C&T SOLUTION INC.

USER'S MANUAL

VCO-3100 Series

Machine Vision System

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Prefaces

Revision

Revision	Description	Date
1.0	Manual Released	2018/10/15

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.candtsolution.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-3100 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-3100-J1900	Machine Vision System with Intel® Celeron® Processor J1900
VCO-3111E-J1900	Machine Vision System with Intel® Celeron® Processor J1900, 1x PCIe x4 Slot (1 Lane)
VCO-3111P-J1900	Machine Vision System with Intel® Celeron® Processor J1900, 1x PCI
VCO-3122E-J1900	Machine Vision System with Intel® Celeron® Processor J1900, 2x PCIe x4 Slot (1 Lane)
VCO-3122P-J1900	Machine Vision System with Intel® Celeron® Processor J1900, 2x PCI
VCO-3133P-J1900	Machine Vision System with Intel® Celeron® Processor J1900, 3x PCI
VCO-3144P-J1900	Machine Vision System with Intel® Celeron® Processor J1900, 4x PCI

Optional Accessories

Model No.	Product Description
1-E09A06007	Adapter AC/DC 12V 5A 60W with 3pin Terminal Block Plug 5.0mm Pitch
SFICBL022	Power Cord, 3-pin US Type, 180cm
1-TPCD00002	Power Cord, European Type, 180cm
1-TPCD00001	Power Cord, 3-pin UK Type, 180cm

Chapter 1

Product Introductions

1.1 Overview

Based on Intel® Celeron® J1900 (2.0GHz) Quad Core processor, VCO-3100 series is an extreme features integration, outstanding system performance, versatile I/O connections, and rugged reliability fanless embedded systems. It offers modularize expansion I/O, rich connectivity interfaces, wide range (9~50V) DC power input, and high reliability even operating in temperature extremes (-40°C ~ +70°C).Featuring with completely cable-less designed, high functional, one-piece housing design, and anti-vibration, VCO-3100 series are ruggedized systems that can operate in harsh environments and easy to install and maintain. A build in over voltage protection (OVP), over current protection (OCP), reserve voltage protection, and wide range DC power input makes VCO-3100 series are safety system for all industrial applications.

VCO-3100 VCO-3111E(P) VCO-3122E(P) VCO-3133P VCO-3144P

1.1.1 Key Features

- Intel® Celeron® processor J1900, up to 2.0GHz
- 1x 204-pin DDR3L SODIMM. max up to 8GB (un-bufferedand non-ECC)
- Dual independent display supported by 1x DVI-I and DisplayPort
- 2x Intel® GbE supporting Wake-on-LAN and PXE
- 2x Internal 2.5" SATA HDD bay
- 1x mSATA (shared by 1x Mini PCIe & SATA) or 1x CFast (shared by 1x mSATA & 1x SATA)
- 2x full-size mini PCIe for communication or expansion modules, 2x internal SIM socket
- Multiple expansion capability including PCIe, PCI, mini PCIe
- 2x External RS-232/422/485 Port, 4x Internal RS-232/422/485 Port
- 1x USB 3.0, 3x USB 2.0
- 1x PCIe x4 (1 Lane) expansion (VCO-3111E only)
- 2x PCIe x4 (1 Lane) expansion (VCO-3122E only)
- 1x PCI expansion (VCO-3111P only)
- 2x PCI expansion (VCO-3122P only)
- 3x PCI expansion (VCO-3133P only)
- 4x PCI expansion (VCO-3144P only)
- 8x Isolated DI, 8x Isolated DO
- 9 to 50VDC wide range power input supporting AT/ATX mode
- -40°C to 70°C extended operating temperature

1.2 Hardware Specification

Processor System
- Intel® Celeron® J1900 Quad Core Processor, 2MB Cache, 2.0 GHz with AMI 64Mbit SPI BIOS

Chipset
- SoC integrated

Memory
- 1x 204-Pin DDR3L-1066/ 1333MHz SO-DIMM (un-buffered and non-ECC), max. up to 8GB

Display
Dual Display
- 1x DVI-D and 1x VGA (w/ Optional Split Cable)
- 1x DVI-D and 1x DisplayPort
- 1x DisplayPort and 1x VGA (w/ DVI to VGA Adapter)

Expansion
- **VCO-3111E Series:** 1x PCIe x4 slot with 1-lane Gen2 PCIe Signal
- **VCO-3111P Series:** 1x PCI
- **VCO-3122E Series** : 2x PCIe x4 slot with 1-lane Gen2 PCIe Signal
- **VCO-3122P Series**: 2x PCI
- **VCO-3133P Series:** 3x PCI
- **VCO-3144P Series:** 4x PCI
- 2x Full-size Mini PCIe Socket for Wi-Fi / GSM / Expansion Module
- Card Dimension: 175 (L) x 112 (H) mm

Ethernet
- 2x Intel® i210-AT GbE LAN Port, Support Wake-on-LAN and PXE

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

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

Storage
- 2x Internal 2.5" SATA HDD Bay
- 1x mSATA Socket (shared by 1x Mini-PCIe & 1x SATA)
- 1x CFast (shared by 1x mSATA & 1x SATA)

I/O Ports
- 1x USB 3.0 Port
- 3x USB 2.0 Port
- 8 Isolated DI and 8 Isolated DO Port
- 2x DB9 Flow Control for COM1~2, Support RS232/422/485 with Auto Flow Control
- 4x Internal connector for COM3~6, Support RS232/422/485 with Auto Flow Control
- 2x Antenna Hole
- 1x Power Switch
- 1x AT/ATX Switch
- 1x Remote Power on/off Connector

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

Power
- Support AT, ATX Mode
- 1x 3-pin Terminal Block Connector with Power Input 9~50VDC
- 1x Optional AC/DC 12V/5A, 60W Power Adapter

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

Physical
- **VCO-3100 Series**
  - ✓ Dimension (WxDxH, mm): 59 x 197 x 185 mm
  - ✓ Weight: 3.28 kg
- **VCO-3111E(P)**
  - ✓ Dimension (WxDxH, mm): 99 x 197 x 185 mm
  - ✓ Weight: 3.31 ~ 3.37kg
- **VCO-3122E(P)**
  - ✓ Dimension (WxDxH, mm): 119 x 197 x 185 mm
  - ✓ Weight: 3.42 ~ 3.45 kg
- **VCO-3133P**
  - ✓ Dimension (WxDxH, mm): 139 x 197 x 185 mm
  - ✓ Weight: 4.22 kg
- **VCO-3144P**
  - ✓ Dimension (WxDxH, mm): 159 x 197 x 185 mm
  - ✓ Weight: 4.45 kg
- Construction: Extruded Aluminum with Heavy Duty Metal
- Mounting: Wall/ DIN-Rail Mounting

Operating System
- Windows® 10
- Windows® 7
- WES7
- Linux kernel 3.X

Certifications
- CE
- FCC Class A

1.3 System I/O

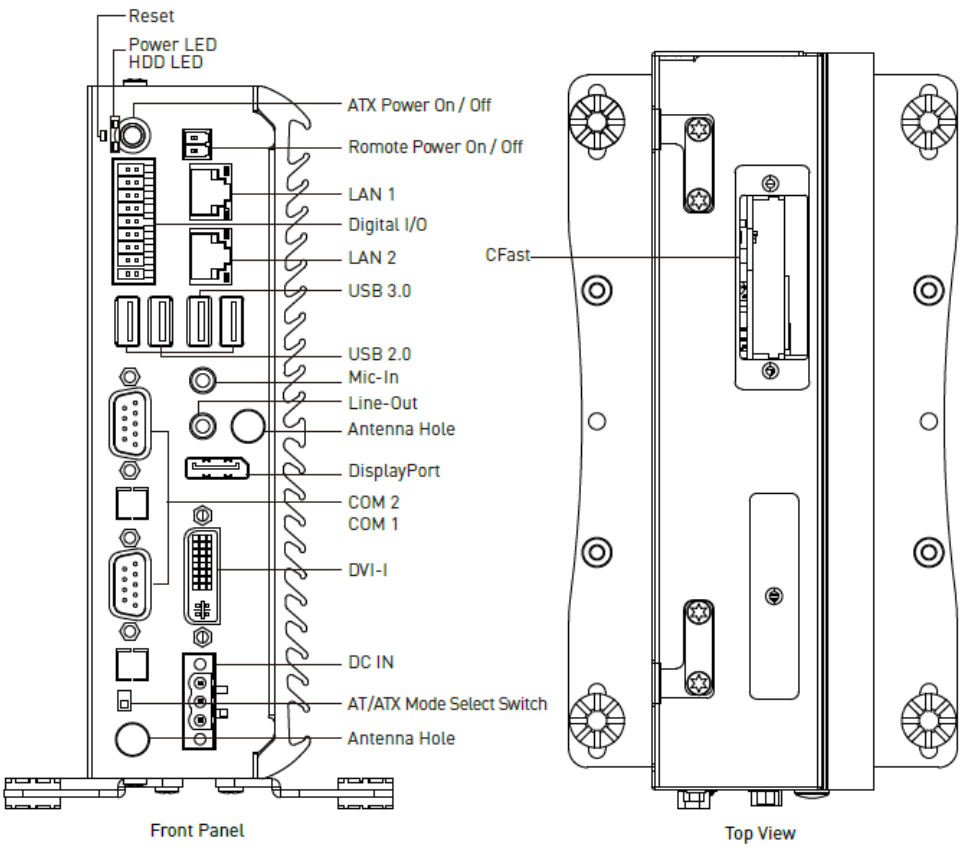
1.3.1 VCO-3100

Front Panel

ATX power on/off switch
Press to power-on or power-off the system
Reset switch
Press to reset the system
AT/ATX mode select switch
Used to select AT or ATX power mode
COM port
COM1 ~ COM2 support RS232/422/485 serial device
USB 3.0 port
Used to connect USB 3.0/2.0/1.1 device
USB 2.0 port
Used to connect USB 2.0/1.1 device
Power LED
Indicates the power status of the system
HDD LED
Indicates the status of the hard drive
DC IN
Used to plug a DC power input with terminal block
DVI-I port
Used to connect a DVI monitor or connect optional split cable for dual display mode
DisplayPort
Used to connect a DisplayPort monitor
LAN port
Used to connect the system to a local area network
Mic-in
Used to connect a microphone
Line-out
Used to connect a speaker
Digital I/O Terminal Block
The Digital I/O terminal block supports 8 digital input and 8 digital output
Remote Power on/off Terminal Block
Used to plug a remote power on/off terminal block
Antenna hole
Used to connect an antenna for optional Mini-PCIe WiFi module

Top View

CFast Socket
Used to insert CFast card



1.3 System I/O

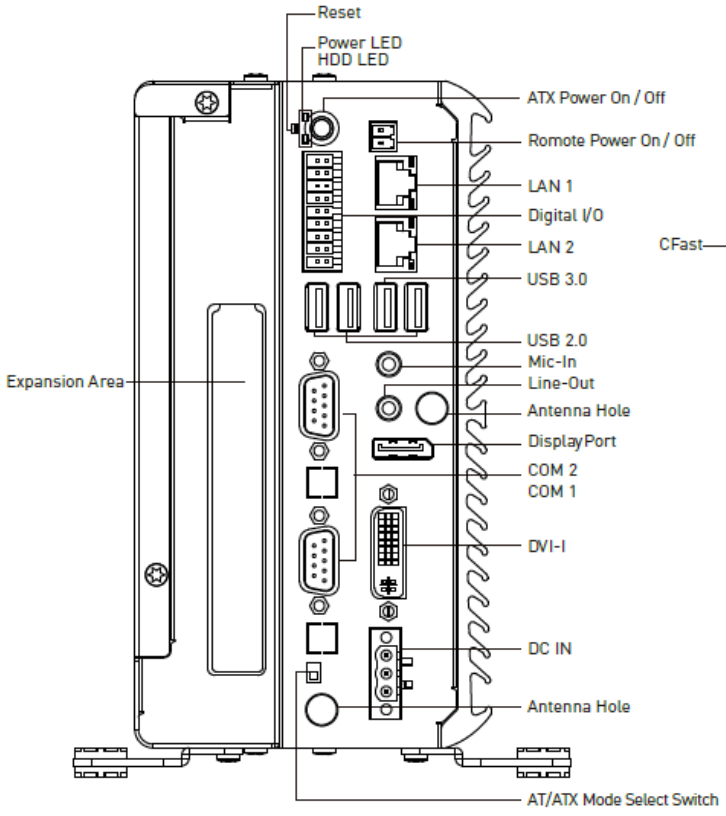
1.3.2 VCO-3111E(P)

Front Panel

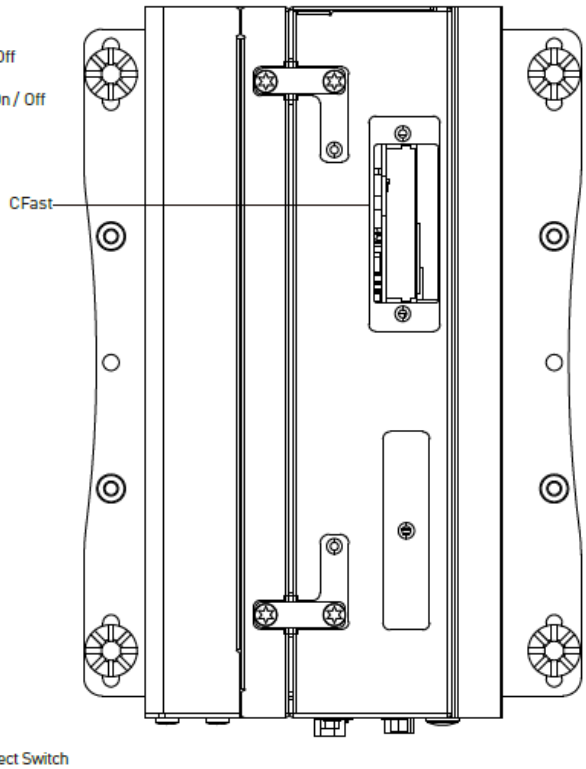
ATX power on/off switch
Press to power-on or power-off the system
Reset switch
Press to reset the system
AT/ATX mode select switch
Used to select AT or ATX power mode
COM port
COM1 ~ COM2 support RS232/422/485 serial device
USB 3.0 port
Used to connect USB 3.0/2.0/1.1 device
USB 2.0 port
Used to connect USB 2.0/1.1 device
Power LED
Indicates the power status of the system
HDD LED
Indicates the status of the hard drive
DC IN
Used to plug a DC power input with terminal block
DVI-I port
Used to connect a DVI monitor or connect optional split cable for dual display mode
Expansion Area
Used to plug PCIe or PCI card
DisplayPort
Used to connect a DisplayPort monitor
LAN port
Used to connect the system to a local area network
Mic-in
Used to connect a microphone
Line-out
Used to connect a speaker
Digital I/O Terminal Block
The Digital I/O terminal block supports 8 digital input and 8 digital output
Remote Power on/off Terminal Block
Used to plug a remote power on/off terminal block
Antenna hole
Used to connect an antenna for optional Mini-PCIe WiFi module

Top View

CFast Socket
Used to insert CFast card



Front Panel



Top View

1.3 System I/O

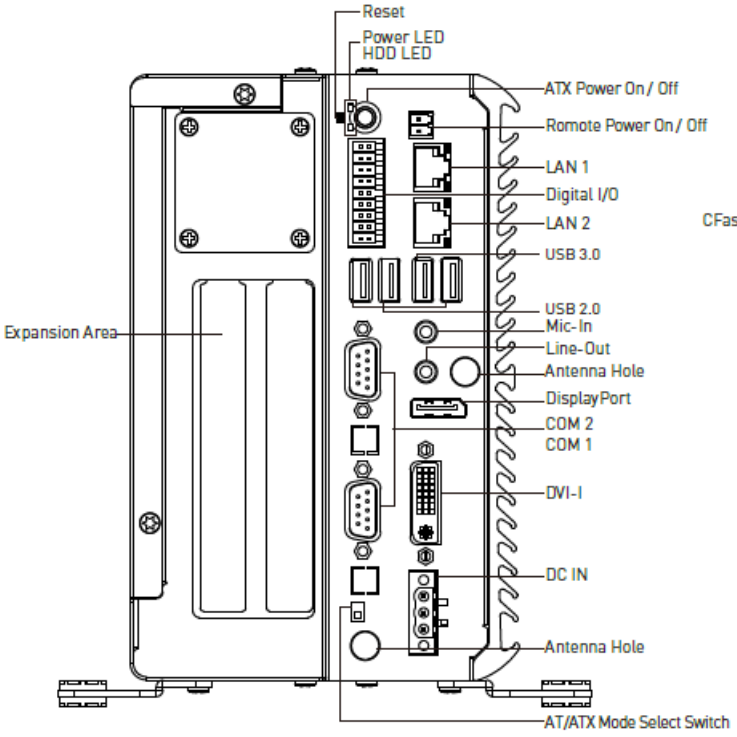
1.3.3 VCO-3122E(P)

Front Panel

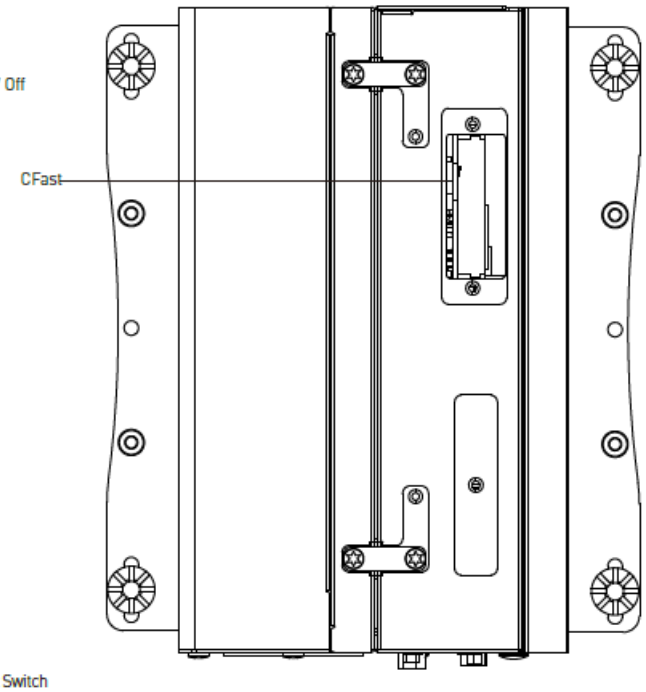
ATX power on/off switch
Press to power-on or power-off the system
Reset switch
Press to reset the system
AT/ATX mode select switch
Used to select AT or ATX power mode
COM port
COM1 ~ COM2 support RS232/422/485 serial device
USB 3.0 port
Used to connect USB 3.0/2.0/1.1 device
USB 2.0 port
Used to connect USB 2.0/1.1 device
Power LED
Indicates the power status of the system
HDD LED
Indicates the status of the hard drive
DC IN
Used to plug a DC power input with terminal block
DVI-I port
Used to connect a DVI monitor or connect optional split cable for dual display mode
Expansion Area
Used to plug PCIe or PCI card
DisplayPort
Used to connect a DisplayPort monitor
LAN port
Used to connect the system to a local area network
Mic-in
Used to connect a microphone
Line-out
Used to connect a speaker
Digital I/O Terminal Block
The Digital I/O terminal block supports 8 digital input and 8 digital output
Remote Power on/off Terminal Block
Used to plug a remote power on/off terminal block
Antenna hole
Used to connect an antenna for optional Mini-PCIe WiFi module

Top View

CFast Socket
Used to insert CFast card



Front Panel



Top View

1.3 System I/O

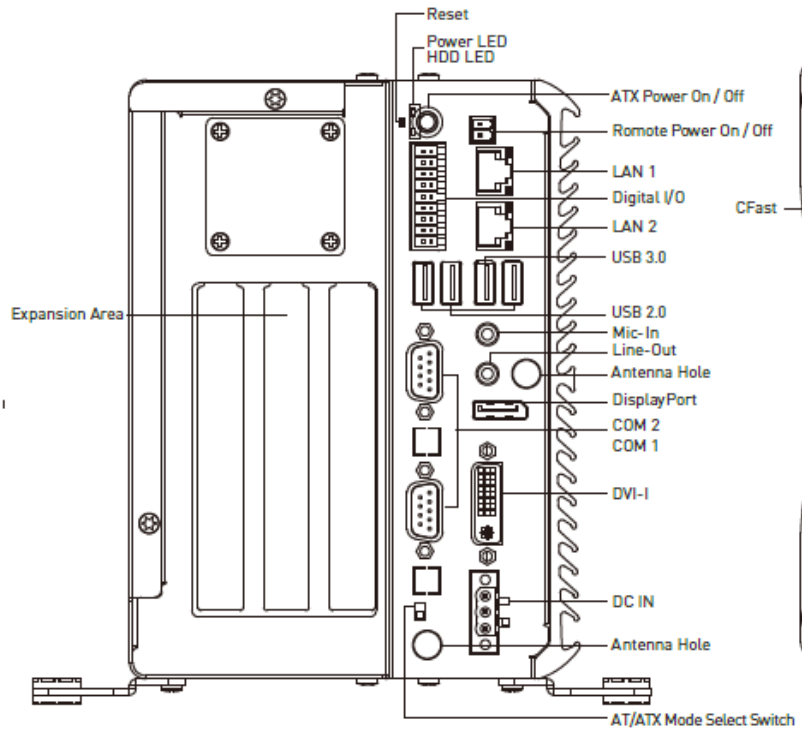
1.3.4 VCO-3133P

Front Panel

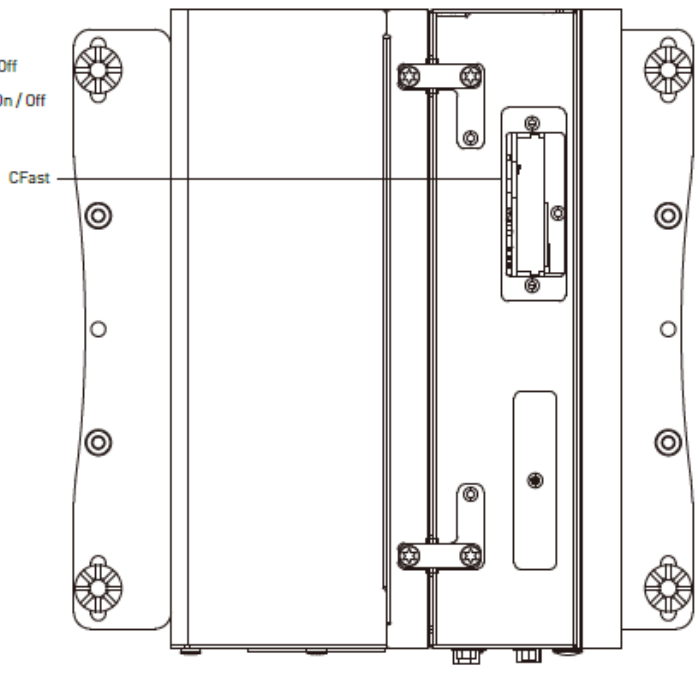
ATX power on/off switch
Press to power-on or power-off the system
Reset switch
Press to reset the system
AT/ATX mode select switch
Used to select AT or ATX power mode
COM port
COM1 ~ COM2 support RS232/422/485 serial device
USB 3.0 port
Used to connect USB 3.0/2.0/1.1 device
USB 2.0 port
Used to connect USB 2.0/1.1 device
Power LED
Indicates the power status of the system
HDD LED
Indicates the status of the hard drive
DC IN
Used to plug a DC power input with terminal block
DVI-I port
Used to connect a DVI monitor or connect optional split cable for dual display mode
Expansion Area
Used to plug PCI card
DisplayPort
Used to connect a DisplayPort monitor
LAN port
Used to connect the system to a local area network
Mic-in
Used to connect a microphone
Line-out
Used to connect a speaker
Digital I/O Terminal Block
The Digital I/O terminal block supports 8 digital input and 8 digital output
Remote Power on/off Terminal Block
Used to plug a remote power on/off terminal block
Antenna hole
Used to connect an antenna for optional Mini-PCIe WiFi module

