

User Manual



# Automation Computer APC-5712



**ESTONE  
TECHNOLOGY**

*Empowering the world with smart solutions*

# Estone Automation Computer User Manual APC-5712

## Revision History

Revision History	Changes	Date
Ver 1.0	First Release	2025/07/11

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# Safety Precautions

- (1) Before installing, wiring, operating, and inspecting this product, you should carefully read this manual and the related manuals introduced in this manual, and operate it correctly with full attention to safety.
- (2) Please keep this user manual properly for future reference.
- (3) Before cleaning the device with a damp cloth, unplug the power cord from the outlet. Please do not use liquids or detergent sprays to clean the device.
- (4) For equipment that uses a power cord, there must be an easily accessible power outlet near the equipment.
- (5) Please ensure that the device is placed on a reliable flat surface before installation. Accidental dropping may cause damage to the device.
- (6) Before you connect the device to the power socket, please confirm whether the voltage of the power socket meets the requirements.
- (7) Please arrange the power cord in a location where people are not likely to trip over it, and do not cover the power cord with any debris.
- (8) Heed all warning and caution labels on the equipment.
- (9) If the device will not be used for a long time, please disconnect it from the power socket to prevent the device from being damaged by excessive voltage fluctuations.
- (10) Please do not let any liquid flow into the device to avoid fire or short circuit.
- (11) Please do not open the device yourself. To ensure your safety, before opening the device, all external power supplies used by the system must be disconnected and the device must be opened by a certified professional engineer with sufficient electrical knowledge.

If you encounter the following situations, please have it repaired by professionals:

- The power cord or plug is damaged;
- There is liquid flowing into the device;
- The device does not work properly, or you can not make it work properly through the user manual;
- The device is dropped or damaged;
- The equipment has obvious appearance damage;

- (12) DO NOT store the device in out of the temperature range what we suggested, NOT less than  $-30^{\circ}\text{C}$  or higher than  $80^{\circ}\text{C}$ , or may damage the device.

# Chapter 1 System Overview

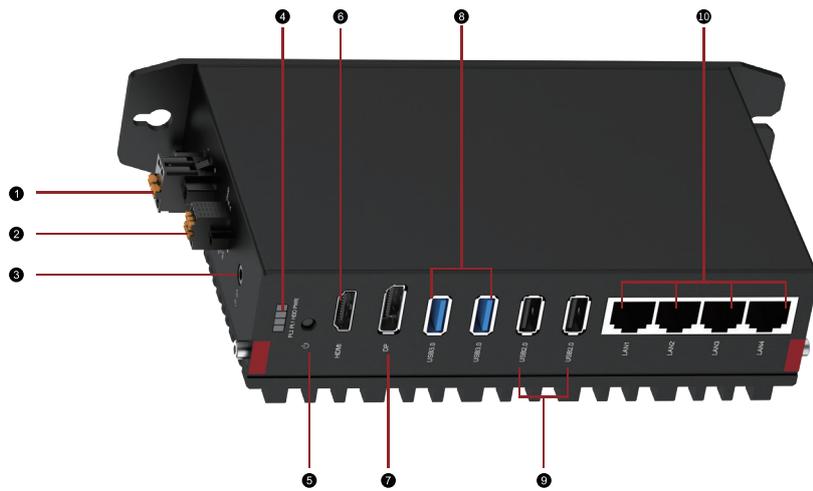
## 1.1 System Introduction

APC-5712 is a low-power compact book style industrial computer in the Estone's Automation PC family. Fanless design, high precision aluminum housing and enclosed structure design ensure the reliability and service life of the product. Exquisite and compact appearance and flexible mount style, which are very suitable to be used in the field of motion control, intelligent gateways, instrument acquisition terminals, and automation control.

## 1.2 Product Specifications

Model Name	APC-5712	
System	CPU	Intel® N97, 4 cores, 6MB Intel Smart Cache
	Memory	1 x SO-DIMM, DDR4 3200MHz(Up to 32GB)
	Storage	1 x M.2 M-Key 2242 SATA SSD
	Display	1 x DP, Support to 4096x2160 @60Hz 1 x HDMI, Support to 3840x2160 @30Hz
	USB	2 x USB3.0, 2 x USB2.0
	COM	1 x RS232(COM1), 1 x RS485(COM2)
	LAN	4 x Intel i210-AT GbE LAN
	Audio	1 x Mic in/line out, OMTP (ALC897, 3.5mm Audio port)
	Expansion	1 x Full-size Mini PCIe slot with SIM card holder
	TPM	TPM 2.0
	Watchdog	1~255 levels programmable
OS	OS Support	Windows 10, Windows 11, Ubuntu
Power	Input Voltage	DC 12~24V, overcurrent, overvoltage and polarity inverse protection
	Maximum Power Dissipation	Max. 90W
Dimensions	APC-5712	170x112x48mm (6.7x4.4x1.9in)
Net Weight	APC-5712	1.25kg (2.8lb)
Environment	Operating Temperature	-20~60 °C (-4~140 °F) with air flow(SSD)
	Storage Temperature	-40~80 °C (-40~176 °F) with air flow(SSD)
	Relative Humidity	5%~95% @40 °C (non-condensing)
	Vibration	5~500Hz, 1.5Grms@with SSD, Follow IEC60068-2-64
	Shock	20G peak acceleration(11ms duration) with SSD, Follow IEC60068-2-27
	EMC	CE/FCC

