C&T SOLUTION INC.

USER'S MANUAL

PC300 Series

PC Module

Table of Contents

Prefaces

Revision

Revision	Description	Date
1.0	Manual Released	2017/09/12
1.1	Power Connector Definition Revised	2017/11/02

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 80°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	PC300 Series PC Module	1
2	Utility DVD Driver	1
3	Screw Pack	1

Ordering Information

Model No.	Product Description
PC300-5350U	PC Module for Industrial Display System with Intel® i5-5350U Processor
PC300-5010U	PC Module for Industrial Display System with Intel® i3-5010U Processor
PC300-3765U	PC Module for Industrial Display System with Intel® Celeron® 3765U Processor
PC311E-5350U	PC Module for Industrial Display System with Intel® i5-5350U Processor, 1x PCIe x4 Expansion
PC311E-5010U	PC Module for Industrial Display System with Intel® i3-5010U Processor, 1x PCIe x4 Expansion
PC311E-3765U	PC Module for Industrial Display System with Intel® Celeron® 3765U Processor, 1x PCIe x4 Expansion
PC311P-5350U	PC Module for Industrial Display System with Intel® i5-5350U Processor, 1x PCI Expansion
PC311P-5010U	PC Module for Industrial Display System with Intel® i3-5010U Processor, 1x PCI Expansion
PC311P-3765U	PC Module for Industrial Display System with Intel® Celeron® 3765U Processor, 1x PCI Expansion

Optional Accessories

Model No.	Product Description
1-E09A06002	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

The PC300 series PC module is based on 5th Gen. Intel® Core™ i5-5350U (2.9GHz) / i3-5010U (2.1GHz) or Celeron® 3765U (1.9GHz) Dual Core processor. It supports Multi-Mode Display Module (MDM) technology which makes it more flexible in system maintaining and upgrading. It also offers modularize expansion I/O, rich connectivity interfaces, wide range (9~48V) DC power input, and high reliability even operating in temperature extremes (-40~+70 ℃).

Featuring with completely cable-less designed and high functional, PC300 series are ruggedized display 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 PC300 series are safety system for all industrial applications.

PC311E / PC311P

PC300

1.1.1 Key Features

- Intel® Core™ Processor i5-5350U, up to 2.9GHz / i3-5010U, 2.1GHz or Celeron® 3765U, 1.9GHz
- 1x 204-pin DDR3L SODIMM. Max up to 8GB
- 1x 2.5" Removable SATA HDD bay support RAID 0,1, 5, 2x mSATA, 2x SIM socket
- 2x Full-size mini PCIe for communication or expansion modules
- 1x PCIe x4 (PC311E Only)
- 1x PCI (PC311P Only)
- 2x LAN
- 1x LVDS, 1x VGA, 1x DisplayPort
- 1x LVDS, 1x DVI-D, 1x DisplayPort (Optional)
- 2x External RS-232/422/485, 2x Internal RS-232/422/485
- 3x USB 3.0, 1x USB 2.0
- 4x Isolated Digital Input, 4x Isolated Digital Output
- 9 to 48VDC wide range power input
- -40˚C to 70˚C extended operating temperature

1.2 Hardware Specification

Processor System
- Onboard Intel® Core ™ i5-5350U / Core™ i3-5010U / Celeron ® 3765U Dual Core Processor, 2.9 / 2.1 / 1.9GHz with AMI 64Mbit SPI BIOS

Memory
- 1x 204-Pin DDR3L-1333 / 1600MHz SO-DIMM (un-buffered and non-ECC), Max. up to 8GB

Display
Triple Display
- 1x LVDS, 1x VGA, and 1x DisplayPort

Expansion
- 1x PCIe X4 (PC311E Only)
- 1x PCI (PC311P Only)
- 2x Full-size Mini PCIe Socket for Wi-Fi / GSM / Expansion Module
- 1x Universal I/O Bracket (PC311E, PC311P Only)

Ethernet
- 1x Intel® i210-AT GbE LAN Port, Support Wake-on-LAN and PXE
- 1x Intel® I218-LM GbE LAN Port, Support Wake-on-LAN and PXE

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

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

Storage
- 1x Removable 2.5" SATA HDD Bay
- 2x Internal mSATA Slot (Shared by 2x Mini-PCIe Socket)
- 2x External SIM Card Socket
- Support RAID 0, 1, 5

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

Digital Input & Output
- 4x 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-)
- 4x 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 9~48VDC
- Power Ignition Sensing
- 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 80˚C
- Relative humidity: 10%~95% (non-condensing)

Physical
- **PC300 Series**
  - Dimension (WxDxH, mm): 246 x 220 x 42mm
  - Weight: 1.68kg
- **PC311E / PC311P Series**
  - Dimension (WxDxH, mm): 246 x 220 x 59mm
  - Weight: 2.21kg
- Construction: Extruded Aluminum with Heavy Duty Metal
- Mounting: VESA Mounting (Optional)

Operating System
- Windows® 7
- WES7
- Windows® 8.1
- WES8.1
- Windows 10
- Linux kernel 3.X

Certifications
- CE
- FCC Class A

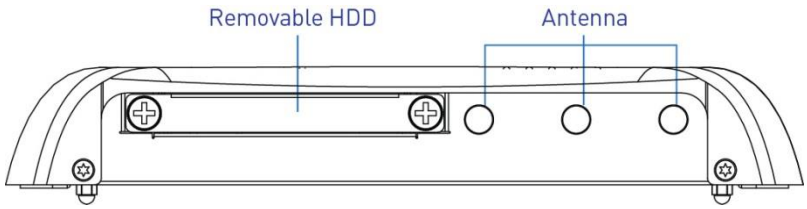
1.3 System I/O

1.3.1 PC300

Front Panel

Removable HDD Bay
Used to inserts a 2.5" HDD device

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



Rear Panel

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

VGA
Used to connect an analog VGA monitor

DisplayPort
Used to connect a DisplayPort monitor

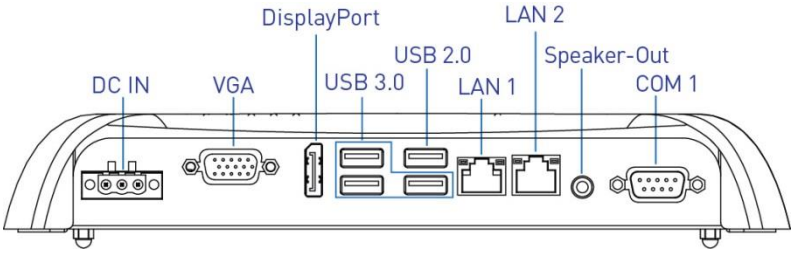
USB 3.0 port
Used to connect USB 3.0/2.0/1.1 device

USB 2.0 port
Used to connect USB 2.0/1.1 device

LAN port
Used to connect the system to a local area network

Speaker-out
Used to connect a external speaker

COM port
COM1 support RS232/422/485 serial device

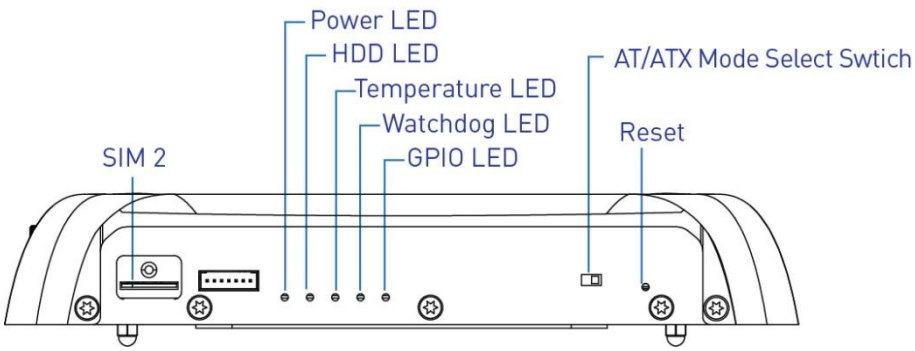


Side (Right)

SIM card
Used to insert SIM card

Reset switch
Press to reset the system

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



Side (Left)

Mic-in
Used to connect a microphone

COM port
COM2 support RS232/422/485 serial device

Digital I/O Terminal Block
The Digital I/O terminal block supports 4 digital input and 4 digital output

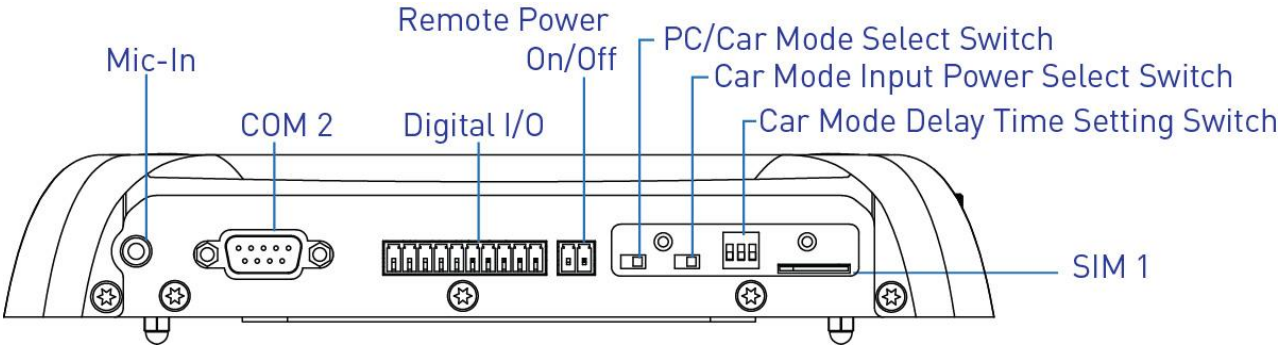
Remote power on/off switch
Used to plug a power on/off switch with terminal block

PC/CAR mode select switch
Used to select PC or CAR power mode

12V/24V mode select switch
Used to select Car power input voltage

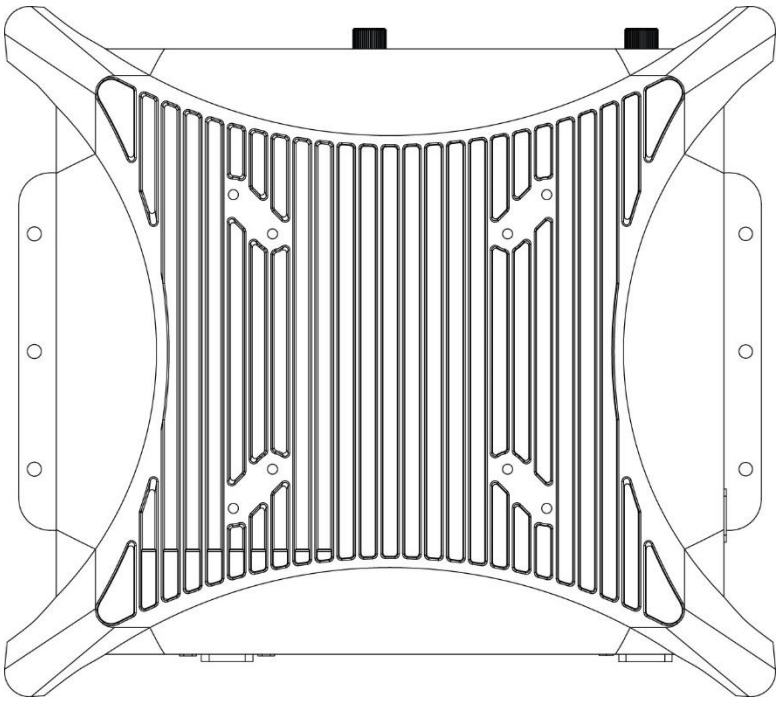
DELAY TIME switch
Used to select Car power turn off delay-time

SIM card
Used to insert SIM card



Top

VESA Mounting Hole
These are mounting holes for VESA mount (75x75mm and 100x100mm)

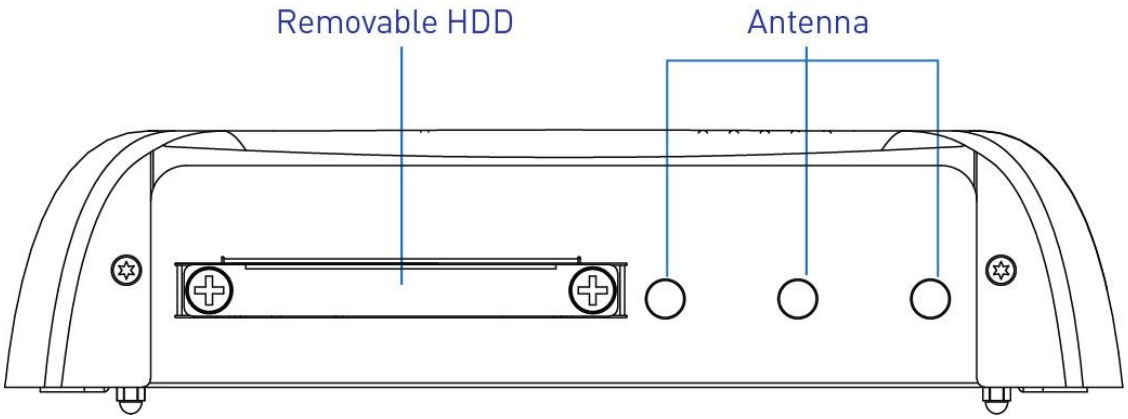


1.3.2 PC311E / PC311P

Front Panel

Removable HDD Bay
Used to inserts a 2.5" HDD device

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



Rear Panel

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Used to connect a DisplayPort monitor

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

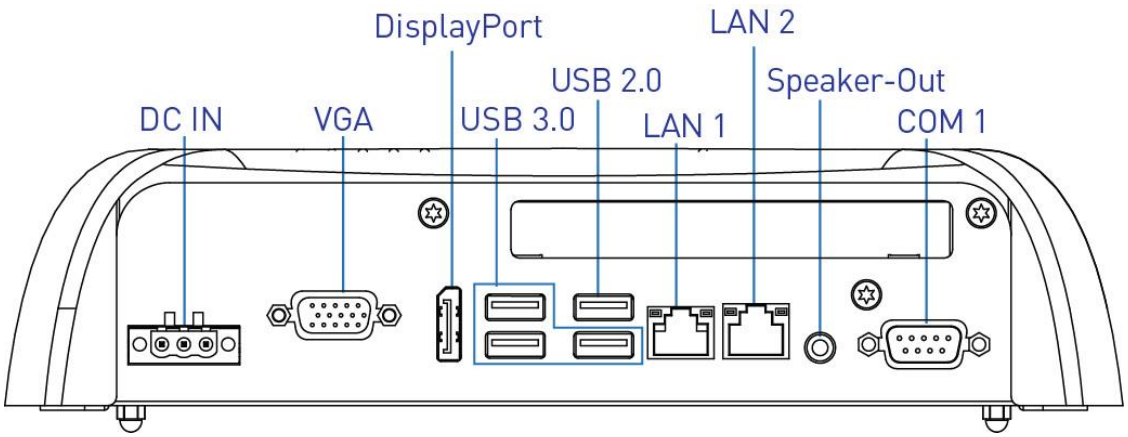
USB 2.0 port
Used to connect USB 2.0/1.1 device

LAN port
Used to connect the system to a local area network

Speaker-out
Used to connect a external speaker

COM port
COM1 support RS232/422/485 serial device

Expansion Area
Used to plug PCI or PCIe Card



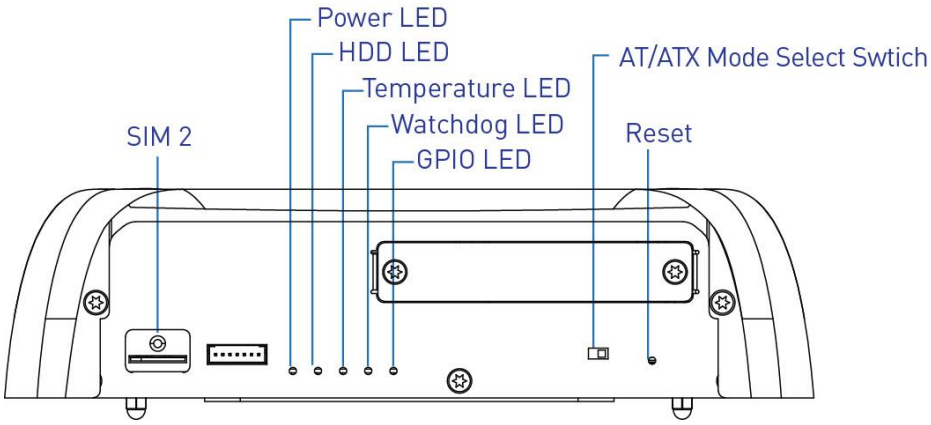
Side (Right)

SIM card
Used to insert SIM card

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

Reset switch
Press to reset the system

Universal I/O Bracket
Used to customized I/O output



Side (Left)

Mic-in
Used to connect a microphone

COM port
COM2 support RS232/422/485 serial device

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The Digital I/O terminal block supports 4 digital input and 4 digital output

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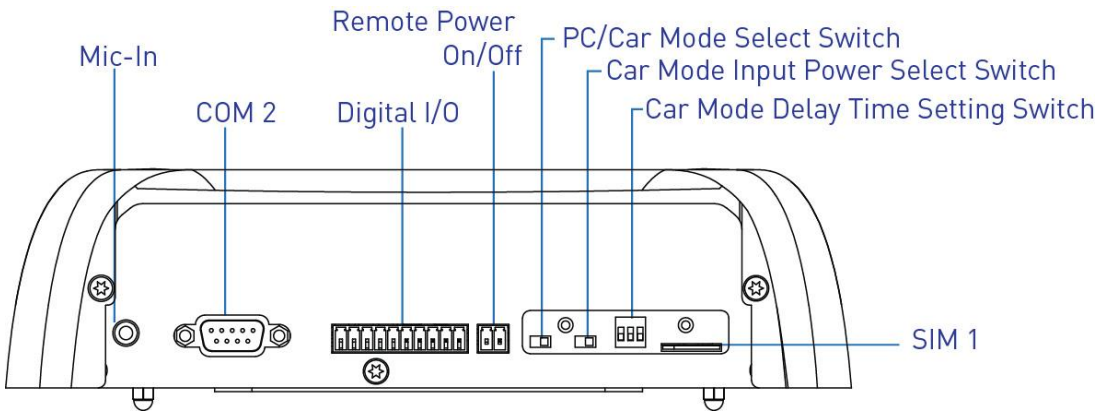
DELAY TIME switch
Used to select Car power turn off delay-time

