CSM Configuration

```
              Aptio Setup Utility – Copyright (C) 2019 American Megatrends, Inc.
      Advanced

   Compatibility Support Module Configuration                    Enable/Disable CSM Support.

   CSM Support                         [Enabled]

   CSM16 Module Version                07.81

   GateA20 Active                      [Upon Request]
   Option ROM Messages                 [Force BIOS]
   INT19 Trap Response                 [Immediate]

   Boot option filter                  [UEFI and Legacy]

   Option ROM execution

   PXE Function                        [Do not launch]           →←: Select Screen
   Storage                             [Legacy]                  ↑↓: Select Item
   Video                               [Legacy]                  Enter: Select
   Other PCI devices                   [UEFI]                    +/-: Change Opt.
                                                                 F1: General Help
                                                                 F2: Previous Values
                                                                 F3: Optimized Defaults
                                                                 F4: Save & Exit
                                                                 ESC: Exit

              Version 2.18.1263. Copyright (C) 2019 American Megatrends, Inc.
```

■ **CSM Support**

This item allows you to enable or disable CSM support.

■ **GateA20 Active**

This item allows you to select <Upon Request> or <Always>.

Upon Request: GA20 can be disabled using BIOS services.

Always: Do not allow GA20 disabling. This option is useful when any RT code is executed above 1MB.

■ **Option ROM Messages**

This item allows you to select <Force BIOS> or <Keep Current>.

Force BIOS : The third-party ROM messages will be forced to display during the boot sequence.

Keep Current : The third-party ROM messages will be displayed only if the third-party manufactured had set the add-on device to do so.

■ **INT19 Trap Response**

BIOS reaction on INT19 trapping by Option ROM: Immediate - execute the trap right away; Postponed - execute the trap during legacy boot.

■ **Boot option filter**

This item allows you to select which type of operating system to boot.

UEFI and Legacy: Allows booting from operating systems that support legacy option ROM or UEFI option ROM.

Legacy only: Allows booting from operating systems that only support legacy option ROM.

UEFI only: Allows booting from operating systems that only support UEFI option ROM.

■ **PXE Function**

This item controls the execution of UEFI and PXE option ROM. Select <Do not launch>, <UEFI> or <Legacy>.

■ **Storage**

This setting allows you to select whether to enable the UEFI or legacy option ROM for the storage device controller. Select <Do not launch>, <UEFI> or <Legacy>.
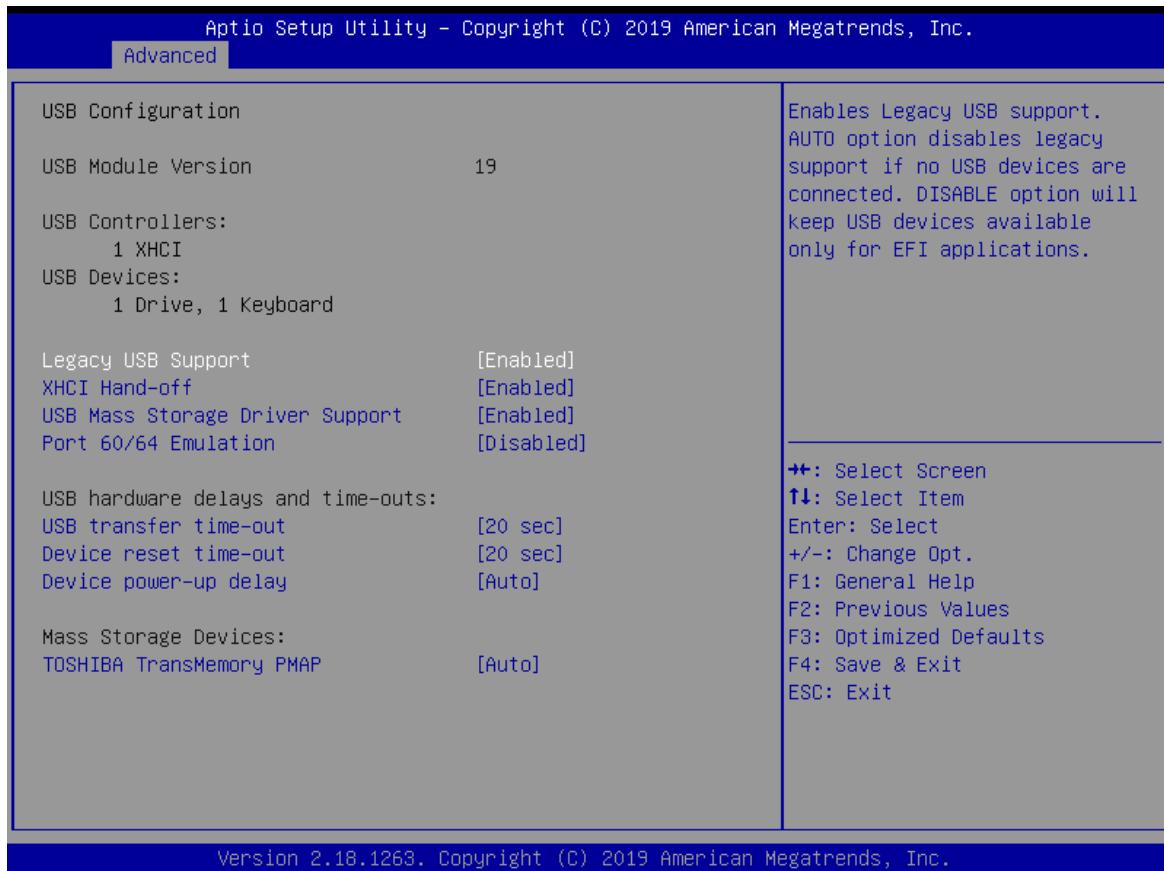
■ **Video**

