C&T SOLUTION INC.

# USER'S MANUAL

## RCO-1000 Series

### Compact Fanless Embedded System

# Table of Contents

# Prefaces

## Revision

| Revision | Description | Date |
|---|---|---|
| 1.0 | Manual Released | 2017/10/26 |
| 1.1 | Power Connector Definition Revised | 2017/11/02 |
| 1.2 | WDT & GPIO Sample Code Revised | 2018/11/27 |

## Disclaimer

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## Environmental Protection Announcement

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

# Safety Precautions

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

- Put this equipment on a reliable surface during installation. Dropping it or letting it fall could cause damage.
- The power outlet shall be installed near the equipment and shall be easily accessible.
- Turn off the system power and disconnect the power cord from its source before making any installation. Be sure both the system and the external devices are turned OFF. Sudden surge
- of power could ruin sensitive components. Make sure the equipment is properly grounded.
- When the power is connected, never open the equipment. The equipment should be opened only by qualified service personnel.
- Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
- Disconnect this equipment from the power before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
- Avoid the dusty, humidity and temperature extremes.
- Do not place heavy objects on the equipment.
- If the equipment is not used for long time, disconnect it from the power to avoid being damaged by transient over-voltage.
- The storage temperature shall be above -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

1. Visit the C&T Solution Inc website at www.candtsolution.com where you can find the latest information about the product.
2. Contact your distributor, our technical support team or sales representative for technical support if you need additional assistance. Please have following information ready before you call:
   - Model name and serial number
   - Description of your peripheral attachments
   - Description of your software (operating system, version, application software, etc.)
   - A complete description of the problem
   - The exact wording of any error messages

## Conventions Used in this Manual

**WARNING** This indication alerts operators to an operation that, if not strictly observed, may result in severe injury.

**CAUTION** This indication alerts operators to an operation that, if not strictly observed, may result in safety hazards to personnel or damage to equipment.

**NOTE** This indication provides additional information to complete a task easily.

# Package Contents

Before installation, please ensure all the items listed in the following table are included in the package.

| Item | Description | Q'ty |
|---|---|---|
| 1 | RCO-1000 Series Embedded System | 1 |
| 2 | Utility DVD Driver | 1 |
| 3 | Wall Mount Kit | 1 |
| 4 | Accessory Kit | 1 |
| 5 | DVI to VGA Adapter | 1 |

# Ordering Information

| Model No. | Product Description |
|---|---|
| RCO-1000-E3845 | Compact fanless embedded system with Intel® E3845 CPU, 1x DVI-I, 2x COM |
| RCO-1000-J1900 | Compact fanless embedded system with Intel® J1900 CPU, 1x DVI-I, 2x COM |
| RCO-1010-E3845 | Compact fanless embedded system with Intel® E3845 CPU, 1x DVI-I, 2x COM, 1x 2.5" SATA HDD Bay |
| RCO-1010-J1900 | Compact fanless embedded system with Intel® J1900 CPU, 1x DVI-I, 2x COM, 1x 2.5" SATA HDD Bay |
| RCO-1010A-E3845 | Compact fanless embedded system with Intel® E3845 CPU, 1x DVI-I, 1x DP, DIO, 2x COM |
| RCO-1010A-J1900 | Compact fanless embedded system with Intel® J1900 CPU, 1x DVI-I, 1x DP, DIO, 2x COM |
| RCO-1010B-E3845 | Compact fanless embedded system with Intel® E3845 CPU, 1x DVI-I, 4x COM |
| RCO-1010B-J1900 | Compact fanless embedded system with Intel® J1900 CPU, 1x DVI-I, 4x COM |
| RCO-1020C-E3845 | Compact fanless embedded system with Intel® E3845 CPU, 1x DVI-I, 1x DP, DIO, 4x COM |
| RCO-1020C-J1900 | Compact fanless embedded system with Intel® J1900 CPU, 1x DVI-I, 1x DP, DIO, 4x COM |
| RCO-1020D-E3845 | Compact fanless embedded system with Intel® E3845 CPU, 1x DVI-I, 6x COM |
| RCO-1020D-J1900 | Compact fanless embedded system with Intel® J1900 CPU, 1x DVI-I, 6x COM |
| RCO-1030-E3845 | Compact fanless embedded system with Intel® E3845 CPU, 1x DVI-I, 1x DP, DIO, 6x COM |
| RCO-1030-J1900 | Compact fanless embedded system with Intel® J1900 CPU, 1x DVI-I, 1x DP, DIO, 6x COM |

# Optional Accessories

| Model No. | Product Description |
|---|---|
| 1-E09A06007 | Adapter AC/DC 12V 5A 60W with 3pin Terminal Block Plug 5.0mm Pitch |
| SFICBL022 | Power Cord, 3-pin US Type, 180cm |
| 1-TPCD00002 | Power Cord, European Type, 180cm |
| 1-TPCD00001 | Power Cord, 3-pin UK Type, 180cm |
| 3-SIDE-0001 | RCO-1000 Series Side Mount Kit |
| 3-SIDE-0002 | RCO-1010 Series Side Mount Kit |
| 3-SIDE-0003 | RCO-1020 Series Side Mount Kit |
| 3-SIDE-0004 | RCO-1030 Series Side Mount Kit |
| 3-VESA-0003 | RCO-1000 Series VESA Mount Kit |
| 3-DINR-0003 | DIN-Rail Mount Kit |

Chapter 1

# Product Introductions

## 1.1 Overview

Based on Intel® Atom™ E3845 (1.91GHz) or Celeron® J1900 (2.0GHz) Quad Core processor, RCO-1000 series is a high variety and diversity fanless embedded system. It offers 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, RCO-1000 series are ruggedized systems that can operate in harsh environments and easy to install and maintain. A build in over voltage protection (OVP), over current protection (OCP), reserve voltage protection, and wide range DC power input makes RCO-1000 series are safety system for all industrial applications.

**RCO-1000**

**RCO-1010**
**RCO-1010A**
**RCO-1010B**

**RCO-1020C**
**RCO-1020D**

**RCO-1030**

### 1.1.1 Key Features

- Intel® Atom™ E3845 (1.91GHz) / Celeron® J1900 (2.0GHz) Dual or Quad Core processor
- 1x DDR3L SO-DIMM max. up to 8GB
- Dual Independent Display from 1x DVI-I and 1x DisplayPort
- 2x Intel® GbE port, support Wake-on-LAN and PXE
- 1x USB 3.0, 3x USB2.0
- 6x RS232/422/485 port
- 4x Isolated DI, 4x Isolated DO
- 1x 2.5" SATA SSD/HDD bay, 1x mSATA and 2x SIM card socket
- 9~48VDC wide range power input, support AT/ATX mode
- 2x Mini-PCIe slot for Wi-Fi, GSM, or I/O expansion
- 1x Remote power on/off switch
- Universal I/O bracket for Mini-PCIe expansion

# 1.2 Hardware Specification

### Processor System
- Onboard Intel® Atom™ E3845 / J1900 Dual or Quad Core Processor, 1.91GHz / 2.0 GHz with AMI 64Mbit SPI BIOS.

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

### Display
**Dual Display**
- 1x DVI-D and 1x VGA (w/ Optional Split Cable)
- 1x DVI-D and 1x DisplayPort (RCO-1010A / RCO-1020C / RCO-1030 only)
- 1x DisplayPort and 1x VGA (w/ DVI to VGA Adapter) (RCO-1010A / RCO-1020C / RCO-1030 only)

### Expansion
- 2x Full-size Mini PCIe Socket for Wi-Fi / GSM / Expansion Module
- 1x Universal I/O Bracket (RCO-1010 / RCO-1020C / RCO-1020D only)
- 2x Universal I/O Bracket (RCO-1030 only)

### Ethernet
- 2 x Intel® I210-AT GbE LAN Port, Support Wake-on-LAN and PXE

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

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

### Storage
- 1x 2.5" SATA SSD/HDD Bay (RCO-1010 / RCO-1010A / RCO-1010B / RCO-1020C / RCO-1020D / RCO-1030 only)
- 1x mSATA (share by 1x Mini-PCIe Socket)
- 2x External SIM Card Socket

### I/O Ports
- 1x USB 3.0 Port
- 3x USB 2.0 Port
- 2 x DB9 for COM1~2, Support RS232/422/485 with Auto Flow Control (RCO-1000 / RCO-1010 / RCO-1010A only)
- 4 x DB9 for COM1~4, Support RS232/422/485 with Auto Flow Control (RCO-1010B / RCO-1020C only)
- 6 x DB9 for COM1~6, Support RS232/422/485 with Auto Flow Control (RCO-1020D / RCO-1030 only)
- 3x Antenna Hole (RCO-1000 only)
- 4x Antenna Hole
- 1x Power Switch
- 1x Remote Power Switch
- 1x Reset Hole
- 1x AT/ATX Switch

### Digital Input & Output
- 4x Digital Input (Source Type)
  - Input Voltage (Dry Contact):
    Logic 0: Close to GND
    Logic 1: Open
  - Input Voltage:
    Logic 0: 3V max.
    Logic 1: 5V min. (DI to COM-)
- 4x Digital Output
  - Supply Voltage: 5~30VDC
  - Sink Current: 200 mA Max. Per Channel

### Power
- Support AT, ATX Mode
- 1x 3-pin Terminal Block Connector with Power Input 9~48VDC
- 1x Optional AC/DC 12V/5A, 60W Power Adapter

### 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
- Dimension (WxDxH, mm):
  150 x 105 x 37 mm (RCO-1000)
  150 x 105 x 49 mm (RCO-1010 / RCO-1010A / RCO-1010B)
  150 x 105 x 65 mm (RCO-1020C / RCO-1020D)
  150 x 105 x 83 mm (RCO-1030)
- Weight: 0.69 ~1.11 kg
- Construction: Extruded Aluminum with Heavy Duty Metal
- Mounting: Wall, Optional VESA / Side / DIN-Rail Mounting

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

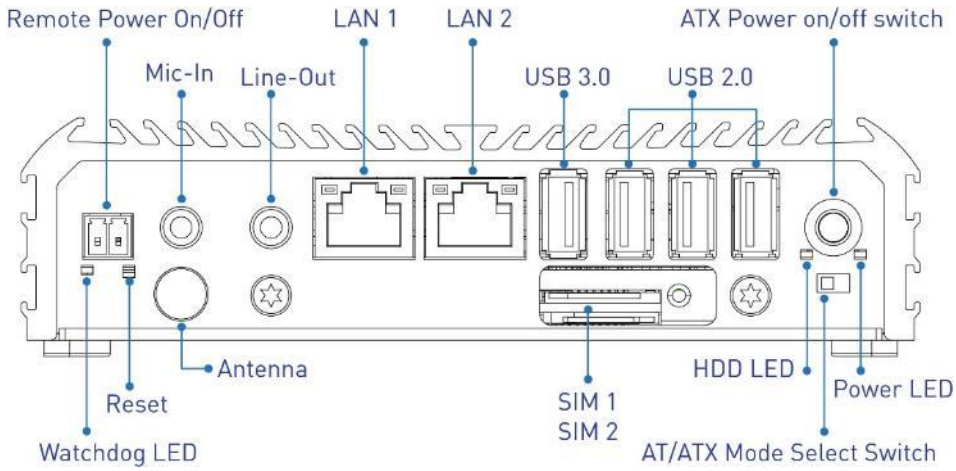
### Certifications
- CE
- FCC Class A

# 1.3 System I/O

## 1.3.1 RCO-1000

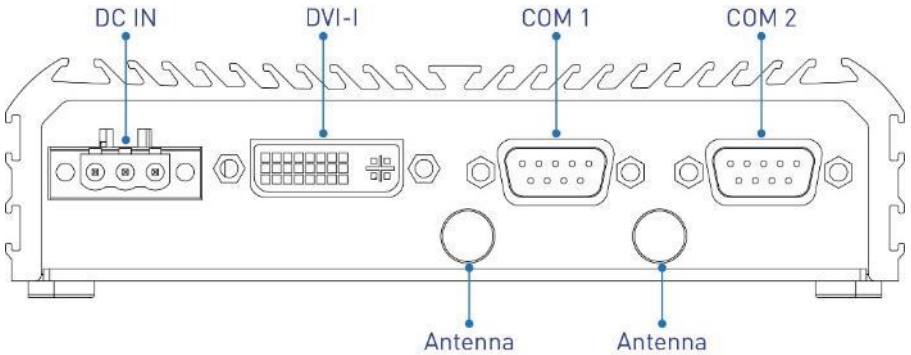
### Front Panel

**ATX power on/off switch**
Press to power-on or power-off the system
**AT/ATX mode select switch**
Used to select AT or ATX power mode
**Power LED**
Indicates the power status of the system
**HDD LED**
Indicates the status of the hard drive
**Wachdog LED**
Indicates the watchdog status of the system
**USB 3.0 port**
Used to connect USB 3.0/2.0/1.1 device
**USB 2.0 port**
Used to connect USB 2.0/1.1 device
**SIM card**
Used to insert a SIM card
**LAN port**
Used to connect the system to a local area network
**Line-out**
Used to connect a speaker
**Mic-in**
Used to connect a microphone
**Remote power on/off switch**
Used to plug a power on/off switch with terminal block
**Reset Hole**
Used to reset the system
**Antenna hole**
Used to connect an antenna for optional Mini-PCIe WiFi module




### Rear Panel

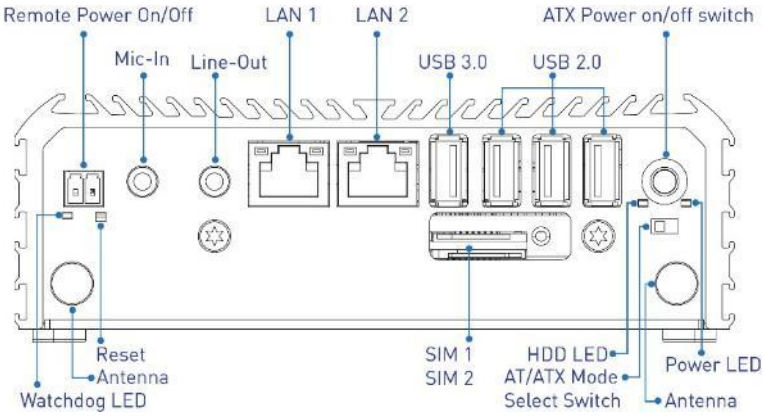
**DC IN**
Used to plug a DC power input with terminal block
**DVI-I port**
Used to connect a DVI monitor or connect optional split cable for dual display mode
**COM port**
COM1 ~ COM2 support RS232/422/485 serial device
**Antenna hole**
Used to connect an antenna for optional Mini-PCIe WiFi module



## 1.3.2 RCO-1010 / RCO-1010A / RCO-1010B

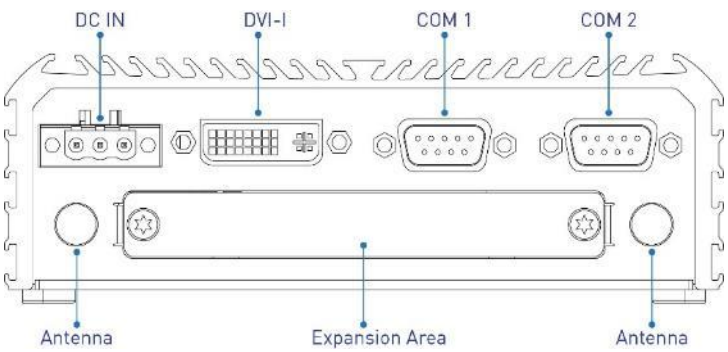
### Front Panel

**ATX power on/off switch**
Press to power-on or power-off the system
**AT/ATX mode select switch**
Used to select AT or ATX power mode
**Power LED**
Indicates the power status of the system
**HDD LED**
Indicates the status of the hard drive
**Wachdog LED**
Indicates the watchdog status of the system
**USB 3.0 port**
Used to connect USB 3.0/2.0/1.1 device
**USB 2.0 port**
Used to connect USB 2.0/1.1 device
**SIM card**
Used to insert a SIM card
**LAN port**
Used to connect the system to a local area network
**Line-out**
Used to connect a speaker
**Mic-in**
Used to connect a microphone
**Remote power on/off switch**
Used to plug a power on/off switch with terminal block
**Reset Hole**
Used to reset the system
**Antenna hole**
Used to connect an antenna for optional Mini-PCIe WiFi module




### Rear Panel

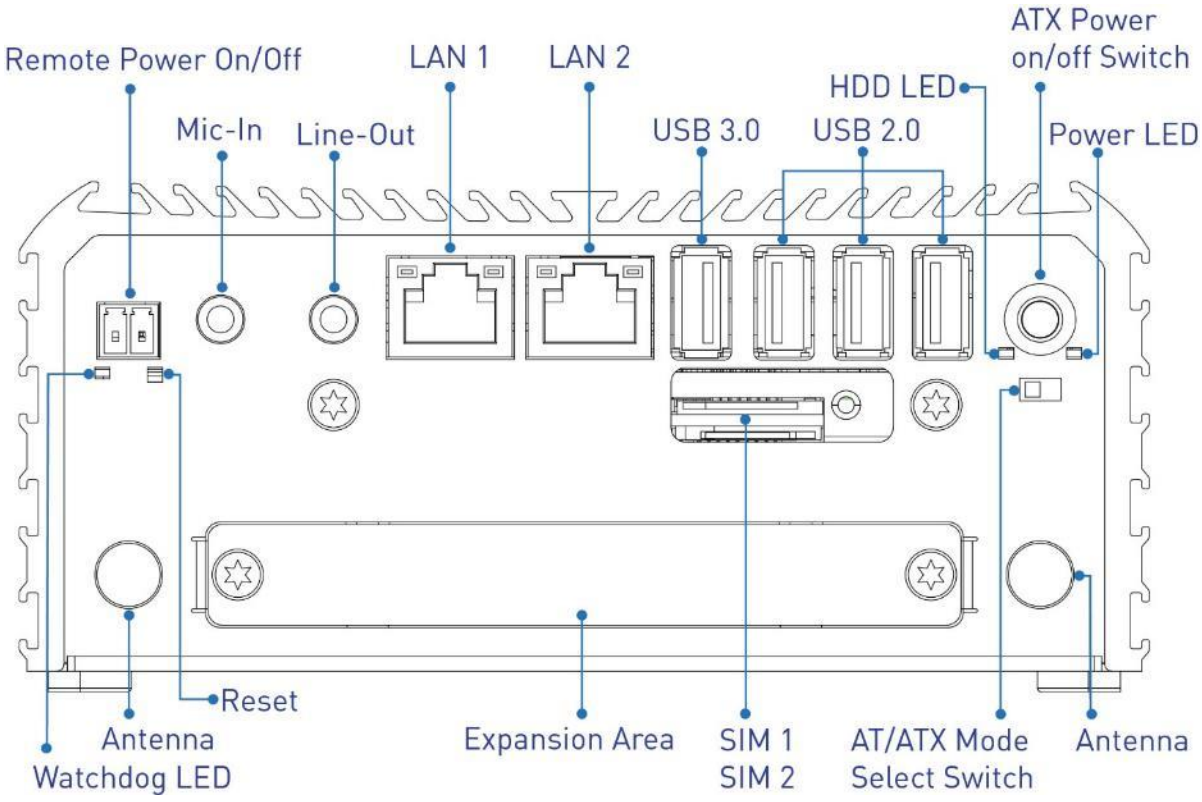
**DC IN**
Used to plug a DC power input with terminal block
**DVI-I port**
Used to connect a DVI monitor or connect optional split cable for dual display mode
**DisplayPort port (RCO-1010A only)**
Used to connect a DisplayPort monitor
**Digital I/O Terminal Block**
The Digital I/O terminal block supports 4 digital input and 4 digital output (RCO-1010A only)
**COM port**
COM1 ~ COM2 support RS232/422/485 serial device (RCO-1010, RCO-1010A Only)
COM1 ~ COM4 support RS232/422/485 serial device (RCO-1010B Only)
**Antenna hole**
Used to connect an antenna for optional Mini-PCIe WiFi module
**Expandable I/O bracket**
Used to customized I/O output (RCO-1010 only)



### 1.3.3 RCO-1020C / RCO-1020D

#### Front Panel

**ATX power on/off switch**
Press to power-on or power-off the system
**AT/ATX mode select switch**
Used to select AT or ATX power mode
**Power LED**
Indicates the power status of the system
**HDD LED**
Indicates the status of the hard drive
**Wachdog LED**
Indicates the watchdog status of the system
**USB 3.0 port**
Used to connect USB 3.0/2.0/1.1 device
**USB 2.0 port**
Used to connect USB 2.0/1.1 device
**SIM card**
Used to insert a SIM card
**LAN port**
Used to connect the system to a local area network
**Line-out**
Used to connect a speaker
**Mic-in**
Used to connect a microphone
**Remote power on/off switch**
Used to plug a power on/off switch with terminal block
**Reset Hole**
Used to reset the system
**Antenna hole**
Used to connect an antenna for optional Mini-PCIe WiFi module
**Expandable I/O bracket**
Used to customized I/O output



