USER'S MANUAL

IFC-400 Series

Industrial Panel PCs

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Prefaces

Revision

Revision	Description	Date
1.0	Manual Released	2019/09/19

Disclaimer

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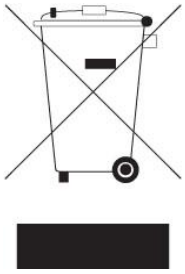
Environmental Protection Announcement

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 -20˚C and below 70˚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 Rusavtomatika website at www.rusavtomatika.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.

Ordering Information

Model No.	Product Description
IFC-412i5-7300	12.1" XGA Resistive Touch Thin Frame Panel PC with Intel® Core™ i5-7300U Processor
IFC-412Ci5-7300	12.1" XGA Capacitive Touch Thin Frame Panel PC with Intel® Core™ i5-7300U Processor
IFC-415i5-7300	15" XGA Resistive Touch Thin Frame Panel PC with Intel® Core™ i5-7300U Processor
IFC-415Ci5-7300	15" XGA Capacitive Touch Thin Frame Panel PC with Intel® Core™ i5-7300U Processor
IFC-W415i5-700	15.6" 16:9 Full HD Resistive Touch Thin Frame Panel PC with Intel® Core™ i5-7300U Processor
IFC-W415Ci5-7300	15.6" 16:9 Full HD Capacitive Touch Thin Frame Panel PC with Intel® Core™ i5-7300U Processor
IFC-417Ci5-7300	17" SXGA Capacitive Touch Thin Frame Panel PC with Intel® Core™ i5-7300U Processor
IFC-417i5-7300	17" SXGA Resistive Touch Thin Frame Panel PC with Intel® Core™ i5-7300U Processor
IFC-419Ci5-7300	19" SXGA Capacitive Touch Thin Frame Panel PC with Intel® Core™ i5-7300U Processor
IFC-419i5-7300	19" SXGA Resistive Touch Thin Frame Panel PC with Intel® Core™ i5-7300U Processor
IFC-421Ci5-7300	21.5" 16:9 Full HD Capacitive Touch Thin Frame Panel PC with Intel® Core™ i5-7300U Processor
IFC-421i5-7300	21.5" 16:9 Full HD Resistive Touch Thin Frame Panel PC with Intel® Core™ i5-7300U Processor

Chapter 1

Product Introductions

1.1 Overview

The IFC-400 series Panel PC is based on 7th Gen. Intel® Core™ i5-7300U (up to 3.5GHz) / i3-7100U (2.4GHz) Dual Core processor. Designed with flat surface, IP 65 dust / waterproof front panel, and aluminum die-casting front frame with rugged body structure, it is a versatile I/O connections, and rugged reliability industrial panel PC.

The IFC-400 series supports Multi-Mode Display Module (MDM) technology which makes it more flexible in system maintaining and upgrading. It offers modularize expansion I/O, rich connectivity interfaces, wide range (9~50V) DC power input, and high reliability even operating in temperature extremes.

Featuring with completely high functional, IFC-400 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), and reverse protection DC power input makes IFC-400 series are safety system for all industrial applications.

1.1.1 Key Features

- 17"~ 21.5" Multi-functional All-in-One Panel PCs
- Intel® 7th Gen (Kaby Lake-U) Processor Core™ i5-7300U up to 3.5GHz or Core™ i3-7100U 2.4GHz
- 1x 260-pin DDR4 SODIMM. max up to 16GB
- 1x 2.5" SATA HDD bay support RAID 0, 1
- 1x mSATA (shared by 1x Mini PCIe), 1x CFast (shared by 1x mSATA), 2x SIM socket
- 2x Full-size mini PCIe for communication or expansion modules
- 2x LAN, 1x VGA, 1x DisplayPort, 1x Dual Channel 24 bit LVDS
- 4x RS-232/422/485, 4x USB 3.0, Audio
- 8x DI + 8x DO with isolation
- 9 to 50VDC wide range power input
- -10°C to 60°C extended operating temperature
- Designed with aluminum die-casting front frame
- IP65 compliant front panel
- Two 10W internal speakers built-in
- Multi-language OSD built-in

1.2 Hardware Specification

1.2.1 IFC-412(C)i5-7300

Display
- LCD Size: 12.1" (4:3)
- Max. Resolution: 1024 x 768 (XGA)
- Brightness (cd/m^2): 500
- Contrast Ratio: 700 : 1
- LCD Color: 16.2M
- Pixel Pitch (mm): 0.24 (H) x 0.24 (V)
- Viewing Angle (H-V): 160 / 160
- Backlight MTBF: 50000 hrs (LED Backlight)

Touch
- Resistive 5-Wire: IFC-412i5-7300 only
- Projected Capacitive: IFC-412Ci5-7300 only

I/O
- VGA: 1x VGA
- DisplayPort: 1x 1x DisplayPort
- COM
  - 4x RS-232/422/485

- USB: 4x USB 3.0
- LAN: 2x RJ45
- Audio: 1x Mic-in, 1x Line-out
- DIO: 8 in / 8 out (Isolated)
- Others:
  - 3x WiFi Antenna Holes
  - 1x Power Switch, 1x AT/ATX Switch,1x Remote Power On/Off

System
- Processor
  - 7th Gen Intel® Core™ i5-7300U Processor, Dual Core, 3MB Cache, up to 3.5 GHz
  - 7th Gen Intel® Core™ i3-7100U Processor, Dual Core, 3MB Cache, 2.4 GHz
- System Chipset: SOC integrated
- LAN Chipset
  - GbE1: Intel® I219LM (Support Wake-on-LAN and PXE)
  - GbE2: Intel® I210-AT (Support Wake-on-LAN and PXE)
- Audio Codec: Realtek ALC888S
- System Memory: 1x 260-Pin DDR4 1866/2133MHz SODIMM. Max. up to 16GB
- BIOS: AMI 128Mbit SPI BIOS
- Watchdog: Software Programmable Supports 1~255 sec. System Reset

Storage
- SSD/HDD: 1x Removable 2.5" SATA HDD Bay Support RAID 0, 1
- mSATA: 1x mSATA (Shared by 1x Mini PCIe)
- SIM Socket: 2x External SIM socket

Expansion
- Mini PCI Express: 2x Full-size Mini PCIe

Other Features
- Internal Speaker: AMP 2W + 2W
- OSD: LCD On/Off, Auto, Menu, Up and Down Multi-language

Operating System
- Windows: Windows 10
- Linux: Linux kernel 4.X

Power
- Power Mode: AT, ATX
- Power Supply Voltage: 9-50VDC
- Power Ignition Sensing: Power Ignition Management
- Power Connector: 3-pin Terminal Block
- Power Adaptor: Optional AC/DC 12V/5A, 60W
- Power Protection
  - OVP (Over Voltage Protection)
  - OCP (Over Current Protection)
  - Reverse Protection

Environment
- Operating Temp.: -10˚C to 60˚C
- Storage Temp.: -20˚C to 70˚C
- Relative Humidity: 10%~80% (non-condensing)
- IP Level: IP 65 Compliant Front Panel
- Vibration: 1.5 Grms, 5 – 500 Hz, 0.5 hr/axis
- Shock: 20G, half sine, 11ms
- Standards / Certification: CE, FCC Class A

Physical
- Front Panel Construction: Die-cast Flat Surface
- Dimension: 319 (W) x 257 (D) x 61.7 (H)mm
- Weight: TBC
- Mounting: VESA Mounting Holes 75 x 75mm, 100 x 100mm

1.2.2 IFC-415(C)i5-7300

Display
- LCD Size: 15" (4:3)
- Max. Resolution: 1024 x 768 (XGA)
- Brightness (cd/m^2): 350
- Contrast Ratio: 700 : 1
- LCD Color: 16.2M
- Pixel Pitch (mm): 0.297 (H) x 0.297 (V)
- Viewing Angle (H-V): 170 / 160
- Backlight MTBF: 50000 hrs (LED Backlight)

Touch
- Resistive 5-Wire: IFC-415i5-7300 only
- Projected Capacitive: IFC-415Ci5-7300 only

I/O
- VGA: 1x VGA
- DisplayPort: 1x 1x DisplayPort
- COM
  - 4x RS-232/422/485
- USB: 4x USB 3.0
- LAN: 2x RJ45
- Audio: 1x Mic-in, 1x Line-out
- DIO: 8 in / 8 out (Isolated)
- Others:
  - 3x WiFi Antenna Holes
  - 1x Power Switch, 1x AT/ATX Switch,1x Remote Power On/Off

System
- Processor
  - 7th Gen Intel® Core™ i5-7300U Processor, Dual Core, 3MB Cache, up to 3.5 GHz
  - 7th Gen Intel® Core™ i3-7100U Processor, Dual Core, 3MB Cache, 2.4 GHz
- System Chipset: SOC integrated
- LAN Chipset
  - GbE1: Intel® I219LM (Support Wake-on-LAN and PXE)
  - GbE2: Intel® I210-AT (Support Wake-on-LAN and PXE)
- Audio Codec: Realtek ALC888S
- System Memory: 1x 260-Pin DDR4 1866/2133MHz SODIMM. Max. up to 16GB
- BIOS: AMI 128Mbit SPI BIOS
- Watchdog: Software Programmable Supports 1~255 sec. System Reset

Operating System
- Windows: Windows 10
- Linux: Linux kernel 4.X

Power
- Power Mode: AT, ATX
- Power Supply Voltage: 9-50VDC
- Power Ignition Sensing: Power Ignition Management
- Power Connector: 3-pin Terminal Block
- Power Adaptor: Optional AC/DC 12V/5A, 60W
- Power Protection
  - OVP (Over Voltage Protection)
  - OCP (Over Current Protection)
  - Reverse Protection

Storage
- SSD/HDD: 1x Removable 2.5" SATA HDD Bay Support RAID 0, 1
- mSATA: 1x mSATA (Shared by 1x Mini PCIe)
- SIM Socket: 2x External SIM socket

Environment
- Operating Temp.: -10°C to 60°C
- Storage Temp.: -20°C to 65°C
- Relative Humidity: 10%~80% (non-condensing)
- IP Level: IP 65 Compliant Front Panel
- Vibration: 1.5 Grms, 5 – 500 Hz, 0.5 hr/axis
- Shock: 20G, half sine, 11ms
- Standards / Certification: CE, FCC Class A

Expansion
- Mini PCI Express: 2x Full-size Mini PCIe

Physical
- Front Panel Construction: Die-cast Flat Surface
- Dimension: 377 (W) x 301 (D) x 64.7 (H)mm
- Weight: TBC
- Mounting: VESA Mounting Holes 75 x 75mm, 100 x 100mm

Other Features
- Internal Speaker: AMP 10W + 10W
- OSD: LCD On/Off, Auto, Menu, Up and Down Multi-language

1.2.3 IFC-W415(C)i5-7300

Display
- LCD Size: 15.6" (16:9)
- Max. Resolution: 1920 x 1080 (Full HD)
- Brightness (cd/m^2): 400
- Contrast Ratio: 700 : 1
- LCD Color: 16.7M
- Pixel Pitch (mm): 0.17925 (H) x 0.17925 (V)
- Viewing Angle (H-V): 160 / 140
- Backlight MTBF: 50000 hrs (LED Backlight)

Touch
- Resistive 5-Wire: IFC-417i5-7300 only
- Projected Capacitive: IFC-417Ci5-7300 only

I/O
- VGA: 1x VGA
- DisplayPort: 1x 1x DisplayPort
- COM
  - 4x RS-232/422/485

- USB: 4x USB 3.0
- LAN: 2x RJ45
- Audio: 1x Mic-in, 1x Line-out
- DIO: 8 in / 8 out (Isolated)
- Others:
  - 3x WiFi Antenna Holes
  - 1x Power Switch, 1x AT/ATX Switch,1x Remote Power On/Off

System
- Processor
  - 7th Gen Intel® Core™ i5-7300U Processor, Dual Core, 3MB Cache, up to 3.5 GHz
  - 7th Gen Intel® Core™ i3-7100U Processor, Dual Core, 3MB Cache, 2.4 GHz
- System Chipset: SOC integrated
- LAN Chipset
  - GbE1: Intel® I219LM (Support Wake-on-LAN and PXE)
  - GbE2: Intel® I210-AT (Support Wake-on-LAN and PXE)
- Audio Codec: Realtek ALC888S
- System Memory: 1x 260-Pin DDR4 1866/2133MHz SODIMM. Max. up to 16GB
- BIOS: AMI 128Mbit SPI BIOS
- Watchdog: Software Programmable Supports 1~255 sec. System Reset

Storage
- SSD/HDD: 1x Removable 2.5" SATA HDD Bay Support RAID 0, 1
- mSATA: 1x mSATA (Shared by 1x Mini PCIe)
- SIM Socket: 2x External SIM socket

Expansion
- Mini PCI Express: 2x Full-size Mini PCIe

Other Features
- Internal Speaker: AMP 10W + 10W
- OSD: LCD On/Off, Auto, Menu, Up and Down Multi-language

Operating System
- Windows: Windows 10
- Linux: Linux kernel 4.X

Power
- Power Mode: AT, ATX
- Power Supply Voltage: 9-50VDC
- Power Ignition Sensing: Power Ignition Management
- Power Connector: 3-pin Terminal Block
- Power Adaptor: Optional AC/DC 12V/5A, 60W
- Power Protection
  - OVP (Over Voltage Protection)
  - OCP (Over Current Protection)
  - Reverse Protection

Environment
- Operating Temp.: -10°C to 60°C
- Storage Temp.: -20°C to 70°C
- Relative Humidity: 10%~80% (non-condensing)
- IP Level: IP 65 Compliant Front Panel
- Vibration: 1.5 Grms, 5 – 500 Hz, 0.5 hr/axis
- Shock: 20G, half sine, 11ms
- Standards / Certification: CE, FCC Class A

Physical
- Front Panel Construction: Die-cast Flat Surface
- Dimension: 398 (W) x 247 (D) x 70.7 (H)mm
- Weight: TBC
- Mounting: VESA Mounting Holes 75 x 75mm, 100 x 100mm

1.2.4 IFC-417(C)i5-7300

Display
- LCD Size: 17" (4:3)
- Max. Resolution: 1280 x 1024 (SXGA)
- Brightness (cd/m²): 350
- Contrast Ratio: 800 : 1
- LCD Color: 16.7M
- Pixel Pitch (mm): 0.264 (H) x 0.264 (V)
- Viewing Angle (H-V): 170 / 160
- Backlight MTBF: 50000 hrs (LED Backlight)

Touch
- Resistive 5-Wire: IFC-417i5-7300 only
- Projected Capacitive: IFC-417Ci5-7300 only

System
- Processor
  - 7th Gen Intel® Core™ i5-7300U Processor, Dual Core, 3MB Cache, up to 3.5 GHz
  - 7th Gen Intel® Core™ i3-7100U Processor, Dual Core, 3MB Cache, 2.4 GHz
- System Chipset: SOC integrated
- LAN Chipset
  - GbE1: Intel® I219LM (Support Wake-on-LAN and PXE)
  - GbE2: Intel® I210-AT (Support Wake-on-LAN and PXE)
- Audio Codec: Realtek ALC888S
- System Memory: 1x 260-Pin DDR4 1866/2133MHz SODIMM. Max. up to 16GB
- BIOS: AMI 128Mbit SPI BIOS
- Watchdog: Software Programmable Supports 1~255 sec. System Reset

Storage
- SSD/HDD: 1x Removable 2.5" SATA HDD Bay Support RAID 0, 1
- mSATA: 1x mSATA (Shared by 1x Mini PCIe)
- SIM Socket: 2x External SIM socket

Expansion
- Mini PCI Express: 2x Full-size Mini PCIe

Other Features
- Internal Speaker: AMP 10W + 10W
- OSD: LCD On/Off, Auto, Menu, Up and Down Multi-language

I/O
- VGA: 1x VGA
- DisplayPort: 1x 1x DisplayPort
- COM
  - 4x RS-232/422/485
- USB: 4x USB 3.0
- LAN: 2x RJ45
- Audio: 1x Mic-in, 1x Line-out
- DIO: 8 in / 8 out (Isolated)
- Others:
  - 3x WiFi Antenna Holes
  - 1x Power Switch, 1x AT/ATX Switch,1x Remote Power On/Off

Operating System
- Windows: Windows 10
- Linux: Linux kernel 4.X

Power
- Power Mode: AT, ATX
- Power Supply Voltage: 9-50VDC
- Power Ignition Sensing: Power Ignition Management
- Power Connector: 3-pin Terminal Block
- Power Adaptor: Optional AC/DC 12V/5A, 60W
- Power Protection
  - OVP (Over Voltage Protection)
  - OCP (Over Current Protection)
  - Reverse Protection

Environment
- Operating Temp.: -10˚C to 60˚C
- Storage Temp.: -20˚C to 70˚C
- Relative Humidity: 10%~80% (non-condensing)
- IP Level: IP 65 Compliant Front Panel
- Vibration: 1.5 Grms, 5 – 500 Hz, 0.5 hr/axis
- Shock: 20G, half sine, 11ms
- Standards / Certification: CE, FCC Class A

Physical
- Front Panel Construction: Die-cast Flat Surface
- Dimension: 407.5 (W) x 339 (D) x 70.5 (H)mm
- Weight: TBC
- Mounting: VESA Mounting Holes 75 x 75mm, 100 x 100mm

1.2.5 IFC-419(C)i5-7300

Display
- LCD Size: 19" (4:3)
- Max. Resolution: 1280 x 1024 (SXGA)
- Brightness (cd/m^2): 350
- Contrast Ratio: 1000 : 1
- LCD Color: 16.7M
- Pixel Pitch (mm): 0.294 (H) x 0.294 (V)
- Viewing Angle (H-V): 170 / 160
- Backlight MTBF: 50000 hrs (LED Backlight)

Touch
- Resistive 5-Wire: IFC-419i5-7300 only
- Projected Capacitive: IFC-419Ci5-7300 only

I/O
- VGA: 1x VGA
- DisplayPort: 1x 1x DisplayPort
- COM
  - 4x RS-232/422/485
- USB: 4x USB 3.0

- LAN: 2x RJ45
- Audio: 1x Mic-in, 1x Line-out
- DIO: 8 in / 8 out (Isolated)
- Others:
  - 3x WiFi Antenna Holes
  - 1x Power Switch, 1x AT/ATX Switch,1x Remote Power On/Off

System
- Processor
  - 7th Gen Intel® Core™ i5-7300U Processor, Dual Core, 3MB Cache, up to 3.5 GHz
  - 7th Gen Intel® Core™ i3-7100U Processor, Dual Core, 3MB Cache, 2.4 GHz
- System Chipset: SOC integrated
- LAN Chipset
  - GbE1: Intel® I219LM (Support Wake-on-LAN and PXE)
  - GbE2: Intel® I210-AT (Support Wake-on-LAN and PXE)
- Audio Codec: Realtek ALC888S
- System Memory: 1x 260-Pin DDR4 1866/2133MHz SODIMM. Max. up to 16GB
- BIOS: AMI 128Mbit SPI BIOS
- Watchdog: Software Programmable Supports 1~255 sec. System Reset

Storage
- SSD/HDD: 1x Removable 2.5" SATA HDD Bay Support RAID 0, 1
- mSATA: 1x mSATA (Shared by 1x Mini PCIe)
- SIM Socket: 2x External SIM socket

Expansion
- Mini PCI Express: 2x Full-size Mini PCIe

Other Features
- Internal Speaker: AMP 10W + 10W
- OSD: LCD On/Off, Auto, Menu, Up and Down Multi-language

Operating System
- Windows: Windows 10
- Linux: Linux kernel 4.X

Power
- Power Mode: AT, ATX
- Power Supply Voltage: 9-50VDC
- Power Ignition Sensing: Power Ignition Management
- Power Connector: 3-pin Terminal Block
- Power Adaptor: Optional AC/DC 12V/5A, 60W
- Power Protection
  - OVP (Over Voltage Protection)
  - OCP (Over Current Protection)
  - Reverse Protection

Environment
- Operating Temp.: -10˚C to 50˚C
- Storage Temp.: -20˚C to 60˚C
- Relative Humidity: 10%~80% (non-condensing)
- IP Level: IP 65 Compliant Front Panel
- Vibration: 1.5 Grms, 5 – 500 Hz, 0.5 hr/axis
- Shock: 20G, half sine, 11ms
- Standards / Certification: CE, FCC Class A

Physical
- Front Panel Construction: Die-cast Flat Surface
- Dimension: 450 (W) x 375 (D) x 71 (H)mm
- Weight: TBC
- Mounting: VESA Mounting Holes 75 x 75mm, 100 x 100mm

1.2.6 IFC-421(C)i5-7300

Display
- LCD Size: 21.5" (16:9)
- Max. Resolution: 1920 x 1080 (Full HD)
- Brightness (cd/m^2): 300
- Contrast Ratio: 5000 : 1
- LCD Color: 16.7M
- Pixel Pitch (mm): 0.248 (H) x 0.248 (V)
- Viewing Angle (H-V): 178 / 178
- Backlight MTBF: 50000 hrs (LED Backlight)

Touch
- Resistive 5-Wire: IFC-421i5-7300 only
- Projected Capacitive: IFC-421Ci5-7300 only

I/O
- VGA: 1x VGA
- DisplayPort: 1x 1x DisplayPort
- COM
  - 4x RS-232/422/485
- USB: 4x USB 3.0

- LAN: 2x RJ45
- Audio: 1x Mic-in, 1x Line-out
- DIO: 8 in / 8 out (Isolated)
- Others:
  - 3x WiFi Antenna Holes
  - 1x Power Switch, 1x AT/ATX Switch,1x Remote Power On/Off

System
- Processor
  - 7th Gen Intel® Core™ i5-7300U Processor, Dual Core, 3MB Cache, up to 3.5 GHz
  - 7th Gen Intel® Core™ i3-7100U Processor, Dual Core, 3MB Cache, 2.4 GHz
- System Chipset: SOC integrated
- LAN Chipset
  - GbE1: Intel® I219LM (Support Wake-on-LAN and PXE)
  - GbE2: Intel® I210-AT (Support Wake-on-LAN and PXE)
- Audio Codec: Realtek ALC888S
- System Memory: 1x 260-Pin DDR4 1866/2133MHz SODIMM. Max. up to 16GB
- BIOS: AMI 128Mbit SPI BIOS
- Watchdog: Software Programmable Supports 1~255 sec. System Reset

Storage
- SSD/HDD: 1x Removable 2.5" SATA HDD Bay Support RAID 0, 1
- mSATA: 1x mSATA (Shared by 1x Mini PCIe)
- SIM Socket: 2x External SIM socket

Expansion
- Mini PCI Express: 2x Full-size Mini PCIe

Other Features
- Internal Speaker: AMP 10W + 10W
- OSD: LCD On/Off, Auto, Menu, Up and Down Multi-language

Operating System
- Windows: Windows 10
- Linux: Linux kernel 4.X

Power
- Power Mode: AT, ATX
- Power Supply Voltage: 9-50VDC
- Power Ignition Sensing: Power Ignition Management
- Power Connector: 3-pin Terminal Block
- Power Adaptor: Optional AC/DC 12V/5A, 60W
- Power Protection
  - OVP (Over Voltage Protection)
  - OCP (Over Current Protection)
  - Reverse Protection

Environment
- Operating Temp.: -10˚C to 60˚C
- Storage Temp.: -20˚C to 60˚C
- Relative Humidity: 10%~80% (non-condensing)
- IP Level: IP 65 Compliant Front Panel
- Vibration: 1.5 Grms, 5 – 500 Hz, 0.5 hr/axis
- Shock: 20G, half sine, 11ms
- Standards / Certification: CE, FCC Class A

Physical
- Front Panel Construction: Die-cast Flat Surface
- Dimension: 527.5 (W) x 323 (D) x 71 (H)mm
- Weight: TBC
- Mounting: VESA Mounting Holes 75 x 75mm, 100 x 100mm