This setting allows you to select whether to enable the UEFI or legacy video option ROM for the video device controller. Select <Do not launch>, <UEFI> or <Legacy>.

■ **Other PCI devices**

This item determines option ROM execution policy for devices other than Network, storage or video. Select <Do not launch>, <UEFI> or <Legacy>.

4.3.12 USB Configuration

```
            Aptio Setup Utility – Copyright (C) 2019 American Megatrends, Inc.
   Advanced

 USB Configuration                                    Enables Legacy USB support.
                                                      AUTO option disables legacy
 USB Module Version            19                     support if no USB devices are
                                                      connected. DISABLE option will
 USB Controllers:                                     keep USB devices available
     1 XHCI                                           only for EFI applications.
 USB Devices:
     1 Drive, 1 Keyboard

 Legacy USB Support           [Enabled]
 XHCI Hand-off                [Enabled]
 USB Mass Storage Driver Support  [Enabled]
 Port 60/64 Emulation         [Disabled]
                                                      →←: Select Screen
 USB hardware delays and time-outs:                   ↑↓: Select Item
 USB transfer time-out        [20 sec]                Enter: Select
 Device reset time-out        [20 sec]                +/-: Change Opt.
 Device power-up delay        [Auto]                  F1: General Help
                                                      F2: Previous Values
 Mass Storage Devices:                                F3: Optimized Defaults
 TOSHIBA TransMemory PMAP     [Auto]                  F4: Save & Exit
                                                      ESC: Exit


            Version 2.18.1263. Copyright (C) 2019 American Megatrends, Inc.
```

■ **Legacy USB Support**
This item allows you to select <Enabled>, <Disabled> or <Auto>.
Enabled: To enable legacy USB support.
Disabled: To keep USB devices available only for EFI specification,
Auto: To disable legacy support if no USB devices are connected.

■ **XHCI Hand-off**
This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver. Select <Enabled> or <Disabled>.

■ **USB Mass Storage Driver Support**
Enables or disables support for USB storage devices.

■ **Port 60/64 Emulation**
This feature enables or disables I/O port 60h/64h emulation support. This should be enabled for complete USB keyboard legacy support for non-USB-aware Operating Systems.

■ **USB Transfer time-out**
Use this item to set the time-out value for control, bulk, and interrupt transfers. Select <1 sec>, <5 sec>, <10 sec> or <20 sec>.