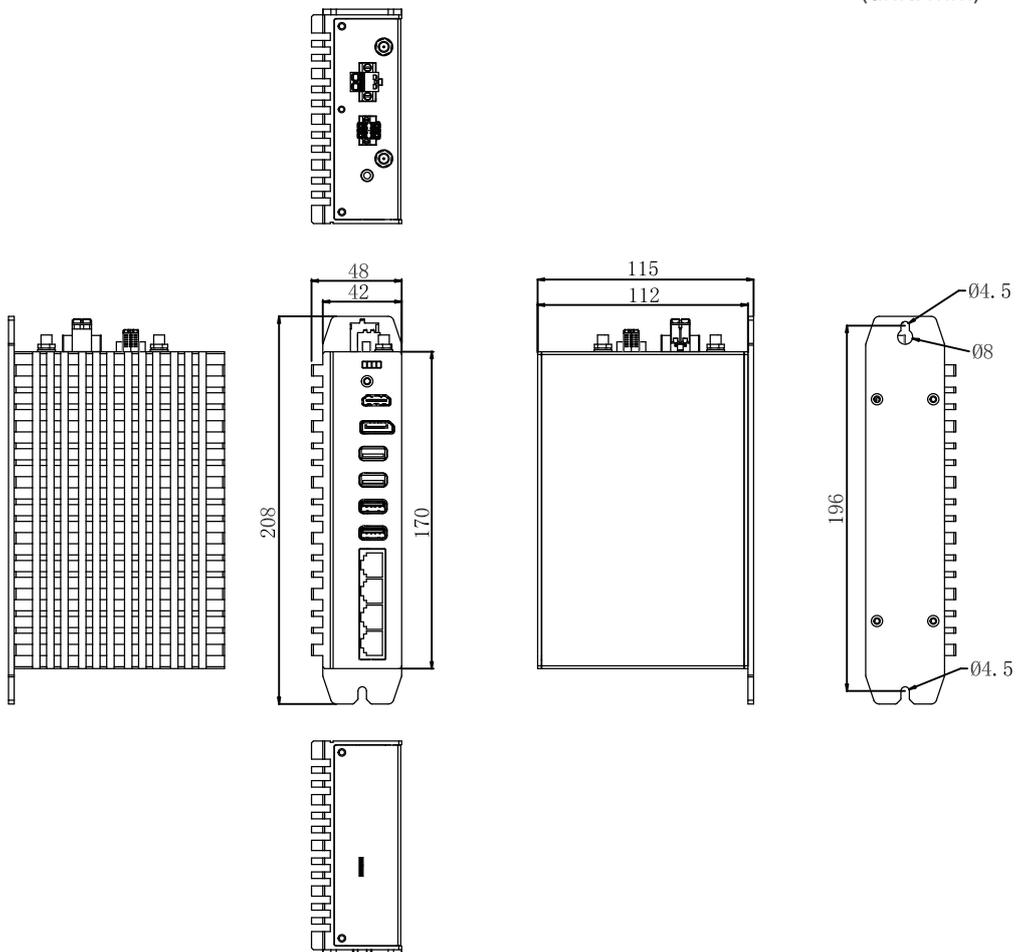
# 1.3 External I/O



- ❶ DC IN 12-24V
- ❷ 1 x RS232, 1 x RS485
- ❸ 1 x Audio
- ❹ LEDs
- ❺ Power On Button
- ❻ HDMI
- ❼ DP
- ❽ 2 x USB3.0
- ❾ 2 x USB2.0
- ❿ 4 x GbE LAN

# 1.4 Dimensions

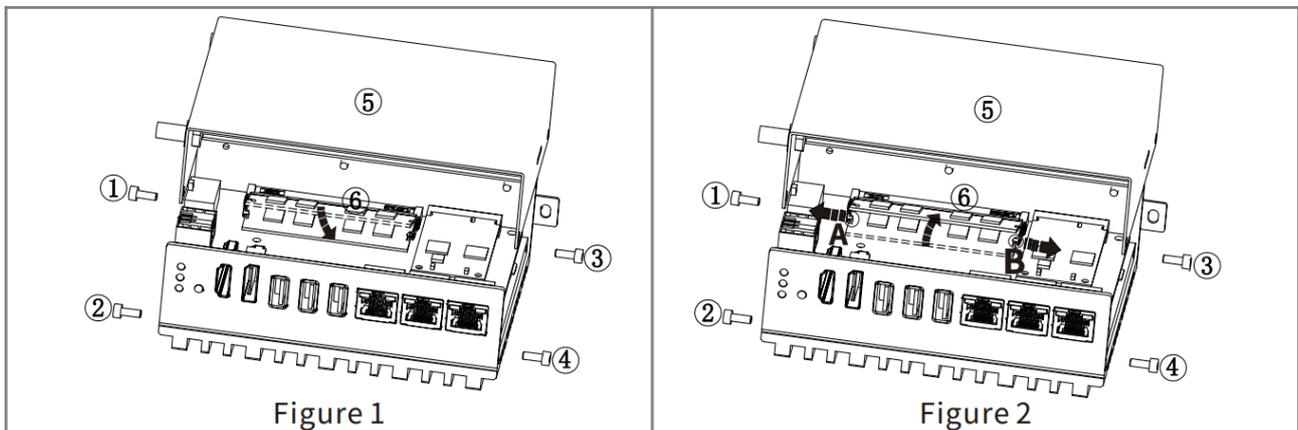
(unit: mm)



# Chapter 2 Installation

## 2.1 Memory card Installation

Use a hexagonal screwdriver to remove the four screws(position 1–4 in the Figure 1), open the rear case(position 5 in the Figure 1), and insert the memory card into the slot(position 6 in the Figure1)at an angle of 30°, then press it in the direction of the arrow(Figure 1)until the card audibly latches into place. Uninstalling or removing memory(RAM) from the product involves a process similar to installing it, gently push or pull the clips away from the sides of the module refer to the direction of arrow A and B in the Figure 2, once the clips are released, the memory module will popup slightly in the Figure 2, Hold the module by its edges and gently pull it out of the slot.

