

# USER'S MANUAL

## UST510-52B-FL Series

Embedded System

User's Manual



[www.axiomtek.com](http://www.axiomtek.com)

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## Safety Precautions

Before getting started, please read the following important safety precautions.

1. The UST510-52B-FL does not come with an operating system which must be installed first before loading any software onto the computer.
2. Be sure to ground yourself to prevent static charge when installing any internal components. Use a grounding wrist strap and place all electronic components in any static-shielded devices. Most electronic components are sensitive to static electrical charge.
3. Disconnect the power cord from the UST510-52B-FL prior to making any installation. Be sure both the system and all external devices are turned OFF. Sudden surge of power could ruin sensitive components. Make sure the UST510-52B-FL is properly grounded.
4. Make sure the voltage of the power source is correct before connecting it to any power outlet.
5. Turn OFF system power before cleaning. Clean the system using a cloth only. Do not spray any liquid cleaner directly onto the screen.
6. Do not leave equipment in an uncontrolled environment where the storage temperature is below  $-40^{\circ}\text{C}$  or above  $80^{\circ}\text{C}$  as it may damage the equipment.
7. Do not open the system's back cover. If opening the cover for maintenance is a must, only a trained technician is allowed to do so. Integrated circuits on computer boards are sensitive to static electricity. To avoid damaging chips from electrostatic discharge, observe the following precautions:
  - Before handling a board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. This will help discharge any static electricity on your body.
  - When handling boards and components, wear a grounding wrist strap available from most electronic component stores.

## **Classifications**

1. Degree of protection against electric shock: not classified
2. Degree of protection against ingress of water: IP40\*
3. Equipment is not suitable for use in the presence of a flammable anesthetic mixture with air, oxygen, or nitrous oxide.
4. Mode of operation: Continuous

## General Cleaning Tips

Please keep the following precautions in mind while understanding the details fully before and during any cleaning of the computer and any components within.

1. A piece of dry cloth is ideal for cleaning the device.
2. Be cautious of any tiny removable components when using a vacuum cleaner to absorb dirt on the floor.
3. Turn the system off before cleaning up the computer or any components within.
4. Avoid dropping any components inside the computer or allowing the circuit board to become damp or wet.
5. For cleaning, be cautious of all kinds of cleaning solvents or chemicals that may cause allergies in certain individuals.
6. Keep food, drinks or cigarettes away from the computer.

### Cleaning Tools:

Although many companies have created products to improve the process of cleaning computers and peripherals users can also use household items for cleaning as needed.

Listed below are items available for cleaning computers or their peripherals.

Pay special attention to components requiring designated products for cleaning as mentioned below.

- Cloth: A piece of cloth is the best tool to use when rubbing up a component. Although paper towels or tissues can be used on most hardware as well, it is recommended to use a piece of cloth.
- Water or rubbing alcohol: A piece of cloth may be somewhat moistened with water or rubbing alcohol before being rubbed on the computer. Unknown solvents may be harmful to plastic parts.
- Vacuuming dust, dirt, hair, cigarette and other particles out of a computer can be one of the best methods of cleaning a computer. Over time these items may restrict the airflow in a computer and cause the circuitry to corrode.
- Cotton swabs: Cotton swabs moistened with rubbing alcohol or water are applicable to wipe hard-to-reach areas in keyboard, mouse and other locations.
- Foam swabs: If possible, it is better to use lint-free swabs such as foam swabs.



**【Note】** : *We strongly recommend that you should shut down the system before cleaning any components.*

### Please follow the steps below:

1. Close all application programs.
2. Close operating software.
3. Turn off the power;
4. Remove all devices.
5. Unplug the power cable.

## **Repair & Scrap Computer Recycling**

Please contact the nearest Axiomtek distributor as soon as possible for suitable solutions when computers require maintenance, repair or recycling.

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# SECTION 1

## INTRODUCTION

This section contains general information and detailed specifications of the UST510-52B-FL. Section 1 includes of the following sub-sections:

- General Descriptions
- System Specifications
- Dimensions
- I/O Outlets
- Packing List
- Model List

### 1.1 General Descriptions

The UST510-52B-FL is a fanless embedded system powered by the 8<sup>th</sup> / 9<sup>th</sup> generation Intel® Xeon® & Core™ i7/i5/i3, Pentium® and Celeron® processor (formal code name: Coffee Lake) and comes with flexible I/O design. To fulfill different application needs, this flexible embedded system supports Windows® 10, Windows® 11 and Linux, and can be wall-mounted or added with anti-vibration kit as an optional request.

The UST510-52B-FL is built with an IP40-rated\* heavy-duty aluminum extrusion, enabling reliable operation in harsh environments. Moreover, it features a wide range of 9 to 36V DC power input with power protection and -40 °C to +70 °C extended operating temperature. To minimize deployment time, this fanless embedded PC provides two flexible I/O windows for customers to easily install additional I/O output, making it perfectly suitable for any industrial grade applications.

### **Features**

- LGA1151 socket 8<sup>th</sup> / 9<sup>th</sup> generation Intel® Xeon® & Core™ i7/i5/i3 & Celeron® processor (Coffee Lake) with Intel®C246
- ECC SO-DIMM memory supported, up to 64GB
- Supporting wide range of DC power input from 9 to 36VDC
- Two HDMI and VGA with triple view supported
- Multiple flexible I/O modules supported
- TPM2.0 onboard

### **Reliable and Stable Design**

The UST510-52B-FL embedded system supports 8<sup>th</sup> / 9<sup>th</sup> generation Intel® Xeon® & Core™ i7/i5/i3 and Celeron® processors, with high flexibility and multi-functional design to present the best solution for any industrial field applications.

### **Flexible Connectivity**

The UST510-52B-FL comes with rich I/O interfaces, including two RS-232/422/485 ports with 4-wire terminal block, four USB 3.0 ports, 6-CH isolated digital input / 2-CH isolated digital output, and 8 or 16 PoE GbE LAN ports. The high flexibility and multi-functional design that make it the best solution for transportation applications.

### **Embedded O.S. Supported**

With the Coffee Lake processor, the UST510-52B-FL can support Windows® 10/11 64 Bit.

### **Various Storage Supported**

In terms of storage, the UST510-52B-FL supports 2 & 4 swappable 2.5" SATA storage drive bay and two mSATA devices.

## 1.2 System Specifications

- **CPU**

- LGA1151 socket 8th / 9th generation Intel® Core™ i7/i5/i3 & Xeon®/Pentium®/Celeron® processor, CPU TDP max. up to 35W/65W.

- **Chipset**

- Intel® C246

- **BIOS**

- American Megatrends Inc. UEFI (Unified Extensible Firmware Interface) BIOS.

- **System Memory**

- 2 x 260-pin DDR4-2666 SO-DIMM, up to 64GB
- ECC Memory supported

- **Display**

- 2 x HDMI (Resolution: 4K/2K@30Hz)
- 1 x VGA (Resolution: 1920X1080@60Hz)

- **Ethernet & Power Over Ethernet (PoE)**

All Ethernet ports use the I210-AT controller, which can support 10/100/1000 Mb/s speed. In addition, all ports support IEEE 802.3AF/AT (15.4W/25.5W) Power over Ethernet (PoE) to provide both internet connection and electric power to devices (eg. IP camera).



**Note:** *The UST510 is a power sourcing equipment. Two PSE devices or external power devices should not be connected, which may cause the risk of power conflict. UST510 must be correctly connected with PD Device (not including external power device) or switch without PoE. For example, user needs to select PD type camera and can't use an external power supply. Please find the switch without no power uplink port if you need a PoE switch.*

※PoE: **P**ower **o**ver **E**thernet

※PSE: **P**ower **S**ourcing **E**quipment

※PD: **P**owered **D**evice

- **USB Ports**

- 4 x USB 3.0

- **Serial Ports**

- 2 x 4-wire RS-232/422/485 (COM1~2)

- **DIO**


- Isolated DIO (6-IN/2-OUT) port with Magnetic Isolation Protection


- **Audio**

- 2 x Audio (Mic-in, Line-out)

- **Mini Card Interface**

- 1 x full-size PCI Express Mini Card slot (mSATA + USB + PCI Express signal)
- 1 x half-size PCI Express Mini Card slot (mSATA + USB)
- 1 x M.2 key A & E 2230 slot (USB)
- 1 x M.2 key B 3050/3042 slot (USB + PCI Express signal)
- 2 x SIM slots

- **Storage**
    - RAID 0/1 supported via 2 x 2.5" SATA HDD/SSD drive, up to 9.5mm in height
    - RAID 0/1/5/10 supported via 4 x 2.5" SATA HDD/SSD, up to 9.5mm in height
    - 2 x mSATA(occupied 2 x PCI Express Mini Card slot)
  - **Flexible I/O Window**
    - 2 x Optional I/O kits via mPCIe interface
  - **Indicator**
    - 1 x Green LED as indicator for PWR status
    - 1 x Green LED as indicator for HDD active
    - 2 x Green LED as indicator for programmable
  - **Button**
    - 1 x Power button
    - 1 x Reset button
  - **Antenna**
    - 4 x SMA type connector openings for antenna
  - **Watchdog Timer**
    - 1~255 seconds or minutes; up to 255 levels.
  - **Power Input**
    - Supports 12 and 24 Vdc typical in-vehicle power input with a terminal block and Smart Ignition.
-  **Note:** UST510 also supports 9 to 36VDC power input for general purpose. Please see Page. 61 for setting.
- **Power Consumption**

**DC 24V@6.91A**
  - **Operation Temperature**
    - -40 °C ~+70 °C (-40 °F ~ 158 °F), with W.T. SSD & Memory : Coffee Lake  
(Operating temperature varies depending on the CPU model in use.)
-  **Note:** *The performance of the system might be adversely affected when operating at a temperature above the system's limitation, which might cause heat throttling and underclocking, or with an unrecommended processor.*
- **Storage Temperature**
    - -40 °C ~+85 °C (-40 °F ~ 185 °F)
  - **Humidity**
    - 10% ~ 95% (non-condensation)
  - **Vibration Endurance**
    - 3 Grms with SSD (5-500Hz, X, Y, Z directions)
    - 0.8Grms with HDD (5~500Hz, X,Y, Z directions)
  - **Weight**
    - 4.16 kg (9.17lb ) without package (8RJ-2SATA)
    - 4.97 kg (10.95lb) without package (16RJ-4SATA)
    - 4.76 kg (10.49kb) without package (8M12-4SATA)
    - 4.82 kg (10.62lb ) with package (8RJ-2SATA)
    - 5.63 kg (12.41lb) with package (16RJ-4SATA)
    - 5.42 kg (11.94lb) with package (8M12-4SATA)

#### Dimension

- 2 SATA (without wall mount)  
240mm (9.45") (W) x 210.5mm (8.29") (D) x 82.2mm (3.24") (H)
- 4 SATA (without wall mount)  
240mm (9.44") (W) x 210.5mm (8.29") (D) x 104.2mm (4.1") (H)

### 1.2.1 Driver Contents

Please download the drivers from the Axiomtek official website.

- Ethernet
- Chipset
- Graphic
- Intel® ME
- Audio
- Rapid Storage



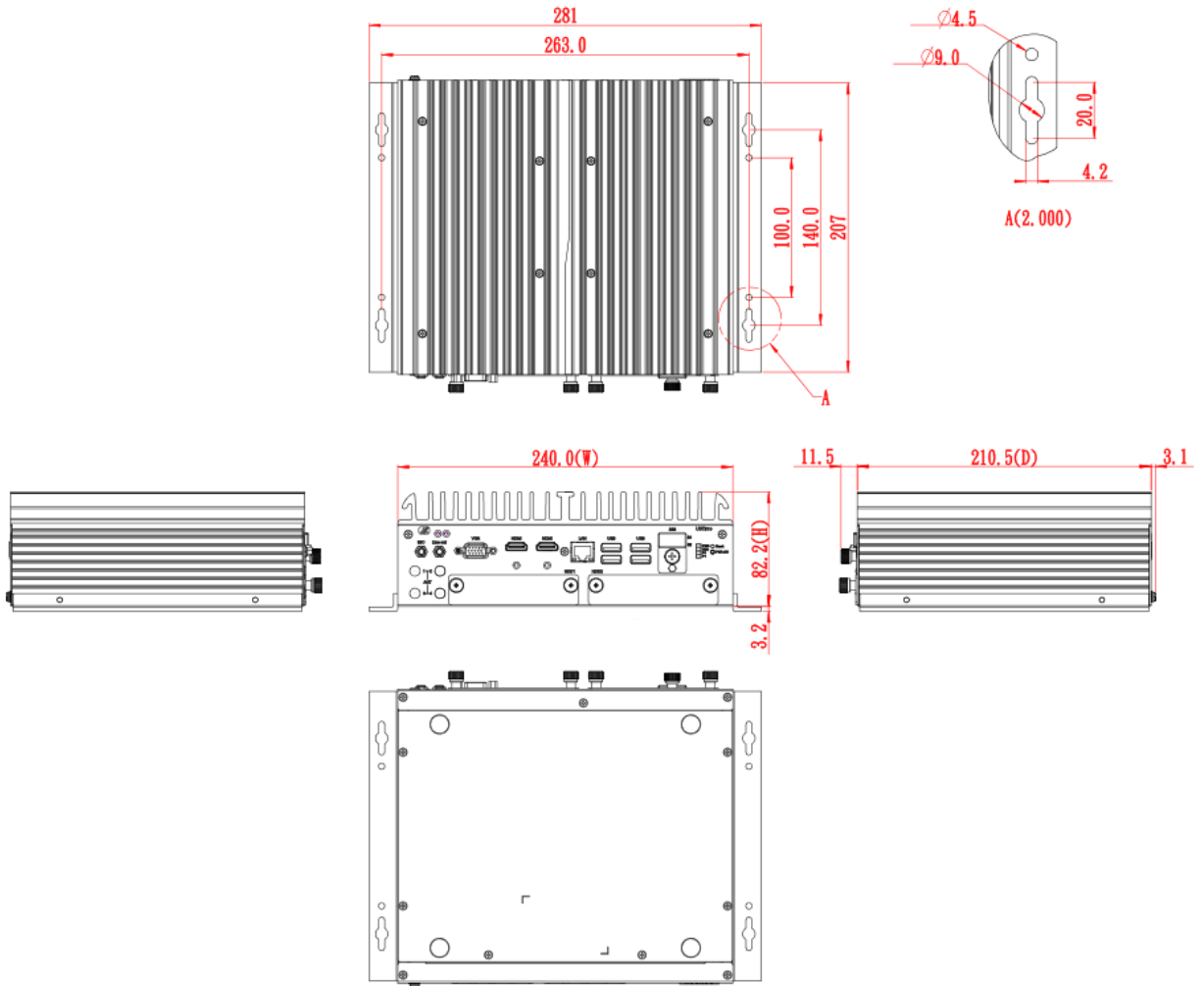
**Note:** All specifications and images are subject to change without notice.

## 1.3 Dimensions

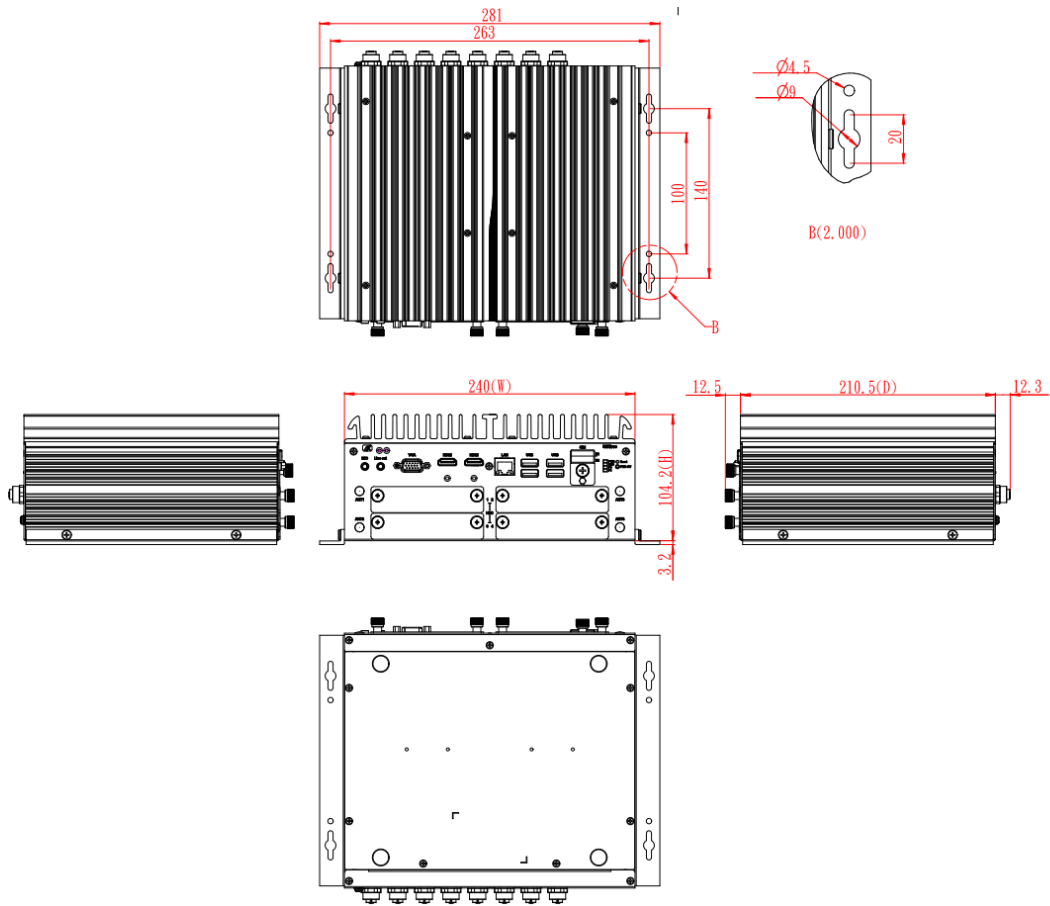
The following diagrams show you the dimensions and outlines of the UST510-52B-FL.