■ **Device reset time-out**
Use this item to set USB mass storage device start unit command time-out. Select <10 sec>, <20 sec>, <30 sec> or <40 sec>.
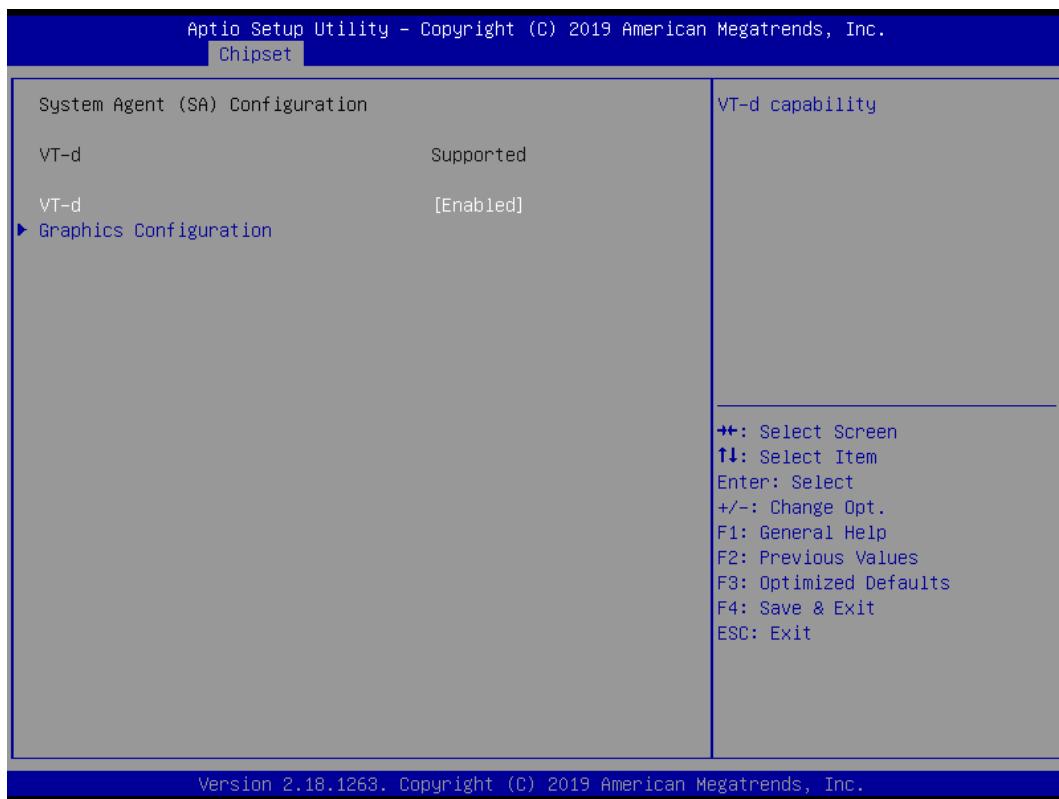
■ **Device power-up delay**
Maximum time the device will take before it properly reports itself to the Host Controller. "Auto" uses default value: for a Root port it is 100ms, for a Hub port the delay is taken from Hub descriptor.

4.4 Chipset

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

```
            Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
    Main  Advanced  Chipset  Security  Boot  Save & Exit

 ▶ System Agent (SA) Configuration                         System Agent (SA) Parameters
 ▶ PCH-IO Configuration




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



            Version 2.18.1263. Copyright (C) 2019 American Megatrends, Inc.
```

4.4.1 System Agent (SA) Configuration

```
            Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
                   Chipset

   System Agent (SA) Configuration                         VT-d capability

   VT-d                            Supported

   VT-d                            [Enabled]
 ▶ Graphics Configuration




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



            Version 2.18.1263. Copyright (C) 2019 American Megatrends, Inc.
```

■ **VT-d**

This item allows users to enable or disable VT-d.

■ **Graphic Configuration**

```
          Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
            Chipset

 Graphics Configuration                                    Select the GTT Size

 GTT Size                        [8MB]
 Aperture Size                   [256MB]
 DVMT Pre-Allocated              [32M]
 DVMT Total Gfx Mem              [256M]




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




          Version 2.18.1263. Copyright (C) 2019 American Megatrends, Inc.
```

❑ **GTT Size**

This item allows you to change the GTT size.