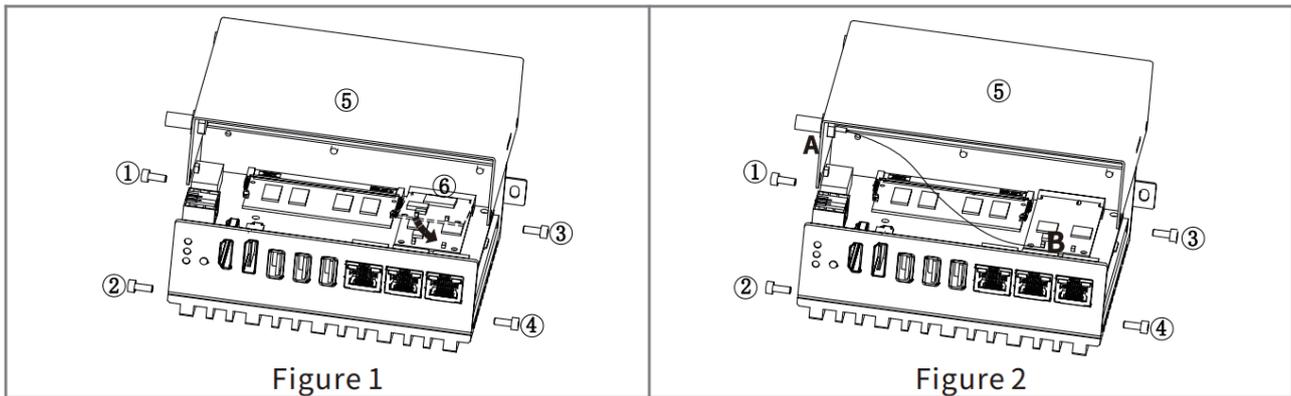


### Note:

1. Before proceeding, make sure to turn off the product, disconnect it from the power source. Also, be aware that opening product might void its warranty, so proceed with caution;
2. If the sim card is installed in the product, must remove it firstly before uninstalling the chassis, otherwise, the SIM card slot may be damaged;
3. Before replacing the memory card, be sure to read reading the specification of product firstly to ensure that using the memory card with compatible specifications.

## 2.2 4G/WiFi card installation

Use a hexagonal screwdriver to remove the four screws(position 1–4 in the Figure 1), open the rear case(position 5 in Figure 1), and insert the miniPCIe expansion card into the slot(position 6 in the Figure 1) at an angle of 30°, then press the expansion card in the direction of the arrow(Figure 1), and fix it on the motherboard with a M2 screw, the antenna adapter cable is installed at position A(Figure 2), and the other end is installed at position B(Figure 2). After the card and cable are installed, the rear cover of the machine can be closed, and the external antenna and SIM card can be installed after locking all of the screws in the product.

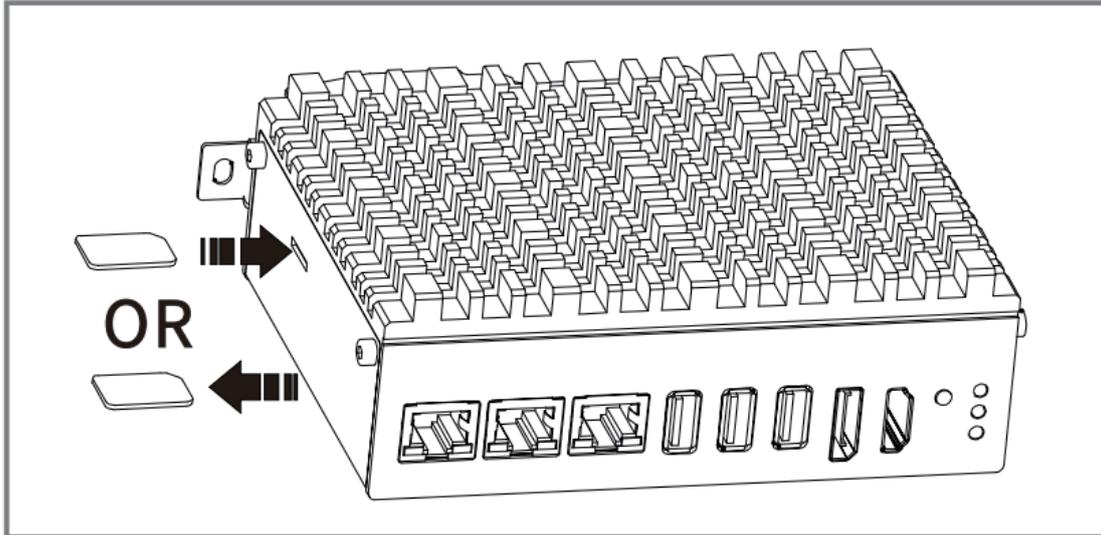


### Note:

1. Before proceeding, make sure to turn off the product, disconnect it from the power source. Also, be aware that opening product might void its warranty, so proceed with caution;
2. If the sim card is installed in the product, must remove it firstly before uninstalling the chassis, otherwise, the SIM card slot may be damaged;
3. Before replacing the memory card, be sure to read reading the specification of product firstly to ensure that using the memory card with compatible specifications.

