

USER'S MANUAL

VCO-6000 Series

Superior Machine Vision System



Table of Contents

Prefaces	04
Revision	04
Disclaimer	04
Copyright Notice	04
Trademarks Acknowledgment	04
Environmental Protection Announcement	04
Safety Precautions	05
Technical Support and Assistance	06
Conventions Used in this Manual	06
Package Contents	07
Ordering Information	07
Optional Accessory	07
Chapter 1 Product Introductions	08
1.1 Overview	09
1.1.1 Key Feature	10
1.2 Hardware Specification	11
1.3 System I/O	12
1.3.1 VCO-6000	12
1.3.2 VCO-6011E(P)	14
1.3.3 VCO-6022E(P/C)	16
1.3.4 VCO-6033E(P/C)	18
1.3.5 VCO-6044P(C)	20
1.3.6 VCO-6055C	22
1.4 Mechanical Dimension	24
1.4.1 VCO-6000	24
1.4.2 VCO-6011E(P)	24
1.4.3 VCO-6022E(P/C)	25
1.4.4 VCO-6033E(P/C)	25
1.4.5 VCO-6044P(C)	26
1.4.6 VCO-6055C	26
Chapter 2 Switches and Connectors	27
2.1 Switch and connector Locations	28
2.1.1 Top View	28
2.1.2 Bottom View	29
2.2 Connector / Switch Definition	30
2.3 Switch Definitions	31
2.4 Connector Definitions	31
Chapter 3 System Setup	46
3.1 Set torque force to 3.5 kgf-cm to execute all the screwing and unscrewing	47
3.2 Disconnecting expansion module from computing module	47
3.3 Removing heat sink cover	48
3.4 Installing SODIMM	49
3.5 Installing CPU	50
3.6 Installing mini PCIe card / mSATA	55
3.7 Installing antenna	56
3.8 Assembly heat sink cover	58

3.9	Installing HDD on removable SATA HDD bay	59
3.10	Installing CFast card	60
3.11	Changing CMOS battery	61
3.12	Installing PCIe/PCI expansion card	62
3.13	Connecting expansion module with computing module	64
3.14	Installing wall mount kit	65
3.15	Installing book mount	66
3.16	Installing din rail kit	67
Chapter 4	BIOS Setup	68
4.1	BIOS Introduction	69
4.2	Main Setup	70
4.2.1	System Language	70
4.2.2	System Date	70
4.2.3	System Time	70
4.3	Advanced Setup	71
4.3.1	CPU Configuration	72
4.3.2	PCH-FW Configuration	73
4.3.3	SATA AND RST Configuration	74
4.3.4	Trusted Computing	75
4.3.5	ACPI Settings	76
4.3.6	NCT6106D Super IO Configuration	77
4.3.7	NCT6106D HW Monitor	80
4.3.8	Serial Port Console Redirection	81
4.3.9	Network Stack Configuration	81
4.3.10	CSM Configuration	82
4.3.11	USB Configuration	83
4.4	Chipset	84
4.4.1	System Agent (SA) Configuration	84
4.4.2	PCH-IO Configuration	87
4.5	Security	90
4.5.1	Administrators Password	90
4.5.2	Users Password	90
4.6	Boot	91
4.6.1	Setup Prompt Timeout	91
4.6.2	Bootup NumLock State	91
4.6.3	Full Screen Logo Show	91
4.6.4	Hard Driver BBS Priorities	91
4.7	Save & Exit	92
4.7.1	Save Changes and Reset	92
4.7.2	Discard Changes and Reset	92
4.7.3	Restore Defaults	92
Appendix WDT & GPIO		93
	WDT Sample Code	94
	GPIO Sample Code	95

Prefaces

Revision

Revision	Description	Date
1.0	Manual Released	2018/01/15
1.1	Added WDT and GPIO Sample Code	2018/02/09
1.2	New-added CPU support, OS revision, and Wall Mount kit revision	2018/08/22
1.3	WDT & GPIO Sample Code Revised	2018/11/28

Disclaimer

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

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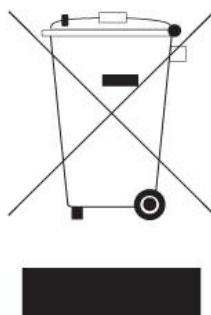
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Environmental Protection Announcement

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



Safety Precautions

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

- Put this equipment on a reliable surface during installation. Dropping it or letting it fall could cause damage.
- The power outlet shall be installed near the equipment and shall be easily accessible.
- Turn off the system power and disconnect the power cord from its source before making any installation. Be sure both the system and the external devices are turned OFF. Sudden surge of power could ruin sensitive components. Make sure the equipment is properly grounded.
- When the power is connected, never open the equipment. The equipment should be opened only by qualified service personnel.
- Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
- Disconnect this equipment from the power before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
- Avoid the dusty, humidity and temperature extremes.
- Do not place heavy objects on the equipment.
- If the equipment is not used for long time, disconnect it from the power to avoid being damaged by transient over-voltage.
- The storage temperature shall be above -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 by service personnel:
 - The power cord or plug is damaged.
 - Liquid has penetrated into the equipment.
 - The equipment has been exposed to moisture.
 - The equipment does not work well or it cannot work according to 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	VCO-6000 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
VCO-6000	Superior Machine Vision System with LGA 1151 for Intel® 6 th /7 th Gen Processor and Q170 PCH
VCO-6011E	Superior Machine Vision System with LGA 1151 for Intel® 6 th /7 th Gen Processor and Q170 PCH, 1x PCIe x16
VCO-6011P	Superior Machine Vision System with LGA 1151 for Intel® 6 th /7 th Gen Processor and Q170 PCH, 1x PCI
VCO-6022E	Superior Machine Vision System with LGA 1151 for Intel® 6 th /7 th Gen Processor and Q170 PCH, 2x PCIe x8
VCO-6022P	Superior Machine Vision System with LGA 1151 for Intel® 6 th /7 th Gen Processor and Q170 PCH, 2x PCI
VCO-6022C	Superior Machine Vision System with LGA 1151 for Intel® 6 th /7 th Gen Processor and Q170 PCH, 1x PCIe x16, 1x PCI
VCO-6033E	Superior Machine Vision System with LGA 1151 for Intel® 6 th /7 th Gen Processor and Q170 PCH, 2x PCIe x1, 1x PCIe x16
VCO-6033P	Superior Machine Vision System with LGA 1151 for Intel® 6 th /7 th Gen Processor and Q170 PCH, 3x PCI
VCO-6033C	Superior Machine Vision System with LGA 1151 for Intel® 6 th /7 th Gen Processor and Q170 PCH, 1x PCIe x16, 2x PCI
VCO-6044P	Superior Machine Vision System with LGA 1151 for Intel® 6 th /7 th Gen Processor and Q170 PCH, 4x PCI
VCO-6044C	Superior Machine Vision System with LGA 1151 for Intel® 6 th /7 th Gen Processor and Q170 PCH, 2x PCIe x4, 1x PCIe x8, 1x PCI
VCO-6055C	Superior Machine Vision System with LGA 1151 for Intel® 6 th /7 th Gen Processor and Q170 PCH, 2x PCIe x4, 1x PCIe x8, 2x PCI

Optional Accessories

Model No.	Product Description
1-E09A12002	Adapter AC/DC 24V 5A 120W with 3pin Terminal Block Plug 5.0mm Pitch, GST120A24-CT1
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 VCO-6000 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.

Delivering rich user experience, the VCO-6000 series implements DVI-I and 2x DisplayPort triple independent display outputs for video and image applications. Moreover, the VCO-6000 series features a fanless design with optional fan module to regulate air flow and sustain optimum internal chassis temperature. It provides isolated DIO, flexible wide voltage range 9V – 50V DC power input and wide operating temperature from -25°C to 70°C so it can really support the add-on cards' full performances even in harsh condition.

There is an array of expansion interfaces on VCO-6000 series to meet different demands of each customer. The 4 Mini PCIe slots can be used for LTE, 3G, GSM, and WLAN wireless communication. For expansion interface, it supports up to 5 PCI/PCI Express slots which can be used to install a variety of PCI, PCIe x1, PCIe x4, PCIe x8, or PCIe x16 including different motion control card, frame grabber card, video capture card, I/O cards, and communication cards.

To make things easier such as installation and maintenance, this series solution features single-side access I/O, accessible storage design and standard mounting configurations for DIN-rail mounting and wall mounting. In addition, its rugged and cable-free design are focused to increase reliability, extend Mean Time To Repair (MTTR) and decrease maintenance efforts.

With its uncompromising industrial construction, the VCO-6000 series is constructed with extruded aluminum and heavy duty metal which enables it to adapt for continuous operation under adverse condition. In addition, it is engineered to balance the act between higher computational speed and lower power consumption to produce minimal heat which has an optimize effect on its lifespan and functional safety.

The VCO-6000 series offers abundant grade features, all-in-one integrated features, various I/O connection, flexible expansion features, and smart manageability to provide customers highly reliable and manageable embedded solution. Moreover, its fanless, noiseless operation, unique thermal solution, and rugged reliability features makes it an excellent solution for multiple applications like machine vision, motion control, digital surveillance and factory automation.

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 SODIMM. max up to 32GB
- Triple independent display supported by 1x DVI-I and 2x DisplayPort
- 2x Intel® GbE supporting Wake-on-LAN and PXE
- 2x 2.5" SATA HDD bay, 2x mSATA (shared by 2x mini PCIe), 1x CFast supporting RAID 0, 1, 5, 10
- 3x full-size mini PCIe for communication or expansion modules
- 4x RS-232/422/485 (w/ 2x internal)
- 4x USB 3.0
- 1x PCIe x16 expansion (VCO-6011E only); 1x PCI expansion (VCO-6011P only)
- 2x PCIe x8 expansion (VCO-6022E only); 2x PCI expansion (VCO-6022P only); 1x PCIe x16 and 1x PCI expansion (VCO-6022C only)
- 2x PCIe x1 and 1x PCIe x16 expansion (VCO-6033E only); 3x PCI expansion (VCO-6033P only); 1x PCIe x16 and 2x PCI expansion (VCO-6033C only)
- 4x PCI expansion (VCO-6044P only); 2x PCIe x4, 1x PCIe x8, and 1x PCI expansion (VCO-6044C only)
- 2x PCIe x4, 1x PCIe x8, and 2x PCI expansion (VCO-6055C only)
- 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



VCO-6000 Series



VCO-6011 Series



VCO-6022 Series



VCO-6033 Series



VCO-6044 Series



VCO-6055 Series

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

Triple Display

- 1x DVI-I, 1x VGA (by optional split cable), and 2x DisplayPort

Expansion

- **VCO-6011E Series:** 1x PCIe x16
- **VCO-6011P Series:** 1x PCI
- **VCO-6022E Series:** 2x PCIe x8
- **VCO-6022P Series:** 2x PCI
- **VCO-6022C Series:** 1x PCIe x16 and 1x PCI
- **VCO-6033E Series:** 2x PCIe x1, 1x PCIe x16
- **VCO-6033P Series:** 3x PCI
- **VCO-6033C Series:** 1x PCIe x16, 2x PCI
- **VCO-6044P Series:** 4x PCI
- **VCO-6044C Series:** 2x PCIe x4, 1x PCIe x8, 1x PCI
- **VCO-6055C Series:** 2x PCIe x4, 1x PCIe x8, 2x PCI
- 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
- 2x mSATA (shared by 2x Mini PCI Express)
- 1x Cfast
- Support RAID 0, 1, 5, 10

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/5A, 120W 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

- **VCO-6000 Series**
 - Dimension (WxDxH): 77 x 256 x 240 mm
 - Weight: TBC
- **VCO-6011 Series**
 - Dimension (WxDxH): 117 x 256 x 240 mm
 - Weight: TBC
- **VCO-6022 Series**
 - Dimension (WxDxH): 137 x 256 x 240 mm
 - Weight: TBC
- **VCO-6033 Series**
 - Dimension (WxDxH): 157 x 256 x 240 mm
 - Weight: TBC
- **VCO-6044 Series**
 - Dimension (WxDxH): 177 x 256 x 240 mm
 - Weight: TBC
- **VCO-6055 Series**
 - Dimension (WxDxH): 197 x 256 x 240 mm
 - Weight: TBC
- 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

1.3.1 VCO-6000

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

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

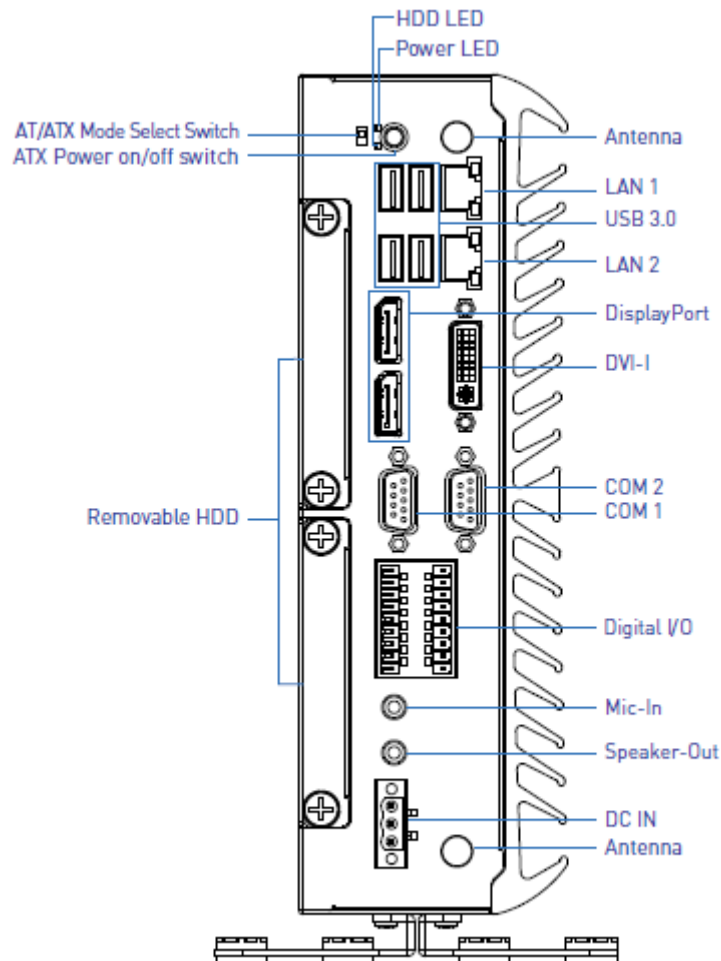
Indicates the power status of the system