## Rear Panel

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

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

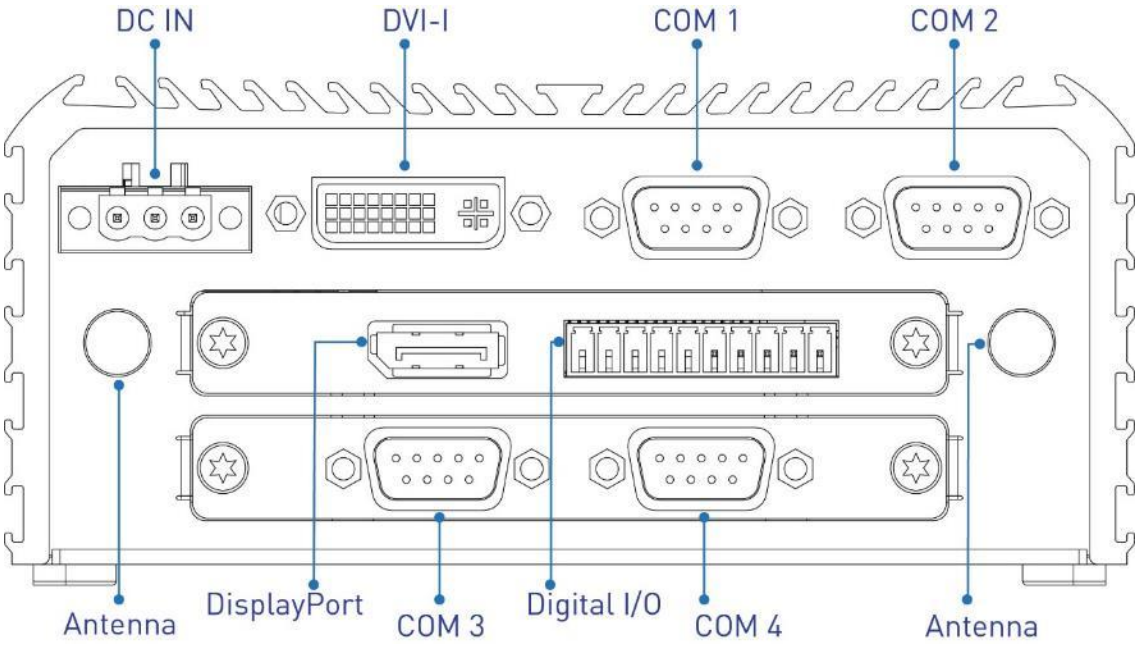
**DisplayPort port (RCO-1020C only)**
Used to connect a DisplayPort monitor

**Digital I/O Terminal Block**
The Digital I/O terminal block supports 4 digital input and 4 digital output (RCO-1020C only)

**COM port**
COM1 ~ COM4 support RS232/422/485 serial device (RCO-1020C Only)
COM1 ~ COM6 support RS232/422/485 serial device (RCO-1020D Only)

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

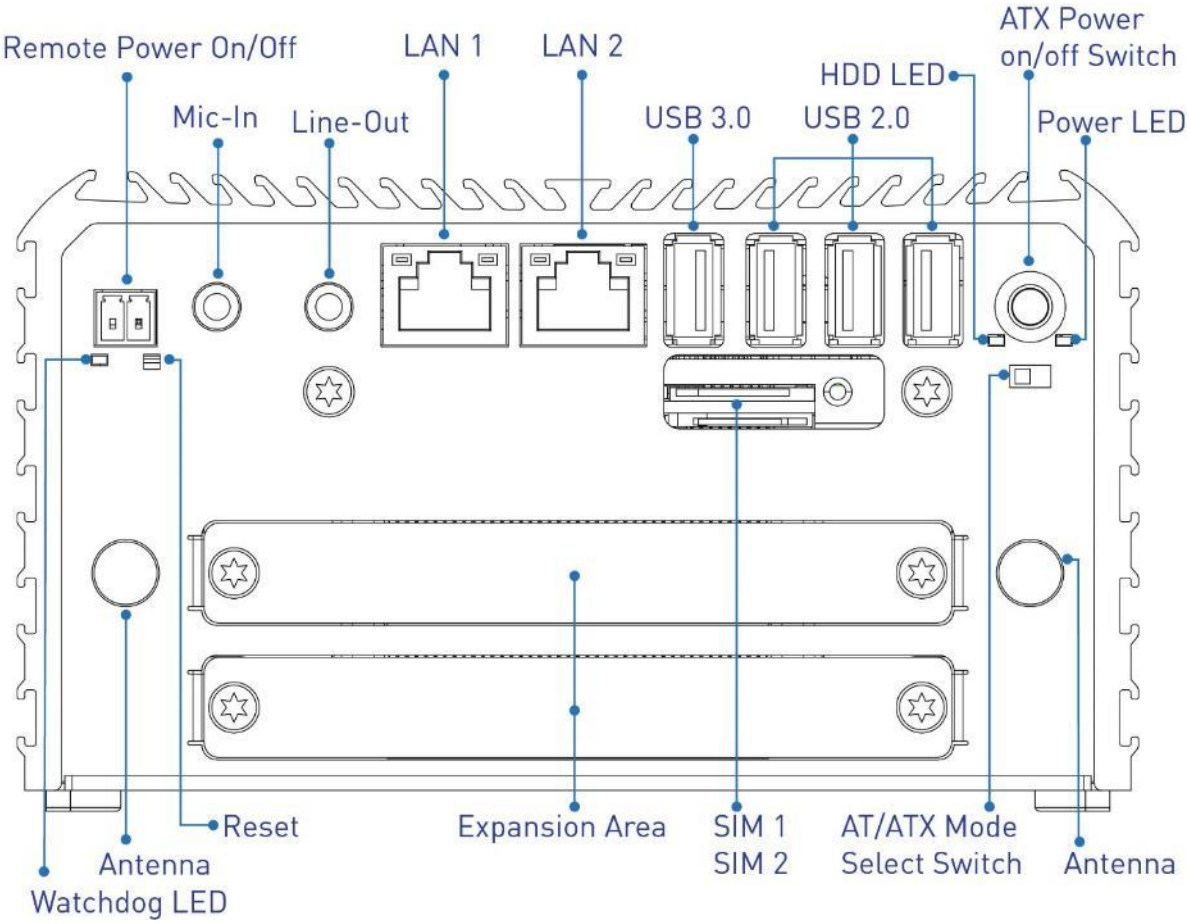
**Expandable I/O bracket**
Used to customized I/O output



### 1.3.4 RCO-1030

#### Front Panel

**ATX power on/off switch**
Press to power-on or power-off the system
**AT/ATX mode select switch**
Used to select AT or ATX power mode
**Power LED**
Indicates the power status of the system
**HDD LED**
Indicates the status of the hard drive
**Wachdog LED**
Indicates the watchdog status of the system
**USB 3.0 port**
Used to connect USB 3.0/2.0/1.1 device
**USB 2.0 port**
Used to connect USB 2.0/1.1 device
**SIM card**
Used to insert a SIM card
**LAN port**
Used to connect the system to a local area network
**Line-out**
Used to connect a speaker
**Mic-in**
Used to connect a microphone
**Remote power on/off switch**
Used to plug a power on/off switch with terminal block
**Reset Hole**
Used to reset the system
**Antenna hole**
Used to connect an antenna for optional Mini-PCIe WiFi module
**Expandable I/O bracket**
Used to customized I/O output



## Rear Panel

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

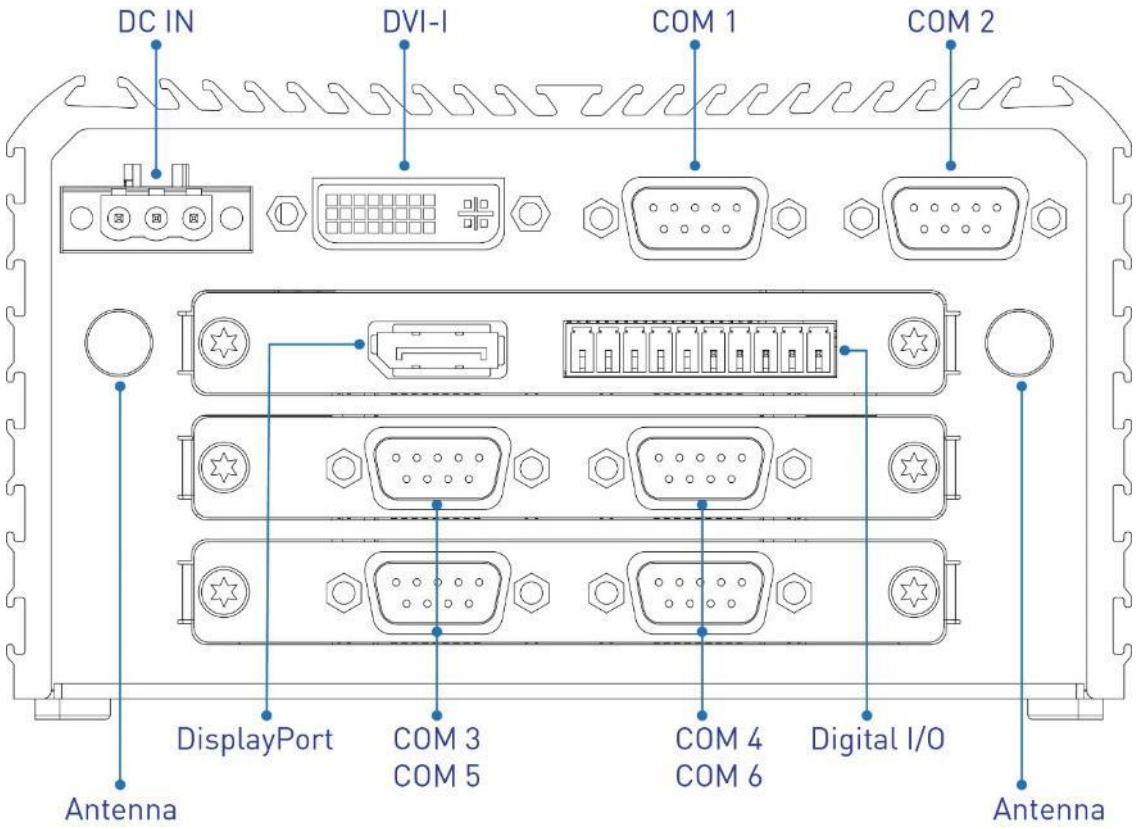
**DVI-I port**
Used to connect a DVI monitor or connect optional split cable for dual display mode

**DisplayPort port**
Used to connect a DisplayPort monitor

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

**COM port**
COM1 ~ COM6 support RS232/422/485 serial device

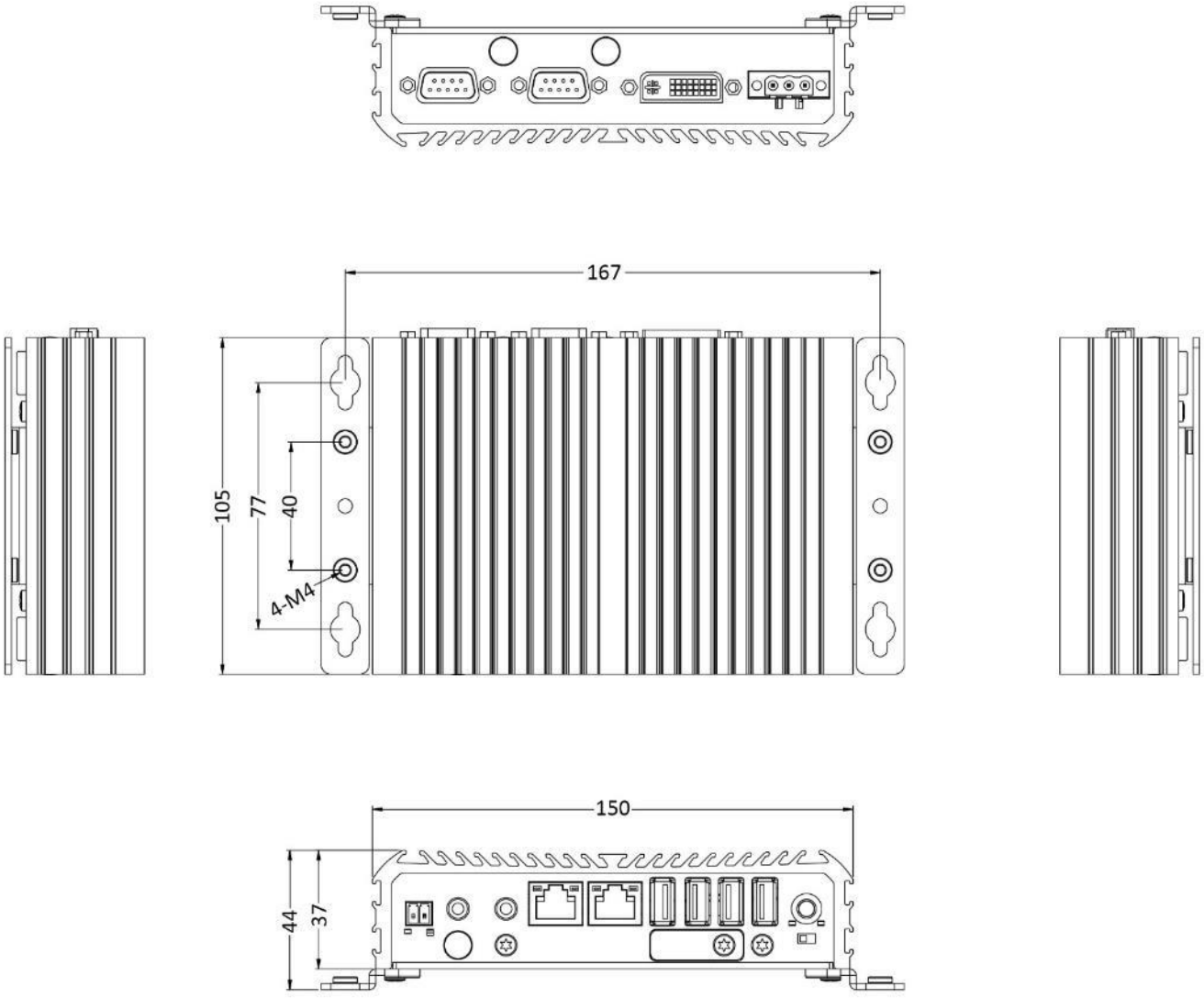
**Antenna hole**
Used to connect an antenna for optional Mini-PCIe WiFi module



# 1.4 Mechanical Dimensions

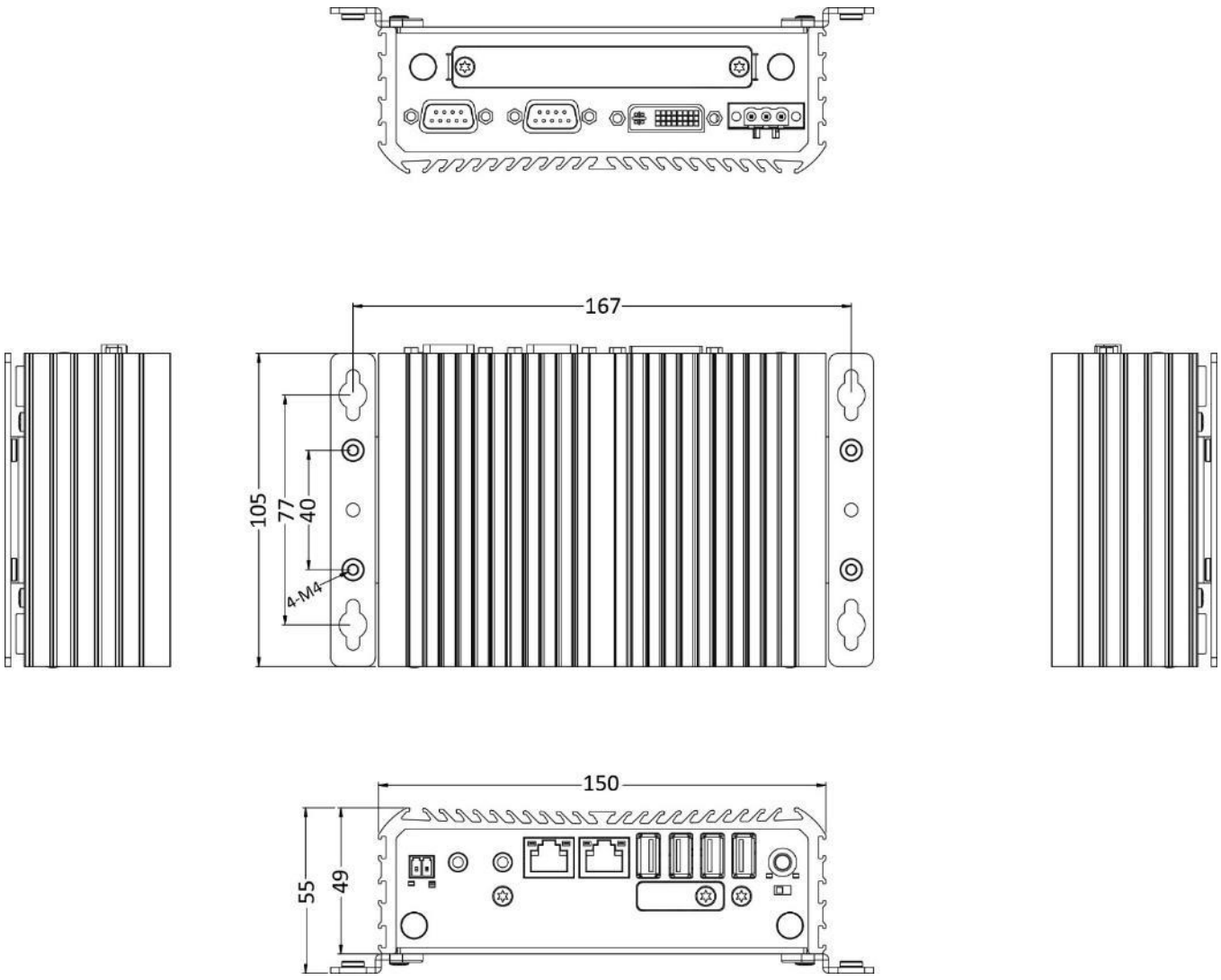
## 1.4.1 RCO-1000

Unit: mm



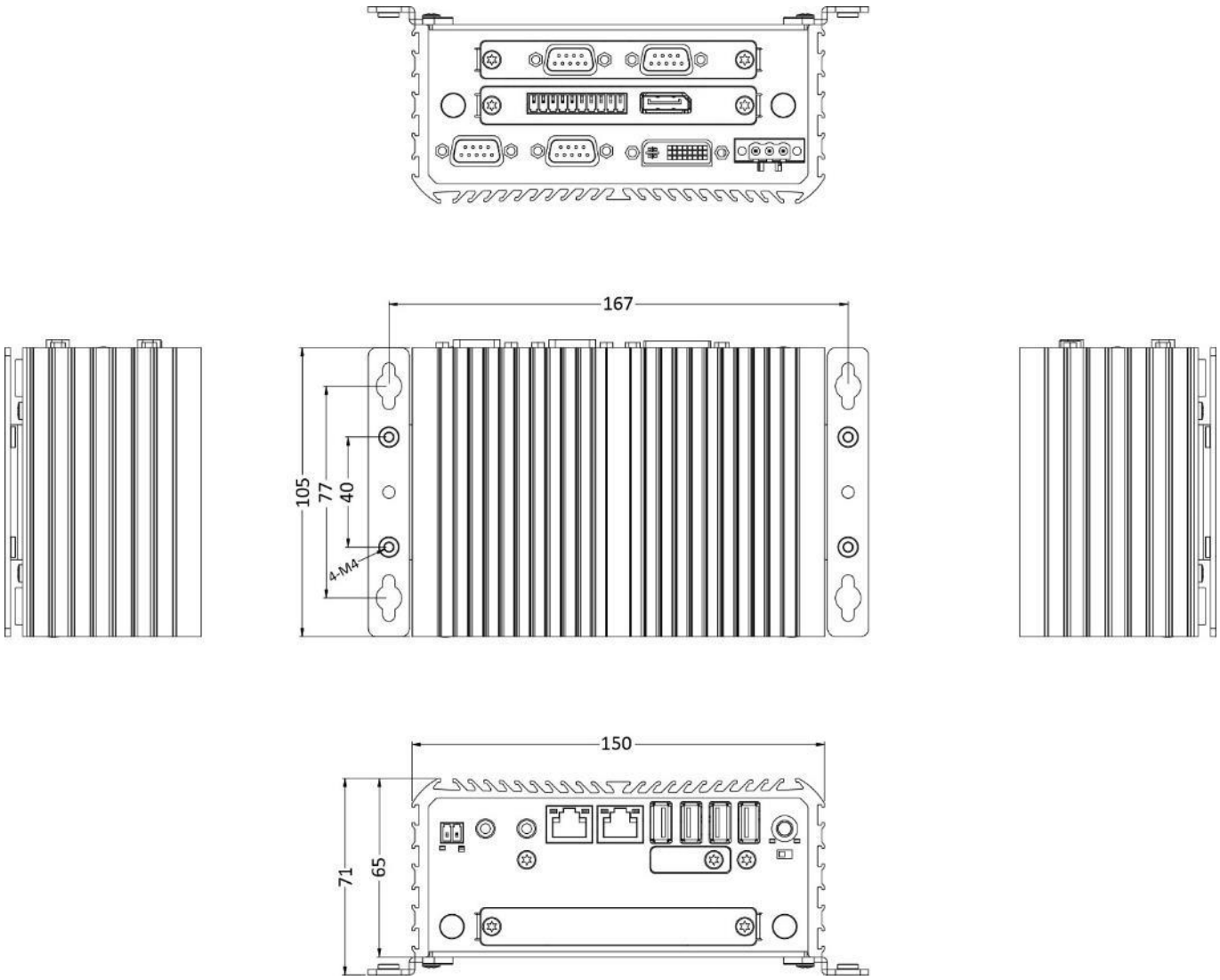
## 1.4.2 RCO-1010 / RCO-1010A / RCO-1010B