Top View

CFast Socket
Used to insert CFast card



Front Panel



Top View

1.3 System I/O

1.3.5 VCO-3144P

Front Panel

ATX power on/off switch
Press to power-on or power-off the system
Reset switch
Press to reset the system
AT/ATX mode select switch
Used to select AT or ATX power mode
COM port
COM1 ~ COM2 support RS232/422/485 serial device
USB 3.0 port
Used to connect USB 3.0/2.0/1.1 device
USB 2.0 port
Used to connect USB 2.0/1.1 device
Power LED
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Used to plug a DC power input with terminal block
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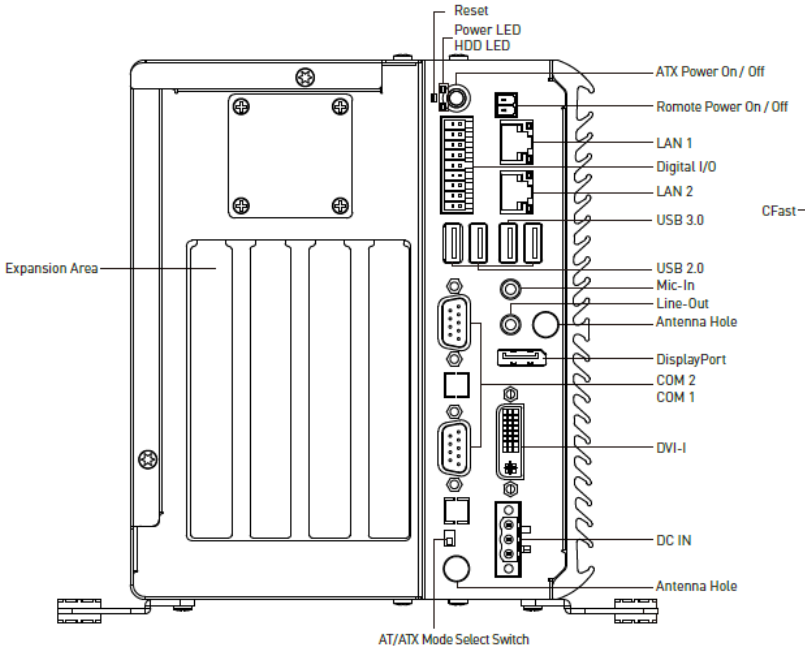
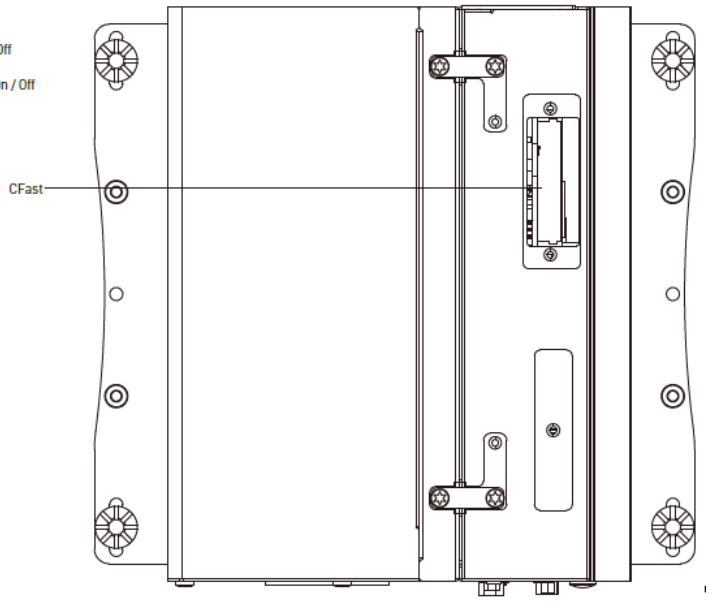
Used to plug a remote power on/off terminal block
Antenna hole
Used to connect an antenna for optional Mini-PCIe WiFi module

Top View

CFast Socket
Used to insert CFast card



Front Panel

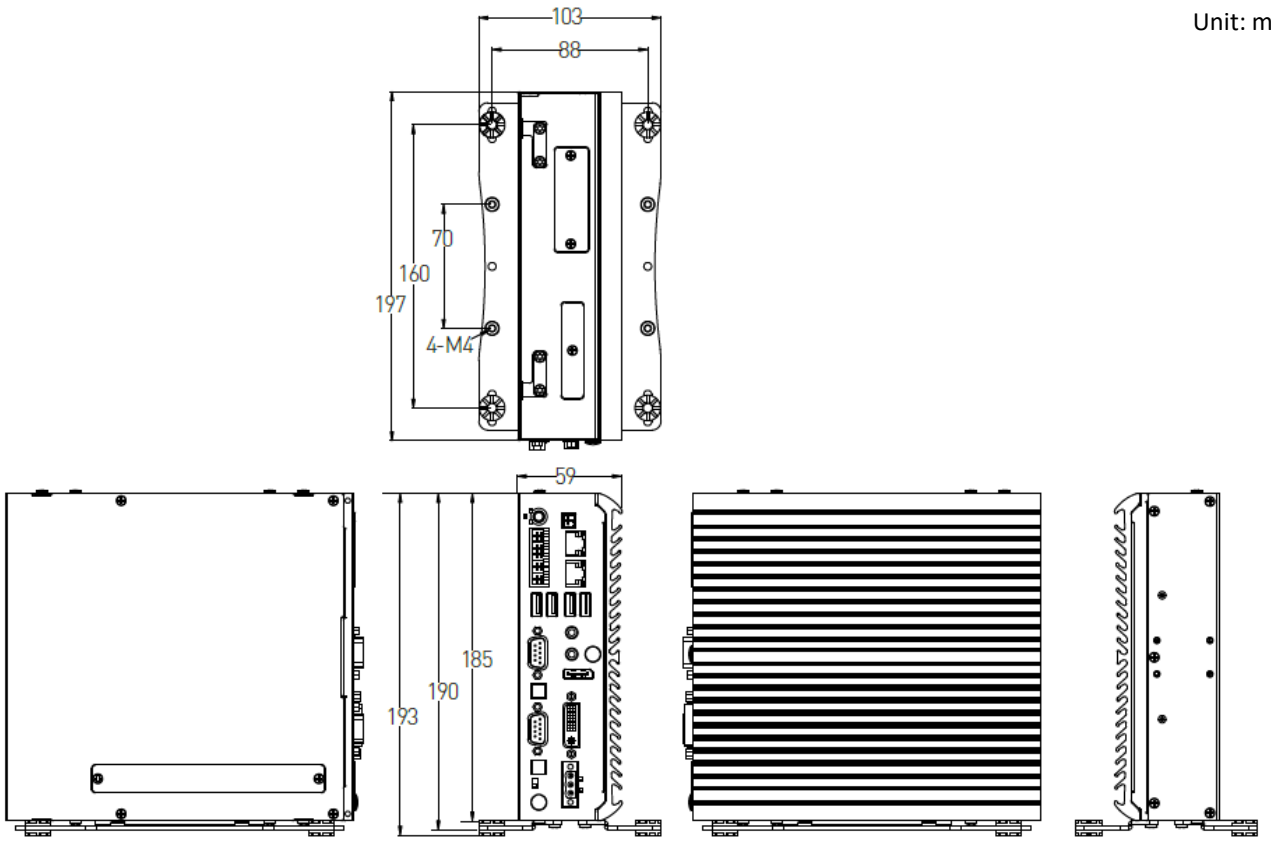


Top View

1.4 Mechanical Dimensions

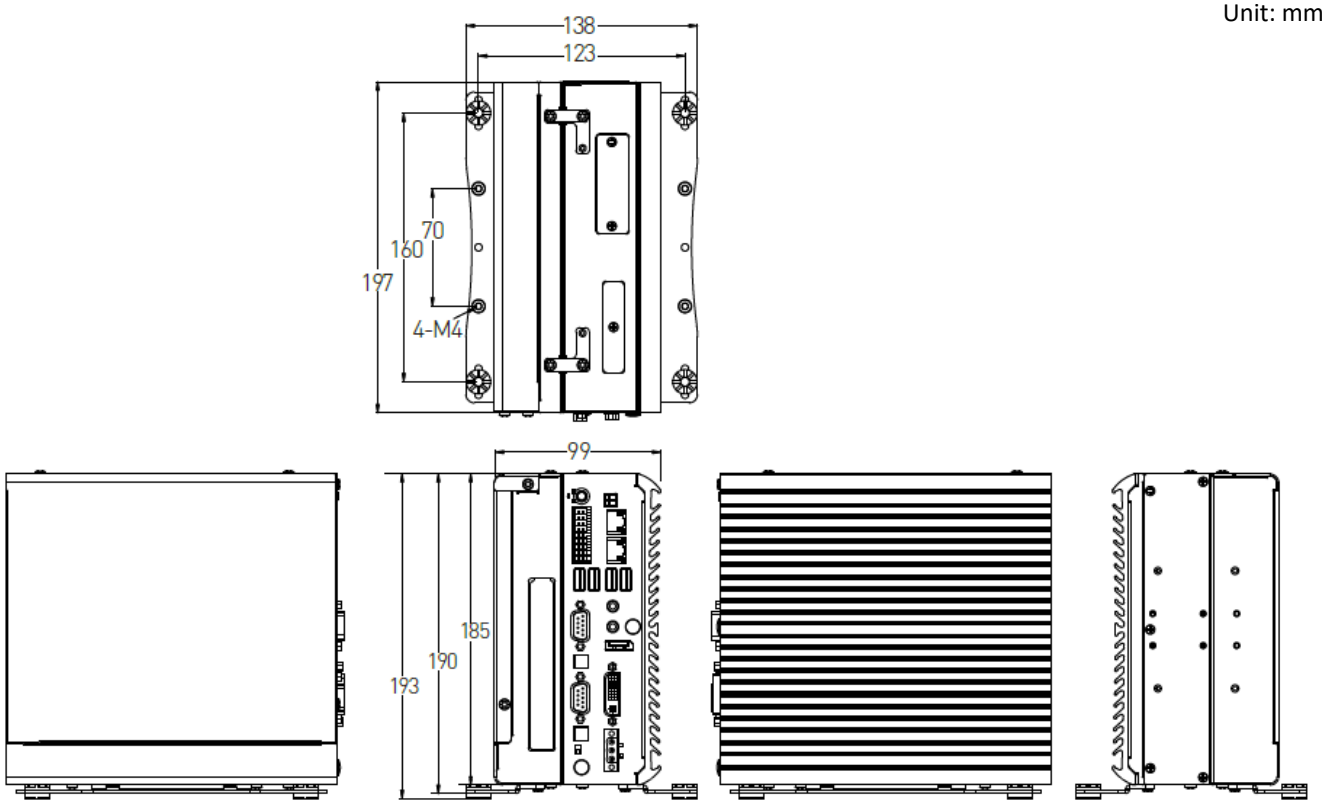
1.4.1 VCO-3100

Unit: mm



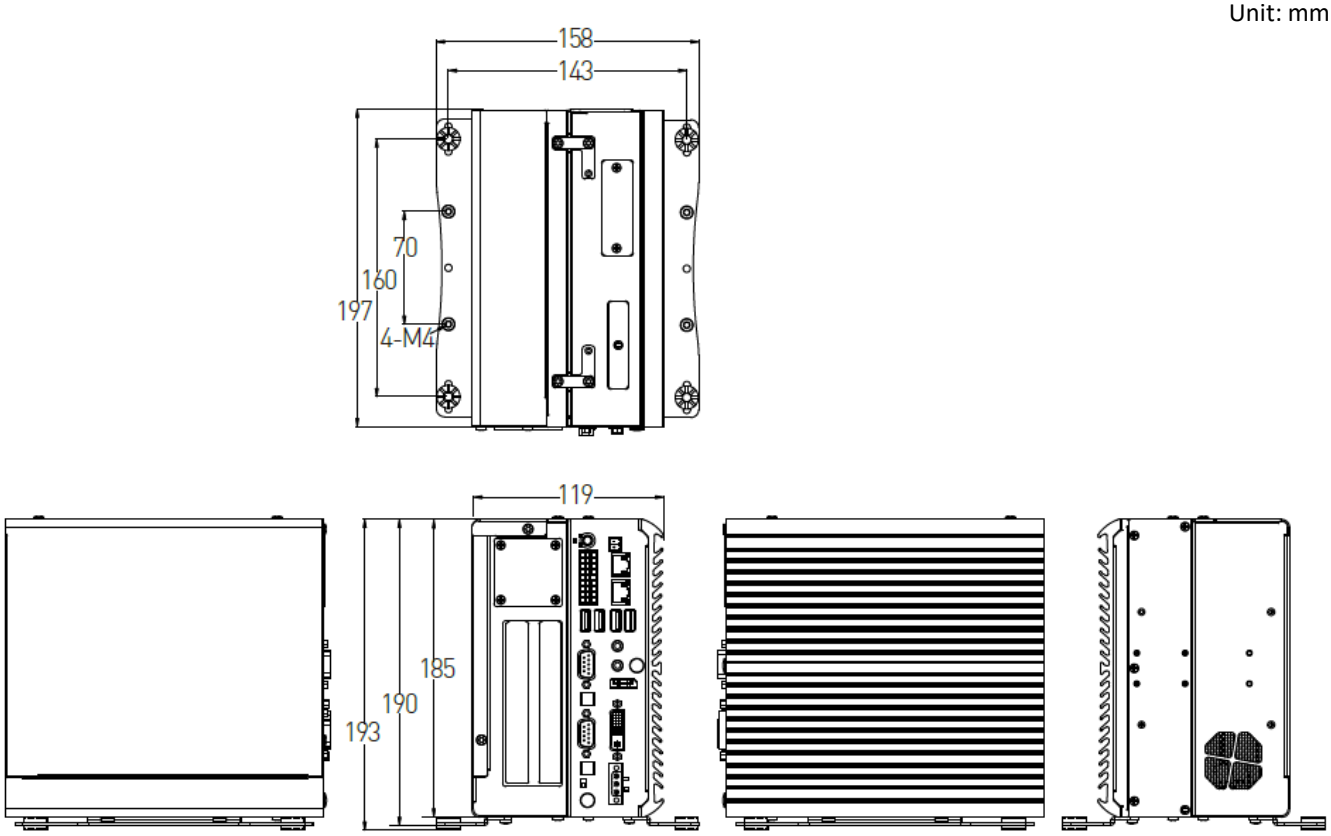
1.4.2 VCO-3111E(P)

Unit: mm



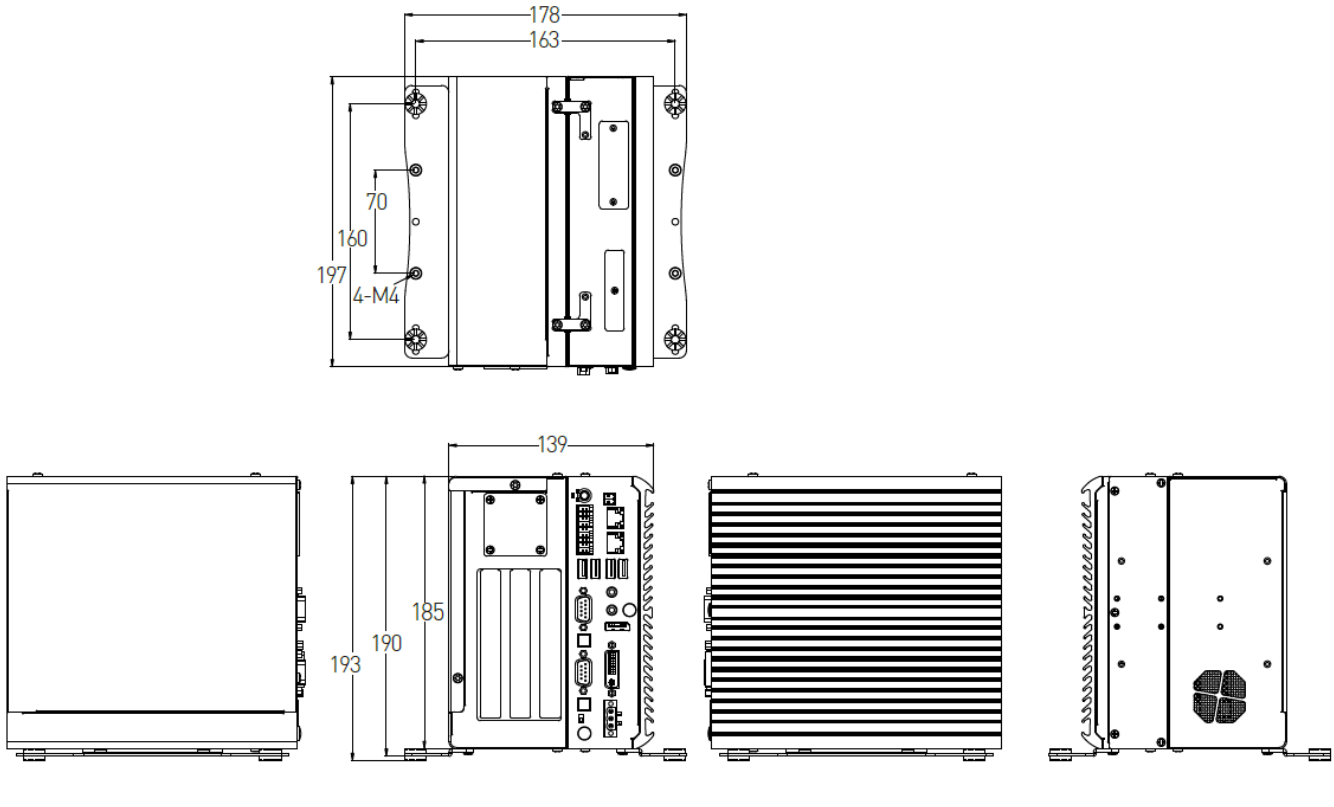
1.4.3 VCO-3122E(P)