1.3 System I/O

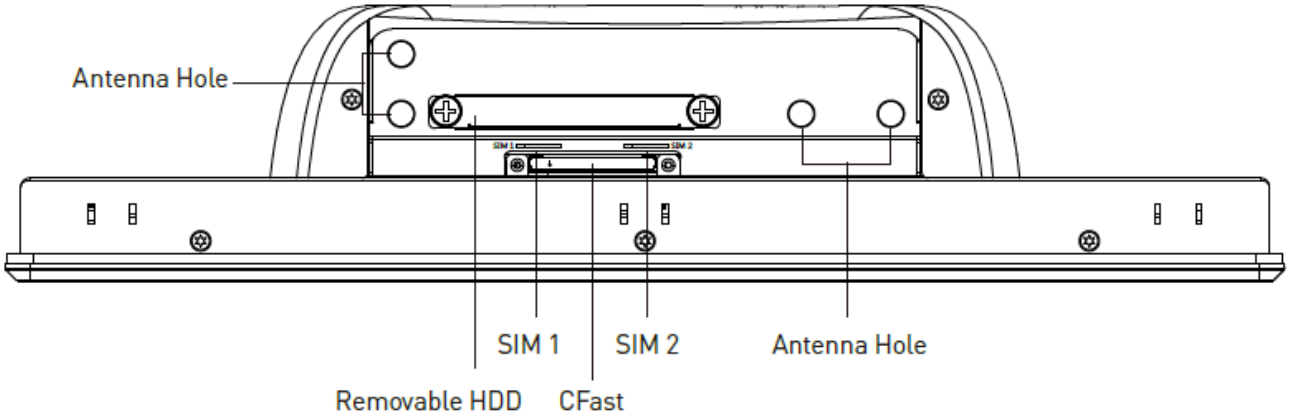
1.3.1 Front

Removable HDD Bay
Used to inserts a 2.5" HDD device

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

SIM Card Socket
Used to insert SIM card

CFast Socket
Used to insert CFast card



1.3.2 Rear

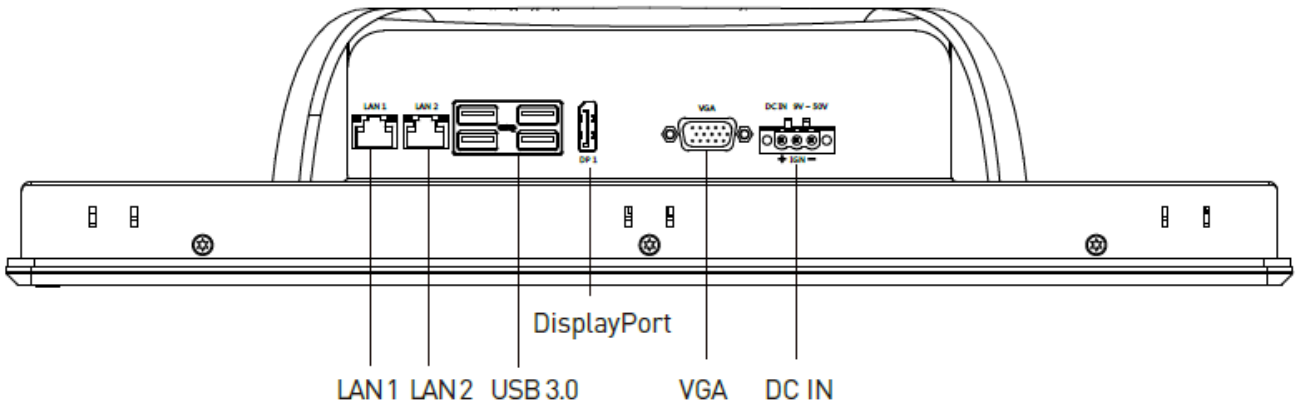
DC IN
Used to plug a DC power input with terminal block

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

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



1.3.3 Side (Right)

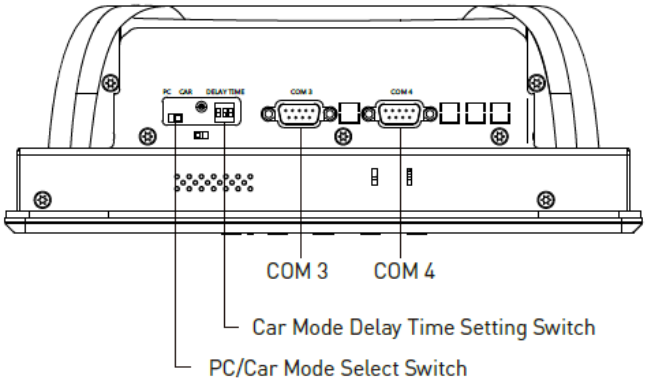
COM port
COM3~4 support RS232/422/485 serial device

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

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

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

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



1.3.4 Side (Left)

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

Power LED
Indicates the power status of the system

HDD LED
Indicates the status of the hard drive

Reset switch
Press to reset the system

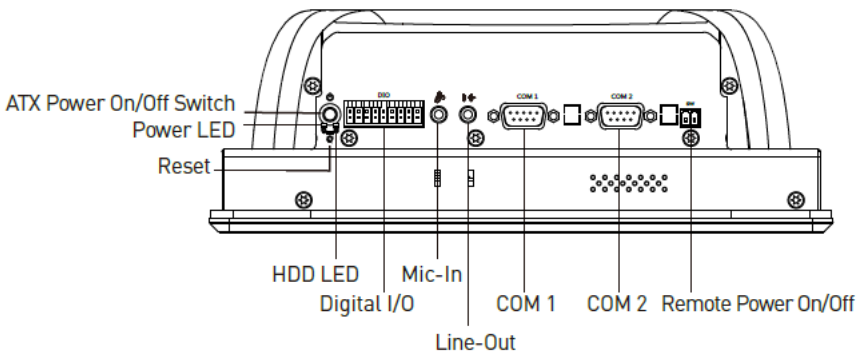
Digital I/O Terminal Block
The Digital I/O terminal block supports 8 digital input and 8 digital output

Line-out
Used to connect a speaker

Mic-in
Used to connect a microphone

Remote Power on/off Terminal Block
Used to plug a remote power on/off terminal block

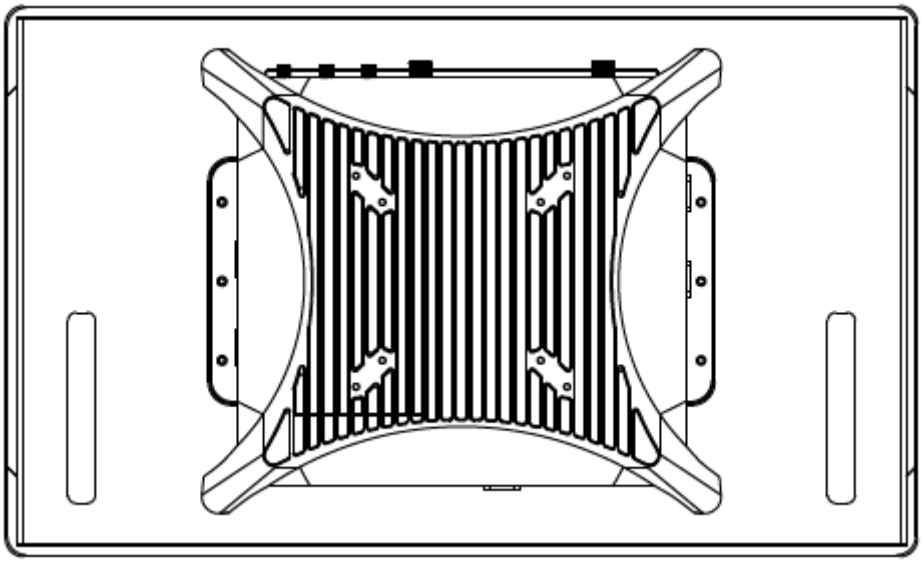
COM port
COM1 ~ COM2 support RS232/422/485 serial device



1.3.5 Top

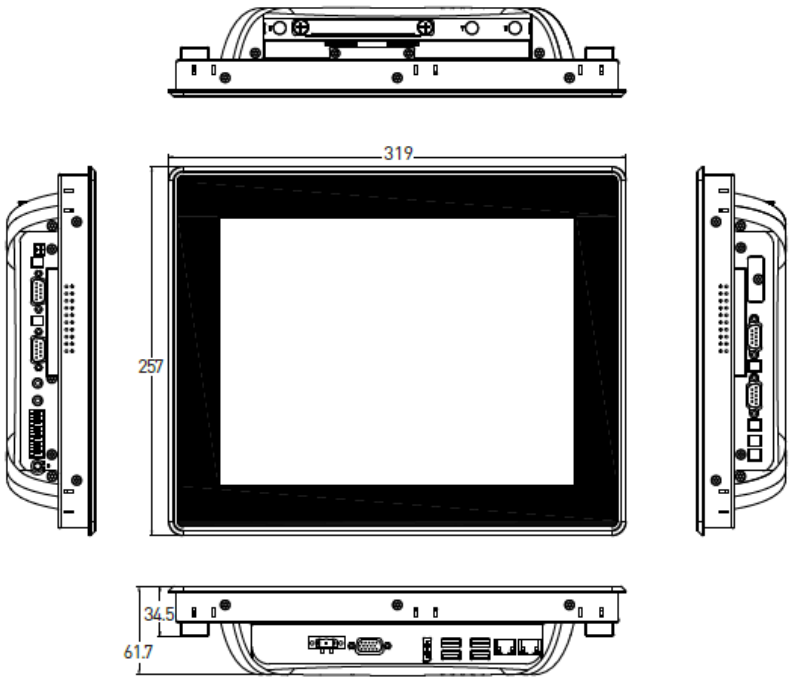
VESA Mounting Hole

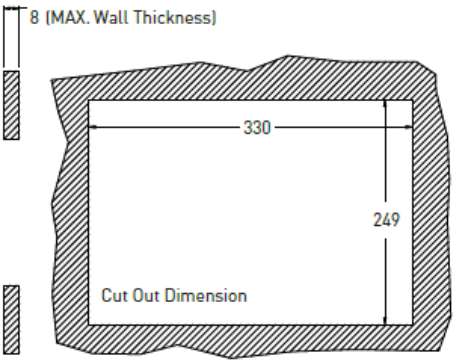
These are mounting holes for VESA mount (75x75mm and 100x100mm)

