USER'S MANUAL

ACO-6000-KBL Series

Surveillance Applied Fanless System

Please note, the ACO-6000 is now referred to as "ACO-6000-KBL" due to a model name change. All product features and functionality remain the same. If any questions, please contact us for more information.

Name Change Guide:

LEGACY Model Name	NEW Model Name
ACO-6000	ACO-6000-KBL
ACO-6000-16L	ACO-6000-KBL-16X
ACO-6000-16L-M12	ACO-6000-KBL-16XM12
ACO-6011	ACO-6000-KBL-1

Table of Contents

Prefaces

Revision

Revision	Description	Date
1.0	Manual Released	2017/09/12
1.1	LAN Chipset Revised	2017/10/16
1.2	Power Connector Definition Revised	2017/11/02
1.3	GPIO Sample Code Revised	2018/02/09
1.4	New-added CPU support, OS revised, and switches definition revised	2018/10/09
1.5	WDT & GPIO Sample Code Revised	2018/11/28
1.6	New-added TPM 1.2 support	2019/08/12
1.7	New-added RST (UEFI RAID) configuration & TPM 2.0 support	2020/03/12

Disclaimer

All specifications and information in this User's Manual are believed to be accurate and up to date. We do not guarantee that the contents herein are complete, true, accurate or non-misleading. The information in this document is subject to change without notice.

We disclaim all warranties, express or implied, including, without limitation, those of merchantability, fitness for a particular purpose with respect to contents of this User's Manual. Users must take full responsibility for the application of the product.

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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 -30°C and below 85°C.
- The computer is provided with a battery-powered real-time clock circuit. There is a danger of explosion if incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.
- If one of the following situation arises, get the equipment checked be service personnel:
    - The power cord or plug is damaged.
    - Liquid has penetrated into the equipment.
    - The equipment has been exposed to moisture.
    - The equipment does not work well or it cannot work according the user's manual.
    - The equipment has been dropped and damaged.
    - The equipment has obvious signs of breakage.

Technical Support and Assistance

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	ACO-6000 Series Fanless Embedded System	1
2	Utility DVD Driver	1
3	Wall Mount Kit	1
4	Accessory Kit	1
5	DVI to VGA Adapter	1

Ordering Information

Model No.	Product Description
ACO-6000	Surveillance Applied Fanless System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, 2x LAN
ACO-6000-4L	Surveillance Applied Fanless System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, 6x LAN
ACO-6000-4L-M12	Surveillance Applied Fanless System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, 2x LAN, 4x M12 LAN
ACO-6000-8L	Surveillance Applied Fanless System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, 10x LAN
ACO-6000-8L-M12	Surveillance Applied Fanless System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, 2x LAN, 8x M12 LAN
ACO-6010-16L	Surveillance Applied Fanless System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, 18x LAN
ACO-6010-16L-M12	Surveillance Applied Fanless System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, 2x LAN, 16x M12 LAN
ACO-6010-4P	Surveillance Applied Fanless System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, 2x LAN, 4x PoE
ACO-6010-4P-M12	Surveillance Applied Fanless System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, 2x LAN, 4x M12 PoE
ACO-6010-8P	Surveillance Applied Fanless System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, 2x LAN, 8x PoE
ACO-6010-8P-M12	Surveillance Applied Fanless System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, 2x LAN, 8x M12 PoE
ACO-6010-16P	Surveillance Applied Fanless System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, 2x LAN, 16x PoE
ACO-6010-16P-M12	Surveillance Applied Fanless System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, 2x LAN, 16x M12 PoE
ACO-6011E	Surveillance Applied Fanless System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, 2x LAN, 1x PCIe x16 Expansion
ACO-6011E-4L	Surveillance Applied Fanless System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, 6x LAN, 1x PCIe x16 Expansion

Model No.	Product Description
ACO-6011E-4L-M12	Surveillance Applied Fanless System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, 2x LAN, 4x M12 LAN, 1x PCIe x16 Expansion
ACO-6011E-8L	Surveillance Applied Fanless System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, 10x LAN, 1x PCIe x16 Expansion
ACO-6011E-8L-M12	Surveillance Applied Fanless System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, 2x LAN, 8x M12 LAN, 1x PCIe x16 Expansion
ACO-6011E-4P	Surveillance Applied Fanless System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, 2x LAN, 4x PoE, 1x PCIe x16 Expansion
ACO-6011E-4P-M12	Surveillance Applied Fanless System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, 2x LAN, 4x M12 PoE, 1x PCIe x16 Expansion
ACO-6011E-8P	Surveillance Applied Fanless System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, 2x LAN, 8x PoE, 1x PCIe x16 Expansion
ACO-6011E-8P-M12	Surveillance Applied Fanless System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, 2x LAN, 8x M12 PoE, 1x PCIe x16 Expansion
ACO-6011P	Surveillance Applied Fanless System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, 2x LAN, 1x PCI Expansion
ACO-6011P-4L	Surveillance Applied Fanless System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, 6x LAN, 1x PCI Expansion
ACO-6011P-4L-M12	Surveillance Applied Fanless System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, 2x LAN, 4x M12 LAN, 1x PCI Expansion
ACO-6011P-8L	Surveillance Applied Fanless System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, 10x LAN, 1x PCI Expansion
ACO-6011P-8L-M12	Surveillance Applied Fanless System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, 2x LAN, 8x M12 LAN, 1x PCI Expansion
ACO-6011P-4P	Surveillance Applied Fanless System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, 2x LAN, 4x PoE, 1x PCI Expansion
ACO-6011P-4P-M12	Surveillance Applied Fanless System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, 2x LAN, 4x M12 PoE, 1x PCI Expansion
ACO-6011P-8P	Surveillance Applied Fanless System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, 2x LAN, 8x PoE, 1x PCI Expansion
ACO-6011P-8P-M12	Surveillance Applied Fanless System with LGA 1151 for Intel® 6th/7th Gen Processor and Q170 PCH, 2x LAN, 8x M12 PoE, 1x PCI Expansion

Optional Accessories

Model No.	Product Description
1-E09A12002	Adapter AC/DC 24V 5A 120W with 3pin Terminal Block Plug 5.0mm Pitch, GST120A24-CT1
1-E09A22102	Adapter AC/DC 24V 9.2A 220W with 3pin Terminal Block Plug 5.0mm Pitch, GST220A24-CT1
SFICBL022	Power Cord, 3-pin US Type, 180cm
1-TPCD00002	Power Cord, European Type, 180cm
1-TPCD00001	Power Cord, 3-pin UK Type, 180cm

Chapter 1

Product Introductions

1.1 Overview

Based on 7th Gen. Intel® Core™ i7-7700T (3.8GHz, Quad Core) / i5-7500T (3.3GHz, Quad Core) / i3-7101TE (3.4GHz, Dual Core) or 6th Gen. Intel® Core™ i7-6700TE (3.4GHz, Quad Core) / i5-6500TE (3.3GHz, Quad Core) / i3-6100TE (2.7GHz, Dual Core) or Pentium® G4400TE (2.4GHz, Dual Core)/ Celeron® G3900TE (2.3GHz, Dual Core) Desktop processor (LGA 1151), ACO-6000 series is an extreme features integration, outstanding system performance, versatile I/O connections, and rugged reliability fanless embedded systems. Compliant with E-Mark and EMC Conformity with EN50155 & EN50121-3-2 certification, as well as support up to 18x LAN or 16x PoE versions and power ignition function, It offers dramatically enhanced CPU and graphics performance, wide power and feature scalability, and advanced features, modularize expansion I/O, rich connectivity interfaces, wide range (9~48V) DC power input, and high reliability even operating in temperature extremes (-25 ℃~+70 ℃).

Featuring with completely cable-less designed, high functional, one-piece housing design, and anti-vibration, ACO-6000 series are ruggedized systems that can operate in harsh environments and easy to install and maintain. A build in over voltage protection (OVP), over current protection (OCP), reverse protection, and wide range DC power input makes ACO-6000 series are safety system for all industrial applications.

ACO-6000 Series

ACO-6010 Series

ACO-6011 Series

1.1.1 Key Features

- LGA 1151 socket for 7th Gen. Intel® Core™ i7-7700T (3.8GHz, Quad Core) / i5-7500T (3.3GHz, Quad Core), i3-7101TE (3.4GHz, Dual Core) or 6th Gen. Intel® Core™ i7-6700TE (3.4GHz, Quad Core) / i5-6500TE (3.3GHz, Quad Core) / i3-6100TE (2.7GHz, Dual Core) or Pentium® G4400TE (2.4GHz, Dual Core) / Celeron® G3900TE (2.3GHz, Dual Core) Desktop Processor
- Intel® Q170 Chipset
- 2x 260-pin DDR4 SODIMM. Max up to 32GB
- Triple independent display supported by 1x DVI-I and 2x DisplayPort
- 2x Intel® GbE supporting Wake-on-LAN and PXE (ACO-6000, ACO-6011E, ACO-6011P Only)
- 6x Intel® GbE (w/ 2x supporting Wake-on-LAN and PXE) (ACO-6000-4L, ACO-6011E-4L, ACO-6011P-4L Only)
- 10x Intel® GbE (w/ 2x supporting Wake-on-LAN and PXE) (ACO-6000-8L, ACO-6011E-8L, ACO-6011P-8L Only)
- 18x Intel® GbE (w/ 2x supporting Wake-on-LAN and PXE) (ACO-6010-16L Only)
- 4x Intel® GbE with M12 connector (ACO-6000-4L-M12, ACO-6011E-4L-M12, ACO-6011P-4L-M12 Only)
- 4x Intel® GbE with PoE function (ACO-6000-4P, ACO-6011E-4P, ACO-6011P-4P Only)
- 4x Intel® GbE with M12 PoE function (ACO-6000-4P-M12, ACO-6011E-4P-M12, ACO-6011P-4P-M12 Only)
- 8x Intel® GbE with PoE function (ACO-6000-8P, ACO-6011E-8P, ACO-6011P-8P Only)
- 8x Intel® GbE with M12 PoE function (ACO-6000-8P-M12, ACO-6011E-8P-M12, ACO-6011P-8P-M12 Only)
- 16x Intel® GbE with M12 connector (ACO-6010-16L-M12 Only)
- 16x Intel® GbE with PoE function (ACO-6000-16P Only)
- 16x Intel® GbE with PoE function (ACO-6000-16P-M12 Only)
- 2x Removable 2.5" SATA HDD Bay and 2x Internal 2.5" SATA SSD/HDD Bay supporting RAID 0, 1, 5, 10
- 3x Full-size Mini-PCIe Socket with 3x SIM Card Socket for communication or expansion modules
- 2x mSATA (Shared by 2x Mini-PCIe Socket)
- 5x RS-232/422/485 (w/ 3x internal), 6x USB 3.0, 2x USB 2.0 (internal), TPM 2.0
- 8x DI + 8x DO with Isolation
- 1x PCI or 1x PCIe x16 Expansion (ACO-6011E, ACO-6011P Series Only)
- 9 to 48VDC wide range power input supporting AT/ATX mode
- -25°C to 70°C extended operating temperature
- Power ignition management

1.2 Hardware Specification

Processor System

- Support 6th & 7th Gen Intel® Core™ i7 / i5 / i3 / Pentium® / Celeron® Desktop Processor (LGA 1151) with AMI 128Mbit SPI BIOS
  - 7th Gen Intel® Core™ i7-7700T, Quad Core, 8MB cache, up to 3.8 GHz
  - 7th Gen Intel® Core™ i5-7500T, Quad Core, 6MB cache, up to 3.3 GHz
  - 7th Gen Intel® Core™ i3-7101TE, Dual Core, 3MB Cache, 3.4 GHz
  - 6th Gen Intel® Core™ i7-6700TE, Quad Core, 8MB cache, up to 3.4 GHz
  - 6th Gen Intel® Core™ i5-6500TE, Quad Core, 6MB Cache, up to 3.3 GHz
  - 6th Gen Intel® Core™ i3-6100TE, Dual Core, 4MB Cache, 2.7 GHz
  - Intel® Pentium G4400TE, Dual Core, 3MB Cache, 2.4 GHz
  - Intel® Celeron G3900TE, Dual Core, 2MB Cache, 2.3 GHz

Memory

- 2x 260-Pin DDR4 1866/2133MHz SODIMM. Max. up to 32GB

Display

Triple Display

- 1x DVI-I, 1x VGA, and 2x DisplayPort

Expansion

- 3x Full-size Mini PCIe Socket for Wi-Fi / GSM / Expansion Module
- 1x PCIe x16 expansion (ACO-6011E only)
- 1x PCI expansion (ACO-6011P only)
- Card Dimension: 235 (L) x 112 (H) mm

Ethernet

- 1x Intel® i210-AT GbE LAN Port and 1x Intel® i219LM GbE LAN , Support Wake-on-LAN and PXE
- 4x Intel® I350-AM4 GbE LAN Port (ACO-60xx-4L and ACO-60xx-4L-M12 only)
- 8x Intel® I350-AM4 GbE LAN Port (ACO-60xx-8L and ACO-60xx-8L-M12 only)
- 16x Intel ® I350-AM4 GbE LAN Port (ACO-6010-16L and ACO-6010-16L-M12 only)
- 4x 802.3at Compliant PoE Port, The Maximum DC Power Delivery on Each PoE is 25.5W (ACO-60xx-4P and ACO-60xx-4P-M12 only)
- 8x 802.3at Compliant PoE Port, The Maximum DC Power Delivery on Each PoE is 25.5W. 80W total power budget (ACO-60xx-8P and ACO-60xx-8P-M12 only)
- 16x 802.3at Compliant PoE Port, The Maximum DC Power Delivery on Each PoE is 25.5W. 160W total power budget (ACO-6010-16P and ACO-6010-16P-M12 only)

Audio

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

Watchdog Timer

- Software Programmable Supports 1~255 sec. System Reset

TPM

- TPM 2.0

Storage

- 2x Removable 2.5" SATA HDD Bay
- 2x Internal 2.5" SATA HDD Bay
- 2x Internal mSATA Slot (Shared by 2x Mini-PCIe Socket)
- 2x External SIM Card Socket
- 1x Internal SIM Card Socket
- Support RAID 0, 1, 5, 10

I/O Ports

- 6x USB 3.0 Port and 2x internal USB 2.0 port
- 8 Isolated DI and 8 Isolated DO Port
- 2x DB9 for COM1~2, Support RS232/422/485 with Auto Flow Control
- 3x Internal connector for COM3~5, Support RS232/422/485 with Auto Flow Control
- 6x Antenna Hole
- 1x Power Switch
- 1x AT/ATX Switch
- 1x Remote Power on/off Connector

Digital Input & Output

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

Power

- Support AT, ATX Mode
- 1x 3-pin Terminal Block Connector with Power Input 9~48VDC
- 1x Optional AC/DC 24V/5A, 120W Power Adapter
- 1x Optional AC/DC 24V/9.2A, 220W Power Adapter (ACO-60xx-4P, ACO-60xx-4P-M12, ACO-60xx-8P, ACO-60xx-8P-M12, ACO-6010-16P, and ACO-6010-16P-M12 only)

Environment

- Operating Temperature: Ambient with Air Flow: -25°C to 70°C (with Industrial Grade Peripherals)
- Storage Temperature: -30°C to 85°C
- Relative humidity: 10%~95% (non-condensing)

Physical

- **ACO-6000 Series**
  - ✓Dimension (WxDxH): 240 x 261 x 79 mm
  - ✓Weight: 3.94 kg ~ 4.98 kg
- **ACO-6010 Series**
  - ✓Dimension (WxDxH): 240 x 261 x 100 mm
  - ✓Weight: 5.34 kg ~ 6.82 kg
- **ACO-6011 Series**
  - ✓Dimension (WxDxH): 240 x 261 x 107 mm
  - ✓Weight: 5.14 kg ~ 6.21 kg
- Construction: Extruded Aluminum with Heavy Duty Metal
- Mounting: Wall Mounting

Operating System

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

Certifications

- CE, FCC Class A, E-Mark, EMC Conformity with EN50155 & EN50121-3-2

1.3 System I/O

1.3.1 ACO-6000

Front Panel

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

Reset switch
Press to reset the system

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

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

12V/24V power input select switch
Used to car mode select 12V or 24V power input

PC/Car mode select switch
Used to select PC or Car mode

Delay time select switch
Used to select car mode PC turn off delay time

Clear CMOS
Used to clear CMOS

SIM card
Used to insert SIM card

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

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

HDD port
Removable 2.5" SATA HDD Area

Power LED
Indicates the power status of the system

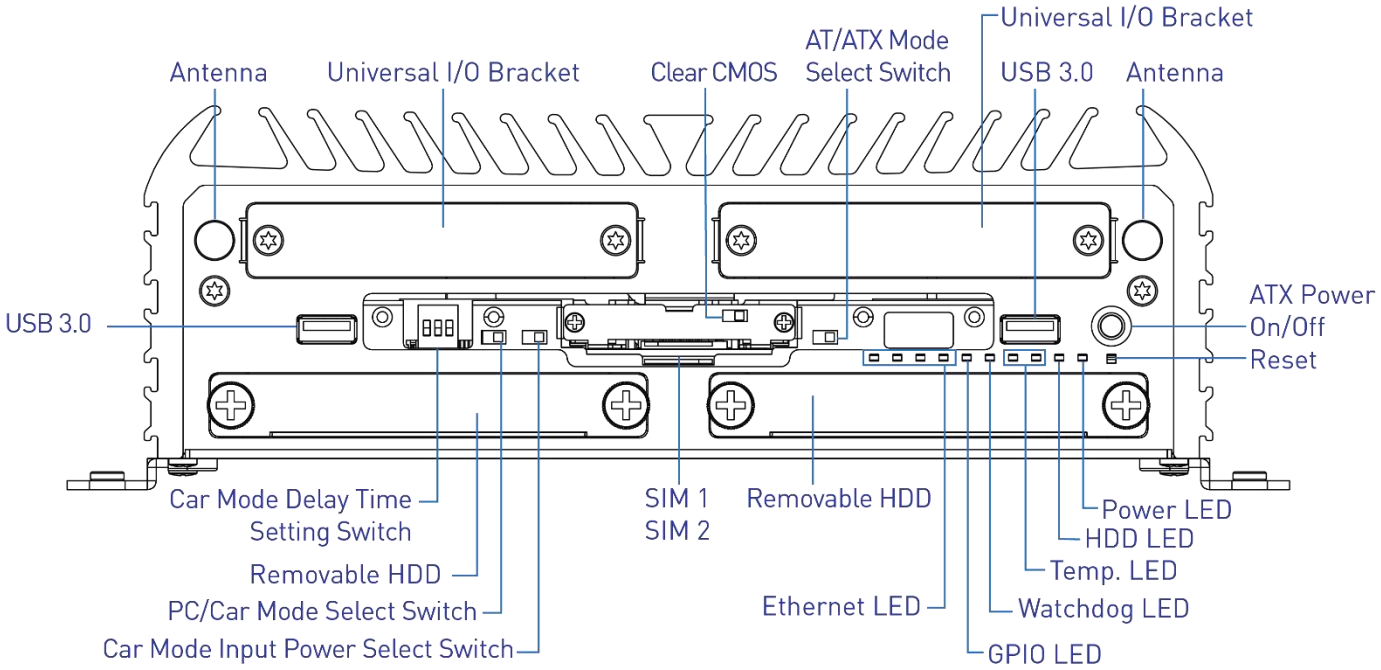
HDD LED
Indicates the status of the hard drive

Watchdog LED
Indicates the status of the watchdog active

GPIO LED
Indicates the status of the customer define

Ethernet LEDs
Indicates the status of the LAN active

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

Speaker-out
Used to connect a speaker

Mic-in
Used to connect a microphone

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

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

DVI-I port
Used to connect a DVI monitor or connect optional split cable for dual display mode

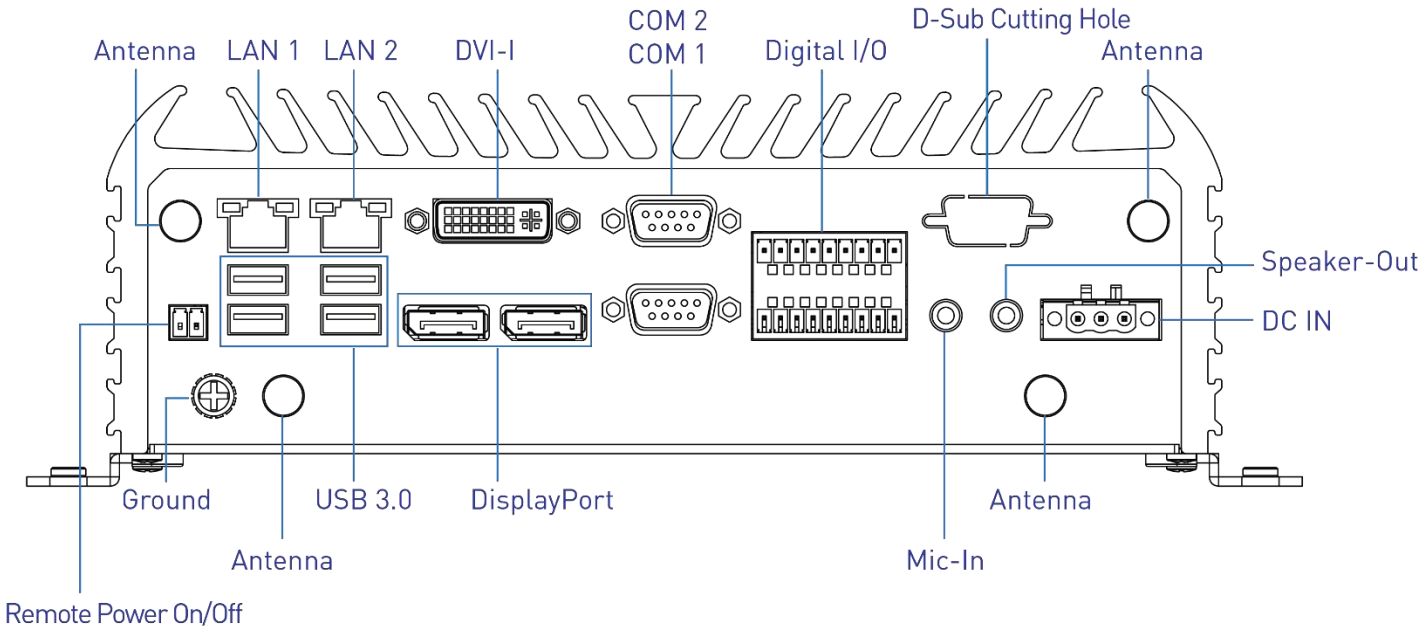
DisplayPort
Used to connect a DisplayPort monitor

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

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

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

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



1.3.2 ACO-6000-4L(P)

Front Panel

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

Reset switch
Press to reset the system

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

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

12V/24V power input select switch
Used to car mode select 12V or 24V power input

PC/Car mode select switch
Used to select PC or Car mode

Delay time select switch
Used to select car mode PC turn off delay time

Clear CMOS
Used to clear CMOS

SIM card
Used to insert SIM card

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

LAN Port
Used to connect the system to a local area network (ACO-6000-4L Only)

PoE Port
Used to connect the system to a local area network with power over Ethernet (ACO-6000-4P Only)

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

HDD port
Removable 2.5" SATA HDD Area

Power LED
Indicates the power status of the system

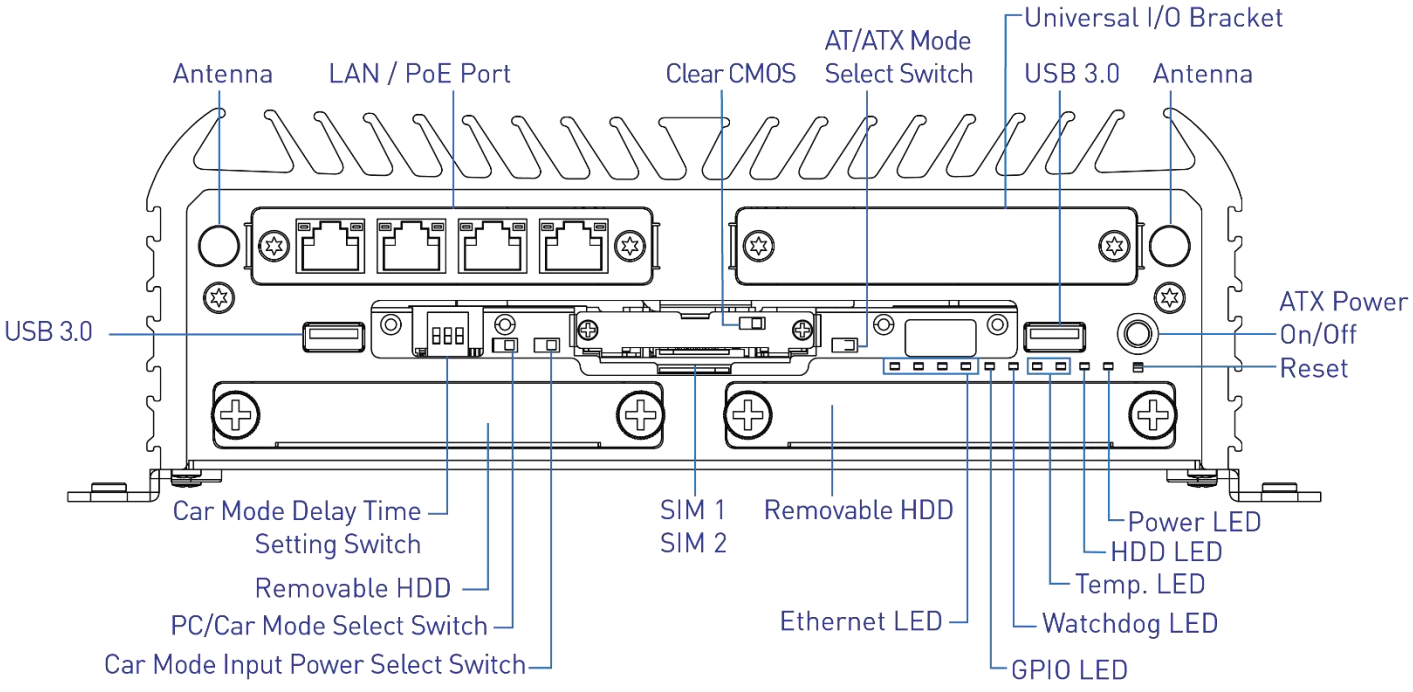
HDD LED
Indicates the status of the hard drive

Watchdog LED
Indicates the status of the watchdog active

GPIO LED
Indicates the status of the customer define

Ethernet LEDs
Indicates the status of the LAN active

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

Speaker-out
Used to connect a speaker

Mic-in
Used to connect a microphone

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

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

DVI-I port
Used to connect a DVI monitor or connect optional split cable for dual display mode

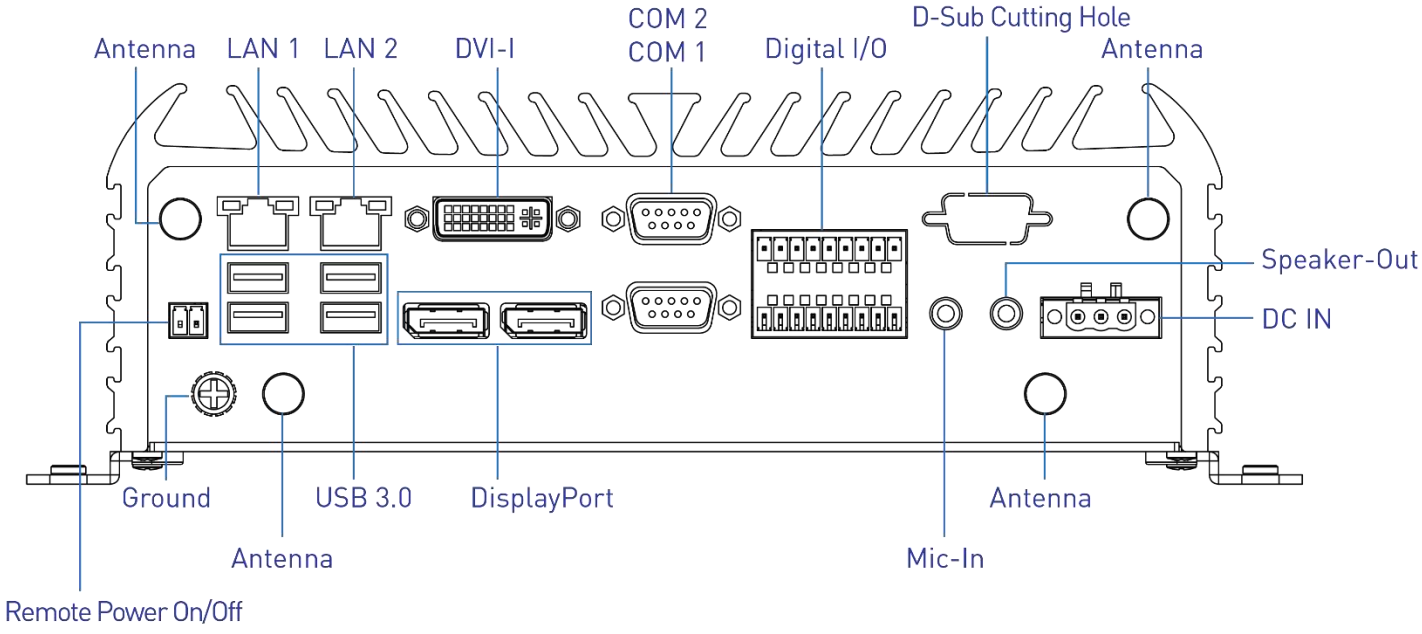
DisplayPort
Used to connect a DisplayPort monitor

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

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

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

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



1.3.3 ACO-6000-4L(P)-M12

Front Panel

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

Reset switch
Press to reset the system

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

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

12V/24V power input select switch
Used to car mode select 12V or 24V power input

PC/Car mode select switch
Used to select PC or Car mode

Delay time select switch
Used to select car mode PC turn off delay time

Clear CMOS
Used to clear CMOS

SIM card
Used to insert SIM card

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

M12 LAN Port
Used to connect the system to a local area network (ACO-6000-4L-M12 Only)

M12 PoE Port
Used to connect the system to a local area network with power over Ethernet (ACO-6000-4P-M12 Only)

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

HDD port
Removable 2.5" SATA HDD Area

Power LED
Indicates the power status of the system

HDD LED
Indicates the status of the hard drive

Watchdog LED
Indicates the status of the watchdog active

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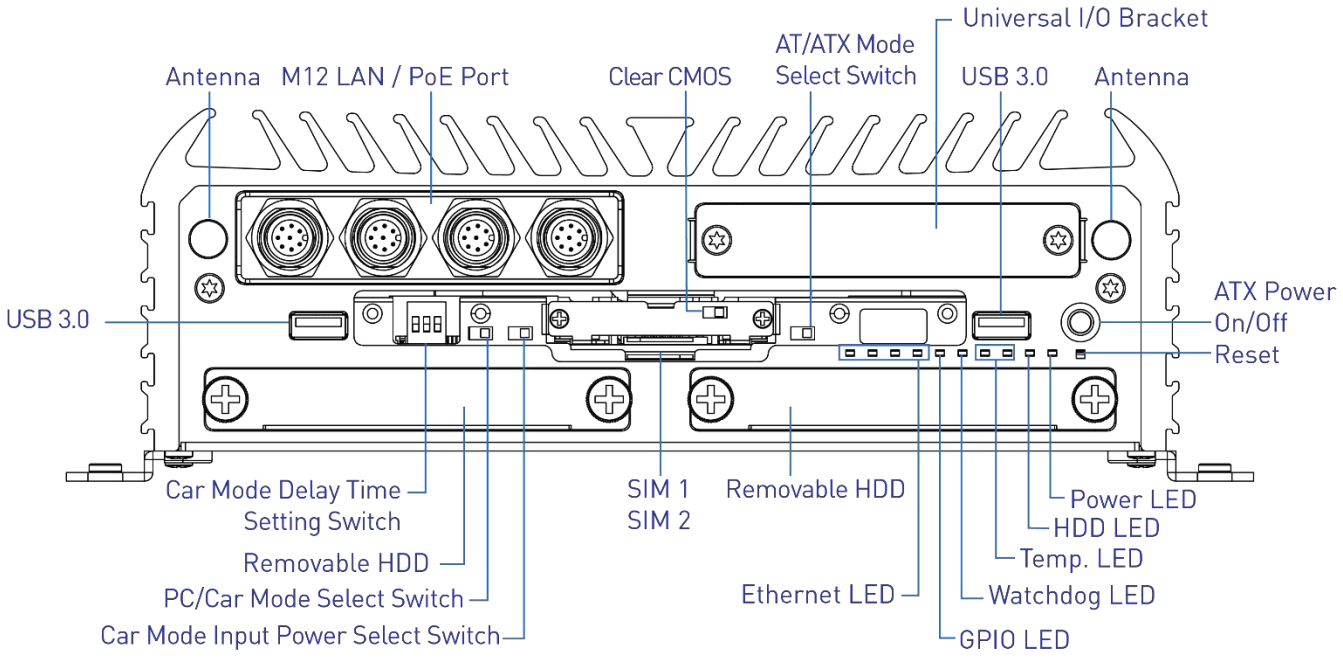
Antenna hole
Used to connect an antenna for optional Mini-PCIe WiFi module



Rear Panel

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

Speaker-out
Used to connect a speaker

Mic-in
Used to connect a microphone

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

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

DVI-I port
Used to connect a DVI monitor or connect optional split cable for dual display mode

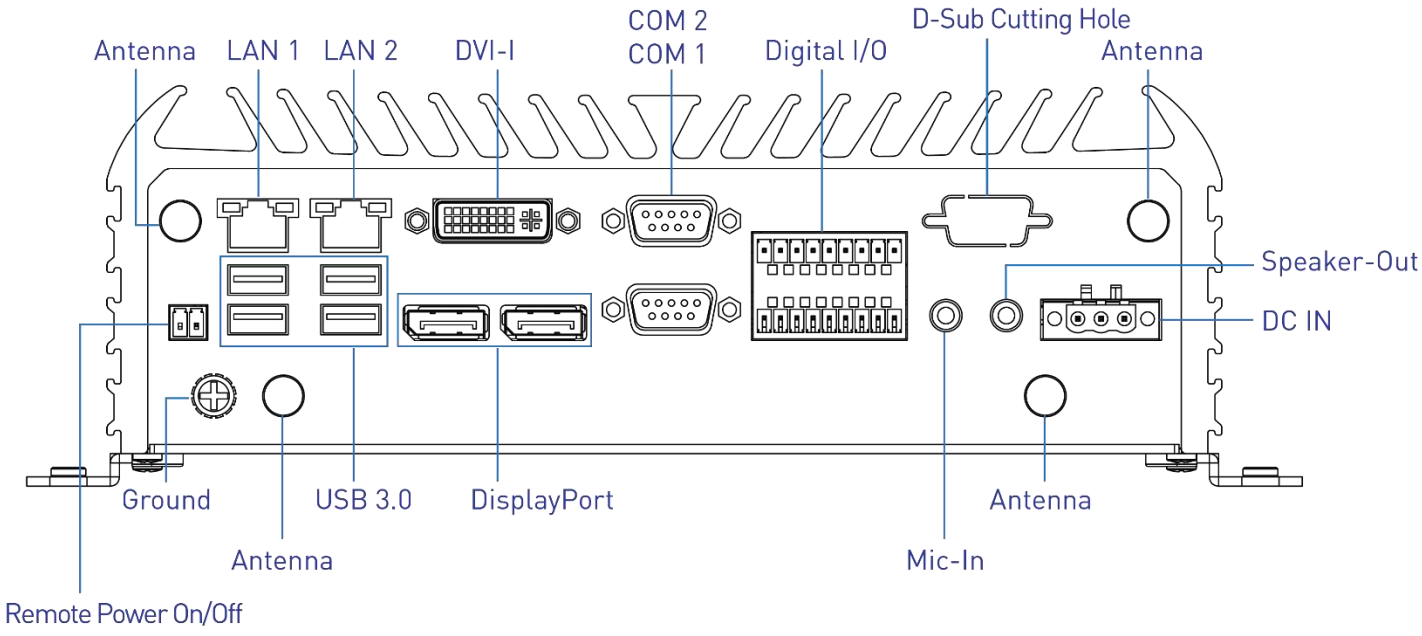
DisplayPort
Used to connect a DisplayPort monitor

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

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

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

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



1.3.4 ACO-6000-8L(P)

Front Panel

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

Reset switch
Press to reset the system

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

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

12V/24V power input select switch
Used to car mode select 12V or 24V power input

PC/Car mode select switch
Used to select PC or Car mode

Delay time select switch
Used to select car mode PC turn off delay time

Clear CMOS
Used to clear CMOS

SIM card
Used to insert SIM card

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

LAN Port
Used to connect the system to a local area network (ACO-6000-8L Only)

PoE Port
Used to connect the system to a local area network with power over Ethernet (ACO-6000-8P Only)

HDD port
Removable 2.5" SATA HDD Area

Power LED
Indicates the power status of the system

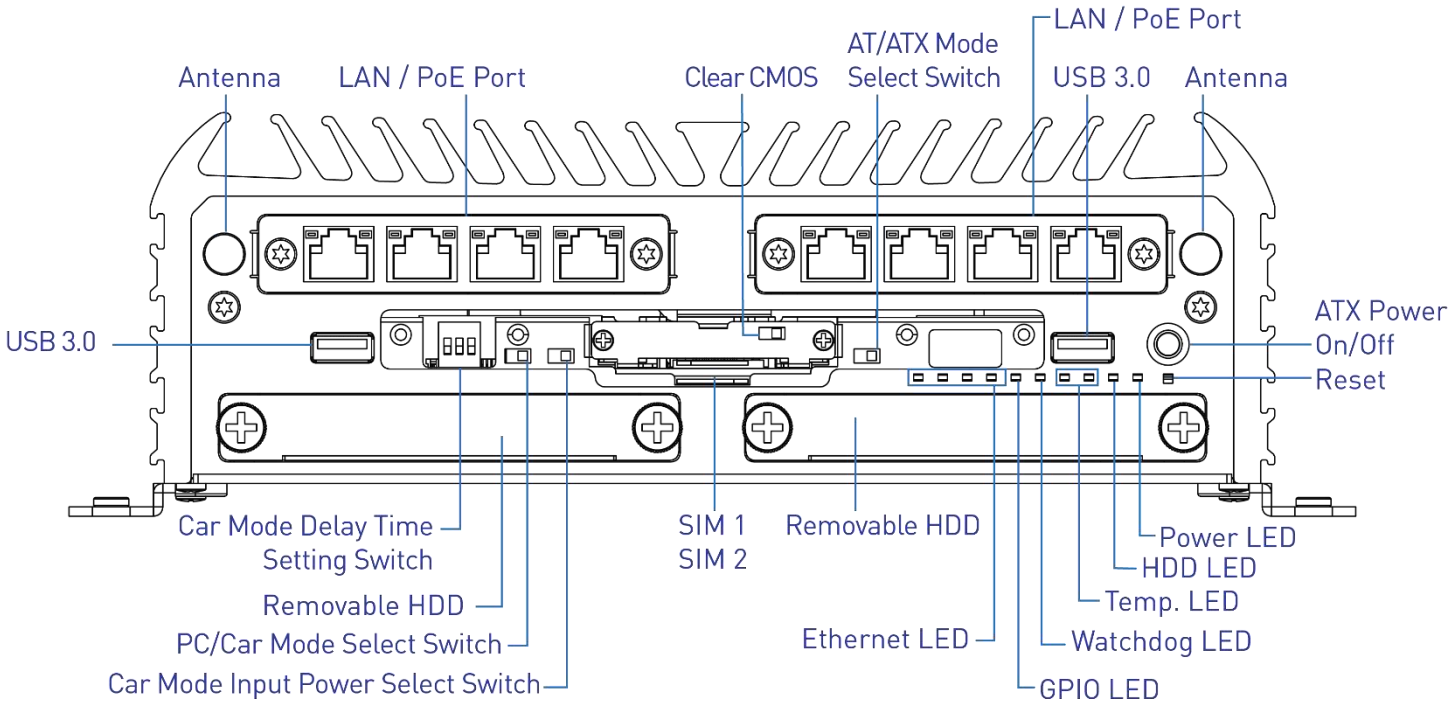
HDD LED
Indicates the status of the hard drive

