# PBC-1000 USER Manual

Intel Atom® x6211E (Elkhart Lake) Fanless Embedded System,
Ultra-Compact, Rugged, -40°C to 70°C Operation Temperature

Vecow

1.5.0 Edition 20240318

# Record of Revision

| Version | Date | Page | Description | Remark |
|---|---|---|---|---|
| 1.00 | 2022/05/20 | All | Official Release | |
| 1.10 | 2022/10/04 | 65, 66, 67 | Update | |
| 1.20 | 2022/11/30 | 5 | Update | |
| 1.30 | 2023/04/26 | 3, 37, 38 | Update | |
| 1.40 | 2023/05/29 | 5 | Update | |
| 1.50 | 2024/03/18 | 4 | Update | |

# Disclaimer

This manual is released by Vecow Co., Ltd. for reference purpose only. All product offerings and specifications are subject to change without prior notice. It does not represent commitment of Vecow Co., Ltd. Vecow shall not be liable for direct, indirect, special, incidental, or consequential damages arising out of the use of the product or documentation or any infringements upon the rights of third parties, which may result from such use.

# Declaration of Conformity

**FCC**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if it is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

**CE**

The products described in this manual complies with all applicable European Union (CE) directives if it has a CE marking. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques.

# Copyright and Trademarks

# Order Information

| Model | GigE LAN | USB 3.0 | COM | DisplayPort | SIM Socket |
|---|---|---|---|---|---|
| PBC-1000 | 2 | 2 | 2 | 1 | 1 |

# Order Accessories

| Part Number | Description |
|---|---|
| DDR4 32G | Certified DDR4 32GB 3200MHz RAM |
| DDR4 16G | Certified DDR4 16GB 3200MHz RAM |
| DDR4 8G | Certified DDR4 8GB 3200MHz RAM |
| DDR4 4G | Certified DDR4 4GB 3200MHz RAM |
| PWA-60W-12V | 60W, 12V, 90V AC to 264V AC Power Adapter with 2-pin Terminal Block |
| DIN-RAIL | DIN Rail Mounting Kit |
| 5G Module | 5G Module with Antenna |
| 4G Module | 4G/GPS Module with Antenna |
| WiFi & Bluetooth | WiFi & Bluetooth Module with Antenna |

# Table of Contents

# 1

# GENERAL INTRODUCTION

## 1.1 Overview

Vecow PBC-1000 is an Ultra-Compact Fanless Embedded Box PC. Powered by Intel Atom® x6000E Series processor, Vecow PBC-1000 brings power-efficient, enhanced graphics performance and flexibility capabilities to empower the edge applications such as Intelligent Control, Energy Management, M2M, In-Vehicle Infotainment, factory Automation, and any AIoT/Industry 4.0 applications.

Vecow PBC-1000 is based on Intel Atom® x6000E Series Processor to deliver up to 40% faster computing and two times improved 3D graphics performance than the former generation solution. Equipped with 2 GigE LAN, 1 DisplayPort with 4K resolution, 32GB of DDR4-3200MHz SO-DIMM memory, M.2 slot for expansions and SATA storage, Vecow PBC-1000 provides an uncompromised visual experience, enhanced I/O and storage options for AIoT applications.

Vecow PBC-1000 features fanless with small form factor design and supports -40°C to 70°C operating temperature and 12V DC power input, making it perfect solution for Intelligent Control, Energy Management, M2M or Industry 4.0 and AIoT applications.

## 1.2 Features

- Intel Atom® x6000 Series Processor delivers up to 40% faster compute and up to 2X better 3D graphics performance than the former generation solution2.5" Pico-ITX compact size, Small Form Factor (SFF), measure only 100 x 72 mm
- Small form factor, ultra-compact design
- Fanless, -40°C to 70°C Operating Temperature
- 2 GigE LAN, 2 USB 3.0, 2 COM, M.2 Key B, M.2 Key E
- SIM Socket for WiFi/5G/4G/LTE/GPRS/UMTS
- Optional VHub AIoT Solution Service supports OpenVINO based AI accelerator and advanced Edge AI applications

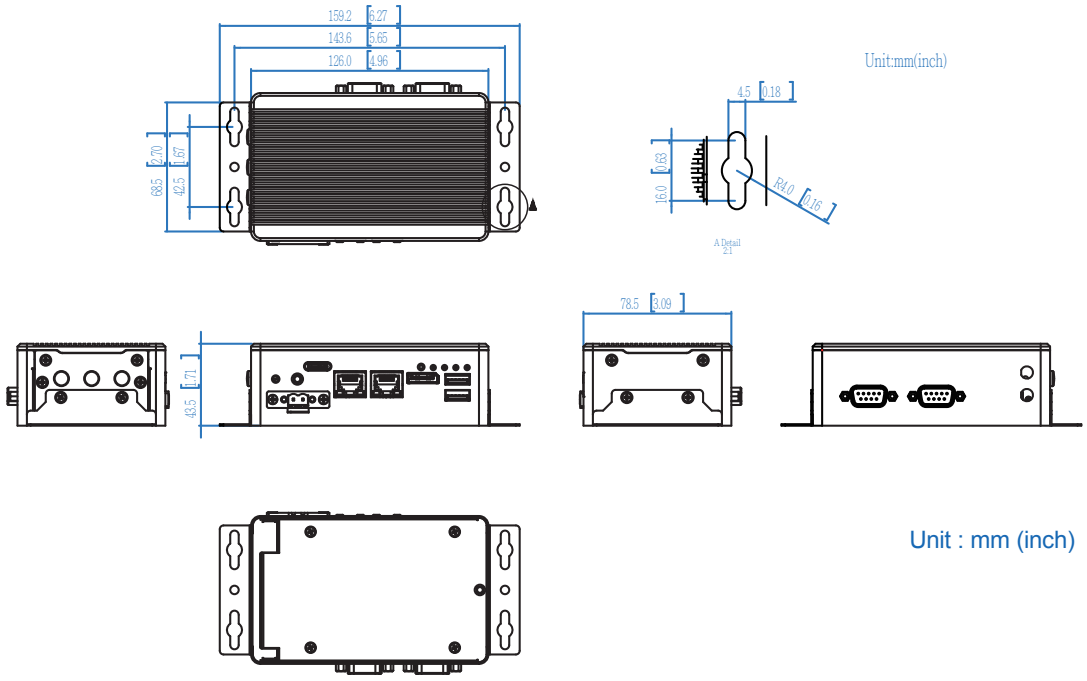
## 1.3 Product Specification

### 1.3.1 Specifications of PBC-1000

| | |
|---|---|
| **System** | |
| Processor | Intel Atom® x6211E Processor (Elkhart Lake) |
| BIOS | AMI |
| SIO | IT8659E |
| Memory | 1 DDR4 3200MHz SO-DIMM, up to 32GB |
| OS | Windows 10, Linux |
| **Graphics** | |
| Processor | Intel® UHD Graphics for 10th Gen Intel® Processors |
| Interface | DisplayPort : Up to 4096 x 2160 @60Hz |
| **Ethernet** | |
| LAN 1 | Realtek RTL8119I supports GigE LAN |
| LAN 2 | Realtek RTL8119I supports GigE LAN |
| **Audio** | |
| Audio Codec | Realtek ALC888S-VD, 7.1 Channel HD Audio |
| **I/O Interface** | |
| Serial | • 1 COM RS-232/422/485<br>• 1 COM RS-232 |
| USB | 2 USB 3.0 |
| LED | HDD, WLAN, Power, WWAN |
| SIM | 1 External Nano SIM Card Socket |
| **Storage** | |
| SATA | 1 SATA III (6Gbps) |
| **Expansion** | |
| M2 | • 1 M.2 Key B Socket (2280)<br>• 1 M.2 Key E Socket (2230) |
| **Power** | |
| Power Input | 12V DC-in |
| Power Interface | 2-pin Terminal Block : V+, V- |
| **Others** | |
| Watchdog Timer | Reset : 1 to 255 sec./min. per step |
| HW Monitor | Monitoring temperature, voltages. Auto throttling control when CPU overheats. |

| Mechanical | |
|---|---|
| Dimension | 126.0mm x 43.5mm x 78.5mm (4.96" x 1.74" x 3.09") |
| Weight | 0.5 kg (1.1 lb) |
| Mounting | • Wallmount by mounting bracket<br>• DIN Rail mount (Optional) |
| **Environment** | |
| Operating Temper-ature | -40°C to 70°C (-40°F to 158°F) |
| Storage Tempera-ture | -40°C to 85°C (-40°F to 185°F) |
| Humidity | 5% to 95% Humidity, non-condensing |
| Relative Humidity | 95% at 70°C |
| Shock | • IEC 60068-2-27<br>• SSD : 50G @wallmount, Half-sine, 11ms |
| Vibration | • IEC 60068-2-64<br>• SSD : 5Grms, 5Hz to 500Hz, 3 Axis |
| EMC | CE, FCC |

## 1.4 Mechanical Dimension



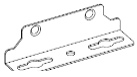
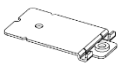

Unit : mm (inch)

# 2

# GETTING TO KNOW YOUR PBC-1000

## 2.1 Packing List

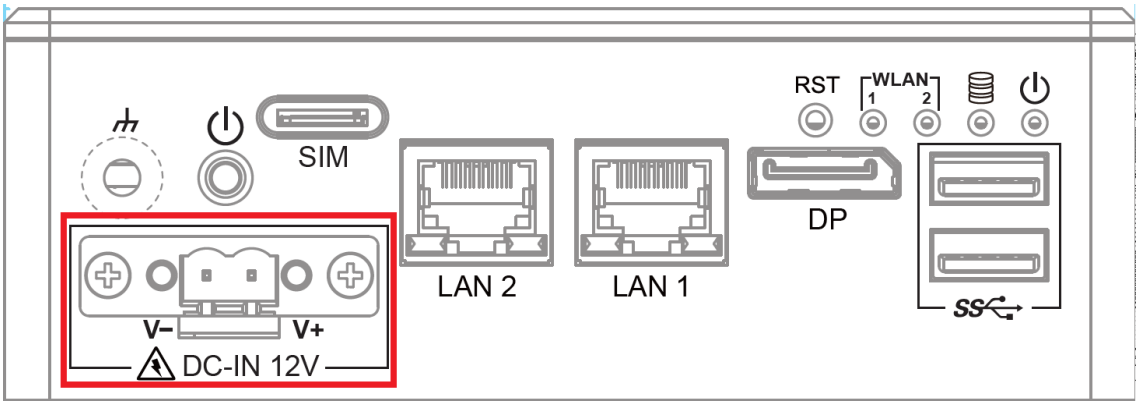
| Item | Description | Qty |
|---|---|---|
| 1 | PBC-1000 Embedded System | 1 |

| Item | Description | Picture | Use for | P/N | Qty |
|---|---|---|---|---|---|
| 1 | PHILLPIS M3*4L |  | M.2 | 53-2426204-80B | 3 |
| 2 | M3x4L |  | Wall mount Bracket/HDD | 53-2466204-30B | 8 |
| 3 | Terminal block 2-pin (5.0mm) |  | DC-IN | 51-2411R02-S1B | 1 |
| 4 | Wall Mount |  | Mount | 62-01P0727-B00 | 2 |
| 5 | M.2 Bracket |  | M.2 | 62-03P0997-30A | 1 |
| 6 | SATA Power Cable |  | HDD | 61-1470022-005 | 1 |
| 7 | SATA Data Cable |  | HDD | 61-13B0707-3BA | 1 |

## 2.2 Front Panel I/O & Functions

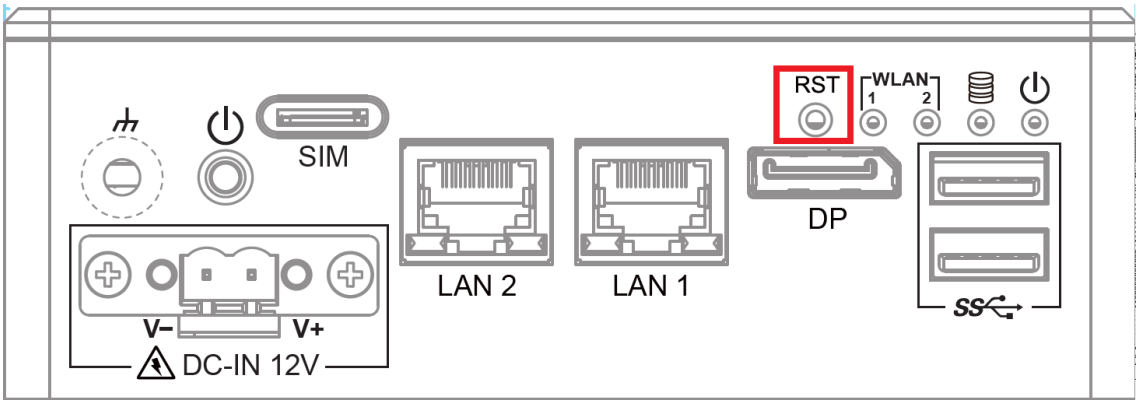
In Vecow's PBC-1000 series family, all I/O connectors are located on the front panel. Most of the general connections to the computer device, such as DC power input, SIM slot, Display port, USB3.2 and LAN Jack are placed on the front panel.

### 2.2.1 Power Terminal Block



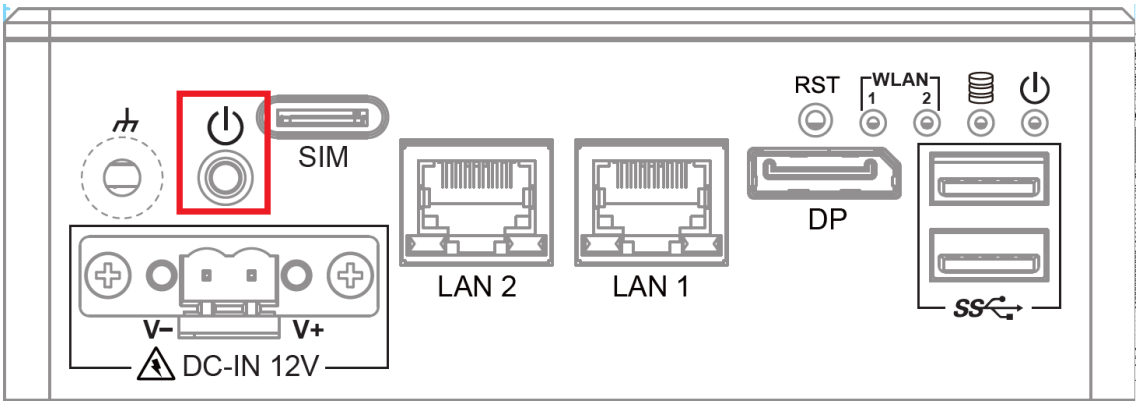

This system supports 12V only DC power input by terminal block in the rear side

### 2.2.2 Reset Tact Switch



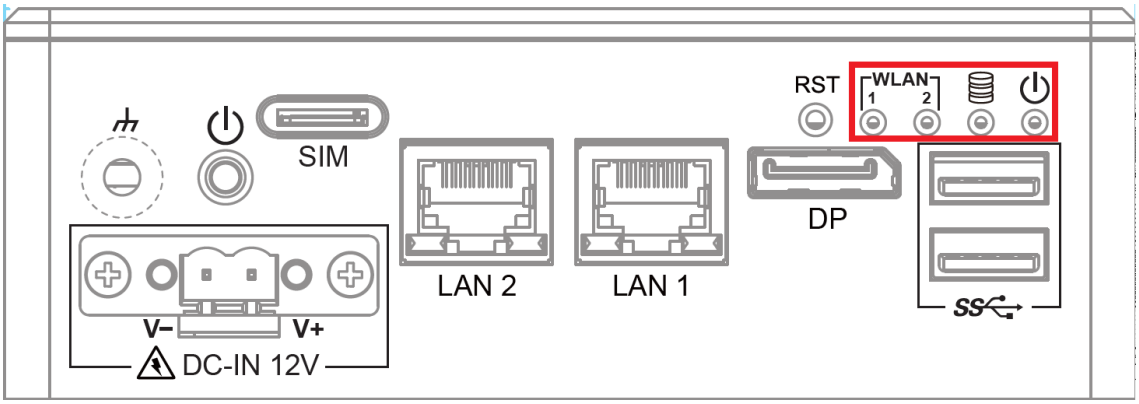

It is a hardware reset switch. Use this switch to reset the system without power off the system. Press the Reset Switch for a few seconds, and then reset will be enabled.

### 2.2.3 Power Button




The power button is a non-latched switch. To power on PBC-1000, press the power button.To power off PBC-1000, you can either command shutdown by OS operation or simply press the power button. If system error appears, press and hold the power button for four seconds to shut down the machine directly.Please do note that a four-second interval between each two power-on/power-off operation is necessary in normal working status. (For example, once turning off the system, you have to wait for four seconds to initiate another power-on operation)

### 2.2.4 HDD,PWR,WWAN,WLAN LED Indicator



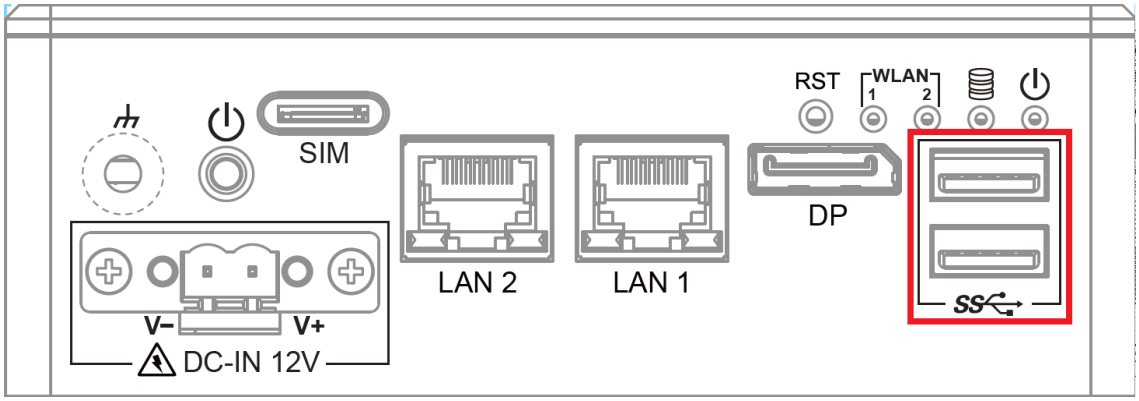

Green-WLAN _LED1 : If the LED is solid green, it indicates that the device on M2 key-E Socket is working.

Green-WLAN_LED2 : If the LED is solid green, it indicates that the device on M2 key-B Socket is working.

Orange-HDD LED : A hard disk LED. If the LED is on, it indicates that the system's storage is functional. If it is off, it indicates that the system's storage is not functional. If it is flashing, it indicates data access activities are in progress.

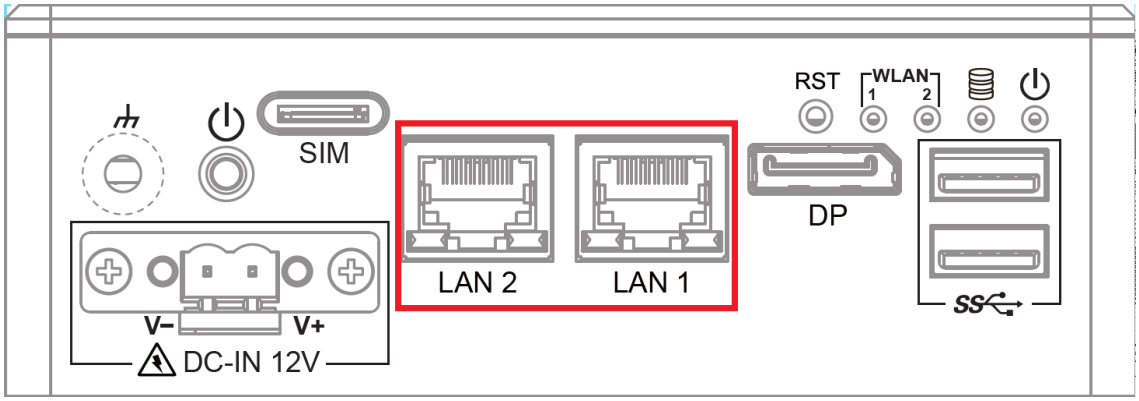
Green-Power LED : If the LED is solid green, it indicates that the system is powered on

### 2.2.5 USB 3.2 Gen1




There are 2 USB 3.2 Gen1 connections available supporting up to 5GB per second data rate in the front side of PBC-1000. It is also compliant with the requirements of Super Speed (SS), high speed (HS), full speed (FS) and low speed (LS).

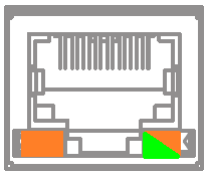
### 2.2.6 10/100/1000 Mbps Ethernet Port




There are two 8-pin RJ-45 jacks supporting 10/100/1000 Mbps Ethernet connections in the top side.Which is powered by Realtek RTL8119I Ethernet engine. When both of LANs work in normal status, iAMT function is enabled. Using suitable RJ-45 cable, you can connect the system to a computer, or to any other devices with Ethernet connection, for example, a hub or a switch. Moreover, both of LANs support Wake on LAN and Pre-boot functions.The pin-outs of LAN 1 and LAN 2 are listed as follows :

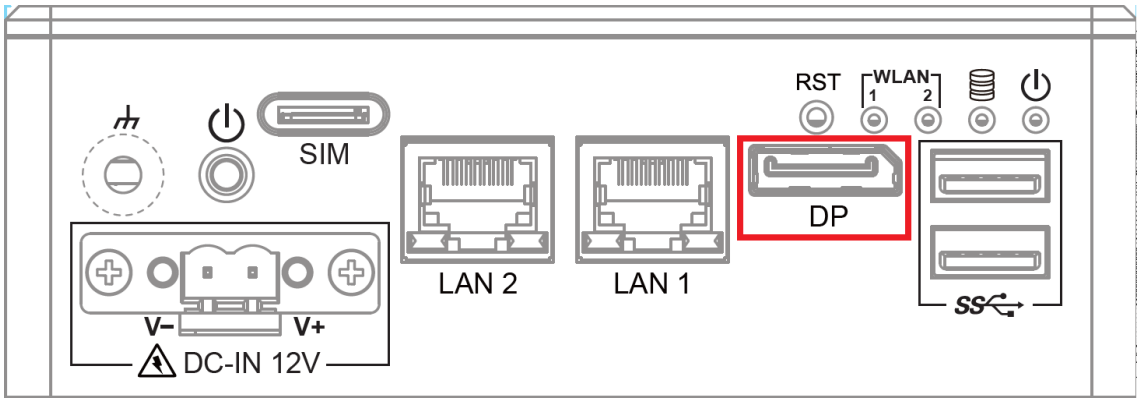
| Pin No. | 10/100 Mbps | 1000 Mbps |
|---|---|---|
| 1 | E_TX+ | MDI0_P |
| 2 | E_TX- | MDI0_N |
| 3 | E_RX+ | MDI1_P |
| 4 | -------- | MDI1_N |
| 5 | -------- | MDI2_P |
| 6 | E_RX- | MDI2_N |
| 7 | -------- | MDI3_P |
| 8 | -------- | MDI3_N |

| LED Location | LED Color | 100Mbps | 1000Mbps |
|---|---|---|---|
| Right | Green/ Orange | Off | Solid Green |
| Left | Orange | Twinkling Orange | Twinkling Orange |



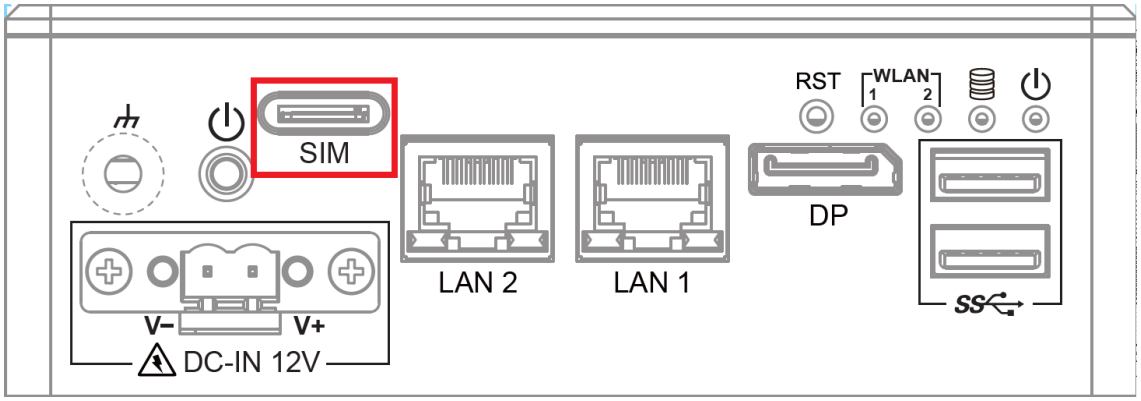
Each LAN port is supported by standard RJ-45 connector with LED indicators to present Active/Link/Speed status of the connection. The LED indicator on the left side lightens in solid green when the cable is properly connected to a 100Mbps Ethernet network; The LED indicator on the left side lightens in solid Orange when the cable is properly connected to a 1000Mbps Ethernet network; The left LED will keep twinkling/ off when Ethernet data packets are being transmitted/receive

### 2.2.7 Display Port




Display Port connection supports up to 4096 x 2160 resolution at 60Hz

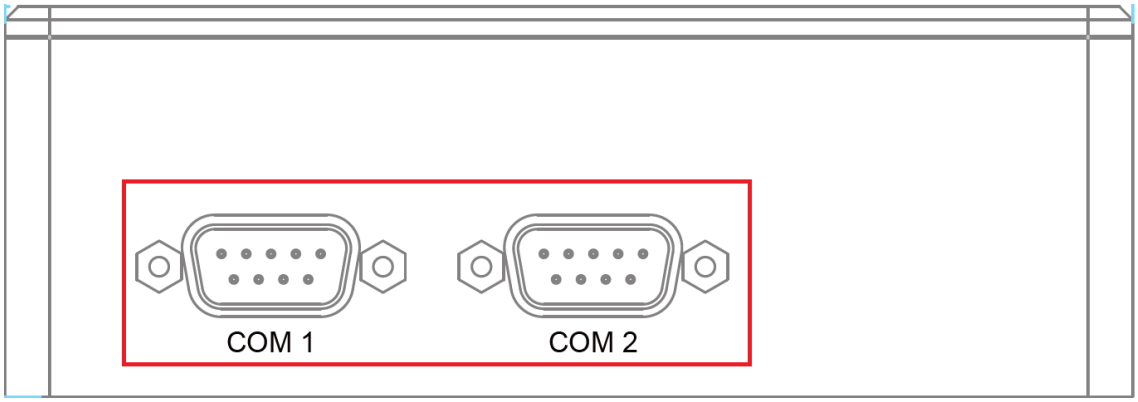
### 2.2.8 Nano SIM Card Socket for M.2 key B Slot




The Nano SIM card socket is support Push-Push type. Please make sure to unplug the system power before inserting the Nano SIM card.

