# USER'S MANUAL

## VCO-6020-1050TI

### GPU Computing System

# Table of Contents

# Prefaces

## Revision

| Revision | Description | Date |
|---|---|---|
| 1.0 | Manual Released | 2019/08/29 |

## Disclaimer

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## Environmental Protection Announcement

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

# Safety Precautions

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

- Put this equipment on a reliable surface during installation. Dropping it or letting it fall could cause damage.
- The power outlet shall be installed near the equipment and shall be easily accessible.
- Turn off the system power and disconnect the power cord from its source before making any installation. Be sure both the system and the external devices are turned OFF. Sudden surge
- of power could ruin sensitive components. Make sure the equipment is properly grounded.
- When the power is connected, never open the equipment. The equipment should be opened only by qualified service personnel.
- Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
- Disconnect this equipment from the power before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
- Avoid the dusty, humidity and temperature extremes.
- Do not place heavy objects on the equipment.
- If the equipment is not used for long time, disconnect it from the power to avoid being damaged by transient over-voltage.
- The storage temperature shall be above -40°C and below 85°C.
- The computer is provided with a battery-powered real-time clock circuit. There is a danger of explosion if incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.
- If one of the following situation arises, get the equipment checked be service personnel:
    - The power cord or plug is damaged.
    - Liquid has penetrated into the equipment.
    - The equipment has been exposed to moisture.
    - The equipment does not work well or it cannot work according the user's manual.
    - The equipment has been dropped and damaged.
    - The equipment has obvious signs of breakage.

## Technical Support and Assistance

1. Visit the C&T Solution 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 | VCO-6020-1050TI 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 |
|---|---|
| VCO-6020-1050TI | GPU Computing System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, GTX 1050Ti Integrated |

# Optional Accessories

| Model No. | Product Description |
|---|---|
| 1-E09A22102 | Adapter AC/DC 24V 9.2A 220W 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 GPU series adopts 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 (LGA 1151) which promises breakthrough performance and power efficiency over previous micro-architectures for high performance graphics, dramatic high-resolution video playback, outstanding system performance and responsiveness, and stronger security. It is designed with customers in mind to deliver an excellent system performance, higher reliability and robustness in a compact construction.

C&T GPU Computing System is your great solution for Machine Vision, Embedded System, Traffic Vision, Telemedicine, Intelligent Control, Deep Learning, Artificial Intelligence, Voice Reorganization and any graphics performance driven Industry 4.0/IIoT applications.

## 1.1.1 Key Features

- Support 6th & 7th Gen Intel® Core™ i7 / i5 / i3 / Pentium® / Celeron® Desktop Processor (LGA 1151)
- Intel® Q170 chipset
- NVIDIA GeForce® GTX 1050 Ti Graphics engine based on NVIDIA Pascal™ GPU architecture
- 2x DDR4 SODIMM. max up to 32GB
- 6x display interface supported by 2x DVI-I, 3x DisplayPort, 1x HDMI
- 2x Intel® GbE supporting Wake-on-LAN and PXE
- 2x 2.5" SATA HDD Bay, 2x mSATA (shared by 2x mini PCIe), 1x CFast
- 3x full-size mini PCIe for communication or expansion modules
- 4x RS-232/422/485 (w/ 2x internal), 4x USB 3.0
- 8x DI + 8x DO with isolation
- 9 to 50VDC wide range power input supporting AT/ATX mode
- -25°C to 70°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

### Chipset
- Intel® Q170 Express Chipset

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

### Display
**6 Display Interfaces**
- 2x DVI-I
- 3x DisplayPort
- 1x HDMI

### Expansion
- 3x Full-size Mini PCIe Socket for Wi-Fi / GSM / Expansion Module (shared by 2x mSATA)

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

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

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

### Storage
- 2x Removable 2.5" SATA HDD Bay with RAID 0, 1, 5, 10 support
- 2x mSATA (shared by 2x Mini PCIe)
- 1x CFast

### I/O Ports
- 4x USB 3.0 Port
- 8 Isolated DI and 8 Isolated DO Port
- 2x DB9 for COM1~2, Support RS232/422/485 with Auto Flow Control
- 2x Internal connector for COM3~4, Support RS232/422/485 with Auto Flow Control
- 2x Antenna Hole
- 1x Power Switch
- 1x AT/ATX Switch

### 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/9.2A, 220W Power Adapter

### Environment
- Operating Temperature: Ambient with Air Flow: -25°C to 70°C (with Industrial Grade Peripherals)
- Storage Temperature: -40°C to 85°C
- Relative humidity: 10%~95% (non-condensing)

### Physical
- Dimension: 137 (W) x 256 (D) x 240 (H) mm
- Weight: 7.71 kg
- Construction: Extruded Aluminum with Heavy Duty Metal
- Mounting: Wall / Book Mounting
  DIN-Rail Mounting (Optional)

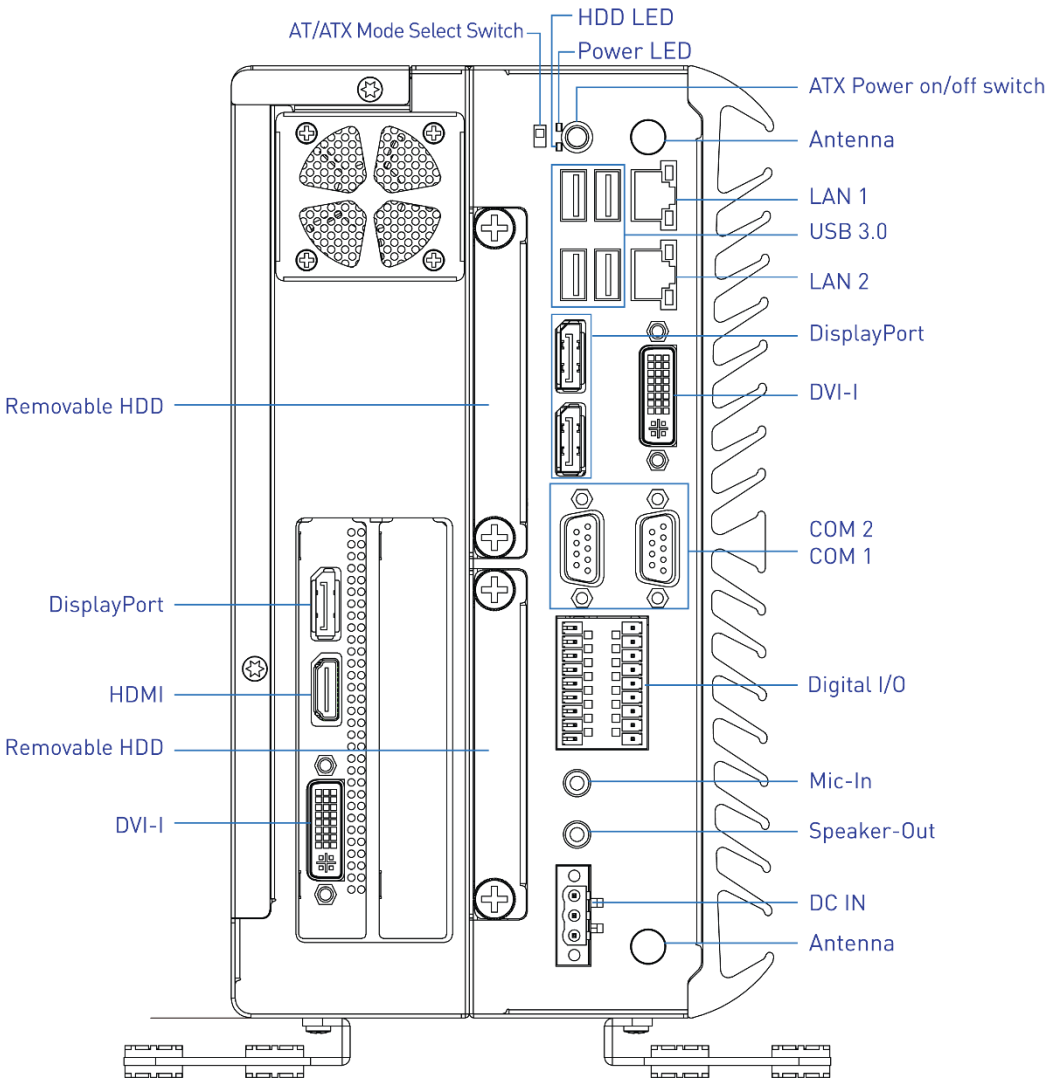
### Operating System
- 6th Gen CPU: Windows 10, Windows 7, WES7
- 7th Gen CPU: Windows 10
- Linux kernel 4.X

### Certifications
- CE, FCC Class A

# 1.3 System I/O

## Front Panel

**DC IN**
Used to plug a DC power input with terminal block
**Speak-out**
Used to connect a speaker
**Mic-in**
Used to connect a microphone
**Digital I/O Terminal Block**
The Digital I/O terminal block supports 8 digital input and 8 digital output
**COM port**
COM1 ~ COM2 support RS232/422/485 serial device
**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
**HDMI**
Used to connect a HDMI monitor
**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
**ATX power on/off switch**
Press to power-on or power-off the system
**AT/ATX mode select switch**
Used to select AT or ATX power mode
**Power LED**
Indicates the power status of the system
**HDD port**
Removable 2.5" SATA HDD Area
**Antenna hole**
Used to connect an antenna for optional Mini-PCIe WiFi module

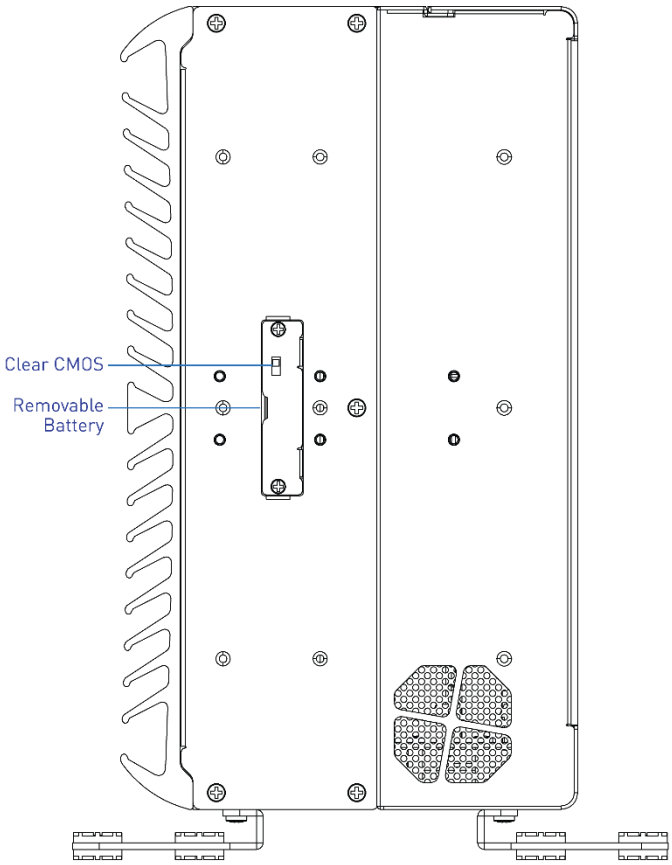


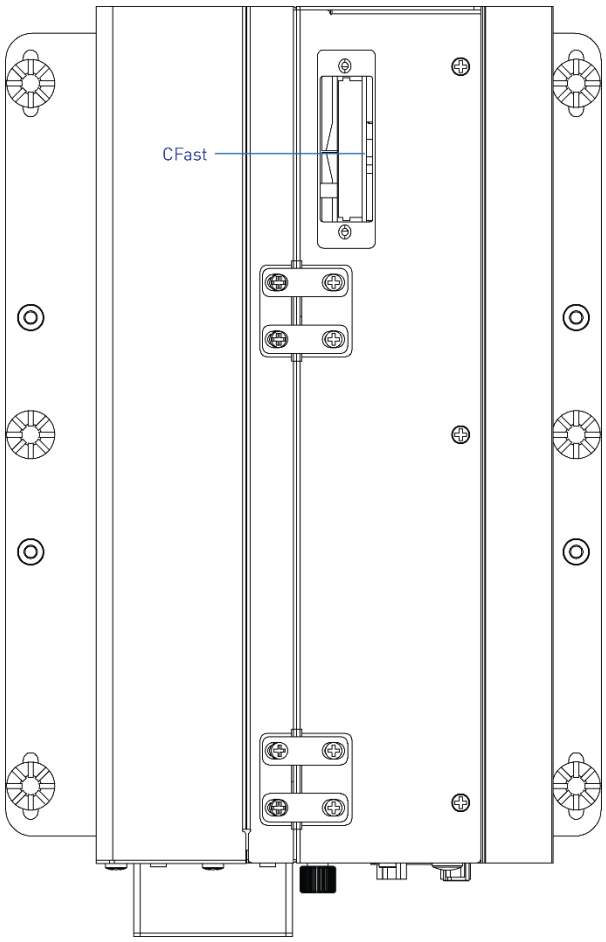
## Rear Panel & Top View

**Clear CMOS**
Used to clear CMOS

**Removable Battery**
Used to insert CMOS battery

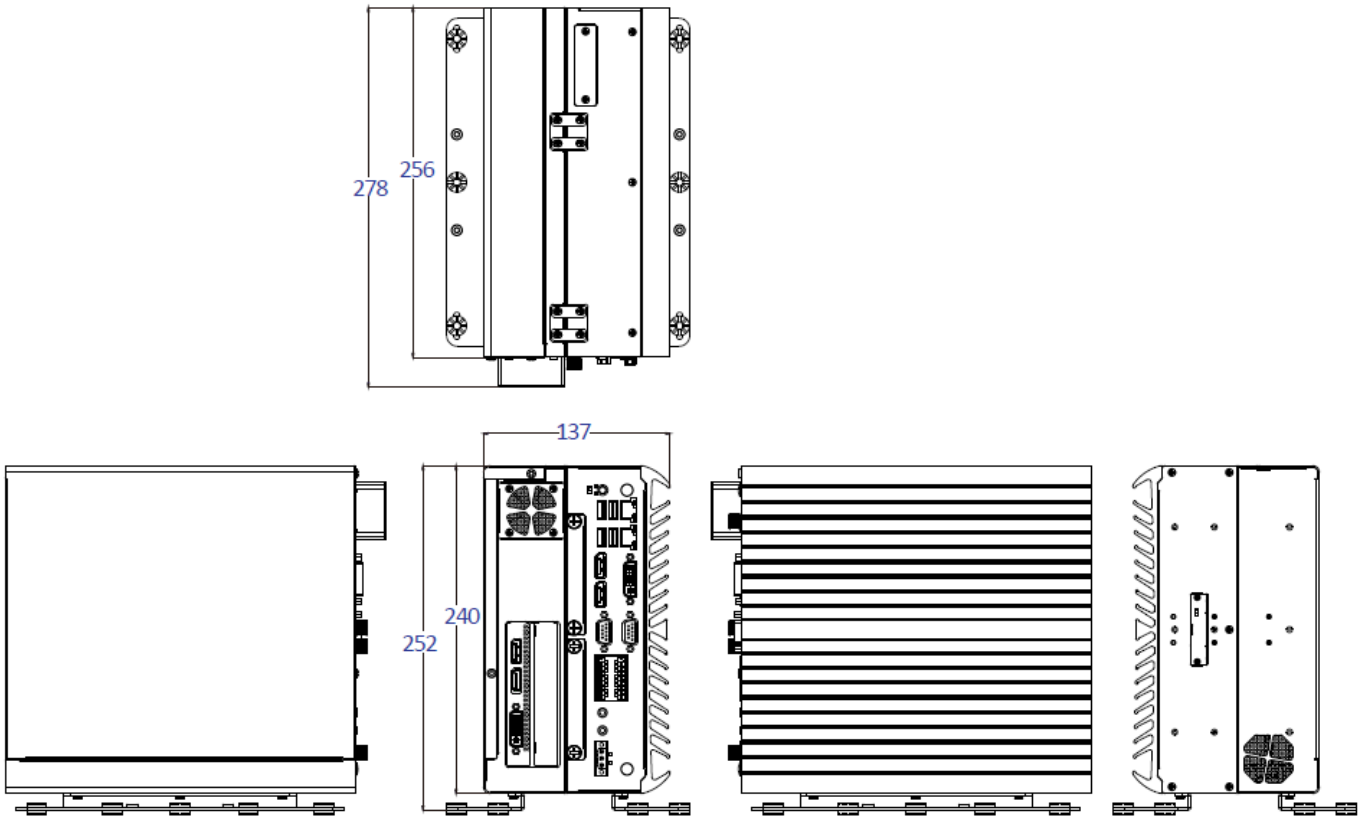
**CFast Socket**
Used to insert CFast card



# 1.4 Mechanical Dimensions

Unit: mm

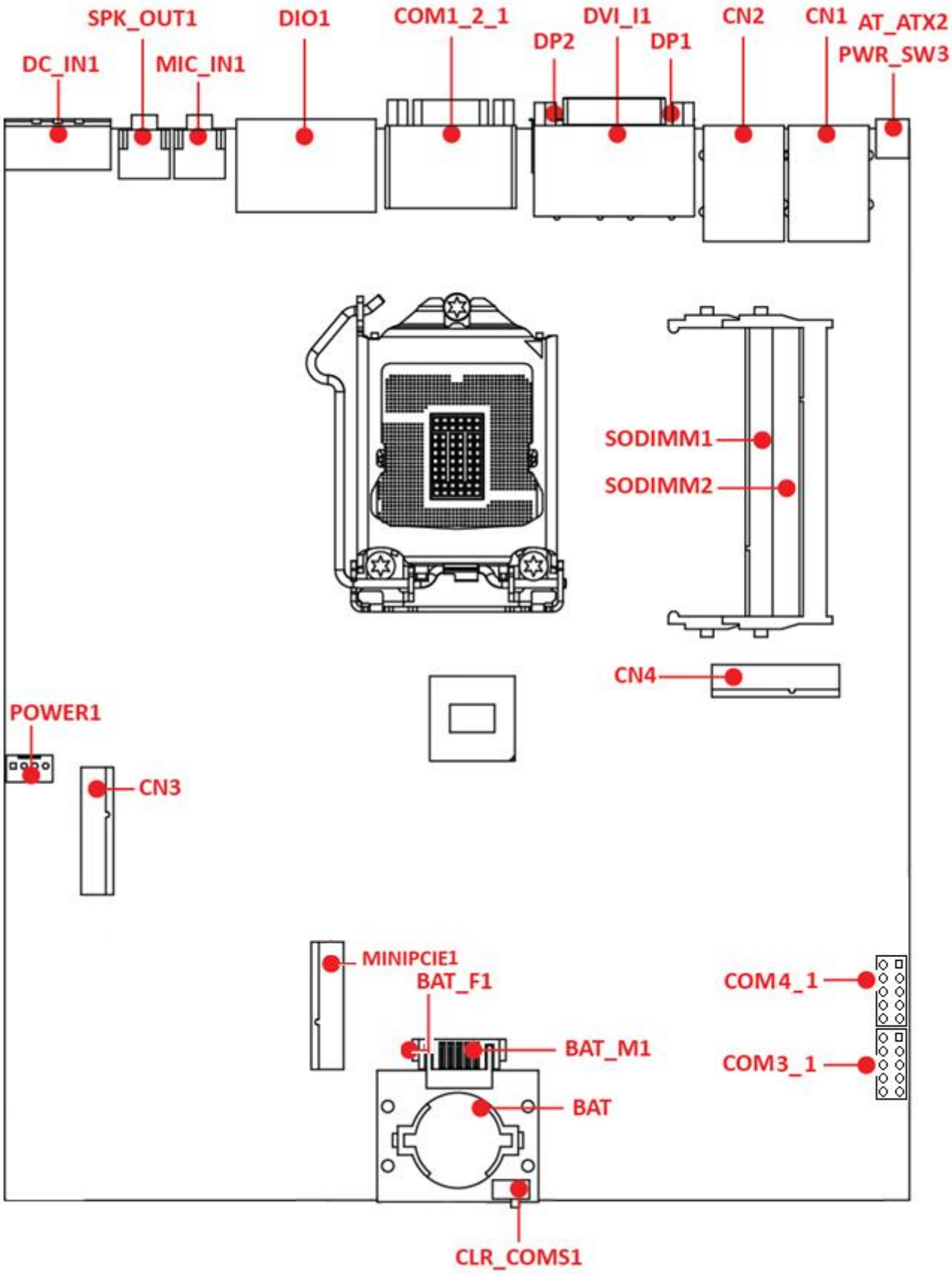


Chapter 2

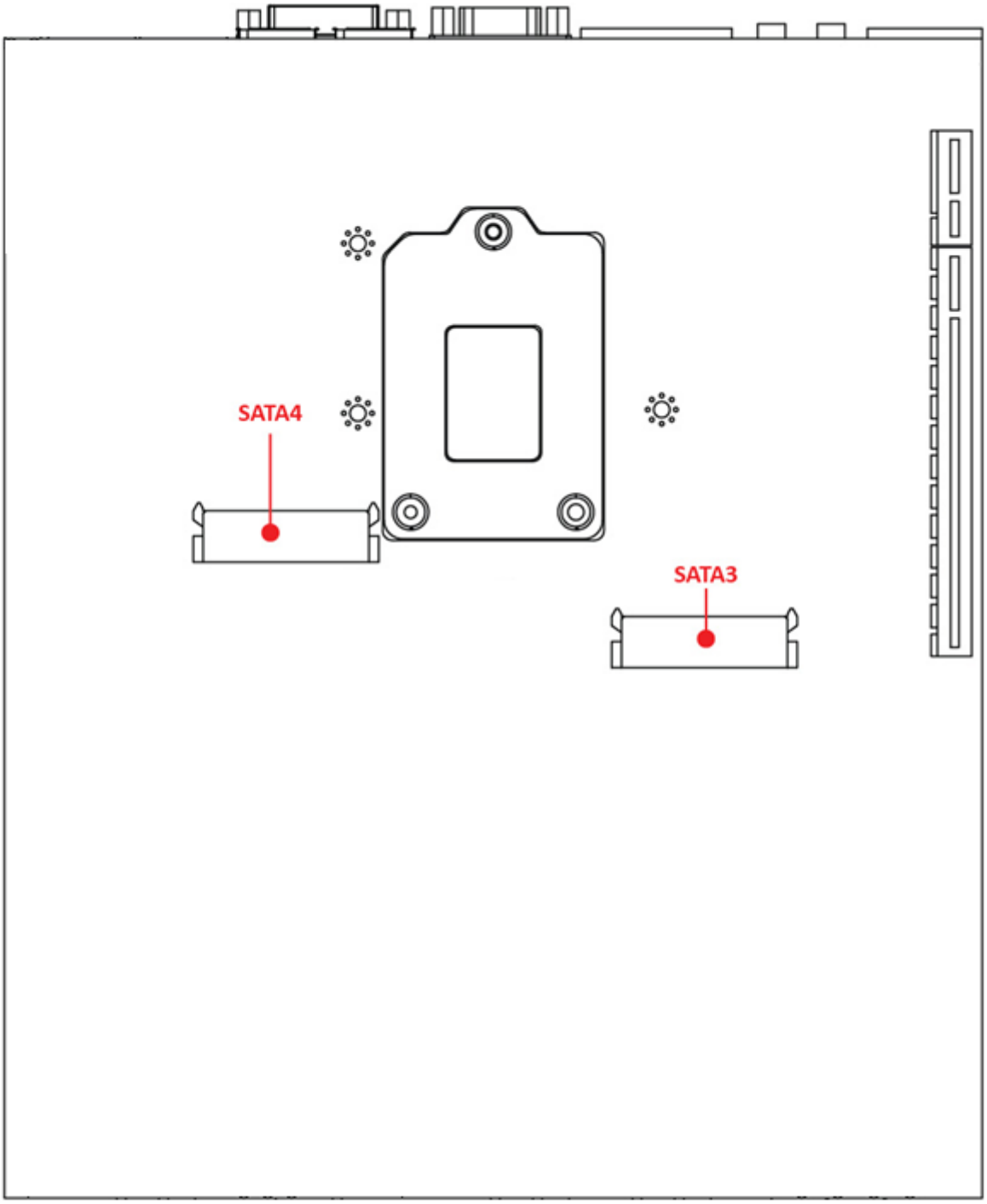
# Switches and Connectors

# 2.1 Switch and Connector Locations

### 2.1.1 Top View



### 2.1.2 Bottom View



## 2.2 Connector / Switch Definition

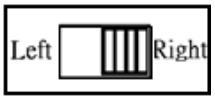
**List of Connector / Switch**

| Connector Location | Definition |
|---|---|
| AT_ATX2 | AT / ATX Power Mode Switch |
| CLR_CMOS1 | Clear BIOS Switch |
| PWR_SW3 | Power Switch |
| COM1_2_1 | RS232 / RS422 / RS485 Connector |
| COM3_1, COM4_1 | RS232 / RS422 / RS485 Connector |
| DC_IN1 | 3-pin DC 9~48V Power Input Connector |
| DVI_I1 | DVI-I Connector |
| DP1, DP2 | DisplayPort Connector |
| SPK_OUT1 | Speaker-out Jack |
| MIC_IN1 | Mic-in Jack |
| DIO1 | 8DI / 8DO Connector |
| CN1 | LAN1 and USB3.0 Ports |
| CN2 | LAN2 and USB3.0 Ports |
| MINIPCIE1 | Mini PCI-Express Socket |
| CN3, CN4 | Mini PCI-Express / mSATA Socket |
| SATA3, SATA4 | SATA with Power Connector |
| CFAST1 | CFAST Socket |
| POWER1, POWER3, POWER4 | Power Connector |
| PCIE1 | PCI-Express X1 Slot |
| PCIE2 | PCI-Express X16 Slot |
| PWR_LED2 | Power LED Status |
| HDD_LED2 | HDD Access LED Status |