❑ **Aperture Size**

Aperture size optimal between 128MB, 256MB, 512MB, 1024MB or 2048MB.

❑ **DVMT Pre-Allocated**
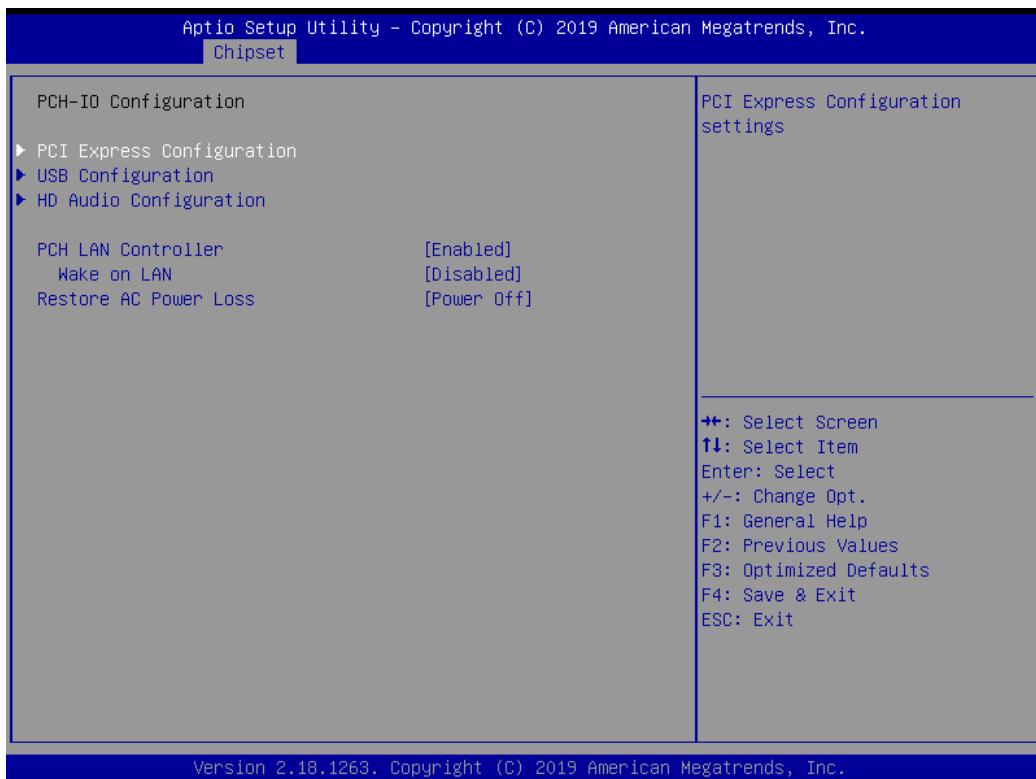
DVMT pre-allocated (fixed) Graphics memory size optimal from 0M to 60M.