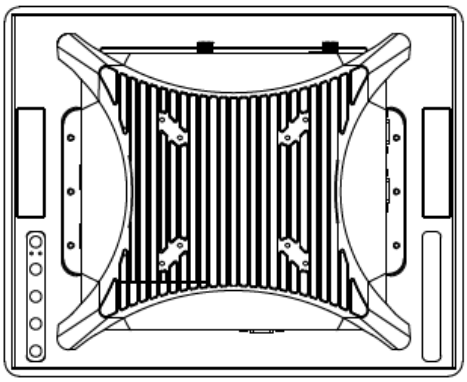


1.4 Mechanical Dimensions

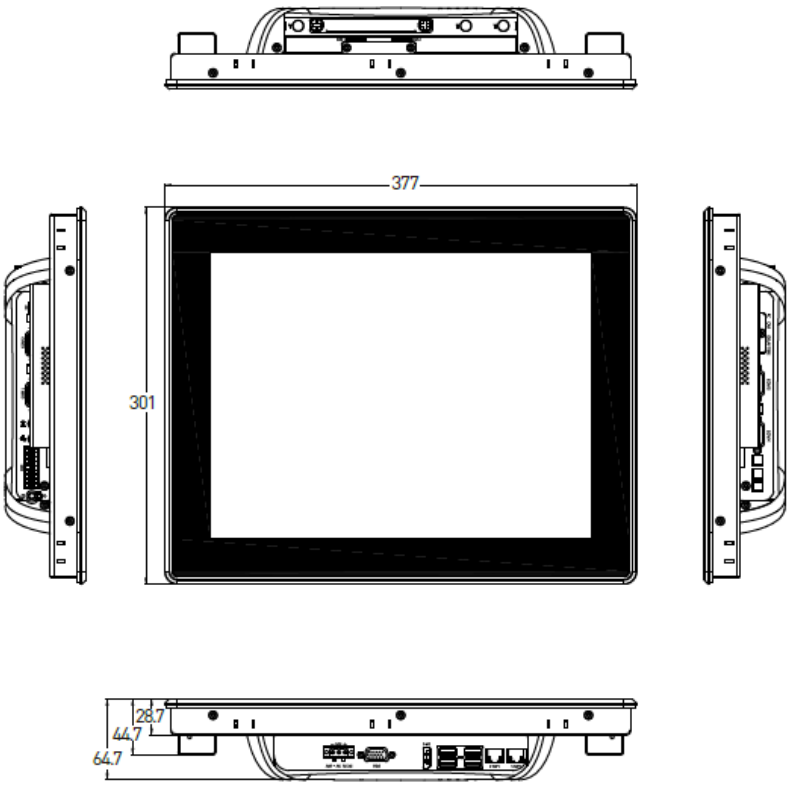
1.4.1 IFC-412(C)i5-7300

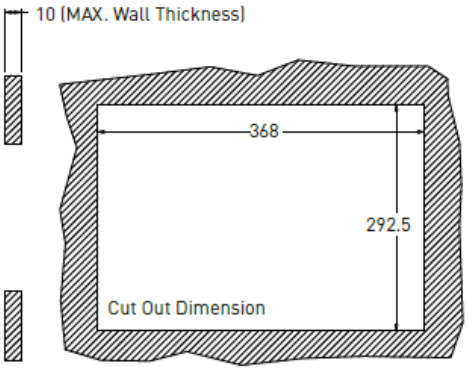


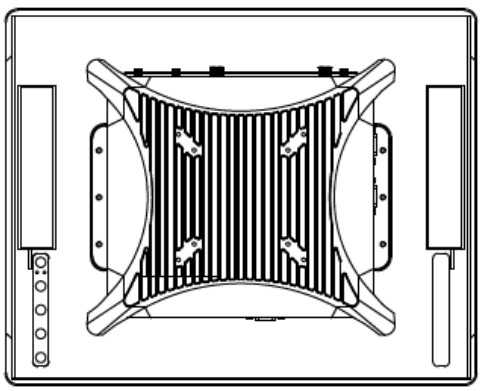




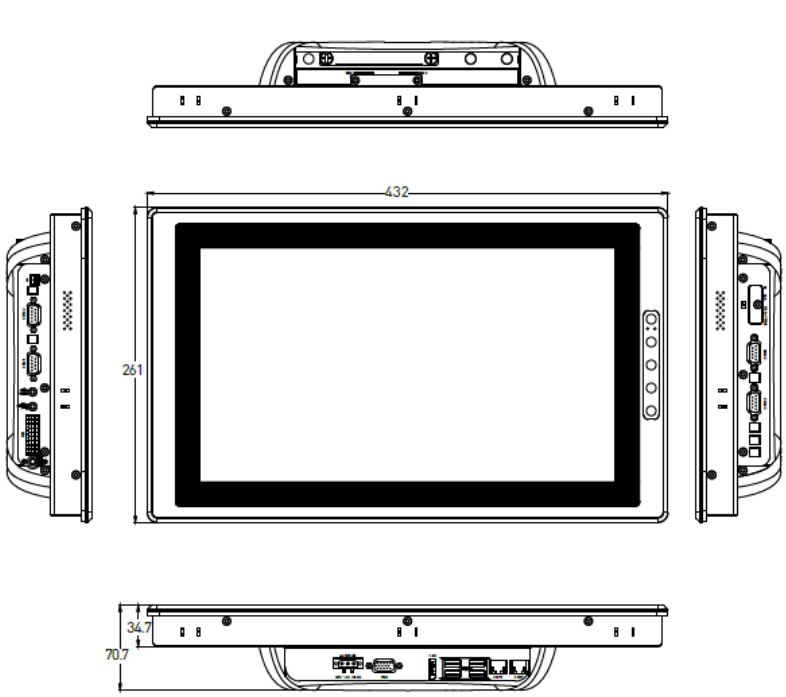
1.4.2 IFC-415(C)i5-7300

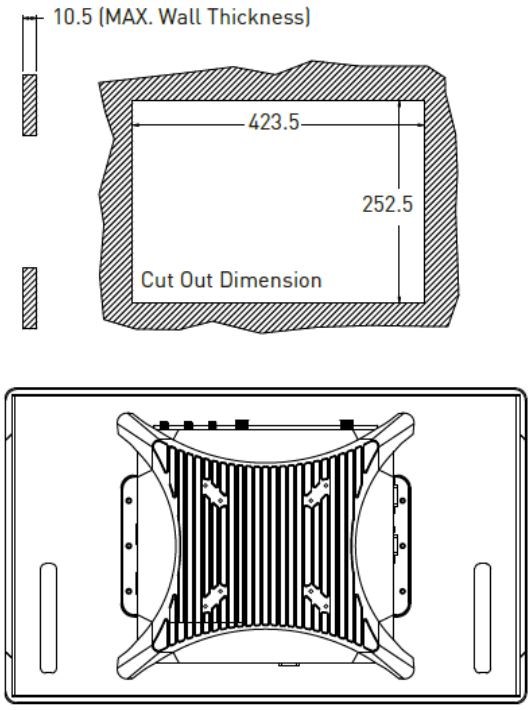




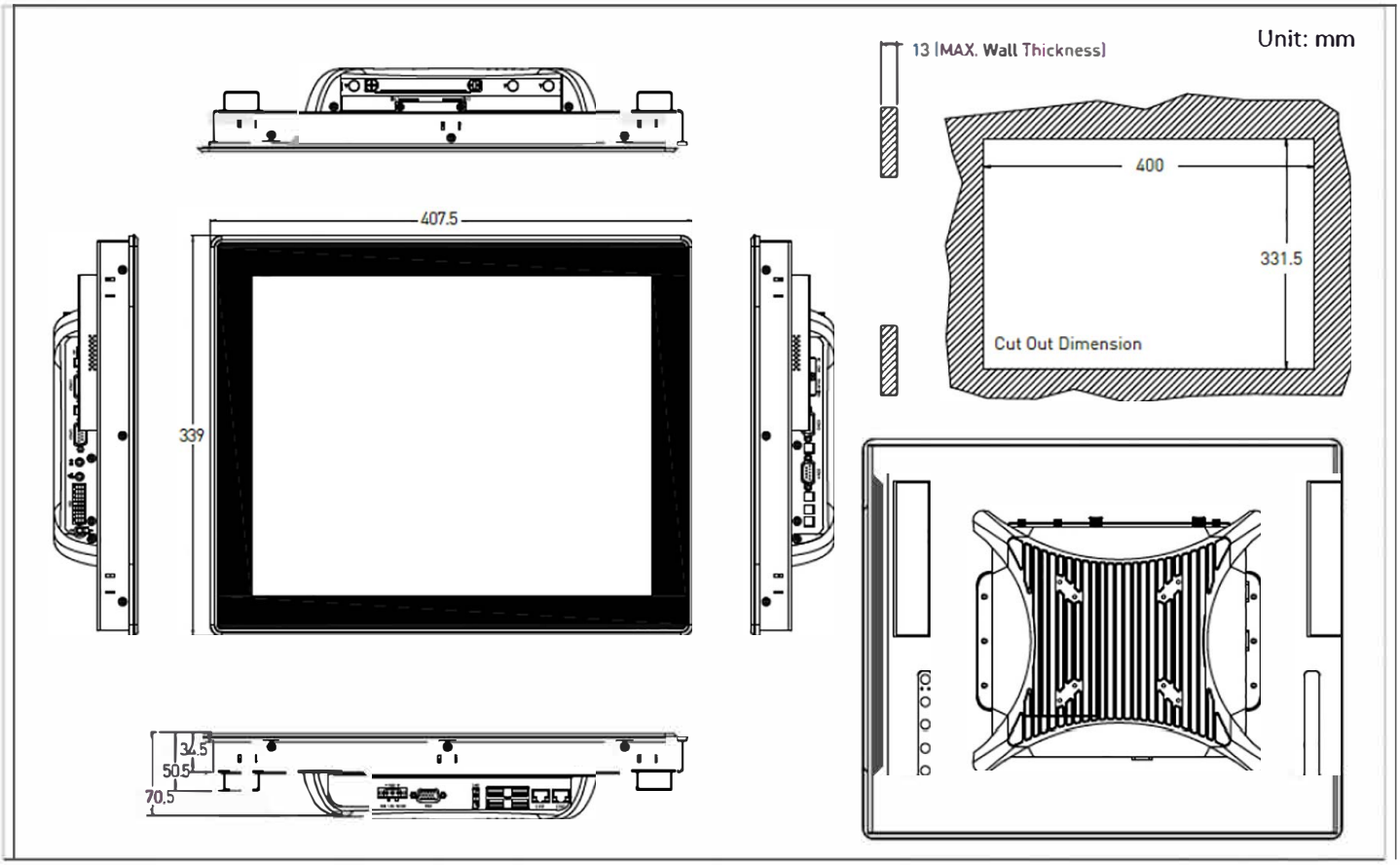


1.4.3 IFC-W415(C)i5-7300

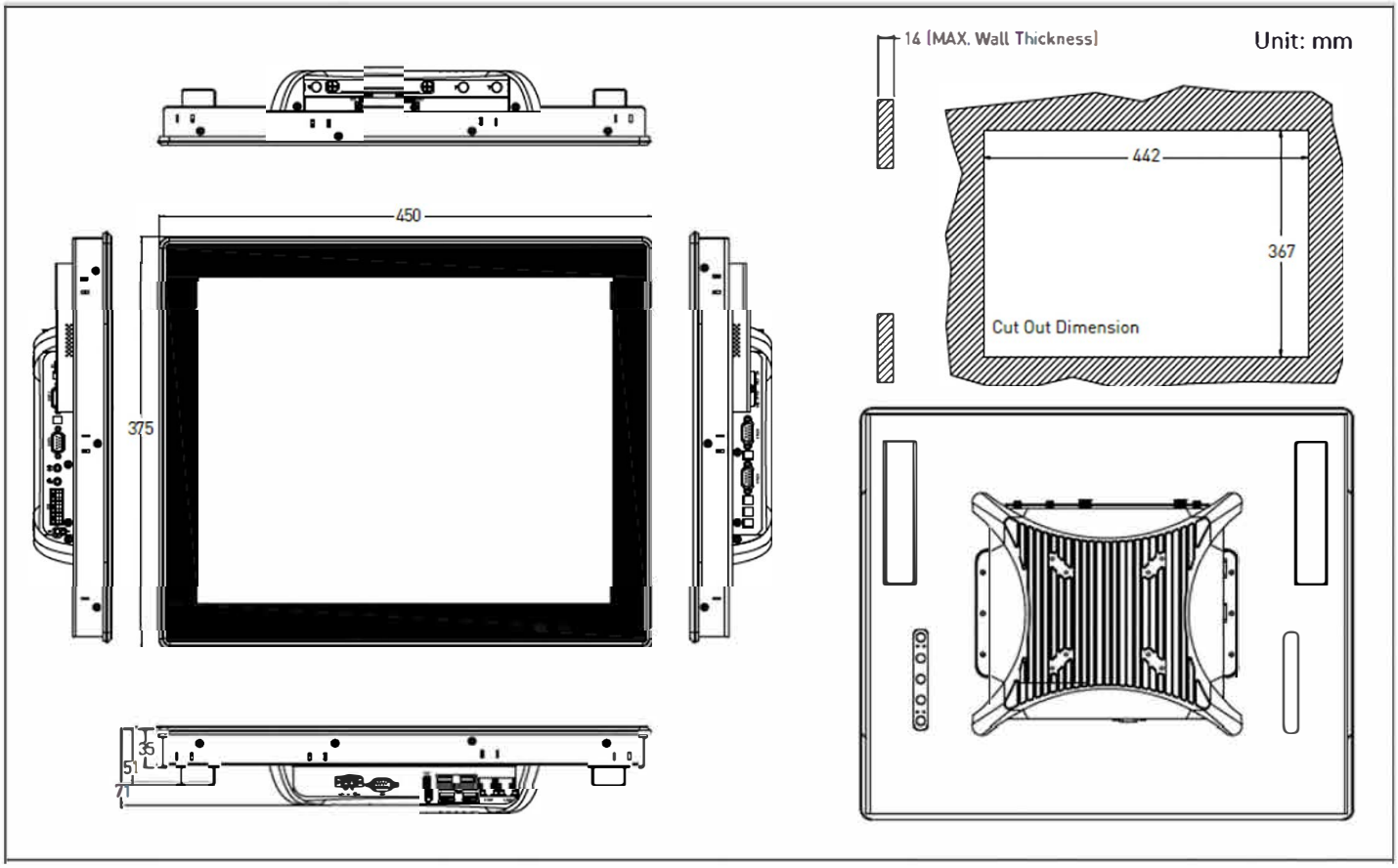




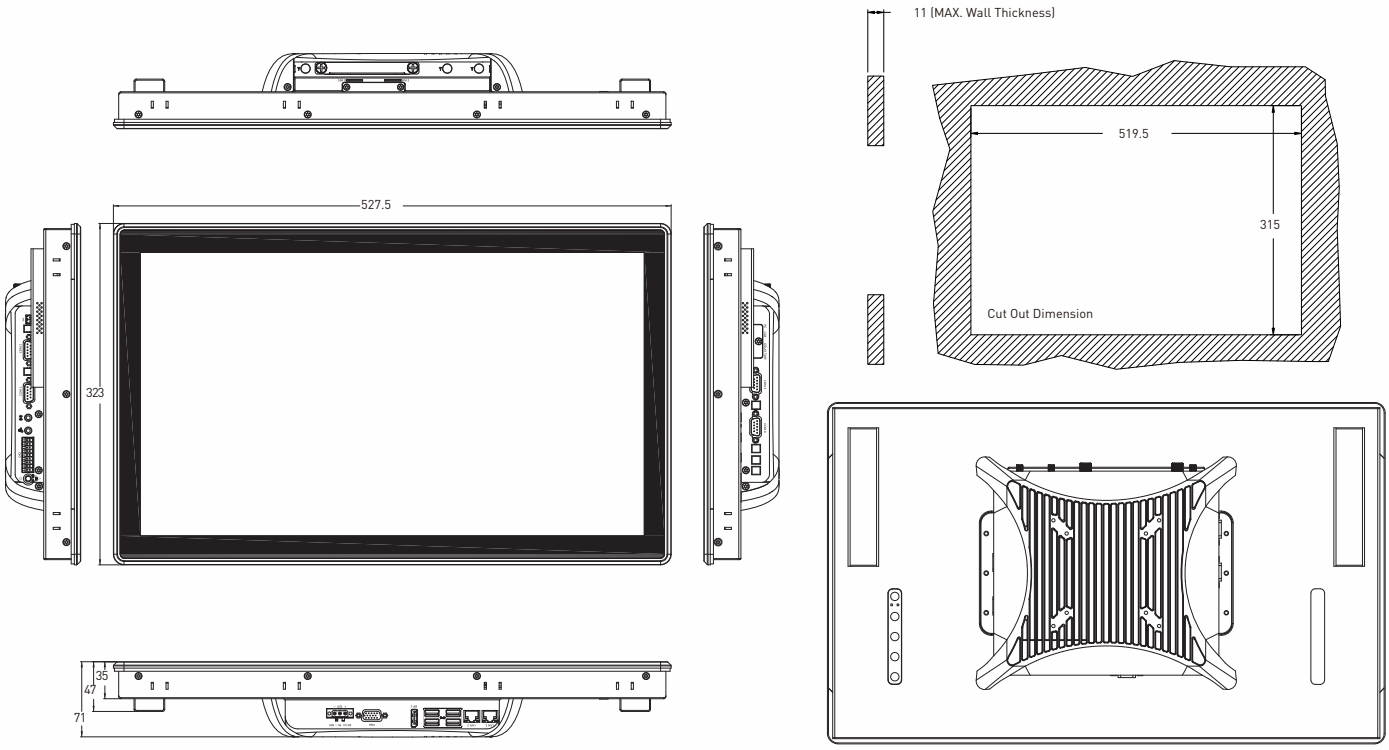
1.4.4 IFC-417(C)i5-7300



1.4.5 IFC-419(C)i5-7300



1.4.6 IFC-421(C)i5-7300

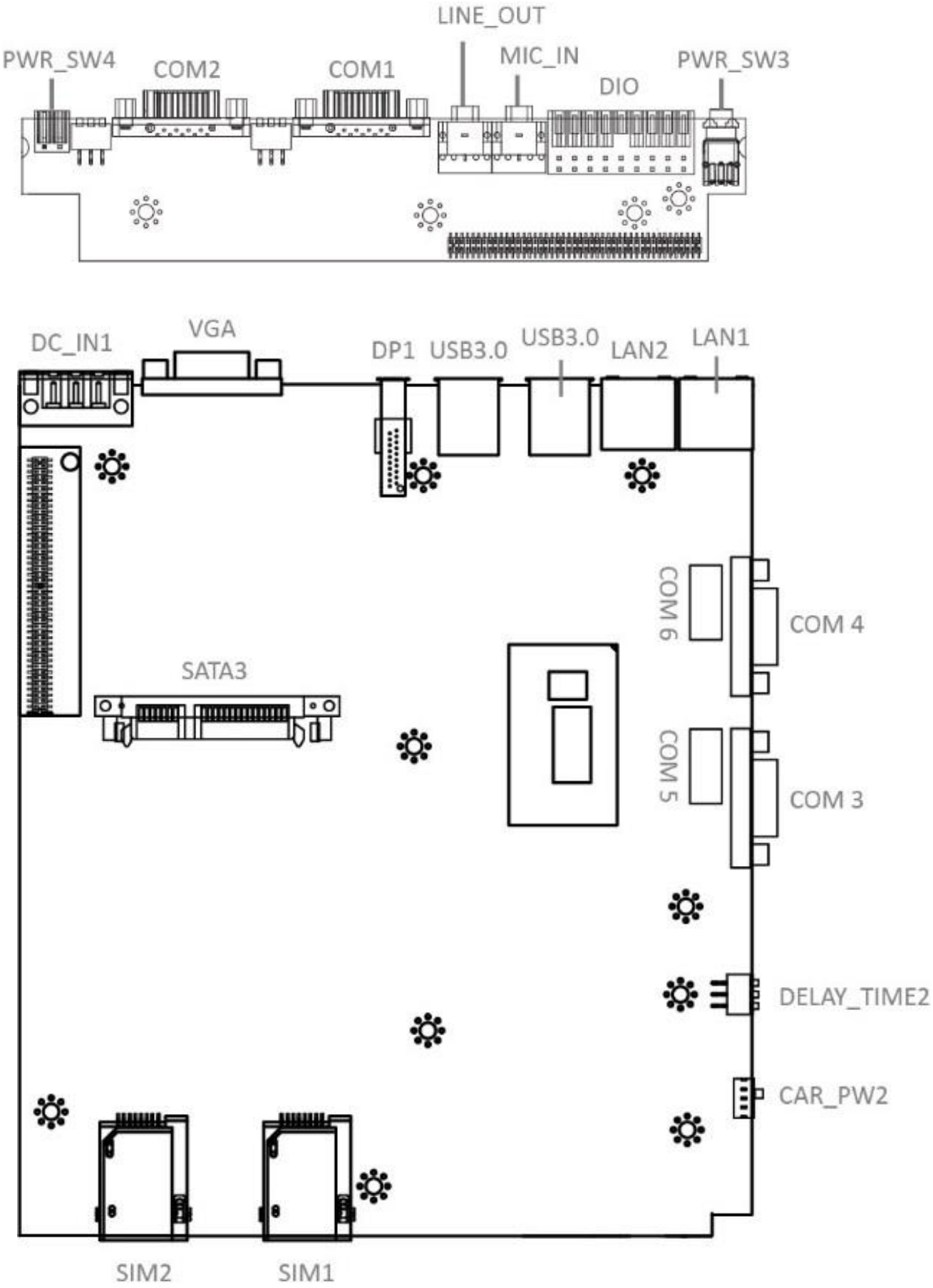


Chapter 2

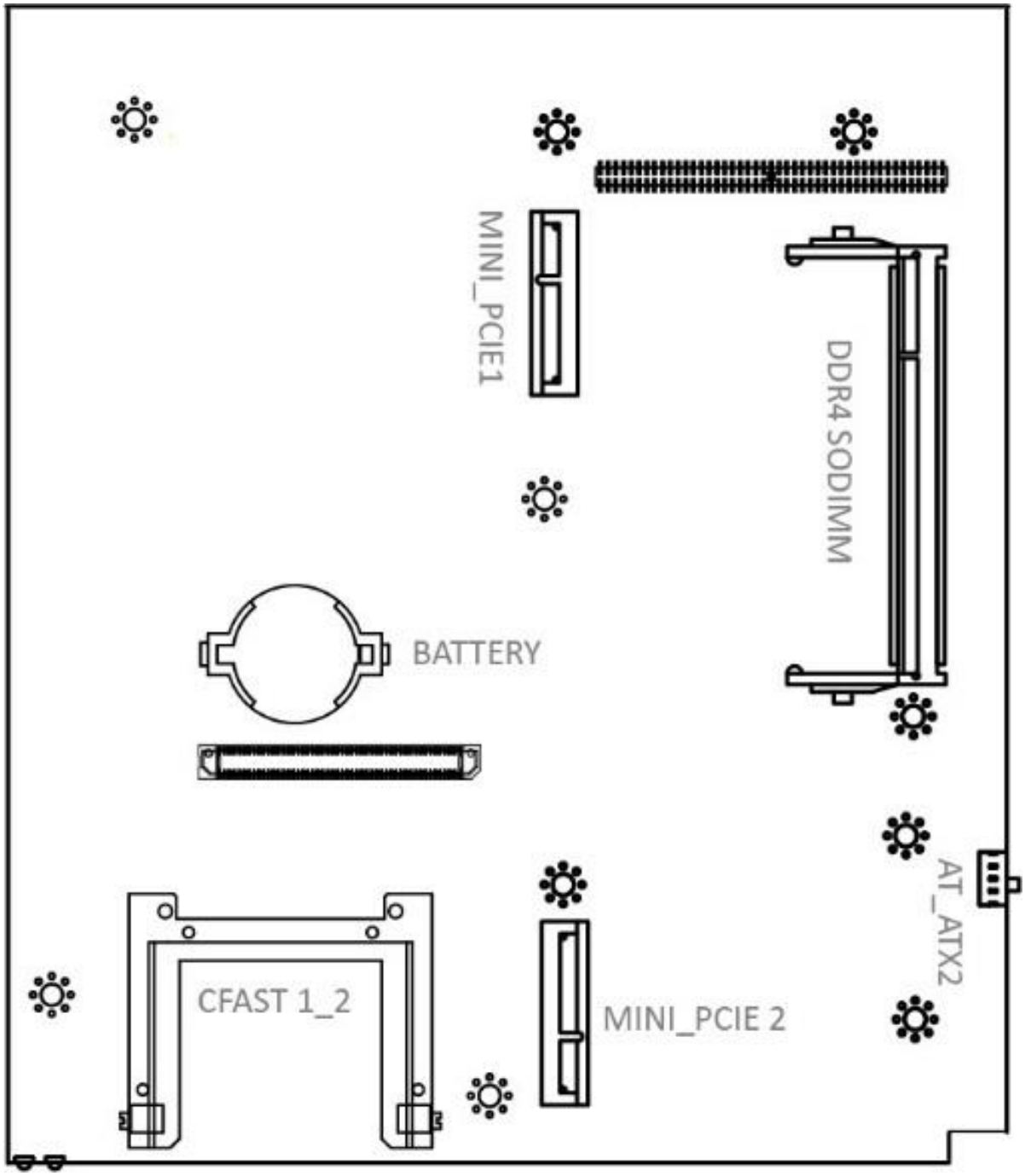
Switches and Connectors

2.1 Switch and Connector Locations

2.1.1 Top View



2.1.2 Bottom View



2.2 Connector / Switch Definition

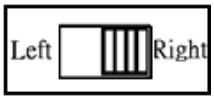
List of Connector / Switch

Connector Location	Definition
AT_ATX2	AT / ATX Power Mode Switch
CLR_CMOS1	Clear BIOS Switch
CAR_PWR2	PC / Car Mode Switch
DELAY_TIME2	Car mode PC turn off delay time
CFAST1_2	CFast Socket
PWR_SW3	Power Switch
RESET2	Reset Switch
USB1_2_1, USB1_2_2	USB 3.0 Port
SIM1_1, SIM2_1	SIM Card Socket
COM1_1, COM2_1, COM3_1, COM4_1	RS232 / RS422 / RS485 Connector
LAN1, LAN2	LAN Port
DC_IN1	3-pin DC 9~50V Power Input Connector
DP1	DisplayPort Connector
LINE_OUT1	Line-out Jack
MIC_IN1	Mic-in Jack
DIO1	8DI / 8DO Connector
PWR_SW4	Remote Power Switch
MINI-PCIE1	Mini PCI-Express / mSATA Socket
MINI-PCIE2	Mini PCI-Express Socket
SATA3	SATA with Power Connector
PWR_LED2	Power LED Status
HDD_LED2	HDD Access LED Status

2.3 Switches Definitions

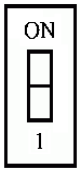
AT_ATX1: AT / ATX Power Mode Switch

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



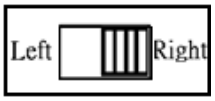
CLR_CMOS1: Clear BIOS Switch

Switch	Definition
Off	Normal Status (Default)
ON	Clear BIOS



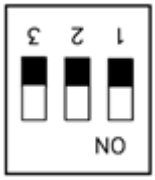
CAR_PWR2: PC / Car Mode Switch

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



DELAY_TIME1: Power off delay time setup Switch

Switch 1 / 2 / 3	Definition
ON / ON / ON	3 sec.（Default Shutdown Timer by O.S）
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 of Setting Power Ignition

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

Step 2:
To configure the power off delay time, please check the Delay Time Setting Options in advance.

Step 3:
To connect the power and ignition power

Step 3

Switch 1 / 2 / 3	Power off delay time
ON / ON / ON	3 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 (Right): PC Mode
Pin 2-3 (Left): Power Ignition Mode

Step 3
To connect the battery power and ignition signal

Example: Delay Time Setting for 5 minutes

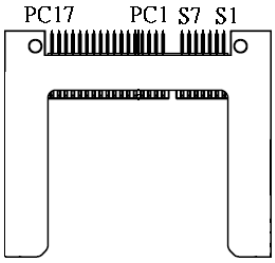
1. If delay time set as "5 minutes"

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

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

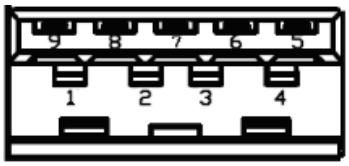
Pin	Definition	Pin	Definition
1	NC	4	GND
2	Power Button	5	NC
3	NC	6	GND

RESET2 : Reset Button

Pin	Definition
1	RESET
2	GND

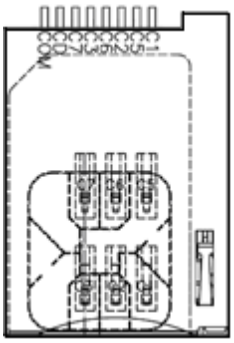
USB3.0 Connector, Type A

Pin	Definition	Pin	Definition
1	+5V	6	USB3_RX+
2	USB2_D-	7	GND
3	USB2_D+	8	USB3_TX-
4	GND	9	USB3_TX+
5	USB3_RX-		



SIM1, SIM2: SIM Card Socket

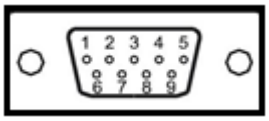
Pin	Definition	Pin	Definition
C1	UIM_PWR	C6	UIM_VPP
C2	UIM_RESET	C7	UIM_DATA
C3	UIM_CLK	CD	NC
C5	GND	COM	GND



COM: RS232 / RS422 / RS485 Connector

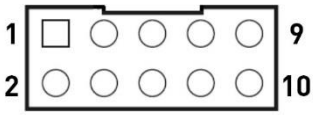
Connector Type: 9-pin D-Sub

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



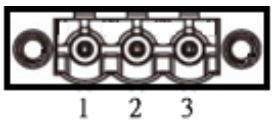
COM: RS232 / RS422 / RS485 Connector
Connector Type: 2X5 10-pin box header, 2.54mm pitch

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



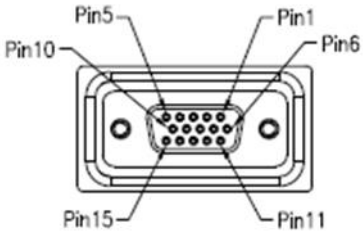
DC_IN1: DC Power Input Connector (+9~50V)
Connector Type: Terminal Block 1X3 3-pin, 5.0mm pitch

Pin	Definition
1	+9~50VIN
2	Car power detect (ACC in)
3	GND



VGA: Standard VGA Connector
Connector Type: 15-pin D-Sub

Pin	Definition	Pin	Definition
1	RED	9	+5V
2	GREEN	10	S_GND
3	BLUE	11	NC
4	NC	12	SDA
5	GND	13	HSYNC
6	R_GND	14	VSYNC
7	G_GND	15	SCL
8	B_GND		



DP: DisplayPort Connector

Pin	Definition	Pin	Definition
1	DP_LANE0_P	11	GND
2	GND	12	DP_LANE3_N
3	DP_LANE0_N	13	GND
4	DP_LANE1_P	14	GND
5	GND	15	DP_AUX_P
6	DP_LANE1_N	16	GND
7	DP_LANE2_P	17	DP_AUX_N
8	GND	18	DP_HPD
9	DP_LANE2_N	19	GND
10	DP_LANE3_P	20	+3.3V

LINE_OUT1 : Line-out Jack (Green)

Connector Type: 5-pin Phone Jack

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

MIC_IN1: Microphone Jack (Pink)

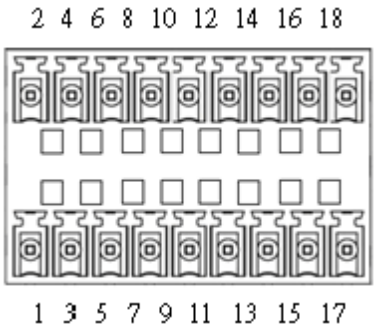
Connector Type: 5-pin Phone Jack

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

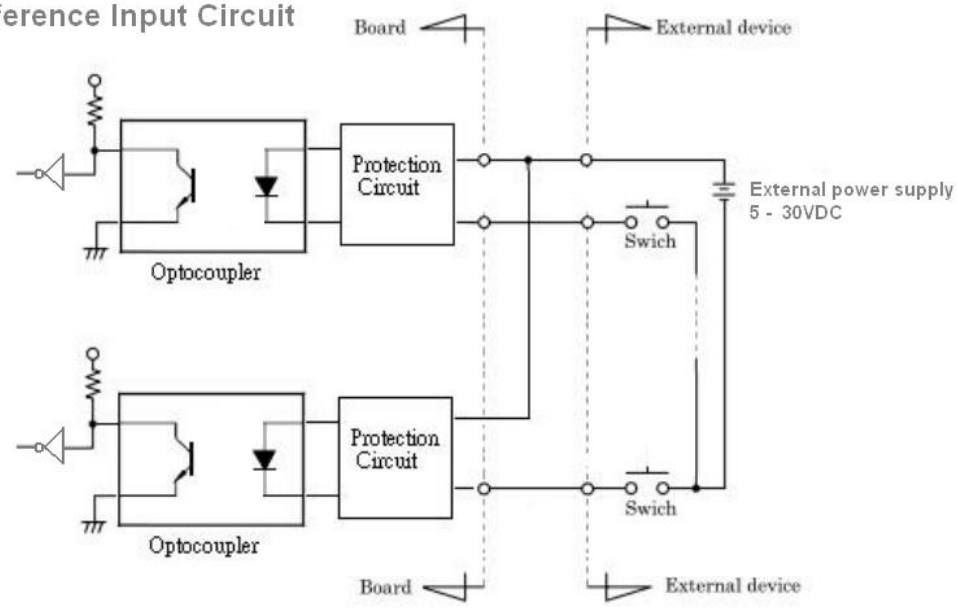
DIO1: Digital Input / Output Connector

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

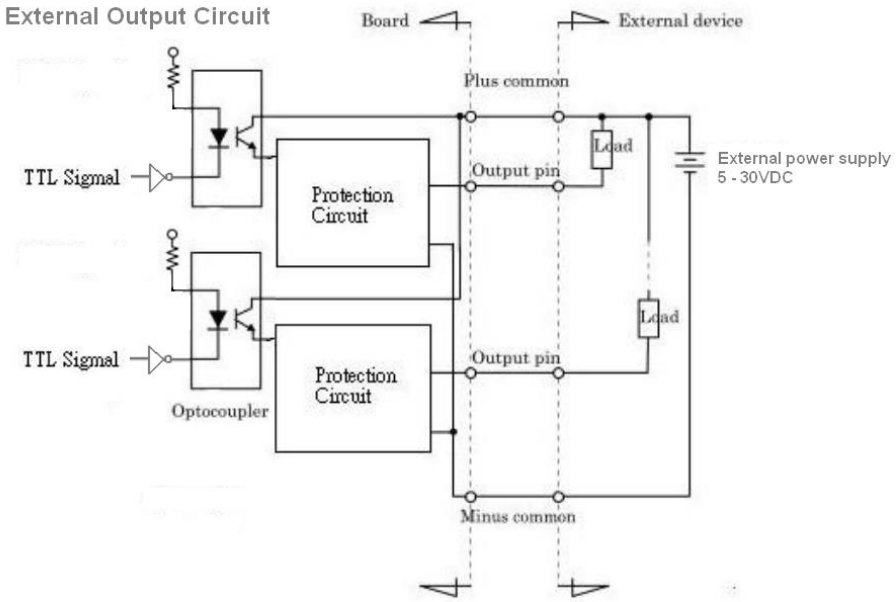
Pin	Definition	Pin	Definition
1	DIN1	2	DOUT1
3	DIN2	4	DOUT2
5	DIN3	6	DOUT3
7	DIN4	8	DOUT4
9	DIN5	10	DOUT5
11	DIN6	12	DOUT6
13	DIN7	14	DOUT7
15	DIN8	16	DOUT8
17	DC power input (+5V~+30V)	18	GND