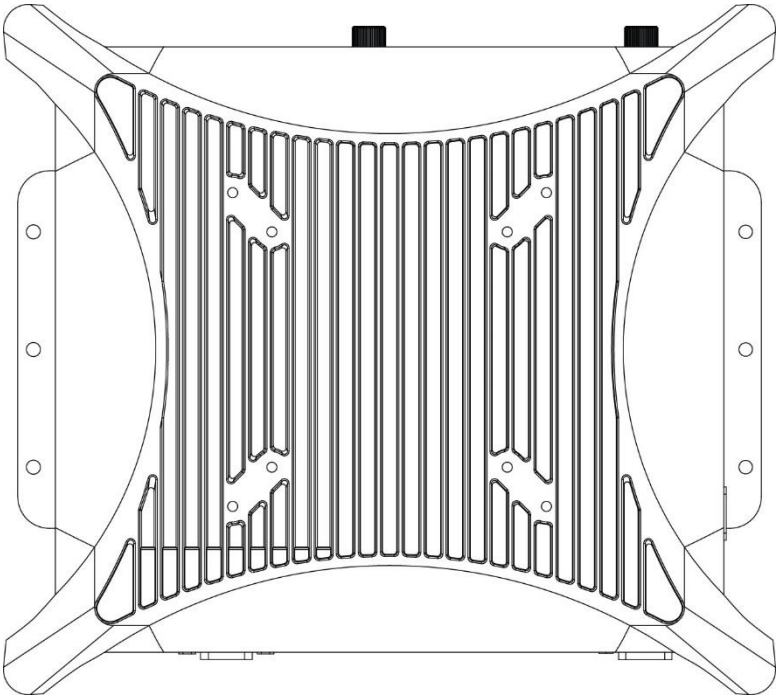
SIM card
Used to insert SIM card



Top

VESA Mounting Hole

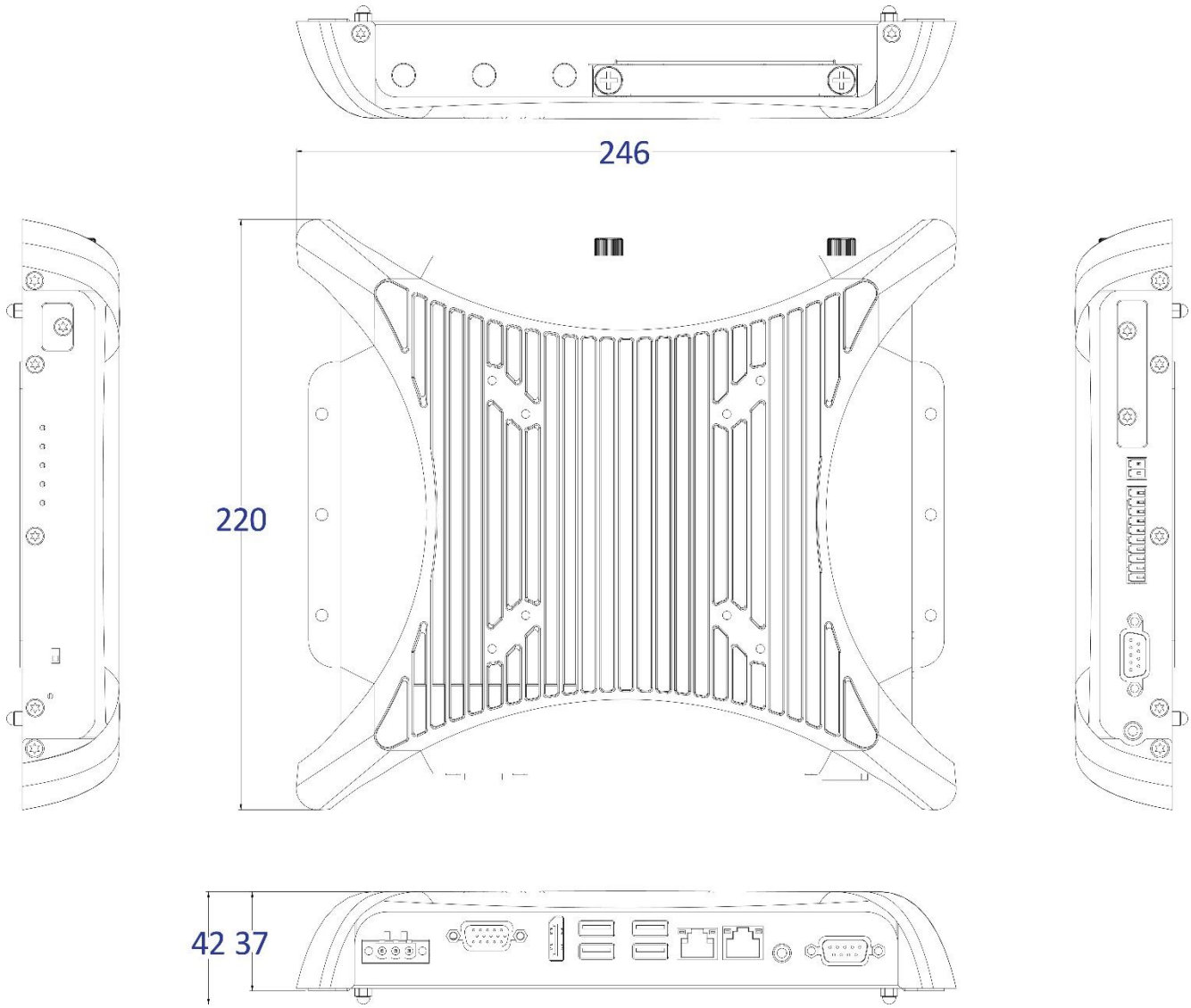
These are mounting holes for VESA mount (75x75mm and 100x100mm)



1.4 Mechanical Dimensions

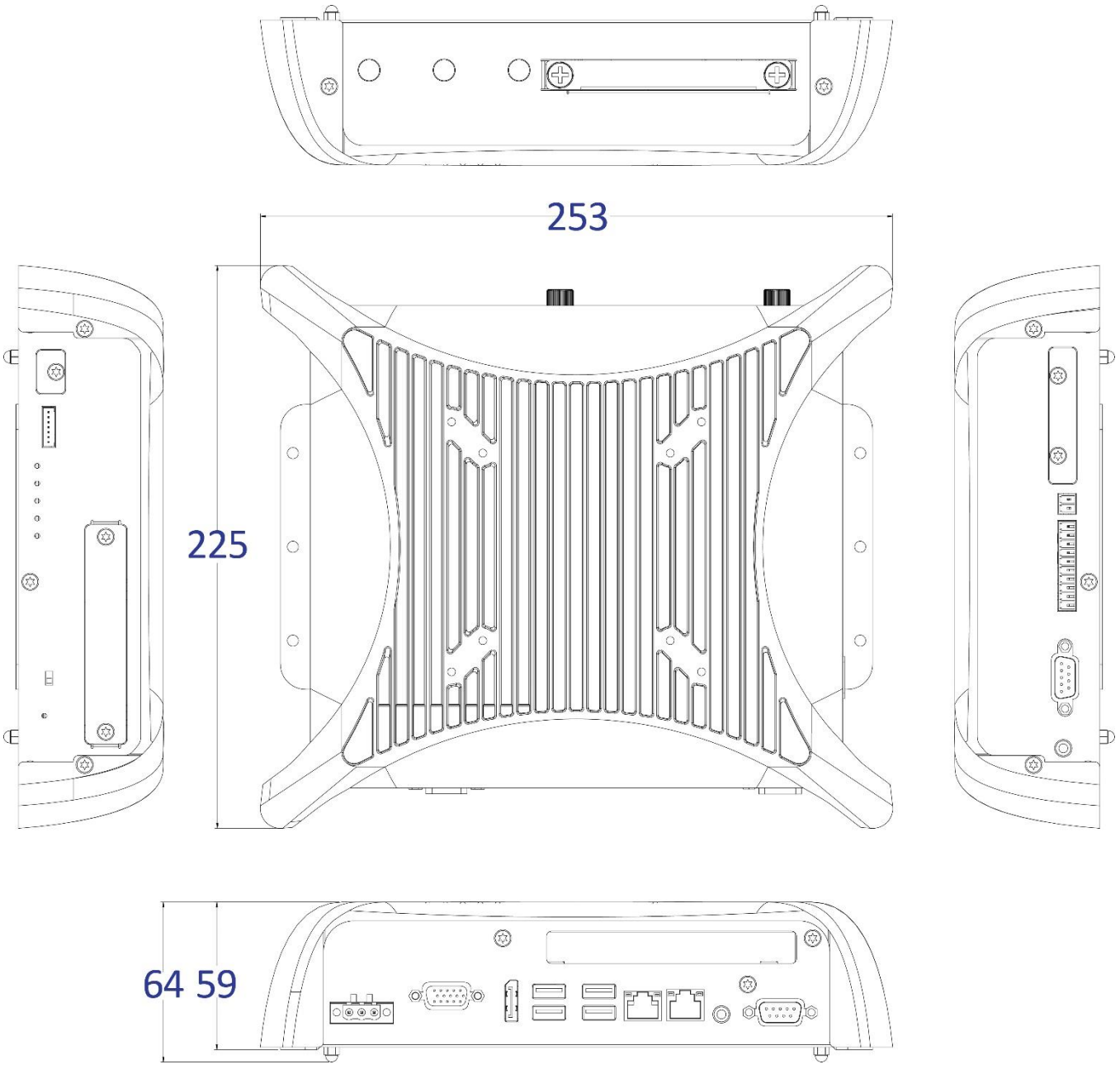
1.4.1 PC300

Unit: mm



1.4.2 PC311E / PC311P

Unit: mm

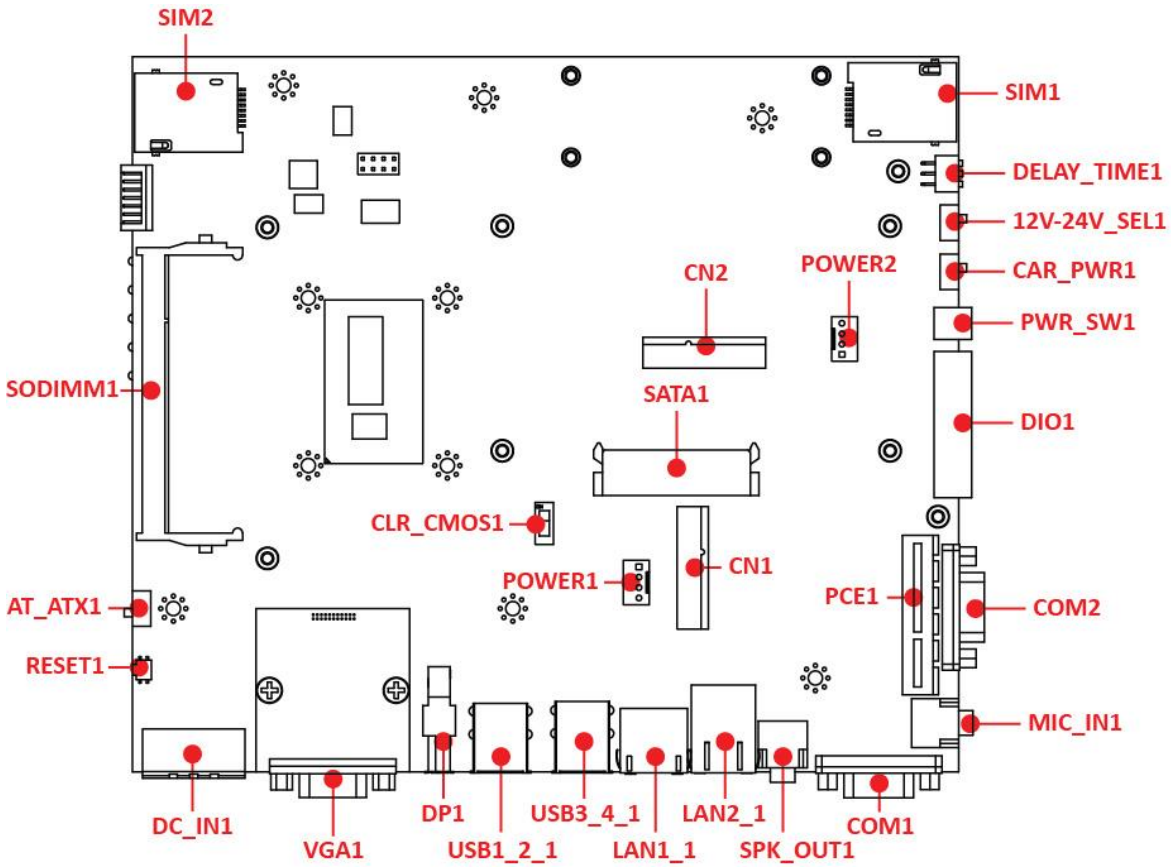


Chapter 2

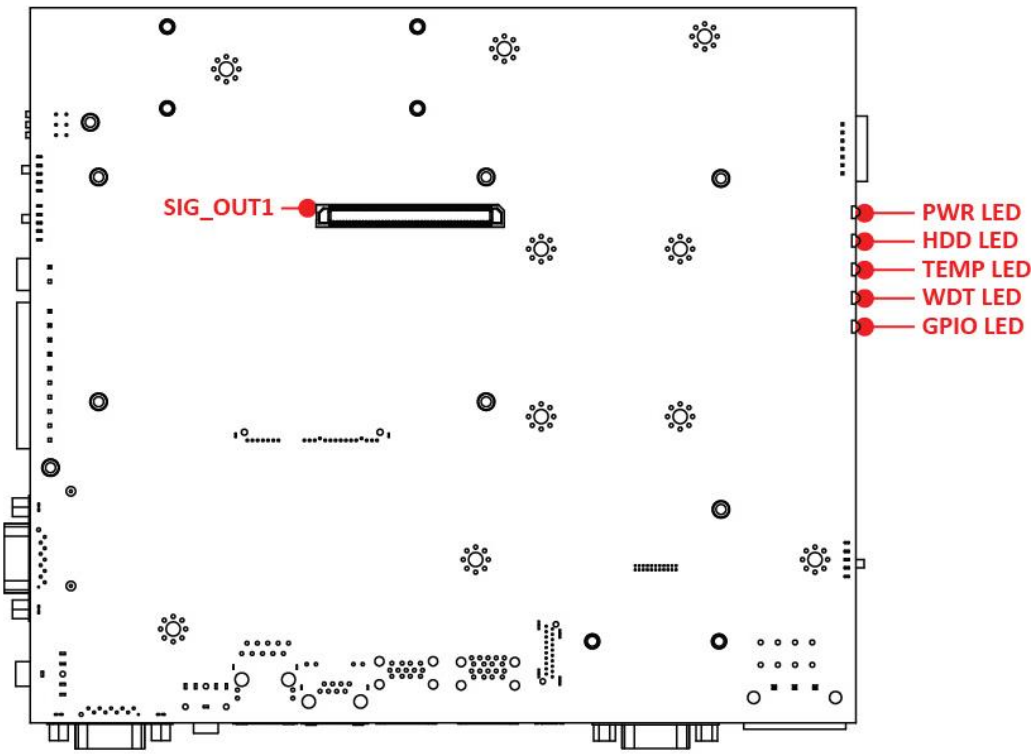
Switches and Connectors

2.1 Switch and Connector Locations

2.1.1 Top View



2.1.2 Bottom View



2.2 Connector / Switch Definition

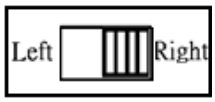
List of Connector / Switch

Connector Location	Definition
AT_ATX1	AT / ATX Power Mode Switch
CLR_CMOS1	Clear BIOS Switch
CAR_PWR1	PC / CAR Power Mode Switch
12-24V_SEL1	Car Power input voltage Switch
DELAY_TIME1	Car power turn off delay time Switch
PWR_SW1	Remote Power Switch
RESET1	Reset Switch
USB1_2_1	USB 3.0 Port
USB3_4_1	USB 3.0 / USB 2.0 Port
SIM1, SIM2	SIM Card Socket
COM1_1, COM2_1	RS232 / RS422 / RS485 Connector
COM3_1, COM4_1	RS232 / RS422 / RS485 Connector
LAN1_1, LAN2_1	LAN Port
DC_IN1	3-pin DC 9~48V Power Input Connector
VGA1	VGA Connector
DP1	DisplayPort Connector
SPK_OUT1	Speaker-out Jack
MIC_IN1	Mic-in Jack
DIO1	4DI / 4DO Connector
CN1, CN2	Mini PCI-Express / mSATA Socket
SATA1	SATA with Power Connector
SATA2	SATA Connector
POWER1, POWER2, POWER3	Power Connector
PCIE1	PCI-Express X4 Slot
PWR_LED1	Power LED Status
HDD_LED1	HDD Access LED Status
TEMP_LED1	Temperature LED Status
WDT_LED1	Watchdog LED Status
GPIO_LED1	GPIO LED Status

2.3 Switches Definitions

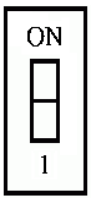
AT_ATX1: AT / ATX Power Mode Switch

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



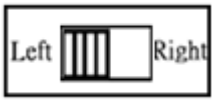
CLR_CMOS1: Clear BIOS Switch

Switch	Definition
Off	Normal Status (Default)
ON	Clear BIOS



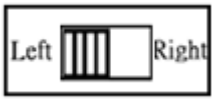
CAR_PWR1: PC / CAR Power Mode Switch

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



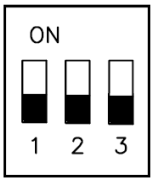
12-24V_SEL1 : Car Power input voltage Switch

Switch	Definition
1-2 (Left)	DC 24V CAR Power Input Mode（Default）
2-3 (Right)	DC 12V CAR Power Input Mode



DELAY_TIME1 : Car power turn off delay time Switch

Switch 1 / 2 / 3	Definition
OFF / OFF / OFF	0 sec.（Default）
ON / ON / OFF	1 min.
ON / OFF / ON	5 min.
ON / OFF / OFF	10 min.
OFF / ON / ON	30 min.
OFF / ON / OFF	1 hour
OFF / OFF / ON	2 hour



Step 1:
To select power ignition by PC/CAR switch.

Step 2:
To select battery input voltage by 12V / 24V switch.

Step 3:
To configure the power off delay time, please check the Delay Time Setting Options in advance.

Step 4:
To connect the power and ignition power

Step 3

Switch 1 / 2 / 3	Power off delay time
ON / ON / ON	0 second
ON / ON / OFF	1 minute
ON / OFF / ON	5 minutes
ON / OFF / OFF	10 minutes
OFF / ON / ON	30 minutes
OFF / ON / OFF	1 hour
OFF / OFF / ON	2 hours

Step 1
Pin 1-2 (Left): PC Power Mode
Pin 2-3 (Right): Power Ignition Mode

Step 2
Pin 1-2 (Left): Battery 24V Input Mode
Pin 2-3 (Right): Battery 12V Input Mode

Example: Delay Time Setting for 5 minutes

1. If delay time set as "5 minutes"

2. The system will shut down 5 minutes later after turning off the vehicle.

Step 4
To connect the battery power and ignition power

2.4 Connectors Definitions

PWR_SW1 : Remote Power Switch

Connector Type: Terminal Block 1X2 2-pin, 3.5mm pitch

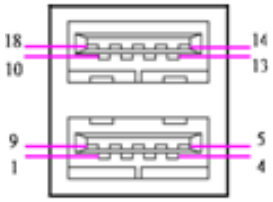
Pin	Definition
1	Power Button
2	GND

RESET1 : Reset Button

Pin	Definition
1	RESET
2	GND

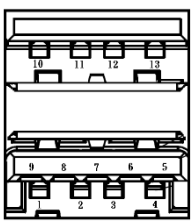
USB1_2_1: USB3.0 Connector, Type A

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_RX1-	14	USB3_RX2-
6	USB3_RX1+	15	USB3_RX2+
7	GND	16	GND
8	USB3_TX1-	17	USB3_TX2-
9	USB3_TX1+	18	USB3_TX2+



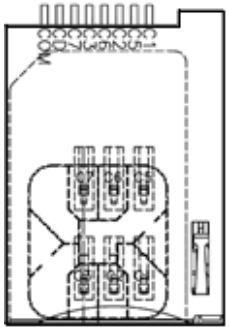
USB3_4_1: USB3.0 / USB2.0 Connector, Type A

Pin	Definition	Pin	Definition
1	+5V	10	+5V
2	USB2_D2-	11	USB2_D3-
3	USB2_D2+	12	USB2_D3+
4	GND	13	GND
5	USB3_R3-	14	
6	USB3_R3+	15	
7	GND	16	
8	USB3_TX3-	17	
9	USB3_TX3+	18	



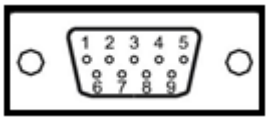
SIM1, SIM2：SIM Card Socket

Pin	Definition	Pin	Definition
C1	UIM_PWR	C6	UIM_VPP
C2	UIM_RESET	C7	UIM_DATA
C3	UIM_CLK	CD	NC
C5	GND	COM	GND



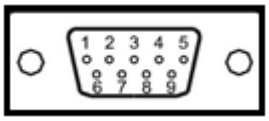
COM1_1: RS232 / RS422 / RS485 Connector
Connector Type: 9-pin D-Sub

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		
6	DSR1		
7	RTS1		
8	CTS1		
9	RI1		