## 2.3 Switches Definitions

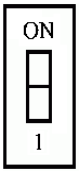
**AT_ATX1: AT / ATX Power Mode Switch**

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



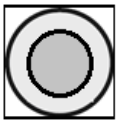

**CLR_CMOS1: Clear BIOS Switch**

| Switch | Definition |
|---|---|
| 1-2 (Left) | Normal Status (Default) |
| 2-3 (Right) | Clear BIOS |



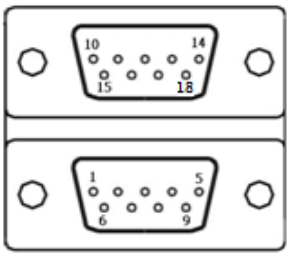

## 2.4 Connectors Definitions

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



**COM1_2_1: RS232 / RS422 / RS485 Connector**
Connector Type: 9-pin D-Sub

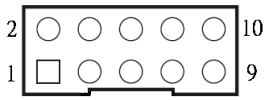
| COM1 | | | |
|---|---|---|---|
| **Pin** | **RS232 Definition** | **RS422 / 485 Full Duplex Definition** | **RS485 Half Duplex Definition** |
| 1 | DCD1 | TX1- | DATA1- |
| 2 | RxD1 | TX1+ | DATA1+ |
| 3 | TxD1 | RX1+ | |
| 4 | DTR1 | RX1- | |
| 5 | GND | GND | GND |
| 6 | DSR1 | | |
| 7 | RTS1 | | |
| 8 | CTS1 | | |
| 9 | RI1 | | |




| COM2 | | | |
|---|---|---|---|
| **Pin** | **RS232 Definition** | **RS422 / 485 Full Duplex Definition** | **RS485 Half Duplex Definition** |
| 10 | DCD2 | TX2- | DATA2- |
| 11 | RxD2 | TX2+ | DATA2+ |
| 12 | TxD2 | RX2+ | |
| 13 | DTR2 | RX2- | |
| 14 | GND | GND | GND |
| 15 | DSR2 | | |
| 16 | RTS2 | | |
| 17 | CTS2 | | |
| 18 | RI2 | | |

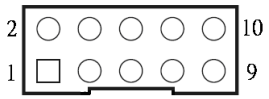
**COM3_1： RS232 / RS422 / RS485 Connector**
Connector Type: 2X5 10-pin box header, 2.54mm pitch

| COM3_1 | | | |
|---|---|---|---|
| **Pin** | **RS232 Definition** | **RS422 / 485 Full Duplex Definition** | **RS485 Half Duplex Definition** |
| 1 | DCD3 | TX3- | DATA3- |
| 2 | RxD3 | TX3+ | DATA3+ |
| 3 | TxD3 | RX3+ | |
| 4 | DTR3 | RX3- | |
| 5 | GND | GND | GND |
| 6 | DSR3 | | |
| 7 | RTS3 | | |
| 8 | CTS3 | | |
| 9 | RI3 | | |




**COM4_1： RS232 / RS422 / RS485 Connector**
Connector Type: 2X5 10-pin box header, 2.54mm pitch

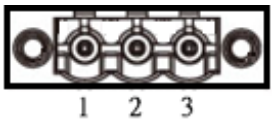
| COM4_1 | | | |
|---|---|---|---|
| **Pin** | **RS232 Definition** | **RS422 / 485 Full Duplex Definition** | **RS485 Half Duplex Definition** |
| 1 | DCD4 | TX4- | DATA4- |
| 2 | RxD4 | TX4+ | DATA4+ |
| 3 | TxD4 | RX4+ | |
| 4 | DTR4 | RX4- | |
| 5 | GND | GND | GND |
| 6 | DSR4 | | |
| 7 | RTS4 | | |
| 8 | CTS4 | | |
| 9 | RI4 | | |



**DC_IN1: DC Power Input Connector (+9~50V)**

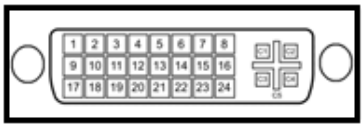
Connector Type: Terminal Block 1X3 3-pin, 5.0mm pitch

| Pin | Definition |
|---|---|
| 1 | +9~50VIN |
| 3 | GND |



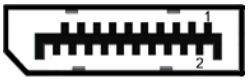

**DVI_I1: DVI-I Connector**

| 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 | | |



**DP1: DisplayPort Connector**

| Pin | Definition | Pin | Definition |
|---|---|---|---|
| 1 | DP1_LANE0_P | 11 | GND |
| 2 | GND | 12 | DP1_LANE3_N |
| 3 | DP1_LANE0_N | 13 | GND |
| 4 | DP1_LANE1_P | 14 | GND |
| 5 | GND | 15 | DP1_AUX_P |
| 6 | DP1_LANE1_N | 16 | GND |
| 7 | DP1_LANE2_P | 17 | DP1_AUX_N |
| 8 | GND | 18 | DP1_HPD |
| 9 | DP1_LANE2_N | 19 | GND |
| 10 | DP1_LANE3_P | 20 | DP1_PWR |



**DP2: DisplayPort Connector**

| Pin | Definition | Pin | Definition |
|---|---|---|---|
| 1 | DP2_LANE0_P | 11 | GND |
| 2 | GND | 12 | DP2_LANE3_N |
| 3 | DP2_LANE0_N | 13 | GND |
| 4 | DP2_LANE1_P | 14 | GND |
| 5 | GND | 15 | DP2_AUX_P |
| 6 | DP2_LANE1_N | 16 | GND |
| 7 | DP2_LANE2_P | 17 | DP2_AUX_N |
| 8 | GND | 18 | DP2_HPD |
| 9 | DP2_LANE2_N | 19 | GND |
| 10 | DP2_LANE3_P | 20 | DP2_PWR |


**SPK_OUT1 : Speaker-out Jack (Green)**
Connector Type: 5-pin Phone Jack

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

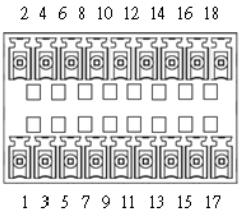
**MIC_IN1: Microphone Jack (Pink)**
Connector Type: 5-pin Phone Jack

| Pin | Definition |
|---|---|
| 1 | GND |
| 2 | MIC_R |
| 3 | NC |
| 4 | GND |
| 5 | MIC_L |

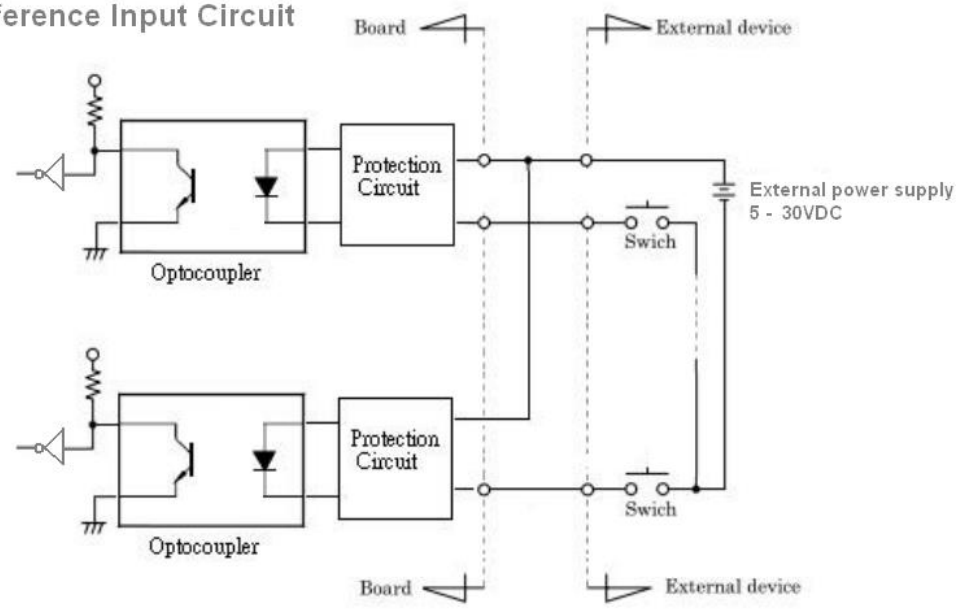
**DIO1: Digital Input / Output Connector**

Connector Type: Terminal Block 2X9 18-pin, 3.5mm pitch

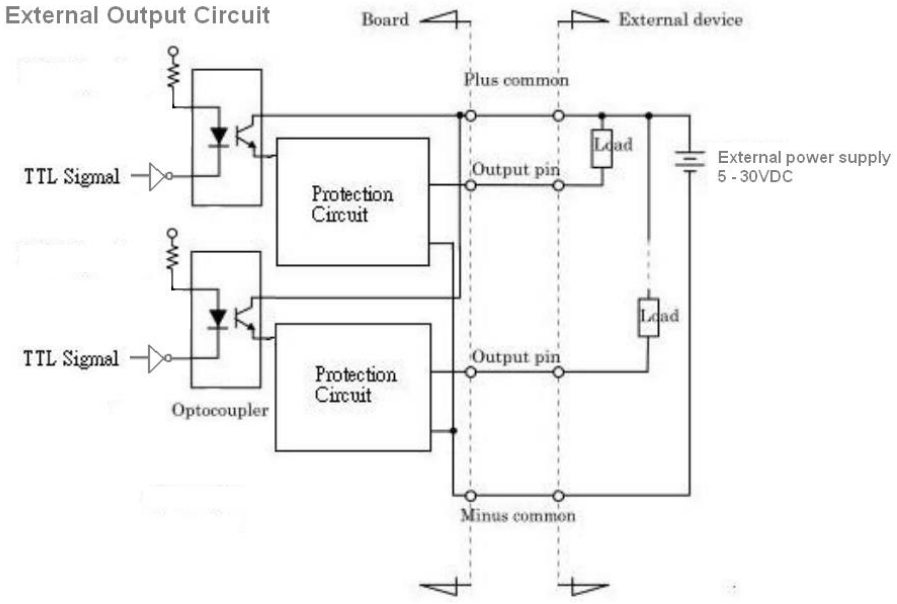
| Pin | Definition | Pin | Definition |
|---|---|---|---|
| 1 | DI1 | 2 | DO1 |
| 3 | DI2 | 4 | DO2 |
| 5 | DI3 | 6 | DO3 |
| 7 | DI4 | 8 | DO4 |
| 9 | DI5 | 10 | DO5 |
| 11 | DI6 | 12 | DO6 |
| 13 | DI7 | 14 | DO7 |
| 15 | DI8 | 16 | DO8 |
| 17 | DC INPUT | 18 | GND |

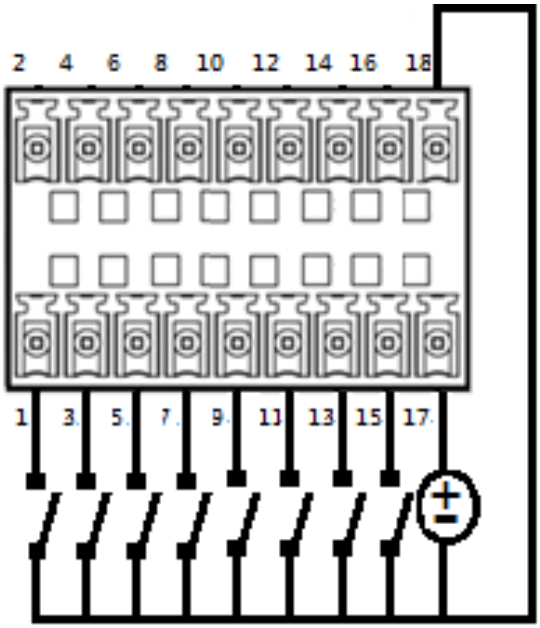



Reference Input Circuit

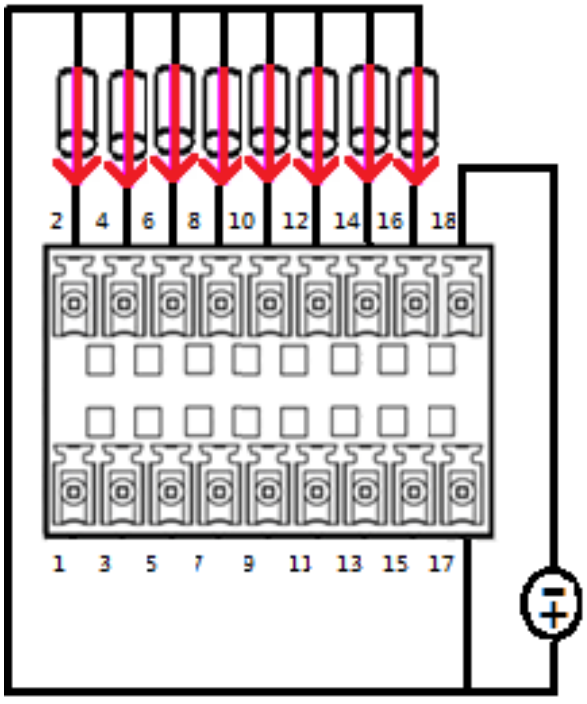



External Output Circuit






**Digital Input Wurung**

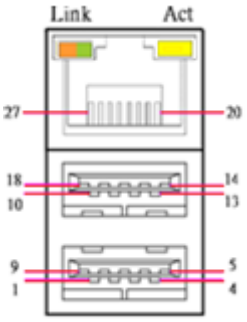



**Digital Output Wurung**

**CN1: LAN1 and USB3.0 Ports**

Connector Type: RJ45 port with LEDs and dual USB3.0 ports

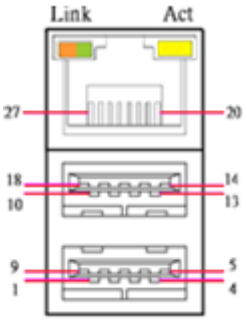
| Pin | Definition | Pin | Definition | Pin | Definition |
|---|---|---|---|---|---|
| 1 | +5V | 10 | +5V | 20 | LAN1_MDI0P |
| 2 | USB2_D1- | 11 | USB2_D2- | 21 | LAN1_MDI0N |
| 3 | USB2_D1+ | 12 | USB2_D2+ | 22 | LAN1_MDI1P |
| 4 | GND | 13 | GND | 23 | LAN1_MDI2P |
| 5 | USB3_RX1- | 14 | USB3_RX2- | 24 | LAN1_MDI2N |
| 6 | USB3_RX1+ | 15 | USB3_RX2+ | 25 | LAN1_MDI1N |
| 7 | GND | 16 | GND | 26 | LAN1_MDI3P |
| 8 | USB3_TX1- | 17 | USB3_TX2- | 27 | LAN1_MDI3N |
| 9 | USB3_TX1+ | 18 | USB3_TX2+ | | |




**CN2: LAN2 and USB3.0 Ports**

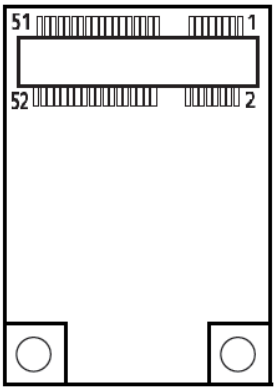
Connector Type: RJ45 port with LEDs and dual USB3.0 ports

| Pin | Definition | Pin | Definition | Pin | Definition |
|---|---|---|---|---|---|
| 1 | +5V | 10 | +5V | 20 | LAN2_MDI0P |
| 2 | USB2_D3- | 11 | USB2_D4- | 21 | LAN2_MDI0N |
| 3 | USB2_D3+ | 12 | USB2_D4+ | 22 | LAN2_MDI1P |
| 4 | GND | 13 | GND | 23 | LAN2_MDI2P |
| 5 | USB3_RX3- | 14 | USB3_RX4- | 24 | LAN2_MDI2N |
| 6 | USB3_RX3+ | 15 | USB3_RX4+ | 25 | LAN2_MDI1N |
| 7 | GND | 16 | GND | 26 | LAN2_MDI3P |
| 8 | USB3_TX3- | 17 | USB3_TX4- | 27 | LAN2_MDI3N |
| 9 | USB3_TX3+ | 18 | USB3_TX4+ | | |



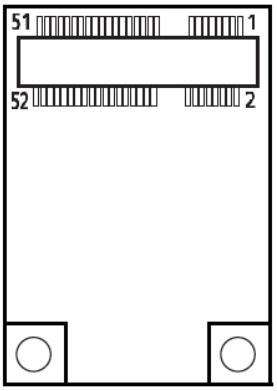
**MINIPCIE1: Mini PCI-Express Socket**

| Pin | Definition | Pin | Definition | Pin | Definition |
|---|---|---|---|---|---|
| 1 | WAKE# | 19 | NC | 37 | GND |
| 2 | +3.3V | 20 | +3.3V | 38 | USB2_D11+ |
| 3 | NC | 21 | GND | 39 | +3.3V |
| 4 | GND | 22 | MINIPCIE RST# | 40 | GND |
| 5 | NC | 23 | MINIPCIE_RXN11 | 41 | +3.3V |
| 6 | +1.5V | 24 | +3.3V | 42 | NC |
| 7 | CLKREQ0# | 25 | MINIPCIE_RXP11 | 43 | GND |
| 8 | NC | 26 | GND | 44 | NC |
| 9 | GND | 27 | GND | 45 | NC |
| 10 | NC | 28 | +1.5V | 46 | NC |
| 11 | MINIPCIE_CLKN0 | 29 | GND | 47 | NC |
| 12 | NC | 30 | SMB_CLK | 48 | +1.5V |
| 13 | MINIPCIE_CLKP0 | 31 | MINIPCIE_TXN11 | 49 | NC |
| 14 | NC | 32 | SMB_DATA | 50 | GND |
| 15 | GND | 33 | MINIPCIE_TXP11 | 51 | NC |
| 16 | NC | 34 | GND | 52 | +3.3V |
| 17 | NC | 35 | GND | | |
| 18 | GND | 36 | USB2_D11- | | |



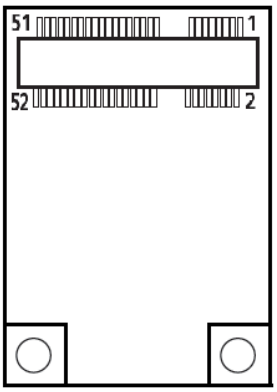
**CN3: Mini PCI-Express / mSATA Socket**

| Pin | Definition | Pin | Definition | Pin | Definition |
|---|---|---|---|---|---|
| 1 | WAKE# | 19 | NC | 37 | GND |
| 2 | +3.3V | 20 | +3.3V | 38 | USB_D13+ |
| 3 | NC | 21 | GND | 39 | +3.3V |
| 4 | GND | 22 | MINIPCIE RST# | 40 | GND |
| 5 | NC | 23 | MINIPCIE_RXN4 (SATA_RXN4) | 41 | +3.3V |
| 6 | +1.5V | 24 | +3.3V | 42 | NC |
| 7 | CLKREQ1# | 25 | MINIPCIE_RXP4 (SATA_RXP4) | 43 | GND |
| 8 | NC | 26 | GND | 44 | NC |
| 9 | GND | 27 | GND | 45 | NC |
| 10 | NC | 28 | +1.5V | 46 | NC |
| 11 | MINIPCIE_CLKN4 | 29 | GND | 47 | NC |
| 12 | NC | 30 | SMB_CLK | 48 | +1.5V |
| 13 | MINIPCIE_CLKP4 | 31 | MINIPCIE_TXN4 (SATA_TXN4) | 49 | NC |
| 14 | NC | 32 | SMB_DATA | 50 | GND |
| 15 | GND | 33 | MINIPCIE_TXP4 (SATA_TXP4) | 51 | NC |
| 16 | NC | 34 | GND | 52 | +3.3V |
| 17 | NC | 35 | GND | | |
| 18 | GND | 36 | USB_D13- | | |