Unit: mm



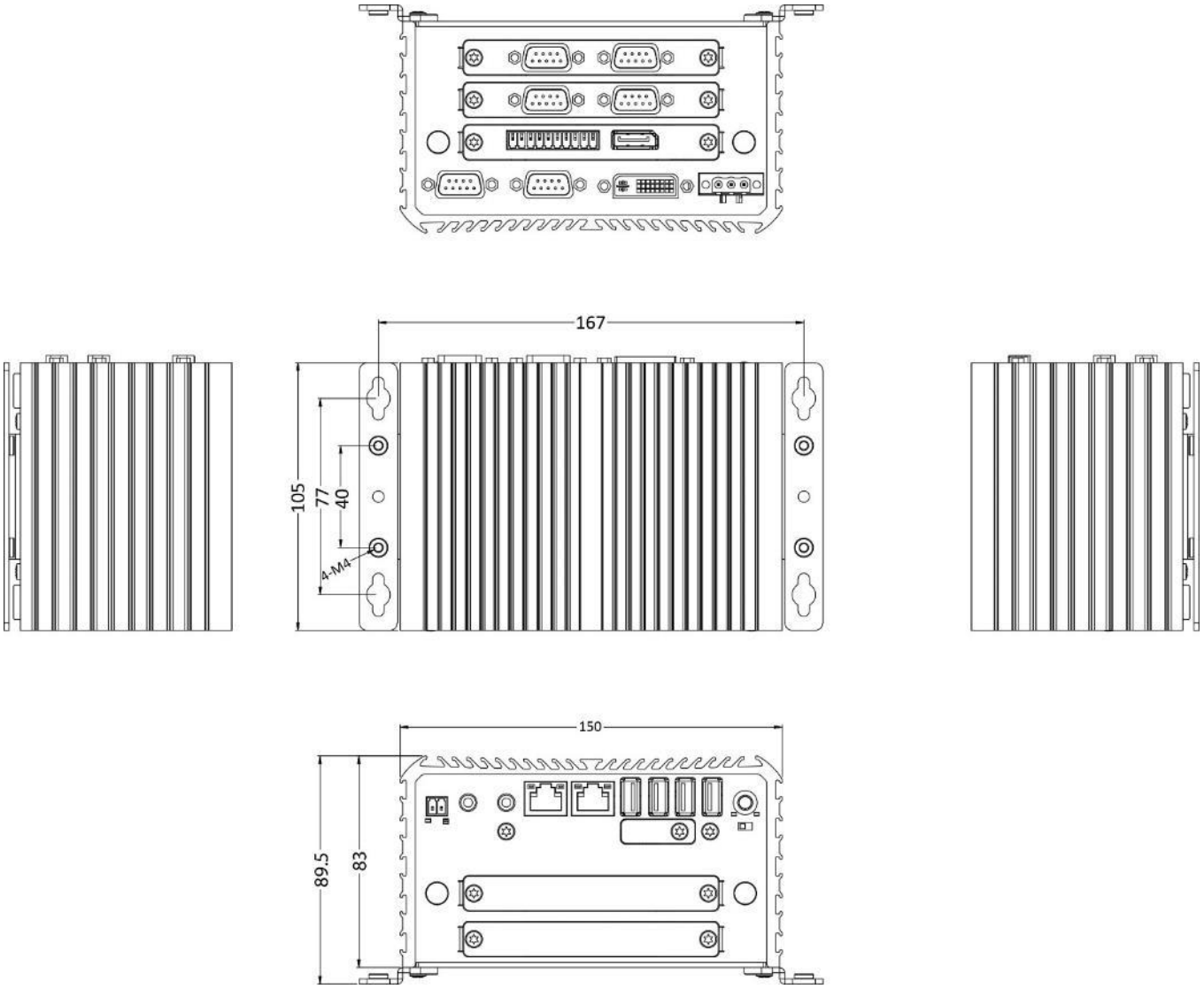
### 1.4.3 RCO-1020C / RCO-1020D

Unit: mm



### 1.4.4 RCO-1030

Unit: mm

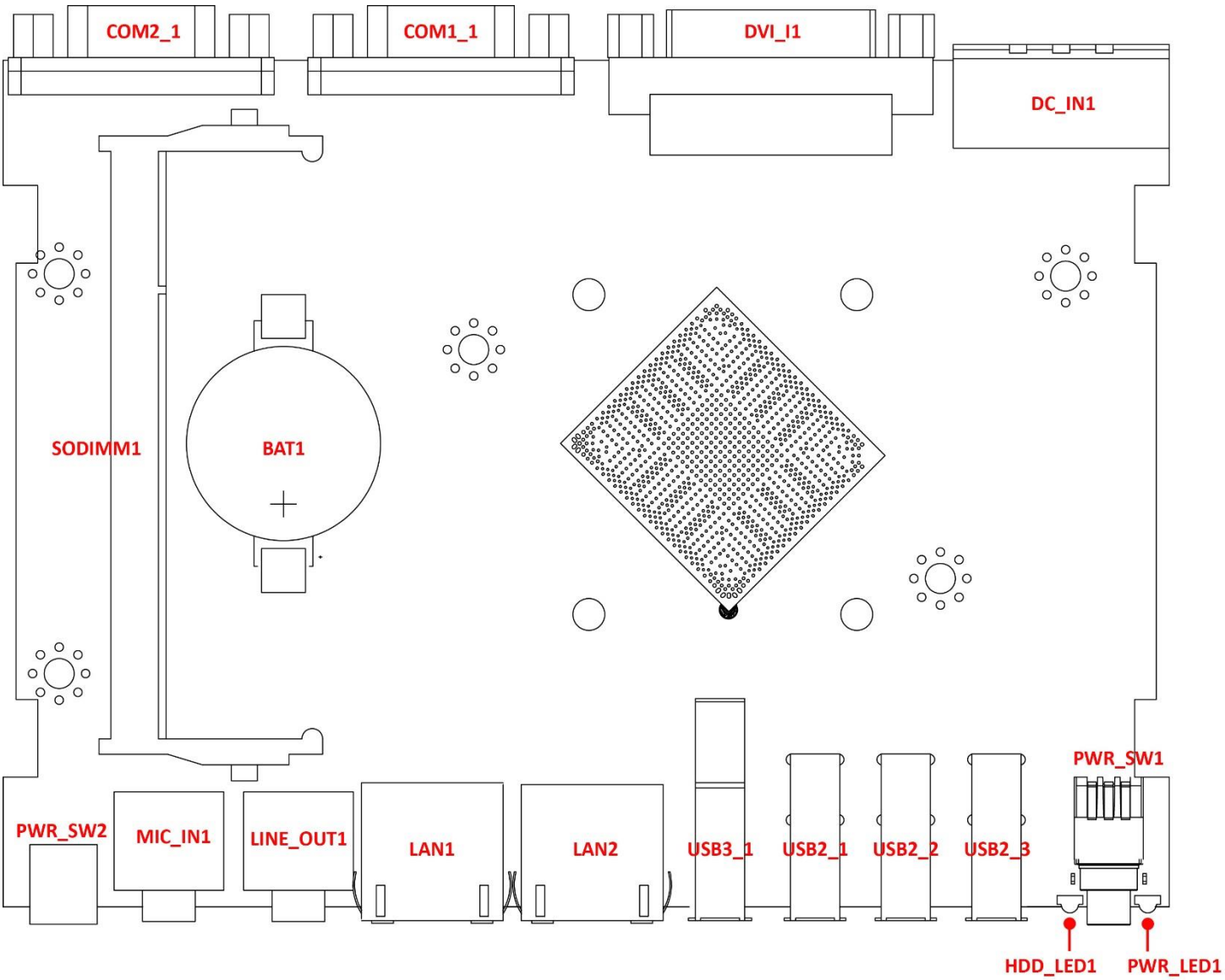


Chapter 2

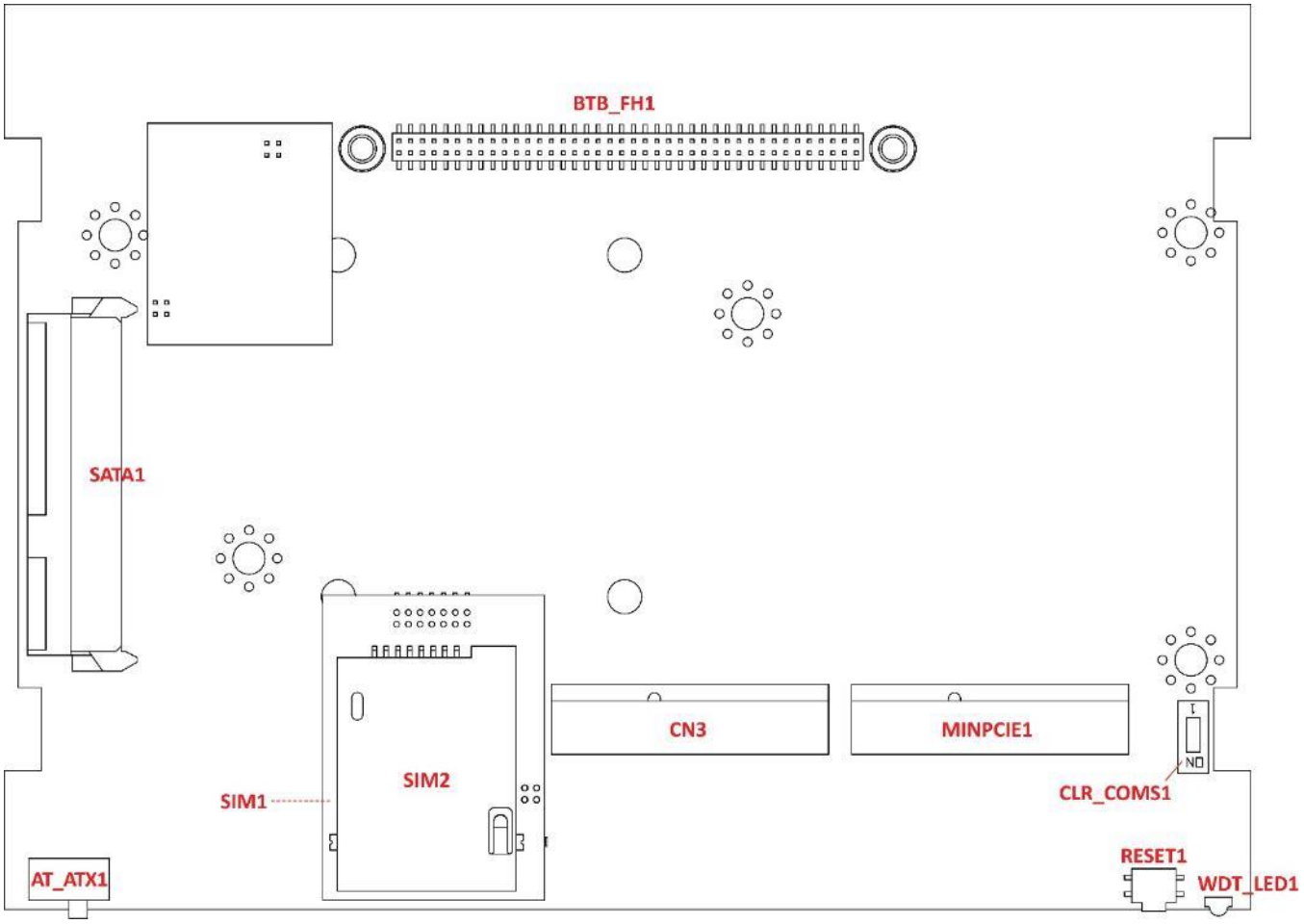
# Switches and Connectors

# 2.1 Switch and Connector Locations

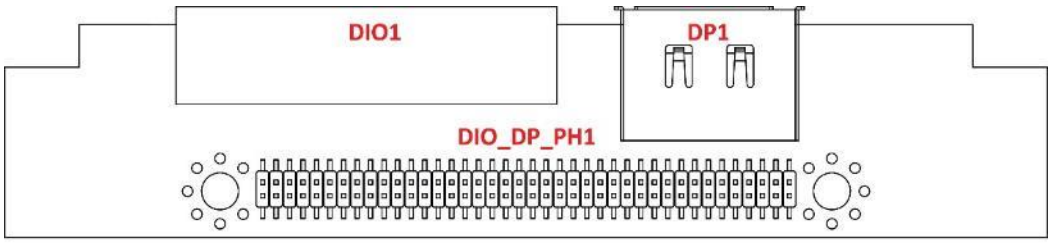
### 2.1.1 Top View

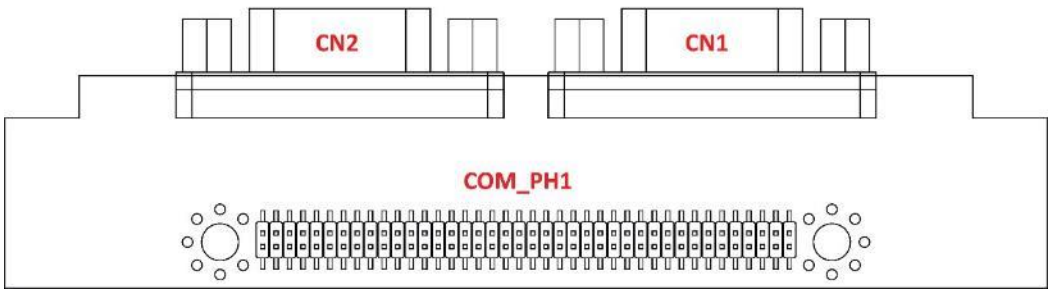


### 2.1.2 Bottom View




### 2.1.3 Daughter board view



## 2.2 Connector / Switch Definition

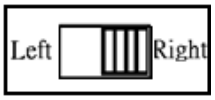
### List of Connector / Switch

| Connector Location | Definition |
|---|---|
| AT_ATX1 | AT / ATX Power Mode Switch |
| CLR_CMOS1 | Clear BIOS Switch |
| PWR_SW1 | Power Switch |
| PWR_LED1 | Power LED Status |
| HDD_LED1 | HDD Access LED Status |
| WDT_LED1 | Watchdog LED Status |
| USB2_1, USB2_2, USB2_3 | USB 2.0 Port |
| USB3_1 | USB 3.0 Port |
| LAN1, LAN2 | LAN Port |
| SIM1, SIM2 | SIM Card Socket |
| LINE_OUT1 | Line-out Jack |
| MIC_IN1 | Mic-in Jack |
| PWR_SW2 | Remote Power Switch |
| RESET1 | Reset Switch |
| DC_IN1 | 3-pin DC 9~48V Power Input Connector |
| DVI_I1 | DVI-I Connector |
| COM1_1, COM2_1, CN1, CN2 | RS232 / RS422 / RS485 Connector |
| DP1 | DisplayPort Connector |
| DIO1 | 4DI / 4DO Connector |
| MINIPCIE1 | Mini PCI-Express Socket |
| CN3 | Mini PCI-Express / mSATA Socket |
| SATA1 | SATA with Power Connector |

## 2.3 Switches Definitions

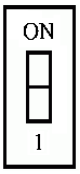
**AT_ATX1: AT / ATX Power Mode Switch**

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




**CLR_CMOS1: Clear BIOS Switch**

| Switch | Definition |
|---|---|
| Off | Normal Status (Default) |
| ON | Clear BIOS |




## 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 |

**PWR_LED1: Power LED Status**

| Pin | Definition |
|---|---|
| 1 | POWER LED+ |
| 2 | POWER LED- |

**HDD_LED1: HDD Access LED Status**

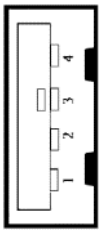
| Pin | Definition |
|---|---|
| 1 | HDD LED+ |
| 2 | HDD LED- |

**WDT_LED1: Watchdog LED Status**

| Pin | Definition |
|---|---|
| 1 | HDD LED+ |
| 2 | HDD LED- |

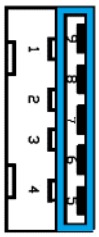
**USB2_1, USB2_2, USB2_3: USB2.0 Connector, Type A**

| Pin | USB2_1 Definition | USB2_2 Definition | USB2_3 Definition |
|---|---|---|---|
| 1 | +5V | +5V | +5V |
| 2 | USB2_D2- | USB2_D3- | USB2_D4- |
| 3 | USB2_D2+ | USB2_D3+ | USB2_D4+ |
| 4 | GND | GND | GND |



### USB3_1: USB 3.0 Connector, Type A

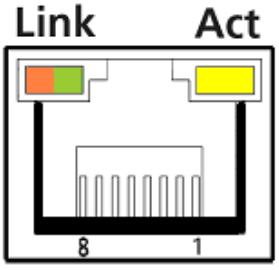
| Pin | Definition | Pin | Definition |
|---|---|---|---|
| 1 | +5V | 6 | USB3_RX+ |
| 2 | USB2_DATA1- | 7 | GND |
| 3 | USB2_DATA1+ | 8 | USB3_TX- |
| 4 | GND | 9 | USB3_TX+ |
| 5 | USB3_RX- | | |



### LAN1, LAN2: RJ45 with LEDs Port

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

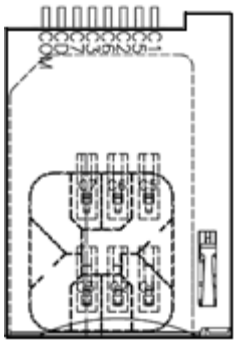
| Pin | Definition | Pin | Definition |
|---|---|---|---|
| 1 | LAN2_MDI0P | 5 | LAN2_MDI2N |
| 2 | LAN2_MDI0N | 6 | LAN2_MDI1N |
| 3 | LAN2_MDI1P | 7 | LAN2_MDI3P |
| 4 | LAN2_MDI2P | 8 | LAN2_MDI3N |




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

### SIM1, SIM2：SIM Card Socket

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



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

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

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

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

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

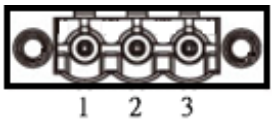
| Pin | Definition |
|---|---|
| 1 | Power Button |
| 2 | GND |


**RESET1 : Reset Button**

| Pin | Definition |
|---|---|
| 1 | RESET |
| 2 | GND |

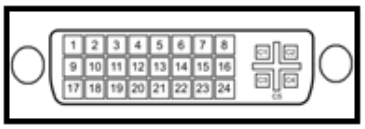
**DC_IN1: DC Power Input Connector (+9~48V)**
Connector Type: Terminal Block 1X3 3-pin, 5.0mm pitch

| Pin | Definition |
|---|---|
| 1 | +9~48VIN |
| 3 | GND |



**DVI_I1: DVI-I Connector**

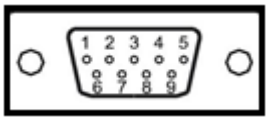
| Pin | Definition | Pin | Definition |
|---|---|---|---|
| 1 | DVI_TX2- | 16 | DVI Hot Plug Detect |
| 2 | DVI_TX2+ | 17 | DVI_TX0- |
| 3 | GND | 18 | DVI_TX0+ |
| 4 | NC | 19 | GND |
| 5 | NC | 20 | NC |
| 6 | DDC_CLOCK | 21 | NC |
| 7 | DDC_DATA | 22 | GND |
| 8 | VGA VSYNC | 23 | DVI_TXCLK+ |
| 9 | 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 | | |



**COM1_1: RS232 / RS422 / RS485 Connector**

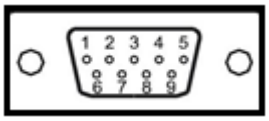
Connector Type: 9-pin D-Sub

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



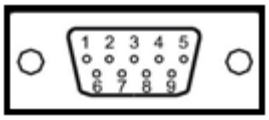
**COM2_1: RS232 / RS422 / RS485 Connector**
Connector Type: 9-pin D-Sub

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




**CN1: RS232 / RS422 / RS485 Connector**
Connector Type: 9-pin D-Sub

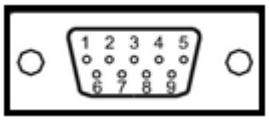
| Pin | RS232 Definition | RS422 / 485 Full Duplex Definition | RS485 Half Duplex Definition |
|---|---|---|---|
| 1 | DCD3 (DCD5) | TX3- (TX5-) | DATA3- (DATA5-) |
| 2 | RxD3 (RxD5) | TX3+ (TX5+) | DATA3+ (DATA5+) |
| 3 | TxD3 (TxD5) | RX3+ (RX5+) | |
| 4 | DTR3 (DTR5) | RX3- (RX5-) | |
| 5 | GND | | |
| 6 | DSR3 (DSR5) | | |
| 7 | RTS3 (RTS5) | | |
| 8 | CTS3 (CTS5) | | |
| 9 | RI3 (RI5) | | |



**CN2: RS232 / RS422 / RS485 Connector**

Connector Type: 9-pin D-Sub

| Pin | RS232 Definition | RS422 / 485 Full Duplex Definition | RS485 Half Duplex Definition |
|---|---|---|---|
| 1 | DCD4 (DCD6) | TX4- (TX6-) | DATA4- (DATA6-) |
| 2 | RxD4 (RxD6) | TX4+ (TX6+) | DATA4+ (DATA6+) |
| 3 | TxD4 (TxD6) | RX4+ (RX6+) | |
| 4 | DTR4 (DTR6) | RX4- (RX6-) | |
| 5 | GND | | |
| 6 | DSR4 (DSR6) | | |
| 7 | RTS4 (RTS6) | | |
| 8 | CTS4 (CTS6) | | |
| 9 | RI4 (RI6) | | |