❑ **DVMT Total Gfx Mem**
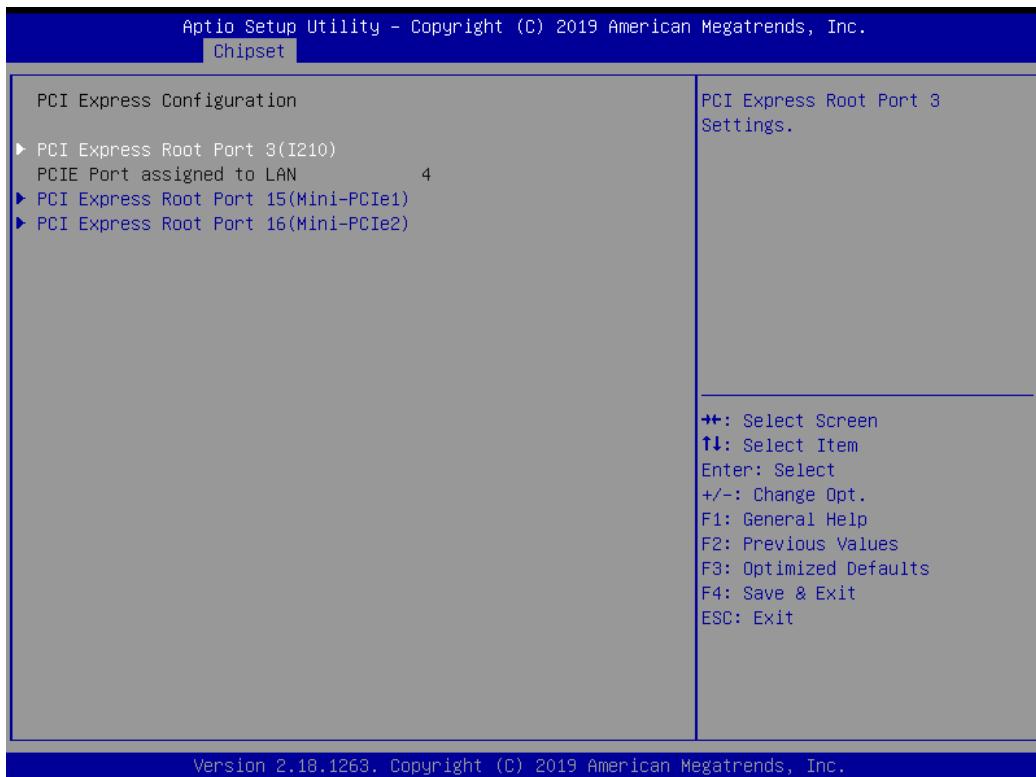
DVMT Total Gfx Mem optimal Between 128M, 256M or MAX.

4.4.2 PCH-IO Configuration
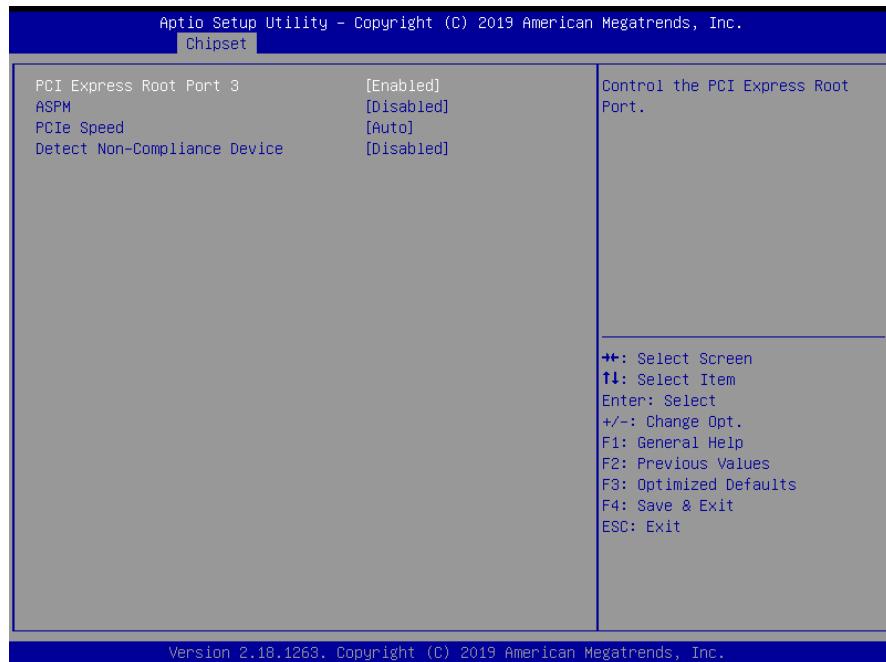
This section allows you to configure the chipset.

```
            Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
              Chipset

   PCH-IO Configuration                                    PCI Express Configuration
                                                           settings
 ▶ PCI Express Configuration
 ▶ USB Configuration
 ▶ HD Audio Configuration

   PCH LAN Controller              [Enabled]
     Wake on LAN                   [Disabled]
   Restore AC Power Loss           [Power Off]




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




            Version 2.18.1263. Copyright (C) 2019 American Megatrends, Inc.
```