Unit: mm



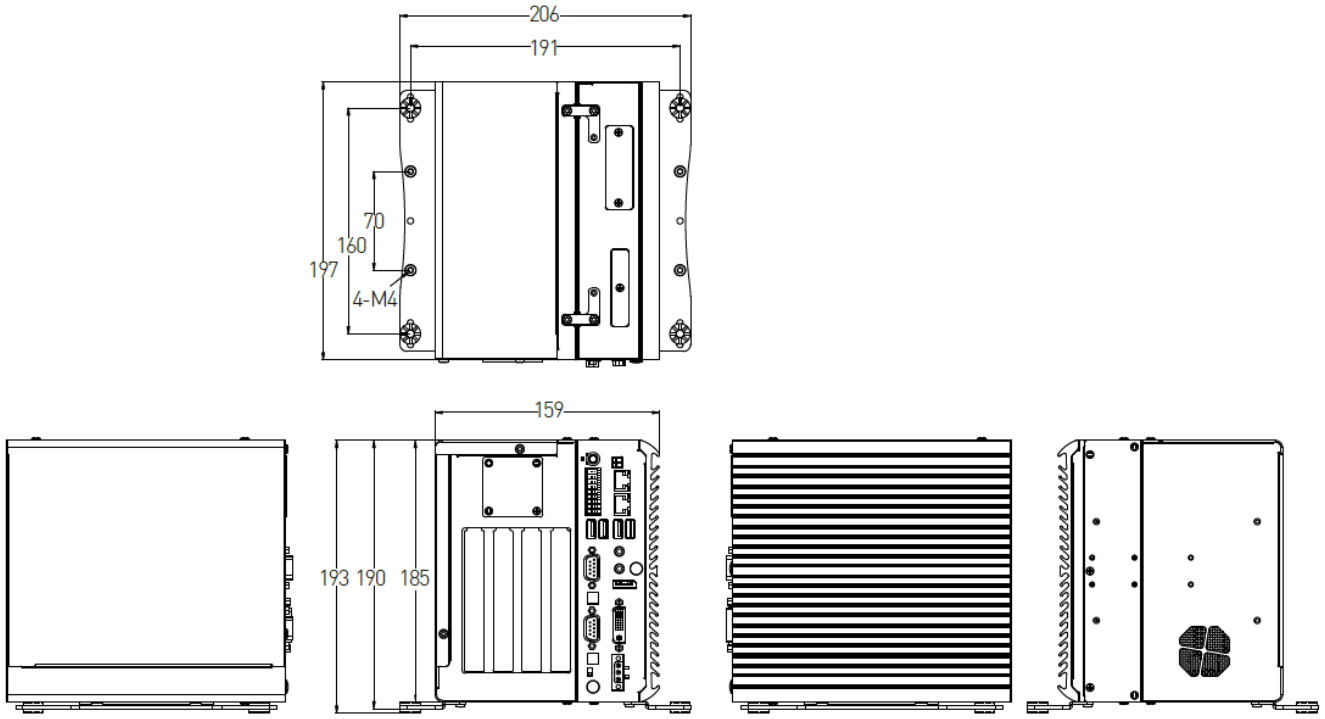
1.4.4 VCO-3133P

Unit: mm



1.4.5 VCO-3144P

Unit: mm

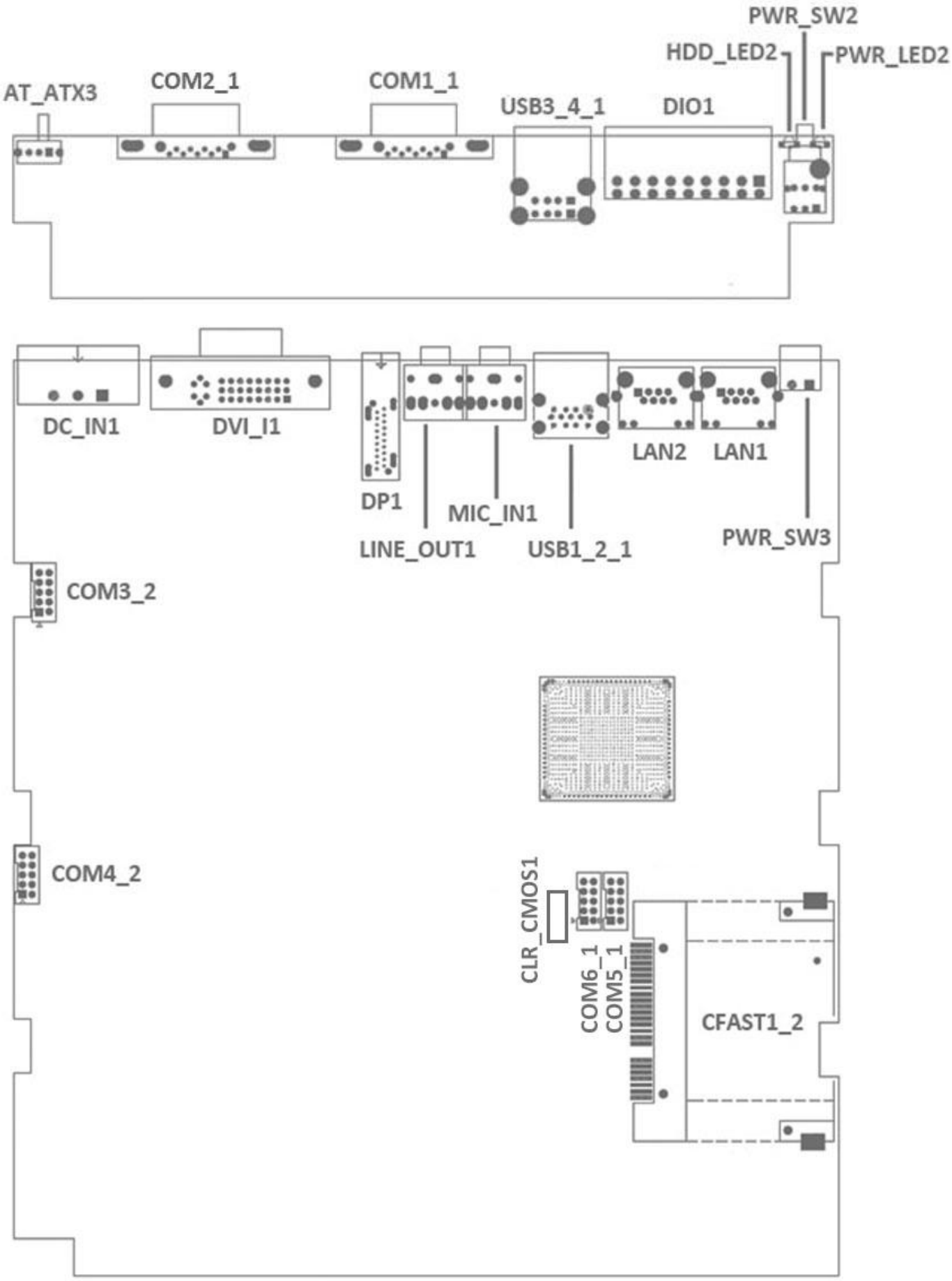


Chapter 2

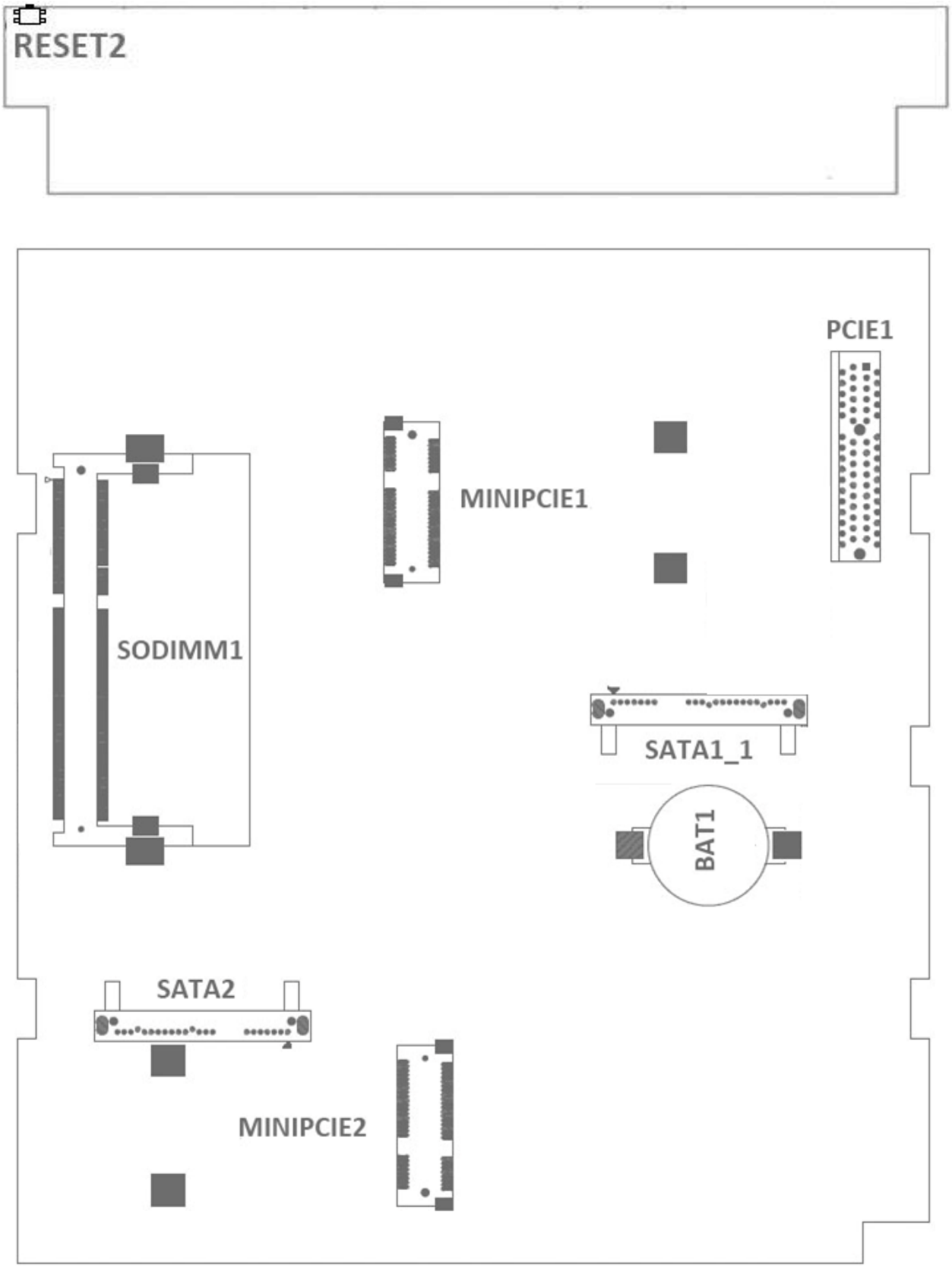
Switches and Connectors

2.1 Switch and Connector Locations

2.1.1 Top View



2.1.2 Bottom View



2.2 Connector / Switch Definition

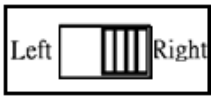
List of Connector / Switch

Connector Location	Definition
AT_ATX3	AT / ATX Power Mode Switch
CLR_CMOS1	Clear BIOS Switch
CFAST1_2	CFast Socket
PWR_SW2	Power Switch
RESET2	Reset Switch
USB1_2_1	USB 3.0 & USB 2.0 Port
USB3_4_1	USB 2.0 Port
COM1_1, COM2_1, COM3_2, COM4_2, COM5_1, COM6_1	RS232 / RS422 / RS485 Connector
LAN1, LAN2	LAN Port
DC_IN1	3-pin DC 9~50V Power Input Connector
DVI_I1	DVI-I Connector
DP1	DisplayPort Connector
LINE_OUT1	Line-out Jack
MIC_IN1	Mic-in Jack
DIO1	8DI / 8DO Connector
PWR_SW3	Remote Power Switch
MINIPCIE1	Mini PCI-Express / mSATA Socket
MINIPCIE2	Mini PCI-Express Socket
SATA1_1, SATA2	SATA with Power Connector
POWER1, POWER2	Power Connector
PCIE1	PCI-Express X4 Slot (1-lane)
PWR_LED1	Power LED Status
HDD_LED1	HDD Access LED Status

2.3 Switches Definitions

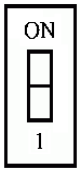
AT_ATX3: AT / ATX Power Mode Switch

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



CLR_CMOS1: Clear BIOS Switch

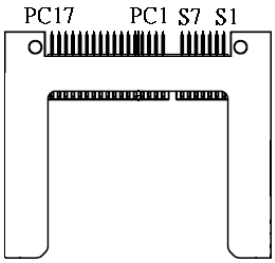
Switch	Definition
Off	Normal Status (Default)
ON	Clear BIOS



2.4 Connectors Definitions

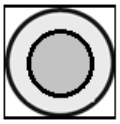
CFAST1_2: CFast Socket

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



PWR_SW2: Power Button

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

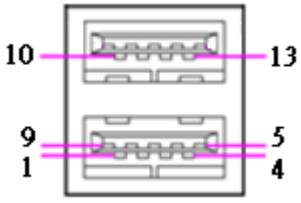


RESET2 : Reset Button

Pin	Definition
1	RESET
2	GND

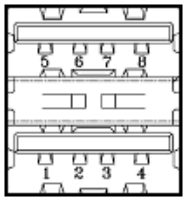
USB1_2_1: USB3.0 & USB2.0 Connector, Type A

Pin	Definition	Pin	Definition
1	+5V	10	+5V
2	USB2_D0-	11	USB2_D1-
3	USB2_D0+	12	USB2_D1+
4	GND	13	GND
5	USB3_RX0-		
6	USB3_RX0+		
7	GND		
8	USB3_TX0-		
9	USB3_TX0+		



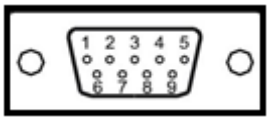
USB3_4_1: USB2.0 Connector, Type A

Pin	USB3_4_1 Definition
1	+5V
2	USB2_D2-
3	USB2_D2+
4	GND
5	+5V
6	USB2_D3-
7	USB2_D3+
8	GND



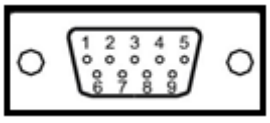
COM1_1: RS232 / RS422 / RS485 Connector
Connector Type: 9-pin D-Sub

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_1: RS232 / RS422 / RS485 Connector
Connector Type: 9-pin D-Sub

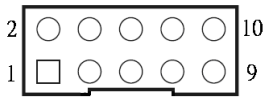
Pin	RS232 Definition	RS422 / 485 Full Duplex Definition	RS485 Half Duplex Definition
1	DCD2	TX2-	DATA2-
2	RXD2	TX2+	DATA2+
3	TXD2	RX2+	
4	DTR2	RX2-	
5	GND	GND	GND
6	DSR2		
7	RTS2		
8	CTS2		
9	RI2		



COM3_2： RS232 / RS422 / RS485 Connector

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

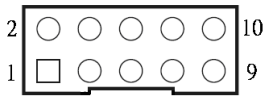
COM3_1			
Pin	**RS232 Definition**	**RS422 / 485 Full Duplex Definition**	**RS485 Half Duplex Definition**
1	DCD3	TX3-	DATA3-
2	RXD3	TX3+	DATA3+
3	TXD3	RX3+	
4	DTR3	RX3-	
5	GND	GND	GND
6	DSR3		
7	RTS3		
8	CTS3		
9	RI3		



COM4_2： RS232 / RS422 / RS485 Connector

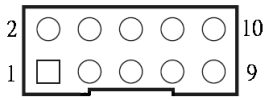
Connector Type: 2X5 10-pin box header, 2.54mm pitch

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		



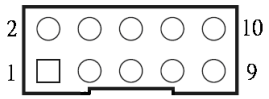
COM5_1： RS232 / RS422 / RS485 Connector
Connector Type: 2X5 10-pin box header, 2.54mm pitch

COM3_1			
Pin	**RS232 Definition**	**RS422 / 485 Full Duplex Definition**	**RS485 Half Duplex Definition**
1	DCD5	TX5-	DATA5-
2	RXD5	TX5+	DATA5+
3	TXD5	RX5+	
4	DTR5	RX5-	
5	GND	GND	GND
6	DSR5		
7	RTS5		
8	CTS5		
9	RI5		



COM6_1： RS232 / RS422 / RS485 Connector
Connector Type: 2X5 10-pin box header, 2.54mm pitch

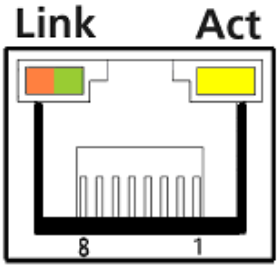
COM4_1			
Pin	**RS232 Definition**	**RS422 / 485 Full Duplex Definition**	**RS485 Half Duplex Definition**
1	DCD6	TX6-	DATA6-
2	RxD6	TX6+	DATA6+
3	TxD6	RX6+	
4	DTR6	RX6-	
5	GND	GND	GND
6	DSR6		
7	RTS6		
8	CTS6		
9	RI6		



LAN1, LAN2: RJ45 with LEDs Port

Connector Type: RJ45 Connector

Pin	Definition	Pin	Definition
1	LAN1_MDI0P	5	LAN1_MDI2N
2	LAN1_MDI0N	6	LAN1_MDI1N
3	LAN1_MDI1P	7	LAN1_MDI3P
4	LAN1_MDI2P	8	LAN1_MDI3N



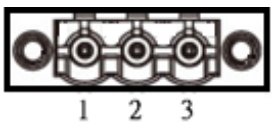
Pin	Definition	Pin	Definition
1	LAN2_MDI0P	5	LAN2_MDI2N
2	LAN2_MDI0N	6	LAN2_MDI1N
3	LAN2_MDI1P	7	LAN2_MDI3P
4	LAN2_MDI2P	8	LAN2_MDI3N

Link LED Status	Definition	Act LED Status	Definition
Steady Orange	1Gbps Network Link	Blinking Yellow	Data Activity
Steady Green	100Mbps Network Link	Off	No Activity
Off	10Mbps Network Link		

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

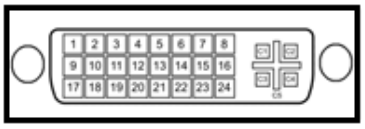
Connector Type: Terminal Block 1X3 3-pin, 5.0mm pitch

Pin	Definition
1	+9~50VIN
2	Power Ignition
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	DP_LANE0_P	11	GND
2	GND	12	DP_LANE3_N
3	DP_LANE0_N	13	GND
4	DP_LANE1_P	14	GND
5	GND	15	DP_AUX_P
6	DP_LANE1_N	16	GND
7	DP_LANE2_P	17	DP_AUX_N
8	GND	18	DP_HPD
9	DP_LANE2_N	19	GND
10	DP_LANE3_P	20	DP_PWR

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

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

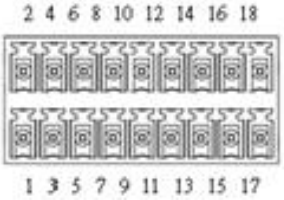
MIC_IN1: Microphone Jack (Pink)
Connector Type: 5-pin Phone Jack

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

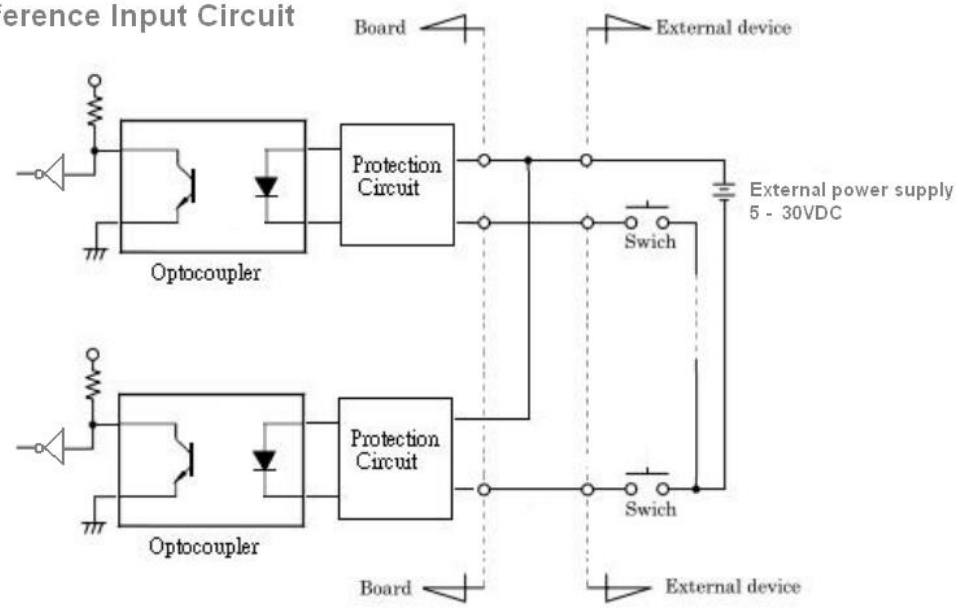
DIO1: Digital Input / Output Connector

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

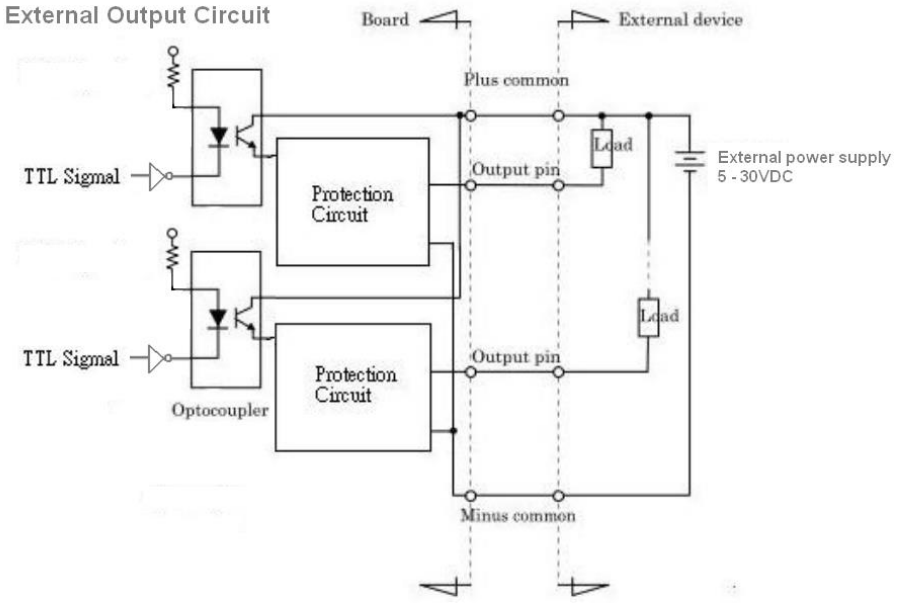
Pin	Definition	Pin	Definition
1	DI1	2	DO1
3	DI2	4	DO2
5	DI3	6	DO3
7	DI4	8	DO4
9	DI5	10	DO5
11	DI6	12	DO6
13	DI7	14	DO7
15	DI8	16	DO8
17	External DC INPUT	18	External GND