COM2_1: RS232 / RS422 / RS485 Connector
Connector Type: 9-pin D-Sub

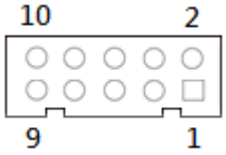
Pin	RS232 Definition	RS422 / 485 Full Duplex Definition	RS485 Half Duplex Definition
1	DCD2	TX2-	DATA2-
2	RxD2	TX2+	DATA2+
3	TxD2	RX2+	
4	DTR2	RX2-	
5	GND		
6	DSR2		
7	RTS2		
8	CTS2		
9	RI2		



COM3_1: RS232 / RS422 / RS485 Connector

Connector Type: 9-pin D-Sub

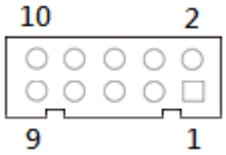
Pin	RS232 Definition	RS422 / 485 Full Duplex Definition	RS485 Half Duplex Definition
1	DCD3	TX3-	DATA3-
2	RxD3	TX3+	DATA3+
3	TxD3	RX3+	
4	DTR3	RX3-	
5	GN3		
6	DSR3		
7	RTS3		
8	CTS3		
9	RI3		



COM4_1: RS232 / RS422 / RS485 Connector

Connector Type: 9-pin D-Sub

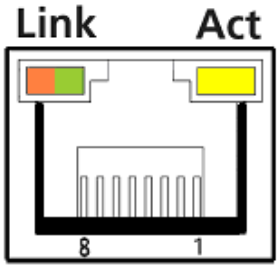
Pin	RS232 Definition	RS422 / 485 Full Duplex Definition	RS485 Half Duplex Definition
1	DCD3	TX3-	DATA3-
2	RxD3	TX3+	DATA3+
3	TxD3	RX3+	
4	DTR3	RX3-	
5	GN3		
6	DSR3		
7	RTS3		
8	CTS3		
9	RI3		



LAN1, LAN2: RJ45 with LEDs Port

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

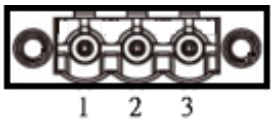


Link LED Status	Definition	Act LED Status	Definition
Steady Orange	1Gbps Network Link	Blinking Yellow	Data Activity
Steady Green	100Mbps Network Link	Off	No Activity
Off	10Mbps Network Link		

DC_IN1: DC Power Input Connector (+9~48V)

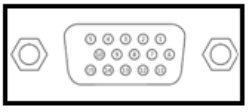
Connector Type: Terminal Block 1X3 3-pin, 5.0mm pitch

Pin	Definition
1	+9~48VIN
2	Power Ignition
3	GND



VGA1: VGA Connector

Pin	Definition	Pin	Definition
1	RED	9	+5V
2	GREEN	10	GND
3	BLUE	11	NC
4	NC	12	DDC_SDA
5	GND	13	HSYNC
6	RED_GND	14	VSYNC
7	GREEN_GND	15	DDC_SCL
8	BLUE_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

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

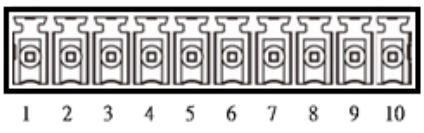
Pin	Definition
1	GND
2	OUT_R
3	NC
4	GND
5	OUT_L

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

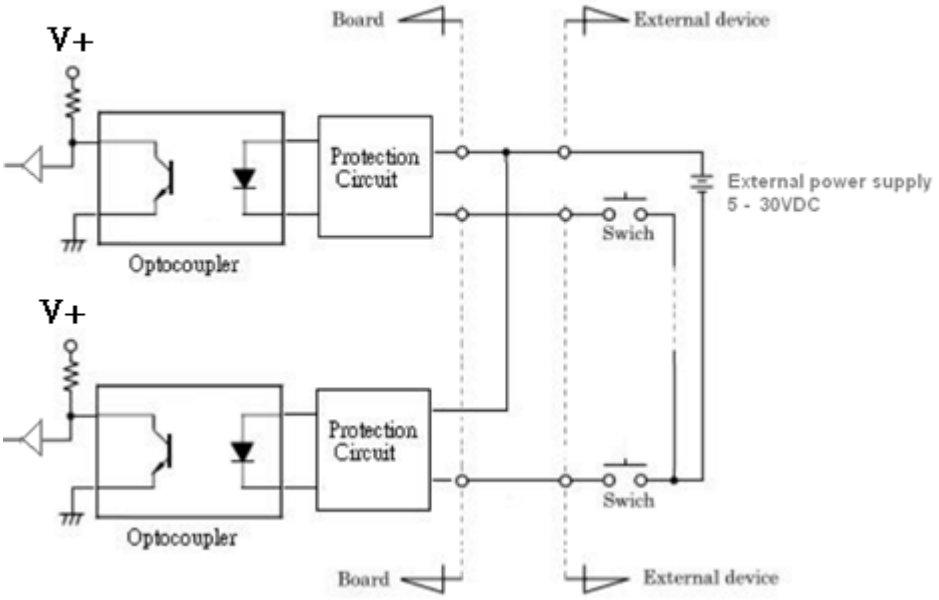
Pin	Definition
1	GND
2	MIC_R
3	NC
4	GND
5	MIC_L

DIO1: Digital Input / Output Connector
Connector Type: Terminal Block 1X10 10-pin, 3.5mm pitch

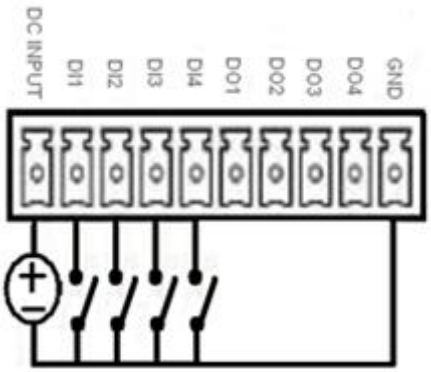
Pin	Definition	Pin	Definition
1	DC INPUT	6	DO1
2	DI1	7	DO2
3	DI2	8	DO3
4	DI3	9	DO4
5	DI4	10	GND



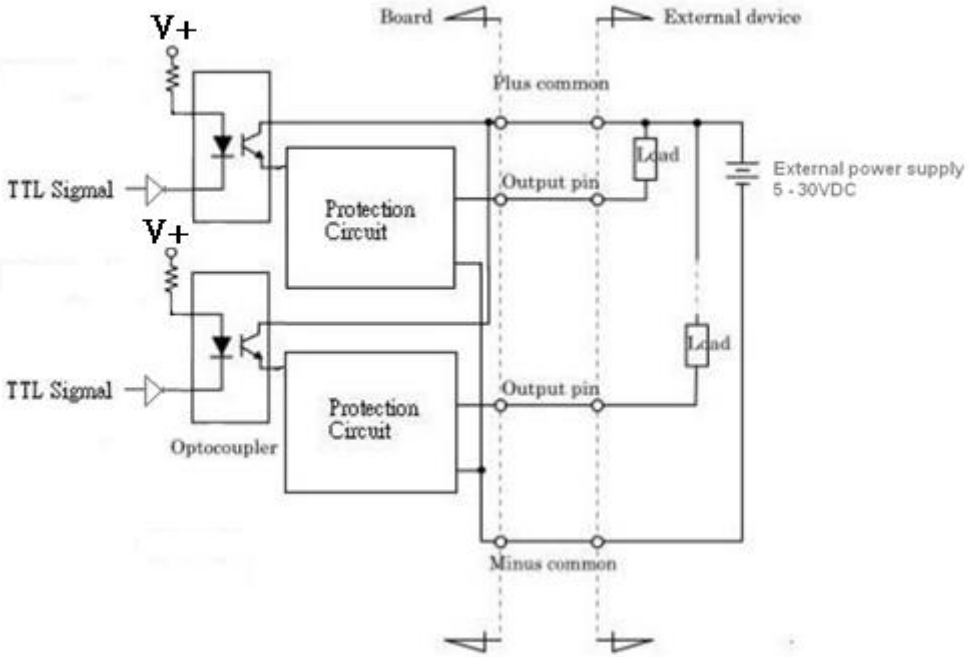
Reference Input Circuit



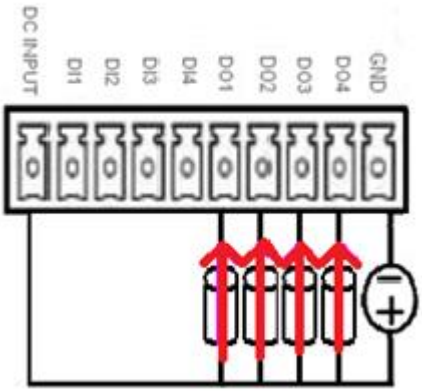
Digital Input Wiring



External Output Circuit

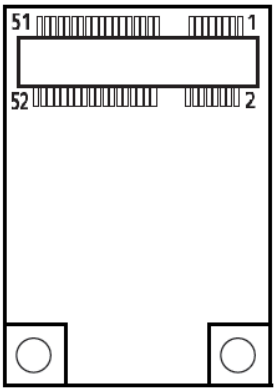


Digital Output Wiring



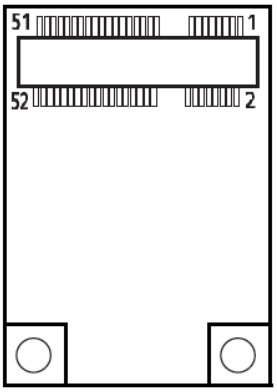
CN1: Mini PCI-Express / mSATA Socket

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	MINIPCIE RST#	40	GND
5	NC	23	MINIPCIE_RXN6_0 (SATA_RXN3)	41	+3.3V
6	+1.5V	24	+3.3V	42	NC
7	CLKREQ4#	25	MINIPCIE_RXP6_0 (SATA_RXP3)	43	GND
8	USIM2_PWR	26	GND	44	NC
9	GND	27	GND	45	NC
10	USIM2_DATA	28	+1.5V	46	NC
11	MINIPCIE_CLKN1	29	GND	47	NC
12	USIM2_CLK	30	SMB_CLK	48	+1.5V
13	MINIPCIE_CLKP1	31	MINIPCIE_TXN6_0 (SATA_TXN3)	49	NC
14	USIM2_RESET	32	SMB_DATA	50	GND
15	GND	33	MINIPCIE_TXP6_0 (SATA_TXP3)	51	NC
16	USIM2_VPP	34	GND	52	+3.3V
17	NC	35	GND		
18	GND	36	USB_D4-		



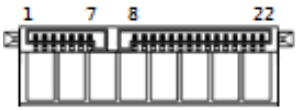
CN2: Mini PCI-Express / mSATA Socket

Pin	Definition	Pin	Definition	Pin	Definition
1	WAKE#	19	NC	37	GND
2	+3.3V	20	+3.3V	38	USB_D5+
3	NC	21	GND	39	+3.3V
4	GND	22	MINIPCIE RST#	40	GND
5	NC	23	MINIPCIE_RXN2 (SATA_RXP2)	41	+3.3V
6	+1.5V	24	+3.3V	42	NC
7	CLKREQ5#	25	MINIPCIE_RXP2 (SATA_RXN2)	43	GND
8	USIM1_PWR	26	GND	44	NC
9	GND	27	GND	45	NC
10	USIM1_DATA	28	+1.5V	46	NC
11	MINIPCIE_CLKN2	29	GND	47	NC
12	USIM1_CLK	30	SMB_CLK	48	+1.5V
13	MINIPCIE_CLKP2	31	MINIPCIE_TXN2 (SATA_TXP2)	49	NC
14	USIM1_RESET	32	SMB_DATA	50	GND
15	GND	33	MINIPCIE_TXP2 (SATA_TXN2)	51	NC
16	USIM1_VPP	34	GND	52	+3.3V
17	NC	35	GND		
18	GND	36	USB_D5-		



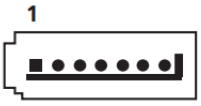
SATA1: SATA with Power Connector

Pin	Definition	Pin	Definition
1	GND	12	GND
2	SATA_TXP0	13	GND
3	SATA_TXN0	14	+5V
4	GND	15	+5V
5	SATA_RXN0	16	+5V
6	SATA_RXP0	17	GND
7	GND	18	GND
8	+3.3V	19	GND
9	+3.3V	20	+12V
10	+3.3V	21	+12V
11	GND	22	+12V



SATA2: SATA Connector

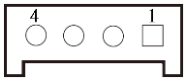
Pin	Definition
1	GND
2	SATA_TXP0
3	SATA_TXN0
4	GND
5	SATA_RXN0
6	SATA_RXP0
7	GND



POWER1, POWER2, POWER3: Power Connector

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

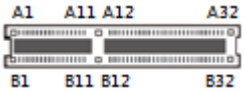
Pin	Definition
1	+5V
2	GND
3	GND
4	+12V



PCIE1: PCI-Express X4 Socket

Connector Type: PCI-Express X4 Slot

Pin	Definition	Pin	Definition	Pin	Definition	Pin	Definition
A1	PCIE_PRSNT1	A17	PEG_RXN0	B1	+12V	B17	PRSNT2_1
A2	+12V	A18	GND	B2	+12V	B18	GND
A3	+12V	A19	NC	B3	+12V	B19	PEG_TXP1
A4	GND	A20	GND	B4	GND	B20	PEG_TXN1
A5	NC	A21	PEG_RXP1	B5	SMB_CLK	B21	GND
A6	NC	A22	PEG_RXN1	B6	SMB_DATA	B22	GND
A7	NC	A23	GND	B7	GND	B23	PEG_TXP2
A8	NC	A24	GND	B8	+3.3V	B24	PEG_TXN2
A9	+3.3V	A25	PEG_RXP2	B9	NC	B25	GND
A10	+3.3V	A26	PEG_RXN2	B10	+3.3VSB	B26	GND
A11	PCIE_RESET#	A27	GND	B11	PCIE_WAKE#	B27	PEG_TXP3
A12	GND	A28	GND	B12	NC	B28	PEG_TXN3
A13	PEG_CLK_P	A29	PEG_RXP3	B13	GND	B29	GND
A14	PEG_CLK_N	A30	PEG_RXN3	B14	PEG_TXP0	B30	NC
A15	GND	A31	GND	B15	PEG_TXN0	B31	PRSNT2_2
A16	PEG_RXP0	A32	NC	B16	GND	B32	GND



PWR_LED1: Power LED Status

Pin	Definition
1	POWER LED+
2	POWER LED-

HDD_LED1: HDD Access LED Status

Pin	Definition
1	HDD LED+
2	HDD LED-

TEMP_LED1: Temperature LED Status

Pin	Definition
1	TEMPERATURE LED+
2	TEMPERATURE LED-

WDT_LED1: Watchdog LED Status

Pin	Definition
1	WATCHDOG LED+
2	WATCHDOG LED-

GPIO_LED1: GPIO LED Status

Pin	Definition
1	GPIO LED+
2	GPIO LED-

Chapter 3

System Setup

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

WARNING

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

3.2 Removing chassis top cover.

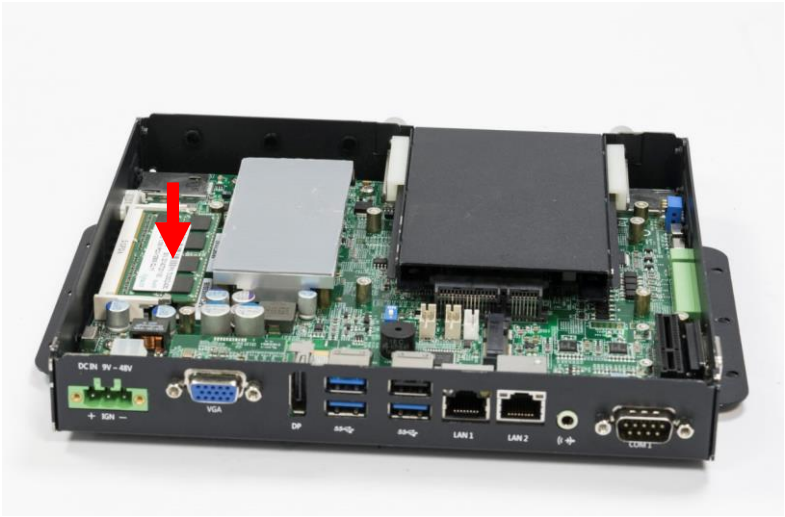
1. Unscrew the 6 screws (M3x5L) below.

2. Now you can remove the top cover of PC module.

3.3 Installing SODIMM

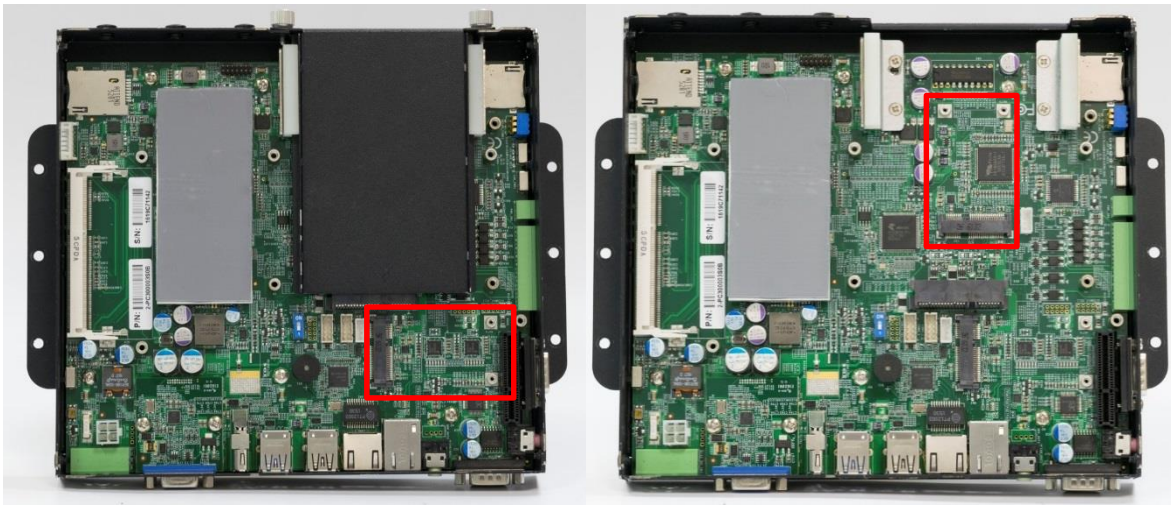
1. Insert memory module from 45 degree direction.

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



3.4 Installing mini PCIe card / mSATA

1. Two mini PCIe slots are available for PC300 series; the second one can be seen when the HDD bay is removed. They both also support 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).

3.5 Installing antenna

1. Three antenna holes are available for PC300 series.

2. Remove antenna hole cover on the system panel.

3. Have antenna jack penetrate through the hole.

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

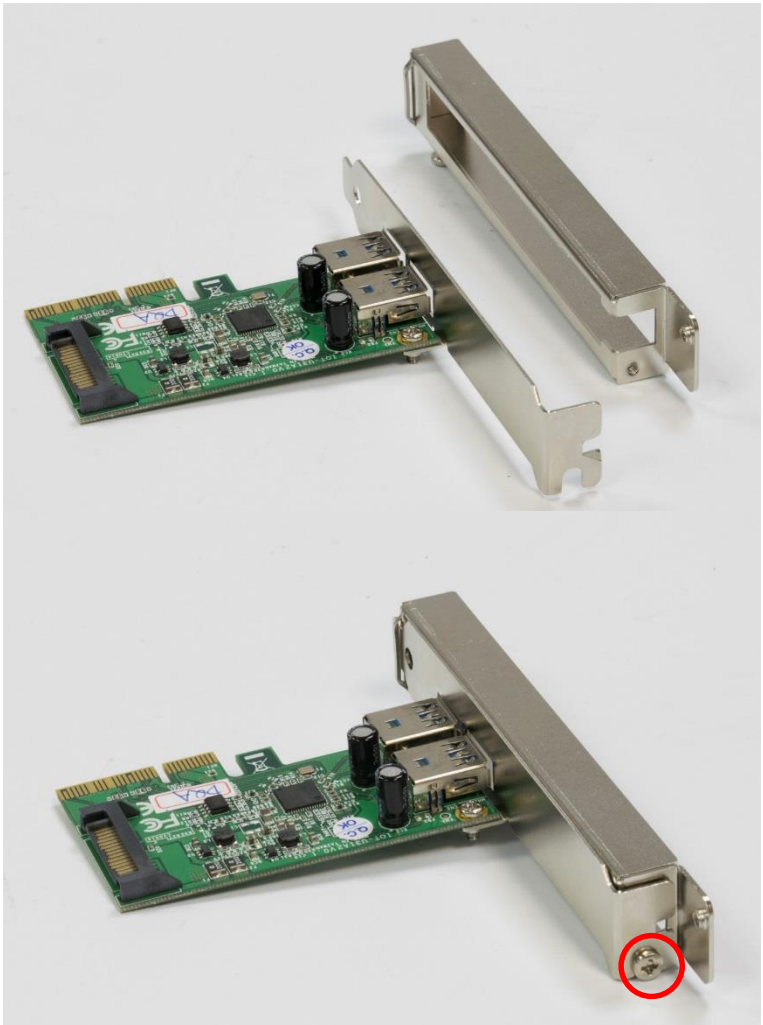
5. Attach the RF connector at the cable-end onto the communication module.