## 2.3 Rear Panel I/O & Functions

### 2.3.1 Serial Port COM

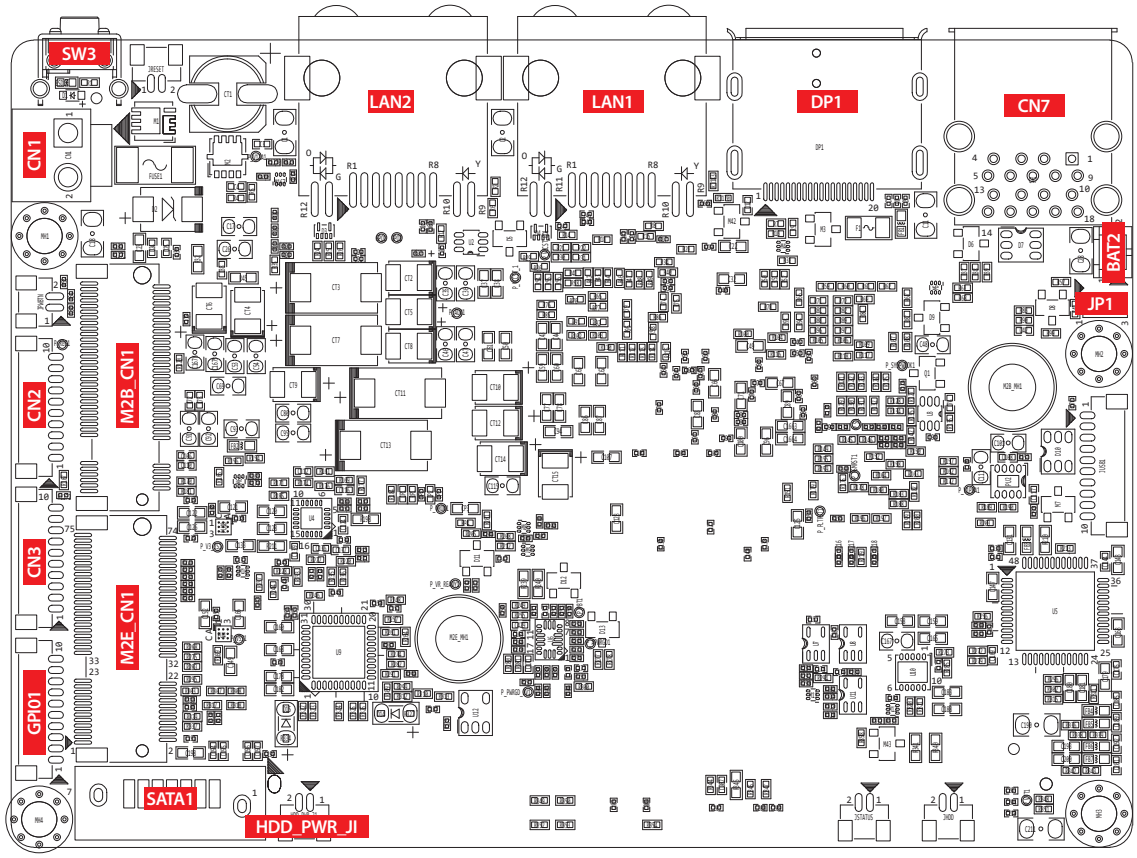



COM1 can be configured for RS-232, RS-422, or RS-485 with auto flow control communication, The default definition is RS-232. COM2 is support RS232 only, if you want to change to RS-422 or RS-485, you can find the setting in BIOS.The pin assignments are listed in the following table:

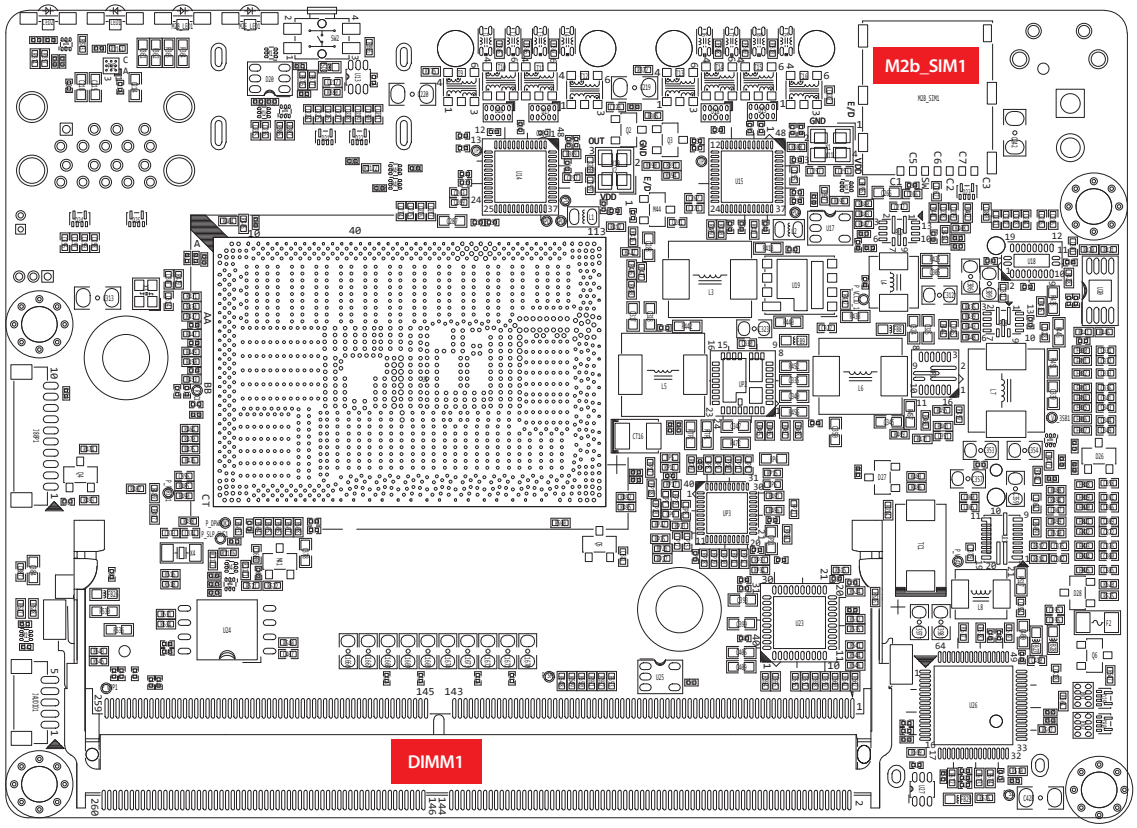
| BIOS Setting | Function |
|---|---|
| COM1 | RS-232 |
| | RS-422 (5-wire) |
| | RS-485 |
| | RS-485 w/z auto-flow control |

# 2.4 Main Board Expansion Connectors

## 2.4.1 PBC-1000 Main Board Top Side View

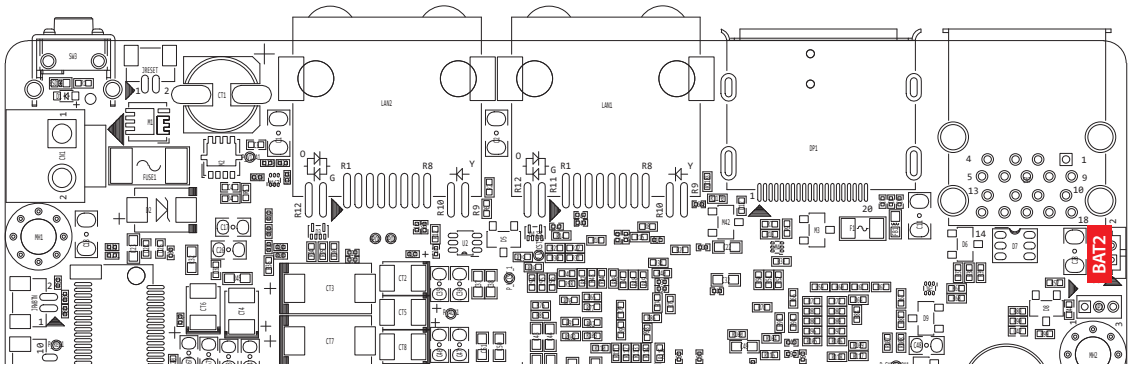


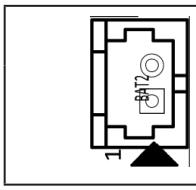

## 2.4.2 PBC-1000 Main Board Bot Side View



### 2.4.3 BAT2 : Battery

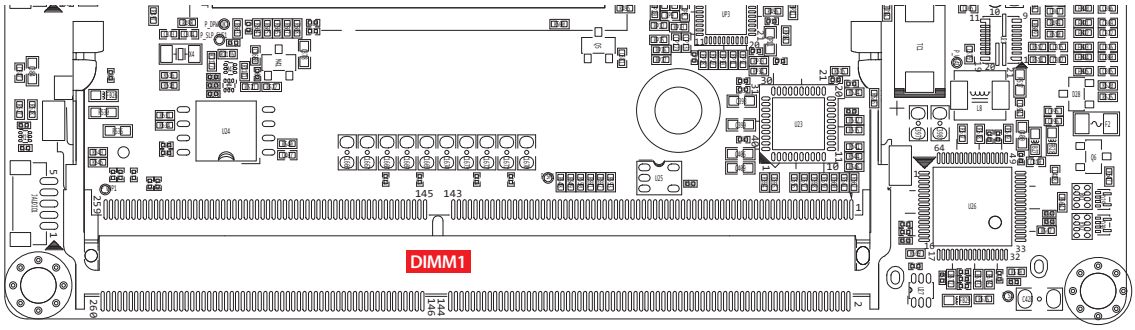
The PBC-1000 real-time clock is powered by a lithium battery. It is equipped with Panasonic BR2032 190mAh lithium battery. It is recommended that you not replace the lithium battery on your own, but if the battery needs to be changed, please contact the Vecow RMA service team.



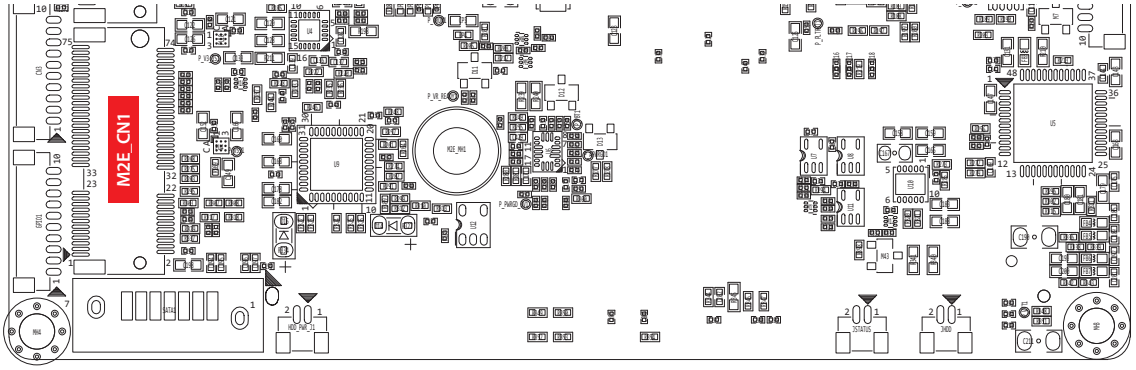

| Pin No. | Function |
|---|---|
| 1 | +3V_BAT |
| 2 | GND |

### 2.4.4 DIMM1 : DDR4 Slot




There is a DDR4 channel onboard, support DDR4 3200, max 32GB

### 2.4.5 M2E_CN1 : M.2 key E Slot for USB 2.0, PCIe Gen3x1 support

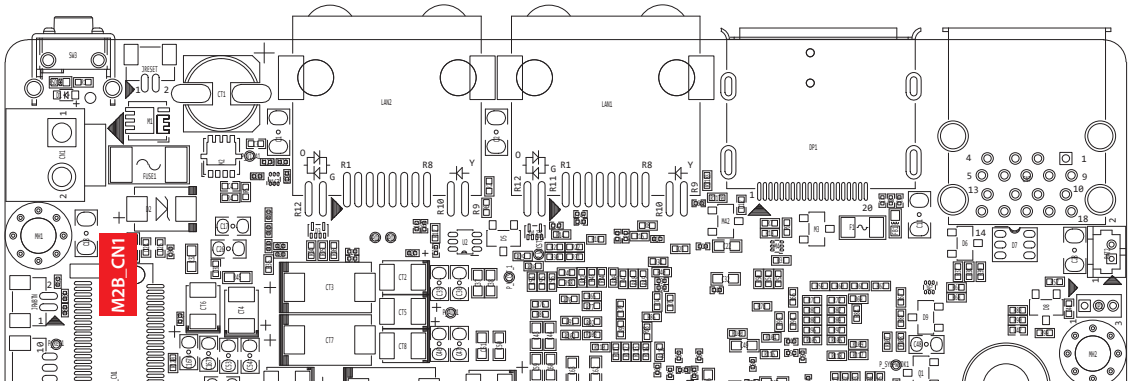



M.2 key E connector is suitable for applications that use wireless connectivity including Wi-Fi, Bluetooth, NFC of GNSS. Module card types include 2230. The pin assignments of M2E_CN1 are listed in the following table :

| Pin No. | Signal Name | Pin No. | Signal Name |
|---|---|---|---|
| 74 | 3.3V | 75 | GND |
| 72 | 3.3V | 73 | NC |
| 70 | NC | 71 | NC |
| 68 | NC | 69 | GND |
| 66 | NC | 67 | NC |
| 64 | NC | 65 | NC |
| 62 | ALERT# (O)(0/3.3V) | 63 | GND |
| 60 | 12C_CLK (I)(0/3.3V) | 61 | NC |
| 58 | 12C_DATA (I/O)(0/3.3V) | 59 | NC |
| 56 | NC | 57 | GND |
| 54 | NC | 55 | PEWAKE0# (I/O)(0/3.3V) |
| 52 | PERST0# (I)(0/3.3V) | 53 | CLKREQ0# (I/O)(0/3.3V) |
| 50 | NC | 51 | GND |
| 48 | NC | 49 | REFCLKn0 |
| 46 | NC | 47 | REFCLKp0 |
| 44 | NC | 45 | GND |

| | | | |
|---|---|---|---|
| 42 | NC | 43 | PERn0 |
| 40 | NC | 41 | PERp0 |
| 38 | NC | 39 | GND |
| 36 | NC | 37 | PETn0 |
| 34 | NC | 35 | PETp0 |
| 32 | NC | 33 | GND |
| | Module Key | | Module Key |
| | Module Key | | Module Key |
| | Module Key | | Module Key |
| | Module Key | | Module Key |
| 22 | NC | 23 | NC |
| 20 | NC | 21 | NC |
| 18 | NC | 19 | NC |
| 16 | LED2# (O)(od) | 17 | NC |
| 14 | NC | 15 | NC |
| 12 | NC | 13 | NC |
| 10 | NC | 11 | NC |
| 8 | NC | 9 | NC |
| 6 | LED1# (O)(od) | 7 | GND |
| 4 | 3.3V | 5 | USB_D- |
| 2 | 3.3V | 3 | USB_D+ |
| | | 1 | GND |

### 2.4.6 M2B_CN1 : M.2 key B Slot for PCIe Gen3x2 ,SATA3.0 or USB3.2 Gen1 support (Option by BIOS setting)

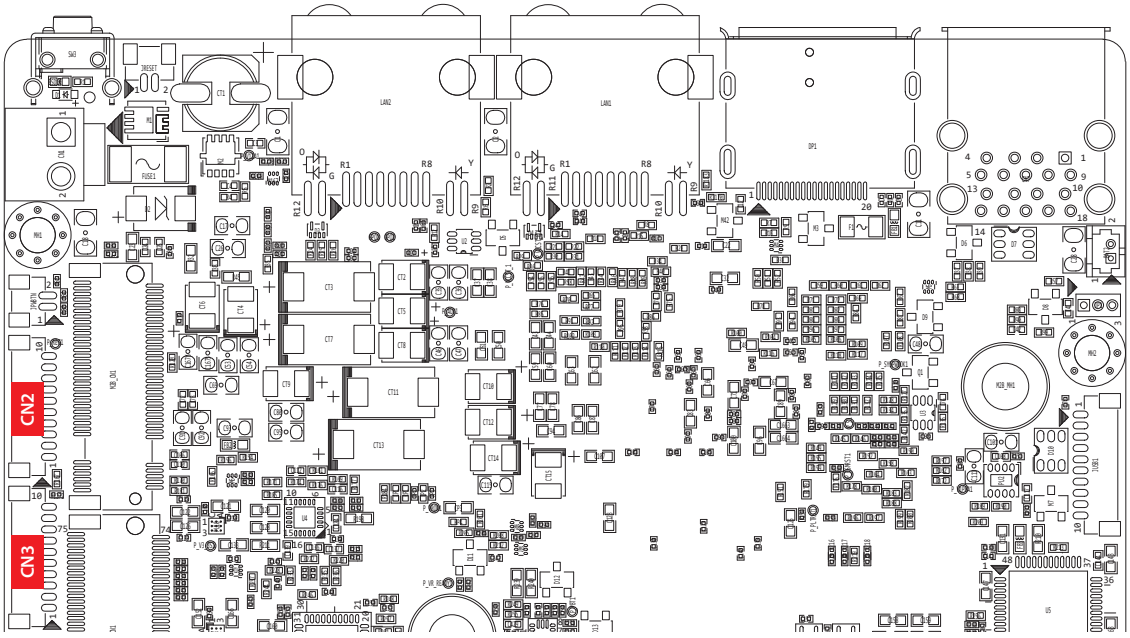



M.2 key B connector is suitable for applications that use wireless connectivity including LTE/5G module, and NVMe SSD (BW : PCIex2) or SATA SSD that types include 2260/3042/3052.The pin assignments of M2B_CN1 are listed in the following table :

| Pin No. | Signal Name | Pin No. | Signal Name |
|---|---|---|---|
| 74 | 3.3V | 75 | NC |
| 72 | 3.3V | 73 | GND |
| 70 | 3.3V | 71 | GND |
| 68 | NC | 69 | CONFIG_1 |
| 66 | SIM DETECT | 67 | NC |
| 64 | NC | 65 | NC |
| 62 | NC | 63 | NC |
| 60 | NC | 61 | NC |
| 58 | NC | 59 | NC |
| 56 | NC | 57 | GND |
| 54 | PEWAKE# | 55 | REFCLKp |
| 52 | CLKREQ# | 53 | REFCLKn |
| 50 | PERST# | 51 | GND |
| 48 | NC | 49 | PETp0/SATA-A+ |
| 46 | NC | 47 | PETn0/SATA-A- |
| 44 | NC | 45 | GND |

| | | | |
|---|---|---|---|
| 42 | NC | 43 | PERp0/SATA-B- |
| 40 | NC | 41 | PERn0/SATA-B+ |
| 38 | DEVSLP | 39 | GND |
| 36 | UIM-PWR | 37 | PETp1/USB3.1-TX+ |
| 34 | UIM-DATA | 35 | PETp1/USB3.1-TX- |
| 32 | UIM-CLK | 33 | GND |
| 30 | UIM-RESET | 31 | PETp1/USB3.1-RX+ |
| 28 | NC | 29 | PETp1/USB3.1-RX- |
| 26 | NC | 27 | GND |
| 24 | NC | 25 | NC |
| 22 | NC | 23 | NC |
| 20 | NC | 21 | NC |
| 18 | Module Key | 19 | Module Key |
| 16 | Module Key | 17 | Module Key |
| 14 | Module Key | 15 | Module Key |
| 12 | Module Key | 13 | Module Key |
| 10 | LED_1# | 11 | GND |
| 8 | W_DISABLE1 | 9 | USB- |
| 6 | FULL_CARD_PWR_OFF/ON | 7 | USB+ |
| 4 | 3.3V | 5 | GND |
| 2 | 3.3V | 3 | GND |
| | | 1 | NC |

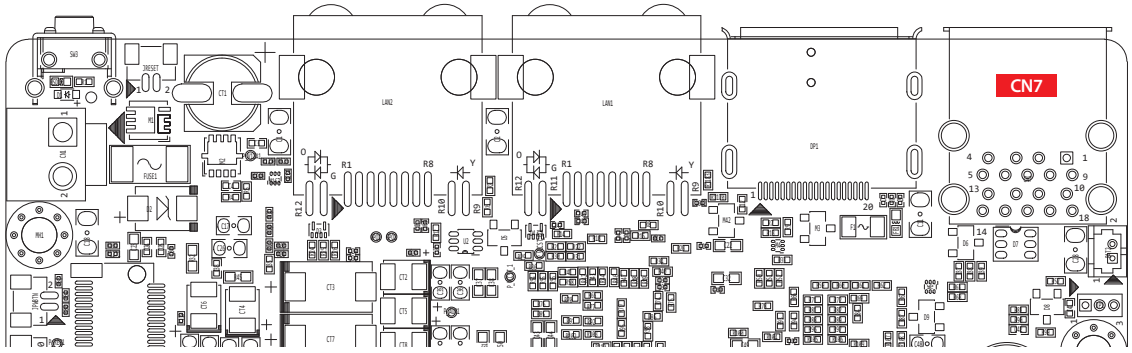
## 2.4.7 CN2.CN3 : Serial Port




CN3 can be configured for RS-232, RS-422, or RS-485 with auto flow control communication, The default definition is RS-232. CN2 is support RS232 only, if you want to change to RS-422 or RS-485, you can find the setting in BIOS.The pin assignments are listed in the following table:

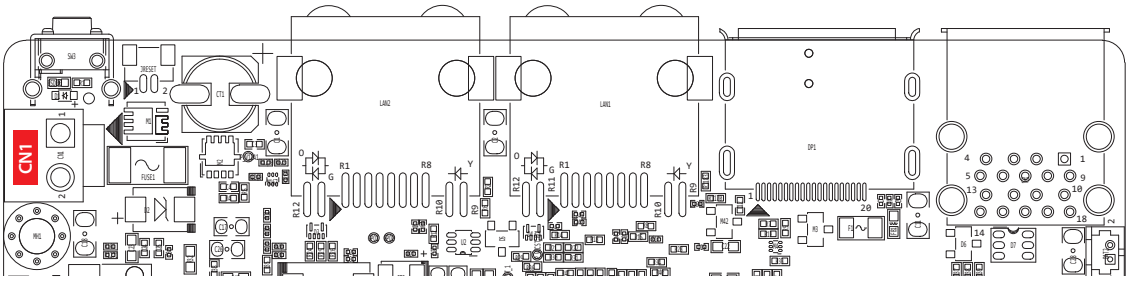
| Serial Port | Pin Number | RS-232 | RS-422 (5-wire) | RS-485 (3-wire) |
|---|---|---|---|---|
| CN2 (RS232 only)<br><br>CN3 (Full) | 1 | DCD | TXD- | DATA- |
| | 2 | RXD | TXD+ | DATA+ |
| | 3 | TXD | RXD+ | -------- |
| | 4 | DTR | RXD- | -------- |
| | 5 | GND | GND | GND |
| | 6 | DSR | -------- | -------- |
| | 7 | RTS | -------- | -------- |
| | 8 | CTS | -------- | -------- |
| | 9 | RI | -------- | -------- |

### 2.4.8 CN7 : External USB 3.2 Gen1 Connector

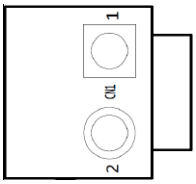



There are 2 USB 3.2 Gen1 connections available supporting up to 5GB per second data rate in the top side of EPBC-1000 series. They are also compliant with the requirements of SuperSpeed (SS), high speed (HS), full speed (FS) and low speed (LS).