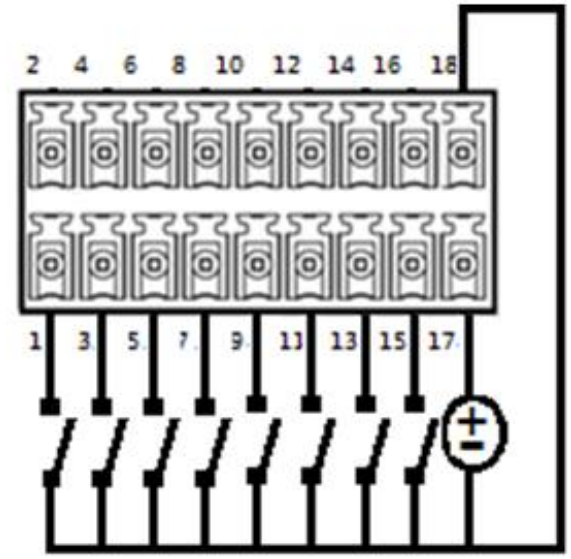


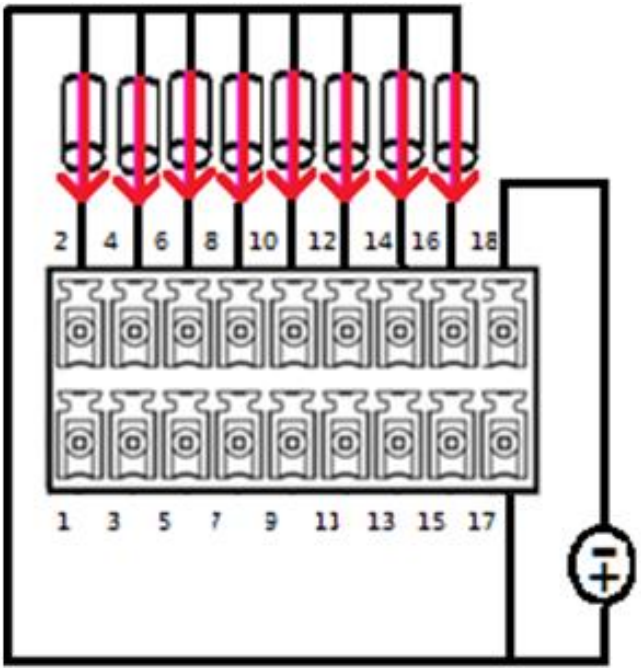
Reference Input Circuit



External Output Circuit

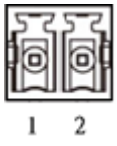






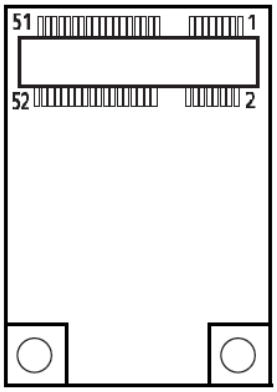
PWR_SW3 : Remote Power Switch
Connector Type: Terminal Block 1X2 2-pin, 3.5mm pitch

Pin	Definition
1	Power Button
2	GND



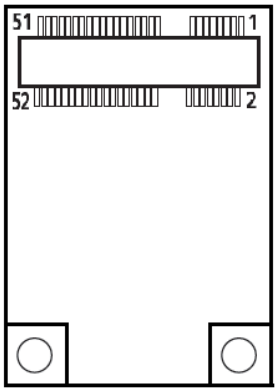
MINIPCIE1: Mini PCI-Express / mSATA Socket

Pin	Definition	Pin	Definition	Pin	Definition
1	WAKE#	19	NC	37	GND
2	+3.3V	20	+3.3V	38	USB_D4+
3	NC	21	GND	39	+3.3V
4	GND	22	PCIE RST#	40	GND
5	NC	23	PCIE_RXN3 (SATA_RXN1)	41	+3.3V
6	+1.5V	24	+3.3V	42	NC
7	CLKREQ3#	25	PCIE_RXP3 (SATA_RXP1)	43	GND
8	USIM1_VCC	26	GND	44	NC
9	GND	27	GND	45	NC
10	USIM1_DATA	28	+1.5V	46	NC
11	PCIE_CLKN3	29	GND	47	NC
12	USIM1_CLK	30	SMB_CLK	48	+1.5V
13	PCIE_CLKP3	31	PCIE_TXN3 (SATA_TXN1)	49	NC
14	USIM1_RST	32	SMB_DATA	50	GND
15	GND	33	PCIE_TXP3 (SATA_TXP1)	51	NC
16	USIM1_VPP	34	GND	52	+3.3V
17	NC	35	GND		
18	GND	36	USB_D4-		



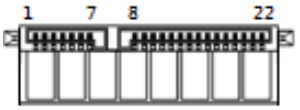
MINIPCIE2: Mini PCI-Express

Pin	Definition	Pin	Definition	Pin	Definition
1	WAKE#	19	NC	37	GND
2	+3.3V	20	+3.3V	38	USB_D6+
3	NC	21	GND	39	+3.3V
4	GND	22	MINIPCIE RST#	40	GND
5	NC	23	PCIE_RXN4	41	+3.3V
6	+1.5V	24	+3.3V	42	NC
7	CLKREQ4#	25	PCIE_RXP4	43	GND
8	USIM2_VCC	26	GND	44	NC
9	GND	27	GND	45	NC
10	USIM2_DATA	28	+1.5V	46	NC
11	PCIE_CLKN4	29	GND	47	NC
12	USIM2_CLK	30	SMB_CLK	48	+1.5V
13	PCIE_CLKP4	31	PCIE_TXN4	49	NC
14	USIM2_RST	32	SMB_DATA	50	GND
15	GND	33	PCIE_TXP4	51	NC
16	USIM2_VPP	34	GND	52	+3.3V
17	NC	35	GND		
18	GND	36	USB_D6-		



SATA1_1, SATA2: SATA with Power Connector

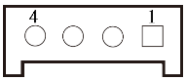
Pin	SATA1_1 Definition	Pin	SATA1_1 Definition	Pin	SATA2 Definition	Pin	SATA2 Definition
1	GND	12	GND	1	GND	12	GND
2	SATA_TXP0	13	GND	2	SATA_TXP1	13	GND
3	SATA_TXN0	14	+5V	3	SATA_TXN1	14	+5V
4	GND	15	+5V	4	GND	15	+5V
5	SATA_RXN0	16	+5V	5	SATA_RXN1	16	+5V
6	SATA_RXP0	17	GND	6	SATA_RXP1	17	GND
7	GND	18	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



POWER1, POWER2: Power Connector

Connector Type: 1X4-pin Wafer, 2.0mm pitch

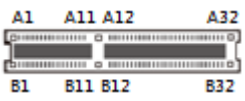
Pin	Definition
1	+5V
2	GND
3	GND
4	+12V



PCIE1: PCI-Express X4 Socket (1-lane)

Connector Type: PCI-Express X4 Slot

Pin	Definition	Pin	Definition	Pin	Definition	Pin	Definition
A1	PCIE_PRSNT1	A17	PCIE_RXN4	B1	+12V	B17	PRSNT2_1
A2	+12V	A18	GND	B2	+12V	B18	GND
A3	+12V	A19		B3	+12V	B19	
A4	GND	A20		B4	GND	B20	
A5	NC	A21		B5	SMB_CLK	B21	
A6	NC	A22		B6	SMB_DATA	B22	
A7	NC	A23		B7	GND	B23	
A8	NC	A24		B8	+3.3V	B24	
A9	+3.3V	A25		B9	NC	B25	
A10	+3.3V	A26		B10	+3.3VSB	B26	
A11	PCIE_RESET#	A27		B11	PCIE_WAKE#	B27	
A12	GND	A28		B12	NC	B28	
A13	PCIE_CLKP	A29		B13	GND	B29	
A14	PCIE_CLKN	A30		B14	PCIE_TXP4	B30	
A15	GND	A31		B15	PCIE_TXN4	B31	
A16	PCIE_RXP4	A32		B16	GND	B32	



PWR_LED1: Power LED Status

Pin	Definition
1	POWER LED+
2	POWER LED-

HDD_LED1: HDD Access LED Status

Pin	Definition
1	HDD LED+
2	HDD LED-

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 bottom cover

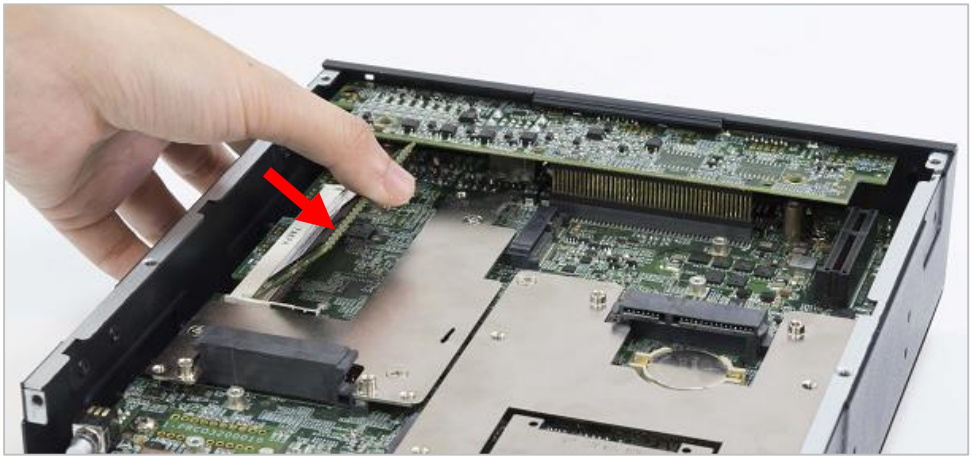
1. Unscrew the 4 screws on the connecting side of computing module.

2. Now you can remove the bottom cover following the below direction.

3.4 Installing SODIMM

1. Place the system body with SODIMM socket facing upward.

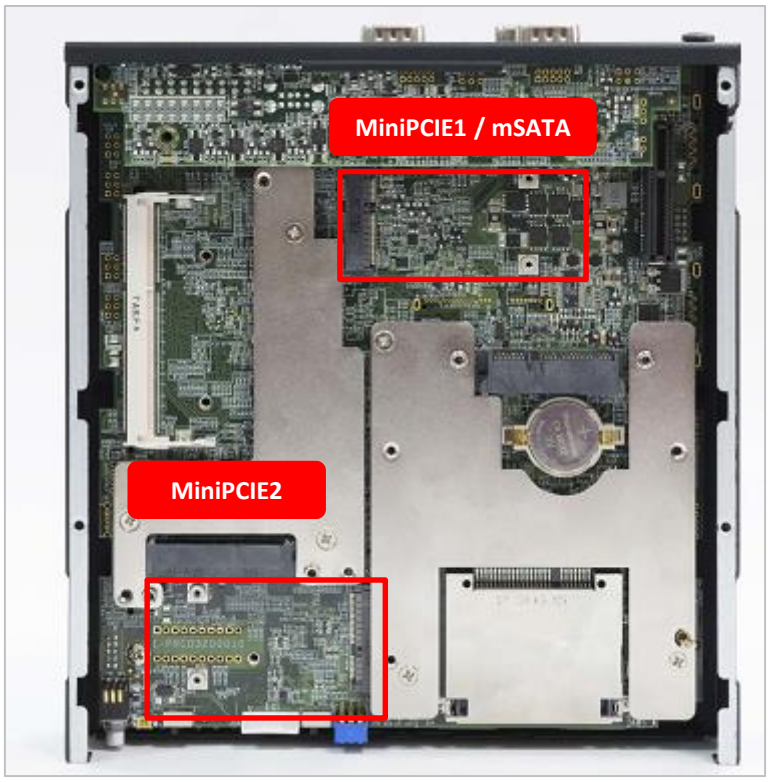
2. Insert memory module from 45 degree direction.



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

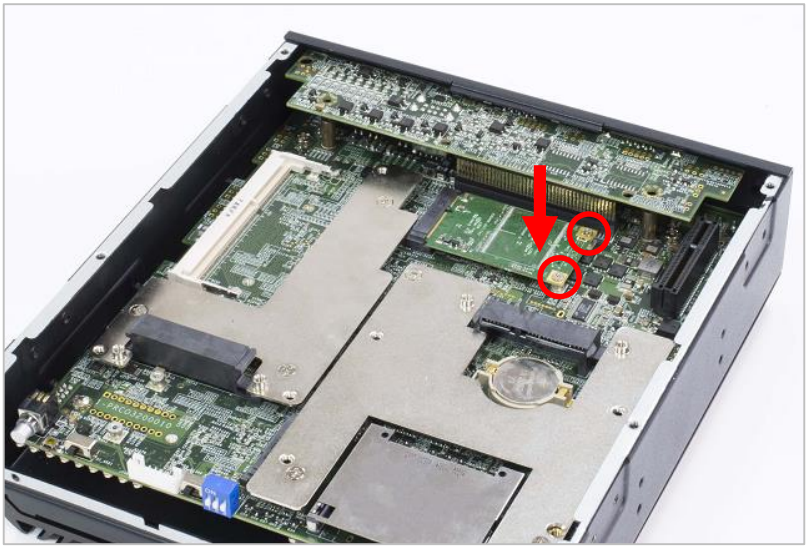
3.5 Installing mini PCIe card / mSATA

1. Two mini PCIe slots are available for VCO-3100 series. MiniPCIE1 supports mSATA.



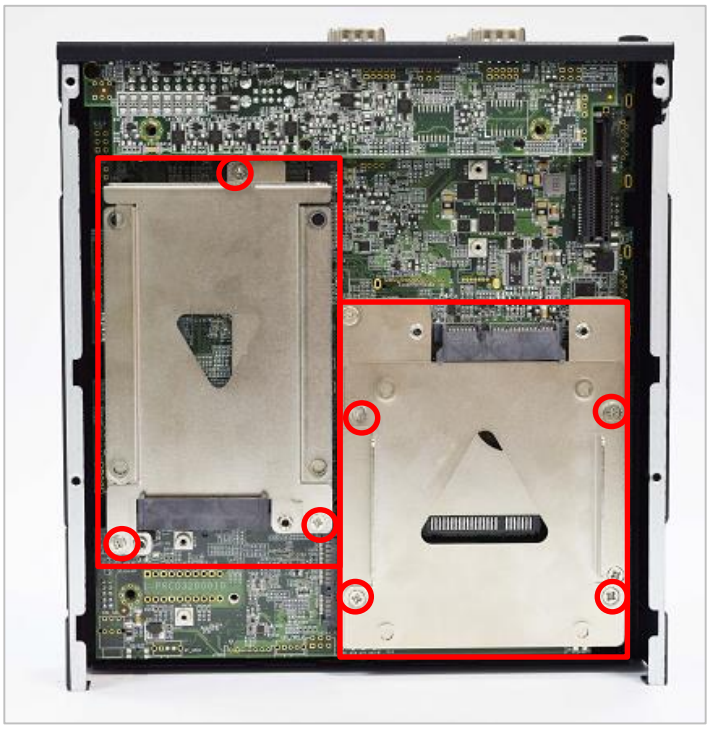
2. Insert mini PCIe card or mSATA module from 45 degree direction.

3. Press the mini PCIe card or mSATA module down and lock it with two screws (M2x3.7L).

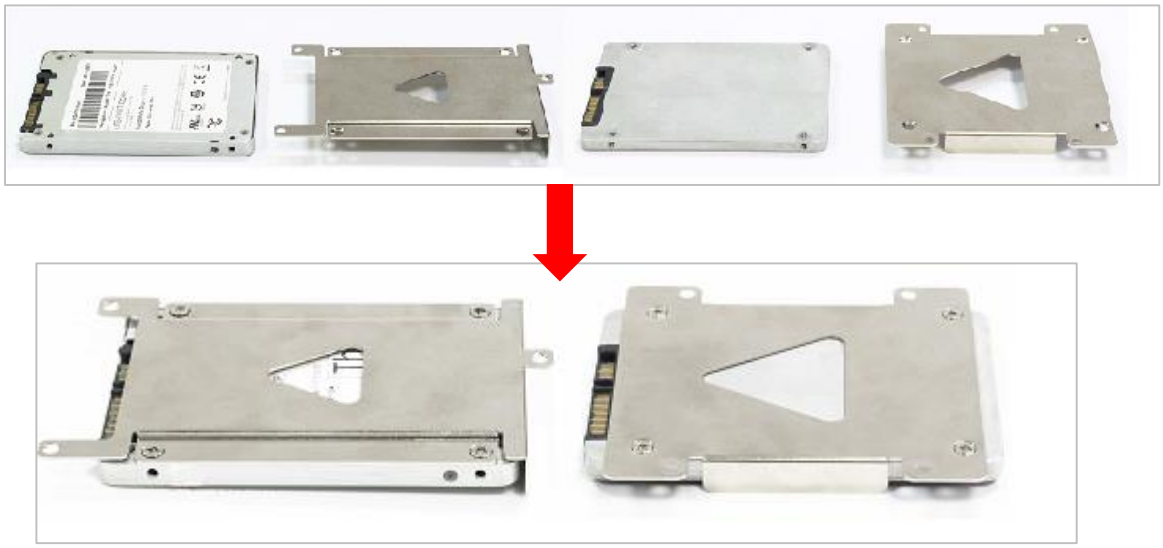


3.6 Installing HDD on internal SATA HDD bay

1. Two internal SATA HDD bays are available for VCO-3100 Series.
2. The screws circled below (M3x5L) need to be removed in order to take out the internal SATA HDD bay.

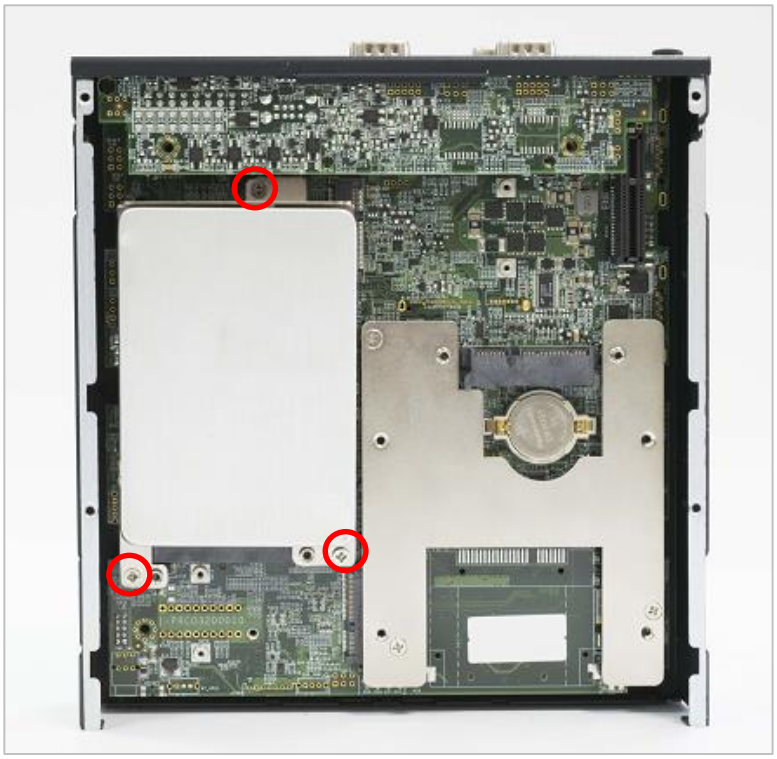


3. Lock the 2.5" HDD with HDD bracket using four screws.



4. Install the HDD bracket following the direction below.

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

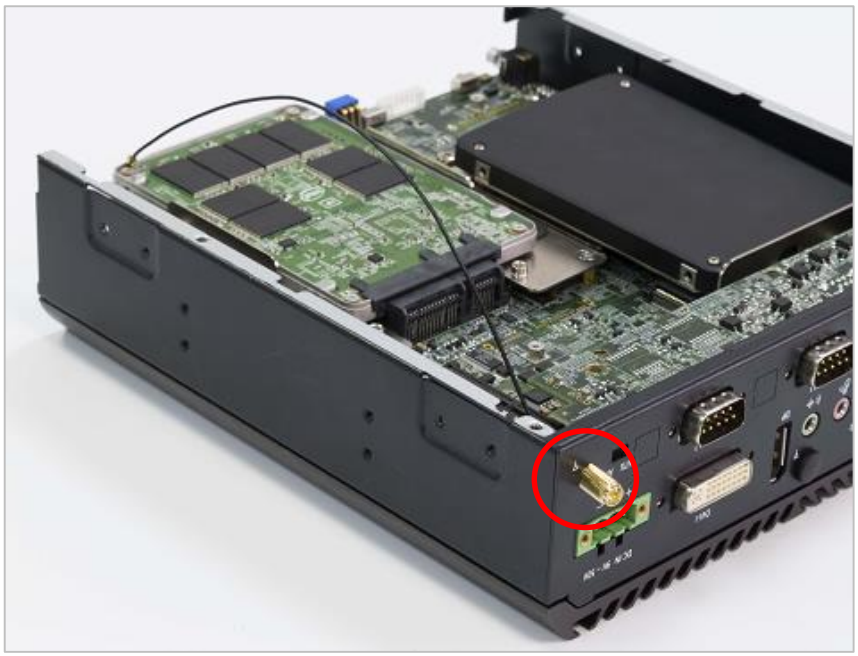


3.7 Installing antenna

1. Two antenna holes are available for VCO-3200 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 Installing CFast card

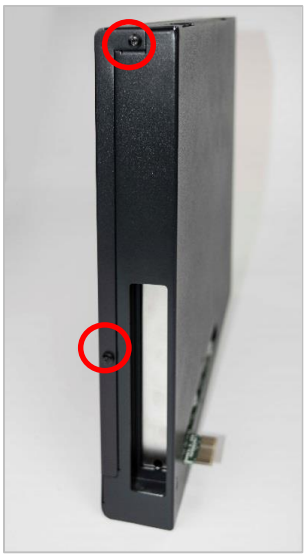
1. CFast socket is located on the system top side. Unscrew two screws to remove the bracket.