### 1.3.1 UST510-52B-FL Dimensions

Model with 2 SATA



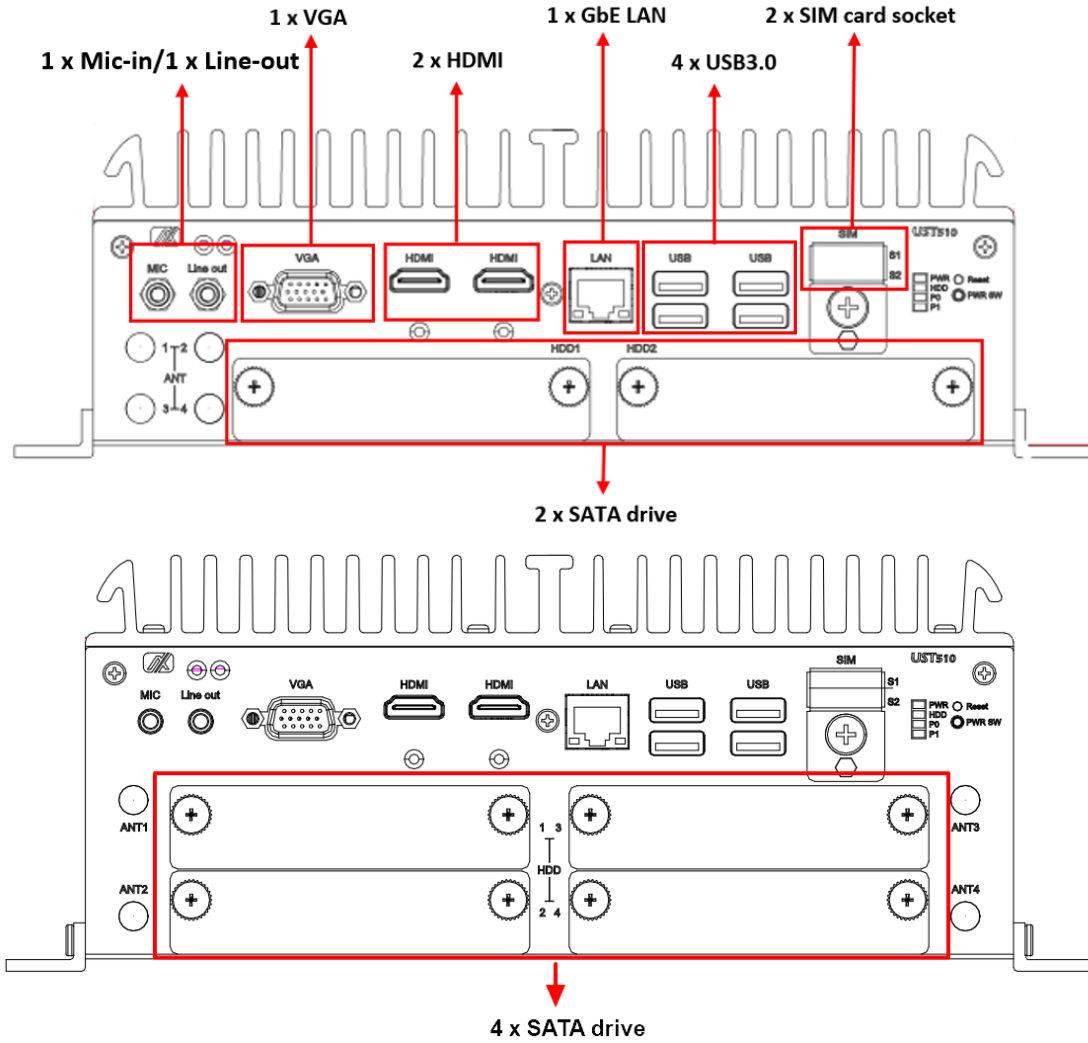
Model with 4 SATA



## 1.4 I/O Outlets

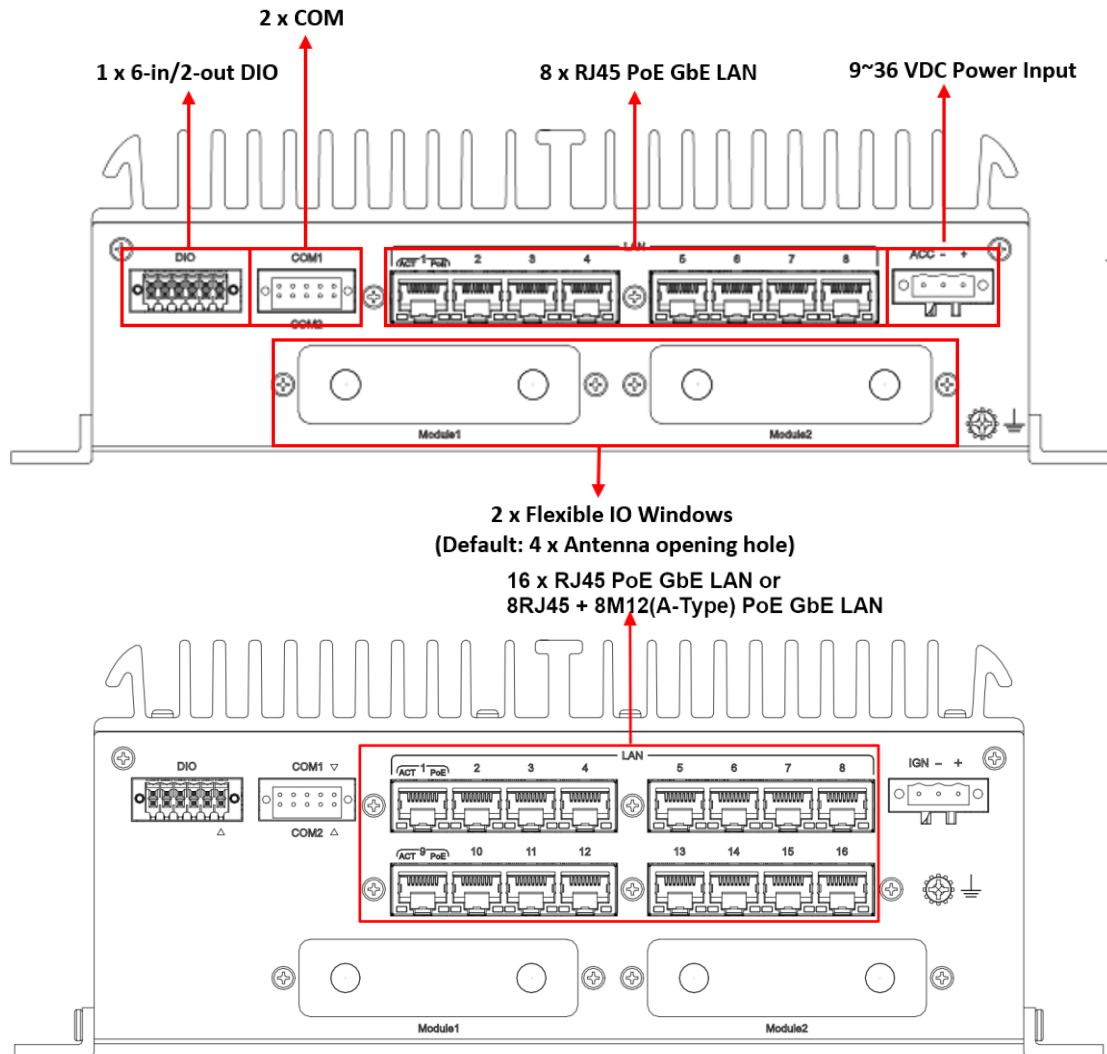
The following figures show you the I/O outlets on the UST510-52B-FL.

### Front View



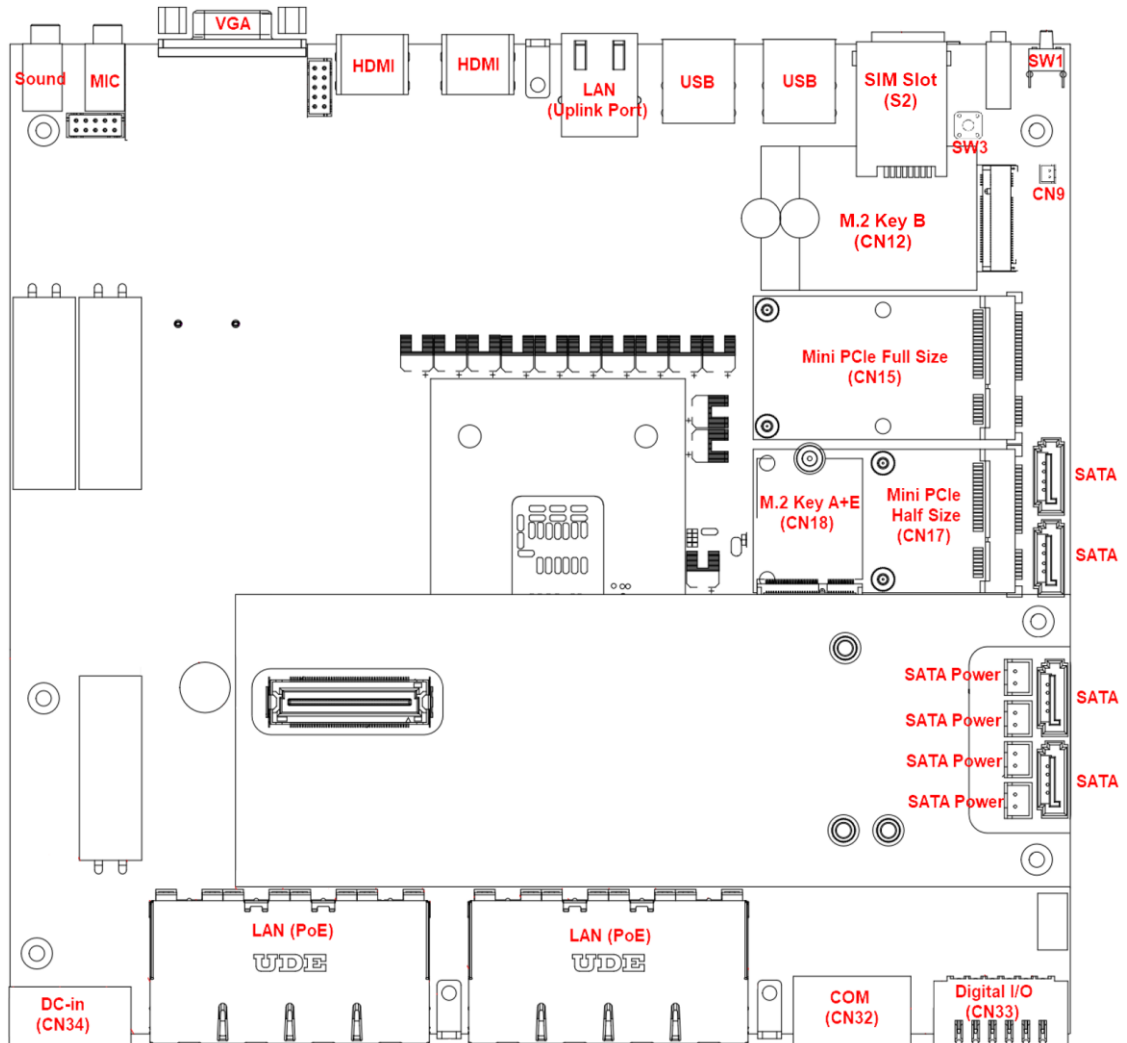


Rear View



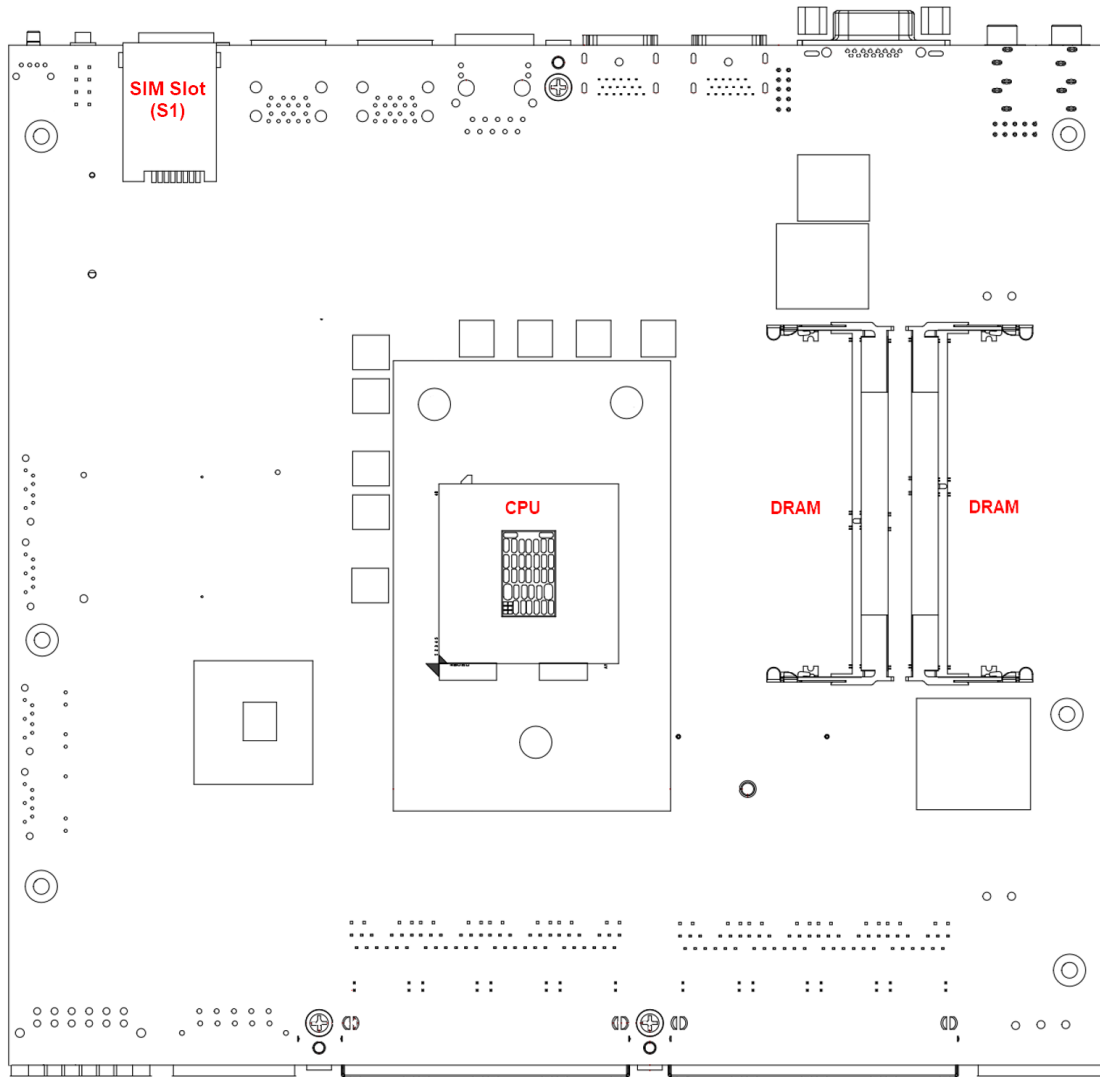
### Motherboard TOP View

For more information about Connector, please refer to Chapter 3.



### Motherboard Bottom View

For more information about Connector, please refer to Chapter 3.



## 1.5 Packing List

The UST510-52B-FL comes with the following bundle package:

- CPU thermal paste x 1
- Memory thermal pads x 4
- HDD screws x 8/16
- Terminal block for Power Input x 1
- Terminal block for COM PORT x 1
- Terminal block for DI/DO x 1
- Wall mount kit x 1
- Wall mount kit screws x 4
- Mini Card slot screws x 4
- M.2 key A & E 2230 size slot screw x 1
- M.2 Key B 3050/3052 size slot screw & holder x 1

Please contact an Axiomtek distributor immediately if any of the item above is missed.

## 1.6 Model List

UST510-52B-FL-8RJ45-2SATA	Fanless embedded system with 9th/8th gen Intel® desktop processor (LGA1151), C246, VGA, 2 HDMI, 6-in/2-out DIO, 2 COM, 4 USB 3.0, <b>8 RJ-45</b> PoE GbE LAN, <b>2 SATA</b> drives and ACC ignition
UST510-52B-FL-16RJ45-4SATA	Fanless embedded system with 9th/8th gen Intel® desktop processor (LGA1151), C246, VGA, 2 HDMI, 6-in/2-out DIO, 2 COM, 4 USB 3.0, <b>16 RJ-45</b> PoE GbE LAN, <b>4 SATA</b> drives and ACC ignition
UST510-52B-FL-8M12-4SATA	Fanless embedded system with 9th/8th gen Intel® desktop processor (LGA1151), C246, VGA, 2 HDMI, 6-in/2-out DIO, 2 COM, 4 USB 3.0, <b>8 M12</b> PoE GbE LAN, <b>4 SATA</b> drives and ACC ignition

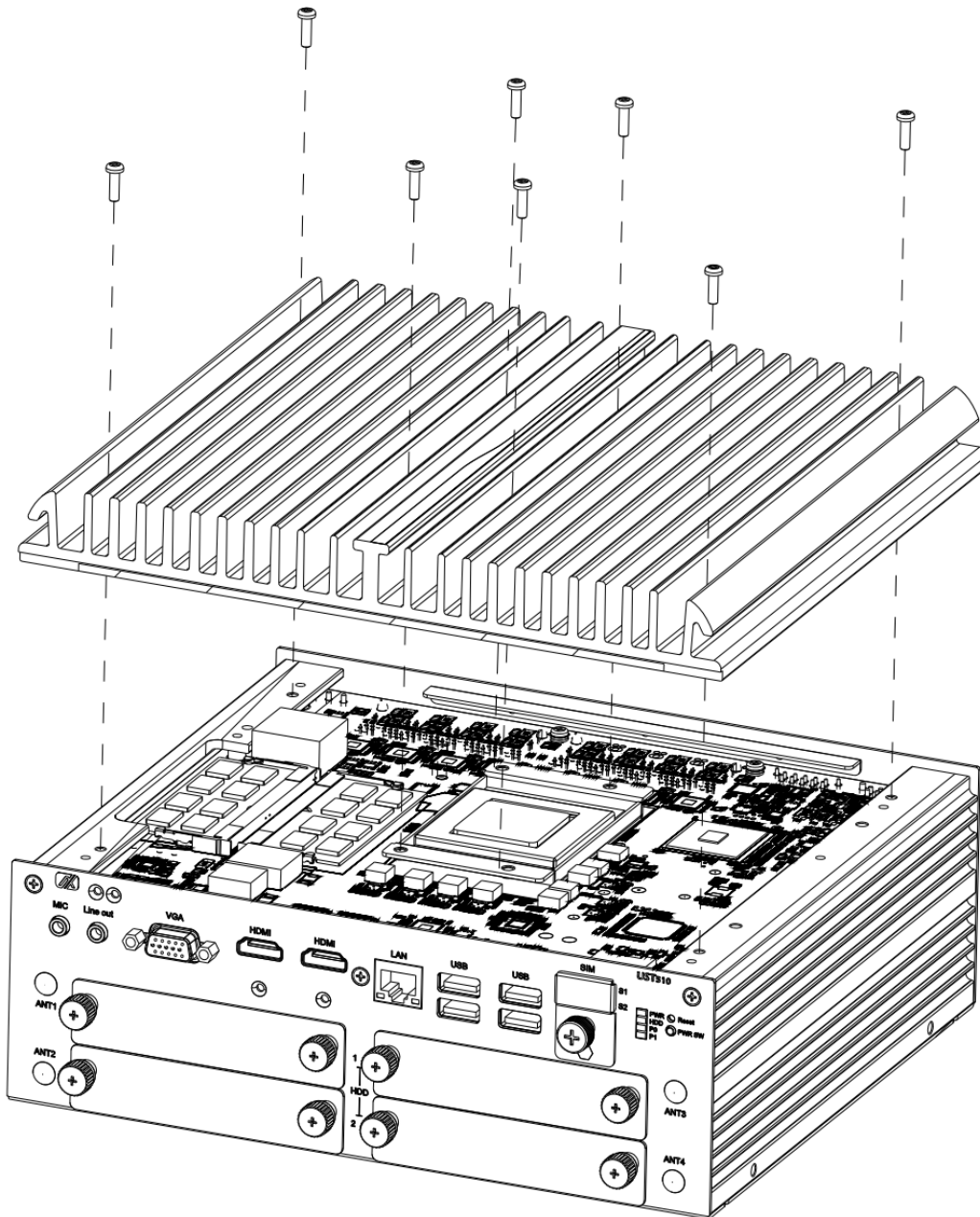
## SECTION 2 HARDWARE INSTALLATION

The UST510-52B-FL is user-friendly for various hardware configurations, such as CPU, DRAM, HDD (Hard Disk Drive), SSD (Solid State Drive), and PCI Express Mini card modules. Section 2 contains guidelines for hardware installation.

### 2.1 Installing CPU & DRAM

**Step 1** Turn off the system and unplug the power cord.

**Step 2** Loosen all screws to remove the top cover.

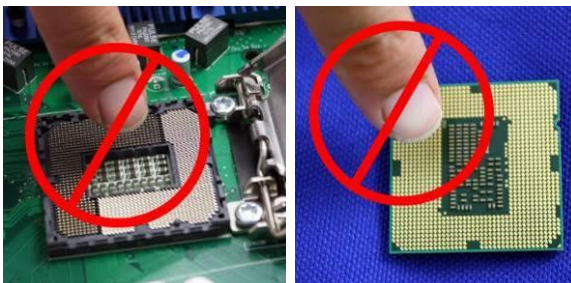
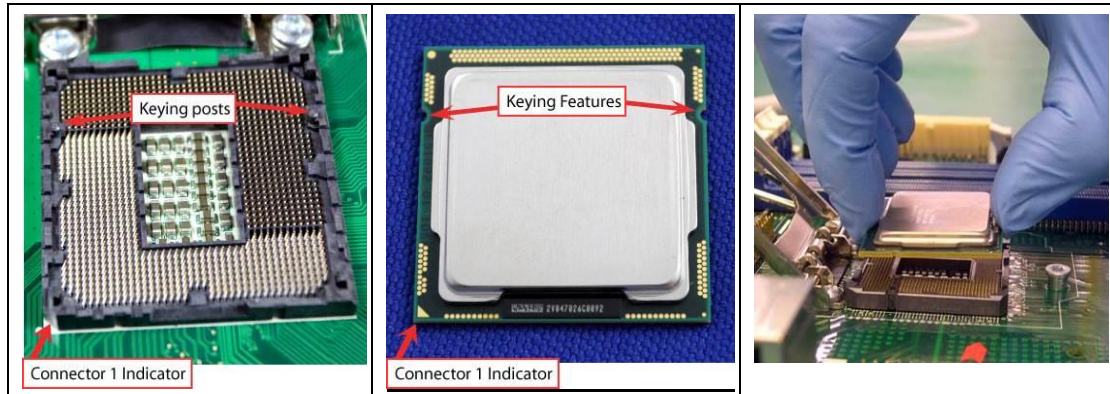


### Step 3 CPU installation steps:

- Take out the processor from package by holding the edges.

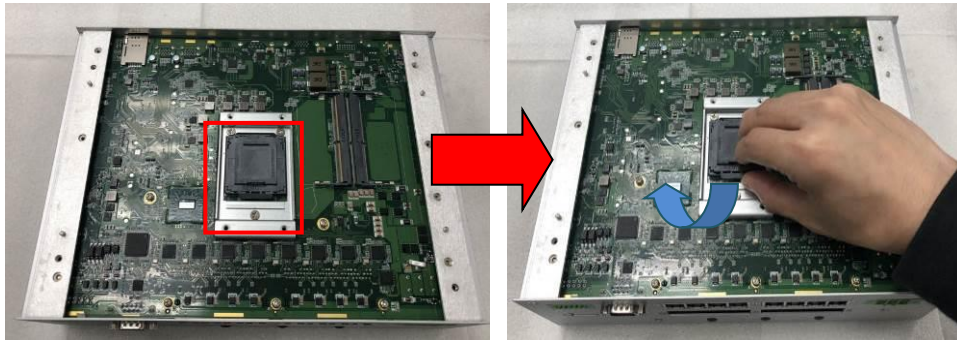


- Double-check the processor package's gold pads for any foreign material.
- Locate connection 1 indicator on the processor which aligns with connection 1 indicator chamfer on the socket, and notice processor keying features that line up with posts along socket walls.
- Hold the processor with thumb and index finger along the top and bottom edges. The socket will have cutouts for your fingers to fit into.
- Carefully place the processor into the socket vertically.