6. Assemble the antenna and antenna jack together.

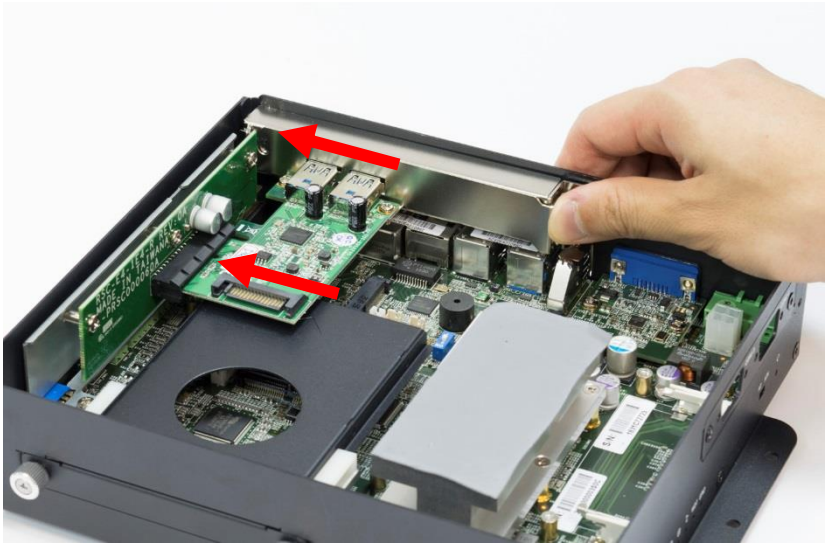
3.6 Installing PCIe/PCI expansion card (Only for PC311E & PC311P)

1. PCIe or PCI card with FHHL dimension is supported by PC311 series.
2. Unscrew the two screws (M3x5L) to remove the expansion window bracket.

3. Lock your expansion card with the expansion window bracket by one screw (M3x5L).



4. Install the PCIe/PCI card according to the below direction and then push the card towards the slot to ensure the gold finger is firmly inserted into the slot.



5. Fasten the two screws (M3x5L) on the panel back to lock the card and expansion window bracket.

3.7 Assembly chassis top cover

1. Ensure thermal pad is in place on the CPU thermal block.

2. Close the chassis top cover following the below direction and make sure the aluminum part on the top cover is touching the thermal pad on CPU thermal block.

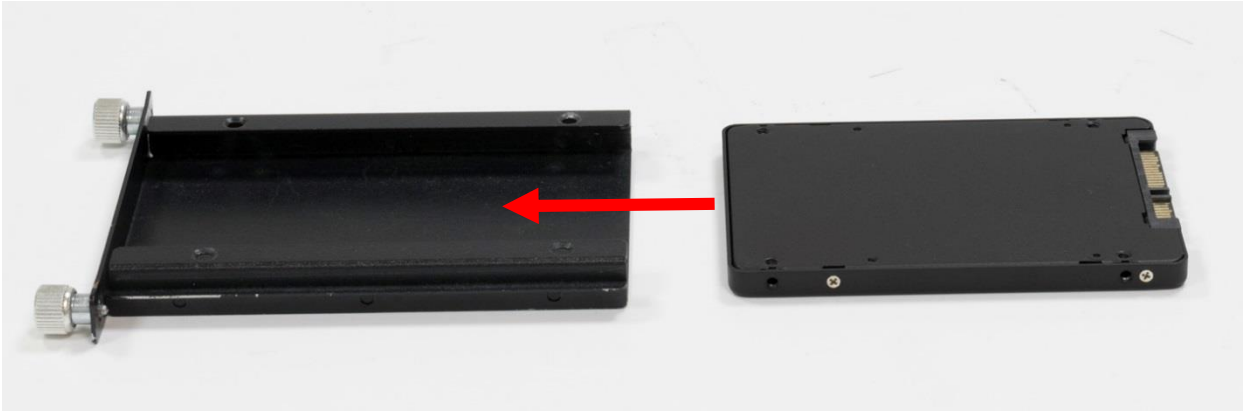
3. Fasten the six screws (M3x5L) to lock the system body with top cover.

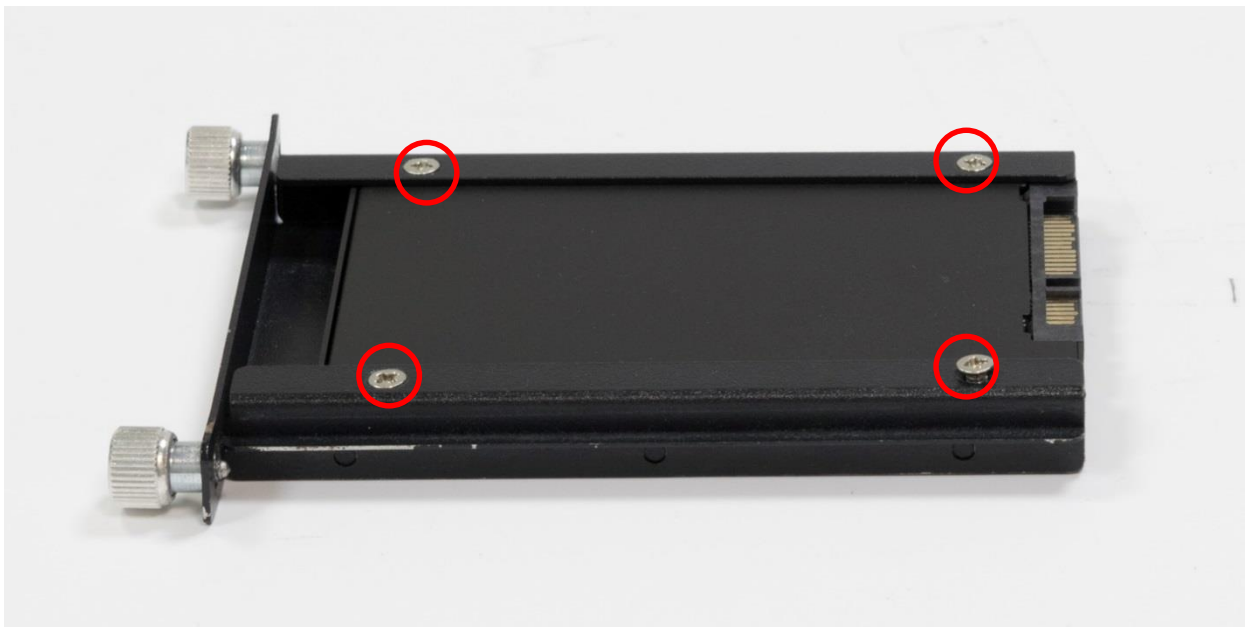
3.8 Installing HDD on removable SATA HDD bay

1. One removable SATA HDD bays are available for PC300 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 (M3x4L).





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

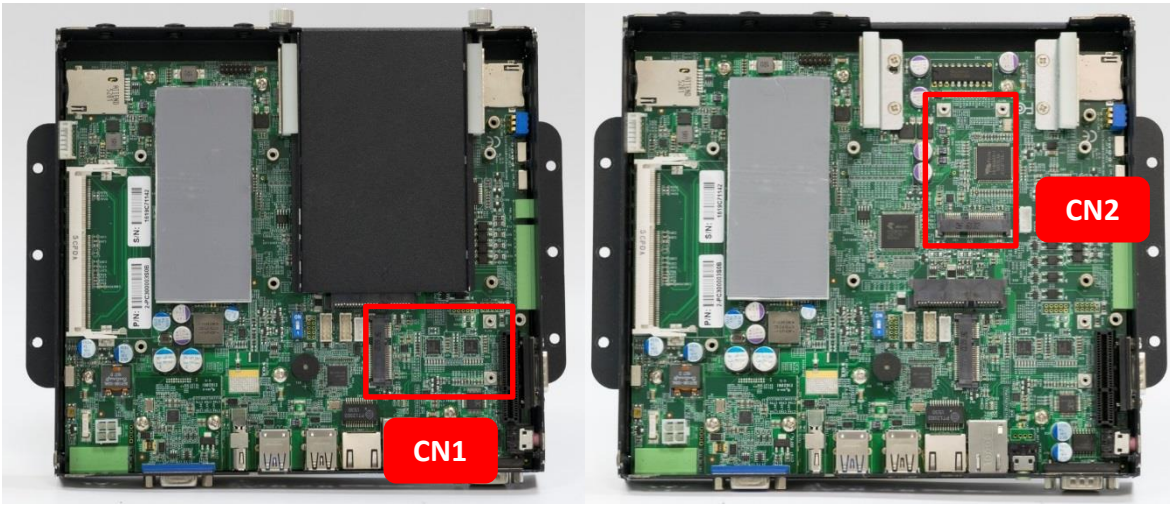
3.9 Installing SIM card

1. For PC300 Series, SIM card slots are located on the side of the system inside protective bracket. Unscrew the screws (M3x5L) below to remove the bracket.

2. Now you can insert SIM card into the socket.

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

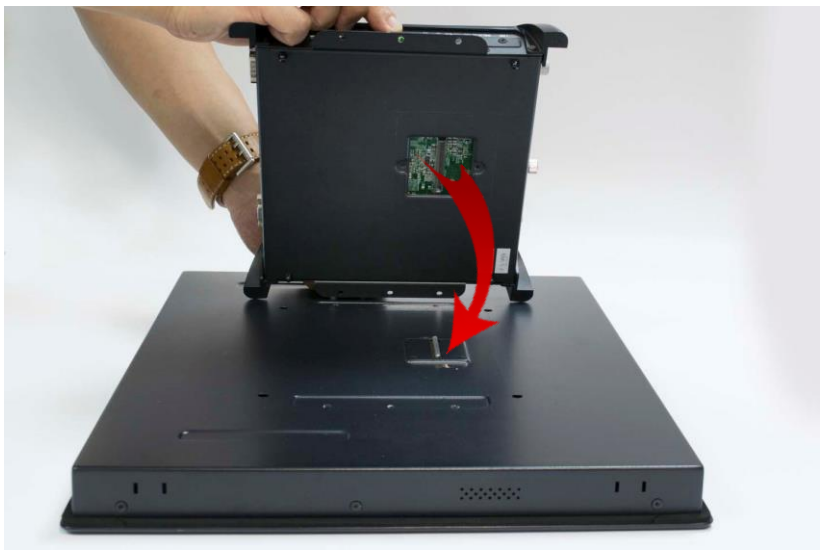
SIM Card Socket Number	Matching Mini PCIe Slot
SIM 1	Mini PCIe / mSATA (CN2)
SIM 2	Mini PCIe / mSATA (CN1)



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

4.10 Connecting PC module with VIO display module

1. Hold the PC module with its connector facing towards the connector on the back of VIO display module.



2. Press the PC module downward to ensure two modules are firmly connected.

3. Lock the below 6 screws (M4x5L).

4.11 Screw location for PC311 series top cover

1. Screw location on the top cover of PC311 series is different from PC300. Highlighted as below.

Chapter 4

BIOS Setup

4.1 BIOS Introduction

The system BIOS software is stored on EEPROM. The BIOS provides an interface to modify the configuration. When the battery is removed, all the parameters will be reset.

BIOS Setup

Power on the embedded system and by pressing <Del> or <F2> immediately allows you to enter the setup screens. If the message disappears before you respond and you still wish to enter the Setup, restart the system by turning it OFF and ON or pressing the RESET button.
You may also restart the system by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys.

Control Keys	
<←> <→>	Select Screen
<↑> <↓>	Select Item
<Enter>	Select
<Page Up/+>	Increases the numeric value or makes changes
<Page Down/->	Decreases the numeric value or makes changes
<F1>	General Help
<F2>	Previous Value
<F3>	Load Optimized Defaults
<F4>	Save Configuration and Exit
<Tab>	Select Setup Fields
<Esc>	Exit BIOS Setup

Main Setup

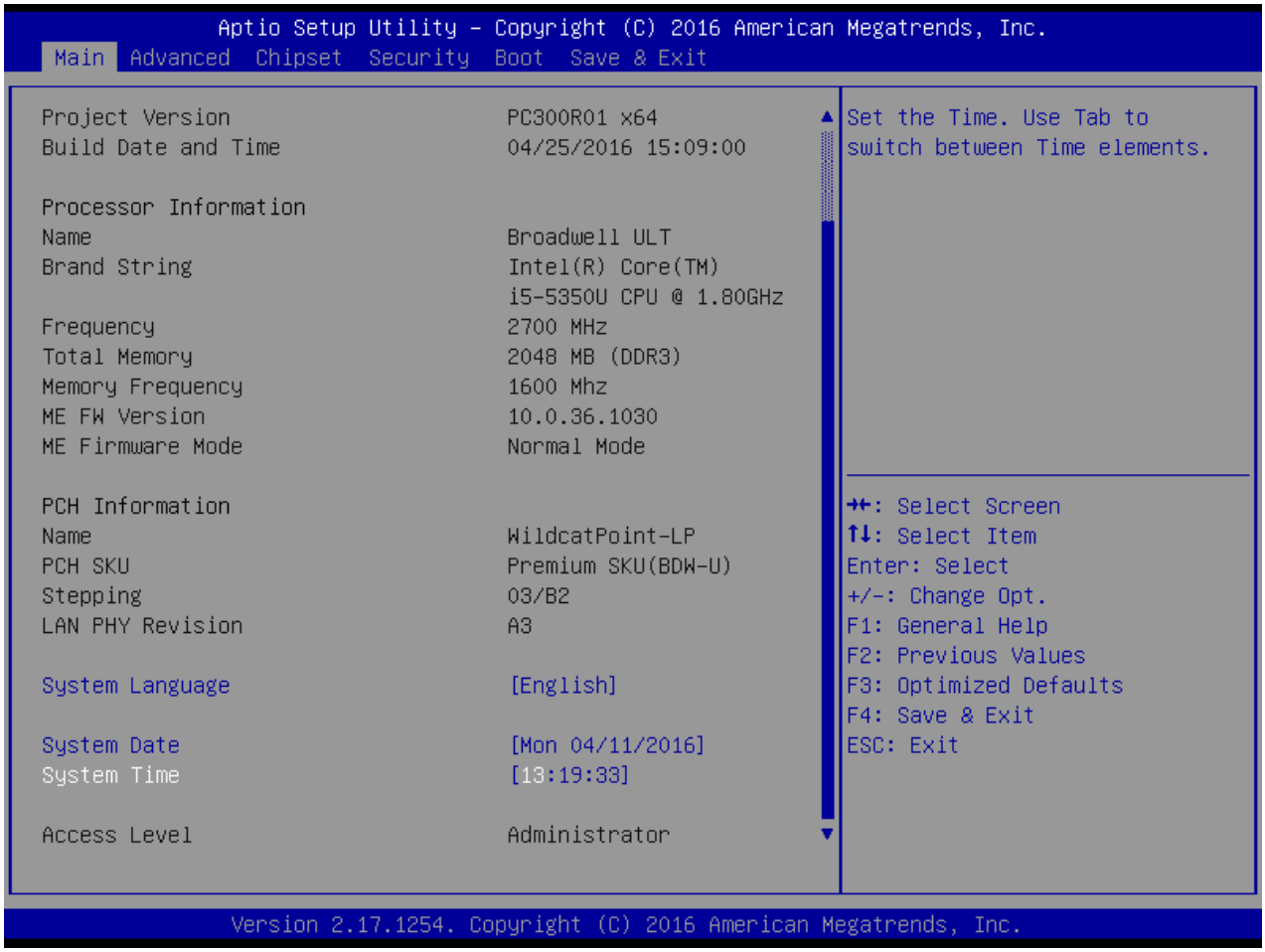
The main menu lists the setup functions you can make changes to. You can use the arrow keys (↑↓) to select the item. The on-line description of the highlighted setup function is displayed at the bottom of the screen.

General Help <F1>

The BIOS setup program provides a General Help screen. You can call up this screen from any menu by simply pressing <F1>. The Help screen lists the appropriate keys to use and the possible selections for the highlighted item. Press <Esc> to exit the Help screen.

4.2 Main Setup

Press <Del> to enter BIOS CMOS Setup Utility, the Main Menu (as shown below) will appears on the screen. Use arrow keys to move among the items and press <Enter> to accept or enter a sub-menu.