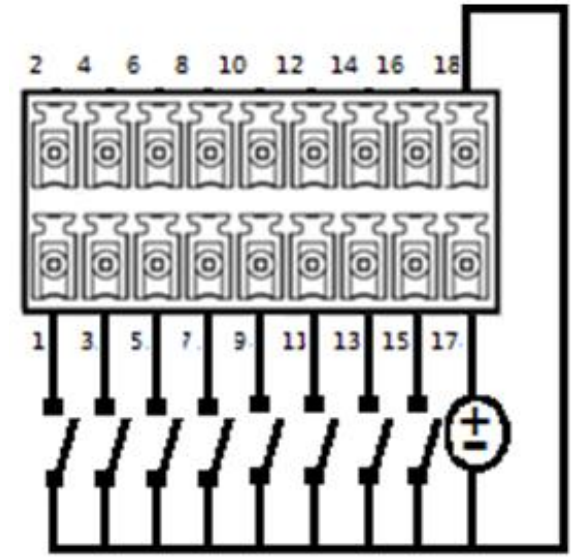


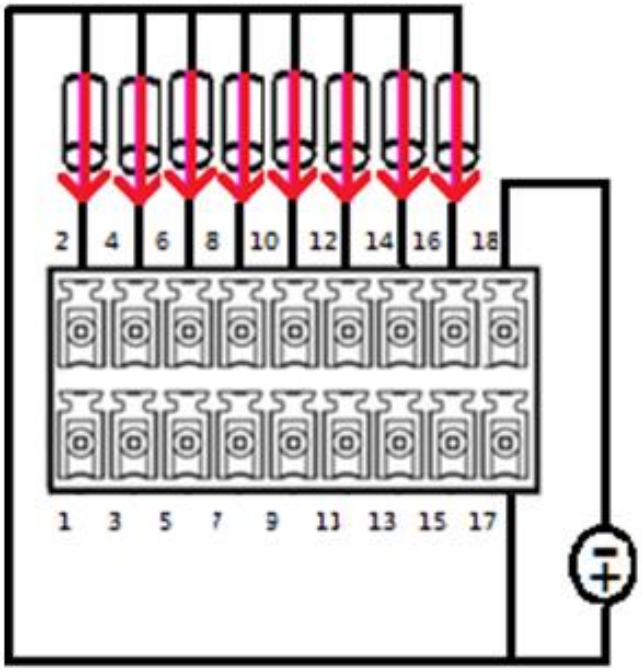
Reference Input Circuit



External Output Circuit







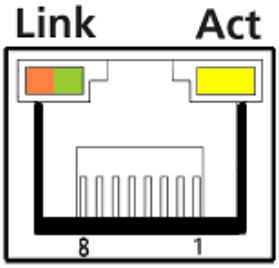
PWR_SW1 : Remote Power Switch
Connector Type: Terminal Block 1X2 2-pin, 3.5mm pitch

Pin	Definition
1	Power Button
2	GND

LAN1, LAN2: RJ45 with LEDs Port

Connector Type: RJ45 Connector

Pin	Definition	Pin	Definition
1	LAN_MDI0P	5	LAN_MDI2N
2	LAN_MDI0N	6	LAN_MDI1N
3	LAN_MDI1P	7	LAN_MDI3P
4	LAN_MDI2P	8	LAN_MDI3N

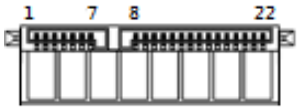


Act LED Status	Definition
Blinking Yellow	Data Activity
Off	No Activity

Link LED Status	Definition
Steady Orange	1Gbps Network Link
Steady Green	100Mbps Network Link
Off	10Mbps Network Link

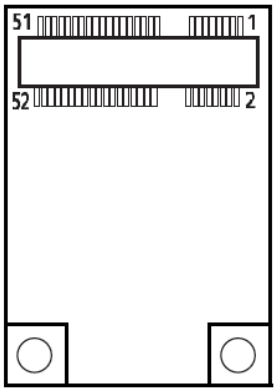
SATA with Power Connector

Pin	SATA1_1 Definition	Pin	SATA1_1 Definition
1	GND	12	GND
2	TxP	13	GND
3	TxN	14	+5V
4	GND	15	+5V
5	RxN	16	+5V
6	RxP	17	GND
7	GND	18	GND
8	NC	19	GND
9	NC	20	+12V
10	DEVSLP	21	+12V
11	GND	22	+12V



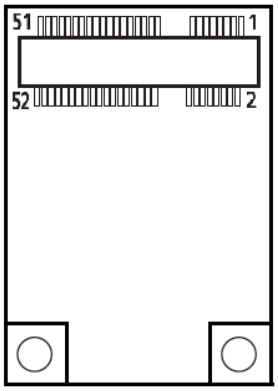
MINIPCIE1: Mini PCI-Express / mSATA Socket

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



MINIPCIE2: Mini PCI-Express Socket

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



PWR_LED2: Power LED Status

Pin	Definition
1	POWER LED+
2	POWER LED-

HDD_LED2: HDD Access LED Status

Pin	Definition
1	HDD LED+
2	HDD LED-

Chapter 3

Front Panel Controls

3.1 Users Controls

■ **Power Button**
Turns the monitor on or off.

■ **LED**
1. Blue indicates power on.
2. Yellow indicates HDD access status.

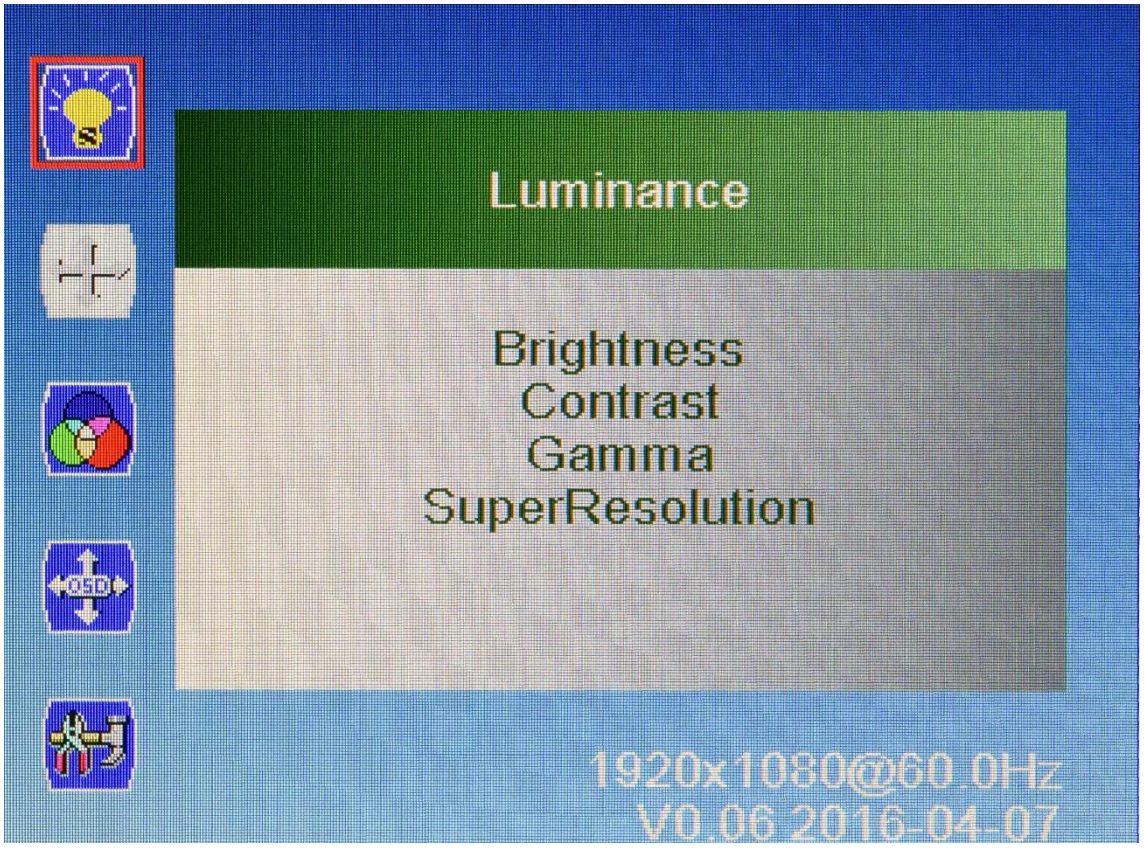
■ **MENU / Enter Button**
Press to view the OSD menu. Press it again to enter a selection in the OSD menu.

■ **Increase Button**
1. Activates the Volume control menu, and increases volume (with audio option).
2. Scrolls the OSD menu upward.
3. Increases the value of a selected function.

■ **Decrease Button**
1. Activates the Volume control menu, and decreases volume (with audio option).
2. Scrolls the OSD menu downward.
3. Decreases the value of a selected function.

■ **AUTO / Exit Button**
1. When the OSD menu is active, press this button to exit the OSD menu.
2. When the OSD menu is inactive, press this button for two seconds to activate the Auto Adjustment function and the monitor will automatically optimize the display position, focus, and clock of your display.

3.2 OSD Operation



3.2.1 Luminance

■ **Brightness**
Adjust the luminance level of the screen.

■ **Contrast**
Adjusts the contrast level of the screen.

■ **Gamma**
This item allows you to on or off the Gamma function.

■ **SuperResolution**
This setting allows you to select options for the SuperResolution. Select <Off> , <Weak>, <Median> or <Strong>.

3.2.2 Picture

Phase
Adjust the monitor internal signal phase.

Clock
Adjust the monitor internal sampling clock rate.

H. Position
Adjusts the position of the screen image left and right.

V. Position
Adjusts the position of the screen image up and down.

3.2.3 Color

Color Temperature
6500K: Select the setting of screen color to be reddish white.
7500K: Select the setting of screen color to be bluish white.
9300K: Select the setting of screen color to be bluish white.
sRGB: Set the screen color to fit the sRGB standard color specification.
User Define: Individual adjustments for red (R), green (G), blue (B).

3.2.4 OSD Settings

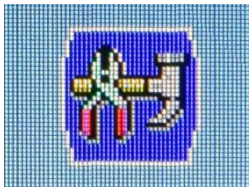
Horizontal
Changes the viewing position of the OSD menu to the left or right area of the screen.

Vertical
Changes the viewing position of the OSD menu to the top or bottom area of the screen.

Transparency
Adjust to view the background information through the OSD.

OSD Time Out
Sets the time duration in seconds that the OSD is visible after the last button is pressed.

3.2.5 Setup



Language
Selects the language in which the OSD menu is displayed. The factory default is English.

Mute
Allows the user to turn the Mute On or Off.

Input
When press Input Select change Input signal to D-SUB, DVI or DP.

Reset
Reset monitor parameters back to factory preset values.

Chapter 4

System Setup

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

4.2 Removing PC module from the display module.

WARNING

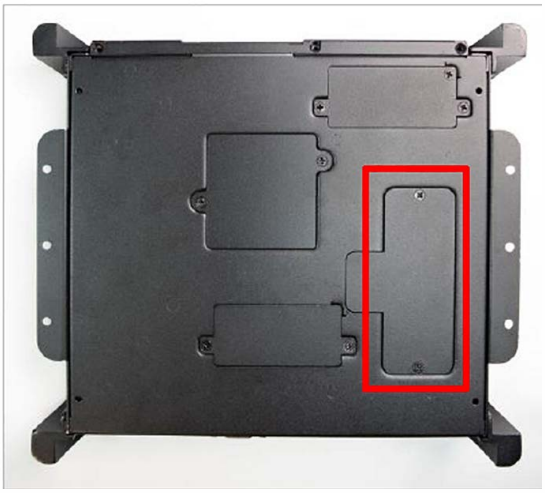
In order to prevent electric shock or system damage, before removing the chassis cover, must turn off power and disconnect the unit from power source.

1. Unscrew the 6 screws (M4x5L) next to the PC module.

2. Lift up the PC module to separate it from the display module.

4.3 Installing SODIMM

1. Remove SODIMM cover in the below circled area for installing memory module.

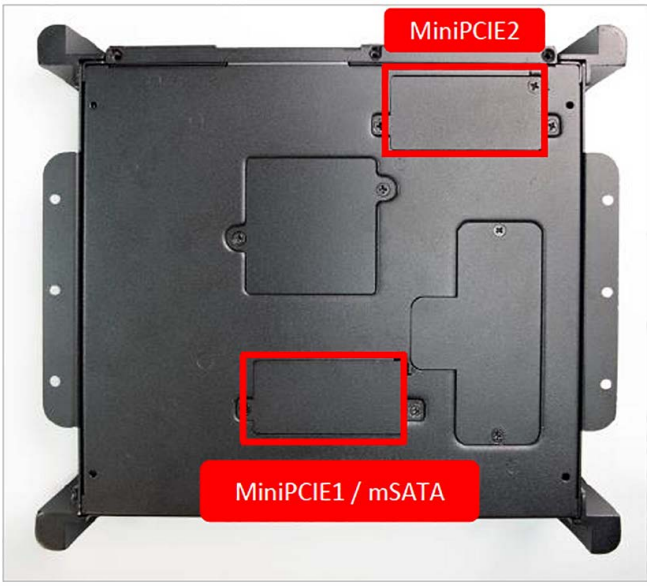


2. Insert memory module from 45 degree direction.

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

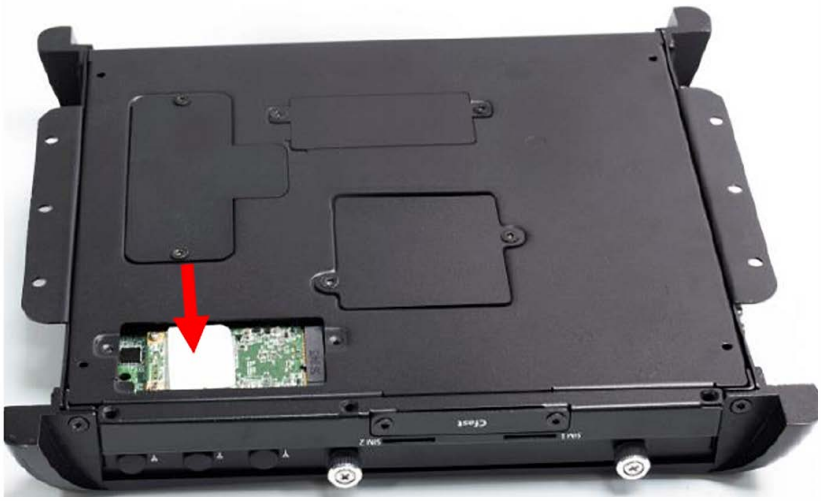
4.4 Installing mini PCIe card / mSATA

1. Two mini PCIe slots are available for IFC-400 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).

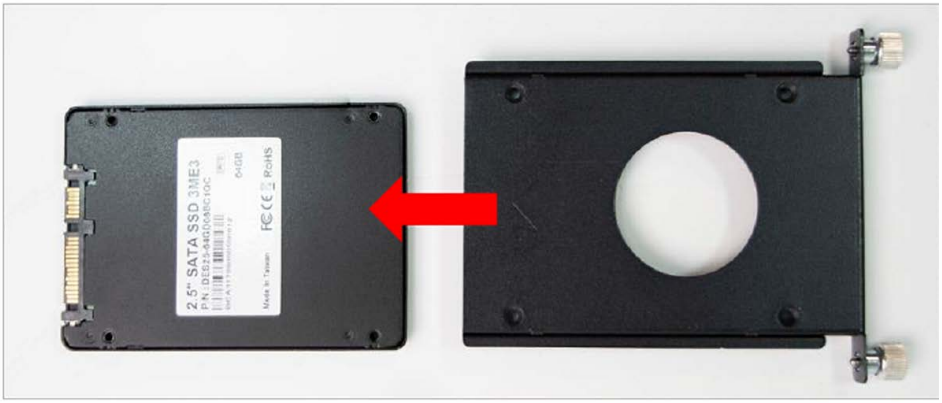


4.5 Installing HDD on removable STAT HDD bay

1. One removable SATA HDD bays is available for PC400 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).

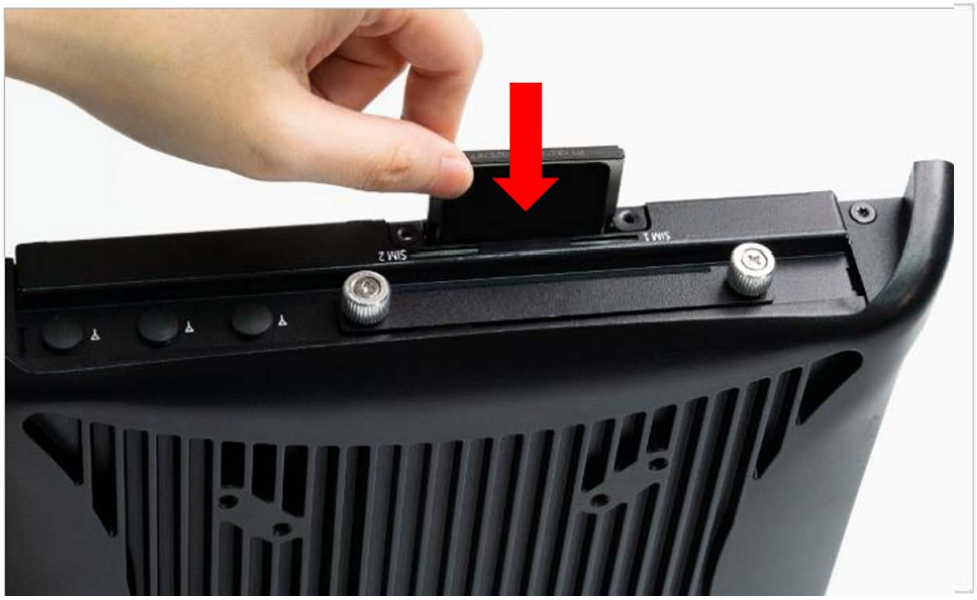


4. Slide the HDD bracket back and then fasten the sun screws.

4.6 Installing CFast card

1. One CFast socket is available for PC100 series. 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.

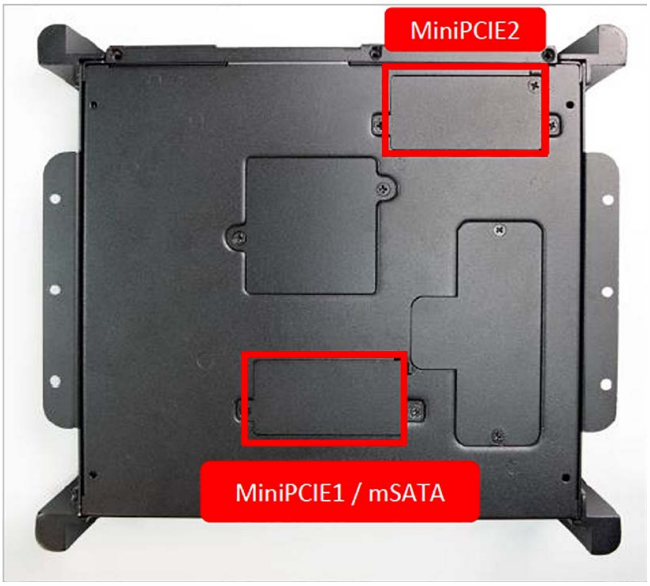
4.7 Installing SIM card

1. For IFC-400 Series, two SIM card slots are available on system chassis between removable HDD bay and CFast slot.

2. Press the SIM card in until you hear the "click" sound.

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	MiniPCIE1 / mSATA
SIM 2	MiniPCIE2



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

4.8 Removing chassis top cover

1. Unscrew the 6 screws (M3x5L) below.

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

4.9 Installing antenna

1. Three antenna holes are available for PC400 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.

4.10 Assembling 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 6 screws (M3x5L) to lock the system body with top cover.

4.11 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) to finish assembly.

Chapter 5

BIOS Setup

5.1 BIOS Introduction

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

BIOS Setup

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

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

Main Setup

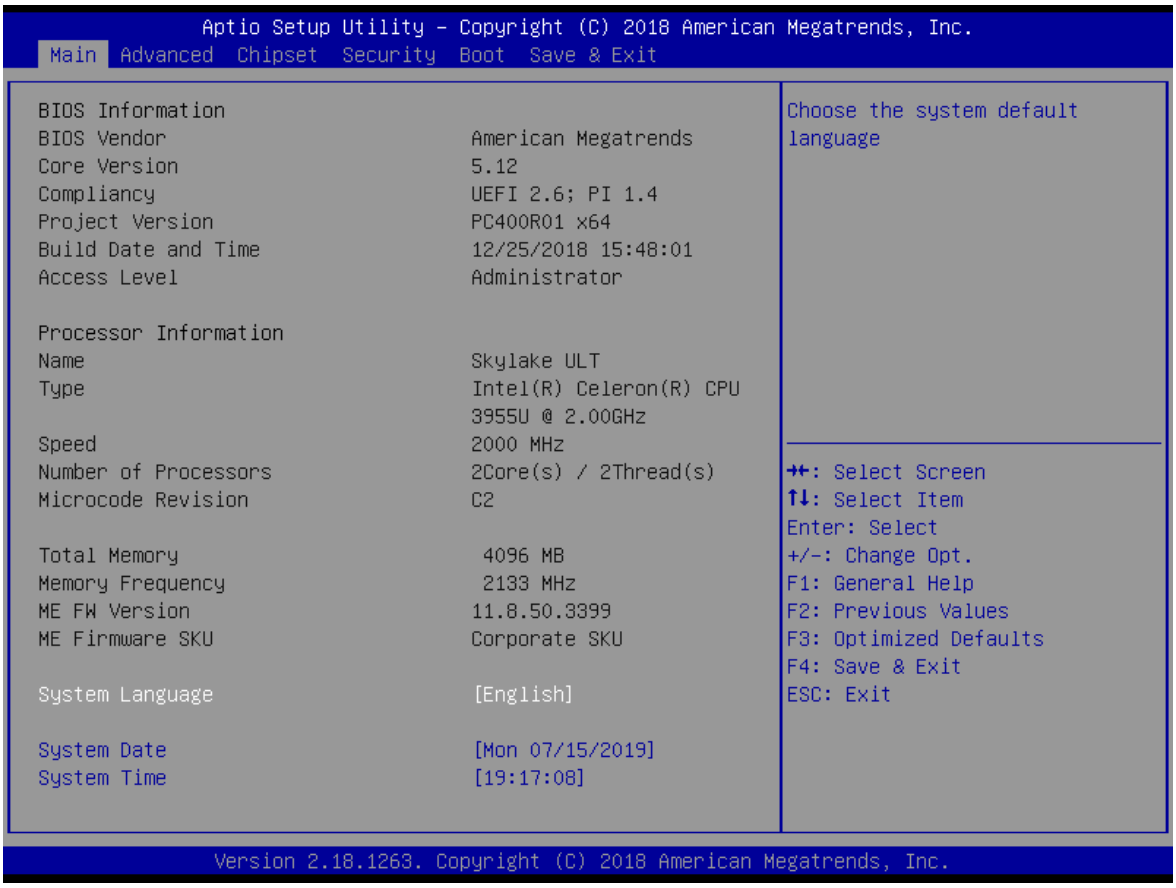
The main menu lists the setup functions you can make changes to. You can use the arrow keys (↑↓) to select the item. The on-line description of the highlighted setup function is displayed at the bottom of the screen.

General Help <F1>

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

5.2 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.