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

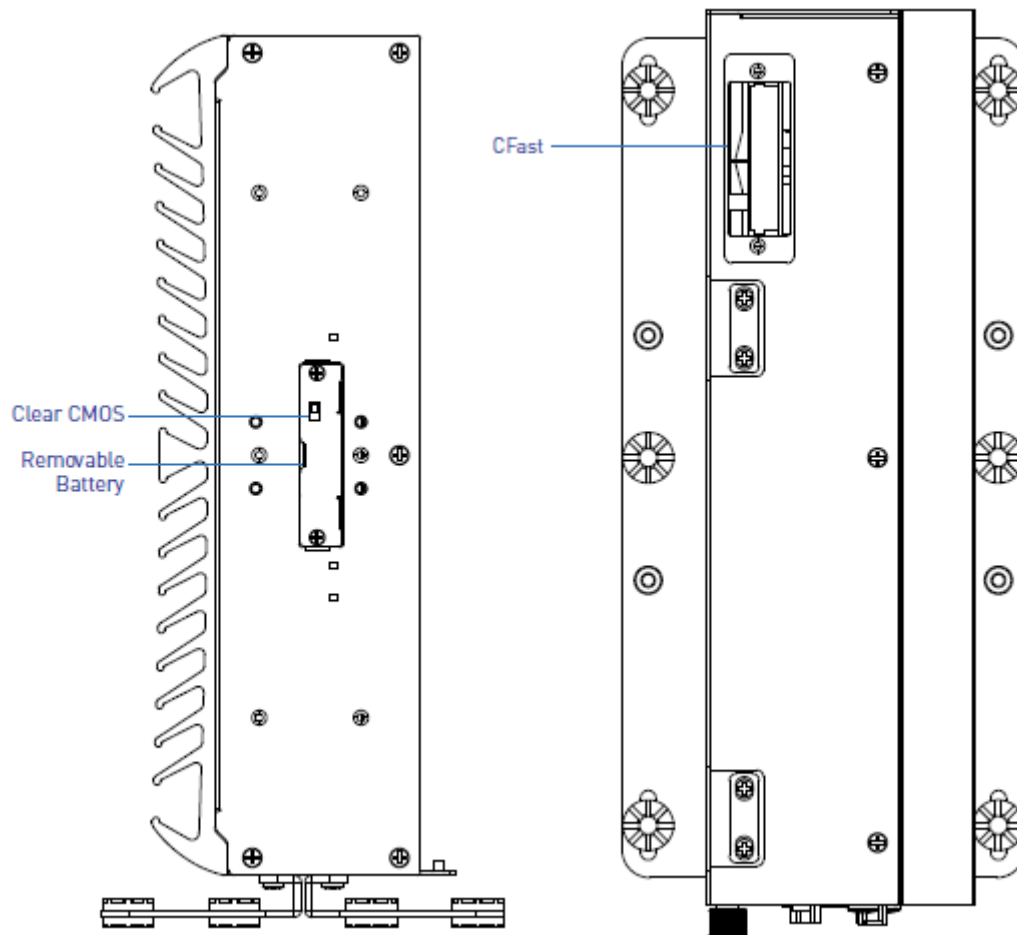
Used to clear CMOS

Removable Battery

Used to insert CMOS battery

CFast Socket

Used to insert CFast card



1.3.2 VCO-6011E(P)

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

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

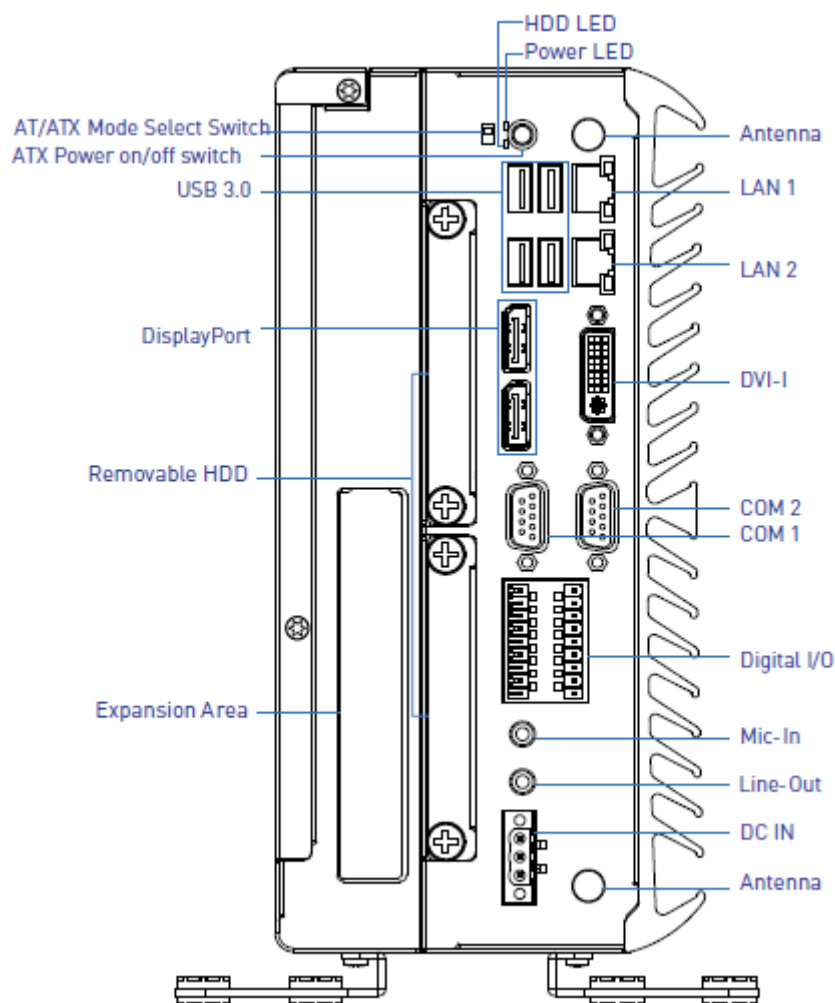
Removable 2.5" SATA HDD Area

Antenna hole

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

Expansion Area

Used to plug PCIe or PCI card



Rear Panel & Top View

Clear CMOS

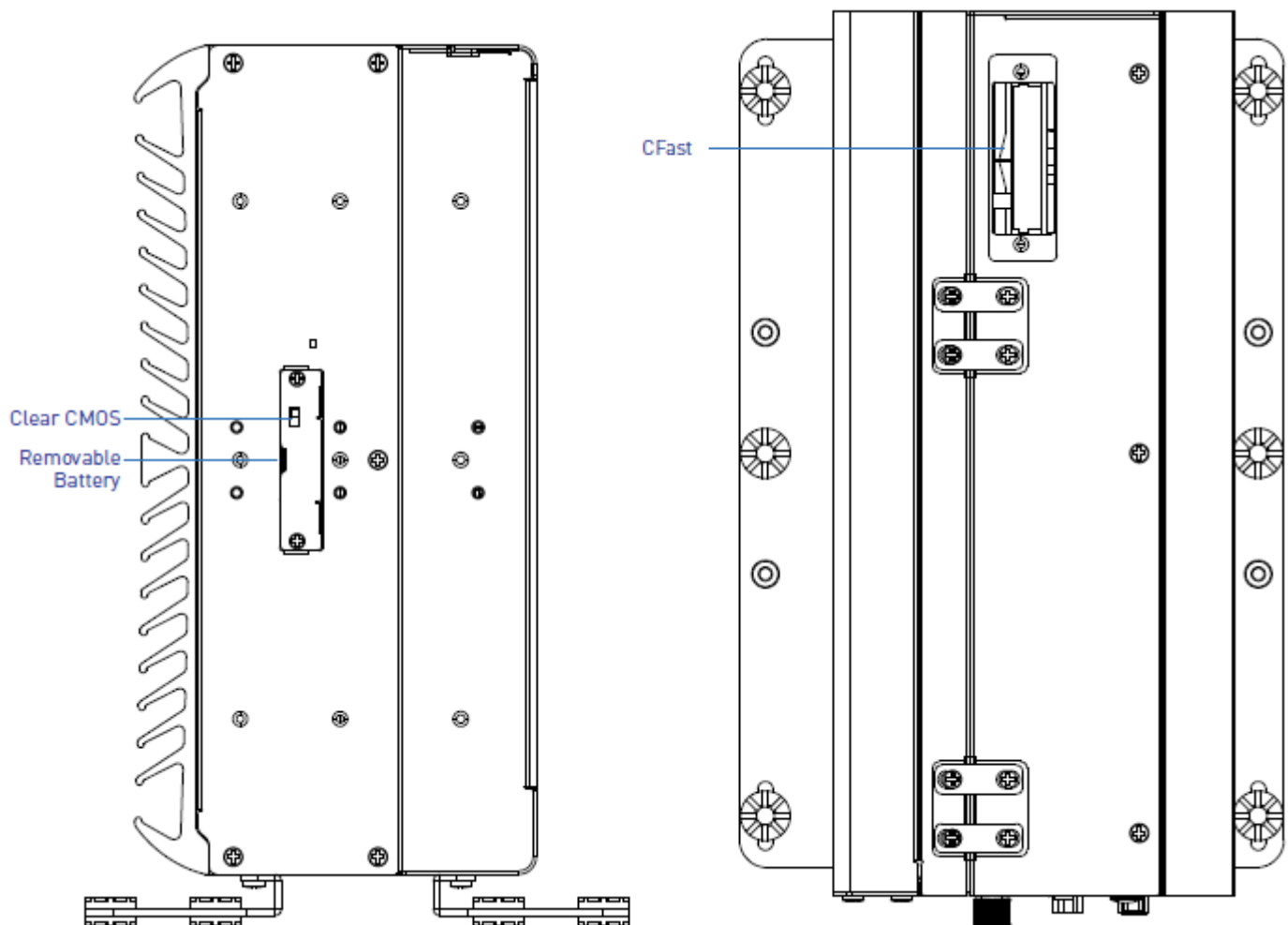
Used to clear CMOS

Removable Battery

Used to insert CMOS battery

CFast Socket

Used to insert CFast card



1.3.3 VCO-6022E(P/C)

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

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

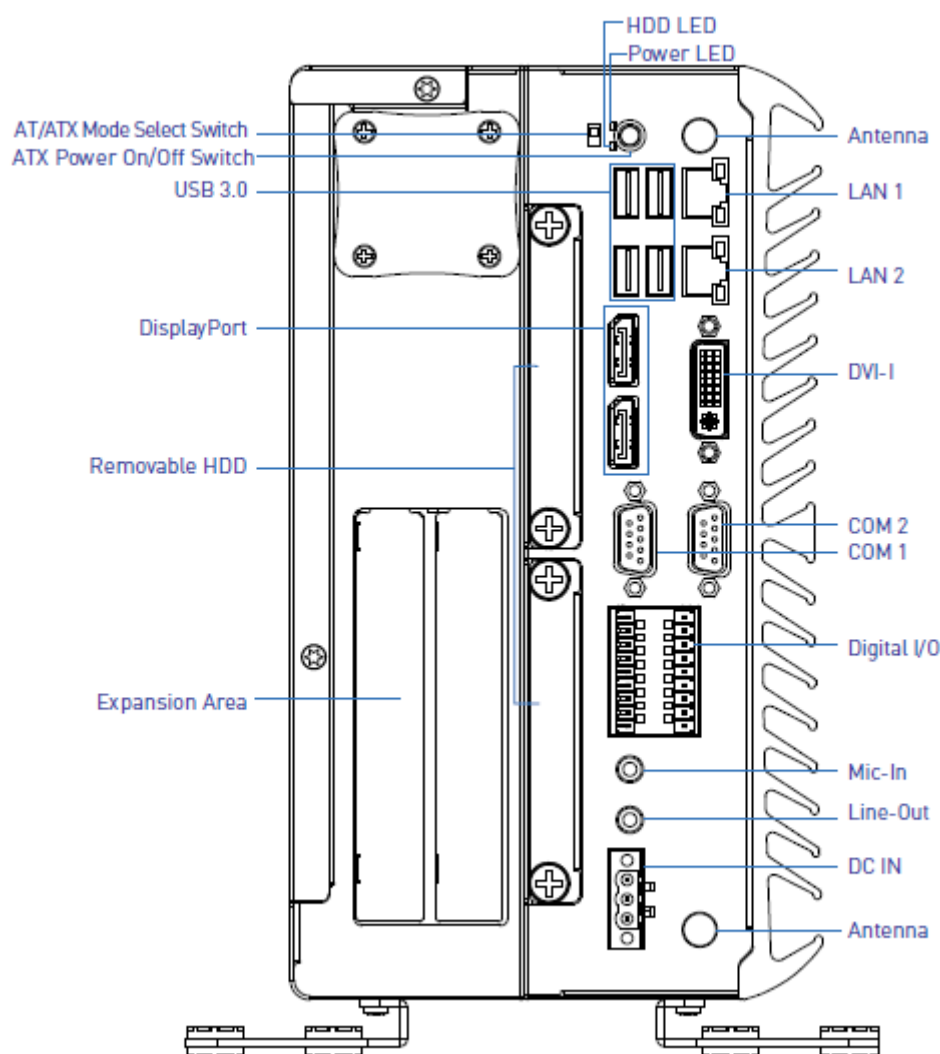
Removable 2.5" SATA HDD Area

Antenna hole

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

Expansion Area

Used to plug PCIe or PCI card



Rear Panel & Top View

Clear CMOS

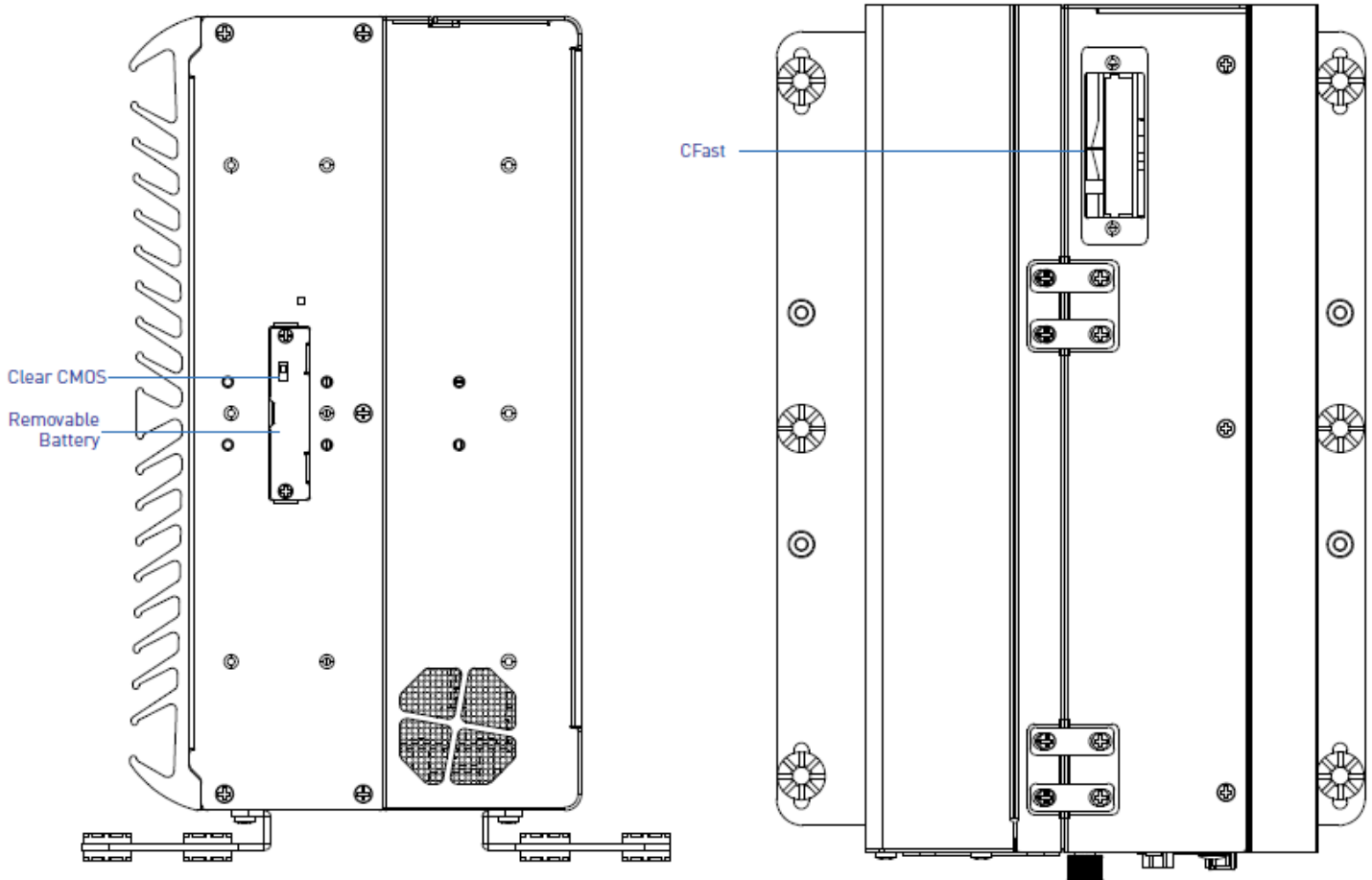
Used to clear CMOS

Removable Battery

Used to insert CMOS battery

CFast Socket

Used to insert CFast card



1.3.4 VCO-6033E(P/C)

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

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

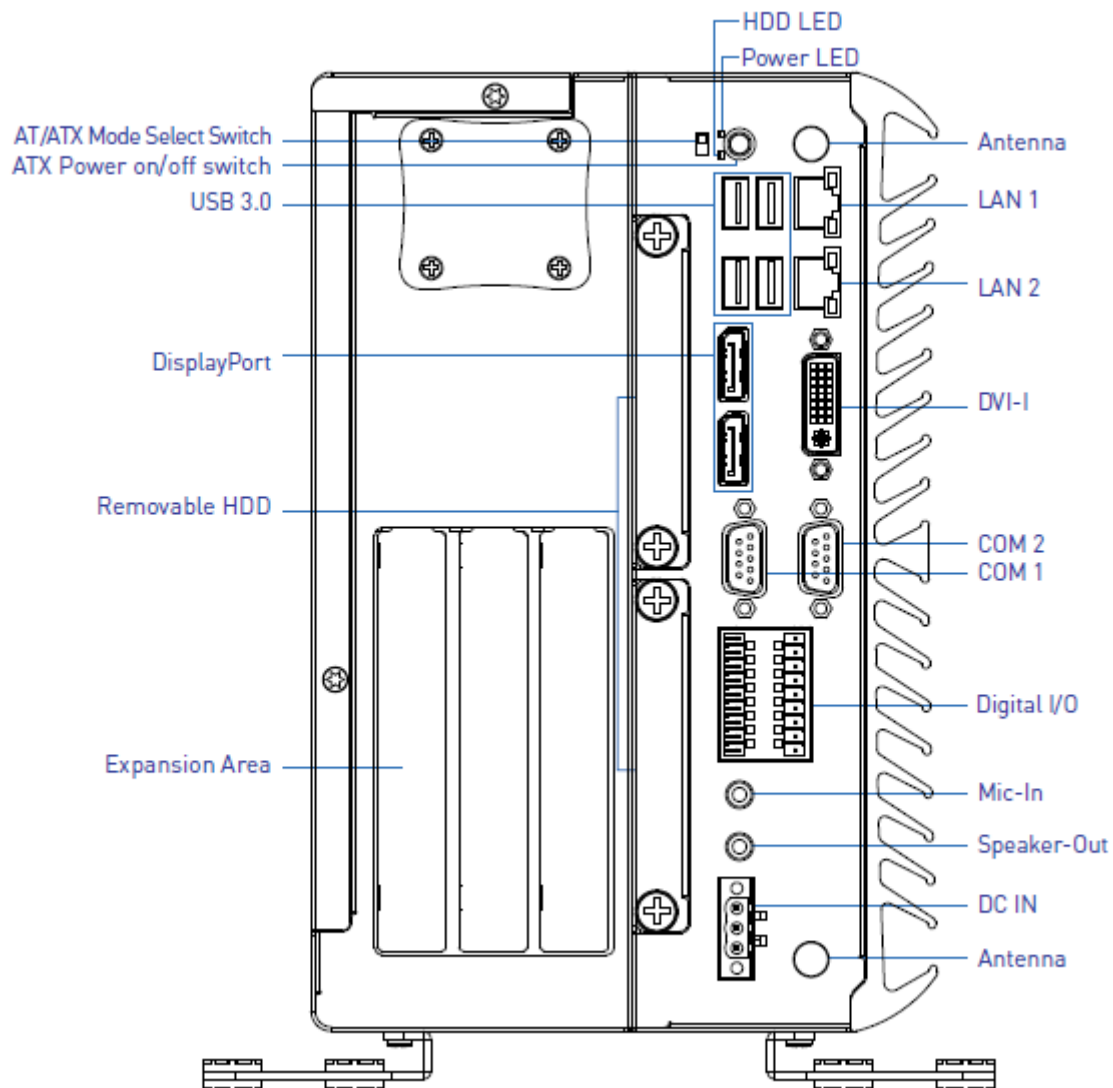
Removable 2.5" SATA HDD Area

Antenna hole

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

Expansion Area

Used to plug PCIe or PCI card



Rear Panel & Top View

Clear CMOS

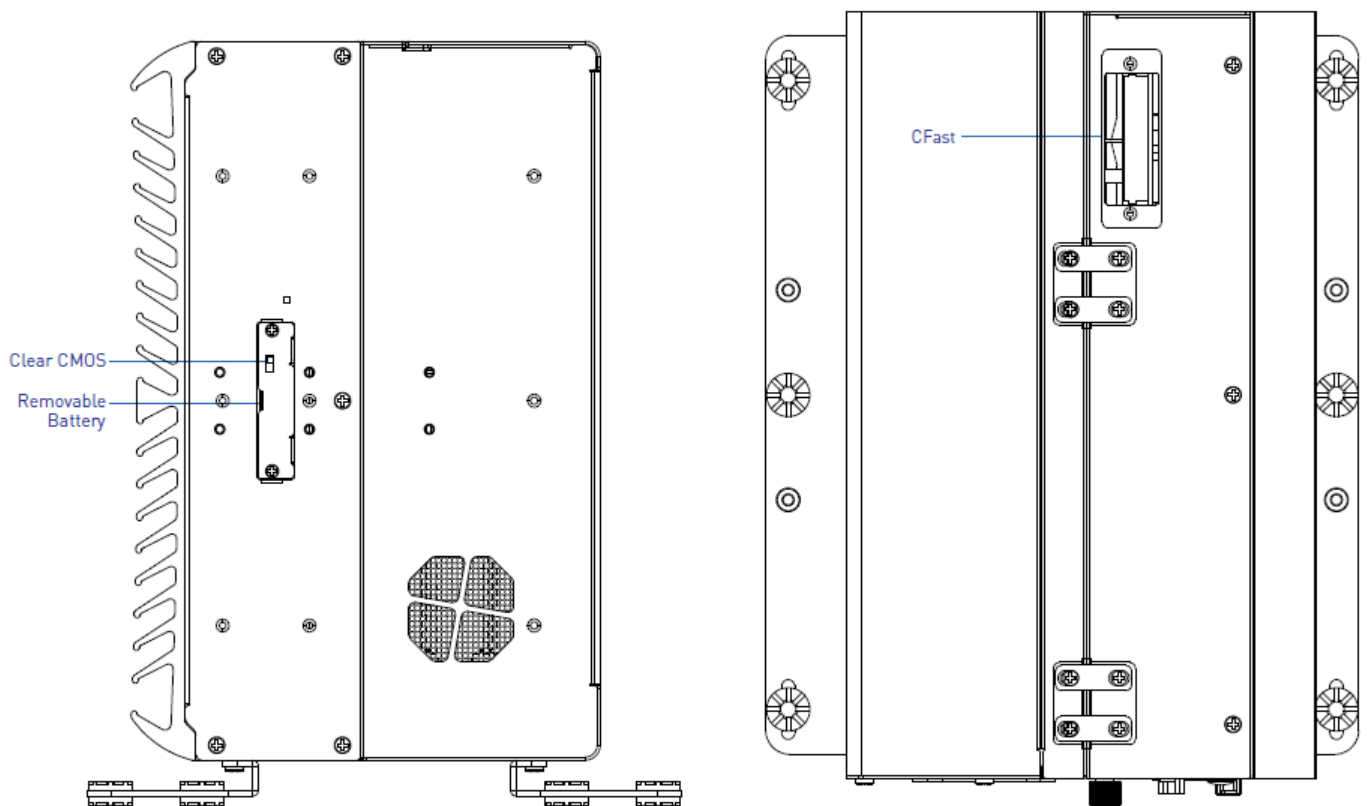
Used to clear CMOS

Removable Battery

Used to insert CMOS battery

CFast Socket

Used to insert CFast card



1.3.5 VCO-6044P(C)

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