4.2.1 System Language

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

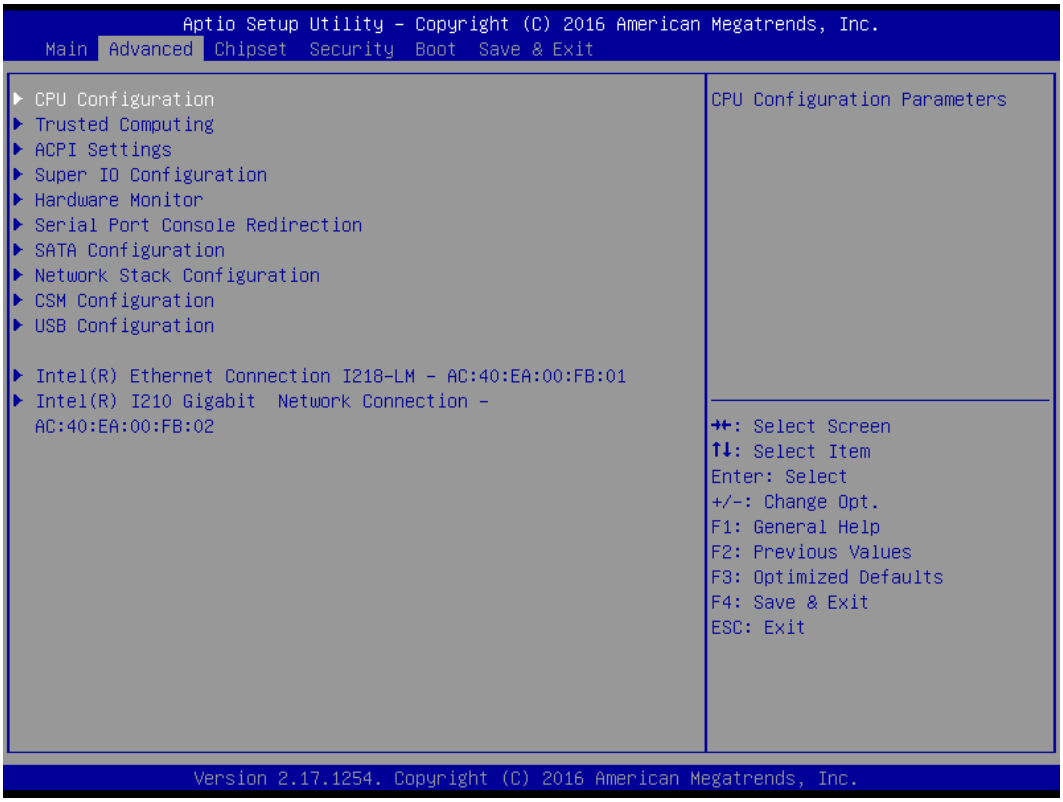
4.2.1 System Date

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

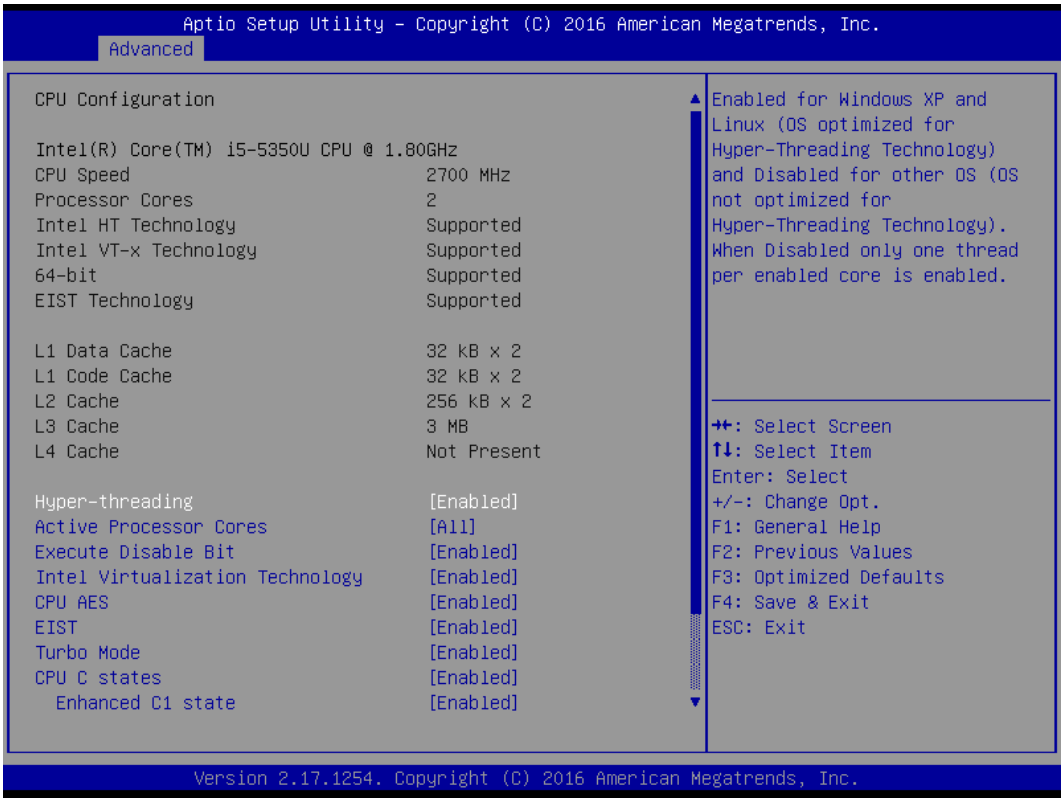
4.2.2 System Time

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

4.3 Advanced Setup



4.3.1 CPU Configuration



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

Active Processor Cores
This setting specifies the number of active processor cores.

Execute Disable Bit
This item allows you to enable or disable the No-Execution page protection technology.

Intel Virtualization Technology
This item allows you to enable or disable intel's virtualization technology.

CPU AES
This item allows you to enable or disable CPU Advanced Encryption Standard (AES) instructions.

EIST
This item allows you to enable or disable Enhanced Intel SpeedStep Technology (EIST).

Turbo Mode
This item allows you to enable or disable Turbo Mode.

CPU C States
This item allows you to enable or disable CPU C states.

Enhanced C1 State
This item allows you to enable or disable Enhanced C1 state.

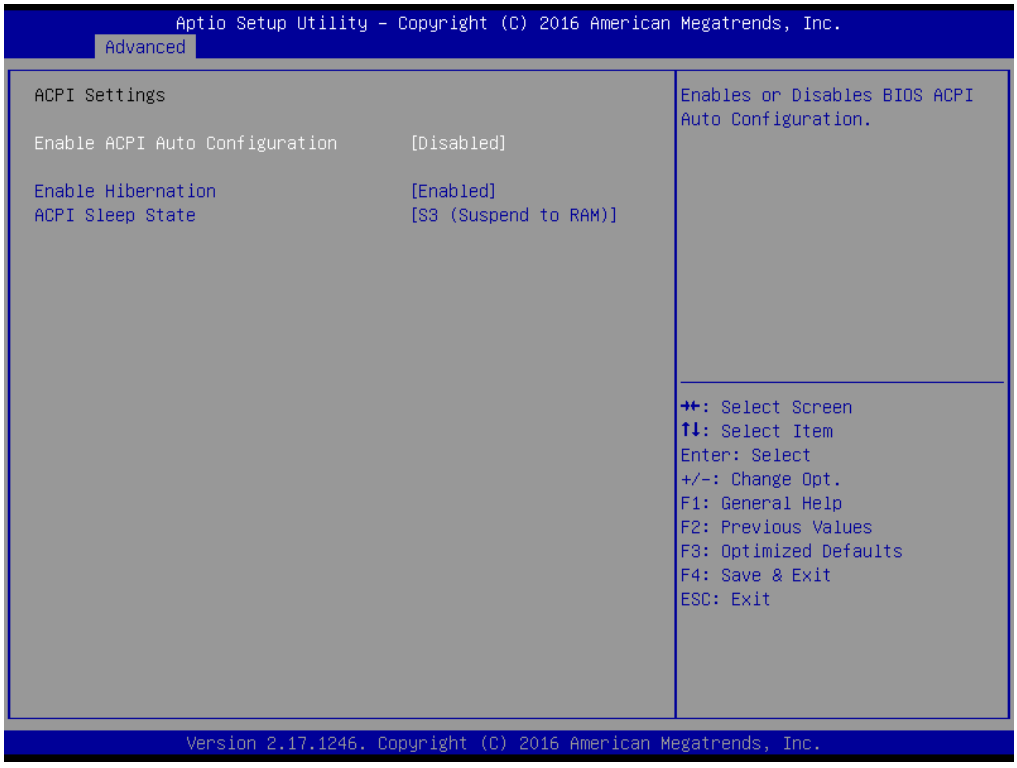
CPU C3 Report
This item allows you to enable or disable CPU C3 report to OS.

CPU C6 Report
This item allows you to enable or disable CPU C6 report to OS.

C6 Latency
Configure Short/Long latency for C6.

CPU C7 Report
Enable or disable CPU C7 report to OS.

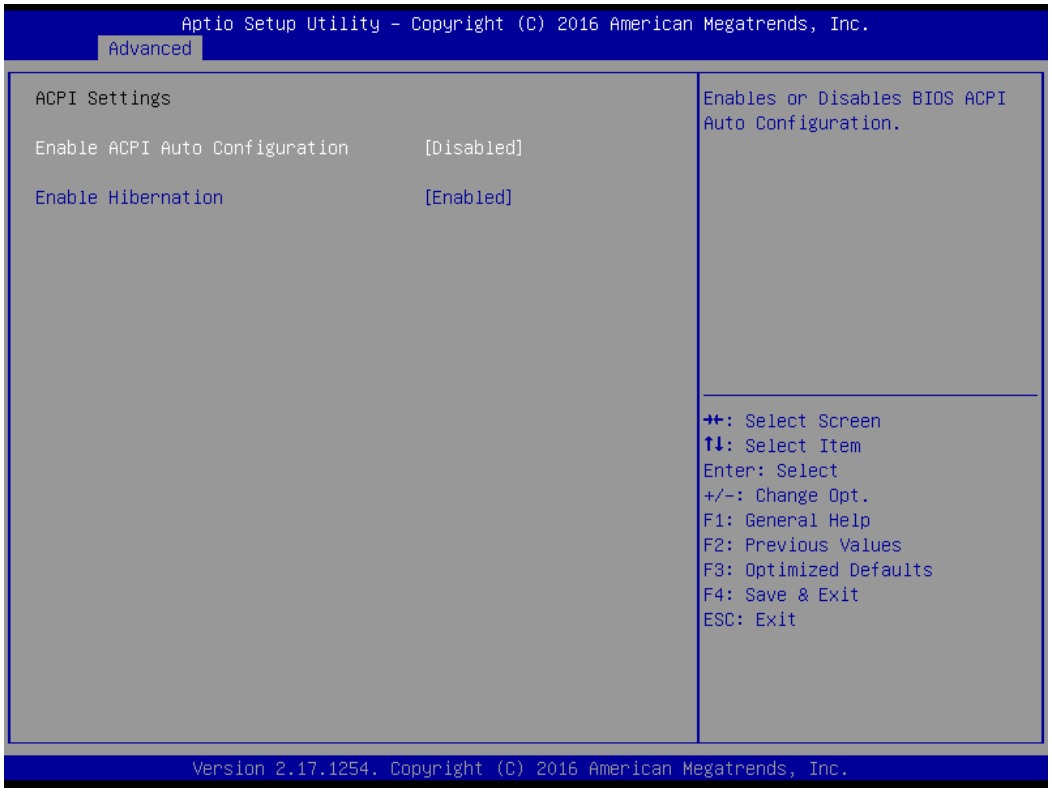
4.3.2 Trusted Computing (Option)



Security Device Support
This item allows you to enable or disable BIOS support for security device.

4.3.3 ACPI Settings

Enable or disable ACPI Auto Configuration.



■ Enable ACPI Auto Configuration

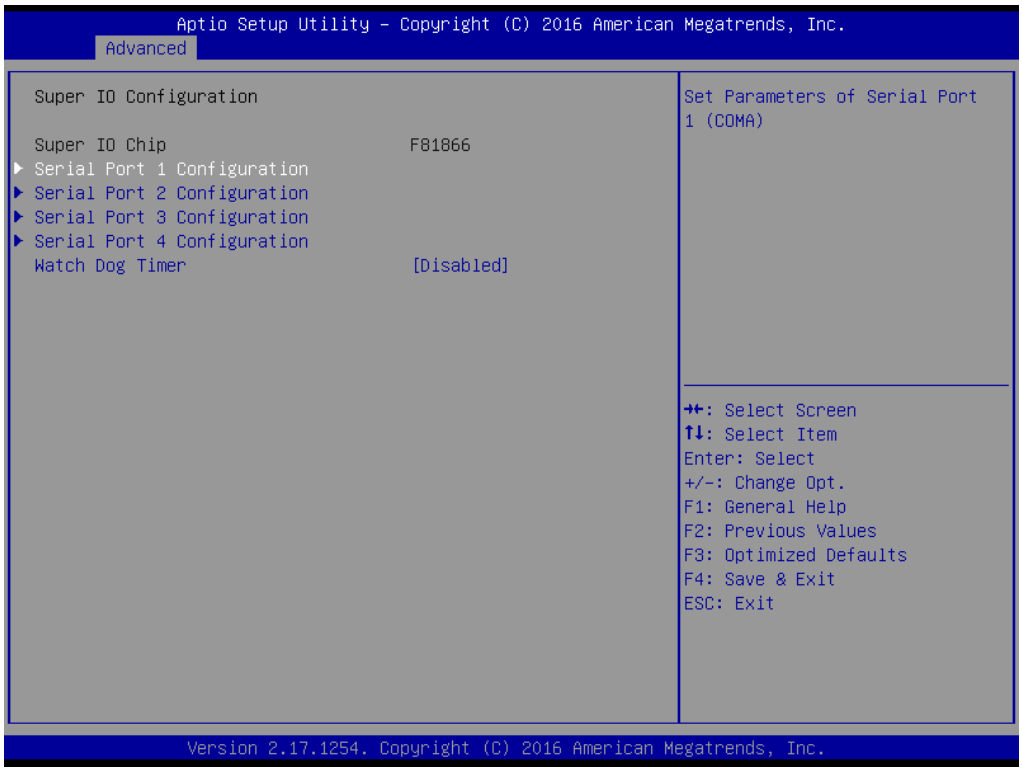
This item allows you to enable or disable BIOS ACPI Auto Configuration.

■ Enable Hibernation

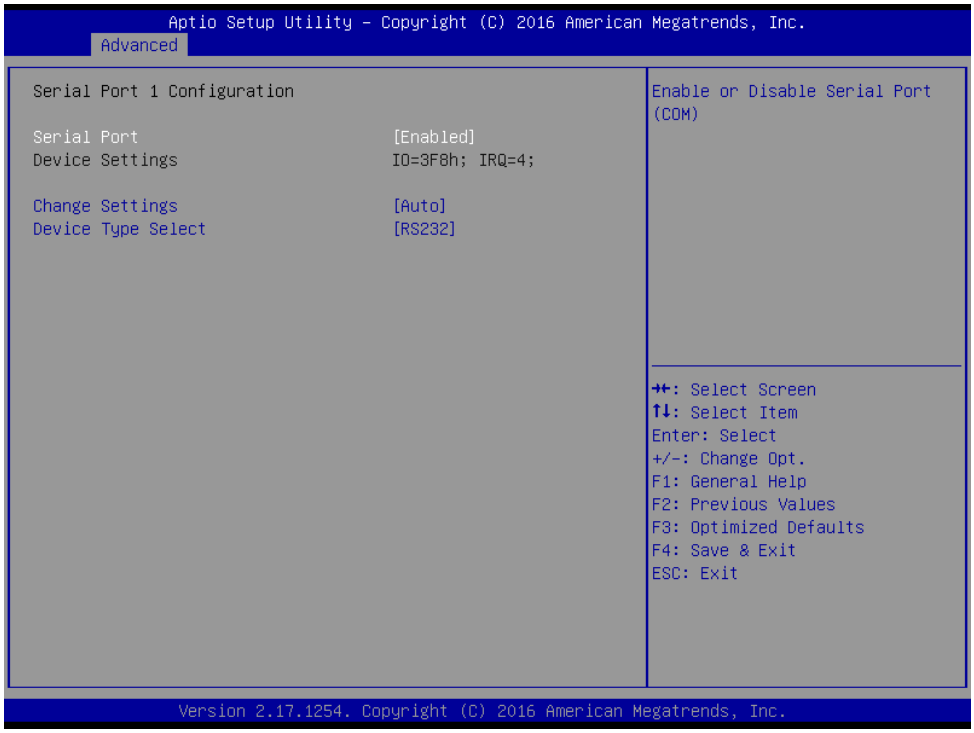
This item allows you to enable or disable system ability to hibernate.

4.3.4 Super IO Configuration

You can use this screen to select options for the Super IO Configuration, and change the value of the selected option.



■ Serial Port 1 Configuration



❑ **Serial Port**

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

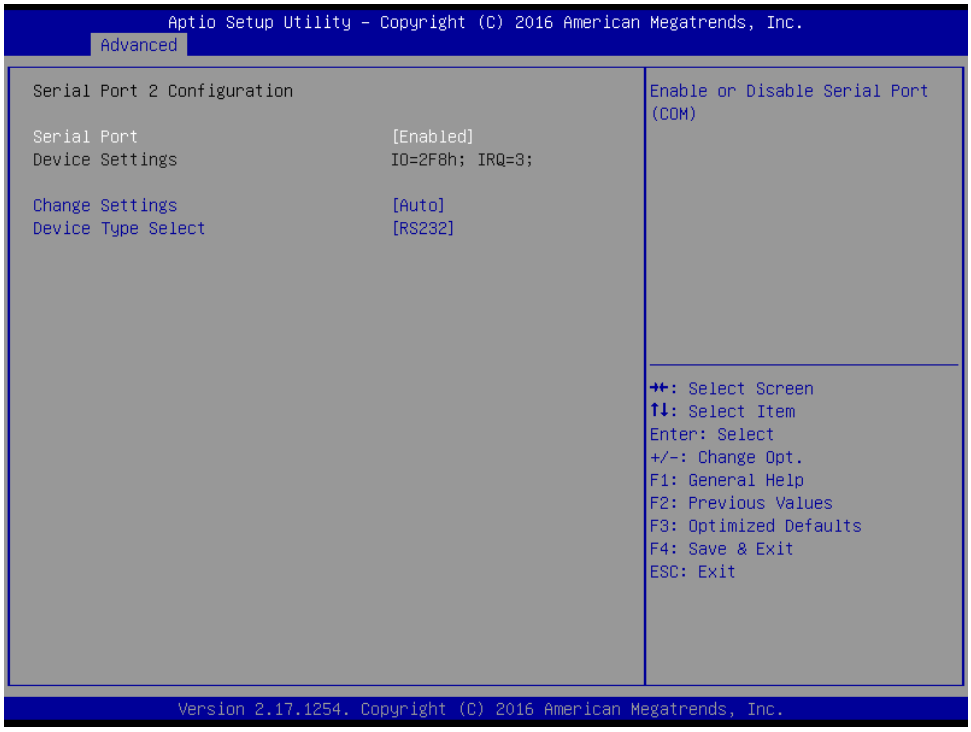
❑ **Change Settings**

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 you to enable or disable serial port.

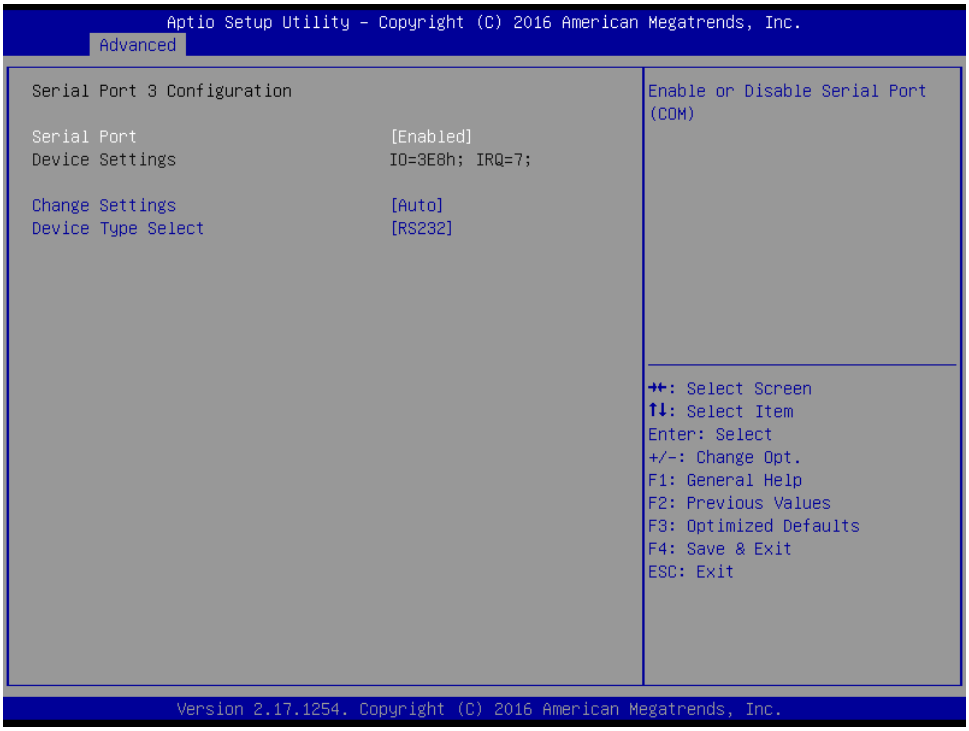
❑ **Change Settings**

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 you to enable or disable serial port.