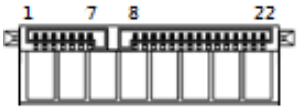

**CN4: Mini PCI-Express / mSATA Socket**

| Pin | Definition | Pin | Definition | Pin | Definition |
|---|---|---|---|---|---|
| 1 | WAKE# | 19 | NC | 37 | GND |
| 2 | +3.3V | 20 | +3.3V | 38 | USB_D14+ |
| 3 | NC | 21 | GND | 39 | +3.3V |
| 4 | GND | 22 | MINIPCIE RST# | 40 | GND |
| 5 | NC | 23 | MINIPCIE_RXN12 (SATA_RXN5) | 41 | +3.3V |
| 6 | +1.5V | 24 | +3.3V | 42 | NC |
| 7 | CLKREQ3# | 25 | MINIPCIE_RXP12 (SATA_RXP5) | 43 | GND |
| 8 | NC | 26 | GND | 44 | NC |
| 9 | GND | 27 | GND | 45 | NC |
| 10 | NC | 28 | +1.5V | 46 | NC |
| 11 | MINIPCIE_CLKN3 | 29 | GND | 47 | NC |
| 12 | NC | 30 | SMB_CLK | 48 | +1.5V |
| 13 | MINIPCIE_CLKP3 | 31 | MINIPCIE_TXN12 (SATA_TXN5) | 49 | NC |
| 14 | NC | 32 | SMB_DATA | 50 | GND |
| 15 | GND | 33 | MINIPCIE_TXP12 (SATA_TXP5) | 51 | NC |
| 16 | NC | 34 | GND | 52 | +3.3V |
| 17 | NC | 35 | GND | | |
| 18 | GND | 36 | USB_D14- | | |



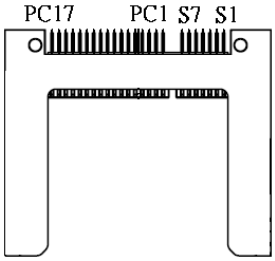
**SATA3, SATA4: SATA with Power Connector**

| Pin | SATA1 Definition | Pin | SATA1 Definition | Pin | SATA2 Definition | Pin | SATA2 Definition |
|---|---|---|---|---|---|---|---|
| 1 | GND | 12 | GND | 1 | GND | 12 | GND |
| 2 | SATA_TXP2 | 13 | GND | 2 | SATA_TXP3 | 13 | GND |
| 3 | SATA_TXN2 | 14 | +5V | 3 | SATA_TXN3 | 14 | +5V |
| 4 | GND | 15 | +5V | 4 | GND | 15 | +5V |
| 5 | SATA_RXN2 | 16 | +5V | 5 | SATA_RXN3 | 16 | +5V |
| 6 | SATA_RXP2 | 17 | GND | 6 | SATA_RXP3 | 17 | GND |
| 7 | GND | 18 | GND | 7 | GND | 18 | GND |
| 8 | +3.3V | 19 | GND | 8 | +3.3V | 19 | GND |
| 9 | +3.3V | 20 | +12V | 9 | +3.3V | 20 | +12V |
| 10 | +3.3V | 21 | +12V | 10 | +3.3V | 21 | +12V |
| 11 | GND | 22 | +12V | 11 | GND | 22 | +12V |



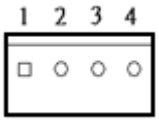
**CFAST1: CFAST Socket**

| 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 | | |



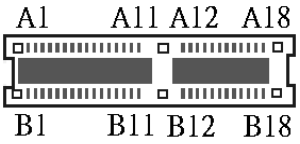

**POWER1, POWER3, POWER4: Power Connector**

| Pin | Definition |
|---|---|
| 1 | +5V |
| 2 | GND |
| 3 | GND |
| 4 | +12V |



**PCIE1: PCI-Express X1 Socket**
Connector Type: PCI-Express X1 Slot

| Pin | Definition | Pin | Definition |
|---|---|---|---|
| A1 | NC | 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 | +3.3VSB |
| A11 | PCIE_RESET# | B11 | PCIE_WAKE# |
| A12 | GND | B12 | +12V |
| A13 | PCIE_CLKP1 | B13 | GND |
| A14 | PCIE_CLKN1 | B14 | PCIE_TXP11 |
| A15 | GND | B15 | PCIE_TXN11 |
| A16 | PCIE_RXP11 | B16 | GND |
| A17 | PCIE_RXN11 | B17 | NC |
| A18 | GND | B18 | GND |



**PCIE1: PCI-Express X16 Socket**

Connector Type: PCI-Express X16 Slot


| Pin | Definition | Pin | Definition | Pin | Definition | Pin | Definition |
|---|---|---|---|---|---|---|---|
| A1 | PCIE_PRSNT1 | A42 | GND | B1 | +12V | B42 | PEG_TXN6 |
| A2 | +12V | A43 | PEG_RXP6 | B2 | +12V | B43 | GND |
| A3 | +12V | A44 | PEG_RXN6 | B3 | +12V | B44 | GND |
| A4 | GND | A45 | GND | B4 | GND | B45 | PEG_TXP7 |
| A5 | NC | A46 | GND | B5 | SMB_CLK | B46 | PEG_TXN7 |
| A6 | NC | A47 | PEG_RXP7 | B6 | SMB_DATA | B47 | GND |
| A7 | NC | A48 | PEG_RXN7 | B7 | GND | B48 | PRSNT2_3 |
| A8 | NC | A49 | GND | B8 | +3.3V | B49 | GND |
| A9 | +3.3V | A50 | NC | B9 | NC | B50 | PEG_TXP8 |
| A10 | +3.3V | A51 | GND | B10 | +3.3VSB | B51 | PEG_TXN8 |
| A11 | PCIE_RESET# | A52 | PEG_RXP8 | B11 | PCIE_WAKE# | B52 | GND |
| A12 | GND | A53 | PEG_RXN8 | B12 | NC | B53 | GND |
| A13 | PEG_CLK_P | A54 | GND | B13 | GND | B54 | PEG_TXP9 |
| A14 | PEG_CLK_N | A55 | GND | B14 | PEG_TXP0 | B55 | PEG_TXN9 |
| A15 | GND | A56 | PEG_RXP9 | B15 | PEG_TXN0 | A56 | GND |
| A16 | PEG_RXP0 | A57 | PEG_RXN9 | B16 | GND | B57 | GND |
| A17 | PEG_RXN0 | A58 | GND | B17 | PRSNT2_1 | B58 | PEG_TXP10 |
| A18 | GND | A59 | GND | B18 | GND | B59 | PEG_TXN10 |
| A19 | NC | A60 | PEG_RXP10 | B19 | PEG_TXP1 | B60 | GND |
| A20 | GND | A61 | PEG_RXN10 | B20 | PEG_TXN1 | B61 | GND |
| A21 | PEG_RXP1 | A62 | GND | B21 | GND | B62 | PEG_TXP11 |
| A22 | PEG_RXN1 | A63 | GND | B22 | GND | B63 | PEG_TXN11 |
| A23 | GND | A64 | PEG_RXP11 | B23 | PEG_TXP2 | B64 | GND |
| A24 | GND | A65 | PEG_RXN11 | B24 | PEG_TXN2 | B65 | GND |
| A25 | PEG_RXP2 | A66 | GND | B25 | GND | B66 | PEG_TXP12 |
| A26 | PEG_RXN2 | A67 | GND | B26 | GND | B67 | PEG_TXN12 |
| A27 | GND | A68 | PEG_RXP12 | B27 | PEG_TXP3 | B68 | GND |
| A28 | GND | A69 | PEG_RXN12 | B28 | PEG_TXN3 | B69 | GND |
| A29 | PEG_RXP3 | A70 | GND | B29 | GND | B70 | PEG_TXP13 |
| A30 | PEG_RXN3 | A71 | GND | B30 | NC | B71 | PEG_TXN13 |
| A31 | GND | A72 | PEG_RXP13 | B31 | PRSNT2_2 | B72 | GND |
| A32 | NC | A73 | PEG_RXN13 | B32 | GND | B73 | GND |
| A33 | NC | A74 | GND | B33 | PEG_TXP4 | B74 | PEG_TXP14 |
| A34 | GND | A75 | GND | B34 | PEG_TXN4 | B75 | PEG_TXN14 |
| A35 | PEG_RXP4 | A76 | PEG_RXP14 | B35 | GND | B76 | GND |
| A36 | PEG_RXN4 | A77 | PEG_RXN14 | B36 | GND | B77 | GND |
| A37 | GND | A78 | GND | B37 | PEG_TXP5 | B78 | PEG_TXP15 |
| A38 | GND | A79 | GND | B38 | PEG_TXN5 | B79 | PEG_TXN15 |
| A39 | PEG_RXP5 | A80 | PEG_RXP15 | B39 | GND | B80 | GND |
| A40 | PEG_RXN5 | A81 | PEG_RXN15 | B40 | GND | B81 | PRSNT2_4 |
| A41 | GND | A82 | GND | B41 | PEG_TXP6 | B82 | NC |

**PWR_LED2: Power LED Status**

| Pin | Definition |
|---|---|
| 1 | POWER LED+ |
| 2 | POWER LED- |

**HDD_LED2: HDD Access LED Status**

| Pin | Definition |
|---|---|
| 1 | HDD LED+ |
| 2 | HDD LED- |

Chapter 3

# System Setup

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

**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.

## 3.2 Removing heat sink cover

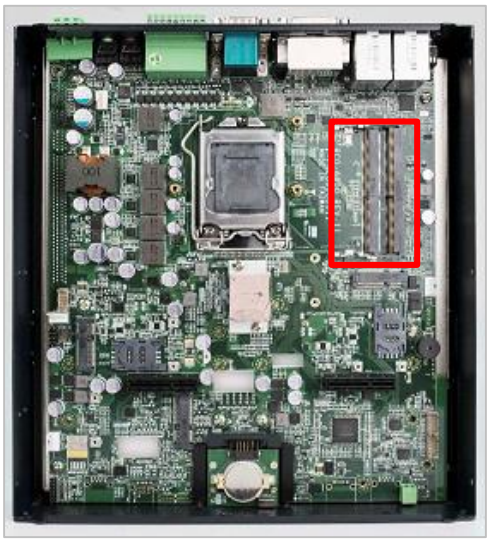
1. Unscrew the 3 screws on the top side of computing module.

2. Unscrew the 3 screws on the bottom side.

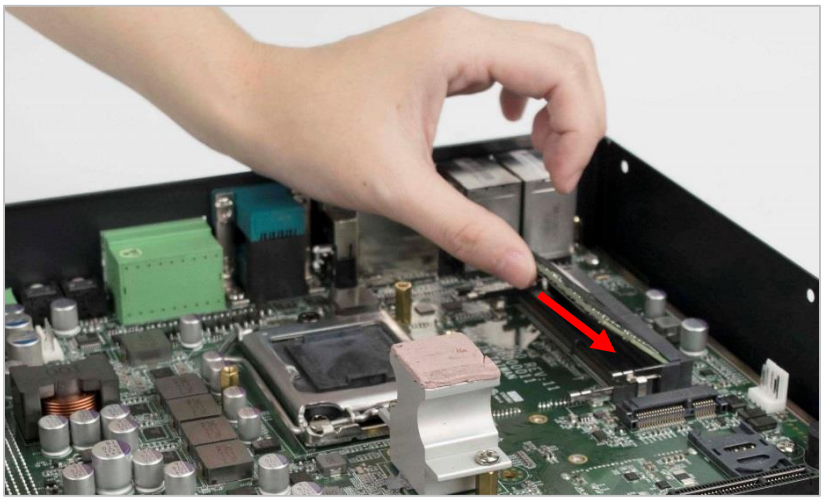
3. Now you can remove the heat sink cover.

## 3.3 Installing SODIMM

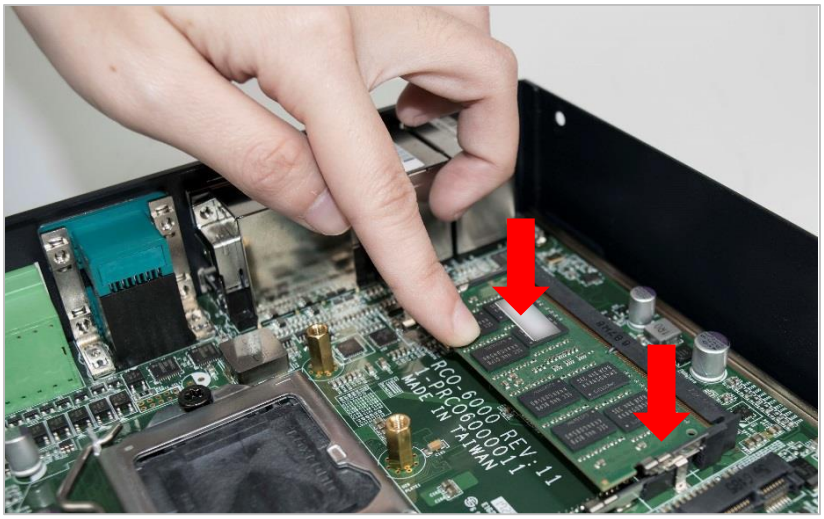
1. Place the system body with SODIMM socket facing upward. Two SODIMM sockets are available for VCO-6000 Series on the top side.



2. Insert memory module from 45 degree direction.

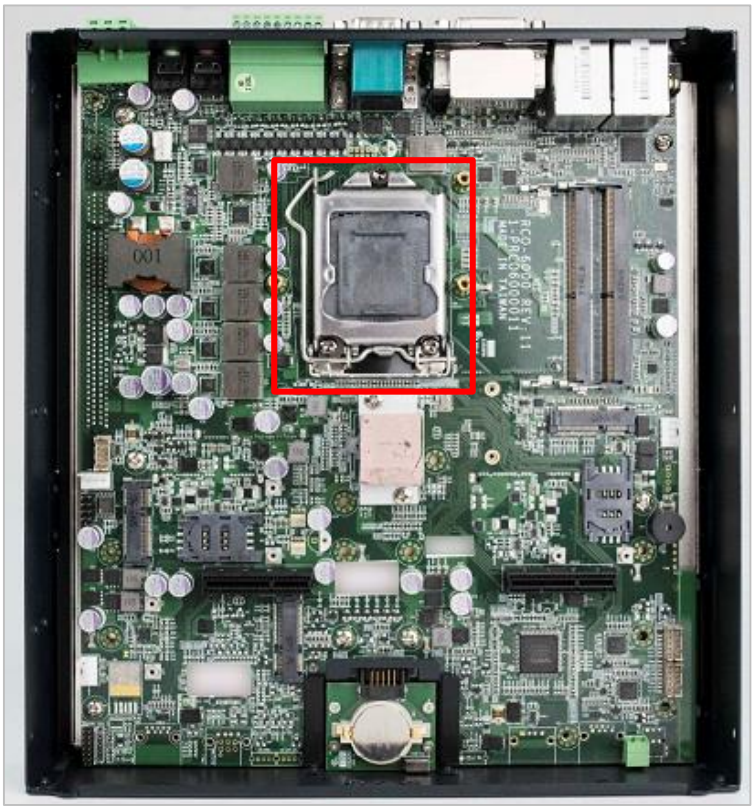


3. Press the memory module vertically downward until you hear the "click" sound. Make sure the memory module is firmly in place.

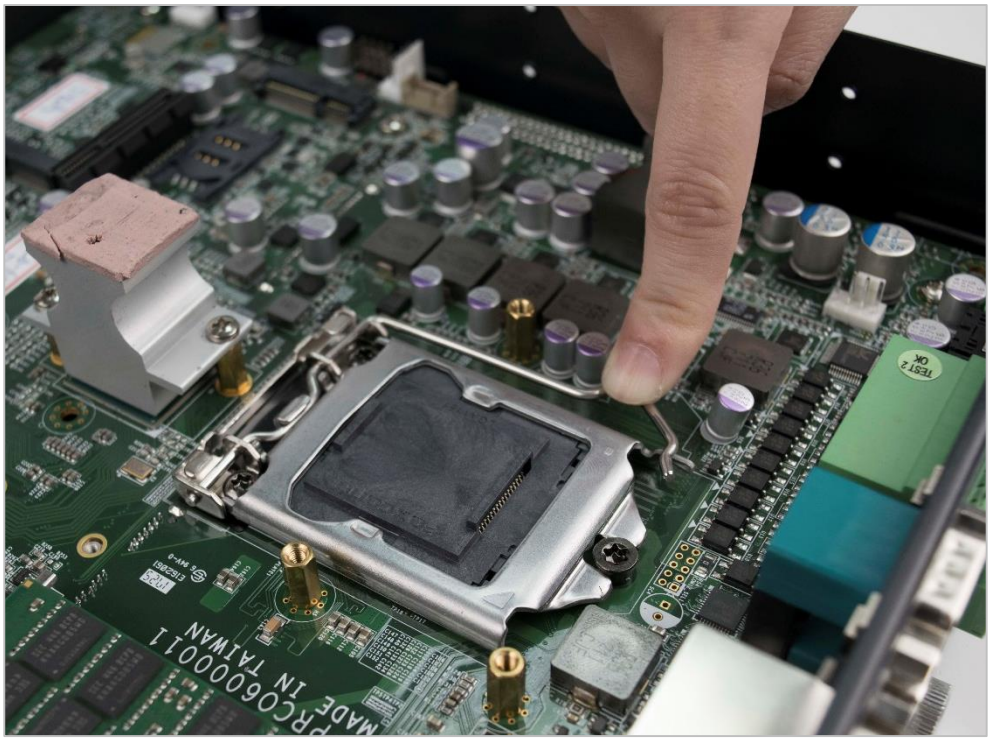


## 3.4 Installing CPU

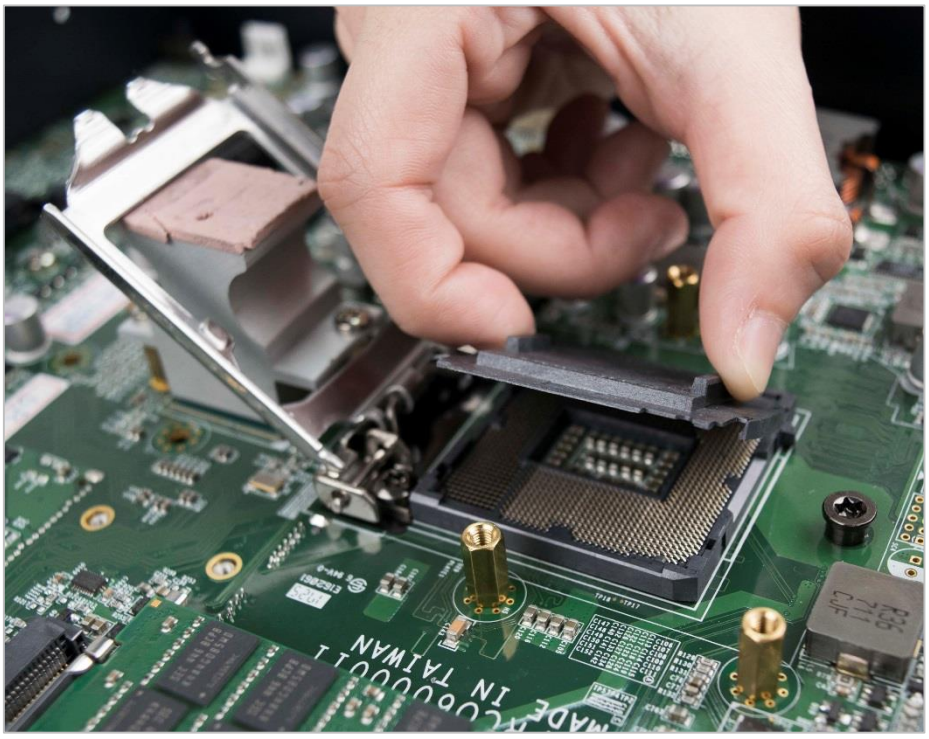
1. You can easily locate the CPU socket after heat sink cover is removed.



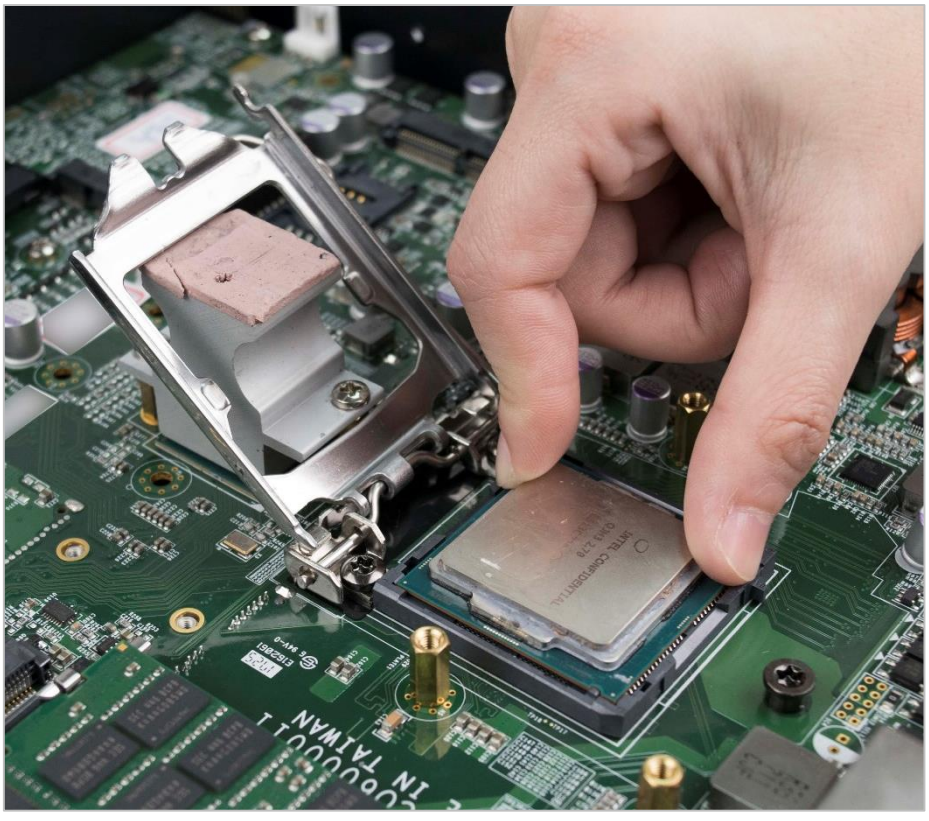
2. Press down the CPU socket lever in order to open the socket cover.