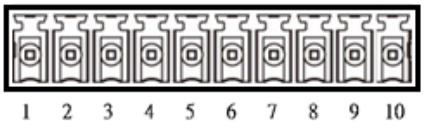

**DP1: DisplayPort Connector**

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

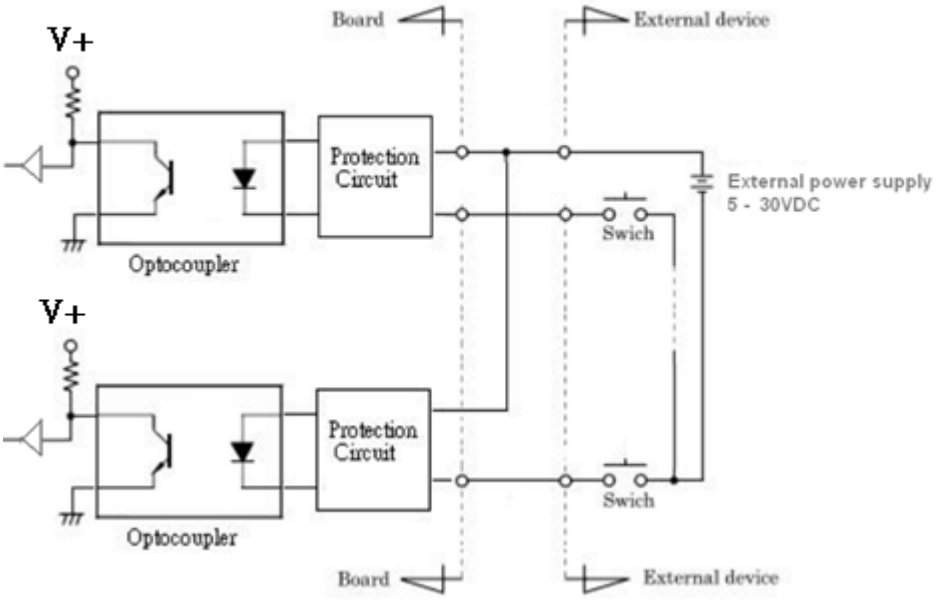

**DIO1: Digital Input / Output Connector**

Connector Type: Terminal Block 1X10 10-pin, 3.5mm pitch

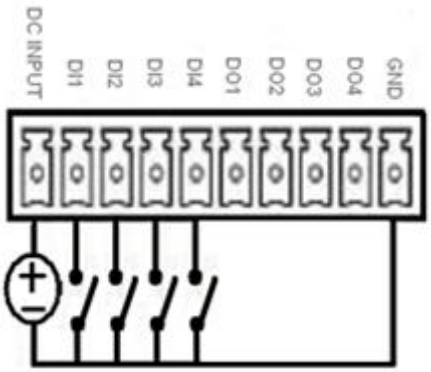
| Pin | Definition | Pin | Definition |
|---|---|---|---|
| 1 | DC INPUT | 6 | DO1 |
| 2 | DI1 | 7 | DO2 |
| 3 | DI2 | 8 | DO3 |
| 4 | DI3 | 9 | DO4 |
| 5 | DI4 | 10 | GND |



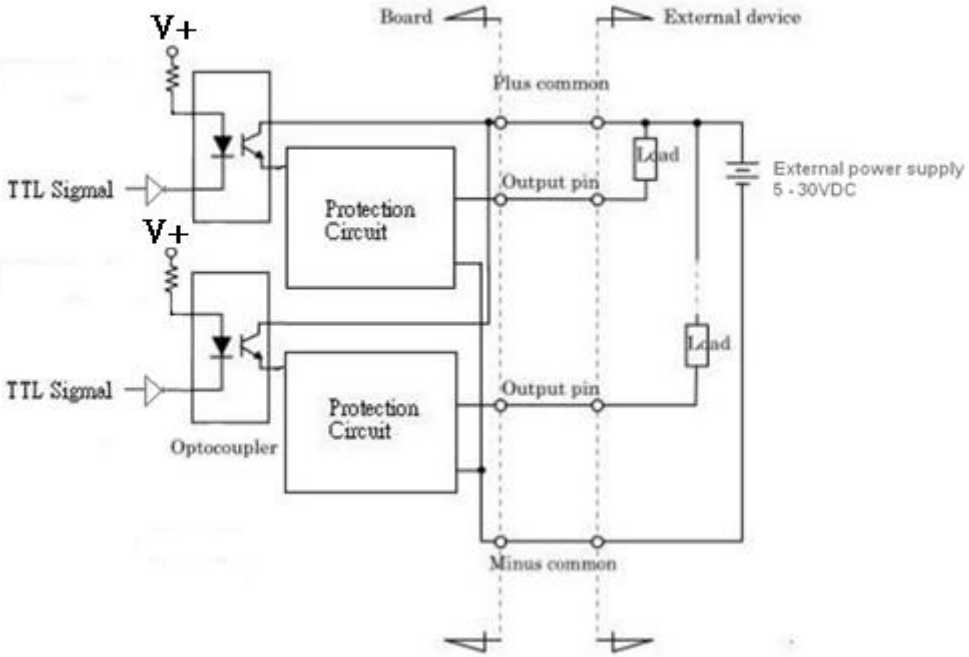
## Reference Input Circuit



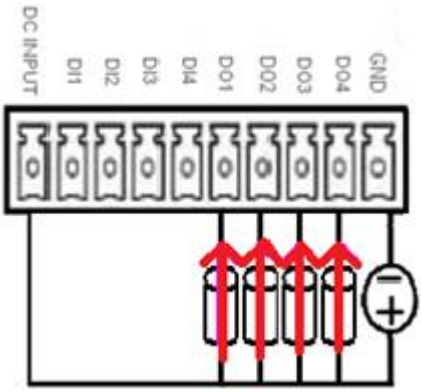

## Digital Input Wiring




## External Output Circuit

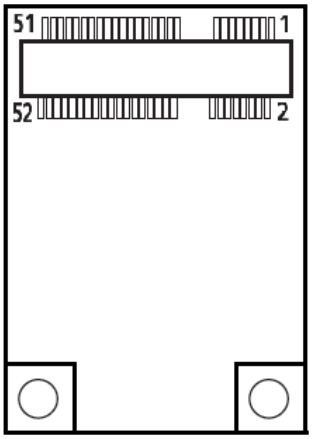



## Digital Output Wiring



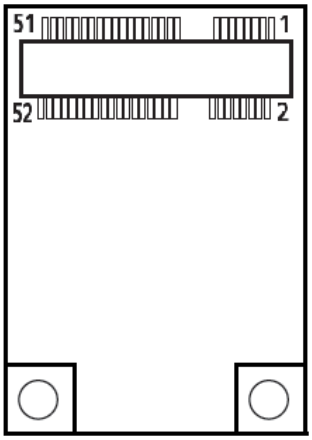
**MINIPCIE1: Mini PCI-Express Socket**

| Pin | Definition | Pin | Definition | Pin | Definition |
|---|---|---|---|---|---|
| 1 | WAKE# | 19 | NC | 37 | GND |
| 2 | +3.3V | 20 | +3.3V | 38 | USB_DP1 |
| 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 | CLKREQ1# | 25 | MINIPCIE_RXP1 | 43 | GND |
| 8 | NC | 26 | GND | 44 | NC |
| 9 | GND | 27 | GND | 45 | NC |
| 10 | NC | 28 | +1.5V | 46 | NC |
| 11 | MINIPCIE_CLKN1 | 29 | GND | 47 | NC |
| 12 | NC | 30 | SMB_CLK | 48 | +1.5V |
| 13 | MINIPCIE_CLKP1 | 31 | MINIPCIE_TXN1 | 49 | NC |
| 14 | NC | 32 | SMB_DATA | 50 | GND |
| 15 | GND | 33 | MINIPCIE_TXP1 | 51 | NC |
| 16 | NC | 34 | GND | 52 | +3.3V |
| 17 | NC | 35 | GND | | |
| 18 | GND | 36 | USB_DN1 | | |



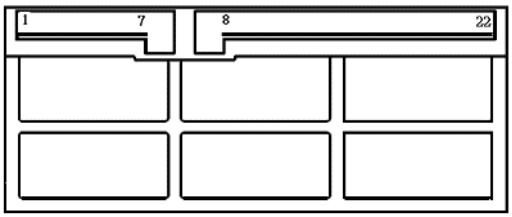

**CN3: Mini PCI-Express / mSATA Socket**

| Pin | Definition | Pin | Definition | Pin | Definition |
|---|---|---|---|---|---|
| 1 | WAKE# | 19 | NC | 37 | GND |
| 2 | +3.3V | 20 | +3.3V | 38 | USB_DP2 |
| 3 | NC | 21 | GND | 39 | +3.3V |
| 4 | GND | 22 | MINIPCIE RST# | 40 | GND |
| 5 | NC | 23 | MINIPCIE_RXN2 (SATA_RXP0) | 41 | +3.3V |
| 6 | +1.5V | 24 | +3.3V | 42 | NC |
| 7 | CLKREQ2# | 25 | MINIPCIE_RXP2 (SATA_RXN0) | 43 | GND |
| 8 | USIM_VCC | 26 | GND | 44 | NC |
| 9 | GND | 27 | GND | 45 | NC |
| 10 | USIM_DATA | 28 | +1.5V | 46 | NC |
| 11 | MINIPCIE_CLKN2 | 29 | GND | 47 | NC |
| 12 | USIM_CLK | 30 | SMB_CLK | 48 | +1.5V |
| 13 | MINIPCIE_CLKP2 | 31 | MINIPCIE_TXN2 (SATA_TXN0) | 49 | NC |
| 14 | USIM_RST | 32 | SMB_DATA | 50 | GND |
| 15 | GND | 33 | MINIPCIE_TXP2 (SATA_TXP0) | 51 | NC |
| 16 | USIM_VPP | 34 | GND | 52 | +3.3V |
| 17 | NC | 35 | GND | | |
| 18 | GND | 36 | USB_DN1 | | |



**SATA1: SATA with Power Connector**

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



# Chapter 3

# System Setup

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

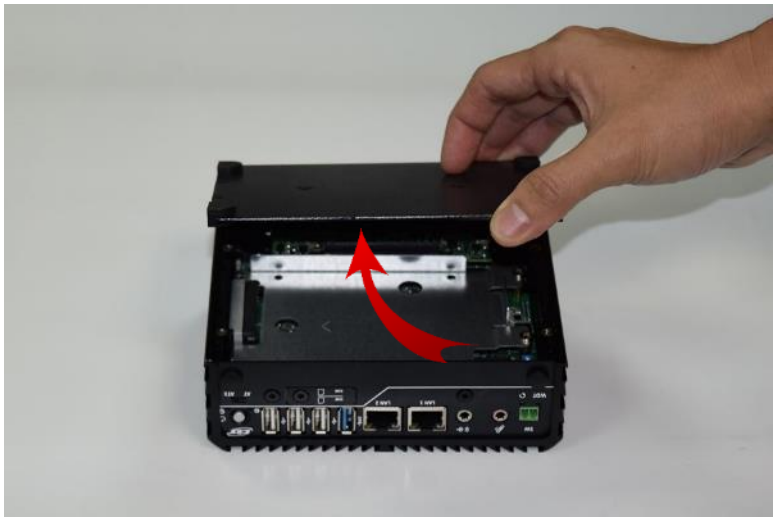
## 3.2 Removing the chassis bottom cover

**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 4 screws (M3x5L) on the bottom cover.

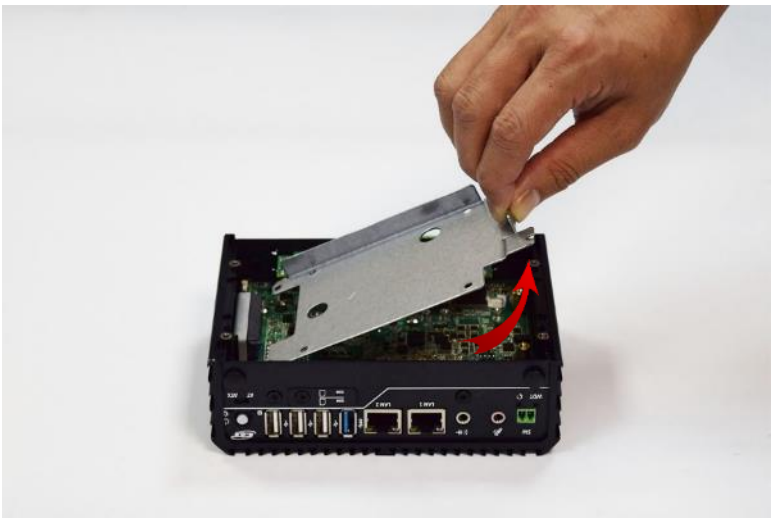
2. Now you can remove the bottom cover.



## 3.3 Removing HDD bracket

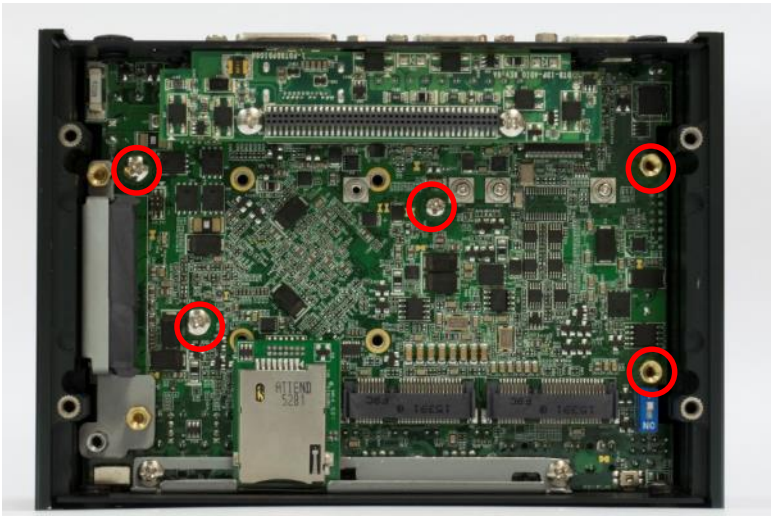
1. This step is does not apply to RCO-1000 model as it has no HDD bracket.
2. Unscrew four screws (M3x5L) circled below.

3. Now you can remove the HDD bracket.

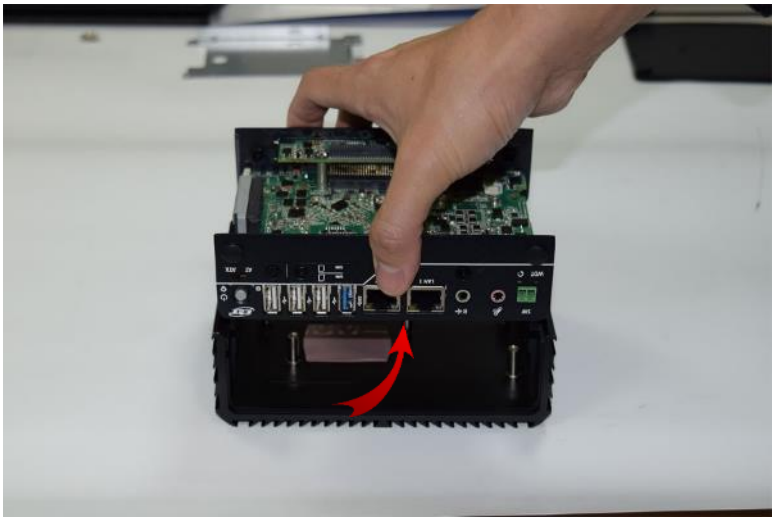


## 3.4 Removing chassis top cover

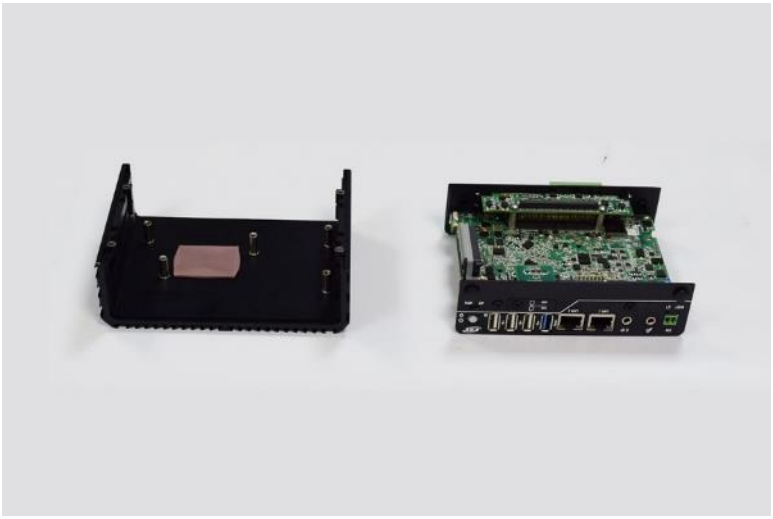
1. Unscrew the three screws (M3x5L) and two copper stud (M3x11L) highlighted below.



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



3. Top cover separated from the system body.



## 3.5 Installing SODIMM

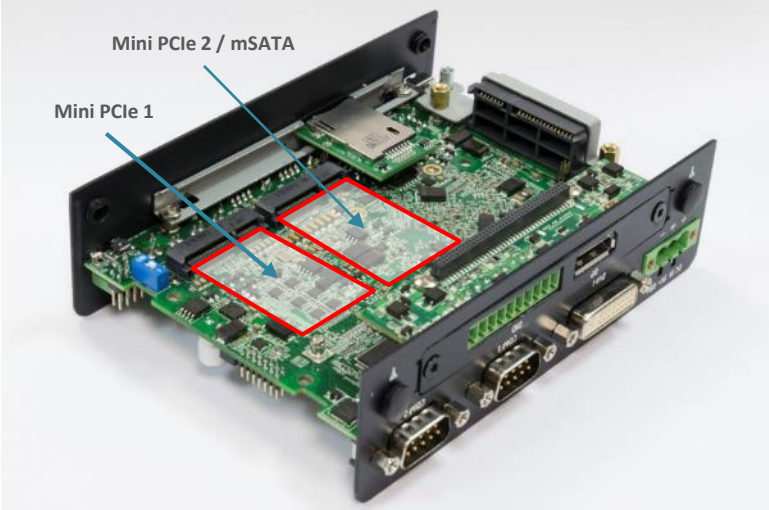
1. Place the system body with SODIMM socket facing upward.

2. Insert memory module from 45 degree direction.

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

## 3.6 Installing Mini PCIe card / mSATA

1. Place the system body upside down so you can see the 2x mini card socket. Mini PCIe 2 (CN3) can support mSATA.




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

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

## 3.7 Installing antenna

1. Remove antenna hole cover on the system panel.


Front


Rear

2. Have antenna jack penetrate through the hole.

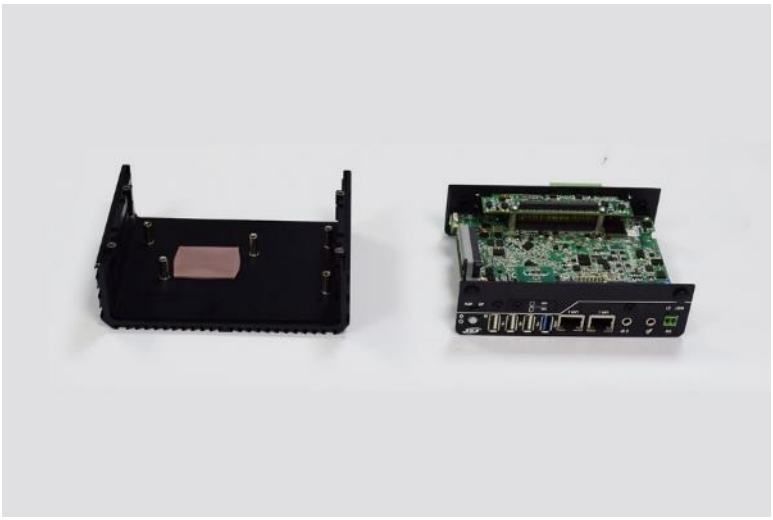

3. Put on washer and fasten the nut with antenna jack.

4. Assemble the antenna and antenna jack together.

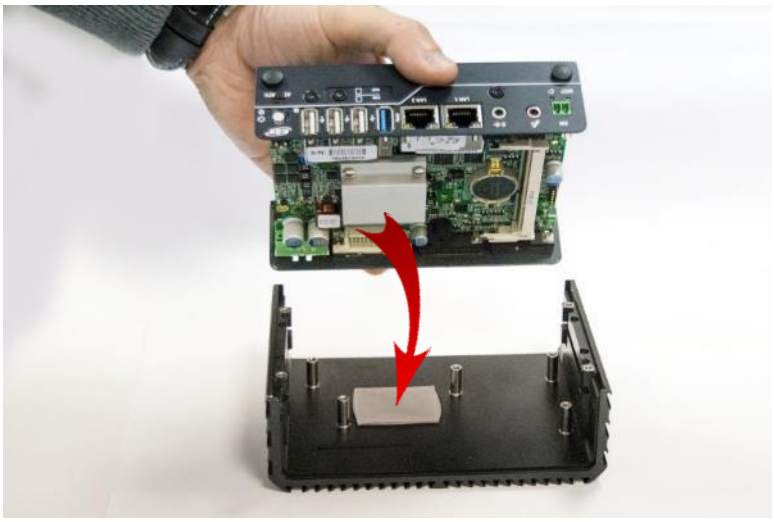
5. Attach the RF connector at the cable-end onto the communication module.