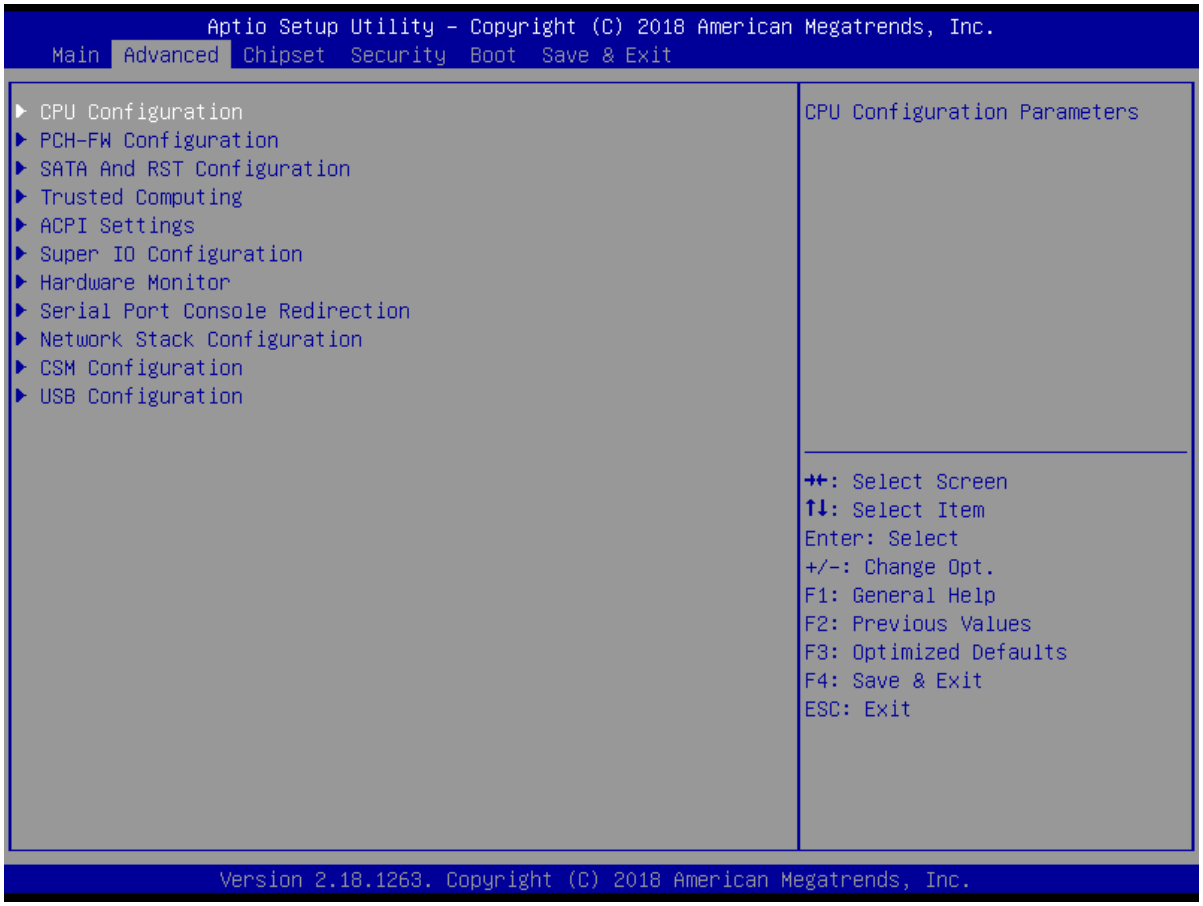
■ System Date

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

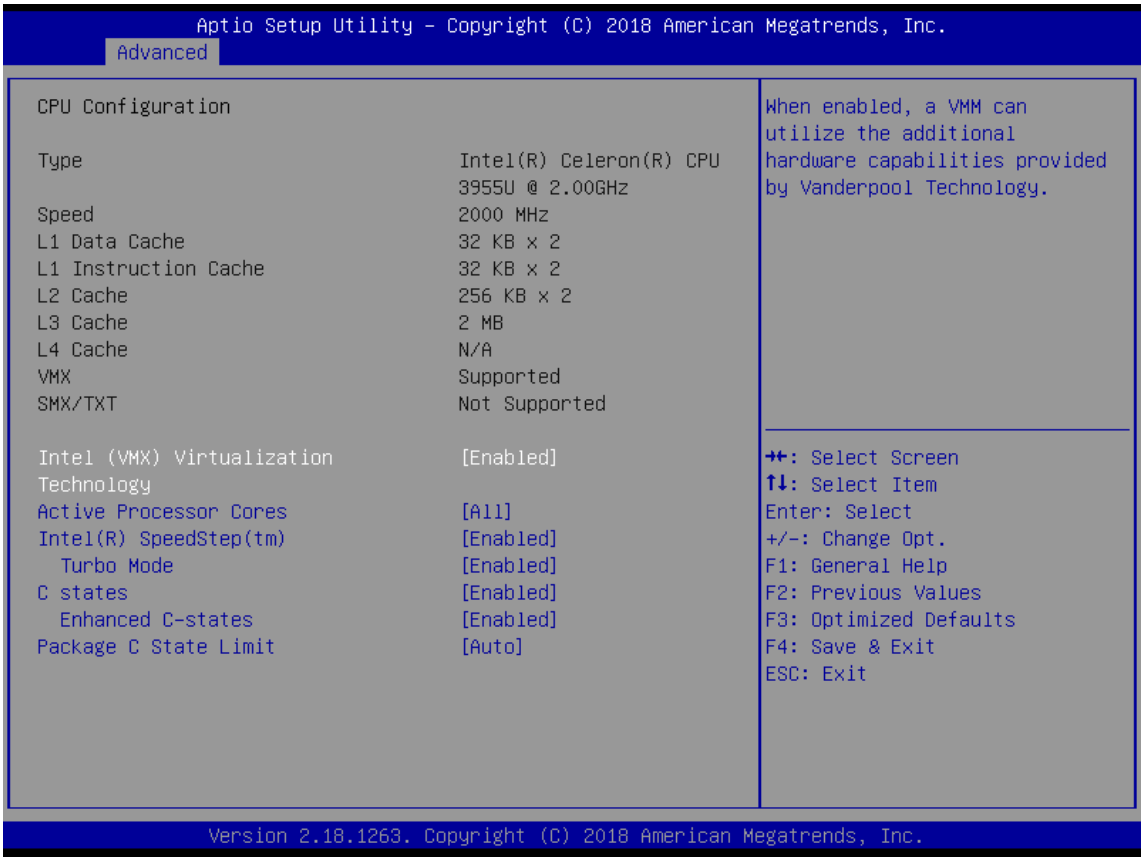
■ System Time

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

5.3 Advanced Setup



5.3.1 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.

Active Processor Cores

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

Intel SpeedStep

This item allows you to enable or disable the Intel SpeedStep.

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

CPU C states

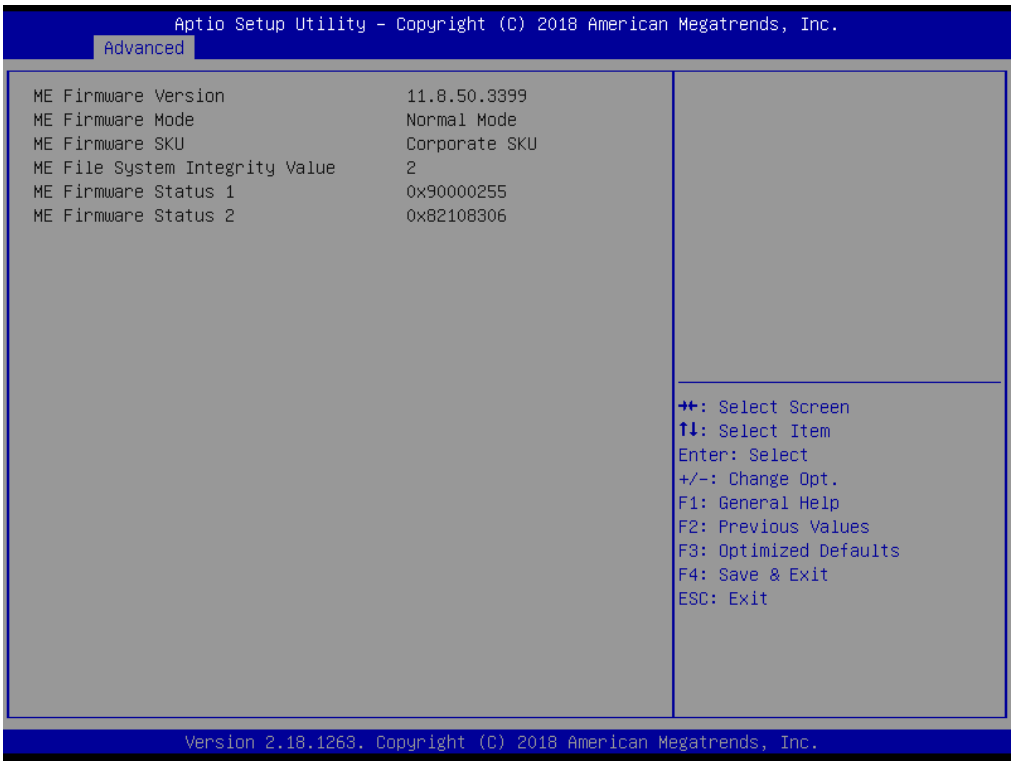
This item allows you to set the power saving of the CPU states.

- **Enhanced C States**
  This item allows your CPU reduce power consumption.

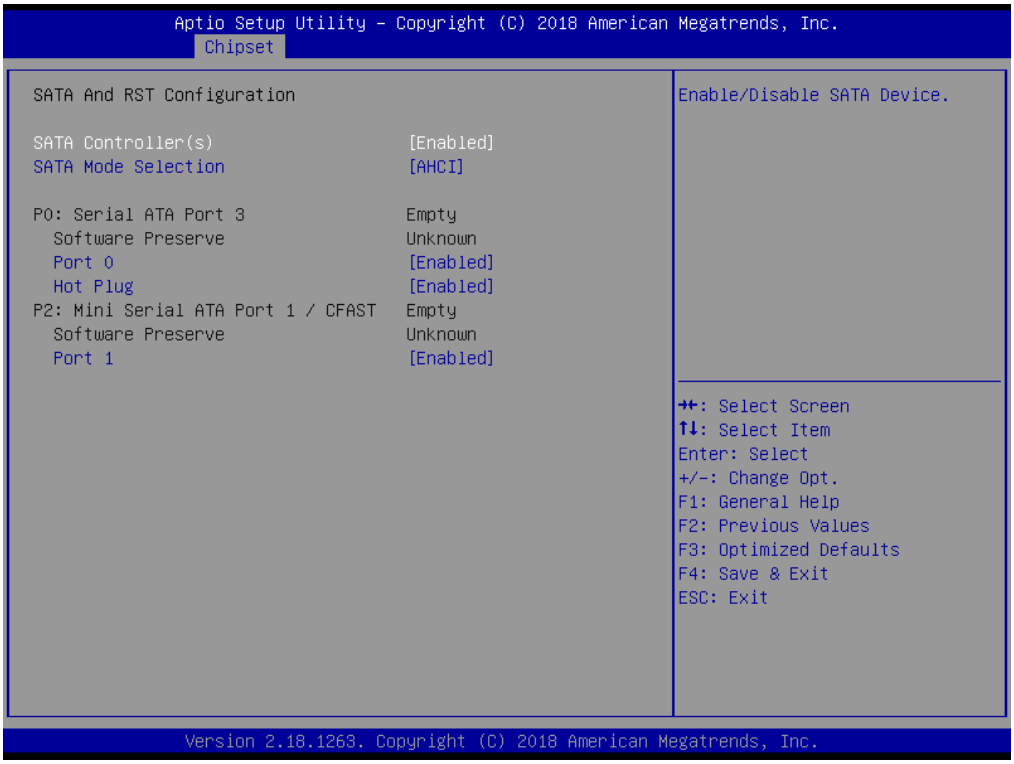
Package C State limit

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

5.3.2 PCH-FW Configuration



5.3.3 SATA and RST Configuration



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

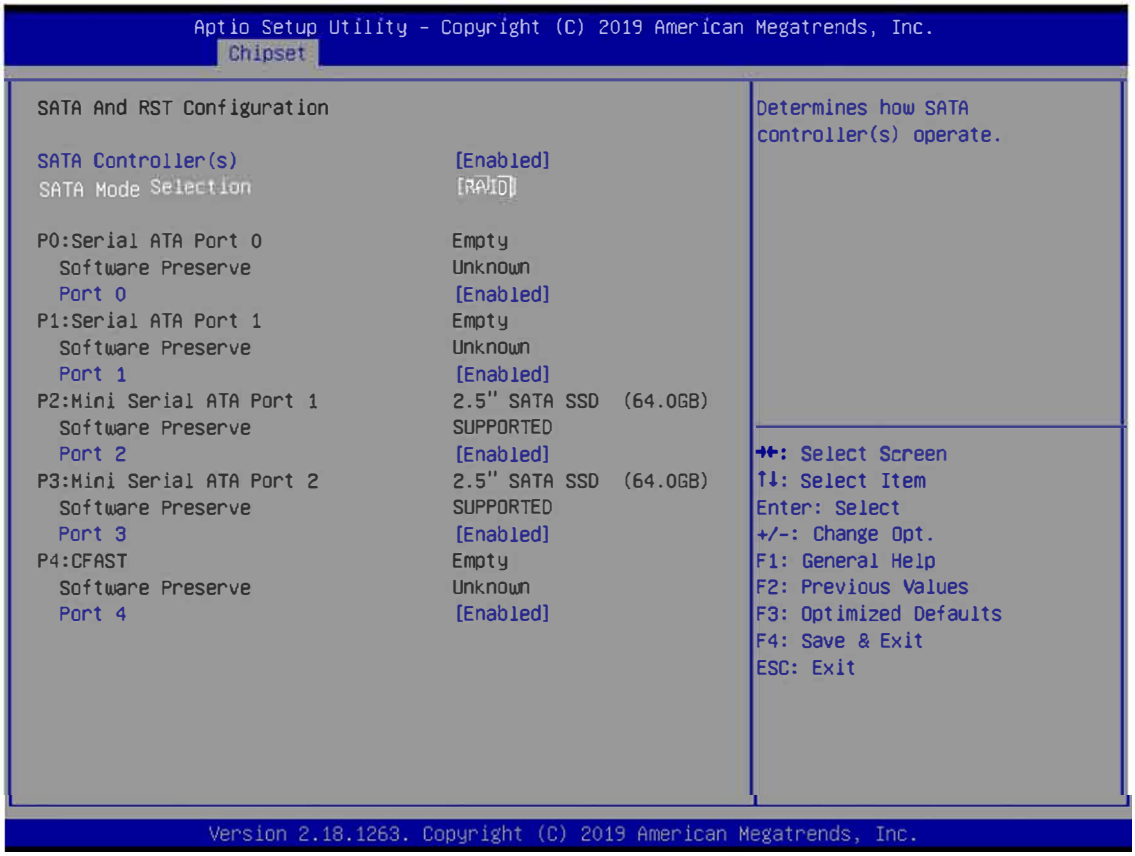
■ SATA Mode Selection
This item allows users to select mode of SATA controller.

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

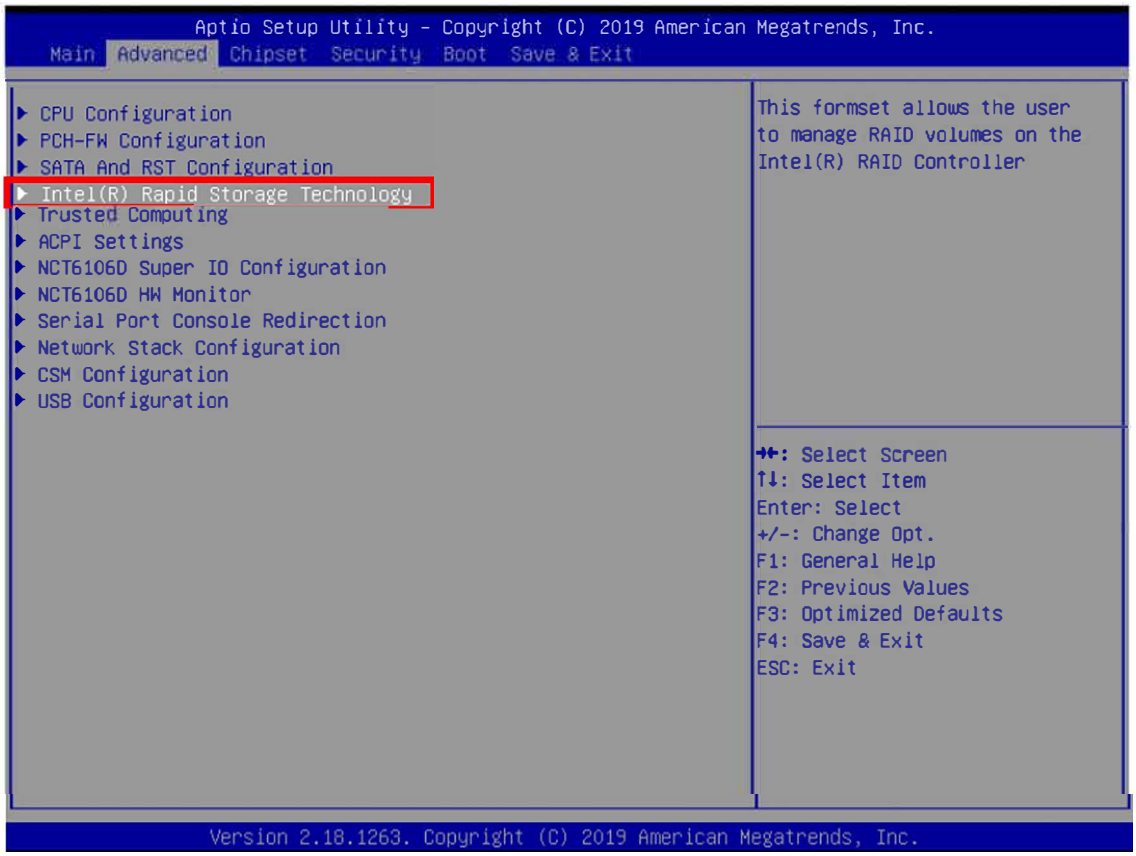
5.3.4 RST (UEFI RAID) Configuration

How to set the UEFI RAID:

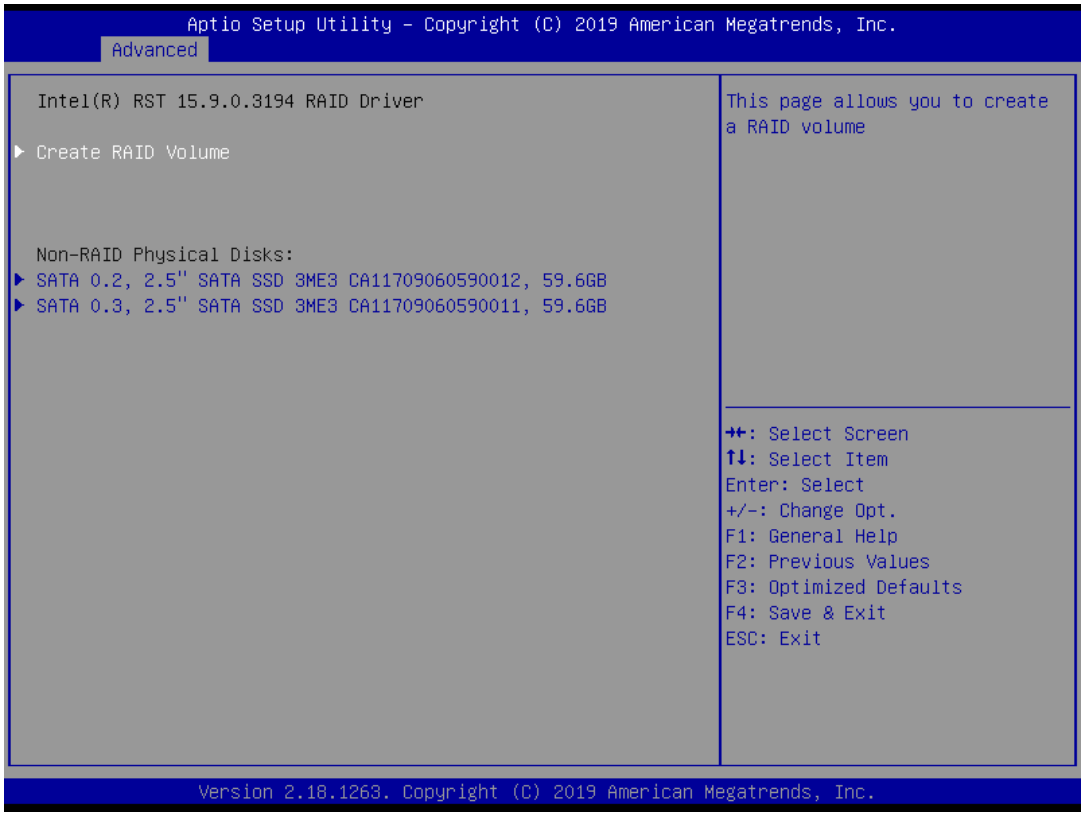
1. When set to RAID, please save change reset system.



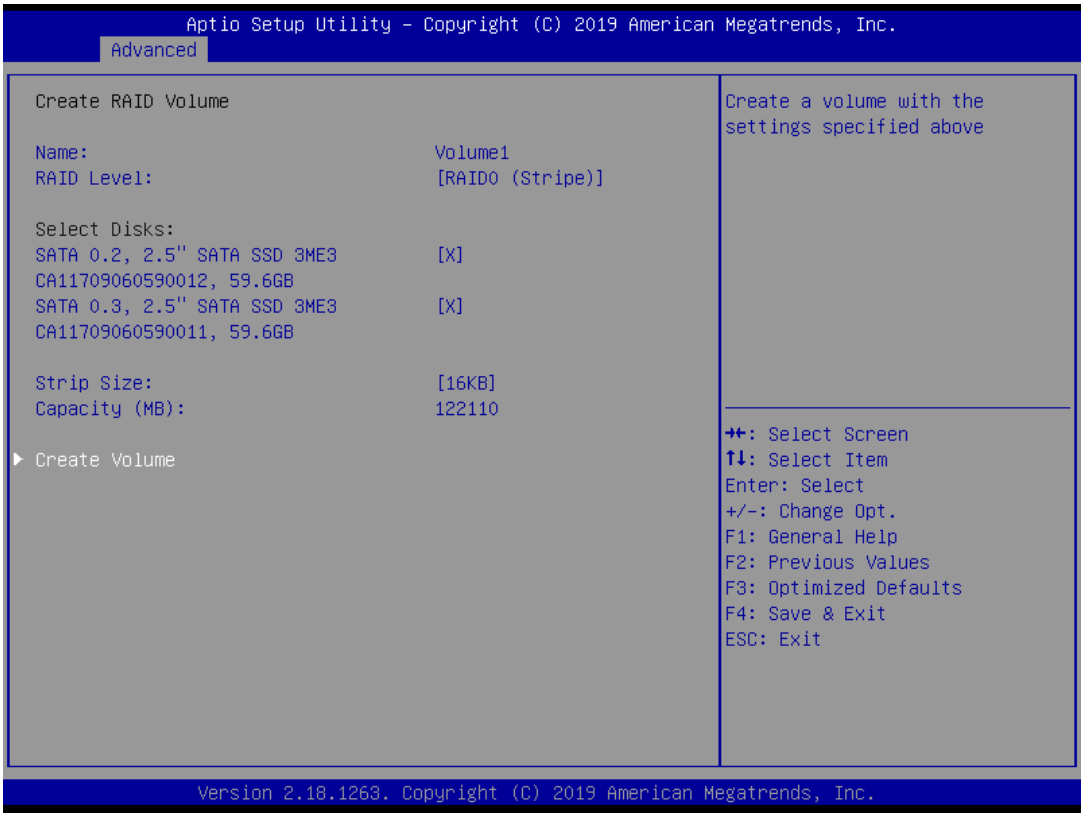
2. After reboot the system, please into BIOS utility and then will see "Intel (R) Rapid Storage Technology"



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

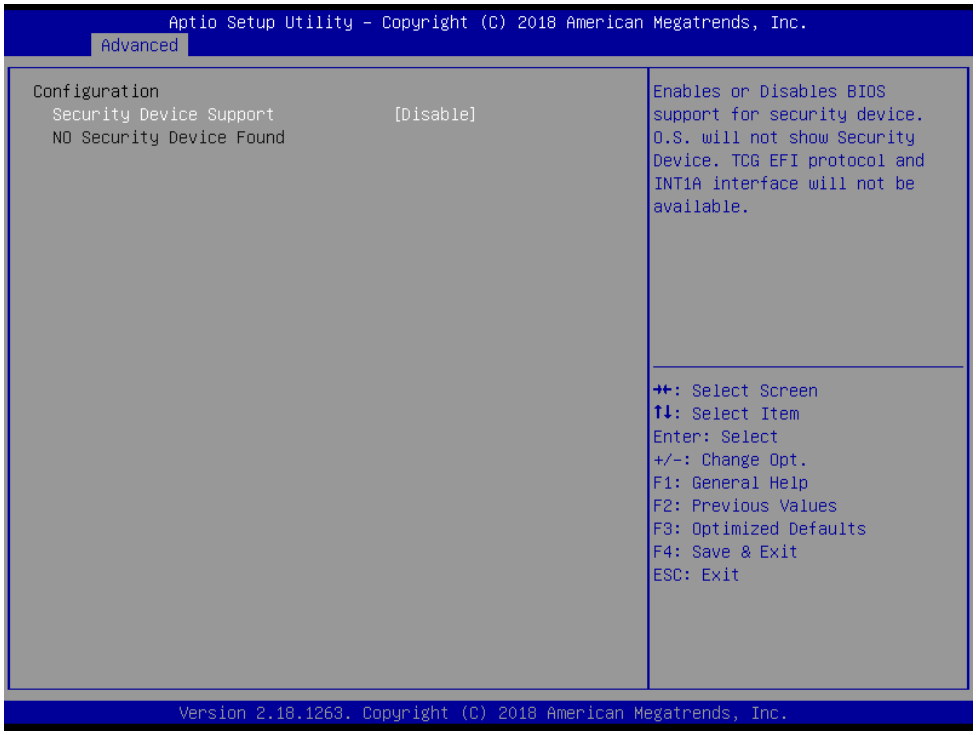


4. Start Create the RAID



- Select Disk that you want to do the RAID
- Select [x]; No-Select [ ]

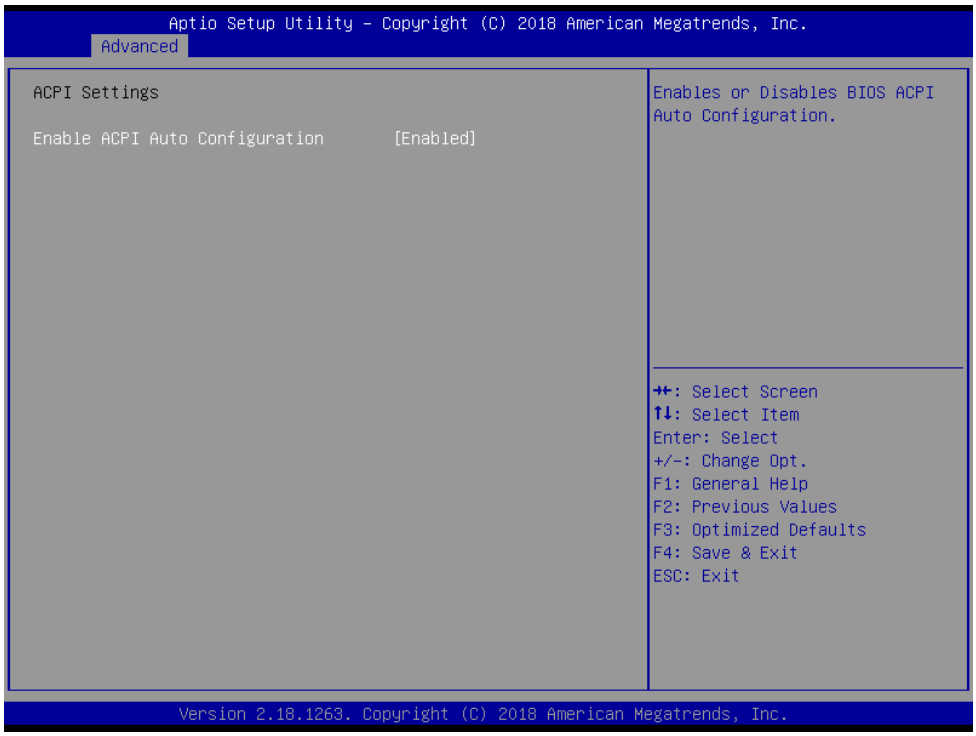
5.3.5 Trusted Computing



■ Security Device Support

Enable or disable Security Device Support.