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

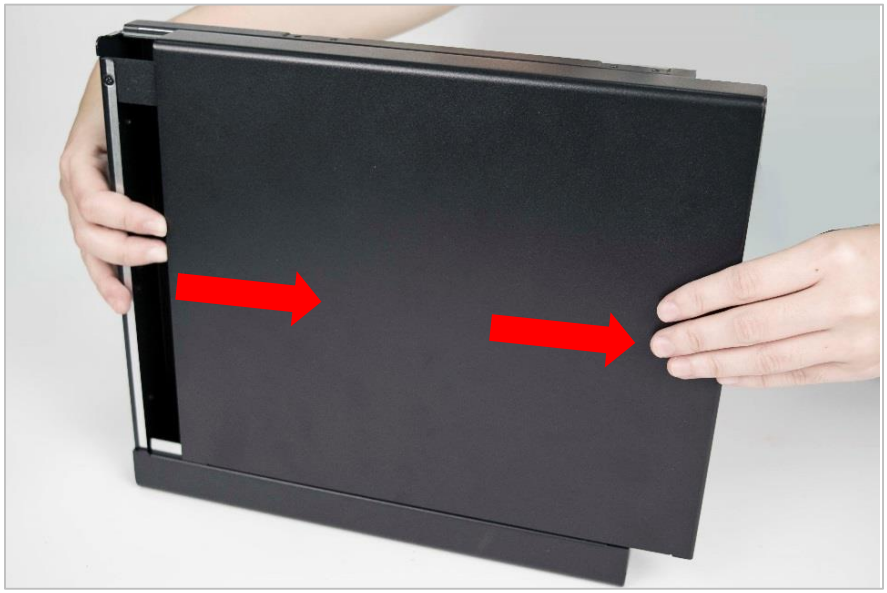
3. The socket is push-push type. Push the installed CFast card again to remove it.

3.9 Installing PCIe/PCI expansion card

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

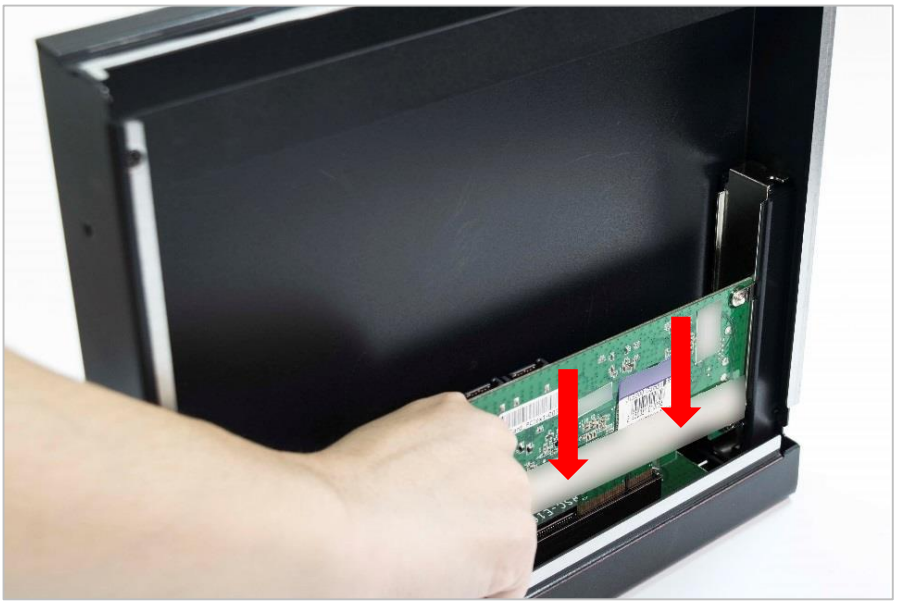


2. Push the chassis cover following the below direction to open the expansion module.



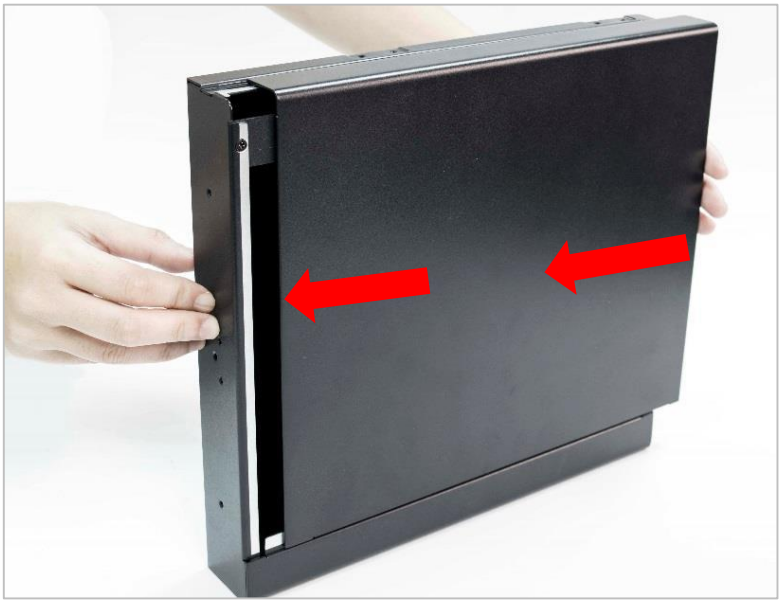
3. Now you will be able see the expansion slots. Unscrew the screw securing the card bracket to remove the bracket.

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.



3.10 Assemble chassis bottom cover

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

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

3.11 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.

3.12 Installing wall mount kit

1. Wall mount kit is available for VCO-3200 series included in the standard package.

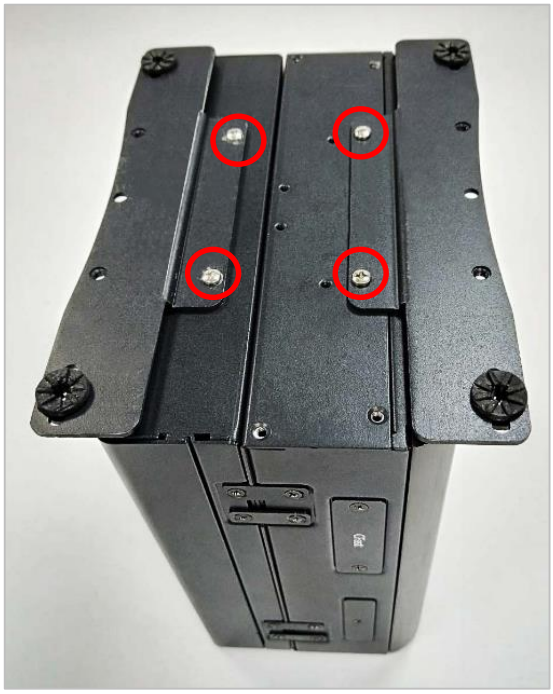
2. Lock the wall mount kit with 4 screws on the system bottom side.

1. Installation complete.

3.13 Installing book mount

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

2. Lock the wall mount kit with 4 screws on the system rear side.



3. Installation complete.

3.14 Installing din rail mount

1. Din rail mount kit is available for VCO-3200 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

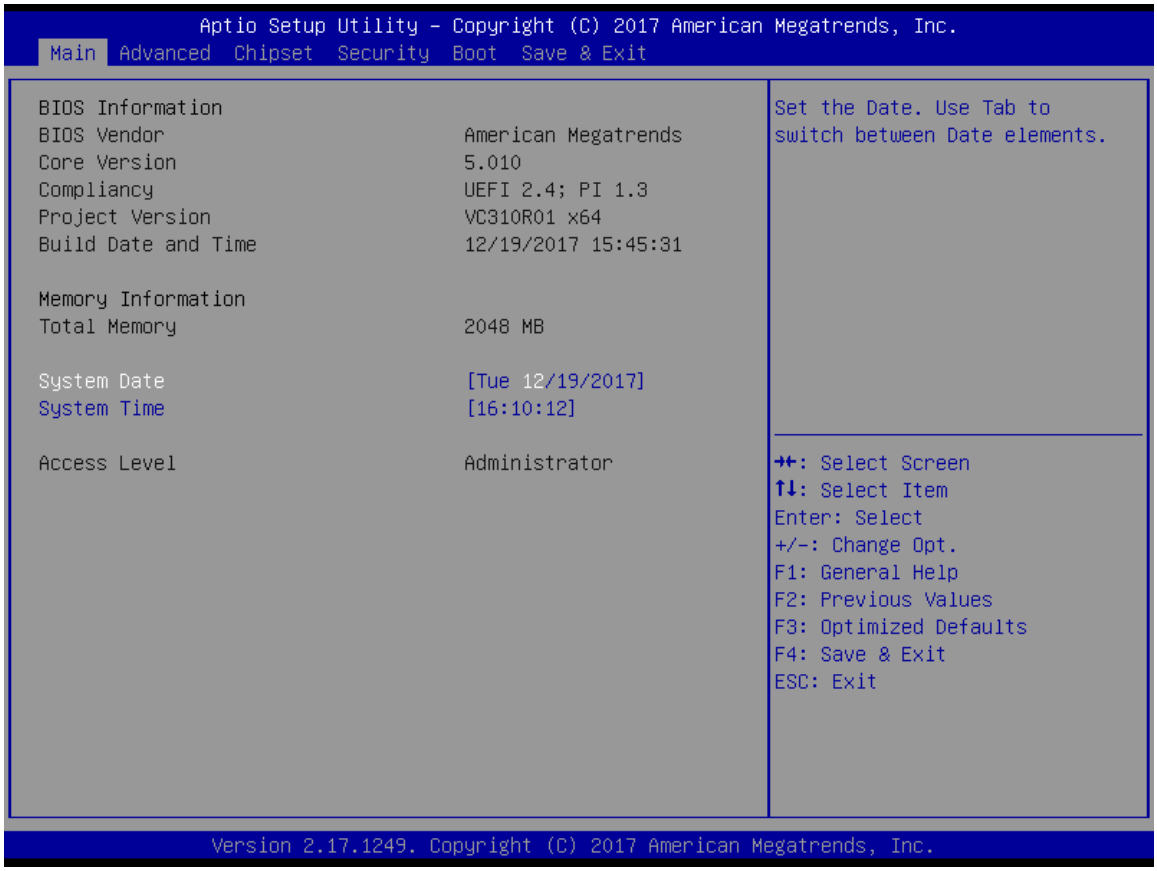
The main menu lists the setup functions you can make changes to. You can use the arrow keys (↑↓) to select the item. The on-line description of the highlighted setup function is displayed at the bottom of the screen.

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 setup screen is showed as following when the setup utility is entered. System Date/Time is set up in the Main Menu.



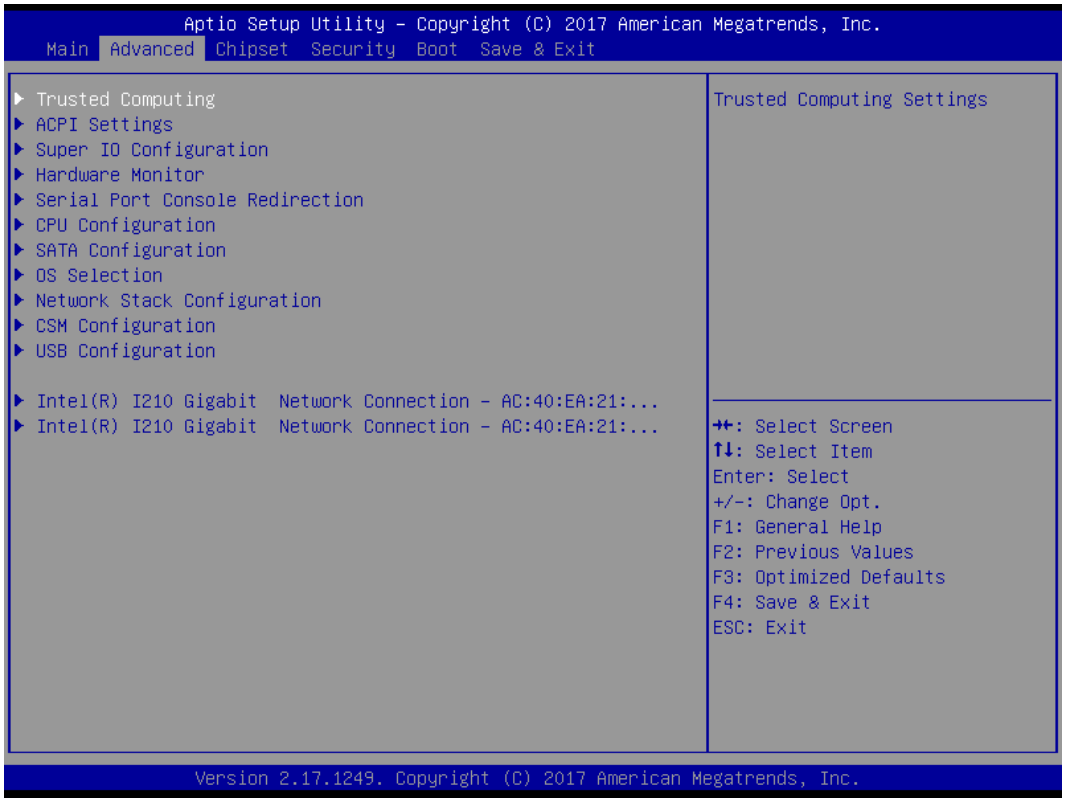
4.2.1 System Date

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

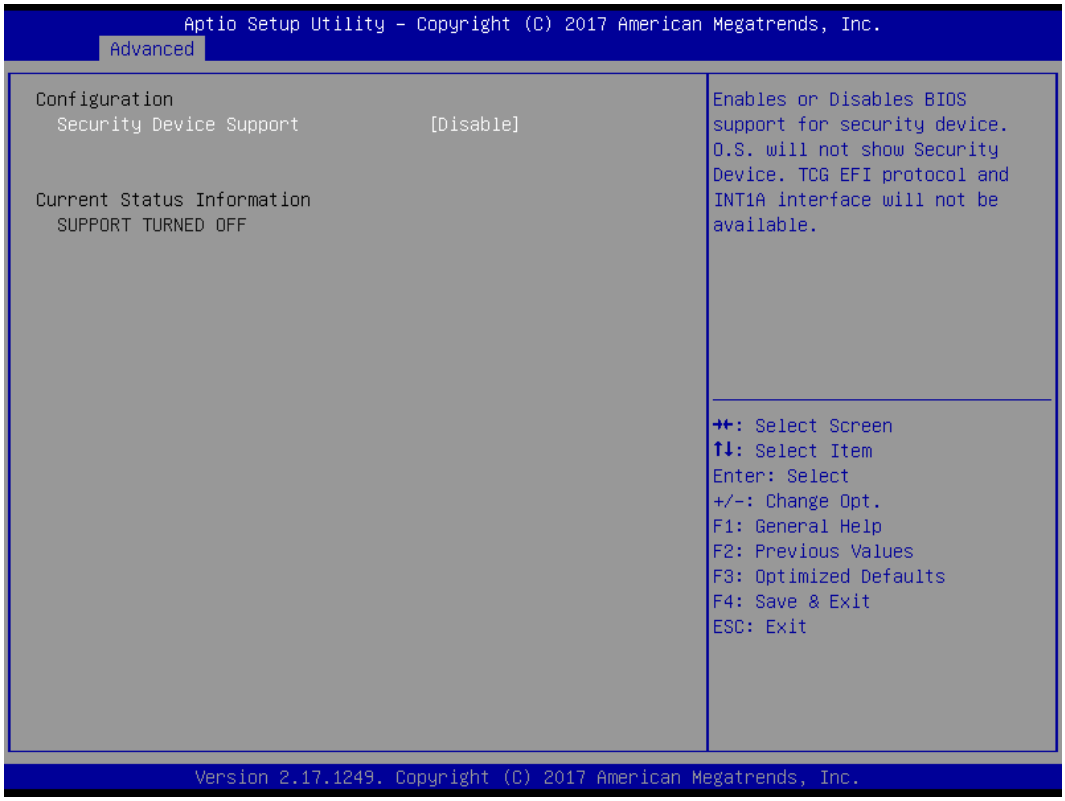
4.2.2 System Time

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

4.3 Advanced Setup

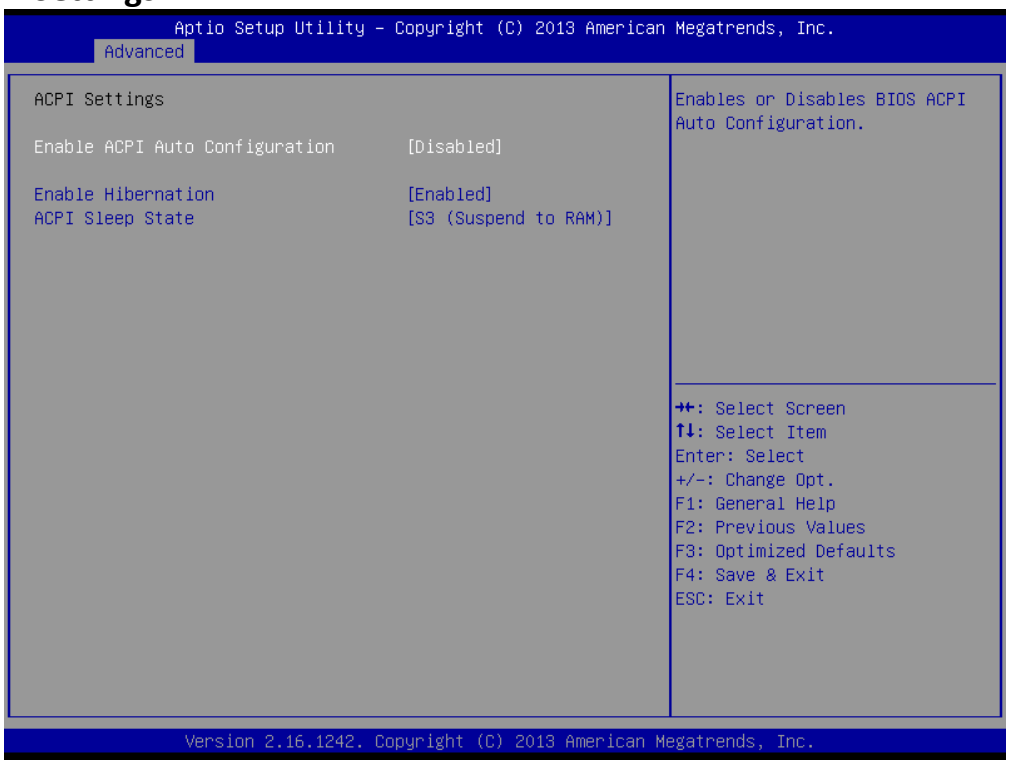


4.3.1 Trusted Computing (Optional)



■ Security Device Support
Enable or disable TPM function

4.3.2 ACPI Settings



■ Enable ACPI Auto Configuration

This item allows you to enable or disable BIOS ACPI Auto Configuration.

■ Enable Hibernation

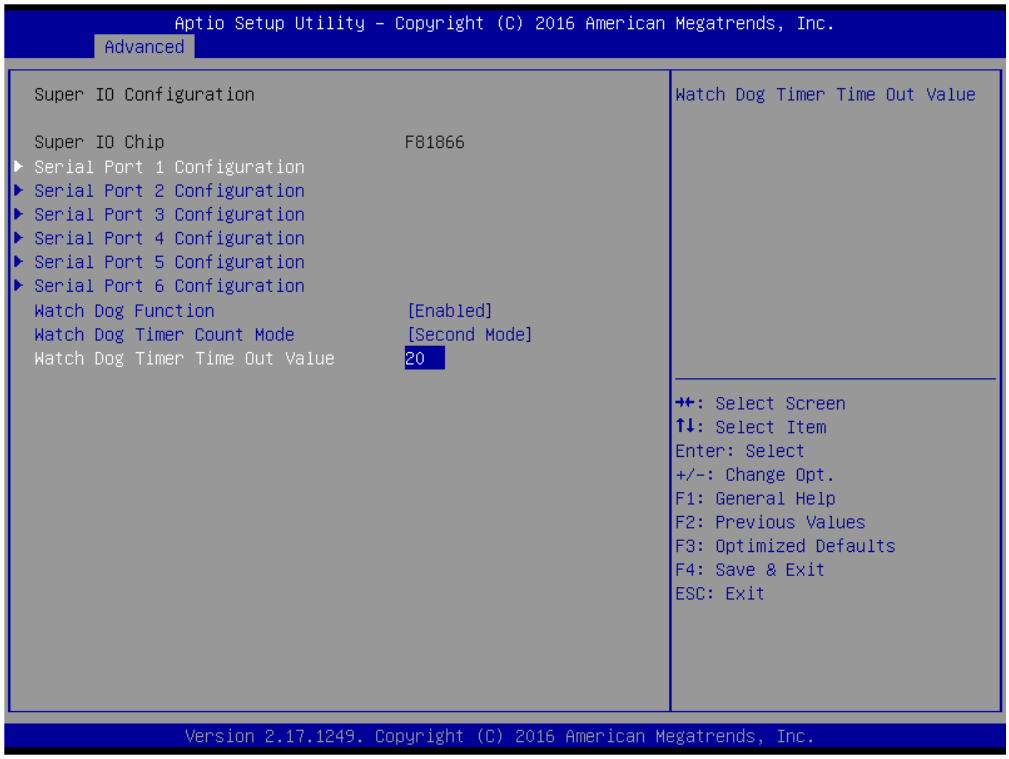
This item allows you to enable or disable system ability to hibernate.