Watchdog LED
Indicates the status of the watchdog active

GPIO LED
Indicates the status of the customer define

Ethernet LEDs
Indicates the status of the LAN active

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

Speaker-out
Used to connect a speaker

Mic-in
Used to connect a microphone

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

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

DVI-I port
Used to connect a DVI monitor or connect optional split cable for dual display mode

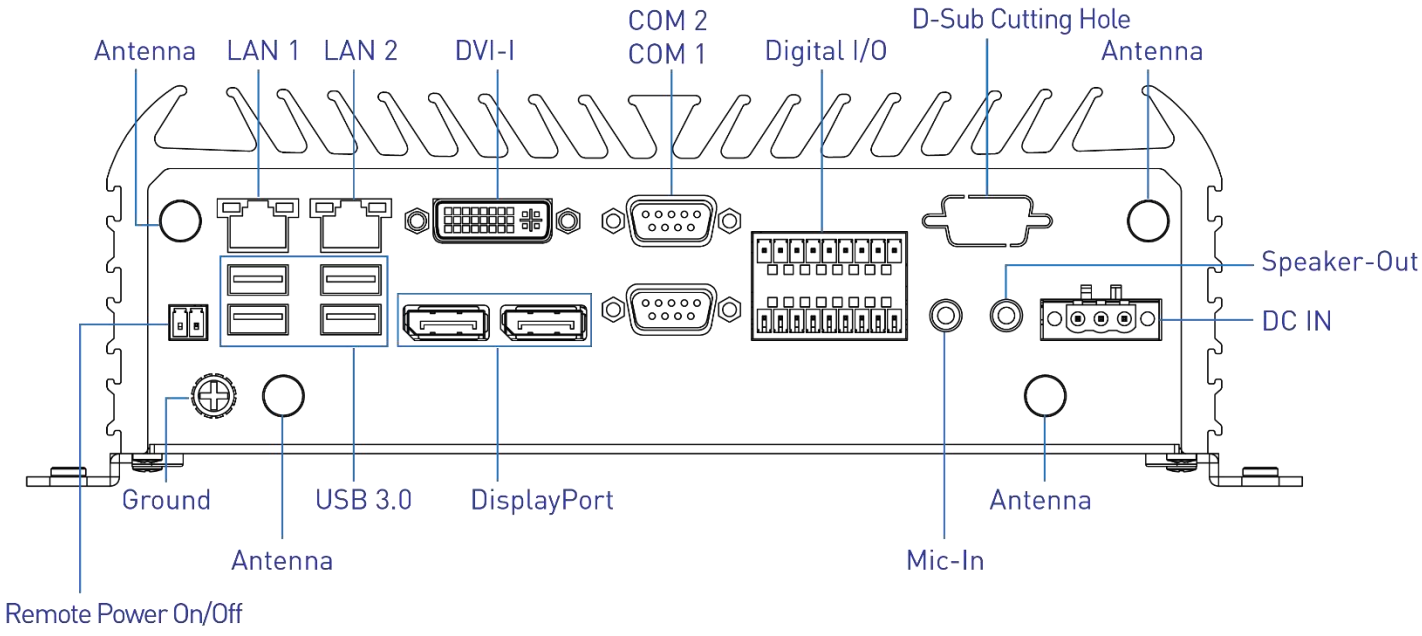
DisplayPort
Used to connect a DisplayPort monitor

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

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

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

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



1.3.5 ACO-6000-8L(P)-M12

Front Panel

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

Reset switch
Press to reset the system

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

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

12V/24V power input select switch
Used to car mode select 12V or 24V power input

PC/Car mode select switch
Used to select PC or Car mode

Delay time select switch
Used to select car mode PC turn off delay time

Clear CMOS
Used to clear CMOS

SIM card
Used to insert SIM card

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

M12 LAN Port
Used to connect the system to a local area network (ACO-6000-8L-M12 Only)

M12 PoE Port
Used to connect the system to a local area network with power over Ethernet (ACO-6000-8P-M12 Only)

HDD port
Removable 2.5" SATA HDD Area

Power LED
Indicates the power status of the system

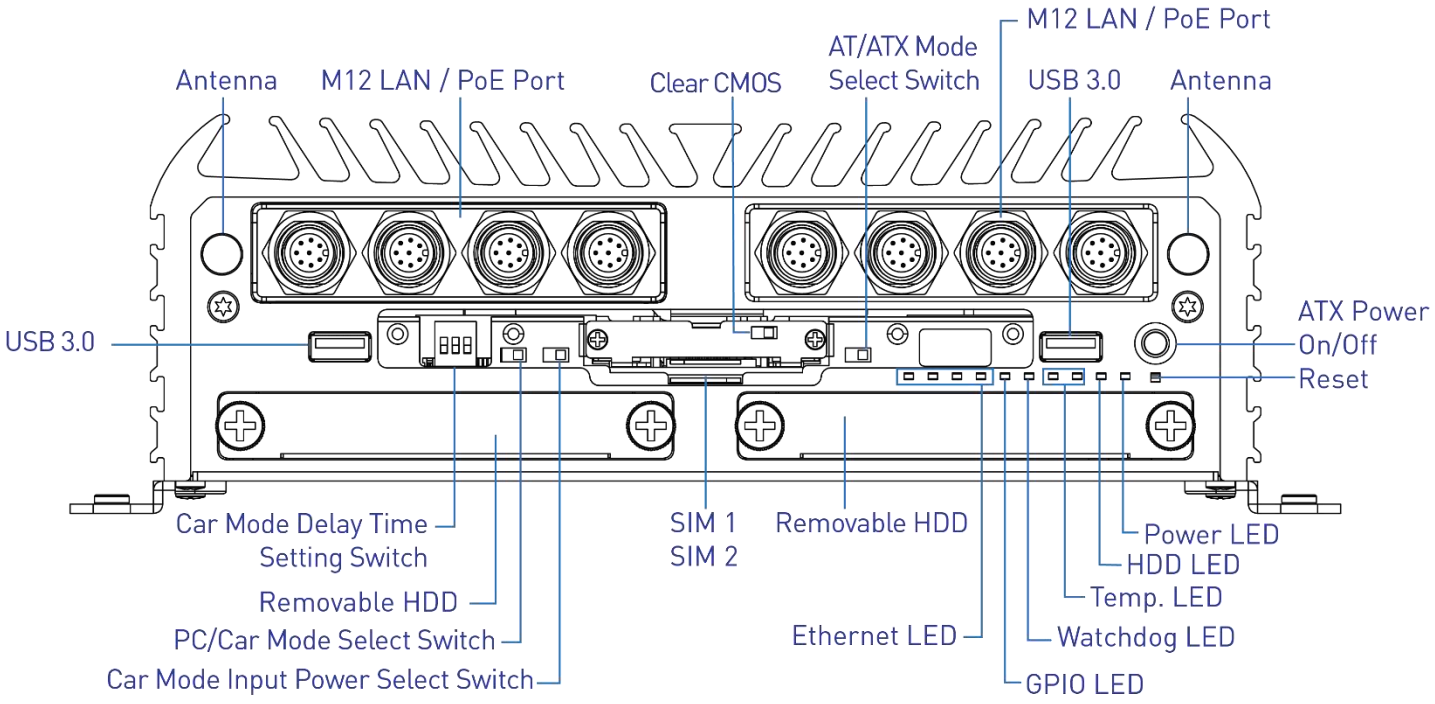
HDD LED
Indicates the status of the hard drive

Watchdog LED
Indicates the status of the watchdog active

GPIO LED
Indicates the status of the customer define

Ethernet LEDs
Indicates the status of the LAN active

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

Speaker-out
Used to connect a speaker

Mic-in
Used to connect a microphone

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

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

DVI-I port
Used to connect a DVI monitor or connect optional split cable for dual display mode

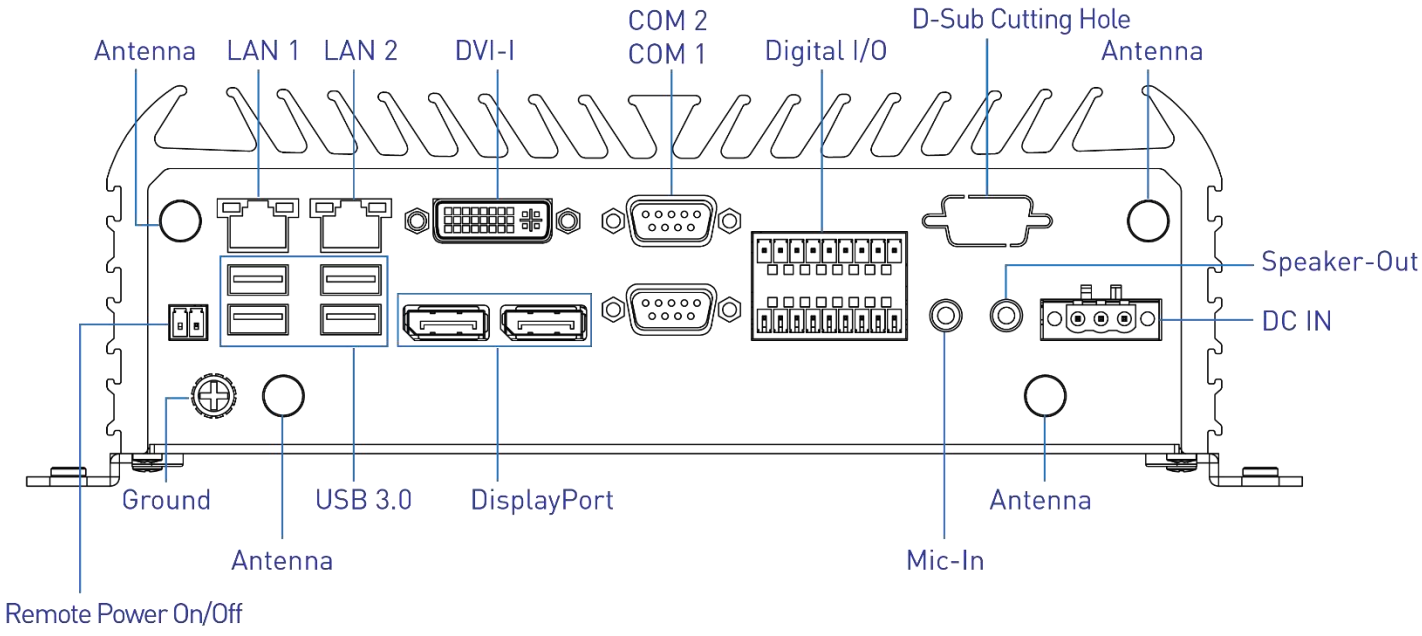
DisplayPort
Used to connect a DisplayPort monitor

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

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

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

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



1.3.6 ACO-6010-16L(P)

Front Panel

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

Reset switch
Press to reset the system

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

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

12V/24V power input select switch
Used to car mode select 12V or 24V power input

PC/Car mode select switch
Used to select PC or Car mode

Delay time select switch
Used to select car mode PC turn off delay time

Clear CMOS
Used to clear CMOS

SIM card
Used to insert SIM card

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

LAN Port
Used to connect the system to a local area network (ACO-6010-16L Only)

PoE Port
Used to connect the system to a local area network with power over Ethernet (ACO-6010-16P Only)

HDD port
Removable 2.5" SATA HDD Area

Power LED
Indicates the power status of the system

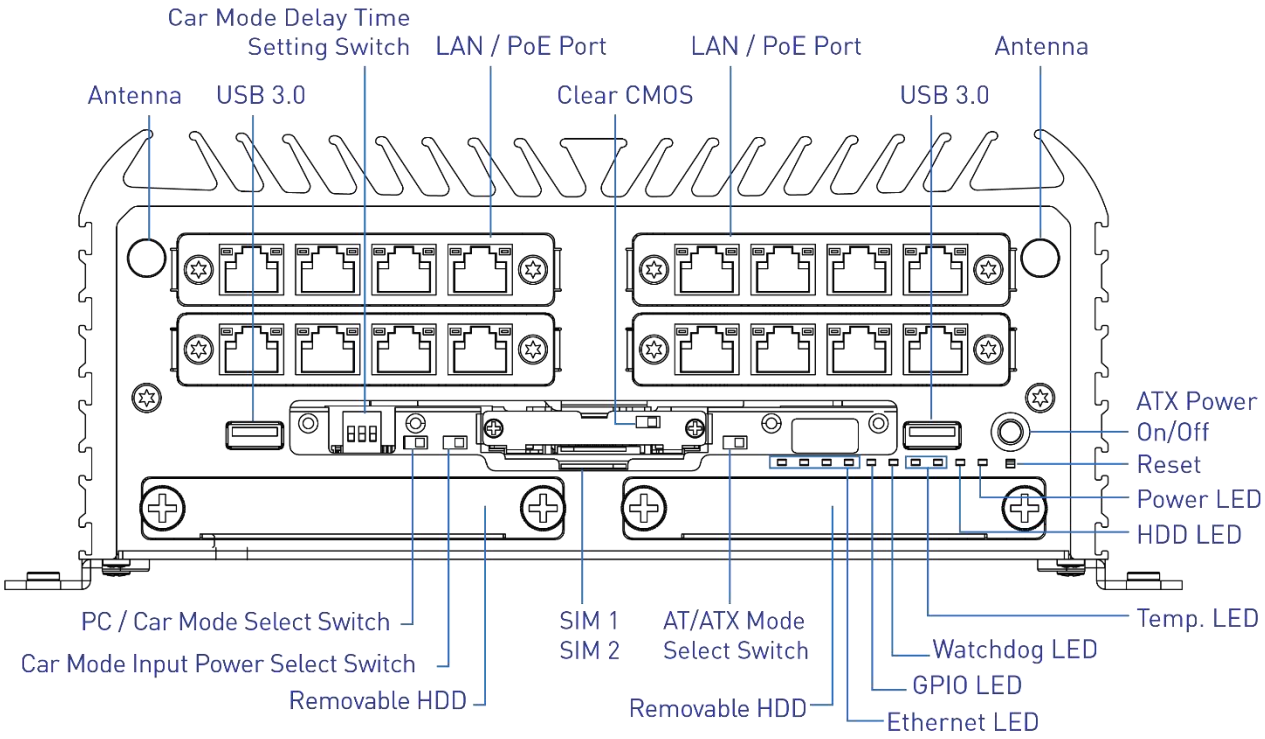
HDD LED
Indicates the status of the hard drive

Watchdog LED
Indicates the status of the watchdog active

GPIO LED
Indicates the status of the customer define

Ethernet LEDs
Indicates the status of the LAN active

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

Speaker-out
Used to connect a speaker

Mic-in
Used to connect a microphone

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

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

DVI-I port
Used to connect a DVI monitor or connect optional split cable for dual display mode

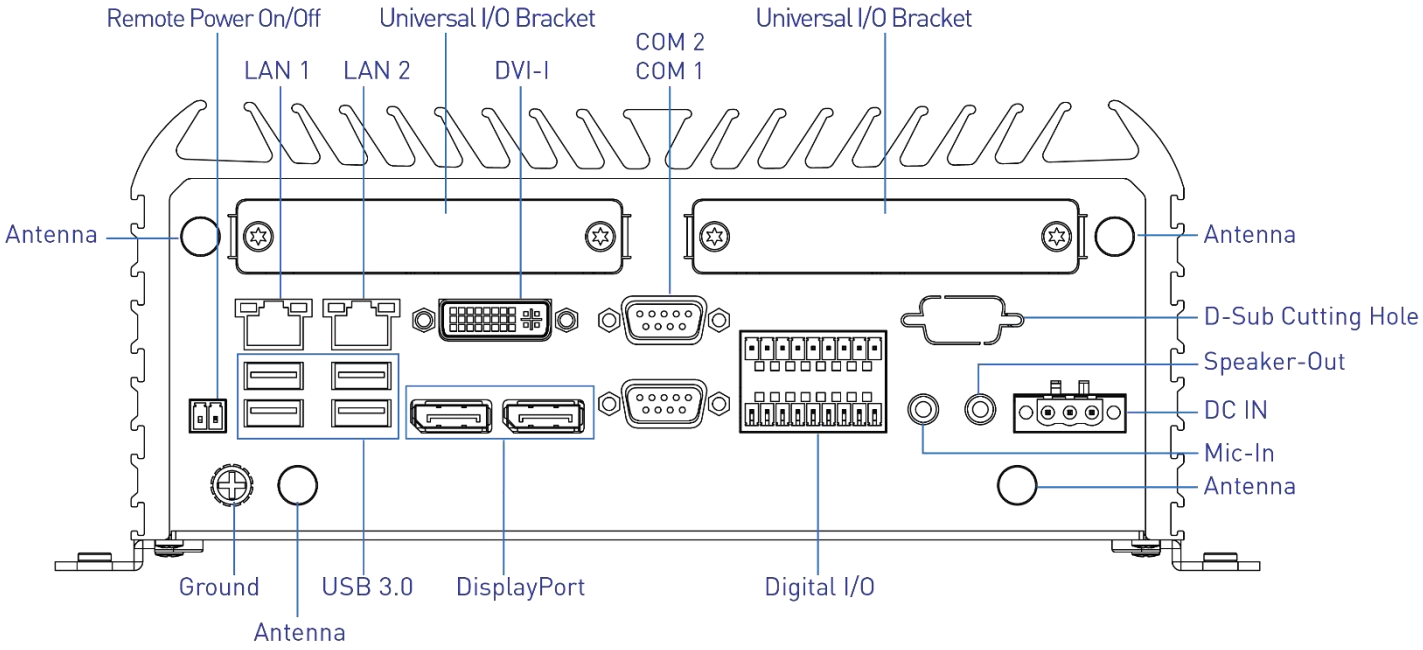
DisplayPort
Used to connect a DisplayPort monitor

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

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

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

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



1.3.7 ACO-6010-16L(P)-M12

Front Panel

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

Reset switch
Press to reset the system

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

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

12V/24V power input select switch
Used to car mode select 12V or 24V power input

PC/Car mode select switch
Used to select PC or Car mode

Delay time select switch
Used to select car mode PC turn off delay time

Clear CMOS
Used to clear CMOS

SIM card
Used to insert SIM card

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

M12 LAN Port
Used to connect the system to a local area network (ACO-6010-16L-M12 Only)

M12 PoE Port
Used to connect the system to a local area network with power over Ethernet (ACO-6010-16P-M12 Only)

HDD port
Removable 2.5" SATA HDD Area

Power LED
Indicates the power status of the system

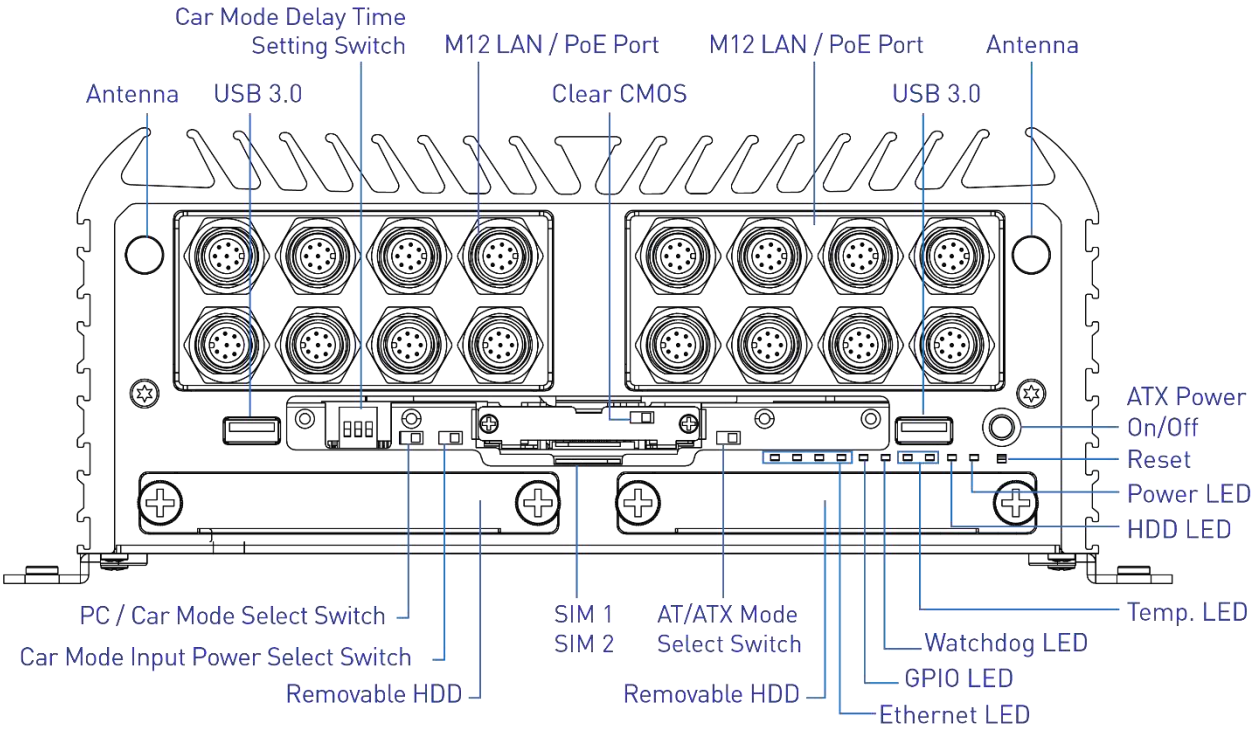
HDD LED
Indicates the status of the hard drive

Watchdog LED
Indicates the status of the watchdog active

GPIO LED
Indicates the status of the customer define

Ethernet LEDs
Indicates the status of the LAN active

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

Speaker-out
Used to connect a speaker

Mic-in
Used to connect a microphone

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

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

DVI-I port
Used to connect a DVI monitor or connect optional split cable for dual display mode

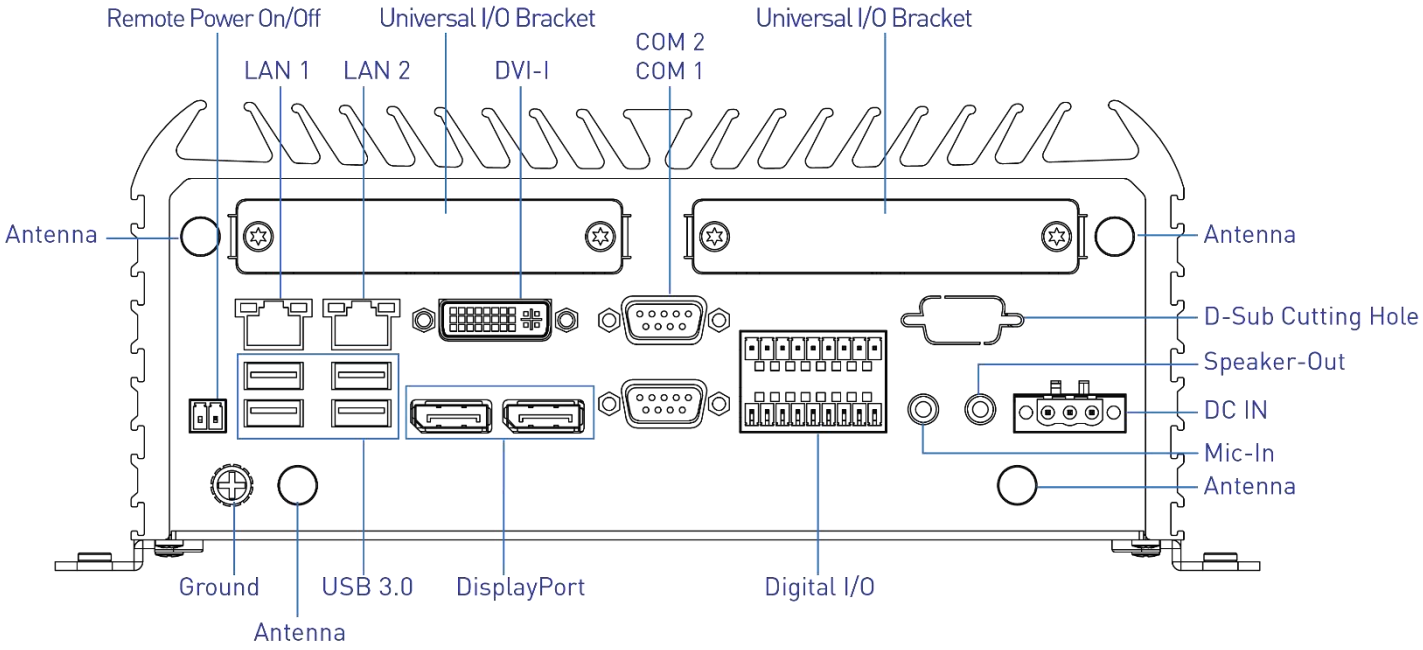
DisplayPort
Used to connect a DisplayPort monitor

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

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

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

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



1.3.8 ACO-6011E(P)

Front Panel

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

Reset switch
Press to reset the system

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

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

12V/24V power input select switch
Used to car mode select 12V or 24V power input

PC/Car mode select switch
Used to select PC or Car mode

Delay time select switch
Used to select car mode PC turn off delay time

Clear CMOS
Used to clear CMOS

SIM card
Used to insert SIM card

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

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

HDD port
Removable 2.5" SATA HDD Area

Power LED
Indicates the power status of the system

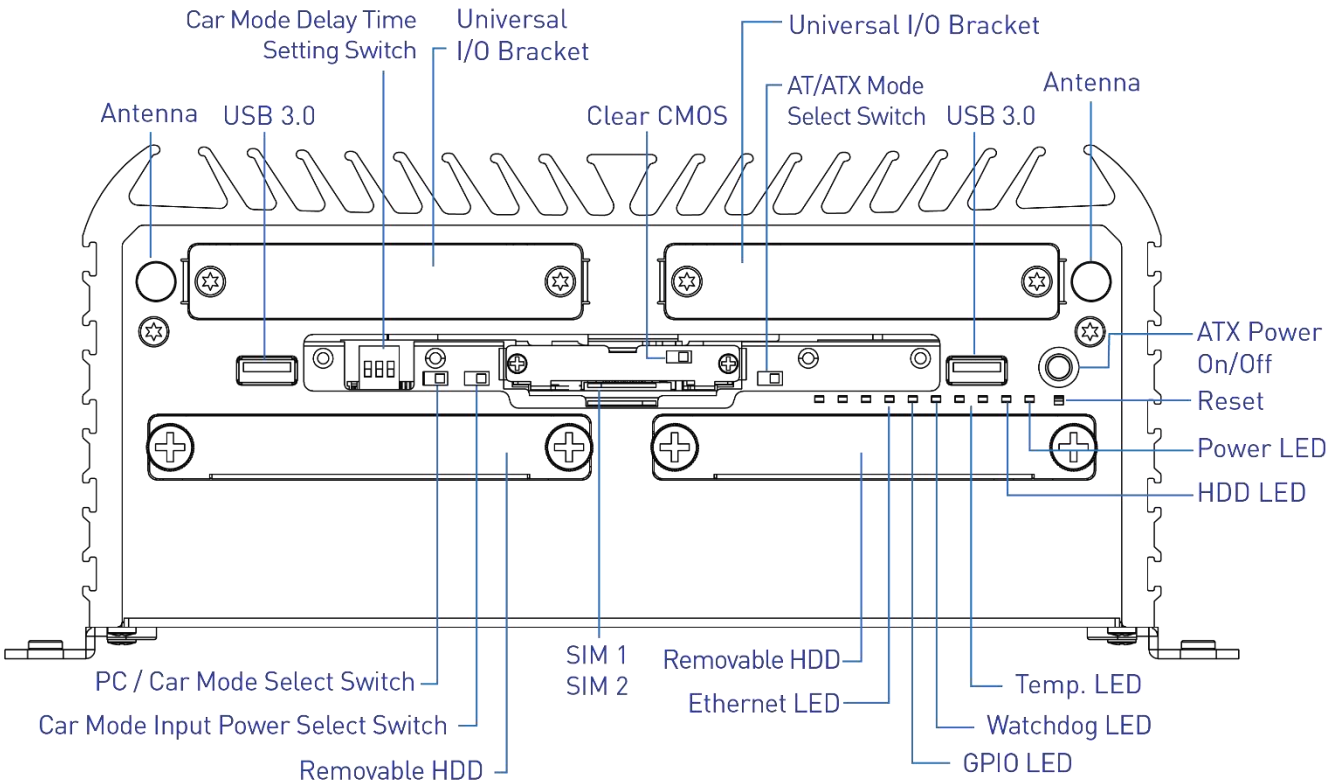
HDD LED
Indicates the status of the hard drive

Watchdog LED
Indicates the status of the watchdog active

GPIO LED
Indicates the status of the customer define

Ethernet LEDs
Indicates the status of the LAN active

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

Speaker-out
Used to connect a speaker

Mic-in
Used to connect a microphone

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

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

DVI-I port
Used to connect a DVI monitor or connect optional split cable for dual display mode

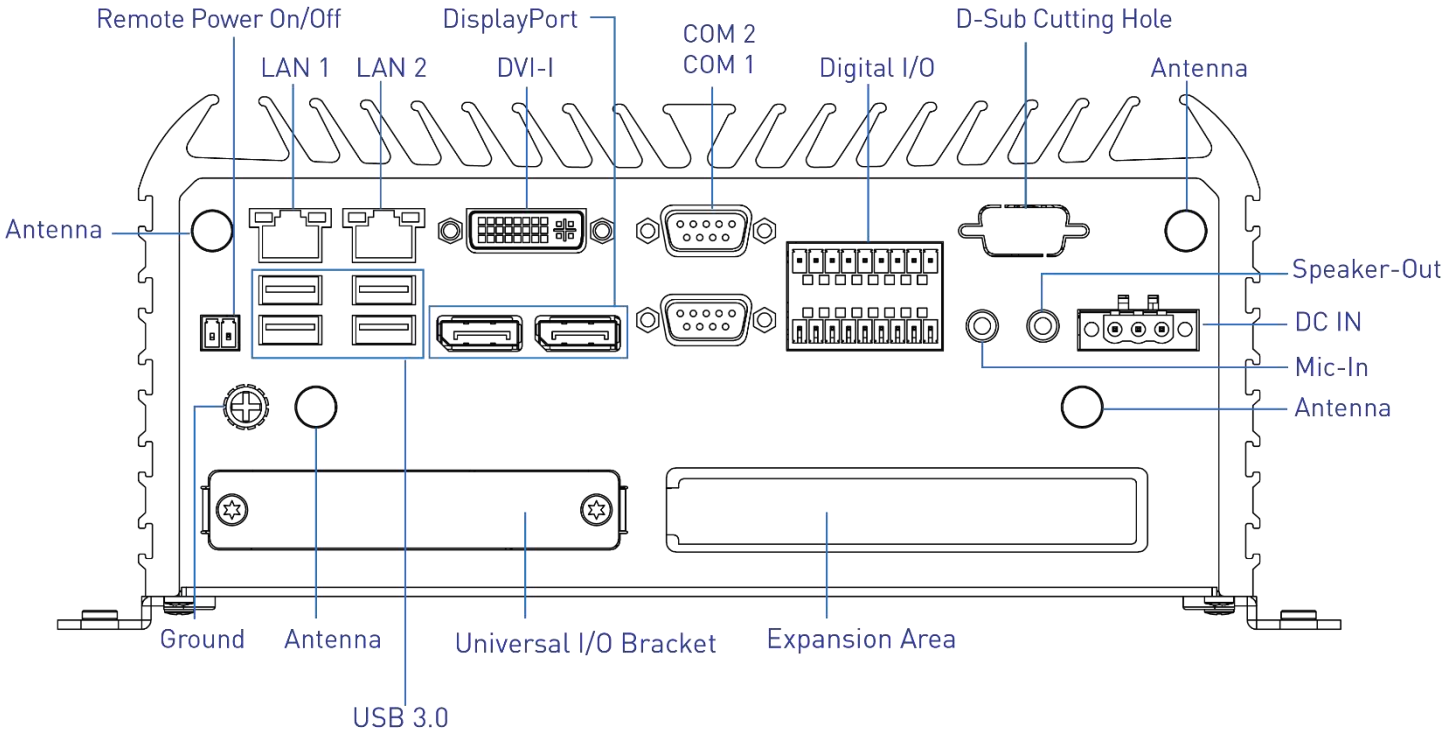
DisplayPort
Used to connect a DisplayPort monitor

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

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

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

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



1.3.9 ACO-6011E(P)-4L(P)

Front Panel

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

Reset switch
Press to reset the system

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

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

12V/24V power input select switch
Used to car mode select 12V or 24V power input

PC/Car mode select switch
Used to select PC or Car mode

Delay time select switch
Used to select car mode PC turn off delay time

Clear CMOS
Used to clear CMOS

SIM card
Used to insert SIM card

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

LAN Port
Used to connect the system to a local area network (ACO-6011E-4L and ACO-6011P-4L Only)

PoE Port
Used to connect the system to a local area network with power over Ethernet (ACO-6011E-4P and ACO-6011P-4P Only)

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

HDD port
Removable 2.5" SATA HDD Area

Power LED
Indicates the power status of the system

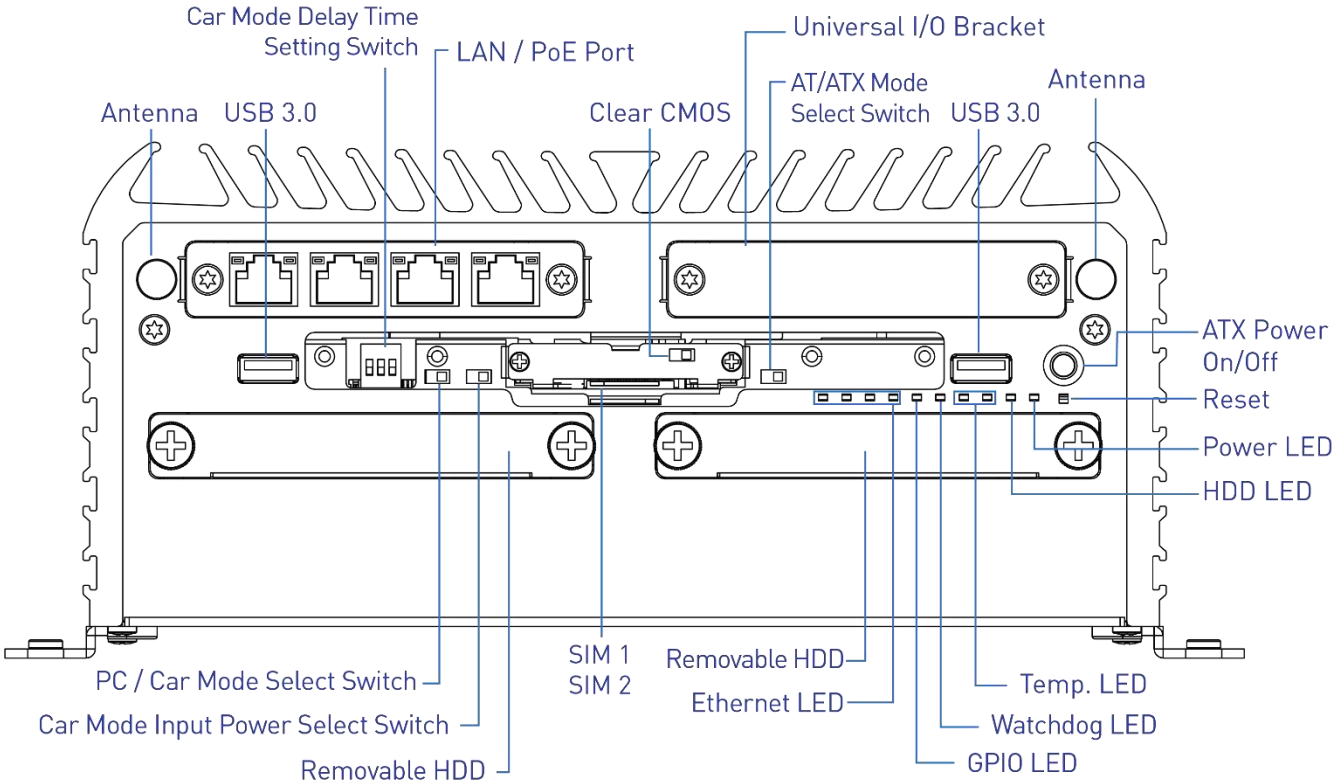
HDD LED
Indicates the status of the hard drive

Watchdog LED
Indicates the status of the watchdog active

GPIO LED
Indicates the status of the customer define

Ethernet LEDs
Indicates the status of the LAN active

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

Speaker-out
Used to connect a speaker

Mic-in
Used to connect a microphone

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

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

DVI-I port
Used to connect a DVI monitor or connect optional split cable for dual display mode