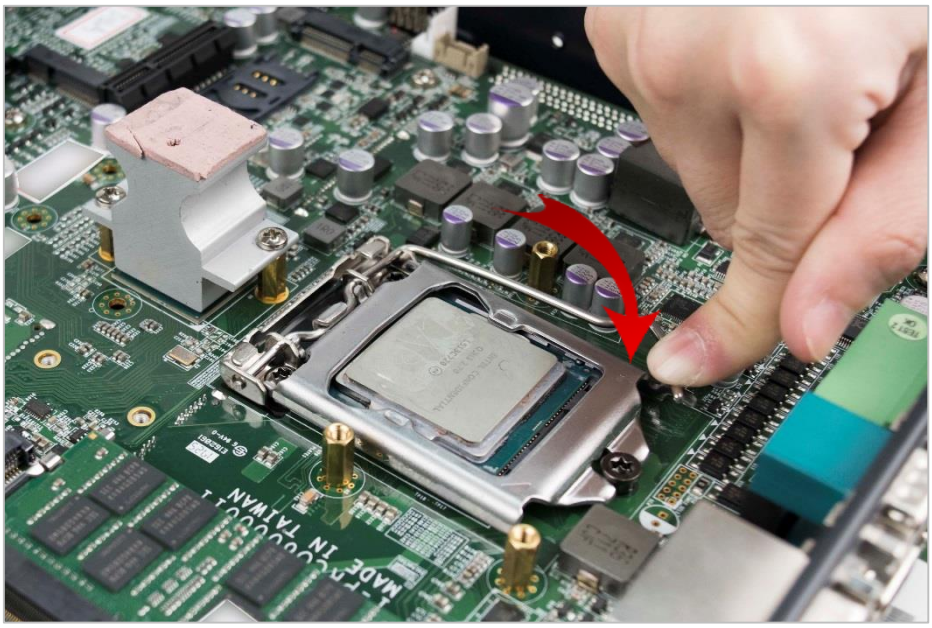
3. Remove the CPU protective cover.



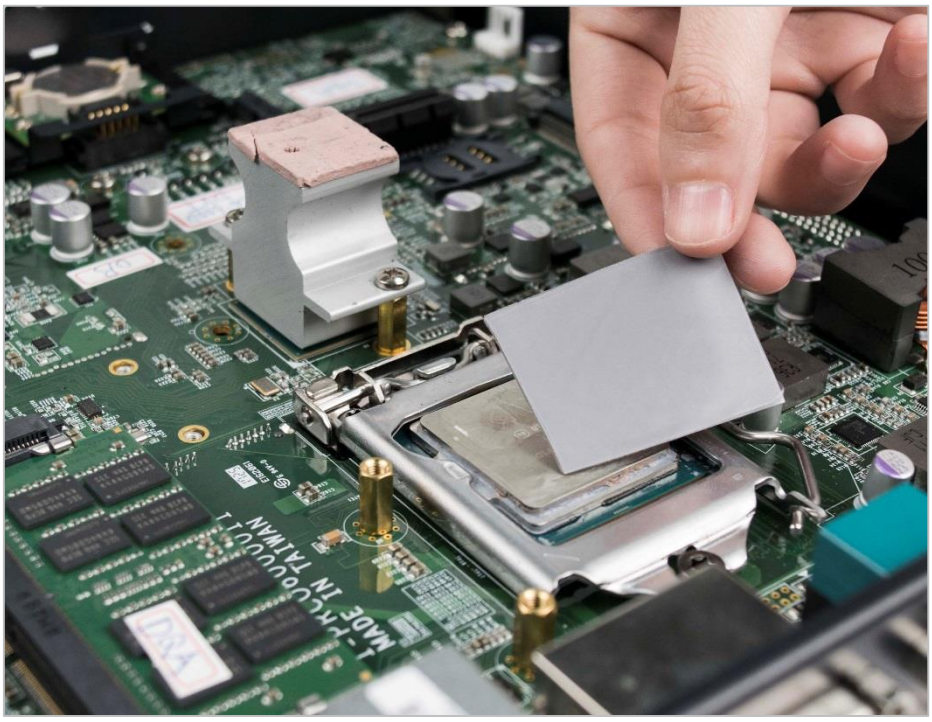
4. Insert CPU gently.



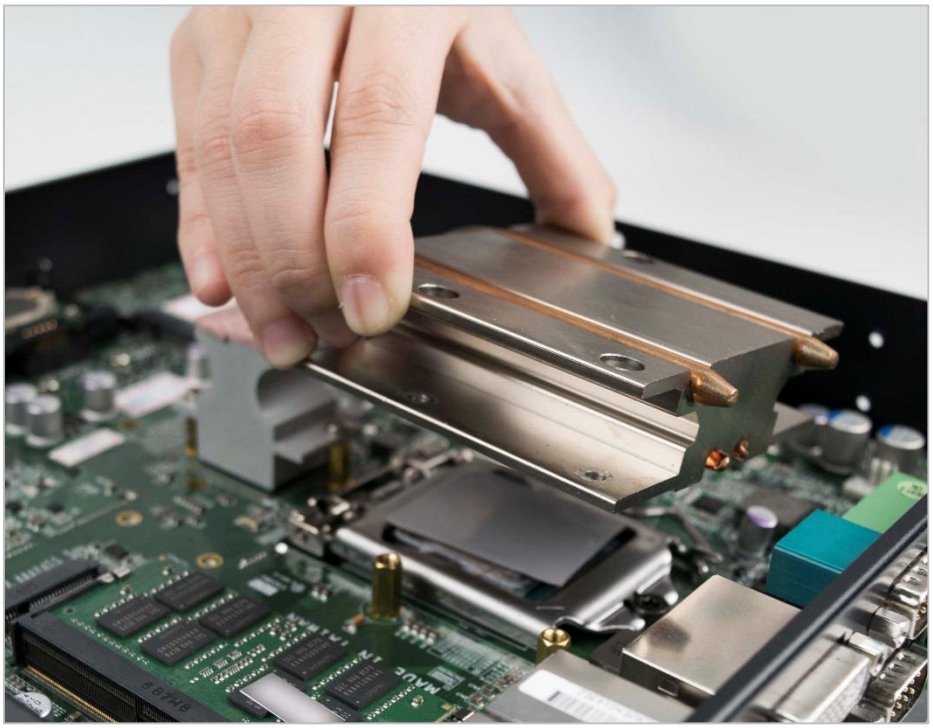
5. Press down the lever again to hold the socket cover.



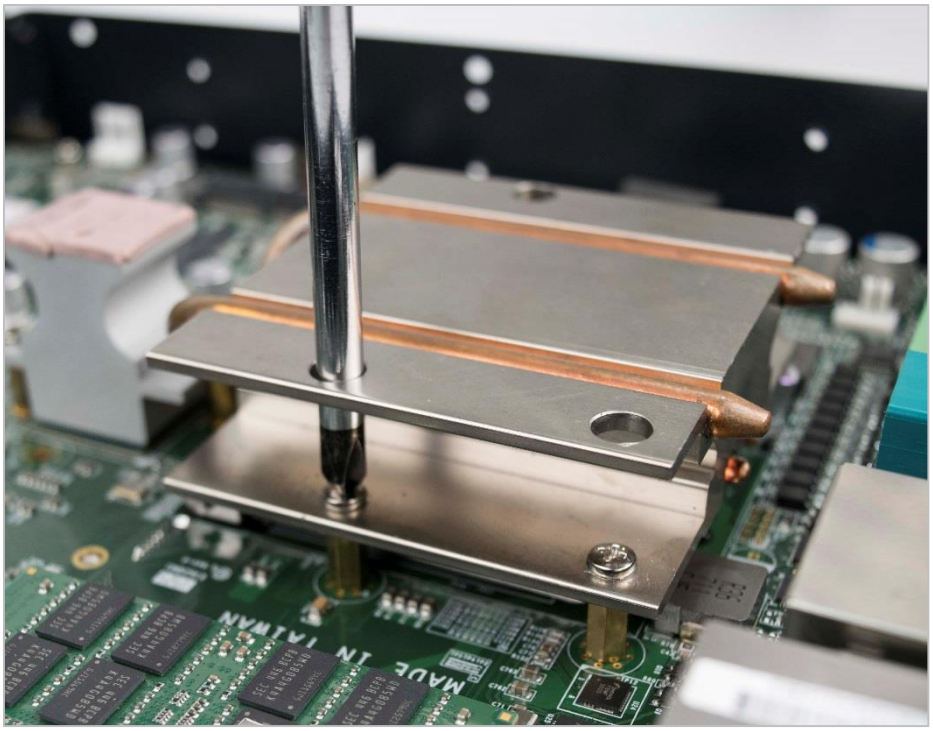
6. Paste thermal pad on the CPU.



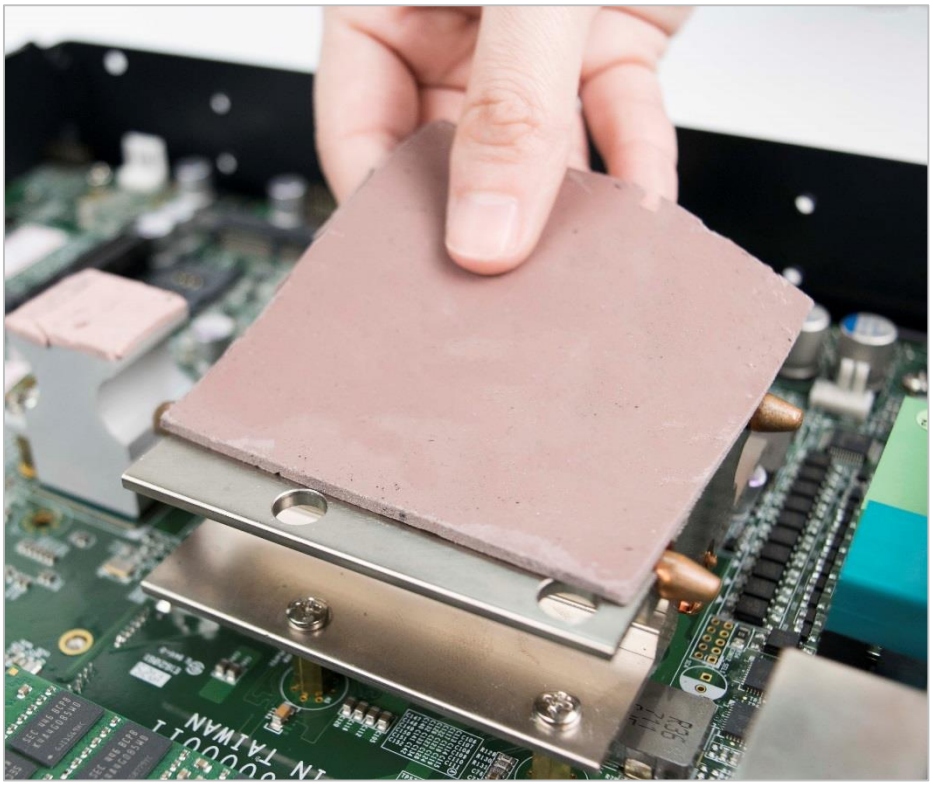
7. Place the designated heat block onto the CPU with thermal pad.



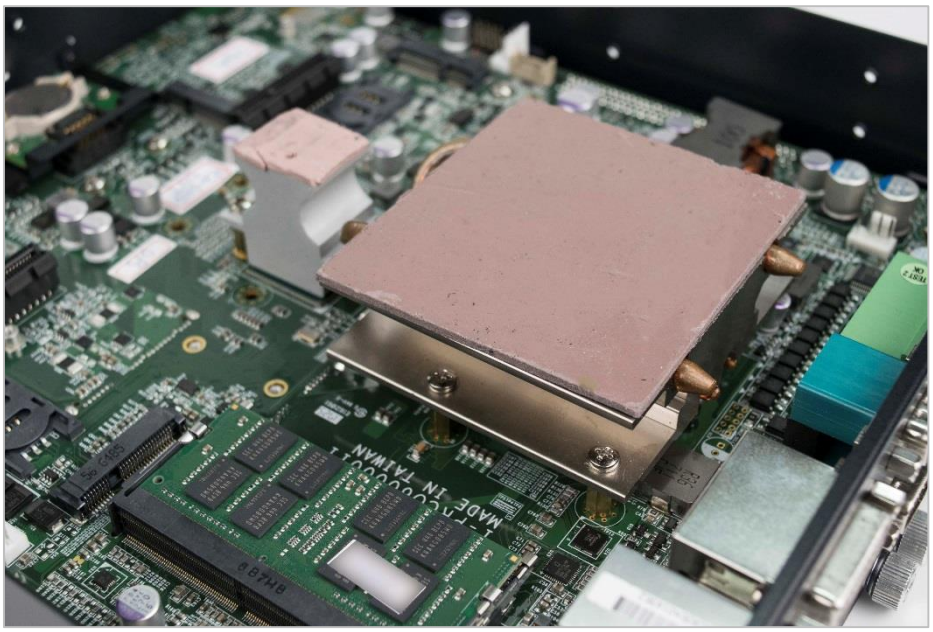
8. Lock the heat block with three screws. Screw driver will able to penetrate through the holes on the top in order to fasten the screws with copper stud.



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

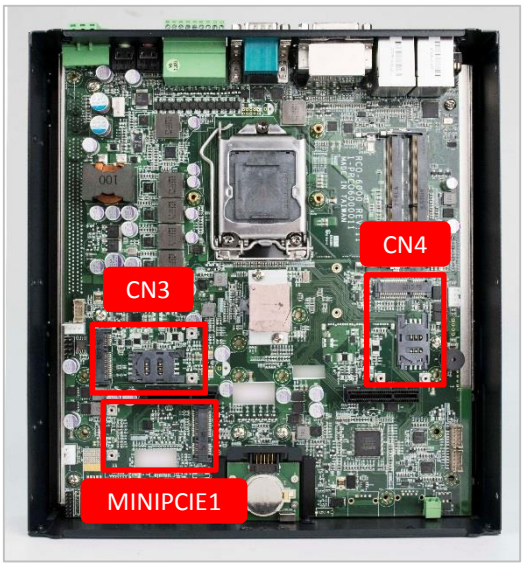


10. Installation complete.

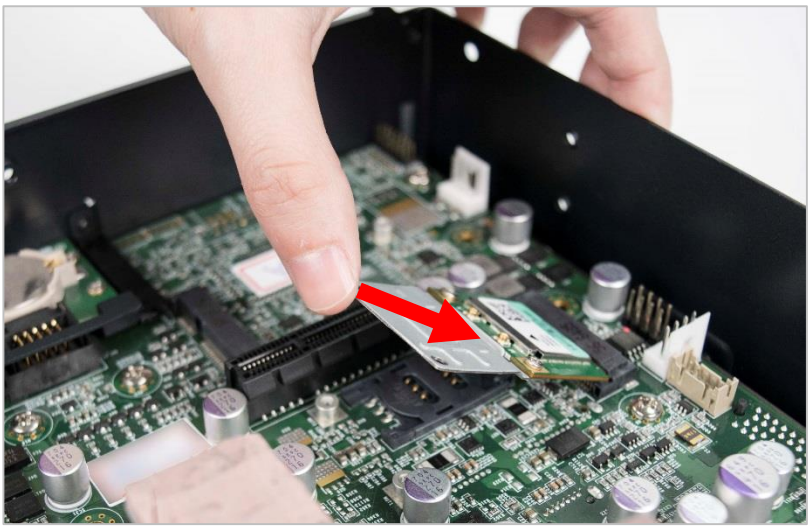


## 3.5 Installing mini PCIe card / mSATA

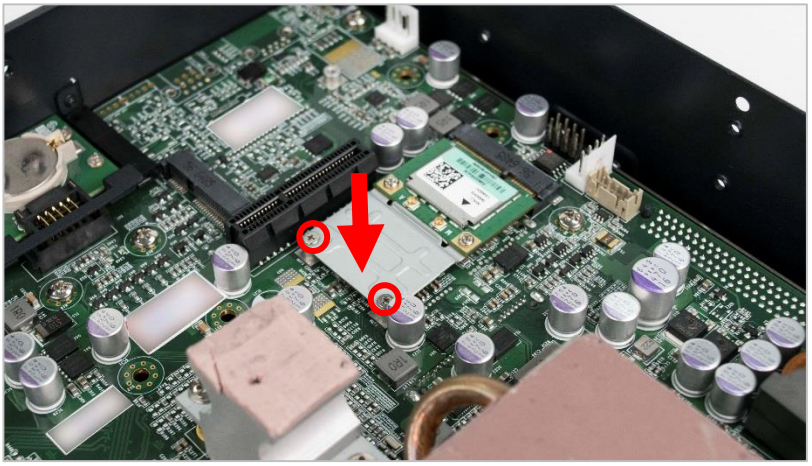
1. Three mini PCIe slots are available for VCO-6000 series. CN3 and CN4 on the top side can also support mSATA.




2. Insert mini PCIe card from 45 degree direction.



3. Press the mini PCIe card down and lock it with two screws.



## 3.6 Installing antenna

1. Two antenna holes are available for VCO-6000 series on the front panel.

2. Remove antenna hole cover on the front panel.

3. Have antenna jack penetrate through the hole.

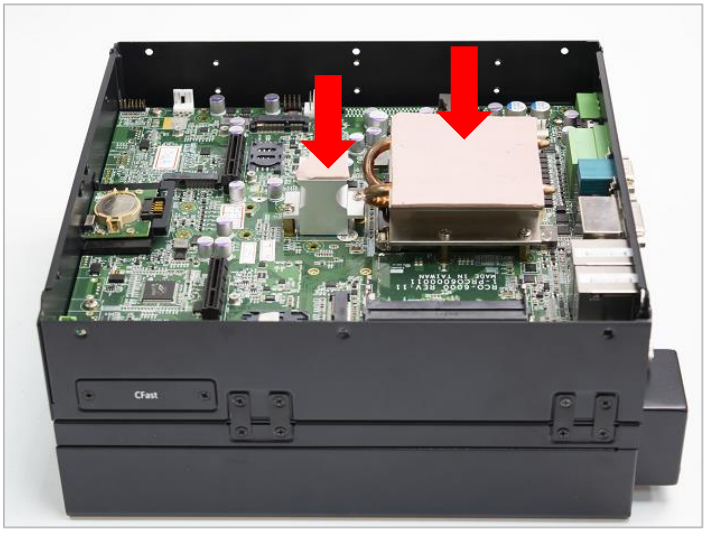
4. Put on washer and fasten the nut with antenna jack.

5. Assemble the antenna and antenna jack together.

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

## 3.7 Assembly heat sink cover

1. Ensure thermal pad is already pasted on both the CPU thermal block and PCH thermal block.



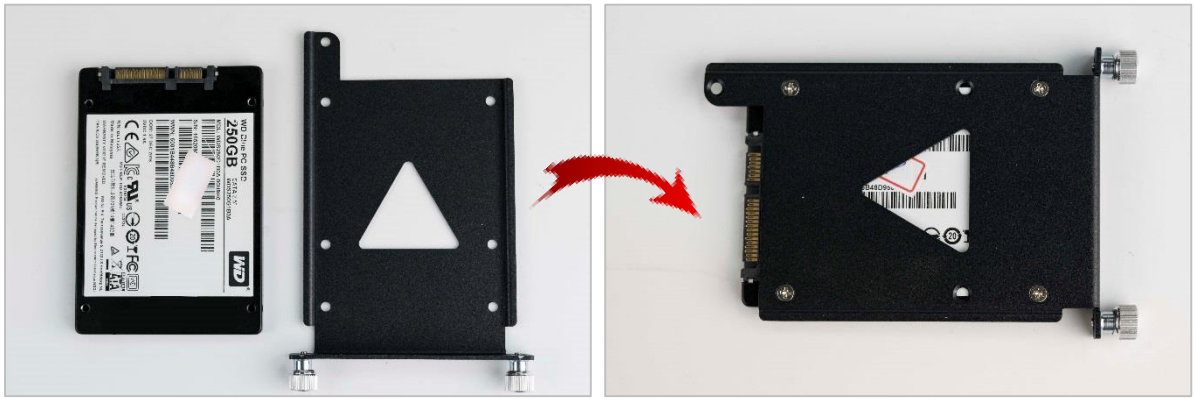
2. Now you can close the heat sink cover.

3. Fasten the six screws on the system top side and bottom side.

## 3.8 Installing HDD on removable SATA HDD bay

1. Two removable SATA HDD bays are available for VCO-6000 Series.
2. Unscrew the two sun screws circled below to take out the removable SATA HDD bay.

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




4. Slide the HDD bracket back and then fasten the sun screws.

## 3.9 Installing CFast card

1. CFast socket is located on the system top side. Unscrew two screws to remove the bracket.

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.