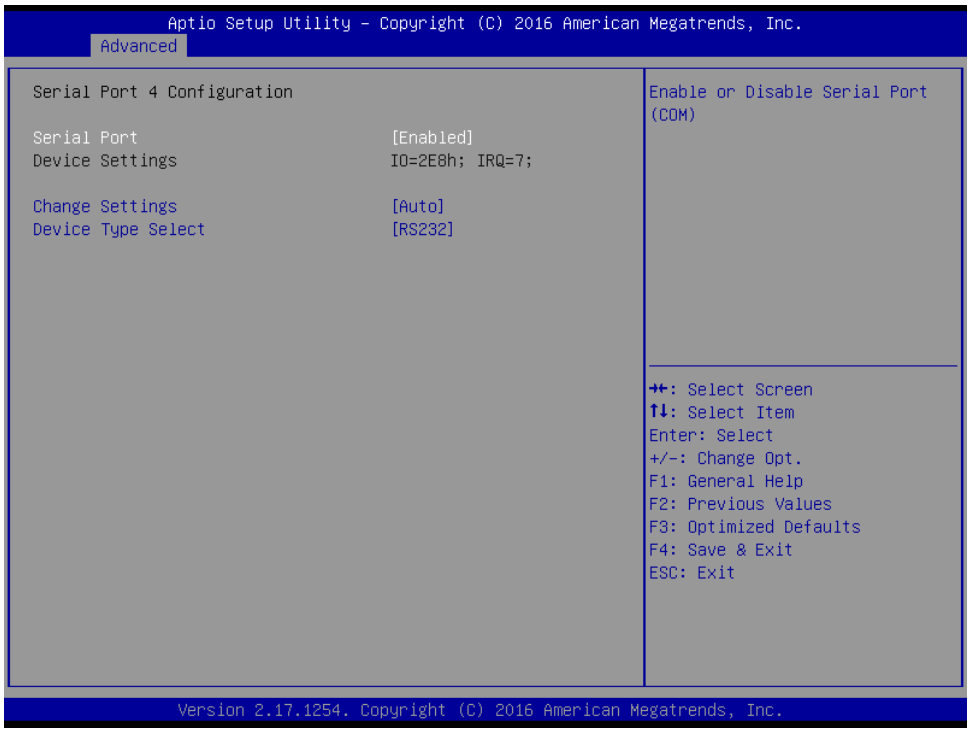
❑ **Change Settings**

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 you 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

You can 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

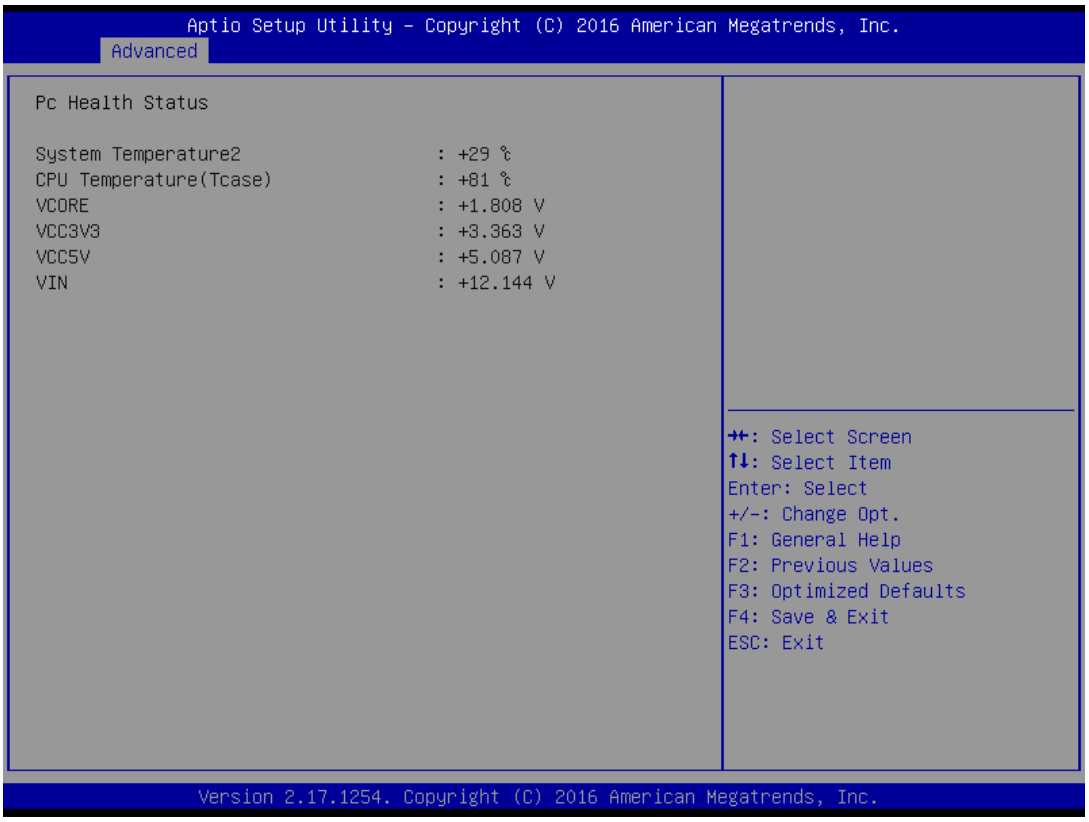
Change the Watch dog mode. Select <Sec> or <Min> mode.

❑ Watch Dog Timer Time Out Value

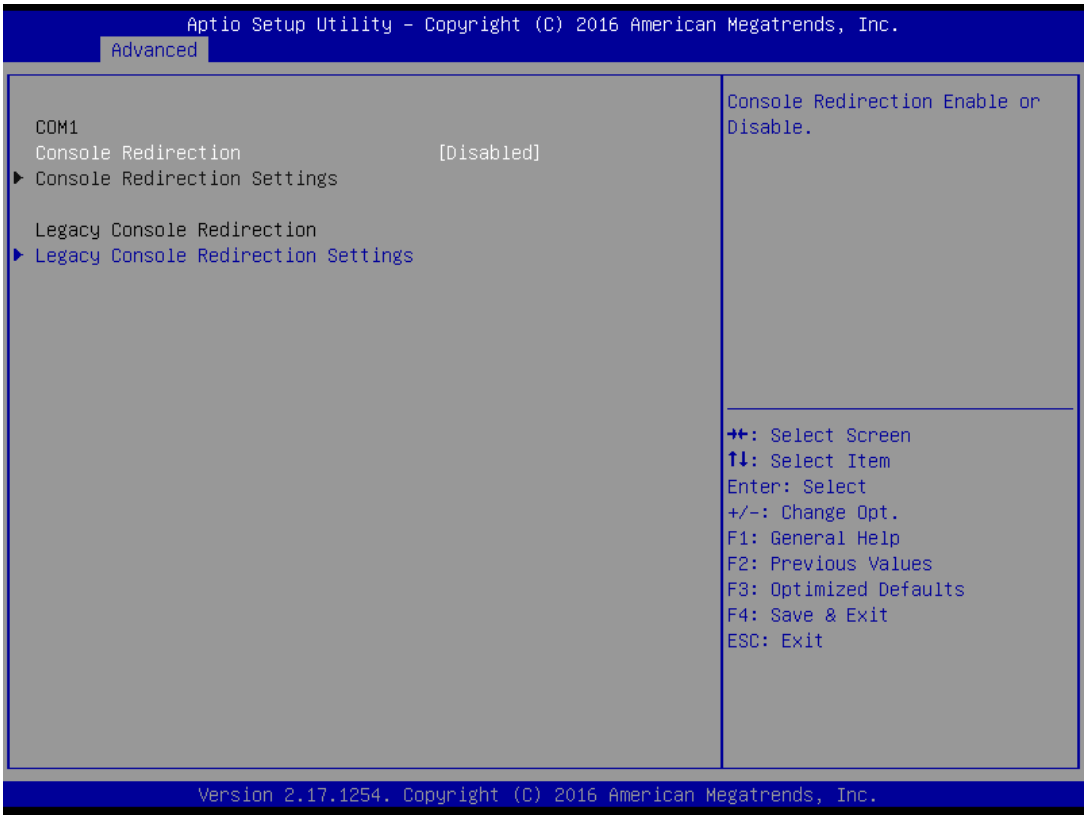
User can set a value in the range of 0 to 255.

4.3.5 Hardware Monitor

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

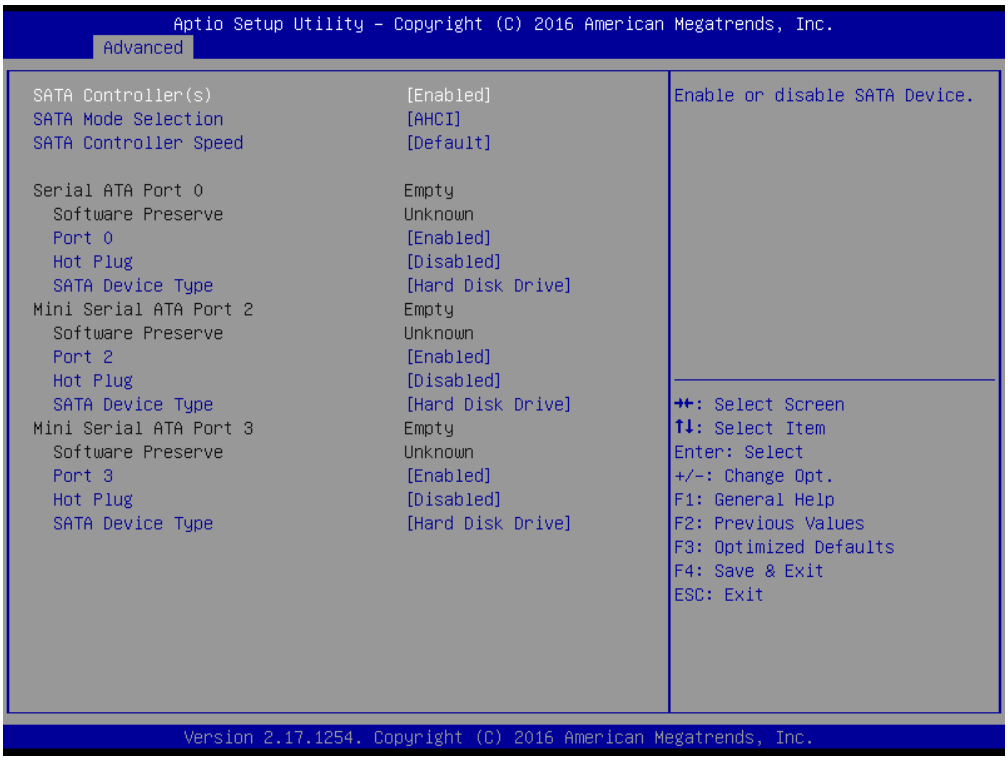


4.3.6 Serial Port Console Redirection



- **Console Redirection**
  This item allows you to enable or disable console redirection.
- **Legacy Console Redirection Settings**
  Select a COM port to display redirection of legacy OS and legacy OPROM messages.

4.3.7 SATA Configuration



■ SATA Controller(s)

This item allows you to enable or disable SATA Controller.

■ SATA Mode Selection

This item allows you to select AHCI or RAID Mode.

■ SATA Controller Speed

The item is for you to set the maximum speed the SATA controller can support. Change the SATA Speed. Select <Default>, <Gen1>, <Gen2> or <Gen3> speed.

■ Serial ATA Port 0 / 2 / 3

❑ **Port 0 / 2 / 3**

This item allows you to enable or disable Serial ATA Port 0 / 2 / 3.

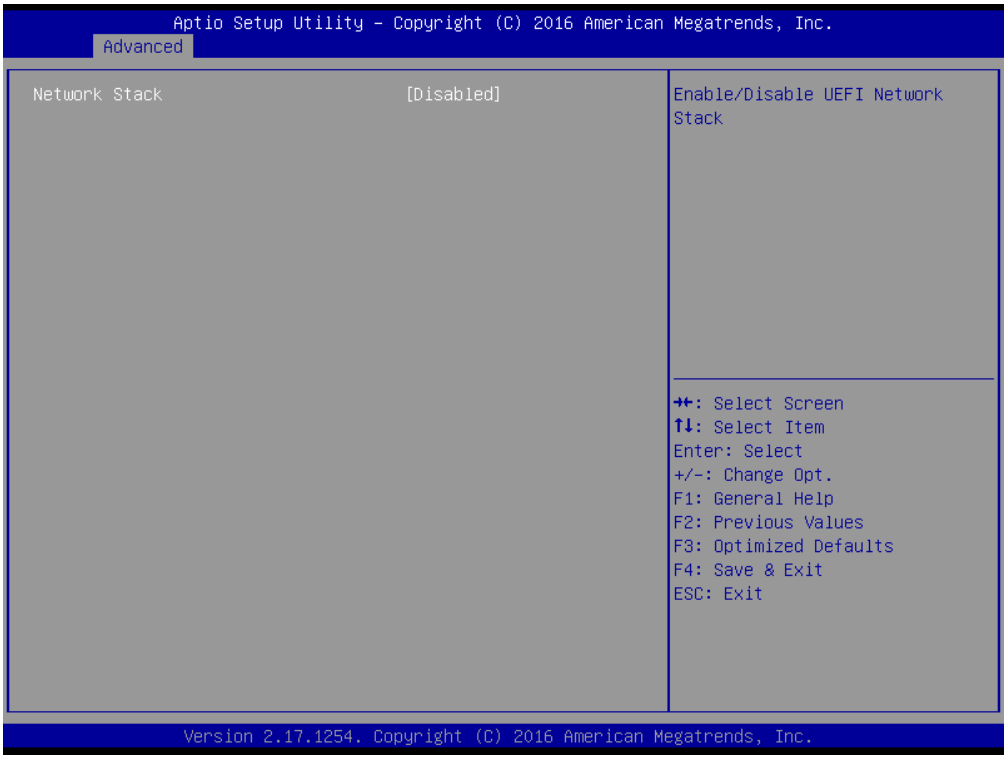
❑ **Hot Plug**

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

❑ **SATA Device Type**

Identify if the relevant SATA port is connected to hard disk drive or solid state drive.

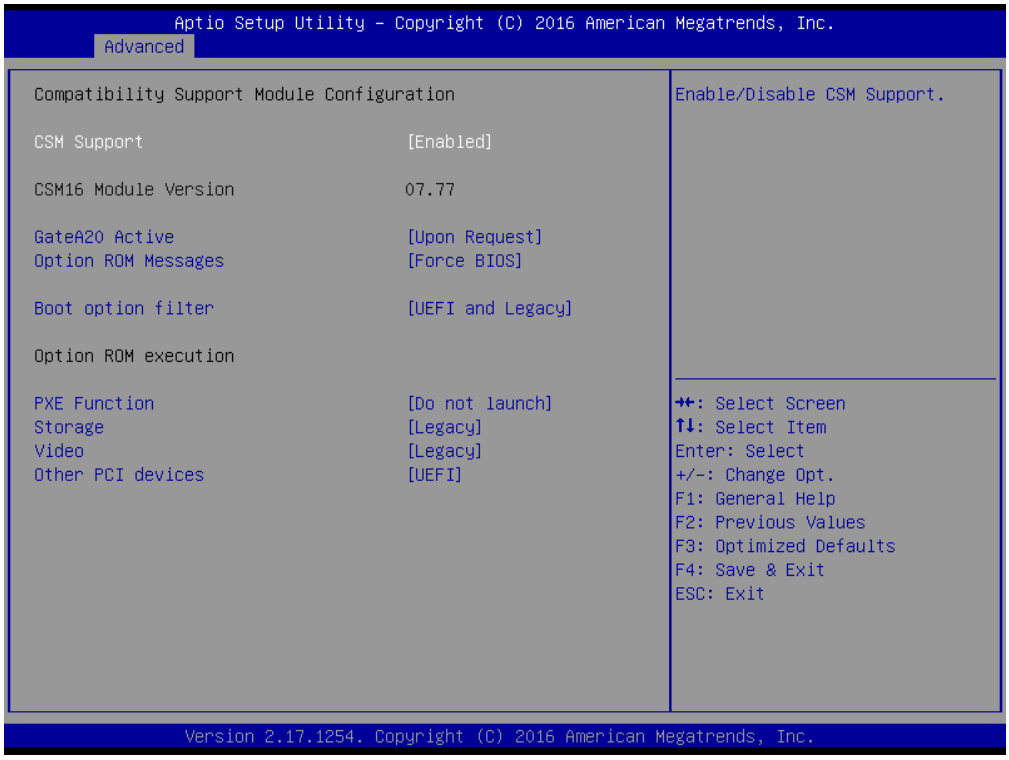
4.3.8 Network Stack Configuration



■ Network Stack

Use this item to enable or disable UEFI Network Stack.

4.3.9 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.

■ 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>.

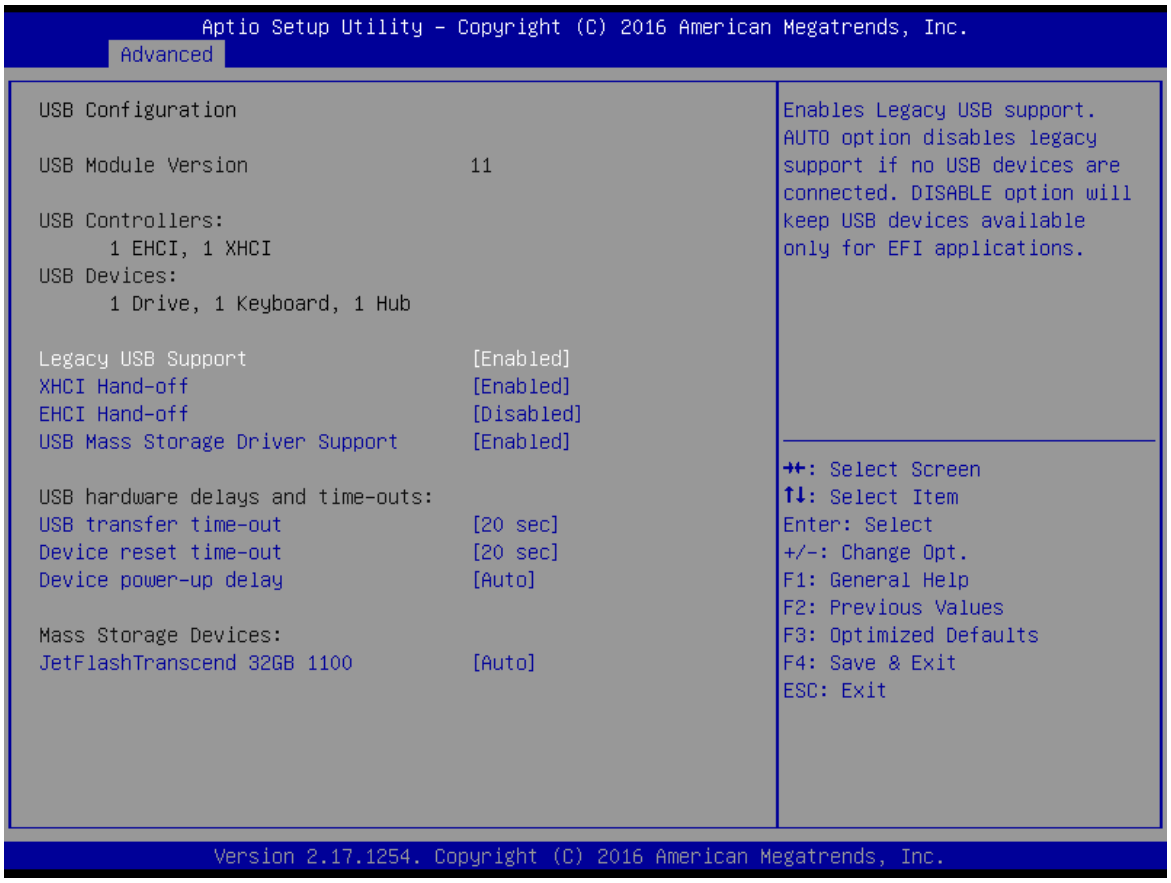
■ Video

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>.

4.3.10 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.