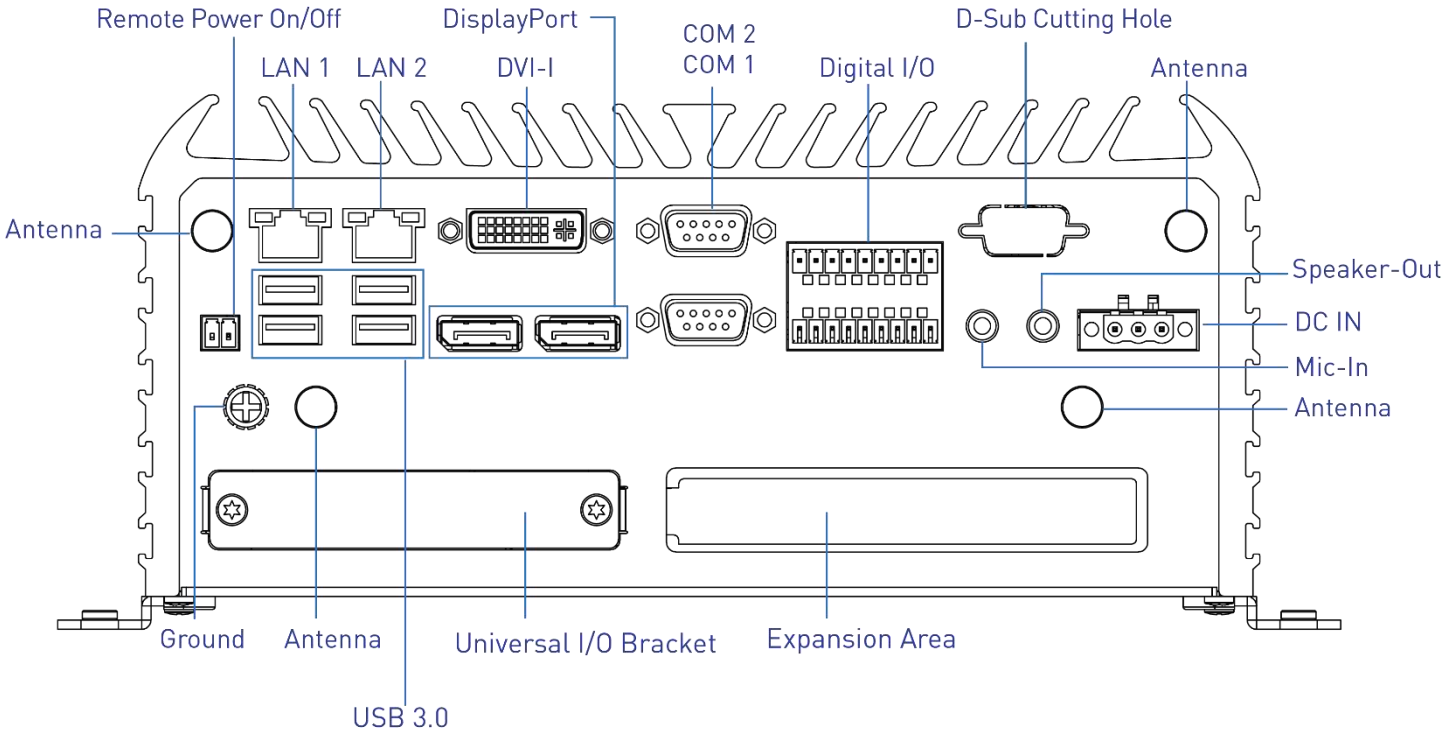
DisplayPort
Used to connect a DisplayPort monitor

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

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

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

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



1.3.10 ACO-6011E(P)-4L(P)-M12

Front Panel

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

Reset switch
Press to reset the system

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

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

12V/24V power input select switch
Used to car mode select 12V or 24V power input

PC/Car mode select switch
Used to select PC or Car mode

Delay time select switch
Used to select car mode PC turn off delay time

Clear CMOS
Used to clear CMOS

SIM card
Used to insert SIM card

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

M12 LAN Port
Used to connect the system to a local area network (ACO-6011E-4L-M12 and ACO-6011P-4L-M12 Only)

M12 PoE Port
Used to connect the system to a local area network with power over Ethernet (ACO-6011E-4P-M12 and ACO-6011P-4P-M12 Only)

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

HDD port
Removable 2.5" SATA HDD Area

Power LED
Indicates the power status of the system

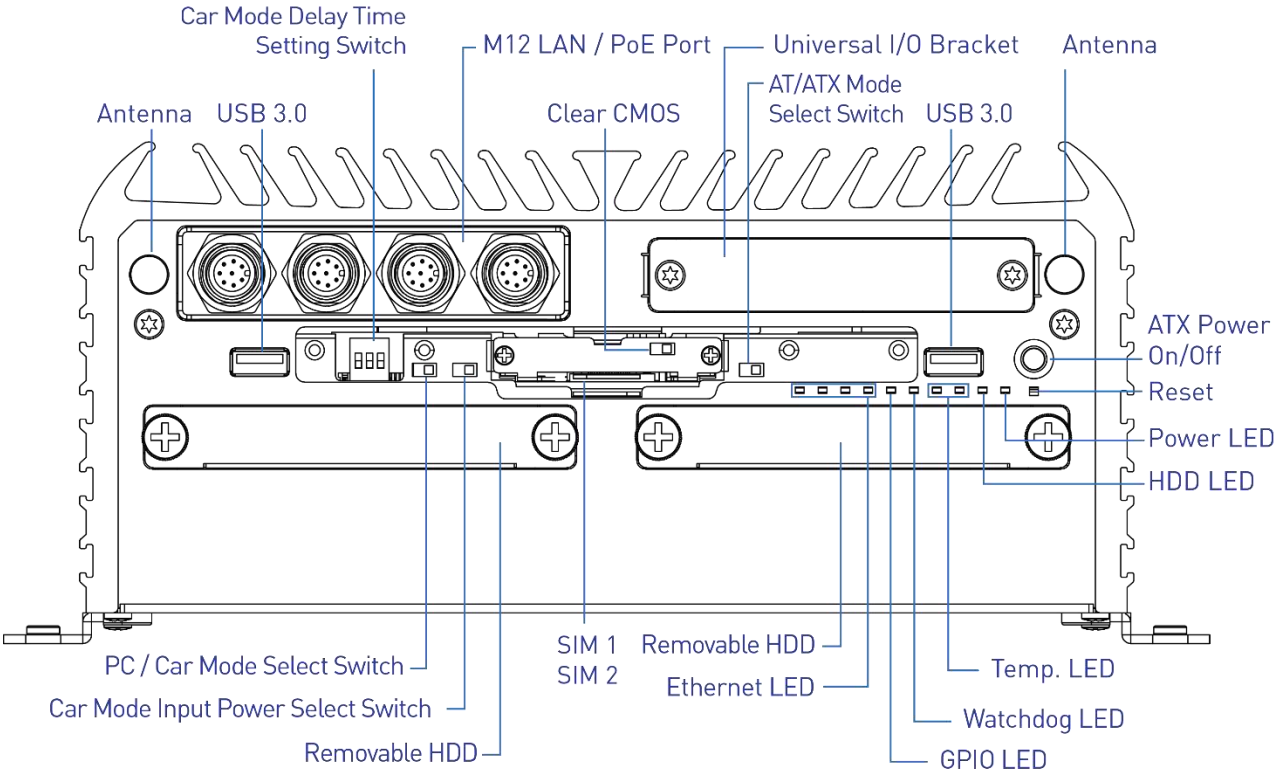
HDD LED
Indicates the status of the hard drive

Watchdog LED
Indicates the status of the watchdog active

GPIO LED
Indicates the status of the customer define

Ethernet LEDs
Indicates the status of the LAN active

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

Speaker-out
Used to connect a speaker

Mic-in
Used to connect a microphone

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

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

DVI-I port
Used to connect a DVI monitor or connect optional split cable for dual display mode

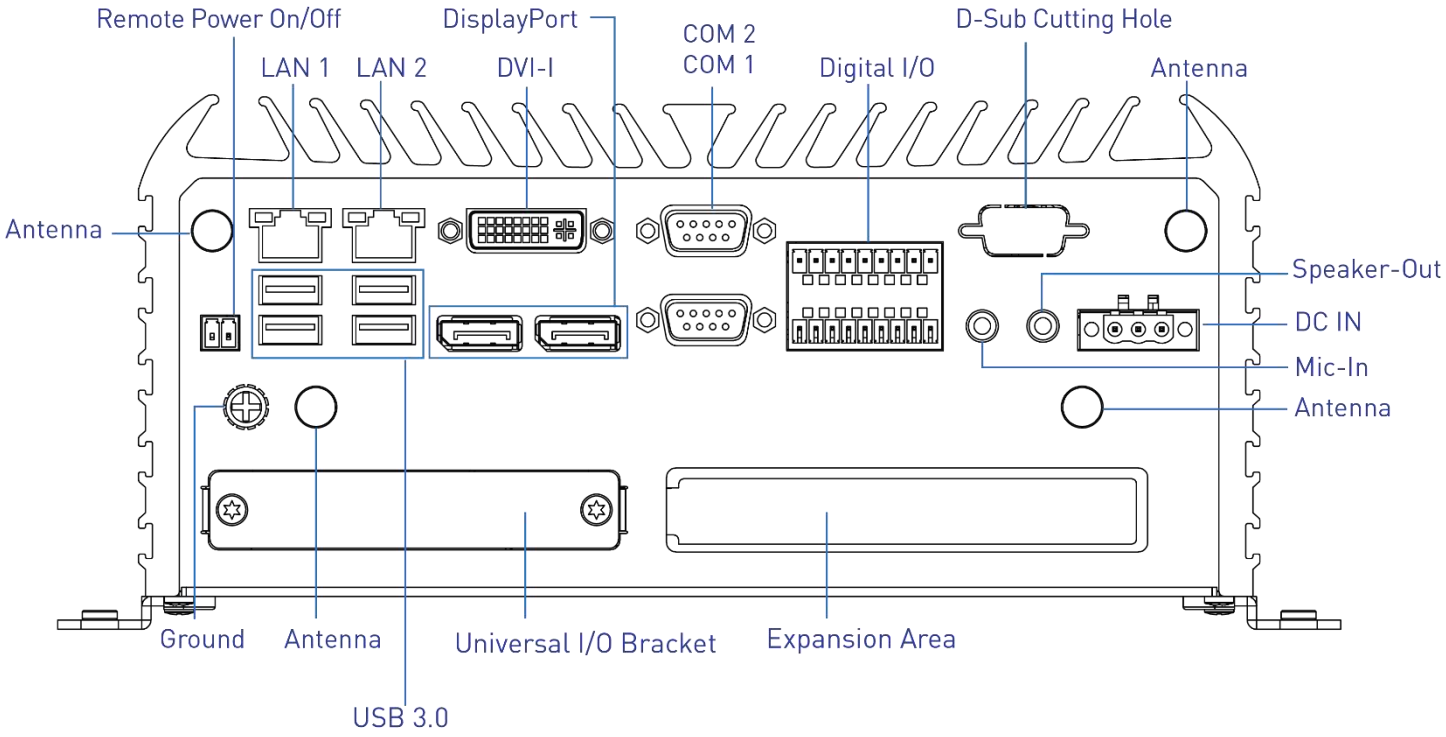
DisplayPort
Used to connect a DisplayPort monitor

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

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

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

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



1.3.11 ACO-6011E(P)-8L(P)

Front Panel

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

Reset switch
Press to reset the system

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

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

12V/24V power input select switch
Used to car mode select 12V or 24V power input

PC/Car mode select switch
Used to select PC or Car mode

Delay time select switch
Used to select car mode PC turn off delay time

Clear CMOS
Used to clear CMOS

SIM card
Used to insert SIM card

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

LAN Port
Used to connect the system to a local area network (ACO-6011E-8L and ACO-6011P-8L Only)

PoE Port
Used to connect the system to a local area network with power over Ethernet (ACO-6011E-8P and ACO-6011P-8P Only)

HDD port
Removable 2.5" SATA HDD Area

Power LED
Indicates the power status of the system

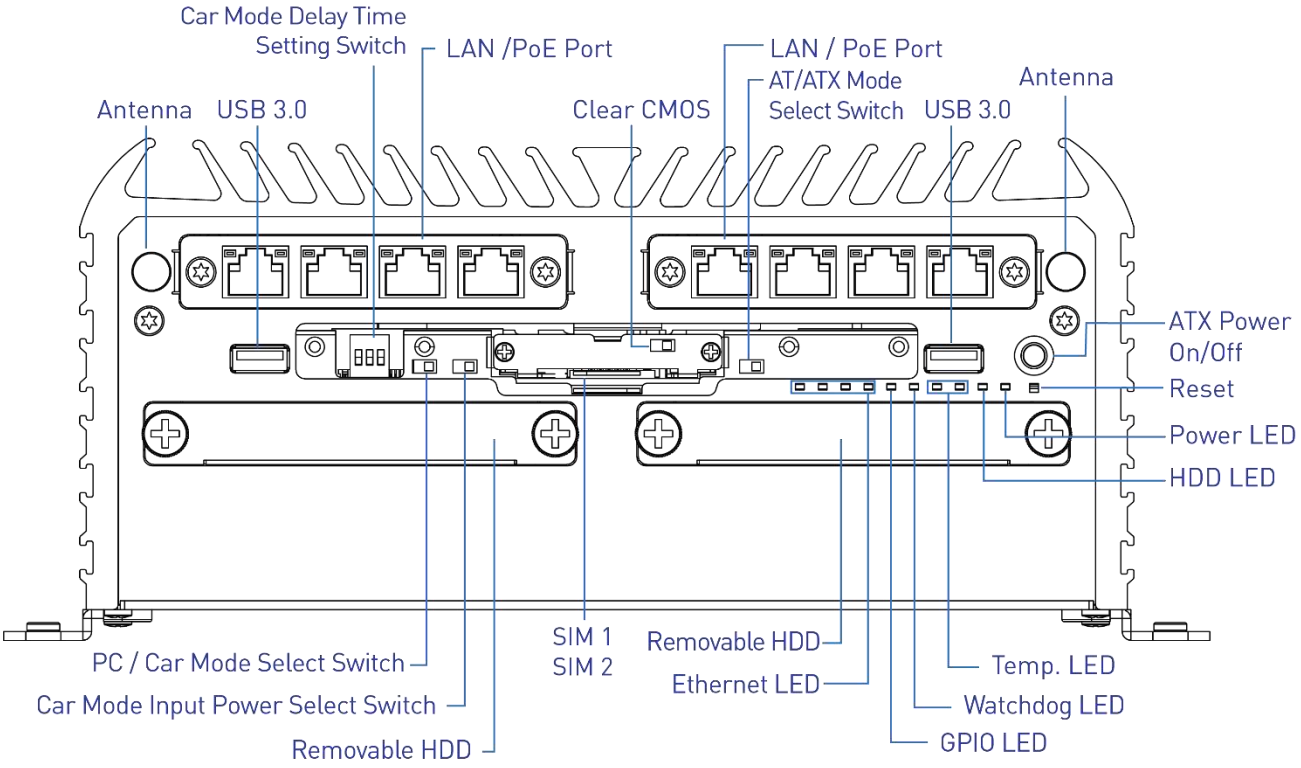
HDD LED
Indicates the status of the hard drive

Watchdog LED
Indicates the status of the watchdog active

GPIO LED
Indicates the status of the customer define

Ethernet LEDs
Indicates the status of the LAN active

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

Speaker-out
Used to connect a speaker

Mic-in
Used to connect a microphone

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

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

DVI-I port
Used to connect a DVI monitor or connect optional split cable for dual display mode

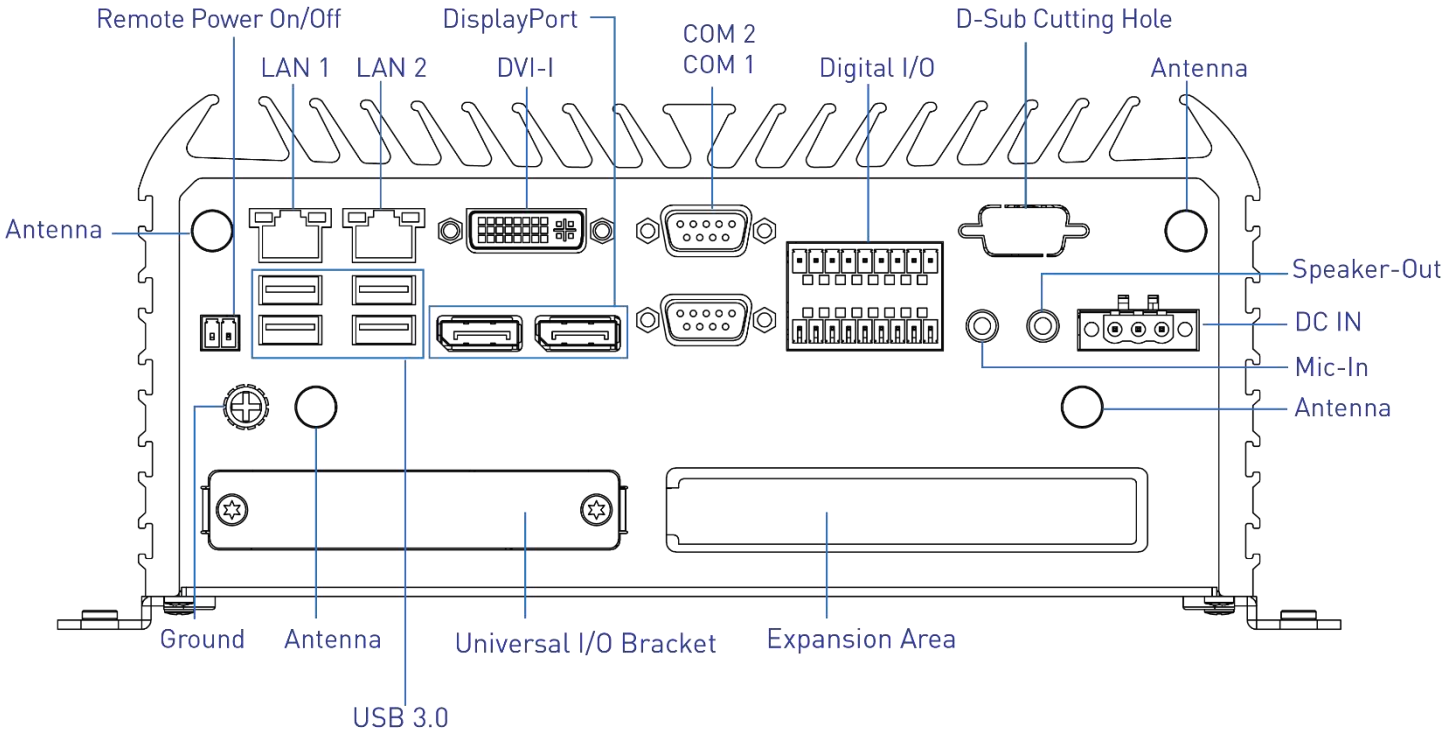
DisplayPort
Used to connect a DisplayPort monitor

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

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

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

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



1.3.12 ACO-6011E(P)-8L(P)-M12

Front Panel

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

Reset switch
Press to reset the system

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

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

12V/24V power input select switch
Used to car mode select 12V or 24V power input

PC/Car mode select switch
Used to select PC or Car mode

Delay time select switch
Used to select car mode PC turn off delay time

Clear CMOS
Used to clear CMOS

SIM card
Used to insert SIM card

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

M12 LAN Port
Used to connect the system to a local area network (ACO-6011E-8L-M12 and ACO-6011P-8L-M12 Only)

M12 PoE Port
Used to connect the system to a local area network with power over Ethernet (ACO-6011E-8P-M12 and ACO-6011P-8P-M12 Only)

HDD port
Removable 2.5" SATA HDD Area

Power LED
Indicates the power status of the system

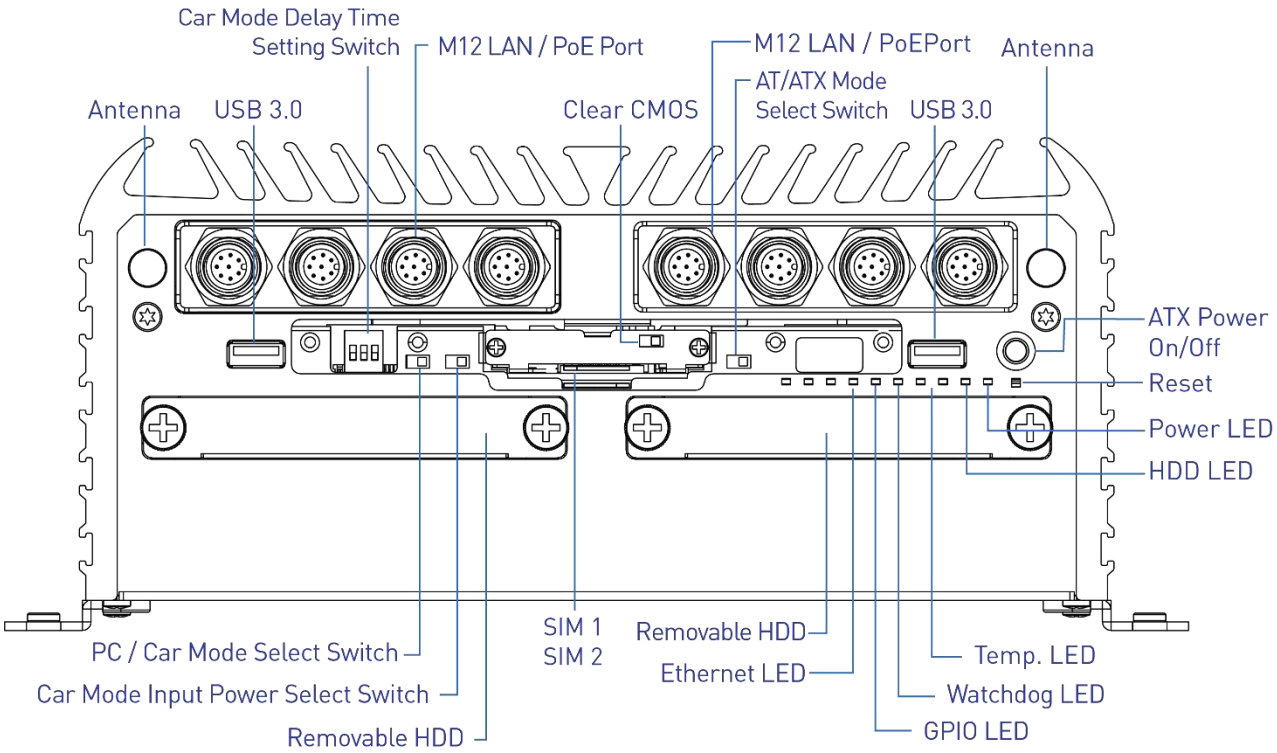
HDD LED
Indicates the status of the hard drive

Watchdog LED
Indicates the status of the watchdog active

GPIO LED
Indicates the status of the customer define

Ethernet LEDs
Indicates the status of the LAN active

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

Speaker-out
Used to connect a speaker

Mic-in
Used to connect a microphone

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

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

DVI-I port
Used to connect a DVI monitor or connect optional split cable for dual display mode

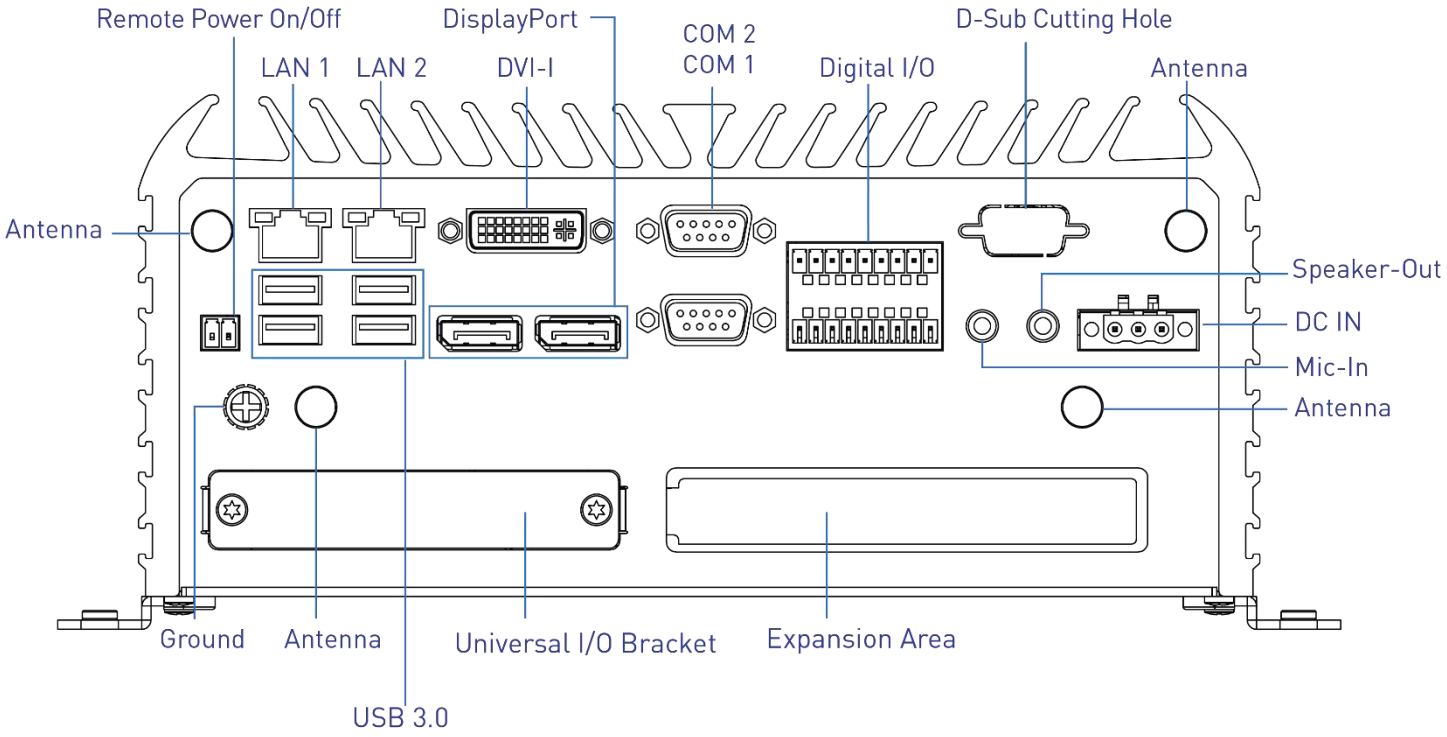
DisplayPort
Used to connect a DisplayPort monitor

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

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

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

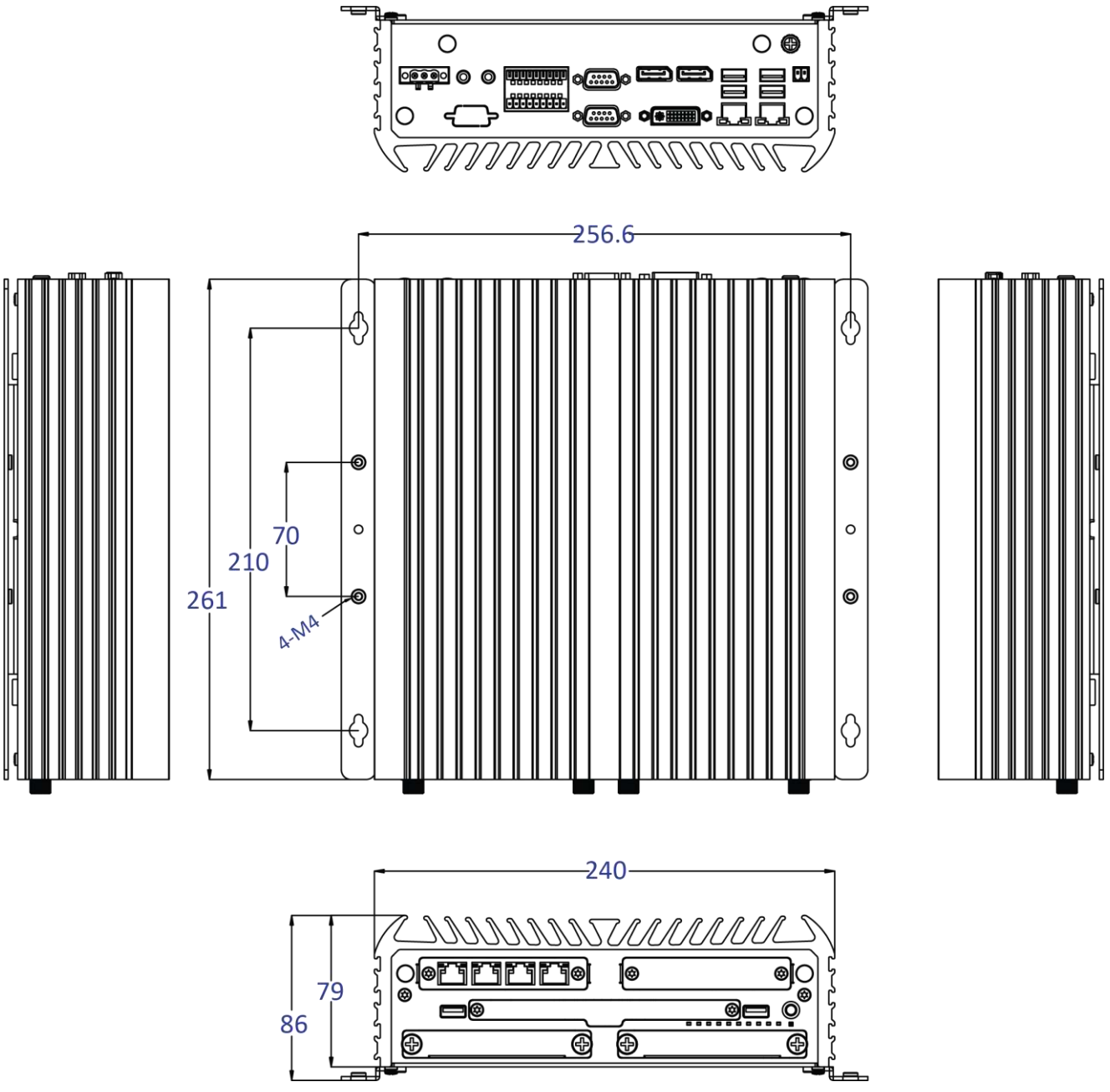
Antenna hole
Used to connect an antenna for optional Mini-PCIe WiFi module



1.4 Mechanical Dimensions

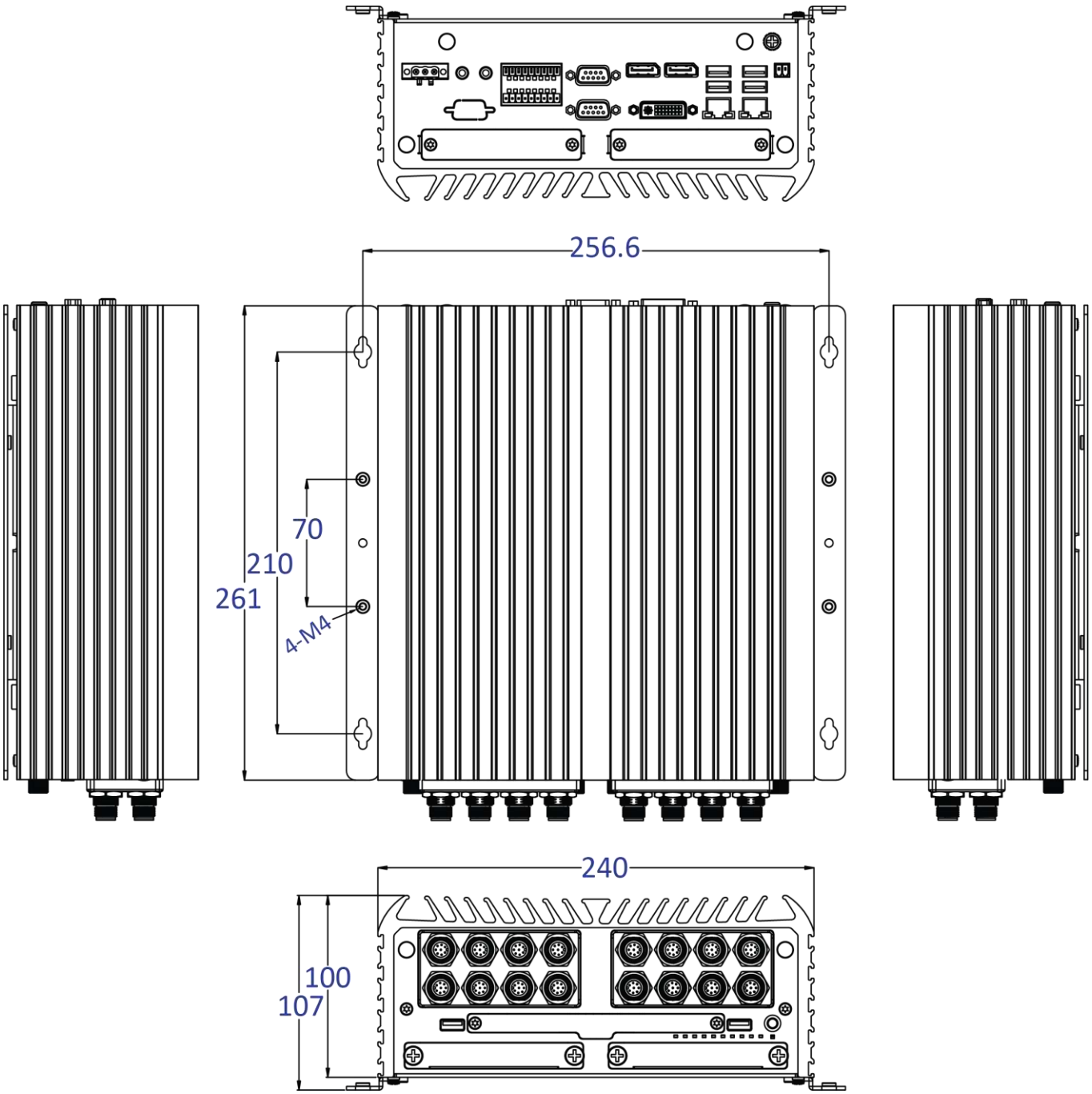
1.4.1 ACO-6000 / ACO-6000-4L(P) / ACO-6000-4L(P)-M12 / ACO-6000-8L(P) / ACO-6000-8L(P)-M12

Unit: mm



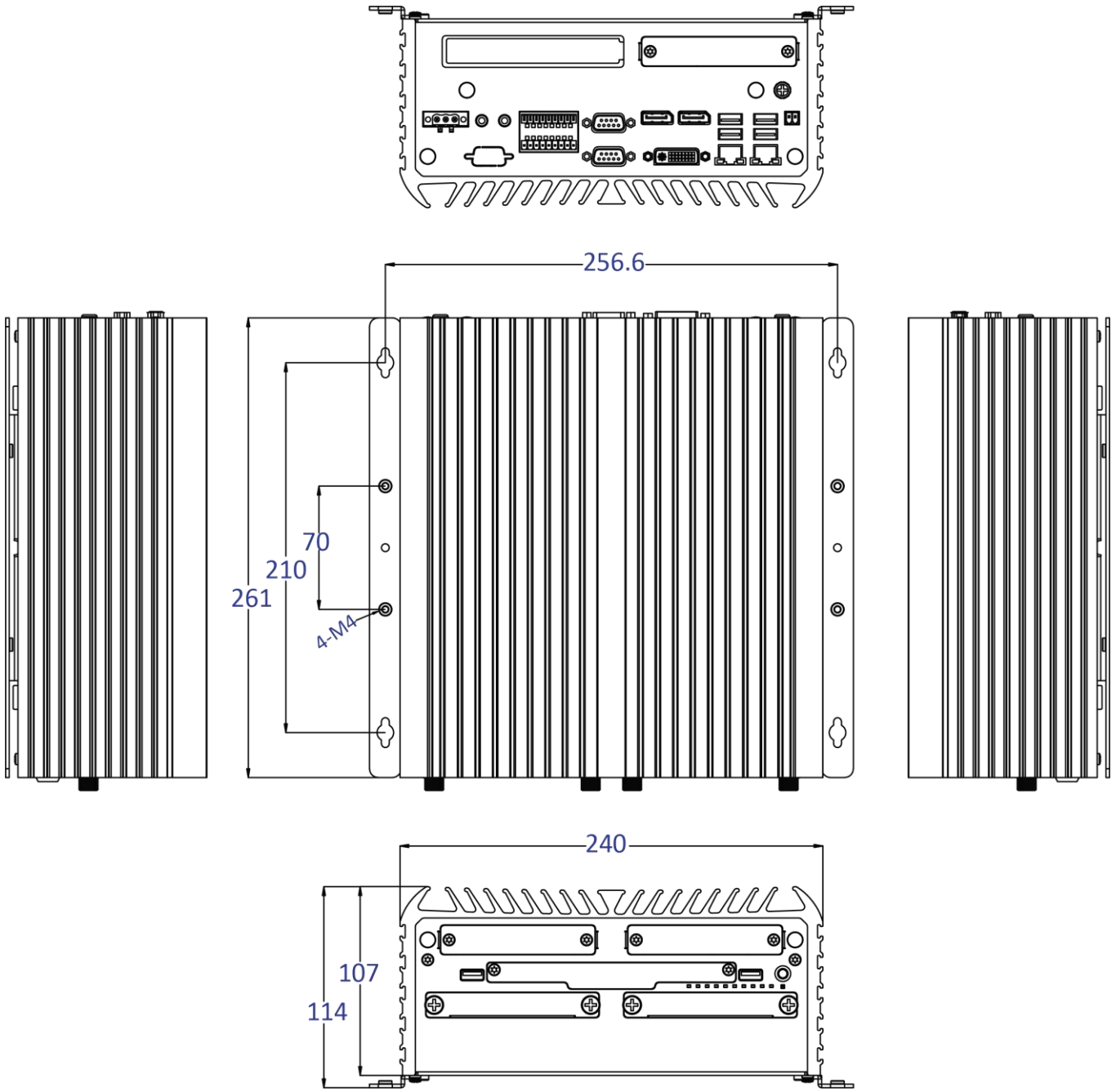
1.4.2 ACO-6010-16L(P) / ACO-6010-16L(P)-M12