### 2.4.9 CN1 : DC Power input

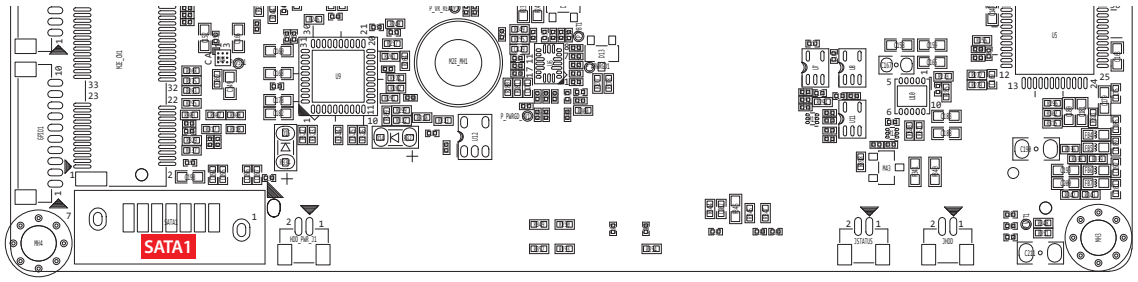



EPBC-1000 supports 12V DC power input by wire-to-board connector in the top side

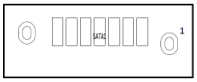



| Pin No. | Definition | Pin No. | Definition |
|---|---|---|---|
| 1 | V- | 2 | V+ |

## 2.4.10 SATA1 : SATA III Connector

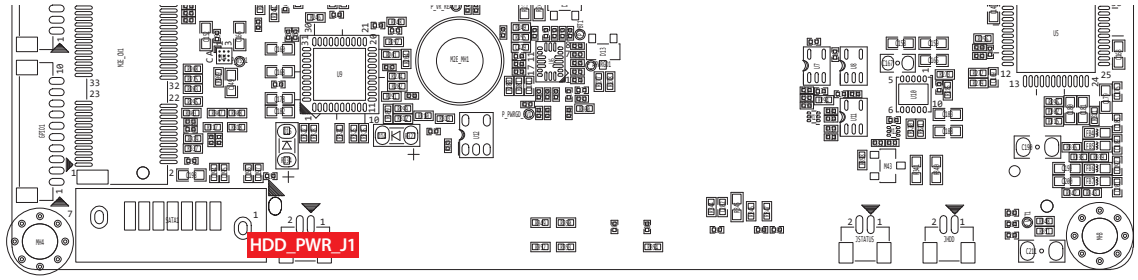



There is a high performance Serial ATA III (SATA III) on the EPBC-1000 series. They support higher storage capacity with less cabling effort and smaller required space. The pin assignments of SATA1 listed in the following table :

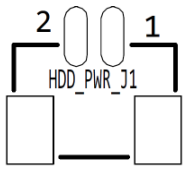


| Pin No. | Definition | Pin No. | Definition |
|---|---|---|---|
| 1 | GND | 2 | TXP |
| 3 | TXN | 4 | GND |
| 5 | RXN | 6 | RXP |
| 7 | GND | | |

## 2.4.11 HDD_PWR_J1 : SATA Power Connector

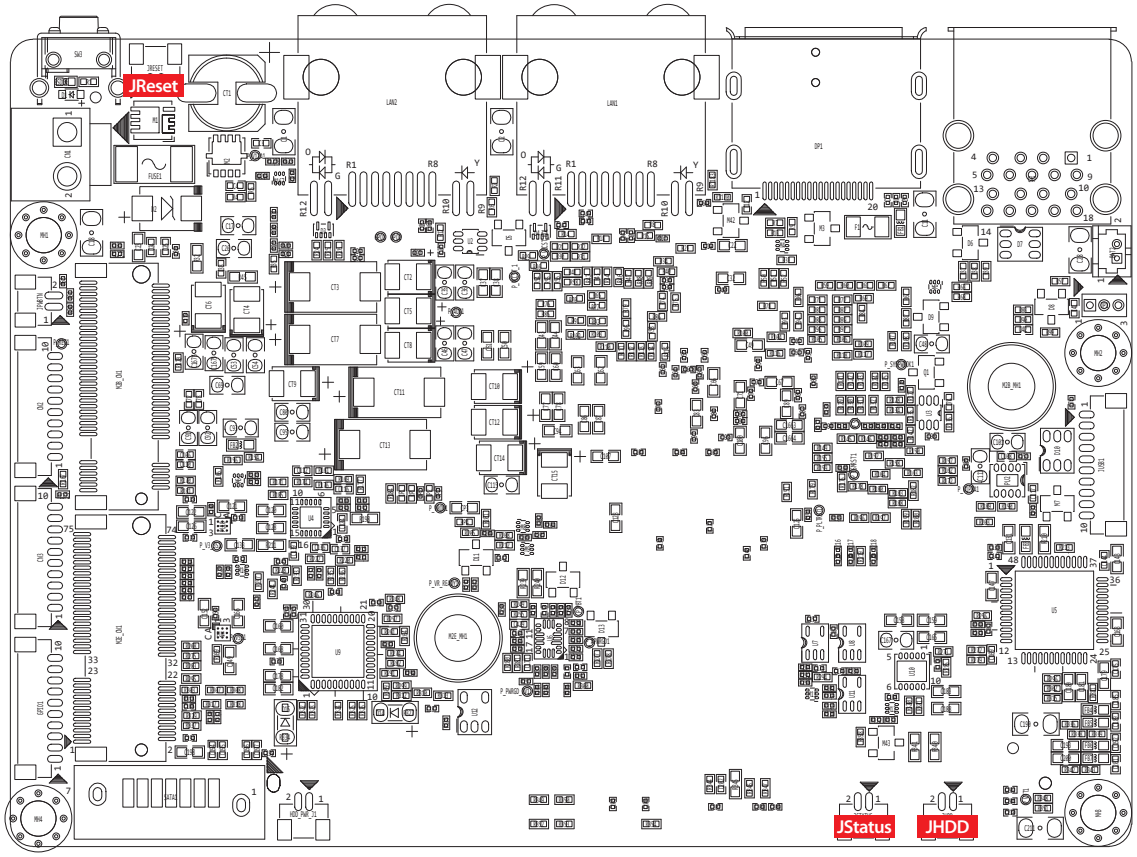



The PBC-1000 series is also equipped with one SATA power connector. It supports 5V (Up to 1.2A) a to the SSD only. The pin assignments of HDD_PWR_J1 is listed in the following table

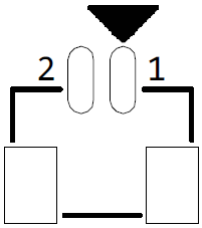



| Pin No. | Definition | Pin No. | Definition |
|---|---|---|---|
| 1 | +5V | 2 | GND |

## 2.4.12 JReset, JStatus, JHDD : 1.0mm 2p extend header

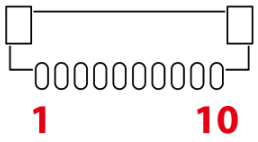



These pin header can be used as a backup for following functions, hard drive LED indicator, reset button, power LED indicator, The pin assignments are listed in the following table :



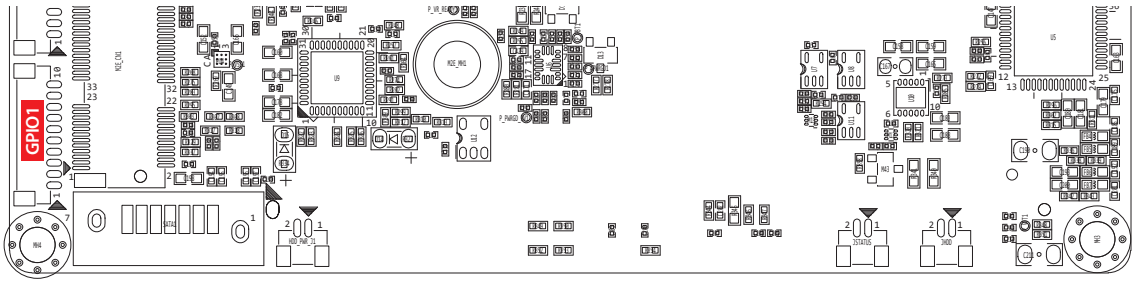

| Pin No. | Pin No. | Definition |
|---|---|---|
| JRESET | 1 | FP_PWR_BTN_IN |
| | 2 | GND |
| JSTATUS | 1 | PWR_LED_P |
| | 2 | PWR_LED_N |
| JHDD | 1 | HDD_LED_P |
| | 2 | HDD_LED_N |

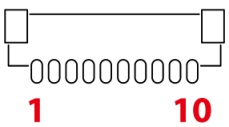
### 2.4.13 J80p1 : I2C/SMB header




| Pin No. | Definition |
|---|---|
| 1 | +3.3V |
| 2 | NC |
| 3 | NC |
| 4 | SMBUS_DAT |
| 5 | SMBUS_CLK |
| 6 | I2C_DAT |
| 7 | I2C_CLK |
| 8 | NC |
| 9 | NC |
| 10 | GND |

### 2.4.14 JDIO1 : 8bit GPIO Header (only support 3.3V)



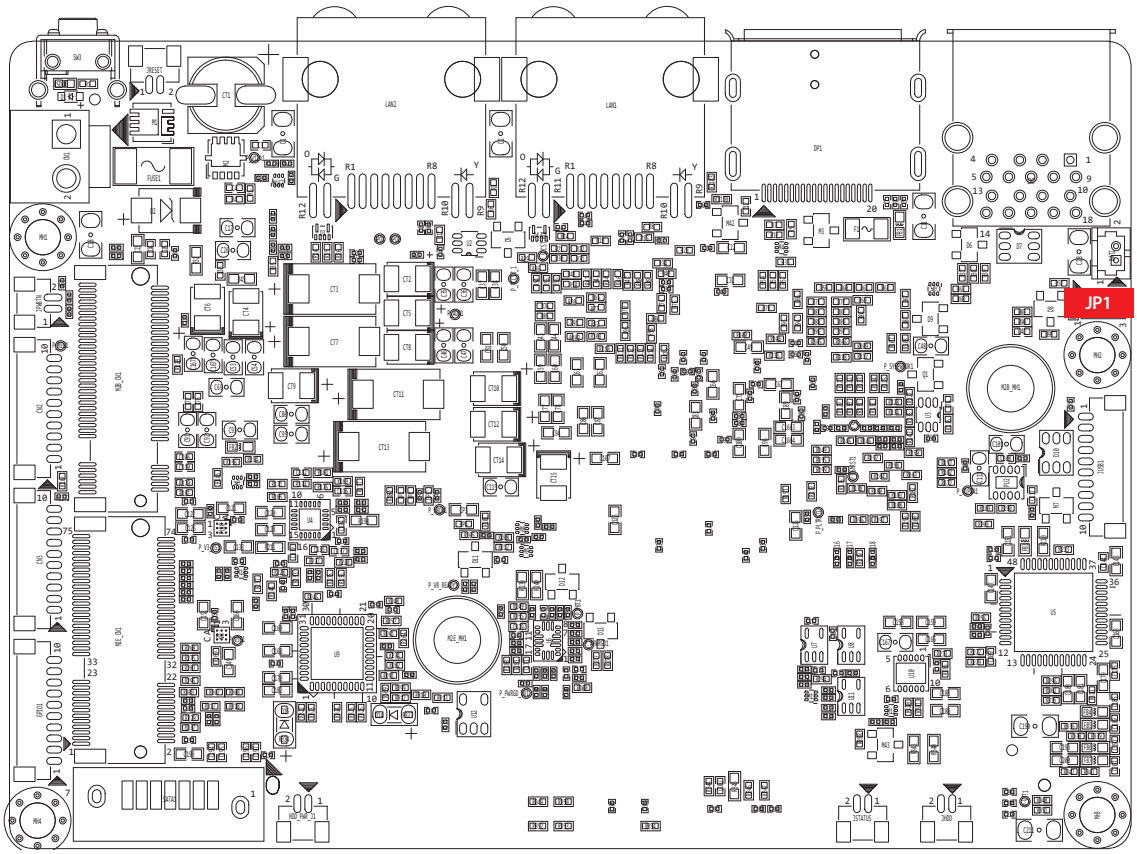




| Pin No. | Definition |
|---|---|
| 1 | SIO_GPIO1 |
| 2 | SIO_GPIO2 |
| 3 | SIO_GPIO3 |
| 4 | SIO_GPIO4 |
| 5 | SIO_GPIO5 |
| 6 | SIO_GPIO6 |
| 7 | SIO_GPIO7 |
| 8 | SIO_GPIO8 |
| 9 | +3.3V |
| 10 | GND |

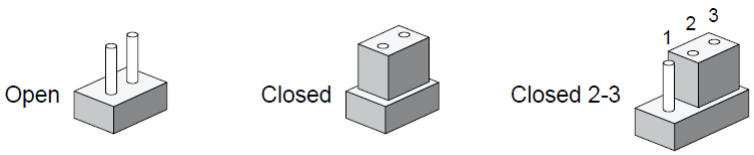
## 2.5 Main Board Jumper Settings

### 2.5.1 Top View of PBC-1000 Main Board With Jumper Location

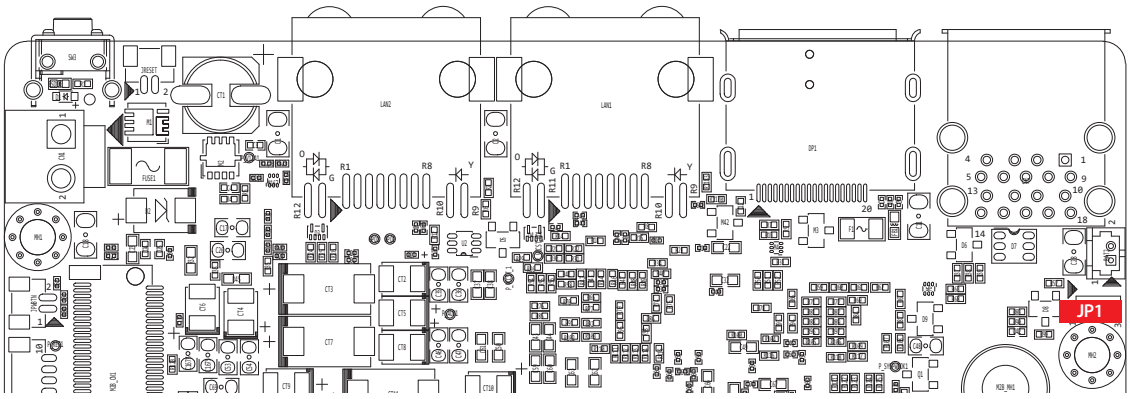
The figure below is the top view of the EPBC-1000 main board. It shows the location of the jumpers.




You may configure your card to match the needs of your application by setting jumpers. A jumper is a metal bridge used to close an electric circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To "close" a jumper, you connect the pins with the clip. To "open" a jumper, you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2, and 3. In this case you would connect either pins 1 and 2, or 2 and 3.



## 2.3.2 JP1 : Clear CMOS



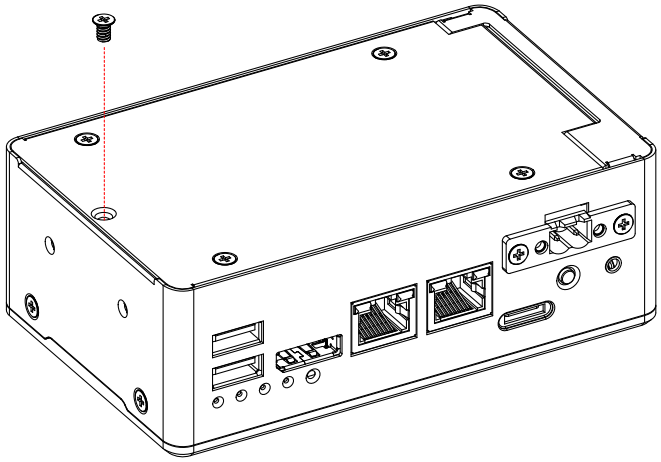

| | Pin No. | Definition |
|---|---|---|
| 1 3 | 1-2 | Normal (default) |
| | 2-3 | Clear CMOS |

# 3

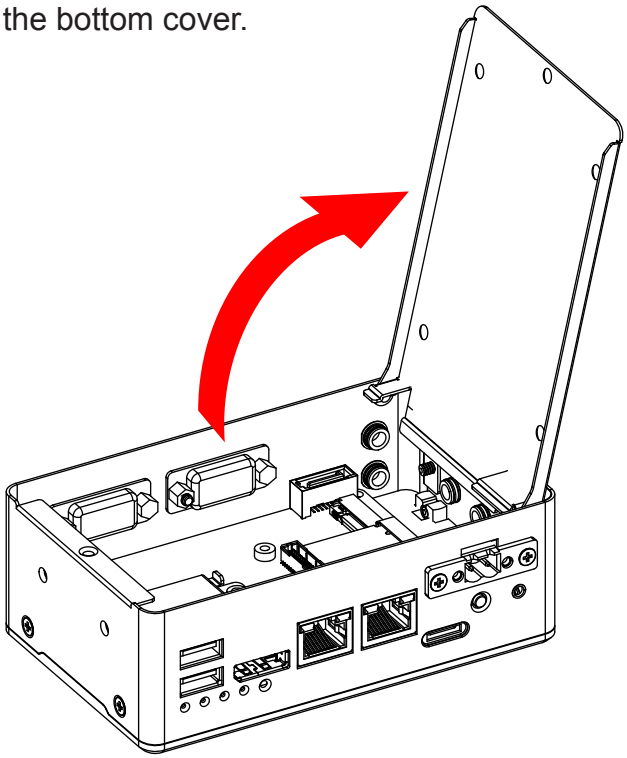
# SETUP

## 3.1 How to Open Your PBC-1000

**Step 1** Remove the Screw indicated and separate Cover from the enclosure.

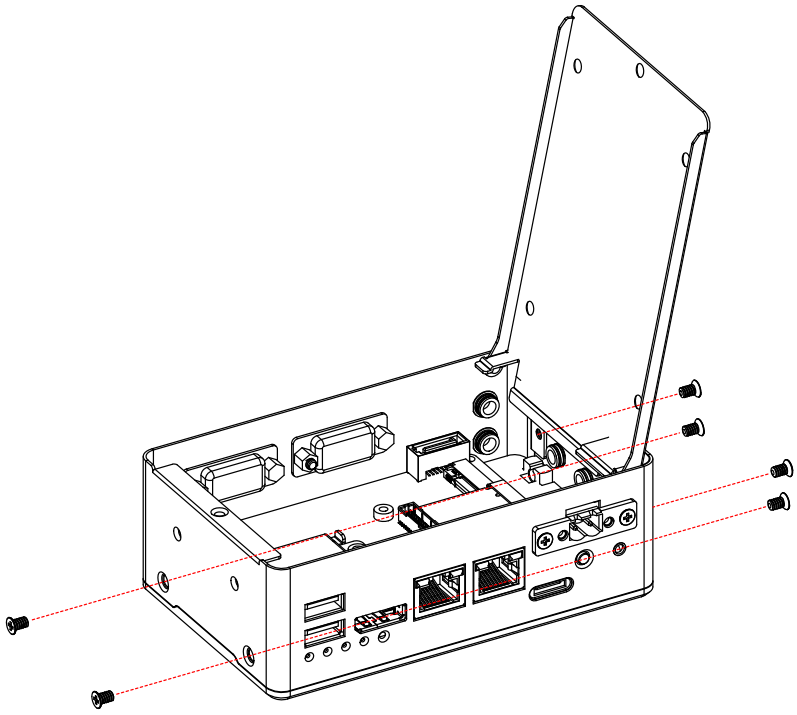


**Step 1** Remove the bottom cover.

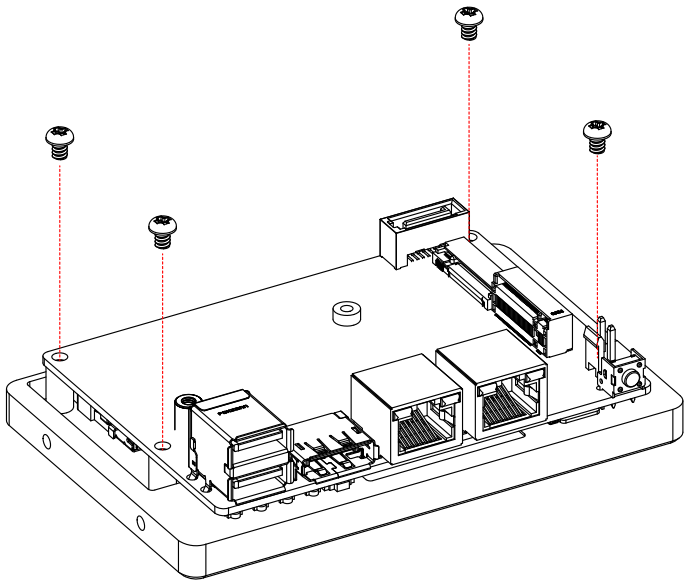


## 3.2 Installing DDR4 SO-DIMM Modules

**Step 1** Remove four #6-32 Screws, two M3 Screws indicated and separate Cover from the enclosure.

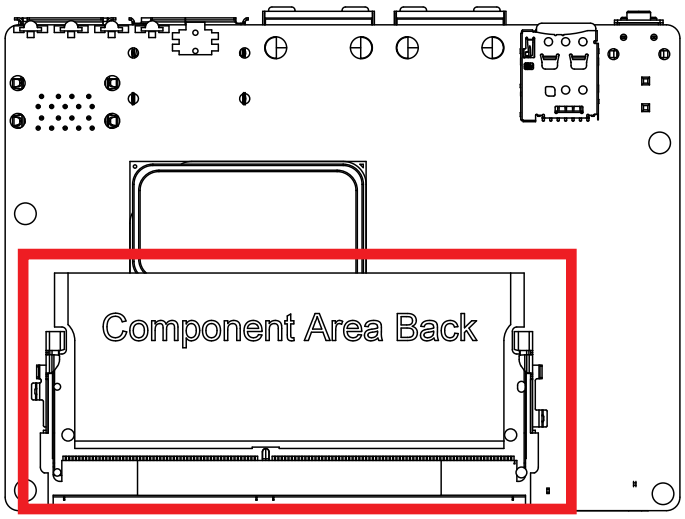


**Step 2** Remove the screws indicated and separate the heat-sink from the PCB.



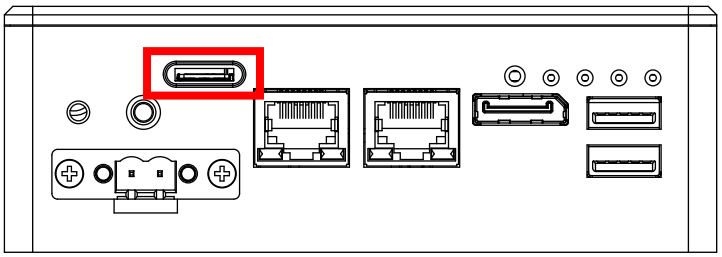
**Step 3** Install DDR4 RAM module into SO-DIMM socket.

**Step 4** Finished.



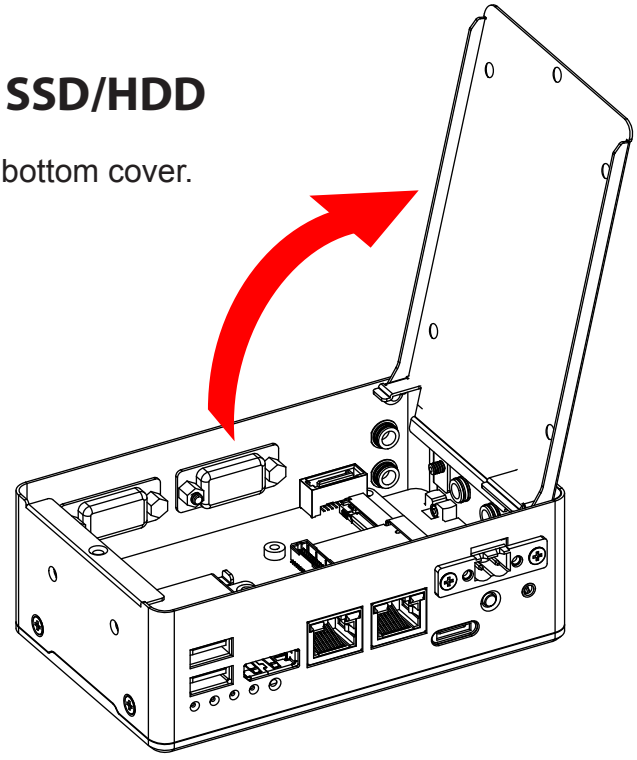

## 3.3 Installing SIM Card

**Step 1** Install SIM card into the SIM card slot.

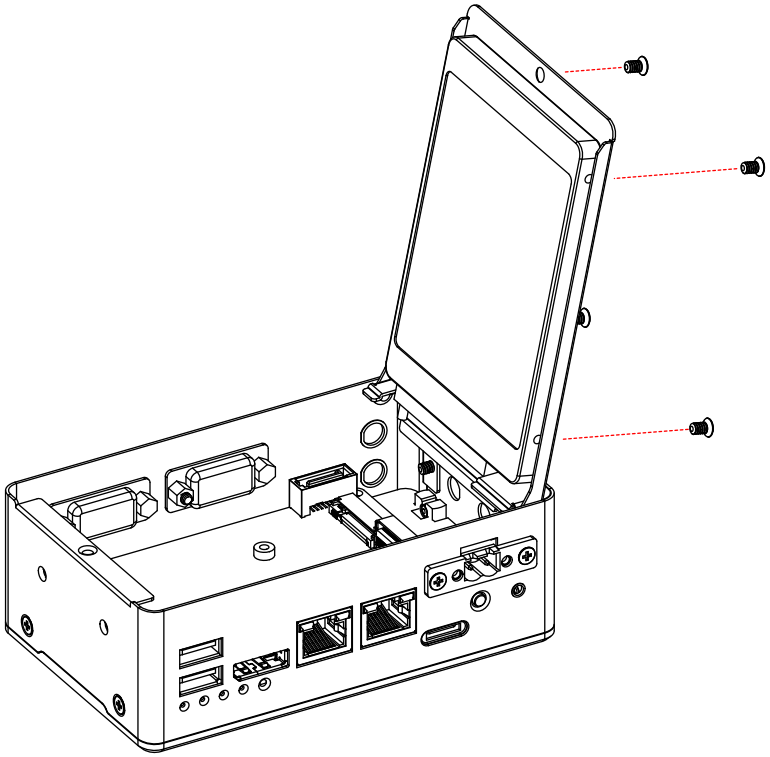


## 3.4 Installing SSD/HDD

**Step 1** Remove the bottom cover.



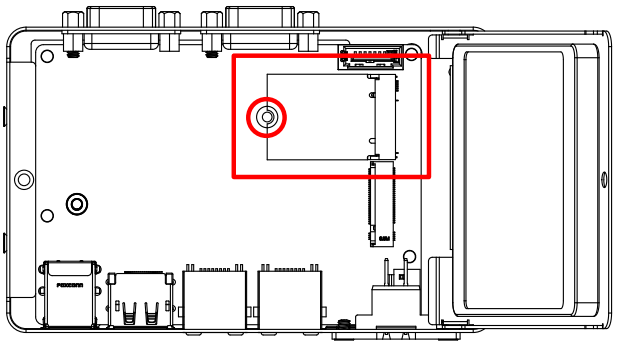
**Step 2** Fasten four Screws indicated.