■ ACPI Sleep State

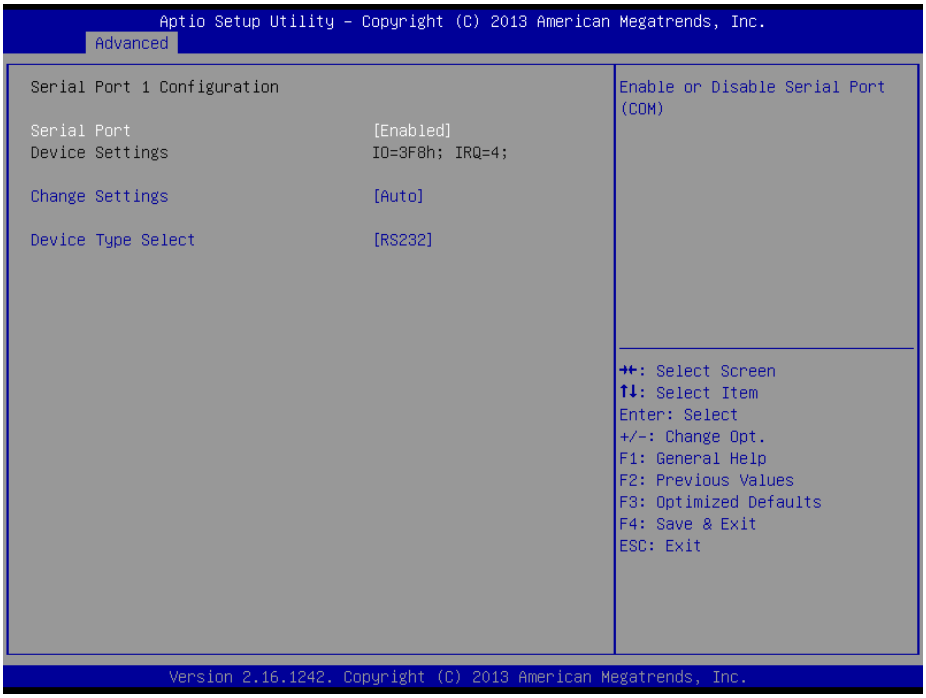
This item selects the highest ACPI sleep state the system will enter when the suspend button is pressed. Select <Suspend Disabled> or <S3 (Suspend to RAM)>.

4.3.3 Super IO Configuration

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

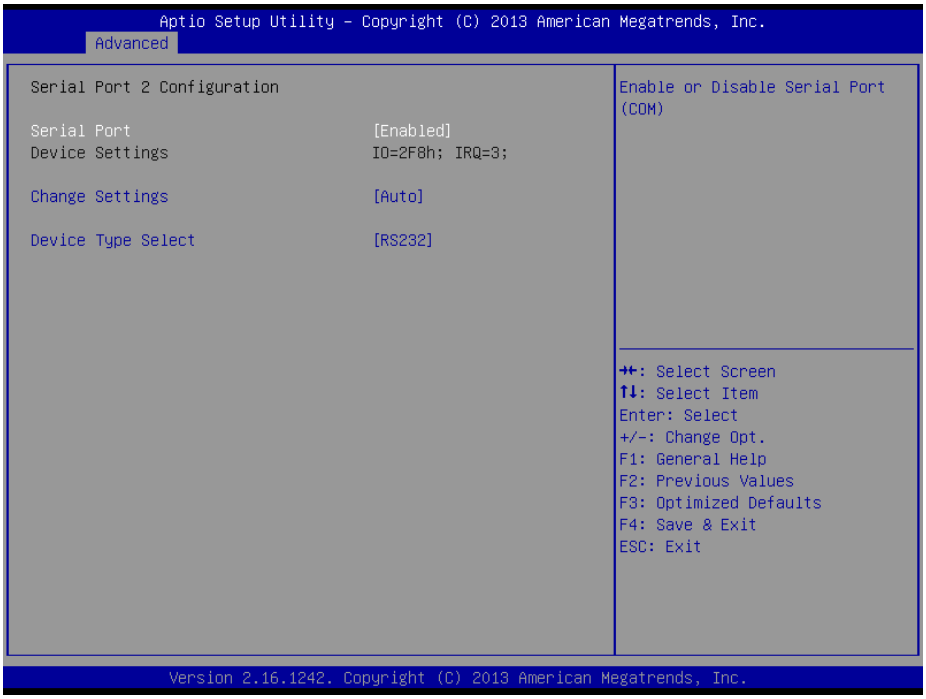


Serial Port 1 Configuration



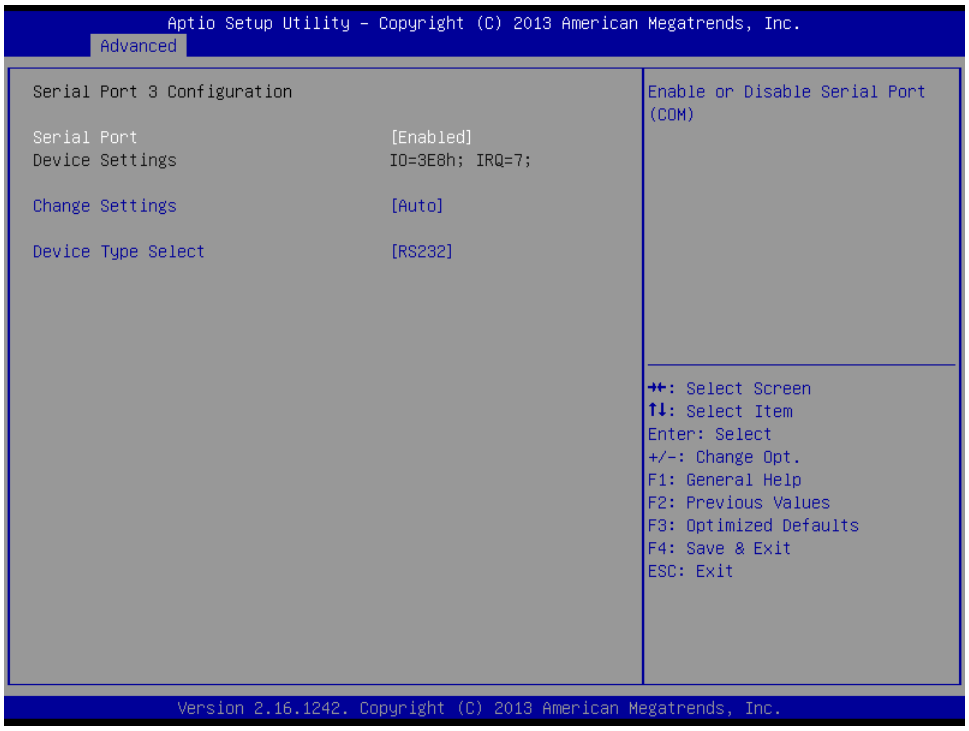
- **Serial Port**
  This item allows you to enable or disable serial port.
- **Change Settings**
  This item allows you to change the address & IRQ settings of the specified serial port.
- **Device Type Select**
  Change the Serial interface. Select <RS232> ,<RS422 Full Duplex> or <RS485 Half Duplex> interface.

Serial Port 2 Configuration



- **Serial Port**
  This item allows you to enable or disable serial port.
- **Change Settings**
  This item allows you to change the address & IRQ settings of the specified serial port.
- **Device Type Select**
  Change the Serial interface. Select <RS232> ,<RS422 Full Duplex> or <RS485 Half Duplex> interface.

Serial Port 3 Configuration

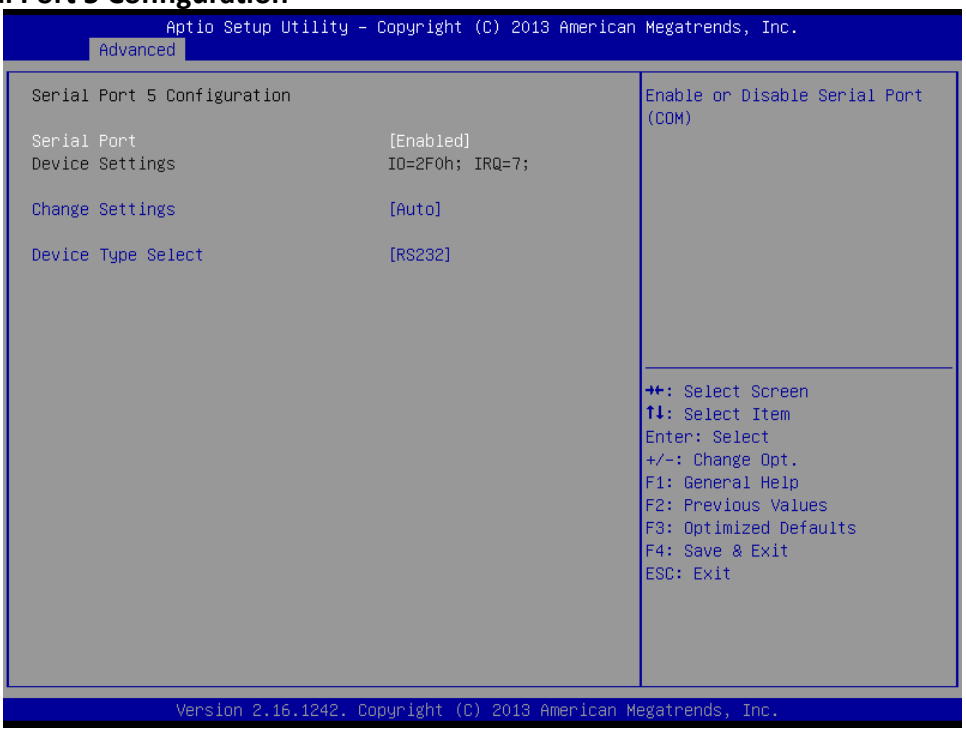


- **Serial Port**
  This item allows you to enable or disable serial port.
- **Change Settings**
  This item allows you to change the address & IRQ settings of the specified serial port.
- **Device Type Select**
  Change the Serial interface. Select <RS232> ,<RS422 Full Duplex> or <RS485 Half Duplex> interface.

Serial Port 4 Configuration

- **Serial Port**
  This item allows you to enable or disable serial port.
- **Change Settings**
  This item allows you to change the address & IRQ settings of the specified serial port.
- **Device Type Select**
  Change the Serial interface. Select <RS232> ,<RS422 Full Duplex> or <RS485 Half Duplex> interface.

Serial Port 5 Configuration



- **Serial Port**
  This item allows you to enable or disable serial port.
- **Change Settings**
  This item allows you to change the address & IRQ settings of the specified serial port.
- **Device Type Select**
  Change the Serial interface. Select <RS232> ,<RS422 Full Duplex> or <RS485 Half Duplex> interface.

Serial Port 6 Configuration

- **Serial Port**
  This item allows you to enable or disable serial port.
- **Change Settings**
  This item allows you to change the address & IRQ settings of the specified serial port.
- **Device Type Select**
  Change the Serial interface. Select <RS232> ,<RS422 Full Duplex> or <RS485 Half Duplex> interface.

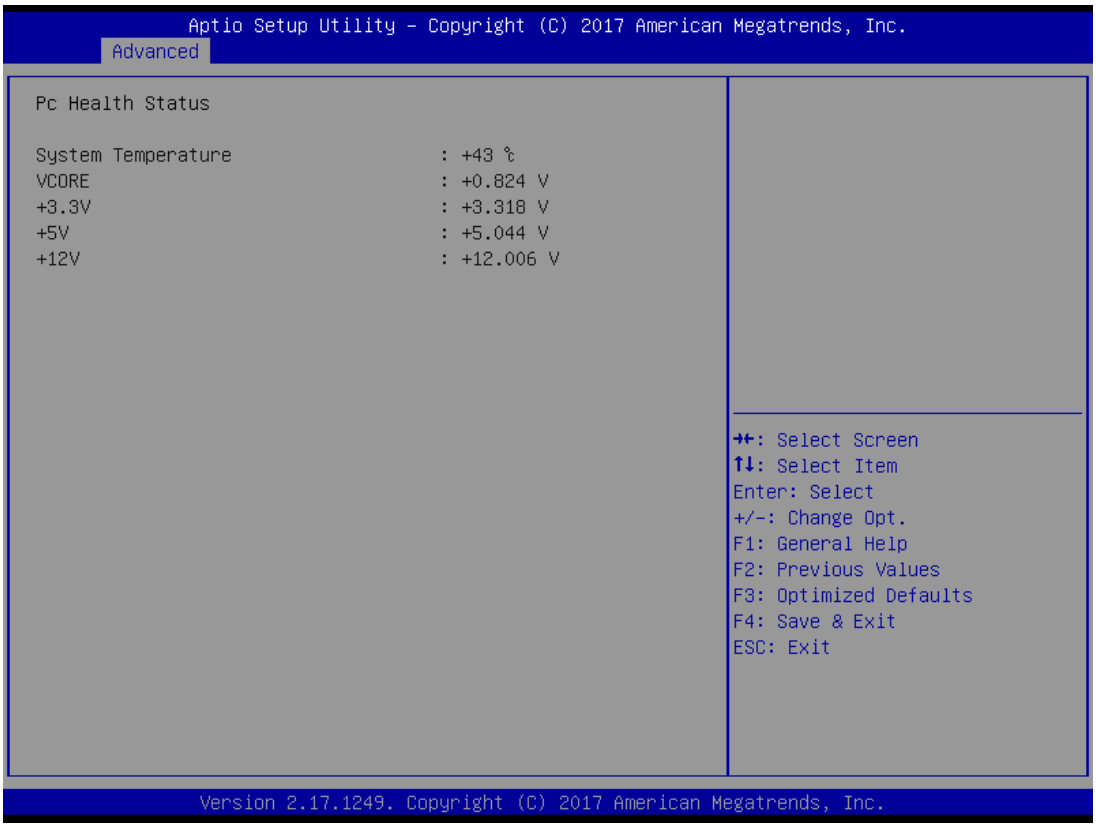
■ Watch Dog Function

This setting allows you to setup the system watch-dog timer, a hardware timer that generates a reset when the software that it monitors does not respond as expected each time the watch dog polls it.

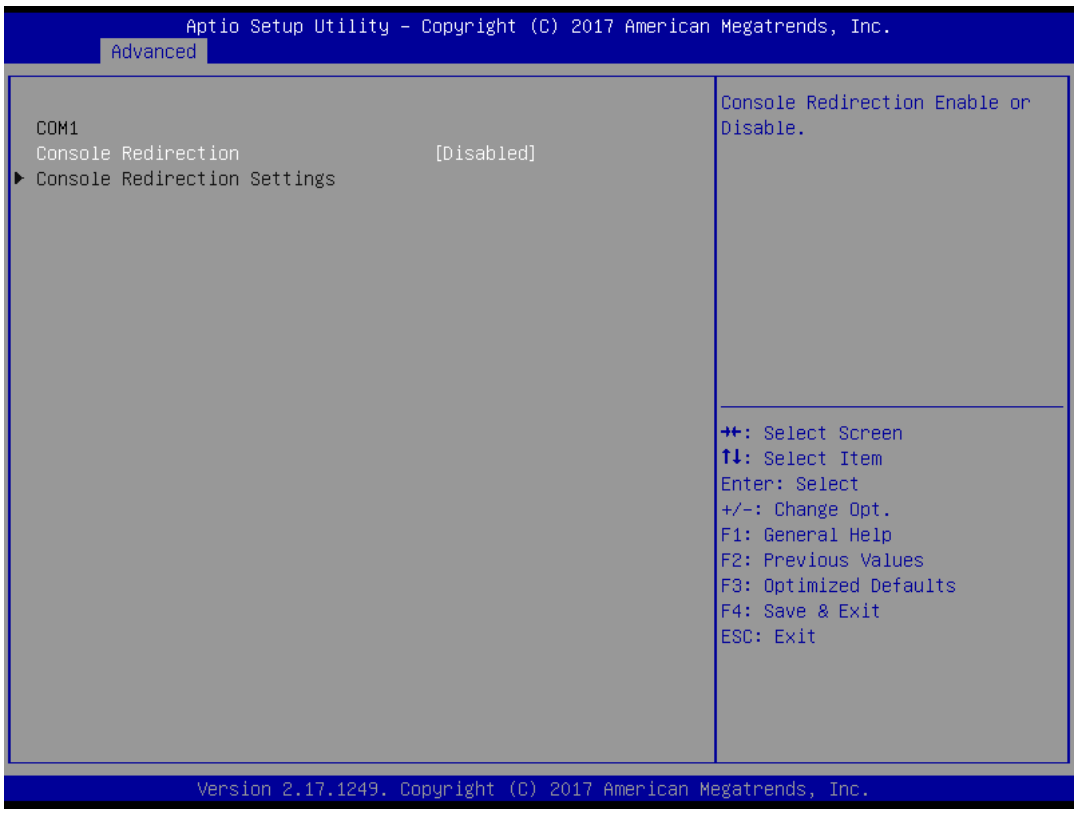
- **Watch Dog Timer Count Mode**
  Change the Watch dog mode. Select <Second Mode> or <Minute Mode> mode.
- **Watch Dog Timer Time Out Value**
  User can set a value in the range of 20 to 255.

4.3.4 Hardware Monitor

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



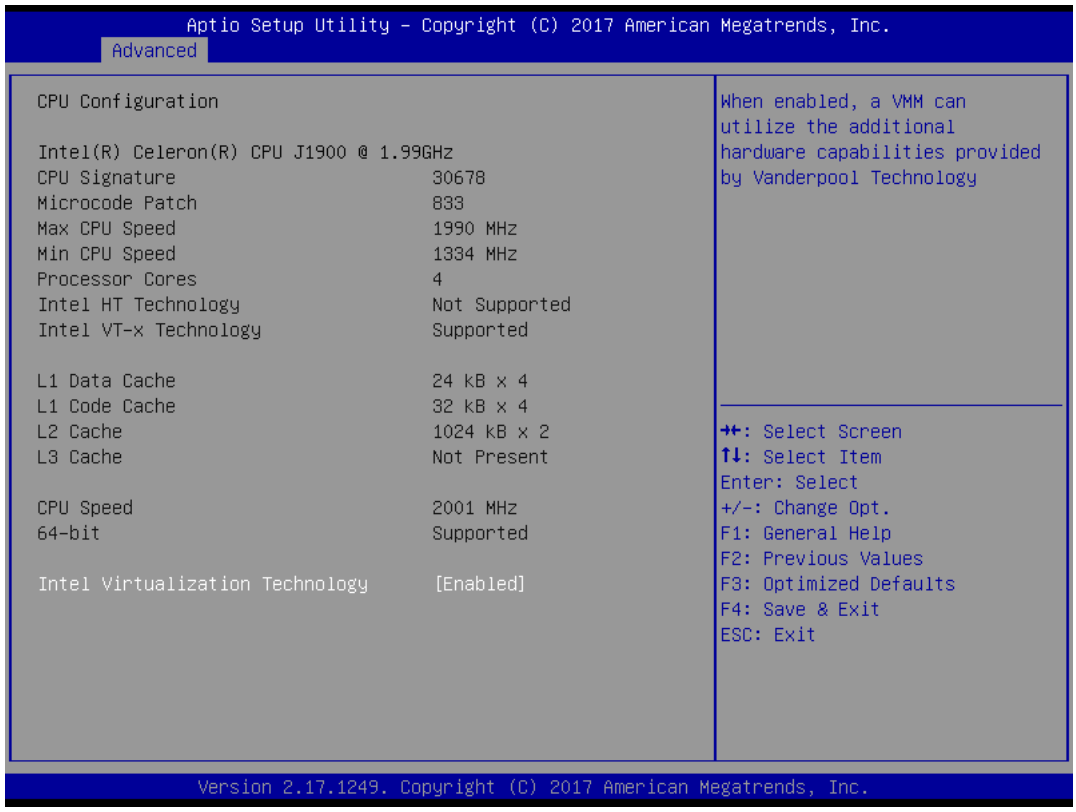
4.3.5 Serial Port Console Redirection



■ Console Redirection

These items allows you to enable or disable COM1 console redirection.

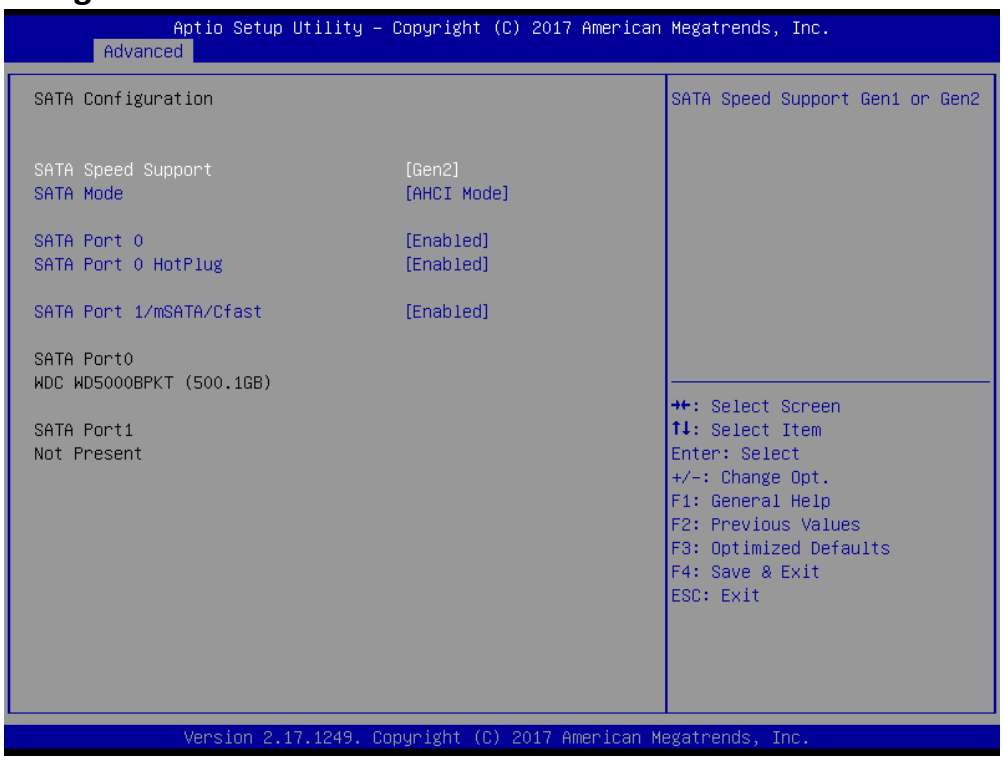
4.3.6 CPU Configuration



■ Intel Virtualization Technology

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

4.3.7 SATA Configuration



■ SATA Speed Support

Change the SATA Speed. Select <Gen1> or <Gen2> speed.

■ SATA Mode

This item allows you to select IDE or AHCI Mode.