## 3.8 Assemble chassis top cover

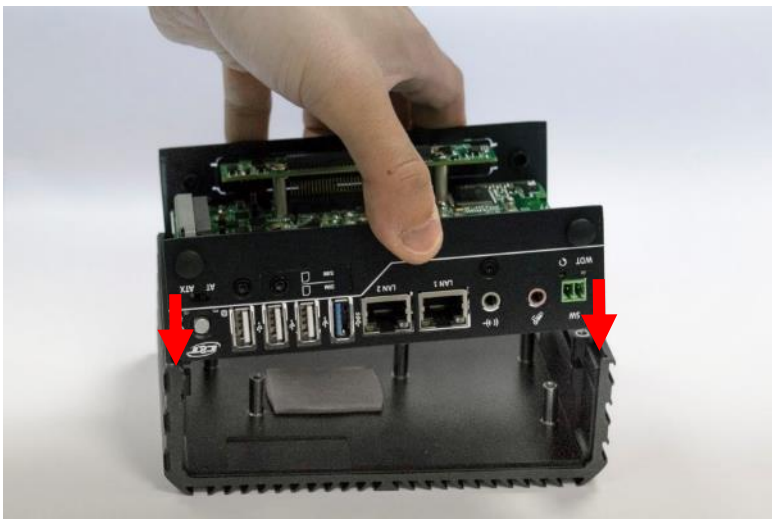
1. Place both top cover and system body upside down as shown below.



2. Ensure thermal pad is in place where the CPU is located or paste the thermal pad back on the CPU thermal block.

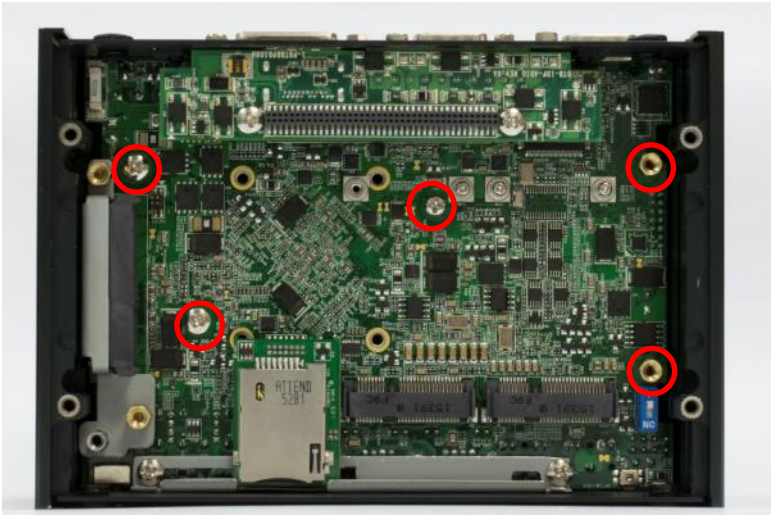


3. Put on washer and fasten the nut with antenna jack.



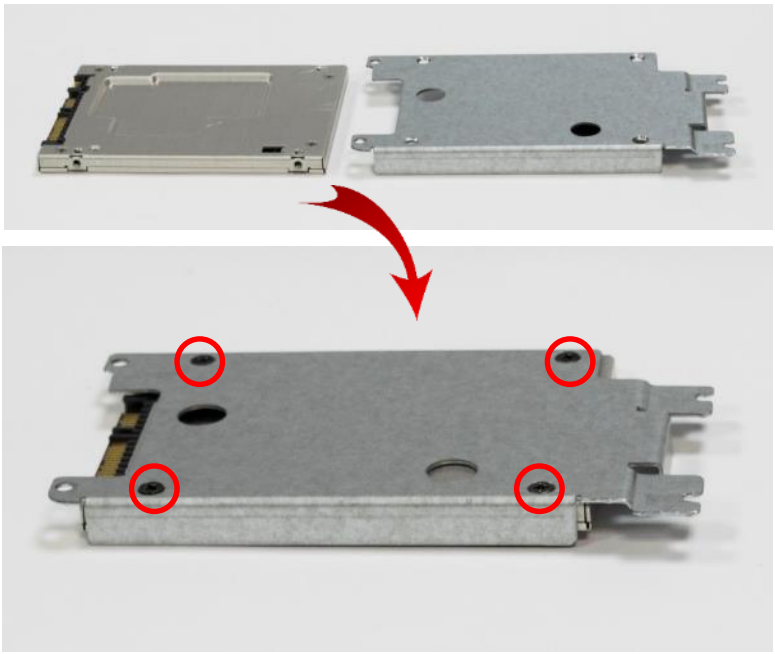
4. Push the system body down until it is firmly in place.


5. Fasten the three screws (M3x5L) and two copper stud (M3x11L) to lock the system body with top cover.



## 3.9 Installing SATA HDD

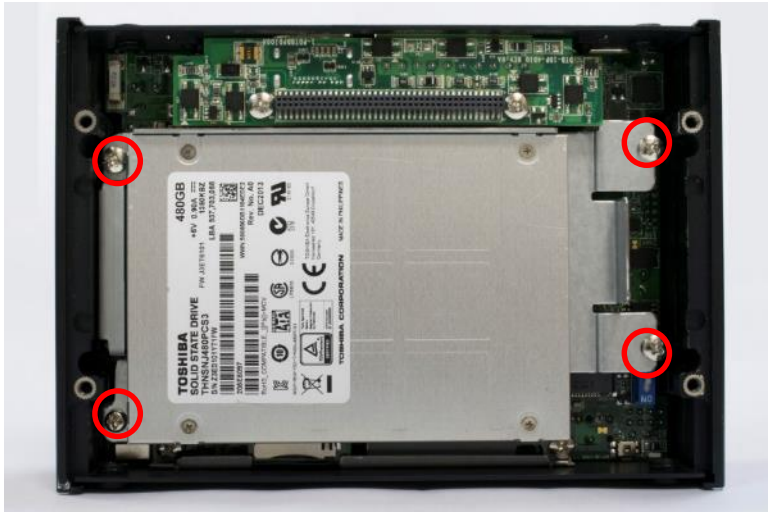
1. Lock the 2.5" HDD with HDD bracket using four screws (M3x4L).



2. Slide the iron plate into the opening on top cover and then place the entire bracket down.

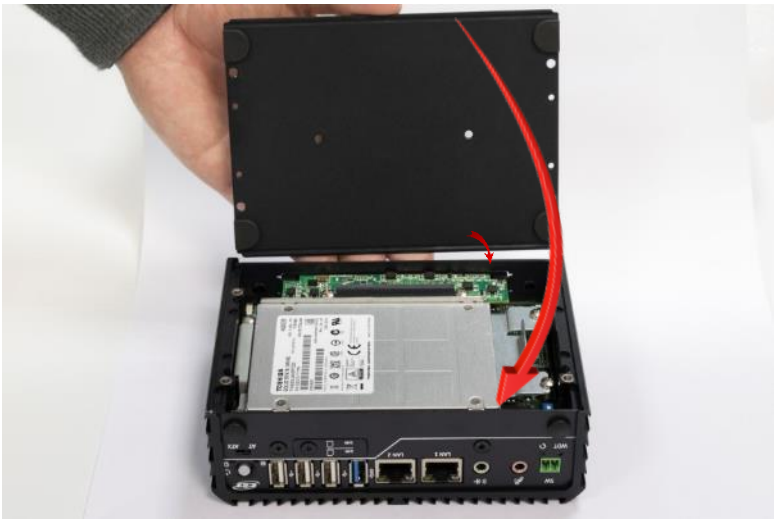
3. Press the entire bracket following the below direction so the SATA connector is firmly plugged into the HDD.

4. Fasten the four screws (M3x5L) to lock the HDD bracket in place.



## 3.10 Assemble chassis bottom cover

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



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

## 3.11 Installing SIM card

1. SIM card socket is located on the front panel of the system. Unscrew one screw (M3x5L) to remove the SIM card socket cover.


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


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

| SIM Card Socket Number | Matching Mini PCIe Slot |
|---|---|
| **SIM 1** | Mini PCIe 1 |
| **SIM 2** | Mini PCIe 2 / mSATA (CN3) |

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

## 3.12 Installing wall mount kit

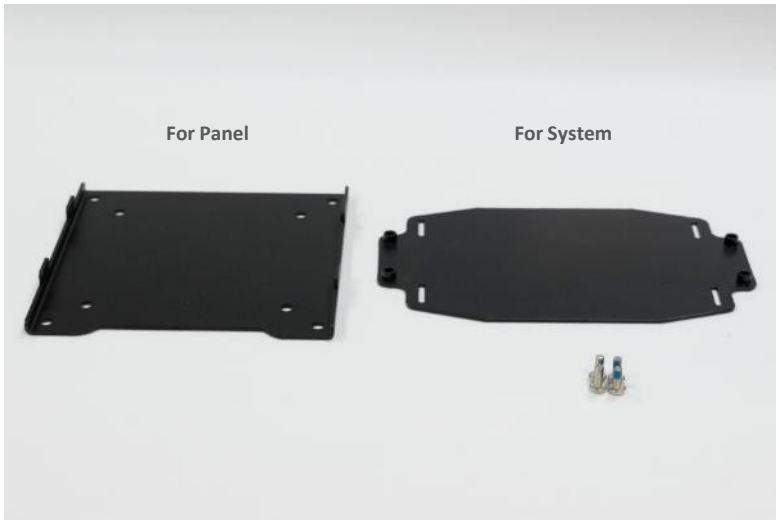
1. Wall mount kit is available for RCO-1000 series included in the standard package.

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

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

## 3.13 Installing VESA mount kit

1. VESA mount kit is available for RCO-1000 series as optional accessories.




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

3. Place the VESA mount kit (for system) on top of the system aligning the matching screw holes.

4. Lock the VESA mount kit (for system) with four screws (M3x8L, Nylok).


5. VESA mount kit (for panel) should be locked on the back of the panel with four screws.

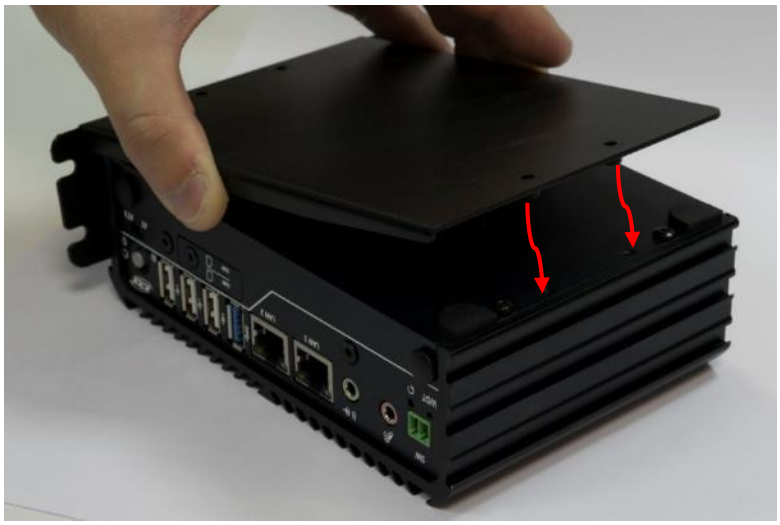
6. Now the system can be hang in the back of the panel using the hooks.

## 3.14 Installing side mount kit

1. Side mount kit is available for RCO-1000 series as optional accessories.

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


3. Place the side mount kit on top of the system aligning the matching screw holes.

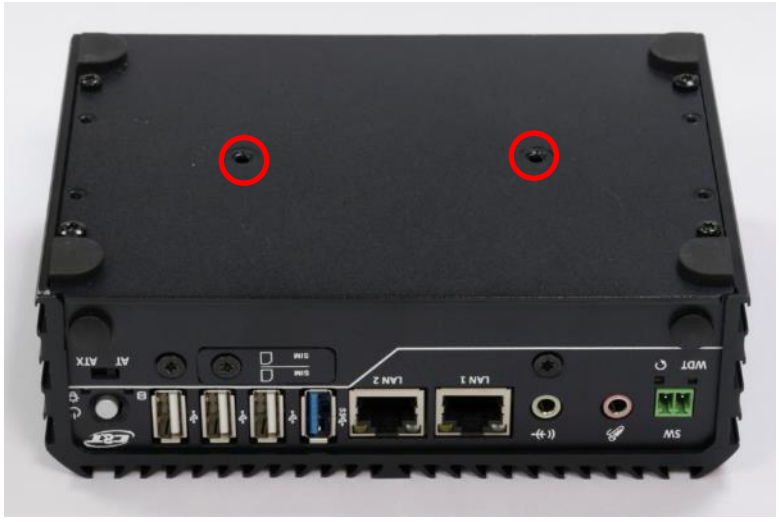


4. Lock the side mount kit with four screws (M3x8L, Nylok).


## 3.15 Installing DIN rail holder

1. Din rail holder is available for RCO-1000 series as optional accessories.

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




3. Place the din rail holder on top of the bottom cover and lock it with two screws (M4x5L, 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

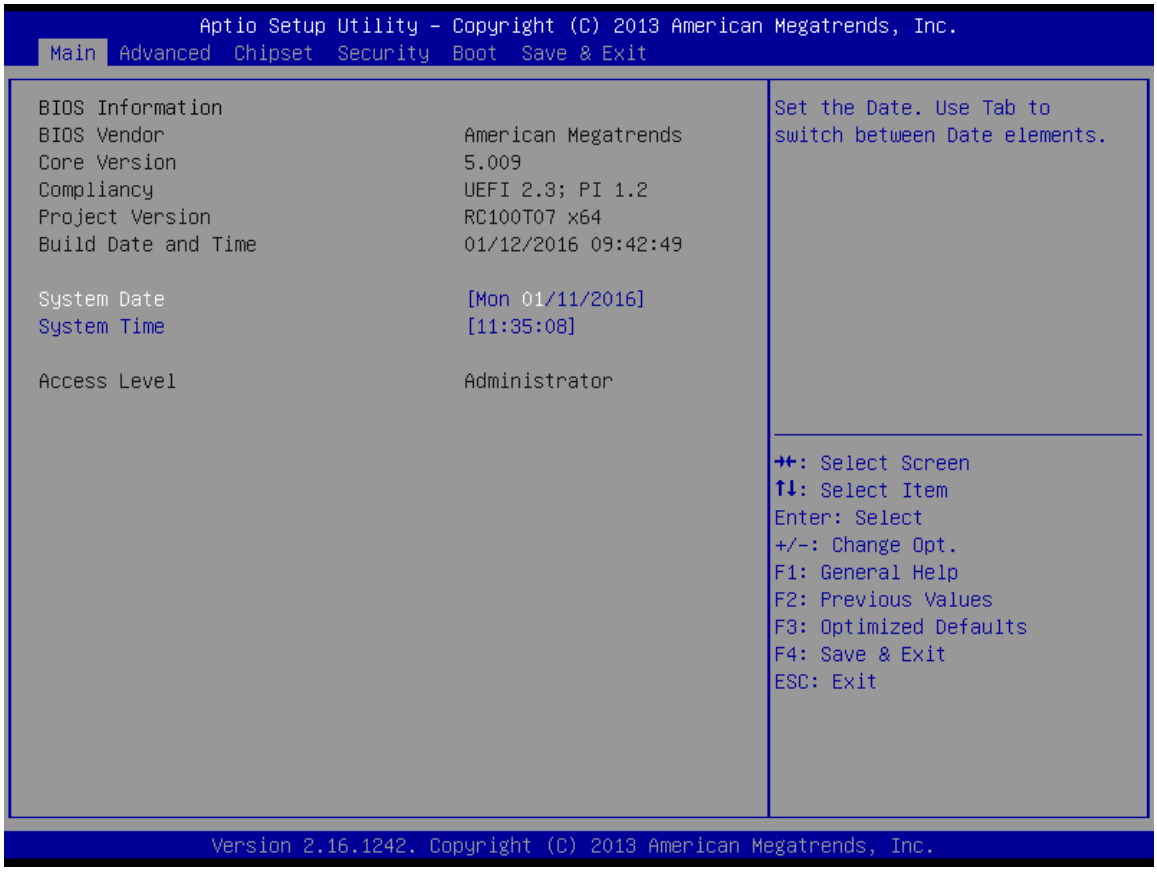
The main menu lists the setup functions you can make changes to. You can use the arrow keys ( ↑↓ ) to select the item. The on-line description of the highlighted setup function is displayed at the bottom of the screen.

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



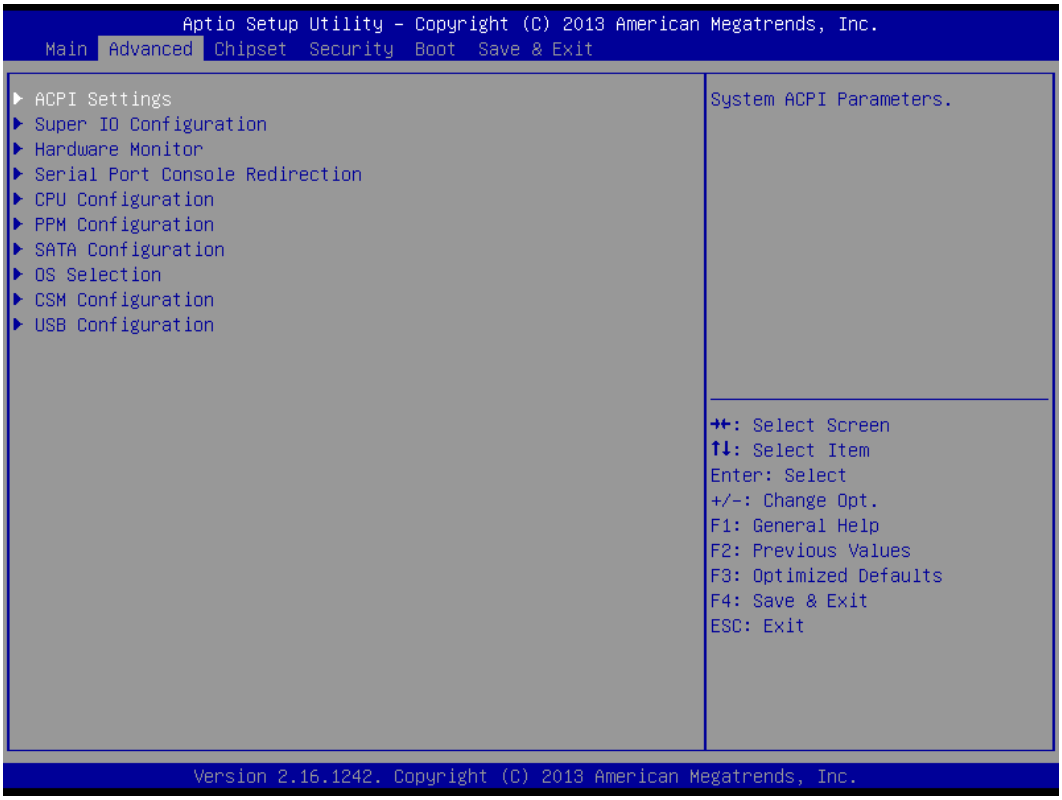

### 4.2.1 System Date

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

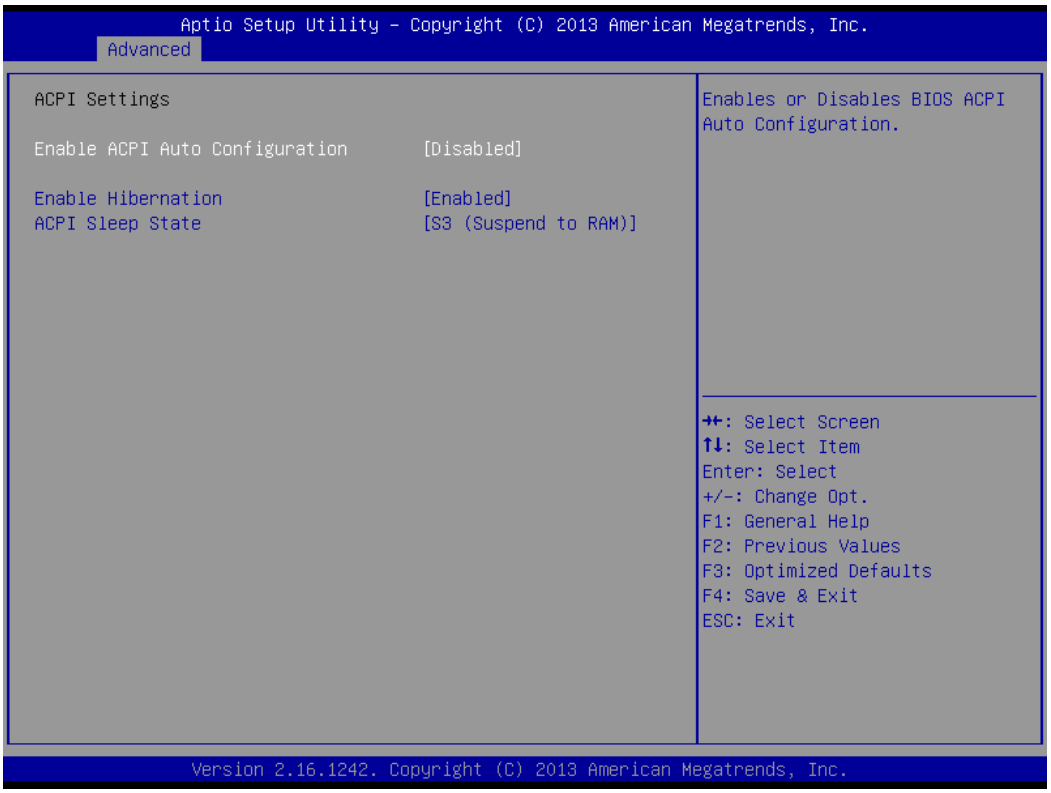
### 4.2.2 System Time

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

# 4.3 Advanced Setup




## 4.3.1 ACPI Settings




**■ Enable ACPI Auto Configuration**

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

**■ Enable Hibernation**

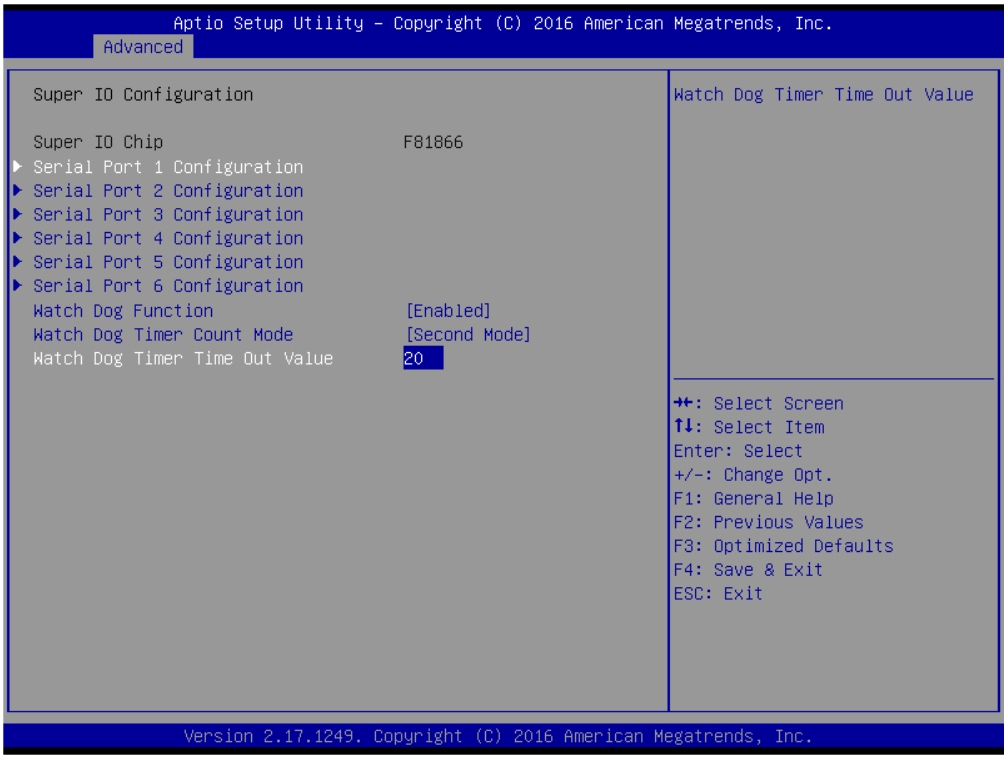
This item allows you to enable or disable system ability to hibernate.