Unit: mm



1.4.3 ACO-6011E(P) / ACO-6011E(P)-4L(P) / ACO-6011E(P)-4L(P)-M12 / ACO-6011E(P)-8L(P) / ACO-6011E(P)-8L(P)-M12

Unit: mm

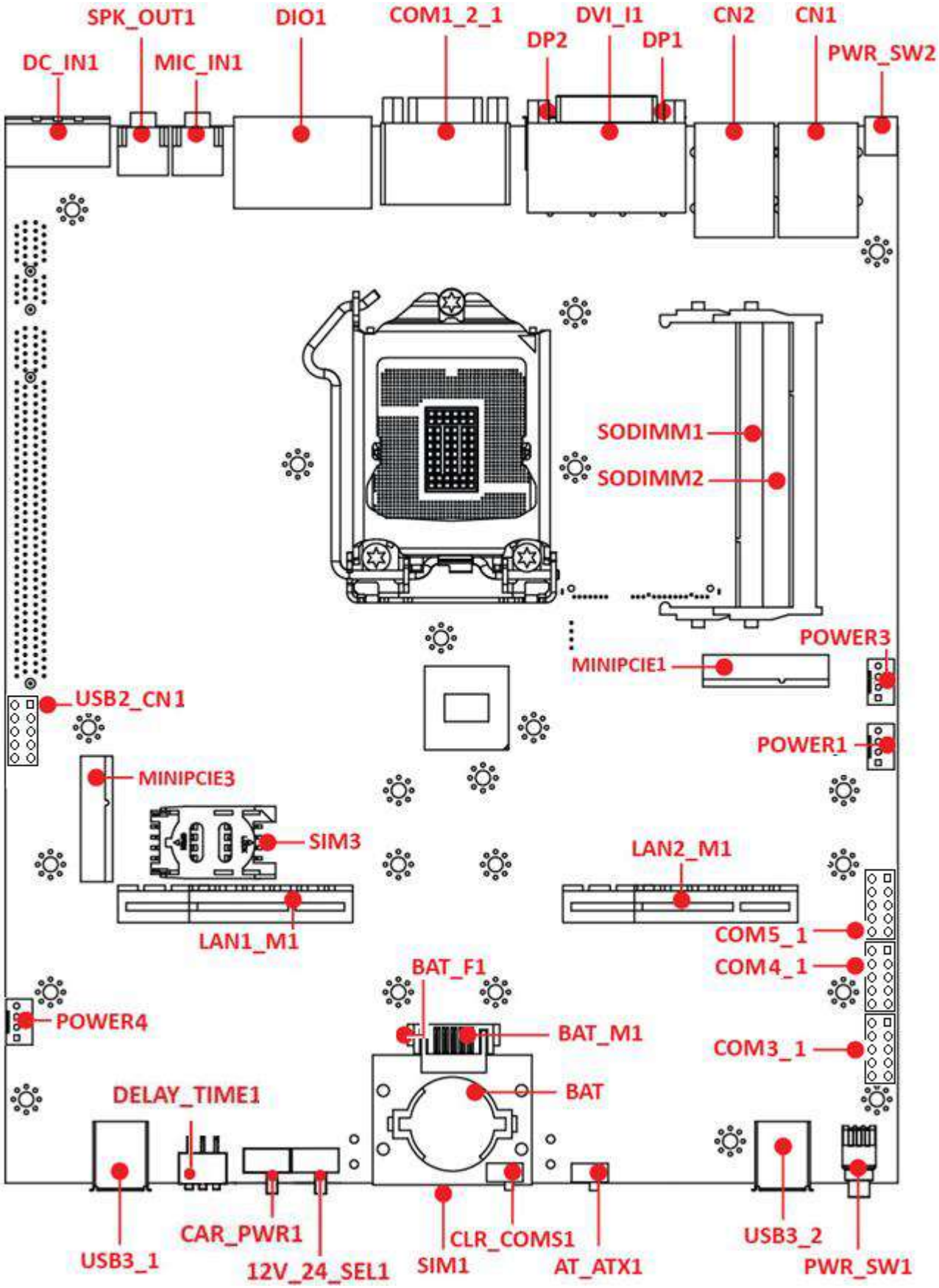


Chapter 2

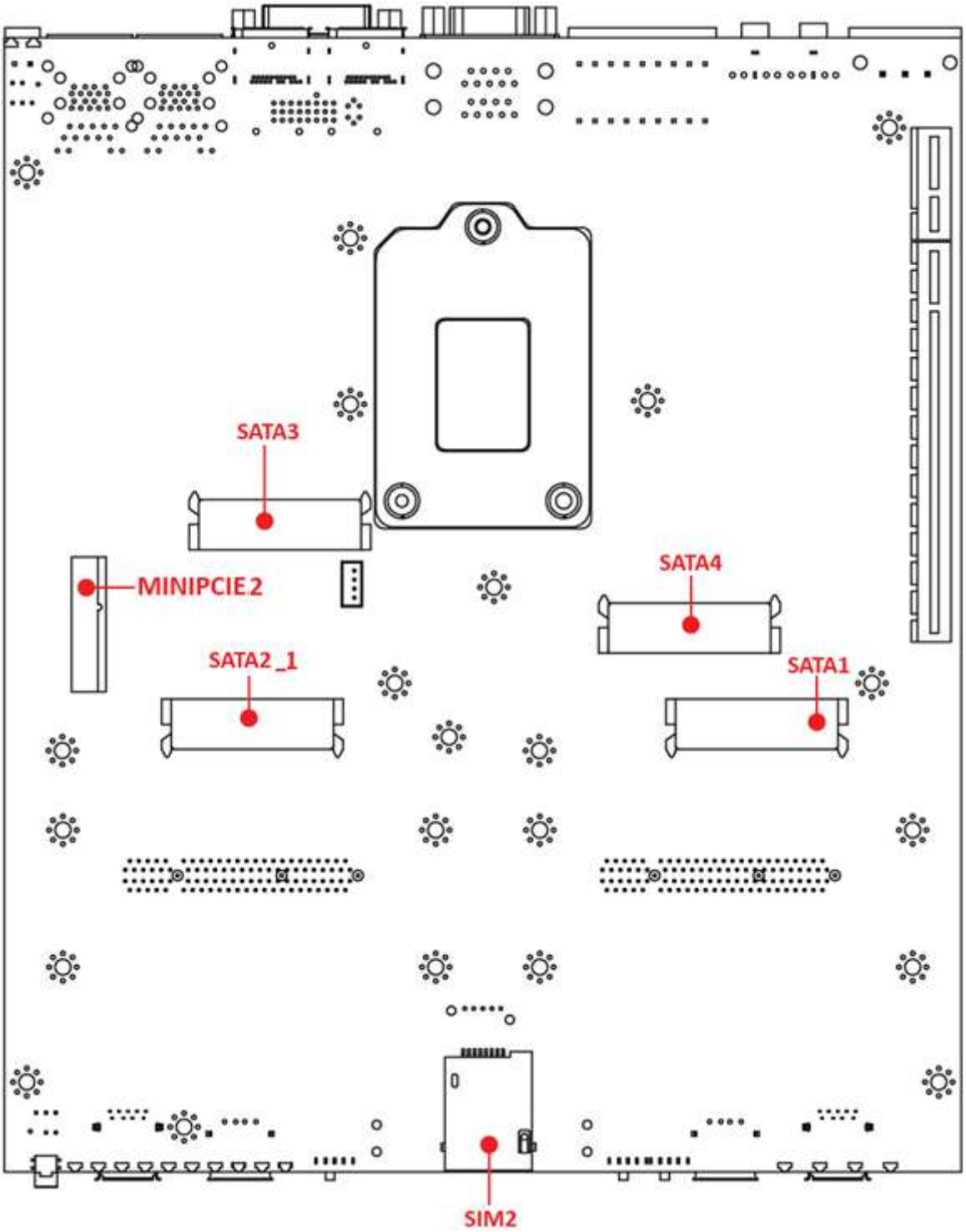
Switches and Connectors

2.1 Switch and Connector Locations

2.1.1 Top View



2.1.2 Bottom View



2.2 Connector / Switch Definition

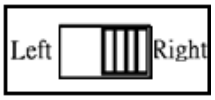
List of Connector / Switch

Connector Location	Definition
AT_ATX1	AT / ATX Power Mode Switch
CLR_CMOS1	Clear BIOS Switch
PWR_SW1	Power Switch
RESET1	Reset Switch
USB3_1,USB3_2	USB 3.0 Port
USB2_1, USB2_2	USB 2.0 Port
USB2_CN1	USB 2.0 Port
SIM1, SIM2, SIM3	SIM Card Socket
COM1_2_1	RS232 / RS422 / RS485 Connector
COM3_1, COM4_1, COM5_1	RS232 / RS422 / RS485 Connector
DC_IN1	3-pin DC 9~48V Power Input Connector
DVI_I1	DVI-I Connector
DP1,DP2	DisplayPort Connector
SPK_OUT1	Speaker-out Jack
MIC_IN1	Mic-in Jack
DIO1	8DI / 8DO Connector
PWR_SW2	Remote Power Switch
CN1	LAN1 and USB3.0 Ports
CN2	LAN2 and USB3.0 Ports
MINIPCIE1	Mini PCI-Express Socket
MINIPCIE2, MINIPCIE3	Mini PCI-Express / mSATA Socket
SATA1, SATA2, SATA3, SATA4	SATA with Power Connector
POWER1, POWER2, POWER3, POWER4	Power Connector
PCIE1	PCI-Express X1 Slot
PCIE2	PCI-Express X16 Slot
PWR_LED1	Power LED Status
HDD_LED1	HDD Access LED Status
WDT_LED1	Watchdog LED Status
GPIO_LED1	GPIO LED Status
LAN1_LINK1, LAN2_LINK1	LAN Link LED
LAN1_ACT1, LAN2_ACT1	LAN Active LED

2.3 Switches Definitions

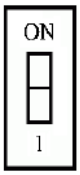
AT_ATX1: AT / ATX Power Mode Switch

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



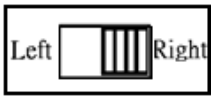
CLR_CMOS1: Clear BIOS Switch

Switch	Definition
Off	Normal Status (Default)
ON	Clear BIOS



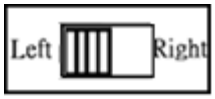
CAR_PWR1: PC / Power Ignition Mode Switch

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



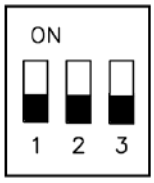
12V_24V_SEL1: 12V / 24V Input Mode Switch

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



DELAY_TIME1: Power off delay time setup Switch

Switch 1 / 2 / 3	Definition
ON / ON / ON	5 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 of Setting Power Ignition

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	5 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

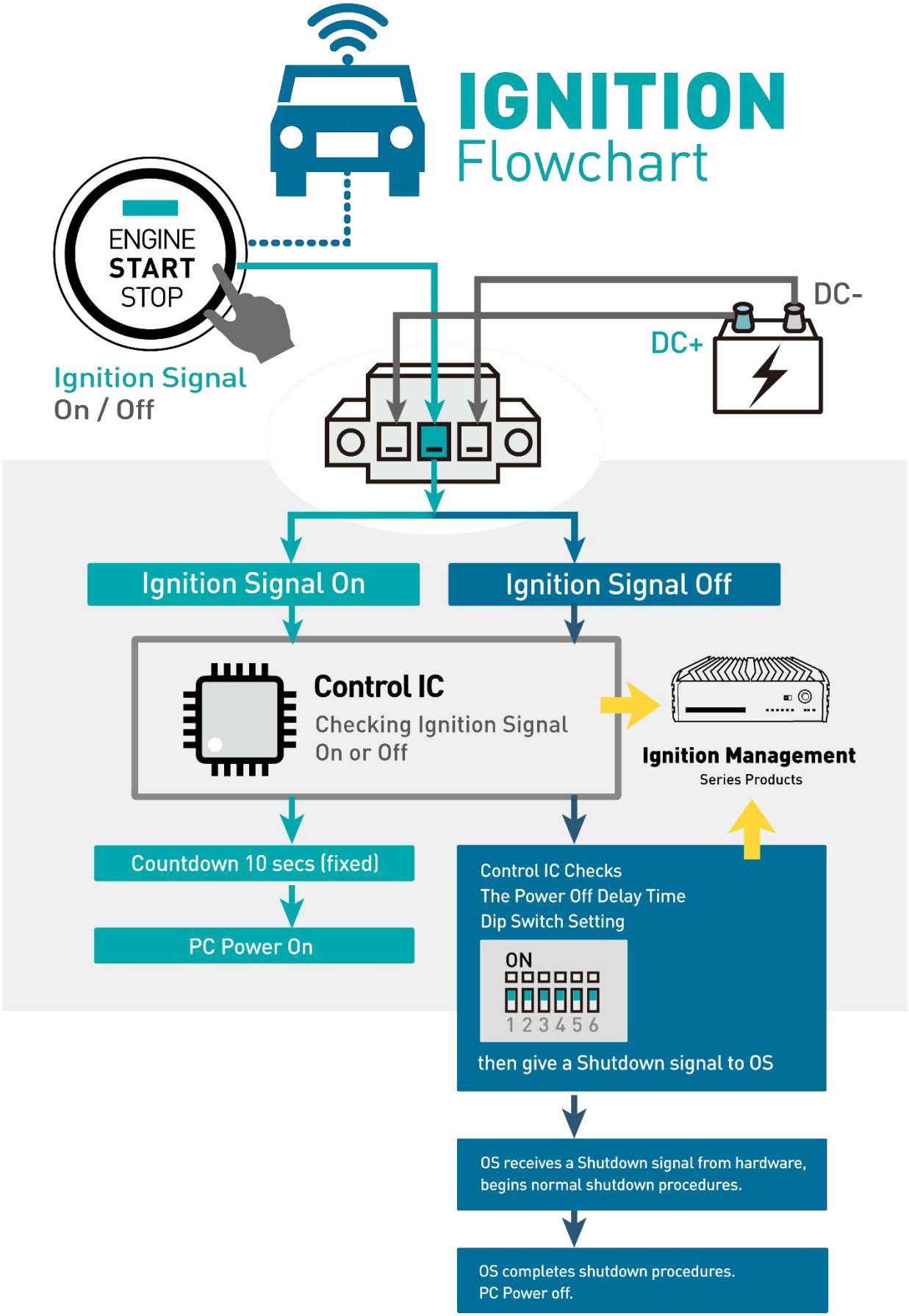
Example: Delay Time Setting for 5 minutes

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

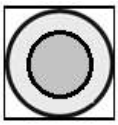
*** System power On/Off signal must be generated by car ignition, don't manually shut down after ignition off.**


IGNITION
Flowchart
ENGINE
START
STOP
Ignition Signal
On / Off
DC-
DC+
Ignition Signal On
Ignition Signal Off
Control IC
Checking Ignition Signal
On or Off
Ignition Management
Series Products
Countdown 10 secs (fixed)
PC Power On
Control IC Checks
The Power Off Delay Time
Dip Switch Setting
ON
1 2 3 4 5 6
then give a Shutdown signal to OS
OS receives a Shutdown signal from hardware,
begins normal shutdown procedures.
OS completes shutdown procedures.
PC Power off.

2.4 Connectors Definitions

PWR_SW1: Power Button

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

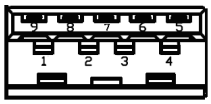


RESET1 : Reset Button

Pin	Definition
1	RESET
2	GND

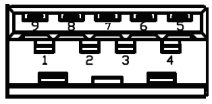
USB3_1: USB3.0 Connector, Type A

Pin	Definition	Pin	Definition
1	+5V	6	USB3_RX5+
2	USB2_D5-	7	GND
3	USB2_D5+	8	USB3_TX5-
4	GND	9	USB3_TX5+
5	USB3_RX5-		



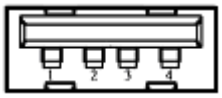
USB3_2: USB3.0 Connector, Type A

Pin	Definition	Pin	Definition
1	+5V	6	USB3_RX6+
2	USB2_D6-	7	GND
3	USB2_D6+	8	USB3_TX6-
4	GND	9	USB3_TX6+
5	USB3_RX6-		



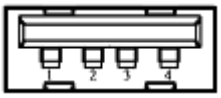
USB2_1: USB3.0 Connector, Type A

Pin	Definition
1	+5V
2	USB2_D7-
3	USB2_D7+
4	GND



USB2_2: USB3.0 Connector, Type A

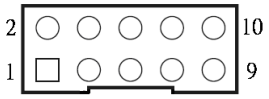
Pin	Definition
1	+5V
2	USB2_D8-
3	USB2_D8+
4	GND



USB2_CN1: USB2.0 Ports

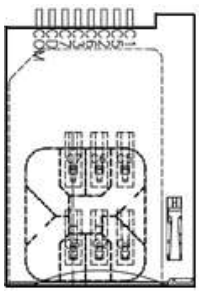
Connector Type: 2X5 10-pin box header, 2.54mm pitch

Pin	Definition	Pin	Definition
1	+5V	2	+5V
3	USB2_D9+	4	USB2_D10+
5	USB2_D9-	6	USB2_D10-
7	GND	8	GND
9	Cable Shield	10	Cable Shield



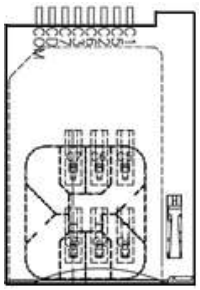
SIM1：SIM Card Socket

Pin	Definition	Pin	Definition
C1	UIM1_PWR	C6	UIM1_VPP
C2	UIM1_RESET	C7	UIM1_DATA
C3	UIM1_CLK	CD	NC
C5	GND	COM	GND



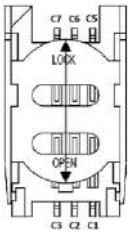
SIM2：SIM Card Socket

Pin	Definition	Pin	Definition
C1	UIM2_PWR	C6	UIM2_VPP
C2	UIM2_RESET	C7	UIM2_DATA
C3	UIM2_CLK	CD	NC
C5	GND	COM	GND



SIM3：SIM Card Socket

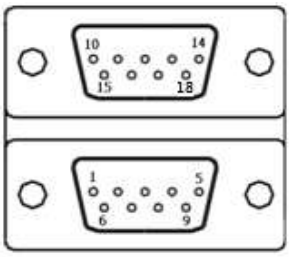
Pin	Definition	Pin	Definition
C1	UIM3_PWR	C5	GND
C2	UIM3_RESET	C6	UIM3_VPP
C3	UIM3_CLK	C7	UIM3_DATA



COM1_2_1: RS232 / RS422 / RS485 Connector

Connector Type: 9-pin D-Sub

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

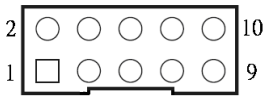


COM2			
Pin	**RS232 Definition**	**RS422 / 485 Full Duplex Definition**	**RS485 Half Duplex Definition**
10	DCD2	TX2-	DATA2-
11	RxD2	TX2+	DATA2+
12	TxD2	RX2+	
13	DTR2	RX2-	
14	GND		
15	DSR2		
16	RTS2		
17	CTS2		
18	RI2		

COM3_1： RS232 / RS422 / RS485 Connector

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

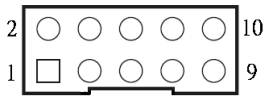
COM3_1			
Pin	**RS232 Definition**	**RS422 / 485 Full Duplex Definition**	**RS485 Half Duplex Definition**
1	DCD3	TX3-	DATA3-
2	RxD3	TX3+	DATA3+
3	TxD3	RX3+	
4	DTR3	RX3-	
5	GND		
6	DSR3		
7	RTS3		
8	CTS3		
9	RI3		



COM4_1： RS232 / RS422 / RS485 Connector

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

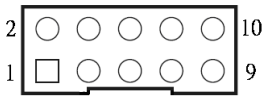
COM4_1			
Pin	**RS232 Definition**	**RS422 / 485 Full Duplex Definition**	**RS485 Half Duplex Definition**
1	DCD4	TX4-	DATA4-
2	RxD4	TX4+	DATA4+
3	TxD4	RX4+	
4	DTR4	RX4-	
5	GND		
6	DSR4		
7	RTS4		
8	CTS4		
9	RI4		



COM5_1： RS232 / RS422 / RS485 Connector

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

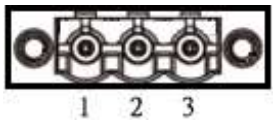
COM4_1			
Pin	**RS232 Definition**	**RS422 / 485 Full Duplex Definition**	**RS485 Half Duplex Definition**
1	DCD6	TX6-	DATA6-
2	RxD6	TX6+	DATA6+
3	TxD6	RX6+	
4	DTR6	RX6-	
5	GN6		
6	DSR6		
7	RTS6		
8	CTS6		
9	RI6		



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

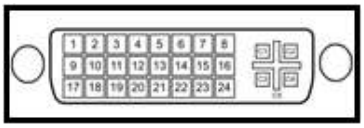
Connector Type: Terminal Block 1X3 3-pin, 5.0mm pitch

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



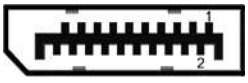
DVI_I1: DVI-I Connector

Pin	Definition	Pin	Definition
1	DVI_TX2-	16	DVI Hot Plug Detect
2	DVI_TX2+	17	DVI_TX0-
3	GND	18	DVI_TX0+
4	NC	19	GND
5	NC	20	VGA_DDC_CLOCK
6	DVI_DDC_CLOCK	21	VGA_DDC_DATA
7	DVI_DDC_DATA	22	GND
8	VGA VSYNC	23	DVI_TXCLK+
9	DVI_TX1-	24	DVI_TXCLK-
10	DVI_TX1+	C1	VGA_RED
11	GND	C2	VGA_GREEN
12	NC	C3	VGA_BLUE
13	NC	C4	VGA_HSYNC
14	+5V	C5	GND
15	GND		



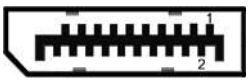
DP1: DisplayPort Connector

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



DP2: DisplayPort Connector

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



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

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

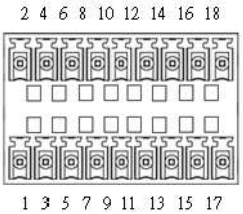
MIC_IN1: Microphone Jack (Pink)
Connector Type: 5-pin Phone Jack

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

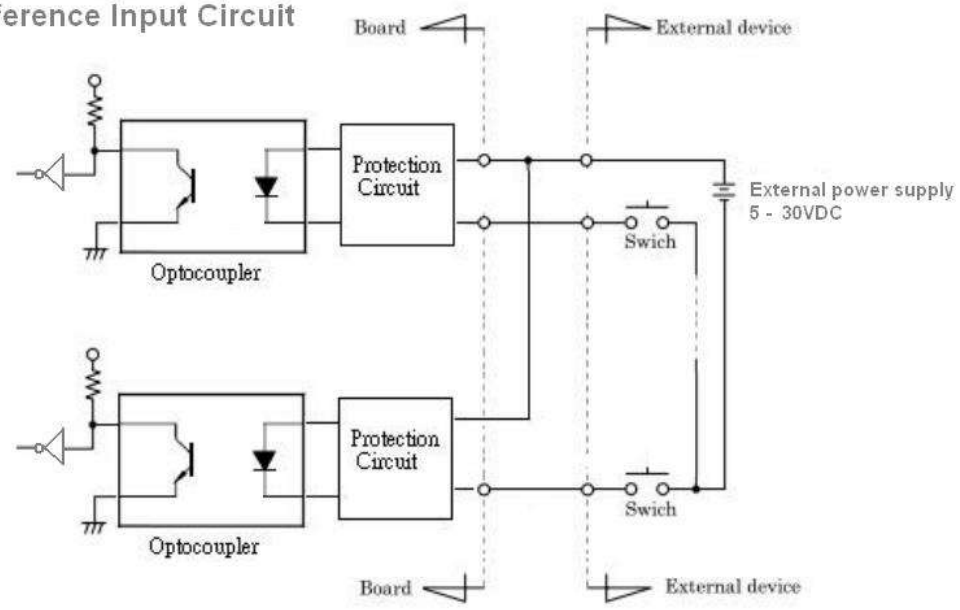
DIO1: Digital Input / Output Connector

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

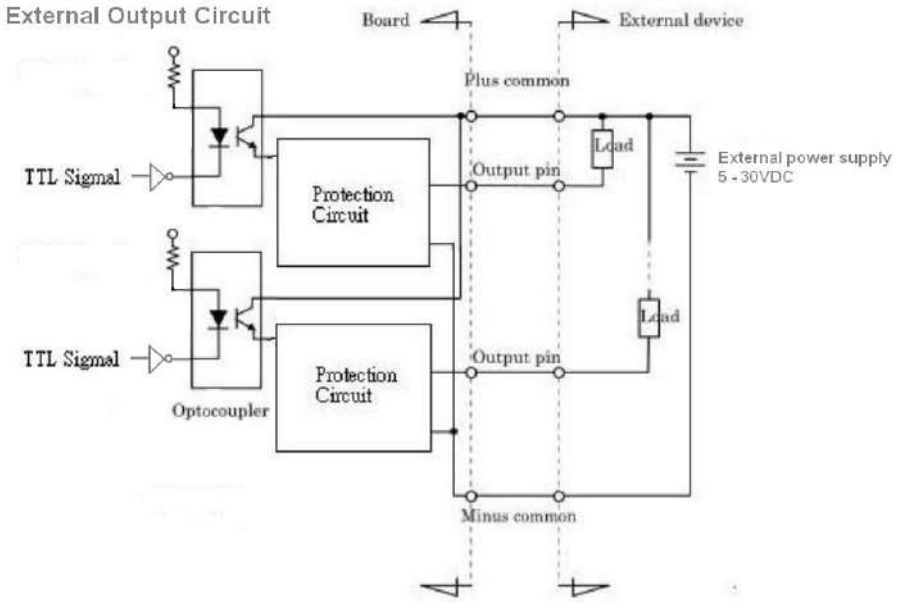
Pin	Definition	Pin	Definition
1	DI1	2	DO1
3	DI2	4	DO2
5	DI3	6	DO3
7	DI4	8	DO4
9	DI5	10	DO5
11	DI6	12	DO6
13	DI7	14	DO7
15	DI8	16	DO8
17	DC INPUT	18	GND

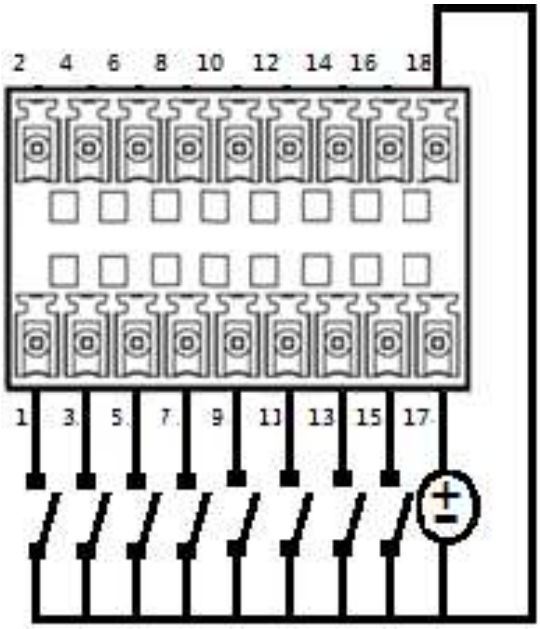


Reference Input Circuit

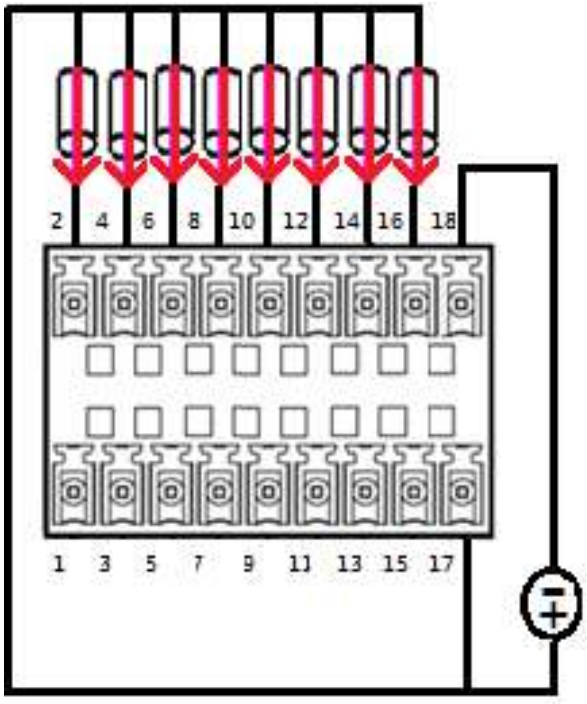


External Output Circuit





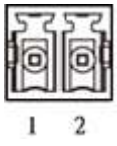
Digital Input Wurung



Digital Output Wurung

PWR_SW2 : Remote Power Switch
Connector Type: Terminal Block 1X2 2-pin, 3.5mm pitch

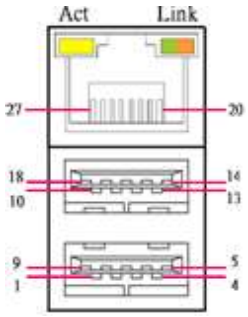
Pin	Definition
1	Power Button
2	GND



CN1: LAN1 and USB3.0 Ports

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

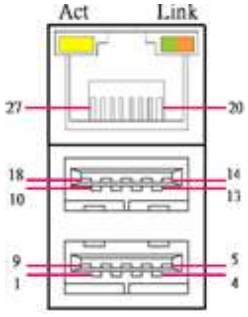
Pin	Definition	Pin	Definition	Pin	Definition
1	+5V	10	+5V	20	LAN1_MDI0P
2	USB2_D1-	11	USB2_D2-	21	LAN1_MDI0N
3	USB2_D1+	12	USB2_D2+	22	LAN1_MDI1P
4	GND	13	GND	23	LAN1_MDI2P
5	USB3_RX1-	14	USB3_RX2-	24	LAN1_MDI2N
6	USB3_RX1+	15	USB3_RX2+	25	LAN1_MDI1N
7	GND	16	GND	26	LAN1_MDI3P
8	USB3_TX1-	17	USB3_TX2-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



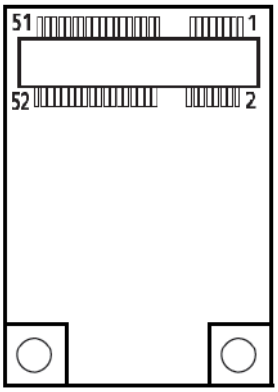
CN2: LAN2 and USB3.0 Ports

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

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

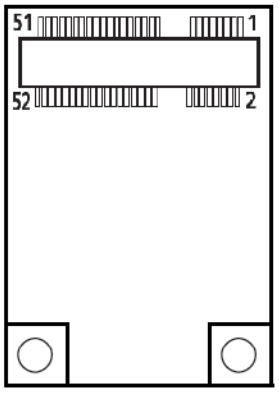


MINIPCIE1: Mini PCI-Express Socket



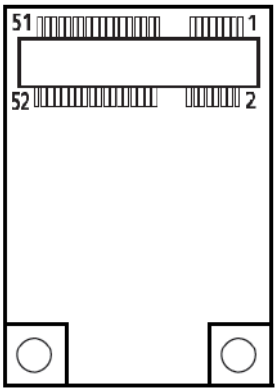
Pin	Definition	Pin	Definition	Pin	Definition
1	WAKE#	19	NC	37	GND
2	+3.3V	20	+3.3V	38	USB2_D11+
3	NC	21	GND	39	+3.3V
4	GND	22	MINIPCIE RST#	40	GND
5	NC	23	MINIPCIE_RXN1	41	+3.3V
6	+1.5V	24	+3.3V	42	NC
7	CLKREQ0#	25	MINIPCIE_RXP1	43	GND
8	USIM1_VCC	26	GND	44	NC
9	GND	27	GND	45	NC
10	USIM1_DATA	28	+1.5V	46	NC
11	MINIPCIE_CLKN0	29	GND	47	NC
12	USIM1_CLK	30	SMB_CLK	48	+1.5V
13	MINIPCIE_CLKP0	31	MINIPCIE_TXN1	49	NC
14	USIM1_RST	32	SMB_DATA	50	GND
15	GND	33	MINIPCIE_TXP1	51	NC
16	USIM1_VPP	34	GND	52	+3.3V
17	NC	35	GND		
18	GND	36	USB2_D11-		

MINIPCIE2: Mini PCI-Express Socket



Pin	Definition	Pin	Definition	Pin	Definition
1	WAKE#	19	NC	37	GND
2	+3.3V	20	+3.3V	38	USB2_D13+
3	NC	21	GND	39	+3.3V
4	GND	22	MINIPCIE RST#	40	GND
5	NC	23	MINIPCIE_RXN17 (SATA_RXN4)	41	+3.3V
6	+1.5V	24	+3.3V	42	NC
7	CLKREQ1#	25	MINIPCIE_RXP17 (SATA_RXP4)	43	GND
8	USIM2_VCC	26	GND	44	NC
9	GND	27	GND	45	NC
10	USIM2_DATA	28	+1.5V	46	NC
11	MINIPCIE_CLKN1	29	GND	47	NC
12	USIM2_CLK	30	SMB_CLK	48	+1.5V
13	MINIPCIE_CLKP1	31	MINIPCIE_TXN17 (SATA_TXN4)	49	NC
14	USIM2_RST	32	SMB_DATA	50	GND
15	GND	33	MINIPCIE_TXP17 (SATA_TXP4)	51	NC
16	USIM2_VPP	34	GND	52	+3.3V
17	NC	35	GND		
18	GND	36	USB2_D13-		

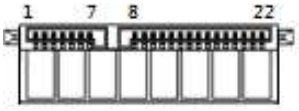
MINIPCIE3: Mini PCI-Express / mSATA Socket



Pin	Definition	Pin	Definition	Pin	Definition
1	WAKE#	19	NC	37	GND
2	+3.3V	20	+3.3V	38	USB_D14+
3	NC	21	GND	39	+3.3V
4	GND	22	MINIPCIE RST#	40	GND
5	NC	23	MINIPCIE_RXN18 (SATA_RXN5)	41	+3.3V
6	+1.5V	24	+3.3V	42	NC
7	CLKREQ2#	25	MINIPCIE_RXP18 (SATA_RXP5)	43	GND
8	USIM3_VCC	26	GND	44	NC
9	GND	27	GND	45	NC
10	USIM3_DATA	28	+1.5V	46	NC
11	MINIPCIE_CLKN2	29	GND	47	NC
12	USIM3_CLK	30	SMB_CLK	48	+1.5V
13	MINIPCIE_CLKP2	31	MINIPCIE_TXN18 (SATA_TXN5)	49	NC
14	USIM3_RST	32	SMB_DATA	50	GND
15	GND	33	MINIPCIE_TXP18 (SATA_TXP5)	51	NC
16	USIM3_VPP	34	GND	52	+3.3V
17	NC	35	GND		
18	GND	36	USB_D14-		

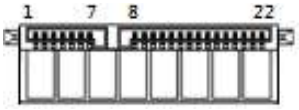
SATA1, SATA2: SATA with Power Connector

Pin	SATA1 Definition	Pin	SATA1 Definition	Pin	SATA2 Definition	Pin	SATA2 Definition
1	GND	12	GND	1	GND	12	GND
2	SATA_TXP0	13	GND	2	SATA_TXP1	13	GND
3	SATA_TXN0	14	+5V	3	SATA_TXN1	14	+5V
4	GND	15	+5V	4	GND	15	+5V
5	SATA_RXN0	16	+5V	5	SATA_RXN1	16	+5V
6	SATA_RXP0	17	GND	6	SATA_RXP1	17	GND
7	GND	18	GND	7	GND	18	GND
8	+3.3V	19	GND	8	+3.3V	19	GND
9	+3.3V	20	+12V	9	+3.3V	20	+12V
10	+3.3V	21	+12V	10	+3.3V	21	+12V
11	GND	22	+12V	11	GND	22	+12V



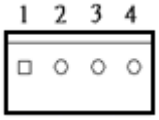
SATA3, SATA4: SATA with Power Connector

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



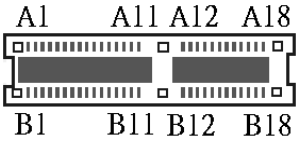
POWER1, POWER2, POWER3, POWER4: Power Connector
Connector Type: 1X4-pin Wafer, 2.0mm pitch

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



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

Pin	Definition	Pin	Definition
A1	NC	B1	+12V
A2	+12V	B2	+12V
A3	+12V	B3	+12V
A4	GND	B4	GND
A5	NC	B5	SMB_CLK
A6	NC	B6	SMB_DATA
A7	NC	B7	GND
A8	NC	B8	+3.3V
A9	+3.3V	B9	NC
A10	+3.3V	B10	+3.3VSB
A11	PCIE_RESET#	B11	PCIE_WAKE#
A12	GND	B12	+12V
A13	PCIE_CLKP1	B13	GND
A14	PCIE_CLKN1	B14	PCIE_TXP11
A15	GND	B15	PCIE_TXN11
A16	PCIE_RXP11	B16	GND
A17	PCIE_RXN11	B17	NC
A18	GND	B18	GND



PCIE1: PCI-Express X16 Socket

Connector Type: PCI-Express X16 Slot

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

PWR_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-

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-

LAN1_LINK1, LAN2_LINK1 : LAN Link LED Status

Pin	Definition
1	LINK LED+
2	LINK LED-100Mbps-
3	LINK LED 100Mbps-

LAN1_ACT1, LAN2_ACT1 : LAN Active LED Status

Pin	Definition
1	ACTIVE LED+
2	ACTIVE LED-

Chapter 3

System Setup

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

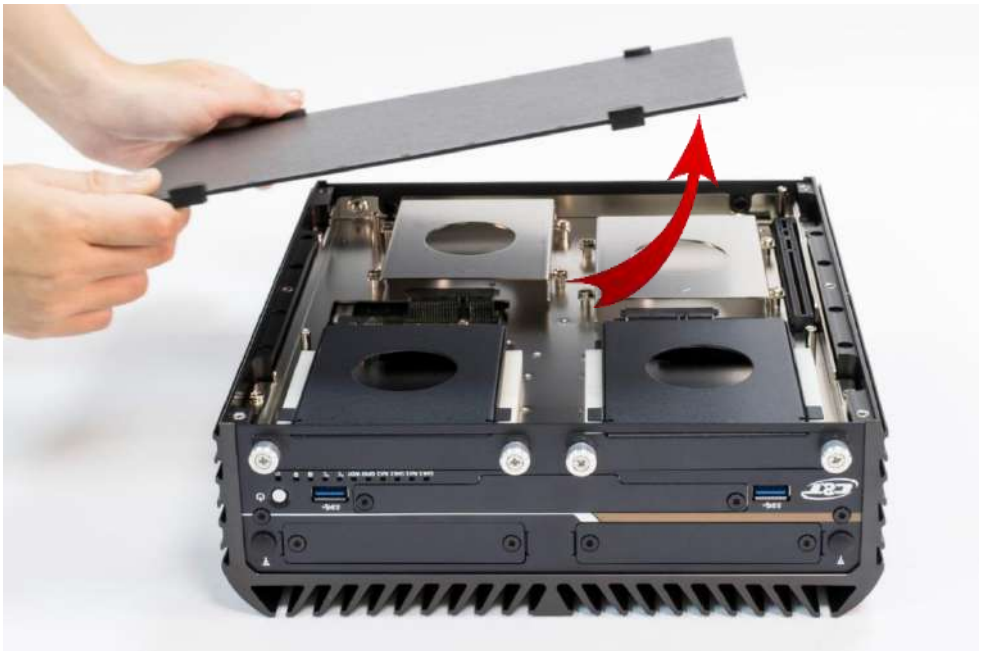
3.2 Removing chassis bottom cover

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.