## 3.10 Changing CMOS battery

1. CMOS battery is accessible from the system rear panel. Unscrew two screws to pull out the CMOS battery.

## 3.11 Installing wall mount kit

1. Wall mount kit is available for VCO-6000 series included in the standard package.

2. Lock the wall mount kit with 6 screws on the system bottom side.

3. Installation complete.

## 3.12 Installing book mount

1. For book mounting, use the same wall mount kit in the standard package.

2. Lock the wall mount kit with 6 screws on the system rear side.

3. Installation complete.

## 3.13 Installing din rail mount

1. Din rail mount kit is available for VCO-6000 series as an optional accessory.

2. Lock the din rail mount with two screws on the system rear panel.

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> or <F2> 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

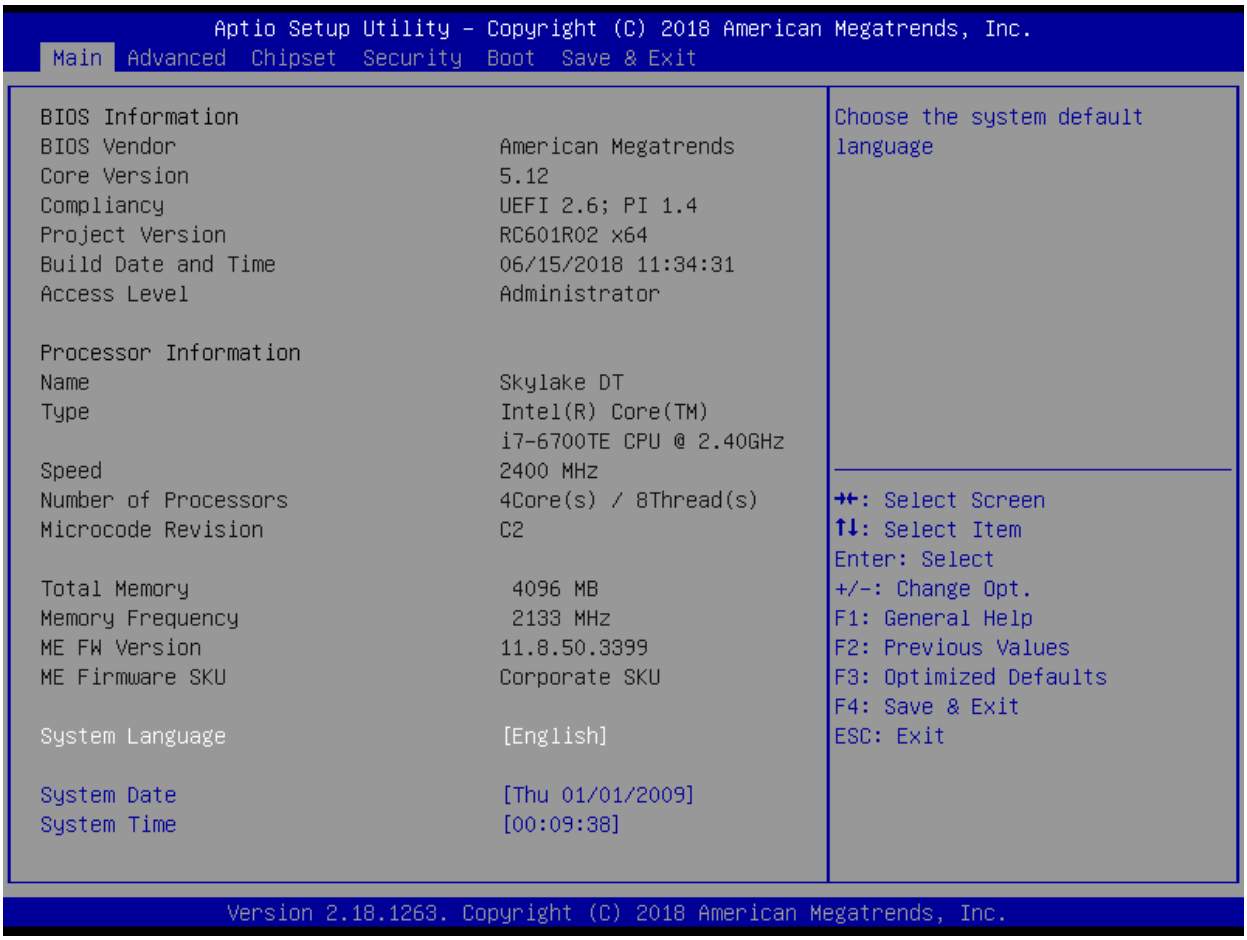
The main menu lists the setup functions you can make changes to. You can use the arrow keys ( ↑↓ ) to select the item. The on-line description of the highlighted setup function is displayed at the bottom of the screen.

### 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.




### 4.2.1 System Language

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

### 4.2.2 System Date

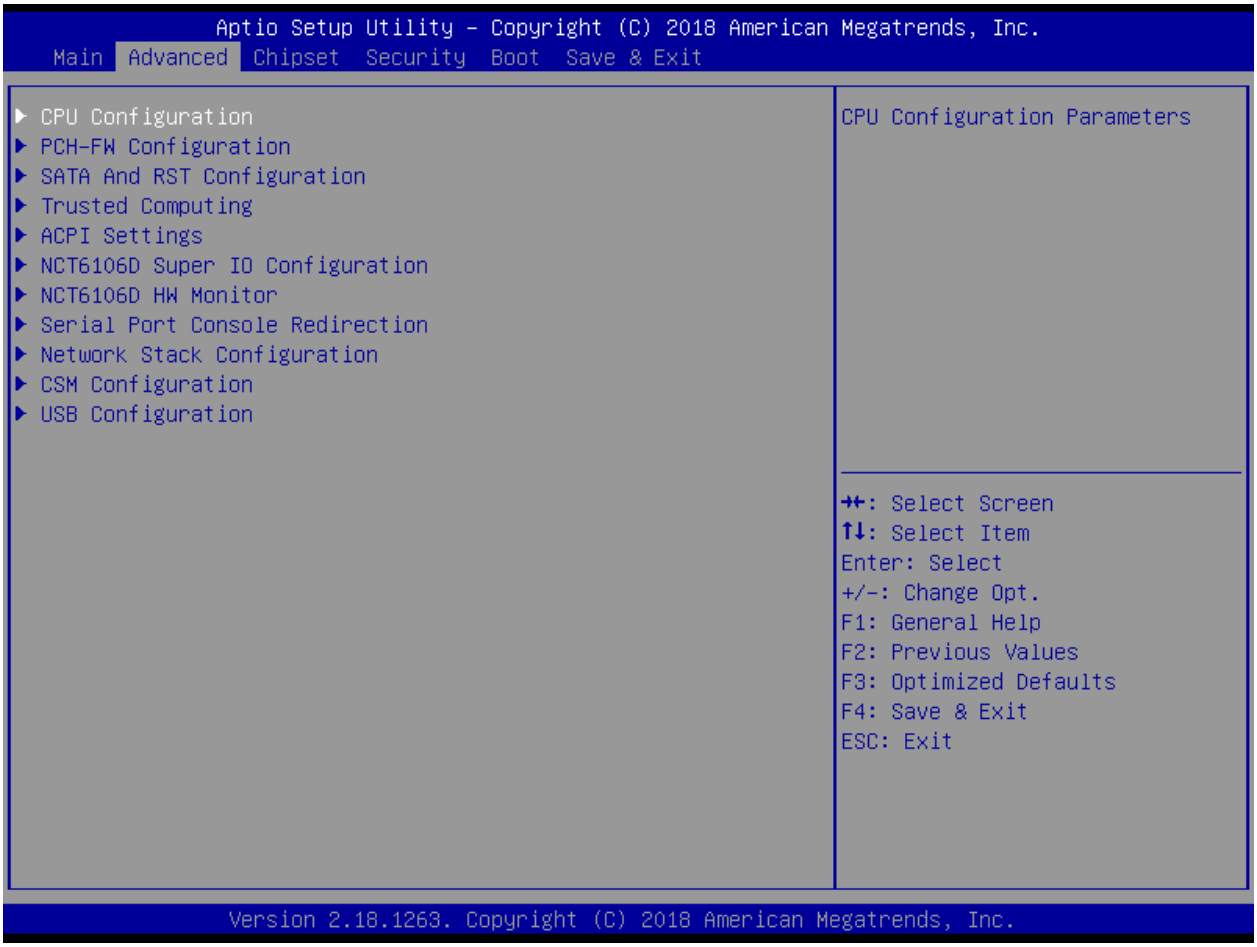
Set the date. Please use <Tab> to switch between date elements.

### 4.2.3 System Time

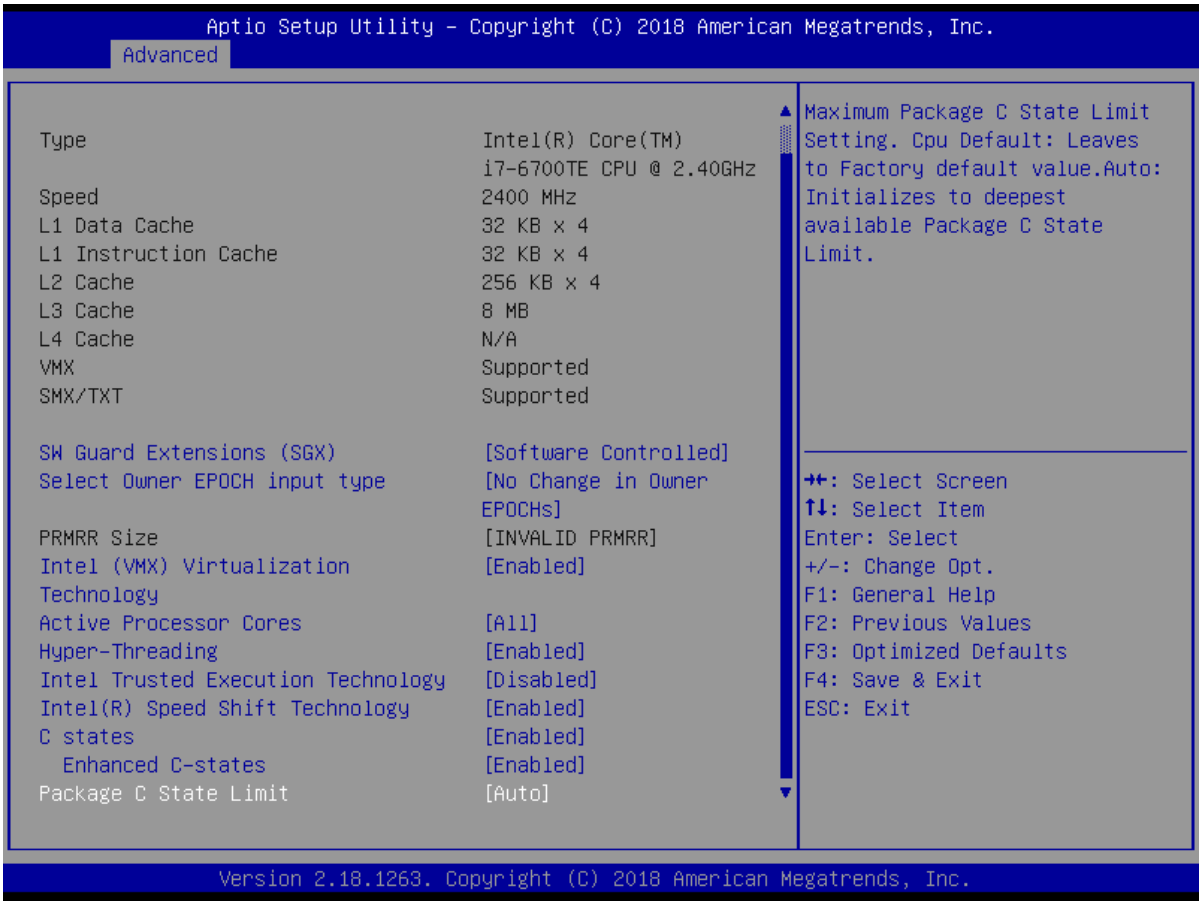
Set the time. Please use <Tab> to switch between time elements.

## 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.



### 4.3.1 CPU Configuration




■ **SW Guard Extensions (SGX)**
This item allows you to set the SW Guard Extensions.

■ **Select Owner EPOCH input type**
This item allows you to select the owner EPOCH input type.

■ **PRMRR Size**
This item allows you to set the PRMRR Size.

■ **Intel (VMX) Virtualization Technology**
When enabled, a VMM can utilize the integrated hardware virtualization support.

■ **Active Processor Cores**
Set number of cores to be enabled. Select <All> or <1> 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.

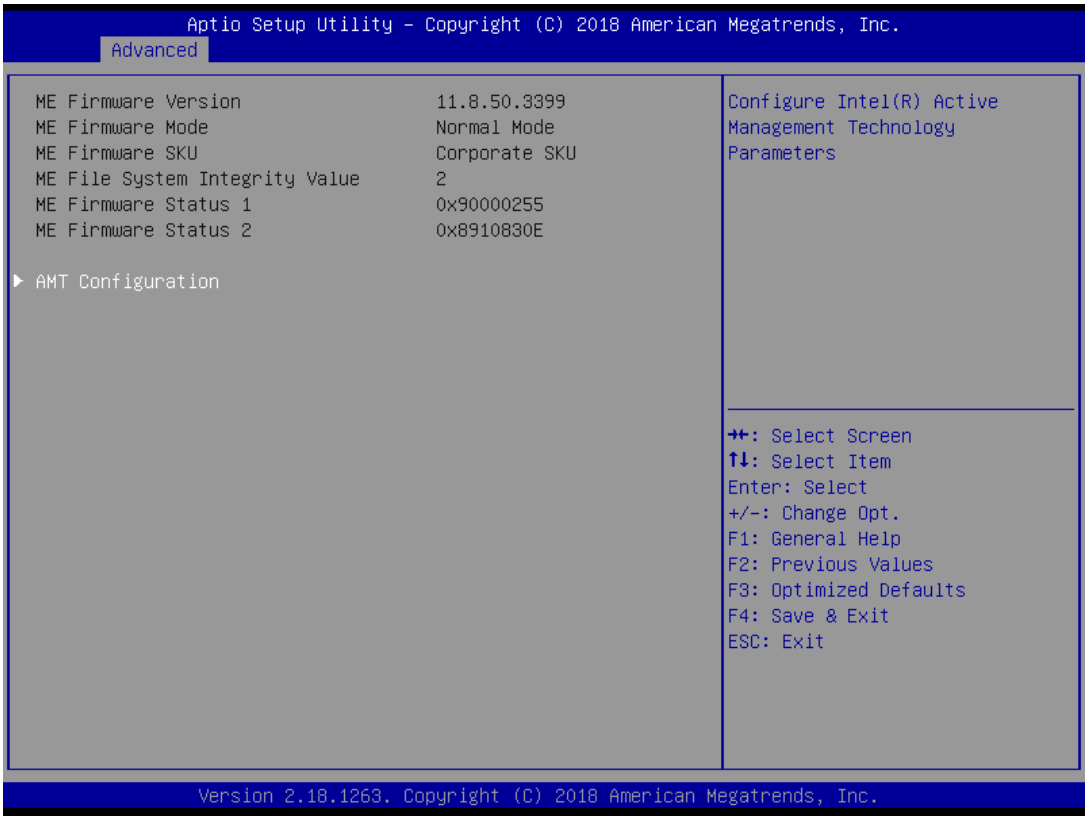
■ **Intel(R) Speed Shift Technology**
This item allows you to enable or disable the Intel Speed Shift Technology

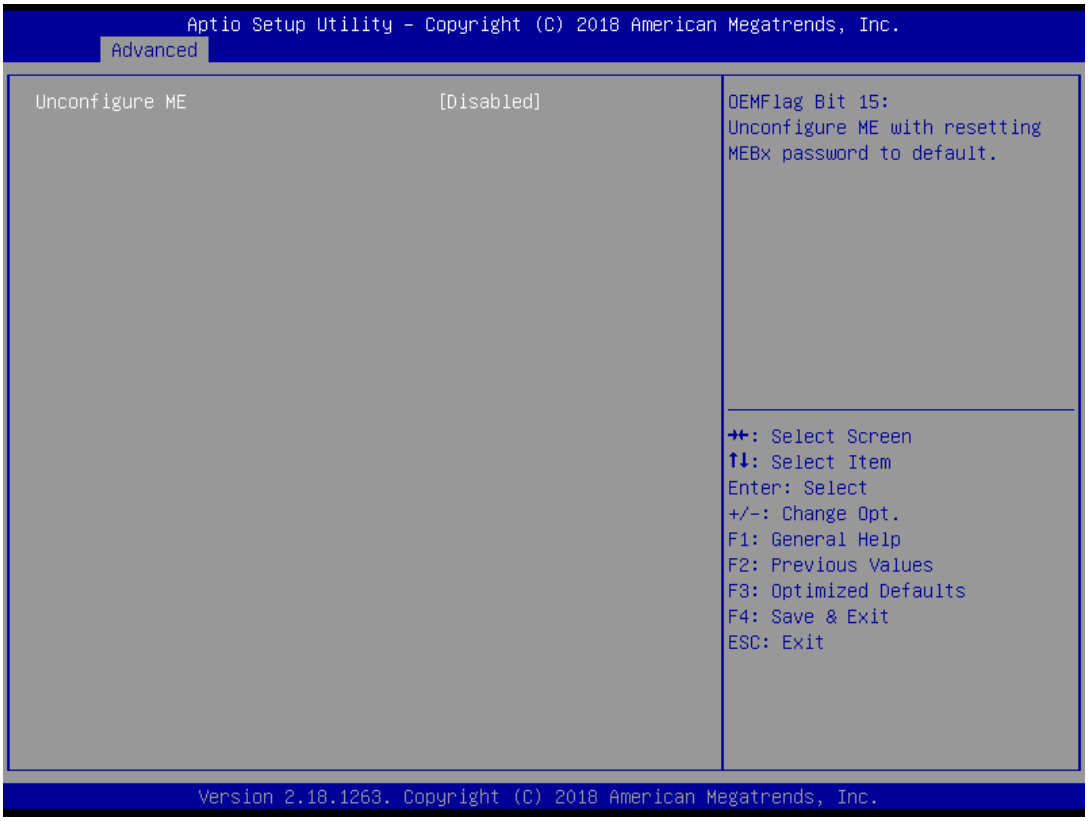
■ **CPU C states**
This item allows you to set the power saving of the CPU states.