**■ ACPI Sleep State**

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

## 4.3.2 Super IO Configuration

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




### ■ Serial Port 1 Configuration


**❑ Serial Port**

This item allows you to enable or disable serial port.

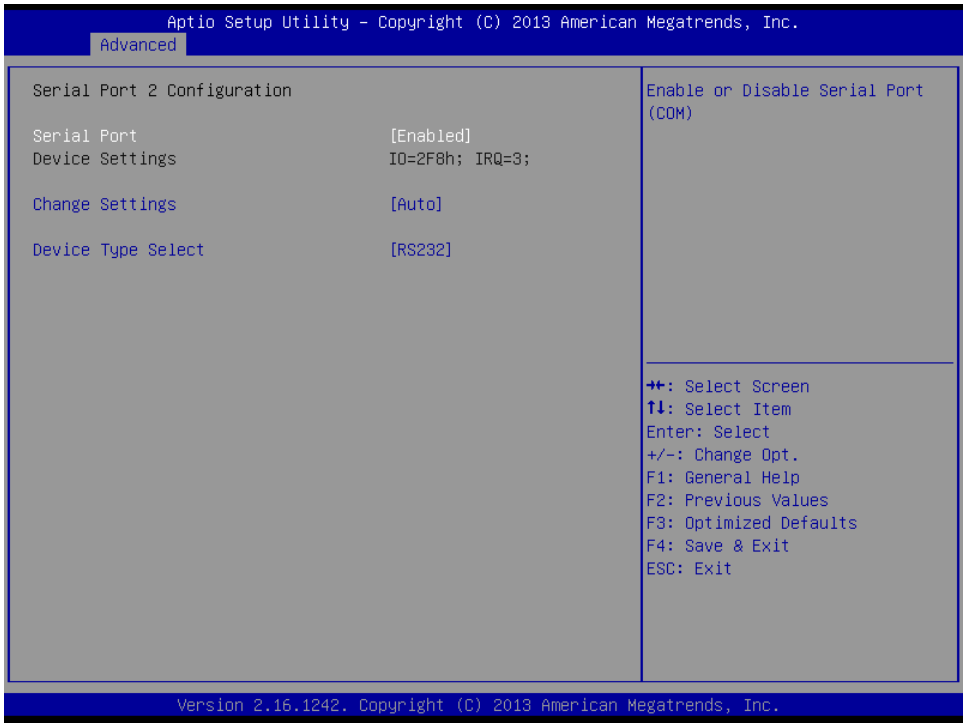
**❑ Change Settings**

This item allows you to change the address & IRQ settings of the specified serial port.

**❑ Device Type Select**

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

## ■ Serial Port 2 Configuration




### ❑ Serial Port

This item allows you to enable or disable serial port.

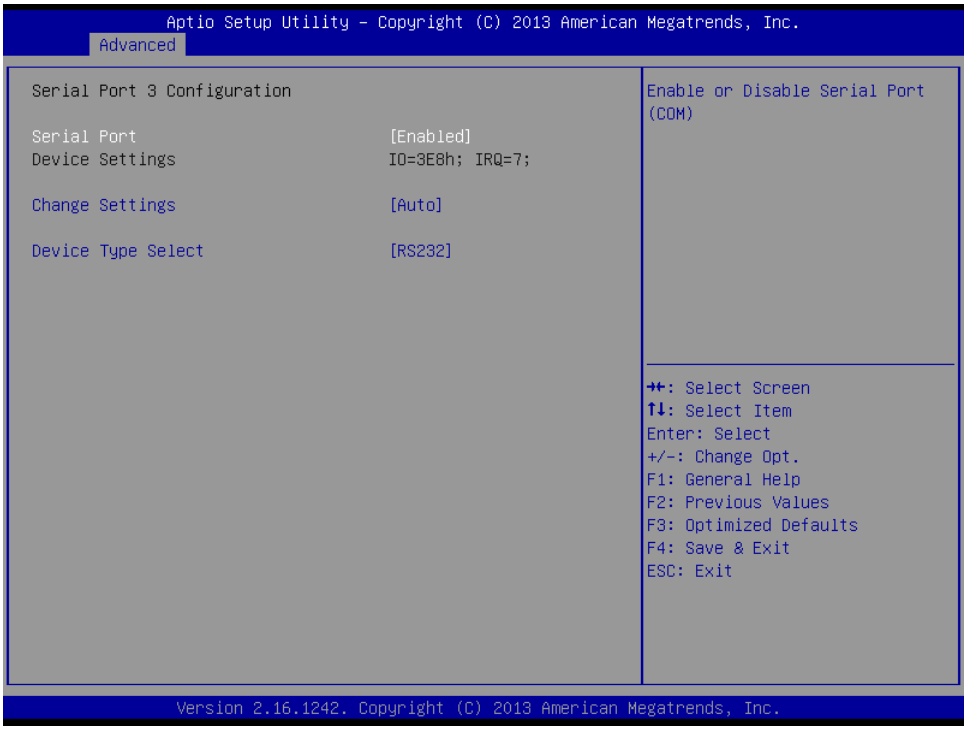
### ❑ Change Settings

This item allows you to change the address & IRQ settings of the specified serial port.

### ❑ Device Type Select

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

## ■ Serial Port 3 Configuration




### ❑ Serial Port

This item allows you to enable or disable serial port.

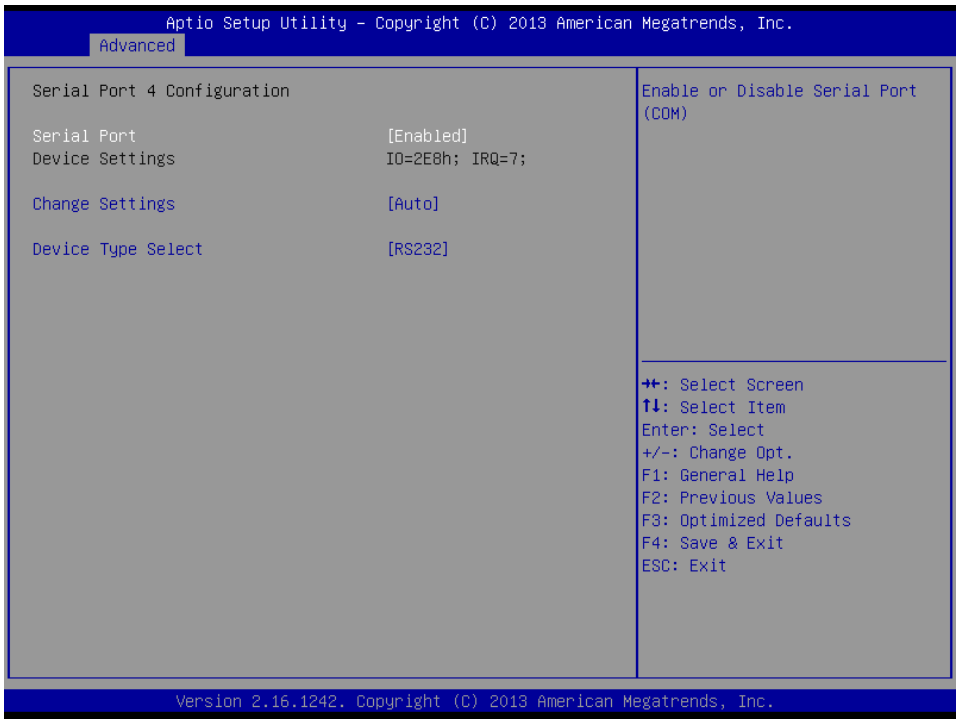
### ❑ Change Settings

This item allows you to change the address & IRQ settings of the specified serial port.

### ❑ Device Type Select

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

## ■ Serial Port 4 Configuration




### ❑ Serial Port

This item allows you to enable or disable serial port.

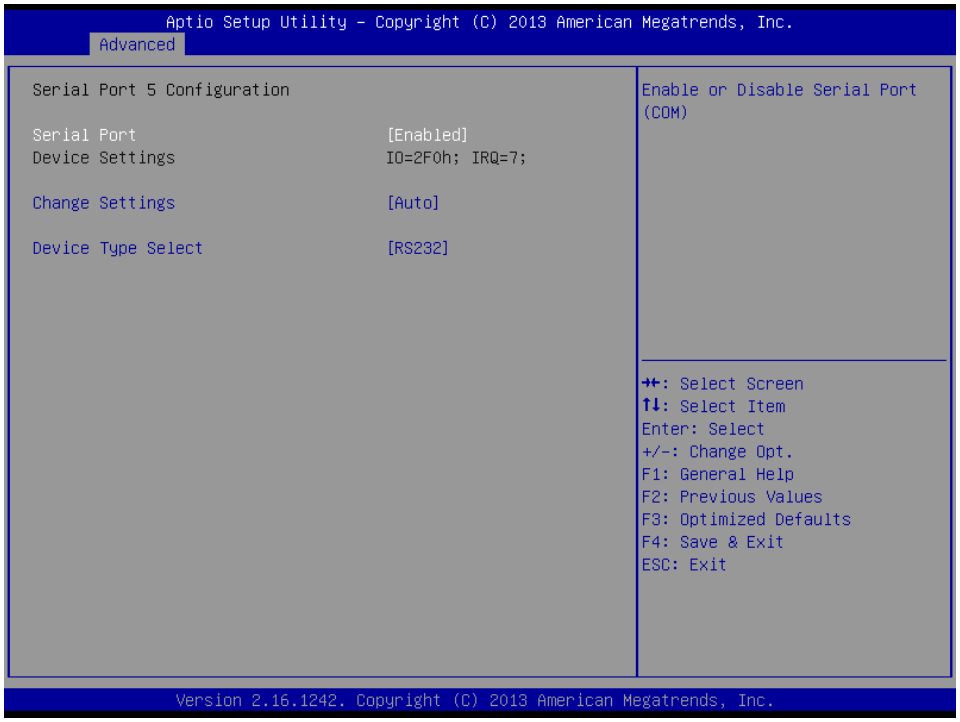
### ❑ Change Settings

This item allows you to change the address & IRQ settings of the specified serial port.

### ❑ Device Type Select

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

## ■ Serial Port 5 Configuration




### ❑ Serial Port

This item allows you to enable or disable serial port.

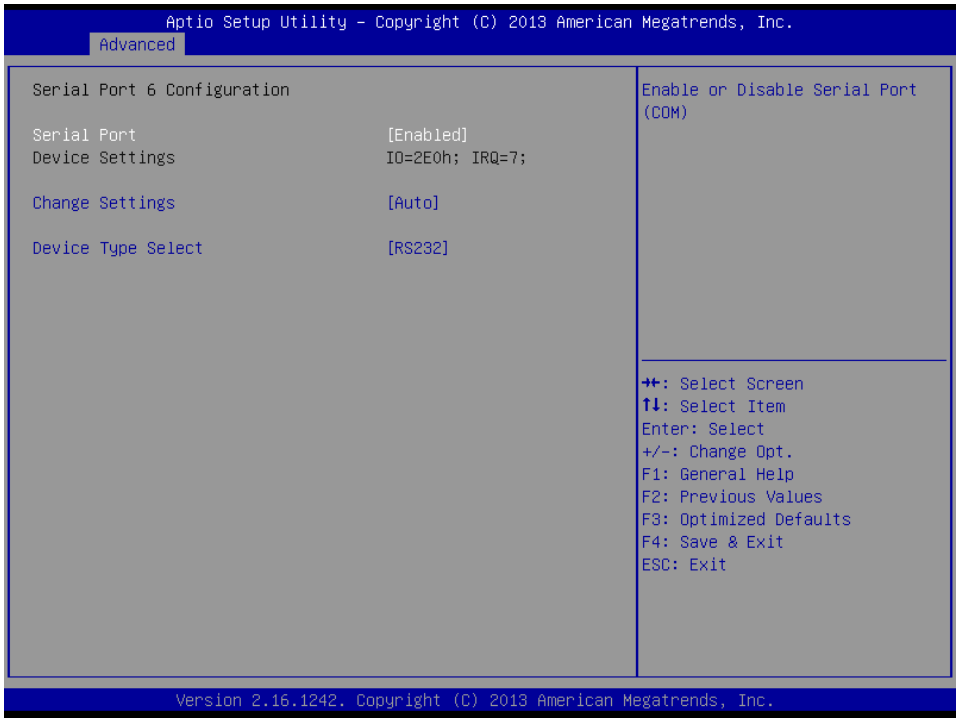
### ❑ Change Settings

This item allows you to change the address & IRQ settings of the specified serial port.

### ❑ Device Type Select

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

## ■ Serial Port 6 Configuration




❑ **Serial Port**

This item allows you to enable or disable serial port.

❑ **Change Settings**

This item allows you to change the address & IRQ settings of the specified serial port.

❑ **Device Type Select**

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

## ■ Watch Dog Function

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

❑ **Watch Dog Timer Count Mode**

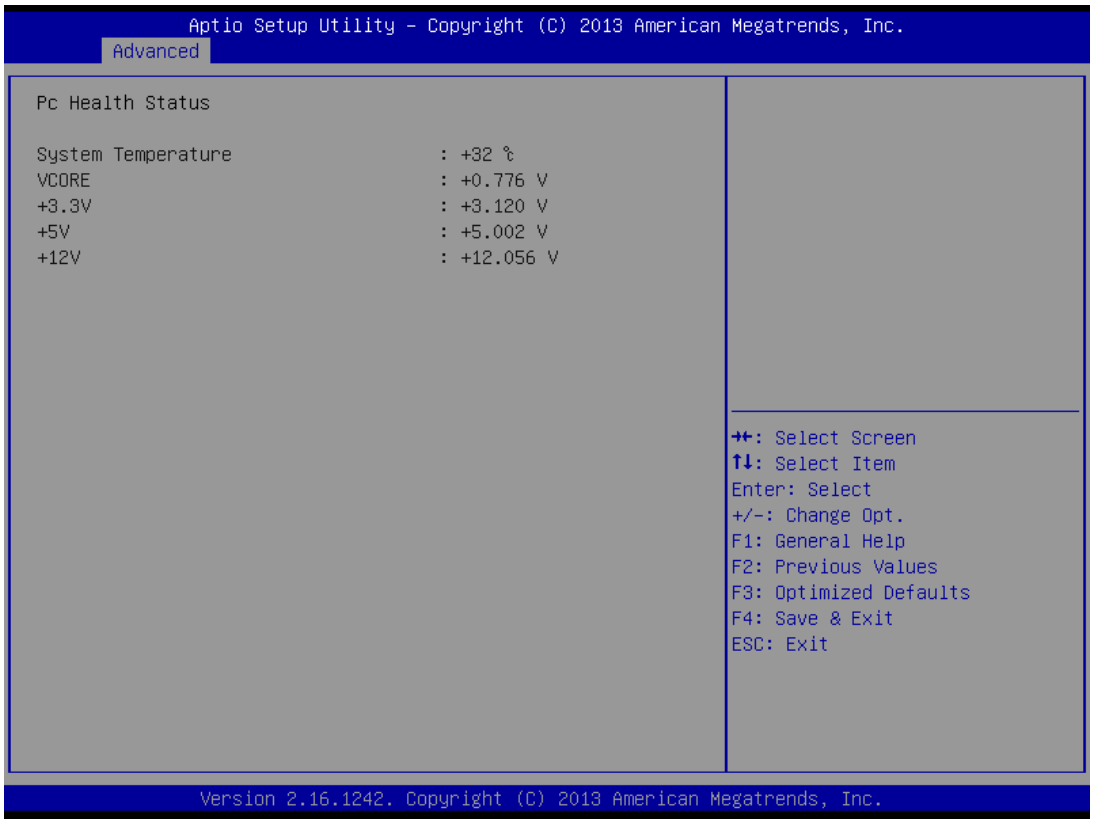
Change the Watch dog mode. Select <Second Mode> or <Minute Mode> mode.

❑ **Watch Dog Timer Time Out Value**

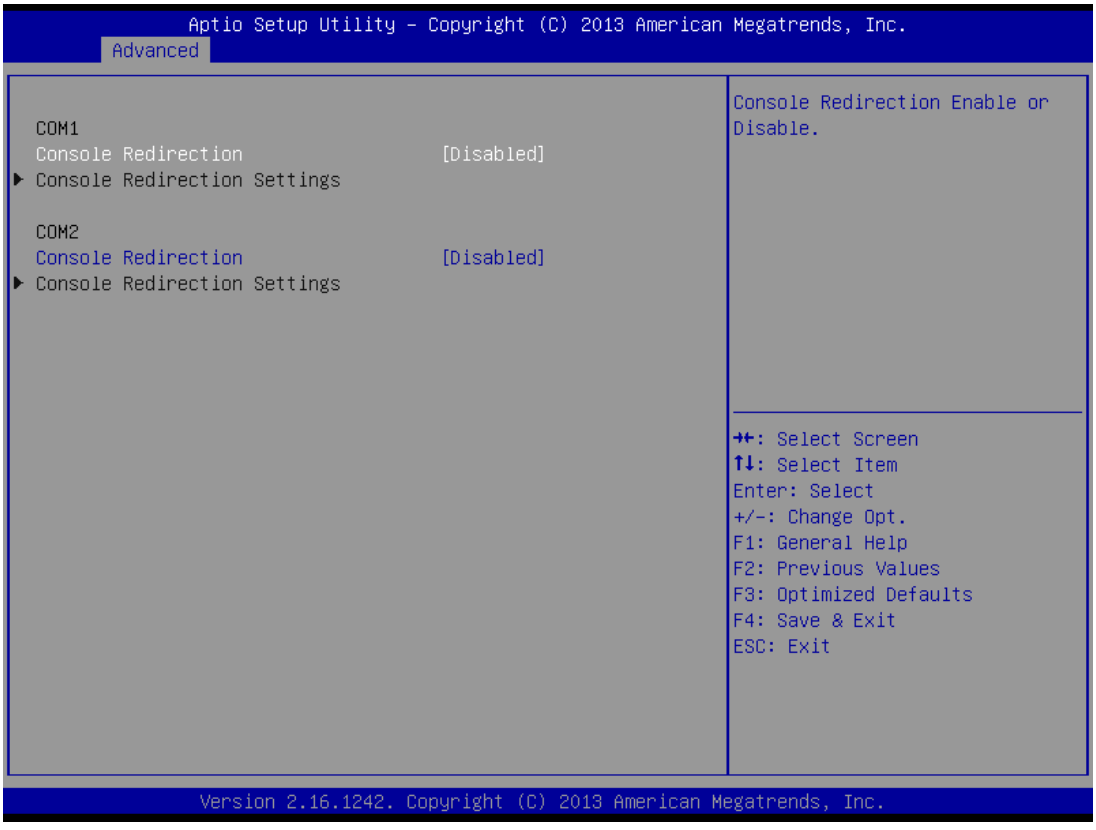
User can set a value in the range of 0 to 255.