5.3.6 ACPI Settings

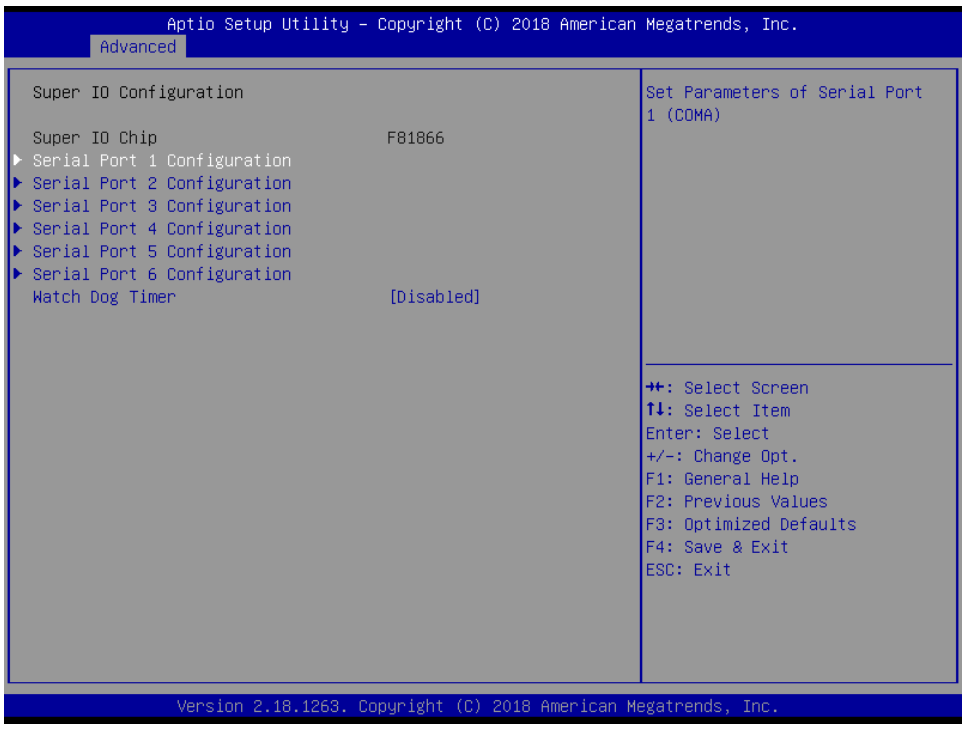


■ Enable ACPI Auto Configuration

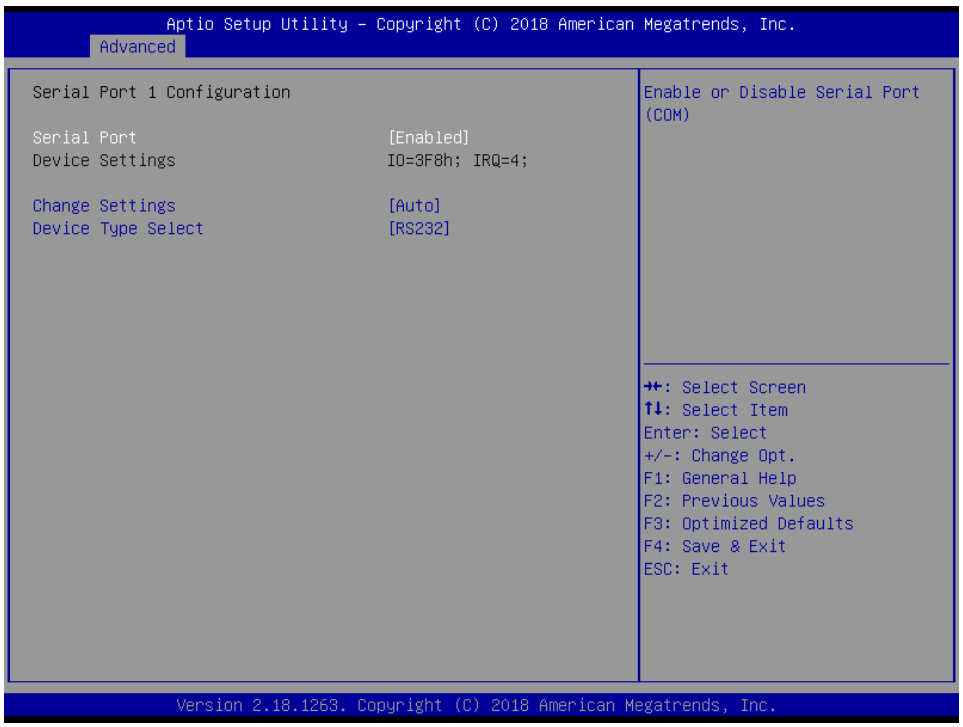
Enable or disable ACPI Auto Configuration.

5.3.7 Super IO Configuration

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

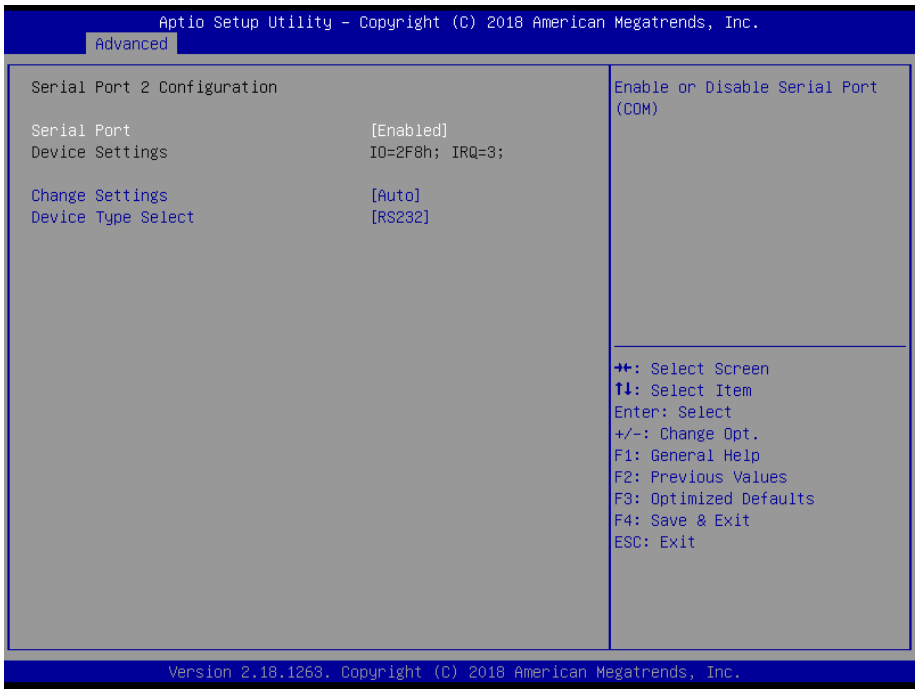


■ Serial Port 1 Configuration



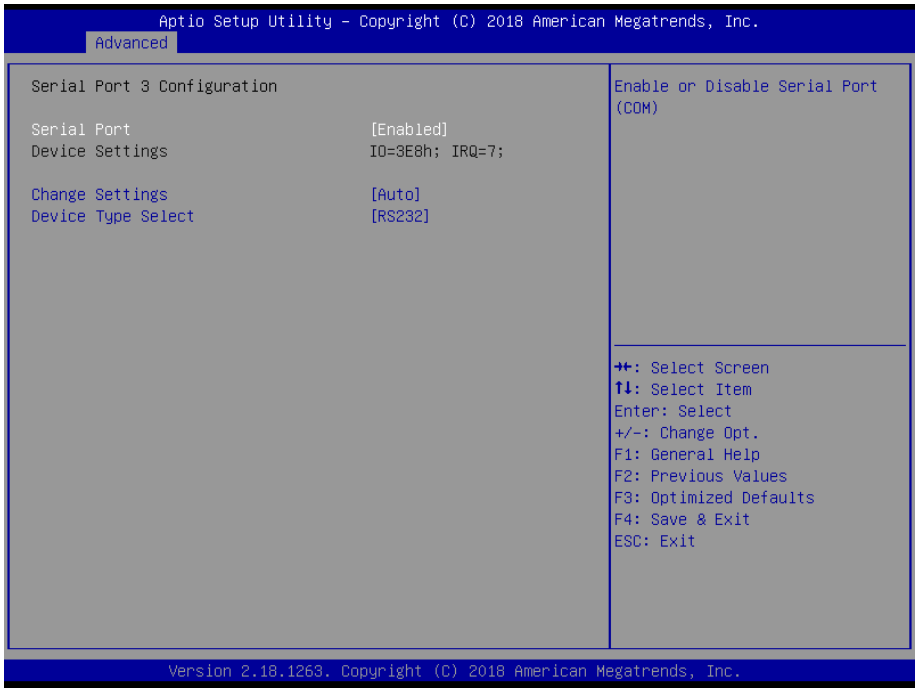
- **Serial Port**
  This item allows you to enable or disable serial port.
- **Change Settings**
  This item allows you to change the address & IRQ settings of the specified serial port.
- **Device Type Select**
  Change the Serial interface. Select <RS232>, <RS422> or <RS485> interface.

Serial Port 2 Configuration



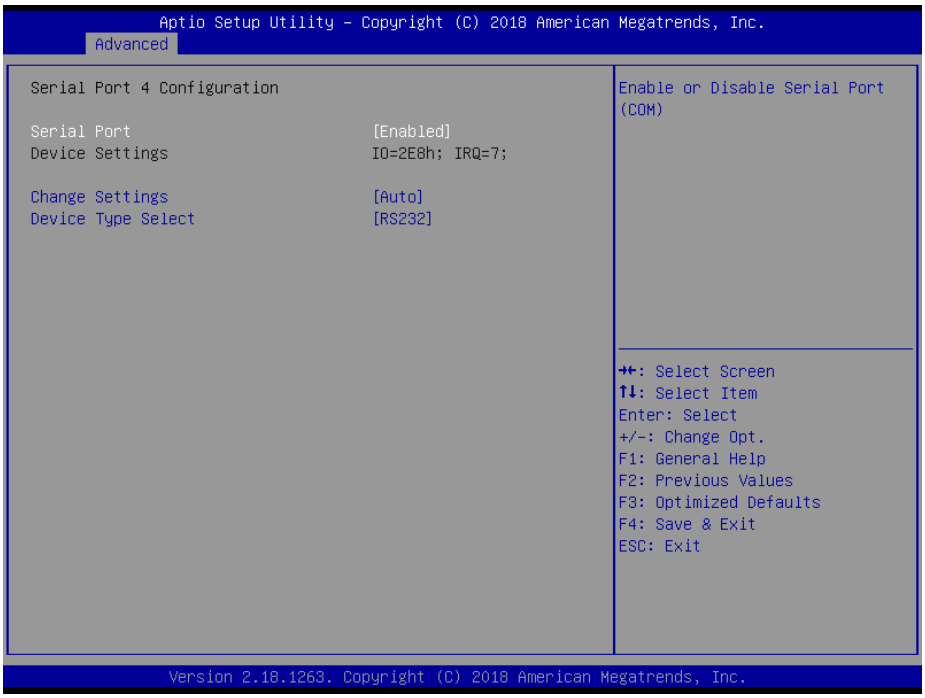
- **Serial Port**
  This item allows you to enable or disable serial port.
- **Change Settings**
  This item allows you to change the address & IRQ settings of the specified serial port.
- **Device Type Select**
  Change the Serial interface. Select <RS232>, <RS422> or <RS485> interface.

Serial Port 3 Configuration



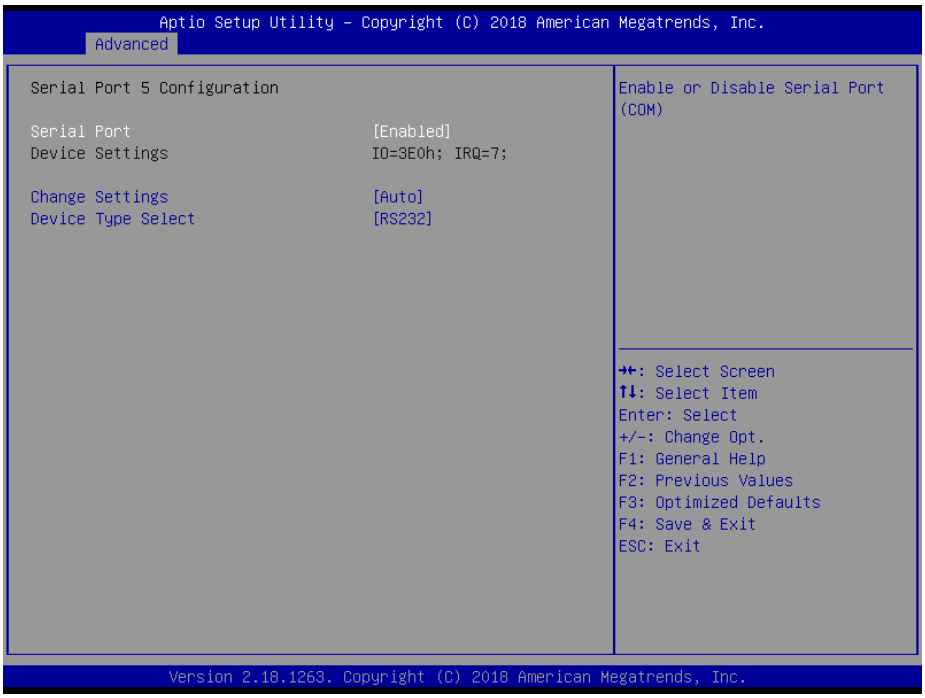
- **Serial Port**
  This item allows you to enable or disable serial port.
- **Change Settings**
  This item allows you to change the address & IRQ settings of the specified serial port.
- **Device Type Select**
  Change the Serial interface. Select <RS232>, <RS422> or <RS485> interface.

Serial Port 4 Configuration



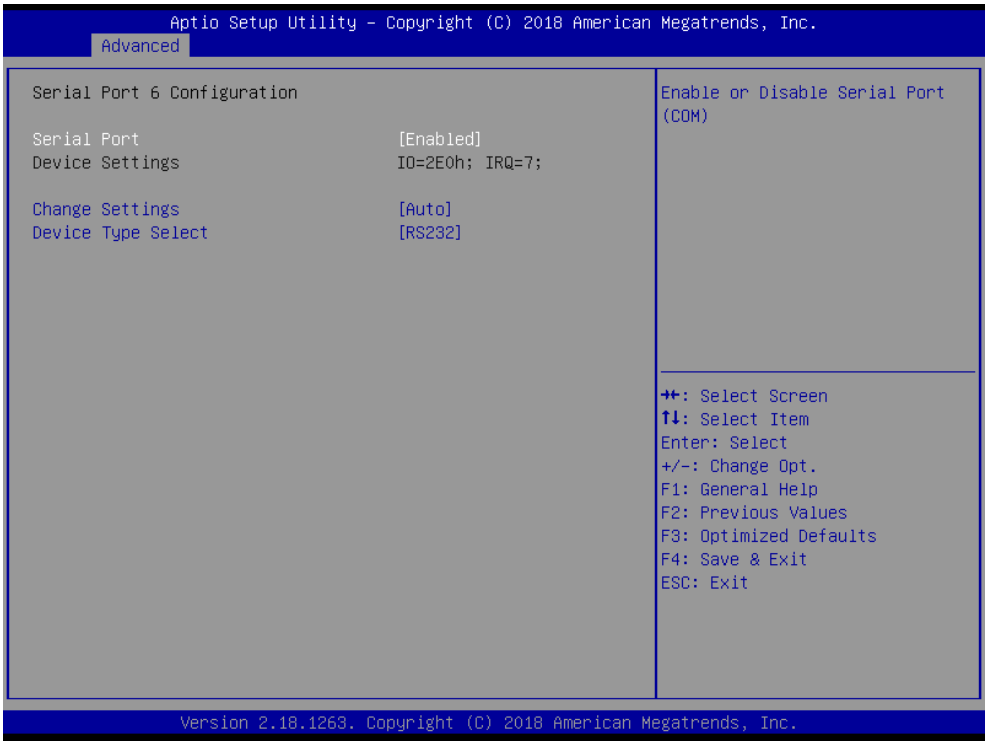
- **Serial Port**
  This item allows you to enable or disable serial port.
- **Change Settings**
  This item allows you to change the address & IRQ settings of the specified serial port.
- **Device Type Select**
  Change the Serial interface. Select <RS232>, <RS422> or <RS485> interface.

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> or <RS485> interface.

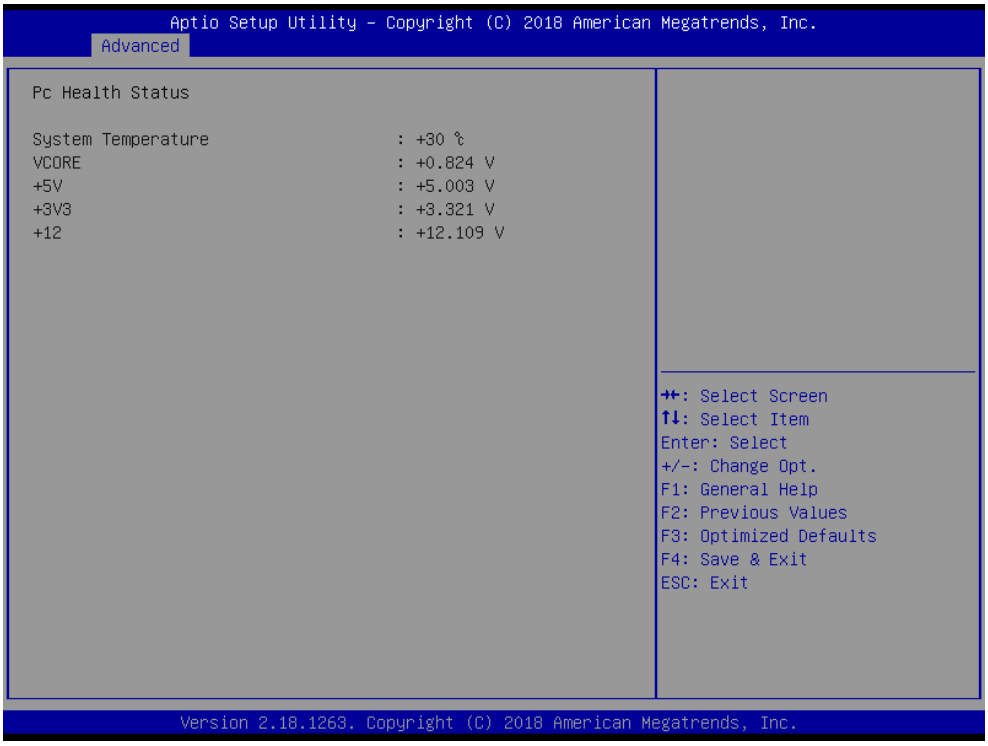
■ Serial Port 6 Configuration



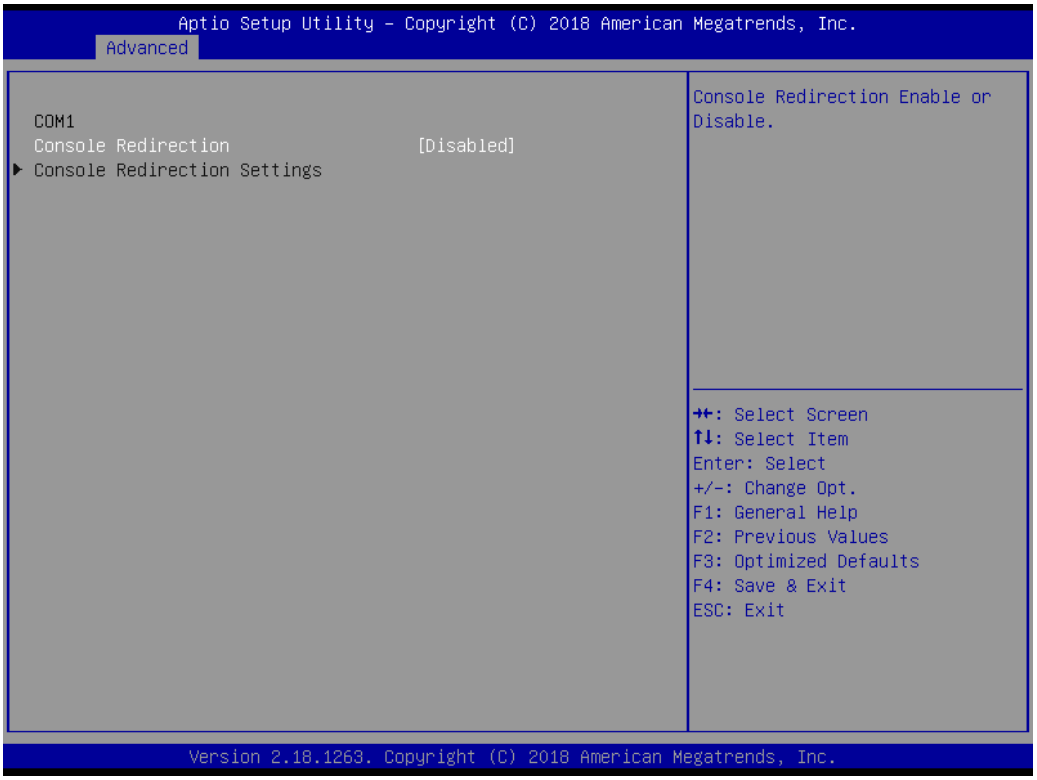
- **Serial Port**
  This item allows you to enable or disable serial port.
- **Change Settings**
  This item allows you to change the address & IRQ settings of the specified serial port.
- **Device Type Select**
  Change the Serial interface. Select <RS232>, <RS422> or <RS485> interface.