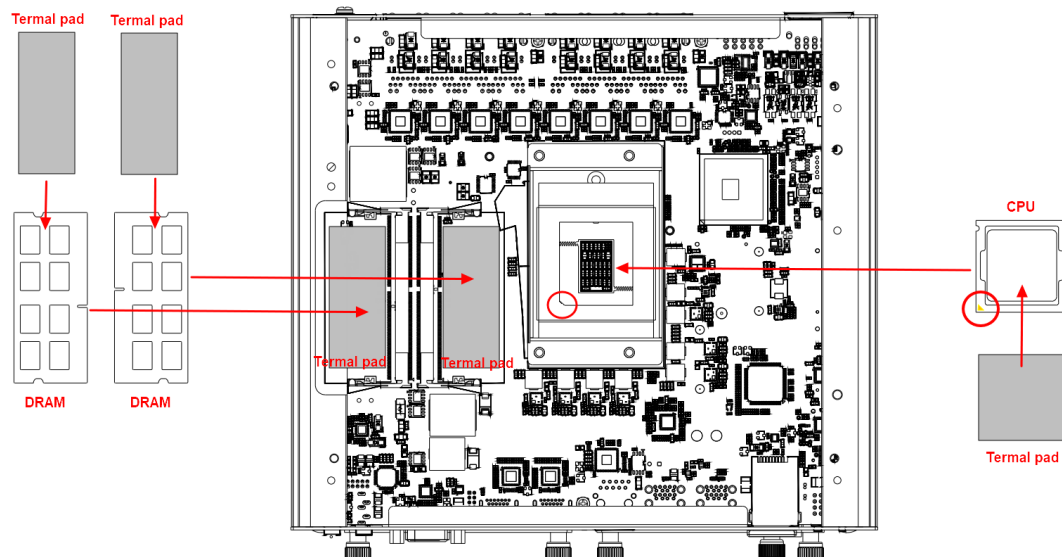
**To avoid damage, never touch the fragile contacts of the socket and the processor at any time during installation.**

**Step 4 Take the protective cover down carefully.**



**Step 5 Stick thermal pad and install DRAM and CPU.**

※ When installing the CPU, pay attention to the CPU's orientation and align the arrow mark on the CPU with the arrow key on the socket (Step 4). And apply the thermal pad on top of the processor.

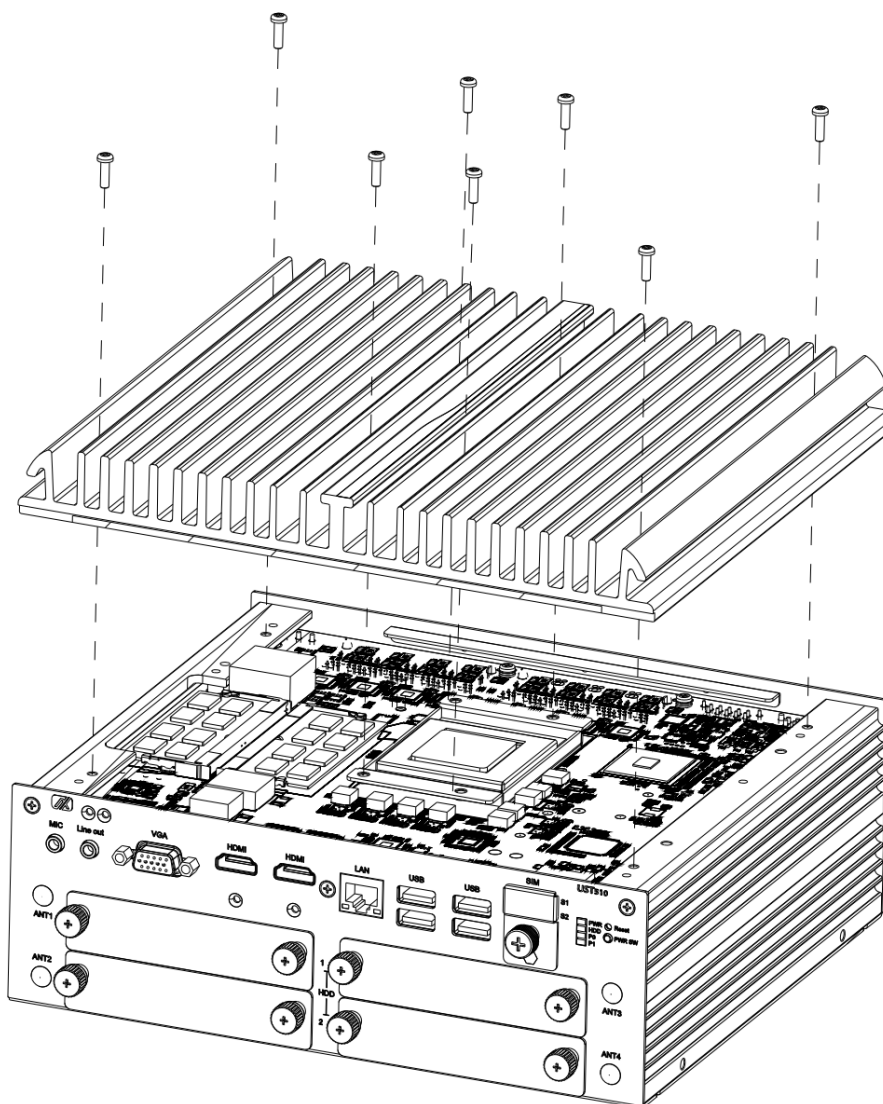



※ The memory module is locked by two latches on the sides. We recommend using "LDC737" silicone on both sides of the memory for optimal protection against vibration.

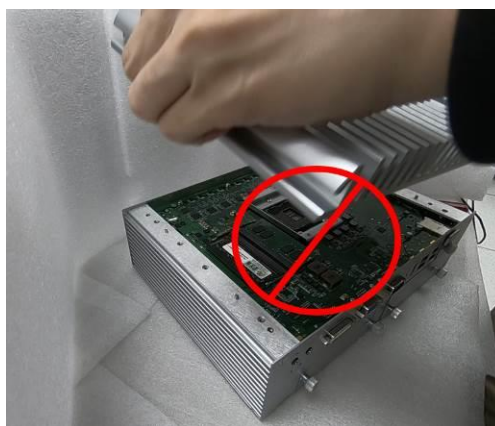




**Step 6 Put the top cover back onto the system and fasten all screws.**



 **Note:** When removing the top cover to change components, the CPU will stick on the underside of the cover. To avoid damaging the CPU by squeezing, please take it down carefully by holding the edges of the CPU and follow section 2.1 to reinstall.







**Note:** Put the thermal pads on the heatsink according to the marked lines. It is suggested that the thermal pads be put on the motherboard's corresponding positions as shown.

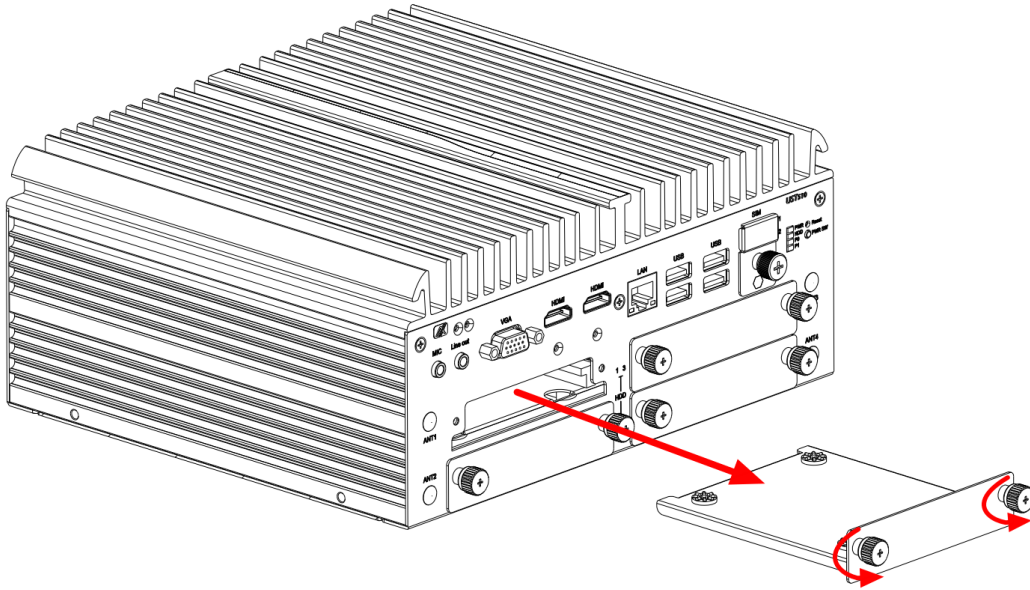


## 2.2 Installing 2.5" SATA Device

### 2.2.1 Installing 2.5" SATA Device

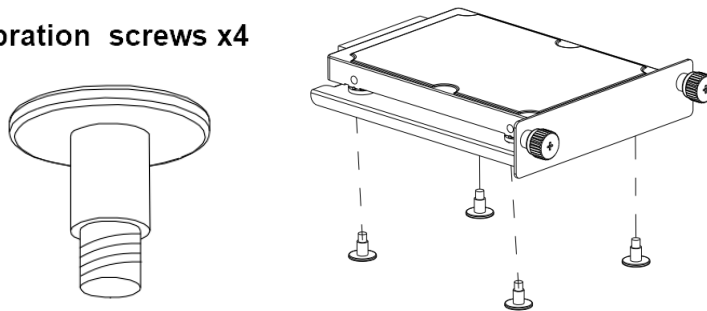
**Step 1** Turn off the system and unplug the power cord.

**Step 2** Loosen all of the SATA drive tray's screws and extract the SATA drive tray.

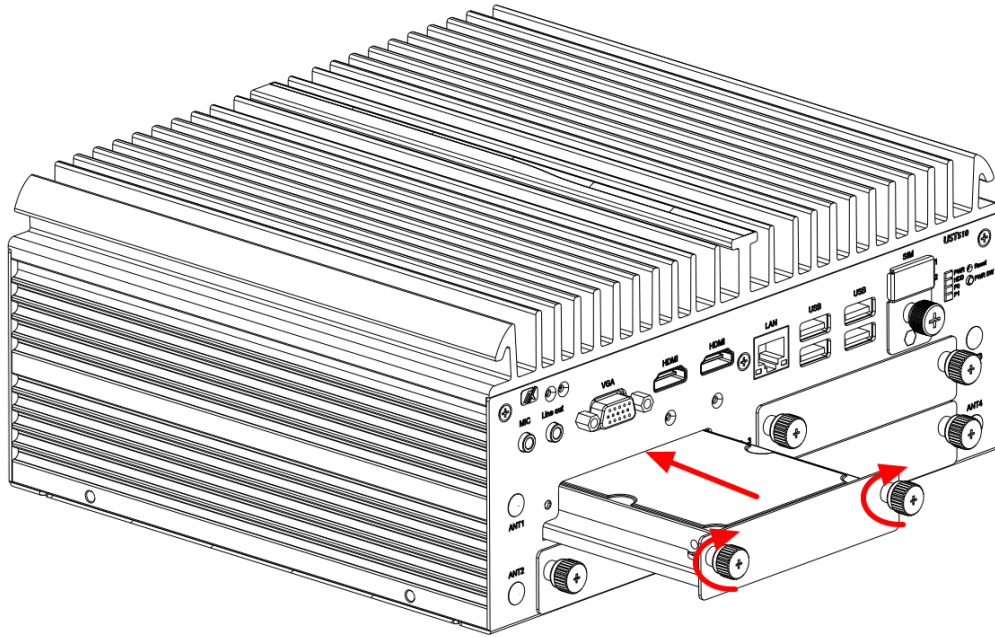


**Step 3** Turn the SATA drive tray upside down to install SSD/HDD and fasten the four vibration screws to secure the SSD/HDD firmly to the SATA drive tray.

vibration screws x4



**Step 4** Slide the secured SATA drive tray back into the system and fasten the screws firmly to complete the installation.



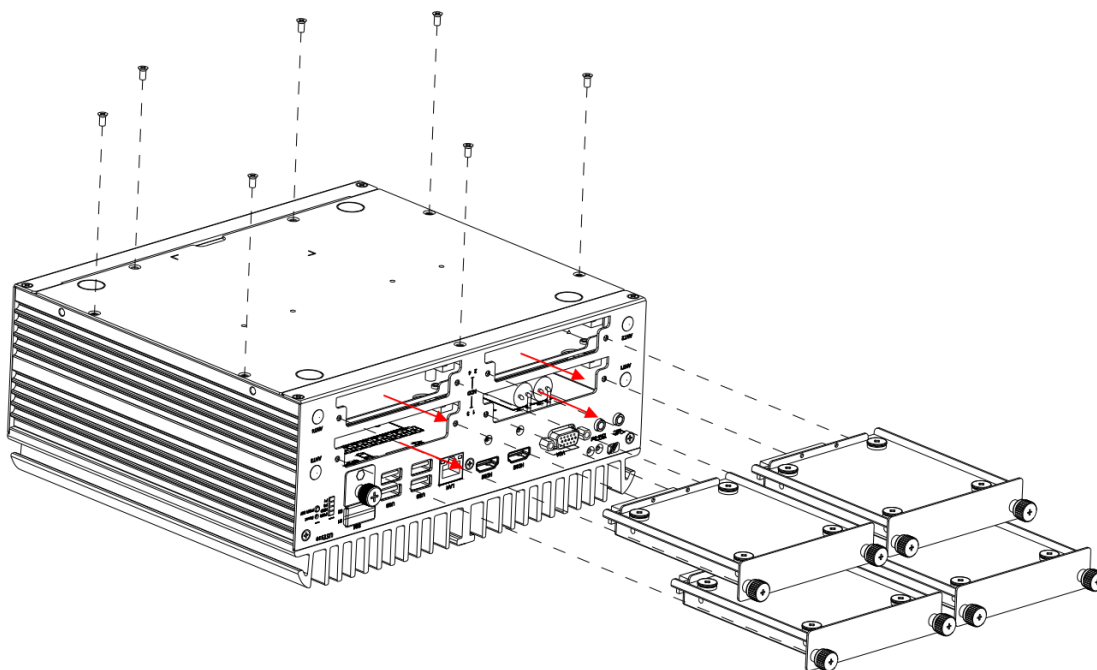
## 2.3 Installing Mini PCIe / M.2 Module

### 2.3.1 Installing Mini PCIe / M.2 Module

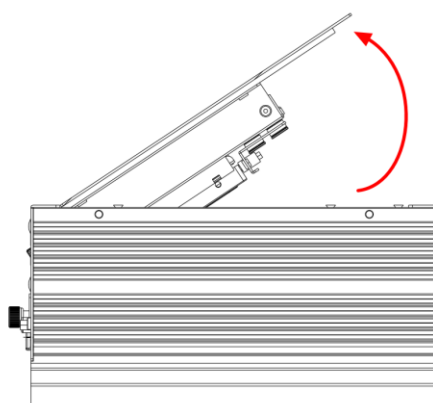
**Step 1** Turn off the system and unplug the power cord.

**Step 2** Turn the system upside down and loosen the SATA trays.

**Step 3** Extract both SATA trays as shown.



**Step 4** Loosen all screws and open the bottom cover carefully.



※After lifting up the cover, please remove the fixed SATA cable first and then put the cover aside.



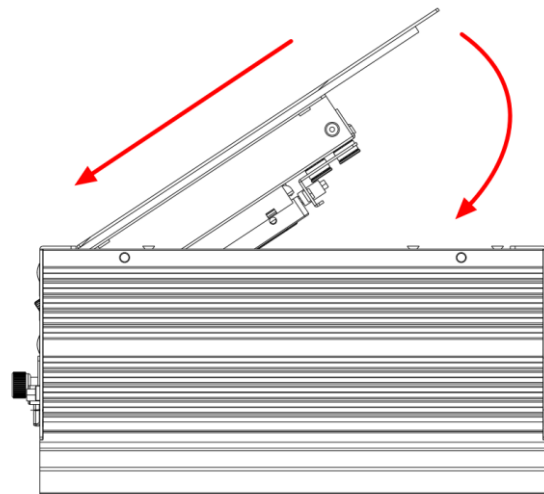
**Step 5** Insert the PCIe card and fasten the screws as shown.

**Step 6** Insert the M.2 2230 E key card and fasten the screws as shown.

**Step 7** Insert the M.2 3050/3052 B key card and fasten the screws as shown.

**Step 8** Place the cover back onto the bottom of the system and fasten all screws firmly.

※ Remember to fasten the SATA cable with a cable tie.



**Step 9** Slide the SATA trays back and fasten screws firmly to complete the installation.

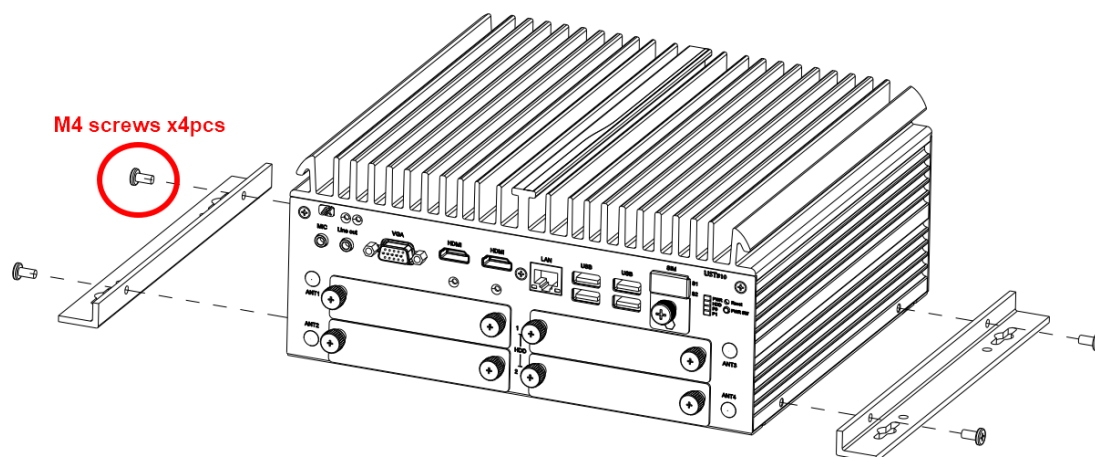
## 2.4 Installing the Wall Mount Kit

### 2.4.1 Installing the Wall Mount Kit

**Step 1** Turn off the system and unplug the power cord.

**Step 2** Locate the wall mount screw holes on both sides of the system.

**Step 3** Attach the wall mount to the system and fasten the screws tightly as shown below to complete the installation.



## 2.5 Installing AX92912 kit & AX92918 kit

### 2.5.1 Installing AX92912 Full-size Gigabit Ethernet Mini PCI-Express Module kit

- **Packing List**

AX92912 Board x1	M2 Screw x2
Quick Installation Guide x 1	M3 Countersunk Flat Head Screw x2
DB9 Audio Cable x2	M3 Flat Head Screw x 4
Heatsink Kit x1	Cable Tie x 2
Thermal Pad x 3	Tie Mount x 2

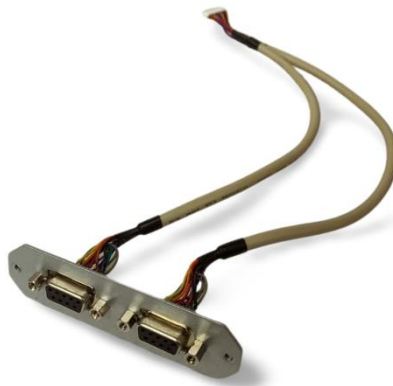
※Please contact your local vendors for any damaged or missing items.

※DO NOT apply power to the board if there is any damaged component.

**Step 1** Turn off the system and unplug the power cord.

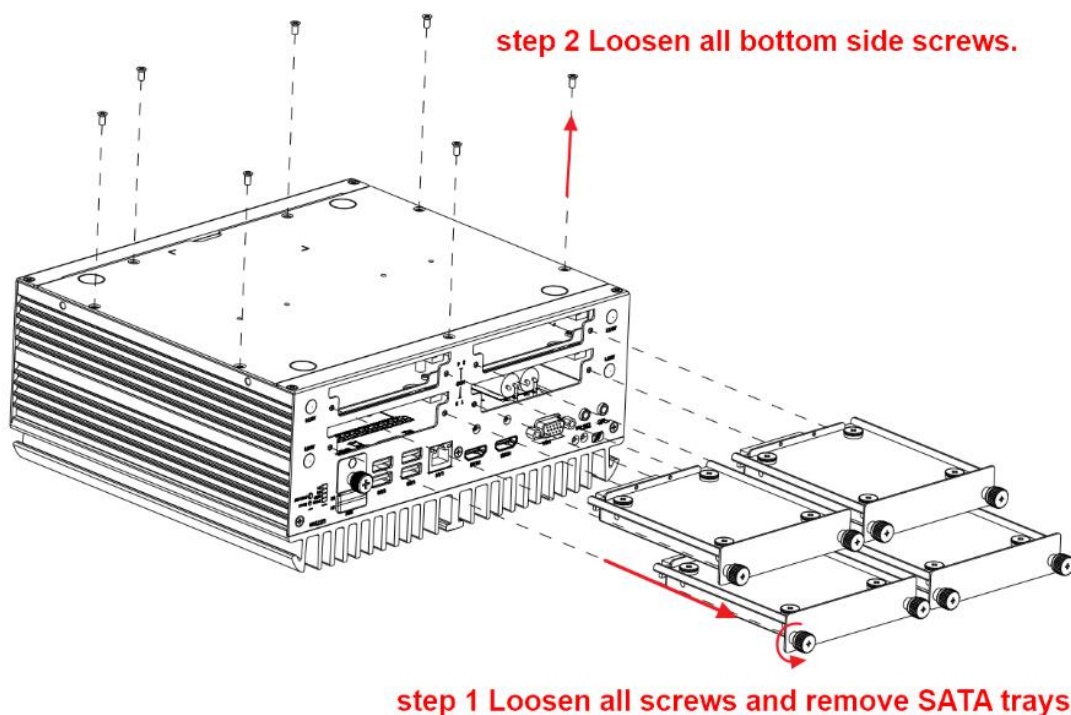
**Step 2** Take out the DB9 Audio Cable, DB9 Bracket, and countersunk flat head screws.