### 4.3.3 Hardware Monitor

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



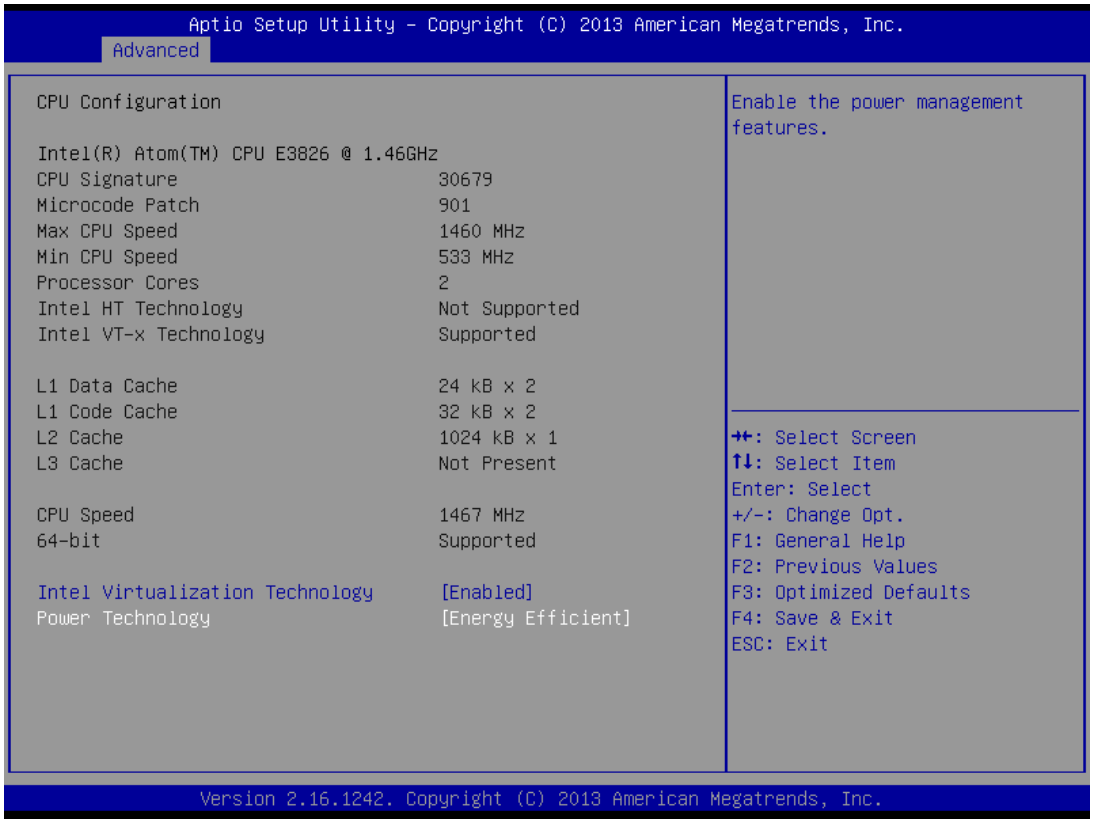

### 4.3.4 Serial Port Console Redirection




**■ Console Redirection**

These items allows you to enable or disable COM1~COM6 console redirection.

## 4.3.5 CPU Configuration



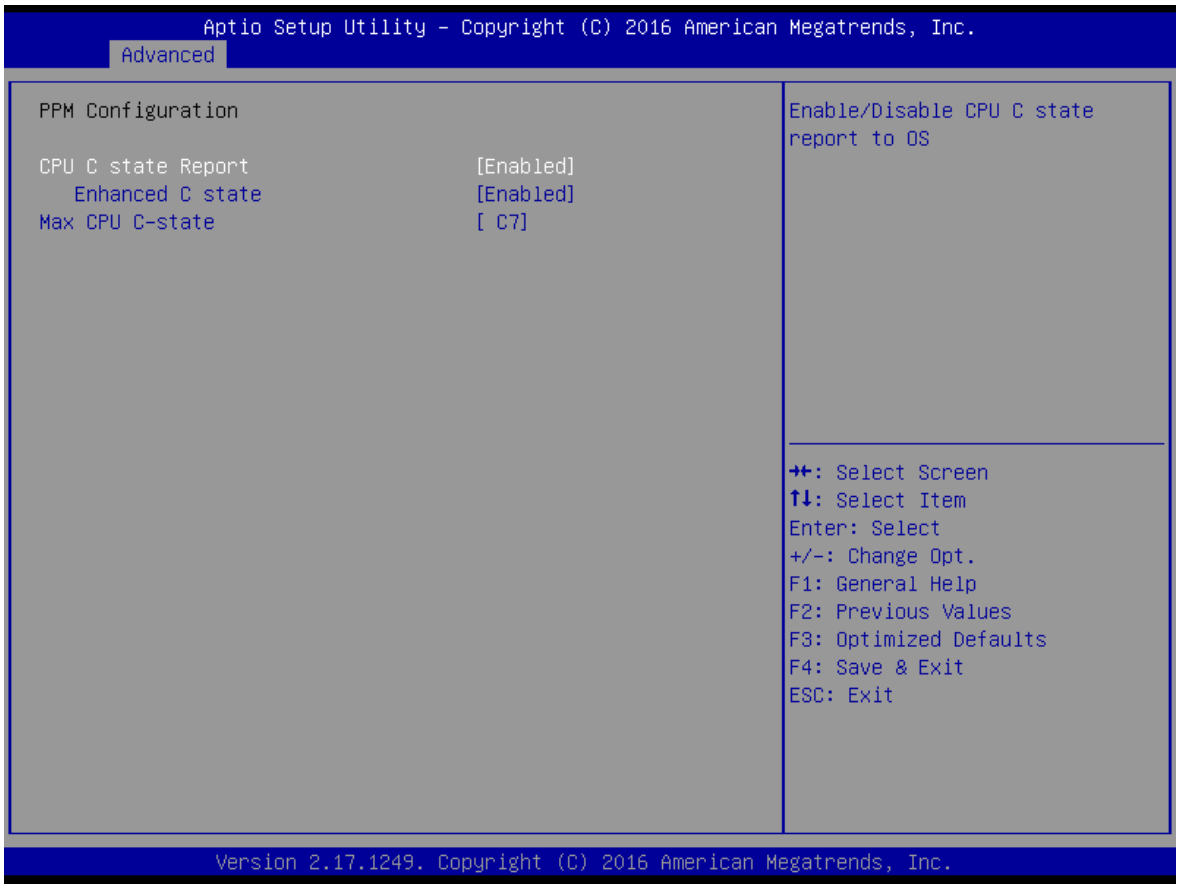

**■ Intel Virtualization Technology**

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

**■ Power Technology**

This item allows you to configure the power management features. Select <Disable>, <Energy Efficient> or <Custom>.

### 4.3.6 PPM Configuration




**■ CPU C state Report**

Enables or disables support for CPU's power-saving functions.

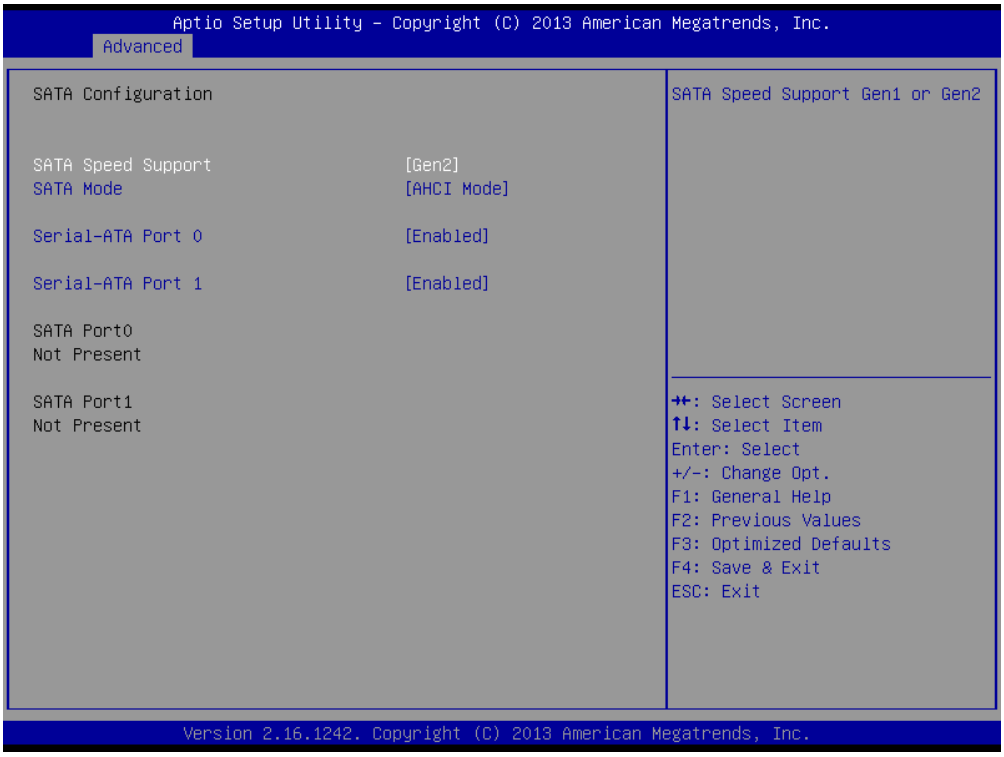
**■ Enhanced C state**

Enables or disables Intel CPU Enhanced Halt (C1E) function, a CPU power-saving function in system halt state. When enabled, the CPU core frequency and voltage will be reduced during system halt state to decrease power consumption. This item is configurable only when CPU C state Report is enabled.

**■ Max CPU C-state**

This item allows you to determine the maximum C state that the CPU will support.

### 4.3.7 SATA Configuration




**■ SATA Speed Support**

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

**■ SATA Mode**

This item allows you to select IDE or AHCI Mode.

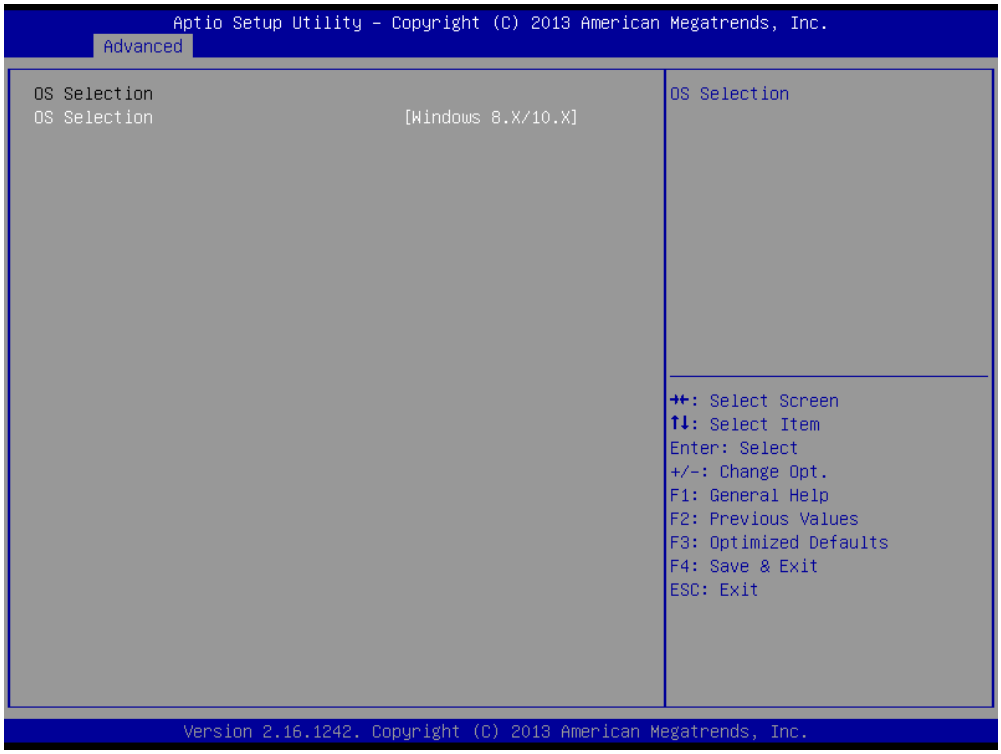
**■ Serial – ATA Port 0**

This item allows you to enable or disable Serial-ATA Port 0.

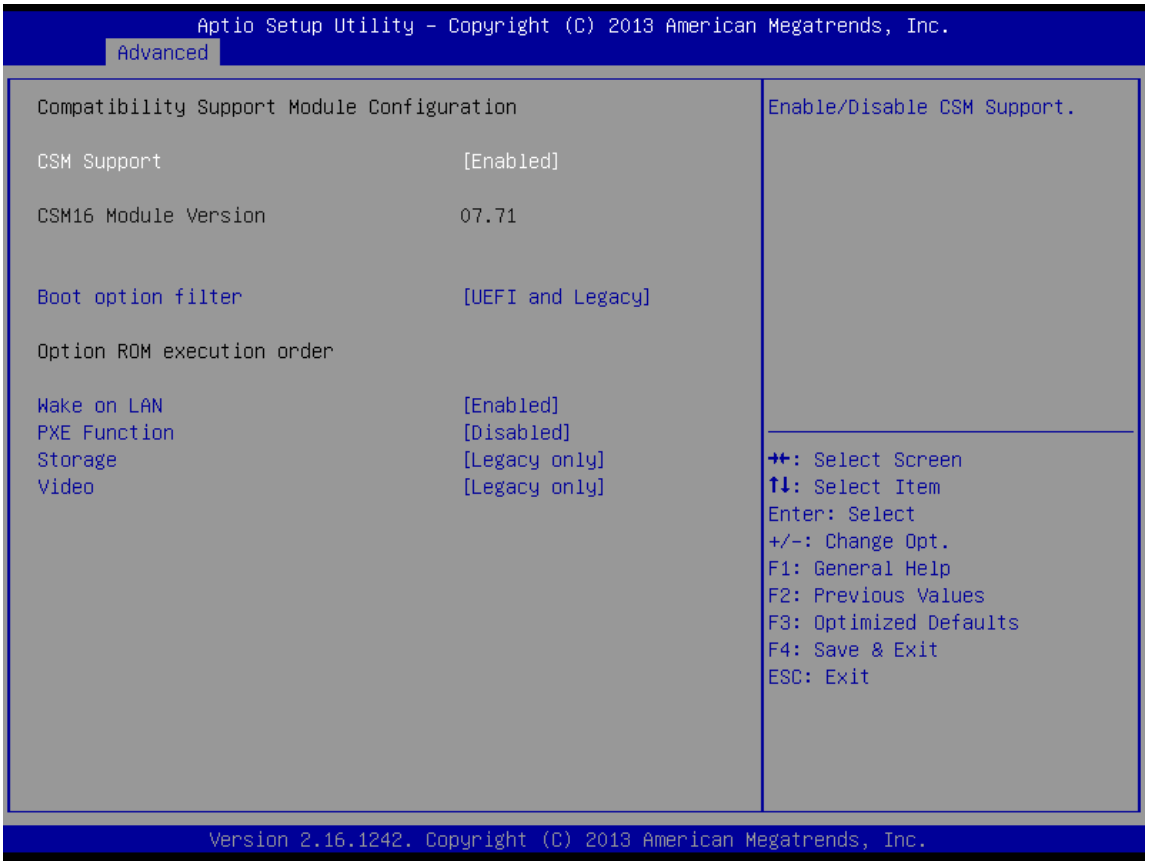
**■ Serial – ATA Port 1**

This item allows you to enable or disable Serial-ATA Port 1.

### 4.3.8 OS Selection



### 4.3.9 CSM Configuration




**■ CSM Support**

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

**■ Boot option filter**

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

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

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

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

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

**■ Wake on LAN**

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

**■ PXE Function**

This item allows you to enable or disable PXE function.

**■ Storage**

This setting allows you to select whether to enable the UEFI or legacy option ROM for the storage device controller.

Do not launch: Disables option ROM.

UEFI only: Enables UEFI option ROM only.

Legacy only: Enables legacy option ROM only.

**■ Video**

This item allows you to select whether to enable the UEFI or legacy option ROM for the storage device controller.

Do not launch: Disables option ROM.

UEFI only: Enables UEFI option ROM only.

Legacy only: Enables legacy option ROM only.

## 4.3.10 USB Configuration


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

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

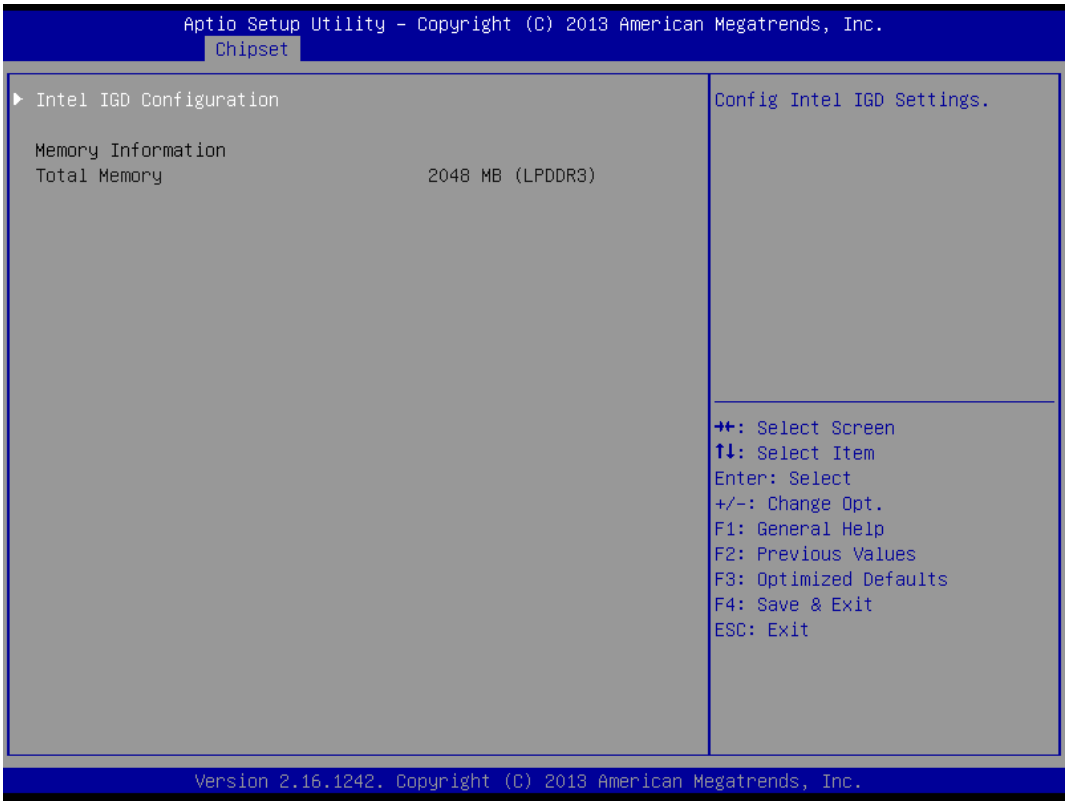
**■ EHCI Hand-off**
Determines whether to enable EHCI Hand-off feature for an operating system without EHCI Hand-off support.

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

# 4.4 Chipset

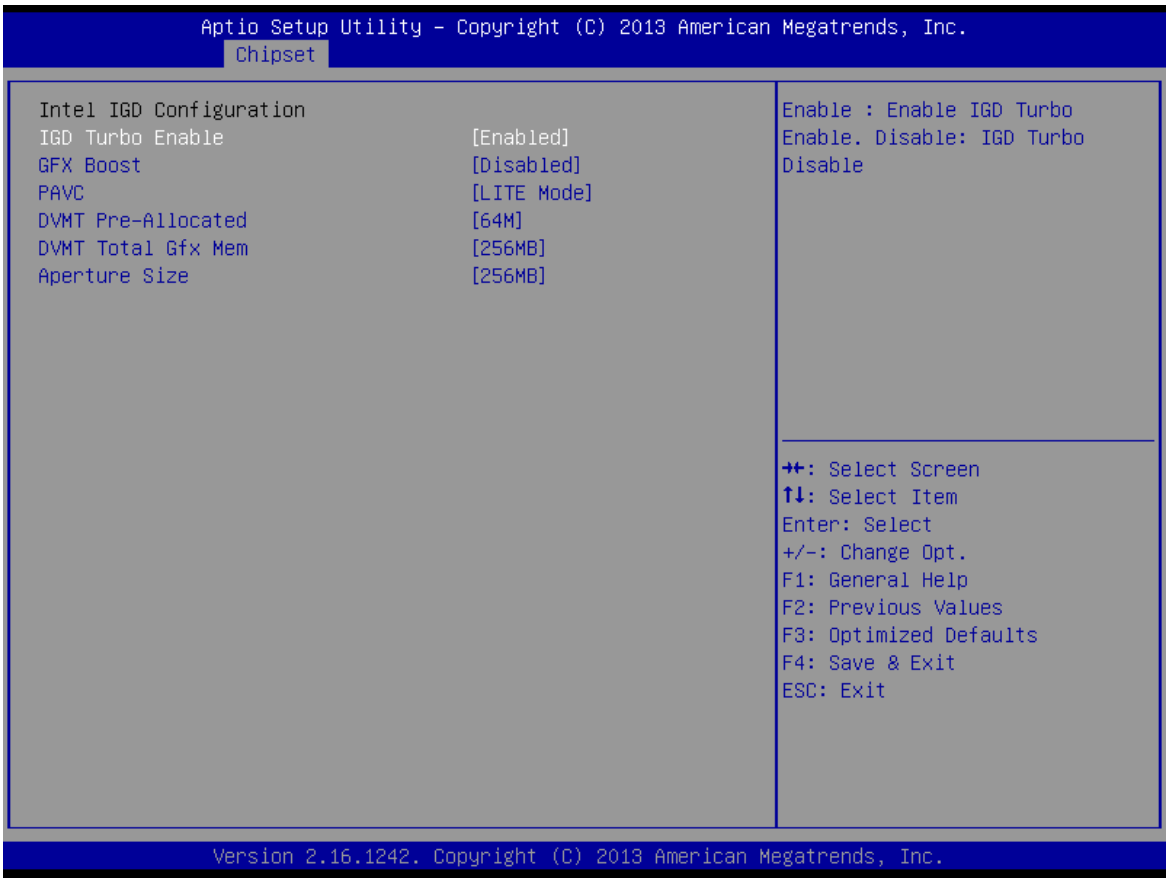

## 4.4.1 North Bridge

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



## ■ Intel IGD Configuration

This section provides onboard graphics-related configuration options.