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

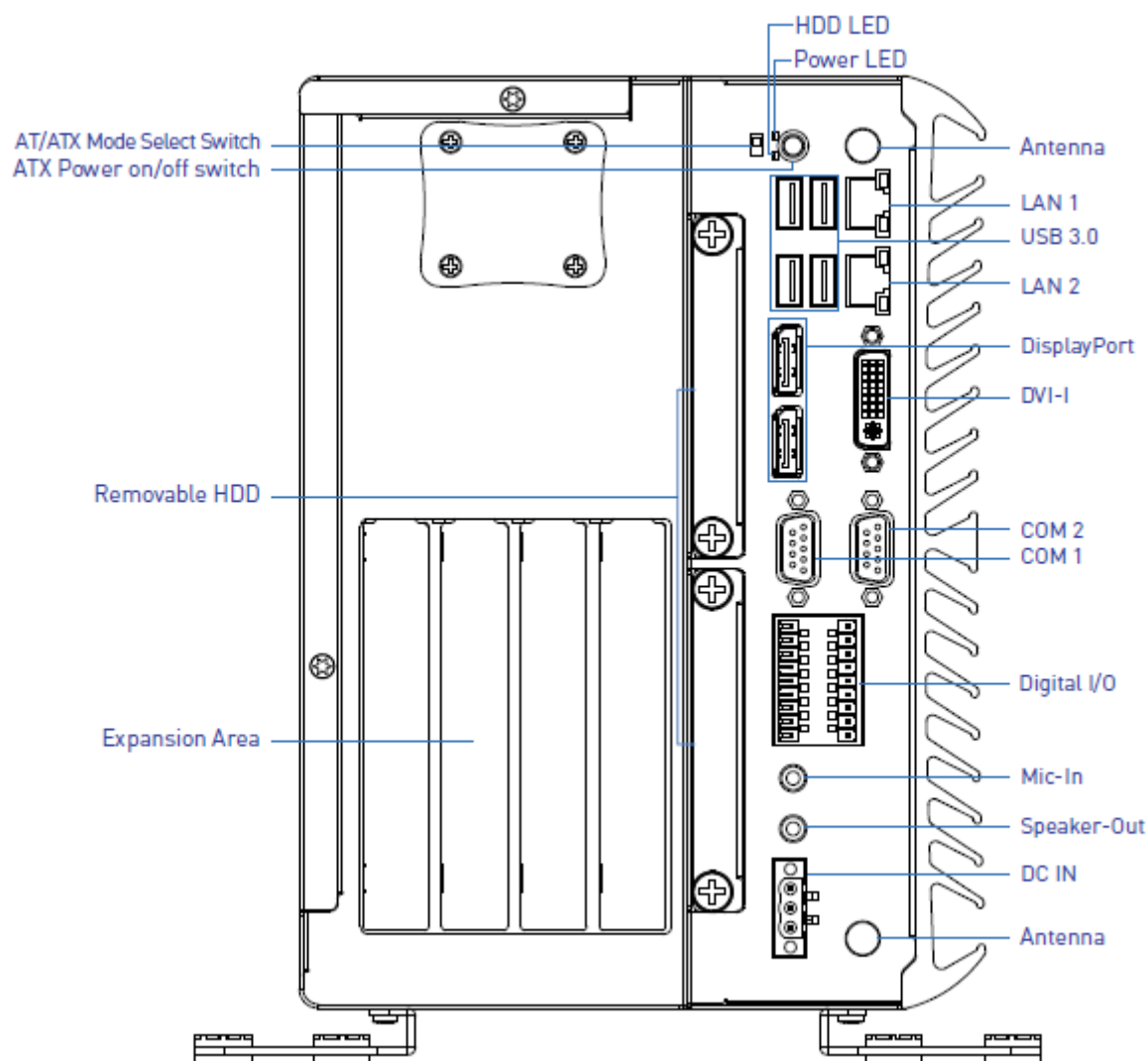
Removable 2.5" SATA HDD Area

Antenna hole

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

Expansion Area

Used to plug PCIe or PCI card



Rear Panel & Top View

Clear CMOS

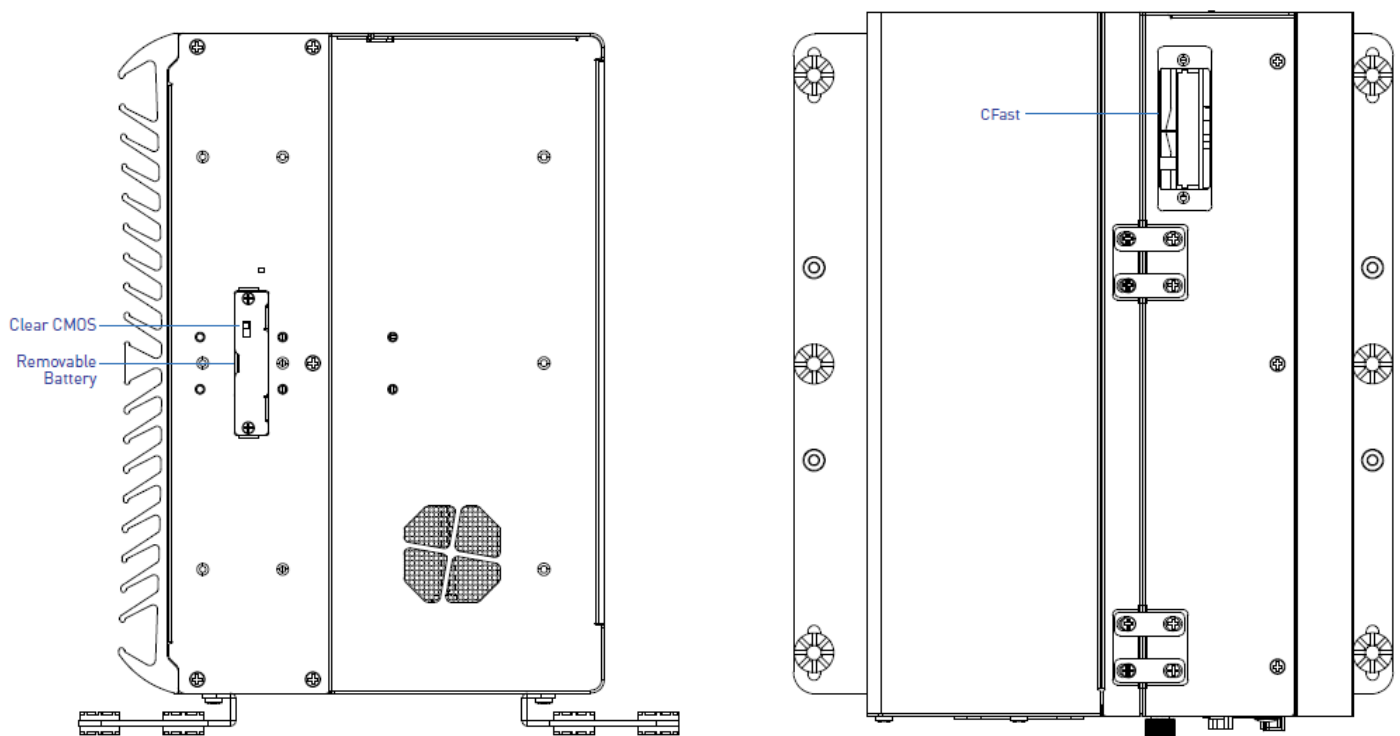
Used to clear CMOS

Removable Battery

Used to insert CMOS battery

CFast Socket

Used to insert CFast card



1.3.6 VCO-6055C

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

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

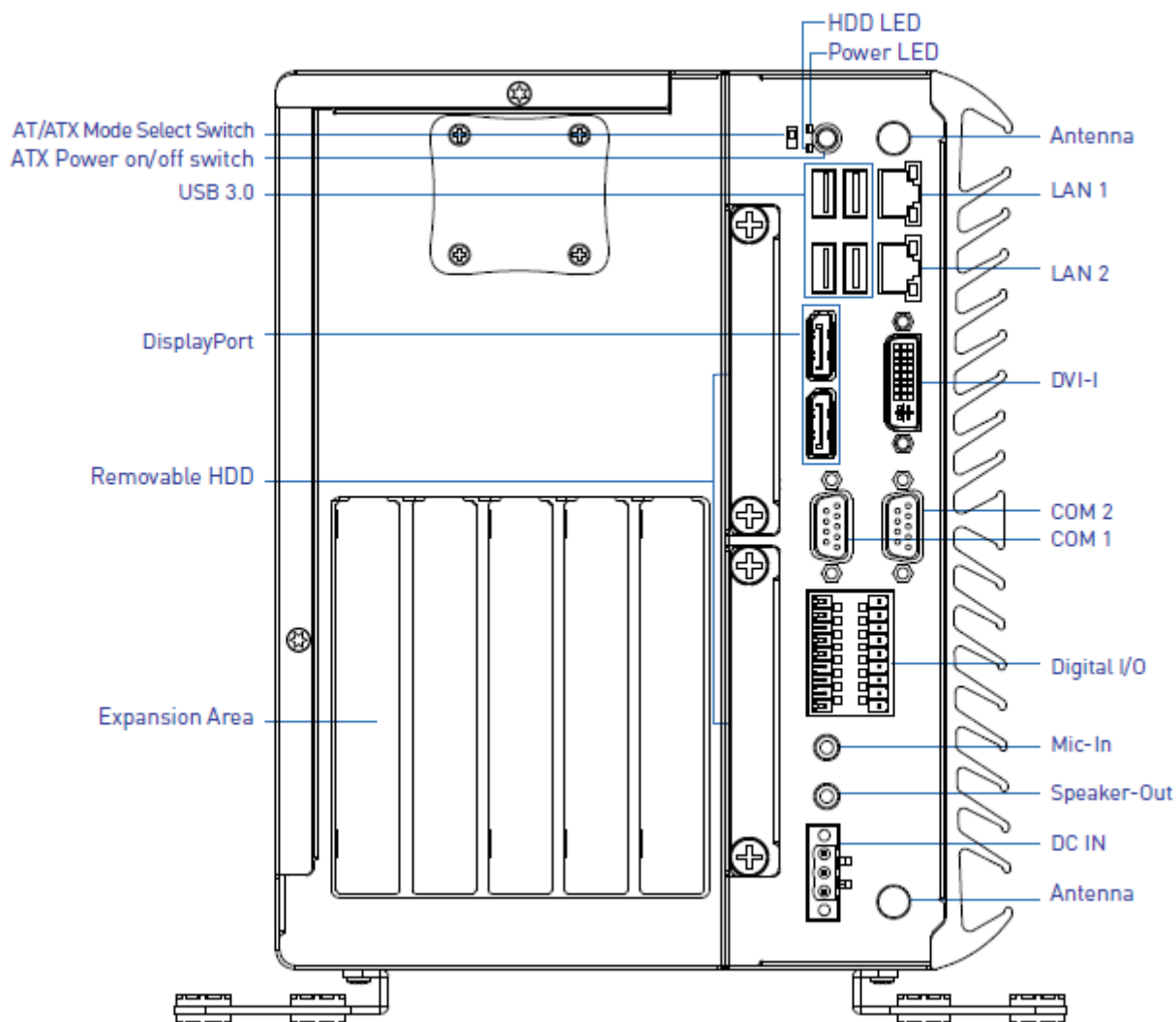
Removable 2.5" SATA HDD Area

Antenna hole

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

Expansion Area

Used to plug PCIe or PCI card



Rear Panel & Top View

Clear CMOS

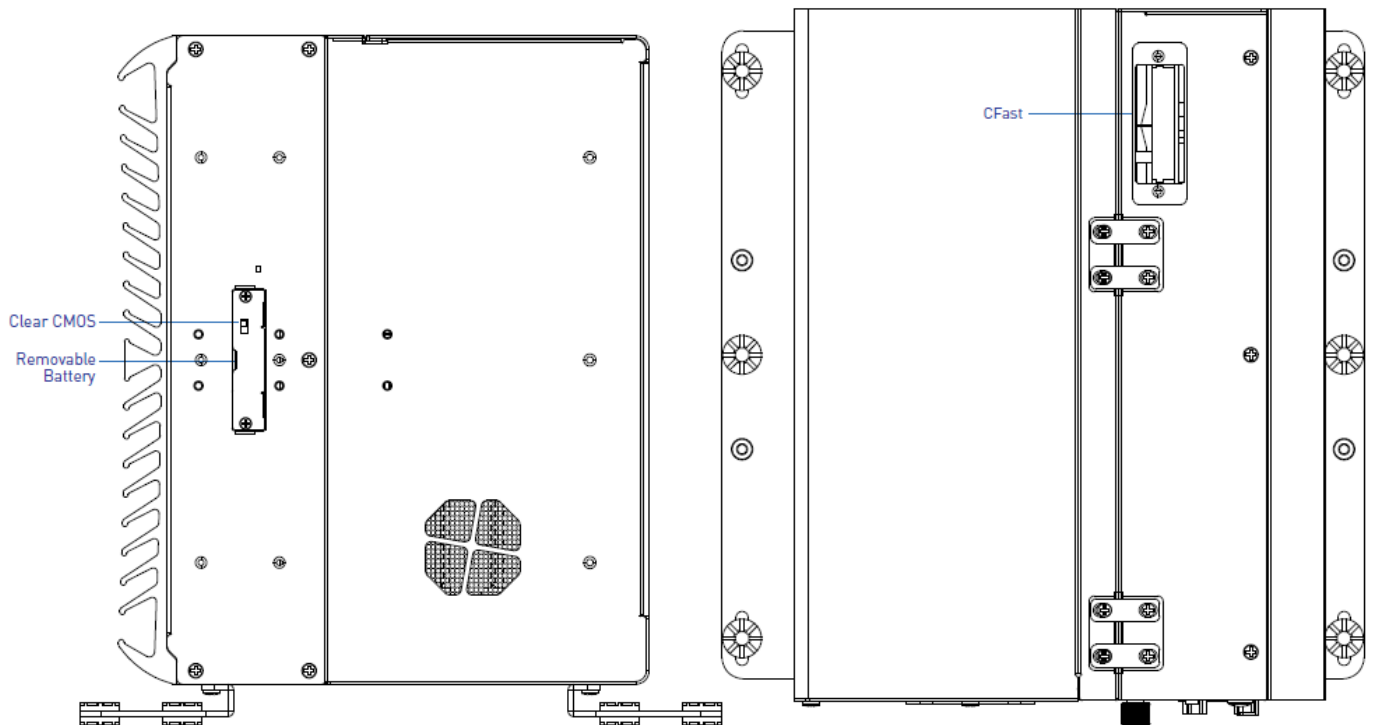
Used to clear CMOS

Removable Battery

Used to insert CMOS battery

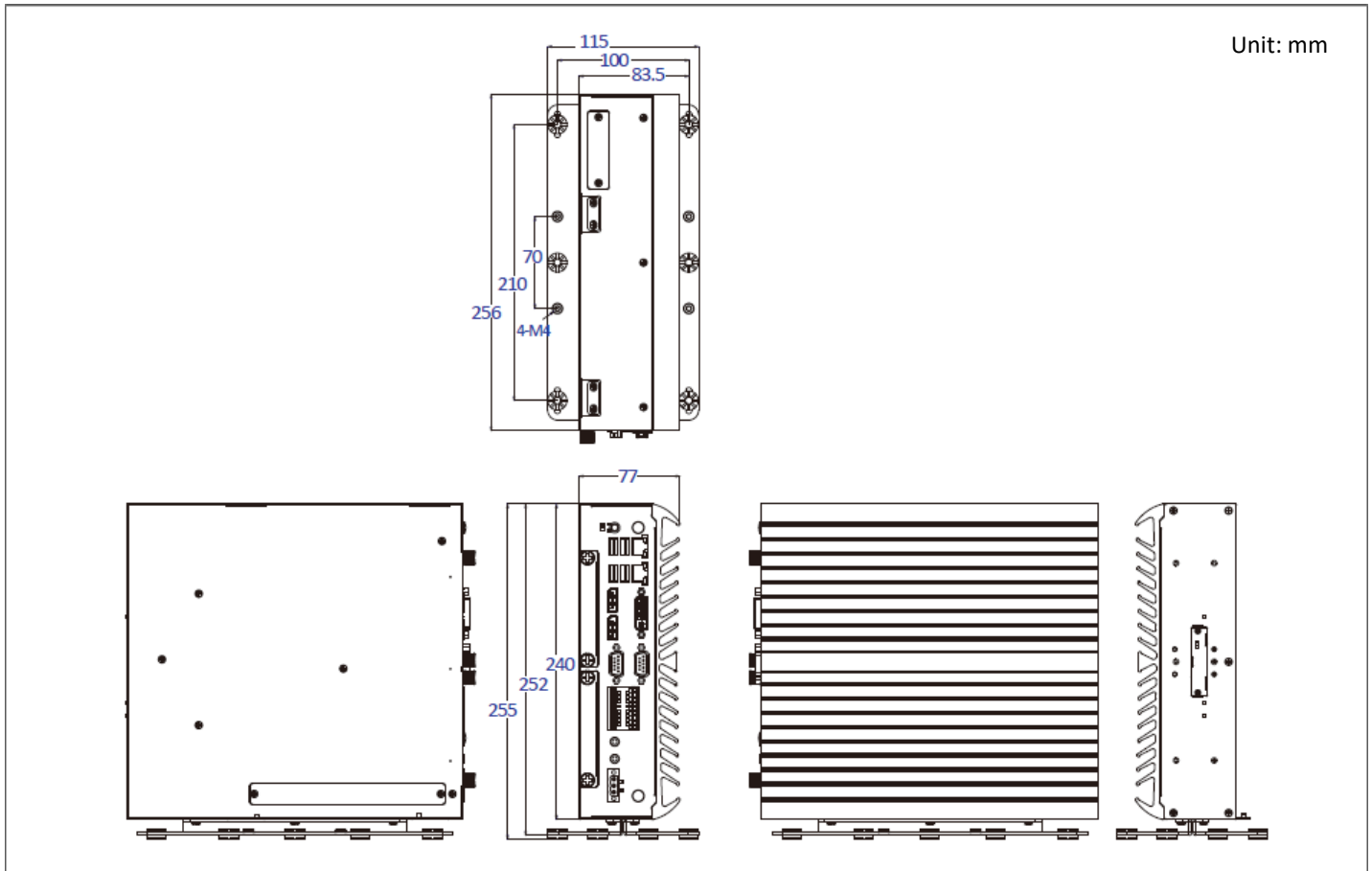
CFast Socket

Used to insert CFast card

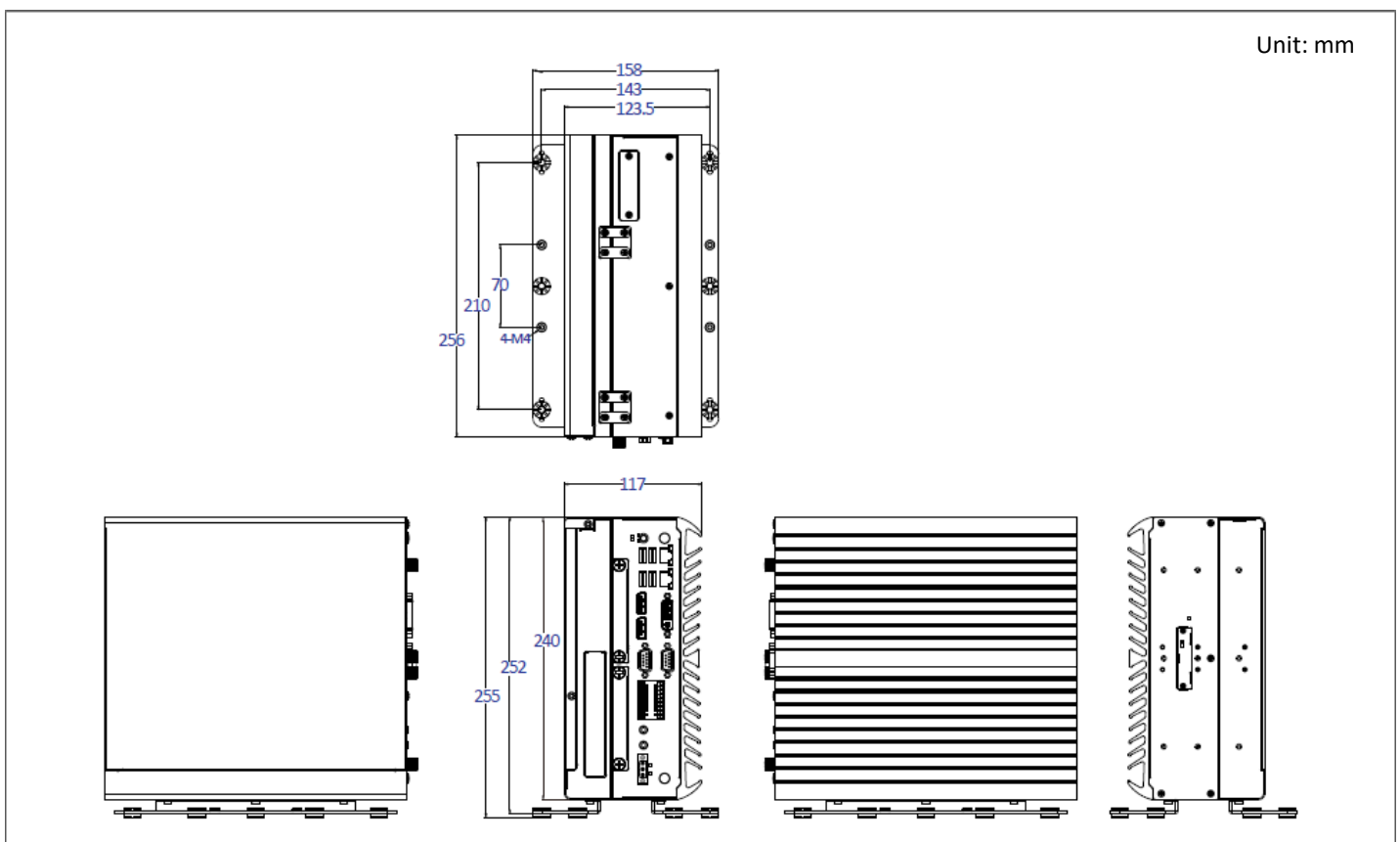


1.4 Mechanical Dimensions

1.4.1 VCO-6000

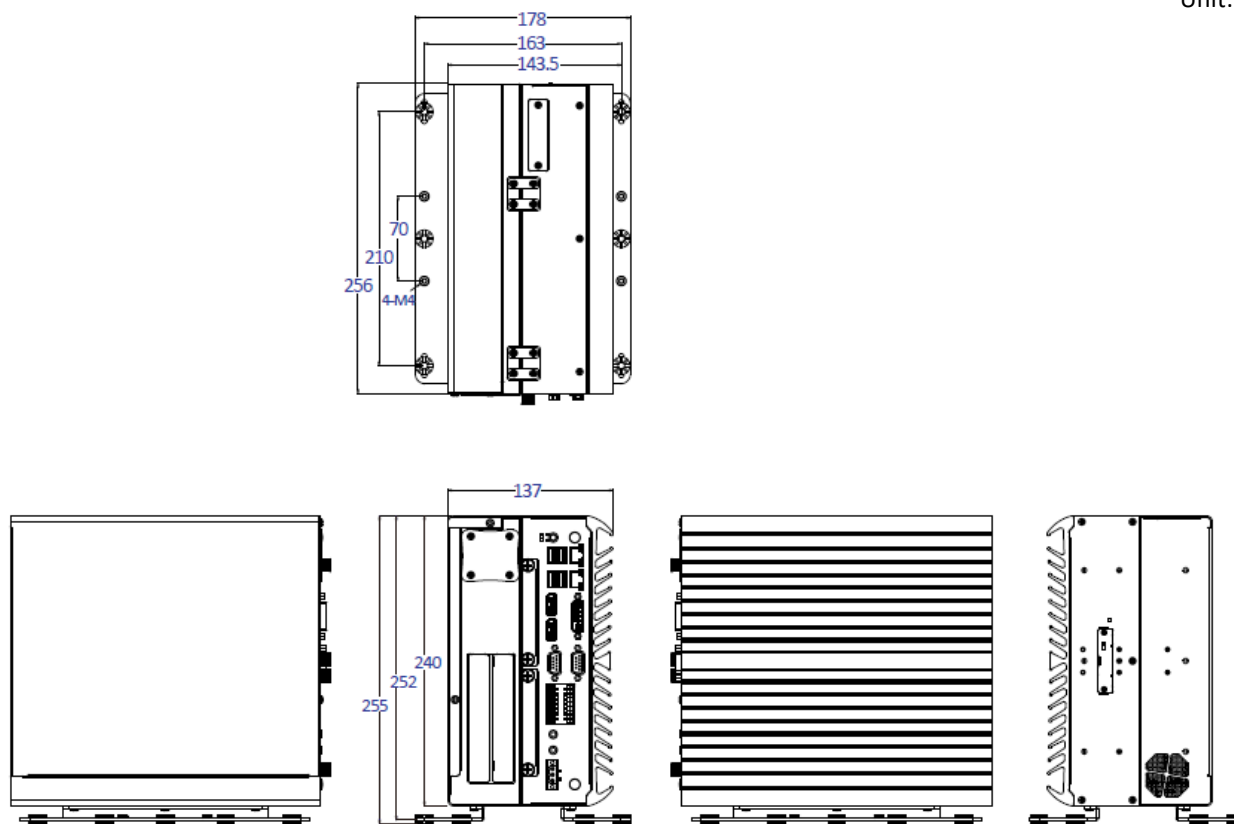


1.4.2 VCO-6011E / VCO-6011P



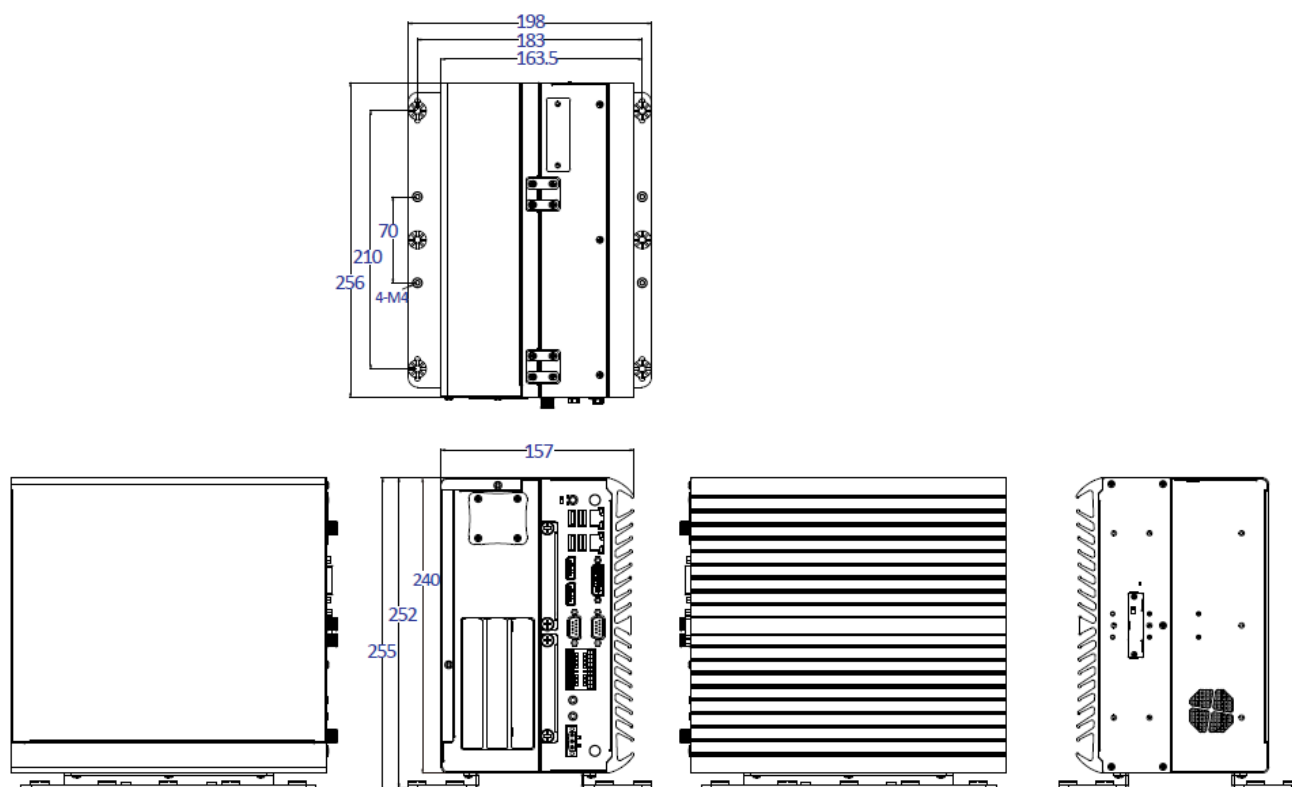
1.4.3 VCO-6022E / VCO-6022P / VCO-6022C

Unit: mm

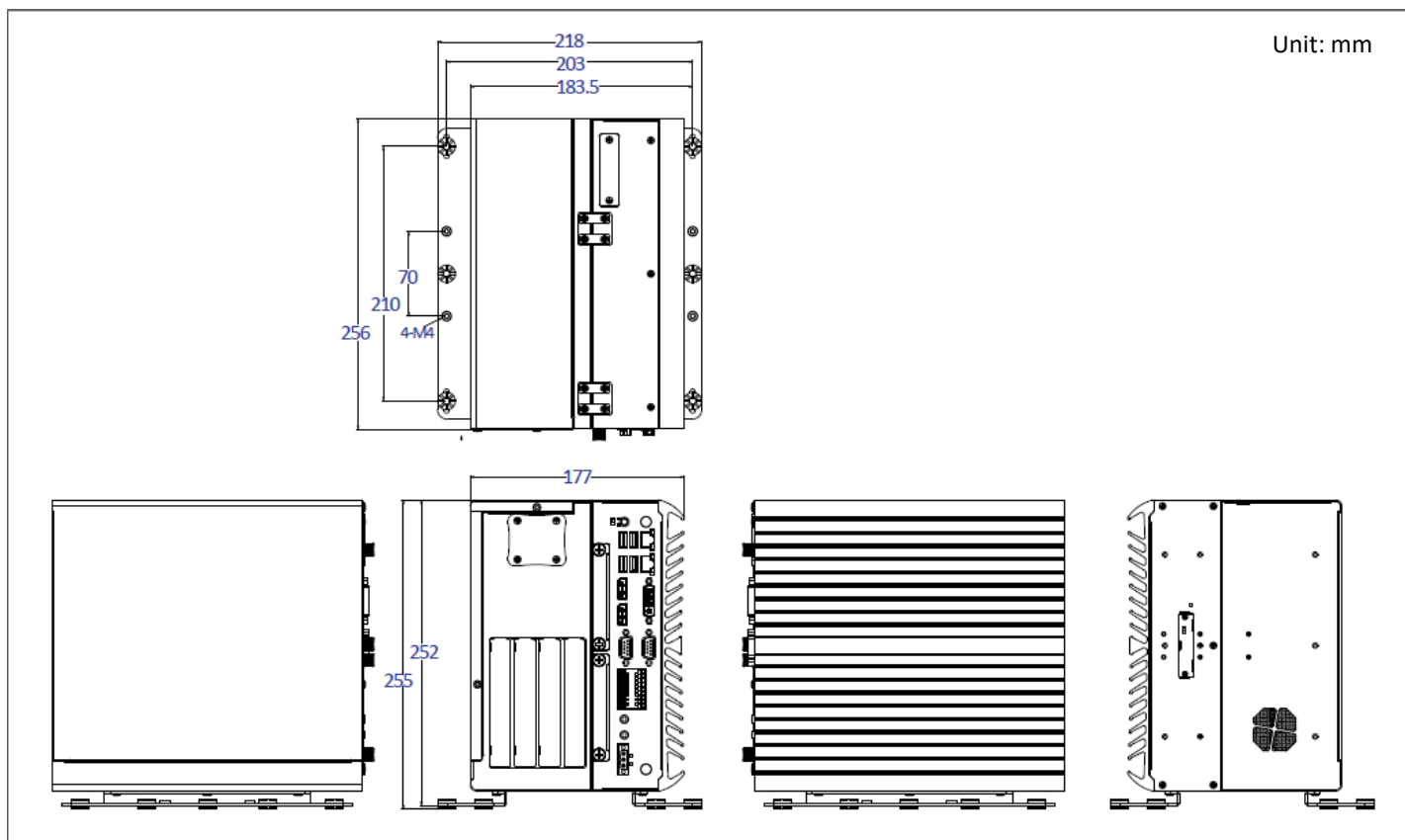


1.4.4 VCO-6033E / VCO-6033P / VCO-6033C

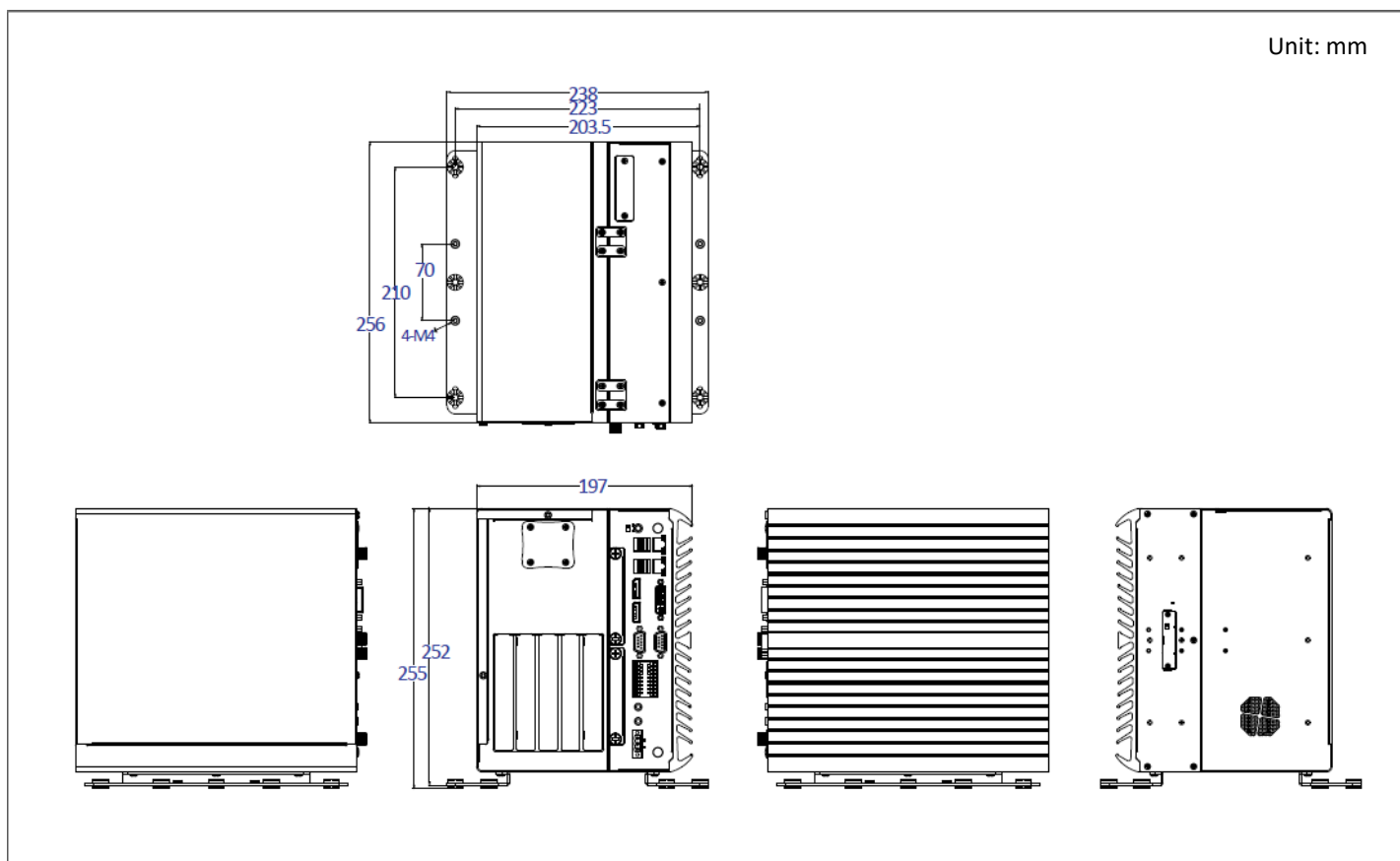
Unit: mm



1.4.5 VCO-6044P / VCO-6044C



1.4.6 VCO-6055C

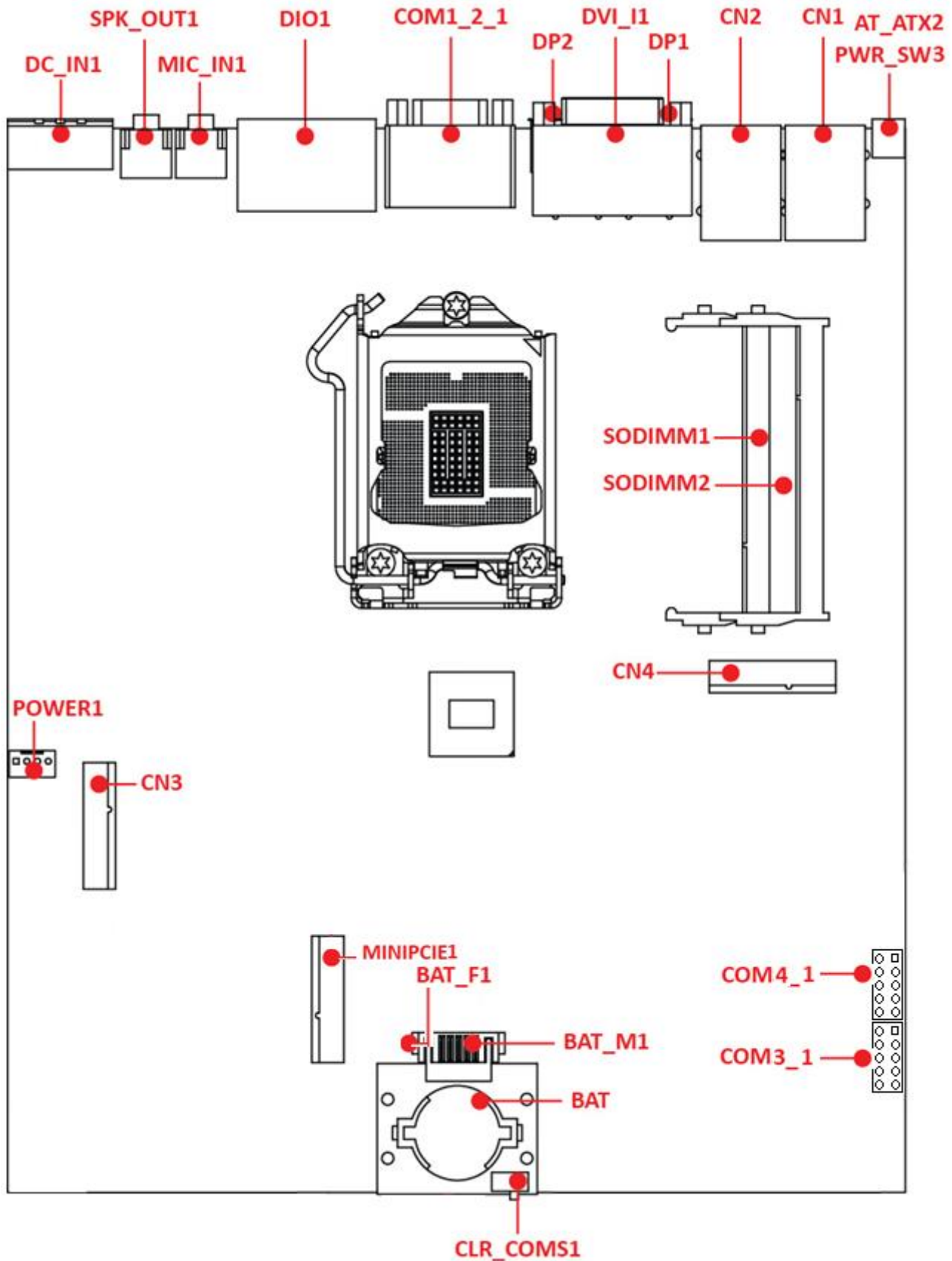


Chapter 2

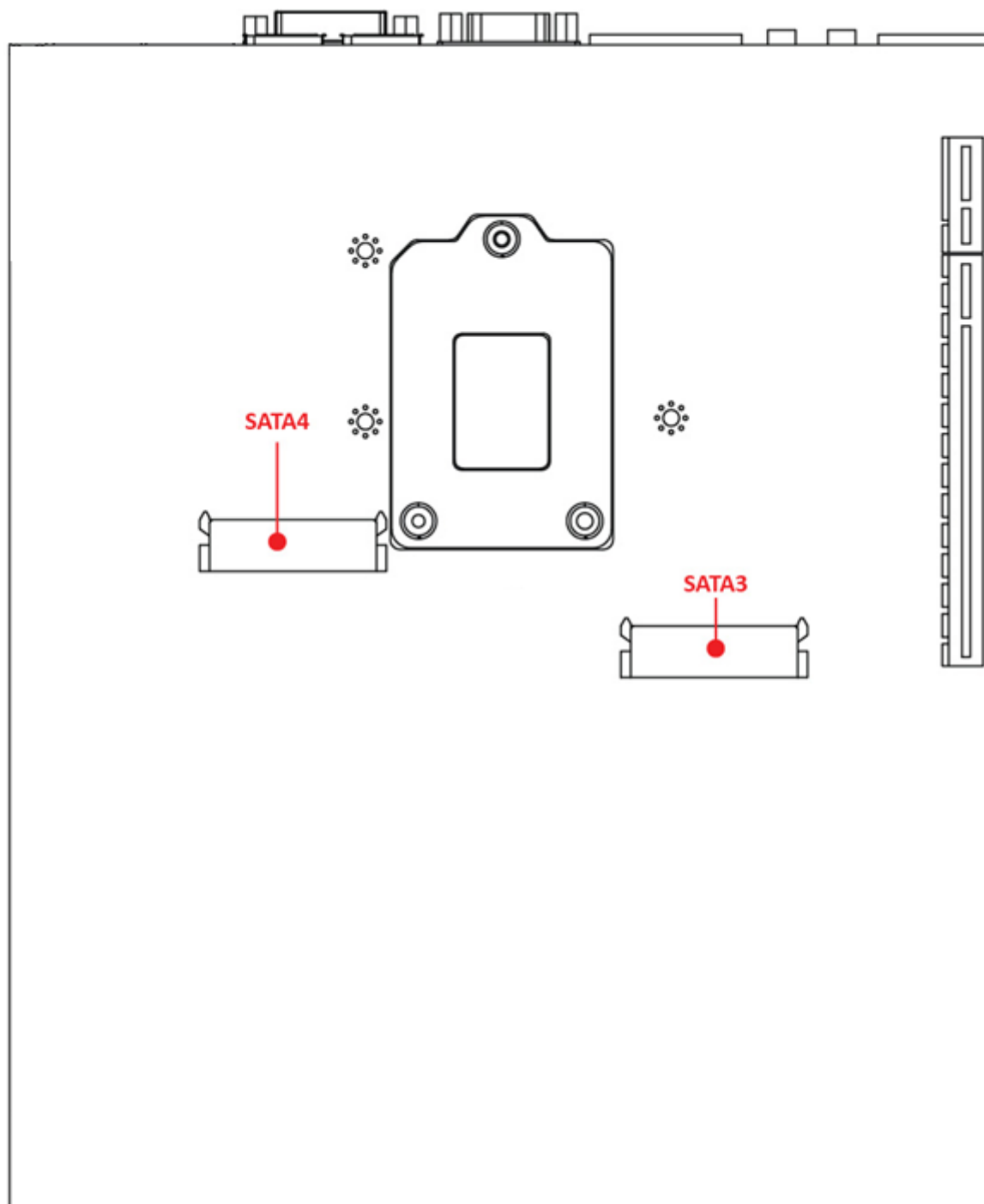
Switches and Connectors

2.1 Switch and Connector Locations

2.1.1 Top View



2.1.2 Bottom View



2.2 Connector / Switch Definition

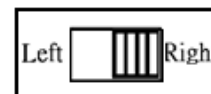
List of Connector / Switch

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
MINIPCI1	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