**Step 3** Secure the DB9 Audio Cable onto the Bracket.





**Step 4** Remove the SATA tray, loosen all the screws on the bottom cover, and open the bottom cover.



※ After lifting up the cover, please remove the fixed SATA cable first and then put the cover aside.



**Step 5** Remove the antenna bracket and install the DB9 bracket on the rear panel.

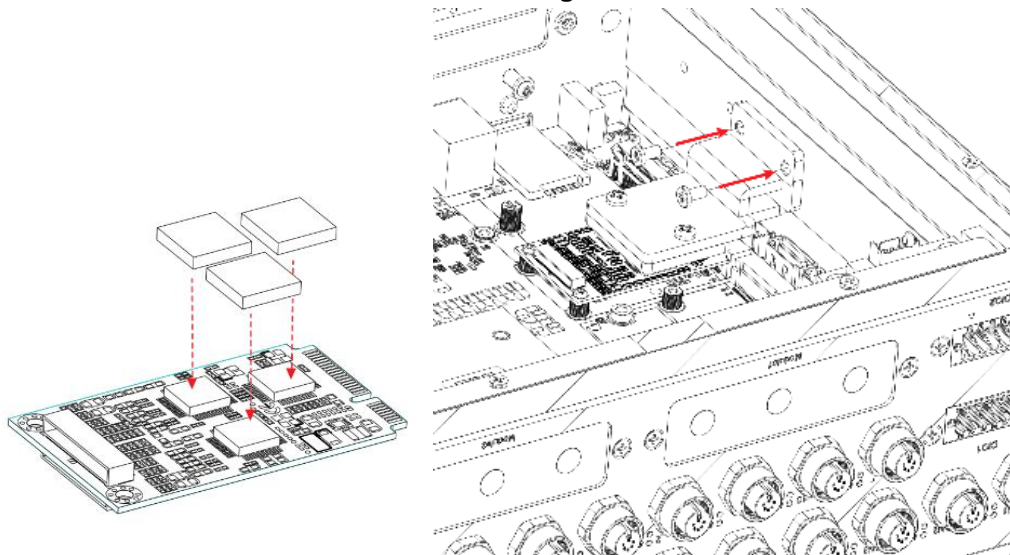




**Step 6** Connect the cables to the module and secure it to the motherboard using M2 screws.



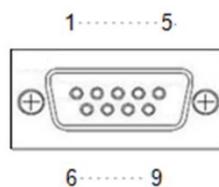
**Step 7** Attach the thermal pad to the corresponding IC positions on the module and secure the heatsink using M3 button head screws.



**Step 8 Organize the cables and reinstall them into the SATA trays according to Step 5, then tighten all the screws.**

*[Note] For manufacturing the external cables, you can refer to the pin definitions below. It is recommended to use shielding for manufacturing the wires.*

Pins	Description
1	Audio Ground
2	Line Out Left
3	Line Out Right
4	Audio Ground
5	Line In Left
6	Line In Right
7	Audio Ground
8	Mic In
9	Audio Ground



## 2.5.2 Installing AX92918 Full-size Gigabit Ethernet Mini PCI-Express Module kit

- **Packing List**

AX92918 Board x1	M2 Screw x2
Quick Installation Guide x 1	M3 Countersunk Flat Head Screw x4
AX93287 Board x2	M3 Flat Head Screw x 4
LAN Cable x2	Cable Tie x 2
Heatsink Kit x1	Thermal Pad x 3
RJ45 Bracket x1	Tie Mount x 2

※Please contact your local vendors for any damaged or missing items.

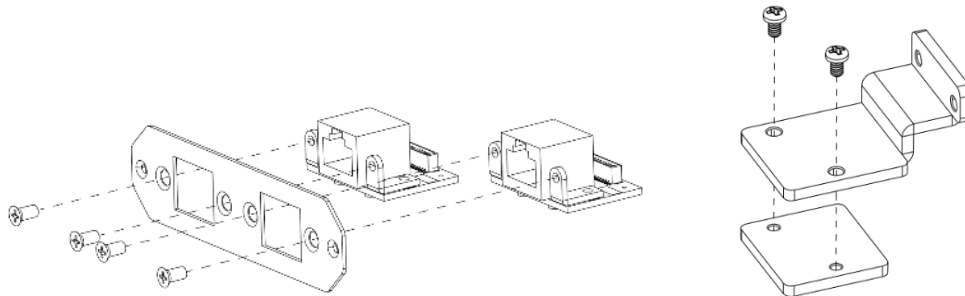
※DO NOT apply power to the board if there is any damaged component.

**Step 1** Turn off the system and unplug the power adaptor.

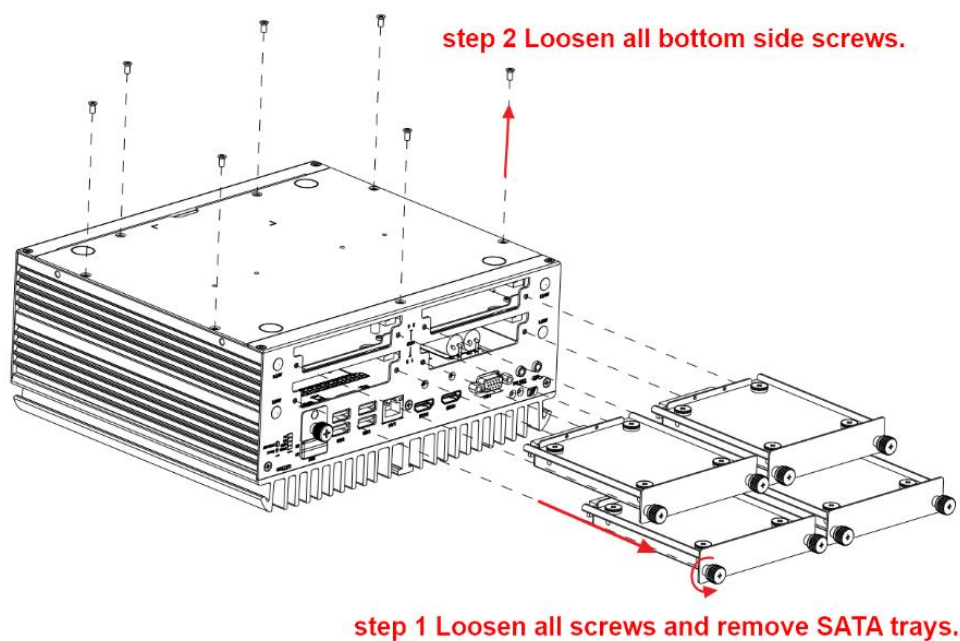
**Step 2** Take out the AX93287 Board, RJ45 Bracket, LAN Cable, and countersunk flat head screws.

**Step 3** Secure the AX93287 Board onto the RJ45 Bracket and connect the cables.

**Step 4** Take out the heatsink accessory and assemble it.



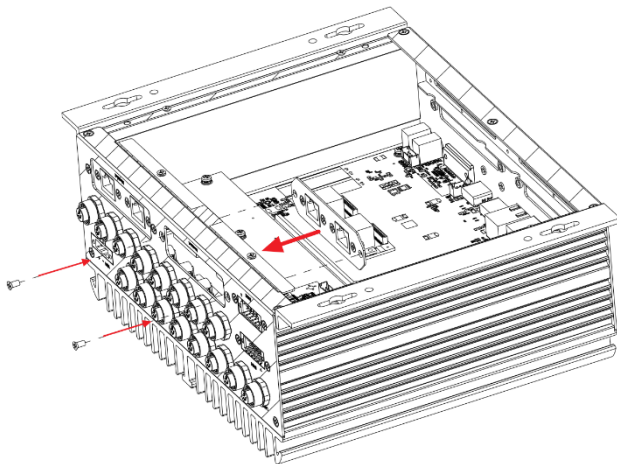
**Step 5 Take out the SATA tray of UST510 and remove the bottom cover.**



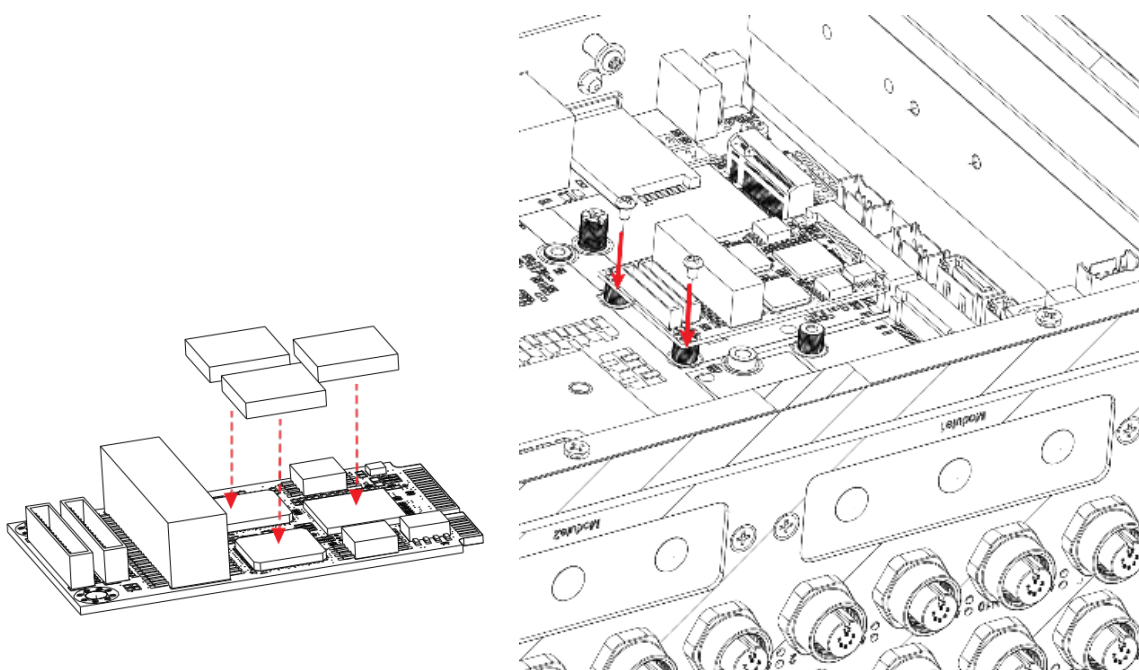
※ After lifting up the cover, please remove the fixed SATA cable first and then put the cover aside.



**Step 6 Remove the original antenna bracket and attach the RJ45 bracket to the panel.**



**Step 7 Apply the thermal pad to the corresponding IC positions on the LAN module, and then use M2 screws to install the LAN module AX92918 onto the motherboard.**

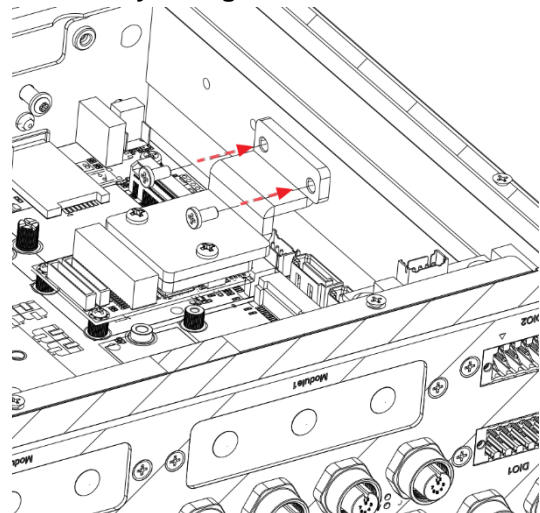




**Step 8** Connect the module to the cable and organize the wires.



**Step 9** Fasten the heatsink by using M3 button head screws.



**Step 10** Re-install the SATA trays according to step 5 and fasten all the screws.

## SECTION 3 LED, BUTTON & CONNECTOR SETTINGS

### 3.1 LED

Functions	Descriptions
PWR	Power LED (note1)
HDD	OS Storage LED
P0	Programmable LED(note2)
P1	Programmable LED(note2)



**Note 1:** With Smart Ignition, users can realize the malfunction status by the blink of PWR LED. Please refer to the table. For more detailed setting, please refer to BIOS Chapter4.4 smart ignition configuration.

No.	Status Description	Number of blinks
1	System Power Ready.	Always on
2	Input power voltage under system turn on start voltage.	1
3	System vin power FAIL	2
4	Power input low voltage Event Active	4
5	Restore safe mode default.	5
6	Update MCU firmware abnormal at previous time.	8

Note :

1. The system will reveal the malfunction status by the frequency of the blink when a malfunction occurs.
2. A 0.1s on/0.2s off is counted as a blink; after a sequence of blinks, there will a 1.5s interval.



**Note 2:** Please refer to APPENDIX D.

## 3.2 Buttons

### 3.2.1 Power Button (SW1)

The power button is located on the I/O side. It allows users to control power on/off state of the UST510-52B-FL.



**Note:** Refer to APPENDIX C for instructions on power button settings for Windows.

Functions	Descriptions
On	Turn on/off system
Off	Keep system status



### 3.2.2 Reset Button (SW1)

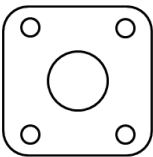
The reset button allows users to reset the UST510-52B-FL.

Functions	Descriptions
On	Reset system
Off	Keep system status



### 3.2.3 Restore BIOS Optimal Defaults (SW3)

Press the tact switch (SW 3) for 4 seconds to restore optimal BIOS defaults.





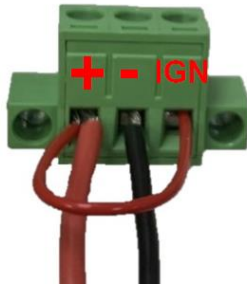
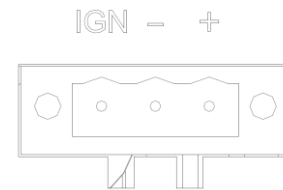
### 3.3 Connectors

Please refer to pin assignments below:

#### 3.3.1 DC-in Power Connector (CN34)

- Wide-range 9 - 36VDC (typical 24VDC) power input with terminal block.
- OVP and RVP protection.
- Supports Axiomtek Smart Ignition.

Pins	Signals
1	DC+
2	GND
3	Ignition (Accessory Power)



(Figure 1)



**Note:** Connect the DC-IN power connector to the UST510-52B-FL in-vehicle system as follows:

When using in-vehicle applications, connect the IGN pin to the accessory power of the vehicle.

If the testing environment is not able to provide accessory power, refer to the connection method illustrated in Figure 1 to proceed.



**Note:** If the IGN fails and causes the system to shut down abnormally, please change the settings according to Appendix C. For vehicle management settings, please refer to smart Ignition Management in Section 4.4

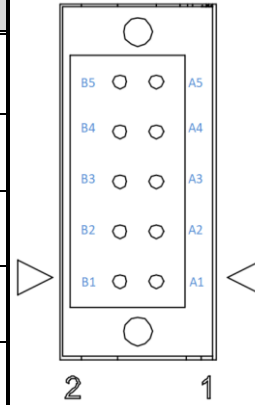
#### 3.3.2 HDMI Connector

The HDMI (High-Definition Multimedia Interface) Rev1.4b is a compact digital interface which is capable of transmitting high resolution video and audio over a single cable. Pin definition follows **HDMI Type A standard**.

### 3.3.3 Serial Port Connector (COM1~COM2)

- 1 port TB supports 2COM
- COM mode supports RS-232/422/485 (which can be selected by BIOS)
- Pin assignment is listed as follows:

PIN	RS232	RS422	RS485	PIN	RS232	RS422	RS485
<b>B5</b>	RX	TX+	D+	<b>A5</b>	RX	TX+	D+
<b>B4</b>	CTS	TX-	D-	<b>A4</b>	CTS	TX-	D-
<b>B3</b>	TX	RX+	x	<b>A3</b>	TX	RX+	x
<b>B2</b>	RTS	RX-	x	<b>A2</b>	RTS	RX-	x
<b>B1</b>	GND	GND	GND	<b>A1</b>	GND	GND	GND



### 3.3.4 Ethernet & Power over Ethernet Connector

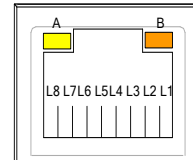
#### RJ45

The board has 9 RJ-45 connectors.

The front-side-panel LAN is designed based on the Intel i211 controller.

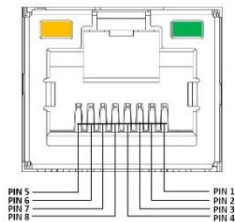
Front-side-panel LAN (without PoE)

Pins	LAN Signal	Pins	LAN Signal
L1	MDI0+	L5	MDI2+
L2	MDI0-	L6	MDI2-
L3	MDI1+	L7	MDI3+
L4	MDI1-	L8	MDI3-
A	Activity link LED (Yellow) OFF: No link Blinking: Link established; data activity detected		
B	Speed LED OFF: 10Mbps data rate Green: 100Mbps data rate Orange: 1GMbps data rate		



LAN1 to LAN8 (RJ45 type with PoE) are based on the Intel i211 with PoE support on the rear side panel.

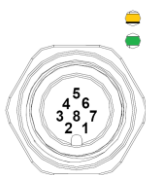
Pins	LAN Signal	Pins	LAN Signal
1	MDI0+ (Passive $V_{PSE+}$ )	5	MDI2+ (Passive $V_{PSE+}$ )
2	MDI0- (Passive $V_{PSE+}$ )	6	MDI2- (Negative $V_{PSE-}$ )
3	MDI1+ (Negative $V_{PSE-}$ )	7	MDI3+ (Negative $V_{PSE-}$ )
4	MDI1- (Passive $V_{PSE+}$ )	8	MDI3- (Negative $V_{PSE-}$ )
ACT	Activity link LED (Orange) OFF: No link Blinking: Link established; data activity detected		
PoE	PoE LED Green: PoE power activity LED Blinking: over power budget		



**Note:** If PoE power supply exceeds power budget, the PoE LED will start blinking.

LAN1 to LAN8 (M12 type with PoE) are based on the Intel i211 with PoE support on the rear side panel.

Pins	LAN Signal	Pins	LAN Signal
1	MDI2+ (Passive $V_{PSE+}$ )	5	MDI1+ (Passive $V_{PSE+}$ )
2	MDI3+ (Passive $V_{PSE+}$ )	6	MDI0+ (Negative $V_{PSE-}$ )
3	MDI3- (Negative $V_{PSE-}$ )	7	MDI2- (Negative $V_{PSE-}$ )
4	MDI0- (Passive $V_{PSE+}$ )	8	MDI1- (Negative $V_{PSE-}$ )
ACT	Activity link LED (Orange) OFF: No link Blinking: Link established; data activity detected		
PoE	PoE LED Green: PoE power activity LED Blinking: over power budget		



**Note:** If PoE power supply exceeds power budget, the PoE LED will start blinking.

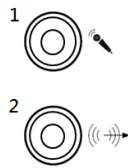
### 3.3.5 USB 3.0 Connector

The Universal Serial Bus connectors are compliant with USB 3.0 (5 GB/s), ideal for connecting USB peripherals such as scanners, cameras and other USB devices. Pin assignment follows **USB Implementers Forum, Inc.**

### 3.3.6 Audio Connector

These two 3.5mm audio jacks are ideal for connecting **TRS** stereo plugs for Audio Mic-In and Audio Line-out.

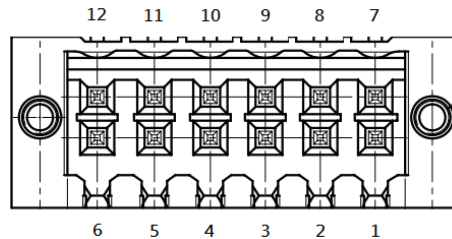
Pins	Signals
1	Microphone In
2	Line Out



### 3.3.7 Digital I/O

The UST510-52B-FL supports 6bit DI and 2bit DO with 2KV optical isolation

Pins	Signals	Pins	Signals
1	COM+	7	IN 0
2	OUT0	8	IN 1
3	OUT1	9	IN 2
4	COM-	10	IN 3
5	DIO_GND	11	IN 4
6	Ext Power	12	IN 5



**Note:** Please refer to Appendix B for more information about Digital I/O

### 3.3.8 SATA Connector (SATA 1~4)

These Serial Advanced Technology Attachment (Serial ATA or SATA) connectors support high-speed SATA interfaces. They are computer bus interfaces for connecting to devices such as hard disk drives. This board has two **SATA 3.0** ports with 6Gb/s performance. Pin definition follows **Serial ATA International Organization**.