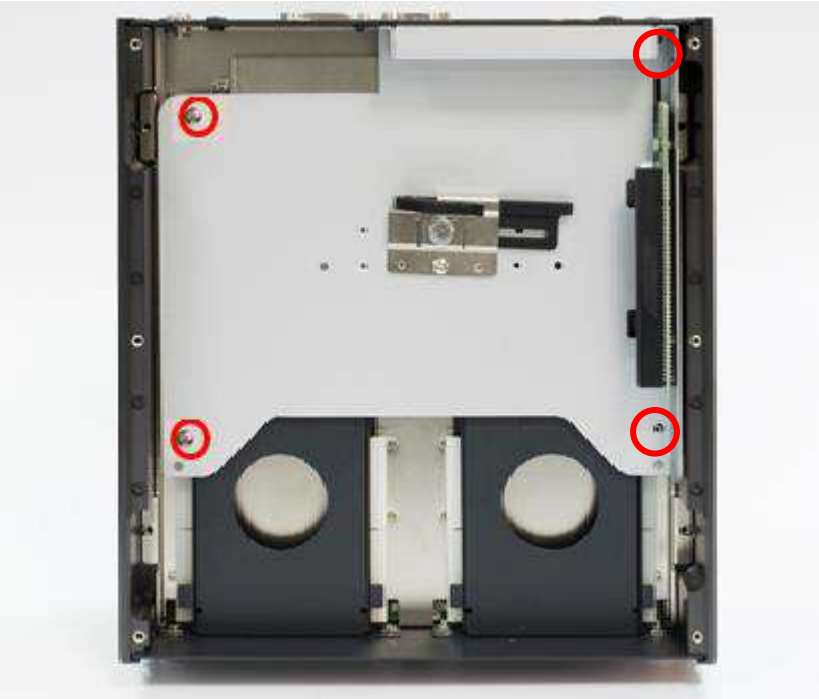
1. Turn the system upside down. Unscrew the 6 screws (M3x5L) on the bottom cover.

2. Now you can remove the bottom cover.

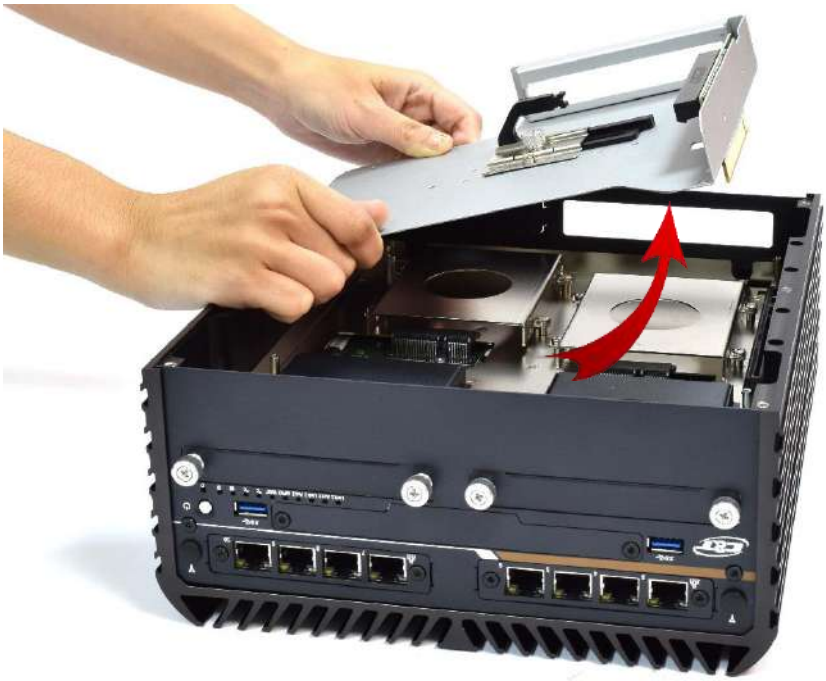


3.2 Removing PCIe/PCI expansion module

1. This step only applies to ACO-6011 series, which is equipped with PCIe/PCI expansion module.
2. Unscrew four screws (M3x5L) circled below.



3. Now you can remove the PCIe/PCI expansion module.



3.3 Removing chassis top cover

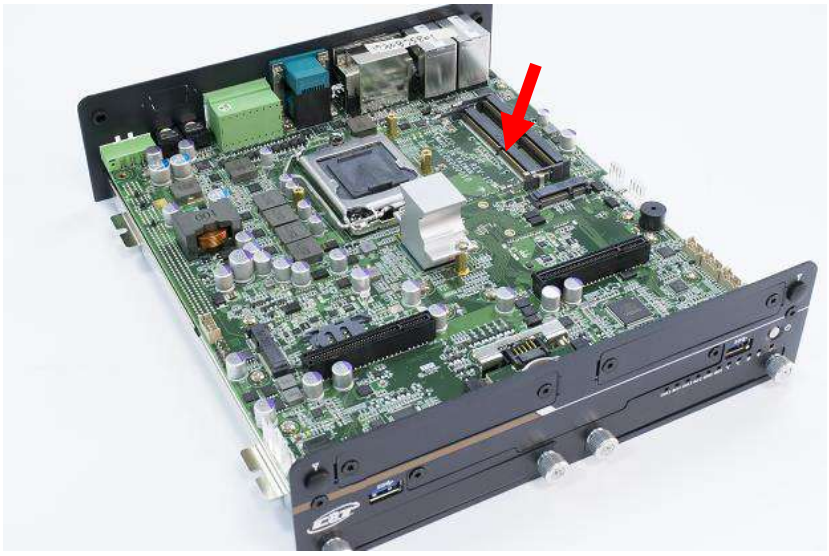
1. Unscrew the four screws (M3x5L) highlighted below.

2. Hold the body of the system and lift it vertically away from the top cover.

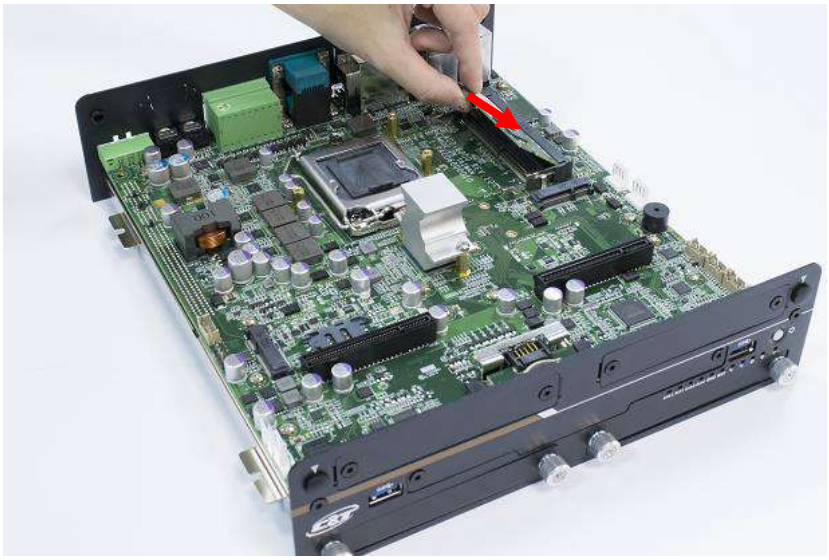
3. Top cover separated from the system body.

3.4 Installing SODIMM

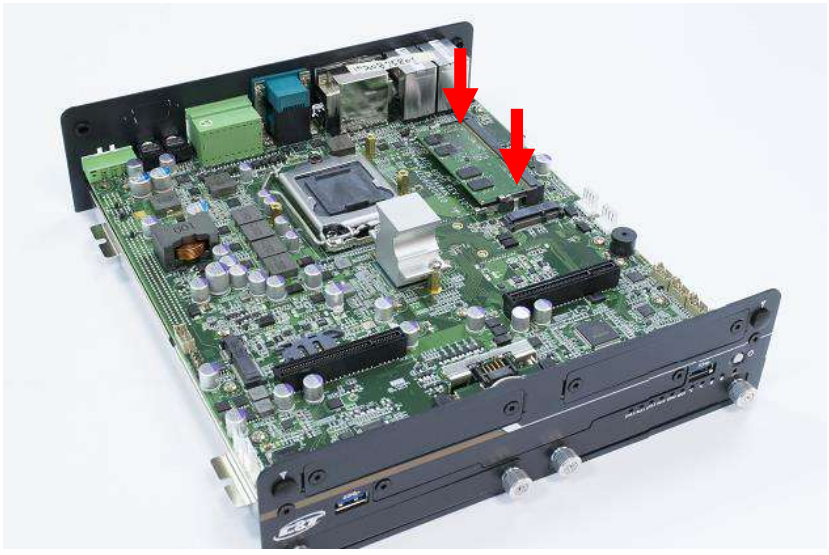
1. Place the system body with SODIMM socket facing upward. Two SODIMM sockets are available for ACO-6000 Series on the top side.



2. Insert memory module from 45 degree direction.

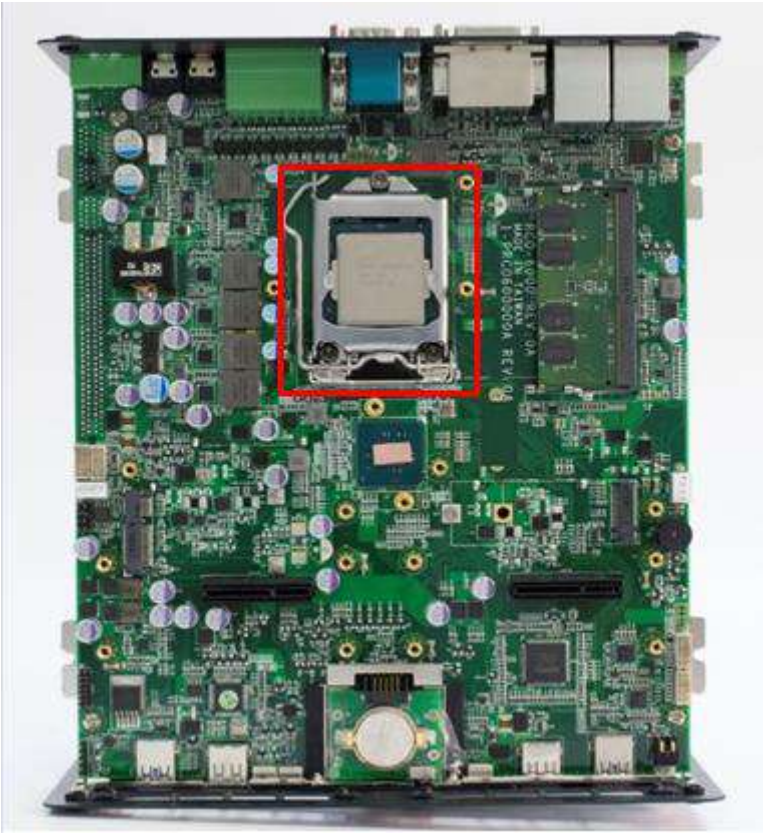


3. Press the memory module vertically downward until you hear the "click" sound. Make sure the memory module is firmly in place.

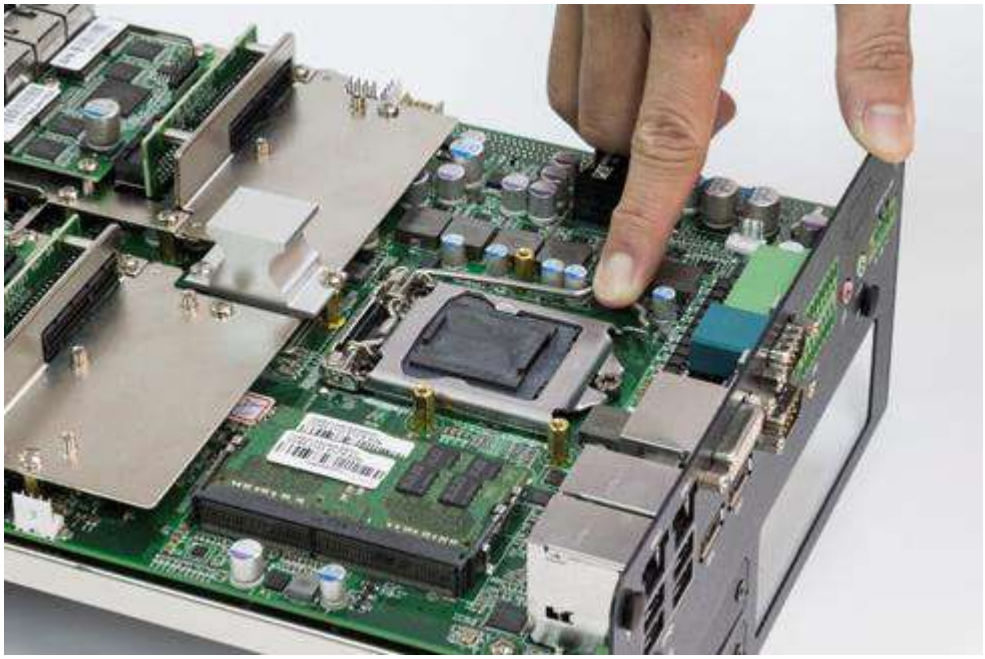


3.5 Installing CPU

1. CPU socket is located on the top side.

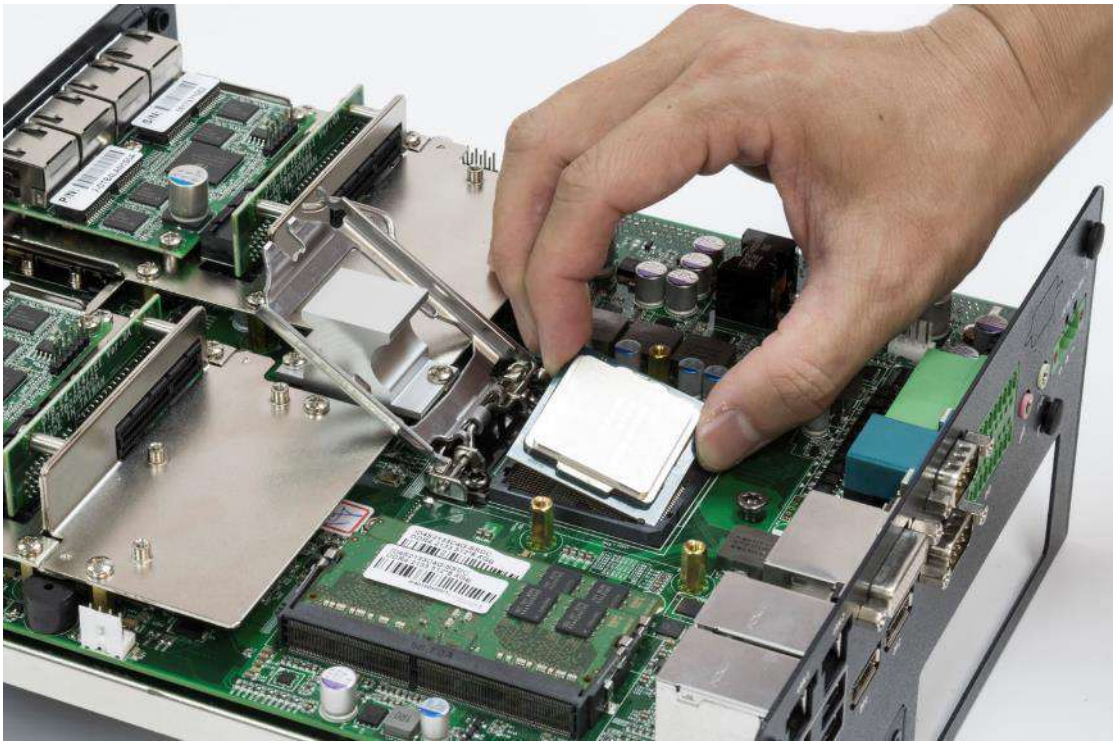


2. Press down the CPU socket lever in order to open the socket cover.

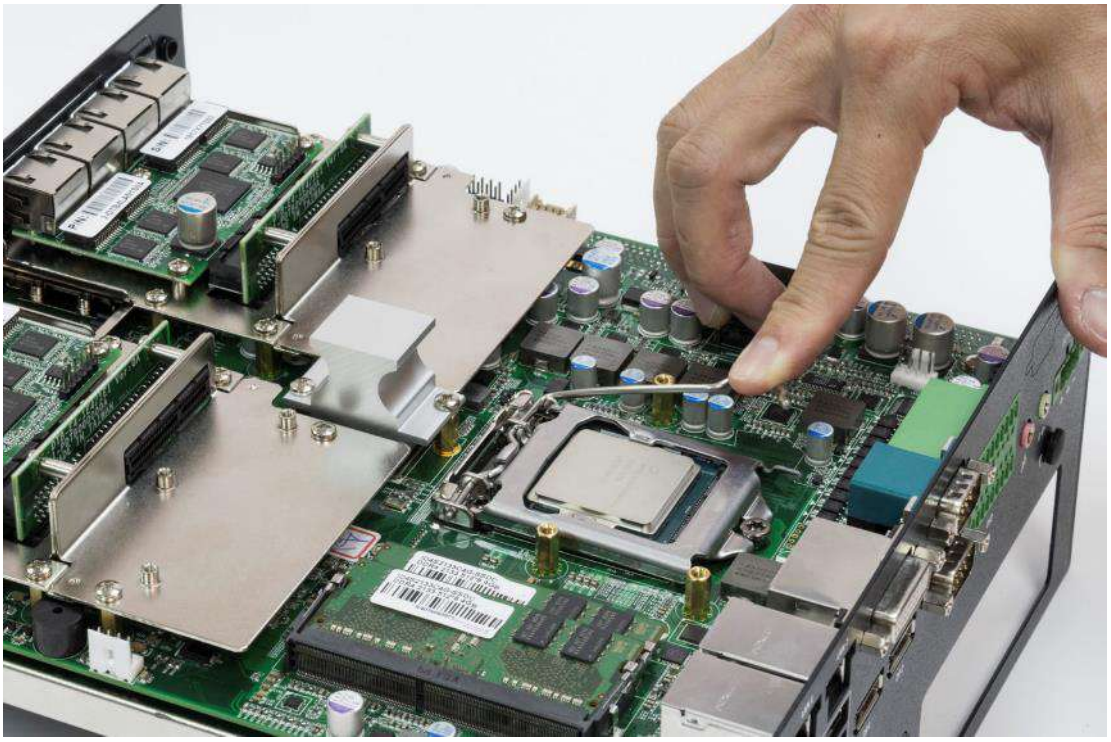


3. Remove the CPU protective cover.

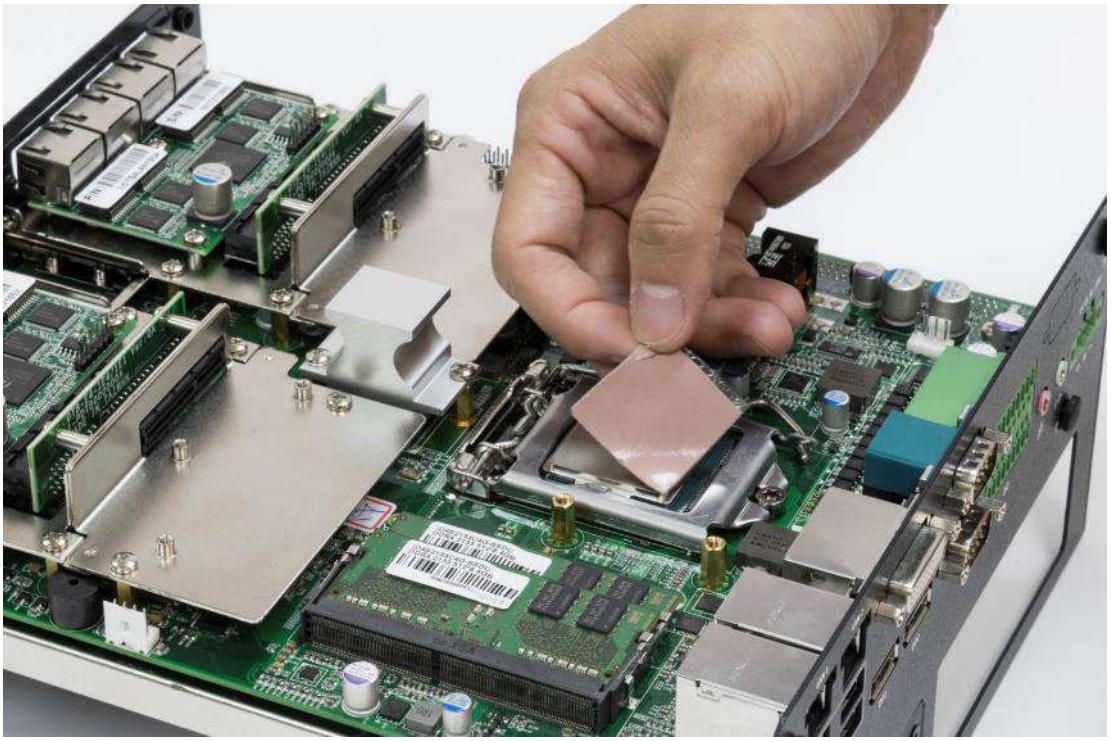
4. Insert CPU gently.



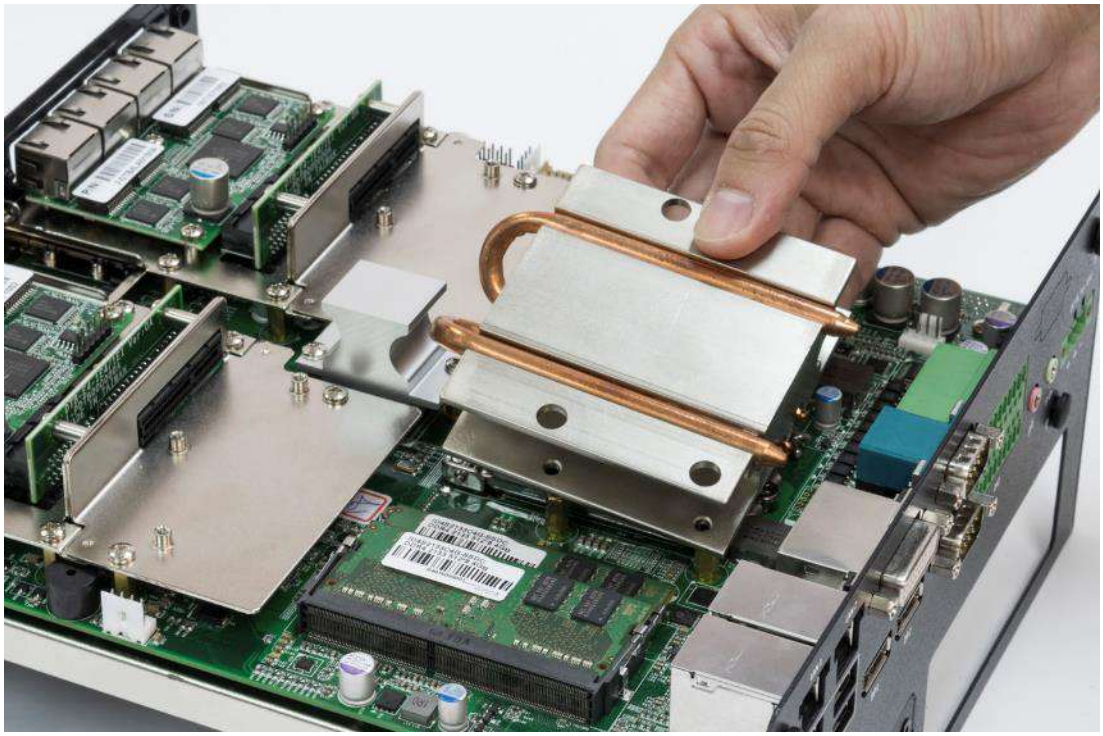
5. Press down the lever again to hold the socket cover.



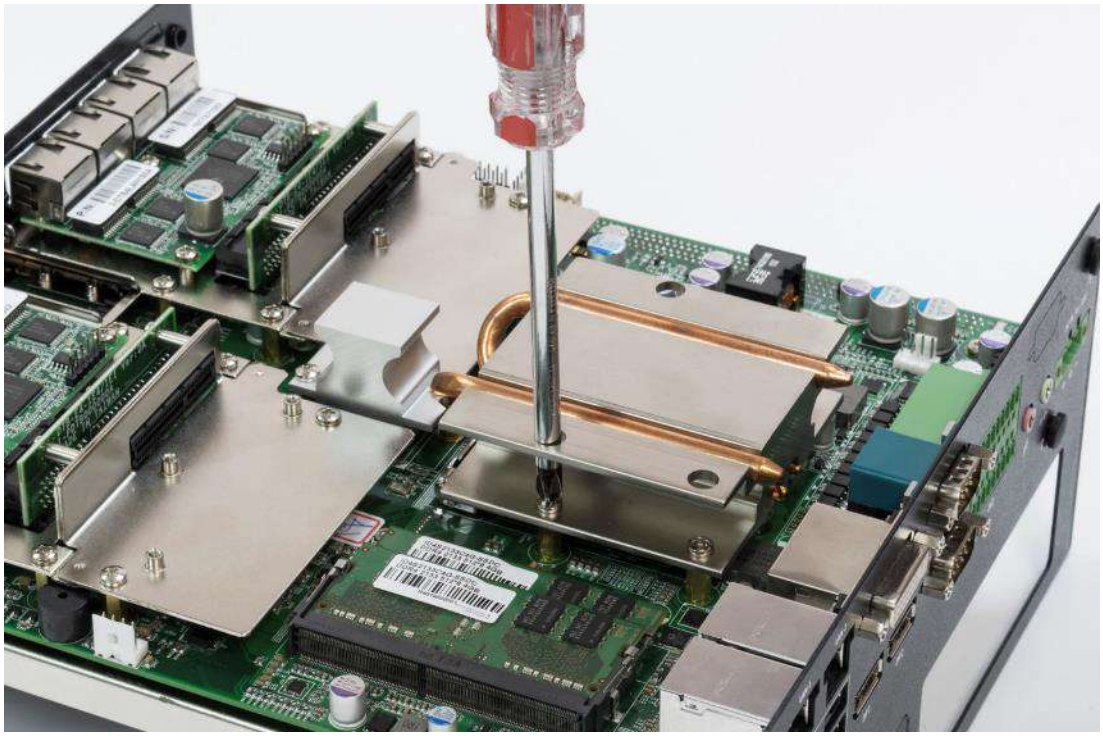
6. Paste thermal pad (1-BR0500040, 29x29x0.5mm) on the CPU.



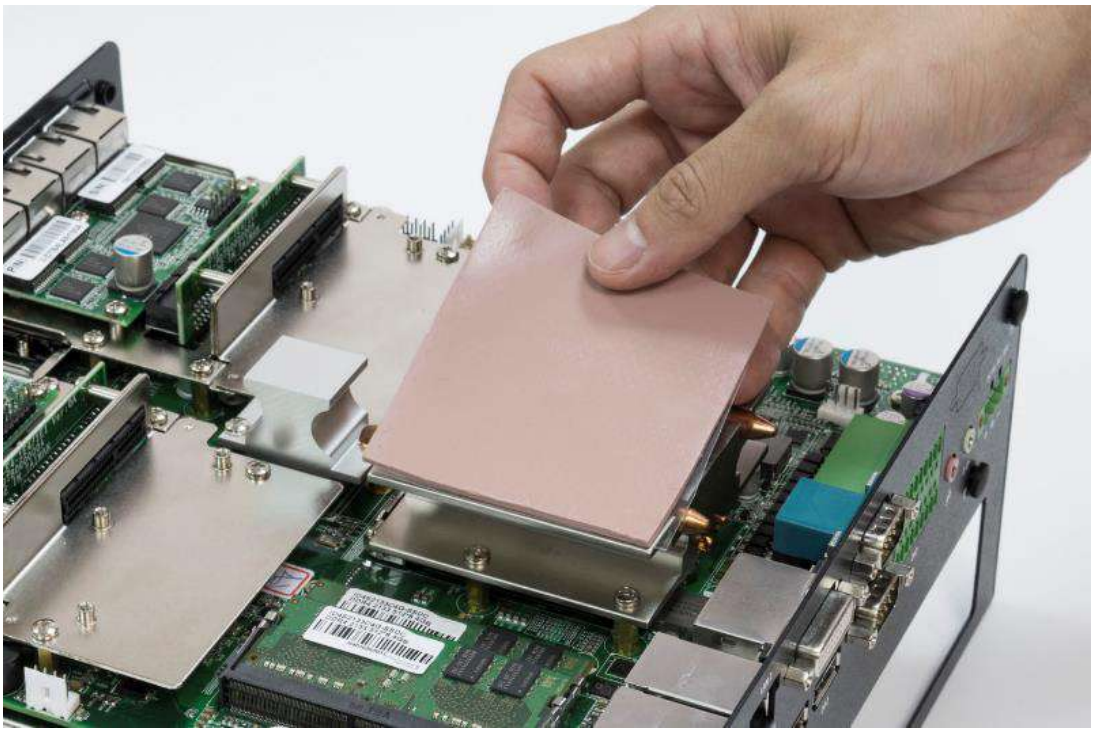
7. Place the designated heat block onto the CPU with thermal pad.



8. Lock the heat block with three screws (M3x5L). Screw driver will able to penetrate through the holes on the top in order to fasten the screws with copper stud.



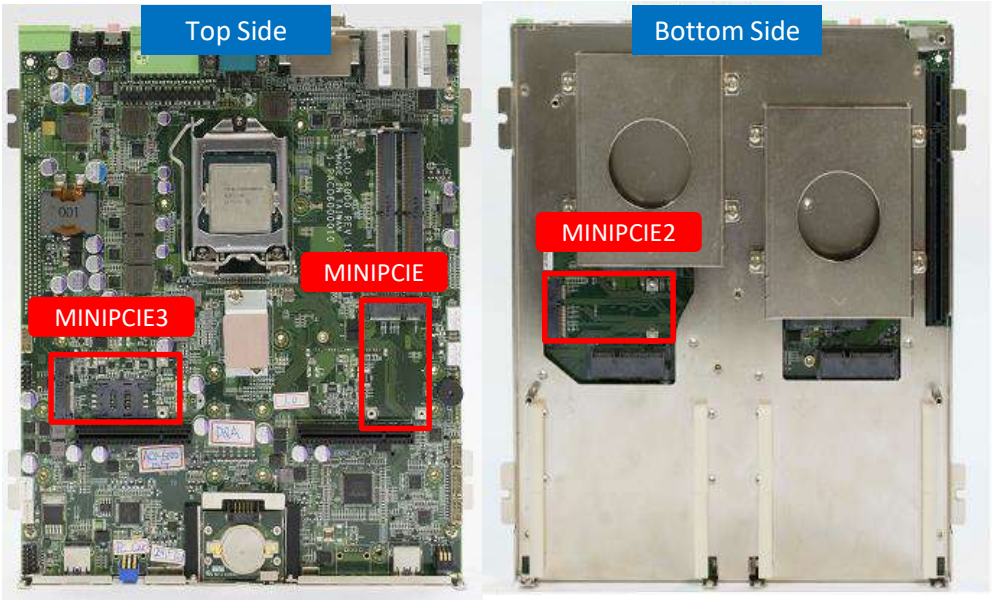
9. Paste the thermal pad (1-BR0500041, 76x70x2.0mm) onto the installed heat block.



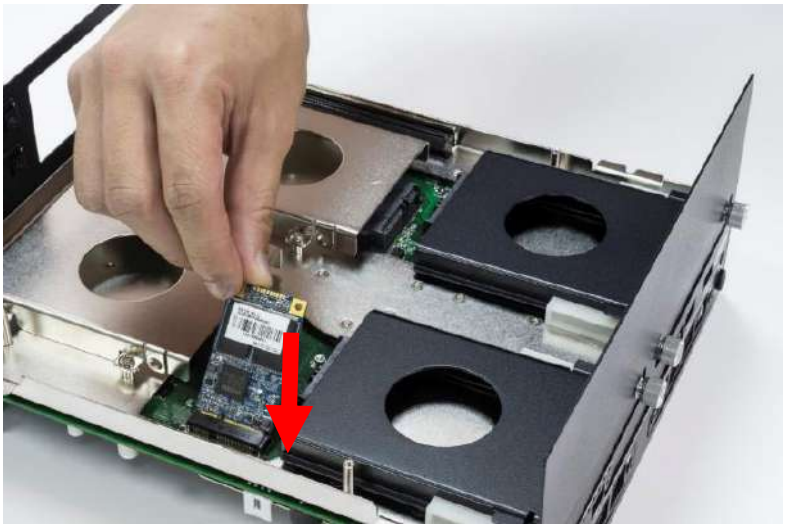
10. Installation complete.

3.6 Installing mini PCIe card / mSATA

1. Three mini PCIe slots are available for ACO-6000 series, two on top side and one on bottom side. MINIPCIE2 on the bottom side and MINIPCIE3 on the top side support mSATA.



2. Insert mini PCIe card from 45 degree direction.



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

3.7 Installing antenna

1. Four antenna holes are available for ACO-6000 series on the rear panel and two holes are on the front panel.

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.

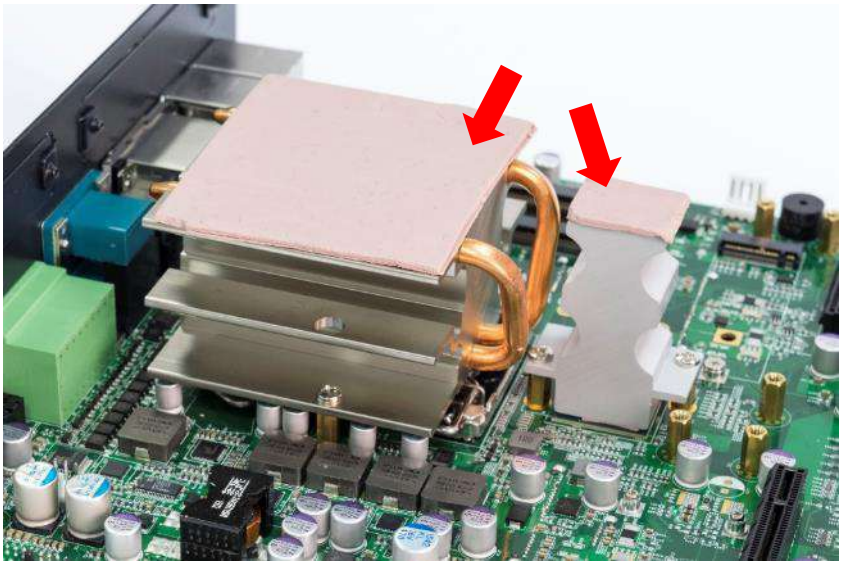
5. Assemble the antenna and antenna jack together.

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

3.8 Assembly chassis top cover

1. Place the top cover upside down as shown below.

2. Ensure thermal pad is in place on both the CPU thermal block and PCH thermal block.



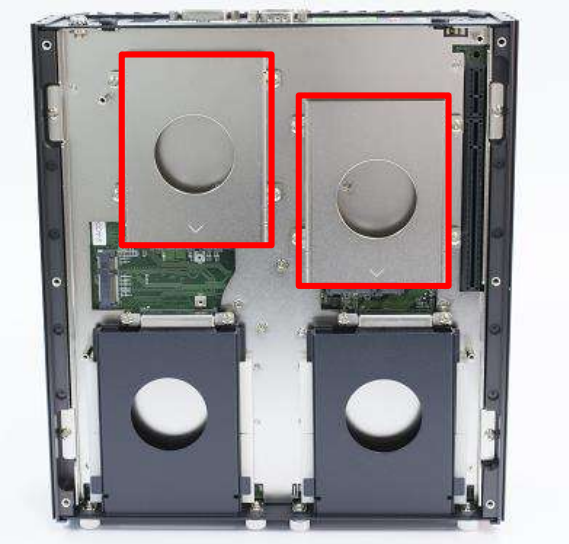
3. Hold the system body and slide the front/rear panel into the slide rail on the top cover.

4. Push the system body down until it is firmly in place.

5. Fasten the four screws (M3x5L) to lock the system body with top cover.

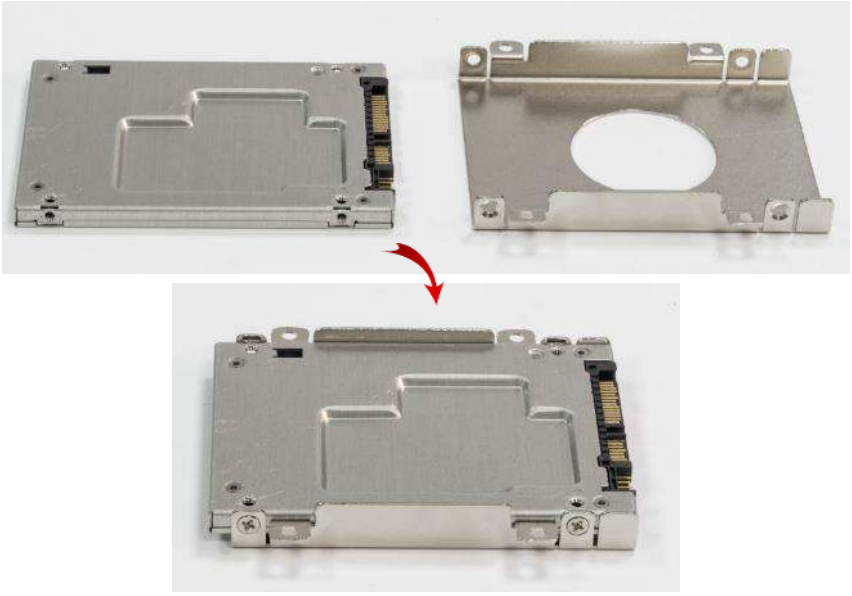
3.9 Installing HDD on internal SATA HDD bay

1. Place the top cover upside down as shown below.

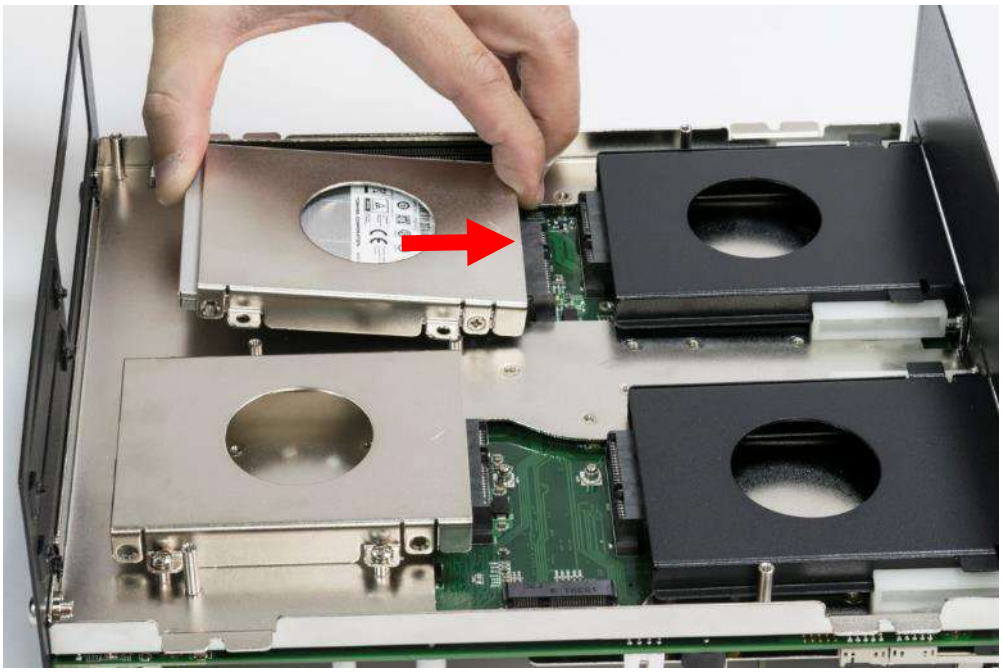


2. Unscrew the four screws (M3x5L) to remove the internal SATA HDD bay.

3. Lock the 2.5" HDD with HDD bracket using four screws (M3x4L).



4. Install the HDD bracket following the direction below.



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

3.10 Installing HDD on removable SATA HDD bay

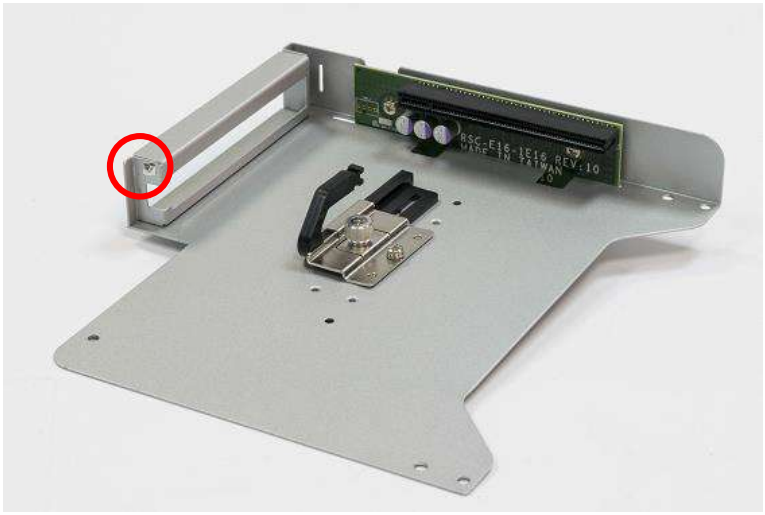
1. Two removable SATA HDD bays are available for ACO-6000 Series.
2. Unscrew the two sun screws circled below to take out the removable SATA HDD bay.