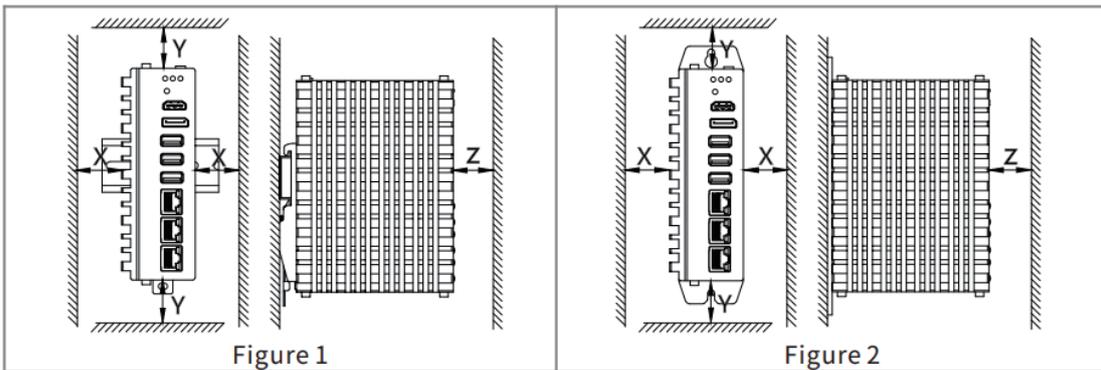
## 2.3 SIM card installation

APC-5712 IPC have a SIM card slot on the motherboard, and the SIM card can be installed and removed directly without dismantling the product. But on the product with the extension I/O, the SIM card can be installed or uninstalled after the chassis is opened.



## 2.4 Product Installation space

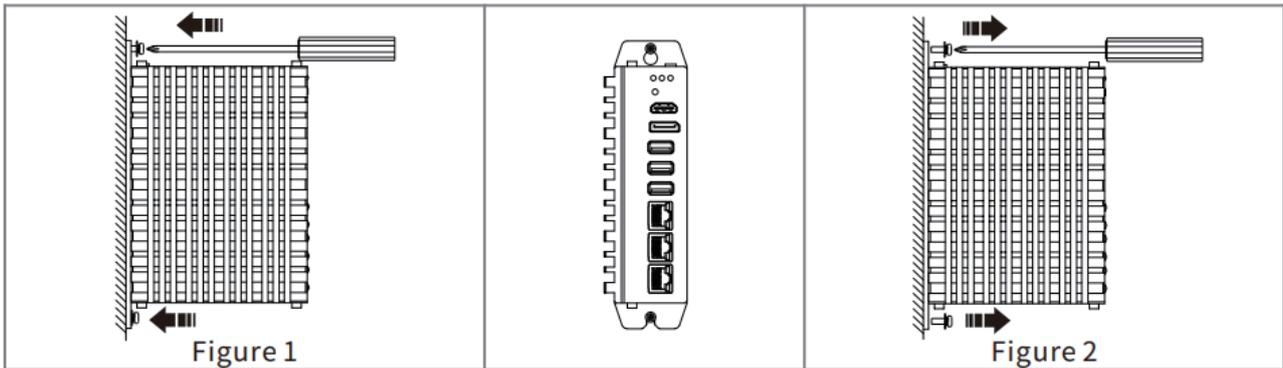
In order to facilitate the installation and heat dissipation and ventilation of the IPC, a sufficient distance should be left between the IPC and the surrounding components.



Direction	Minimum space (mm)
X	50
Y	100
Z	50

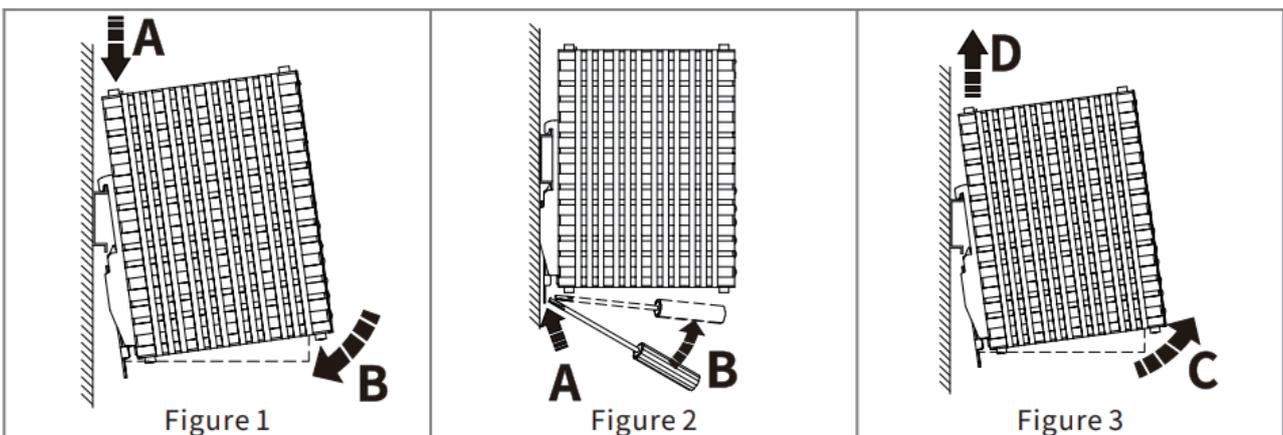
## 2.5 Wall mounted installation

There is a hanging plate on the back of the IPC, and there is a hole on the upper and lower sides of the hanging plate. The IPC can be fixed on the backboard through screws to realize the wall-mounted structure (Refer to Figure 1). Please refer to Figure 2 during disassembly. Please pay attention that the mounting screw pan head needs to be less than 8mm and greater than 4.5mm.