### 3.3.9 SATA Power Connector

The table shows all SATA power connectors pin out:

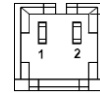
Pin s	Signals
1	+5V level
2	GND



### 3.3.10 Remote Switch Connector (CN9)

With the Flexible IO kit installed, a remote switch can be added to the position of the flexible IO window. ( Please contact AXIOMTEK for inquiries.)

Pins	Signals	Description
1	Short (1-2)	Low Active. Acts as PC's power button when an external switch is installed (Pin1 active). **The internal pull up resistor does not connect to any power source.
2	GND	Ground



### 3.3.11 SIM Card Slots (S1~S2)

The UST510-52B-FL includes two SIM slots on the front side of the system. It is mainly used for 3G/4G/LTE wireless network applications on CN12 and CN15. PIN definition follows ISO/IEC 7810:2003, ID-000.

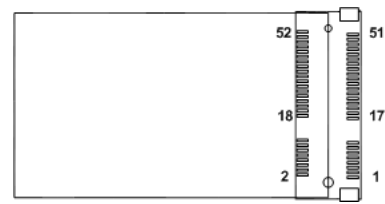
### 3.3.12 PCI Express Mini Card Slot

#### Full-Size (CN15)

The UST510-52B-FL supports full-size PCI-Express Mini Card slots. CN15 supports **PCI-Express or SATA (mSATA) via BIOS selection and USB signals**; PCI-Express complies with PCI-Express Mini Card Spec. V1.2. Thus, users can install a mSATA or WLAN/WWAN card into this slot. Please refer to the SATA of BIOS setting to enable or disable mSATA support.

#### CN15

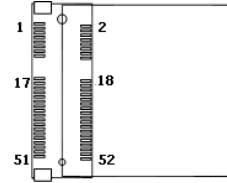
Pins	Signals	Pin	Signals
1	WAKE#	2	+3.3VSB
3	No use	4	GND
5	No use	6	+1.5V
7	CLKREQ#	8	No use
9	GND	10	No use
11	REFCLK-	12	No use
13	REFCLK+	14	No use
15	GND	16	No use
17	No use	18	GND
19	No use	20	W_DISABLE#
21	GND	22	PERST#
23	PE_RXN3/mSATA	24	+3.3VSB
25	PE_RXP3/mSATA	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PE_TXN3/ mSATA	32	SMB_DATA
33	PE_TXP3/ mSATA	34	GND
35	GND	36	USB_D8-
37	GND	38	USB_D8+
39	+3.3VSB	40	GND
41	+3.3VSB	42	No use
43	GND	44	No use
45	No use	46	No use
47	No use	48	+1.5V
49	No use	50	GND
51	No use	52	+3.3VSB



**Half-Size (CN17)**

CN17 supports **USB2.0** and **SATA (mSATA)** signals and complies with **PCI-Express Mini Card Spec. V1.2**. Thus, users can install a mSATA card into this slot.

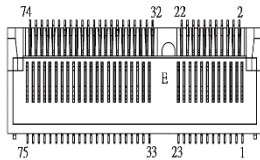
Pins	Signals	Pins	Signals
51	NC	52	+3.3Vaux
49	NC	50	GND
47	NC	48	+1.5V
45	NC	46	NC
43	GND	44	NC
41	+3.3Vaux	42	NC
39	+3.3Vaux	40	GND
37	GND	38	USB_D+
35	GND	36	USB_D-
33	mSATA_Tp	34	GND
31	mSATA_Tn	32	SMB_DATA
29	GND	30	SMB_CLK
27	GND	28	+1.5V
25	mSATA_Rn	26	GND
23	mSATA_Rp	24	+3.3Vaux
21	GND	22	PERST#
19	NC	20	W_DISABLE#
17	NC	18	GND
Mechanical Key			
15	GND	16	NC
13	REFCLK+	14	NC
11	REFCLK-	12	NC
9	GND	10	NC
7	NC	8	NC
5	NC	6	1.5V
3	NC	4	GND
1	WAKE#	2	3.3Vaux



### 3.3.13 M.2 Key E Connector (CN18)

The system comes with one M.2 Key E connector (Wi-Fi & Bluetooth)

Pins	Signals	Pins	Signals
2	+3.3V	1	GND
4	+3.3V	3	USB#14_D+
6	N/C	5	USB#14_D-
8	N/C	7	GND
10	PCM_CRF_RST[*]	9	CNV_WR_1_DN[*]
12	N/C	11	CNV_WR_1_DP[*]
14	PCMOUT_CLKREQ0[*]	13	GND
16	N/C	15	CNV_WR_0_DN[*]
18	GND	17	CNV_WR_0_DP[*]
20	UART_BT_WAKE[*]	19	GND
22	CNV_BRI_RSP[*]	21	CNV_WR_CLK_DN[*]
		23	CNV_WR_CLK_DP[*]
32	CNV_RGI_DT[*]		
34	CNV_RGI_RSP[*]	33	GND
36	CNV_BRI_DT[*]	35	PCIE12_TX_DP[*]
38	CL_RST[*]	37	PCIE12_TX_DN
40	CL_DATA[*]	39	GND
42	CL_CLK[*]	41	PCIE12_RX_DP
44	CNV_PA_BLANKING[*]	43	PCIE12_RX_DN
46	CNV_MFUART2_TXD[*]	45	GND
48	CNV_MFUART2_RXD[*]	47	CLKOUT_PCIE_P3
50	PCH_SUSCLK	49	CLKOUT_PCIE_N3
52	BUF_PLT_RST	51	GND
54	BT_KILL1	53	NGFF_CLKREQ3
56	WLAN_KILL1	55	PCH_WAKE
58	N/C	57	GND
60	N/C	59	CNV_WT_1_DN[*]
62	N/C	61	CNV_WT_1_DP[*]
64	M2_REFCLK	63	GND
66	N/C	65	CNV_WT_0_DN[*]
68	N/C	67	CNV_WT_0_DP[*]
70	N/C	69	GND
72	+3.3V	71	CNV_WT_CLK_DN[*]
74	+3.3V	73	CNV_WT_CLK_DP[*]
		75	GND

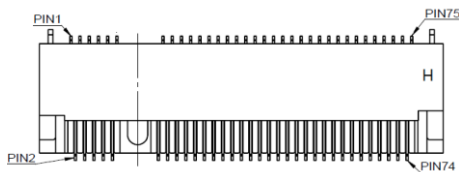




### 3.3.14 M.2 3050/3052 Key B (CN14)

The system comes with one M.2 Key B connector (LTE & SIM).

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	CONFIG_3	2	+3.3V	3	GND	4	+3.3V
5	GND	6	Full Card PWR OFF	7	USB_D+	8	W_DISABLE1#
9	USB_D-	10	GPIO_9	11	GND	12	Key B
13	Key B	14	Key B	15	Key B	16	Key B
17	Key B	18	Key B	19	Key B	20	GPIO_5
21	CONFIG_0	22	GPIO_6	23	GPIO_11	24	GPIO_7
25	DPR	26	GPIO_10	27	GND	28	GPIO_8
29	USB3.1-Tx-	30	UIM-RESET	31	USB3.1-Tx+	32	UIM-CLK (O)
33	GND	34	UIM-DATA (I/O)	35	USB3.1-Rx-	36	UIM-PWR (O)
37	USB3.1-Rx+	38	NC	39	GND	40	GPIO_0
41	PERn0	42	GPIO_1	43	PERp0	44	GPIO_2
45	GND	46	GPIO_3	47	PETn0	48	GPIO_4
49	PETp0	50	PERST#	51	GND	52	CLKREQ#
53	REFCLKn	54	PEWAKE#	55	REFCLKp	56	NC
57	GND	58	NC	59	ANTCTL0	60	COEX3
61	ANTCTL1	62	COEX_RXD	63	ANTCTL2	64	COEX_TXD
65	ANTCTL3	66	SIM_DETECT	67	RESET# (I)(0/1.8V)	68	SUSCLK
69	CONFIG_1	70	+3.3V	71	GND	72	+3.3V
73	GND	74	+3.3V	75	CONFIG_2		



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## SECTION 4 BIOS SETUP UTILITY

This section provides users with detailed descriptions in terms of how to set up basic system configurations through the BIOS setup utility.

### 4.1 Starting

To enter the setup screens, follow the steps below:

1. Turn on the computer and press the <Del> key immediately.
2. After pressing the <Del> key, the main BIOS setup menu displays. Users can access other setup screens, such as the Advanced and Chipset menus, from the main BIOS setup menu.

It is strongly recommended that users should avoid changing the chipset's defaults. Both AMI and system manufacturers have carefully set up these defaults to provide the best performance and reliability.

## 4.2 Navigation Keys

The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process. These keys include <F1>, <F2>, <Enter>, <ESC>, <Arrow> keys, and so on.



**Note:** Some of the navigation keys differ from one screen to another.

Hot Keys	Descriptions
←→ Left/Right	The Left and Right <Arrow> keys allow users to select a setup screen.
↑↓ Up/Down	The Up and Down <Arrow> keys allow users to select a setup screen or sub-screen.
+– Plus/Minus	The Plus and Minus <Arrow> keys allow users to change the field value of a particular setup item.
Tab	The <Tab> key allows users to select setup fields.
F1	The <F1> key allows users to display the General Help screen.
F2	The <F2> key allows users to Load Previous Values.
F3	The <F3> key allows users to Load Optimized Defaults.
F4	The <F4> key allows users to save any changes they made and exit the Setup. Press the <F4> key to save any changes.
Esc	The <Esc> key allows users to discard any changes they made and exit the Setup. Press the <Esc> key to exit the setup without saving any changes.
Enter	The <Enter> key allows users to display or change the setup option listed for a particular setup item. The <Enter> key can also allow users to display the setup sub-screens.

## 4.3 Main Menu

The Main Menu screen is the first screen users see when entering the setup utility. Users can always return to the Main setup screen by selecting the Main tab. System Time/Date can be set up as described below. The Main BIOS setup screen is also shown below.



### BIOS Information

Display the auto-detected BIOS information.

### System Date/Time

Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

### Access Level

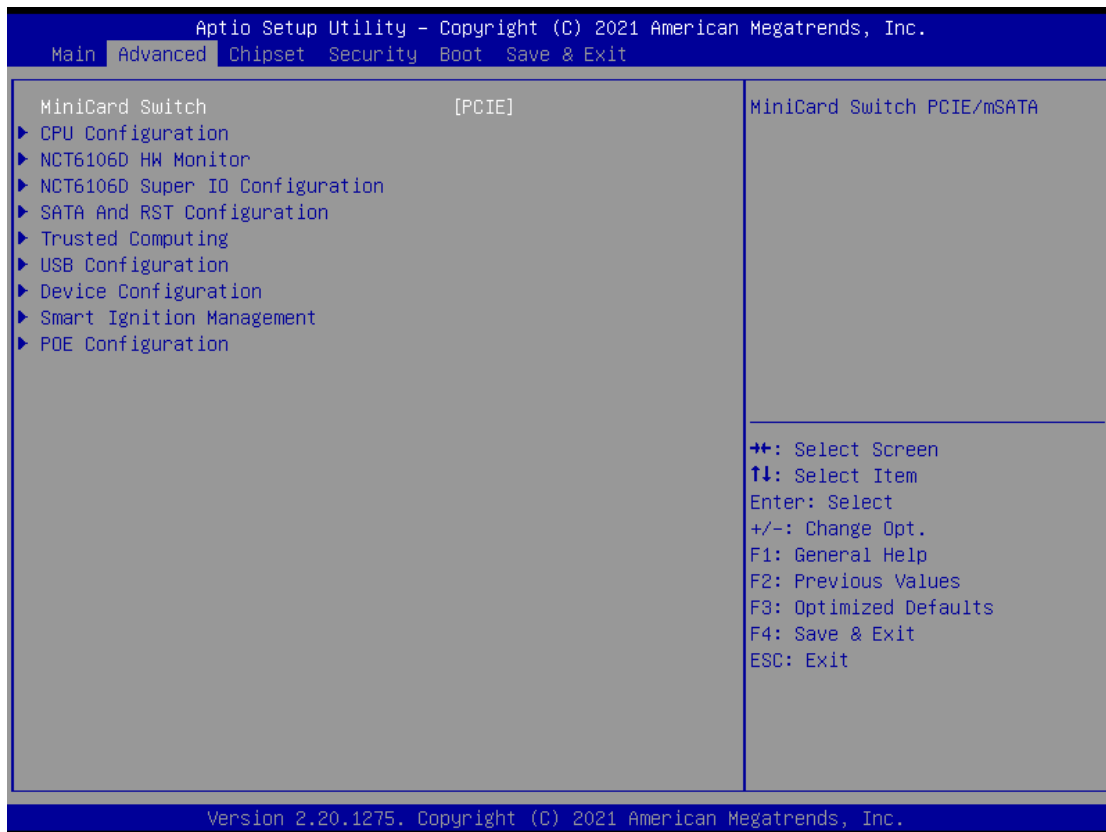
Display the access level of the current user.

## 4.4 Advanced Menu

The Advanced menu also allows users to set configuration of the CPU and other system devices. Users can select any items in the left frame of the screen to go to sub menus:

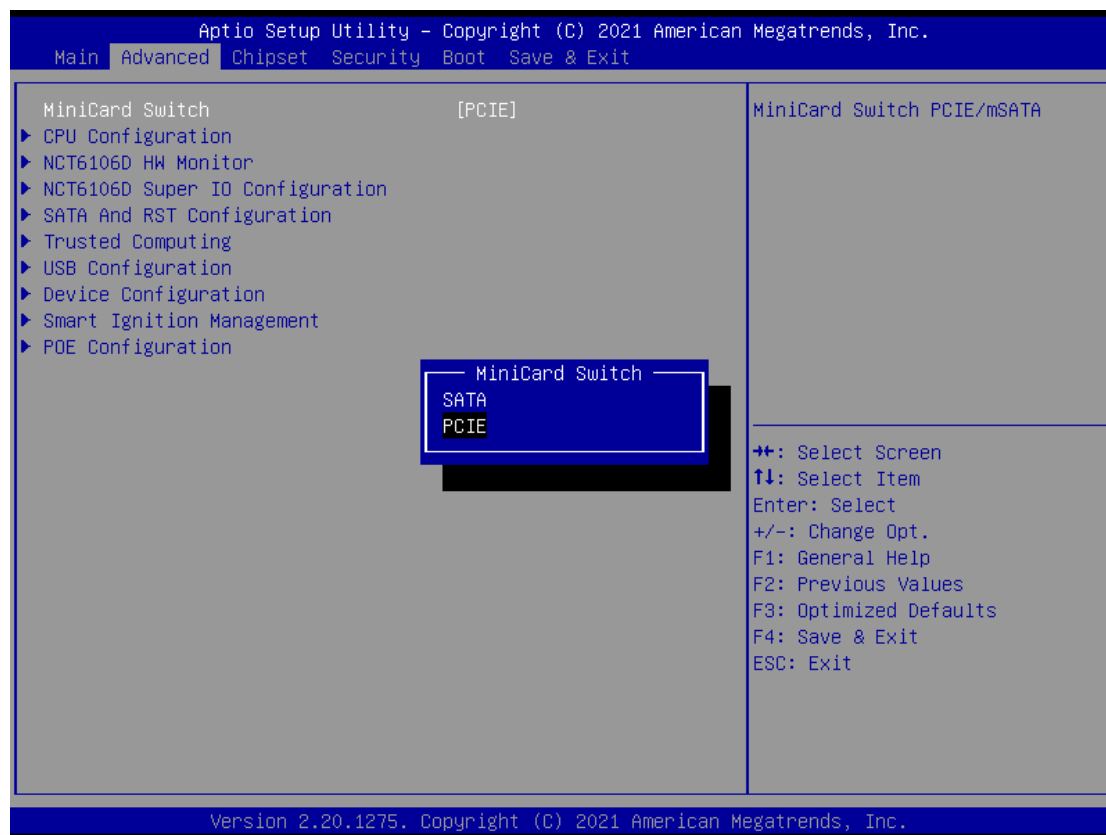
- MiniCard Switch
- ▶ CPU Configuration
- ▶ NCT6106D HW Monitor
- ▶ NCT6106D Super IO Configuration
- ▶ SATA And RST Configuration
- ▶ Trusted Computing
- ▶ USB Configuration
- ▶ Device Configuration
- ▶ Smart Ignition Management
- ▶ PoE Configuration

For items marked with “▶”, please press <Enter> for more options.



## Mini Card switch

Use this to select Mini Card setting, default is "PCIE".



## CPU Configuration

This screen shows the CPU version and its detailed information.

CPU Configuration		When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Type	Intel(R) Core(TM) i5-8500T CPU @ 2.10GHz	
ID	0x906EA	
Microcode Revision	B4	
Speed	2100 MHz	
L1 Data Cache	32 KB x 6	
L1 Instruction Cache	32 KB x 6	
L2 Cache	256 KB x 6	
L3 Cache	9 MB	
L4 Cache	N/A	
VMX	Supported	
SMX/TXT	Supported	++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Intel (VMX) Virtualization Technology	[Enabled]	

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### Intel Virtualization Technology

It allows a hardware platform to run multiple operating systems separately and simultaneously, enabling one system to virtually function as several systems.

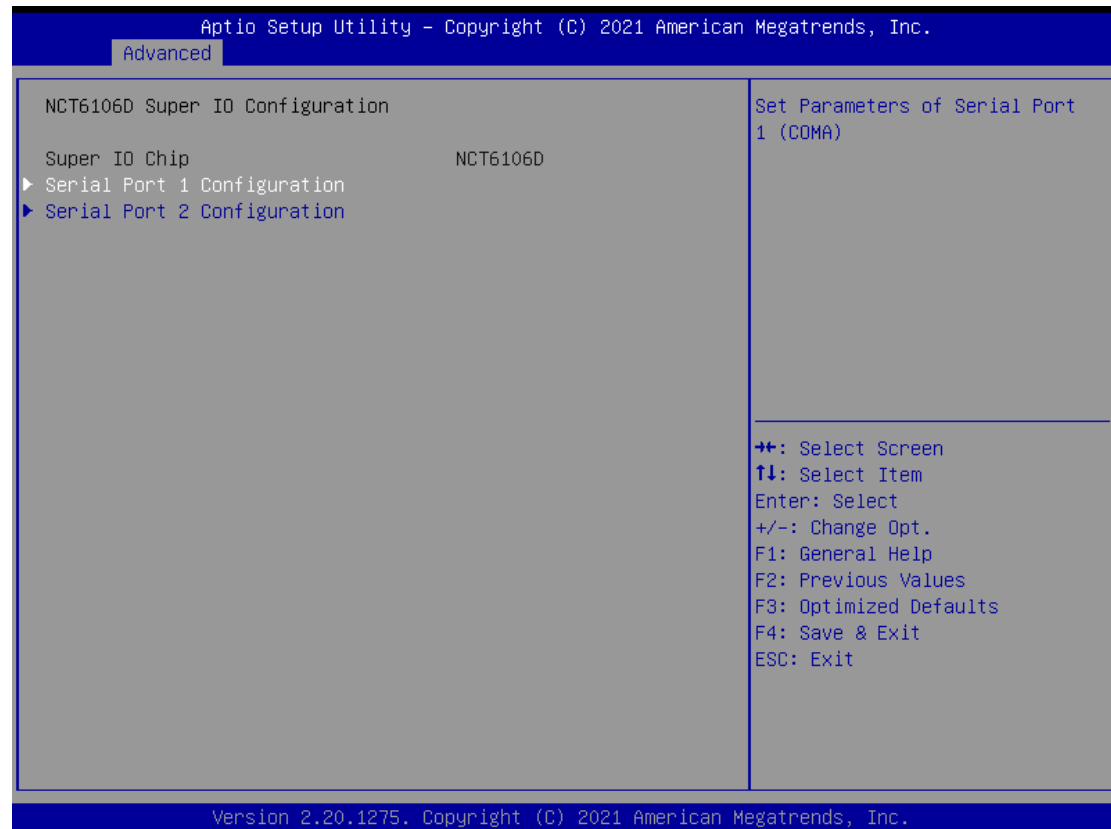


## NCT6106D Super IO Configuration

In this screen user can select options for the NCT6106D Super IO Configurations and change the value of the selected option. A description of the selected item appears on the right side of the screen. For items marked with “▶”, press <Enter> for more options

The default setting for all Serial Ports is RS232.

You can change the setting by selecting the value you want in each COM Port Type. The system also supports RS422 & RS485 mode.



## Serial Port 1~2 (COM1~2) Configurations

Use these items to set parameters related to serial ports 1~2.