## 3.5 Installing M.2

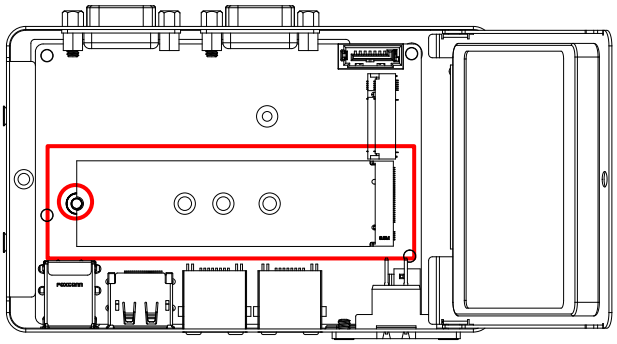
### 3.5.1 Key E 2230

**Step 1** Install M.2 into the M.2 slot and fasten M3 screw indicated.



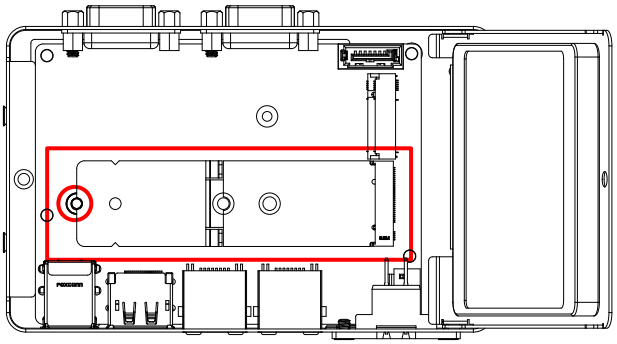
### 3.5.2 Key B 2280

**Step 1** Install M.2 into the M.2 slot and fasten M3 screw indicated.



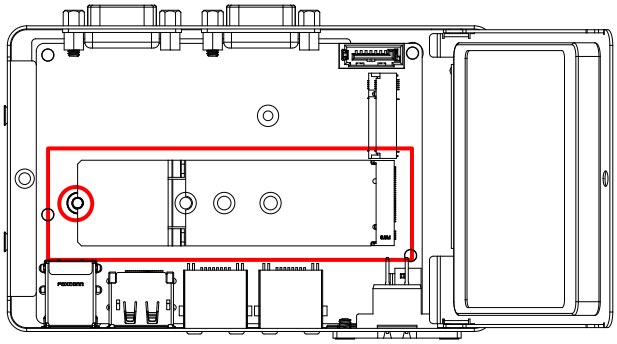
### 3.5.3 Key B 3042

**Step 1** Install M.2 with M.2 Tray into the M.2 slot and fasten M3 screw indicated.



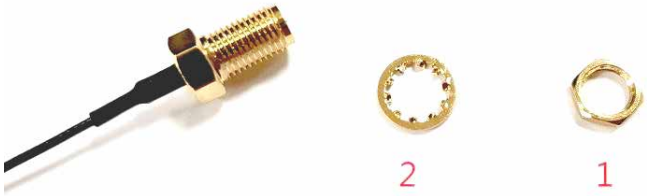
### 3.5.4 Key B 3052

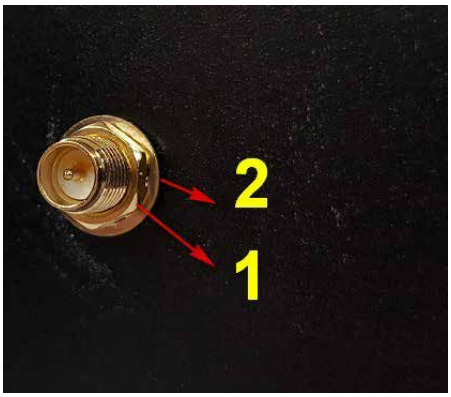
**Step 1** Install M.2 with M.2 Tray into the M.2 slot and fasten M3 screw indicated.



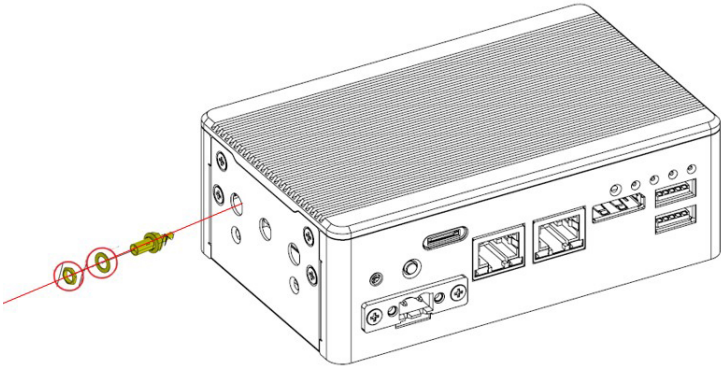
## 3.6 Installing Antenna cable

**Step 1** Check antenna cable and washers.



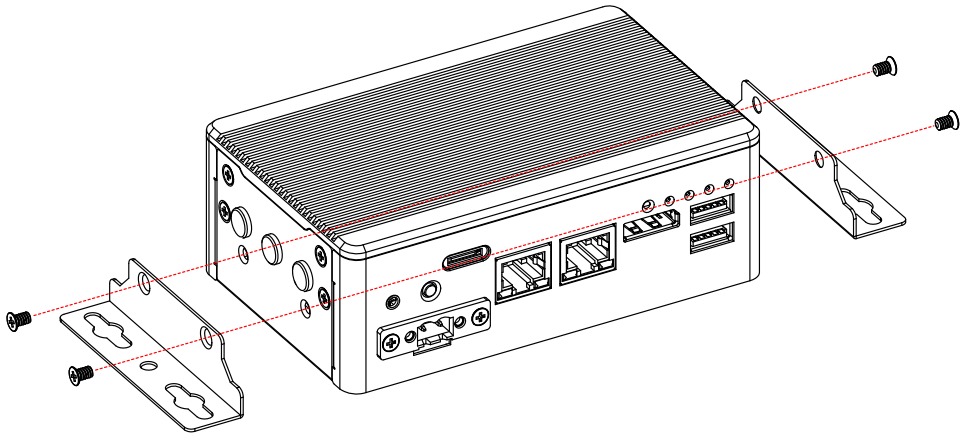




**Step 2** Install antenna cable and then fasten washer and nut.

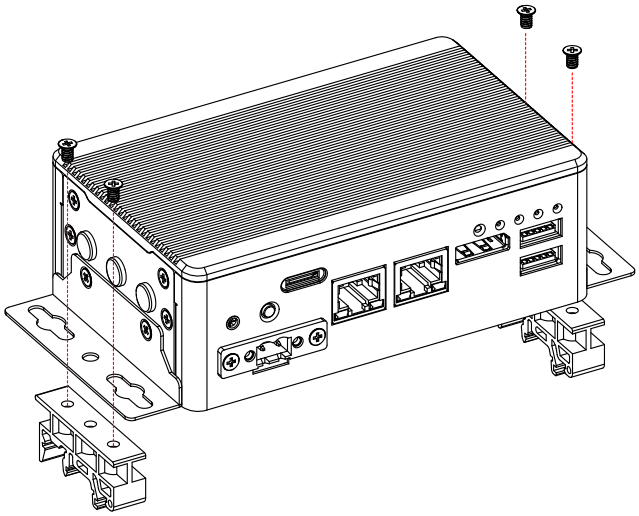


## 3.7 Mounting Your PBC-1000

### 3.7.1 Install wall mount to PBC-1000, Install four F head M3x4L screws



### 3.7.2 Install DIN Rail Kit to PBC-1000 Wall mount, Install four M3x4L screws



# 4

# BIOS SETUP

## 4.1 BIOS Setup

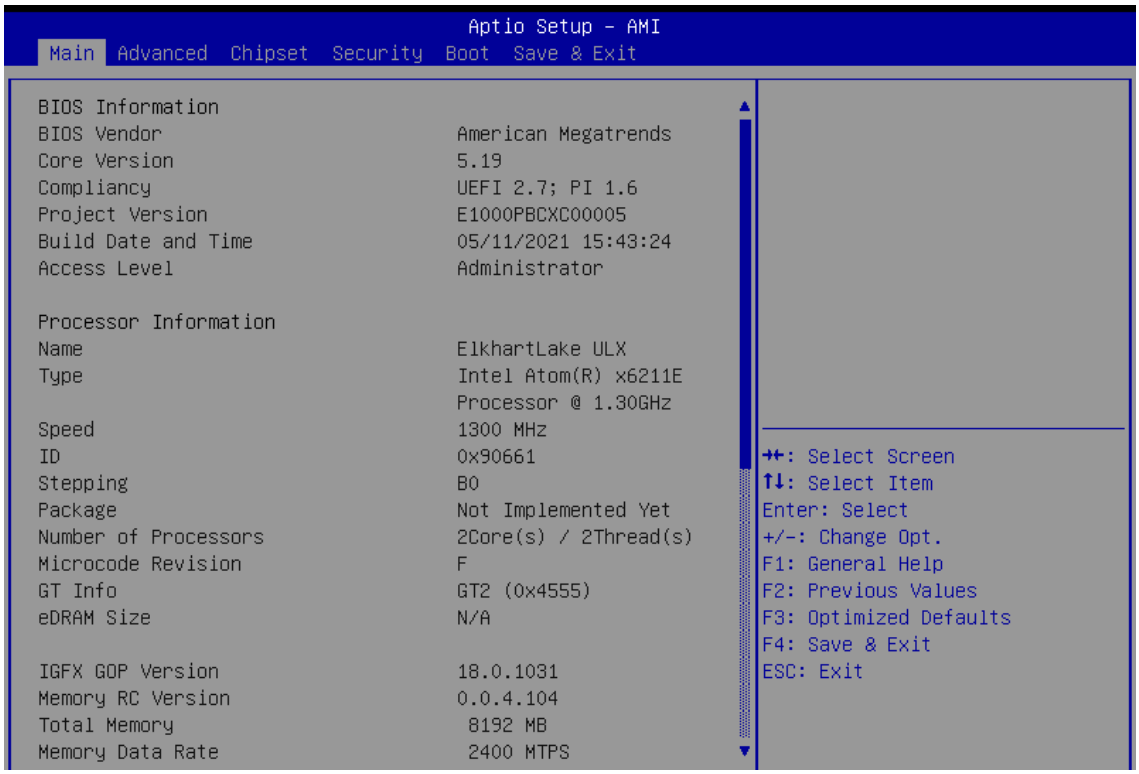



Figure 4-1 : Entering Setup Screen

BIOS provides an interface for users to check and change system configuration. The BIOS setup program is accessed by pressing the <Del> key when POST display output is shown.

## 4.2 Main Menu

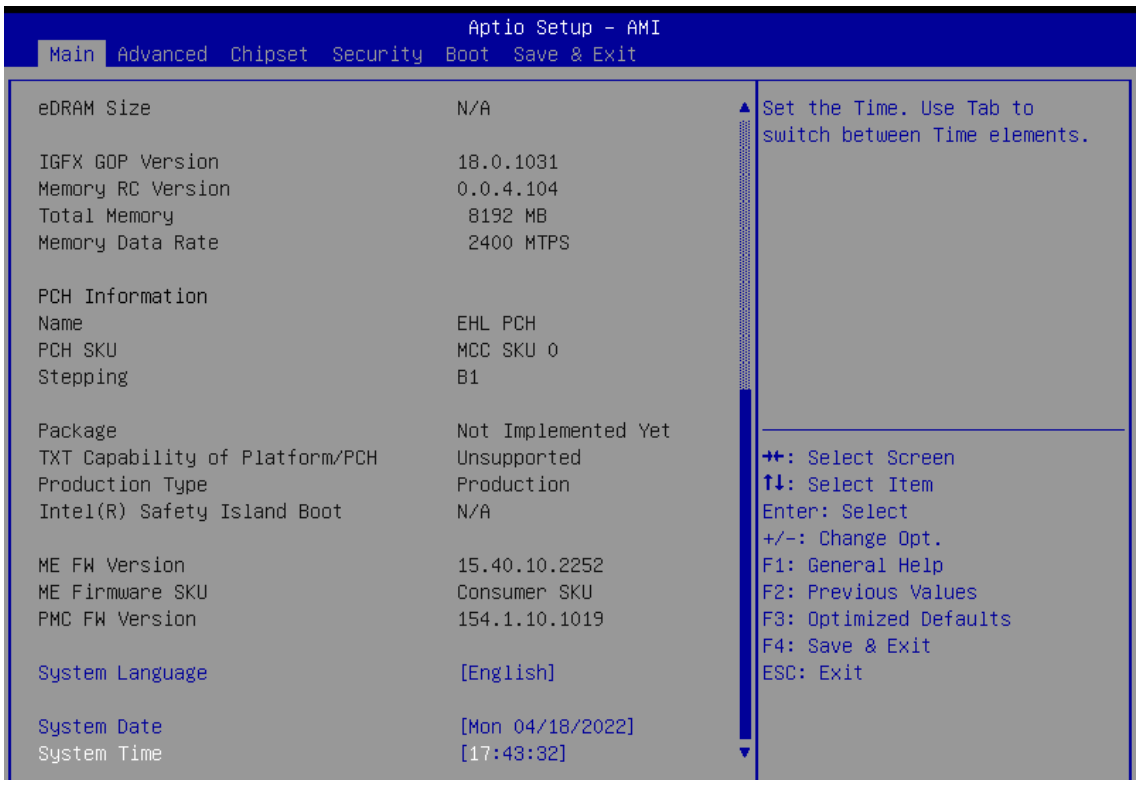



Figure 4-2 : BIOS Main Menu

The main menu displays BIOS version and system information. There are two options on the main menu, system date and system time.

### System Date
Set the date. Use Tab to switch between date elements.

### System Time
Set the time. Use Tab to switch between time elements.

## 4.3 Advanced Functions

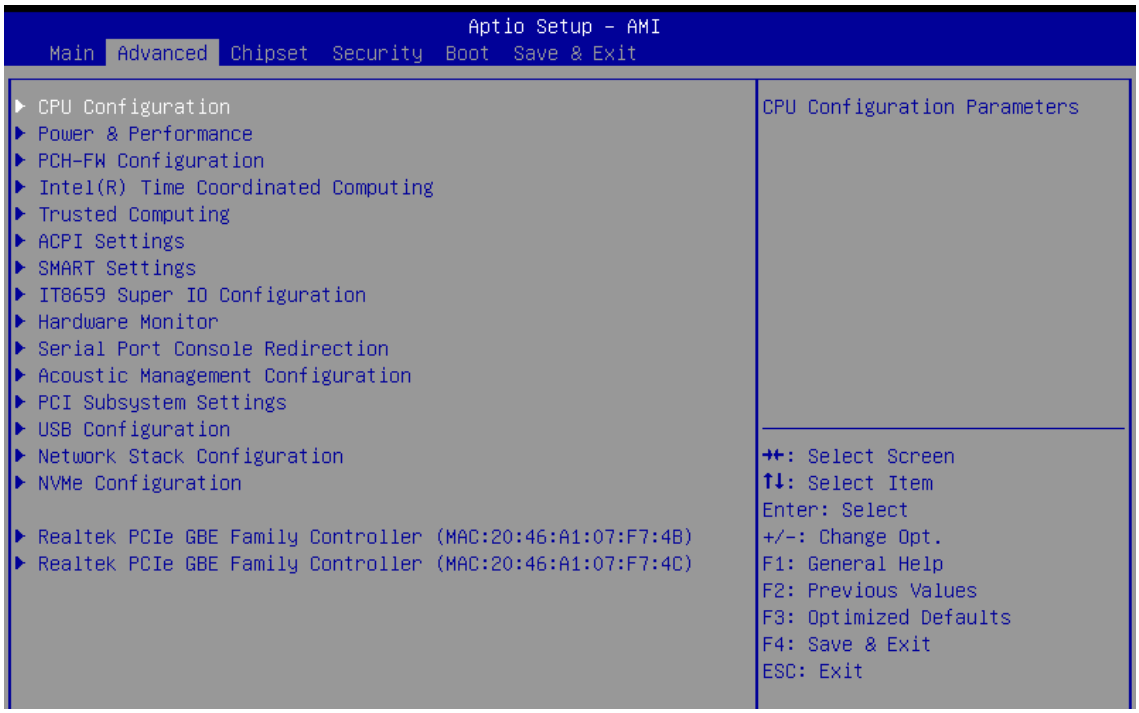



Figure 4-3 : BIOS Advanced menu

Select advanced tab to enter advanced BIOS setup options such as CPU configuration, USB configuration, and Network Stack configuration.

### 4.3.1 CPU Configuration

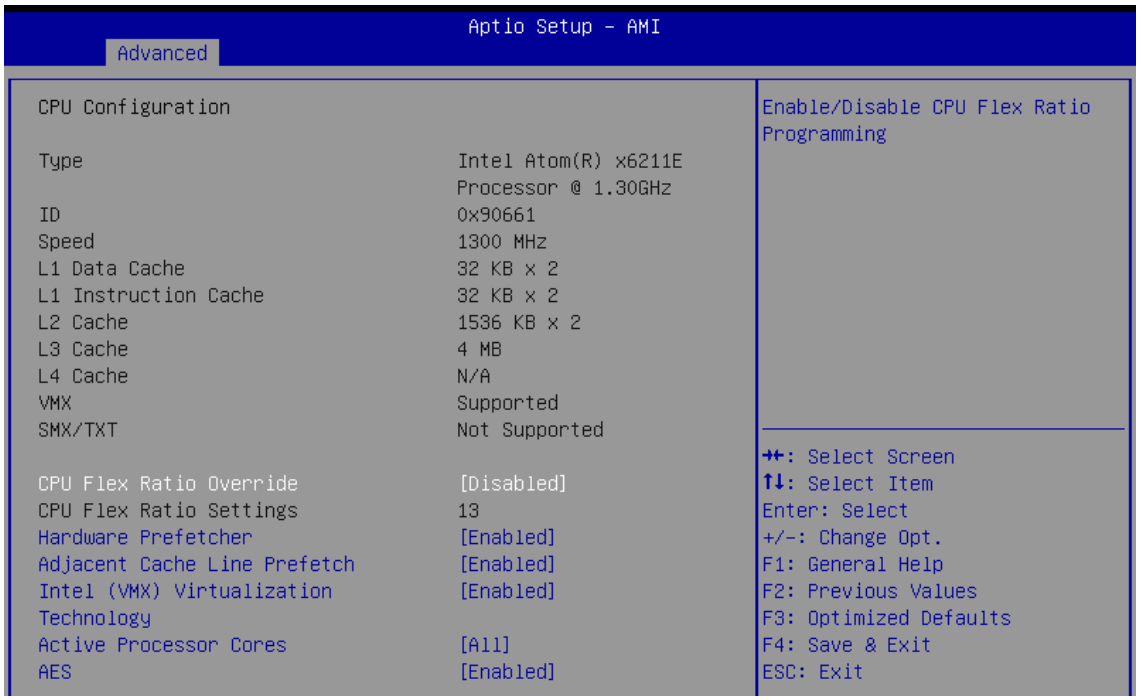



Figure 4-3-1 : CPU Configuration

### CPU Flex Ratio Override
Enable/Disable CPU Flex Ratio Programming.

### Hardware Prefetcher
To turn on/off the MLC streamer prefetcher.

### Adjacent Cache Line Prefetch
To turn on/off prefetching of adjacent cache lines.

### Intel (VMX) Virtualization Technology
When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

### Active Processor Cores
Number of cores to enable in each processor package.

### AES
Enable/Disable AES (Advanced Encryption Standard).

## 4.3.2 Power & Performance

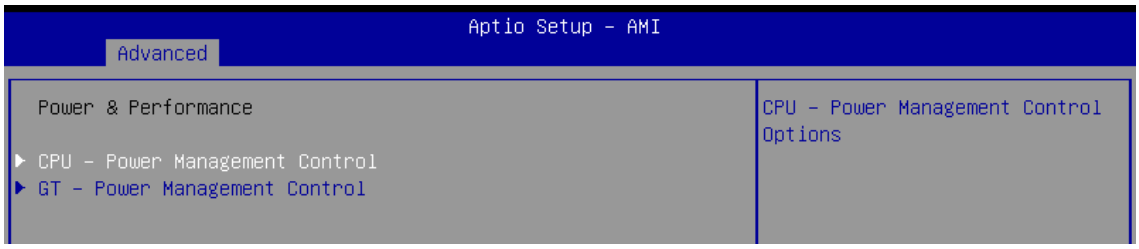



Figure 4-3-2 : Power & Performance

## 4.3.2.1 CPU - Power Management Control

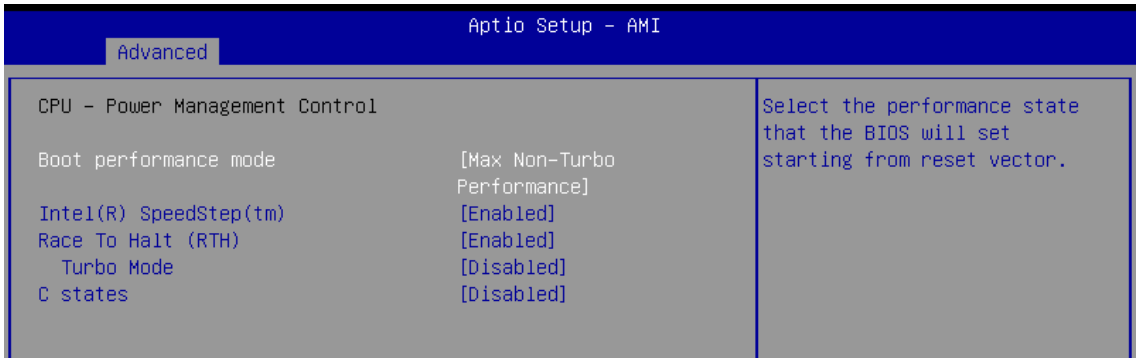



Figure 4-3-2-1 : CPU - Power Management Control

### Boot performance mode
Select the performance state that the BIOS will set starting from reset vector.

### Intel(R) SpeedStep(tm)
Allows more than two frequency ranges to be supported.

### Race To Halt (RTH)
Enable/Disable Race To Halt feature. RTH will dynamically increase CPU frequency in order to enter pkg C-State faster to reduce overall power. (RTH is controlled through MSR 1FC bit 20).

### Turbo Mode
Enable/Disable processor Turbo Mode (requires EMTTM enabled too). AUTO means enabled.

### C states
Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.

## 4.3.2.2 GT - Power Management Control

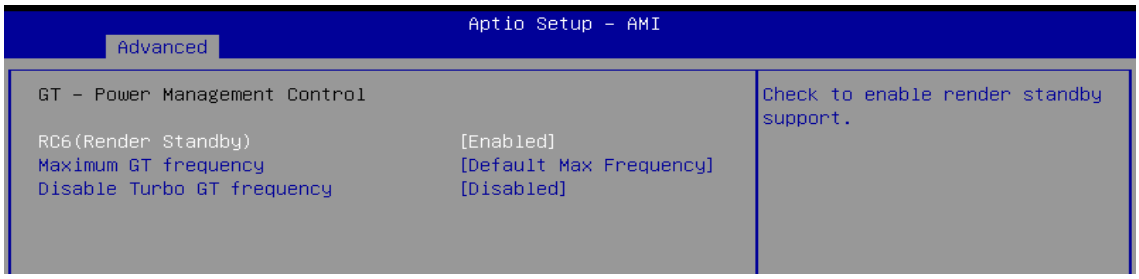



Figure 4-3-2-2 : GT - Power Management Control

### RC6(Render Standby)
Check to enable render standby support.

### Maximum GT frequency
Maximum GT frequency limited by the user. Choose between 200MHz (RPN) and 750MHz (RP0). Value beyond the range will be clipped to min/max supported by SKU.