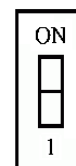
AT_ATX1: AT / ATX Power Mode Switch

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



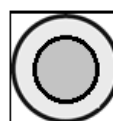
CLR_CMOS1: Clear BIOS Switch

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



2.4 Connectors Definitions

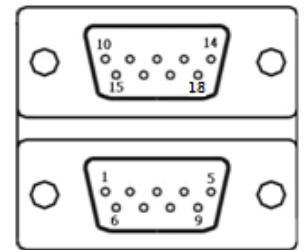
Pin	Definition	Pin	Definition
1	NC	4	GND
2	Power Button	5	NC
3	NC	6	GND



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		

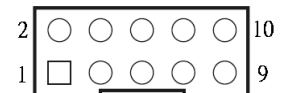


COM2			
Pin	RS232 Definition	RS422 / 485 Full Duplex Definition	RS485 Half Duplex Definition
10	DCD2	TX2-	DATA2-
11	RxD2	TX2+	DATA2+
12	TxD2	RX2+	
13	DTR2	RX2-	
14	GND	GND	GND
15	DSR2		
16	RTS2		
17	CTS2		
18	RI2		

COM3_1 : RS232 / RS422 / RS485 Connector

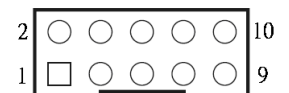
Connector Type: 2X5 10-pin box header, 2.54mm pitch

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

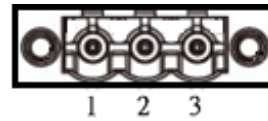
COM4_1			
Pin	RS232 Definition	RS422 / 485 Full Duplex Definition	RS485 Half Duplex Definition
1	DCD4	TX4-	DATA4-
2	RxD4	TX4+	DATA4+
3	TxD4	RX4+	
4	DTR4	RX4-	
5	GND	GND	GND
6	DSR4		
7	RTS4		
8	CTS4		
9	RI4		



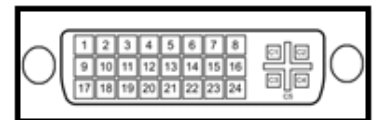
DC_IN1: DC Power Input Connector (+9~50V)

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

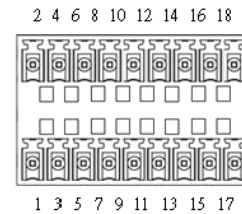
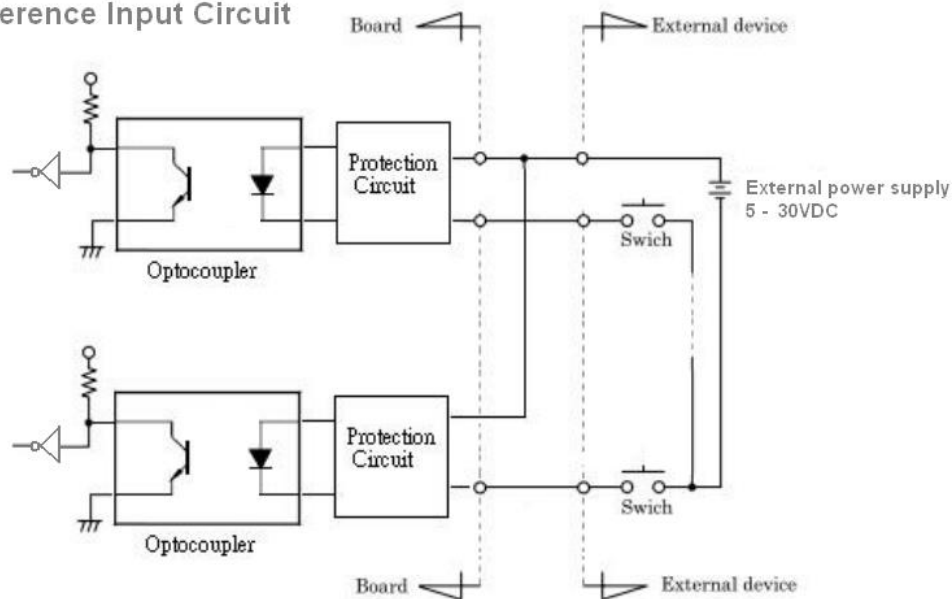
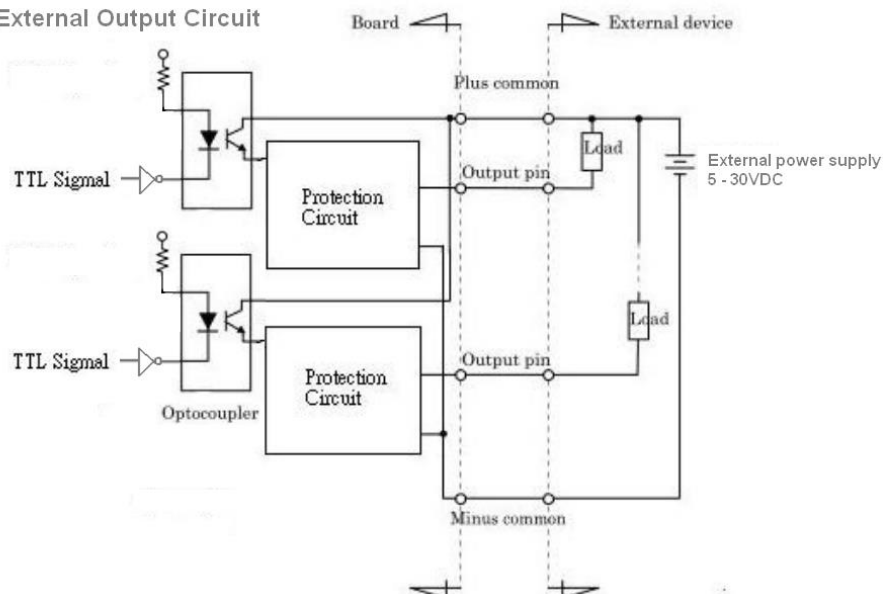
Pin	Definition
1	GND
2	MIC_R
3	NC
4	GND
5	MIC_L

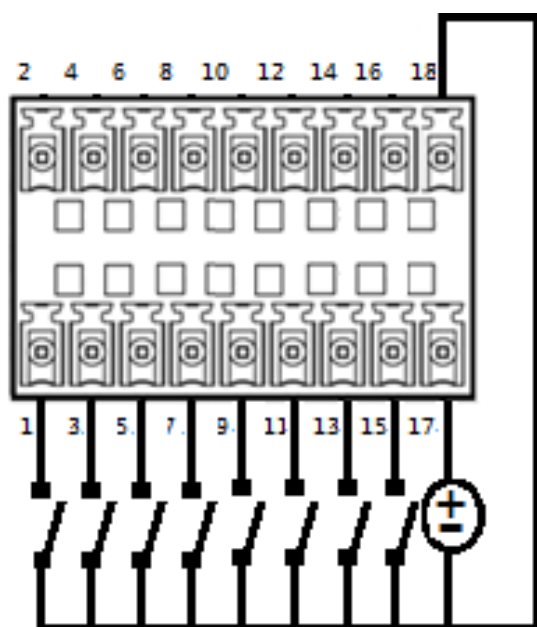


DIO1: Digital Input / Output Connector

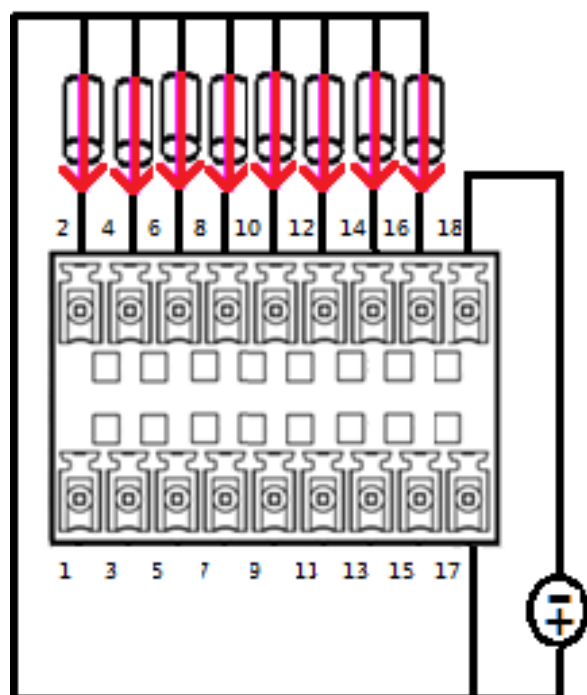
Connector Type: Terminal Block 2X9 18-pin, 3.5mm pitch

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

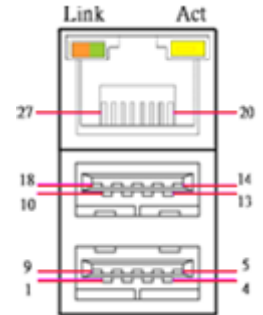


Digital Output Wurung

CN1: LAN1 and USB3.0 Ports

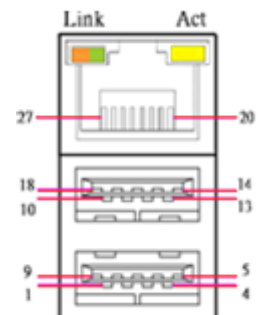
Connector Type: RJ45 port with LEDs and dual USB3.0 ports

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**

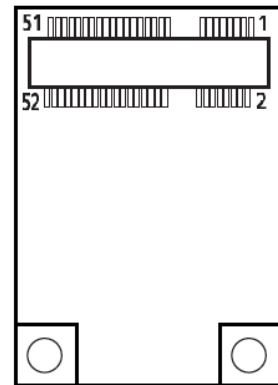
Connector Type: RJ45 port with LEDs and dual USB3.0 ports

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+		



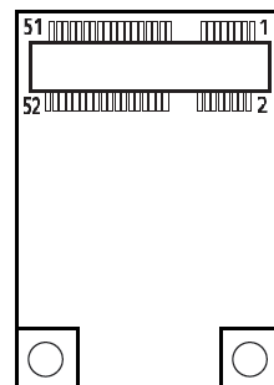
MINIPCIE1: Mini PCI-Express Socket

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_CLKNO	29	GND	47	NC
12	NC	30	SMB_CLK	48	+1.5V
13	MINIPCIE_CLKPO	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-		

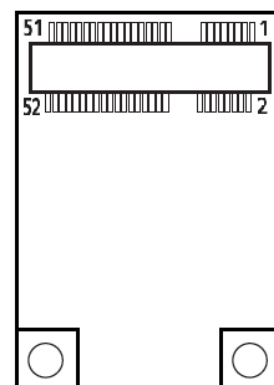


CN3: Mini PCI-Express / mSATA Socket

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	MINIPCI _E RST#	40	GND
5	NC	23	MINIPCI _E _RXN4 (SATA_RXN4)	41	+3.3V
6	+1.5V	24	+3.3V	42	NC
7	CLKREQ1#	25	MINIPCI _E _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	MINIPCI _E _CLKN4	29	GND	47	NC
12	NC	30	SMB_CLK	48	+1.5V
13	MINIPCI _E _CLKP4	31	MINIPCI _E _TXN4 (SATA_TXN4)	49	NC
14	NC	32	SMB_DATA	50	GND
15	GND	33	MINIPCI _E _TXP4 (SATA_TXP4)	51	NC
16	NC	34	GND	52	+3.3V
17	NC	35	GND		
18	GND	36	USB_D13-		

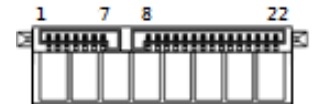
**CN4: Mini PCI-Express / mSATA Socket**

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	MINIPCI _E RST#	40	GND
5	NC	23	MINIPCI _E _RXN12 (SATA_RXN5)	41	+3.3V
6	+1.5V	24	+3.3V	42	NC
7	CLKREQ3#	25	MINIPCI _E _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	MINIPCI _E _CLKN3	29	GND	47	NC
12	NC	30	SMB_CLK	48	+1.5V
13	MINIPCI _E _CLKP3	31	MINIPCI _E _TXN12 (SATA_TXN5)	49	NC
14	NC	32	SMB_DATA	50	GND
15	GND	33	MINIPCI _E _TXP12 (SATA_TXP5)	51	NC
16	NC	34	GND	52	+3.3V
17	NC	35	GND		
18	GND	36	USB_D14-		



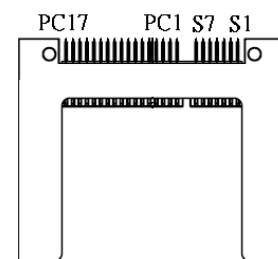
SATA3, SATA4: SATA with Power Connector

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

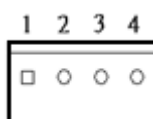


CFAST1: CFAST Socket

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**

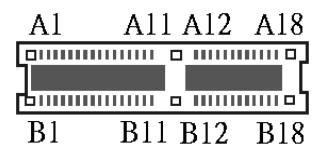
Pin	Definition
1	+5V
2	GND
3	GND
4	+12V



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_PRSENT1	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	PRSENT2_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	PRSENT2_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	PRSENT2_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	PRSENT2_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**

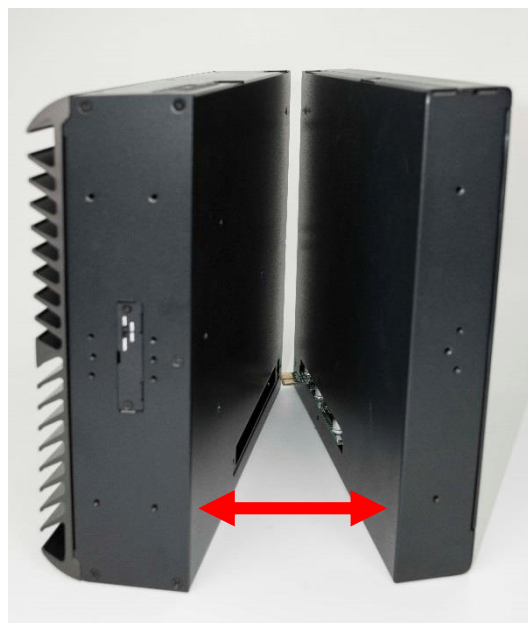
In order to prevent electric shock or system damage, before removing the chassis cover, must turn off power and disconnect the unit from power source.

3.2 Disconnecting expansion module from computing module

1. Remove the 4 connecting brackets on the top side of the system and the 4 brackets on the bottom side.



2. Now you can separate the expansion module from the computing module.



3.3 Removing heat sink cover

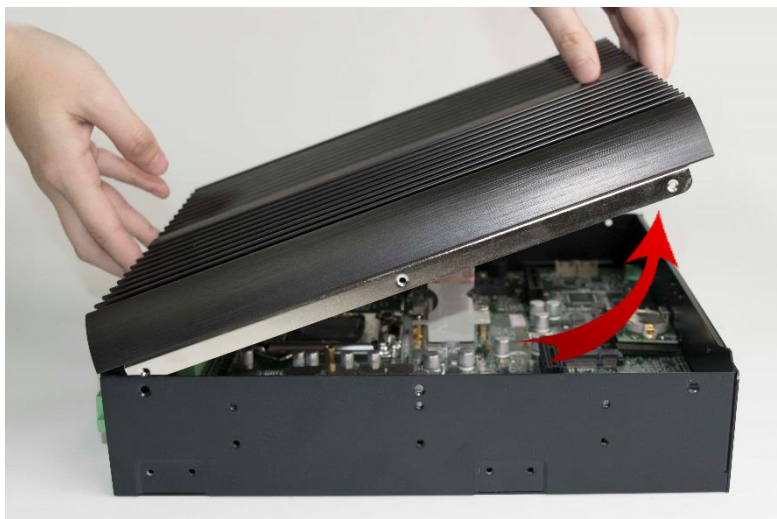
1. Unscrew the 3 screws on the top side of computing module.



2. Unscrew the 3 screws on the bottom side.

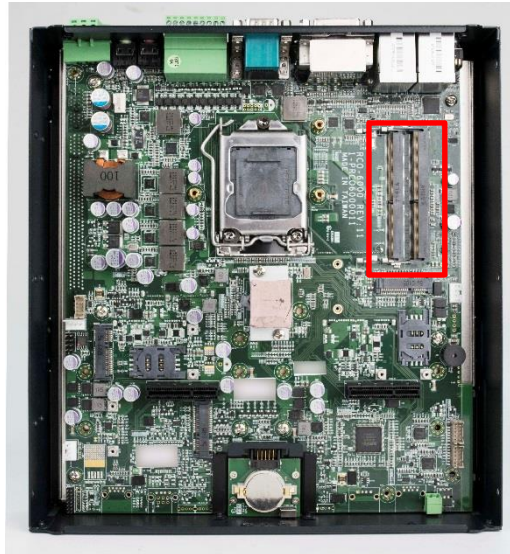


3. Now you can remove the heat sink cover.

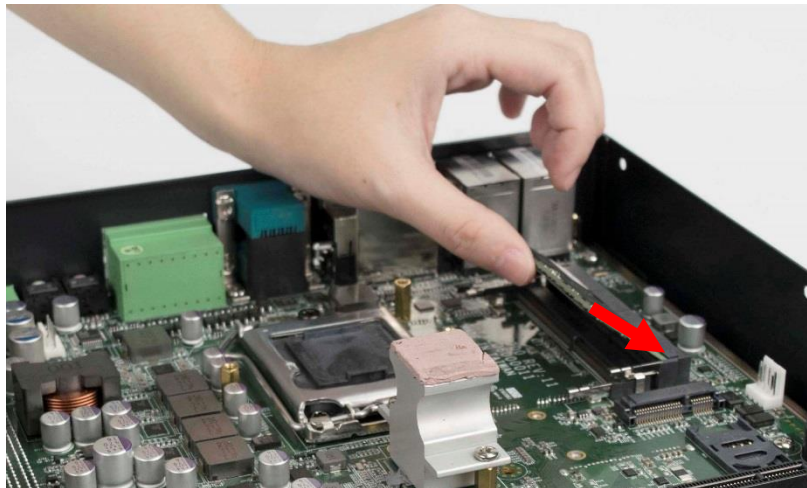


3.4 Installing SODIMM

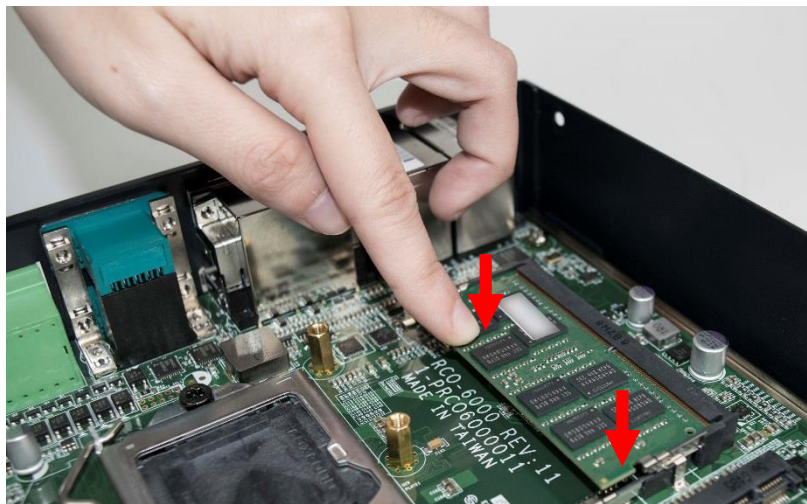
1. Place the system body with SODIMM socket facing upward. Two SODIMM sockets are available for VCO-6000 Series on the top side.



2. Insert memory module from 45 degree direction.

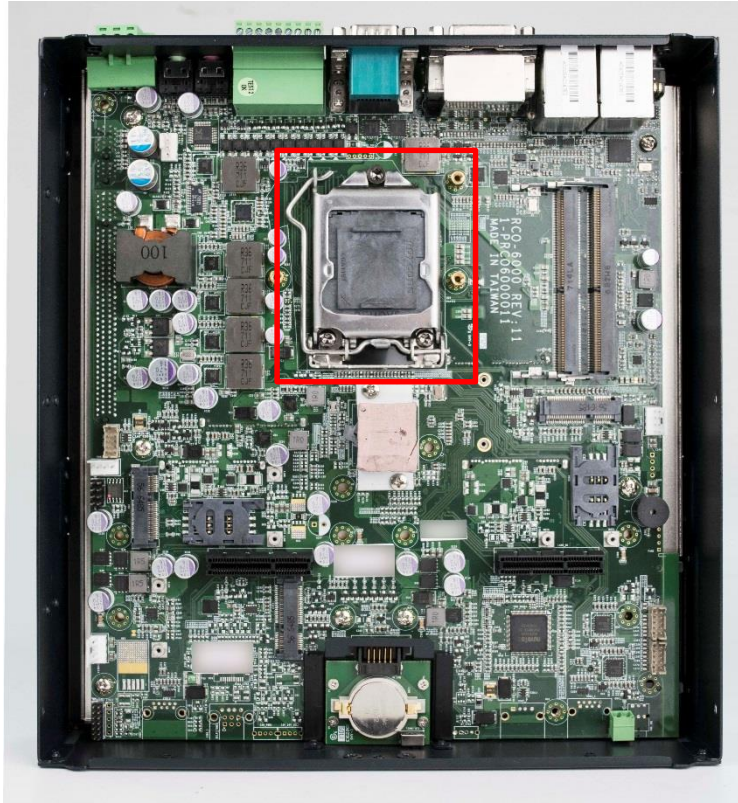


3. Press the memory module vertically downward until you hear the “click” sound. Make sure the memory module is firmly in place.

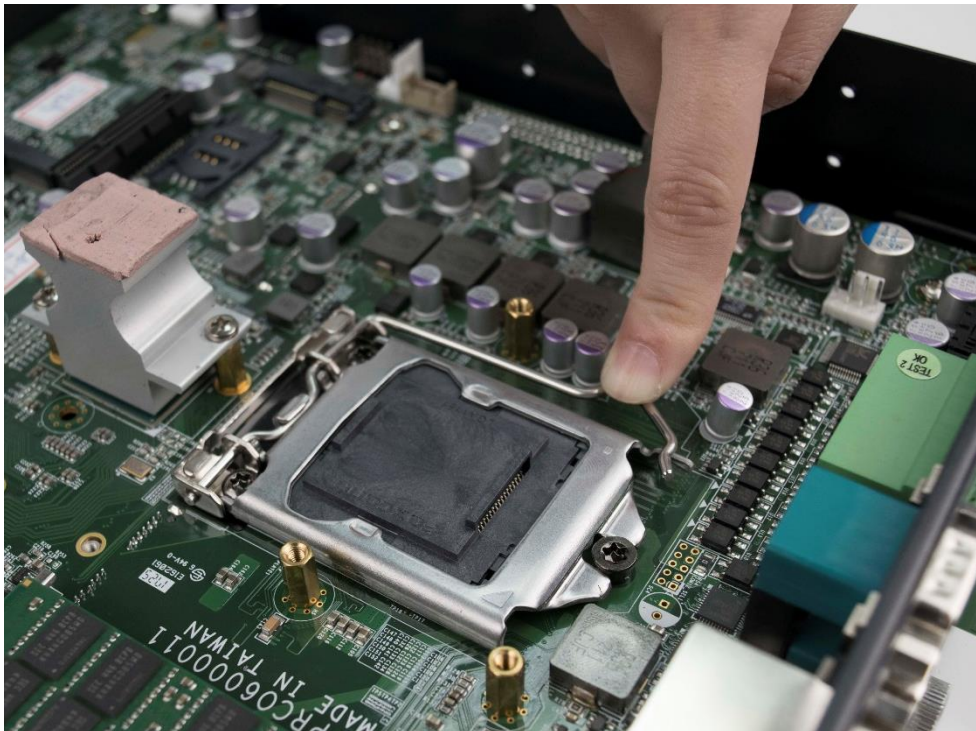


3.5 Installing CPU

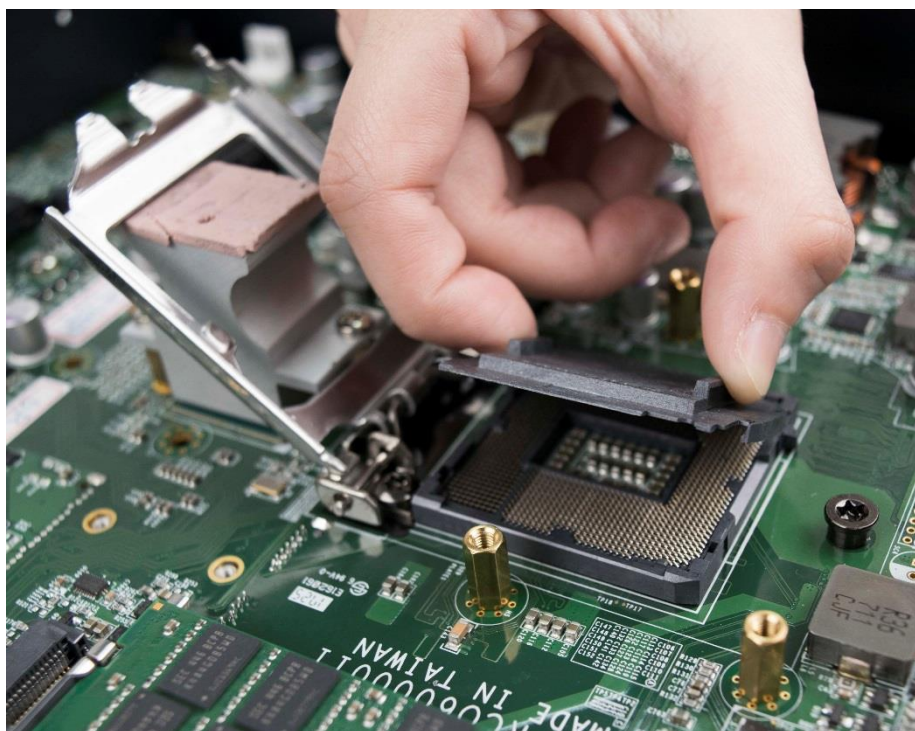
1. You can easily locate the CPU socket after heat sink cover is removed.