■ **PCI Express Configuration**

```
            Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
              Chipset

   PCI Express Configuration                               PCI Express Root Port 3
                                                           Settings.
 ▶ PCI Express Root Port 3(I210)
   PCIE Port assigned to LAN          4
 ▶ PCI Express Root Port 15(Mini-PCIe1)
 ▶ PCI Express Root Port 16(Mini-PCIe2)




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




            Version 2.18.1263. Copyright (C) 2019 American Megatrends, Inc.
```

❑ **PCI Express Root Port 3 / 15 / 16**

```
                Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
                   Chipset

  PCI Express Root Port 3          [Enabled]           Control the PCI Express Root
  ASPM                             [Disabled]          Port.
  PCIe Speed                       [Auto]
  Detect Non-Compliance Device     [Disabled]




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




                Version 2.18.1263. Copyright (C) 2019 American Megatrends, Inc.
```

✓ **PCI Express Port 3 / 15 / 16**
This item allows you to enable or disable PCI Express Port 3 / 15 / 16 in the chipset.

✓ **ASPM**
This item allows you to select the ASPM state for energy-saving. Select <Disabled> ,<L0s>, <L1>, <L0sL1> or <Auto>
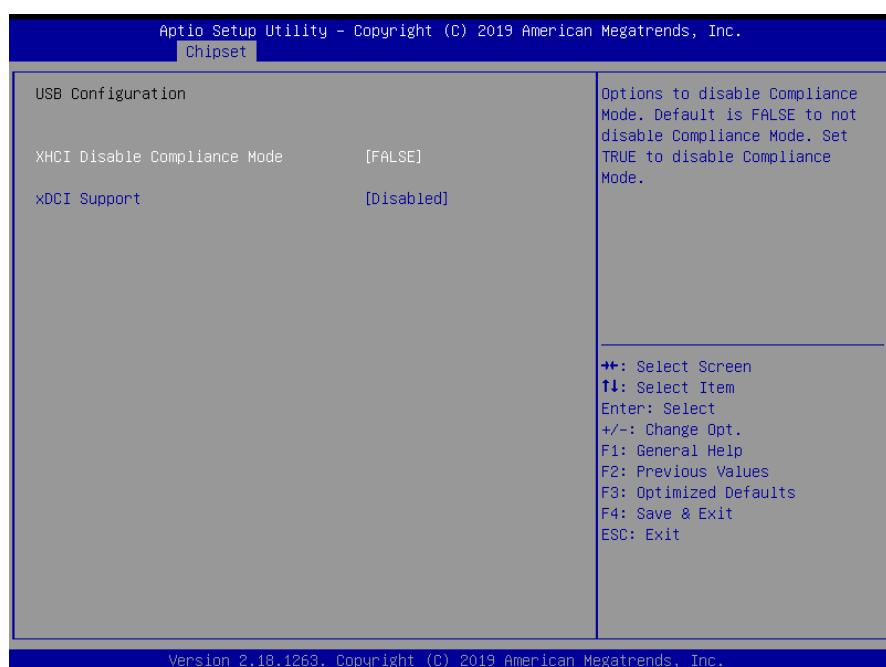
✓ **PCIe Speed**
Change the PCIe Port Speed. Select <AUTO> ,<Gen 1> or <Gen 2>

✓ **Detect Non-Compliance Device**
Detect Non-Compliance PCI Express Device. If enable, it will take more time at POST time.

■ **USB Configuration**

```
                Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
                   Chipset

  USB Configuration                                    Options to disable Compliance
                                                       Mode. Default is FALSE to not
                                                       disable Compliance Mode. Set
  XHCI Disable Compliance Mode     [FALSE]             TRUE to disable Compliance
                                                       Mode.
  xDCI Support                     [Disabled]




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




                Version 2.18.1263. Copyright (C) 2019 American Megatrends, Inc.
```

❑ **XHCI Disable Compliance mode**
Options to disable compliance mode. Default is FALSE enable compliance mode.
Set TRUE to disable compliance mode.

❑ **xDCI Support**
This item will allow users to enable or disable xDCI Support.