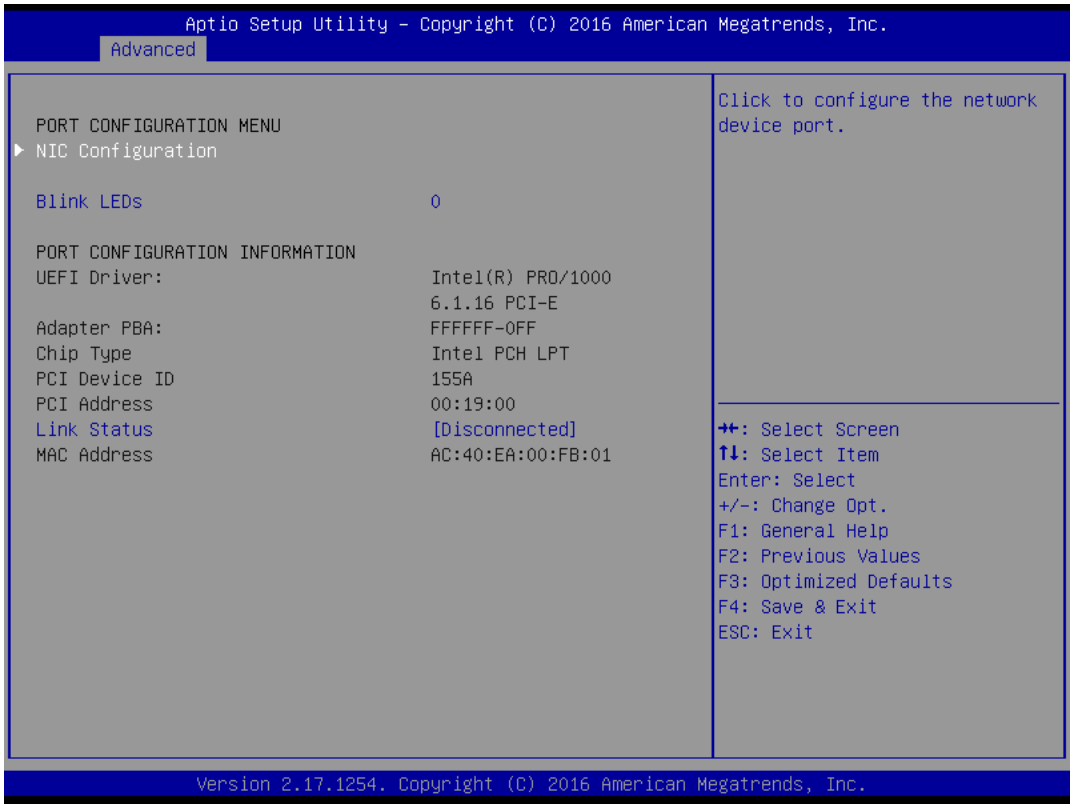
■ **USB Mass Storage Driver Support**
Enables or disables support for USB storage devices.

■ **USB transfer time-out**
Set the time-out value for Control, Bulk, and Interrupt transfers.

■ **Device reset time-out**
Set USB mass storage device Start Unit command time-out value.

■ **Device power-up delay**
Set the maximum time of the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100 ms, for a Hub port the delay is taken from Hub descriptor.

4.3.11 Intel(R) Ethernet Connection I218-LM-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 Negotiate>, <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.

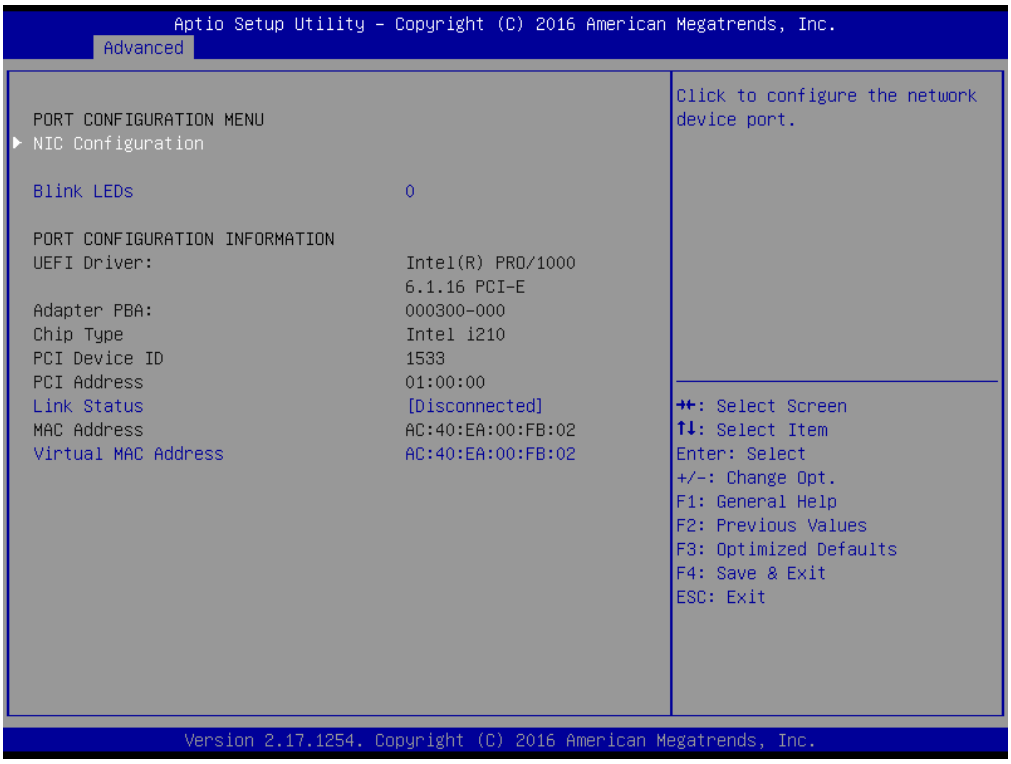
■ Blink LEDs

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>.

4.3.12 Intel(R) 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.

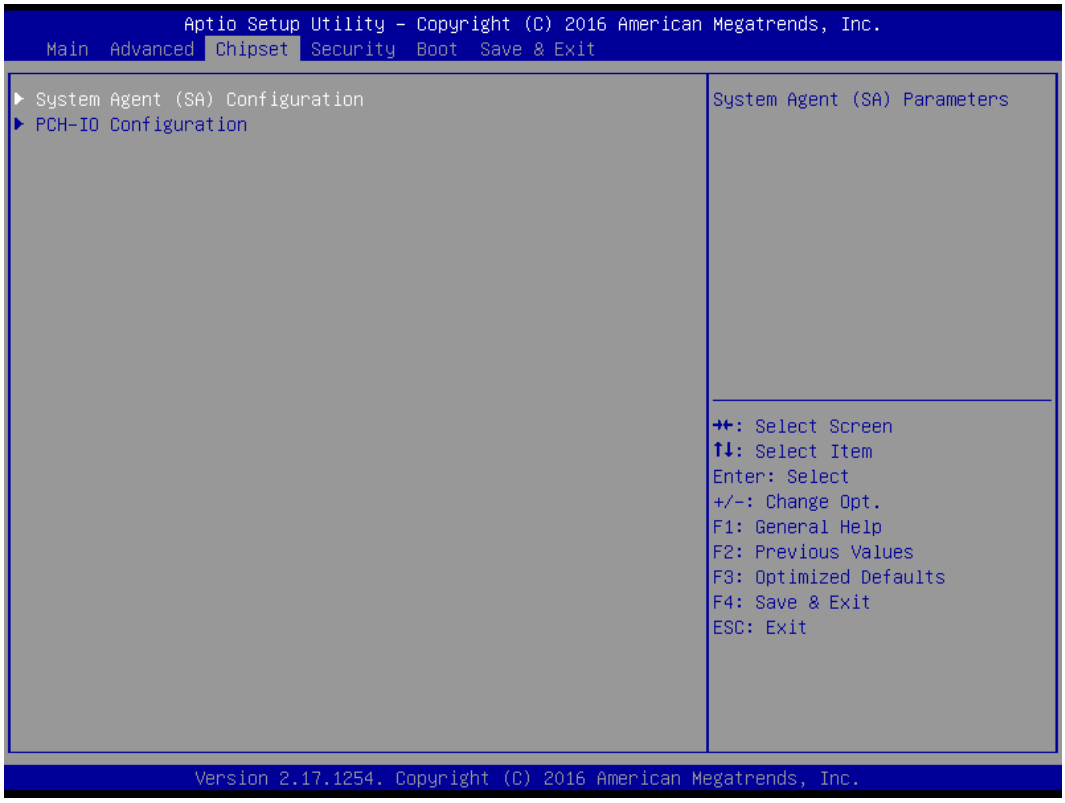
■ Link Status

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>.

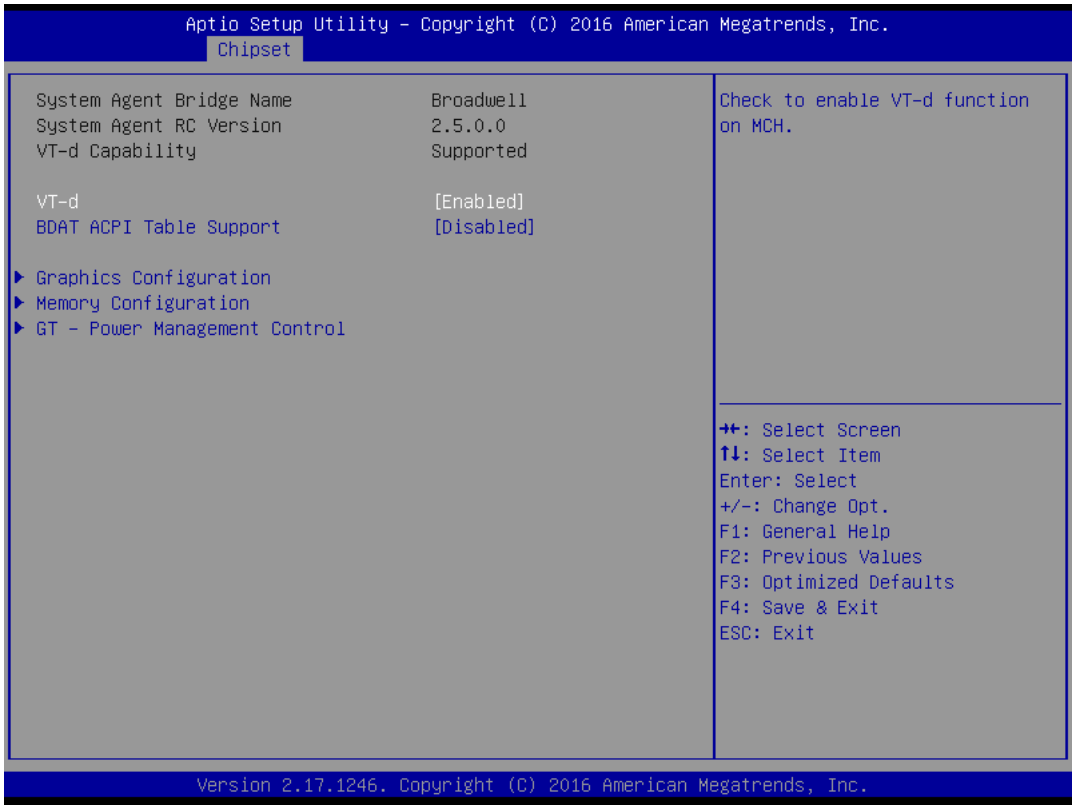
■ Virtual MAC Address

Displays the programmatically assignable MAC Address.

4.4 Chipset

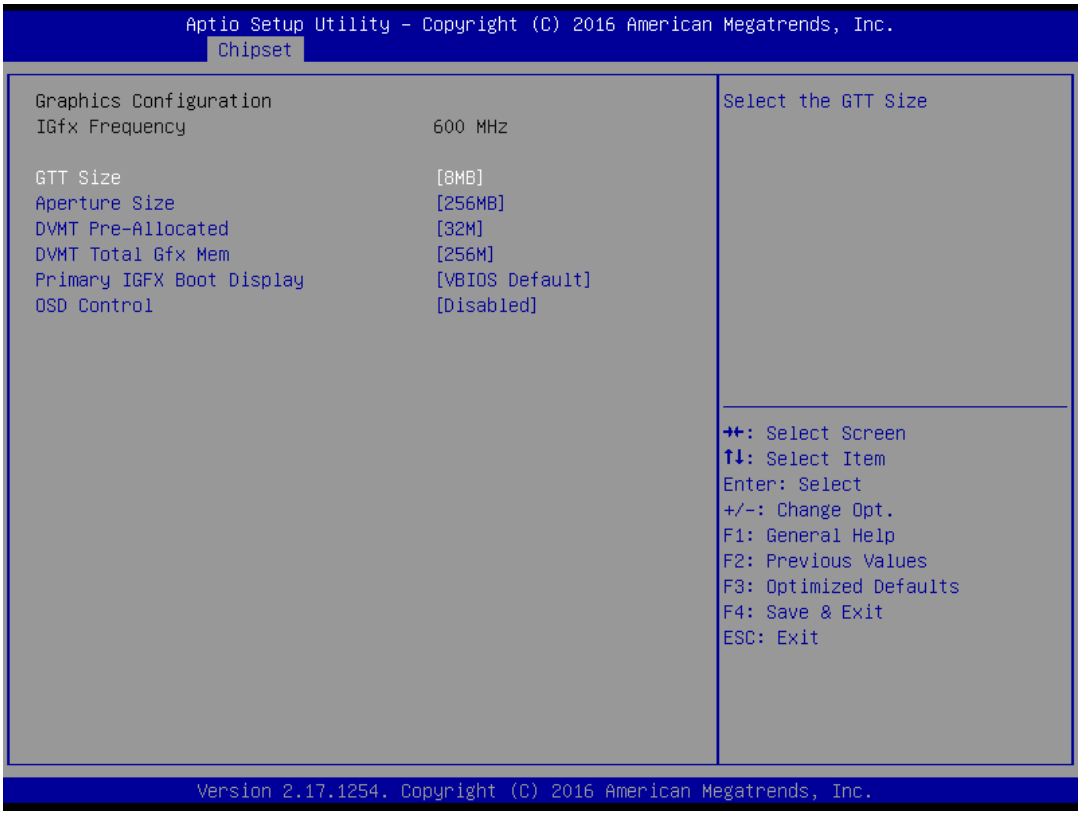


4.4.1 System Agent (SA) Configuration



▸ **Graphics Configuration**

Use this item to configure internal graphics controller.



❑ **GTT Size**

This item allows you to change the GTT size.

❑ **Aperture Size**

This item allows you to change the Aperture size.

❑ **DVMT Pre-Allocated**

Used the DVMT Pre-Allocated option to specify the amount of system memory that can be used by the internal graphics device.

❑ **DVMT Total Gfx Mem**

This setting specifies the memory size for DVMT.

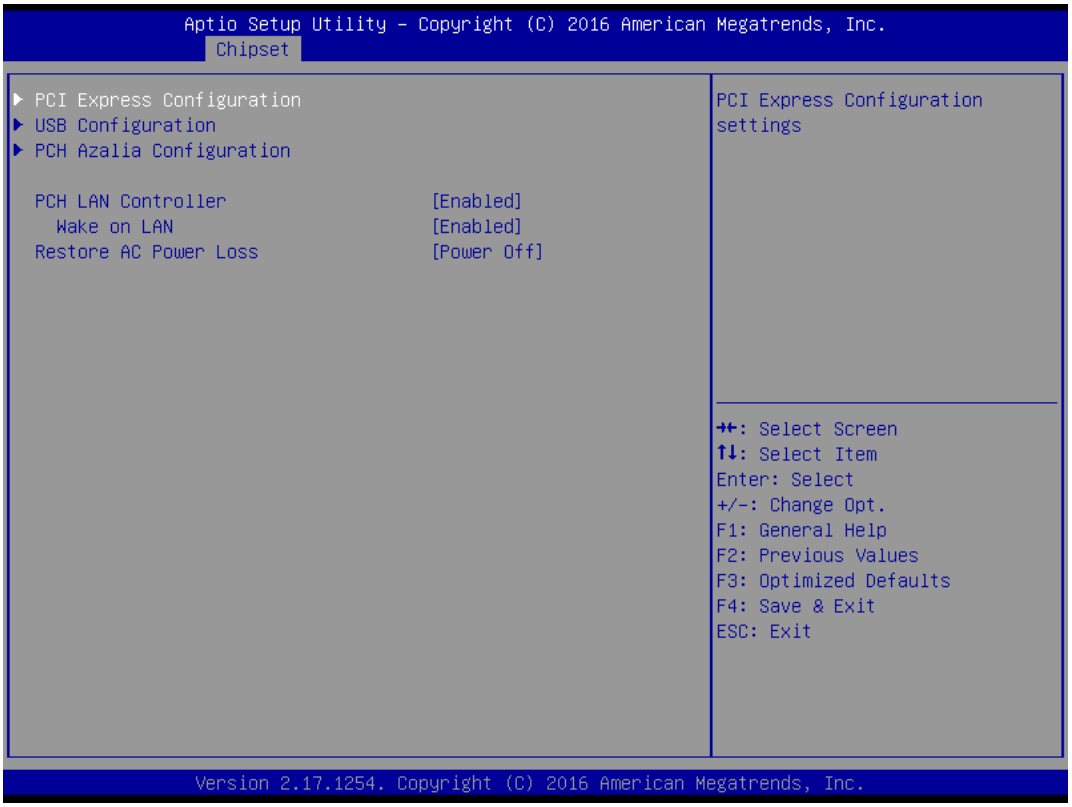
❑ **Primary IGFX Boot Display**

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

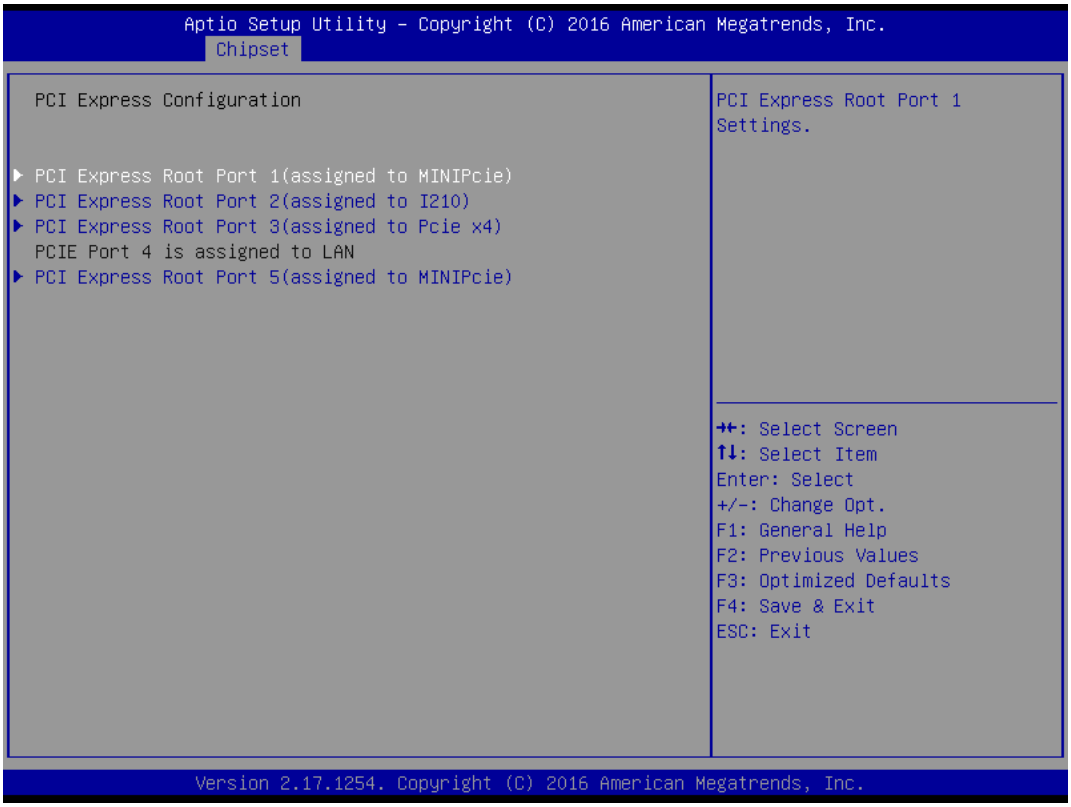
❑ **OSD Control**

This item allows you to enable or disable OSD Control.