### Serial Port 1 & 2 Configuration

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Advanced

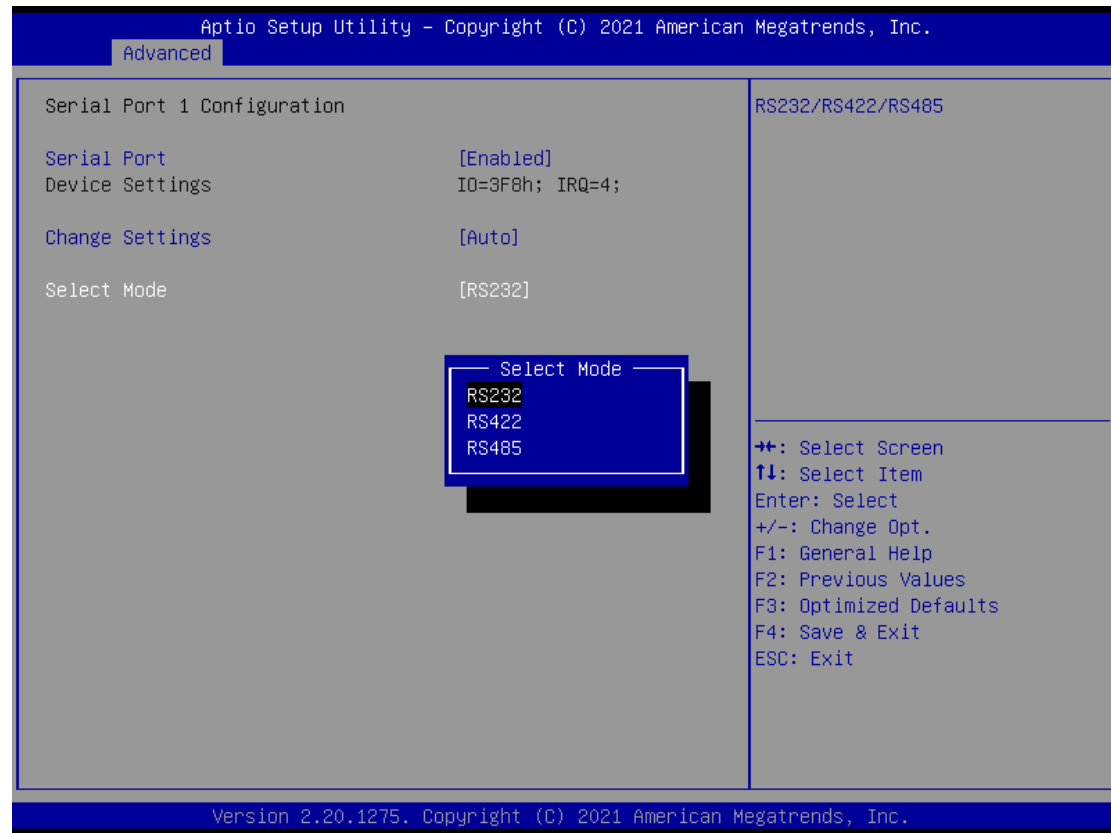
Serial Port 1 Configuration		Enable or Disable Serial Port (COM)
Serial Port	[Enabled]	
Device Settings	IO=3F8h; IRQ=4;	
Change Settings	[Auto]	
Select Mode	[RS232]	

++: Select Screen  
↑↓: Select Item  
Enter: Select  
+/-: Change Opt.  
F1: General Help  
F2: Previous Values  
F3: Optimized Defaults  
F4: Save & Exit  
ESC: Exit

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**Select Mode**

Use this option to set RS-232/RS-422/RS-485 mode.



### NCT6106D Hardware Monitor

This screen displays the temperatures of the system and CPU and system voltages (VCORE, +3.3V, +12V and +5V).

The screenshot shows the BIOS Hardware Monitor screen. At the top, it says "Aptio Setup Utility - Copyright (C) 2021 American Megatrends, Inc." and "Advanced". The main area is titled "Pc Health Status" and displays the following data:

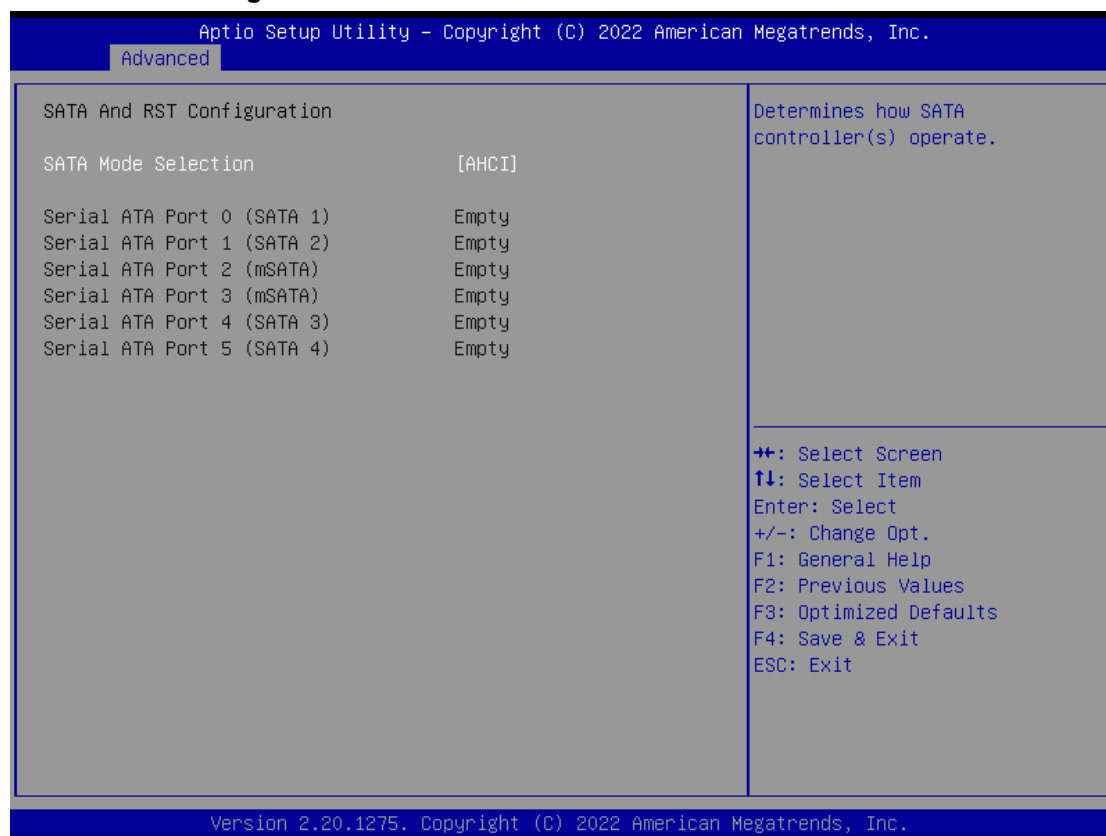
CPU	: +58 °C
SYSTEM	: +31 °C
+3.3V	: +3.328 V
+5V	: +5.056 V
+3.3VSB	: +3.328 V
+5VSB	: +5.056 V
VBAT	: +2.864 V

Below the data, there is a legend for navigation:

- ←→: Select Screen
- ↑↓: Select Item
- Enter: Select
- +/-: Change Opt.
- F1: General Help
- F2: Previous Values
- F3: Optimized Defaults
- F4: Save & Exit
- ESC: Exit

At the bottom, it says "Version 2.20.1275. Copyright (C) 2021 American Megatrends, Inc."

## SATA & RST Configuration



### SATA Mode Selection

AHCI (Advanced Host Controller Interface) mode is how SATA controller(s) operate.

### Serial ATA Port 0~5

It shows the device installed in connector SATA0~5.

## Trusted Computing

This screen provides function for specifying the TPM settings.



### Security Device Support

Enable or disable BIOS support for security device. OS will not show security device. TCG EFI protocol and INT1A interface will not be available.

### SHA256 PCR Bank

Enable or Disable SHA256 PCR Bank.

### SHA384 PCR Bank

Enable or Disable SHA384 PCR Bank.

### Pending operation

Schedule an Operation for the Security Device.



**NOTE: Your computer will reboot during restart to change State of security Device.**

### Platform Hierarchy

Enable or Disable Platform Hierarchy.

### Storage Hierarchy

Enable or Disable Storage Hierarchy.

### Endorsement Hierarchy

Enable or Disable Endorsement Hierarchy.

### Physical Presence Spec Version

Select to Tell O.S. to support PPI Spec Version 1.2 or 1.3.



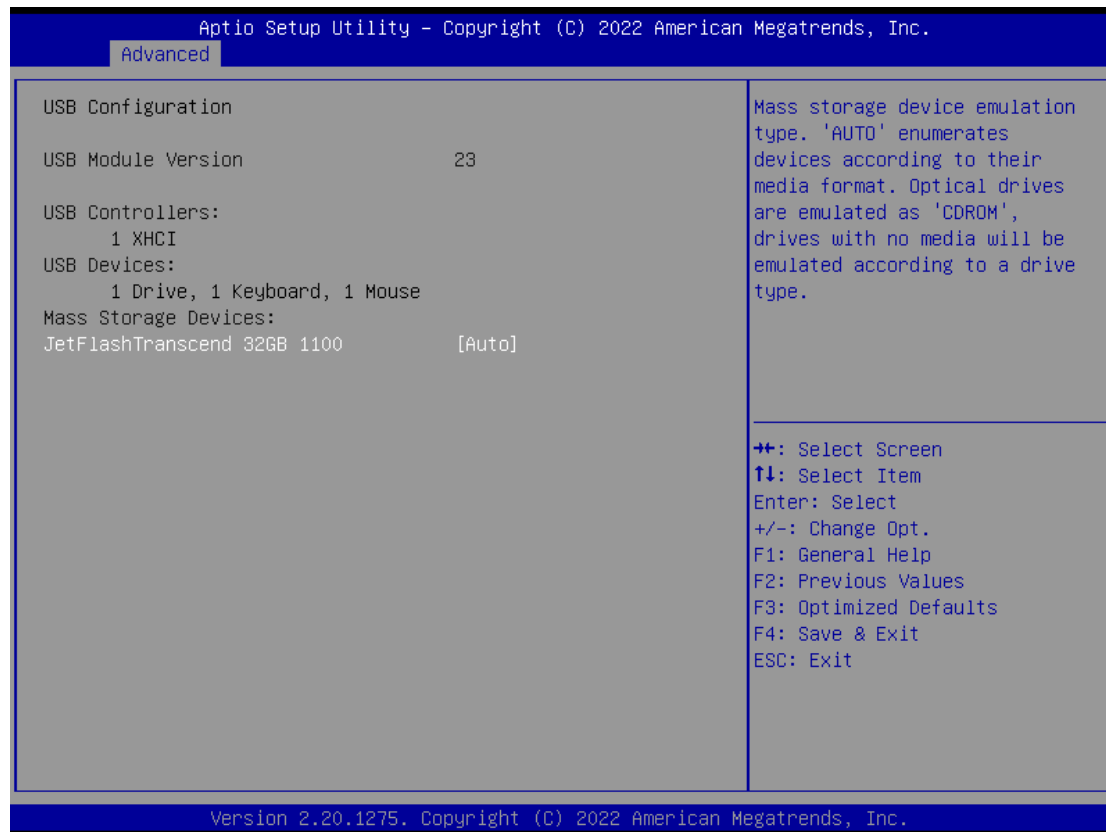
**Note: Some HCK tests might not support 1.3.**

### Device Select

TPM 1.2 will limit the support to TPM 1.2 devices, TPM 2.0 will limit the support to TPM 2.0 devices. Auto will support both with the default set to TPM 2.0 devices if not found, TPM 1.2 devices will be enumerated.

## USB Configuration

This screen specifies USB settings.



## USB Devices

Display all detected USB devices.



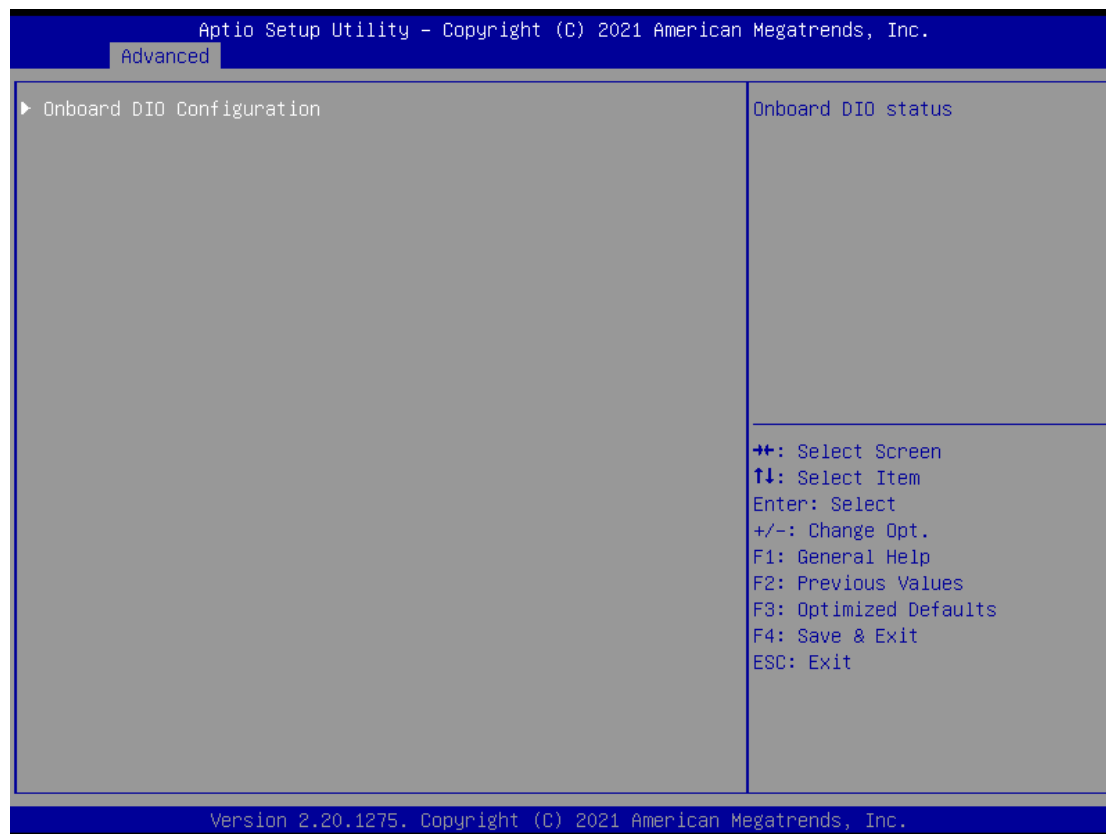
## Device Configuration

The DIO Modification default setting is “disable”.

If the setting is changed to “enable”, you can load manufacture default and program DIO setting.

(Please refer to below graphics.)





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Advanced

<p>DIO status</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 30%;">1. Input/Output Status</td><td style="width: 30%;">Out &amp; High</td></tr> <tr><td>2. Input/Output Status</td><td>Out &amp; High</td></tr> <tr><td>3. Input/Output Status</td><td>In &amp; High</td></tr> <tr><td>4. Input/Output Status</td><td>In &amp; High</td></tr> <tr><td>5. Input/Output Status</td><td>In &amp; High</td></tr> <tr><td>6. Input/Output Status</td><td>In &amp; High</td></tr> <tr><td>7. Input/Output Status</td><td>In &amp; High</td></tr> <tr><td>8. Input/Output Status</td><td>In &amp; High</td></tr> </table>	1. Input/Output Status	Out & High	2. Input/Output Status	Out & High	3. Input/Output Status	In & High	4. Input/Output Status	In & High	5. Input/Output Status	In & High	6. Input/Output Status	In & High	7. Input/Output Status	In & High	8. Input/Output Status	In & High	<hr/> <p>             ++: Select Screen              ↑↓: Select Item              Enter: Select              +/-: Change Opt.              F1: General Help              F2: Previous Values              F3: Optimized Defaults              F4: Save &amp; Exit              ESC: Exit         </p>
1. Input/Output Status	Out & High																
2. Input/Output Status	Out & High																
3. Input/Output Status	In & High																
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7. Input/Output Status	In & High																
8. Input/Output Status	In & High																

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Aptio Setup Utility - Copyright (C) 2021 American Megatrends, Inc.

Advanced

<p>DIO status</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 30%;">1. Input/Output Status</td><td style="width: 30%;">Out &amp; Low</td></tr> <tr><td style="padding-left: 20px;">Input/Output Setting</td><td>[Output]</td></tr> <tr><td style="padding-left: 20px;">High/Low Setting</td><td>[Low]</td></tr> <tr><td>2. Input/Output Status</td><td>Out &amp; Low</td></tr> <tr><td style="padding-left: 20px;">Input/Output Setting</td><td>[Output]</td></tr> <tr><td style="padding-left: 20px;">High/Low Setting</td><td>[Low]</td></tr> <tr><td>3. Input/Output Status</td><td>In &amp; High</td></tr> <tr><td style="padding-left: 20px;">Input/Output Setting</td><td>[Input]</td></tr> <tr><td>4. Input/Output Status</td><td>In &amp; High</td></tr> <tr><td style="padding-left: 20px;">Input/Output Setting</td><td>[Input]</td></tr> <tr><td>5. Input/Output Status</td><td>In &amp; High</td></tr> <tr><td style="padding-left: 20px;">Input/Output Setting</td><td>[Input]</td></tr> <tr><td>6. Input/Output Status</td><td>In &amp; High</td></tr> <tr><td style="padding-left: 20px;">Input/Output Setting</td><td>[Input]</td></tr> <tr><td>7. Input/Output Status</td><td>In &amp; High</td></tr> <tr><td style="padding-left: 20px;">Input/Output Setting</td><td>[Input]</td></tr> <tr><td>8. Input/Output Status</td><td>In &amp; High</td></tr> <tr><td style="padding-left: 20px;">Input/Output Setting</td><td>[Input]</td></tr> </table>	1. Input/Output Status	Out & Low	Input/Output Setting	[Output]	High/Low Setting	[Low]	2. Input/Output Status	Out & Low	Input/Output Setting	[Output]	High/Low Setting	[Low]	3. Input/Output Status	In & High	Input/Output Setting	[Input]	4. Input/Output Status	In & High	Input/Output Setting	[Input]	5. Input/Output Status	In & High	Input/Output Setting	[Input]	6. Input/Output Status	In & High	Input/Output Setting	[Input]	7. Input/Output Status	In & High	Input/Output Setting	[Input]	8. Input/Output Status	In & High	Input/Output Setting	[Input]	<p style="text-align: center;">High/Low Setting</p> <hr/> <p>             ++: Select Screen              ↑↓: Select Item              Enter: Select              +/-: Change Opt.              F1: General Help              F2: Previous Values              F3: Optimized Defaults              F4: Save &amp; Exit              ESC: Exit         </p>
1. Input/Output Status	Out & Low																																				
Input/Output Setting	[Output]																																				
High/Low Setting	[Low]																																				
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Input/Output Setting	[Input]																																				

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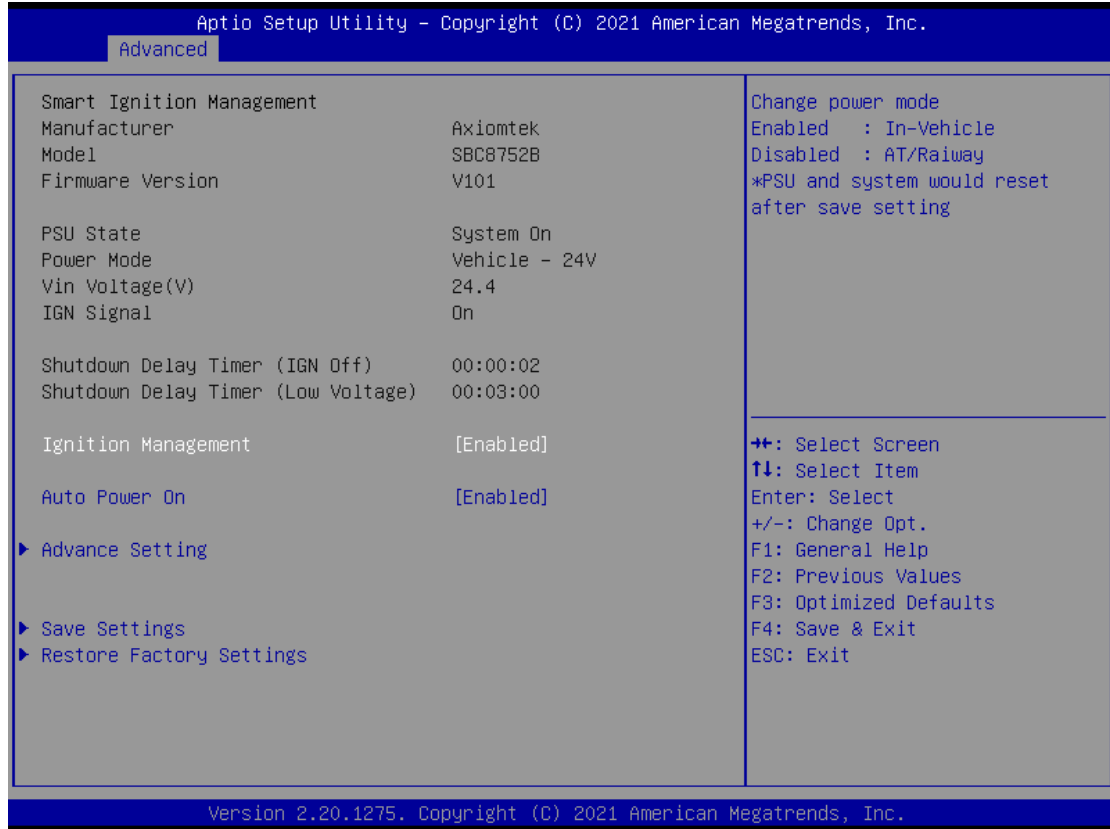
### Smart Ignition Configuration