### Disable Turbo GT frequency
Enabled: Disables Turbo GT frequency. Disabled: GT frequency is not limited.

## 4.3.3 PCH-FW Configuration

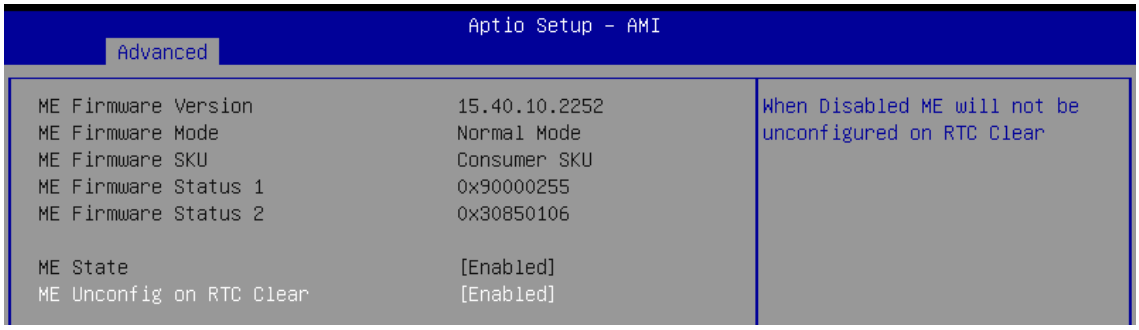



Figure 4-3-3 : PCH-FW Configuration

### ME State
CWhen Disabled ME will be put into ME Temporarily Disabled Mode.

### ME Unconfig on RTC Clear
When Disabled ME will not be unconfigured on RTC Clear.

## 4.3.4 Intel(R) Time Coordinated Computing

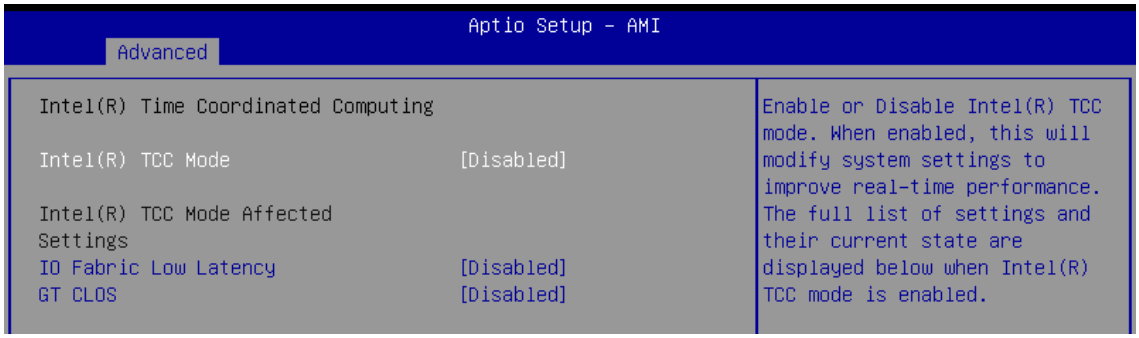



Figure 4-3-4 : Intel(R) Time Coordinated Computing

### Intel(R) TCC Mode
Enable or Disable Intel(R) TCC mode. When enabled, this will modify system settings to improve real-time performance. The full list of settings and their current state are displayed below when Intel(R) TCC mode is enabled.

### IO Fabric Low Latency
Enable or Disable IO Fabric Low Latency. This will turn off some power management in the PCH IO fabrics. This option provides the most aggressive IO Fabric performance setting. S3 state is NOT supported.

### GT CLOS
Enable or Disable Graphics Technology(GT) Class of Service. Enable will reduce Gfx LLC allocation to minimize impact of Gfx workload on LLC.

## 4.3.5 Trusted Computing

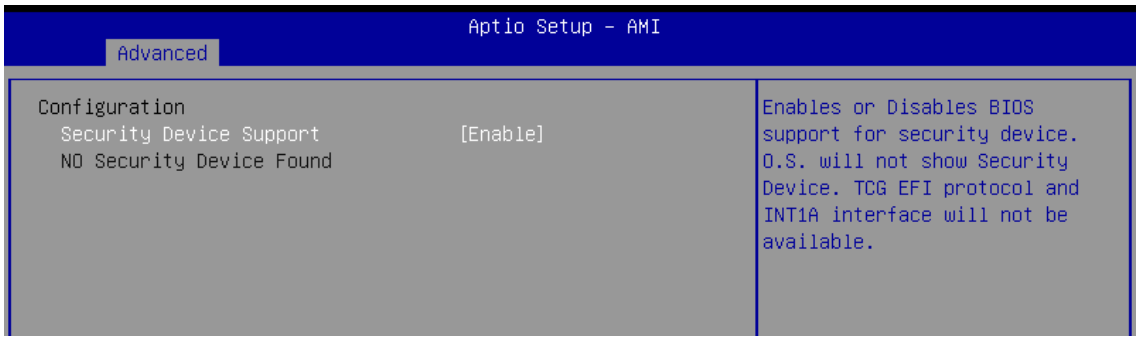



Figure 4-3-5 : Trusted Computing

Control the TPM device status and display related information if TPM chip is present.

### 4.3.6 ACPI Settings

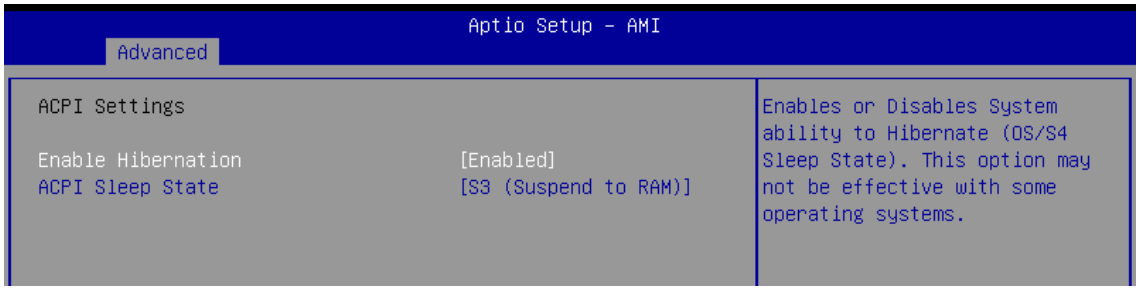



Figure 4-3-6 : ACPI Settings

**Enable Hibernation**
Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some operating systems.

**ACPI Sleep State**
Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.

### 4.3.7 SMART Settings

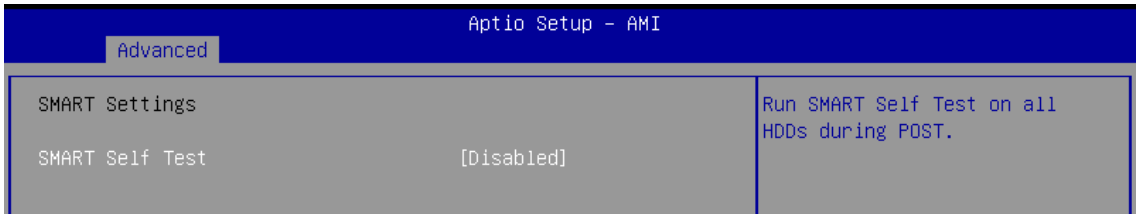



Figure 4-3-7 : SMART Settings

**SMART Self Test**
Run SMART Self Test on all HDDs during POST.

### 4.3.8 IT8659E Super IO Configuration

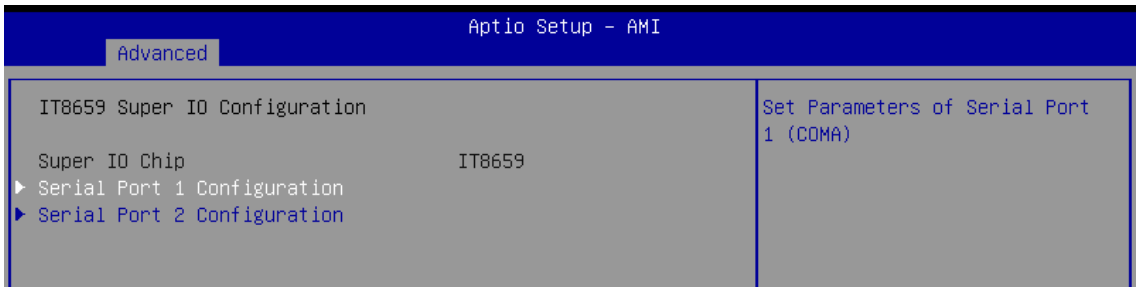



Figure 4-3-8 : IT8659E Super IO Configuration

**Serial Port 1 Configuration**
Set Parameters of Serial Port 1 (COMA).

**Serial Port 2 Configuration**
Set Parameters of Serial Port 2 (COMB).

### 4.3.9 Hardware Monitor

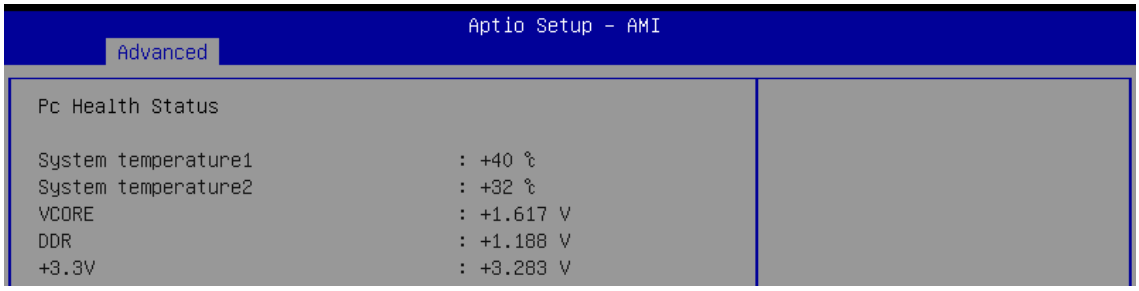



Figure 4-3-9 : Hardware Monitor

The IT8659E SIO features an enhanced hardware monitor providing thermal, fan speed, and system voltages' status monitoring.

### 4.3.10 Serial Port Console Redirection

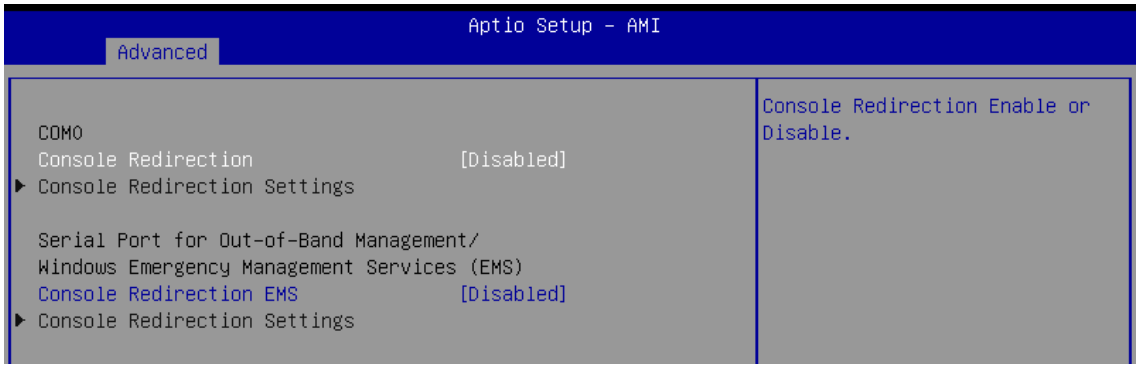



Figure 4-3-10 : Serial Port Console Redirection

**Console Redirection**

Console Redirection Enable or Disable.

**Console Redirection Settings**

The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

**Console Redirection EMS**

Console Redirection Enable or Disable.

**Console Redirection Settings**

The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

### 4.3.11 Acoustic Management Configuration

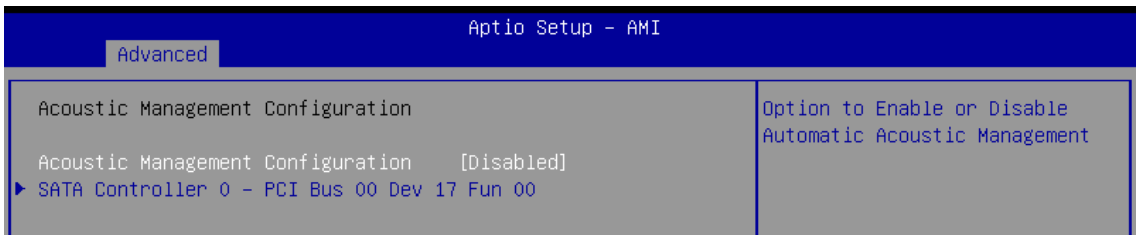



Figure 4-3-11 : Acoustic Management Configuration

**Acoustic Management Configuration**

Option to Enable or Disable Automatic Acoustic Management.

### 4.3.12 PCI Subsystem Settings

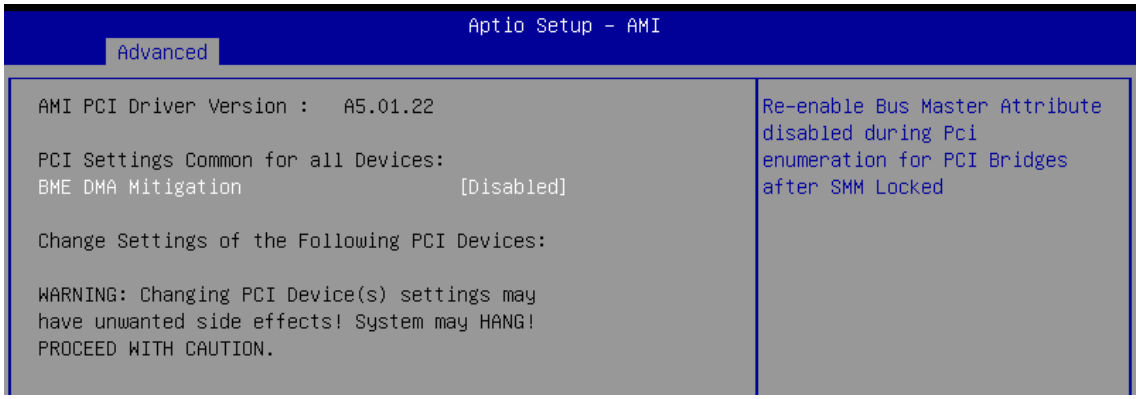



Figure 4-3-12 : PCI Subsystem Settings

#### BME DMA Mitigation

Re-enable Bus Master Attribute disabled during Pci enumeration for PCI Bridges after SMM Locked.

### 4.3.13 USB Configuration

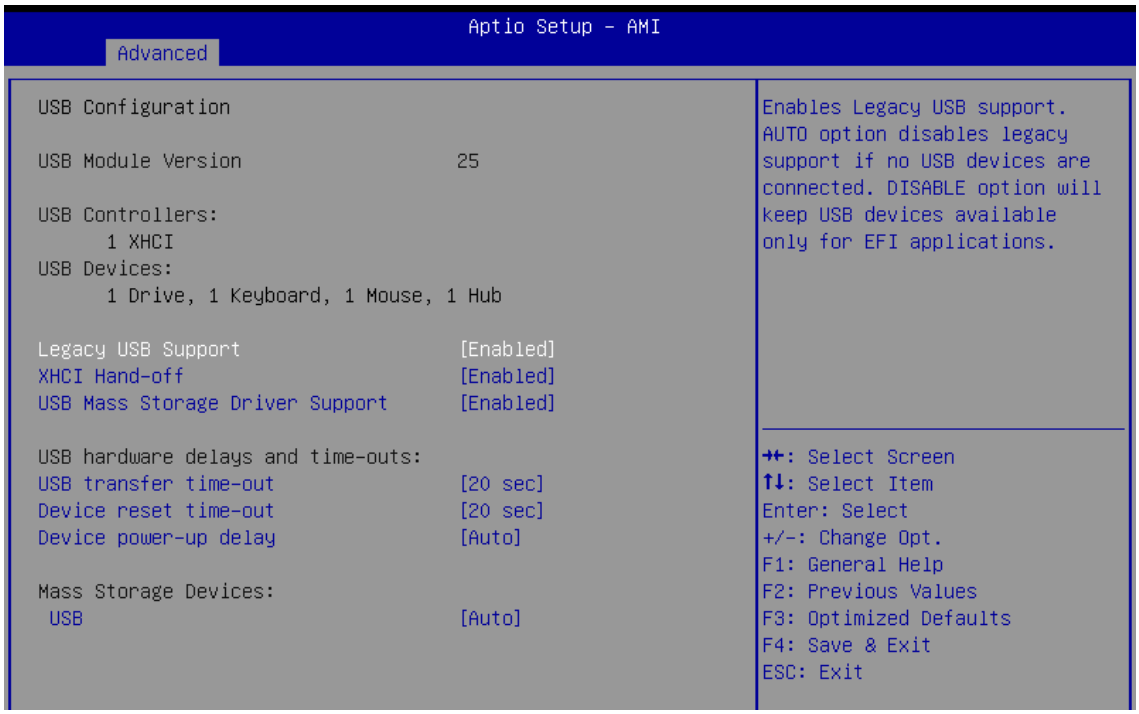



Figure 4-3-13 : USB Configuration

#### Legacy USB Support

Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.

#### XHCI Hand-off

This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.

### USB Mass Storage Driver Support
Enable/Disable USB Mass Storage Driver Support.

### USB transfer time-out
The time-out value for Control, Bulk, and Interrupt transfers.

### Device reset time-out
USB mass storage device Start Unit command time-out.

### 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 100 ms, for a Hub port the delay is taken from Hub descriptor.

## 4.3.14 Network Stack Configuration

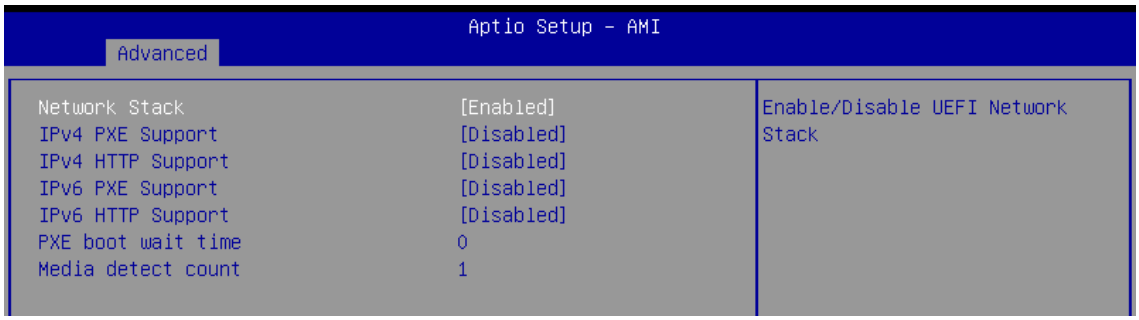



Figure 4-3-14 : Network Stack Configuration

### Network Stack
Enable/Disable UEFI Network Stack.

### IPv4 PXE Support
Enable/Disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.

### IPv4 HTTP Support
Enable/Disable IPv4 HTTP boot support. If disabled, IPv4 HTTP boot support will not be available.

### IPv6 PXE Support
Enable/Disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.

### IPv6 HTTP Support
Enable/Disable IPv6 HTTP boot support. If disabled, IPv6 HTTP boot support will not be available.

### PXE boot wait time
Wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the value.

### Media detect count
Number of times the presence of media will be checked. Use either +/- or numeric keys to set the value.

### 4.3.15 NVMe Configuration

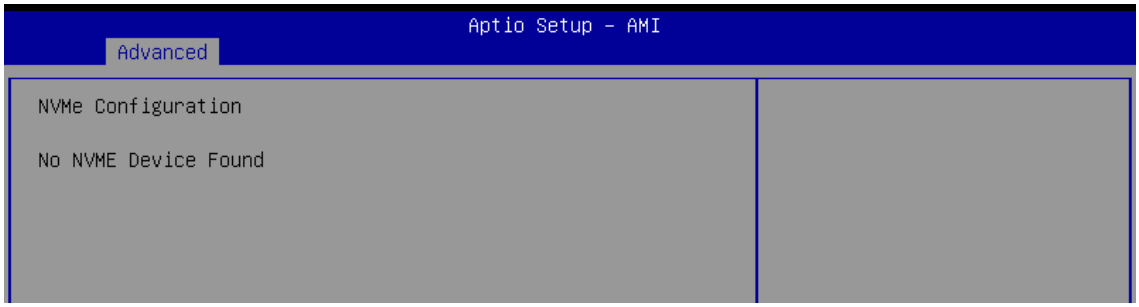



Figure 4-3-15 : NVMe Configuration

Display NVMe Controller and Drive information.

## 4.4 Chipset Functions

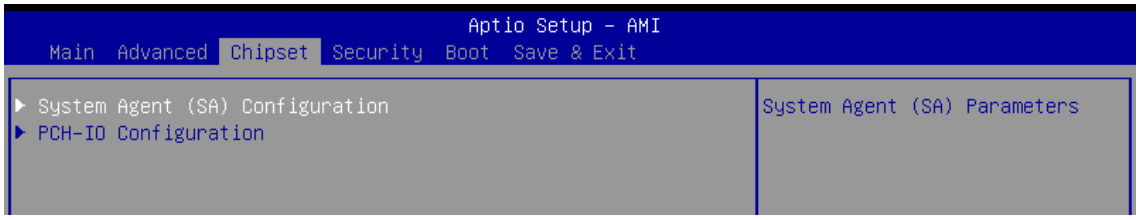



Figure 4-4 : BIOS Chipset Menu

Select chipset tab to enter chipset BIOS setup options such as SA configuration and PCH-IO configuration.

### 4.4.1 System Agent (SA) Configuration

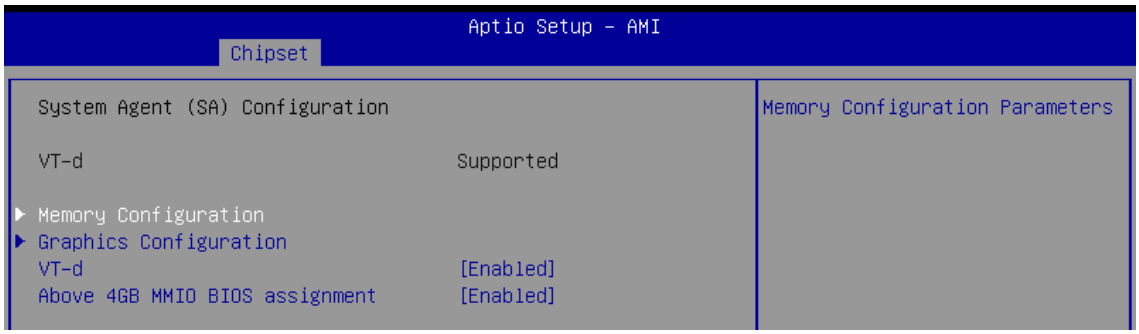



Figure 4-4-1 : System Agent (SA) Configuration

**VT-d**
VT-d capability.

**Above 4GB MMIO BIOS assignment**
Enable/Disable above 4GB MemoryMappedIO BIOS assignment. This is enabled automatically when Aperture Size is set to 2048MB.

### 4.4.1.1 Memory Configuration

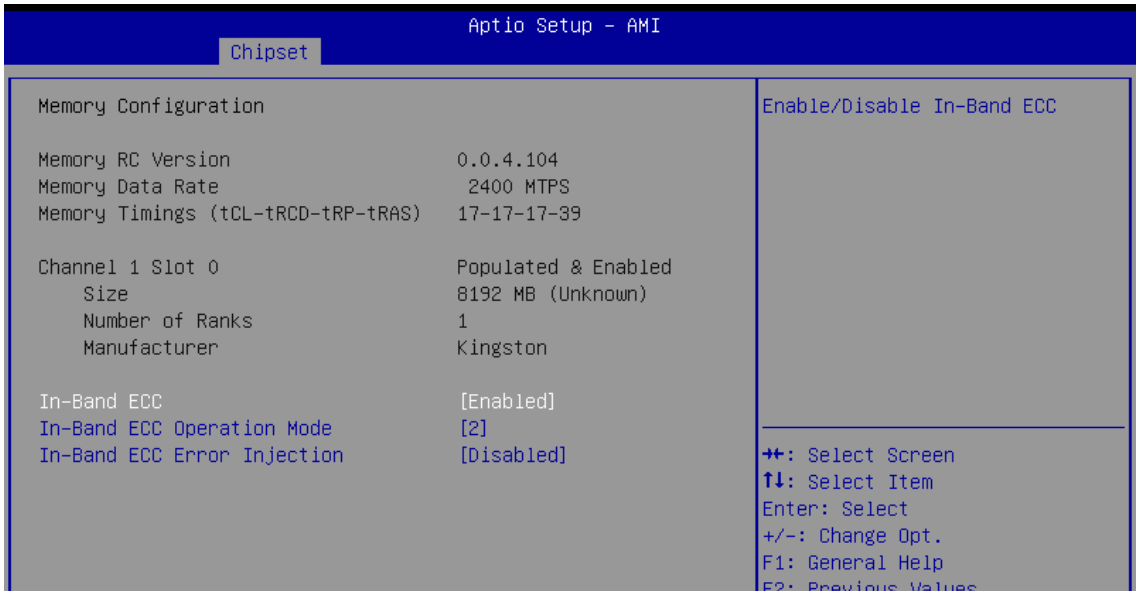



Figure 4-4-1-1 : Memory Configuration

#### In-Band ECC
Enable/Disable In-Band ECC.

#### In-Band ECC Operation Mode
0: Functional Mode protects requests based on the address range, 1: Makes all requests non protected and ignore range checks, 2:Makes all requests protected and ignore range checks.

#### In-Band ECC Error Injection
By enabling this Error Injection Enabling feature, the user acknowledges the security risks. Enabling Error Injection allows attackers who have access to the Host Operating System to inject IBECC errors that can cause unintended memory corruption and enable the leak of security data in the BIOS stolen memory regions.