## 2.6 DIN-Rail mounted

APC-5712 IPC also support DIN-Rail mounted as an option. Put the IPC in the normal mounting position, the IPC is mounted on the DIN-Rail bar from above. Make sure that the universal DIN-Rail adapter is in the correct position behind the DIN-rail (A in Figure 1). Then press the IPC down until the universal DIN-rail adapter audibly latches into place (B in Figure 1). Please make sure that the IPC is securely attached to the DIN-Rail. When disassembling, the steps are reversed, please refer to Figure 2 and Figure 3.



## 2.7 Ground wiring

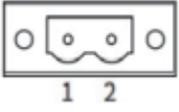
APC-5712 IPC have a ground screw on the side of the power terminal, it is recommended to use thicker and shorter cable to connect to the ground nearby properly to achieve a better EMC protection effect.

# Chapter 3 Connectors and I/O Definitions

## 3.1 Power connector

The product provides one phoenix Terminal on the front to connecting the DC power input.

Pin definition of DC connector:

	Pin No.	Signal	Description
	1	-	GND
	2	+	12-24V+

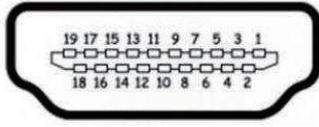
## 3.2 Status LED

The product provides four status leds on the front to indicate the status of the power and the storage disk operation and two programmable leds.

LED	Status	Description
Power LED	Off	The Product is power off
	On (Yellow)	The Product is power on
Disk LED	Blink (Yellow)	The disk is reading or writing
PL1	(Yellow)	User programmable led setting the GPO
PL2	(Yellow)	User programmable led setting the GPO

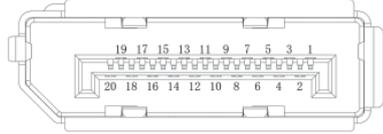
### 3.3 HDMI

Pin definition of HDMI connector:

HDMI TYPE-A Connector			
Pin No.	Signal name	Pin No.	Signal name
1	TMDS DATA2+	11	TMDS CLOCK SHIELD
2	TMDS DATA 2 SHIELD	12	TMDS CLOCK-
3	TMDS DATA2-	13	CEC
4	TMDS DATA1+	14	N.C.
5	TMDS DATA 1 SHIELD	15	DDC CLOCK
6	TMDS DATA1-	16	DDC DATA
7	TMDS DATA O+	17	GND
8	TMDS DATA O SHIELD	18	+5V PWR
9	TMDS DATA0-	19	+5V PWR
10	TMDS CLOCK+	20	

### 3.4 DP

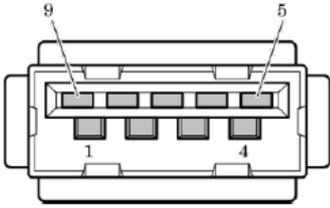
Pin definition of DP connector:

DisplayPort Connector			
Pin No.	Signal name	Pin No.	Signal name
1	ML Lane0 P	11	GND
2	GND	12	ML Lane3N
3	ML Lane0 N	13	CONFIG1
4	ML Lane1P	14	CONFIG2
5	GND	15	AUX CH P
6	ML Lane1N	16	GND
7	ML Lane2 P	17	AUX CH N
8	GND	18	Hot plug detect
9	ML Lane2 N	19	Return
10	ML Lane3 P	20	DP PWR

### 3.5 USB3.0

The product provides four USB TYPE-A ports on the front.

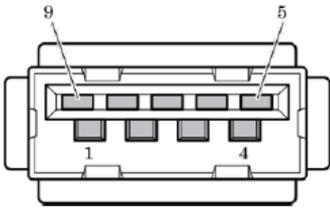
Pin definition of USB3.0 connector:

	Pin No.	Signals	PIN	Signals
	1	VCC5	6	SSR+
	2	DATA-	7	GND
	3	DATA+	8	SSTX-
	4	GND	9	SSTX+
5	SSRX-	10		
Current	Max. 1A per USB			
Cable length	Max. 3m (without hub)			

### 3.6 USB2.0

The product provides four USB TYPE-A ports on the front.

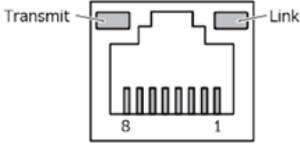
Pin definition of USB2.0 connector:

	Pin No.	Signals
	1	VCC5
	2	DATA-
	3	DATA+
4	GND	
Current	Max. 0.5A per USB2.0	
Cable length	Max. 3m (without hub)	

### 3.7 Ethernet

The product provides four 1GbE LAN controllers using standard RJ45 connectors, they are LAN1, LAN2, LAN3, LAN4.

Pin definition of RJ45 connector:

	Pin No.	Signal	
		100BASE-TX	100BASE-TXV
	1	TX+	TRD+(0)
	2	TX-	TRD-(0)
	3	RX+	TRD+(1)
	4	N.C.	TRD+(2)
	5	N.C.	TRD-(2)
	6	RX-	TRD-(1)
	7	N.C.	TRD+(3)
	8	CTS	TRD-(3)
LED Link	On	Active	
Orange(light)	Link(a connection to an Ethernet network exists)	Blinking(data be-ing transferred)	
LED Transmit	On	Off	
Green(light)	100Mbps	10Mbps	
Orange(light)	1000Mbps		

There are two status leds in the RJ45 connector indicate the status of the link and transmit separately. Link led is blinking when link successfully, and when the network is working in the 1000Mbps, the transmit led is on in orange color, and when the network is working in the 100Mbps, the transmit led is on in green color, and in green color when working in the other speed.