5.3.8 Hardware Monitor

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



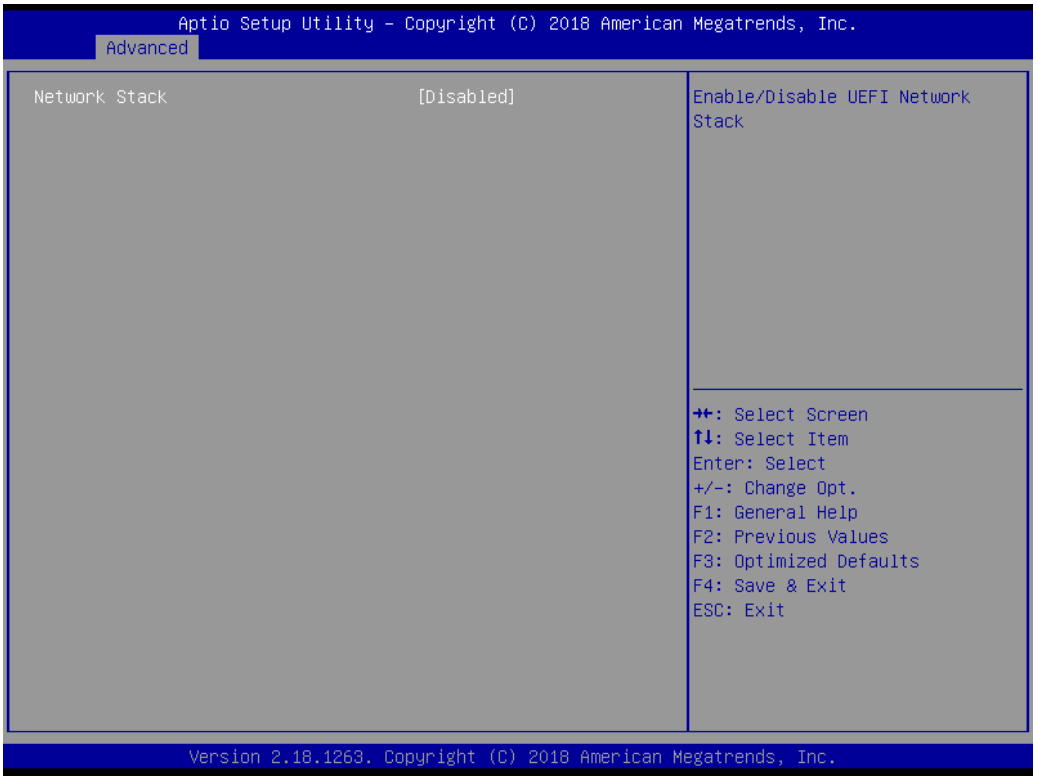
5.3.9 Serial Port Console Redirection



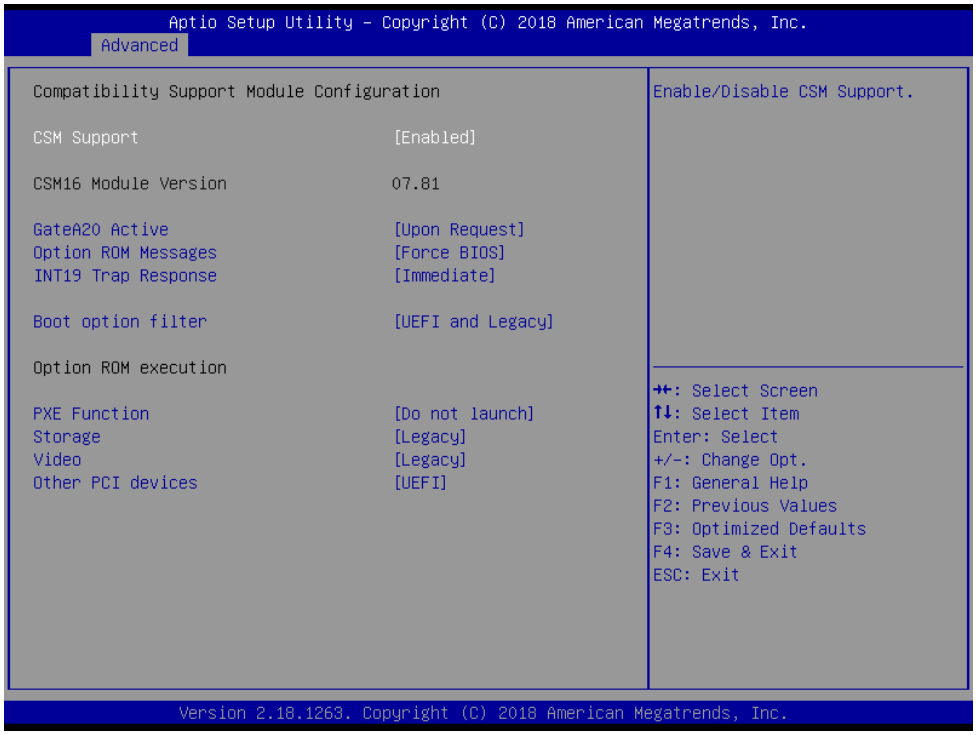
■ Console Redirection

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

5.3.10 Stack Configuration



5.3.11 CSM Configuration



CSM Support
This item allows users to enable or disable for "CSM Support".

GateA20 Active
This item allows users to set Upon Request or Always for "GateA20 Active".

Option ROM Messages
This item allows users to set Force BIOS or Keep Current for "Option ROM Messages".

INT19 Trap Response
This item allows users to set the BIOS reaction to INT19 trapping by Option ROM:
"Immediate" - execute the trap right away;
"postponed" - execute the trap during legacy boot.

Boot option filter
This item allows users to select which type of operating system to boot by option:
"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.

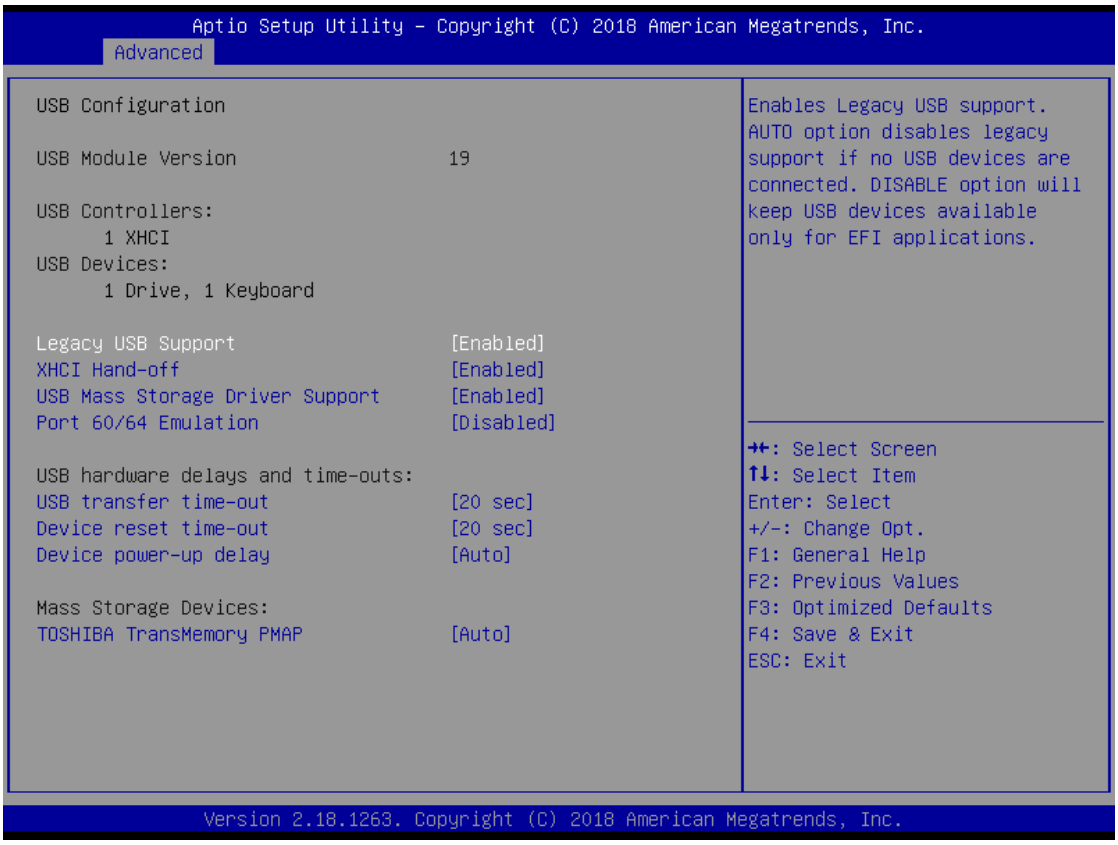
PXE Function
This item allows users to enable or disable PXE function.

Storage
This item allows users to set Do not launch or UEFI or Legacy for "Storage".

Video
This item allows users to set Do not launch or UEFI or Legacy for "Video".

Other PCI devices
This item allows users to set Do not launch or UEFI or Legacy for "Other PCI devices".

5.3.12 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.

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

■ Port 60/64 Emulation
Enables or disables support for Port 60/64 Emulation.

■ USB transfer time-out
This item allows users to set different time mode for "USB transfer time-out".

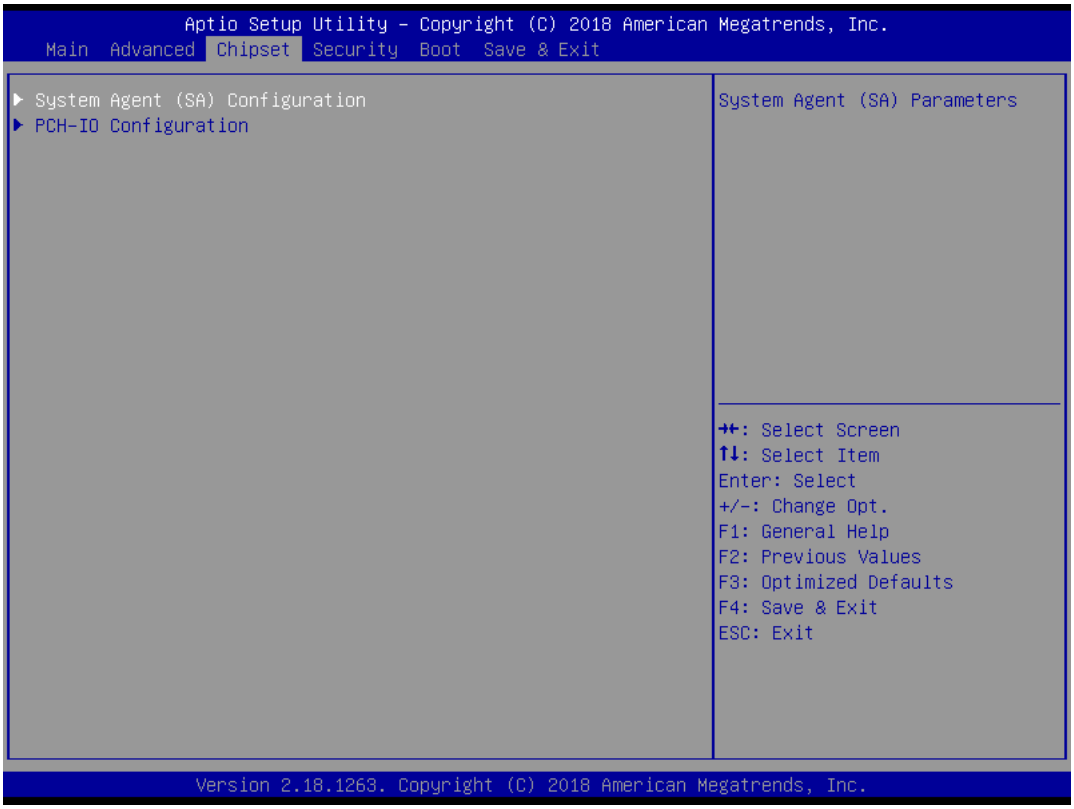
■ Device reset time-out
This item allows users to set different time mode for "Device reset time-out".

■ Device power-up delay
This item allows users to set different time mode for "Device power-up delay".

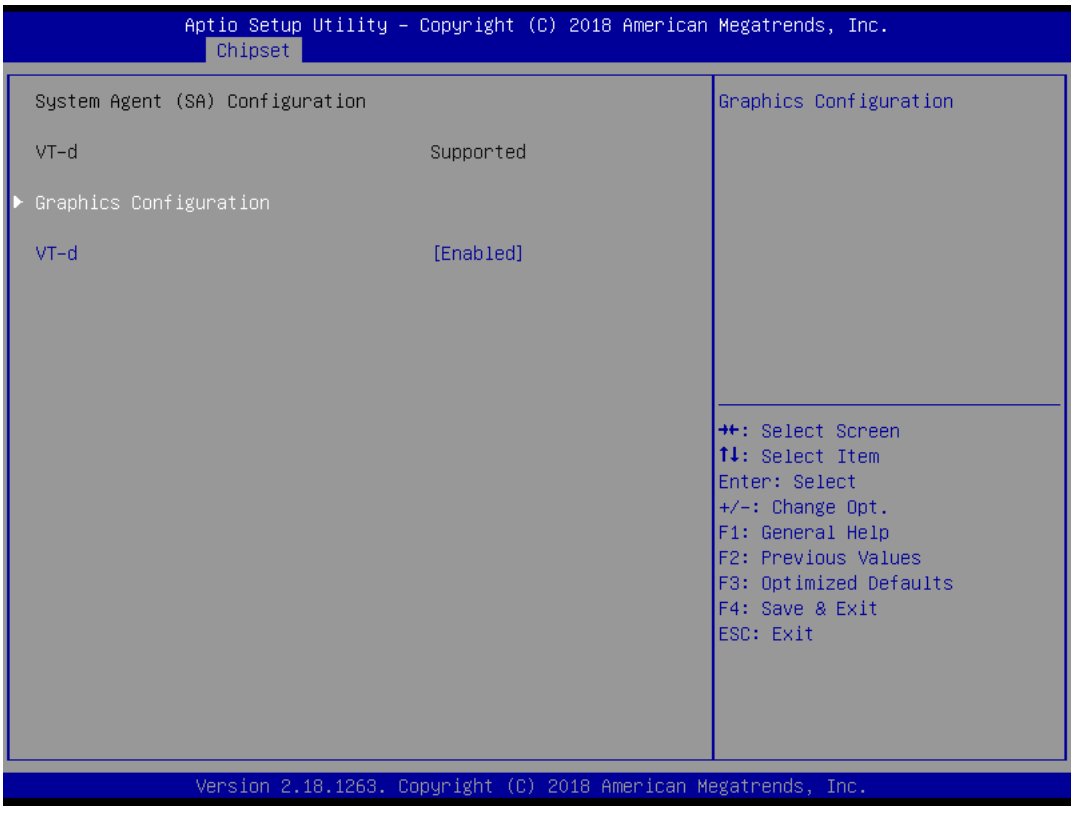
■ Mass Storage Devices
This item allows users to set different mode for "Mass Storage Devices".

5.4 Chipset

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



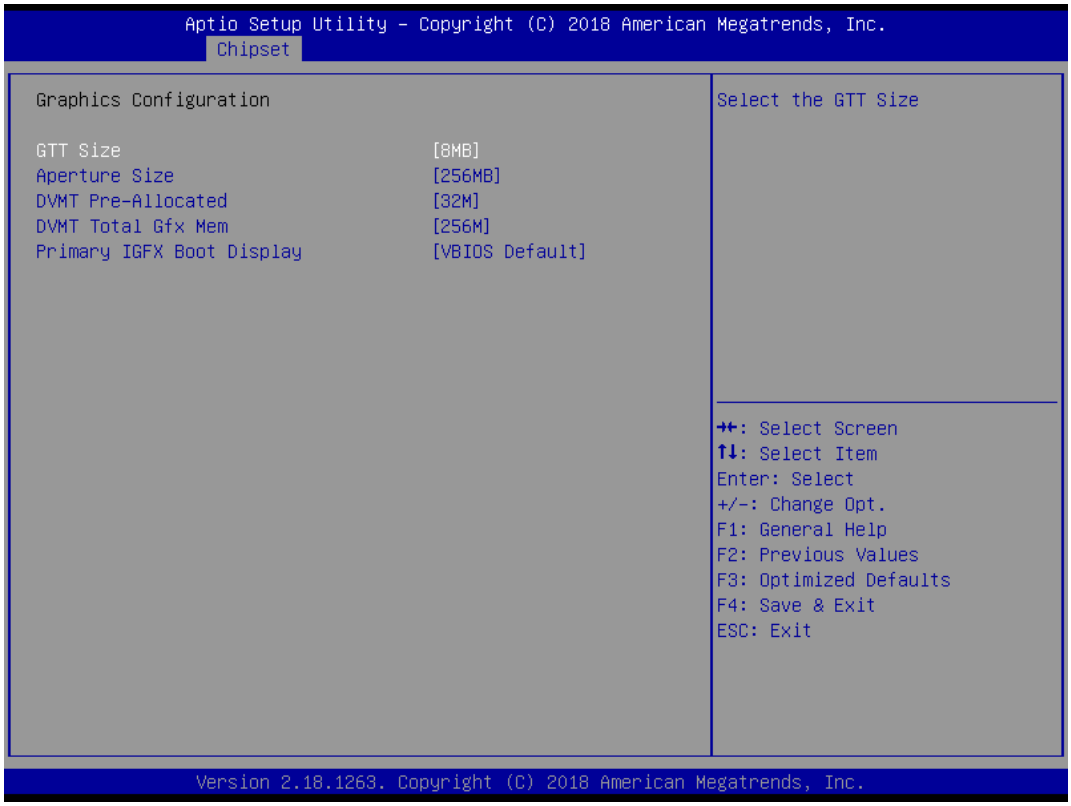
5.4.1 System Agent (SA) Configuration



■ VT-d

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

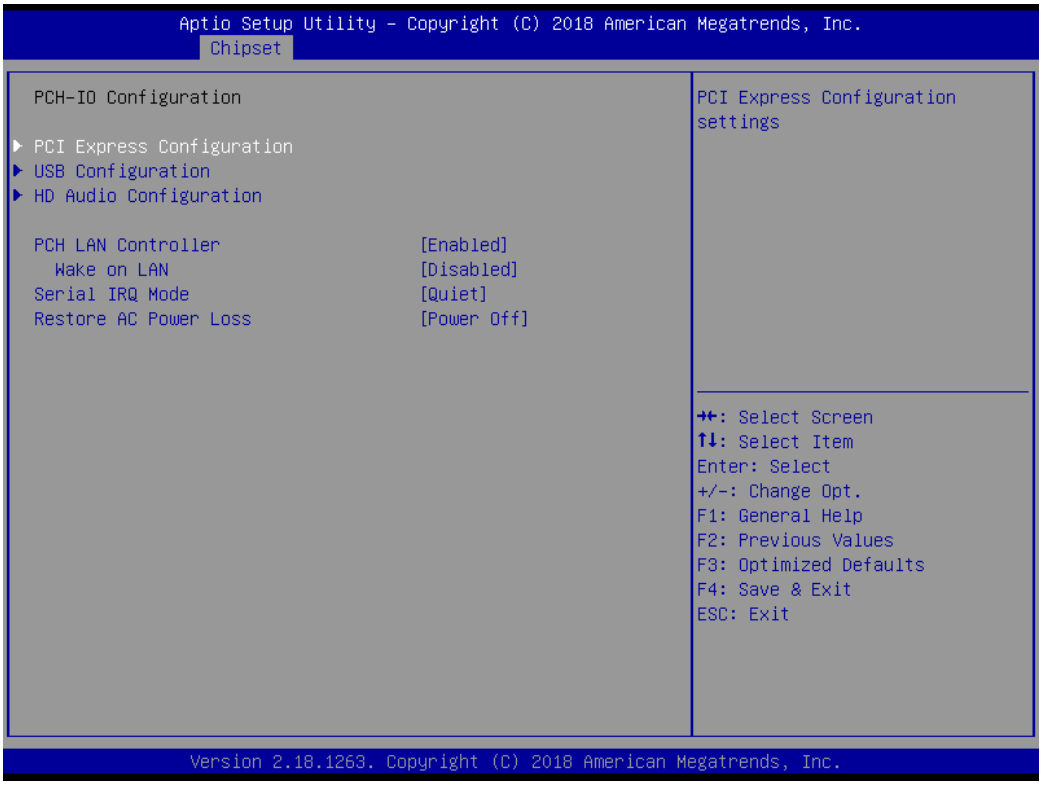
Graphic Configuration



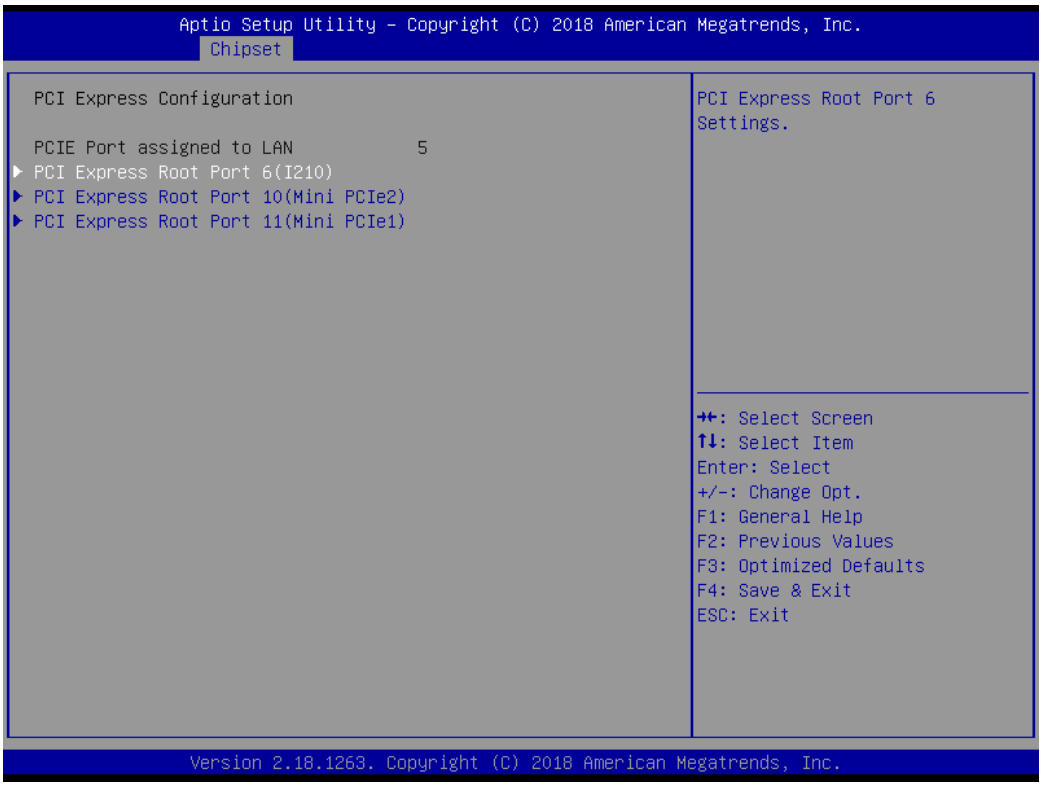
- **GTT Size**
  This item allows you to change the GTT size.
- **Aperture Size**
  Aperture size optimal between 128MB, 256MB, 512MB, 1024MB or 2048MB.
- **DVMT Pre-Allocated**
  DVMT pre-allocated (fixed) Graphics memory size optimal from 0M to 60M.
- **DVMT Total Gfx Mem**
  DVMT Total Gfx Mem optimal Between 128M, 256M or MAX.
- **Primary IGFX Boot Display**
  Use the field to select the type of device you want to use as the display(s) of the system.