### 4.4.1.2 Graphics Configuration

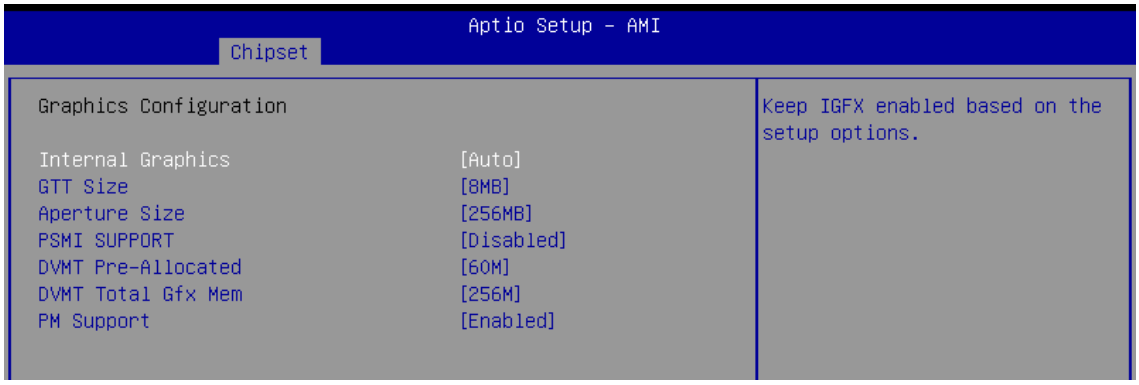



Figure 4-4-1-2 : Graphics Configuration

**Internal Graphics**
Keep IGFX enabled based on the setup options.

**GTT Size**
Select the GTT Size.

**Aperture Size**
Select the Aperture Size. Note : Above 4GB MMIO BIOS assignment is automatically enabled when selecting 2048MB aperture. To use this feature, please disable CSM Support.

**PSMI SUPPORT**
PSMI Enable/Disable.

**DVMT Pre-Allocated**
Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.

**DVMT Total Gfx Mem**
Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device.

**PM Support**
Enable/Disable PM Support.

### 4.4.2 PCH-IO Configuration

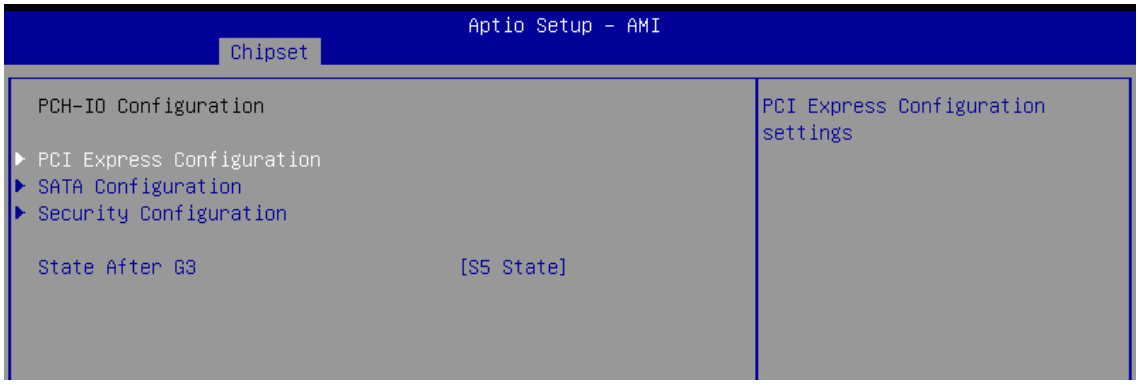



Figure 4-4-2 : PCH-IO Configuration

**State After G3**

Specify what state to go to when power is re-applied after a power failure (G3 state).

### 4.4.2.1 PCI Express Configuration

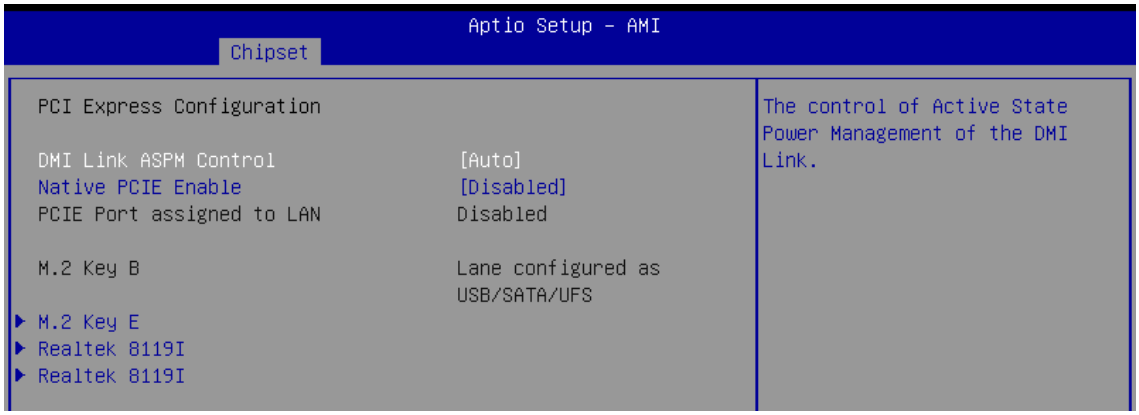



Figure 4-4-2-1 : PCI Express Configuration

**DMI Link ASPM Control**

The control of Active State Power Management of the DMI Link.

**Native PCIE Enable**

Bit - PCIe Native * control
0 - ~ Hot Plug
1 - SHPC Native Hot Plug control
2 - ~ Power Management Events
3 - PCIe Advanced Error Reporting control
4 - PCIe Capability Structure control
5 - Latency Tolerance Reporting control

**PCI Express device settings**

BIOS options for PCI Express device setting.

### 4.4.2.2 SATA Configuration

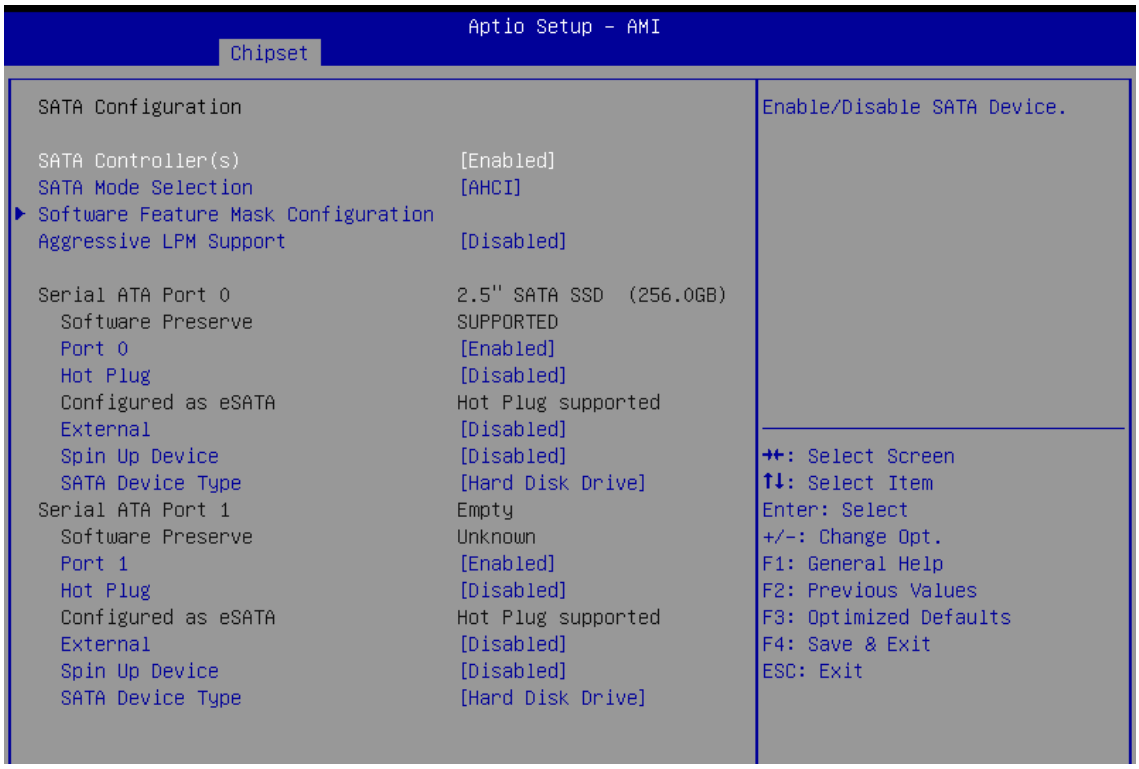



Figure 4-4-2-2 : SATA Configuration

**SATA Controller(s)**
Enable/Disable SATA Device.

**SATA Mode Selection**
Determines how SATA controller(s) operate.

**Software Feature Mask Configuration**
RST Legacy OROM/RST UEFI driver will refer to the SWFM configuration to enable/disable the storage features.

**Aggressive LPM Support**
Enable PCH to aggressively enter link power state.

**Port n**
Enable or Disable SATA Port.

**Hot Plug**
Designates this port as Hot Pluggable.

**External**
Marks this port as external.

**Spin Up Device**
If enabled for any of ports Staggerred Spin Up will be performed and only the drives which have this option enabled will spin up at boot. Otherwise all drives spin up at boot.

**SATA Device Type**
Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.

### 4.4.2.3 Security Configuration

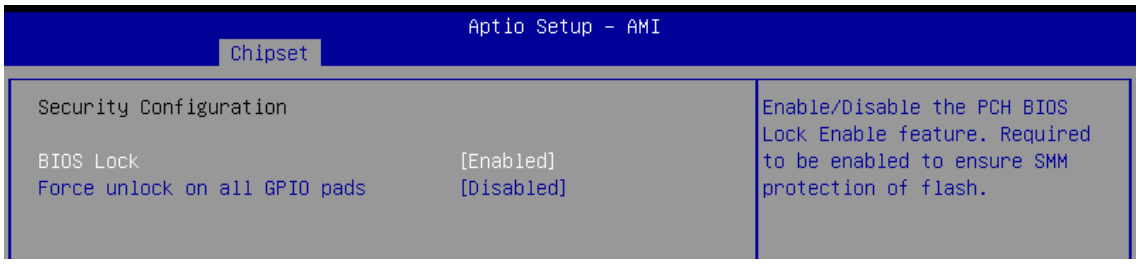



Figure 4-4-2-3 : Security Configuration

**BIOS Lock**
Enable/Disable the PCH BIOS Lock Enable feature. Required to be enabled to ensure SMM protection of flash.

**Force unlock on all GPIO pads**
If Enabled BIOS will force all GPIO pads to be in unlocked state.

## 4.5 Security Function

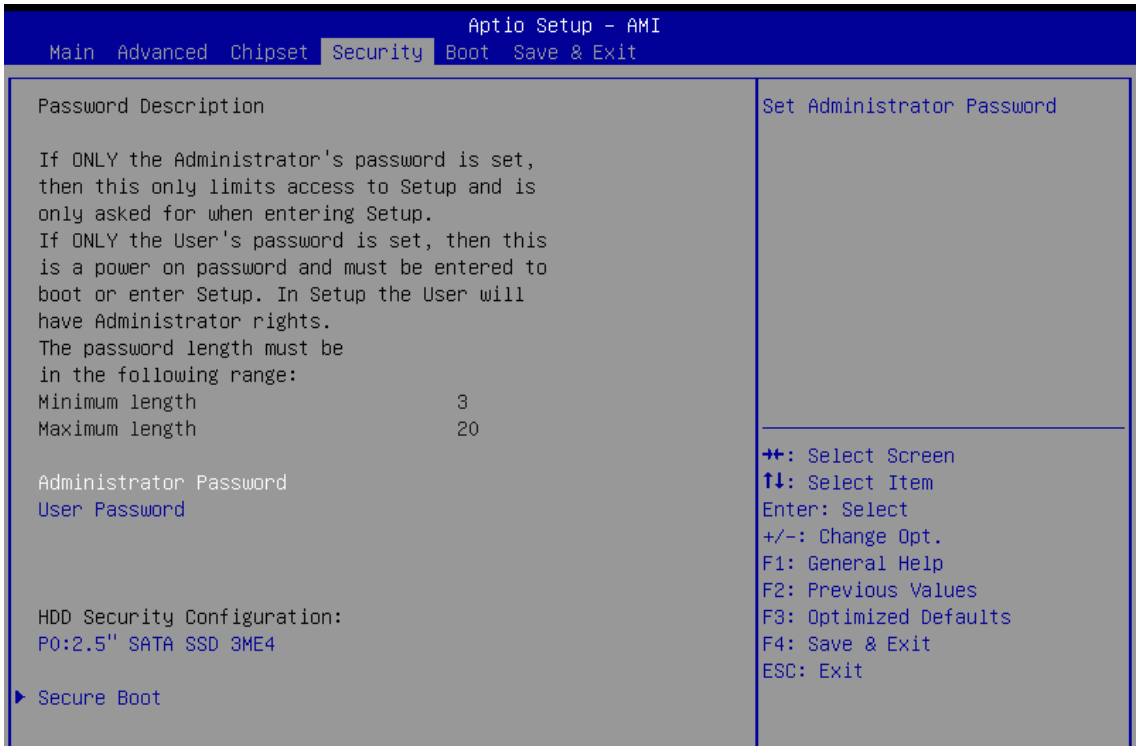



Figure 4-5 : BIOS Security Menu

**Administrator Password**
Set Administrator Password.

**User Password**
Set User Password.

### 4.5.1 HDD Security Configuration

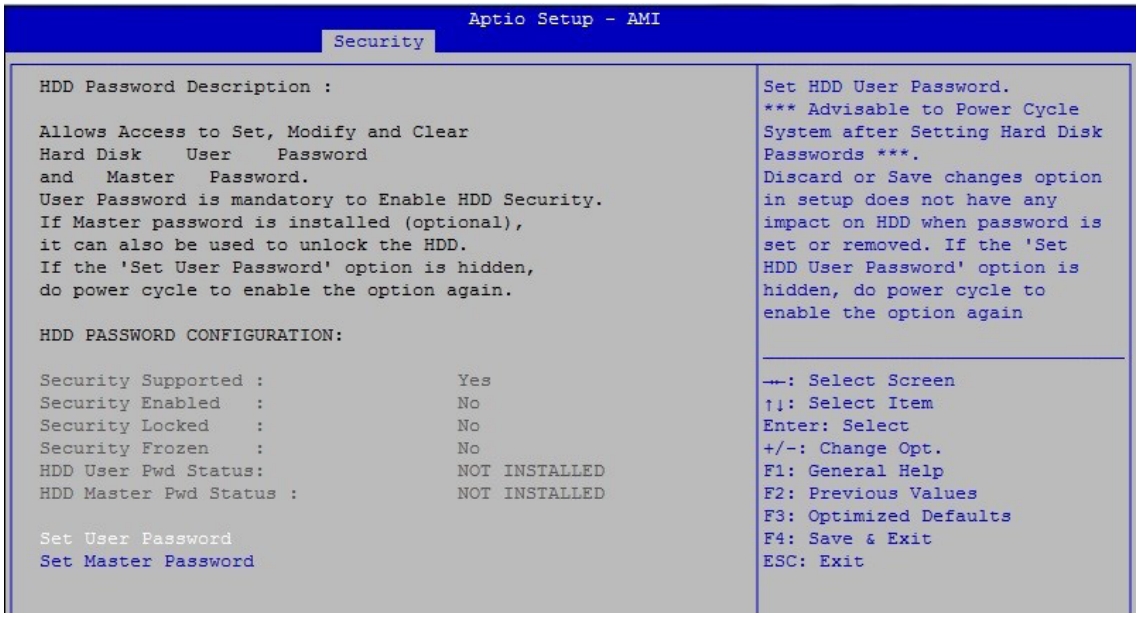



Figure 4-5-1 : HDD Security Configuration

**Set User Password**
Set HDD User Password.

*** Advisable to Power Cycle System after Setting Hard Disk Passwords ***.

Discard or Save changes option in setup does not have any impact on HDD when password is set or removed. If the 'Set HDD User Password' option is hidden, do power cycle to enable the option again.

### 4.5.2 Secure Boot

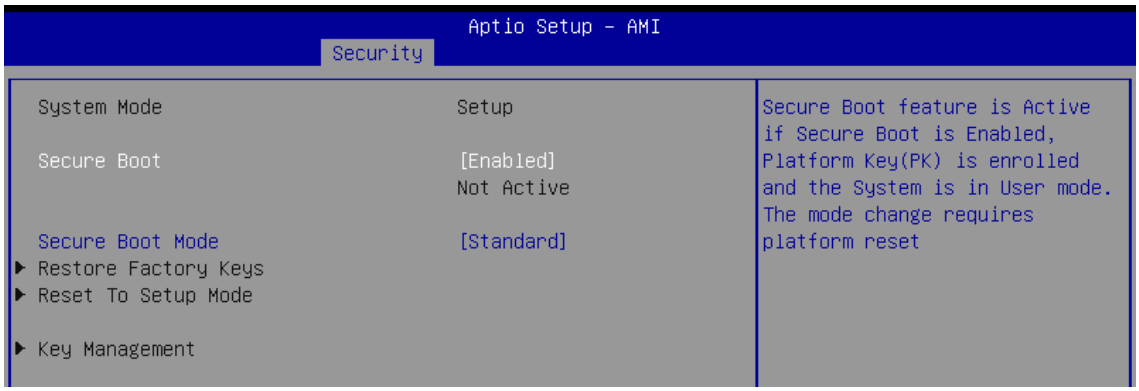



Figure 4-5-2 : Secure Boot

**Secure Boot**
Secure Boot feature is Active if Secure Boot is Enabled, Platform Key(PK) is enrolled and the System is in User mode. The mode change requires platform reset.

**Secure Boot Mode**
Secure Boot mode options: Standard or Custom. In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication.

**Key Management**
Enables expert users to modify Secure Boot Policy variables without full authentication.

## 4.6 Boot Function

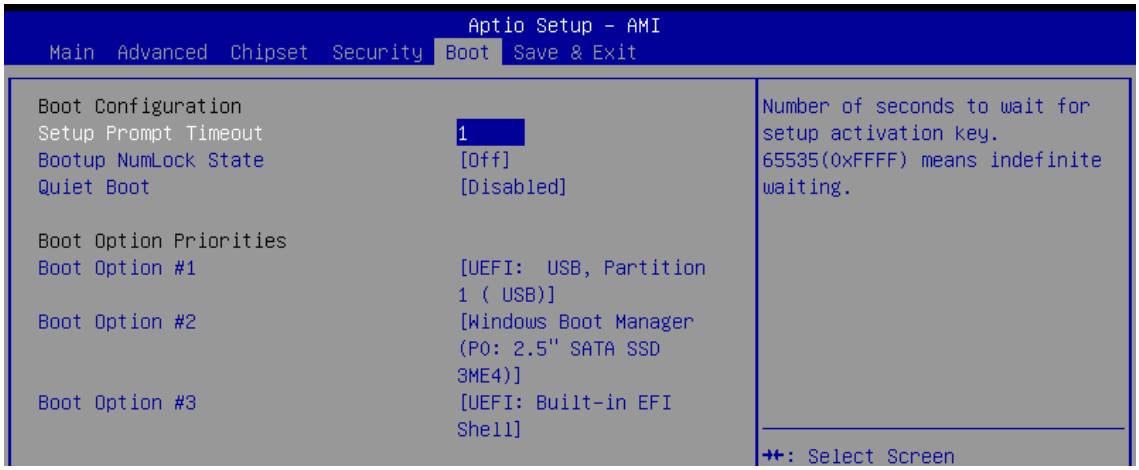



Figure 4-6 : Boot Function

### Setup Prompt Timeout

Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

### Bootup NumLock State

Select the keyboard NumLock state.

### Quiet Boot

Enables or disables Quiet Boot option.

### Boot Option #x

Sets the system boot order.

## 4.7 Save & Exit

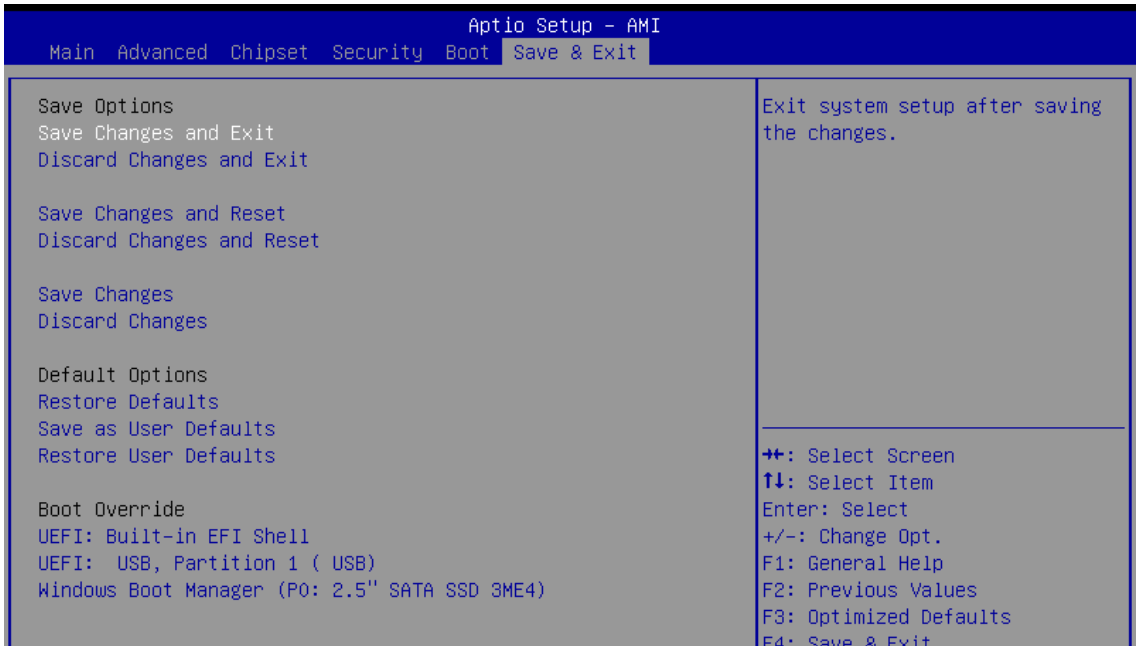



Figure 4-7 : Save & Exit

### Save Changes and Exit
Exit system setup after saving the changes.

### Discard Changes and Exit
Exit system setup without saving any changes.

### Save Changes and Reset
Reset the system after saving the changes.

### Discard Changes and Reset
Reset system setup without saving any changes.

### Save Changes
Save Changes done so far to any of the setup options.

### Discard Changes
Discard Changes done so far to any of the setup options.

### Restore Defaults
Restore/Load Default values for all the setup options.

### Save as User Defaults
Save the changes done so far as User Defaults.

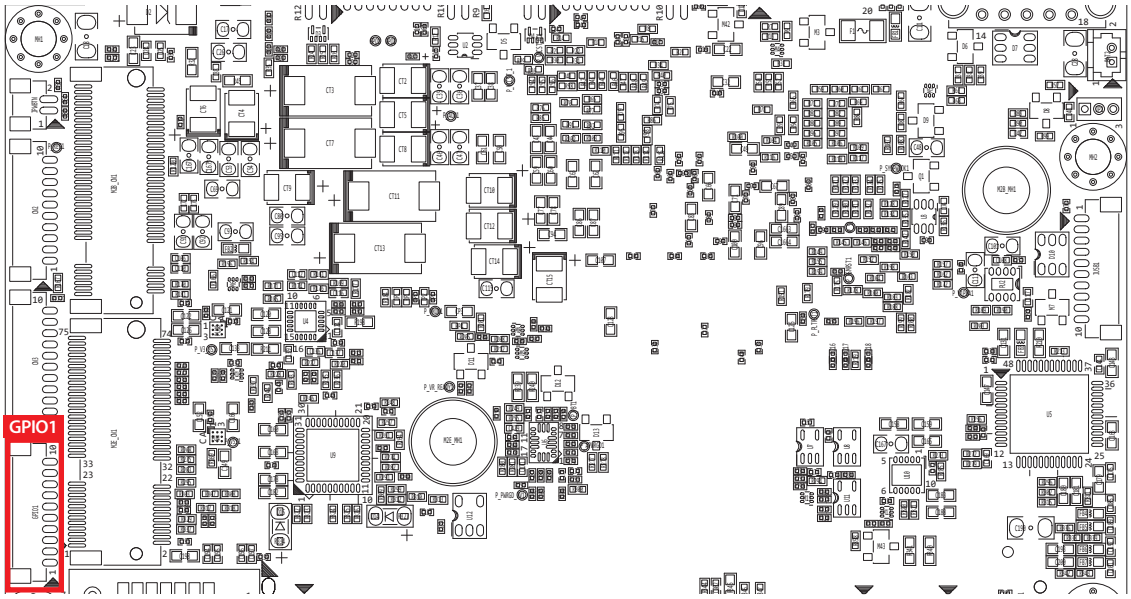
### Restore User Defaults
Restore the User Defaults to all the setup options.

# A

# APPENDIX A : GPIO Guide

## A.1 Function Description

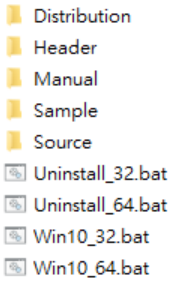
The EPBC-1000 offers a 8-bit GPIO a pair of 10-bit internal connector, and a watchdog timer.
GPIO definition is shown below:




| GPIO1 | |
|---|---|
| Pin No. | GPIO Definition |
| 1 | GPIO 0 |
| 2 | GPIO 1 |
| 3 | GPIO 2 |
| 4 | GPIO 3 |
| 5 | GPIO 4 |
| 6 | GPIO 5 |
| 7 | GPIO 6 |
| 8 | GPIO 7 |
| 9 | +VDIO |
| 10 | GND |

## A.2 Software Package Contain

Distribution folders include x32 and x64 versions, use the batch file for driver installation.




There are included as fallowed:

Win10_32.bat, and Win10_64.bat:

Installation for driver, and

Uninstall_32.bat, and Uninstall_64.bat:

Uninstallation for driver

Run batch file as Administrator.

Make sure Windows version before installation.

Header folders include head file for software developer or System Integration.

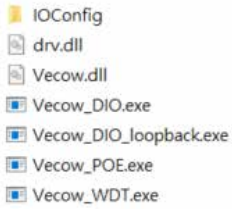
Manual folders include API description.

Sample folders include sample program, driver library, and API library for Windows/Linux

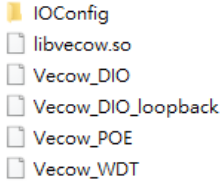
Source folders include sample program source code that compile on Visual Studio 2008/ ubuntu18.04.