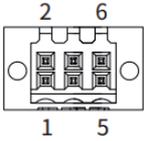
Items	
Network type	1000BASE-T/100BASE-TX/10BASE-T
Transmission speed	1000M/100M/10M bps
Max. Network path length	100m/segment
NIC Type	Intel i210-AT Ethernet Controller

Operation at 1000Mbps requires a category5e or greater cable.

### 3.8 COM

The product provides two COM ports on the front, they are COM1 and COM2. COM1 is RS232, COM2 is RS485.

Pin definition of COM port:

	Pin No.	Signals	Description	Pin No.	Signals	Description
	1	GND	GND	2	GND	GND
	3	TXD	COM2 RS-232 Send	4	B	COM1 RS-485 Data-
	5	RXD	COM2 RS-232 Receive	6	A	COM1 RS-485 Data+
RS-485/RS-232 Transfer rate			Max. 115.2kbit/s			

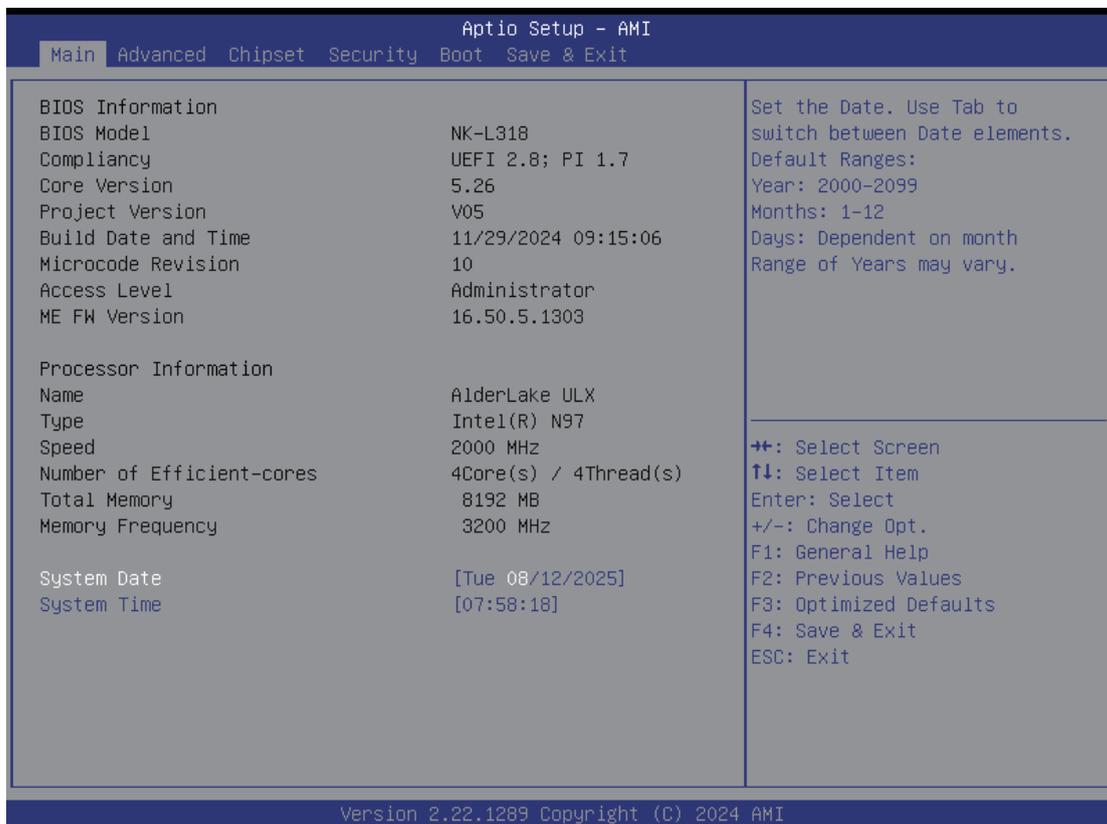
# Chapter 4 BIOS Setup

Press the Del key during boot to enter the BIOS setup.

shortcut key	Description
→ ←	Select Screen
↑ ↓	Select Item
Enter	Select
+ -	Change Opt
F1	General Help
F3	Optimized Defaults
F4	Save & Exit
F7	Select Boot Device
ESC	Exit