3. Lock the 2.5" HDD with HDD bracket using four screws (M3x4L).

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

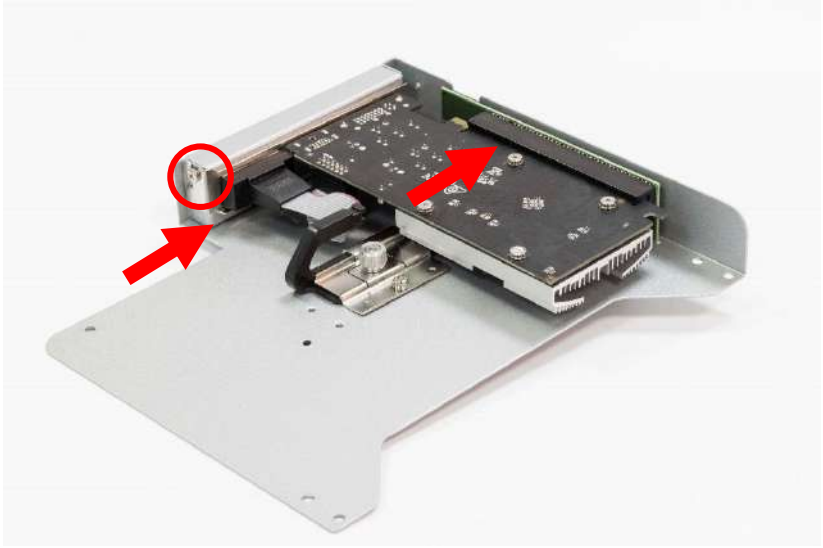
3.11 Installing PCIe/PCI expansion card

1. PCIe or PCI card with FHHL dimension is supported by ACO-6000 series.
2. Unscrew the screw (M3x5L) to remove the plane bracket.



3. Loose the sun screw (circled below) on the holder so the pairing arm can be adjustable.

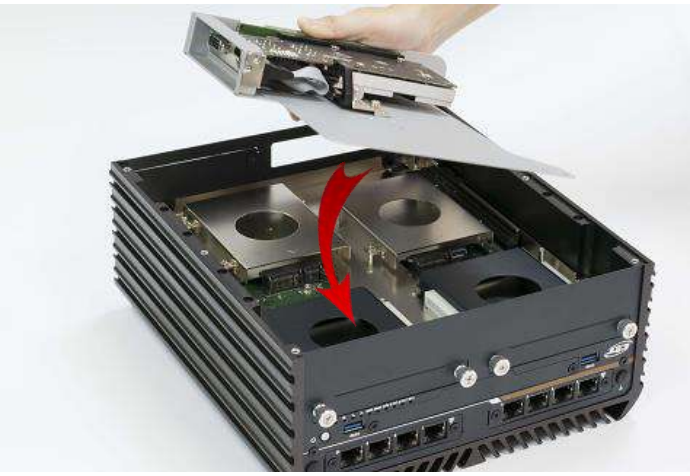
4. Install the PCIe/PCI card according to the below direction and ensure the gold finger is inserted into the slot. Then fasten the screw in the circle.



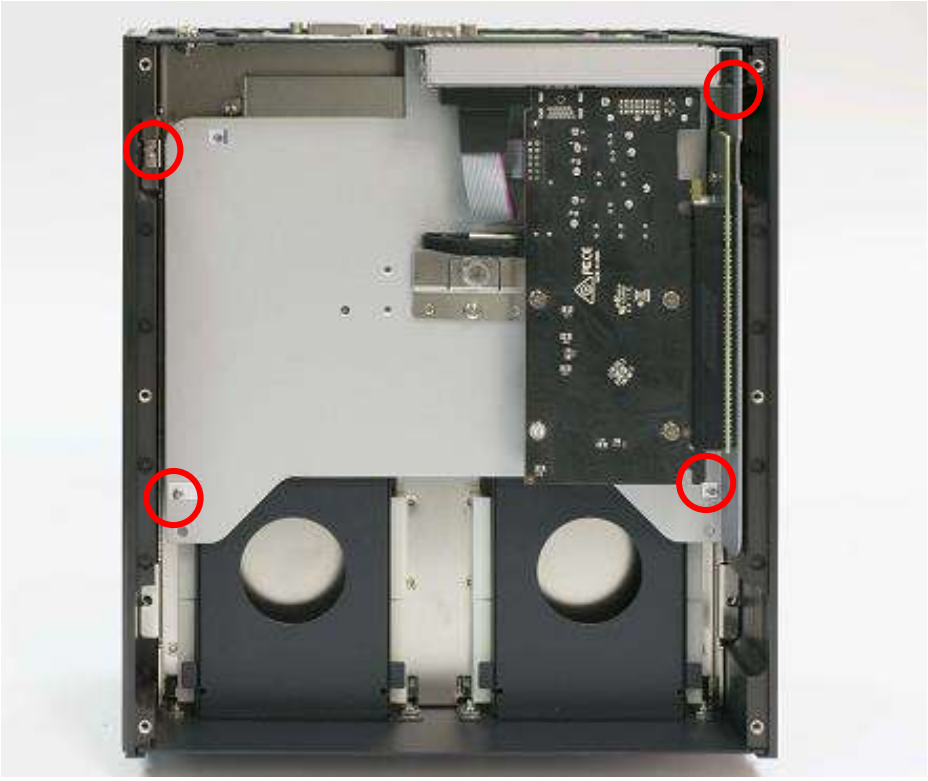
5. Adjust the arm until it holds the card firmly in place. Then fasten the sun screw on the holder.

3.12 Installing PCIe/PCI expansion module

1. Install the expansion module back in place and ensure the golden finger is inserted into the expansion slot.

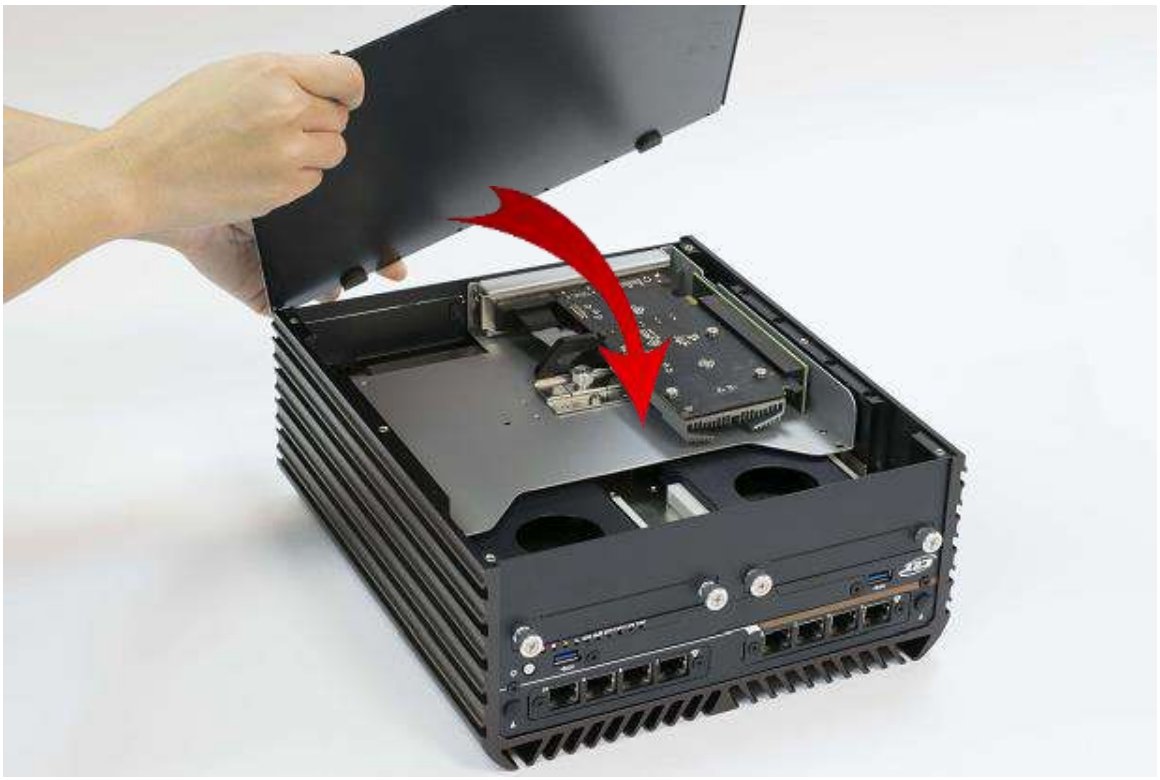


2. Fasten the four screws (M3x5L) below to lock the expansion module.



3.13 Assemble chassis bottom cover

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



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

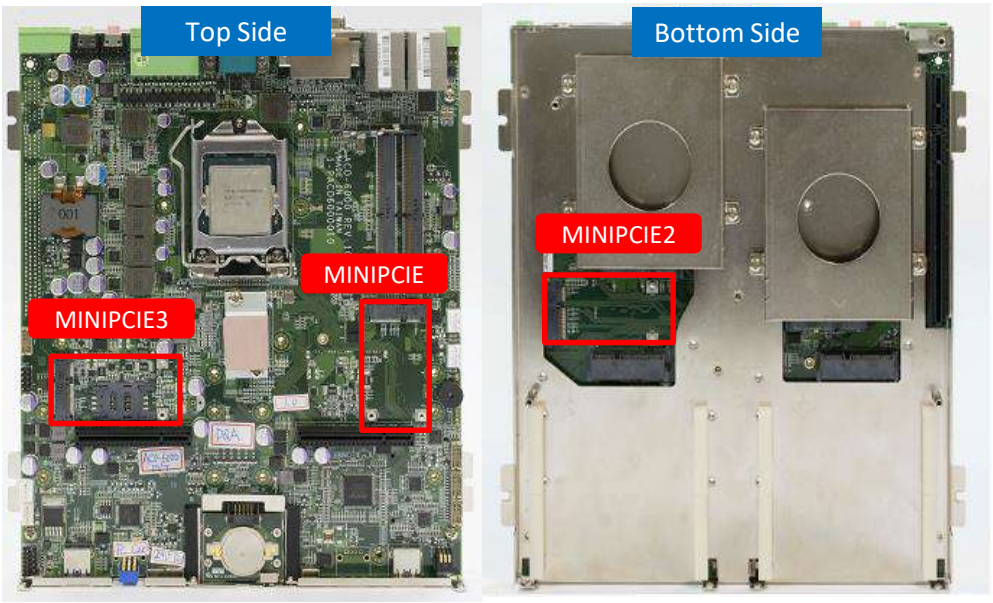
3.14 Installing SIM card

1. For ACO-6000 Series, SIM card slot is located inside the control area. Unscrew the two screws below to remove the cover bracket.

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

3. Please note that the installation of SIM cards has to match the installation of mini PCIe slots.

SIM Card Socket Number	Matching Mini PCIe Slot
SIM 1	MINIPCIE1
SIM 2	MINIPCIE2
SIM 3	MINIPCIE3



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

3.15 Installing wall mount kit

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

2. Place the system upside down so you can see the bottom cover. The highlighted eight screw holes below will be used.

3. Lock the wall mount kit with eight screws (M3x5L, Nylok).

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

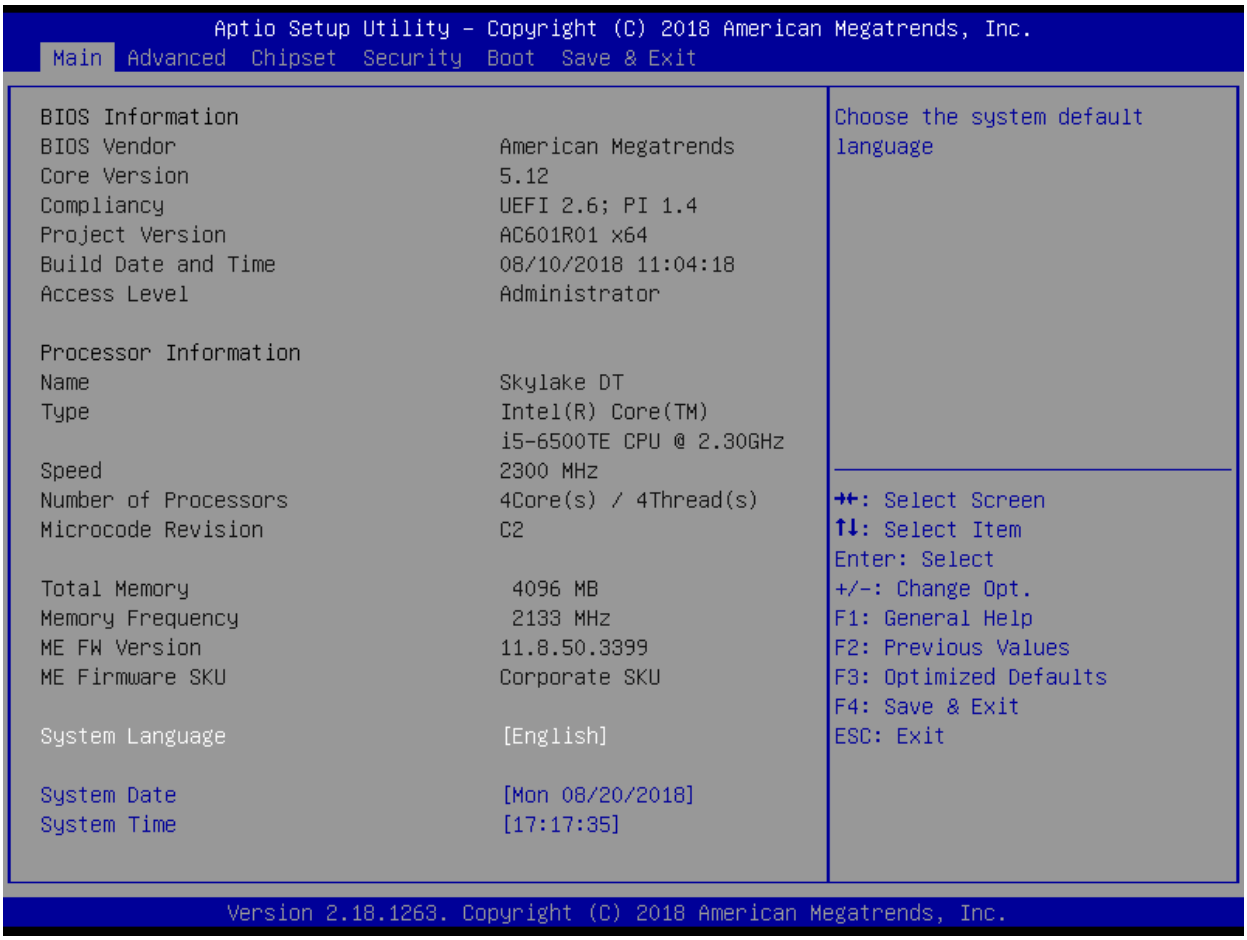
The main menu lists the setup functions you can make changes to. You can use the arrow keys (↑↓) to select the item. The on-line description of the highlighted setup function is displayed at the bottom of the screen.

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.



■ System Language

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

■ System Date

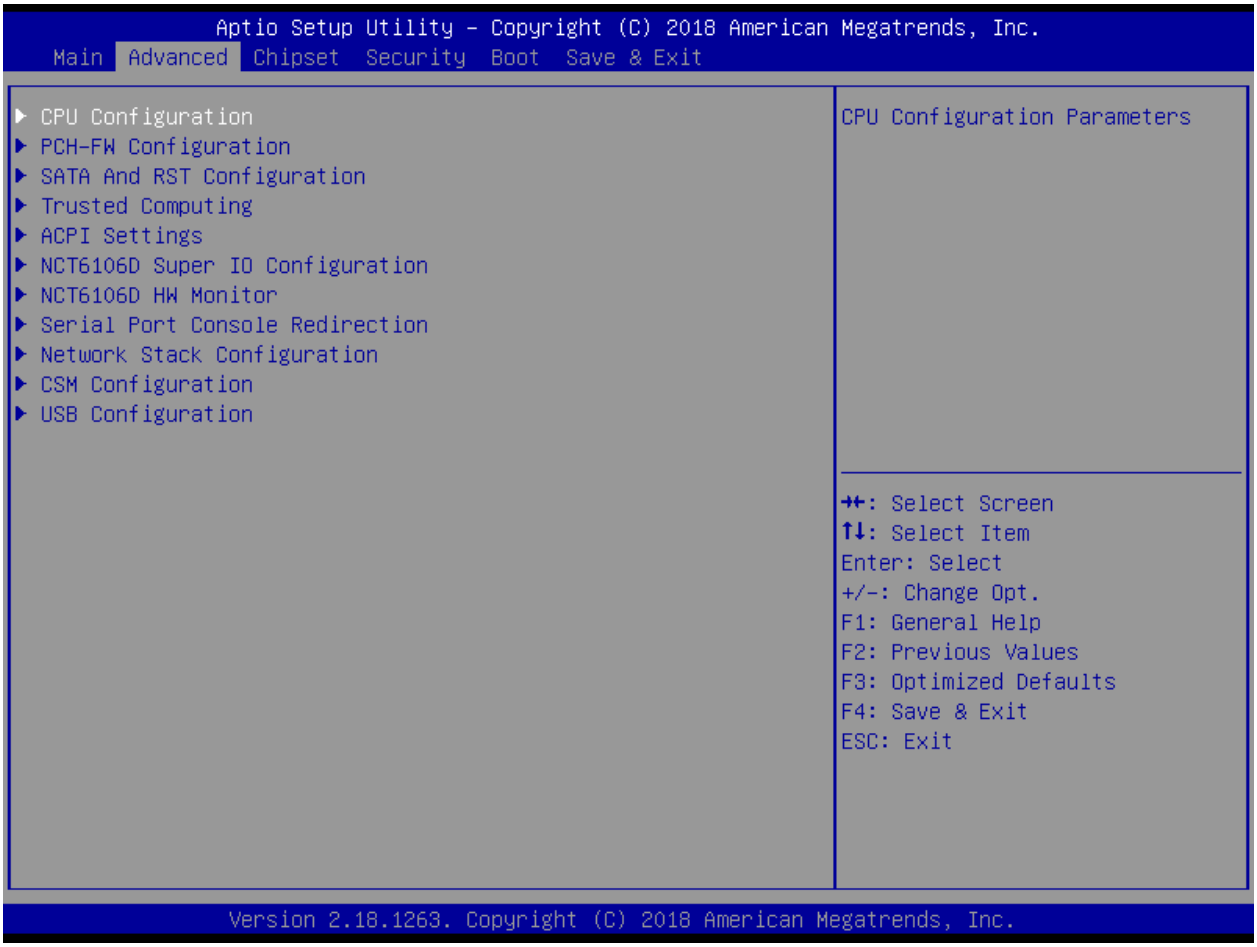
Set the date. Please use <Tab> to switch between date elements.

■ System Time

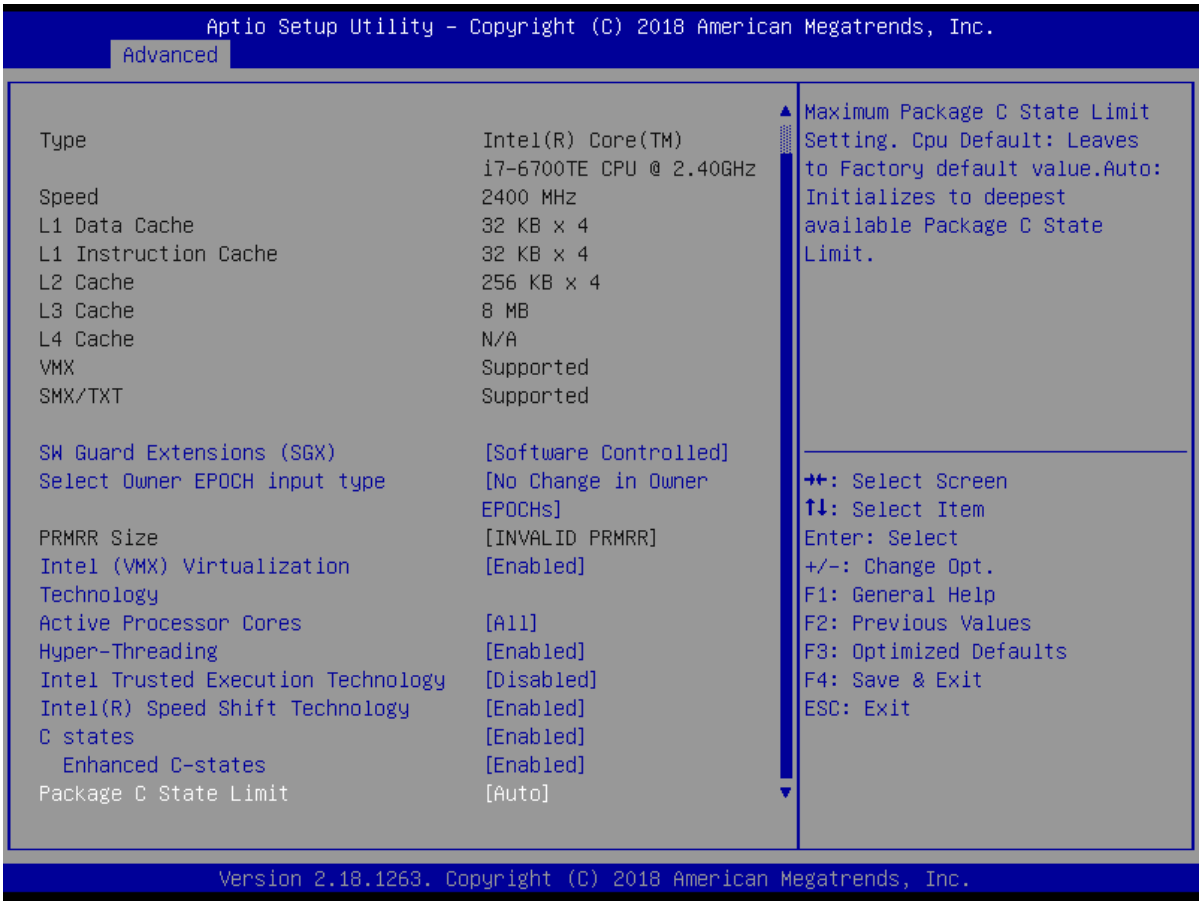
Set the time. Please use <Tab> to switch between time elements.

4.3 Advanced Setup

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



4.3.1 CPU Configuration



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

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

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

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

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

■ Hyper-Threading
This item allows you to enable or disable the Intel Hyper-Threading Technology.

■ Intel Trusted Execution Technology
This item allows you to enable or disable the Intel Trusted Execution Technology.

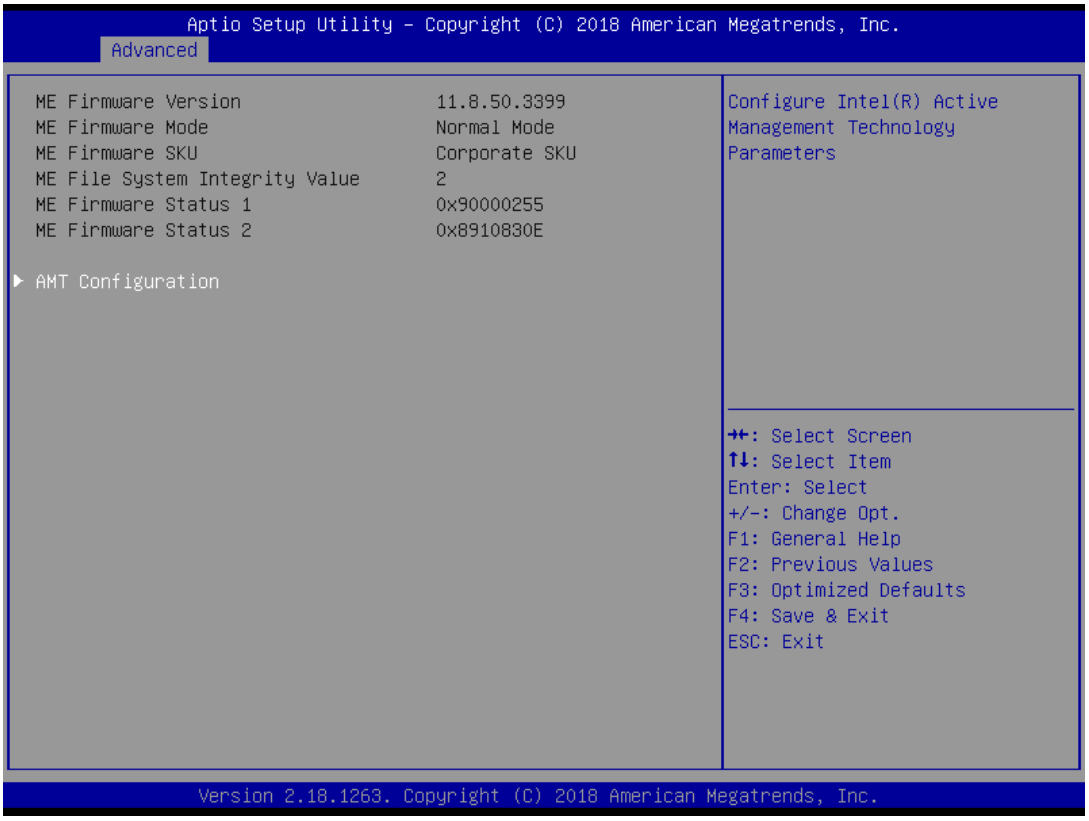
■ Intel(R) Speed Shift Technology
This item allows you to enable or disable the Intel Speed Shift Technology

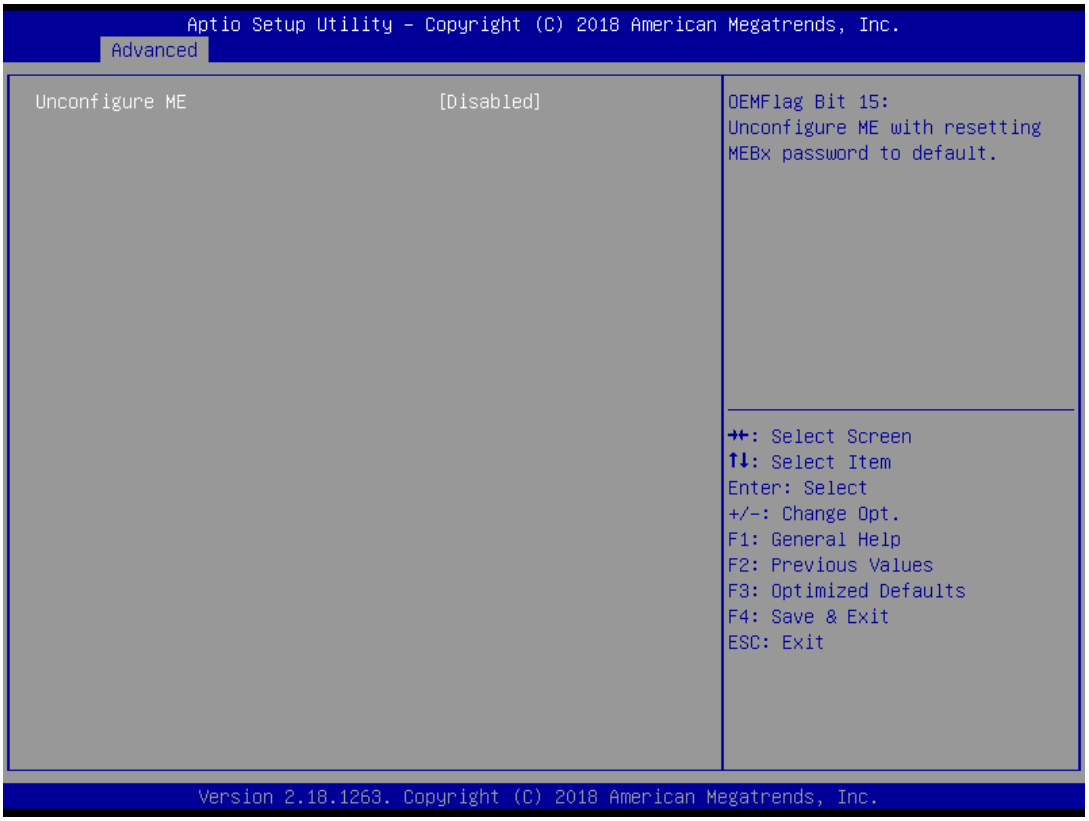
■ CPU C states
This item allows you to set the power saving of the CPU states.

❑ Enhanced C State
This item allows your CPU reduce power consumption

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

4.3.2 PCH-FW Configuration





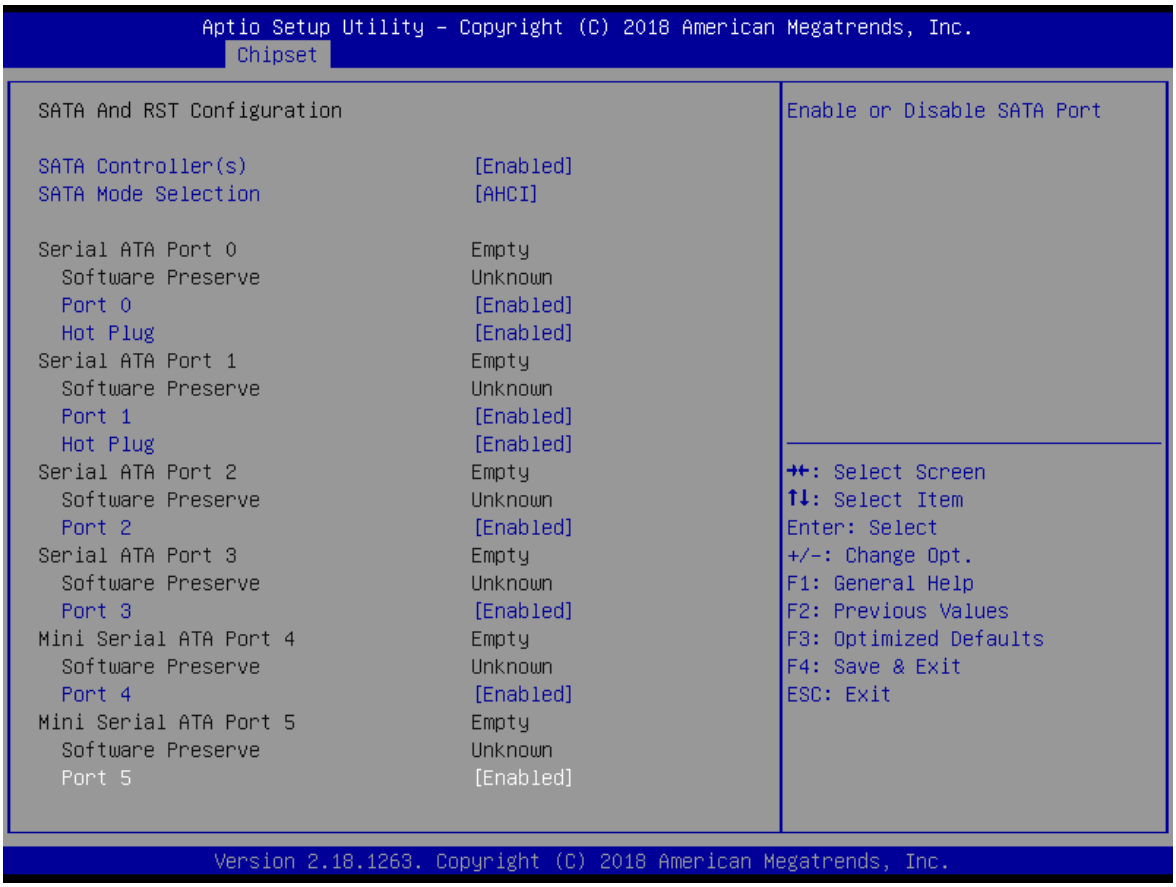
■ AMT Configuration

Intel Active Management Technology (AMT) is hardware-based technology for remotely managing and securing PCs out-of-band.

■ Un-Configure ME

Use this function to enable or disable Un-Configure ME without password function.

4.3.3 SATA And RST Configuration



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

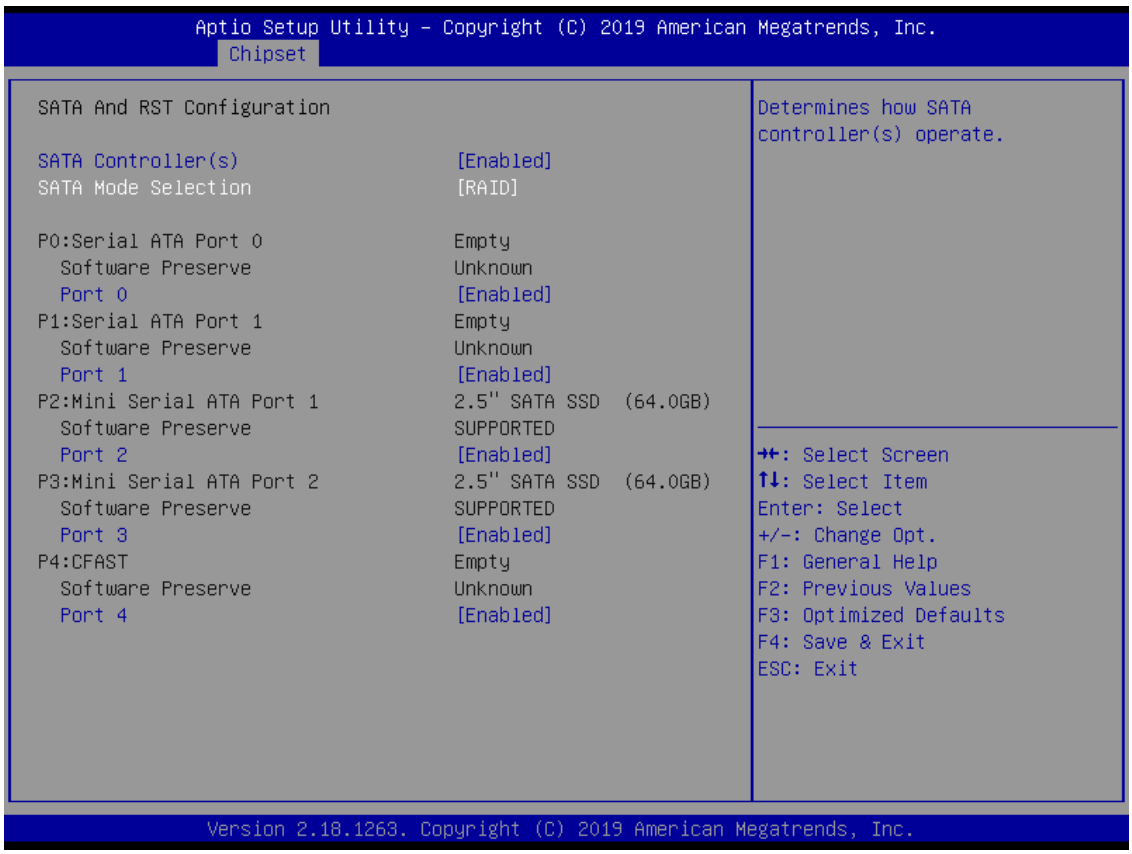
■ **SATA Mode Selection**
This item allows users to select mode of SATA controller.