■ SATA Port 0

This item allows you to enable or disable SATA Port 0.

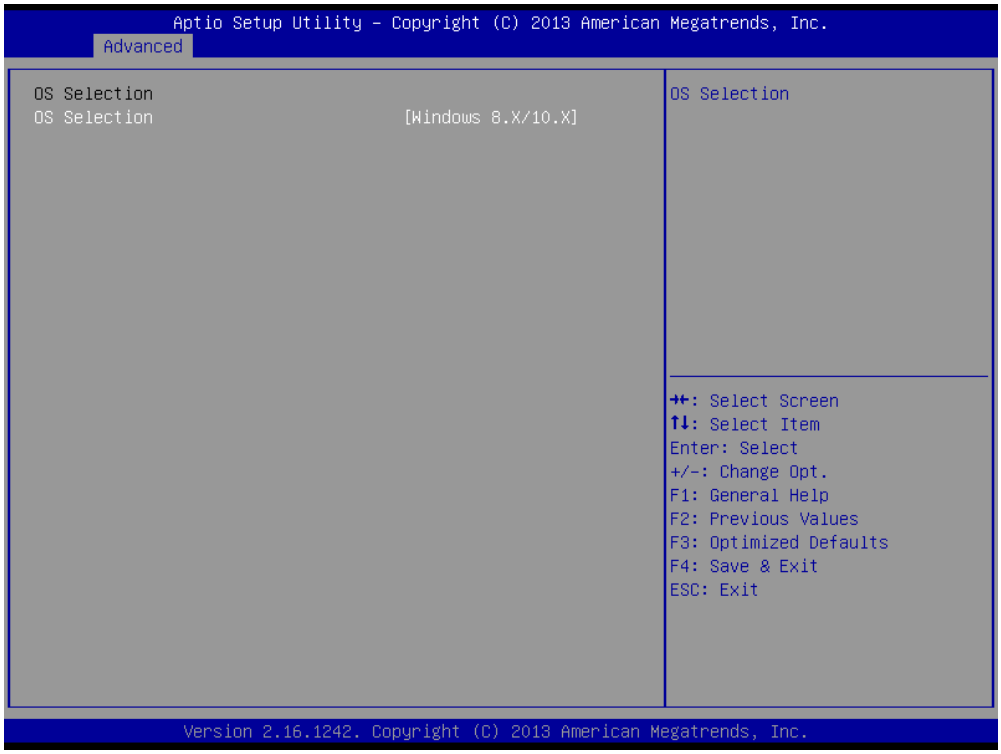
■ SATA Port 0 HotPlug

This item allows you to enable or disable SATA Port 0 hot plug function.

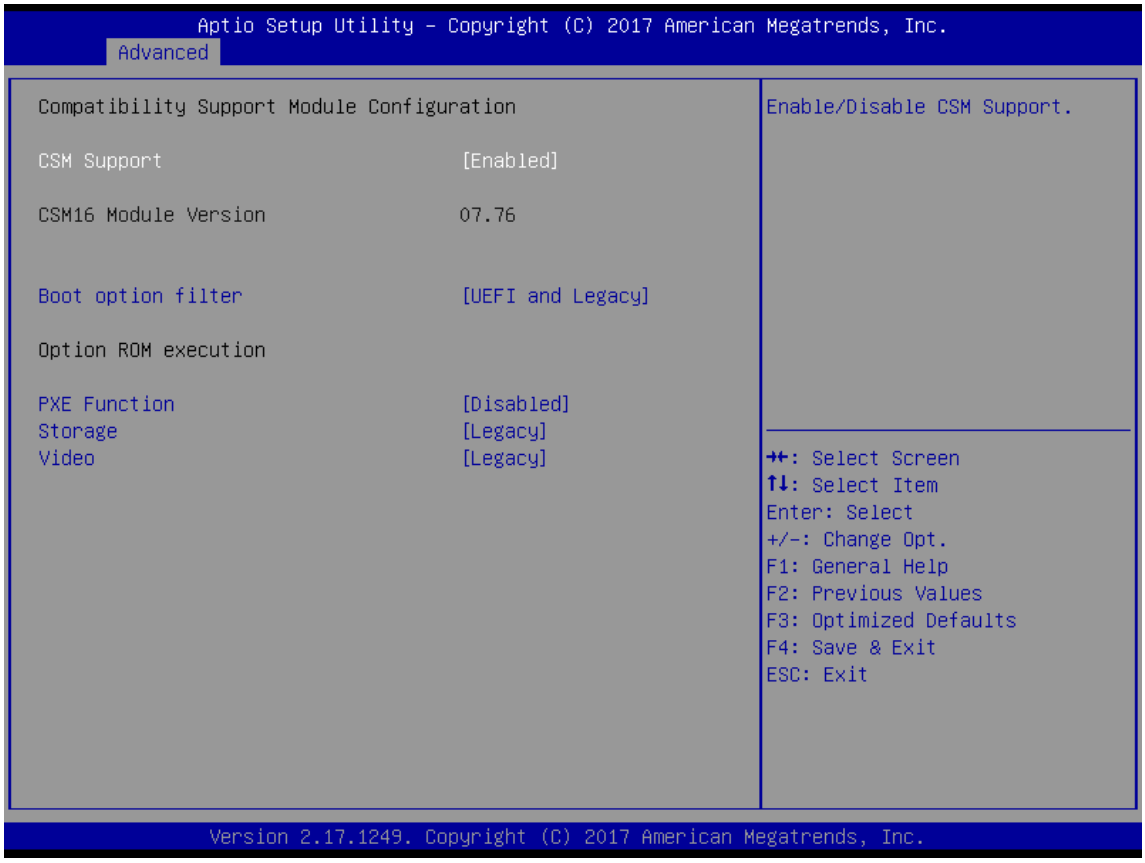
■ SATA Port 1/mSATA/Cfast

This item allows you to enable or disable SATA Port 1/mSATA/Cfast.

4.3.8 OS Selection



4.3.9 CSM Configuration



■ CSM Support

Enables or disables UEFI CSM (Compatibility Support Module) to support a legacy PC boot process.

■ 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.
This item is configurable only when CSM Support is set to Enabled.

■ PXE Function

This item allows you to enable or disable PXE function.

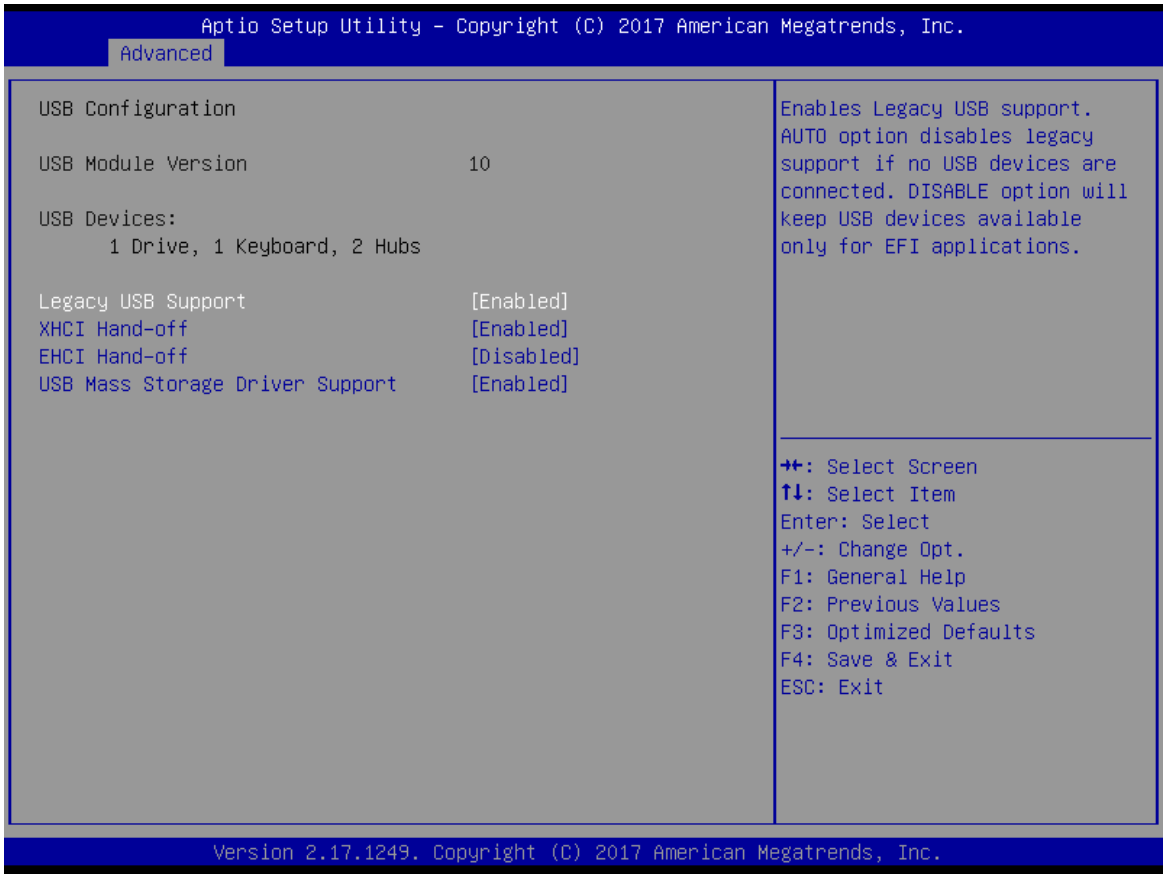
■ Storage

This setting allows you to select whether to enable the UEFI or legacy option ROM for the storage device controller.
Do not launch: Disables option ROM.
UEFI only: Enables UEFI option ROM only.
Legacy only: Enables legacy option ROM only.

■ Video

This item allows you to select whether to enable the UEFI or legacy option ROM for the storage device controller.
Do not launch: Disables option ROM.
UEFI only: Enables UEFI option ROM only.
Legacy only: Enables legacy option ROM only.

4.3.10 USB Configuration



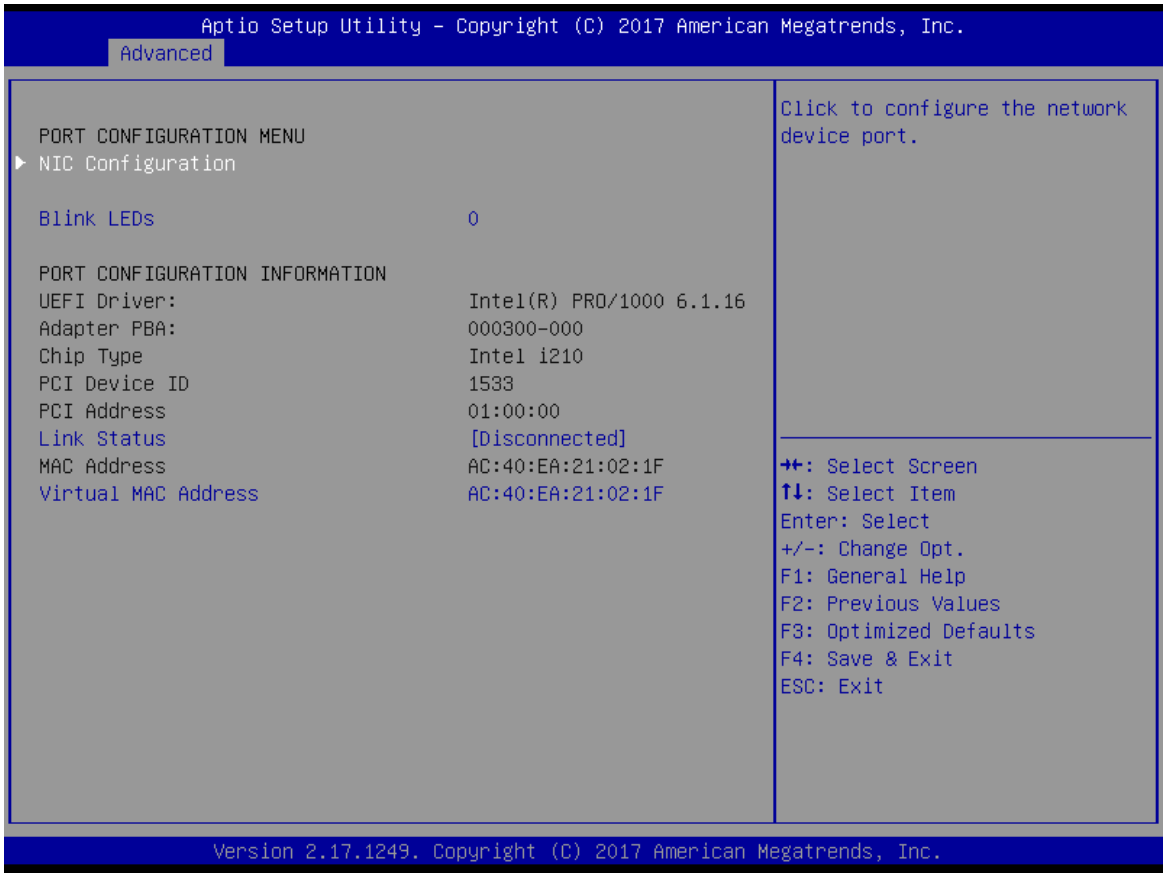
■ Legacy USB Support
Allows USB keyboard/ mouse to be used in MS-DOS.

■ XHCI Hand-off
Determines whether to enable XHCI (USB3.0) Hand-off feature for an operating system without XHCI (USB3.0) Hand-off support.

■ EHCI Hand-off
Determines whether to enable EHCI Hand-off feature for an operating system without EHCI Hand-off support.

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

4.3.11 Intel® I210 Gigabit Network Connection- XX:XX:XX:XX:XX:XX



■ NIC Configuration

Press enter to configure the network device port.

- **Link Speed**
  Use this item to specify the port speed used for the selected boot protocol. Select <Auto Negotiated>, <10 Mbps Half>, <10 Mbps Full>, <100Mbps Half> or <100 Mbps Full>.
- **Wake On LAN**
  Enables the server to be powered on using an in-band magic packet.

■ Blink LEDs

Use this item to identify the physical network port by blinking the associated LED.

■ Link Status

Use this item to specify the port speed used for the selected boot protocol. Select <Auto Negotiated>, <10 Mbps Half>, <10 Mbps Full>, <100 Mbps Half> or <100 Mbps Full>.

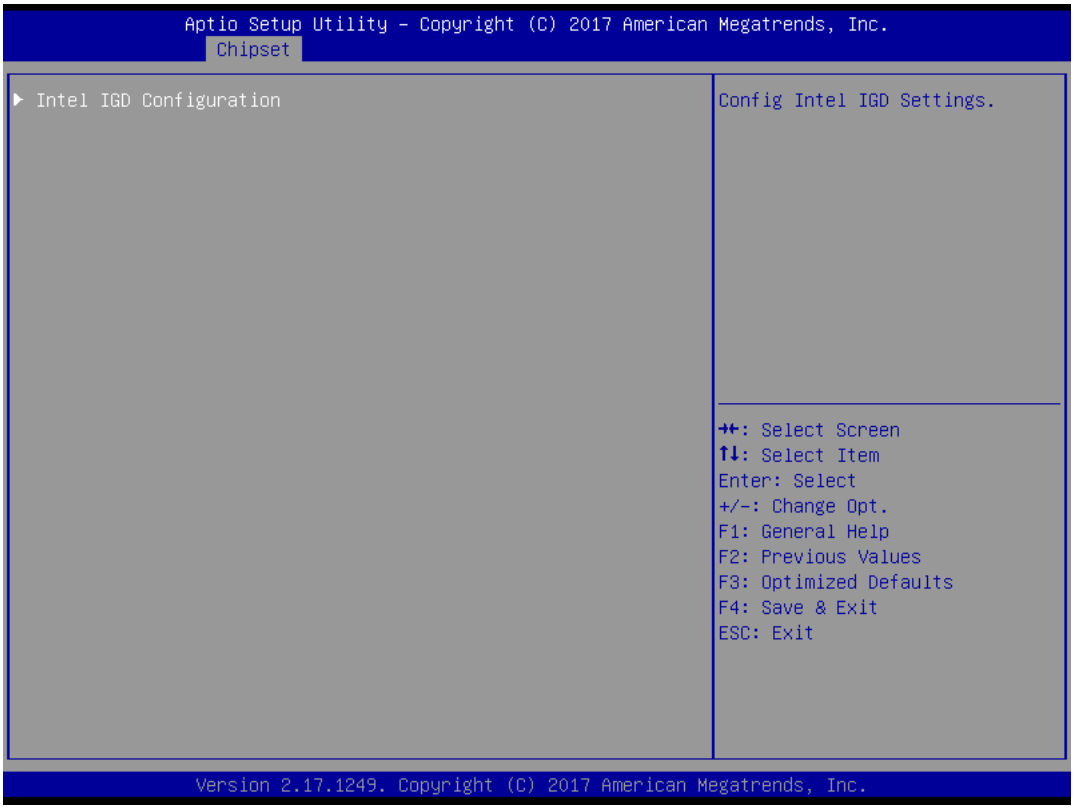
■ Virtual MAC Address

Displays the programmatically assignable MAC Address.

4.4 Chipset

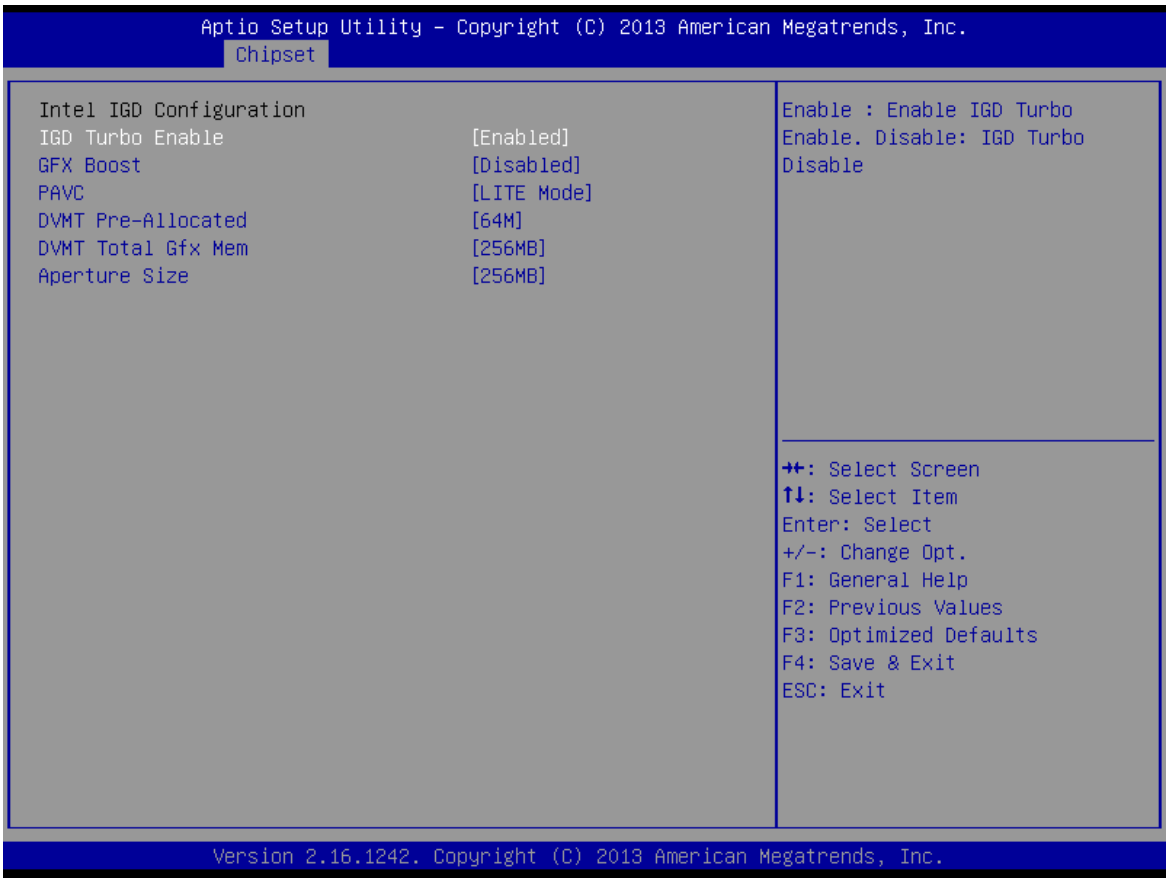
4.4.1 North Bridge

This section provides information on the installed memory size and memory/onboard graphics-related configuration options.