❑ **Enhanced C State**
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



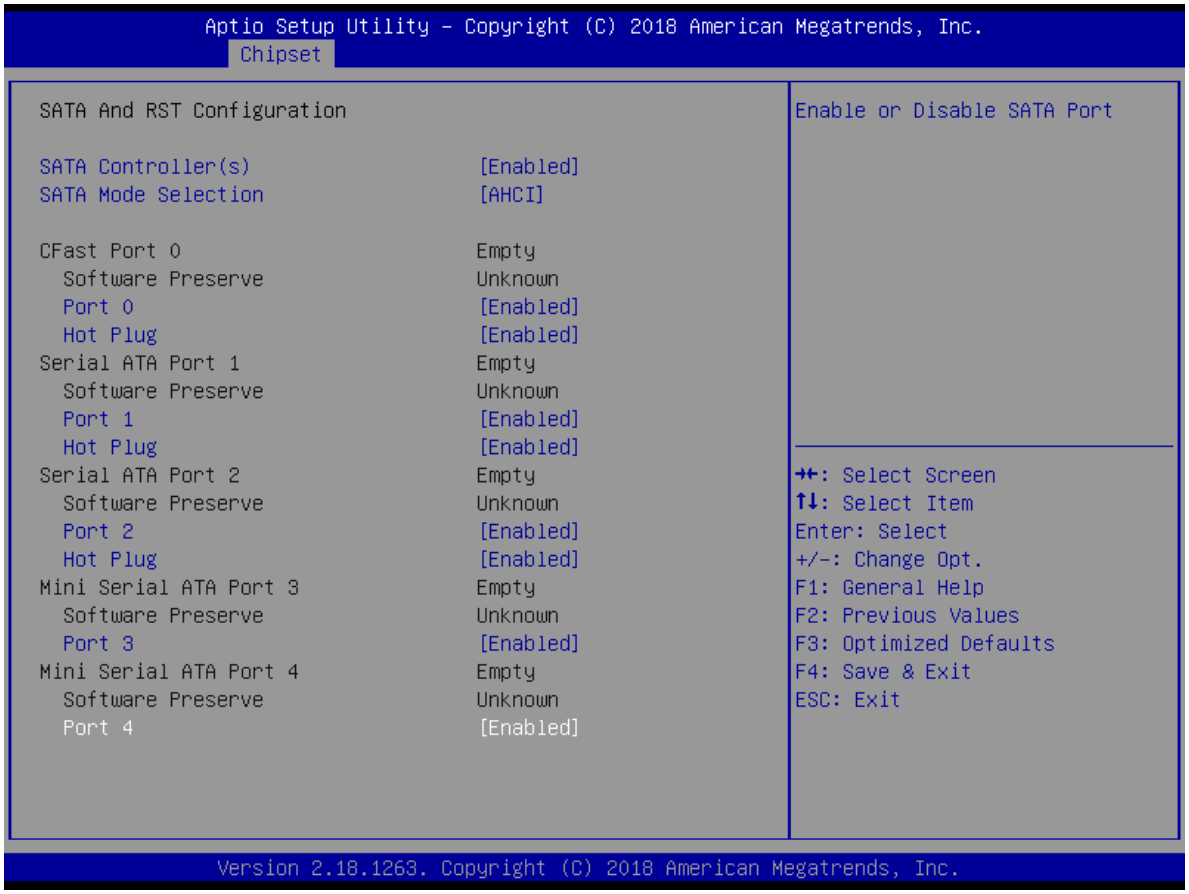

**■ AMT Configuration**

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

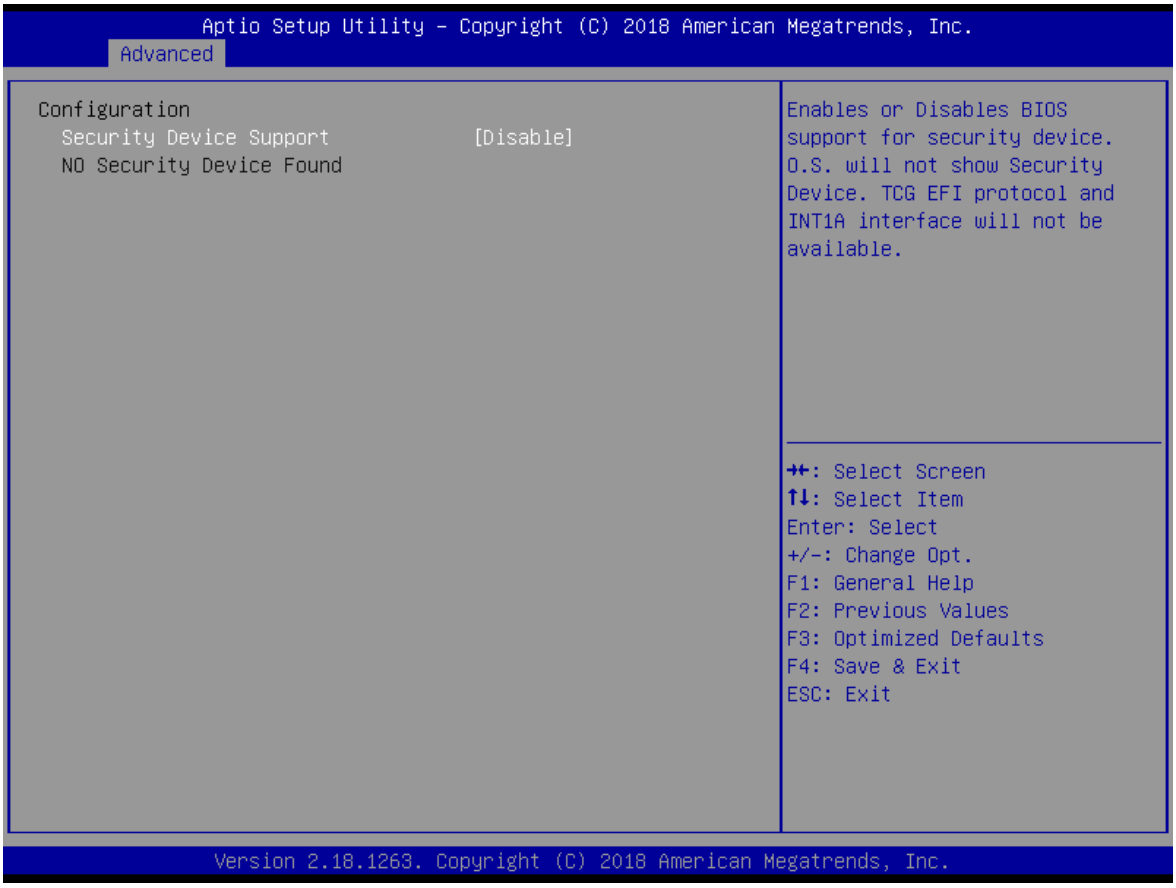



**■ SATA Controller(s)**
Enable or disable Serial ATA controller.

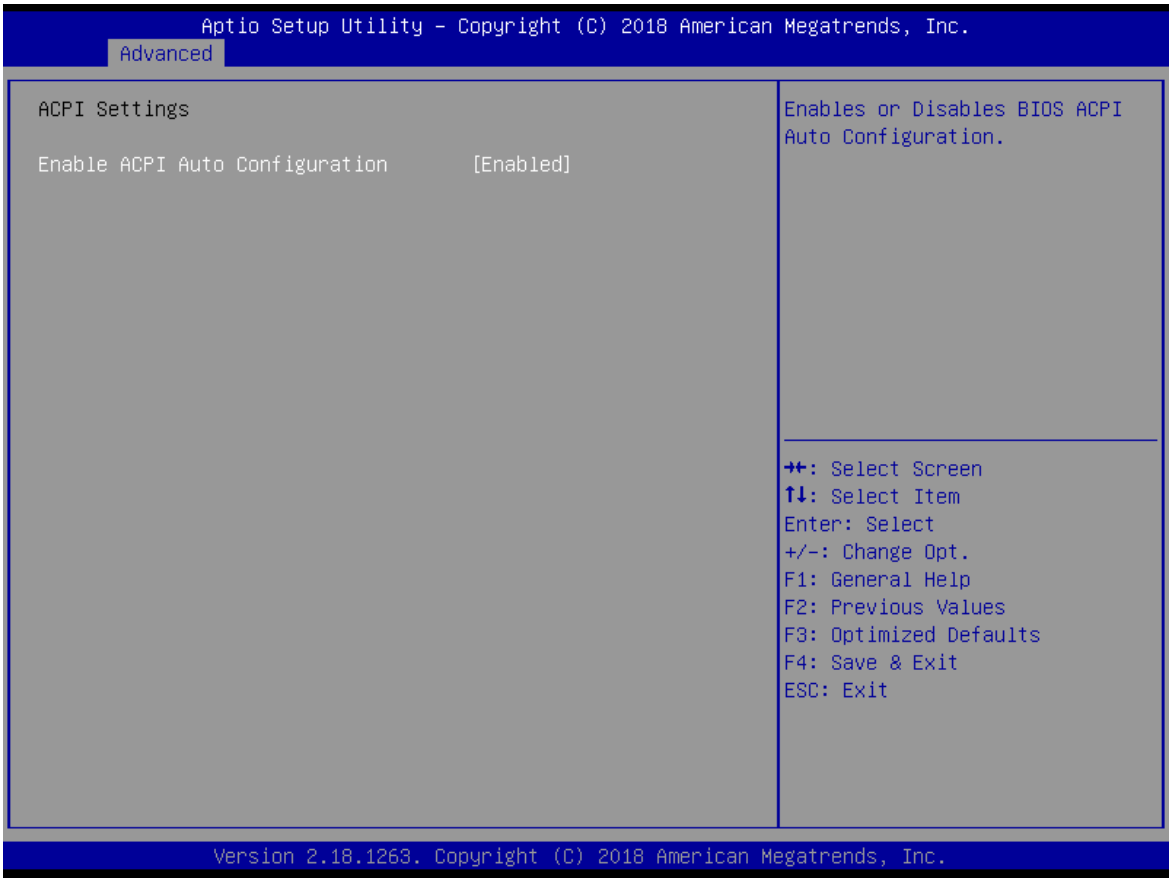
**■ SATA Mode Selection**
This item allows users to select mode of SATA controller.

**■ Serial ATA Port 0 / 1 / 2 / 3 / 4 / 5**
This item allows users to enable or disable Serial ATA Port 0 / 1 / 2 / 3 / 4 / 5.

### 4.3.4 Trusted Computing

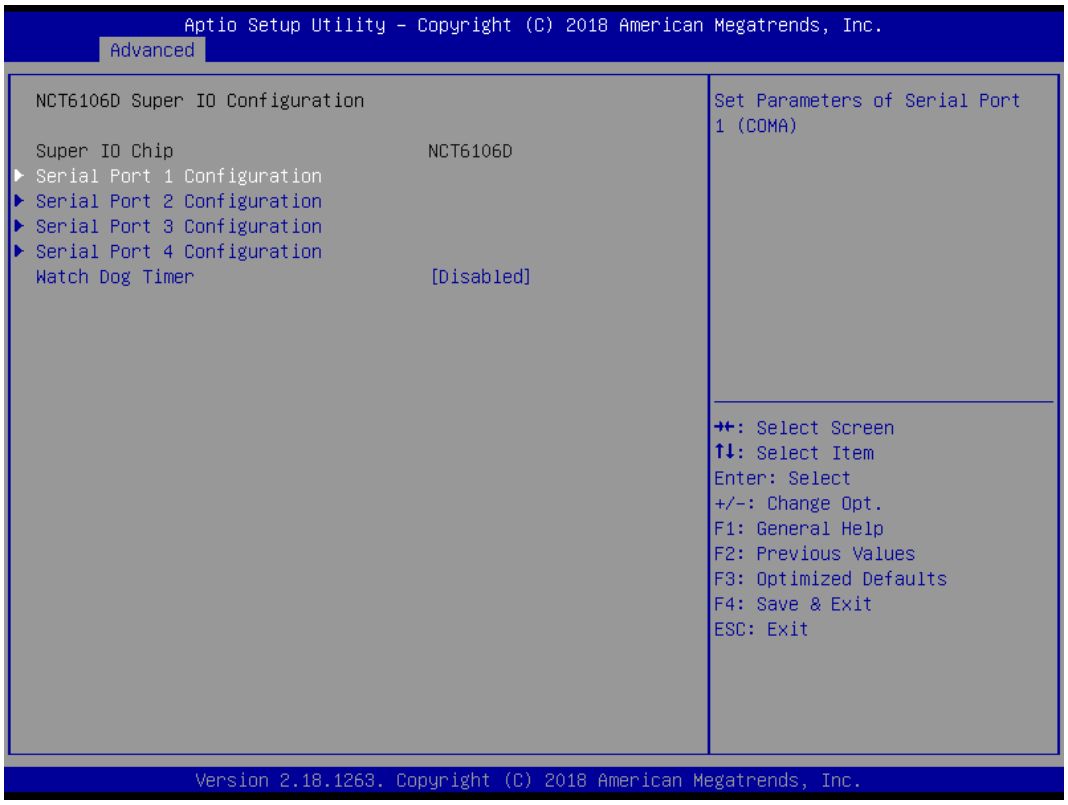


### 4.3.5 ACPI Settings

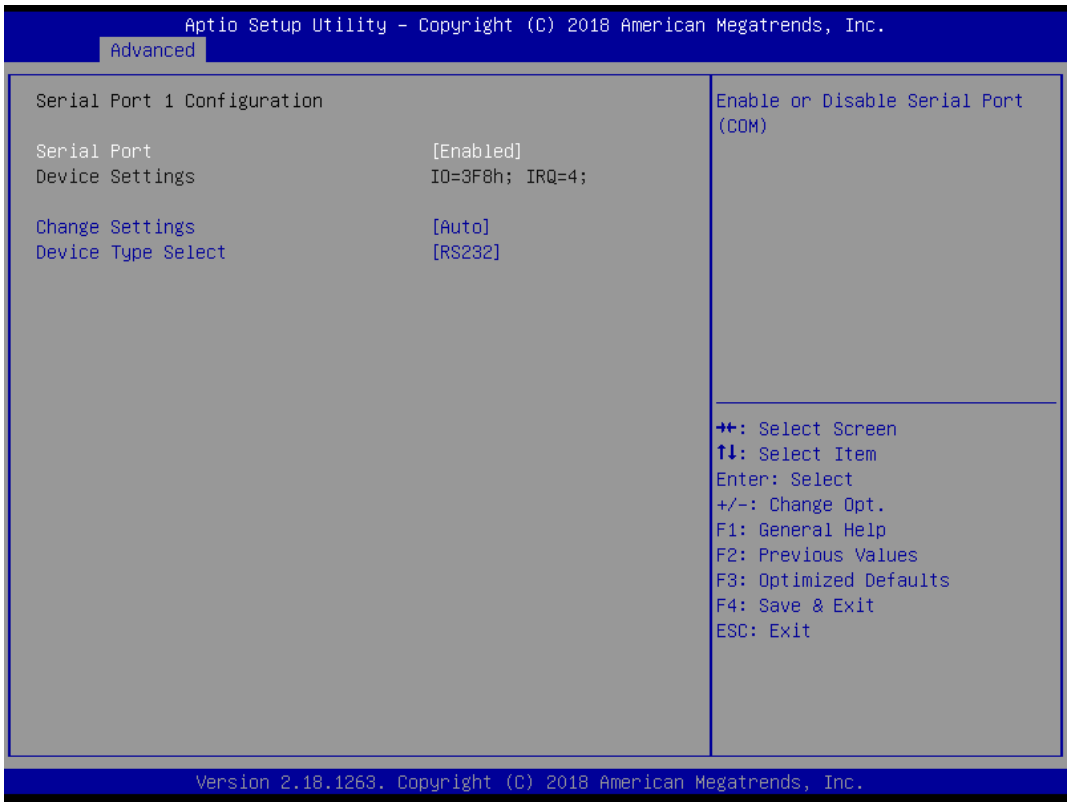



■ **Enable ACPI Auto Configuration**
Enable or disable BIOS ACPI auto configuration.

## 4.3.6 NCT6106D Super IO Configuration




### ■ Serial Port 1 Configuration




❑ **Serial Port**

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

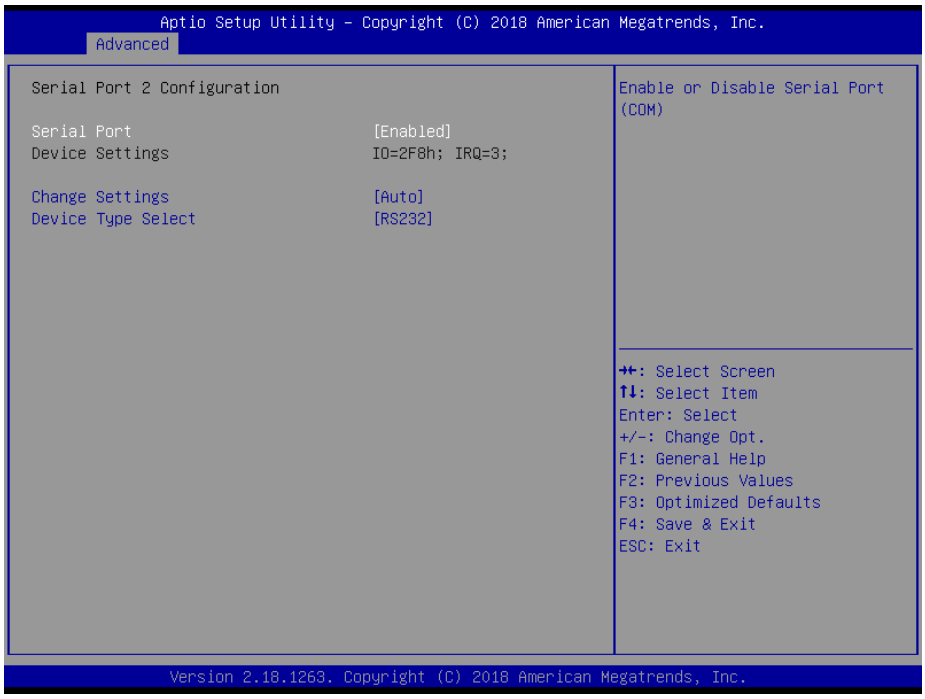
❑ **Change Settings**

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

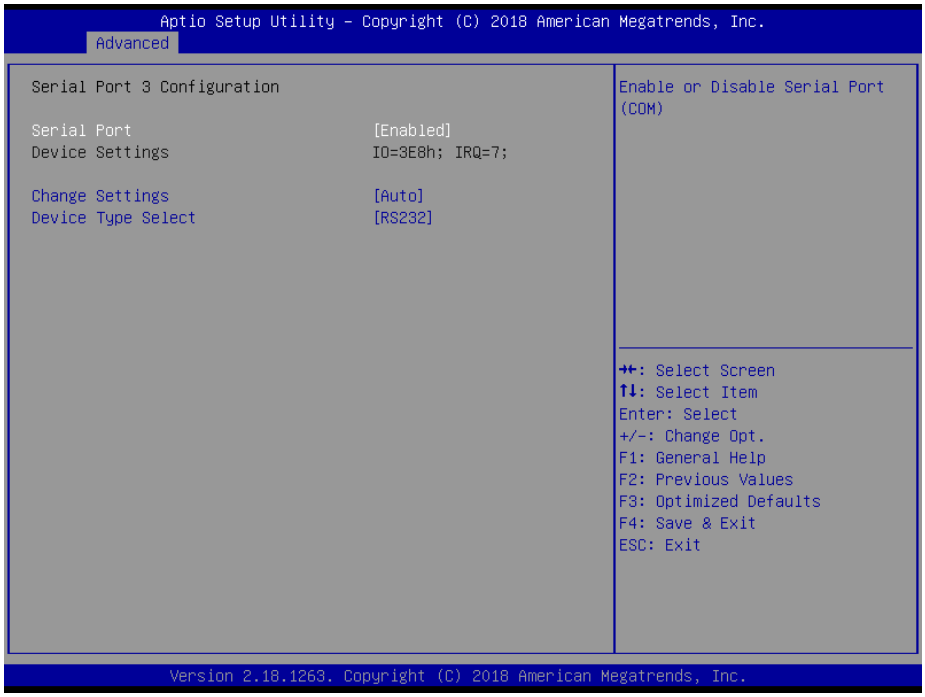



❑ **Serial Port**
This item will allow users to enable or disable serial port.

❑ **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

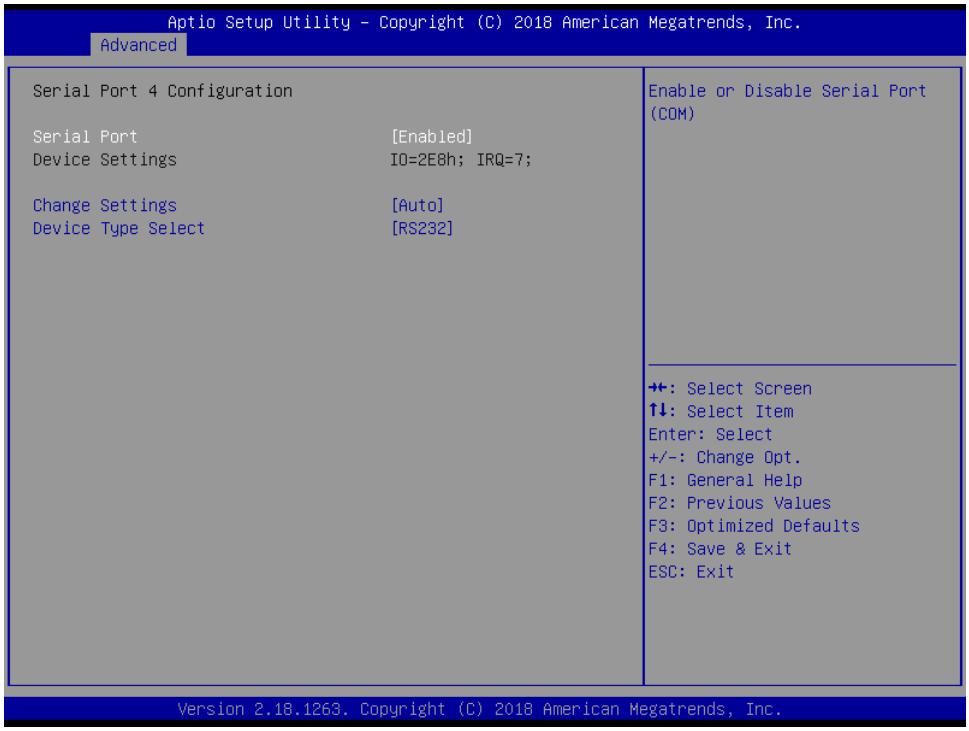



❑ **Serial Port**
This item will allow users to enable or disable serial port.

❑ **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




❑ **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.

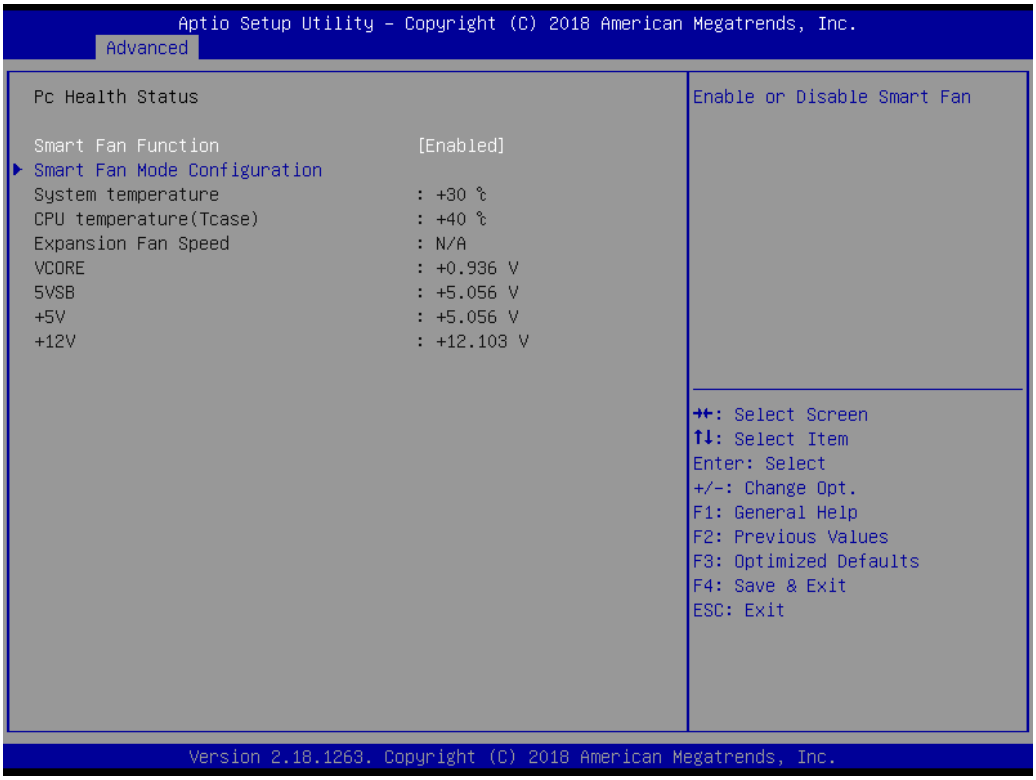
## Watch dog Timer

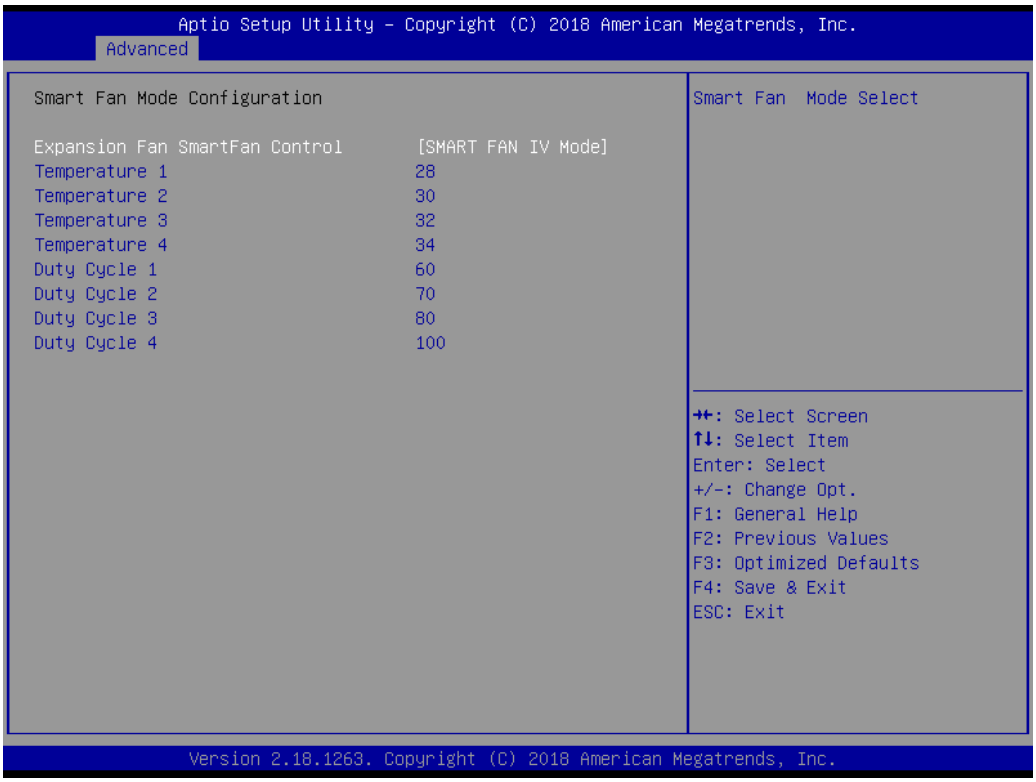
❑ **Watch Dog Timer Count Mode**
Change the Watch dog mode. Select <Second Mode> or <Minute Mode> mode.