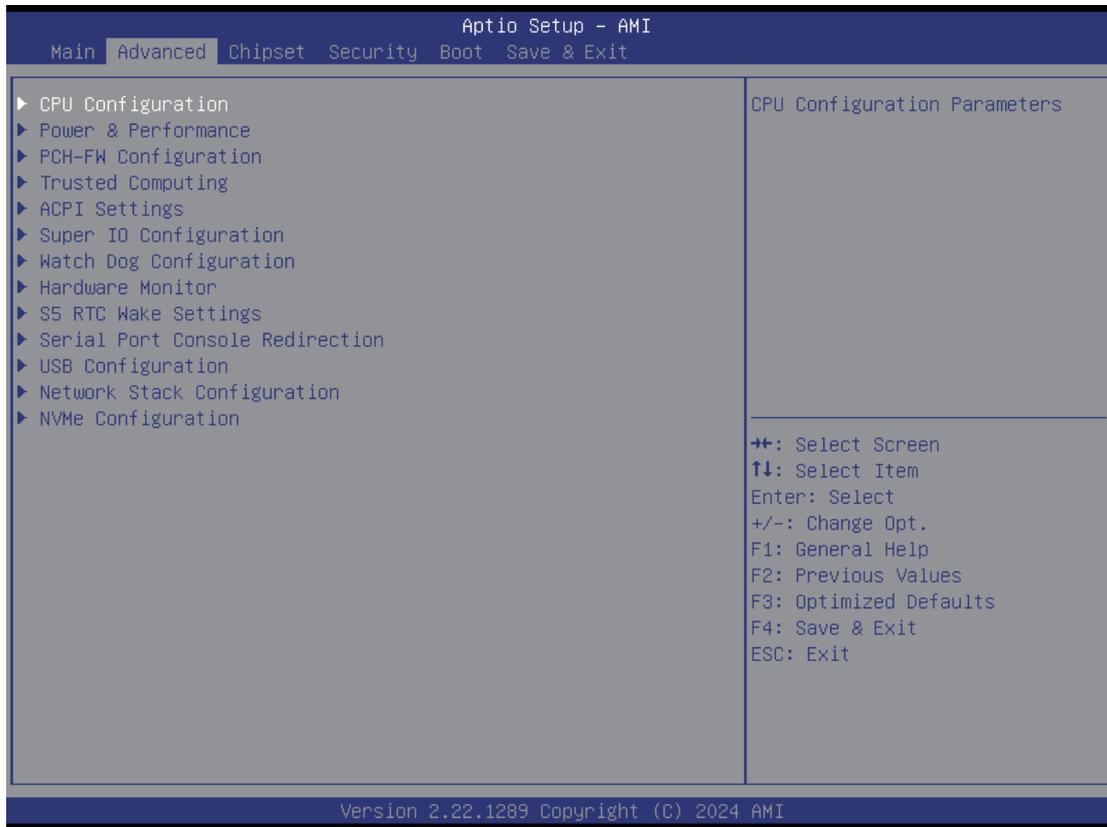
## 4.1 Main

The Main page shows the BIOS version information, basic information of the CPU, memory, and date and time.



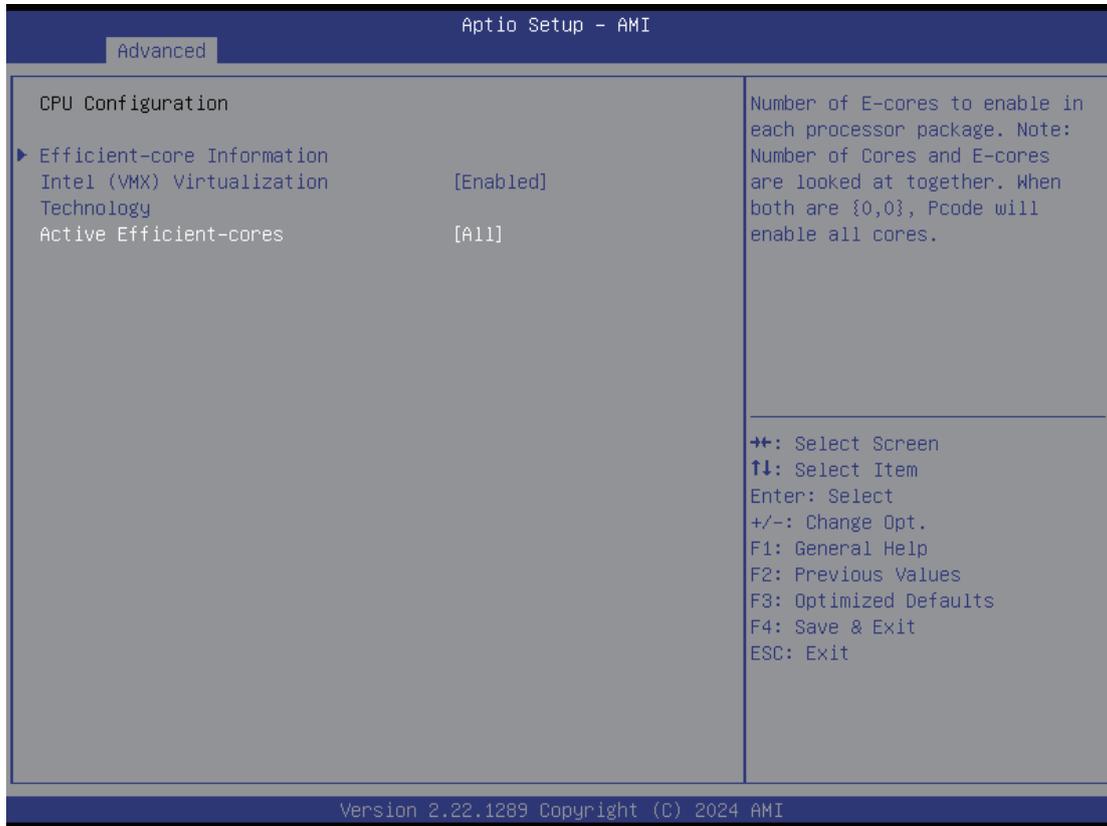
## 4.2 Advanced

The Advanced page displays controls for CPU, Power & Performance, TPM, ACPI, Super IO, Watch Dog, Hardware monitor, S5 RTC Wake, USB, Network Stack.