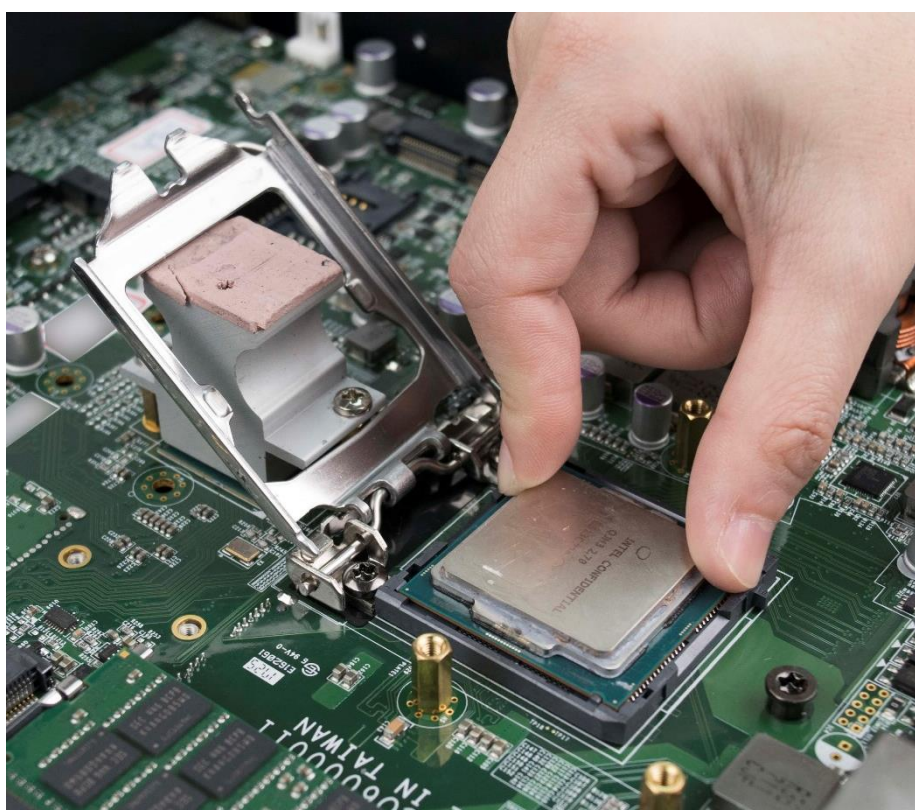
2. Press down the CPU socket lever in order to open the socket cover.



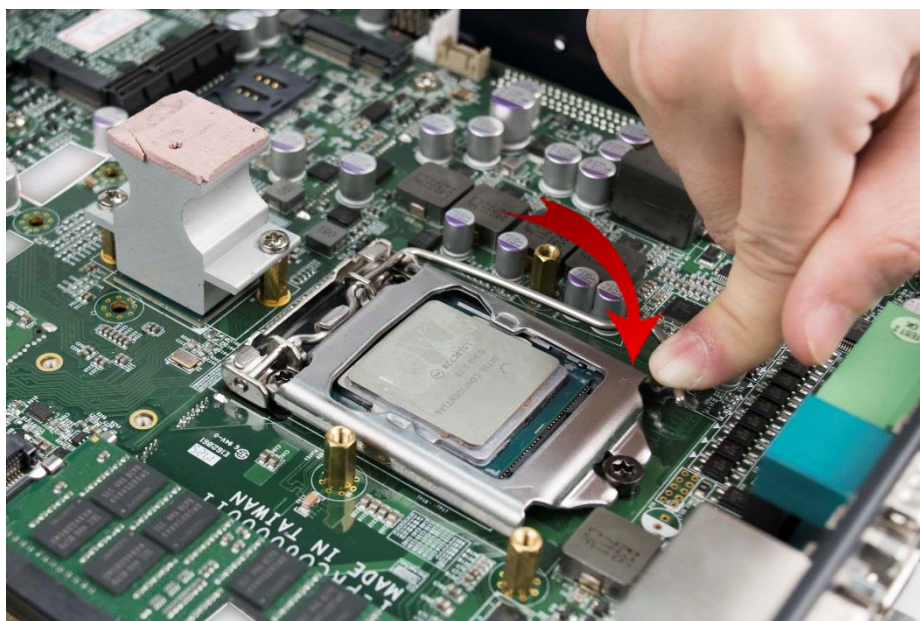
3. Remove the CPU protective cover.



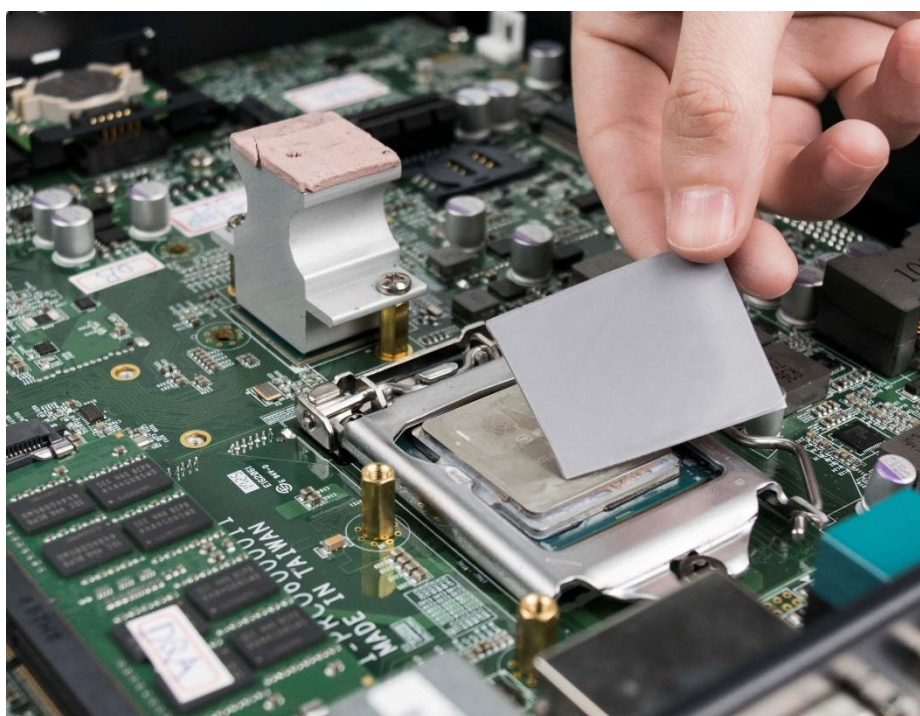
4. Insert CPU gently.



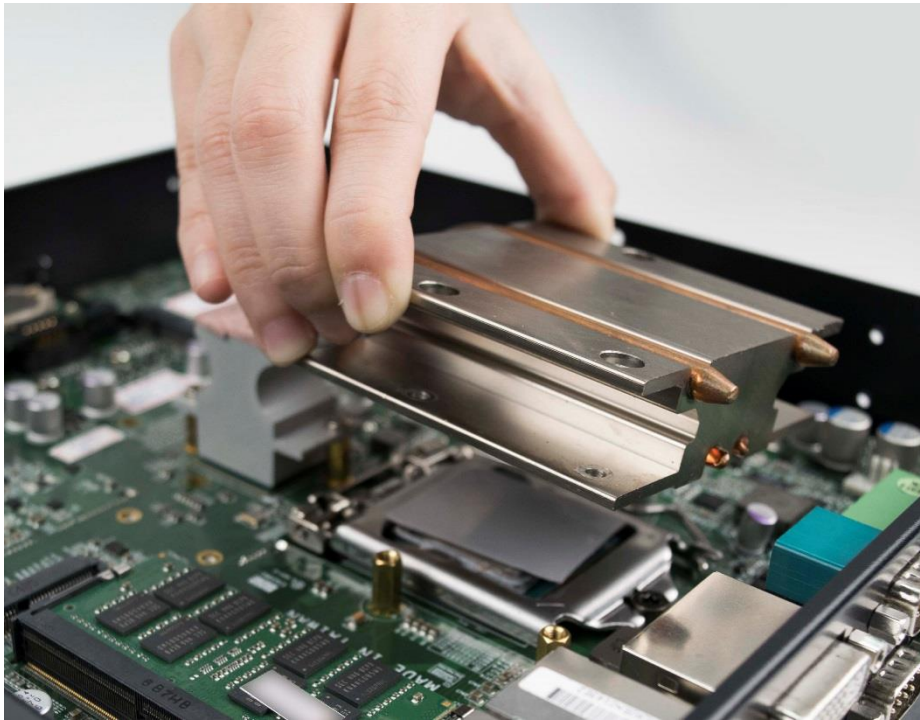
5. Press down the lever again to hold the socket cover.



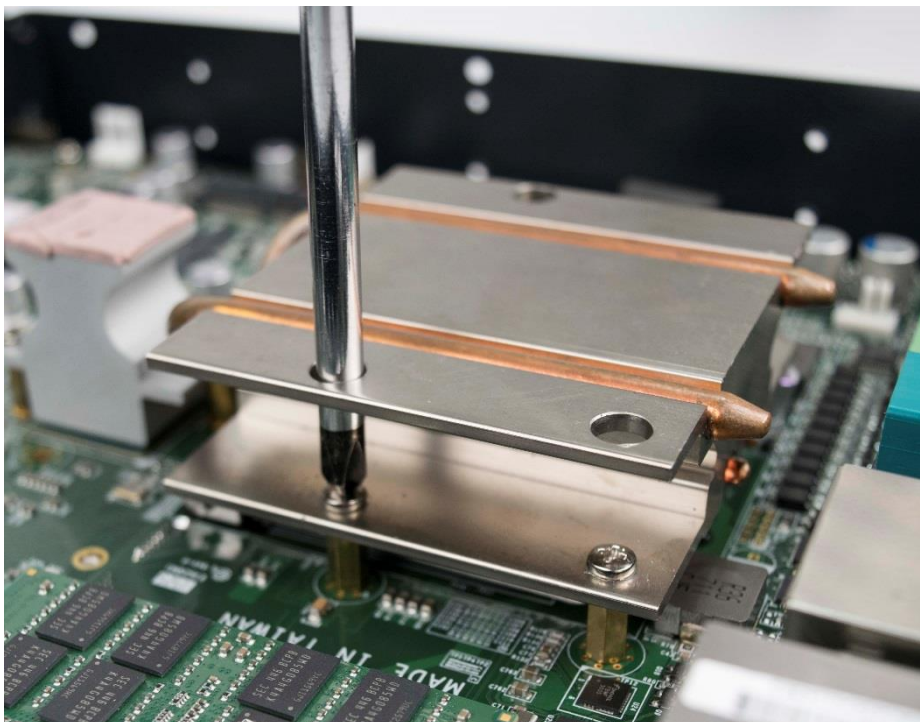
6. Paste thermal pad on the CPU.



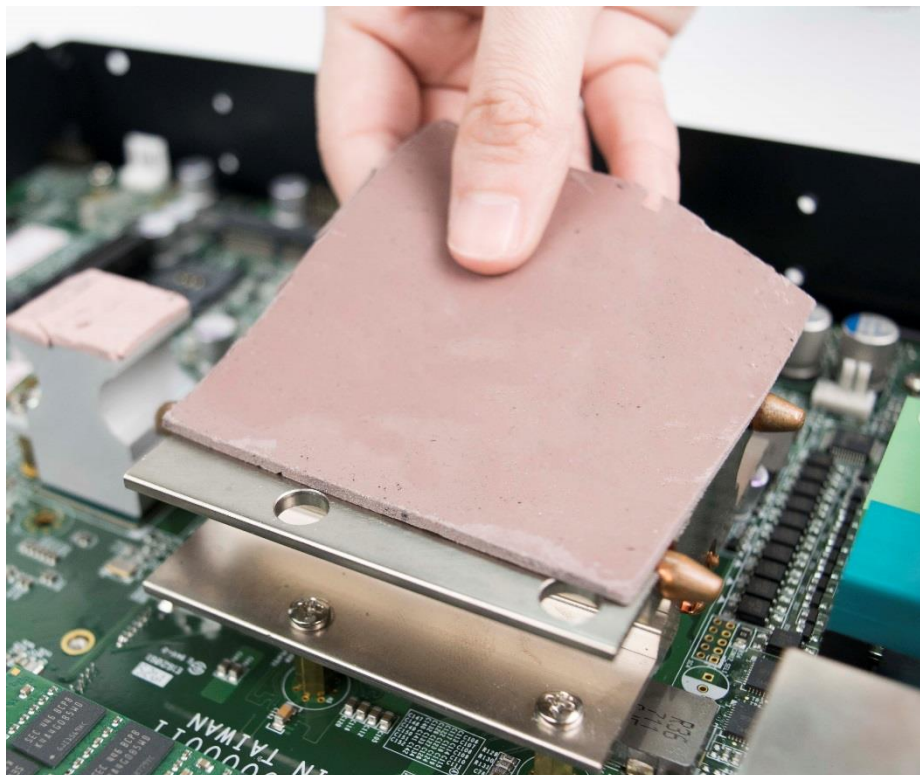
7. Place the designated heat block onto the CPU with thermal pad.



8. Lock the heat block with three screws. Screw driver will be 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.

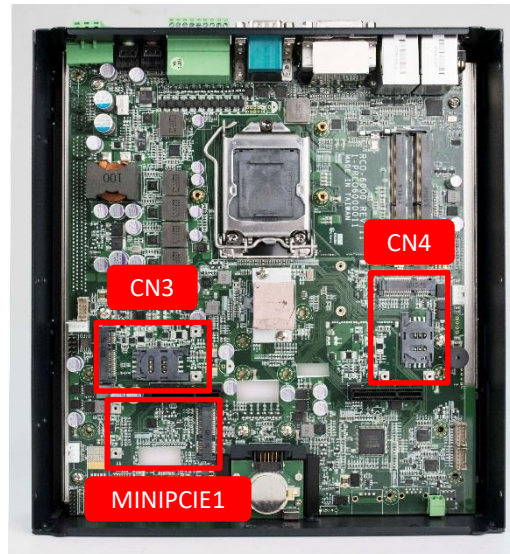


10. Installation complete.

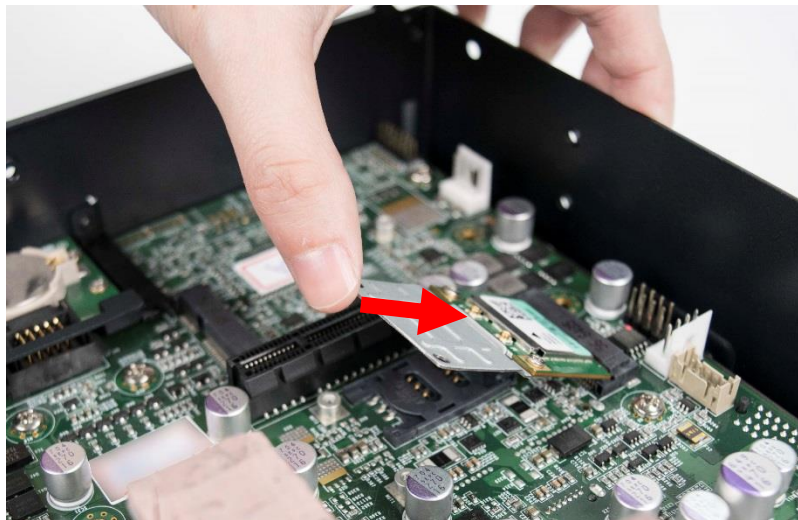


3.6 Installing mini PCIe card / mSATA

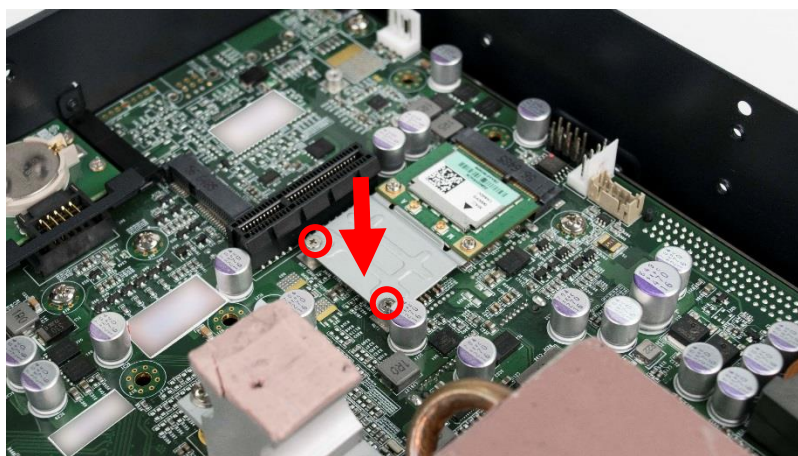
1. Three mini PCIe slots are available for VCO-6000 series. CN3 and CN4 on the top side can also support mSATA.



2. Insert mini PCIe card from 45 degree direction.



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



3.7 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.



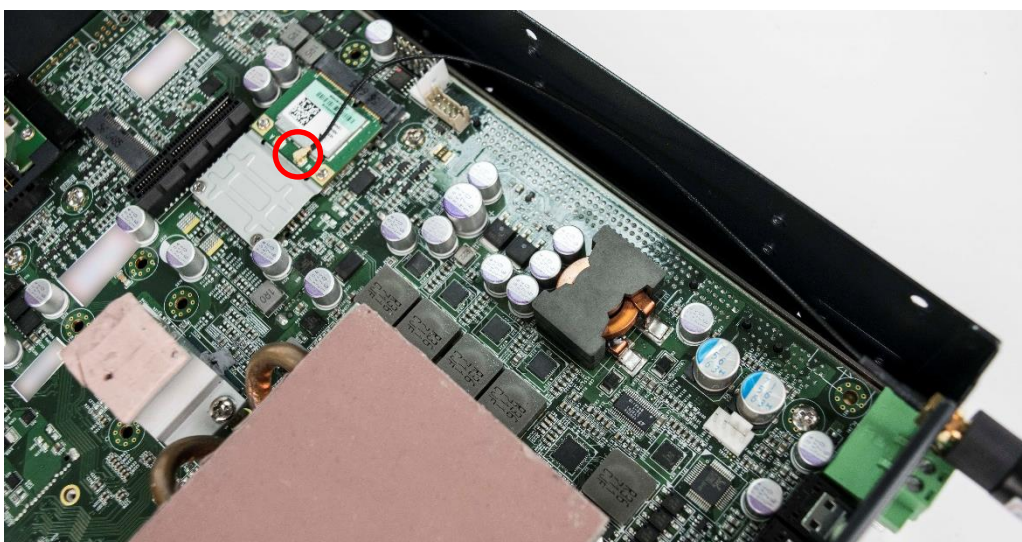
4. Put on washer and fasten the nut with antenna jack.



5. Assemble the antenna and antenna jack together.



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

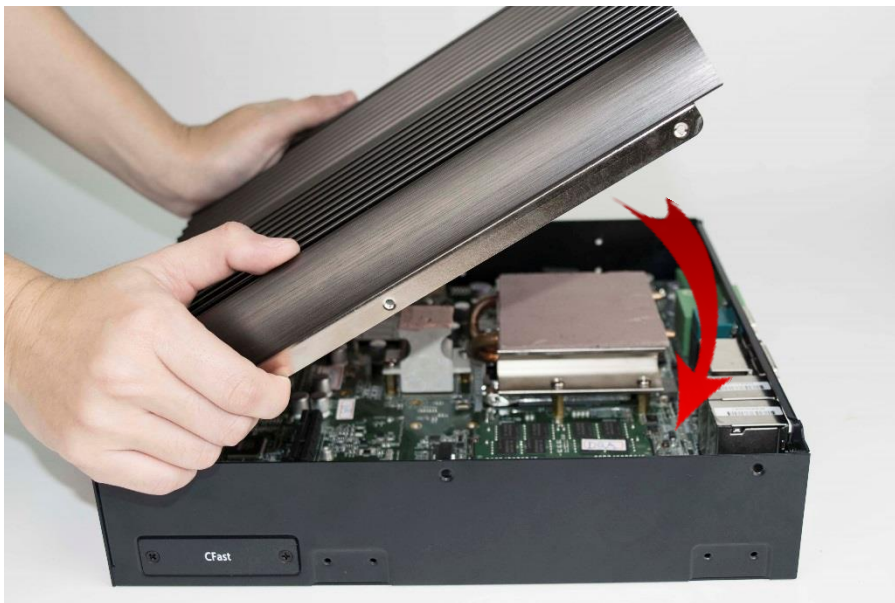


3.8 Assembly heat sink cover

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.

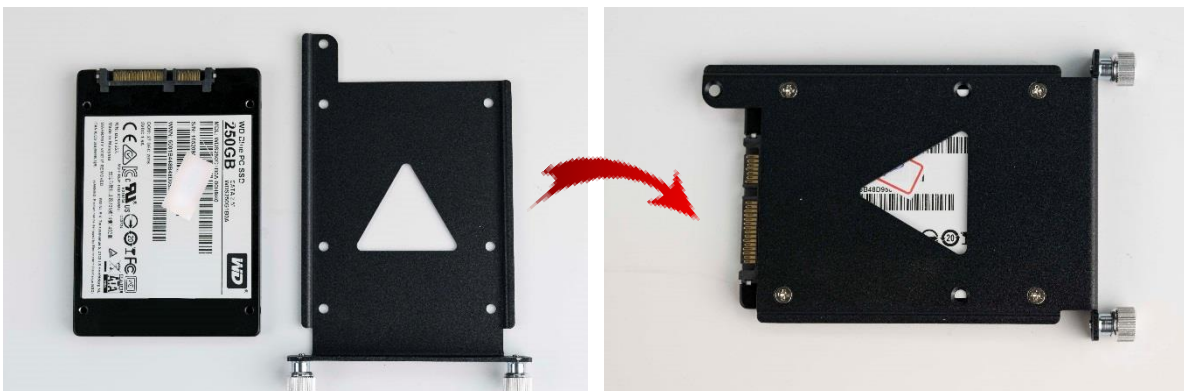


3.9 Installing HDD on removable SATA HDD bay

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.



3.10 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.

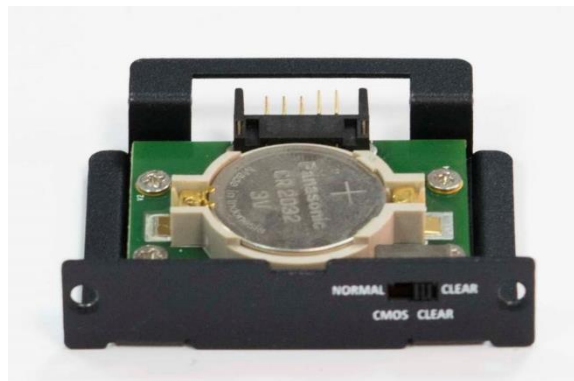


3. The socket is push-push type. Push the installed CFast card again to remove it.



3.11 Changing CMOS battery

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

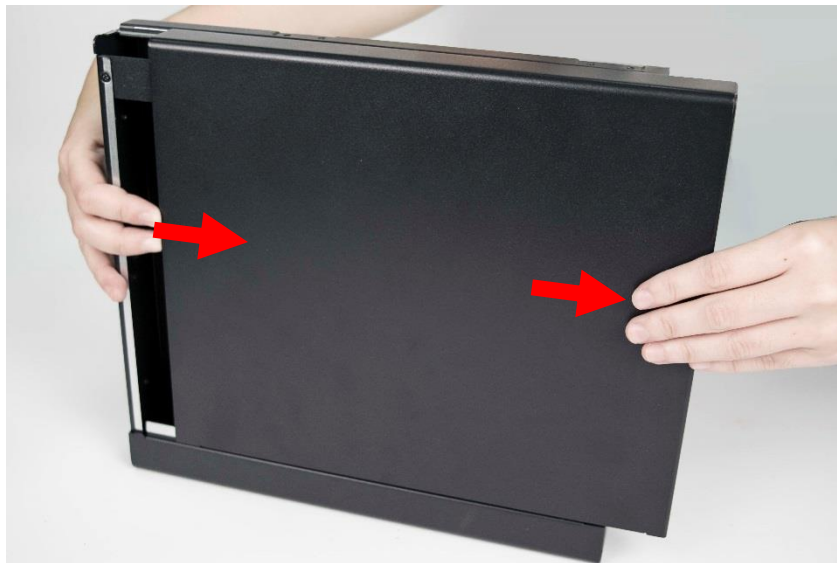


3.12 Installing PCIe/PCI expansion card

1. Unscrew two screws on the front side of expansion module.



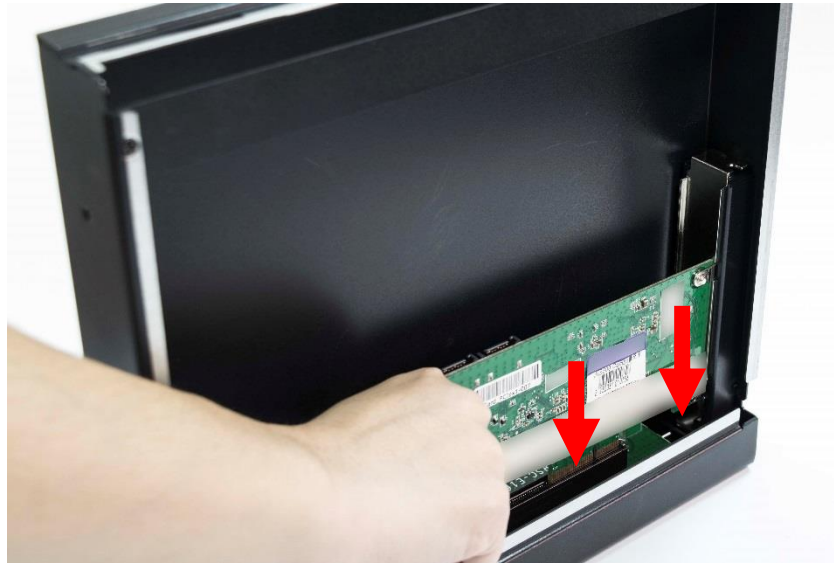
2. Push the chassis cover following the below direction to open the expansion module.