❑ **Watch Dog Timer Time Out Value**
User can set a value in the range of 0 to 255.

### 4.3.7 NCT6106D HW Monitor

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

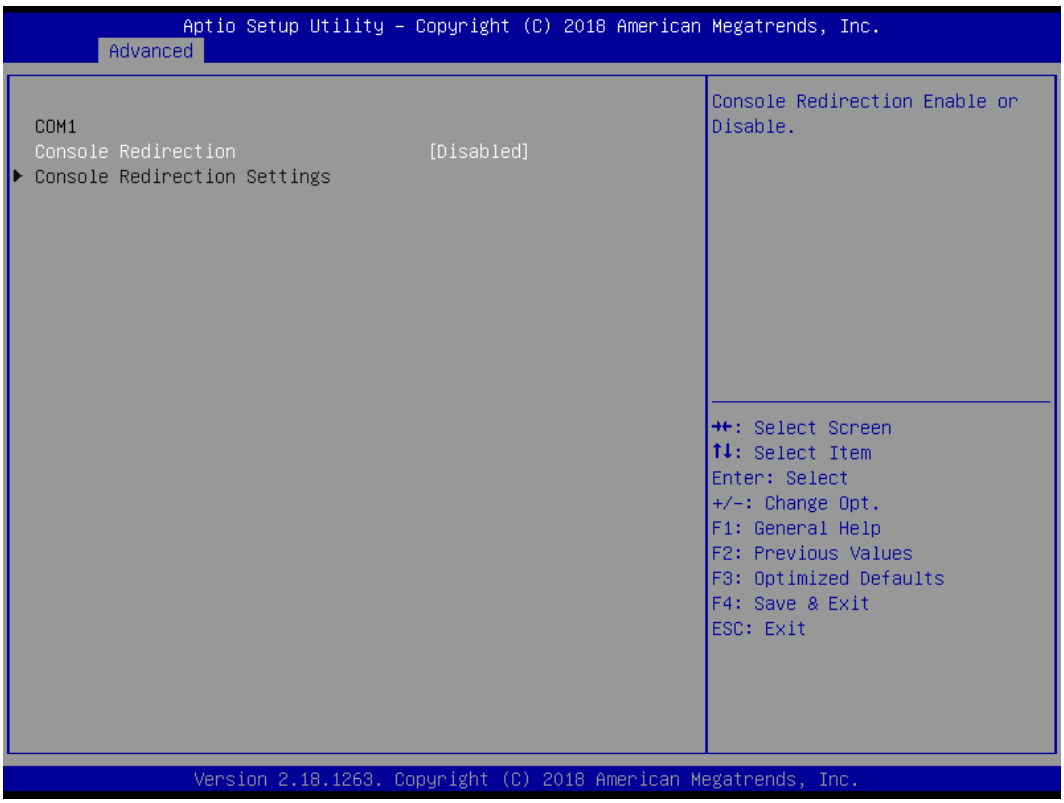


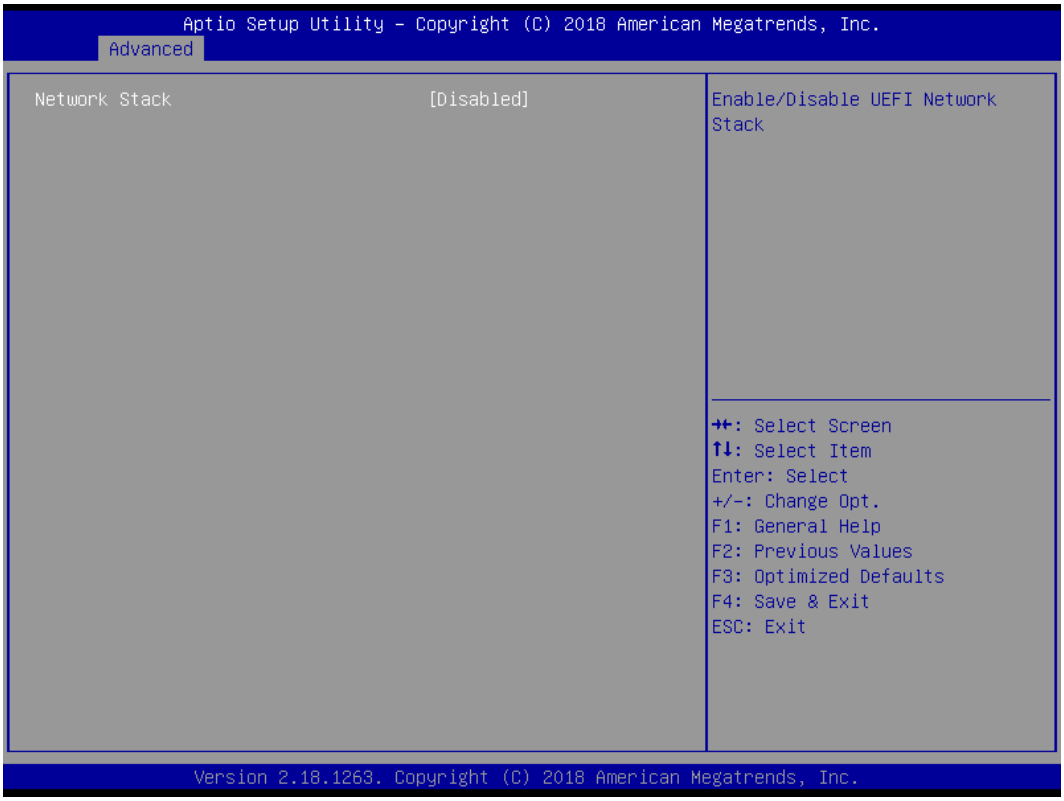
## 4.3.8 Serial Port Console Redirection

### ■ Console Redirection

This item allows users to enable or disable console redirection.



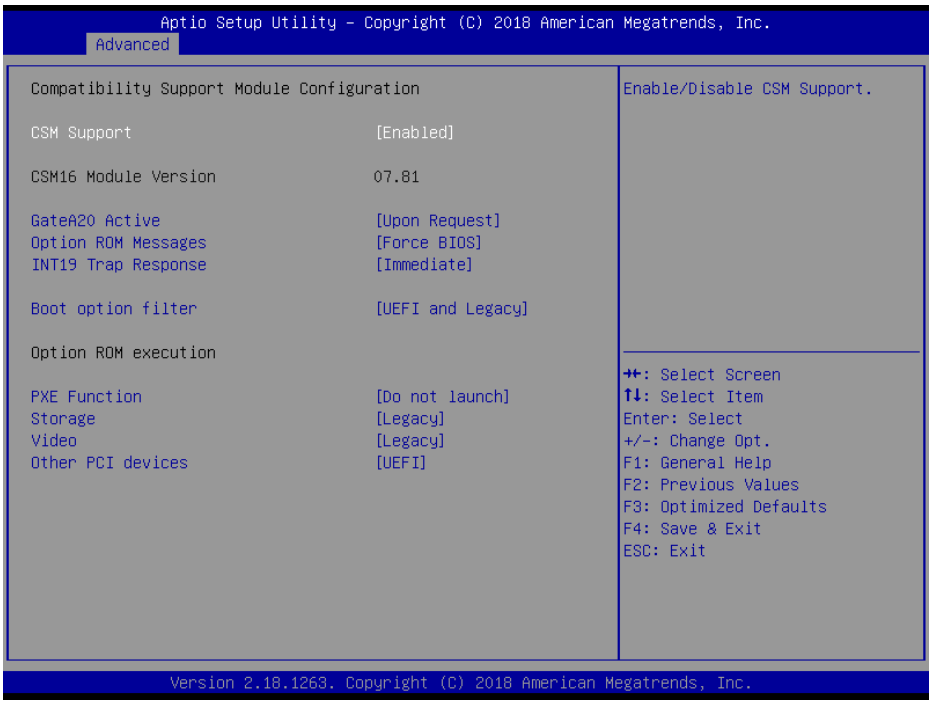

## 4.3.9 Network Stack Configuration




### ■ Network Stack

Use this item to enable or disable UEFI Network Stack.

## 4.3.10 CSM Configuration




**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>.

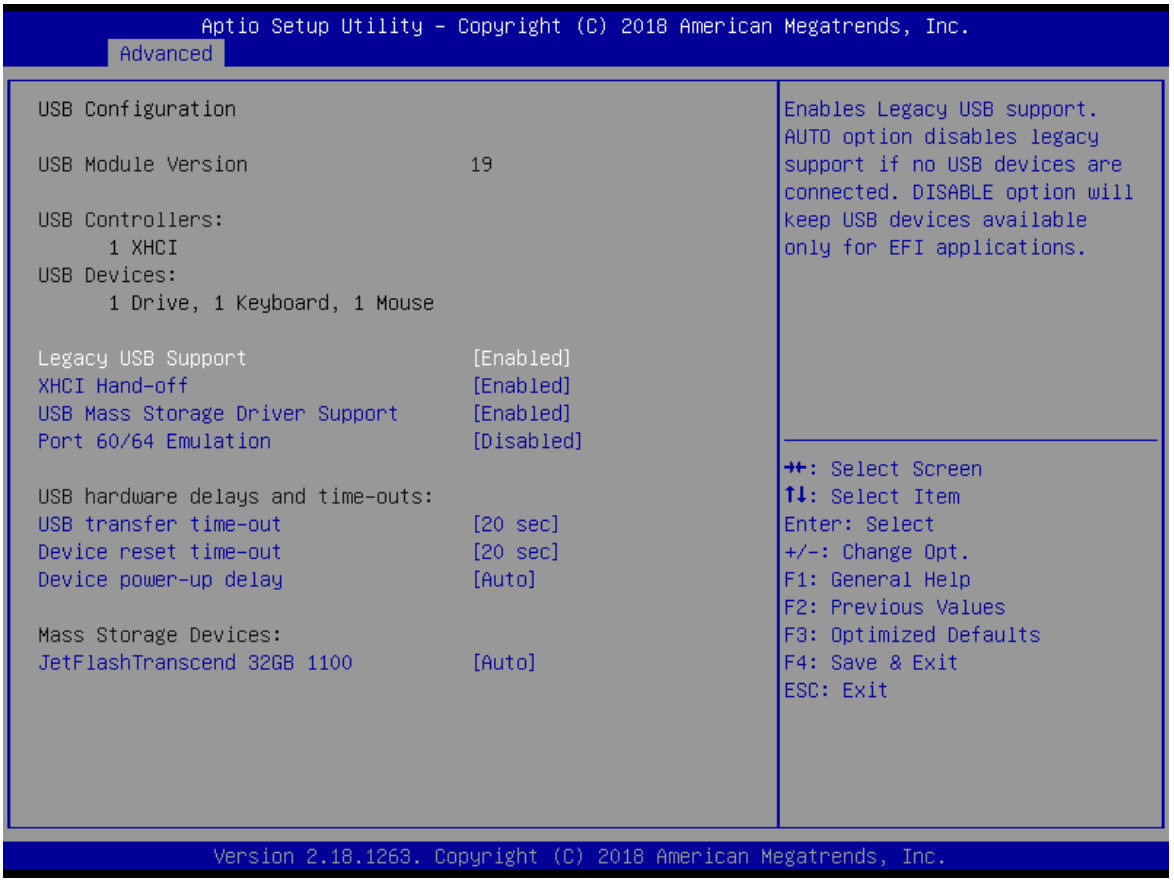
**Video**

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>.

### 4.3.11 USB Configuration




■ **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>.

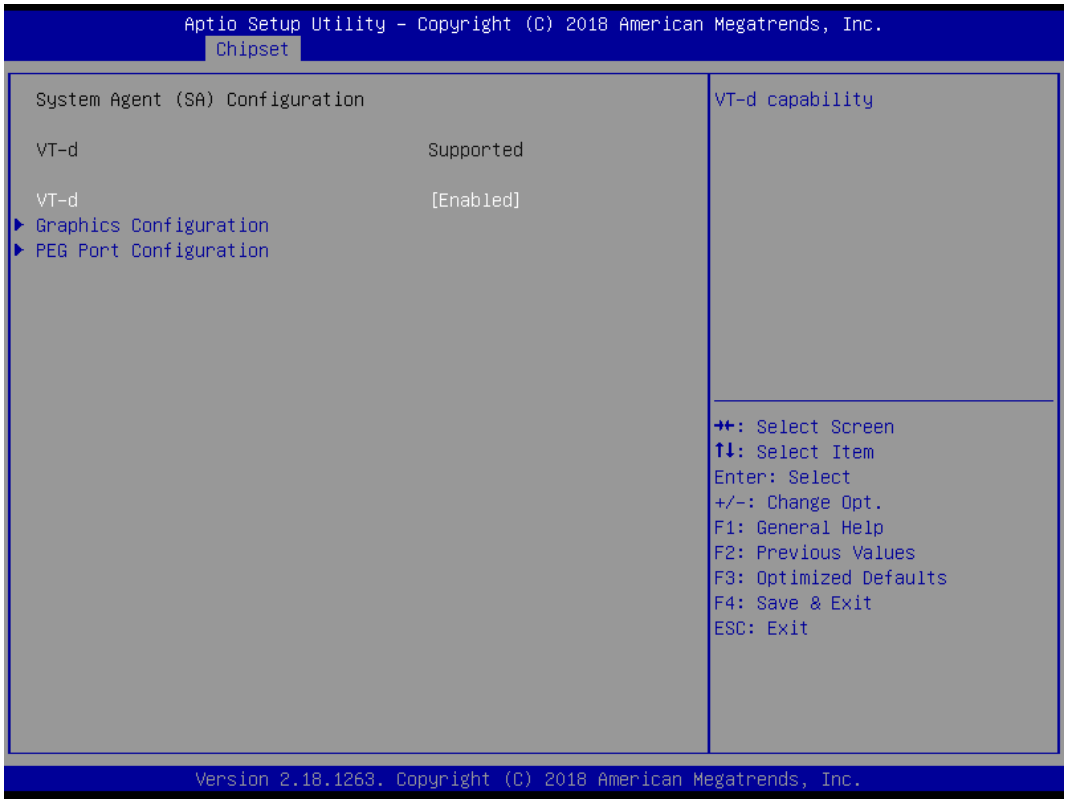
■ **Device reset time-out**
Use this item to set USB mass storage device start unit command time-out. Select <10 sec>, <20 sec>, <30 sec> or <40 sec>.

■ **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.

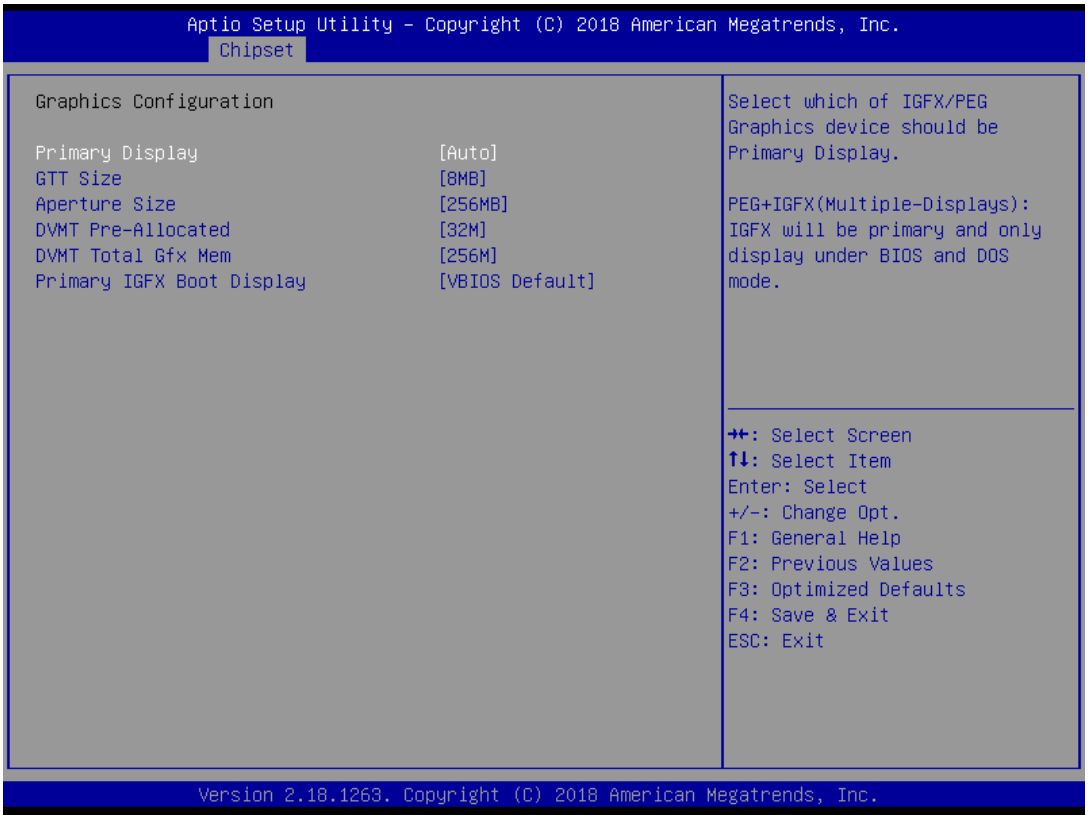

## 4.4.1 System Agent (SA) Configuration




### ■ VT-d

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

## Graphic Configuration




❑ **Primary Display**

Change the Primary Display. Select <Auto> or <PEG+IGFX>
PEG+IGFX (Multiple-Displays): IGFX will be primary and only display under BIOS an DOS mode

❑ **GTT Size**

This item allows you to change the GTT size.

❑ **Aperture Size**

Aperture size optimal between 128MB, 256MB, 512MB, 1024MB, 2048MB or 4096MB.

❑ **DVMT Pre-Allocated**

DVMT pre-allocated (fixed) Graphics memory size optimal from 32M to 2048M.

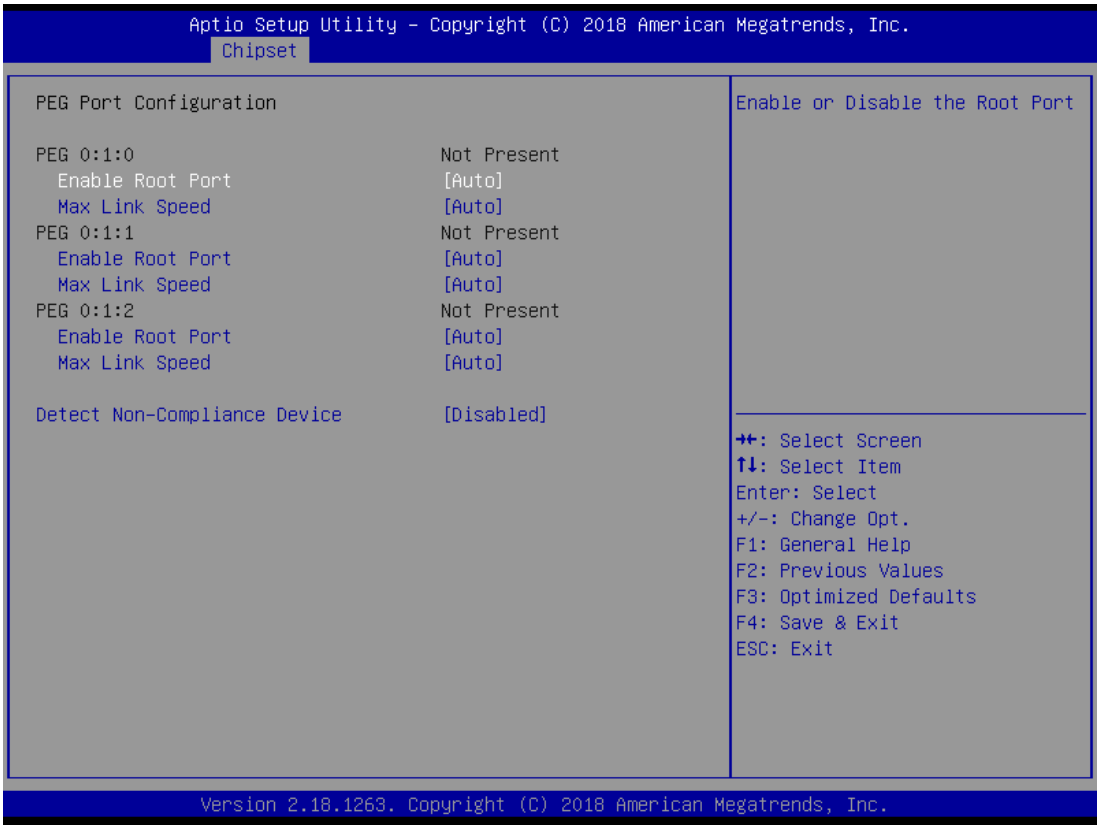
❑ **DVMT Total Gfx Mem**

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

❑ **Primary IGFX Boot Display**

Use the field to select the type of device you want to use as the display(s) of the system.

## ■ PEG Port Configuration




❑ **PEG 0:1:0**

✓ **Enable Root Port**
This item allows you to enable or disable the Root Port.

✓ **Max Link Speed**
This item allows you to configure PEG 0:1:0 Max Sped.

❑ **PEG 0:1:1**

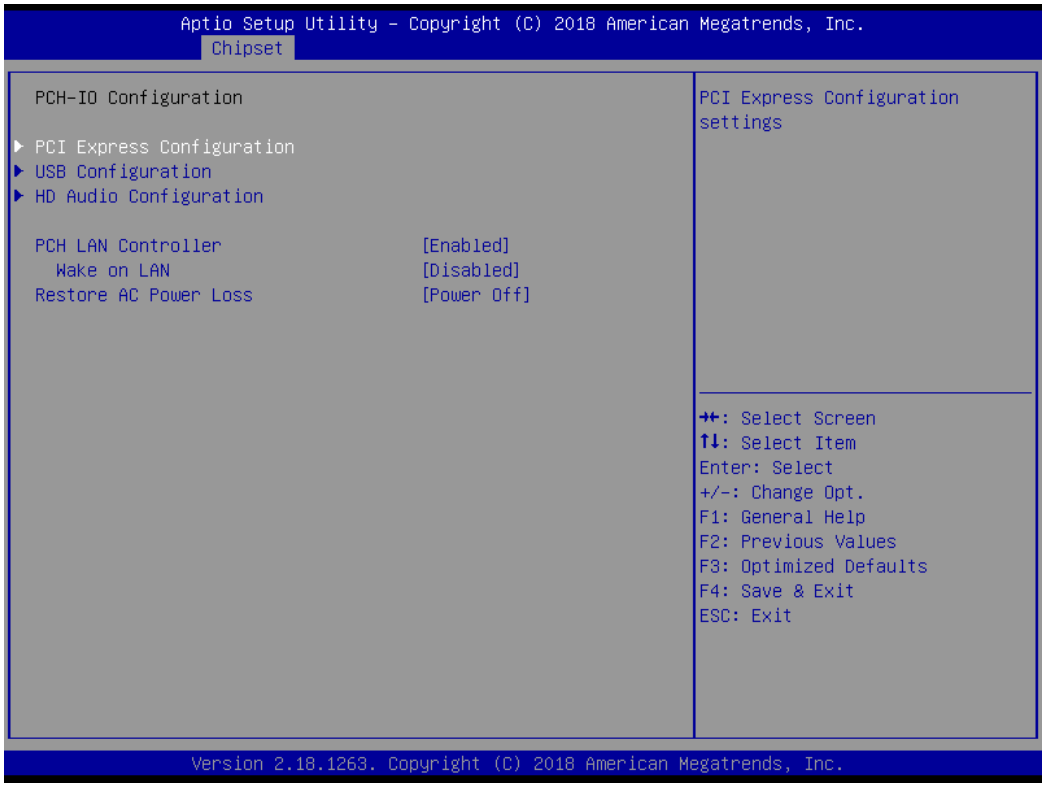
✓ **Enable Root Port**
This item allows you to enable or disable the Root Port.