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

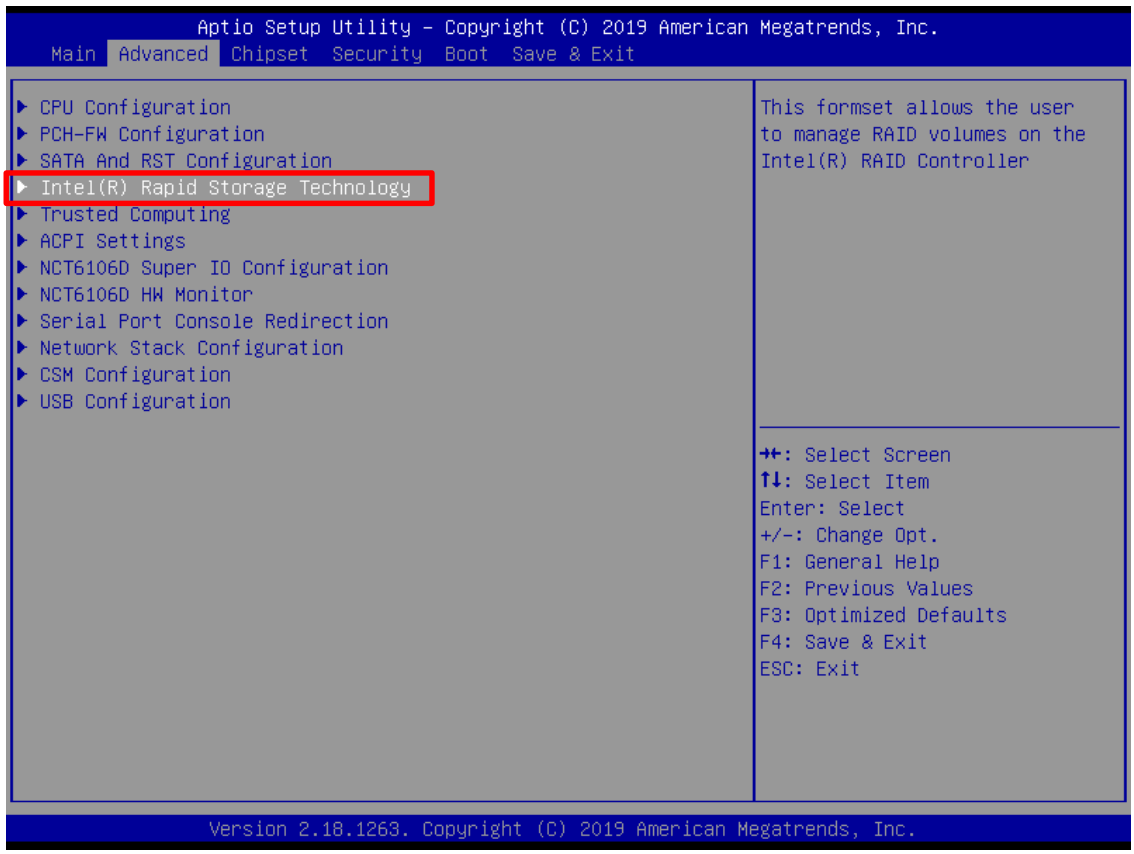
4.3.4 RST (UEFI RAID) Configuration

How to set the UEFI RAID:

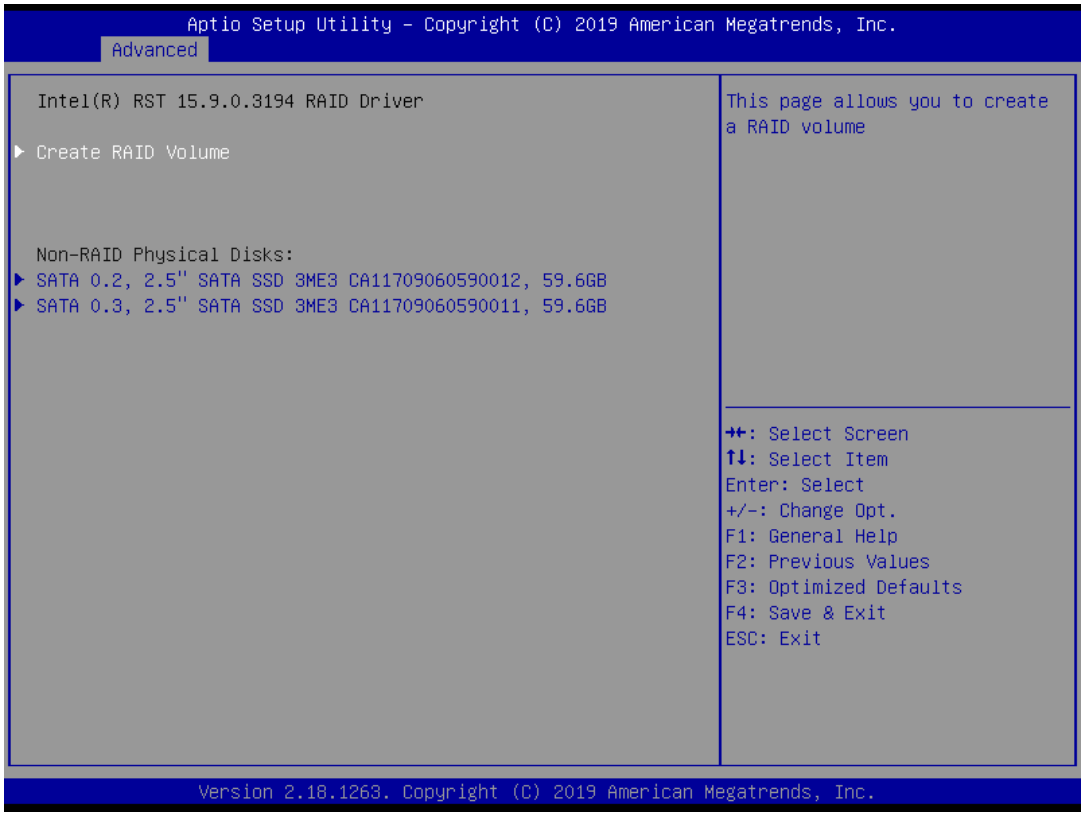
1. When set to RAID, please save change reset system.



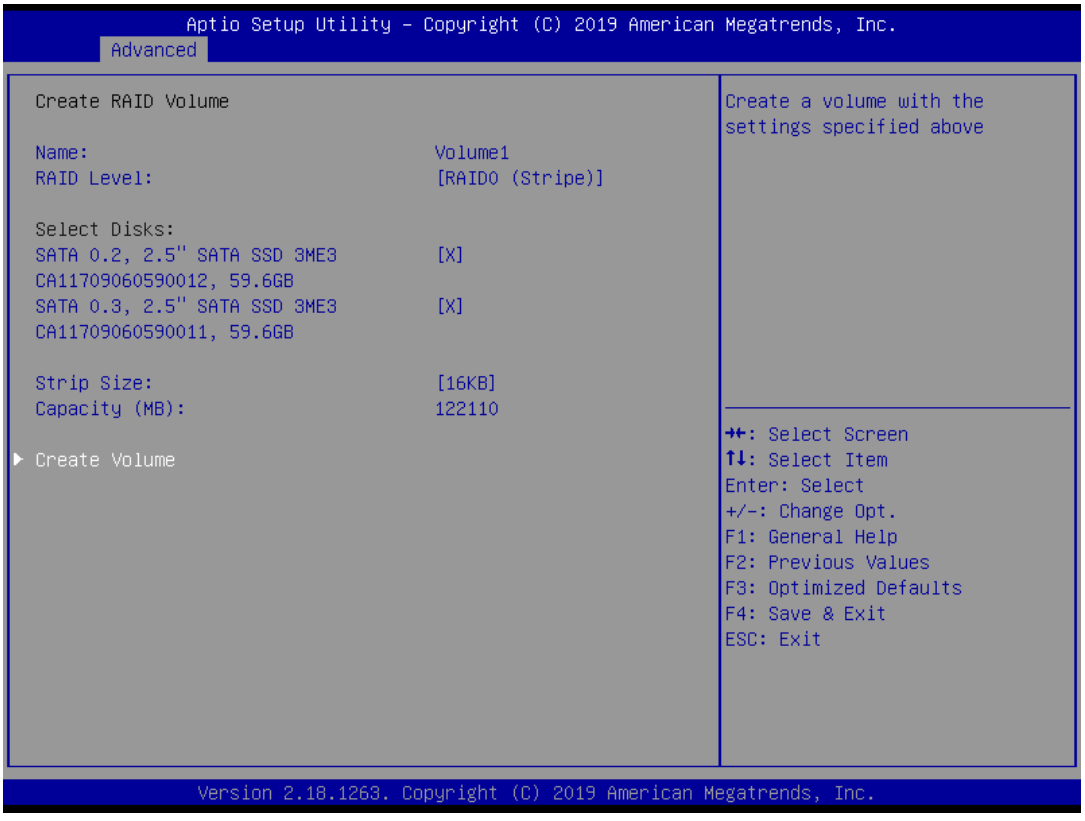
2. After reboot the system, please into BIOS utility and then will see "Intel (R) Rapid Storage Technology"



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

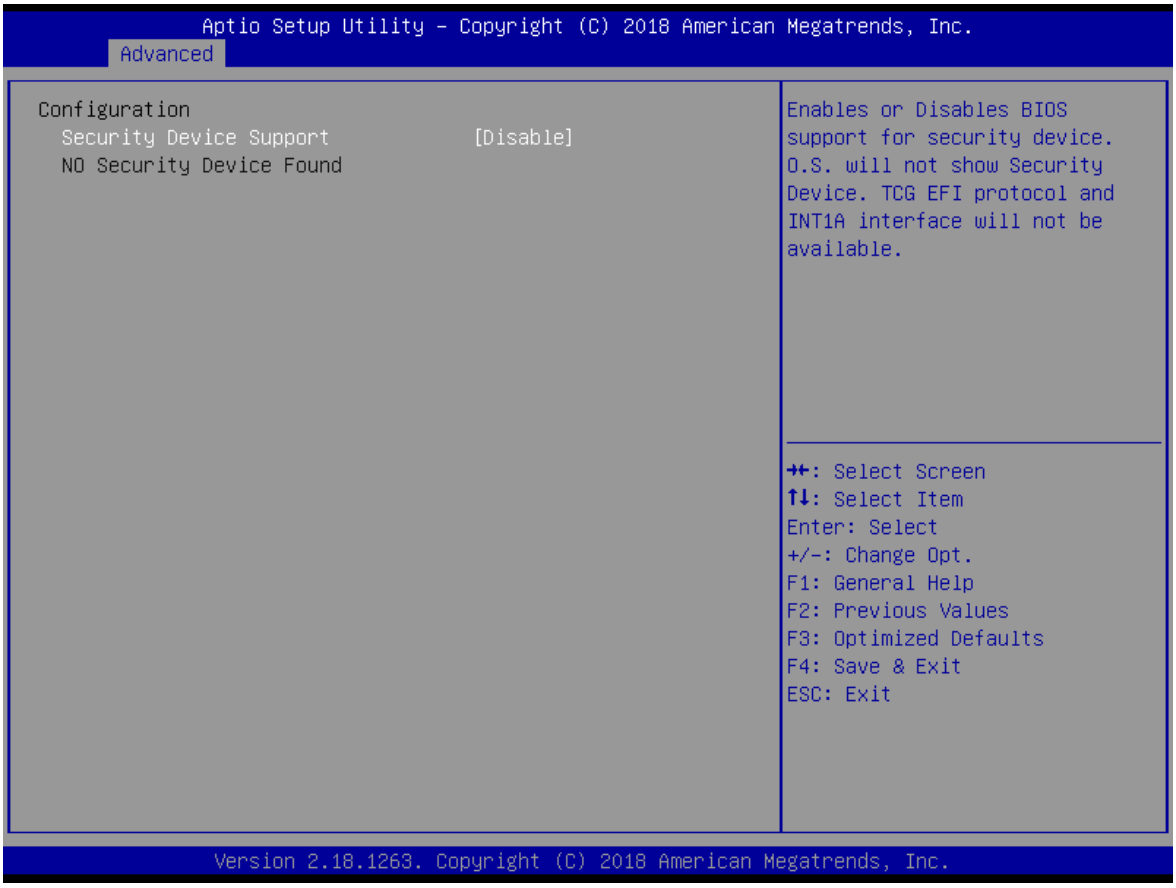


4. Start Create the RAID

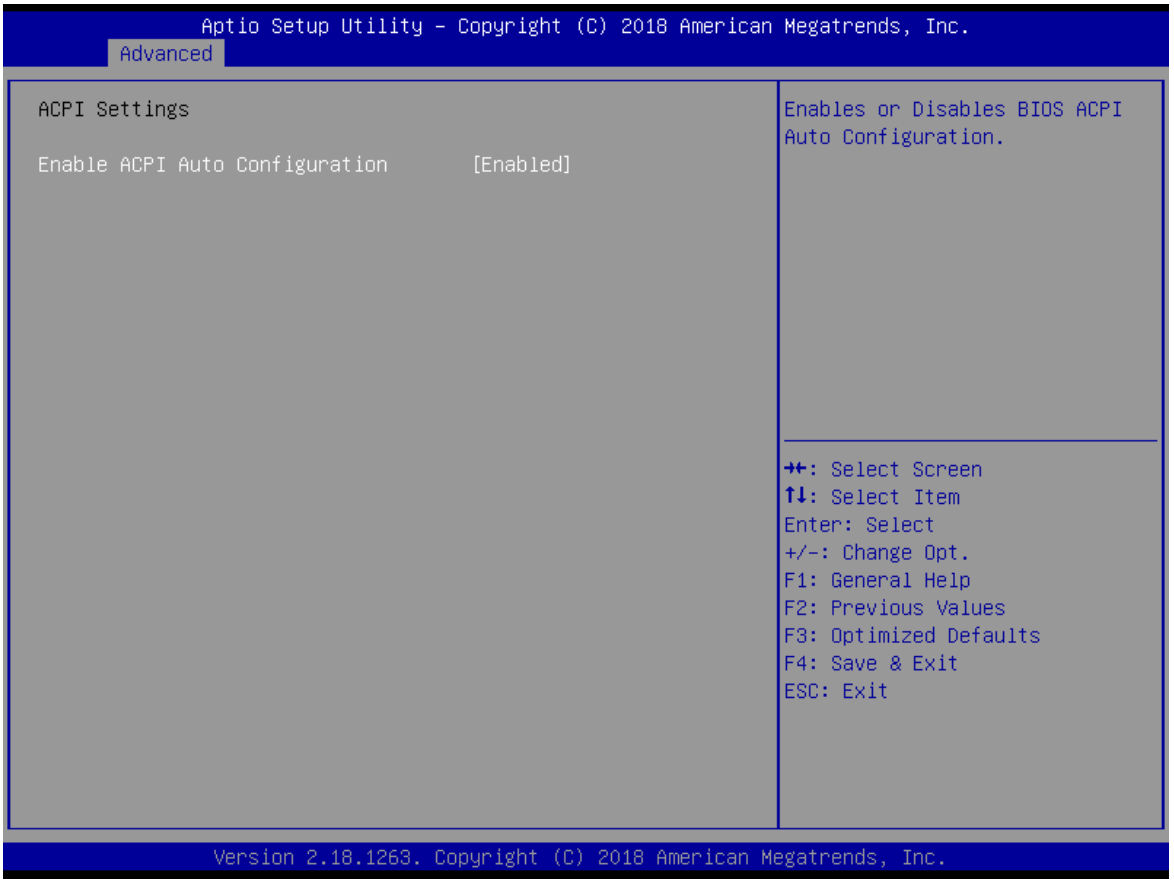


- Select Disk that you want to do the RAID
- Select [x]; No-Select [ ]

4.3.5 Trusted Computing



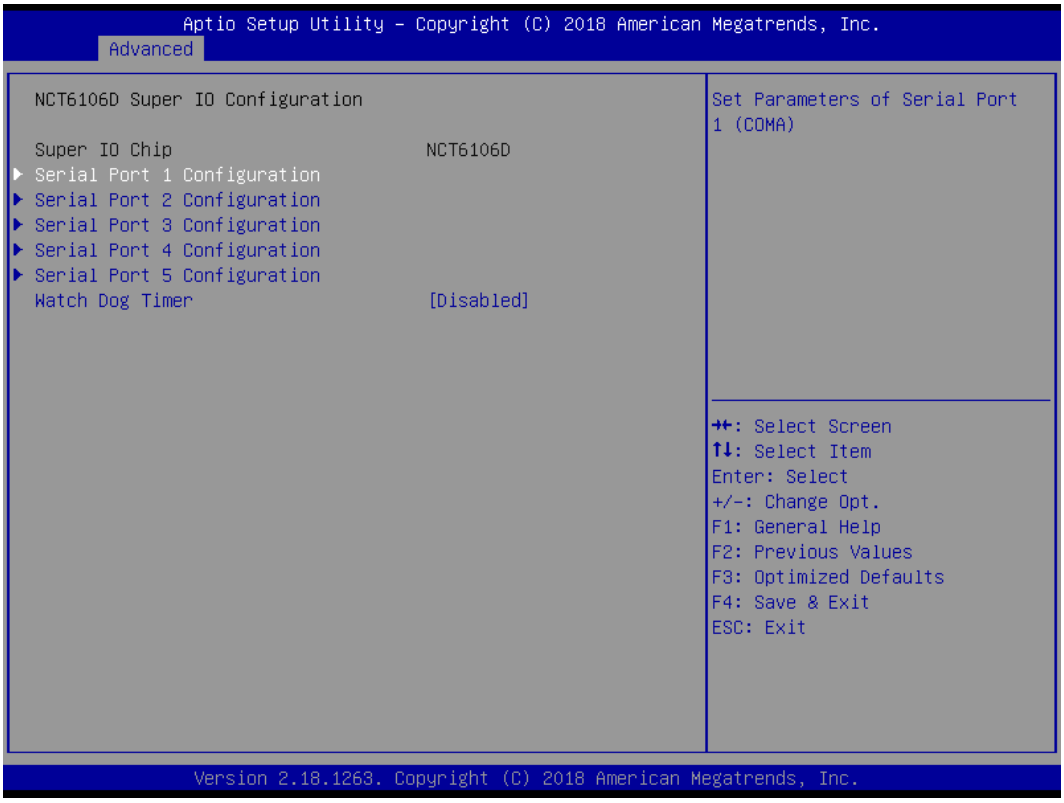
4.3.6 ACPI Settings



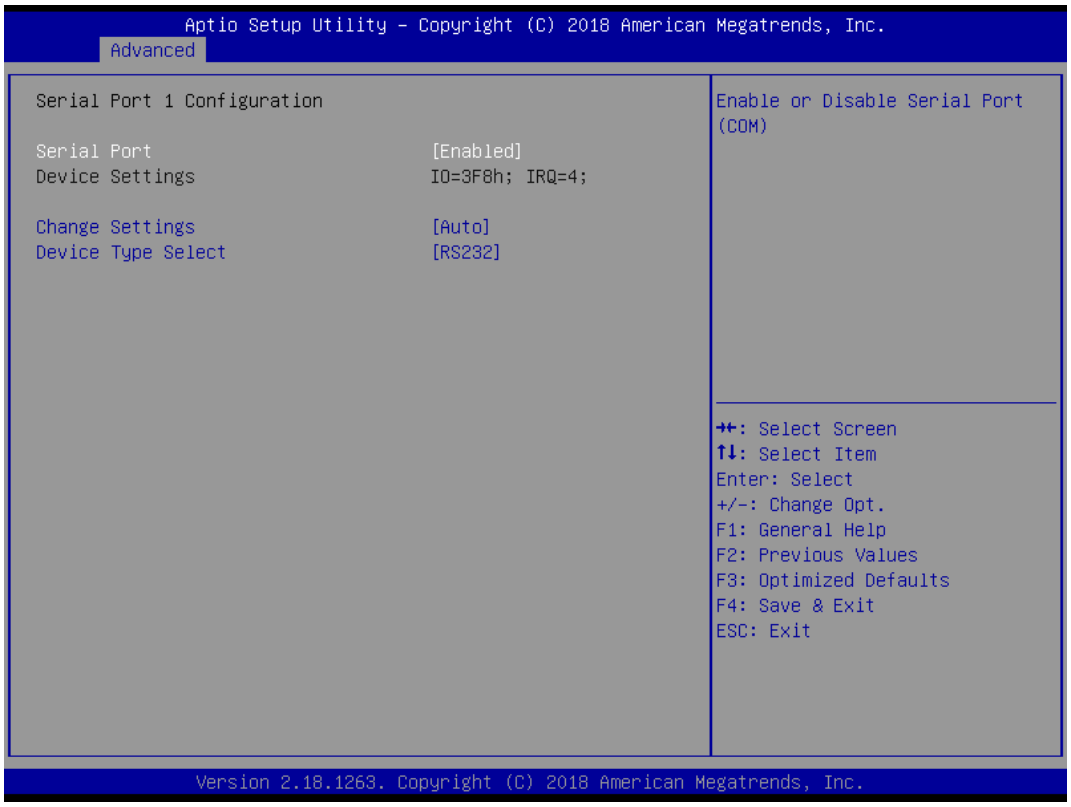
■ **Enable ACPI Auto Configuration**

Enable or disable BIOS ACPI auto configuration.

4.3.7 NCT6106D Super IO Configuration



■ Serial Port 1 Configuration



❑ **Serial Port**

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

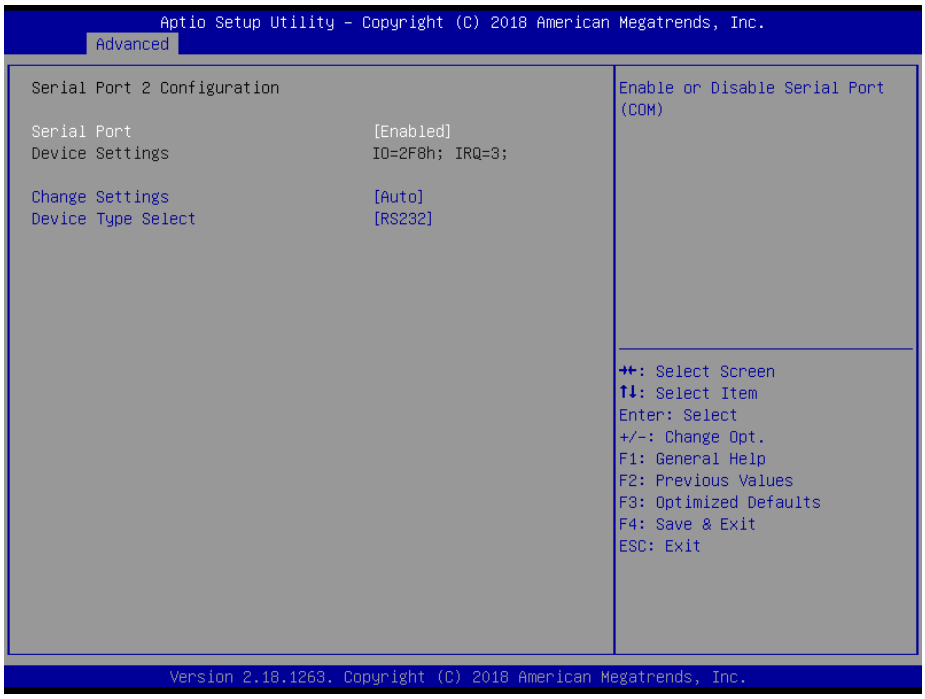
❑ **Change Settings**

This setting is used to change the address & IRQ settings of the specified serial port.

❑ **Device Type Select**

Change the Serial interface. Select <RS232> ,<RS422> or <RS485> interface.

Serial Port 2 Configuration

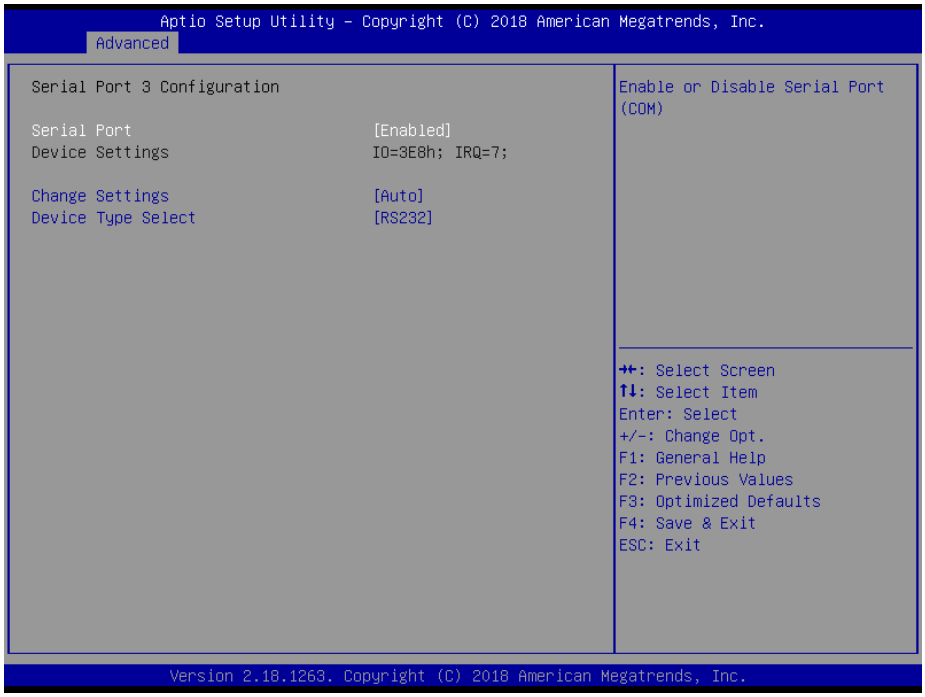


❑ **Serial Port**
This item will allow users to enable or disable serial port.

❑ **Change Settings**
This setting is used to change the address & IRQ settings of the specified serial port.

❑ **Device Type Select**
Change the Serial interface. Select <RS232> ,<RS422> or <RS485> interface

Serial Port 3 Configuration



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

❑ **Change Settings**
This setting is used to change the address & IRQ settings of the specified serial port.

❑ **Device Type Select**
Change the Serial interface. Select <RS232> ,<RS422> or <RS485> interface.

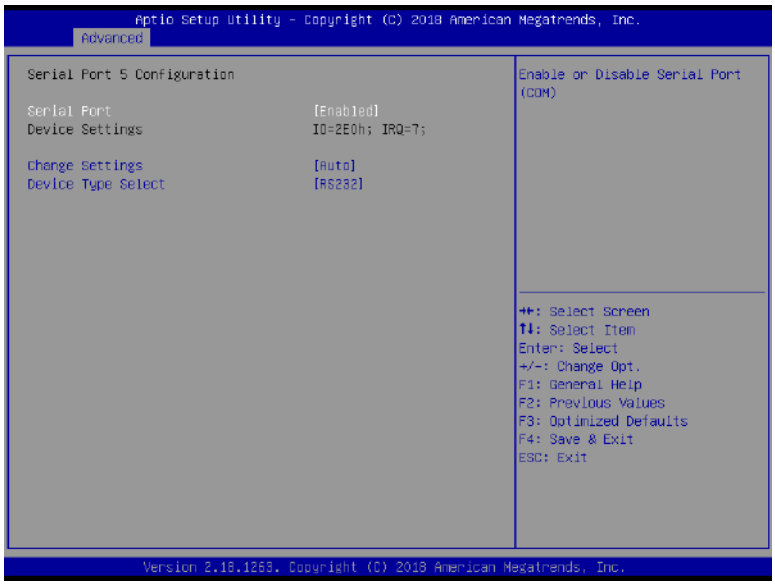
■ Serial Port 4 Configuration

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

❑ **Change Settings**
This setting is used to change the address & IRQ settings of the specified serial port.

❑ **Device Type Select**
Change the Serial interface. Select <RS232> ,<RS422> or <RS485> interface.

■ Serial Port 5 Configuration



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

❑ **Change Settings**
This setting is used to change the address & IRQ settings of the specified serial port.

❑ **Device Type Select**
Change the Serial interface. Select <RS232> ,<RS422> or <RS485> interface.

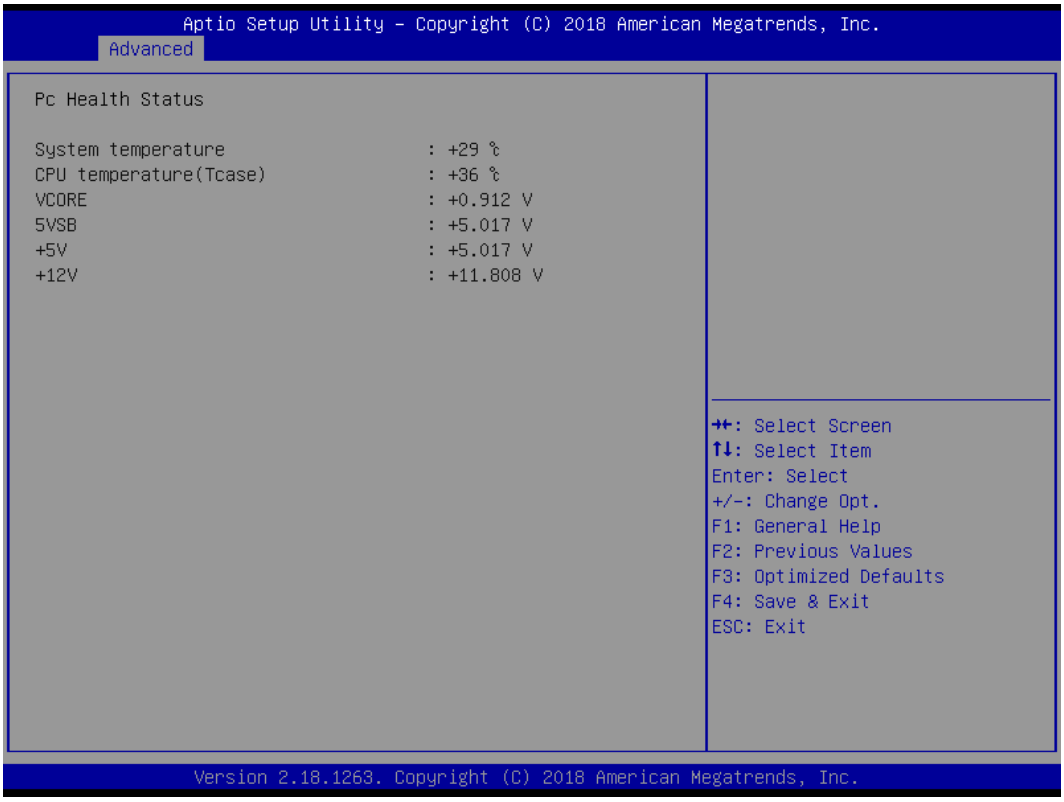
■ Watch dog Timer

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

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

4.3.8 NCT6106D HW Monitor

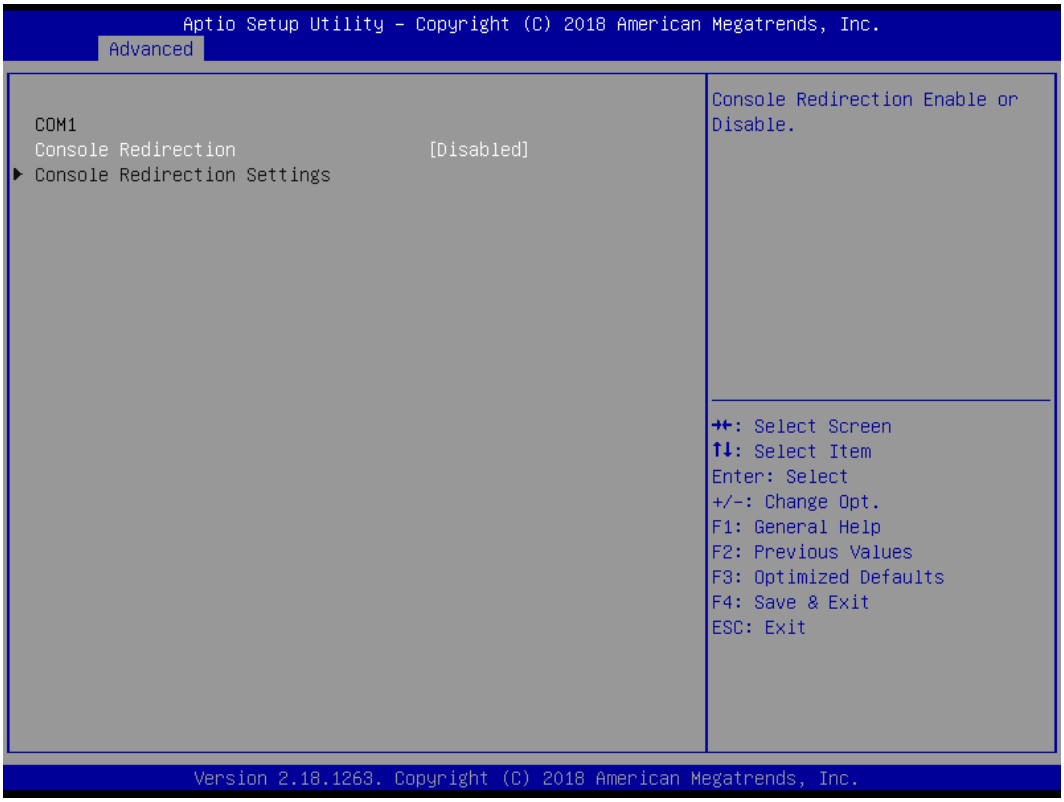
These items display the current status of all monitored hardware devices/components such as voltages, temperatures and all fans' speeds.



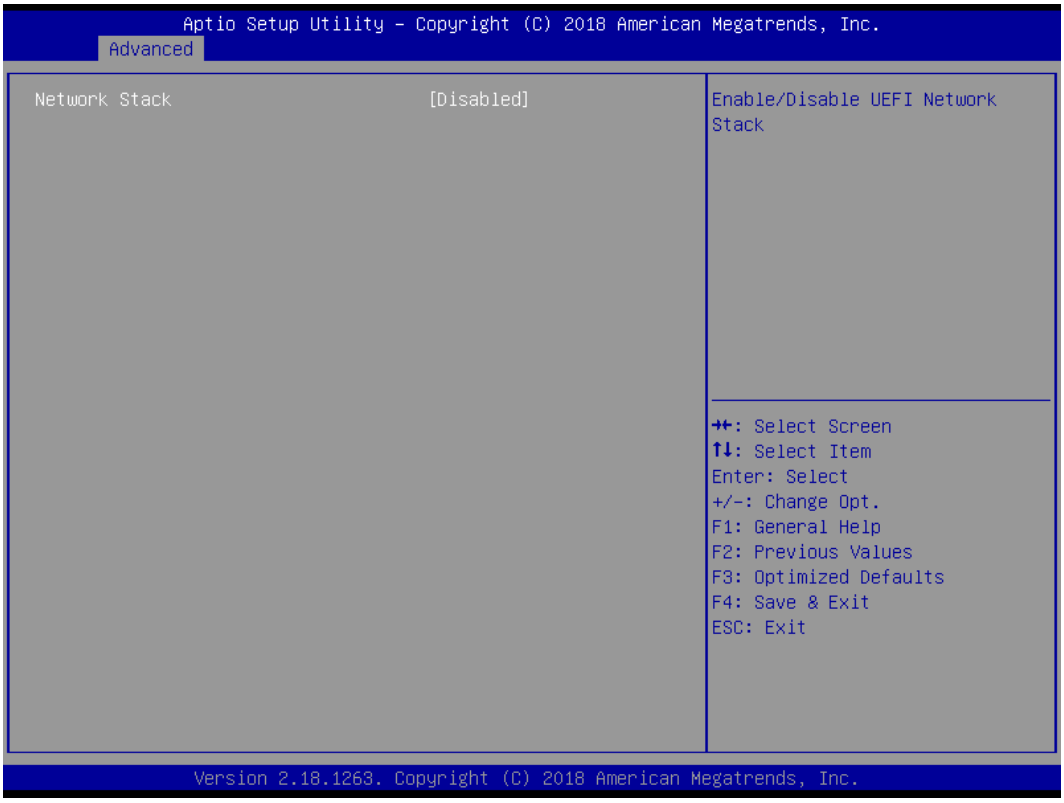
4.3.9 Serial Port Console Redirection

■ Console Redirection

This item allows users to enable or disable console redirection.



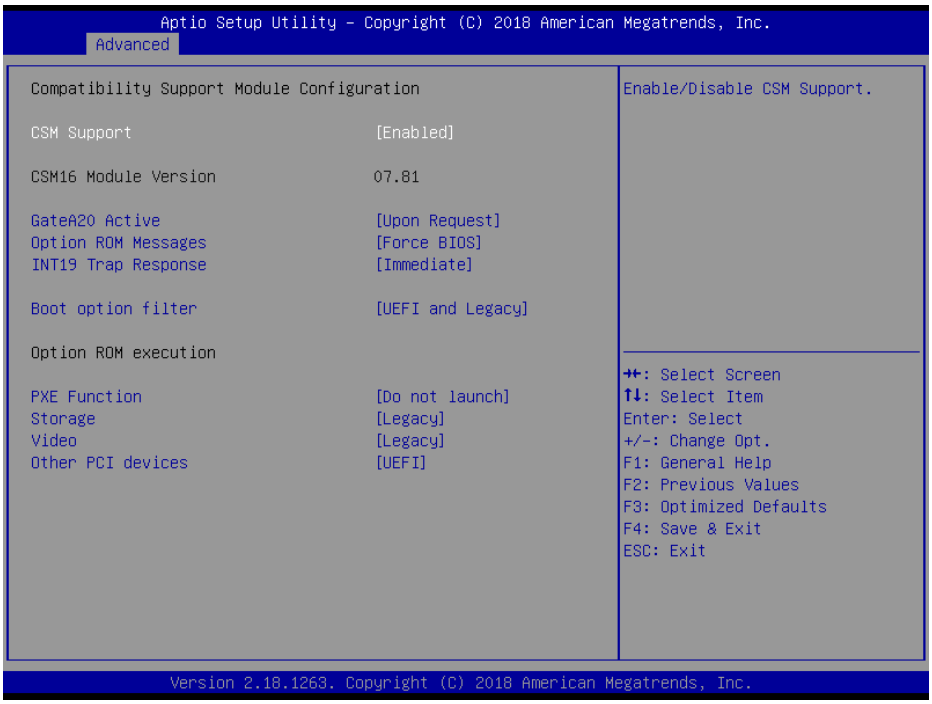
4.3.10 Network Stack Configuration



■ Network Stack

Use this item to enable or disable UEFI Network Stack.

4.3.11 CSM Configuration



■ CSM Support

This item allows you to enable or disable CSM support.

■ GateA20 Active

This item allows you to select <Upon Request> or <Always>.

Upon Request: GA20 can be disabled using BIOS services.

Always: Do not allow GA20 disabling. This option is useful when any RT code is executed above 1MB.

■ Option ROM Messages

This item allows you to select <Force BIOS> or <Keep Current>.

Force BIOS : The third-party ROM messages will be forced to display during the boot sequence.

Keep Current : The third-party ROM messages will be displayed only if the third-party manufactured had set the add-on device to do so.

■ INT19 Trap Response

BIOS reaction on INT19 trapping by Option ROM: Immediate - execute the trap right away; Postponed - execute the trap during legacy boot.

■ Boot option filter

This item allows you to select which type of operating system to boot.

UEFI and Legacy: Allows booting from operating systems that support legacy option ROM or UEFI option ROM.

Legacy only: Allows booting from operating systems that only support legacy option ROM.

UEFI only: Allows booting from operating systems that only support UEFI option ROM.

■ PXE Function

This item controls the execution of UEFI and PXE option ROM. Select <Do not launch>, <UEFI> or <Legacy>.

■ Storage

This setting allows you to select whether to enable the UEFI or legacy option ROM for the storage device controller. Select <Do not launch>, <UEFI> or <Legacy>.