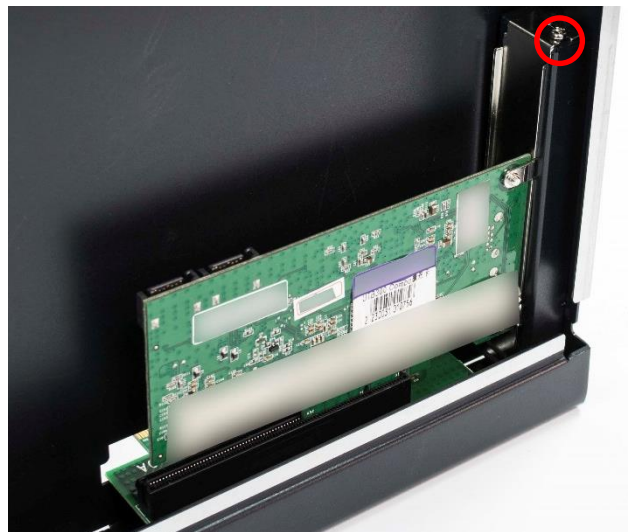
3. Now you will be able see the expansion slots. Unscrew the screw securing the card bracket to remove the bracket.



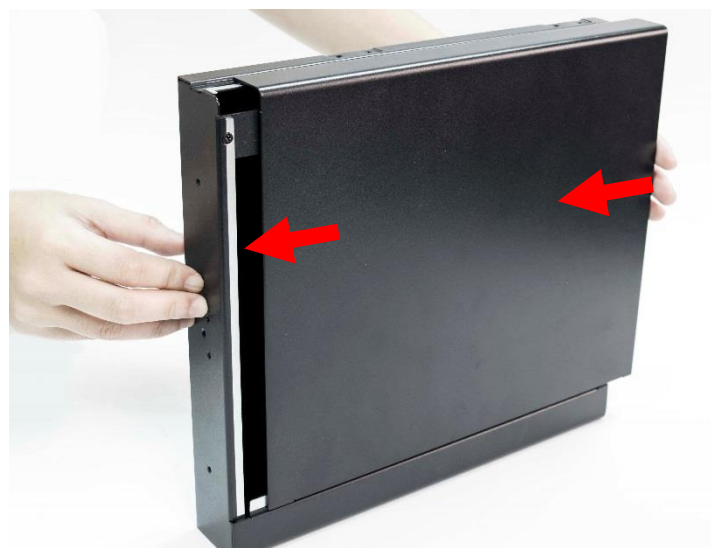
4. Insert your PCIe/PCI card into the expansion slot.



5. Install the screw back to secure the PCIe/PCI card



6. Close the chassis cover.

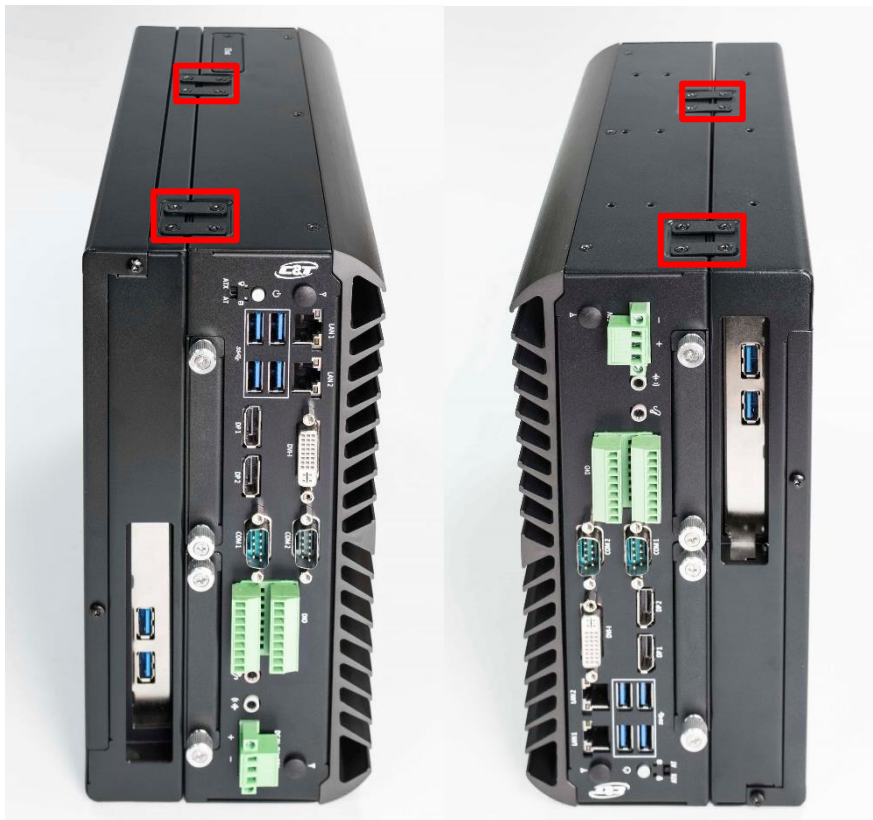


3.13 Connecting expansion module with computing module

1. Connect expansion module with computing module by inserting the gold fingers on the expansion module into the slot on the computing module.



2. Fasten all the screws with the connecting brackets on the top side and bottom of the system.



3.14 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.



3.15 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.



3.16 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 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

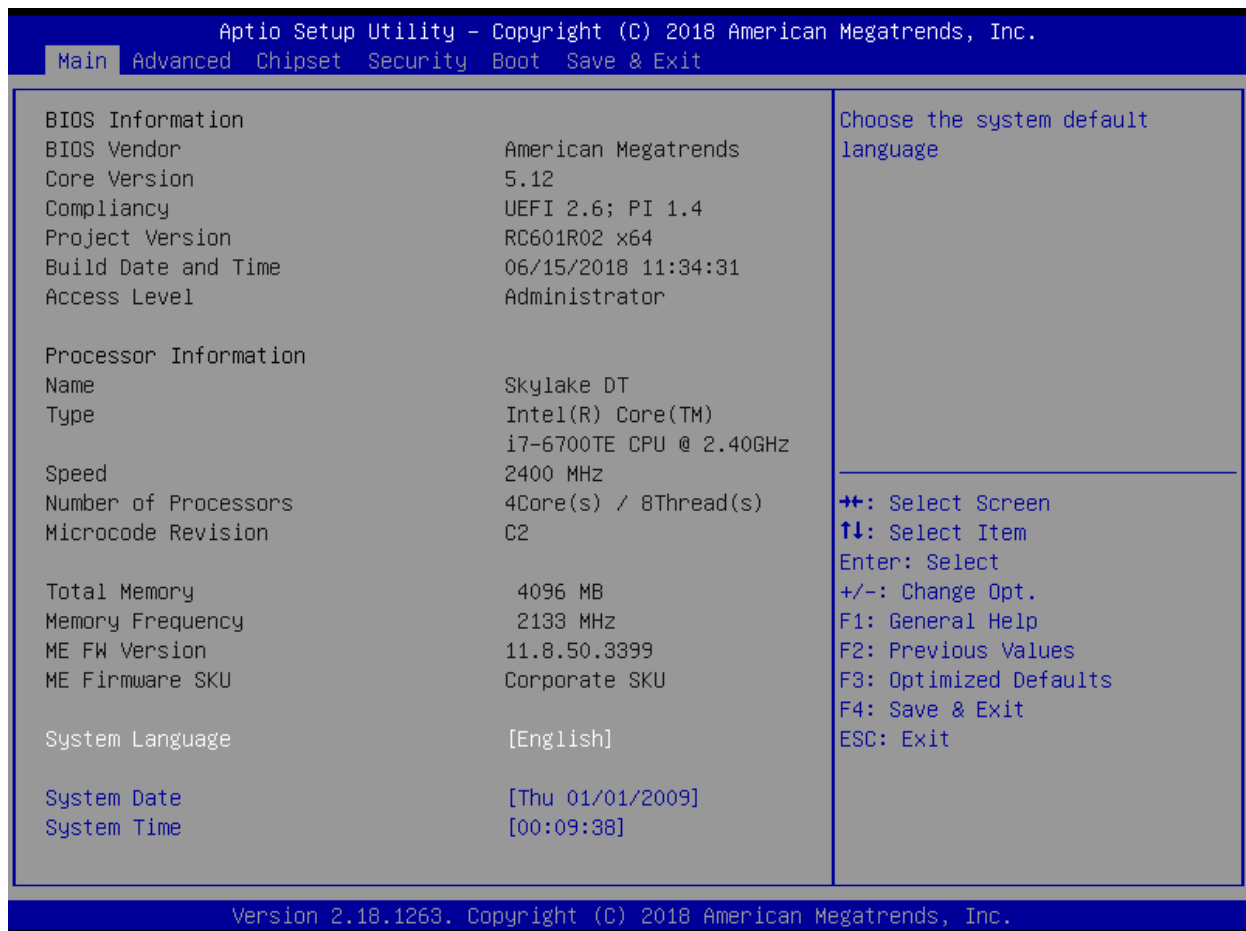
The main menu lists the setup functions you can make changes to. You can use the arrow keys (↑ ↓) to select the item. The on-line description of the highlighted setup function is displayed at the bottom of the screen.

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 to enter BIOS CMOS Setup Utility, the Main Menu (as shown below) will appear 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

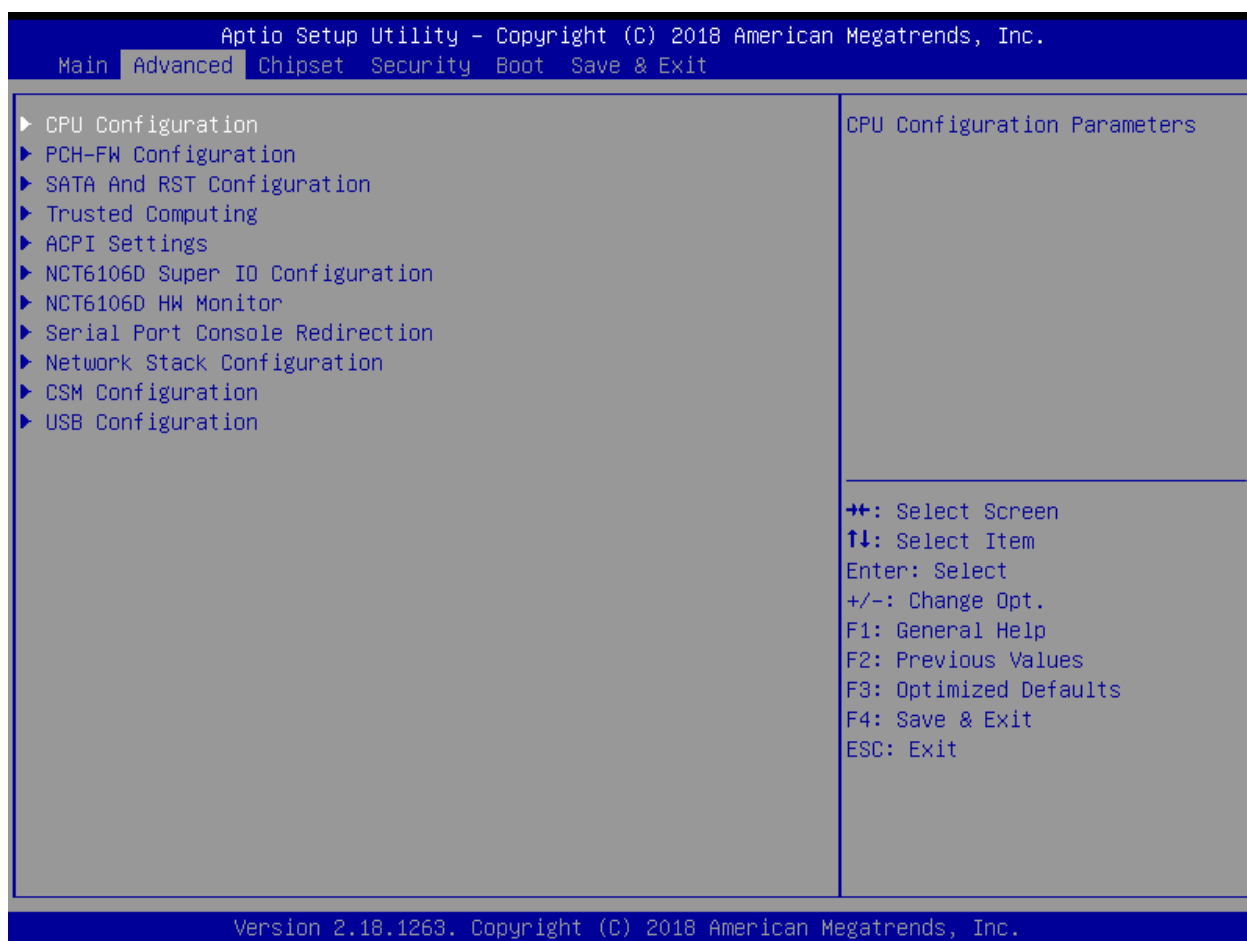
Set the date. Please use <Tab> to switch between date elements.

4.2.3 System Time

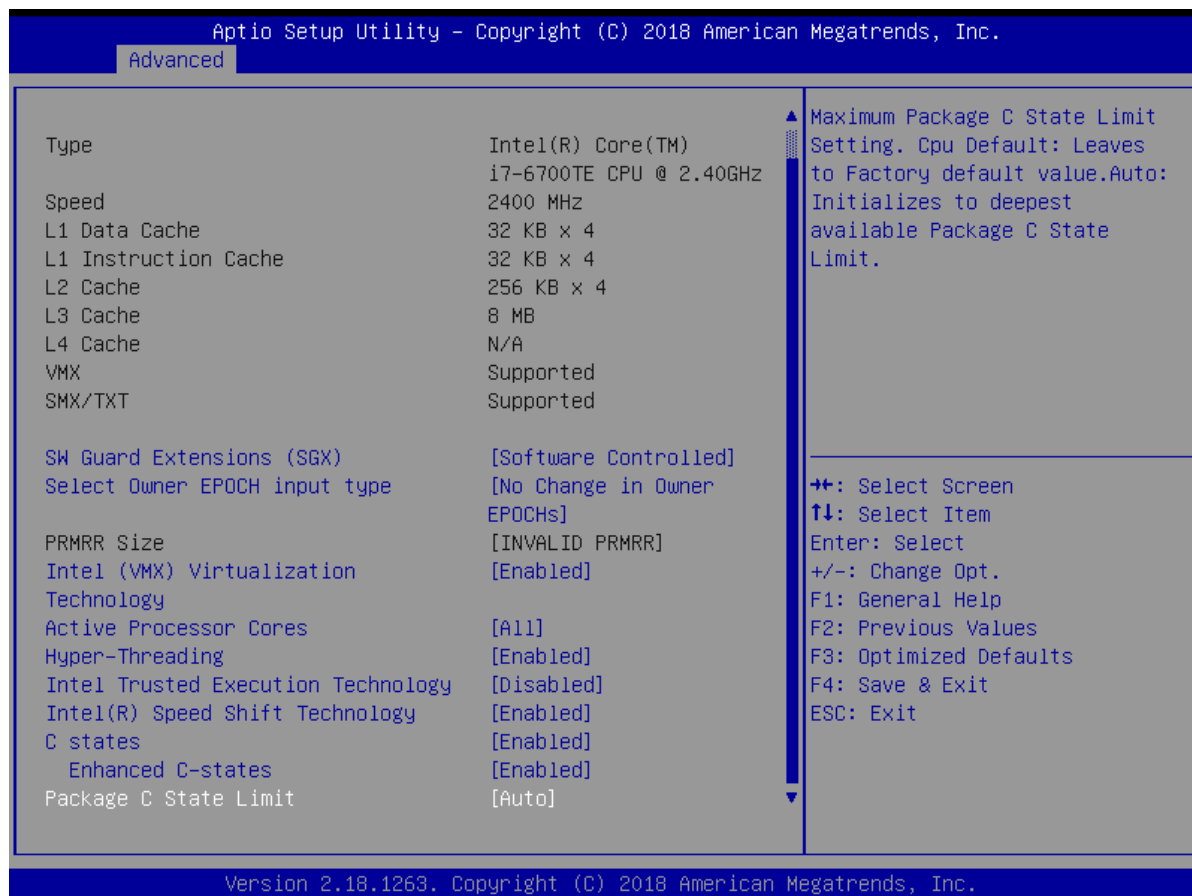
Set the time. Please use <Tab> to switch between time elements.

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.

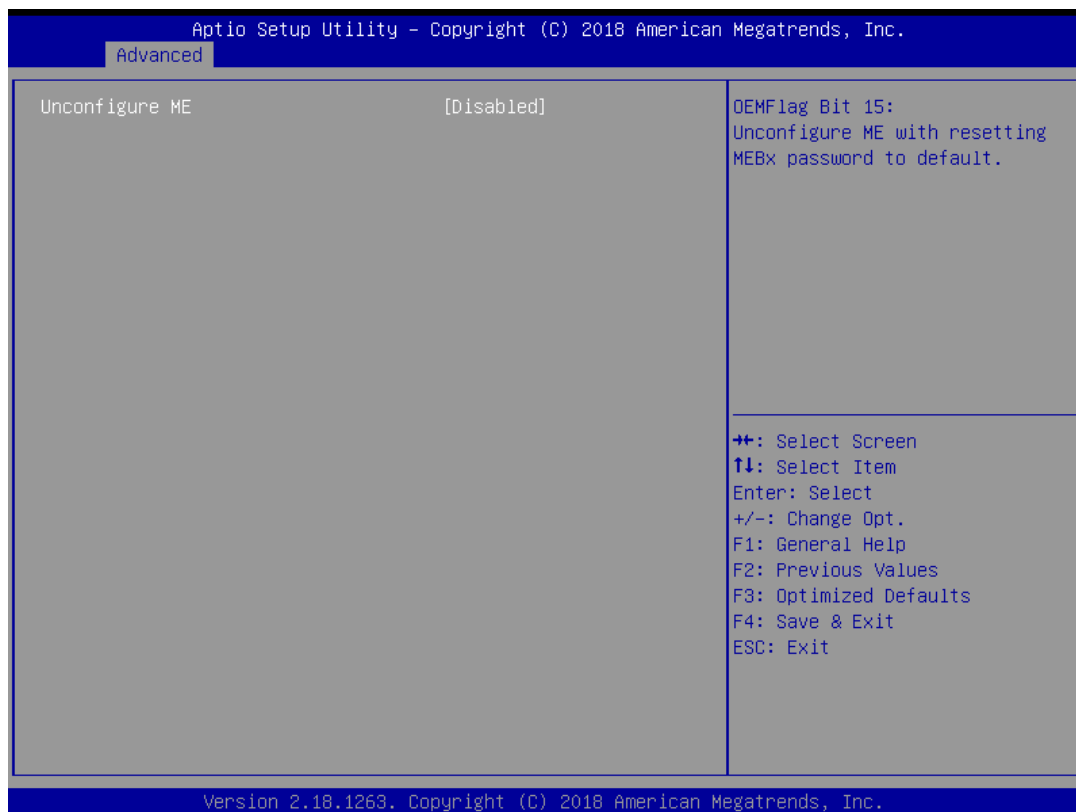
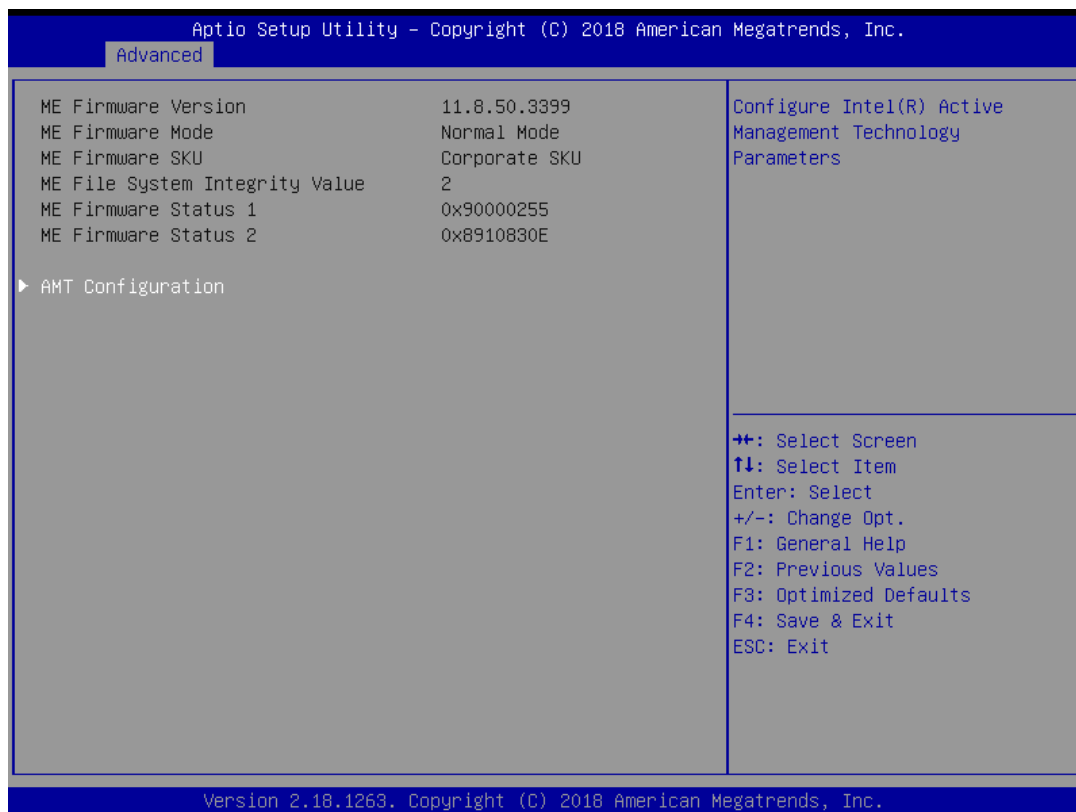
☐ Enhanced C State

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



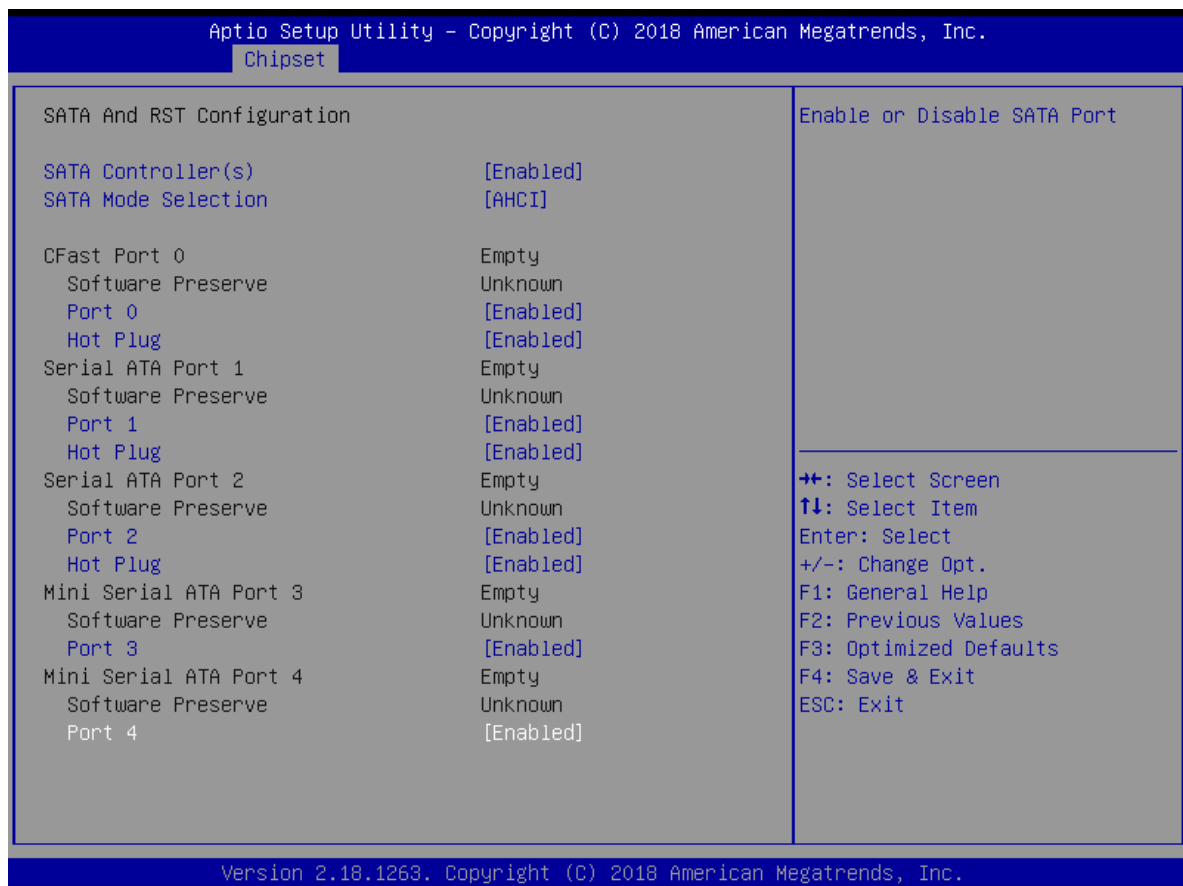
■ AMT Configuration

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.