### ❑ IGD Turbo Enable

This item allows you to enable or disable IGD Turbo.

### ❑ GFX Boost

This item allows you to enable or disable GFX Boost.

### ❑ PAVC

This item enables/disables Protected Audio Video Control. Select <Disabled>, <LITE Mode> or <SERPENT Mode>.

### ❑ DVMT Pre-Allocated

This item selects DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device. . Select <64M>, <96M>, <128M>, <160M>, <192M>, <224M>, <256M>, <288M>, <320M>, <352M>, <384M>, <416M>, <448M>, <480M> or <512M>.

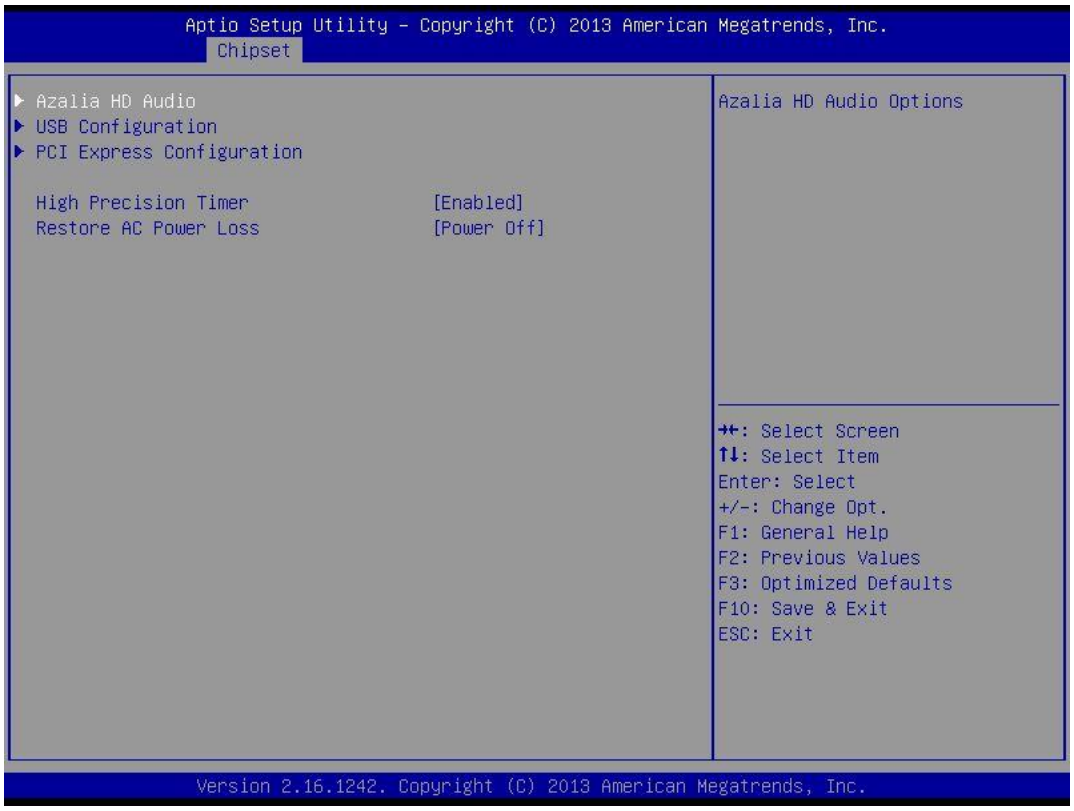
### ❑ DVMT Total Gfx Mem

This item selects DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device. Select <128MB>, <256MB> or <Max>.

### ❑ Aperture Size

This item selects the Aperature Size. Select <128MB>, <256MB> or <512MB>.

## 4.4.2 South Bridge




**■ Azalia HD Audio**

Control detection of the Azaliadevice.

**❑ Audio Controller**

Enabled: Azalia will be unconditionally enabled.

Disabled: Azalia will be unconditionally disabled.

**■ USB Configuration**

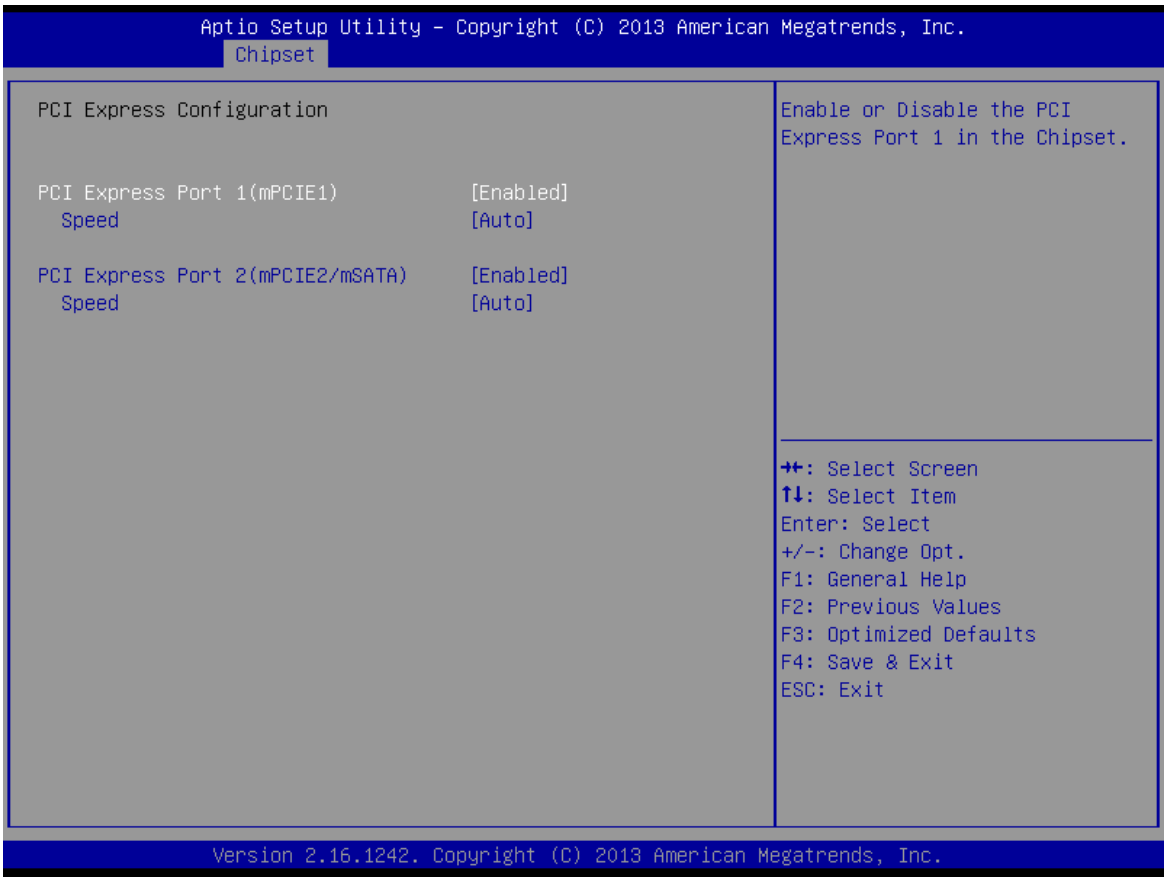
**❑ XHCI Mode**

This item allows you to enable or disable the USB XHCI controller.

**❑ USB 2.0 (EHCI) Support**

This item allows you to enable or disable the USB EHCI support.

## ■ PCI Express Configuration




❑ **PCI Express Port 1 (mPCIE1)**

This item allows you to enable or disable PCI Express Port 1 (mPCIE1) in the Chipset.

❑ **Speed**

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

❑ **PCI Express Port 2 (mPCIE2/mSATA)**

❑ This item allows you to enable or disable PCI Express Port 2 (mPCIE2/mSATA) in the Chipset.

❑ **Speed**

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

## ■ High Precision Timer

Enable or disable High Precision Event Timer (HPET) in the operating system.

## ■ Restore AC Power Loss

This item specifies whether your system will reboot after a power failure or interrupt occurs. Available settings are:

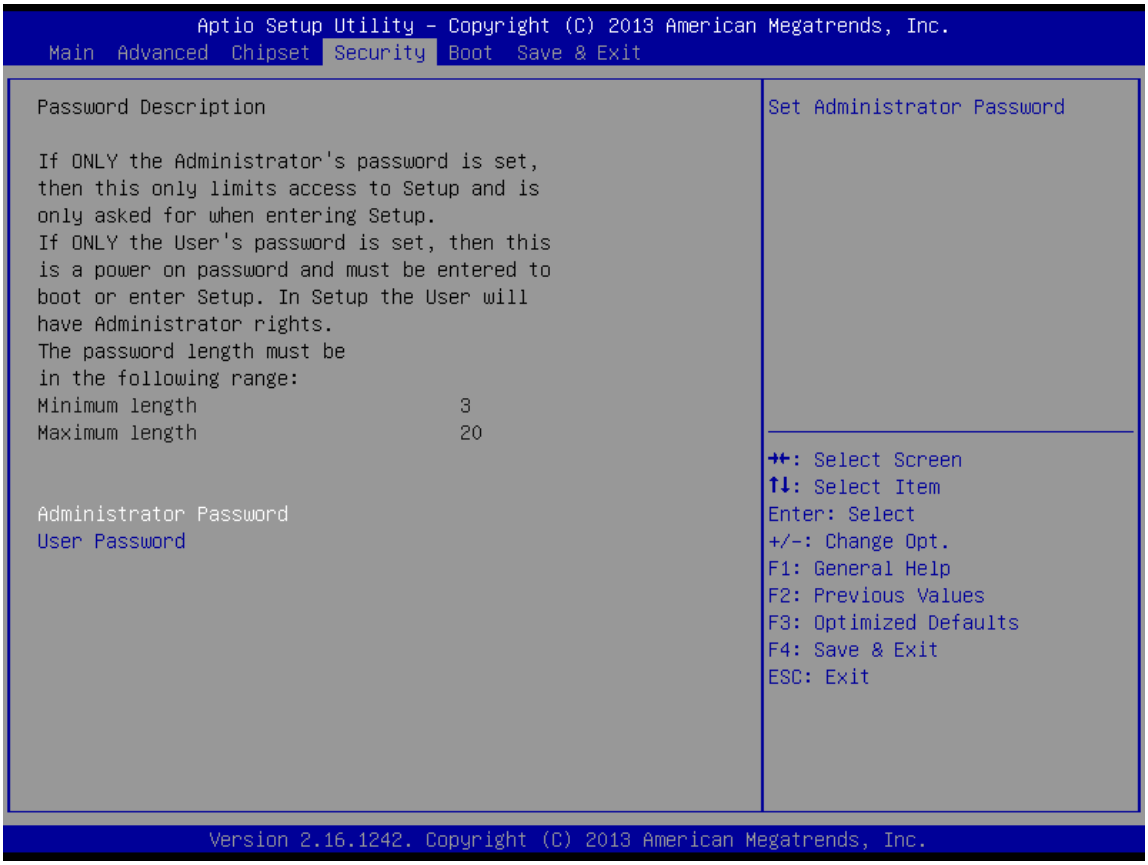
Power Off: Leave the computer in the power off state.

Power On: Leave the computer in the power on state.

Last State: Restore the system to the previous status before power failure or interrupt occurred.

# 4.5 Security

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




## 4.5.1 Administrator Password

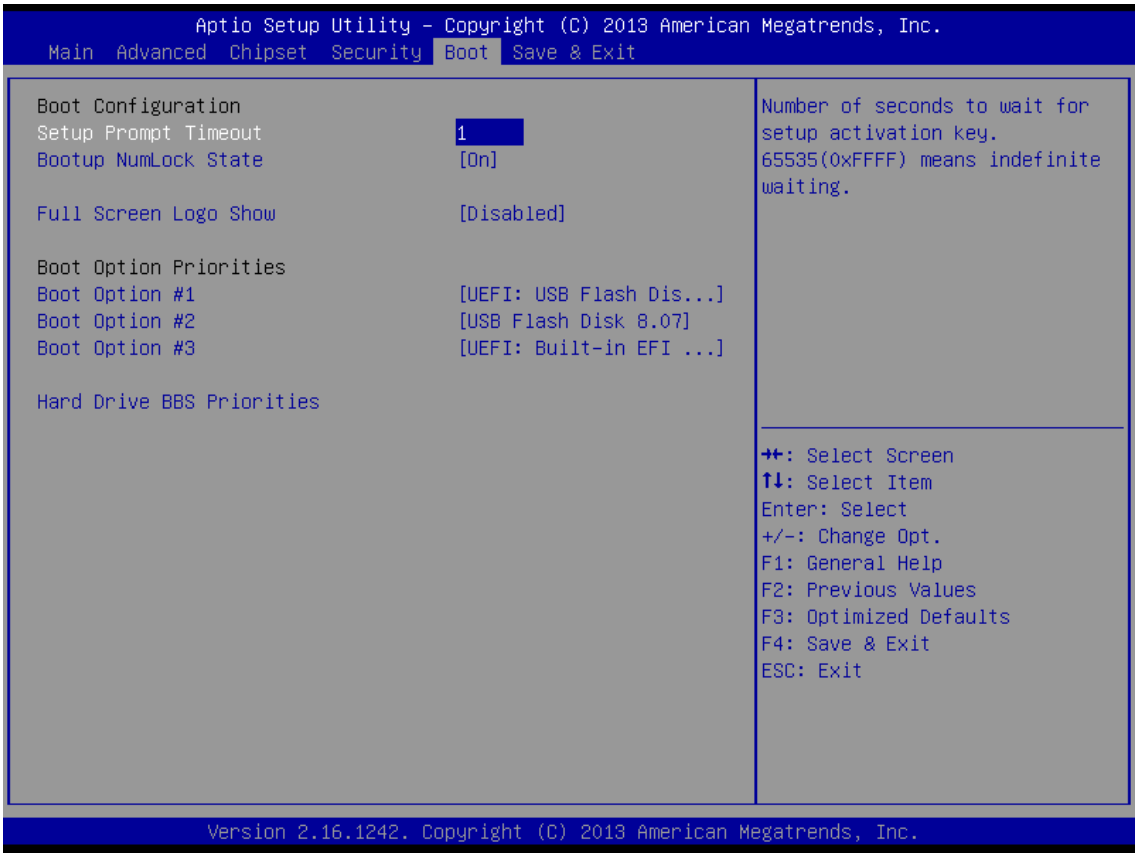
This item allows you to set Administrator Password.

## 4.5.2 User Password

This item allows you to set User Password.

# 4.6 Boot

This menu allows you to setup the system boot options.




## 4.6.1 Setup Prompt Timeout

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

## 4.6.2 Bootup NumLock State

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

## 4.6.3 Full Screen Logo Show

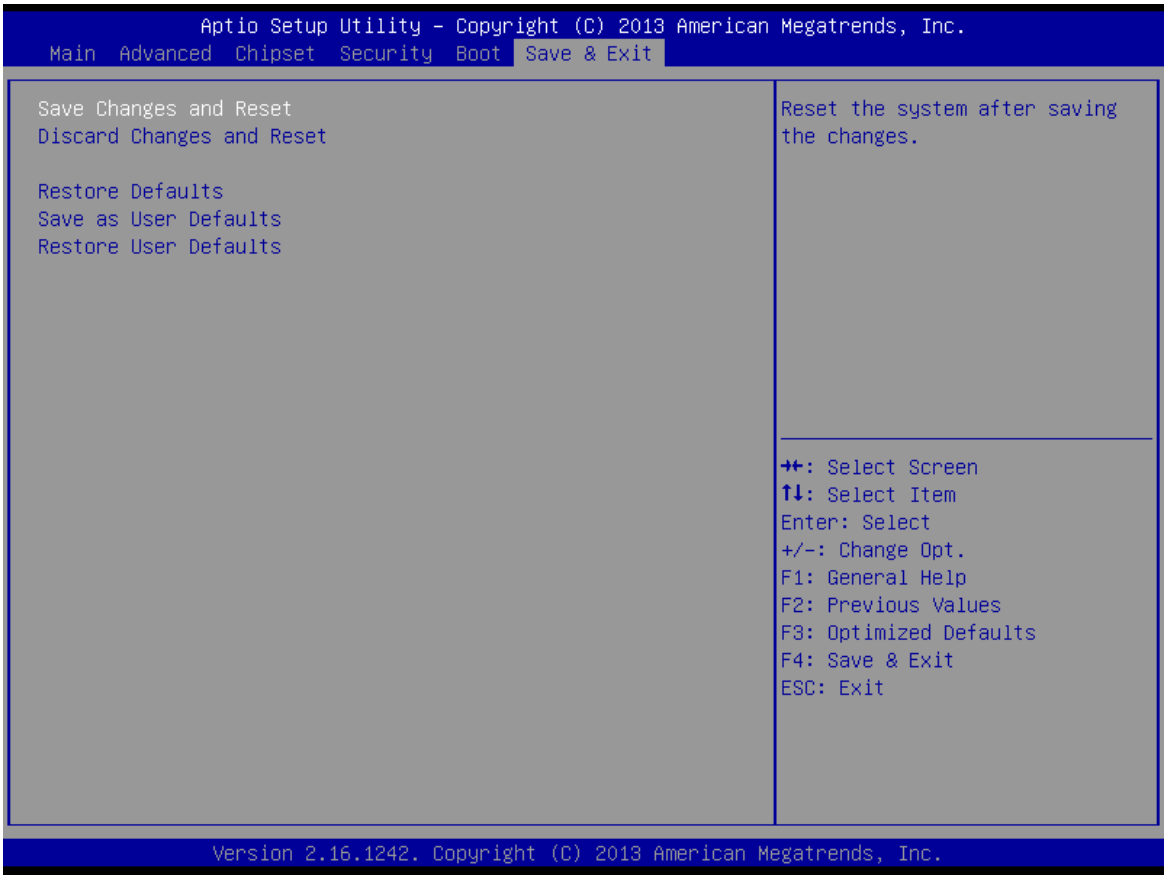
This item allows you to enable or disable Full Screen Logo Show function.

## 4.6.4 Boot Option Priorities

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

# 4.7 Save & Exit

This setting allows you to configure the boot settings.




## 4.7.1 Save Changes and Reset

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

## 4.7.2 Discard Changes and Reset

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

## 4.7.3 Restore Defaults

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

## 4.7.4 Save as User Defaults

When users have completed system configuration, select this option to save changes as user defaults without exit BIOS setup menu.

## 4.7.5 Restore User Defaults

Use this item to restore defaults to 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

**Sample Code:**

Set watchdog timer to 30 seconds

```
AddrPort =0x4e;
DataPort=0x4f;
SIO_UNLOCK_VALUE=0x87;
SIO_LOCK_VALUE=0xaa;
WATCHDOG_LDN=0x07;
WDT_ UNIT=0x60;  // 0x60=sec, 0x68=min, 0x40=disable watchdog timer
WDT_TIMER= 30;

 // Set watchdog timer to 30 seconds
// enable config mode, switch WDT configuration
                    WriteByte(AddrPort, SIO_UNLOCK_VALUE);
usleep(4000);    //delay
                    WriteByte(AddrPort, SIO_UNLOCK_VALUE);
                    WriteByte(AddrPort, 0x07);
                    WriteByte(DataPort, WATCHDOG_LDN);

                    // activate wdt
                    WriteByte(AddrPort, 0x30);
                    data=ReadByte(DataPort);
                    data=data|0x01;
                    WriteByte(DataPort, data);

                    // set timer value
                    WriteByte(AddrPort, 0xf6);
                    WriteByte(DataPort, WDT_TIMER);

                    // set unit
                    WriteByte(AddrPort, 0xf5);
                    WriteByte(DataPort, WDT_UNIT);

                    // enable reset
                    WriteByte(AddrPort, 0xfa);
                    data=ReadByte(DataPort);
                    data=data|0x01;
                    WriteByte(DataPort, data);

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

# GPIO Sample Code

- GPI 0 ~ GPI 3

| | GPI 0 | GPI 1 | GPI 2 | GPI 3 |
|---|---|---|---|---|
| IO Address | 0xA03 | 0xA03 | 0xA03 | 0xA03 |
| Bit | 4 | 5 | 6 | 7 |
| Sample code | **#1** | | | |

- GPO 0 ~ GPO 3

| | GPO 0 | GPO 1 | GPO 2 | GPO 3 |
|---|---|---|---|---|
| IO Address | 0xA02 | 0xA02 | 0xA02 | 0xA02 |
| Bit | 0 | 1 | 2 | 3 |
| Sample code | **#2** | | | |

---

**Sample Code:**

```
    GPI_REG = 0xA03;
    GPO_REG = 0xA02;
    GPO_0 = 0x01;  //bit0 is 1

#1 : Get GPI 0 status
// Get GPI 0 Pin Status
data=ReadByte(GPI_REG);  // data bit4 is GPI 0 status


#2 : Set GPO 0 status to high
// Set GPO 0 Pin to High
  data=ReadByte(GPO_REG);
    data |= GPO_0;
 WriteByte(GPO_REG, data);   //data bit0 set GPO 0 status to high
```