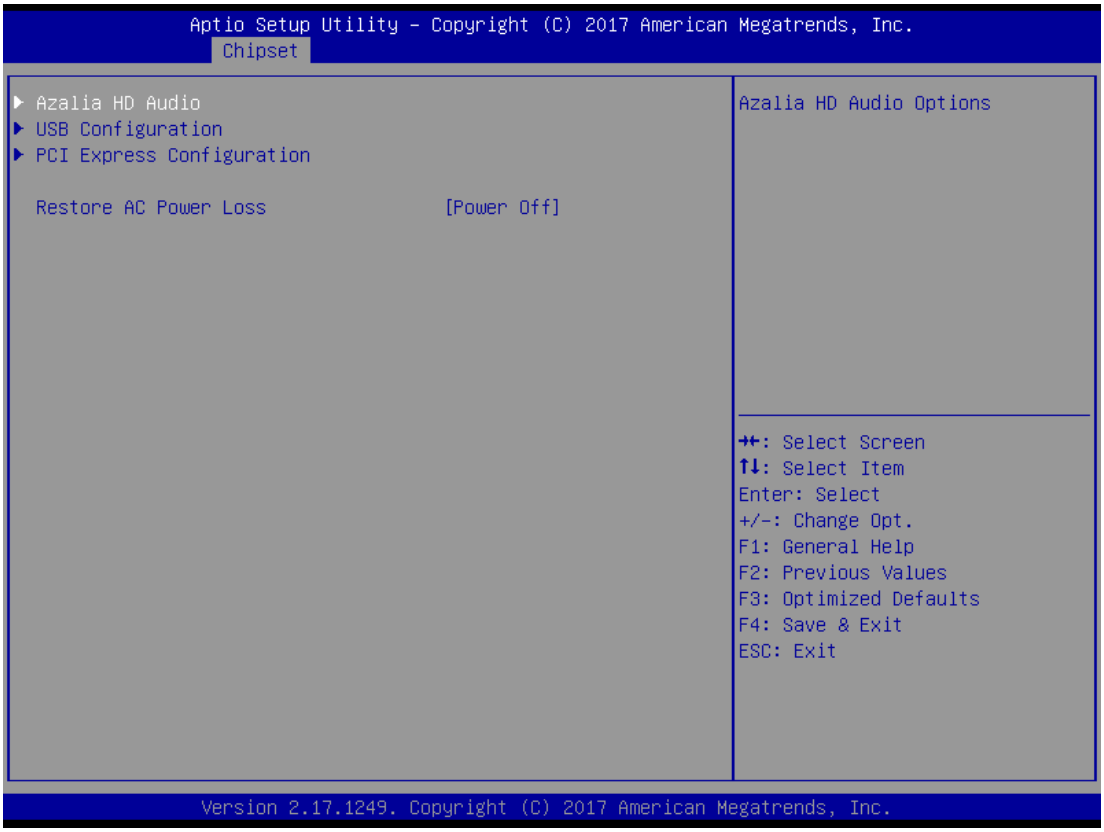
Intel IGD Configuration

This section provides onboard graphics-related configuration options.



- **IGD Turbo Enable**
  This item allows you to enable or disable IGD Turbo.
- **GFX Boost**
  This item allows you to enable or disable GFX Boost.
- **PAVC**
  This item enables/disables Protected Audio Video Control. Select <Disabled>, <LITE Mode> or <SERPENT Mode>.
- **DVMT Pre-Allocated**
  This item selects DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device. . Select <64M>, <96M>, <128M>, <160M>, <192M>, <224M>, <256M>, <288M>, <320M>, <352M>, <384M>, <416M>, <448M>, <480M> or <512M>.
- **DVMT Total Gfx Mem**
  This item selects DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device. Select <128MB>, <256MB> or <Max>.
- **Aperture Size**
  This item selects the Aperature Size. Select <128MB>, <256MB> or <512MB>.

4.4.2 South Bridge



■ Azalia HD Audio

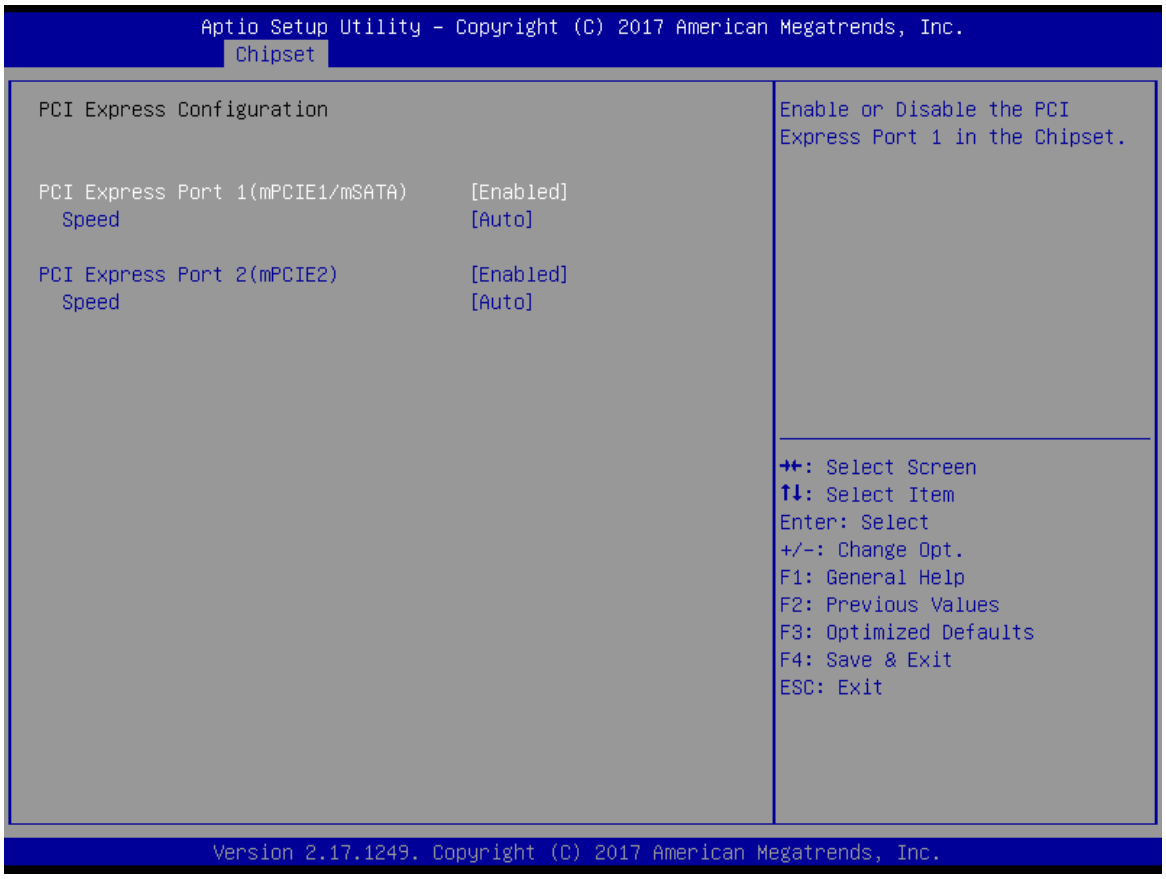
Control detection of the Azalia device.

- **Audio Controller**
  Enabled: Azalia will be unconditionally enabled.
  Disabled: Azalia will be unconditionally disabled.

■ USB Configuration

- **XHCI Mode**
  This item allows you to enable or disable the USB XHCI controller.
- **USB 2.0 (EHCI) Support**
  This item allows you to enable or disable the USB EHCI support.

PCI Express Configuration



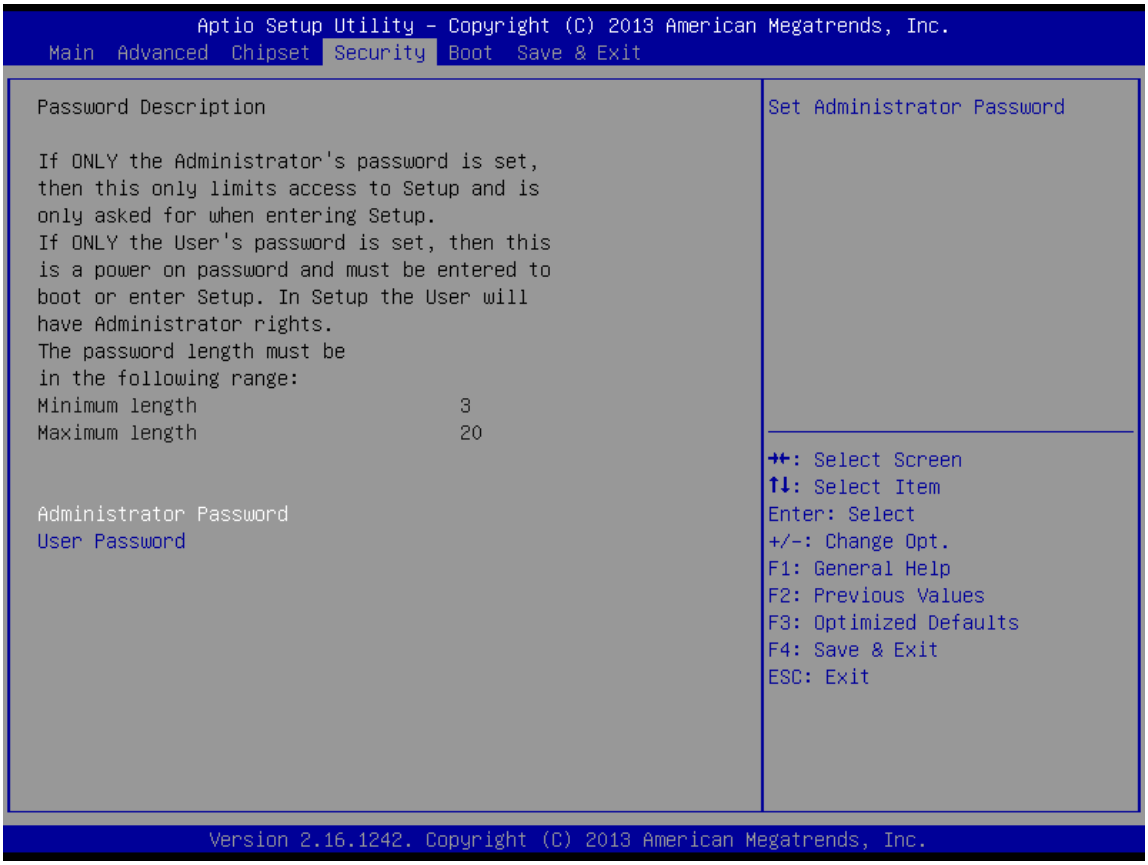
- **PCI Express Port 1 (mPCIE1/mSATA)**
  This item allows you to enable or disable PCI Express Port 1 (Mpcie1/mSATA) in the Chipset.
- **Speed**
  Change the PCIe Port Speed. Select <AUTO> ,<Gen 2> or <Gen 1>
- **PCI Express Port 2 (mPCIE2)**
  This item allows you to enable or disable PCI Express Port 2 (mPCIE2) in the Chipset.
- **Speed**
  Change the PCIe Port Speed. Select <AUTO> ,<Gen 2> or <Gen 1>

Restore AC Power Loss

This item specifies whether your system will reboot after a power failure or interrupt occurs.
Available settings are:
Power Off: Leave the computer in the power off state.
Power On: Leave the computer in the power on state.
Last State: Restore the system to the previous status before power failure or interrupt occurred.

4.5 Security

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



4.5.1 Administrator Password

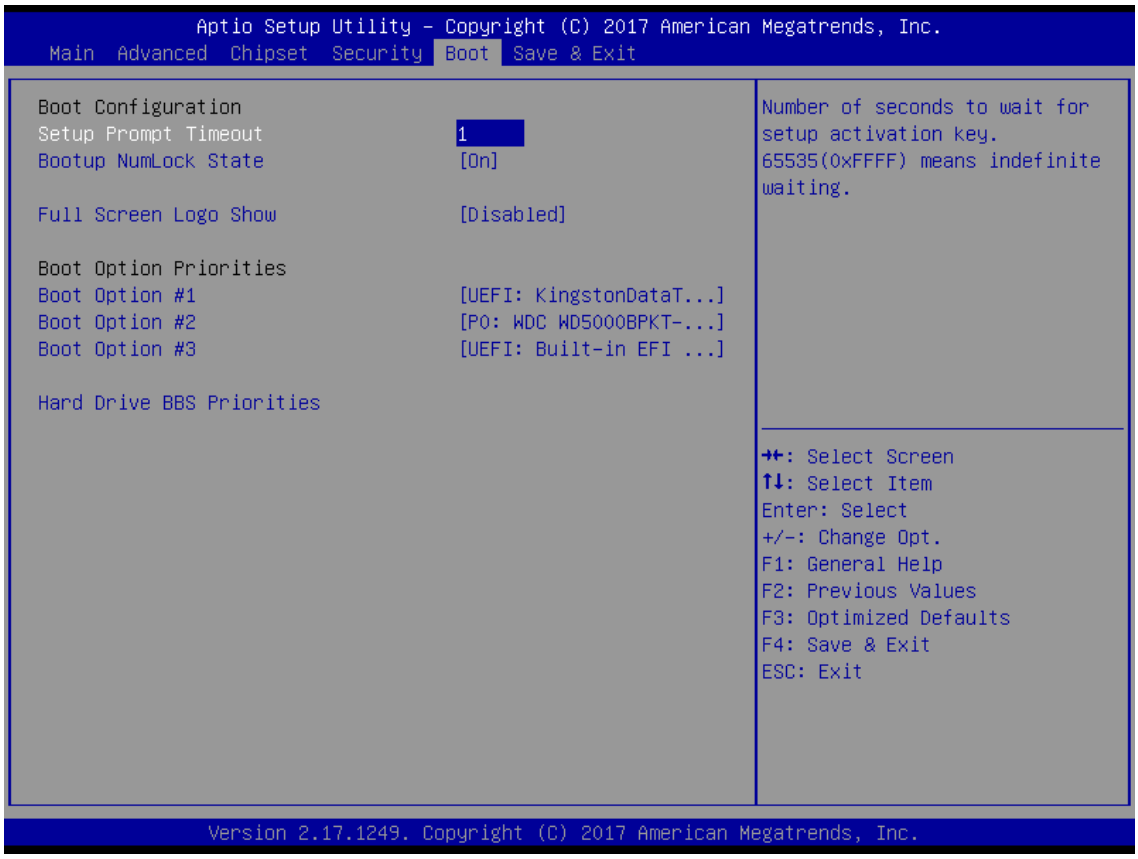
This item allows you to set Administrator Password.

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

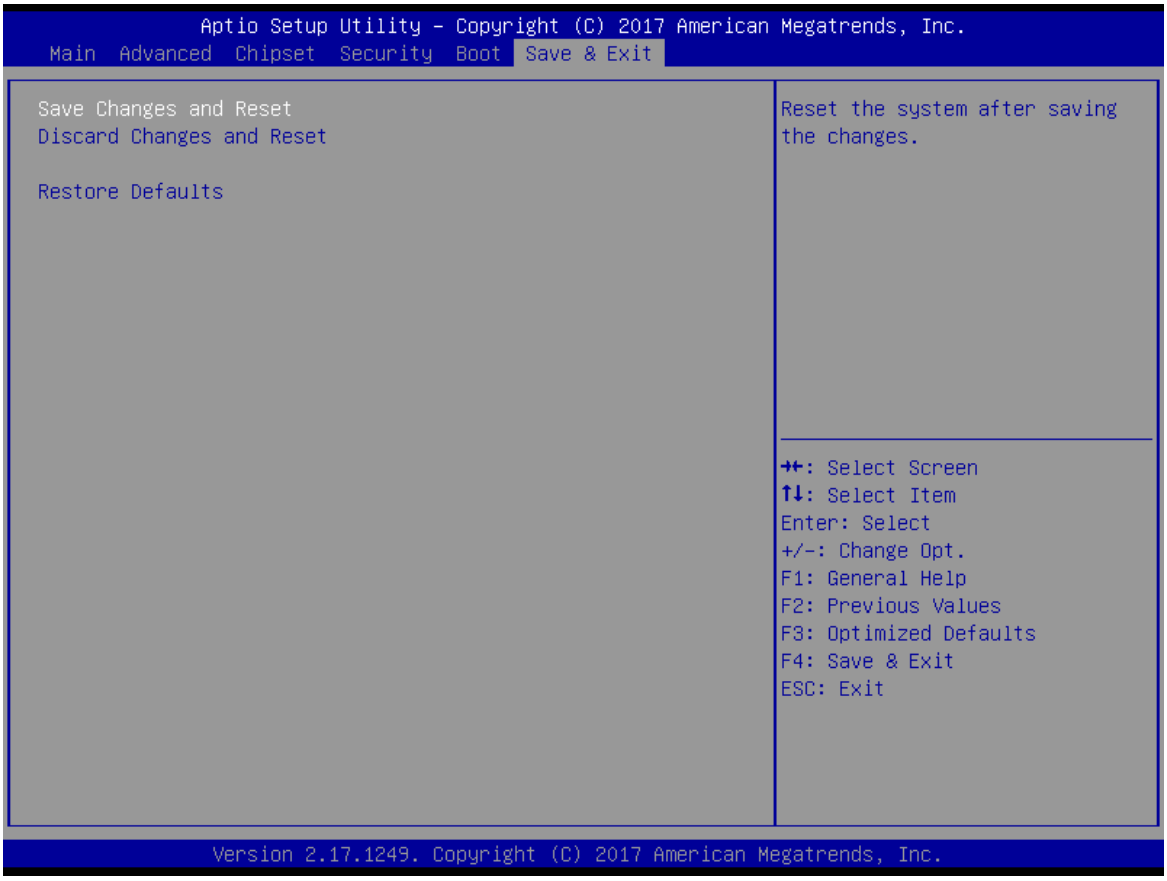
This item allows you to enable or disable Full Screen Logo Show function.

4.6.4 Boot Option 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 you to configure the boot settings.



4.7.1 Save Changes and Reset

This item allows you reset the system after saving the changes.

4.7.2 Discard Changes and Reset

Select this option to quit Setup without making any permanent changes to the system configuration.

4.7.3 Restore Defaults

This selection allows you to reload the BIOS when problem occurs during system booting sequence. These configurations are factory settings optimized for this system.

Appendix

WDT & GPIO

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

WDT Sample Code

```
SIO_INDEX_Port      equ 04Eh
SIO_DATA_Port equ   04Fh
SIO_UnLock_Value    equ 087h
SIO_Lock_Value equ  0AAh
WatchDog_LDN        equ 007h
WDT_UNIT            equ 60h ;60h=second, 68h=minute, 40h=Disabled Watchdog timer
WDT_Timer           equ 30 ;ex. 30 seconds

Sample code:
;Enable config mode
    mov         dx, SIO_INDEX_Port
    mov         al, SIO_UnLock_Value
    out         dx, al
    jmp         short $+2       ;Io_delay
    jmp         short $+2       ;Io_delay
    out         dx, al
;Change to WDT
    mov         dx, SIO_INDEX_Port
    mov         al, 07h
    out         dx, al
    mov         dx, SIO_DATA_Port
    mov         al, WatchDog_LDN
    out         dx, al
;Acive WDT
    mov         dx, SIO_INDEX_Port
    mov         al, 30h
    out         dx, al
    mov         dx, SIO_DATA_Port
    in          al, dx
    or          al, 01h
    out         dx, al
;set timer
    mov         dx, SIO_INDEX_Port
    mov         al, 0F6h
    out         dx, al
    mov         dx, SIO_DATA_Port
    mov         al, WDT_Timer
    out         dx, al
;set UINT
    mov         dx, SIO_INDEX_Port
    mov         al, 0F5h
    out         dx, al
    mov         dx, SIO_DATA_Port
    mov         al, WDT_UNIT
    out         dx, al
;enable reset
    mov         dx, SIO_INDEX_Port
    mov         al, 0Fah
    out         dx, al
    mov         dx, SIO_DATA_Port
    in          al, dx
    or          al, 01h
    out         dx, al
;close config mode
    mov         dx, SIO_INDEX_Port
    mov         al, SIO_Lock_Value
    out         dx, al
```

GPIO Sample Code

- GPI 0 ~ GPI 3

	GPI 0	GPI 1	GPI 2	GPI 3
IO Address	0xA03h	0xA03h	0xA03h	0xA03h
Bit	4	5	6	7
Sample code	#1			

- GPO 0 ~ GPO 3

	GPO 0	GPO 1	GPO 2	GPO 3
IO Address	0xA02h	0xA02h	0xA02h	0xA02h
Bit	0	1	2	3
Sample code	#2			

```
GPI_REG     equ 0A03h
GPO_REG     equ 0A02h
GPO_0       equ 00000001b
```

Sample Code:

#1 : Get GPI 0 status

```
; Get GPI 0 Pin Status Register
    In      al, GPI_REG
    ;al bit4 = GPI 0 status
```

#2 : Set GPO 0 status to high

```
; Set GPO 0 Pin to High
    mov     dx, GPO_REG
    in      al, dx
    or      al, GPO_0
    out     dx, al
    ;al bit0 = GPO 0 status
```

- GPI 4 ~ GPI 7

	GPI 4	GPI 5	GPI 6	GPI 7
IO Address	0xA06h	0xA06h	0xA06h	0xA06h
Bit	0	1	2	3
Sample code	#3			

- GPO 4 ~ GPO 7

	GPO 4	GPO 5	GPO 6	GPO 7
IO Address	0xA06h	0xA07h	#5	0xA04h
Bit	4	7	0	7
Sample code	#4		#5	

```
GPI_REG     equ 0A06h
GPO_REG     equ 0A06h
GPO_4       equ 00010000b
```

Sample Code:

#3 : Get GPI 4 status

```
; Get GPI 4 Pin Status Register
    In      al, GPI_REG
    ;al bit0 = GPI 4 status
```

#4 : Set GPO 4 status to high

```
; Set GPO 0 Pin to High
    mov     dx, GPO_REG
    in      al, dx
    or      al, GPO_4
    out     dx, al
    ;al bit4 = GPO 4 status
```

#5 : GPO 6 must be accessed by gpio configuration (IO address is protected)
Set GPO 6 status to high

```
SIO_INDEX_Port equ 04Eh
SIO_DATA_Port equ 04Fh
SIO_UnLock_Value equ 087h
SIO_Lock_Value equ 0AAh
SIO_LDN_GPIO equ 06h
GPO_REG equ 0d1h
GPO_6 equ 00000001b

; Enable config mode
mov dx, SIO_INDEX_Port
mov al, SIO_UnLock_Value
out dx, al
jmp short $+2 ;Io_delay
jmp short $+2 ;Io_delay
out dx, al

; Switch GPIO Configuration for SIO LDN 0x06
mov dx, SIO_INDEX_Port
mov al, 07h
out dx, al
mov dx, SIO_DATA_Port
mov al, SIO_LDN_GPIO
out dx, al

; Set GPO 6 Pin to High
mov dx, SIO_INDEX_Port
mov al, GPO_REG
out dx, al
mov dx, SIO_DATA_Port
in al, dx
or al, GPO_6
out dx, al
;al bit0 = GPO 6 status

; Exit SIO
mov dx, SIO_INDEX_Port
mov al, SIO_Lock_Value
out dx, al
```

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