## A.3 Sample

Execute demo tool.




Windows



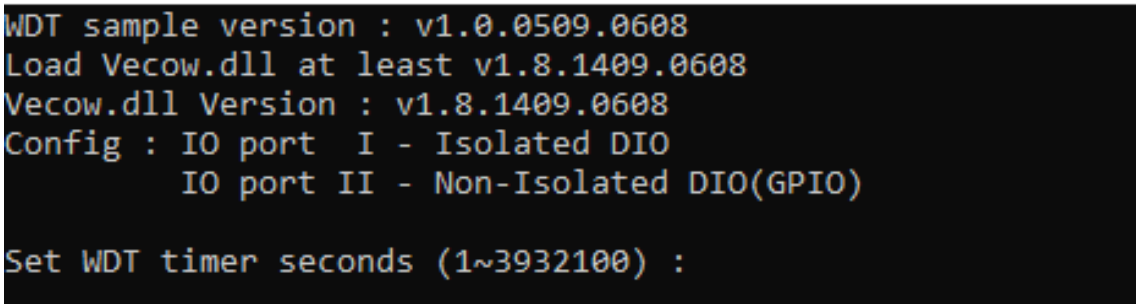

Linux

```
DIO sample version : v1.0.0609.0608
Load Vecow.dll at least v1.8.1409.0608
Vecow.dll Version : v1.8.1409.0608
Config : IO port  I - Isolated DIO
         IO port II - Non-Isolated DIO(GPIO)

Choose IO : (1/2)
```

Vecow_DIO

```
DIO loopback sample version : v1.0.1509.0608
Load Vecow.dll at least v1.8.1409.0608
Vecow.dll Version : v1.8.1409.0608
Config : IO port  I - Isolated DIO
         IO port II - Non-Isolated DIO(GPIO)

How many IO temp_port : (1/2)
```

Vecow_DIO_loopback


WDT sample version : v1.0.0509.0608
Load Vecow.dll at least v1.8.1409.0608
Vecow.dll Version : v1.8.1409.0608
Config : IO port  I - Isolated DIO
IO port II - Non-Isolated DIO(GPIO)
Set WDT timer seconds (1~3932100) :

Vecow_WDT

# B

# APPENDIX B : Software Functions

## B.1 Driver API Guide

In Header folder, Vecow.h and VecowLinux.h contain usabled API for Windows/ Linux.

**BOOL initial_SIO(BYTE Isolate_Type, BYTE DIO_NPN)**

Initial machine for IO and watch dogtimer.

Isolate_Type: DIO type.

1: Isolated DIO; 0: Non-Isolated DIO(GPIO).

DIO_NPN: DI / DO type.

1: PNP (Source) mode for European rule; 0: NPN (Sink) mode for Japanese rule.

Return:

TRUE (1): Success.

FALSE (0): Fail (Driver not exists, or version is too old, or machine not match).

**BOOL get_IO1_configuration**
**(BYTE *Iso, BYTE *DI_mode, BYTE *DO_mode, WORD *Mask)**
**BOOL get_IO2_configuration**
**(BYTE *Iso, BYTE *DI_mode, BYTE *DO_mode, WORD *Mask)**

Get DIO configuration (by variable)

Isolate_Type: DIO type.

1: Isolated DIO; 0: Non-Isolated DIO(GPIO).

DI_mode ([7:0]): DI type, pin setting by hexadecimal bitmask only for Isolated DIO.

0xFF: PNP (Source) mode for European rule; 0: NPN (Sink) mode for Japanese rule.

DO_mode: DO type only for Isolated DIO.

1: PNP (Source) mode for European rule; 0: NPN (Sink) mode for Japanese rule.

Mask ([15:0]): In / Out, pin setting by hexadecimal bitmask only for Non-Isolated DIO(GPIO).

1: Output; 0: Input

Return :

TRUE (1): Success.

FALSE (0): Fail (Initial error, or call by pointer error, or hardware problem).

**BBOOL set_IO1_configuration**
**(BYTE Iso, BYTE DI_mode, BYTE DO_mode, WORD Mask)**
**BOOL set_IO2_configuration**
**(BYTE Iso, BYTE DI_mode, BYTE DO_mode, WORD Mask)**

Set DIO configuration.

Isolate_Type: DIO type.

1: Isolated DIO; 0: Non-Isolated DIO(GPIO).

DI_mode ([7:0]): DI type, pin setting by hexadecimal bitmask only for Isolated DIO.

0xFF: PNP (Source) mode for European rule; 0: NPN (Sink) mode for Japanese rule.

DO_mode: DO type only for Isolated DIO.

1: PNP (Source) mode for European rule; 0: NPN (Sink) mode for Japanese rule.

Mask ([15:0]): In / Out, pin setting by hexadecimal bitmask only for Non-Isolated DIO(GPIO).

1: Output; 0: Input

Return:

TRUE (1): Success.

FALSE (0): Fail (Initial error or hardware problem).

**BOOL get_GPIO1(WORD *GPIO_data)**

Get GPIO

GPIO_data ([15:0]): GPIO state, pin setting by hexadecimal bitmask.

1: High; 0: Low.

Return :

TRUE (1): Success.

FALSE (0): Fail (Initial error or hardware problem).

**BOOL set_GPIO1(WORD GPIO_data)**

Set GPIO

GPIO_data ([15:0]): GPIO state, pin setting by hexadecimal bitmask.

1: High; 0: Low

Return:

TRUE (1): Success;

FALSE (0): Fail (Initial error, or hardware problem)

**BOOL get_WDT(DWORD *WDT)**

Get watchdog timer setup

WDT: watchdog timer setup

Unit: second. (Range: 0 ~ 65535 sec, 1093 ~ 65535 min (=65580 ~ 3932100 sec))

Return:

TRUE (1): Success;

FALSE (0): Fail (Initial error, or call by pointer error, or hardware problem)

**BOOL Set_WDT(DWORD WDT)**

Set watchdog timer setup

WDT: watchdog timer setup

Unit: second. (Range: 0 ~ 65535 sec, 1093 ~ 65535 min (=65580 ~ 3932100 sec))

Return:

TRUE (1): Success;

FALSE (0): Fail (Initial error, or setup 0, or hardware problem )

**BOOL Cancel_WDT()**

Cancel watchdog timer

Return:

TRUE (1): Success;

FALSE (0): Fail (Initial error, or hardware problem)

**BOOL config_COMPORT(BYTE *PORT_NUM)**

Set COMPORT configuration.

A. PORT_NUM: Usable COMPORT number.
Range: 1~2.

Return:

TRUE (1): Success;

FALSE (0): Fail (Initial error, or setup 0, or hardware problem)

**BOOL set_COMPORT_mode(BYTE port, BYTE mode, BYTE term)**

Set COMPORT mode.

B. port: which port set.
Range: 1~2.

C. mode: Usable COMPORT number.
0: RS232 mode; 1: RS422-5Wire mode.
2: RS422-9Wire mode; 4: RS485 mode.
4: Loopback mode.

D. term: Termination enable for RS422/RS485 mode.
1: Enable; 0: Disable.

Return:

TRUE (1): Success;

FALSE (0): Fail (Initial error or hardware problem)

**BOOL get_COMPORT_mode(BYTE port, BYTE *mode, BYTE term)**

Get COMPORT mode.

E. port: which port get.
Range: 1~2.

F. mode: Usable COMPORT number.
0: RS232 mode; 1: RS422-5Wire mode.
2: RS422-9Wire mode; 4: RS485 mode.
4: Loopback mode.

G.term: Termination enable for RS422/RS485 mode.
1: Enable; 0: Disable.

Return:

TRUE (1): Success;

FALSE (0): Fail (Initial error or hardware problem)

# APPENDIX C : Power Consumption

| Testing Board | PBC-1000 |
|---|---|
| RAM | 16GB * 1 |
| USB-1 : (USB 2.0) | USB Micsoft Wired Keyboard 600 |
| USB-2 : (USB 2.0) | USB Mouse HP G1K28AA |
| SATA 0 | Apacer SATA AP120GAS340XC |
| SATA 1 | Kingston SA400MB/480GB |
| LAN 1 (RTL8119I) | 1.0 Gbps |
| LAN 2 (RTL8119I) | 1.0 Gbps |
| Graphics Output | DP |
| Power Plan | Balance (Windows10 Power plan) |
| Power Source : | Chroma 62006P-100-25 |

## C.1 Intel Atom® x6211E Processor 1.5M Cache, up to 3.00 GHz

| CPU | Power Input | Standby Mode | | Power on and boot to Win10 64bit | | | |
|---|---|---|---|---|---|---|---|
| | | | | Sleep Mode | | idle status CPU usage less 3% | |
| | | Max Current | Max Consumption | Max Current | Max Consumption | Max Current | Max Consumption |
| Intel Atom® x6211E | 12V | 0.129A | 01.54W | 0.137A | 01.65W | 0.798A | 09.57W |

| CPU | Power Input | Power on and boot to Win10 64bit | | | |
|---|---|---|---|---|---|
| | | Run 100% CPU usage without 2D | | Run 100% CPU usage with 3D | |
| | | Max Current | Max Consumption | Max Current | Max Consumption |
| Intel Atom® x6211E | 12V | 0.889A | 10.67W | 0.940A | 11.28W |

# D

# APPENDIX D : Supported Memory & Storage List

## D.1 Test Item

| Testing Board | PBC-1000 |
|---|---|
| Memory Test | MemTest86 V9.3 |
| BurnIn Test | BurnInTest Pro V9.2 (build 1009) |

| Channel | Memory Test | Burn-in Test | Flash BIOS | Remove Battery | Sleep | Hibermate | Reboot | HWiNFO64 |
|---|---|---|---|---|---|---|---|---|
| *1(DIMM 1) | PASS | PASS | PASS | PASS | PASS | PASS | PASS | PASS |

## D.2 Supported Non-ECC Memory List

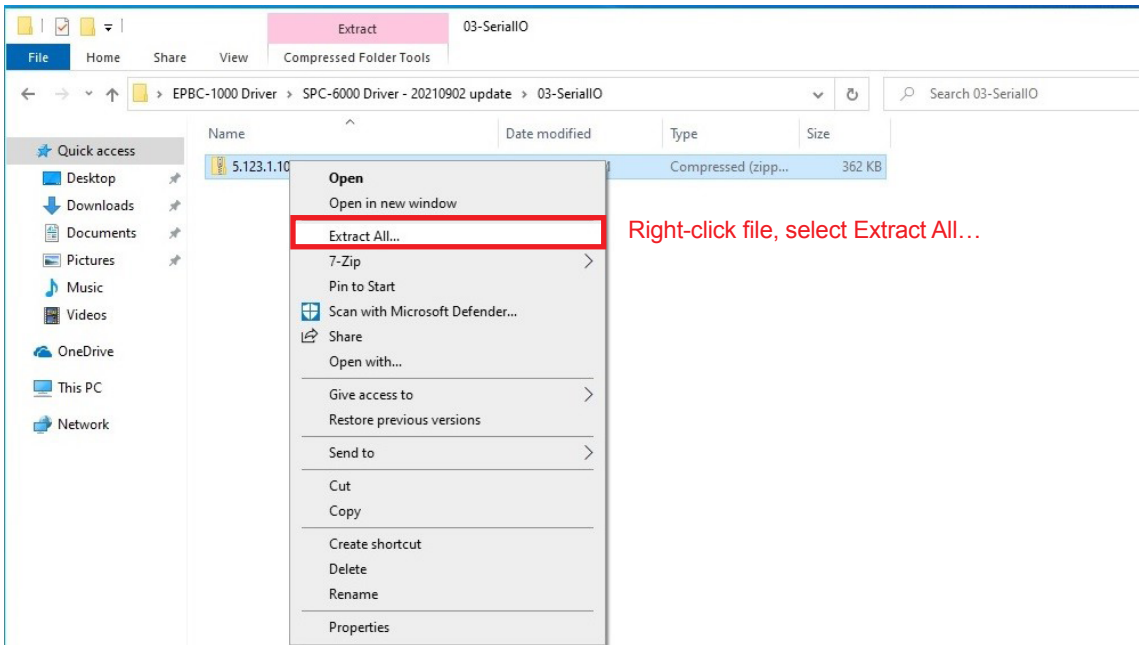
| Brand | Info | Test Temp. (Celsius) |
|---|---|---|
| innodisk 16G DDR4-2400 SO-DIMM | M4D0-AGS1Q5SJ-H03 | 25ºC |
| innodisk 4G DDR4-2666 SO-DIMM | M4S0-4GSSNCIK-H03 | 25ºC |
| MemxPro 16G DDR4-2666 SO-DIMM | D4S-AG26H1G8W2 | 25ºC |
| SL-Link 32GB DDR4-3200 SODIMM | J4BGSH2G8TMFC | 25ºC |
| Smart 16GB DDR4-3200 SODIMM | ST2046SO410825-SE | 25ºC |

## D.3 Supported Storage List

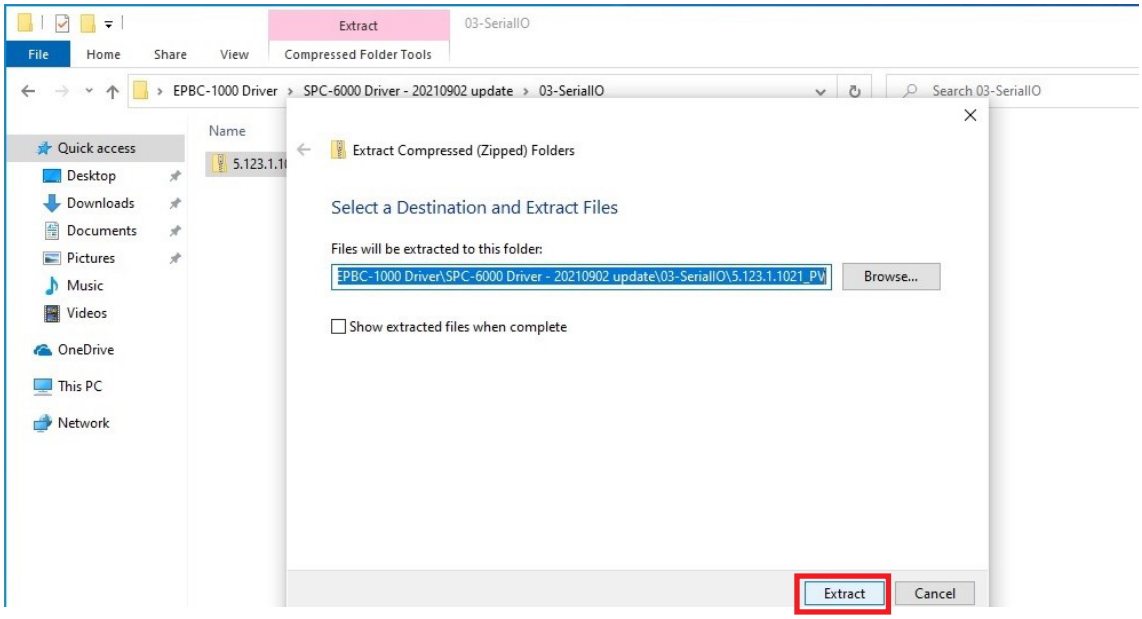
| Type | Vendor | Model | Capacity |
|---|---|---|---|
| M.2 SSD | innodisk | M.2 (P42) 3TE6 | 256GB |
| SATA SSD | Transcend | SSD370 TS64GSSD370 | 64GB |
| | innodisk | 3MG2-P DGS25-64GD81BC1QC | 64GB |
| | | 3TE7 DES25-B56DK1GC3QL-H03 | 256GB |
| | Kingston | SA400S371120G | 120GB |
| | | SUV400S37 | 120GB |
| | Intel | SSD E 5400s SSDSC2KR120H6 | 120GB |
| | MEMXPRO | M3A MI3MA1212802WN | 128GB |
| | FORESEE | S903S128G | 128GB |
| | FORESEE | S903S256G | 256GB |
| | LITE-ON | K8-L1256 | 256GB |
| | LITE-ON | K8-L1512 | 512GB |

** If more help is needed, please contact Vecow Technical Support.**

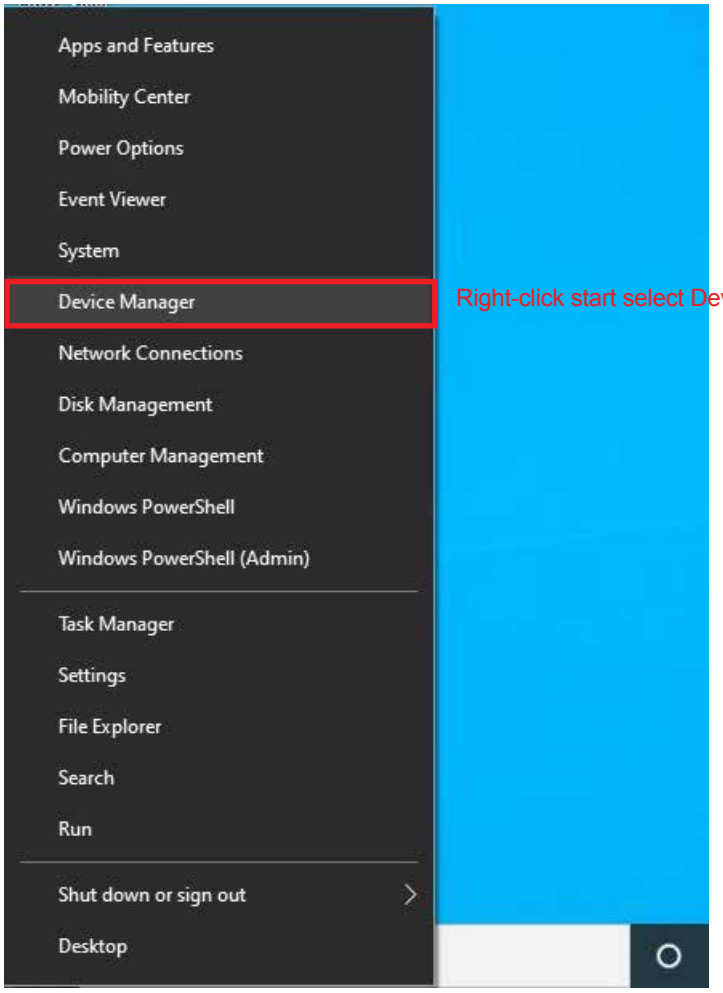
# APPENDIX E : Driver install (Unknown Device )