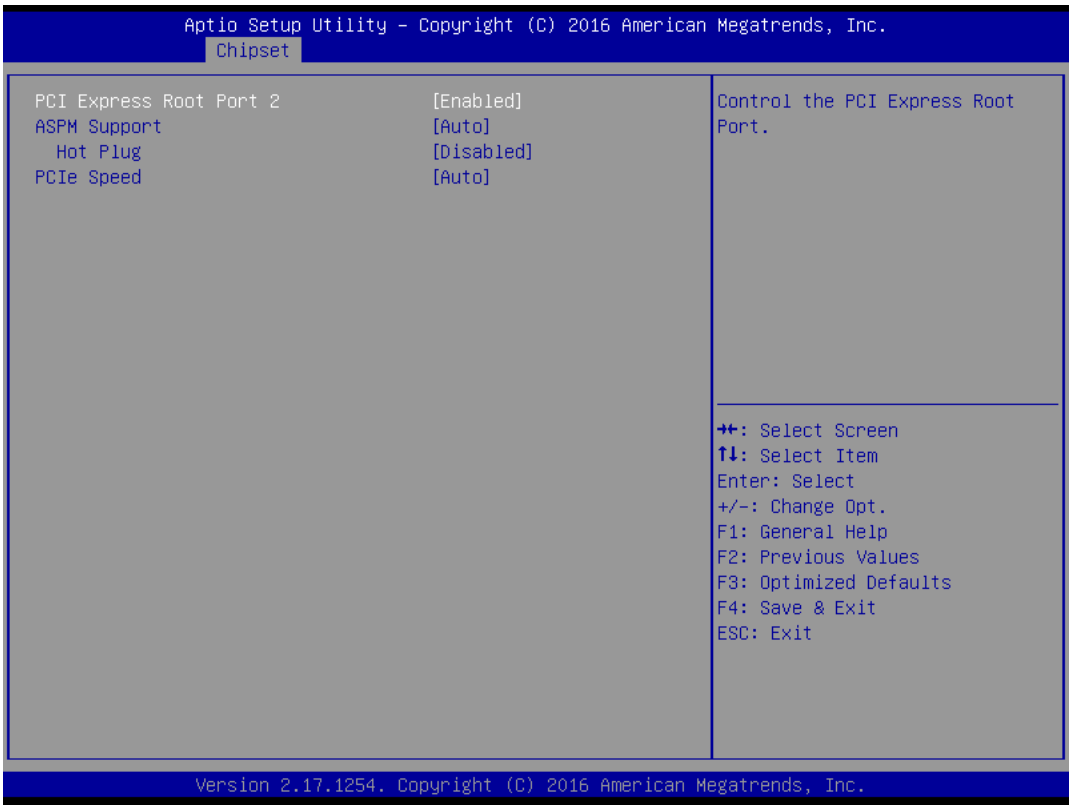
4.4.2 PCH-IO Configuration



▸ PCI Express Configuration

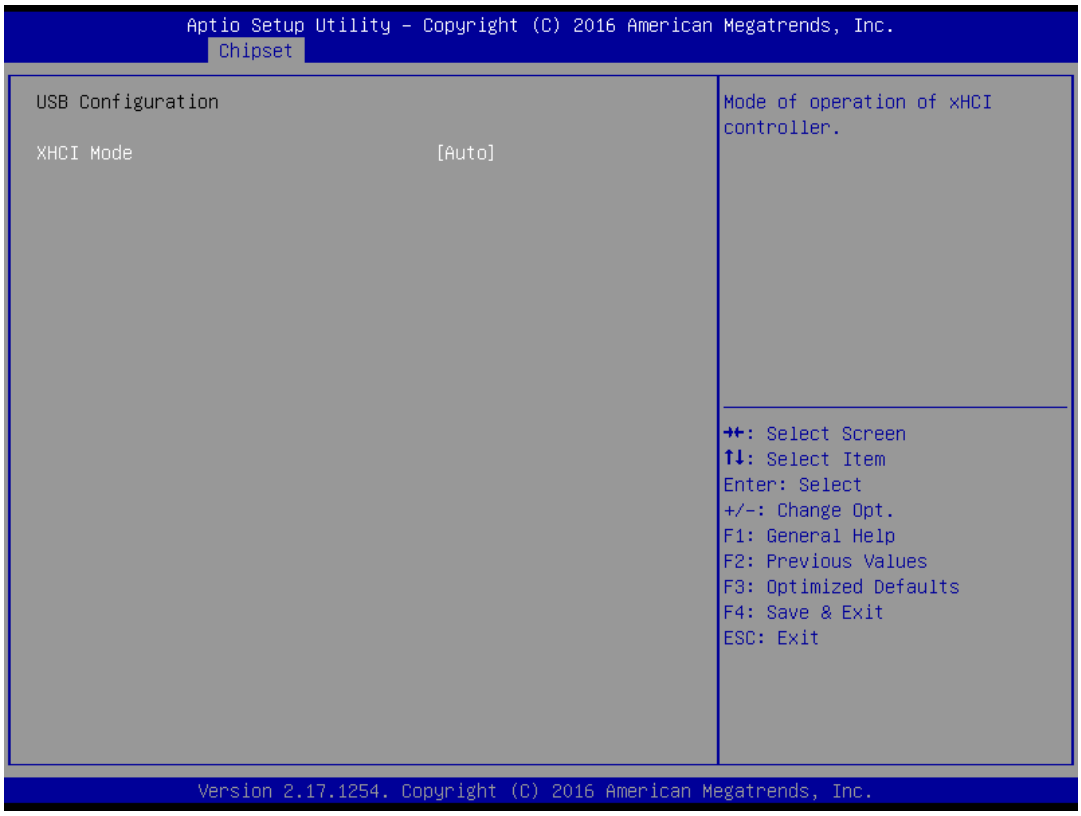


❑ PCI Express Root Port 1 / 2 / 3 / 5



- **PCI Express Port 1 / 2 / 3 / 5**
  This item allows you to enable or disable PCI Express Port 2 / 4 / 5 / 6 in the chipset.
- **ASPM**
  This item allows you to select the ASPM state for energy-saving. Select <Disabled> ,<L0s>, <L1>, <L0sL1> or <Auto>
- **Hot Plug**
  This item allows you to enable or disable hot plug function.
- **PCIe Speed**
  Change the PCIe Port Speed. Select <AUTO> ,<Gen 1> or <Gen 2>

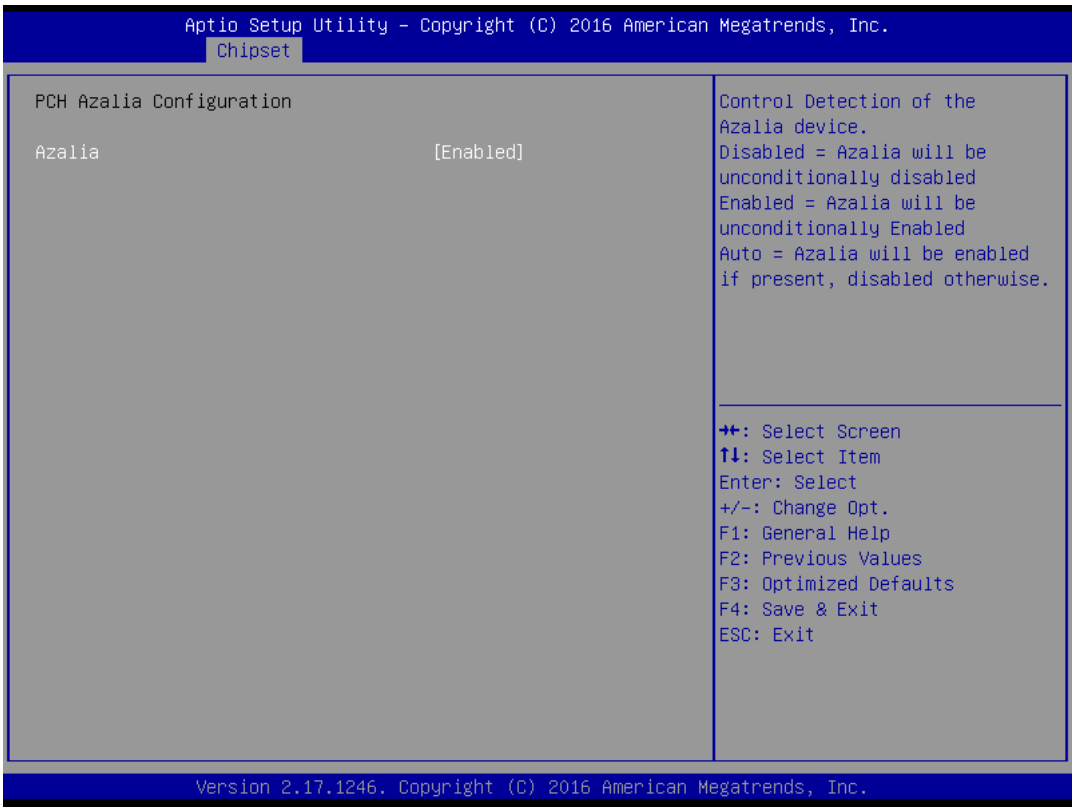
▸ USB Configuration



❑ XHCI Mode

Mode of operation of XHCI controller.

▸ PCH Azalia Configuration



➢ Azalia

Control Detection of the Azalia 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.

PCH LAN Controller

This item allows you to enable or disable the onboard PCH integrated ethernet controller.

Wake on LAN

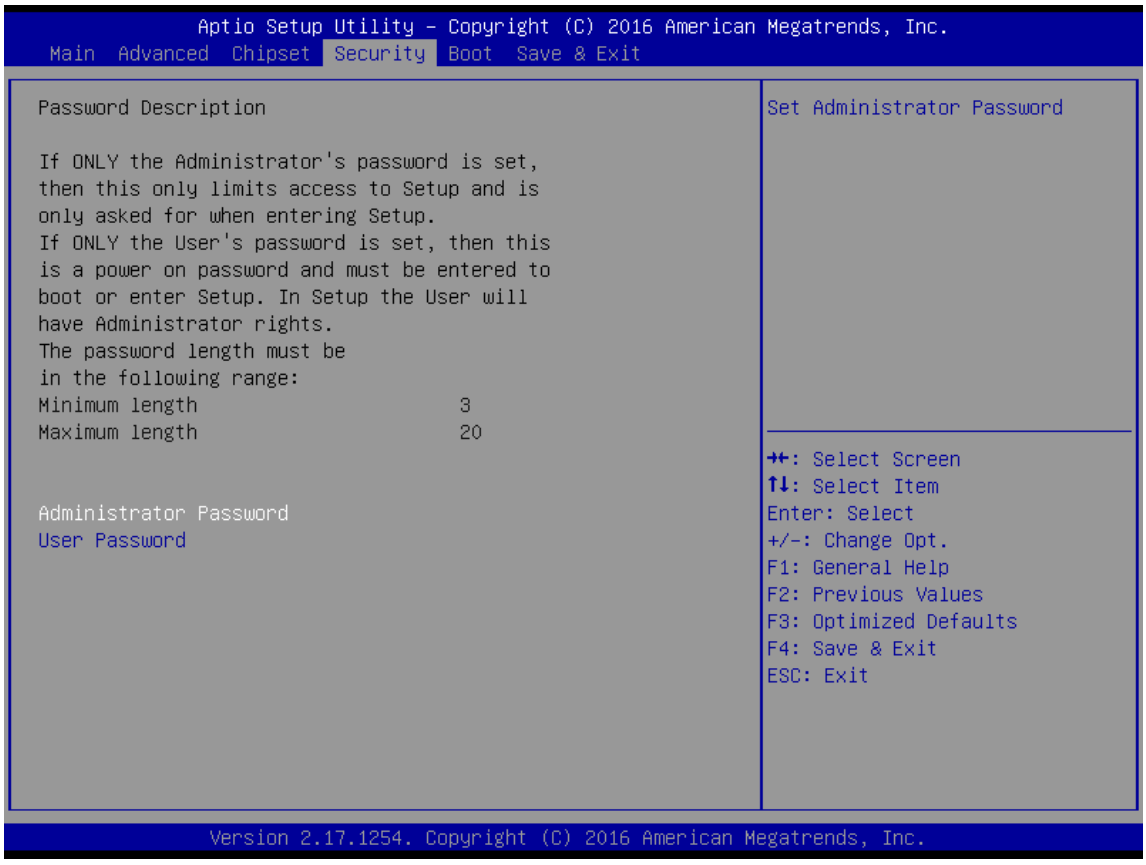
This item allows you to enable or disable wake on LAN function.

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

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



4.5.1 Administrator Password

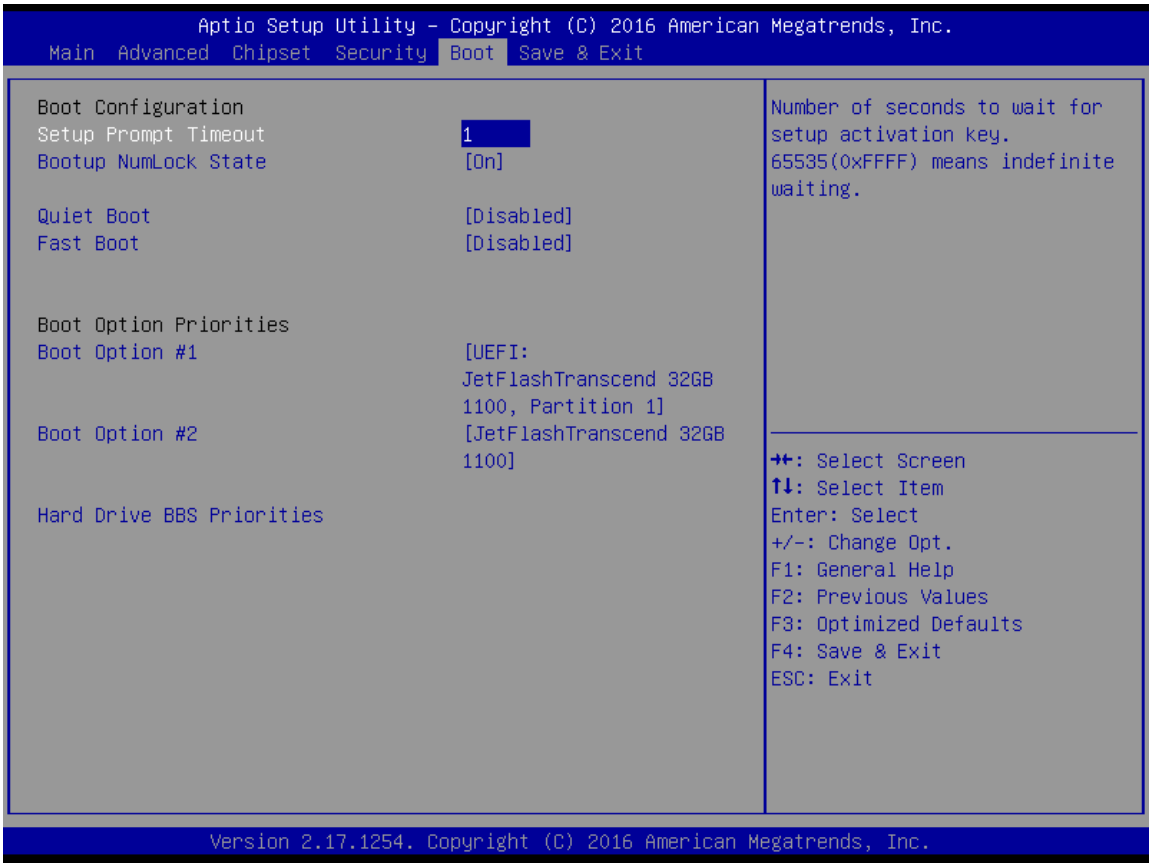
Administrator Password controls access to the BIOS Setup utility.

4.5.2 User Password

User Password controls access to the system at boot and to the BIOS Setup utility.

4.6 Boot

This section allows you to configure the boot settings.



4.6.1 Setup Prompt Timeout

User Password controls access to the system at boot and to the BIOS Setup utility.

4.6.2 Bootup NumLock State

Select the Power-on state for Numlock.

4.6.3 Quiet Boot

This item allows you to enable or disable Quiet Boot option.

4.6.4 Fast Boot

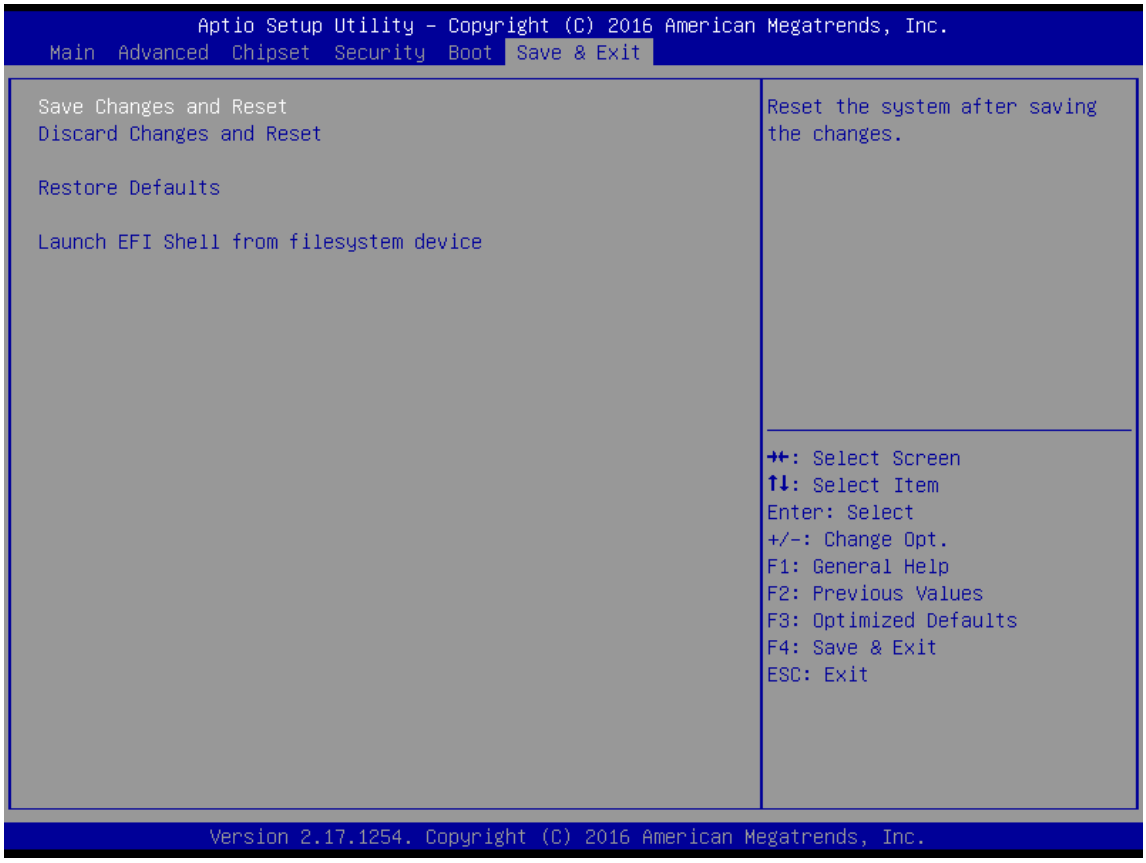
This item allows you to enable or disable Fast Boot option.

4.6.5 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 section allows you to configure the boot settings.



4.7.1 Save Changes and Reset

This item allows you to reset system setup after saving changes.

4.7.2 Discard Changes and Reset

This item allows you to reset system setup without saving any changes.

4.7.3 Restore Defaults

This item allows you to restore/ load default values for all the options.

4.7.4 Lauch EFI Shell from filesystem device

Use this item to launch EFI shell application (shell.efi) from one of the available filesystem device.

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 02Eh
SIO_DATA_Port       equ 02Fh
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 1 ~ GPI 4

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

- GPO 1 ~ GPO 4

	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 00010000b
```

Sample Code:

#1 : Get GPI 0 status

```
; Get GPI 0 Pin Status Register
    In      al, GPI_REG
    ;al bit0 = 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 bit4 = GPO 0 status
```