✓ **Max Link Speed**
This item allows you to configure PEG 0:1:1 Max Sped.

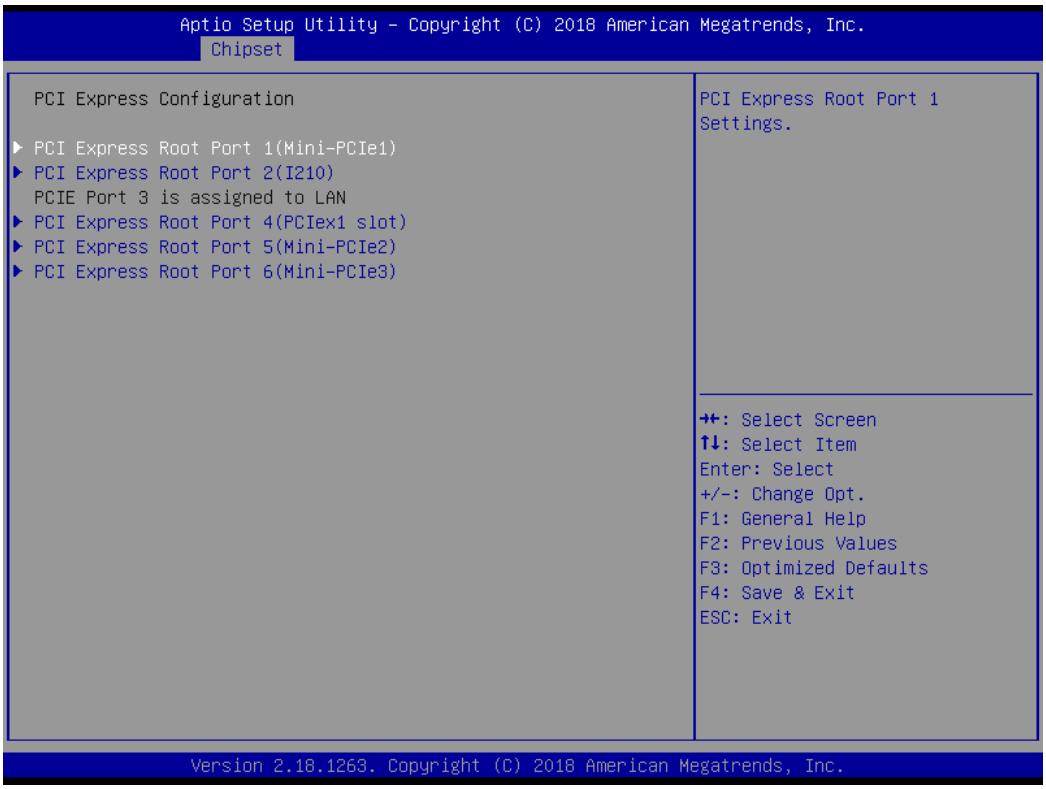
❑ **Detect Non-Compliance Device**
Detect Non-Compliance PCI Express Device. If enable, it will take more time at POST time.

## 4.4.2 PCH-IO Configuration

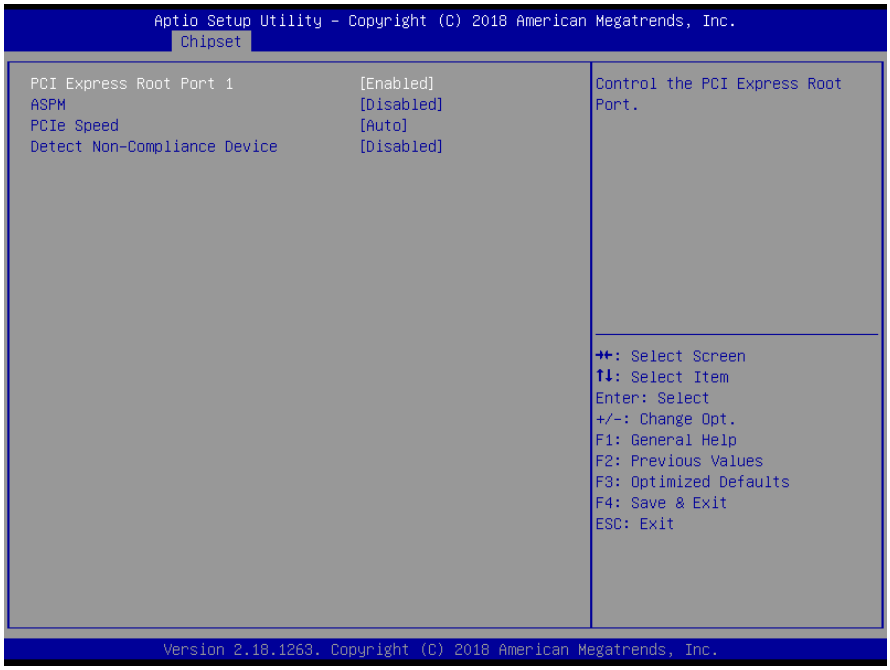
This section allows you to configure the chipset.




### ■ PCI Express Configuration

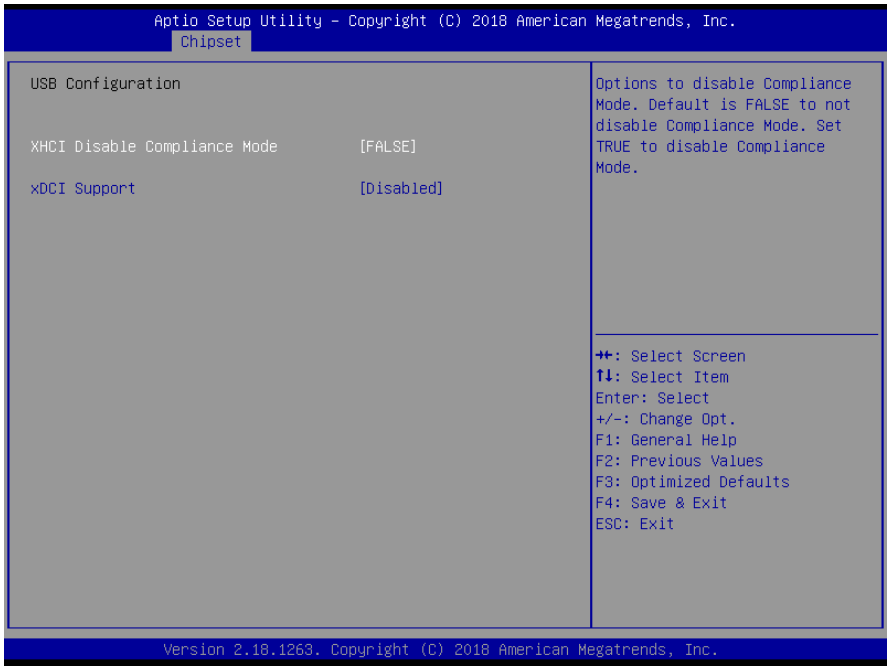


### ❑ PCI Express Root Port 1 / 3 / 4 / 5 / 6 / 7 / 8 / 9




- ✓ **PCI Express Port 1 / 3 / 4 / 5 / 6 / 7 / 8 / 9**
  This item allows you to enable or disable PCI Express Port 1 / 3 / 4 / 5 / 6 / 7 /8 / 9 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



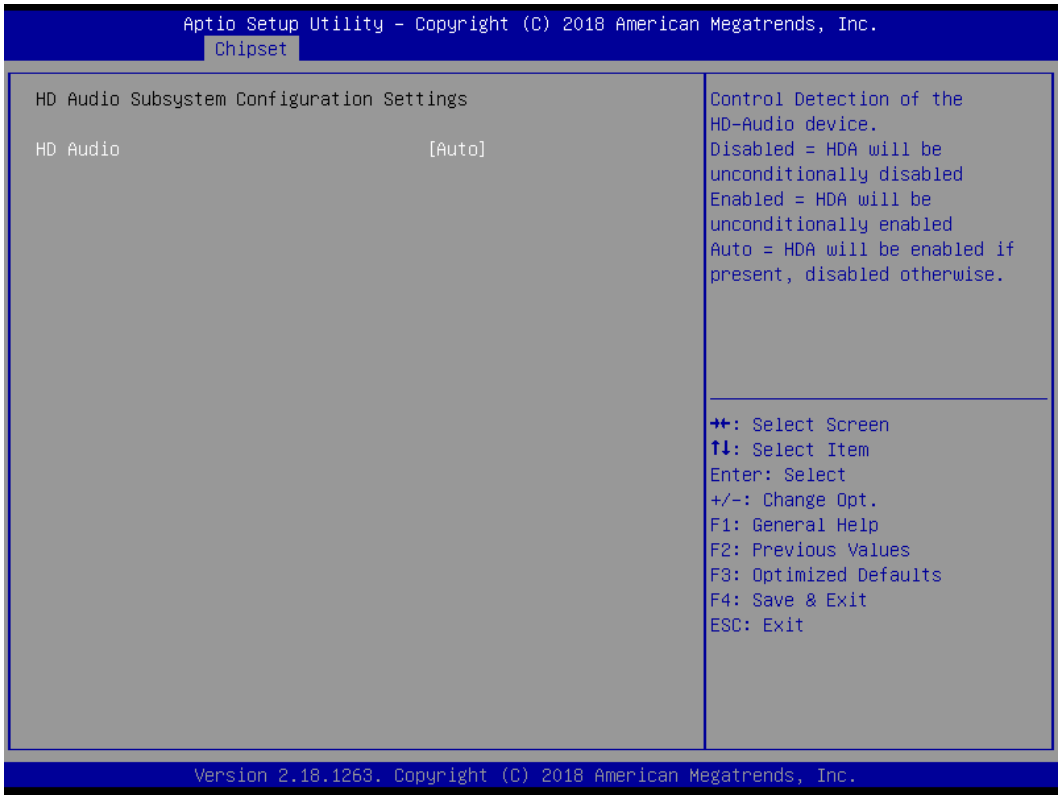

### ❑ XHCI Disable Compliance mode

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




### ❑ HD Audio

Control detection of the HD-Audio device. This item allows you to select <Enabled>, <Disabled> or <Auto>.

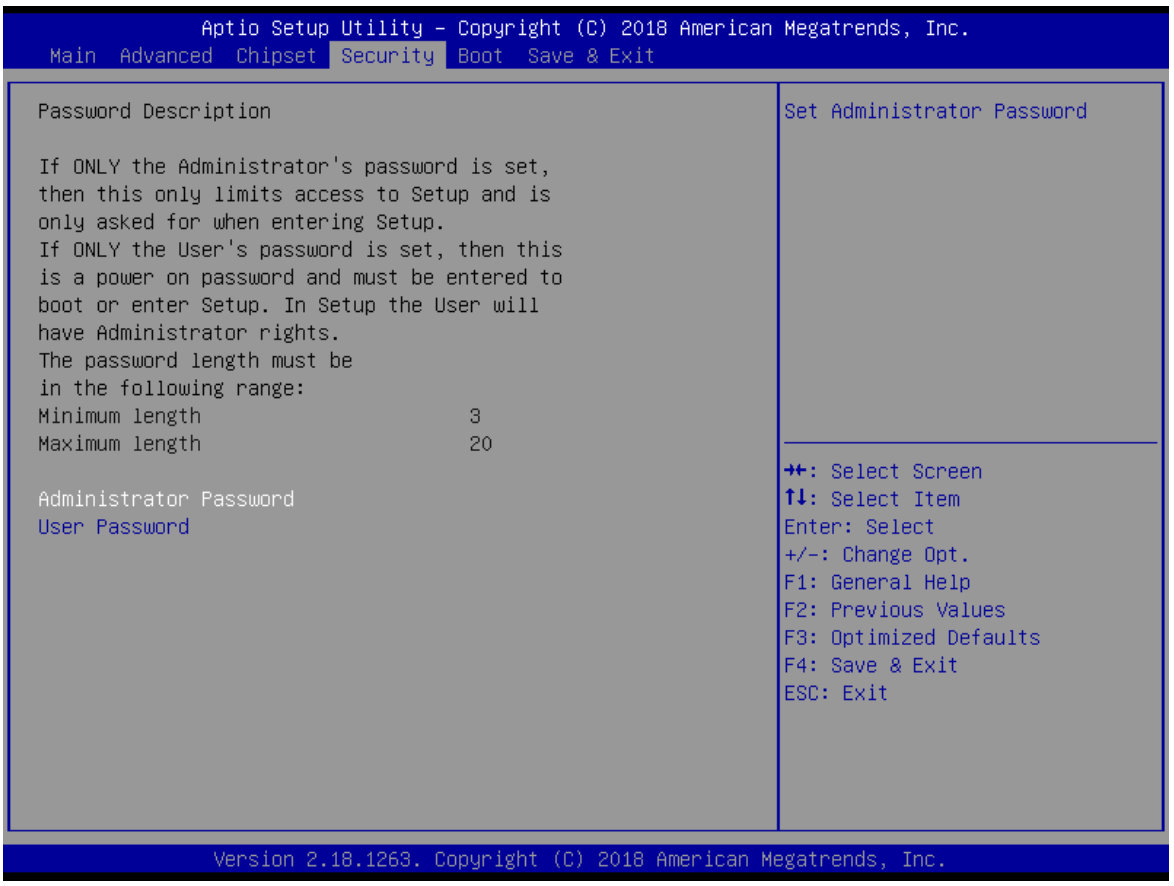
Disabled: Azalia will be unconditionally be disabled.

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.




## 4.5.1 Administrator Password

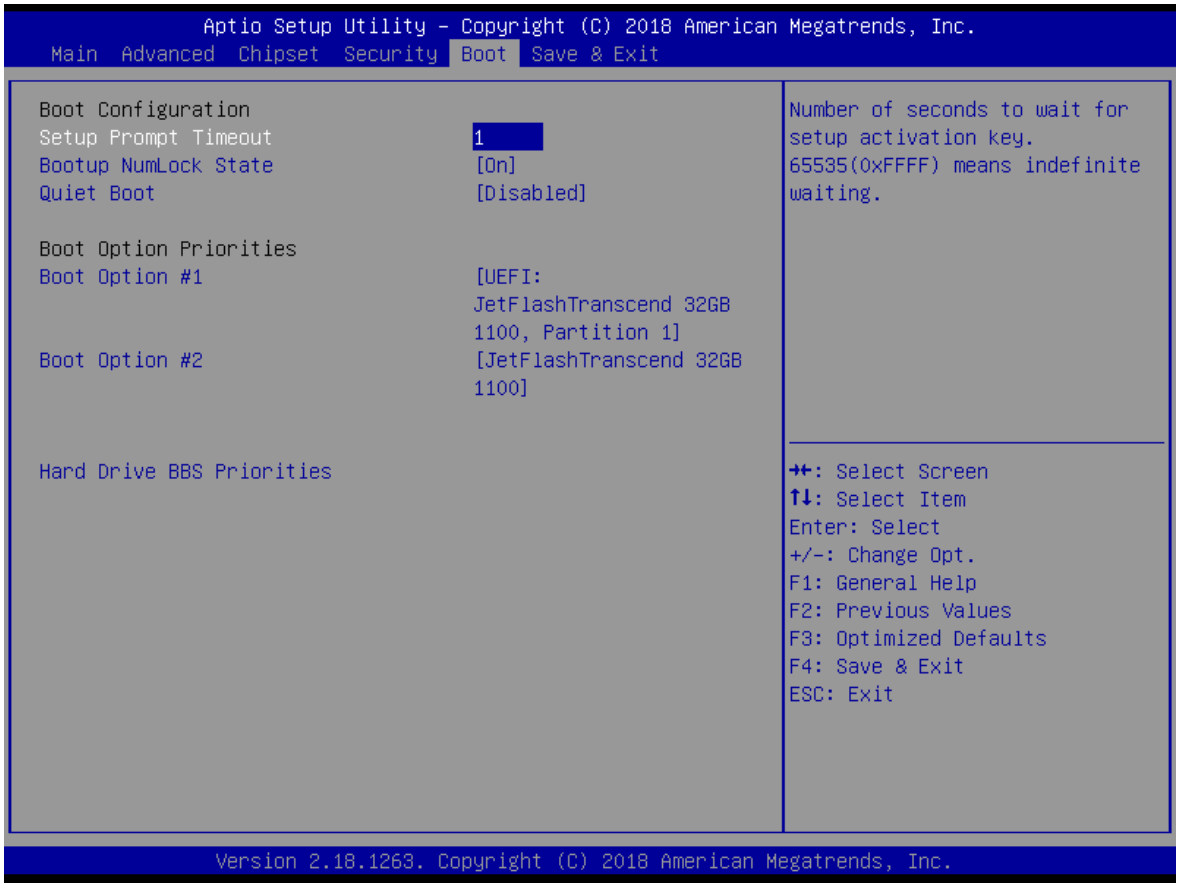
This item allows you to set Administrator Password.

## 4.5.2 User Password

This item allows you to set User Password.

# 4.6 Boot

This menu allows you to setup the system boot options.




### 4.6.1 Setup Prompt Timeout

This item sets number of seconds to wait for setup activation key.

### 4.6.2 Bootup NumLock State

This item selects the keyboard NumLock state. Select <On> or <Off>.

### 4.6.3 Full Screen Logo Show

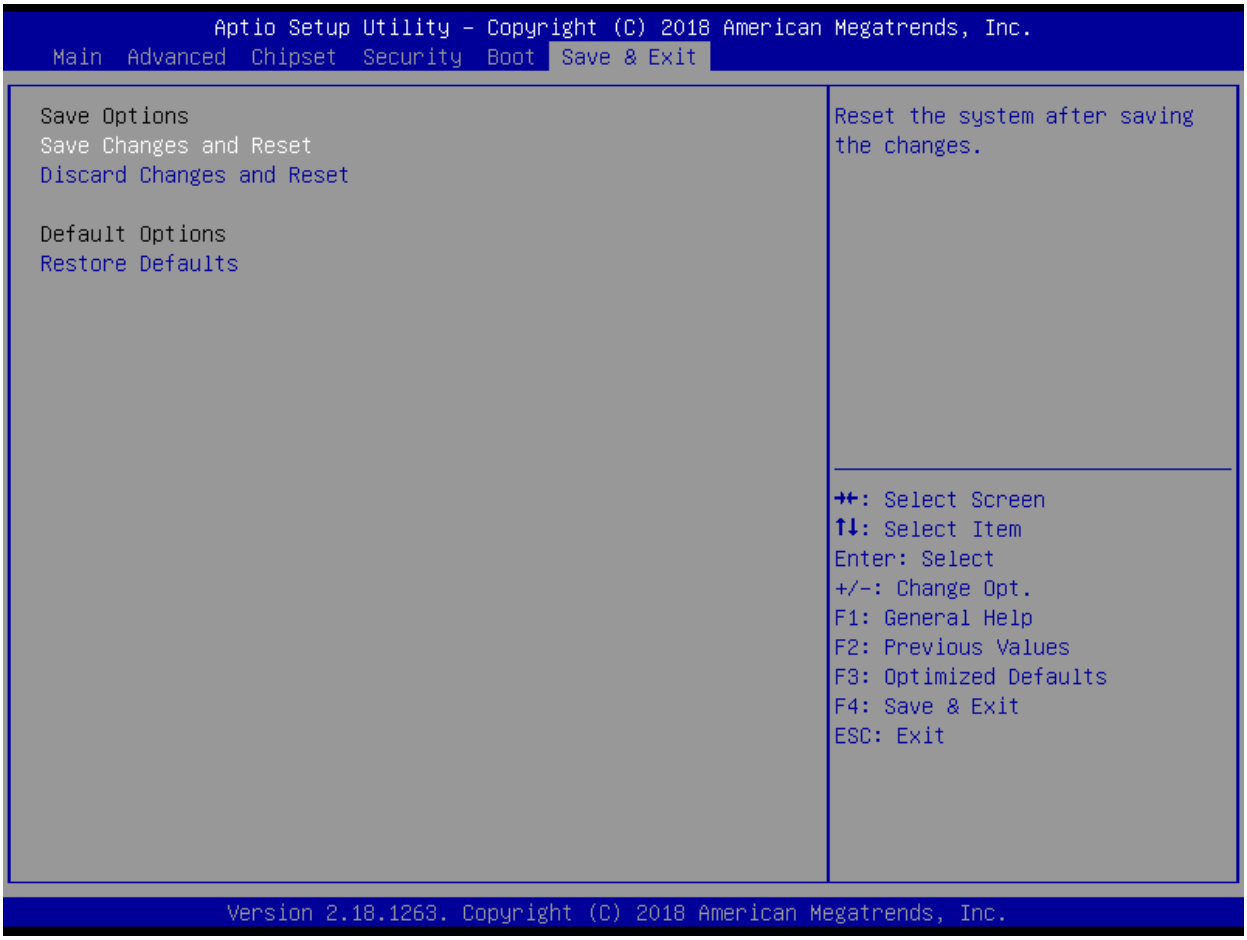
This item allows you to enable or disable Full Screen Logo Show function.

### 4.6.4 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.




## 4.7.1 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.

## 4.7.2 Discard Changes and Reset

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

## 4.7.3 Restore Defaults

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

# Appendix

# WDT & GPIO

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

# WDT Sample Code

WDT Setting

**Psuedo Code**

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

//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, 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.

**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);
```