5.4.2 PCH-IO Configuration

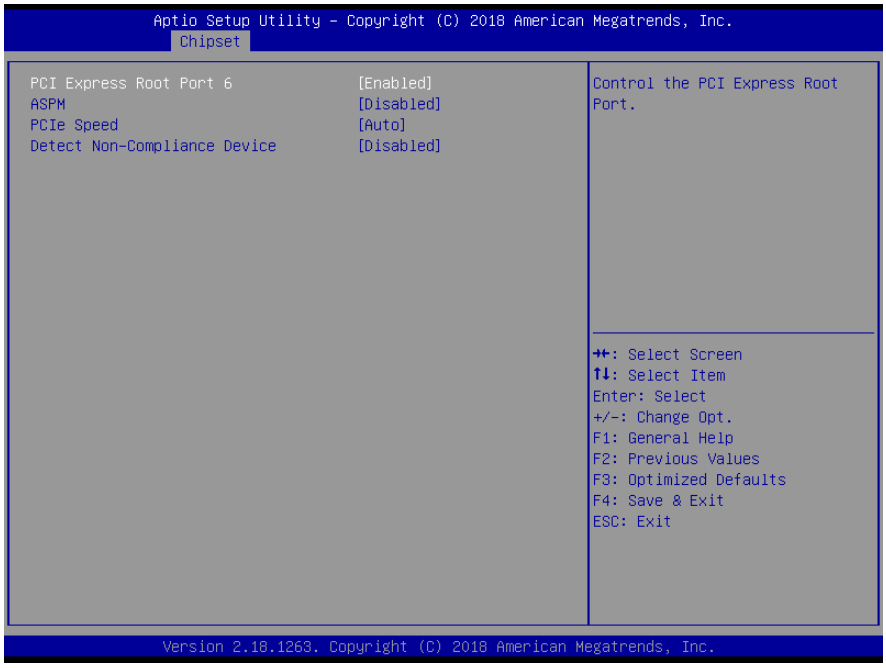
This section allows you to configure the chipset.



■ PCI Express Configuration



- **PCI Express Root Port 6 / 10 / 11**



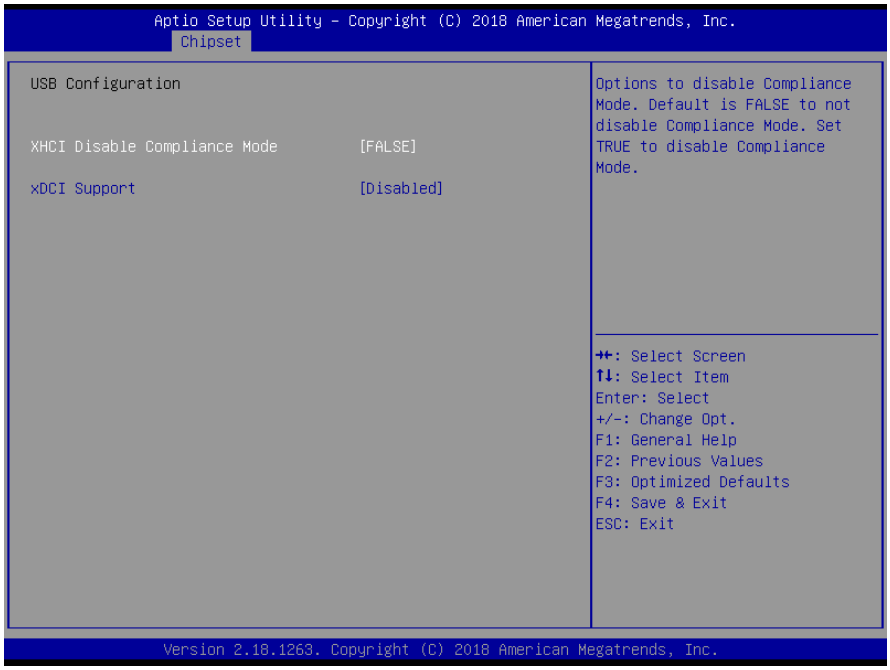
✓ **PCI Express Port 6 / 10 / 11**
This item allows you to enable or disable PCI Express Port 6 / 10 / 11 in the chipset.

✓ **ASPM**
This item allows you to select the ASPM state for energy-saving. Select <Disabled> ,<L0s>, <L1>, <L0sL1> or <Auto>

✓ **PCIe Speed**
Change the PCIe Port Speed. Select <AUTO>, <Gen 1>, <Gen 2> or <Gen 3>

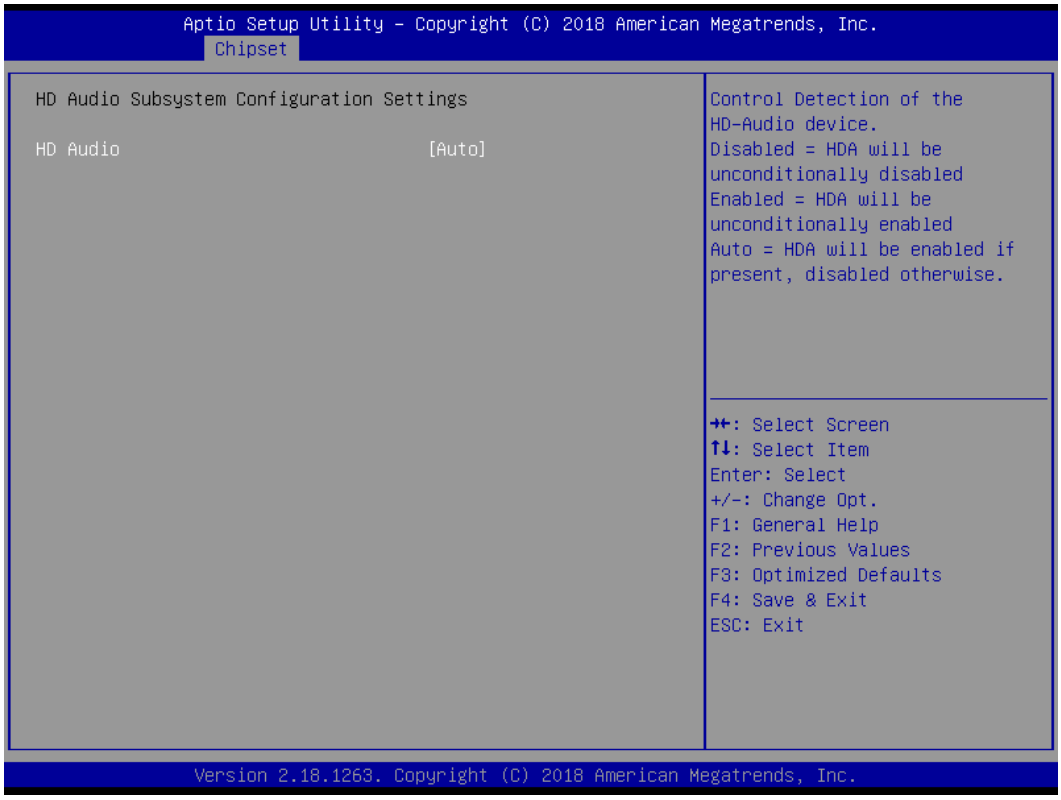
✓ **Detect Non-Compliance Device**
Detect Non-Compliance PCI Express Device. If enable, it will take more time at POST time.

■ USB Configuration



- **XHCI Disable Compliance mode**
  Options to disable compliance mode. Default is FALSE enable compliance mode. Set TRUE to disable compliance mode.
- **xDCI Support**
  This item will allow users to enable or disable xDCI Support.

HD Audio Configuration



- **HD Audio**

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

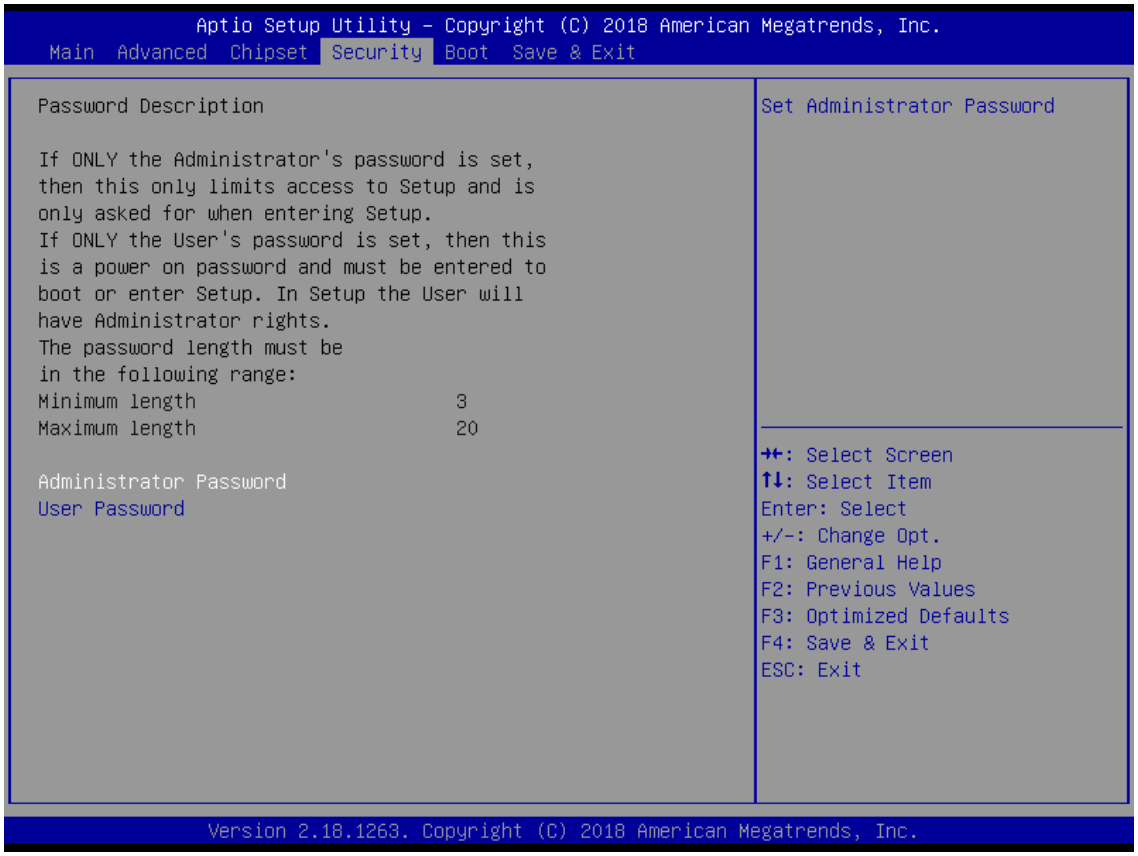
  Disabled: Azalia will be unconditionally be disabled.

  Enabled: Azalia will be unconditionally be enabled.

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

5.5 Security

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



■ Administrator Password

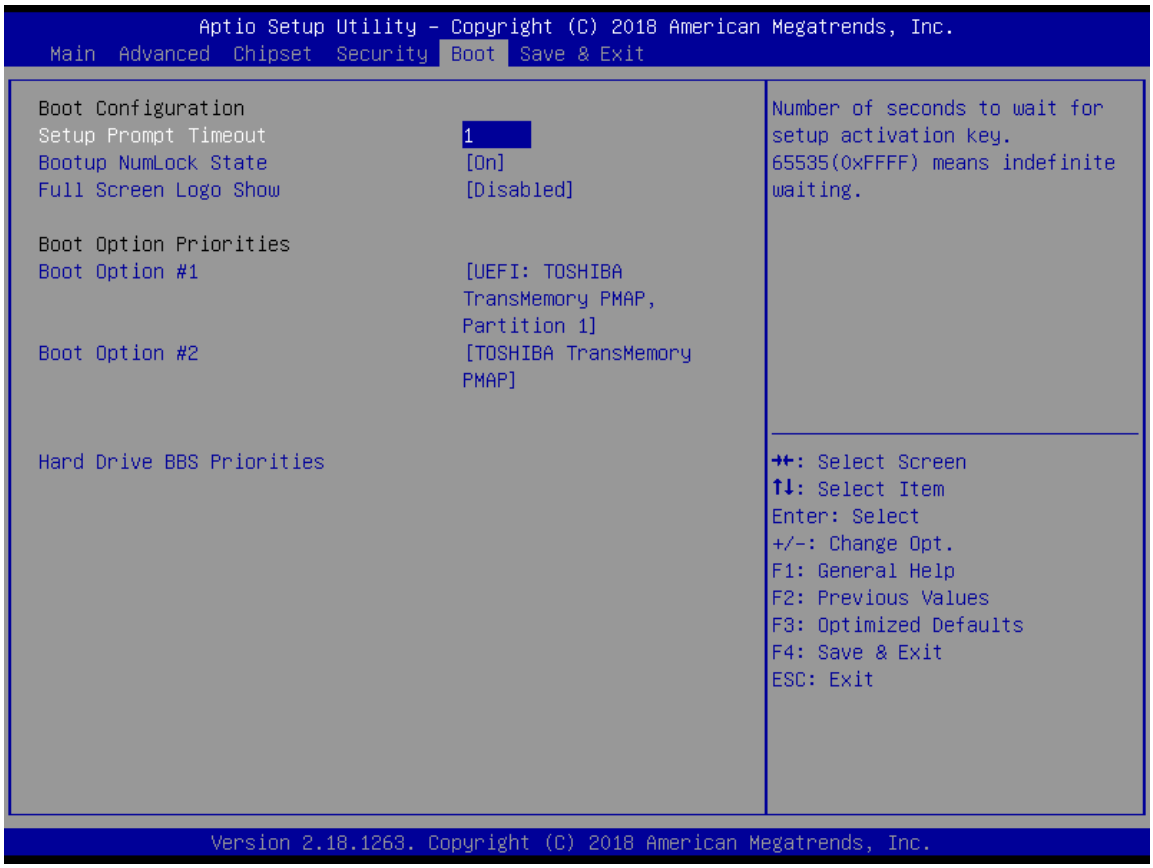
This item allows you to set Administrator Password.

■ User Password

This item allows you to set User Password.

5.6 Boot

This menu allows you to setup the system boot options.



■ Setup Prompt Timeout

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

■ Bootup NumLock State

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

■ Full Screen Logo Show

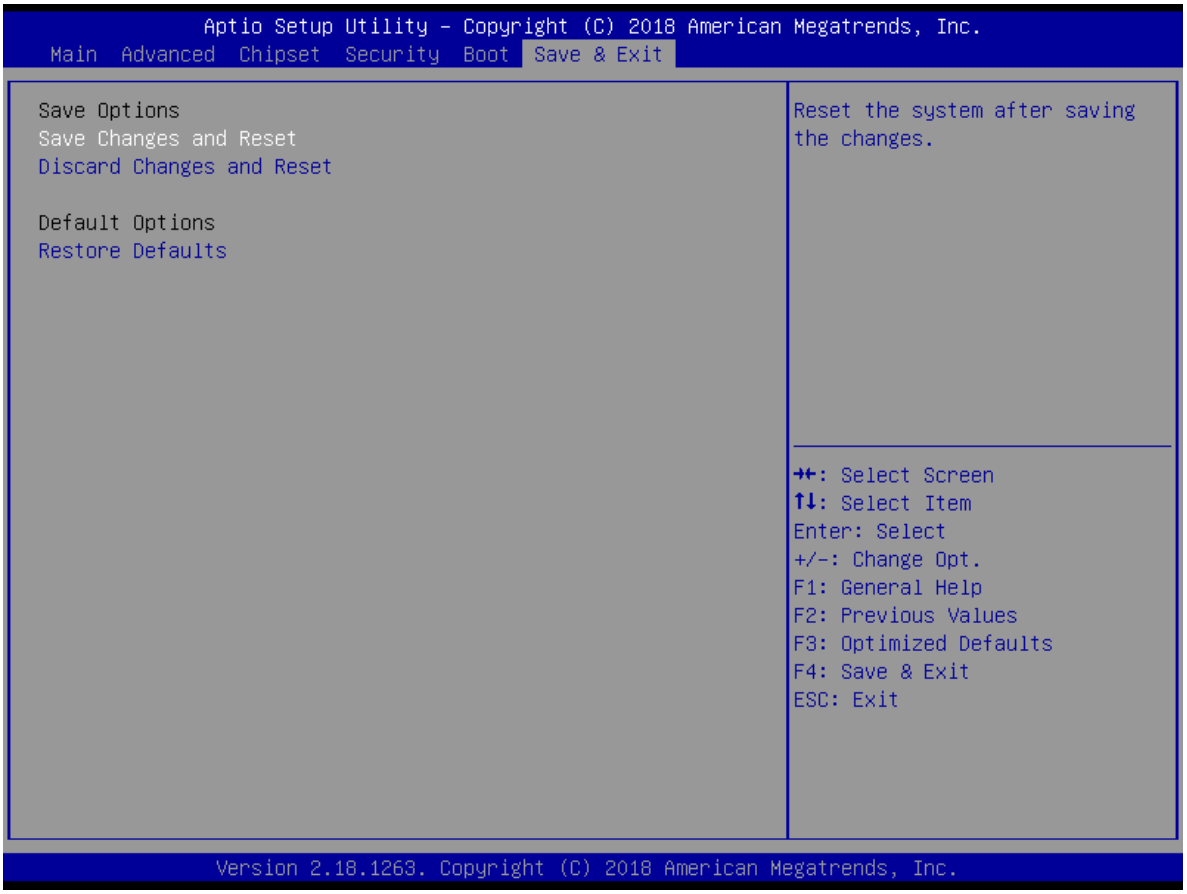
This item allows you to enable or disable Full Screen Logo Show function.

■ Hard Driver BBS Priorities

The items specify the boot device priority sequence from the available devices. The number of device items that appears on the screen depends on the number of devices installed in the system.

5.7 Save & Exit

This setting allows users to configure the boot settings.



Save Changes and Reset

This item allows user to reset the system after saving the changes. This item allows user to reset the system after saving the changes.

Discard Changes and Reset

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

Restore Defaults

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

Appendix

WDT & GPIO

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

WDT Sample Code

// IO Address 0xA16 is time value
// IO Address 0xA15 is WDT enable and configuration
Example, Set 0xA16=-0x03, 0xA15=0x31, it will reset after 3 seconds

```
#define TimePort       0xA16
#define TimeEnablePort  0xA15

WriteByte (TimePort,0x03)
WriteByte (TimeEnablePort,0x31)
```

Watchdog Timer Configuration Register 1 – base address + 05h

Bit	Name	R/W	Reset	Default	Description
7	Reserved	R	-	0	Reserved
6	WDTMOUT_STS	R/W	5VSB	0	If watchdog timeout event occurred, this bit will be set to 1. Write a 1 to this bit will clear it to 0.
5	WD_EN	R/W	5VSB	0	If this bit is set to 1, the counting of watchdog time is enabled.
4	WD_PULSE	R/W	5VSB	0	Select output mode (0: level, 1: pulse) of RSTOUT# by setting this bit.
3	WD_UNIT	R/W	5VSB	0	Select time unit (0: 1 sec, 1: 60 sec) of watchdog timer by setting this bit.
2	WD_HACTIVE	R/W	5VSB	0	Select output polarity of RSTOUT# (1: high active, 0: low active) by setting this bit.
1-0	WD_PSWIDTH	R/W	5VSB	0	Select output pulse width of RSTOUT# 0: 1 ms 1: 25 ms 2: 125 ms 3: 5 sec

Watchdog Timer Configuration Register 2 – base address + 06h

Bit	Name	R/W	Reset	Default	Description
7-0	WD_TIME	R/W	5VSB	0	Time of watchdog timer

GPIO Sample Code

- GPI 1 ~ GPI 8

	GPI 1	GPI 2	GPI 3	GPI 4	GPI 5	GPI 6	GPI 7	GPI 8
IO Address	0xA03h	0xA03h	0xA03h	0xA03h	0xA06h	0xA06h	0xA06h	0xA06h
Bit	4	5	6	7	0	1	2	3
Sample code	#1							

- GPO 1 ~ GPO 8

	GPO 1	GPO 2	GPO 3	GPO 4	GPO 5	GPO 6	GPO 7	GPO 8
IO Address	0xA02h	0xA02h	0xA02h	0xA02h	0xA06h	0xA07h	0xA08h	0xA04h
Bit	0	1	2	3	4	7	0	7
Sample code	#2							

```
#define GPI1to4_ADDR            0xA03
#define GPI5to8_ADDR            0xA06

#define GPO1to4_ADDR            0xA02

#define GPO5_ADDR               0xA06
#define GPO6_ADDR               0xA04
#define GPO7_ADDR               0xA08
#define GPO8_ADDR               0xA04

#define GPO1_DataHigh           0x01
#define GPO2_DataHigh           0x02
#define GPO3_DataHigh           0x04
#define GPO4_DataHigh           0x08
#define GPO5_DataHigh           0x10
#define GPO6_DataHigh           0x80
#define GPO7_DataHigh           0x01
#define GPO8_DataHigh           0x80

#define WriteByte       outportb
#define ReadByte        inportb
```

Sample Code:
#1 :
// Get GPI 1 status
//Get GPI 0 Pin Status Register
printf("Input port value = %x\n", ReadByte**(**GPI1to4_ADDR**));** // bit4 = GPI 1 status

// Get GPI 5 status
//Get GPI 0 Pin Status Register
printf("Input port value = %x\n", ReadByte**(**GPI_REG5to8**));** // bit0 = GPI 5 status

#2 :
// Set GPO status to high
; Set GPO 1 Pin to High
Data = ReadByte(GPO1to4_ADDR) | GPO1_DataHigh;
WriteByte(GPO1to4_ADDR, Data); //Set IO_DO1 to High

; Set GPO 2 Pin to High
Data = ReadByte(GPO1to4_ADDR) | GPO2_DataHigh;
WriteByte(GPO1to4_ADDR, Data); //Set IO_DO2 to High

; Set GPO 3 Pin to High
Data = ReadByte(GPO1to4_ADDR) | GPO3_DataHigh;
WriteByte(GPO1to4_ADDR, Data); //Set IO_DO3 to High

; Set GPO 4 Pin to High
Data = ReadByte(GPO1to4_ADDR) | GPO4_DataHigh;
WriteByte(GPO1to4_ADDR, Data); //Set IO_DO4 to High

; Set GPO 5 Pin to High
Data = ReadByte(GPO5_ADDR) | GPO5_DataHigh;
WriteByte(GPO5_ADDR, Data); //Set IO_DO5 to High

; Set GPO 6 Pin to High
Data = ReadByte(GPO6_ADDR) | GPO6_DataHigh;
WriteByte(GPO6_ADDR, Data); //Set IO_DO6 to High

; Set GPO 7 Pin to High
Data = ReadByte(GPO7_ADDR) | GPO7_DataHigh;
WriteByte(GPO7_ADDR, Data); //Set IO_DO7 to High

; Set GPO 8 Pin to High
Data = ReadByte(GPO8_ADDR) | GPO8_DataHigh;
WriteByte(GPO8_ADDR, Data); //Set IO_DO8 to High