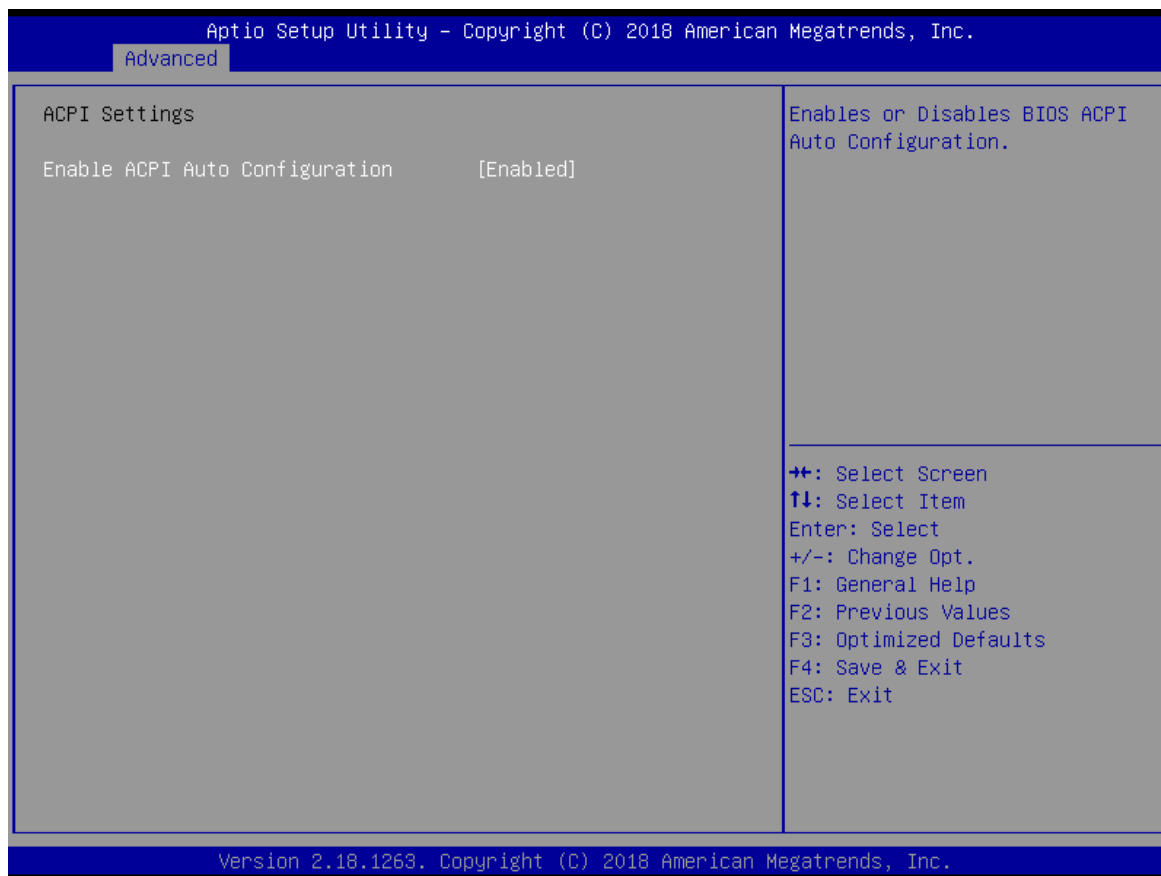
■ Serial ATA Port 0 / 1 / 2 / 3 / 4 / 5

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

4.3.4 Trusted Computing



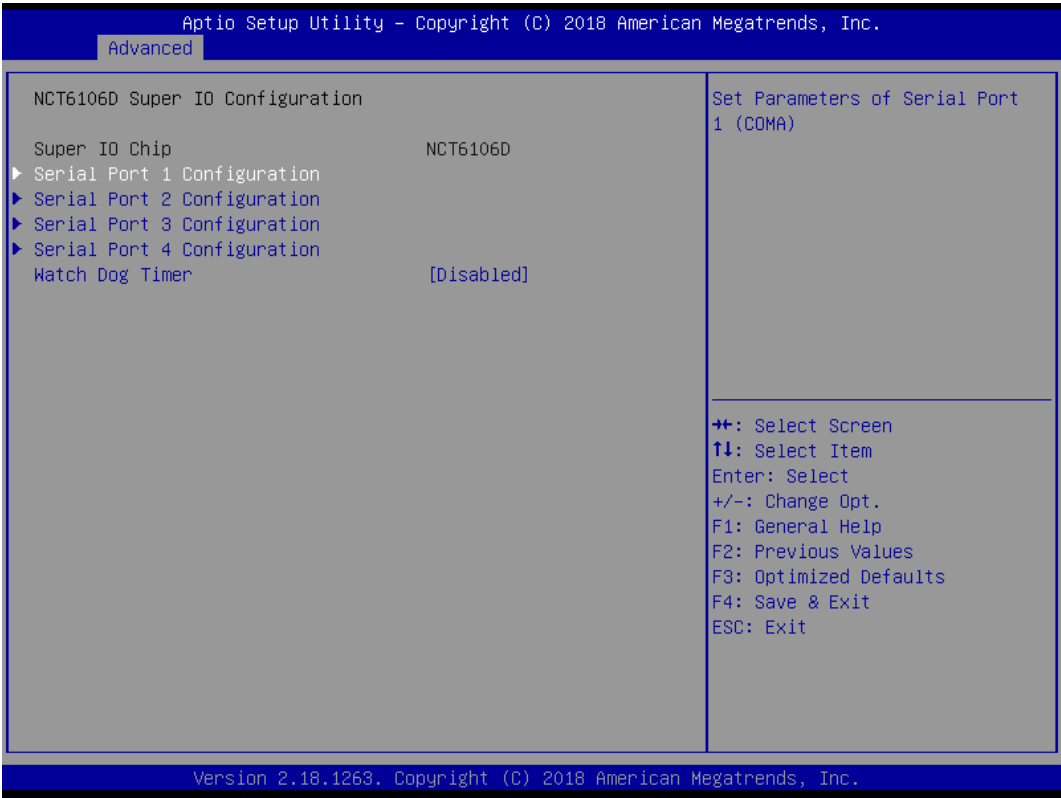
4.3.5 ACPI Settings



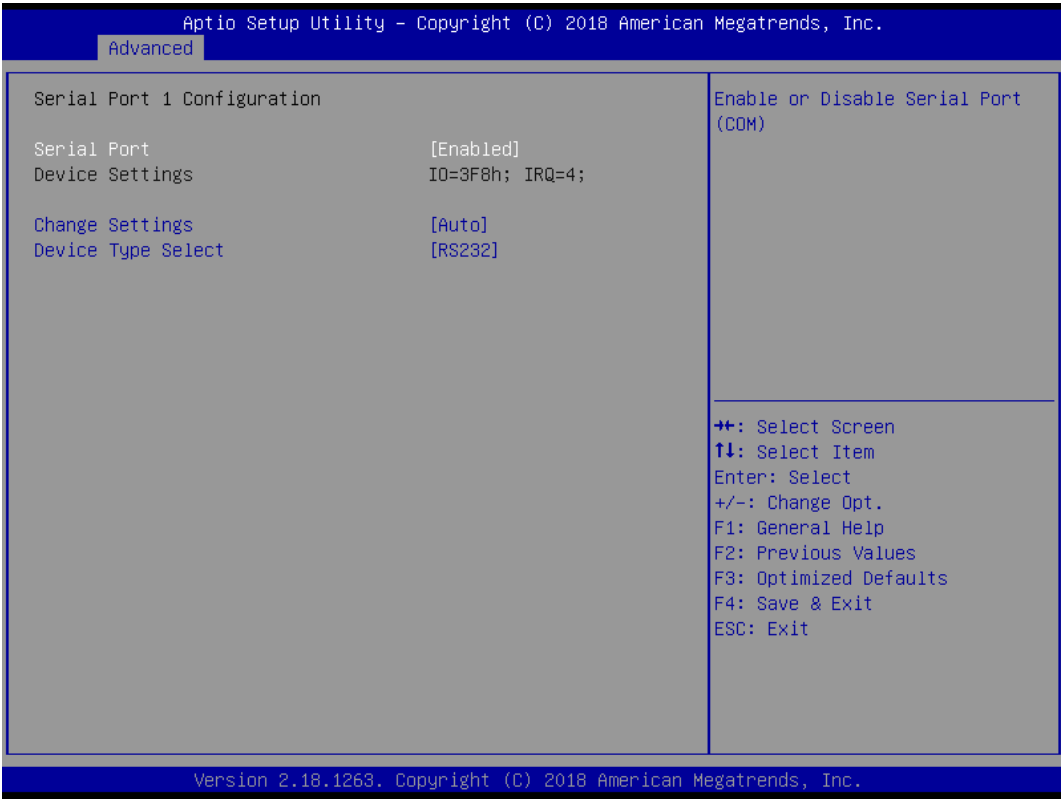
■ Enable ACPI Auto Configuration

Enable or disable BIOS ACPI auto configuration.

4.3.6 NCT6106D Super IO Configuration

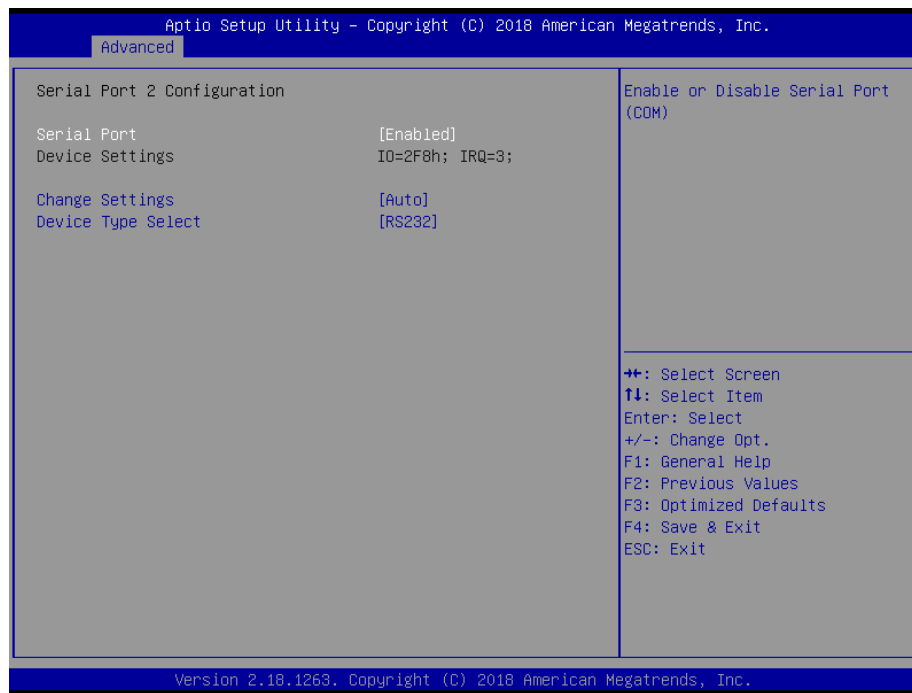


Serial Port 1 Configuration



- ☐ **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.

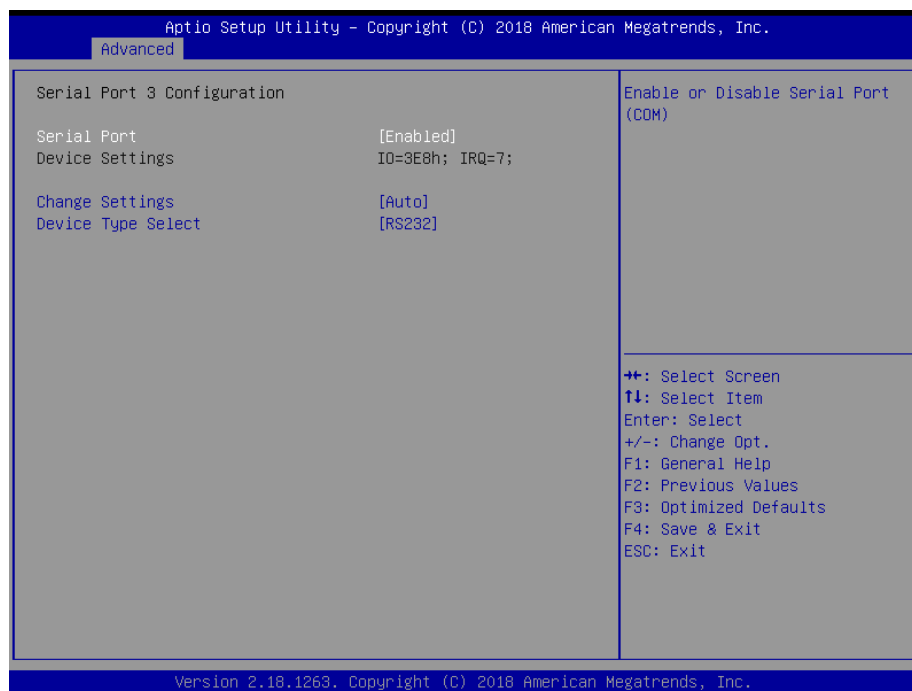
☐ Change Settings

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.

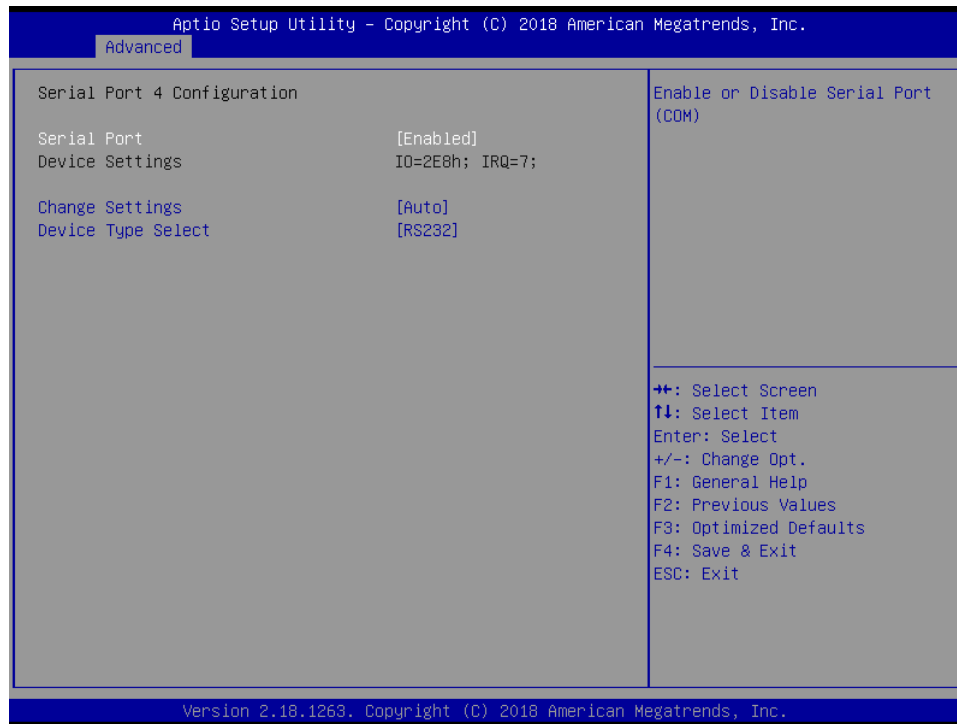
☐ Change Settings

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

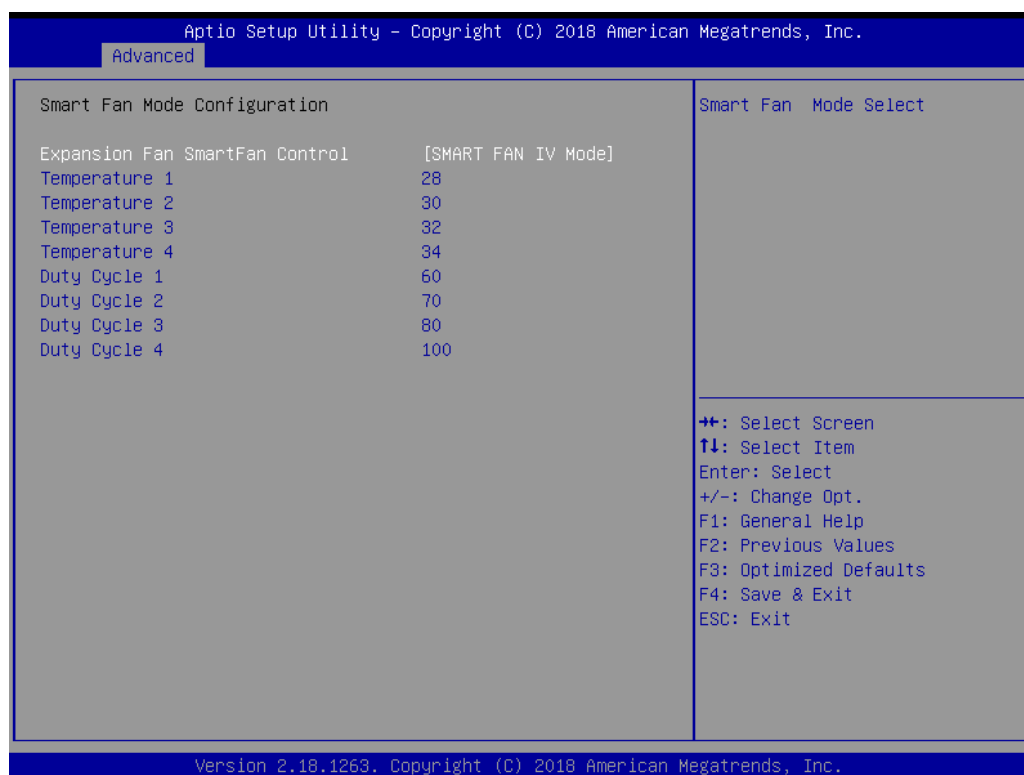
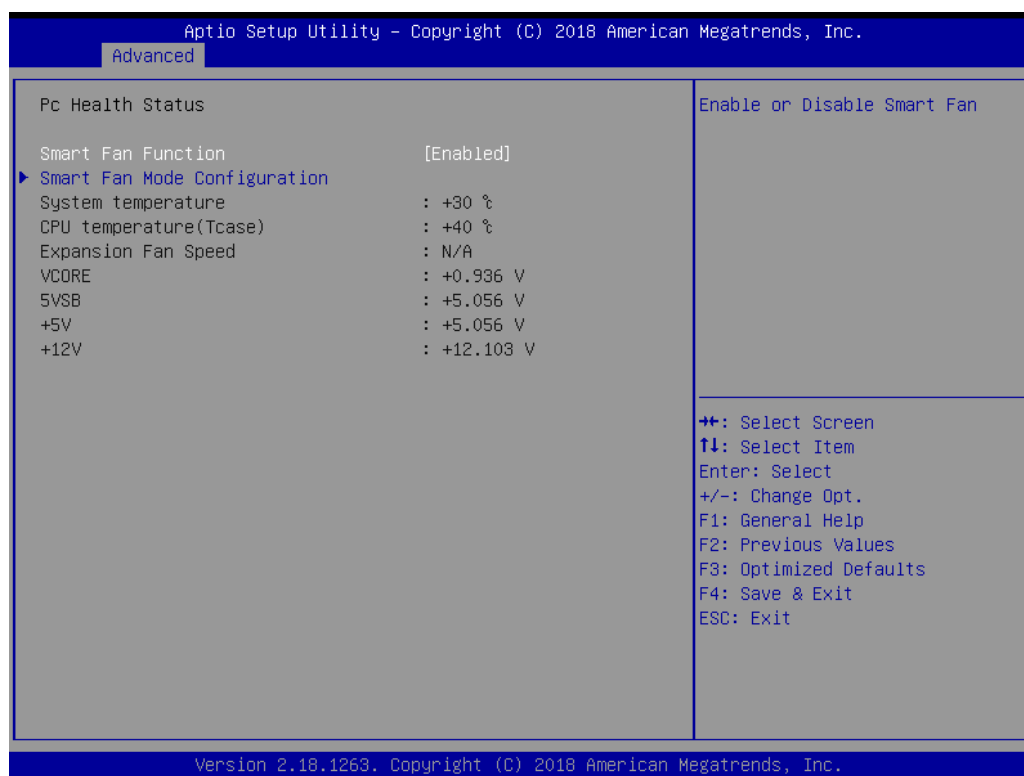
Change the Watch dog mode. Select <Second Mode> or <Minute Mode> mode.

☐ 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.



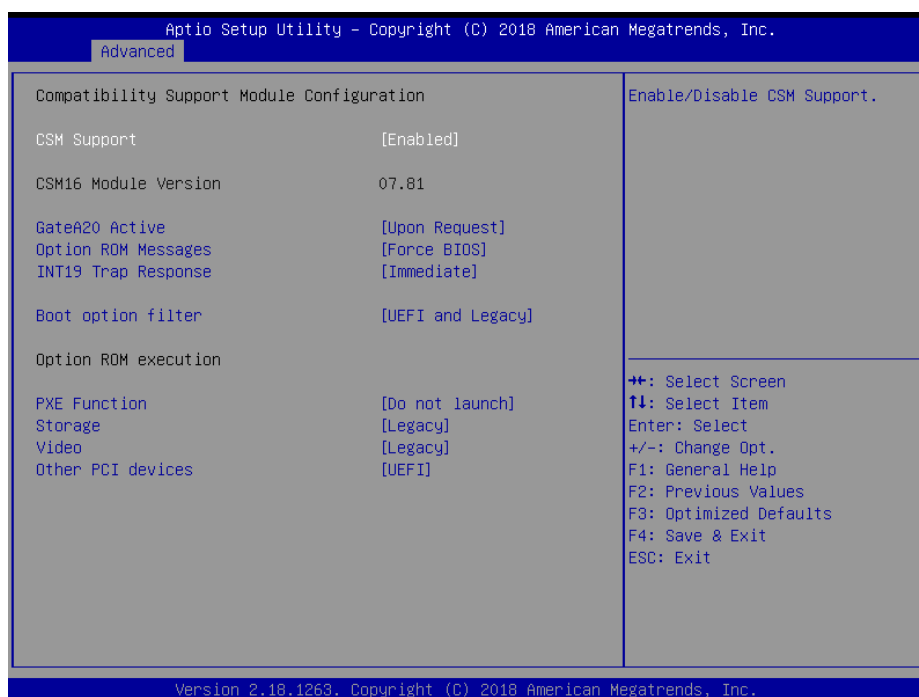
4.3.9 Network Stack Configuration



■ 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>.

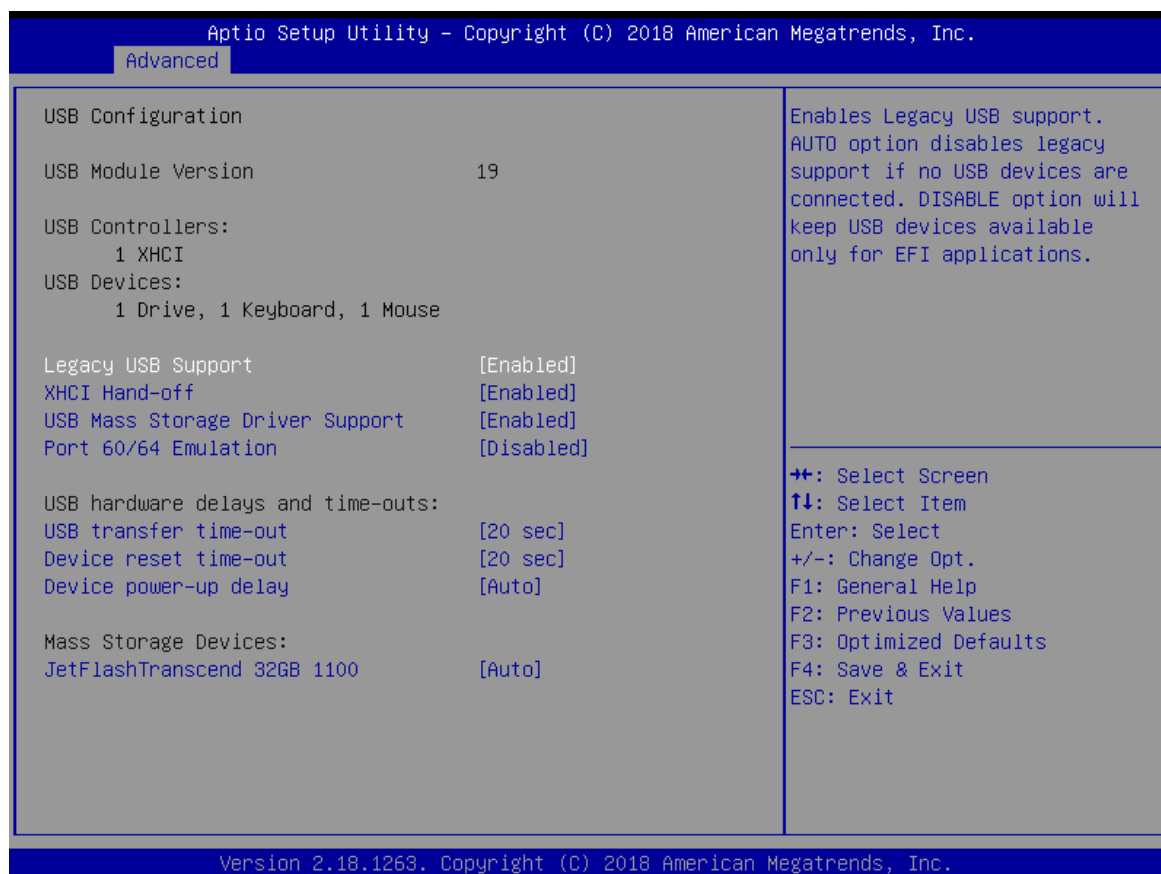
■ Video

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

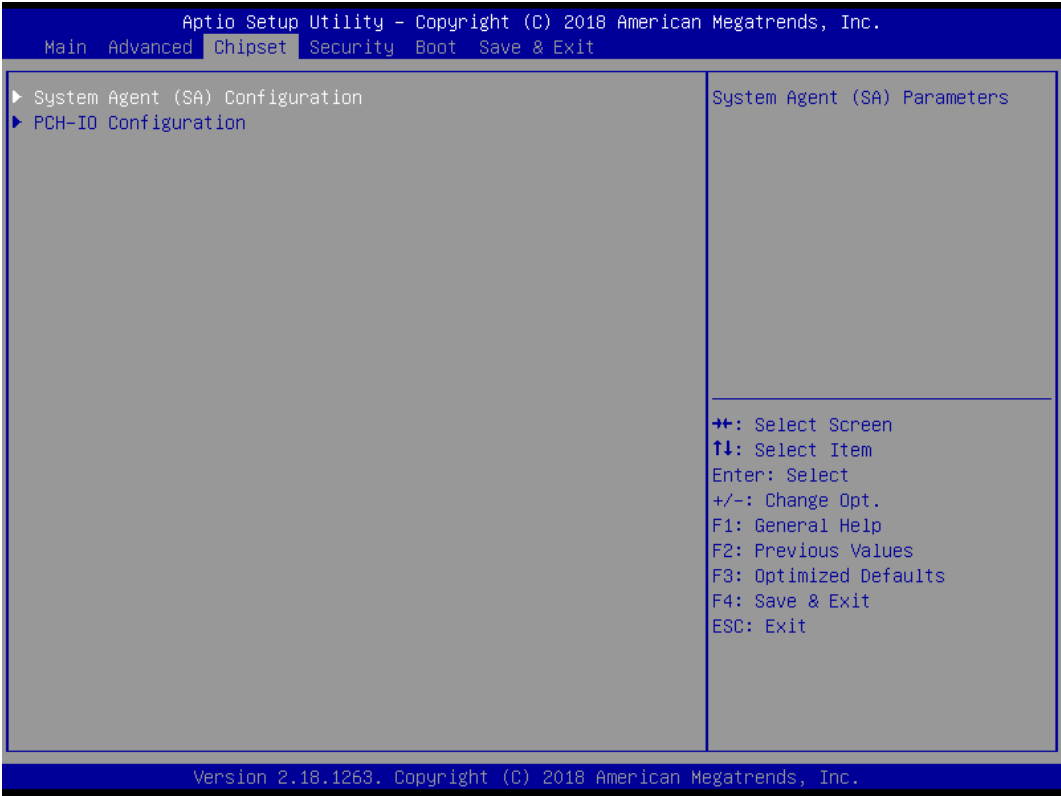
Use this item to set USB mass storage device start unit command time-out. Select <10 sec>, <20 sec>, <30 sec> or <40 sec>.