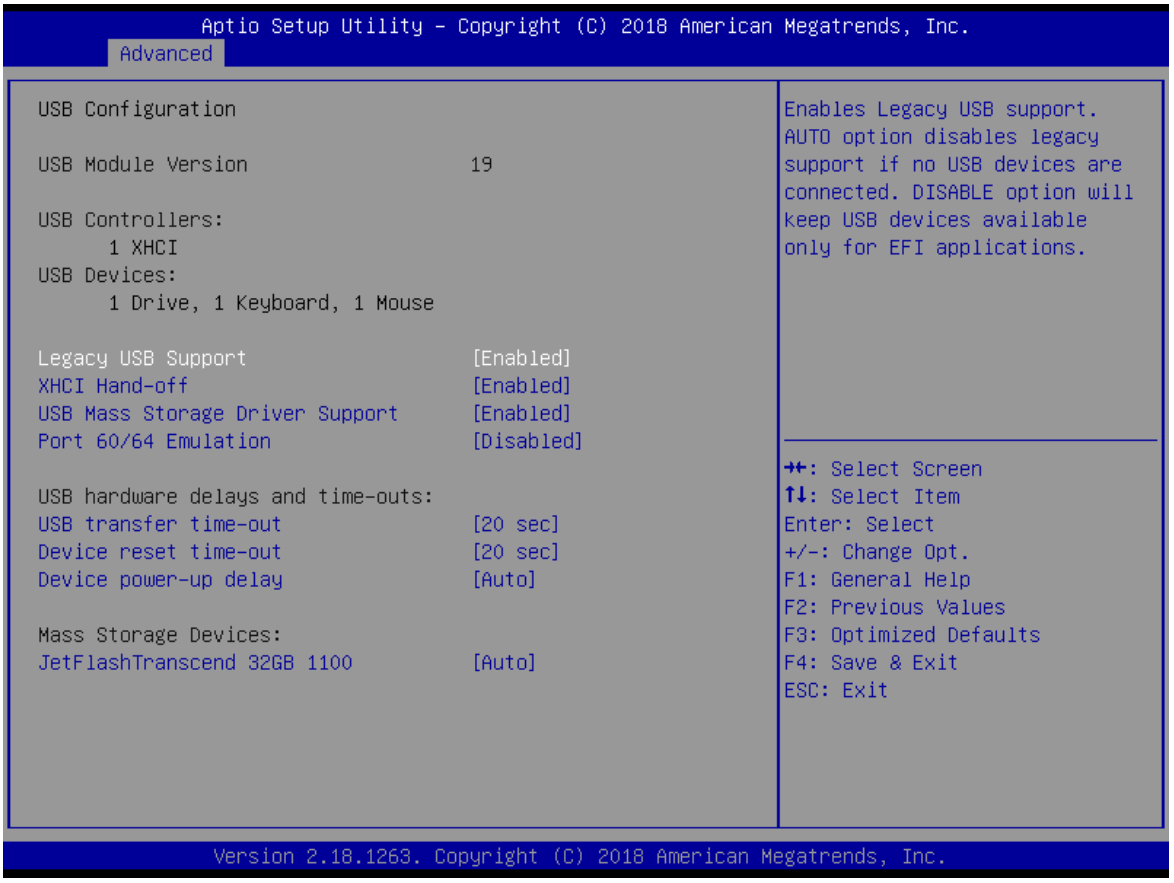
■ Video

This setting allows you to select whether to enable the UEFI or legacy video option ROM for the video device controller. Select <Do not launch>, <UEFI> or <Legacy>.

■ Other PCI devices

This item determines option ROM execution policy for devices other than Network, storage or video. Select <Do not launch>, <UEFI> or <Legacy>.

4.3.12 USB Configuration



■ **Legacy USB Support**
This item allows you to select <Enabled>, <Disabled> or <Auto>.
Enabled: To enable legacy USB support.
Disabled: To keep USB devices available only for EFI specification,
Auto: To disable legacy support if no USB devices are connected.

■ **XHCI Hand-off**
This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver. Select <Enabled> or <Disabled>.

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

■ **Port 60/64 Emulation**
This feature enables or disables I/O port 60h/64h emulation support. This should be enabled for complete USB keyboard legacy support for non-USB-aware Operating Systems.

■ **USB Transfer time-out**
Use this item to set the time-out value for control, bulk, and interrupt transfers. Select <1 sec>, <5 sec>, <10 sec> or <20 sec>.

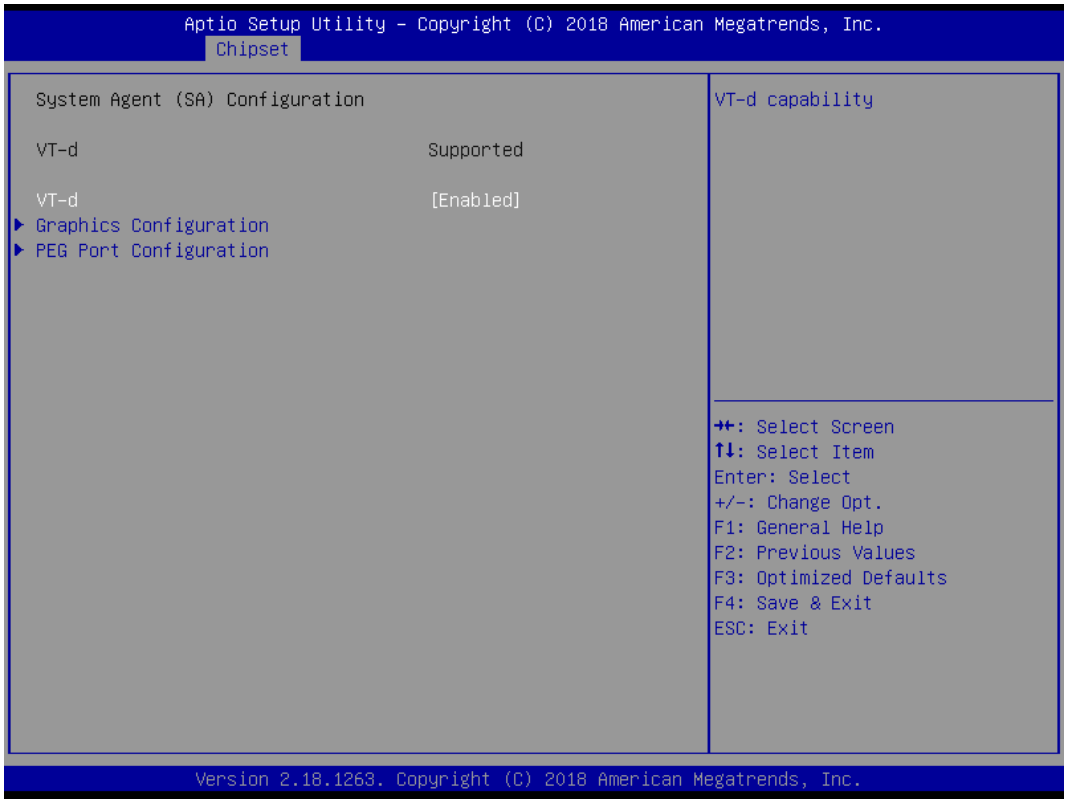
■ **Device reset time-out**
Use this item to set USB mass storage device start unit command time-out. Select <10 sec>, <20 sec>, <30 sec> or <40 sec>.

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

4.4 Chipset

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

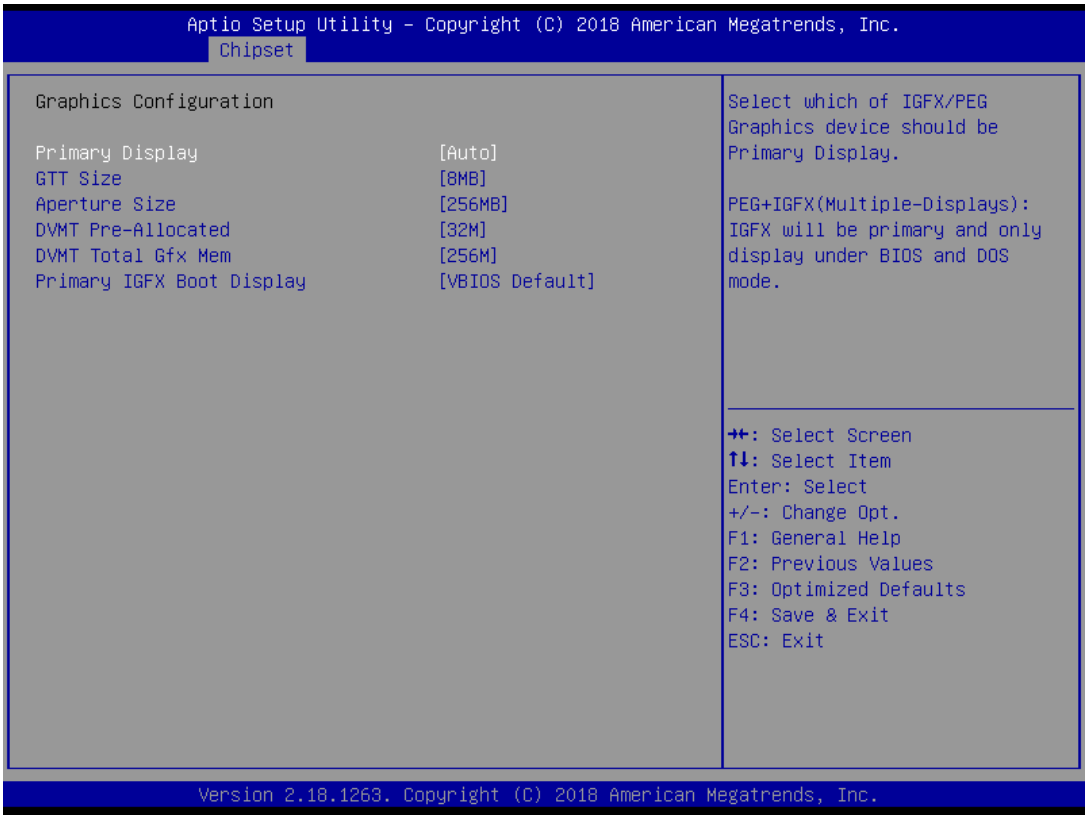
4.4.1 System Agent (SA) Configuration



■ VT-d

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

Graphic Configuration



❑ **Primary Display**

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

❑ **GTT Size**

This item allows you to change the GTT size.

❑ **Aperture Size**

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

❑ **DVMT Pre-Allocated**

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

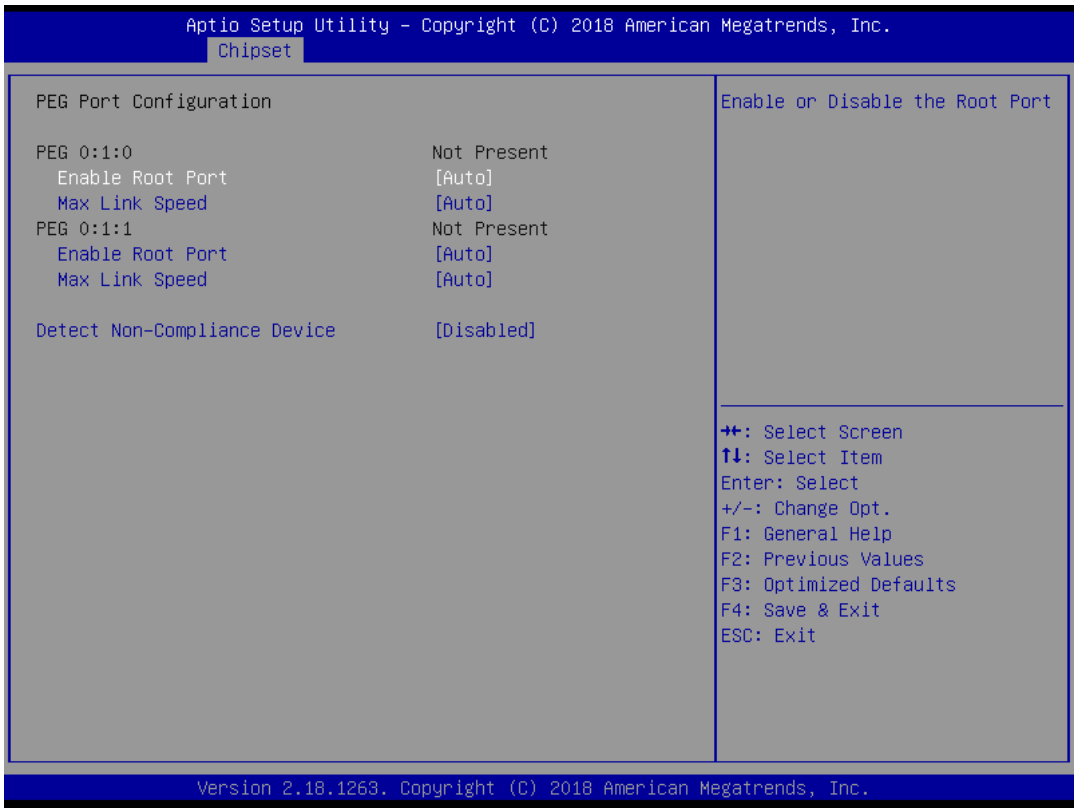
❑ **DVMT Total Gfx Mem**

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

❑ **Primary IGFX Boot Display**

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

■ PEG Port Configuration



❑ PEG 0:1:0

- ✓ **Enable Root Port**
  This item allows you to enable or disable the Root Port.
- ✓ **Max Link Speed**
  This item allows you to configure PEG 0:1:0 Max Sped.

❑ PEG 0:1:1

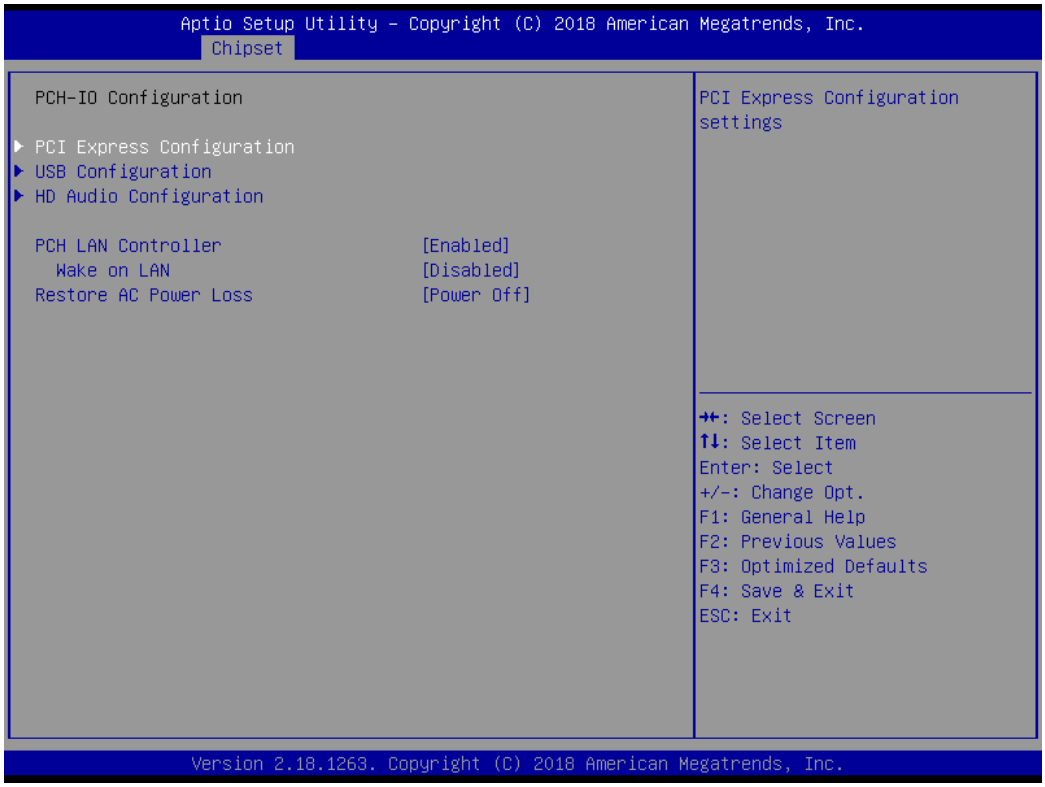
- ✓ **Enable Root Port**
  This item allows you to enable or disable the Root Port.
- ✓ **Max Link Speed**
  This item allows you to configure PEG 0:1:1 Max Sped.

❑ Detect Non-Compliance Device

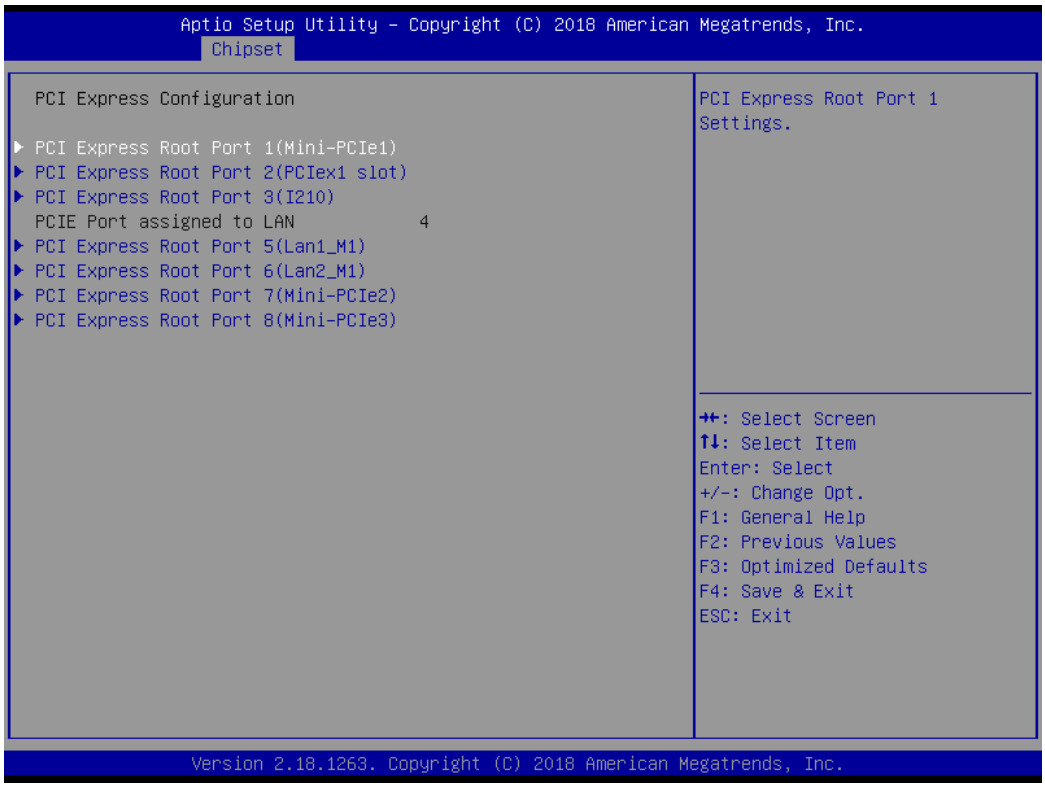
Detect Non-Compliance PCI Express Device. If enable, it will take more time at POST time.

4.4.2 PCH-IO Configuration

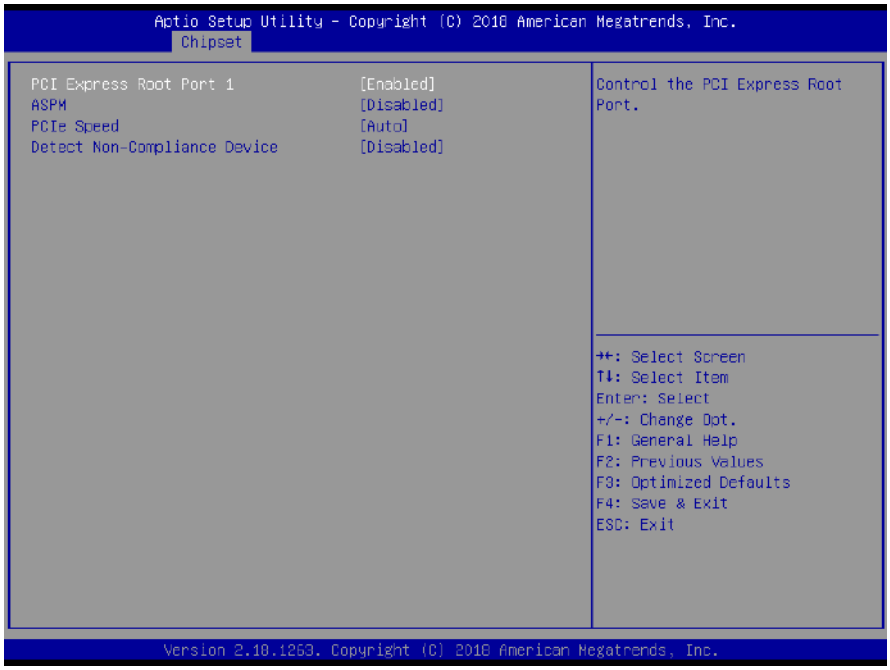
This section allows you to configure the chipset.



■ PCI Express Configuration



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



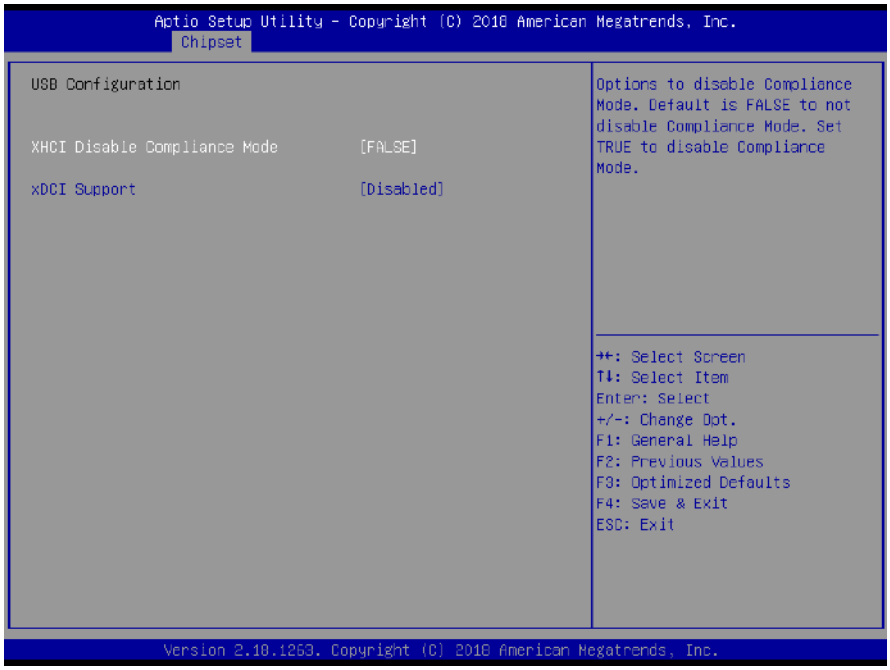
✓ **PCI Express Port 1 / 3 / 4 / 5 / 6 / 7 / 8 / 9**
This item allows you to enable or disable PCI Express Port 1 / 3 / 4 / 5 / 6 / 7 /8 / 9 in the chipset.

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

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

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

■ USB Configuration



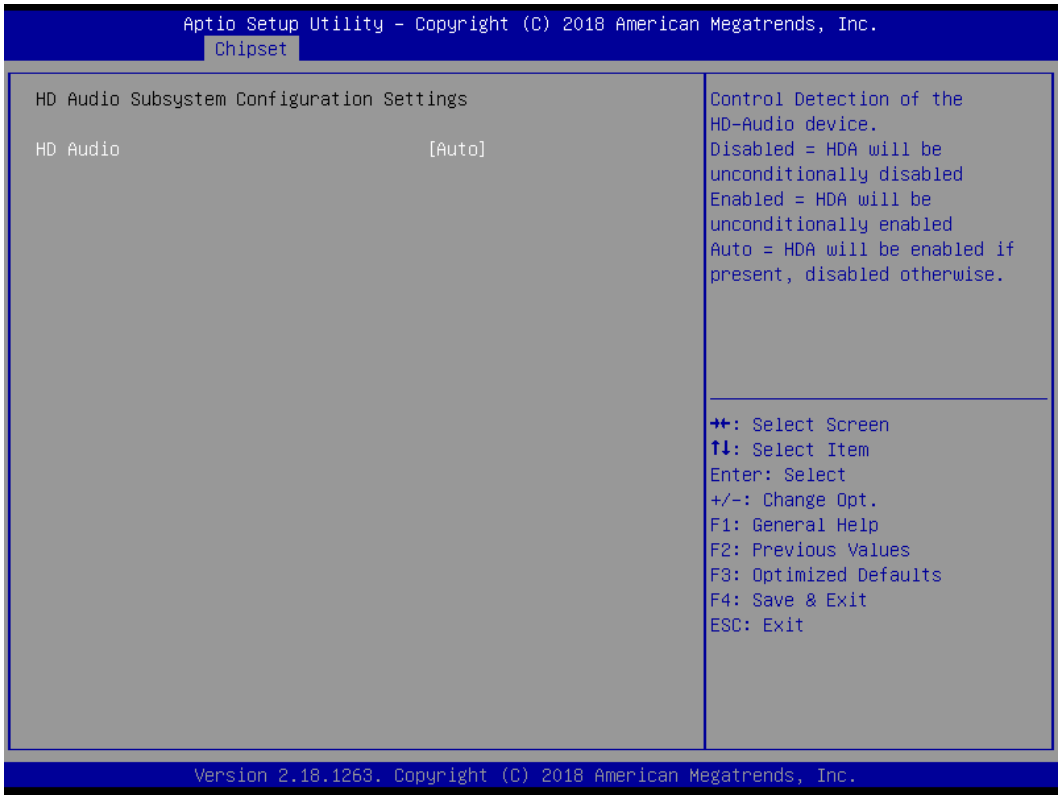
❑ XHCI Disable Compliance mode

Options to disable compliance mode. Default is FALSE enable compliance mode. Set TRUE to disable compliance mode.

❑ xDCI Support

This item will allow users to enable or disable xDCI Support.

HD Audio Configuration



❑ HD Audio

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

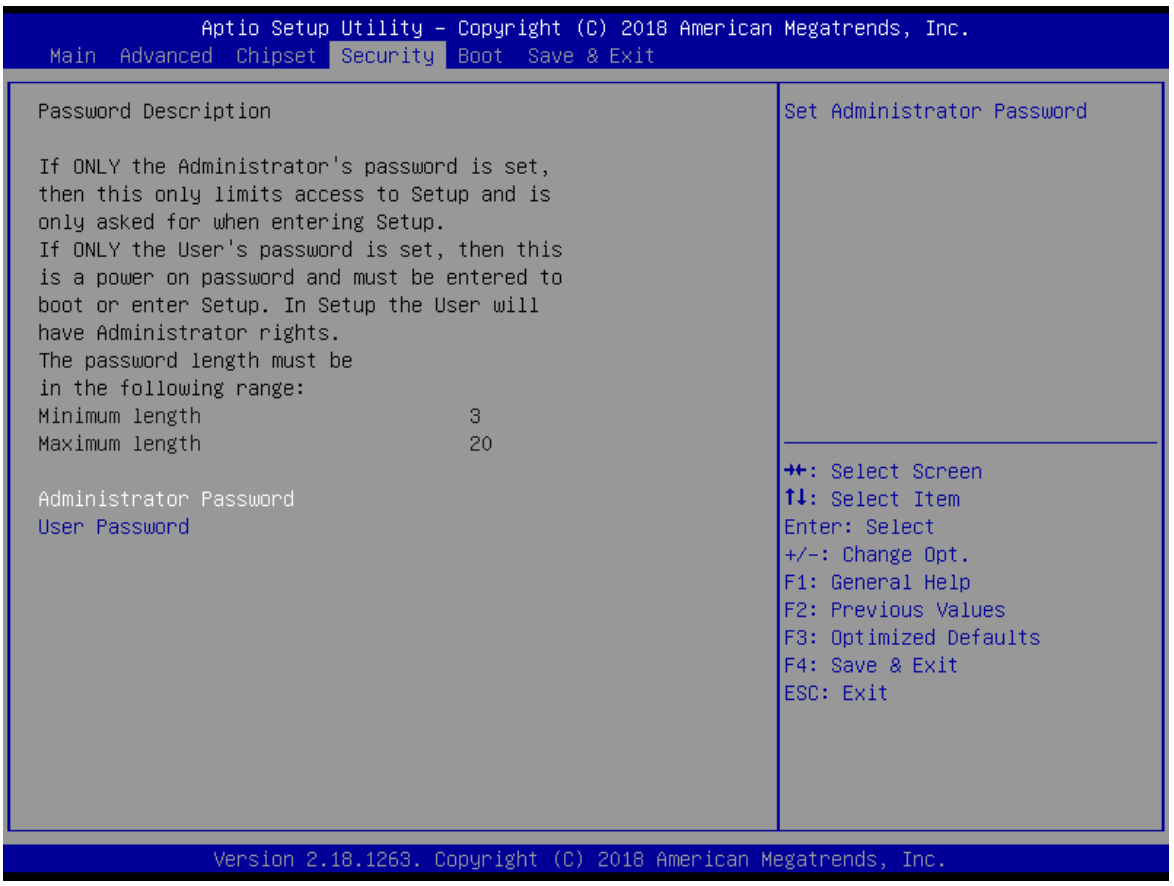
Disabled: Azalia will be unconditionally be disabled.

Enabled: Azalia will be unconditionally be enabled.

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

4.5 Security

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



■ Administrator Password

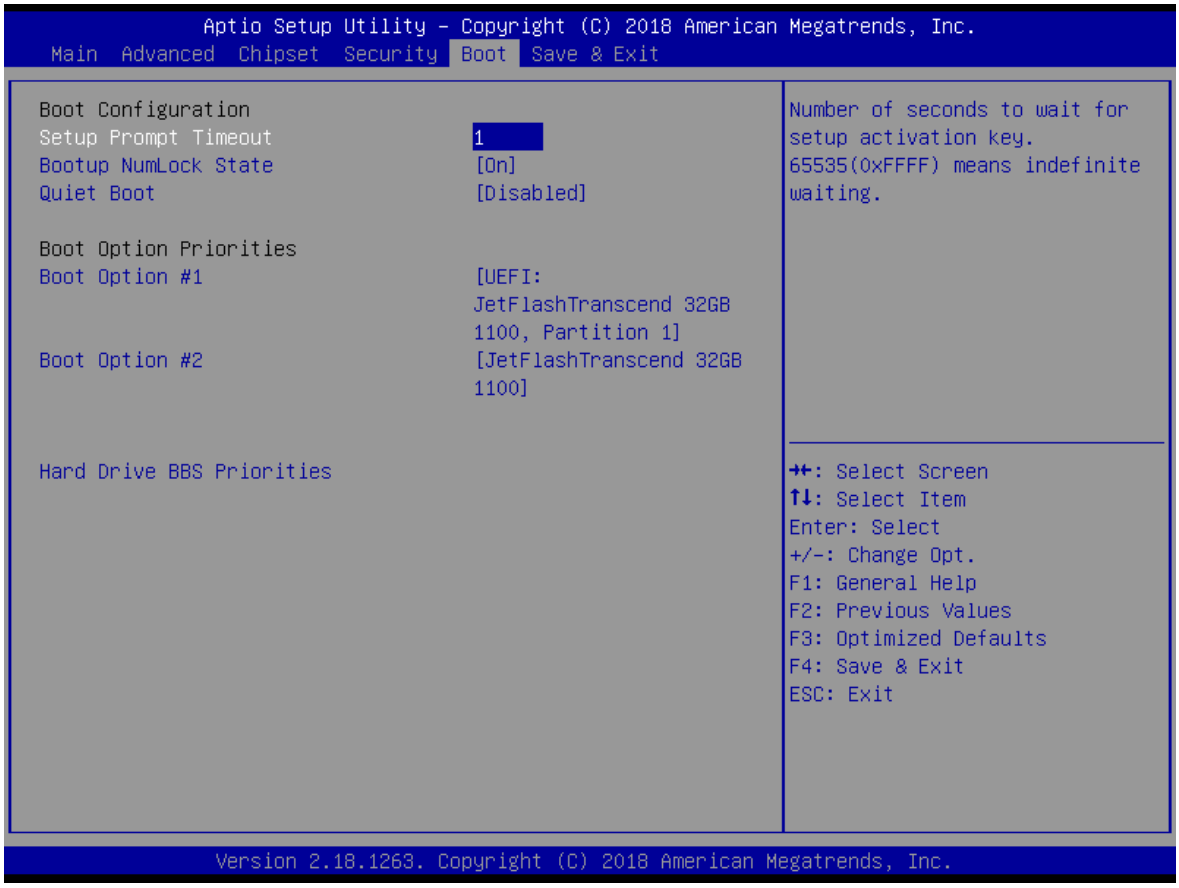
This item allows you to set Administrator Password.

■ User Password

This item allows you to set User Password.

4.6 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

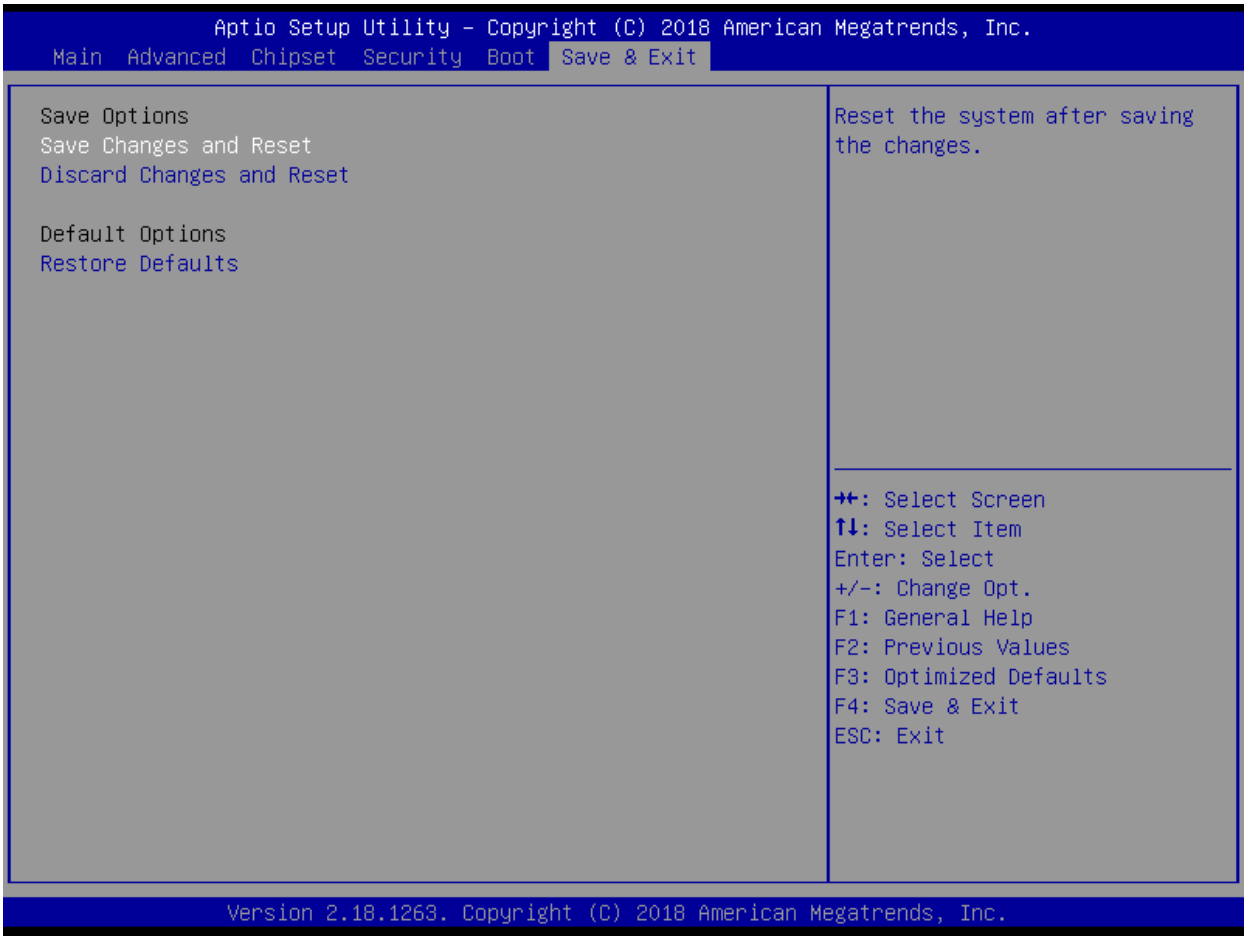
This item allows you to enable or disable Full Screen Logo Show function.

■ 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.

4.7 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

WDT Setting

Psuedo Code

```
#define AddrPort                0x2e
#define DataPort                0x2f
#define SIO_UnLock_Value        0x87
#define SIO_Lock_Value          0xaa
#define WATCHDOG_LDN            0x08
#define GPIO_Port               0xF1

//Enter_Config
WriteByte (AddrPort, SIO_UnLock_Value);
WriteByte (AddrPort, SIO_UnLock_Value);

//Enter WATCHDOG LDN
WriteByte (AddrPort, 0x07);
WriteByte (DataPort, WATCHDOG_LDN);

//Set count mode
WriteByte (AddrPort, 0xf0);
buf2 = ReadByte (DataPort) & 0xf4;   //clear "Select Watchdog Timer I count mode
buf2 |= 0x02;    //Enable the Watchdog Timer I output low pulse to the KBRST# pin
// buf2 |= 0x08;              //Bit3 = (1:Minute Mode/0:Second Mode)
WriteByte (DataPort, buf2);       //Write back

//Set watch dog time value
WriteByte (AddrPort, 0xf1)
WriteByte (DataPort, Time)     //Set watch dog time value

// close config mode
WriteByte (AddrPort, 0xaa);
```

GPIO Sample Code

GPIO Setting

PIN#	GPIO#	Default Configuration
18	XCOM-	
17	XCOM+	
16	OUT8	DIO Output8
15	IN8	DIO Input8
14	OUT7	DIO Output7
13	IN7	DIO Input7
12	OUT6	DIO Output6
11	IN6	DIO Input6
10	OUT5	DIO Output5
9	IN5	DIO Input5
8	OUT4	DIO Output4
7	IN4	DIO Input4
6	OUT3	DIO Output3
5	IN3	DIO Input3
4	OUT2	DIO Output2
3	IN2	DIO Input2
2	OUT1	DIO Output1
1	IN1	DIO Input1

The GPIO function is provided by Nuvoton NCT6106D, and it can be accessed through its GPIO index/data port. To access the GPIO register, write index to the index port, and then read/write from/to data port. The configuration on the RCO-6000 is described as below.

Psuedo Code

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

//Enter_Config
WriteByte (AddrPort, SIO_UnLock_Value);
WriteByte (AddrPort, SIO_UnLock_Value);

WriteByte (AddrPort, 0x07);
WriteByte (DataPort, SIO_LDN_GPIO);

//Set OUT1~OUT8Value
WriteByte (AddrPort, GPIO_Port);
WriteByte (DataPort, 0x00); //set OUT1~OUT8 value, OUT1=Bit0, OUT2=Bit1
```

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
OUT8	OUT7	OUT6	OUT5	OUT4	OUT3	OUT2	OUT1

```
// Read In1~In8 value
WriteByte (AddrPort, 0xED);
Data= ReadByte (DataPort); //Read In1~In8 value
```

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
IN8	IN7	IN6	IN5	IN4	IN3	IN2	IN1

```
// close config mode
WriteByte (AddrPort, SIO_Lock_Value);
```