■ **HD Audio Configuration**

```
              Aptio Setup Utility – Copyright (C) 2019 American Megatrends, Inc.
                Chipset

   HD Audio Subsystem Configuration Settings          Control Detection of the
                                                      HD-Audio device.
   HD Audio                        [Auto]             Disabled = HDA will be
                                                      unconditionally disabled
                                                      Enabled = HDA will be
                                                      unconditionally enabled
                                                      Auto = HDA will be enabled if
                                                      present, disabled otherwise.


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



              Version 2.18.1263. Copyright (C) 2019 American Megatrends, Inc.
```

❑ **HD Audio**

Control detection of the HD-Audio device. This item allows you to select <Enabled>, <Disabled> or <Auto>.
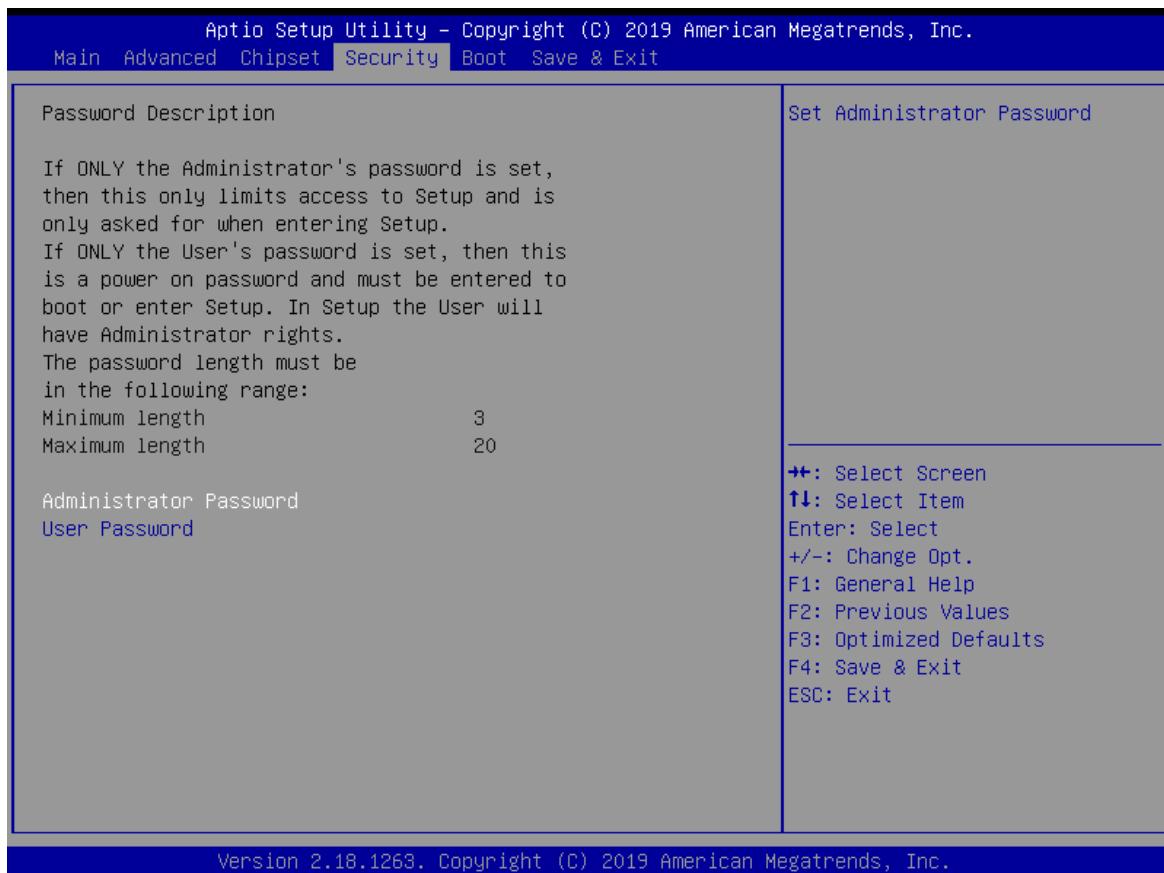
Disabled: Azalia will be unconditionally be disabled.