The Smart Ignition Management setting includes Axiomtek's latest technology in



ignition management. Please read the description below with pictures. *Note: If the user needs to use more in-depth function, please refer to the Smart Ignition technical*

*document.*



BIOS menu item	Description
<b>Ignition Management</b>	<b>Enabled</b>
	Switch to In-Vehicle mode
	<b>Disabled</b>
	Switch to AT/Railway mode
	*PSU and system will reset after setting is saved

<p><b>Auto Power On</b></p>	<p><b>Enabled</b></p> <p>System will turn on automatically under below conditions</p> <ul style="list-style-type: none"> <li>- Manually disconnects and reconnects system power</li> <li>- Power interruption: Resumes power after power fail</li> </ul> <p><b>Disabled</b></p> <p>System will not turn on automatically when power is connected or when power resumes from a power failure</p>
<p><b>Advance Setting</b></p>	<p>Set system on/off timing and voltage threshold levels</p>
<p><b>Save Settings</b></p>	<p>Save the current settings to PSU</p>
<p><b>Restore Factory Settings</b></p>	<p>Restores factory defaults to remove any incorrect or corrupt settings that might have prevented the system from properly powering on/off.</p>

```

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  Advanced
===== Voltage =====
Activate Voltage Trigger(V)      [20.0V]
Low Voltage Trigger(V)          [18.0V]

Shutdown Delay Timer (Low Voltage)
Minuium Timer                   00:01:00
Maximum Timer                   03:00:00
Hour                            0
Minute                          3
Second                          0
===== IGN Function =====
IGN Trigger                      [Enabled]

System Turn On Delay Timer(IGN On)
Minuium Timer                   00:00:02
Maximum Timer                   00:30:00
Hour                            0
Minute                          0
Second                          2

Shutdown Delay Timer (IGN Off)
Minuium Timer                   00:00:01
Maximum Timer                   06:00:00
Hour                            0
Minute                          0
Second                          2

The system only turns on when the power source delivers the voltage above the value you set

++: Select Screen
t↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

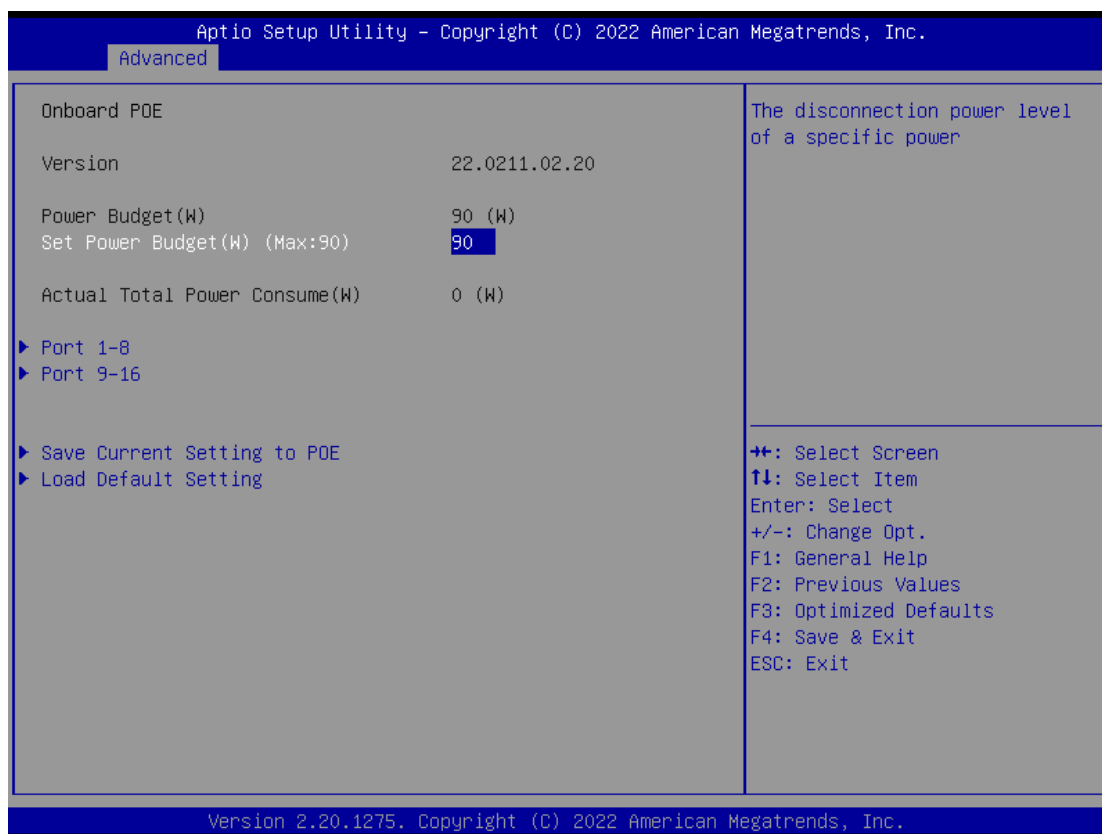
Version 2.20.1275. Copyright (C) 2021 American Megatrends, Inc.
  
```

BIOS menu item	Description
<b>Activate Voltage Trigger</b>	The system only turns on when the voltage delivered by the power source is higher than the value you set here.
<b>Low Voltage Trigger</b>	The system will begin countdown stage once voltage drops below the value you set here.  If the power source voltage does not come back above the value of [Activate Voltage Trigger] within the time you set for [Shutdown Delay Time (Low Voltage)], the system will shut down and remain off.
<b>Shutdown Delay Timer (Low Voltage)</b>	The counter will be activated once power source voltage drops below the value defined in [Low Voltage Trigger]. The system will be forced to turn off once timer completes countdown.
<b>IGN Trigger</b>	<b>Enable</b>  IGN signal will trigger [System Turn On Delay] and [Shutdown Delay].  <b>Disable</b>  IGN signal will not affect any power management.
<b>System Turn On Delay Timer (IGN On)</b>	When receiving the IGN signal, the system will be turned on after setup time is counted down.  The counter will be reset if IGN is off and on during the system countdown time.
<b>Shutdown Delay Timer (IGN Off)</b>	When the system is on, IGN voltage goes off, and the system will be gracefully shut down by the operating system after being triggered by the setup timer signal within the time you set.  Additionally, if power source voltage is lower than the setup value it will cause the system to turn off as well.

### POE Configuration

Power over Ethernet (PoE) describes any of several standard or ad-hoc systems which pass electric power along with data on twisted pair Ethernet cabling.

This menu allows users to set the power level and enable/disable a specific port.



### Version

It displays PoE Controller FW version.

### Power Budget

It displays current total power budget on all ports.



**Note:** *Please be advised that, when setting up power budget, the power budget must be not lower than the total of Power Device (PD) operating watts and Power Classifications Watts. Otherwise, the system will not provide electricity to the PD. Please request the PD supplier for clear Power Classifications watts values or checking the info in the BIOS.*

### Setting Power Budget

Set disconnection power level for a specific power (Max: 90).

### Actual Total Power Consume

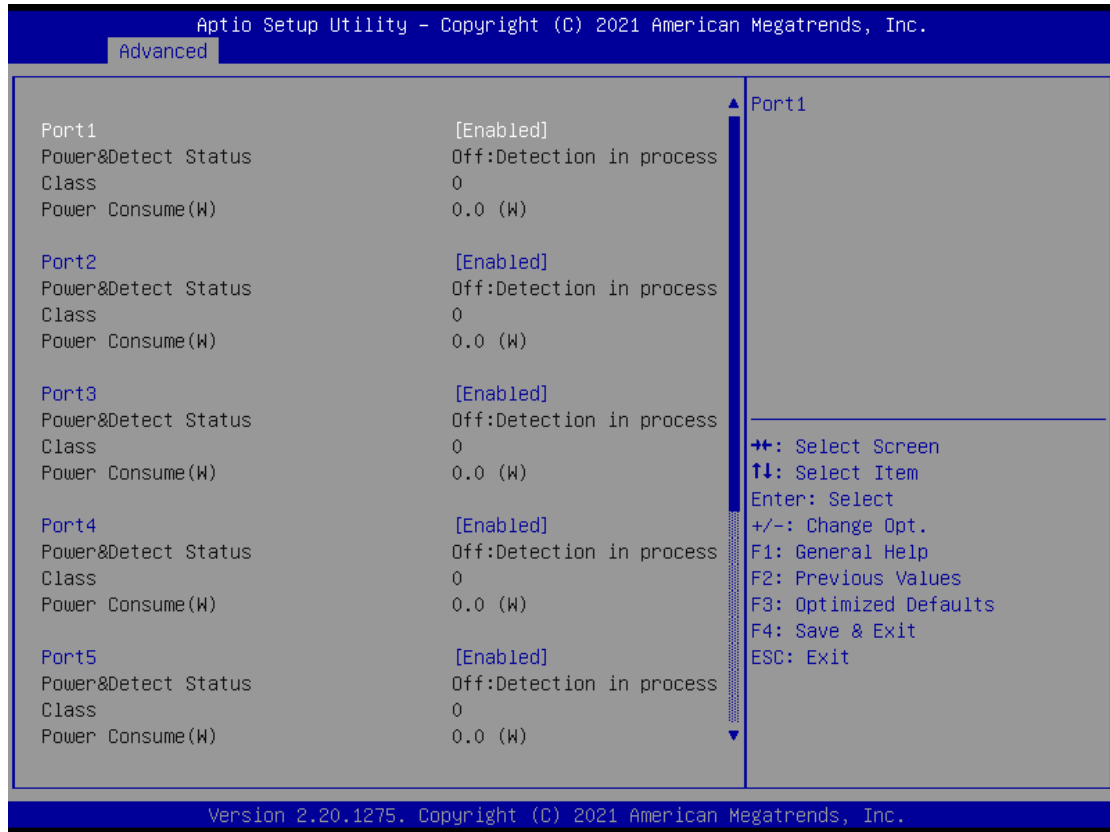
The UST510-52B-FL supplies power to devices according to the actual power usage

### Save Current Setting to POE

Save the current settings from menu into the POE non-volatile memory and these user values become the defaults after any reset.

### Load Default Setting

Restore the default settings and save to POE. Default: Power Budget 90w, all ports enabled.



**Port1~Port16**

Enable/Disable a specific POE port and display all port status.

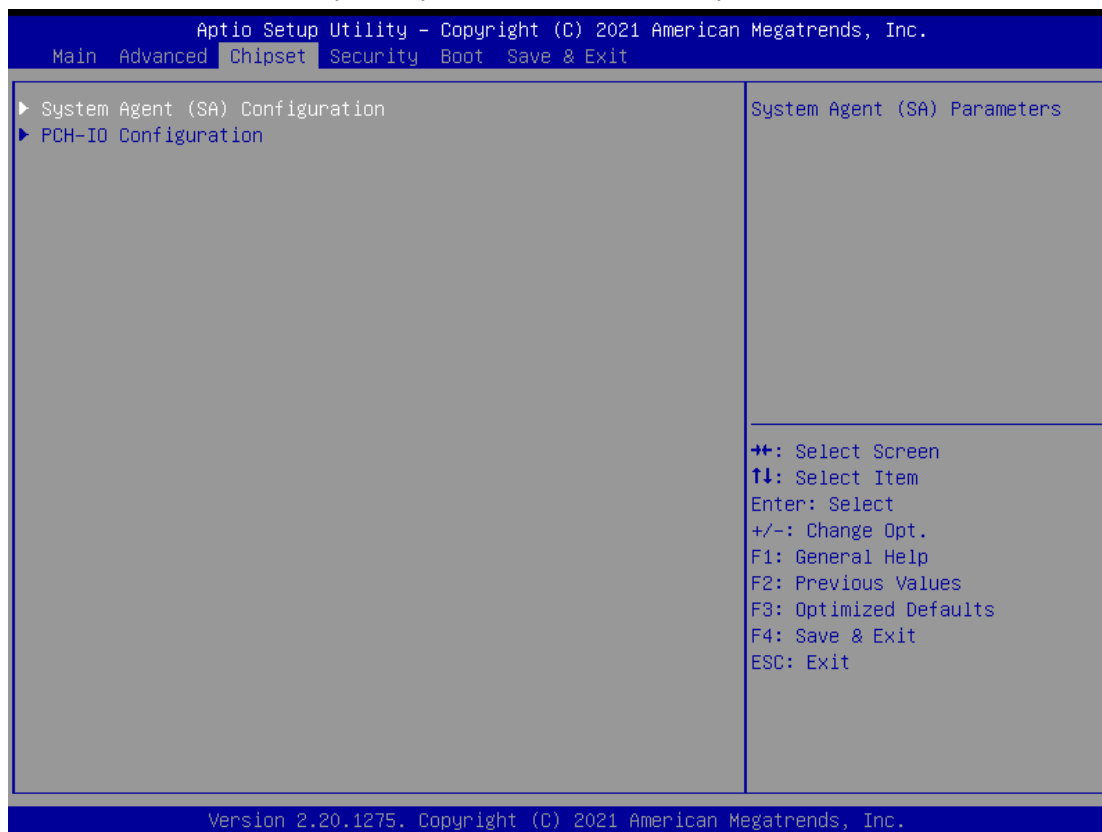


## 4.5 Chipset Menu

The Chipset menu allows users to change the advanced chipset settings. Users can select any of the items in the left frame of the screen to go to the sub menus:

- ▶ System Agent (SA) Configurations
- ▶ PCH-IO Configurations

For items marked with “▶”, please press <Enter> for more options.



## System Agent (SA) Configurations

The screenshot displays the Aptio Setup Utility interface. At the top, a blue header bar contains the text "Aptio Setup Utility - Copyright (C) 2021 American Megatrends, Inc." and a sub-menu "Chipset". The main area is split into two columns. The left column is titled "System Agent (SA) Configuration" and lists "SA PCIe Code Version" as 7.0.104.64, with "Memory Configuration" selected and indicated by a right-pointing arrow. The right column is titled "Memory Configuration Parameters" and is currently empty. A legend at the bottom right of the main area lists navigation keys: F4 for Select Screen, F5 for Select Item, Enter for Select, +/- for Change Opt., F1 for General Help, F2 for Previous Values, F3 for Optimized Defaults, F4 for Save & Exit, and ESC for Exit. A footer bar at the bottom of the screen reads "Version 2.20.1275. Copyright (C) 2021 American Megatrends, Inc."

System Agent (SA) Configuration	Memory Configuration Parameters
SA PCIe Code Version 7.0.104.64 ▶ Memory Configuration	

Legend:

- F4: Select Screen
- F5: Select Item
- Enter: Select
- +/-: Change Opt.
- F1: General Help
- F2: Previous Values
- F3: Optimized Defaults
- F4: Save & Exit
- ESC: Exit

## Memory Configuration

Use this item to refer to the information related to system memory.

This screen shows the system memory information.

The screenshot displays the BIOS 'Chipset' menu with the following memory configuration details:

Parameter	Value
Memory RC Version	0.7.1.110
Memory Frequency	2133 MHz
Total Memory	8192 MB
DIMM#1	Populated & Enabled
Size	8192 MB (DDR4)
DIMM#2	Not Populated / Disabled

Navigation instructions:

- ←→: Select Screen
- ↑↓: Select Item
- Enter: Select
- +/-: Change Opt.
- F1: General Help
- F2: Previous Values
- F3: Optimized Defaults
- F4: Save & Exit
- ESC: Exit

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## PCH-IO Configuration

This screen shows ME Firmware information.

```
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Chipset

PCH-IO Configuration

PCH Information
Name                CNL PCH-H
PCH SKU             C246

ME FW Version       12.0.70.1652
ME Firmware SKU     Corporate SKU

++: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

Version 2.20.1275. Copyright (C) 2021 American Megatrends, Inc.
```

## 4.6 Security



### Administrator Password

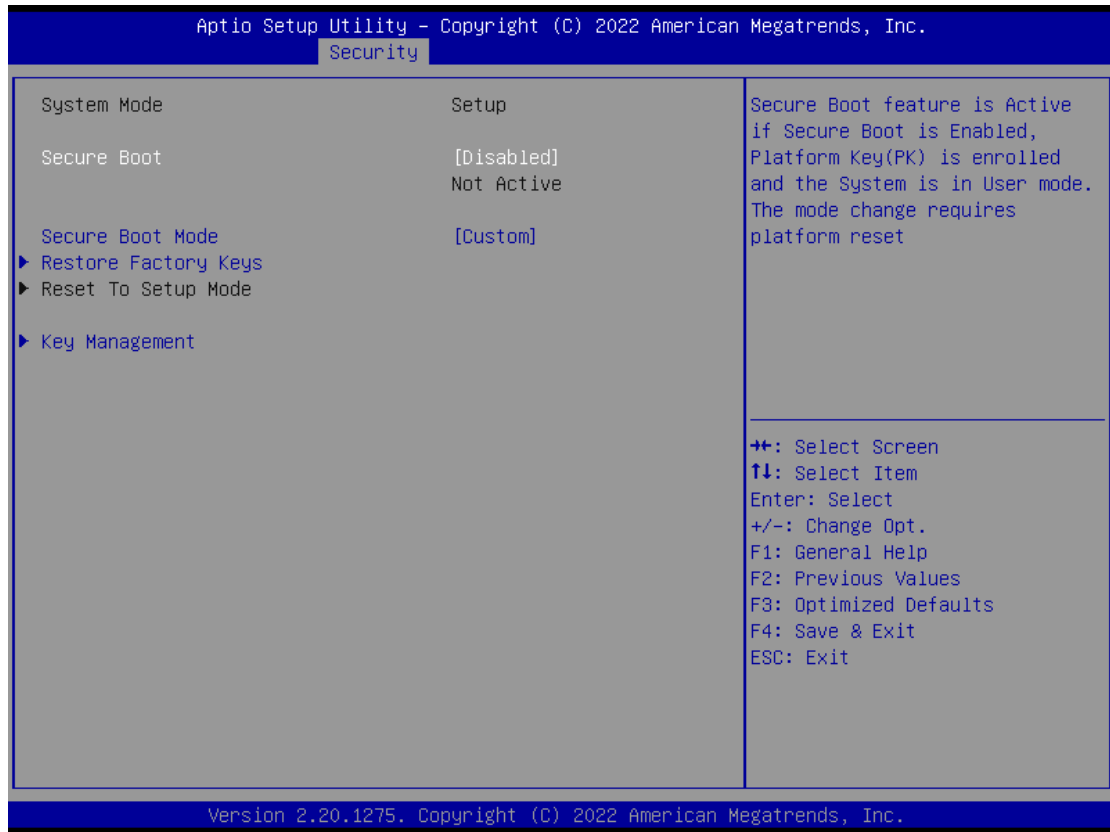
This item indicates whether an administrator password has been set (installed or uninstalled).

### User Password

This item indicates whether a user password has been set (installed or uninstalled).

### Secure Boot

This item allows you to configure the Windows® Secure Boot settings and manage its keys to protect the system from unauthorized access and malwares during POST.



### Secure Boot

This item can Enable or Disable Secure Boot Mode.

### Secure Boot Mode

Use this item to set UEFI Secure Boot Mode to Standard mode or Custom mode. This change is effective after save. After reset, this mode will return to Standard mode.

### Restore Factory Keys

Return to factory default.

### Key Management

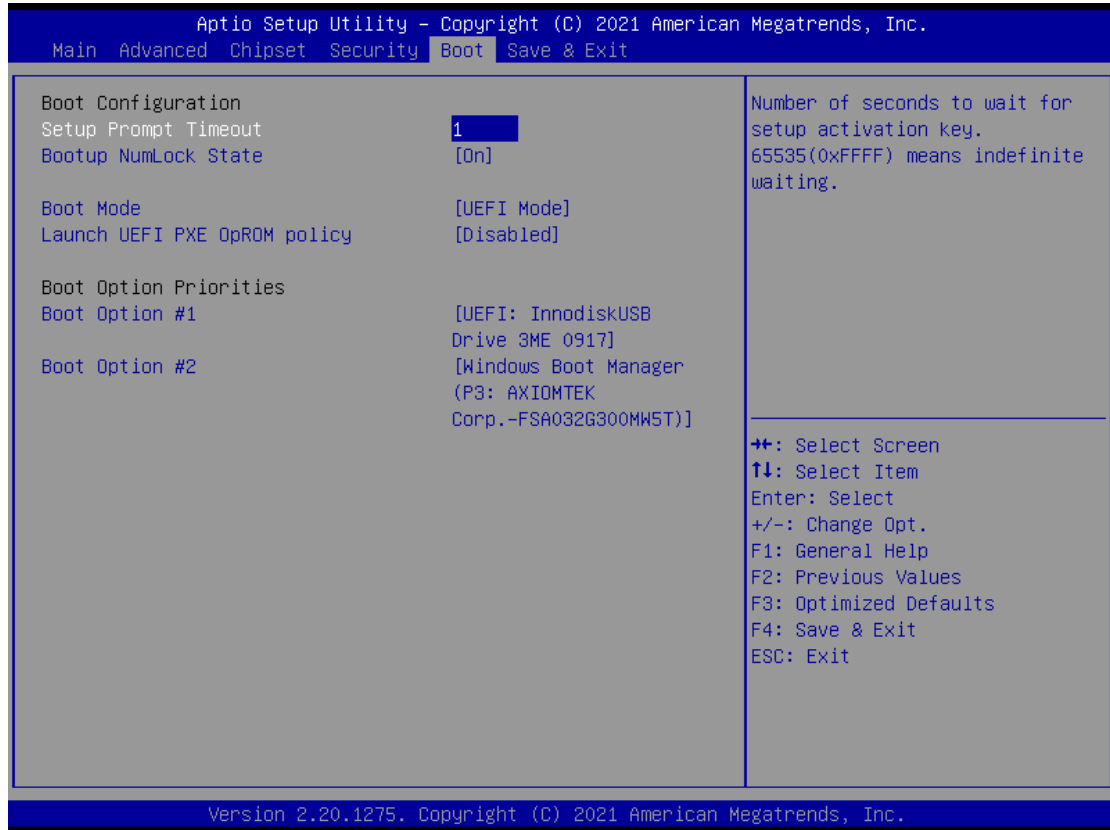
Enables expert users to modify Secure boot policy variables without full authentication.