Device power-up delay

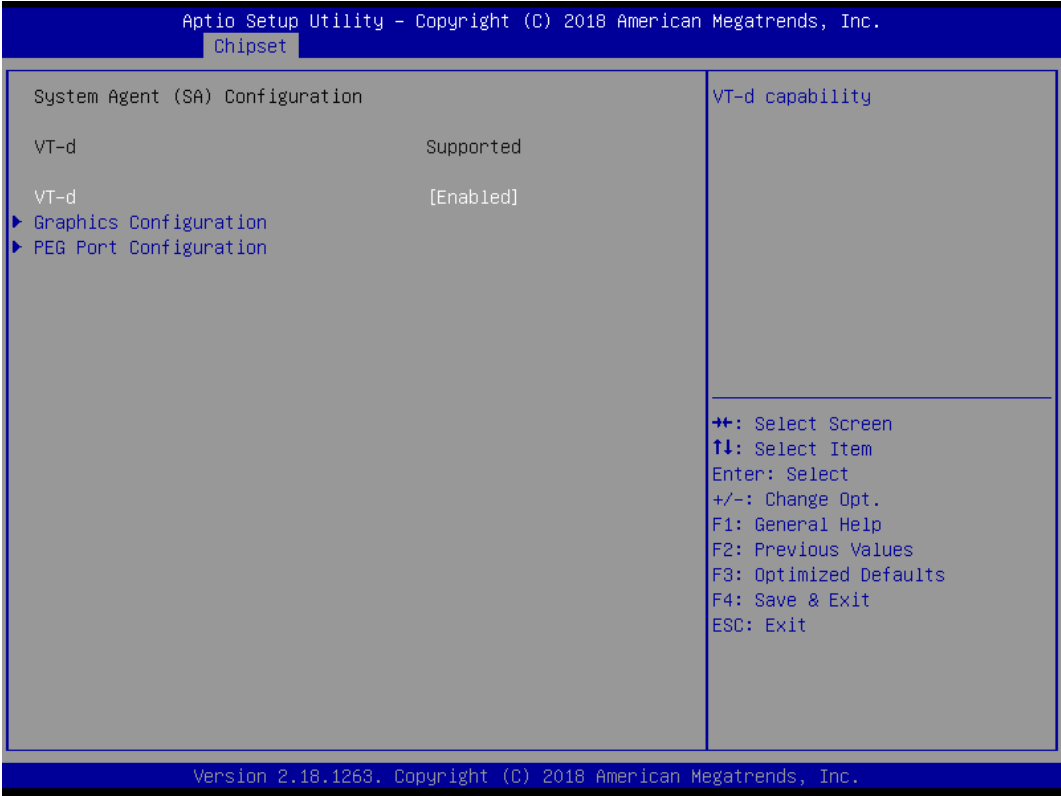
Maximum time the device will take before it properly reports itself to the Host Controller. "Auto" uses default value: for a Root port it is 100ms, for a Hub port the delay is taken from Hub descriptor.

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.



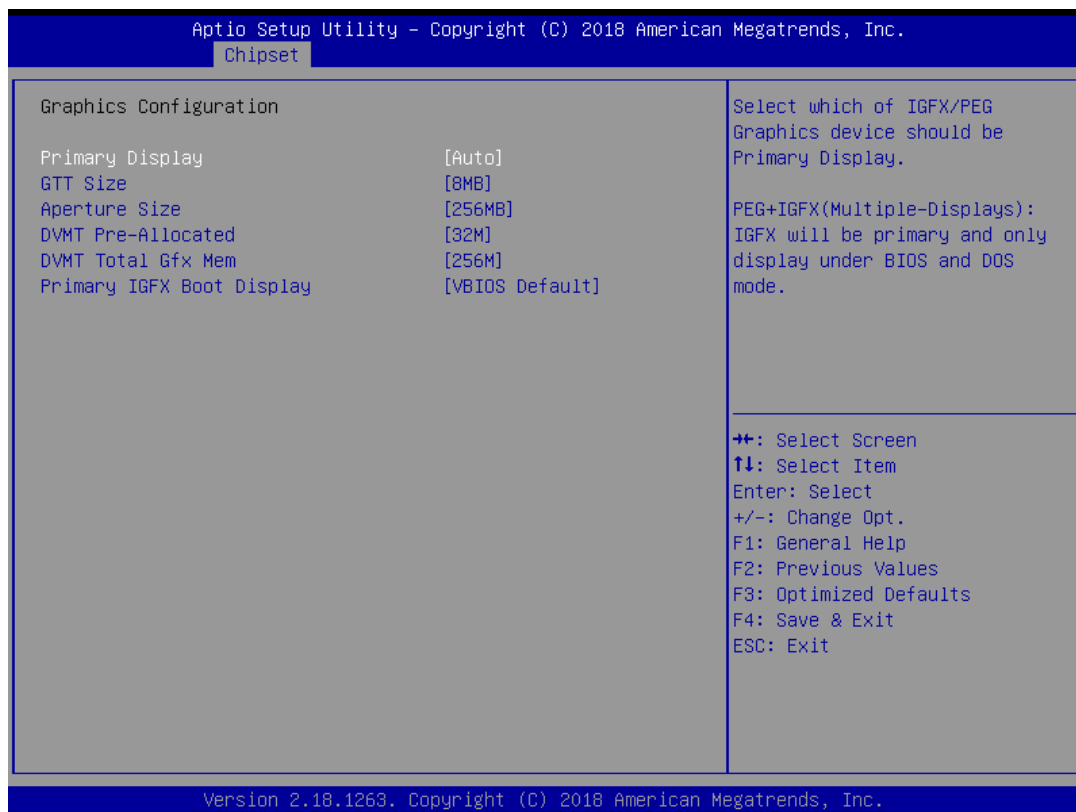
4.4.1 System Agent (SA) Configuration



■ 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 and 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.

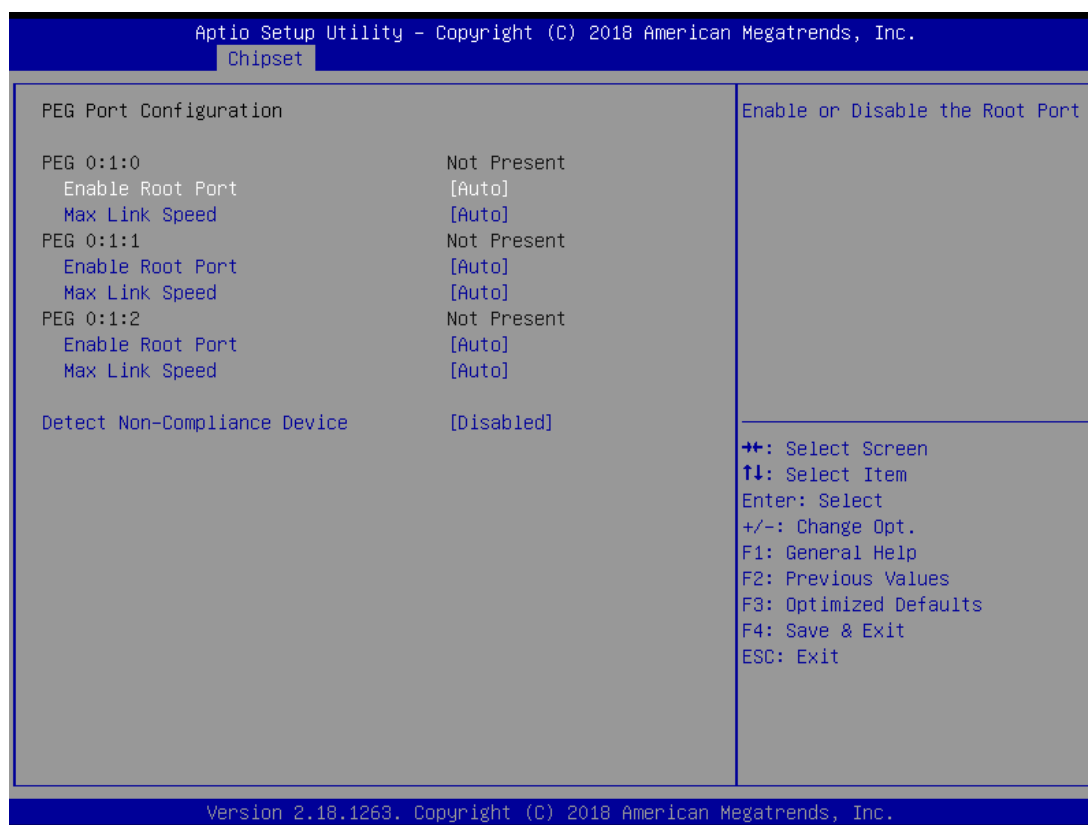
❑ DVMT Total Gfx Mem

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

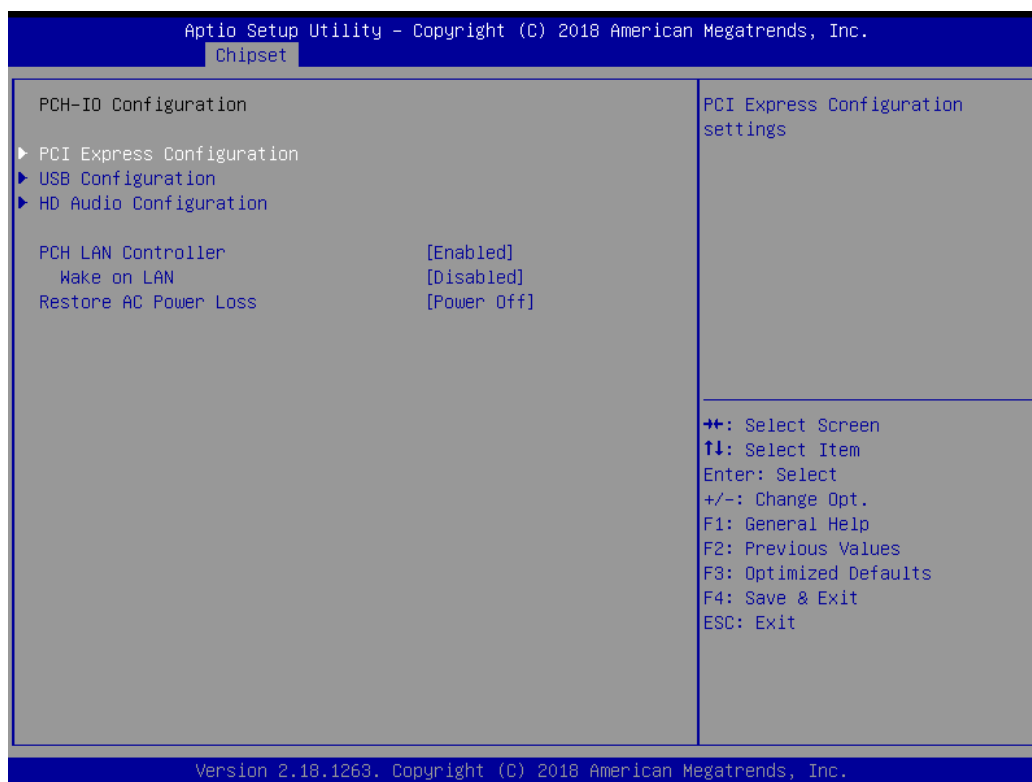
This item allows you to configure PEG 0:1:1 Max Sped.

□ Detect Non-Compliance Device

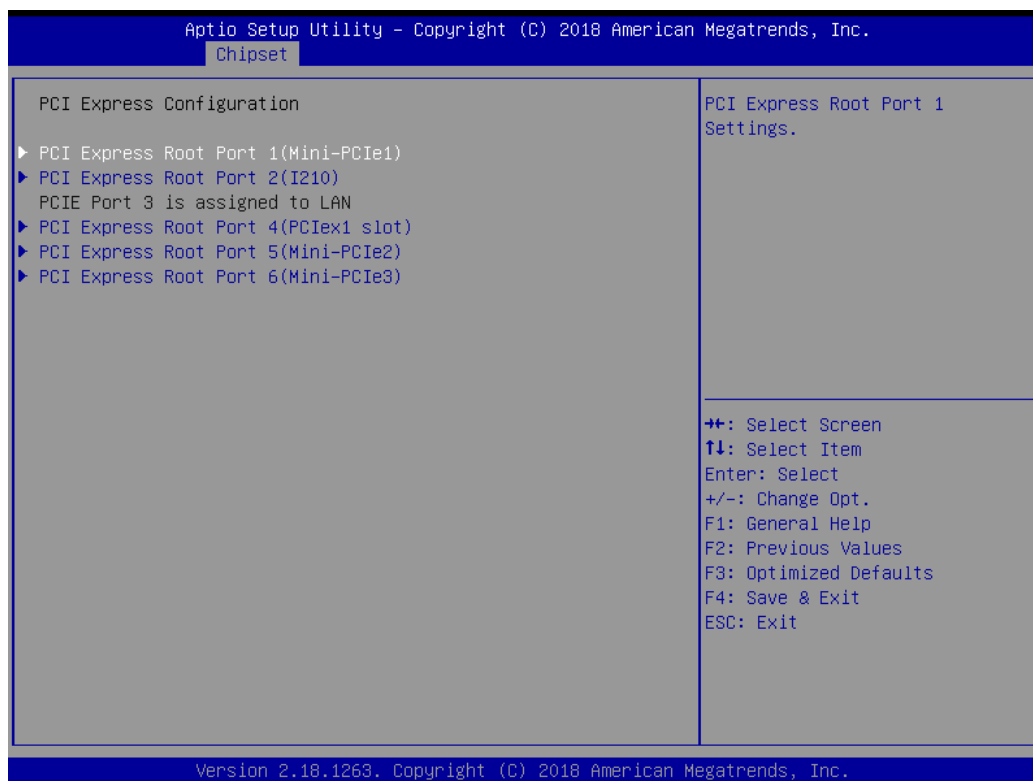
Detect Non-Compliance PCI Express Device. If enable, it will take more time at POST time.

4.4.2 PCH-IO Configuration

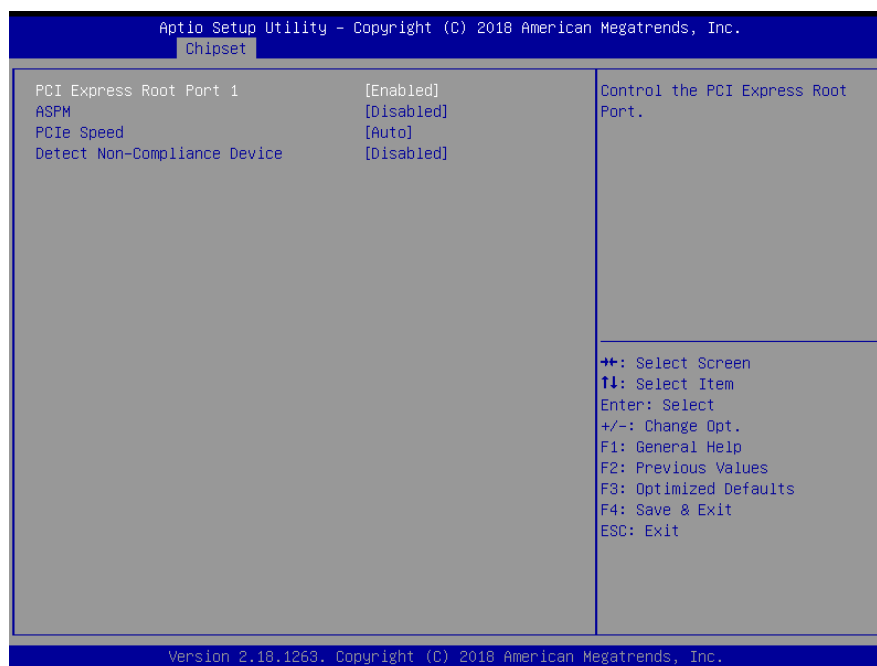
This section allows you to configure the chipset.



■ 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>.

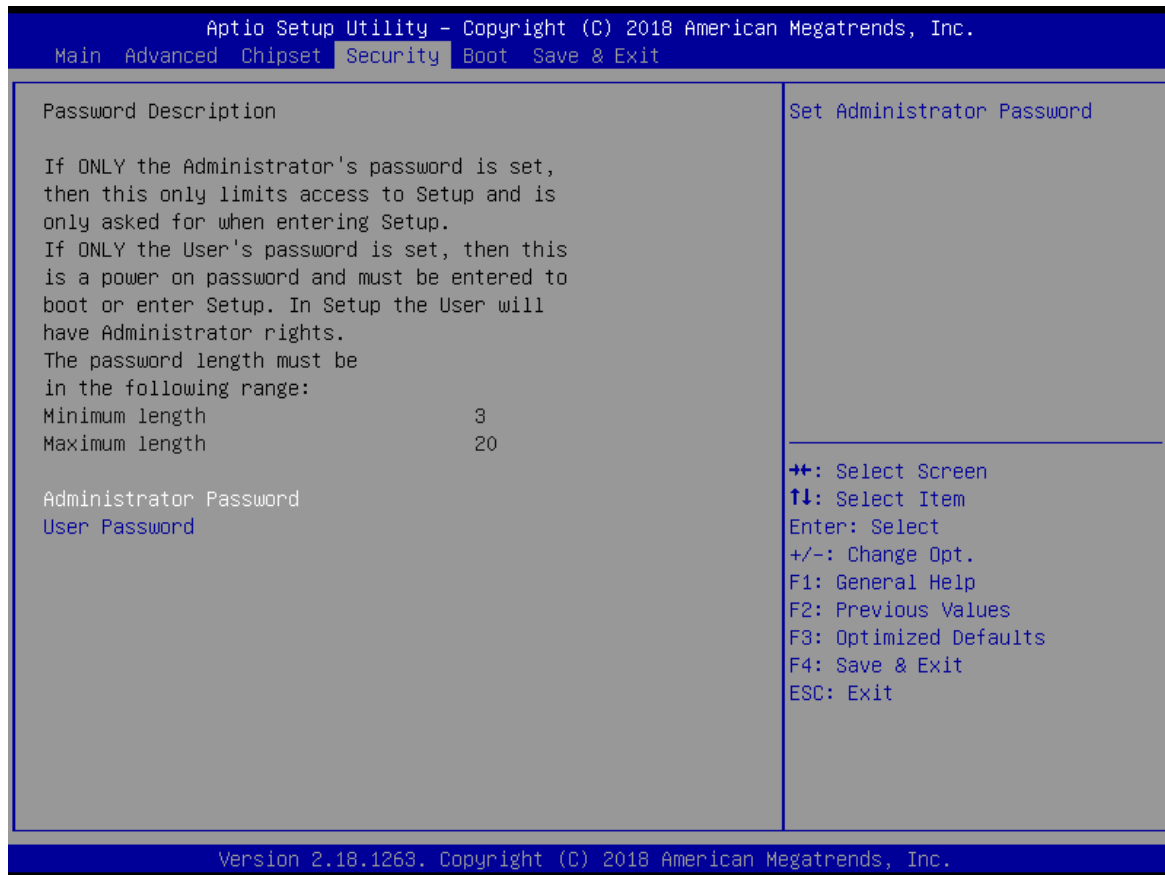
Disabled: Azalia will be unconditionally be disabled.

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

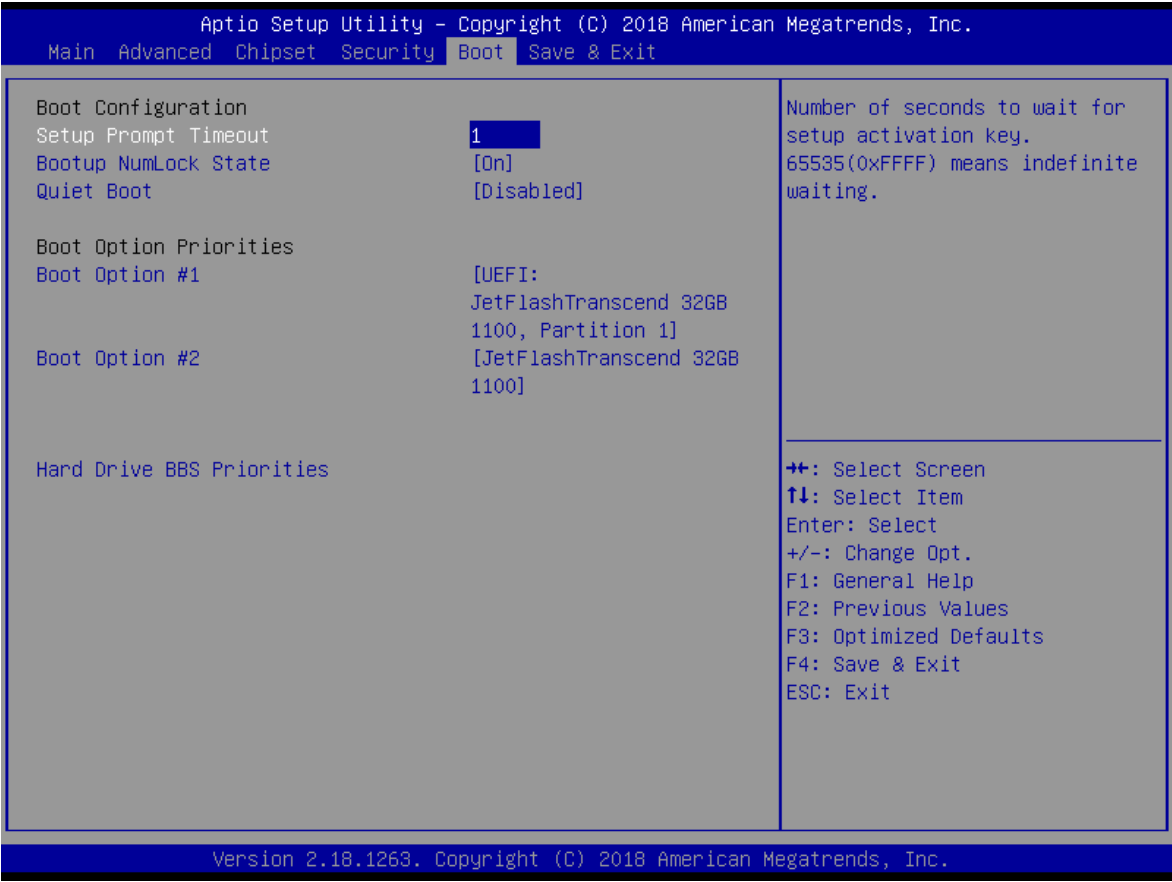
This item allows you to set Administrator Password.

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

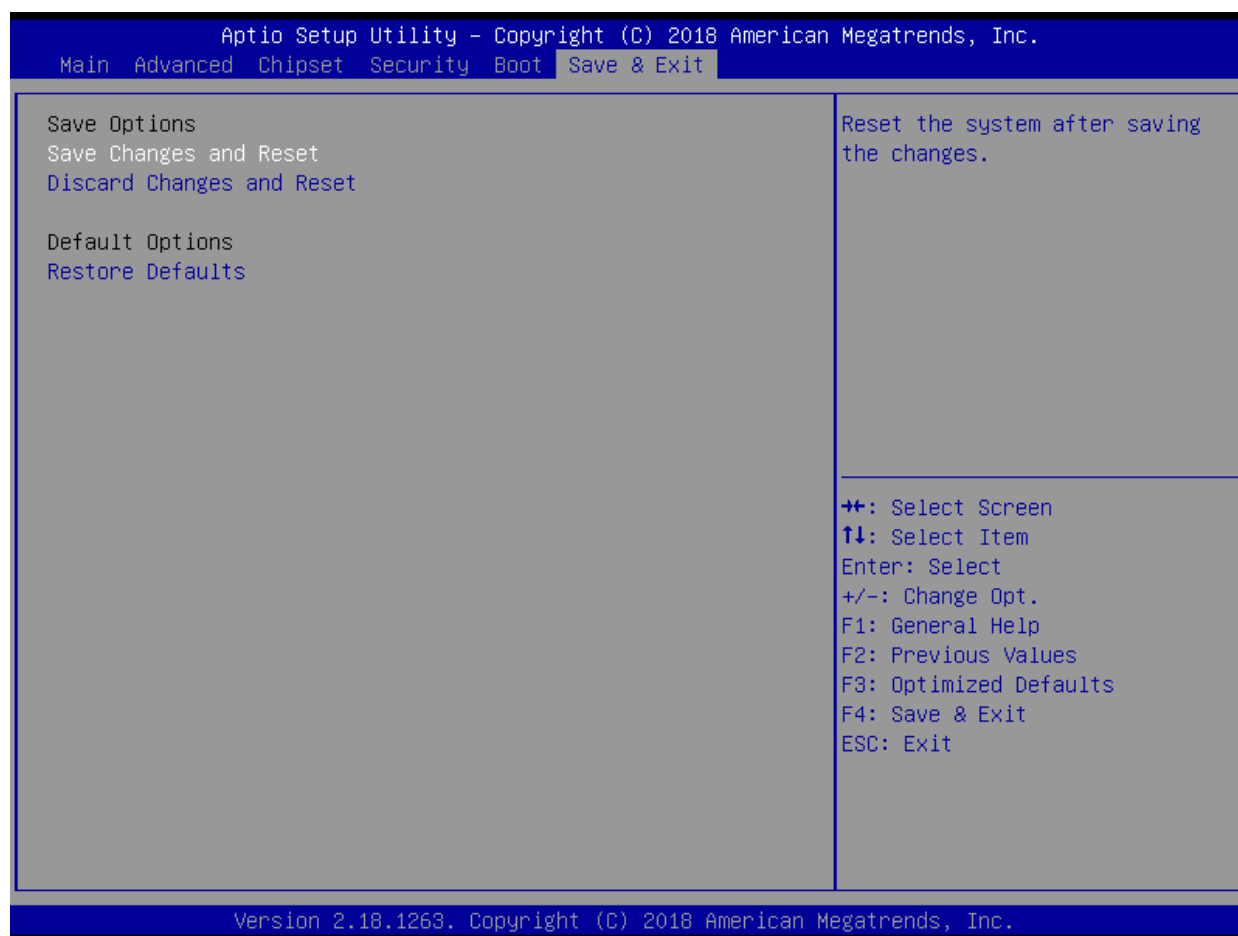
This item allows you to enable or disable Full Screen Logo Show function.

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);
```