Enabled: Azalia will be unconditionally be enabled.

Auto: Azalia will be enabled if present, disabled otherwise.

4.5 Security

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

```
              Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
     Main  Advanced  Chipset  Security  Boot  Save & Exit

     Password Description                               Set Administrator Password

     If ONLY the Administrator's password is set,
     then this only limits access to Setup and is
     only asked for when entering Setup.
     If ONLY the User's password is set, then this
     is a power on password and must be entered to
     boot or enter Setup. In Setup the User will
     have Administrator rights.
     The password length must be
     in the following range:
     Minimum length                    3
     Maximum length                    20                ───────────────────────────

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




              Version 2.18.1263. Copyright (C) 2019 American Megatrends, Inc.
```

■ **Administrator Password**

This item allows you to set Administrator Password.

■ **User Password**

This item allows you to set User Password.

4.6 Boot

This menu allows you to setup the system boot options.

```
           Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
     Main  Advanced  Chipset  Security  Boot  Save & Exit

   Boot Configuration                                      Number of seconds to wait for
   Setup Prompt Timeout            1                       setup activation key.
   Bootup NumLock State            [On]                    65535(0xFFFF) means indefinite
   Full Screen Logo Show           [Disabled]              waiting.

   Boot Option Priorities
   Boot Option #1                  [UEFI: TOSHIBA
                                   TransMemory PMAP,
                                   Partition 1]
   Boot Option #2                  [TOSHIBA TransMemory
                                   PMAP]


   Hard Drive BBS Priorities                               →←: Select Screen
                                                           ↑↓: Select Item
                                                           Enter: Select
                                                           +/-: Change Opt.
                                                           F1: General Help
                                                           F2: Previous Values
                                                           F3: Optimized Defaults
                                                           F4: Save & Exit
                                                           ESC: Exit




           Version 2.18.1263. Copyright (C) 2019 American Megatrends, Inc.
```

■ **Setup Prompt Timeout**
This item sets number of seconds to wait for setup activation key.

■ **Bootup NumLock State**
This item selects the keyboard NumLock state. Select <On> or <Off>.

■ **Full Screen Logo Show**
This item allows you to enable or disable Full Screen Logo Show function.

■ **Hard Driver BBS Priorities**
The items specify the boot device priority sequence from the available devices. The number of device items that appears on the screen depends on the number of devices installed in the system.

4.7 Save & Exit

This setting allows users to configure the boot settings.

```
          Aptio Setup Utility – Copyright (C) 2019 American Megatrends, Inc.
   Main  Advanced  Chipset  Security  Boot  Save & Exit

   Save Options                                    Reset the system after saving
   Save Changes and Reset                          the changes.
   Discard Changes and Reset

   Default Options
   Restore Defaults



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


          Version 2.18.1263. Copyright (C) 2019 American Megatrends, Inc.
```

■ **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

Psuedo Code

```
#define AddrPort                0x2E
#define DataPort                0x2F
#define SIO_UnLock_Value        0x87
#define SIO_Lock_Value          0xAA
#define WATCHDOG_LDN            0x07

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

//Enter WATCHDOG LDN
WriteByte (AddrPort, 0x07);
WriteByte (DataPort, WATCHDOG_LDN);

//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, SIO_Lock_Value);
```
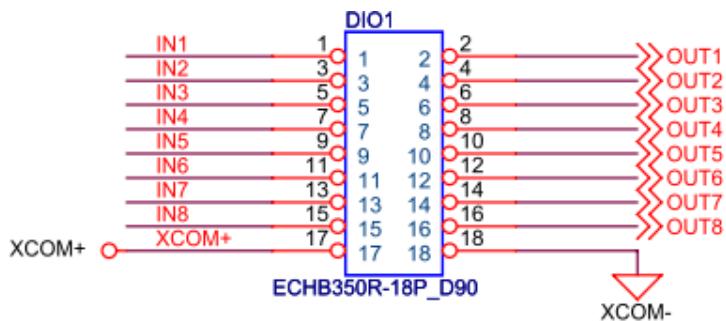
GPIO Sample Code

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 is described as below.

Psuedo 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);
```