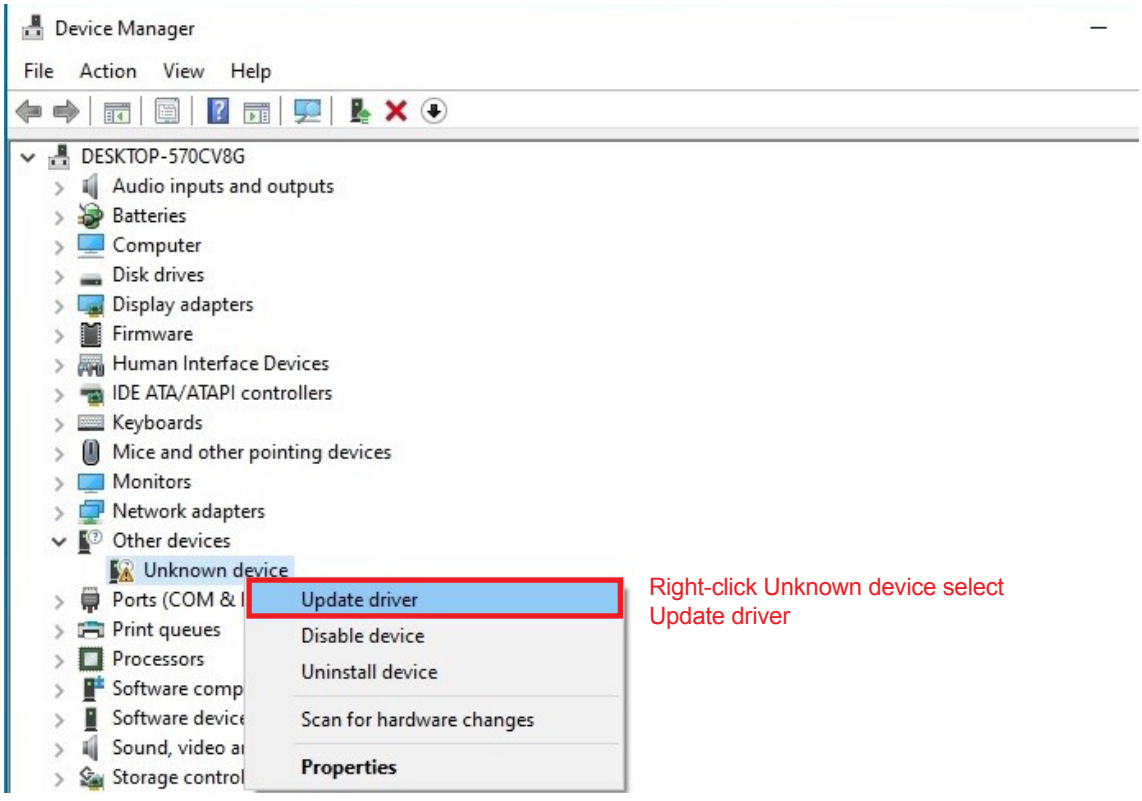

Right-click file, select Extract All…



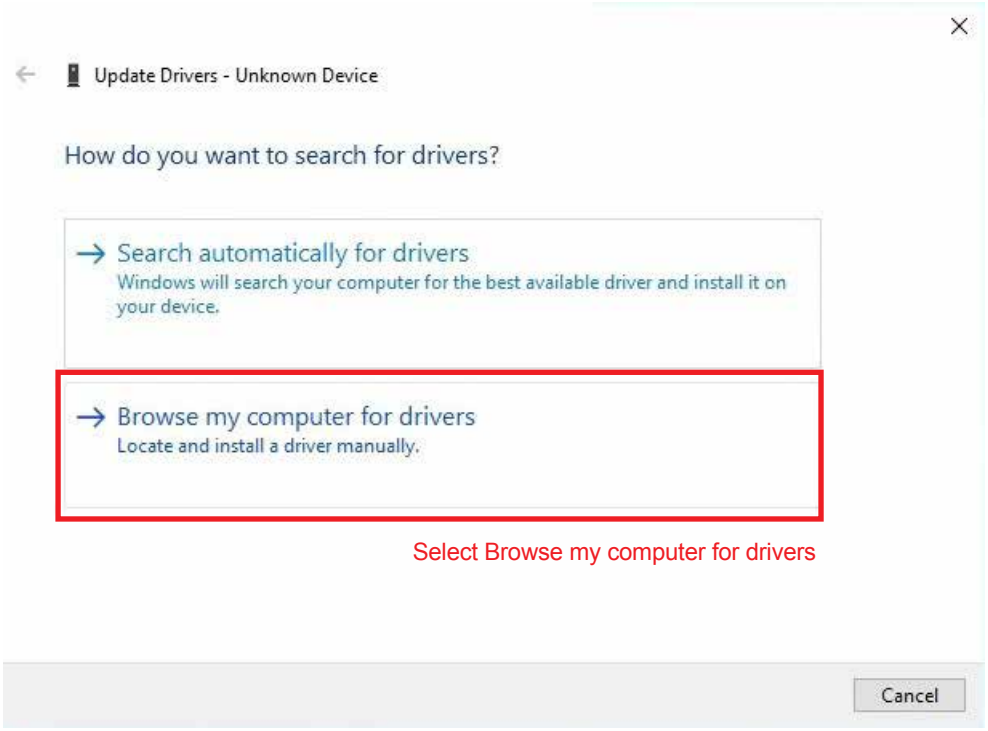

Click Extract



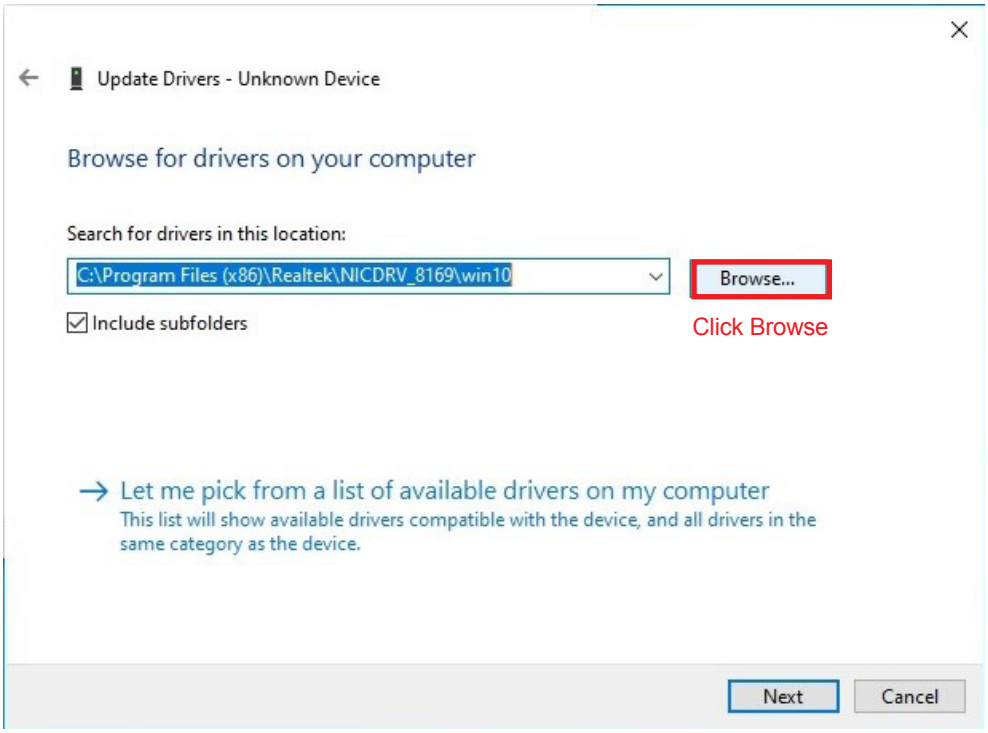

Right-click start select Device Manager



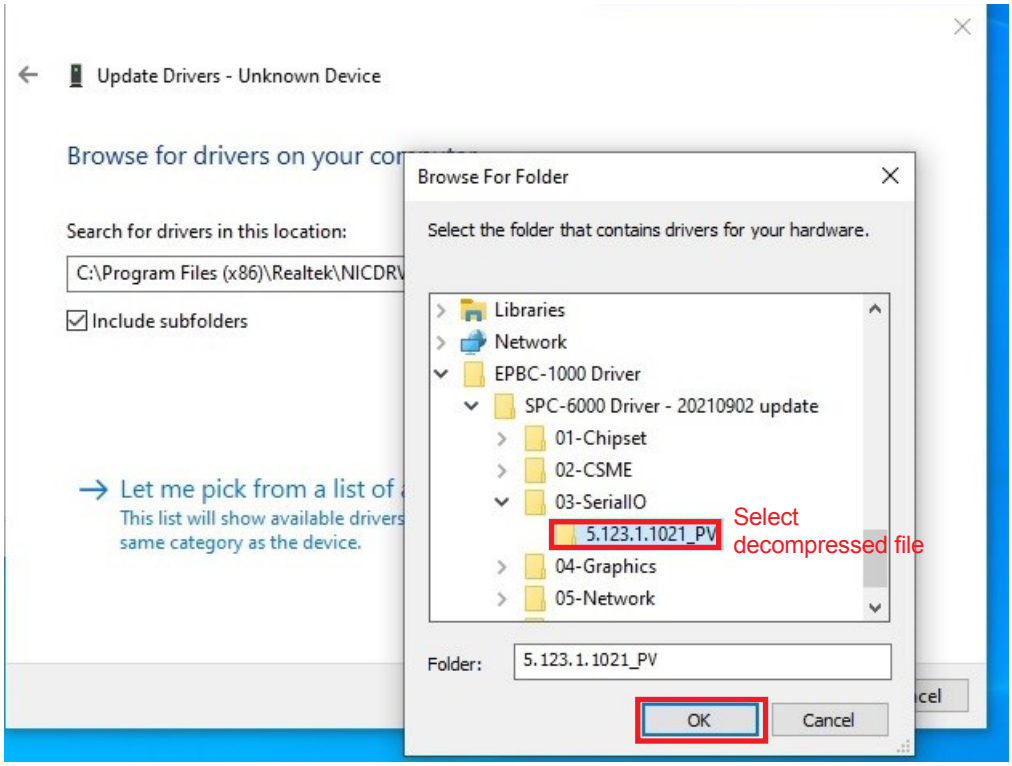

Right-click Unknown device select Update driver



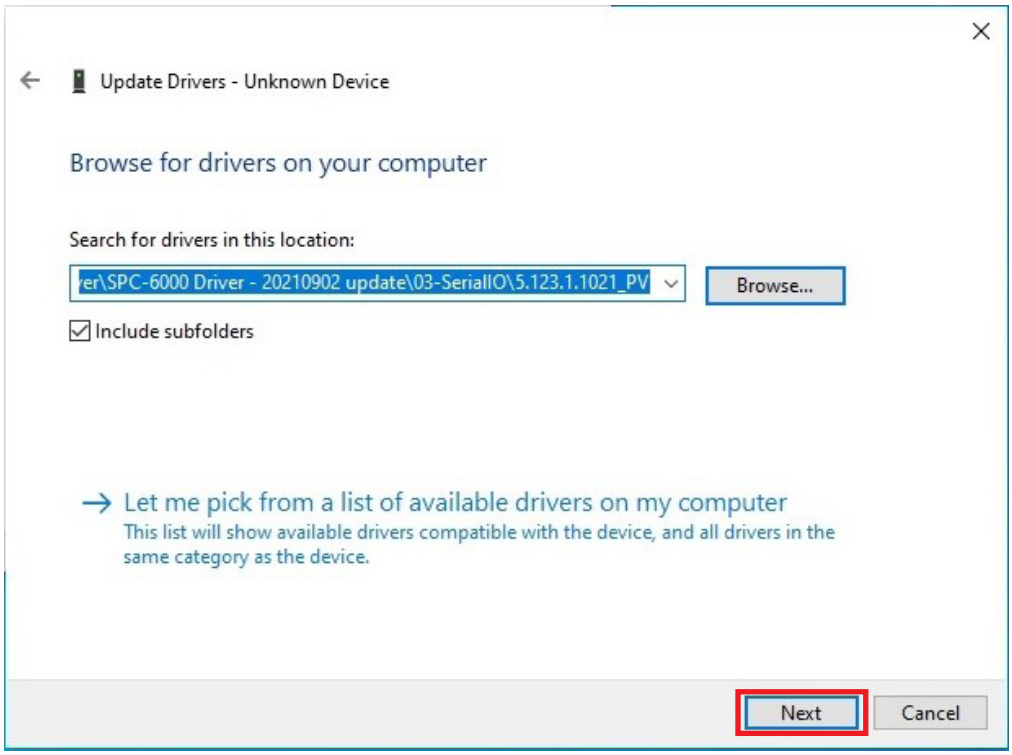

Select Browse my computer for drivers



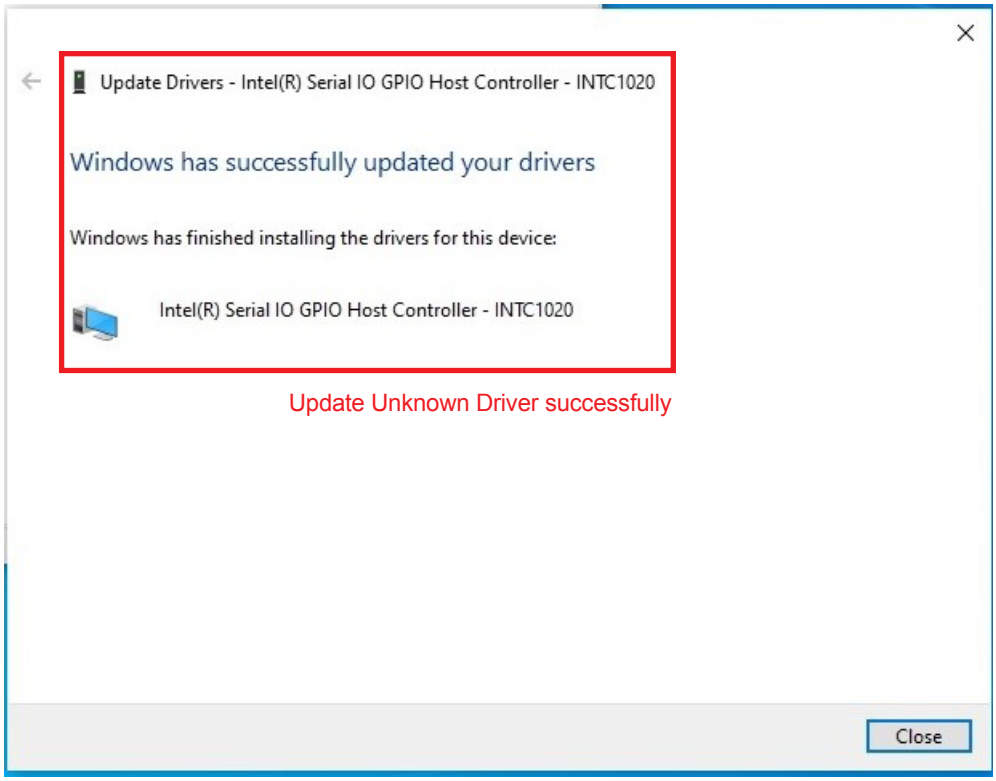

Click Browse



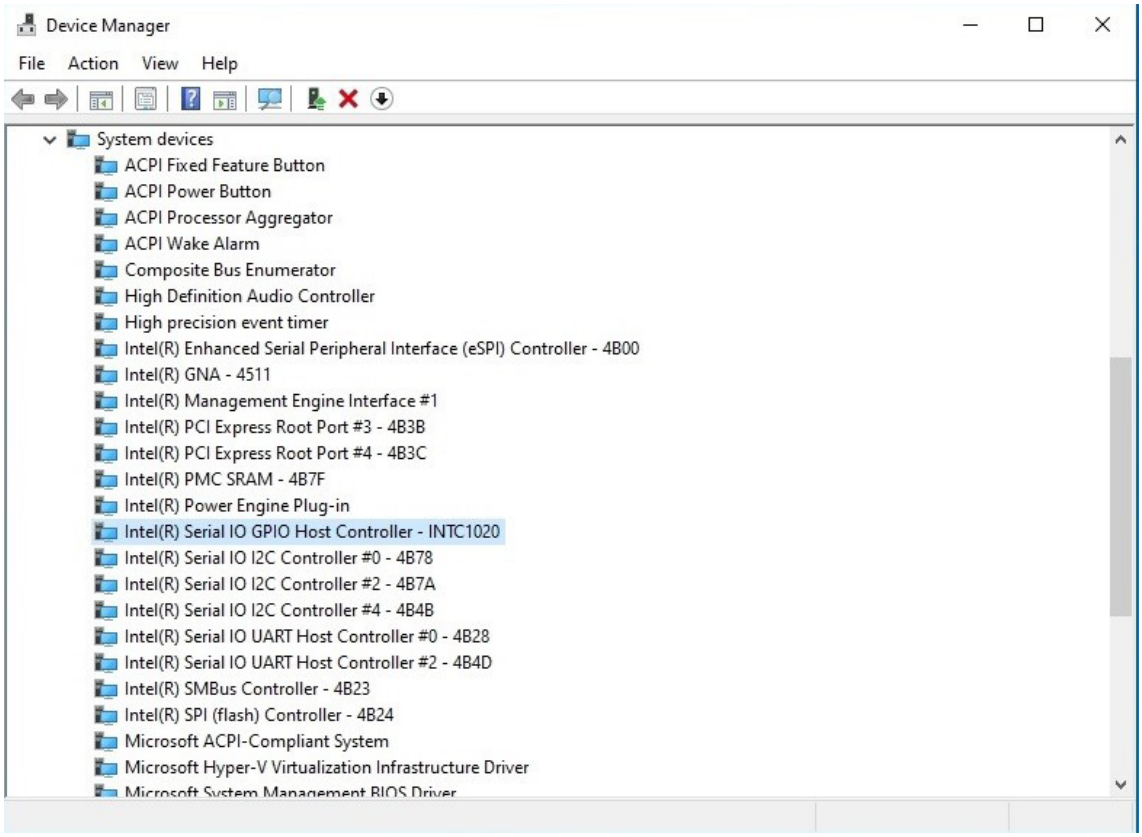

Click OK




Click Next

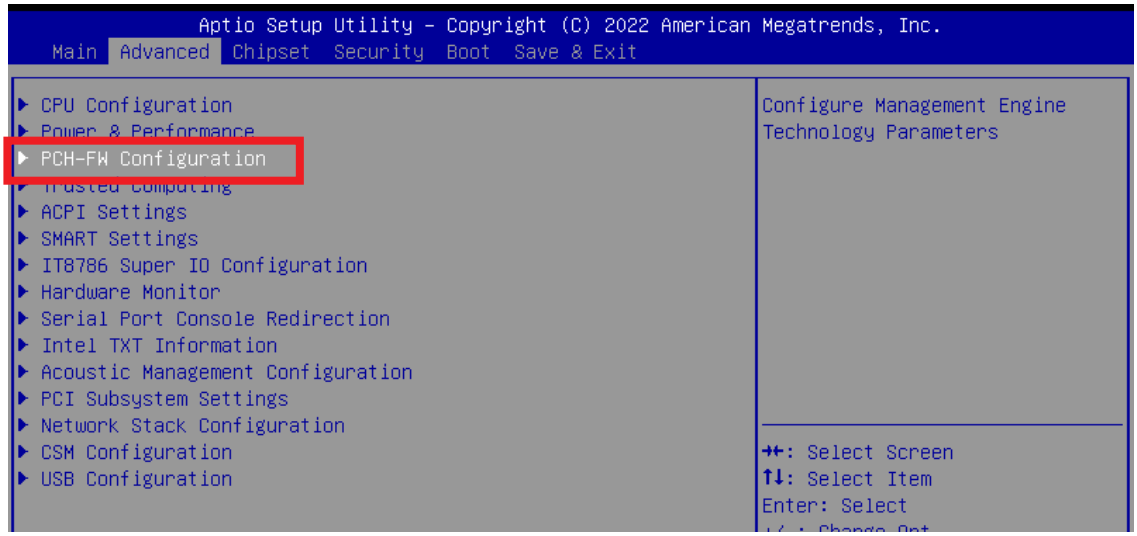



Update Unknown Driver successfully

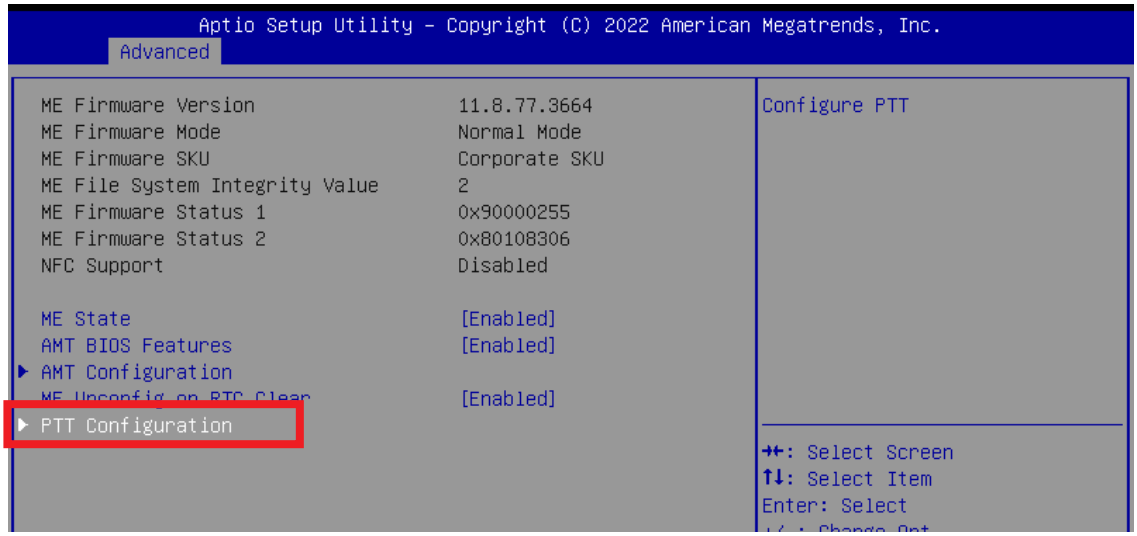


# APPENDIX F : Install Win11 (BIOS TPM Setting)

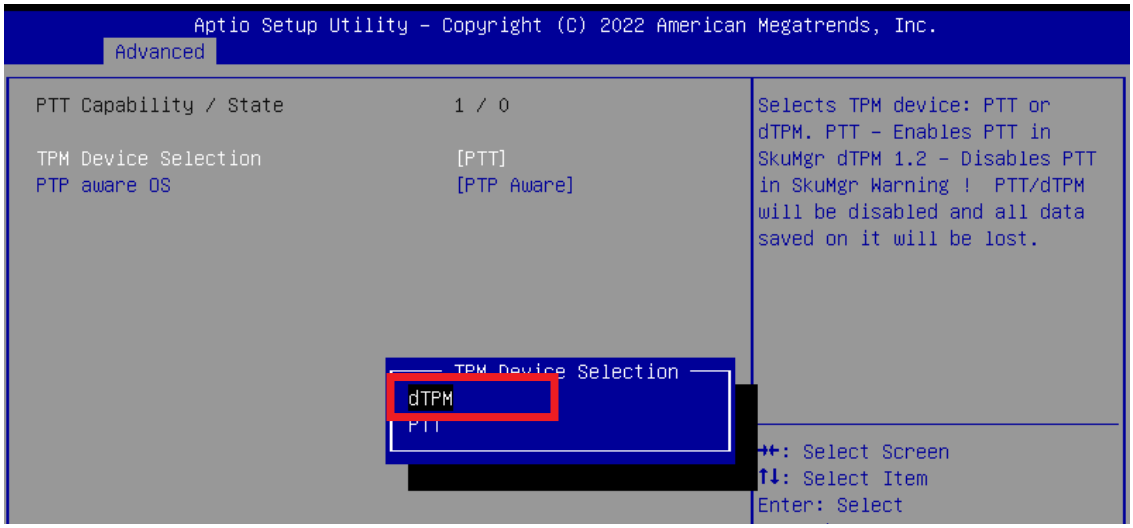
**Step 1** Click on “Advanced”, then click on “PCH-FW Configuration”

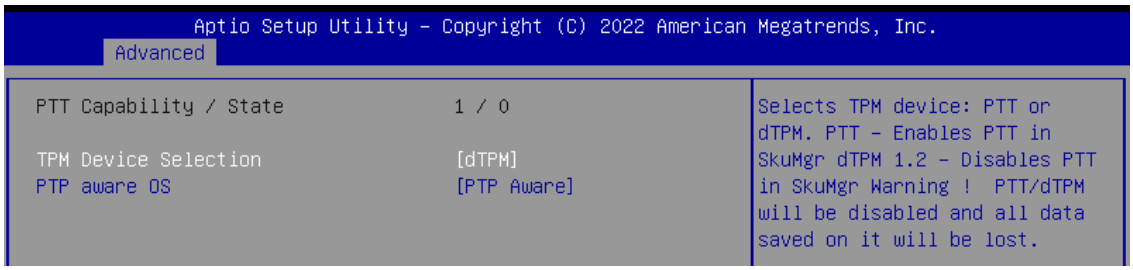



**Step 2** Click on “PTT Configuration”

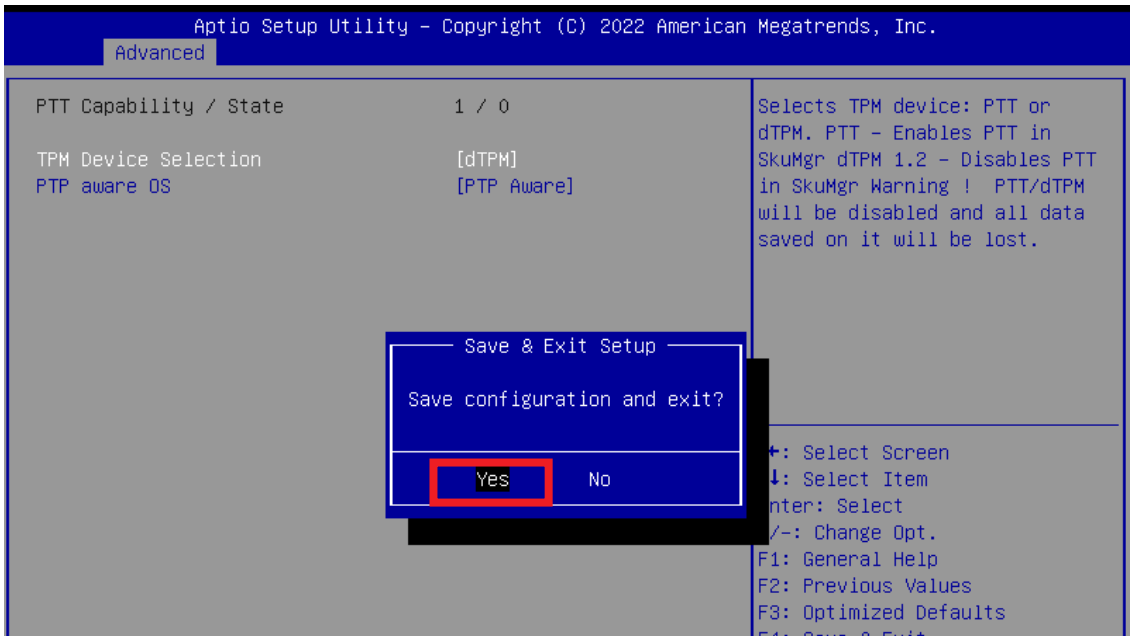


**Step 3** Click on “dTPM” (TPM Device Selection)

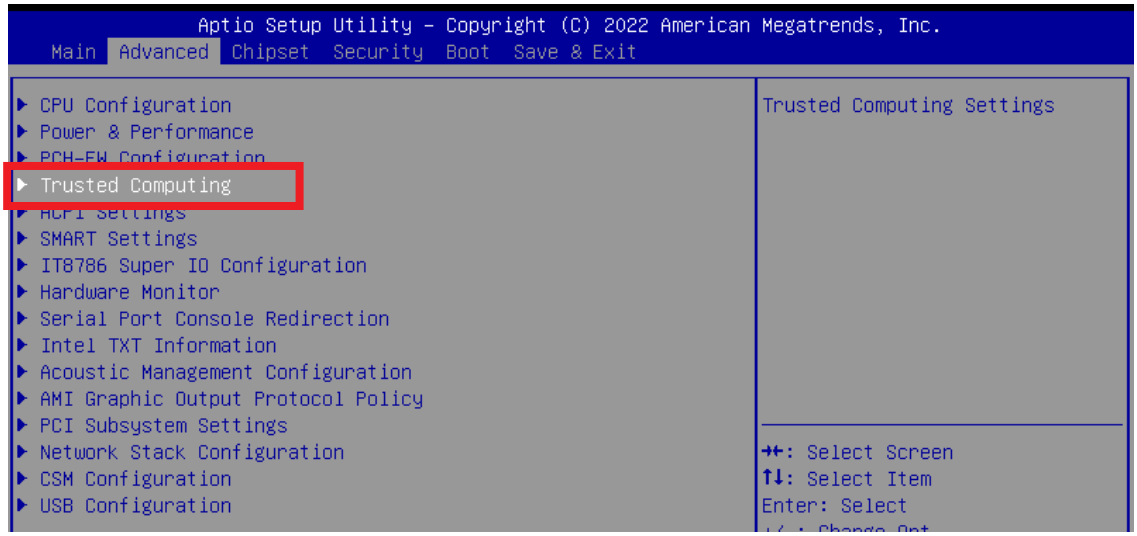


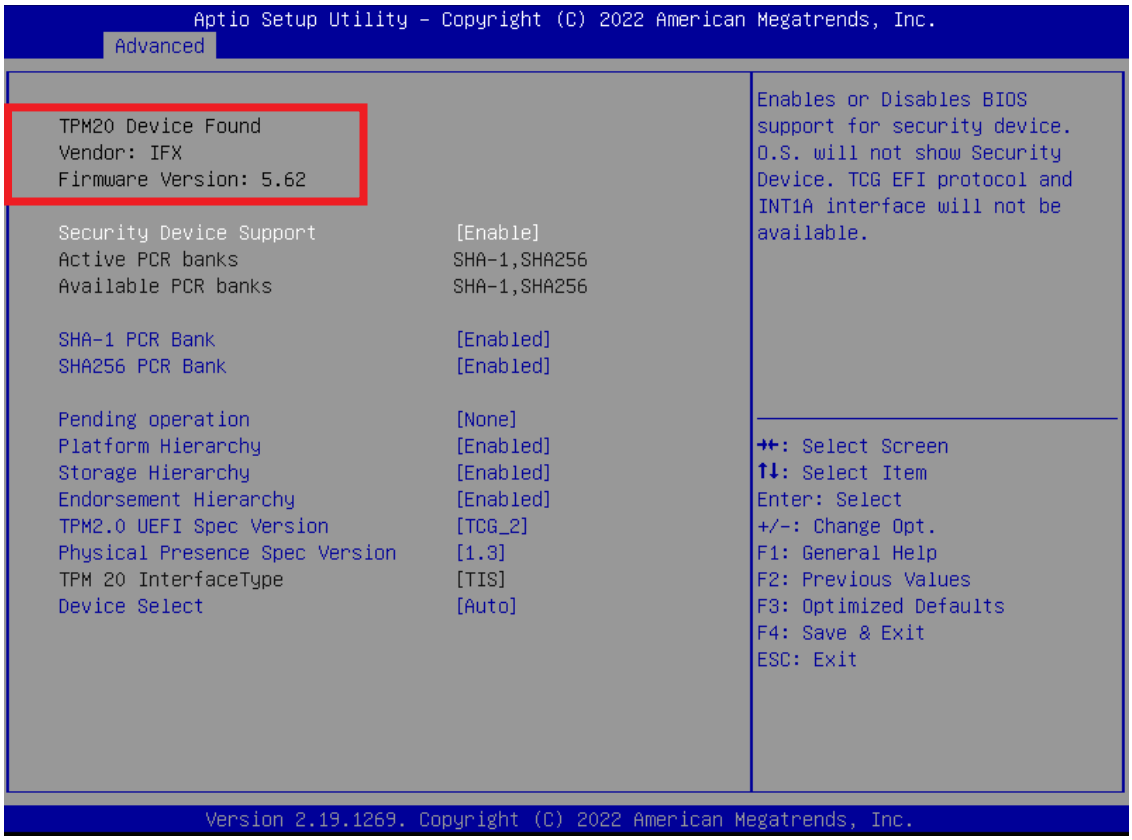

**Step 4** Please save the BIOS settings by pressing F4. Please press Enter when the pop-up window which asks “Save configuration and exit?” appears. The computer will then restart.



**Step 5** Click on “Trusted Computing”




**Step 6** If the window shows “TPM2.0 Device Found Firmware Version:5.62”, then the setting is completed.




** If more help is needed, please contact Vecow technical support **

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For further support information, please visit www.vecow.com