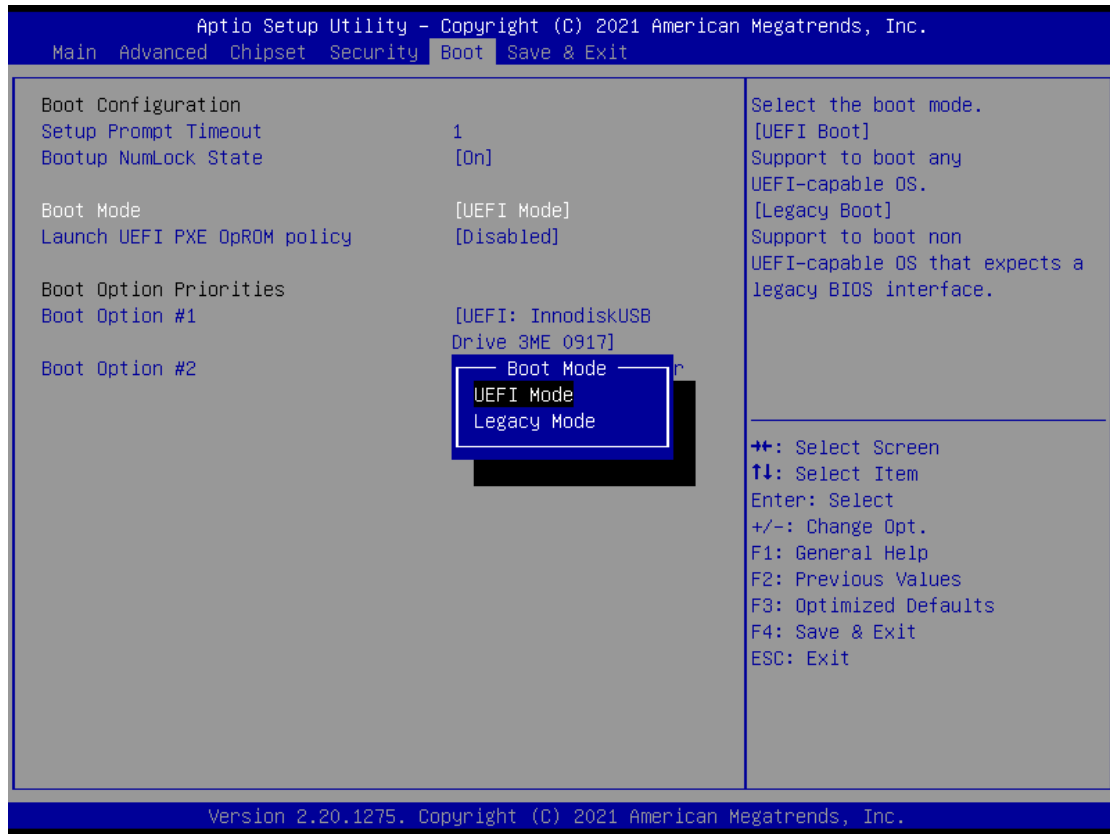
## 4.7 Boot Menu

The Boot menu allows users to change boot options of the system, providing UEFI, Legacy, and Compatible modes to select from.

The default setting boot mode is [UEFI Mode].

(Please refer to below graphics.)





### Setup Prompt Timeout

Use this item to set up number of seconds to wait for setup activation key where 65535(0xFFFF) means indefinite waiting.

### Bootup NumLock State

Use this item to select the power-on state for the keyboard NumLock.

### Boot Option Priorities

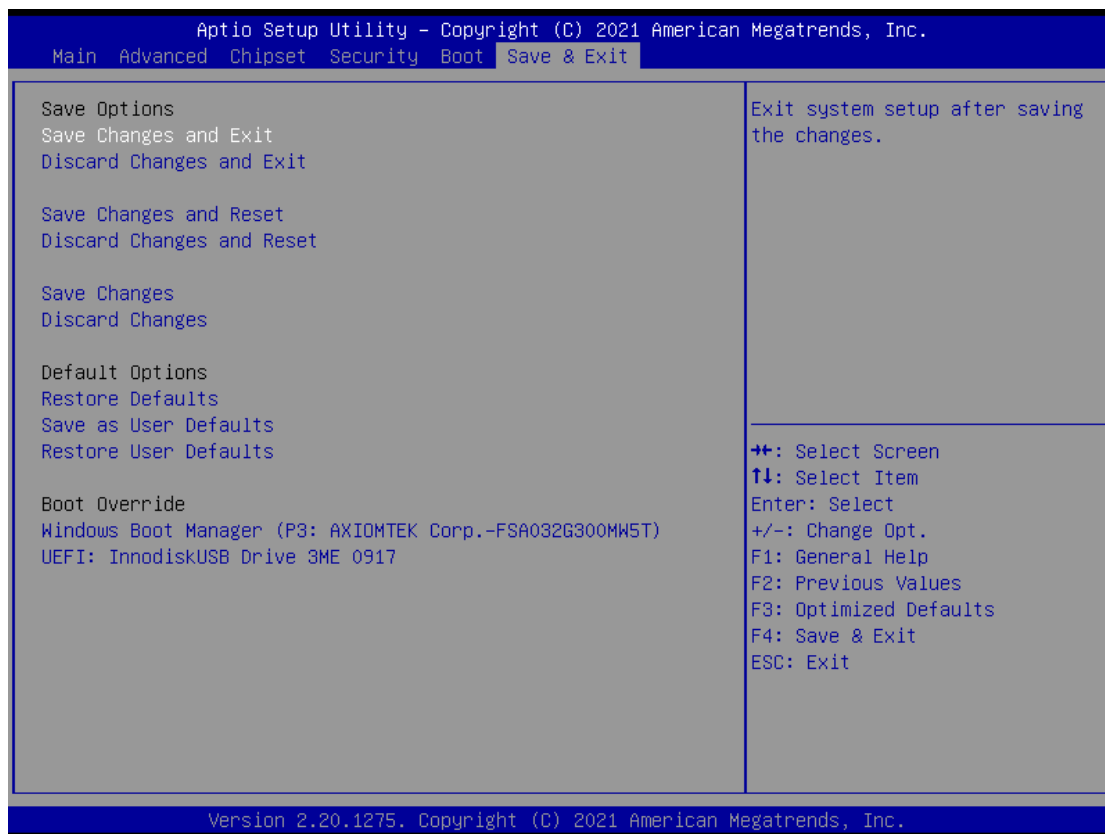
These are settings for boot priority. Specify the boot device priority sequence from the available devices.



## 4.8 Save & Exit Menu

The Save & Exit menu allows users to determine whether or not to accept their modifications to the system configuration, or to keep default values for optimal fail-safe performance.

(Please refer to below graphics.)



BIOS menu item	Description
<b>Save Changes and Exit</b>	When users have completed the system configuration changes, select this option to leave Setup and return to Main Menu. Select Save Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to save changes and exit.
<b>Discard Changes and Exit</b>	Select this option to quit Setup without making any permanent changes to the system configuration and return to Main Menu. Select Discard Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to discard changes and exit.
<b>Save Changes and Reset</b>	After completing the system configuration changes, select this option to leave Setup and reboot the computer so the new system configurations will take effect. Select Save Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to save changes and reset.
<b>Discard Changes and Reset</b>	Select this option to quit Setup without making any permanent changes to the system configuration and reboot the computer. Select Discard Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to discard changes and reset.
<b>Save Changes</b>	After completing the system configuration changes, select this option to save changes. Select Save Changes from the Save & Exit menu and press <Enter>. Select Yes to save changes.
<b>Discard Changes</b>	Select this option to quit Setup without making any permanent changes to the system configuration. Select Discard Changes from the Save & Exit menu and press <Enter>. Select Yes to discard changes.
<b>Restore Defaults</b>	It automatically sets all Setup options to a complete set of default settings when users select this option. Select Restore Defaults from the Save & Exit menu and press <Enter>.
<b>Save as User Defaults</b>	Select this option to save system configuration changes done so far as User Defaults. Select Save as User Defaults from the Save & Exit menu and press <Enter>.
<b>Restore User Defaults</b>	It automatically sets all Setup options to a complete set of User Defaults when users select this option. Select Restore User Defaults from the Save & Exit menu and press <Enter>.
<b>Boot Override</b>	Select a drive to immediately boot that device regardless of the current boot order.

## APPENDIX A WATCHDOG TIMER

### About Watchdog Timer

Software stability is a major issue in most applications. Some embedded systems are not watched by humans for 24 hours. It is usually too slow to wait for someone to reboot when a computer hangs. The system needs to be able to reset automatically when things go wrong. The watchdog timer gives us solutions in this regard.

The watchdog timer is a counter that triggers a system to reset when it counts down to zero from a preset value. The software starts the counter with an initial value and must reset it periodically. If the counter ever reaches zero, it means the software has crashed, the system will reboot.

### How to Use the Watchdog Timer

The user can configure the watchdog timer using the watchdog function included in the AXVIEW 2.0 software developed by Axiomtek or the debug.exe software released by Microsoft.



**NOTE:** The related tool for setting WDT will not be available on the official download page. If you need any tool, please contact Axiomtek's local distributor immediately.

### Sample Program

The sample code below shows how to use DEBUG.exe in DOS mode to configure WDT function.

#### Enable watchdog timer

STEP	Sample code	Note
1. Enter configuration mode	O 2E 87	Un-lock super I/O
	O 2E 87	Un-lock super I/O
2. Select logic device	O 2E 07	Select logic register
	O 2F 08	Switch to WDT device
3. Enable WDT device	O 2E 30	Select register
	O 2F 01	Enable WDT
4. Set time unit	O 2E F0	Select logic register
	O 2F M	M = 08h (Minute) , M = 00h (Second)
5. Set timer	O 2E F1	Select logic register
	O 2F 0A	Set timer (where 0A (hex) = 10sec)

**Disable watchdog timer**

STEP	Sample code	Note
1. Enter configuration mode	○ 2E 87	Un-lock super I/O
	○ 2E 87	Un-lock super I/O
2. Select logic device	○ 2E 07	Select logic register
	○ 2F 08	Switch to WDT device
3. Disable WDT device	○ 2E 30	Select register
	○ 2F 00	Disable WDT

## APPENDIX B DIGITAL I/O

### Digital I/O Specification

#### Digital Input:

Input channels: 6, source type

Input voltage: 0 to 30VDC

Input level for dry contacts:

Logic level 0: close to ground

Logic level 1: open

Input level for wet contacts:

Logic level 1: +3VDC max.

Logic level 0: +/- 10VDC min. to +/-30VDC max. (source to digital input)

output channels: 2 sink type

output current: Max. 200 mA per channel, current sink type.

on-state voltage: 12~ 24VDC nominal

Isolation: 2KV

External voltage: 10 to 30VDC, open collector to 30V

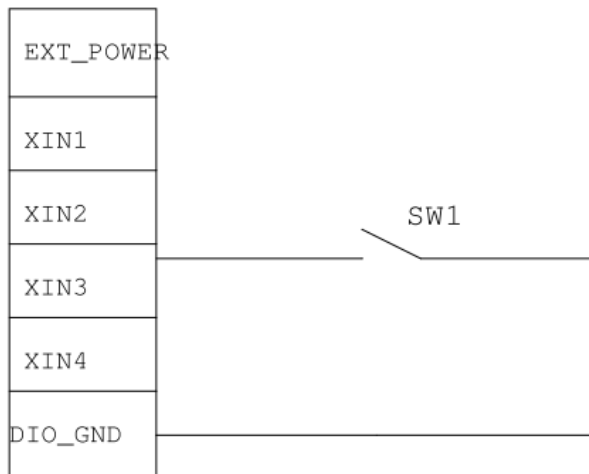
### Digital Input Wiring

#### DRY contact

Logic level 0: close to ground

Logic level 1: open

#### DRY

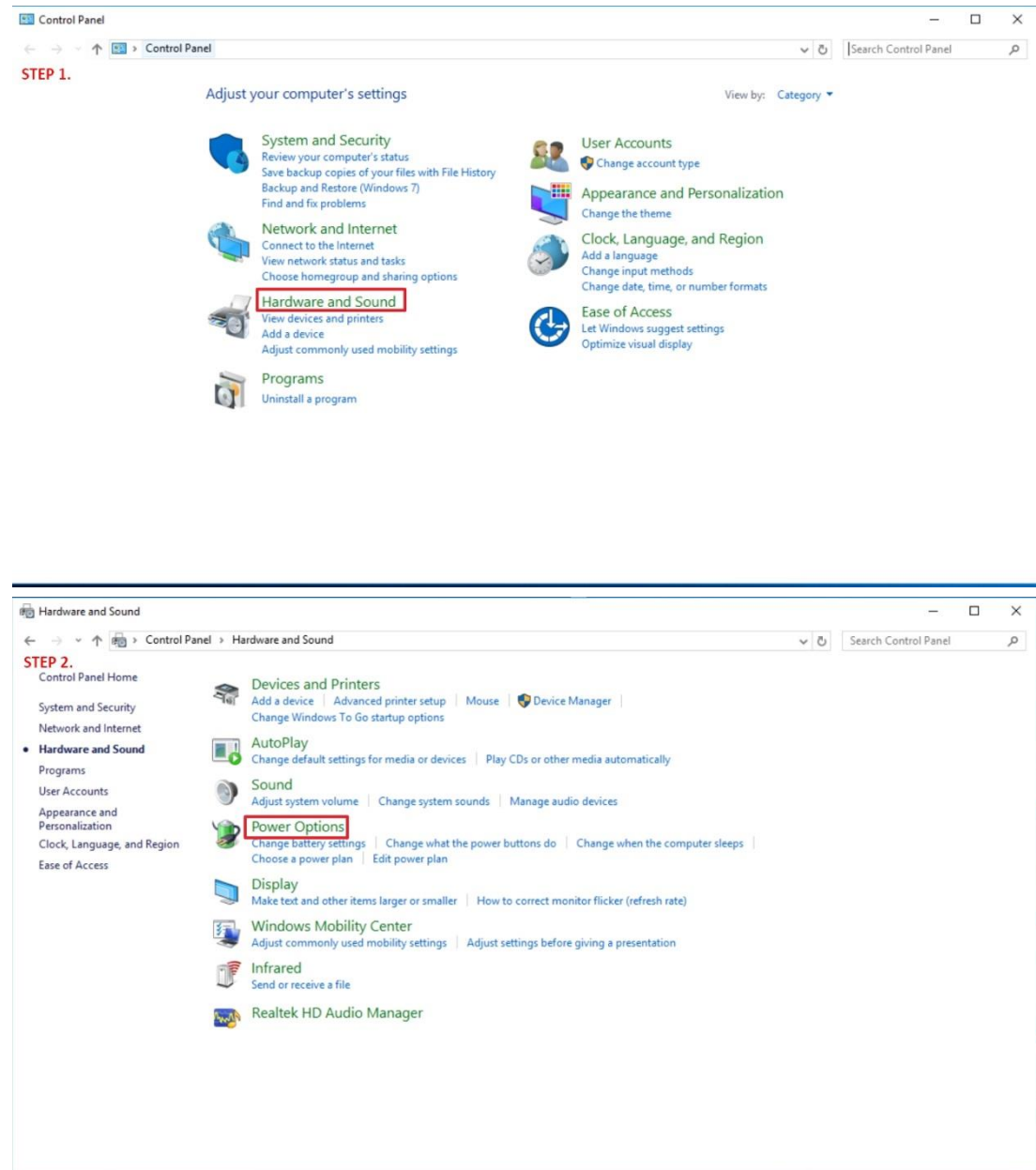


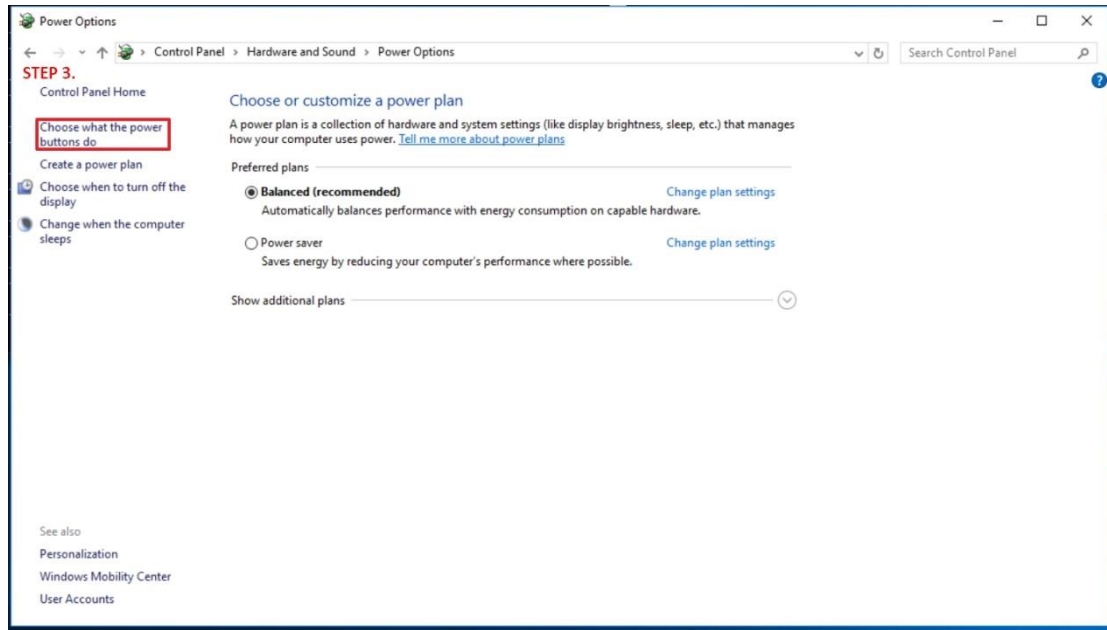


## APPENDIX C

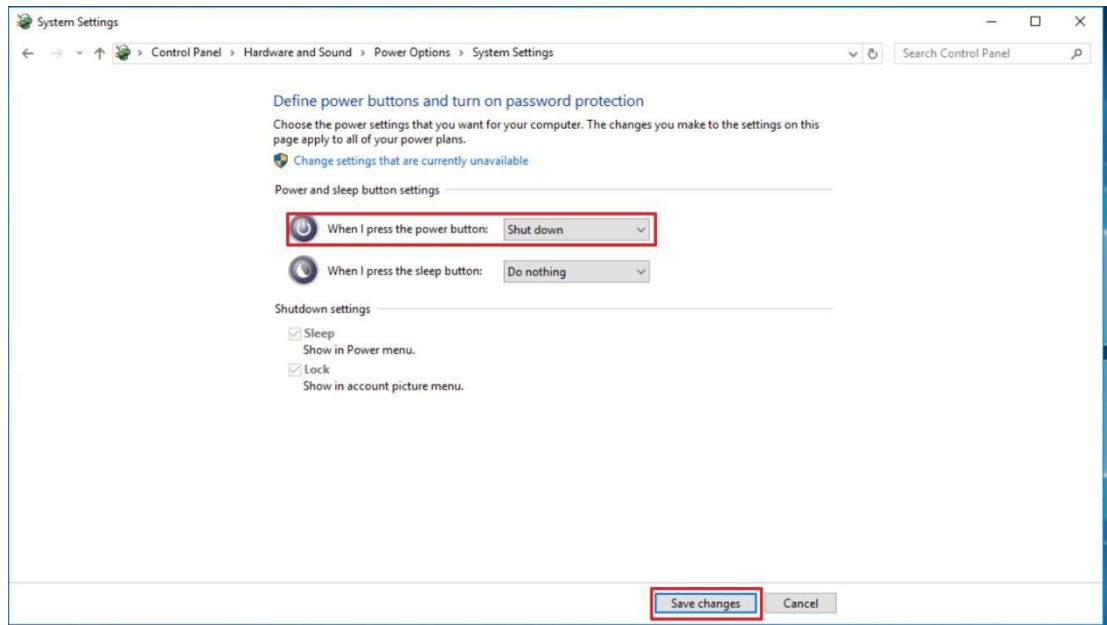
# POWER BUTTON SETTING FOR WINDOWS

To enable the power button function, go to the console of the PC and then follow below figures to complete the setting.





Please check if the action of pressing the power button is “Shut down” to let ACC work normally and prevent unexpected hard shut down.





## **APPENDIX D**

### **Programmable LED**

If the user needs to use this function, please contact FAE for further information.