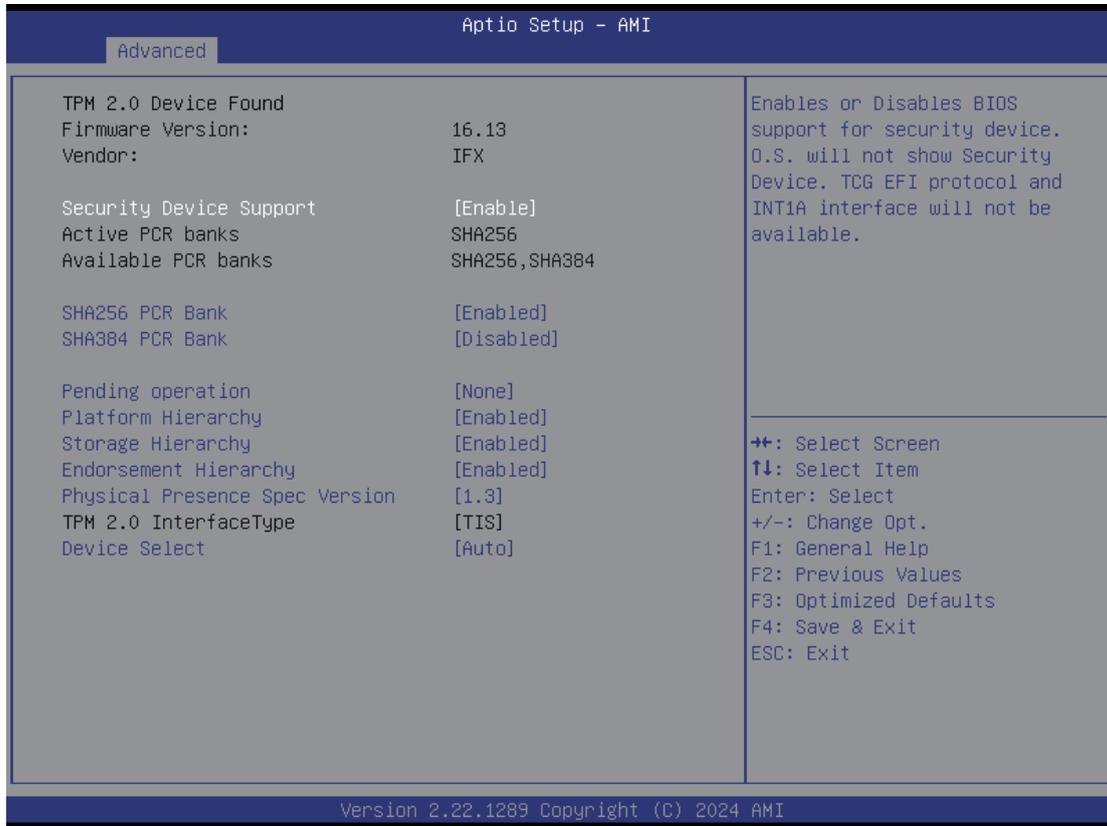
## 4.2.1 CPU Configuration

The Active Efficient-cores option can control the number of cores enabled. The default setting is to enable all.



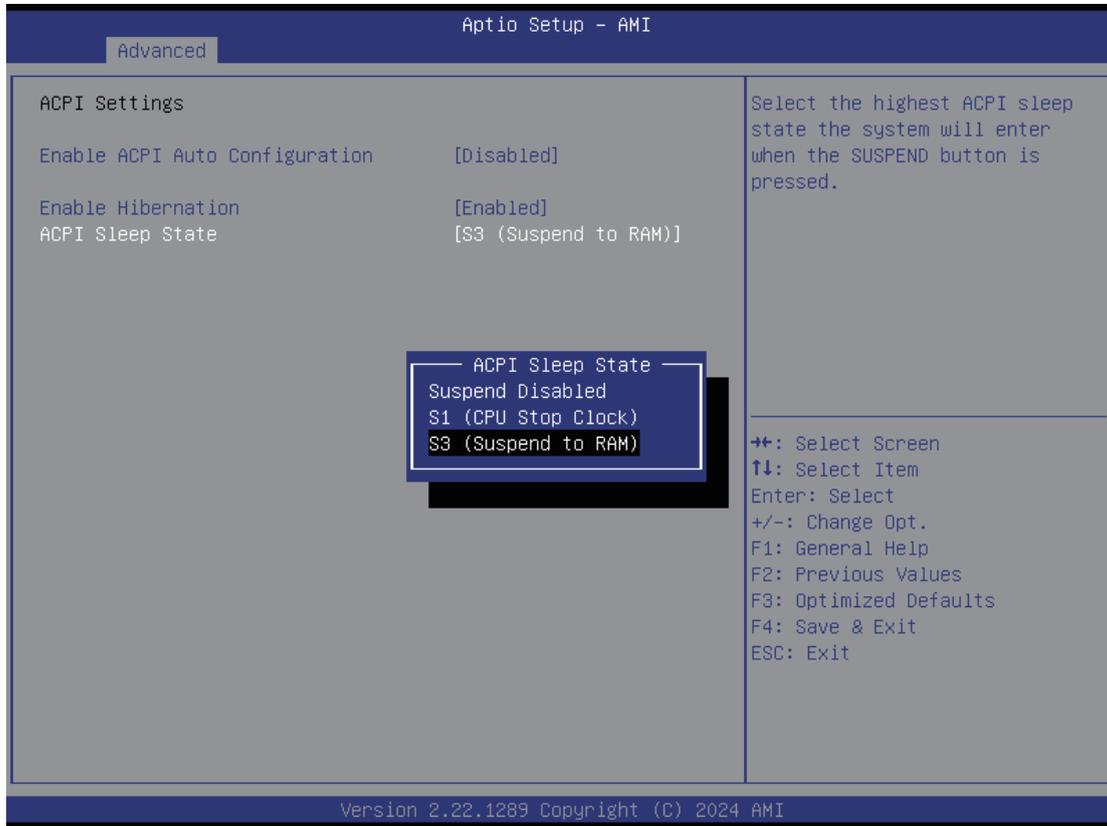
## 4.2.2 Trusted Computing

The Security Device Support is set to Enable by default, and TPM2.0 is turned on. When Security Device Support is set to Disable, TPM2.0 is turned off.



## 4.2.3 ACPI Settings

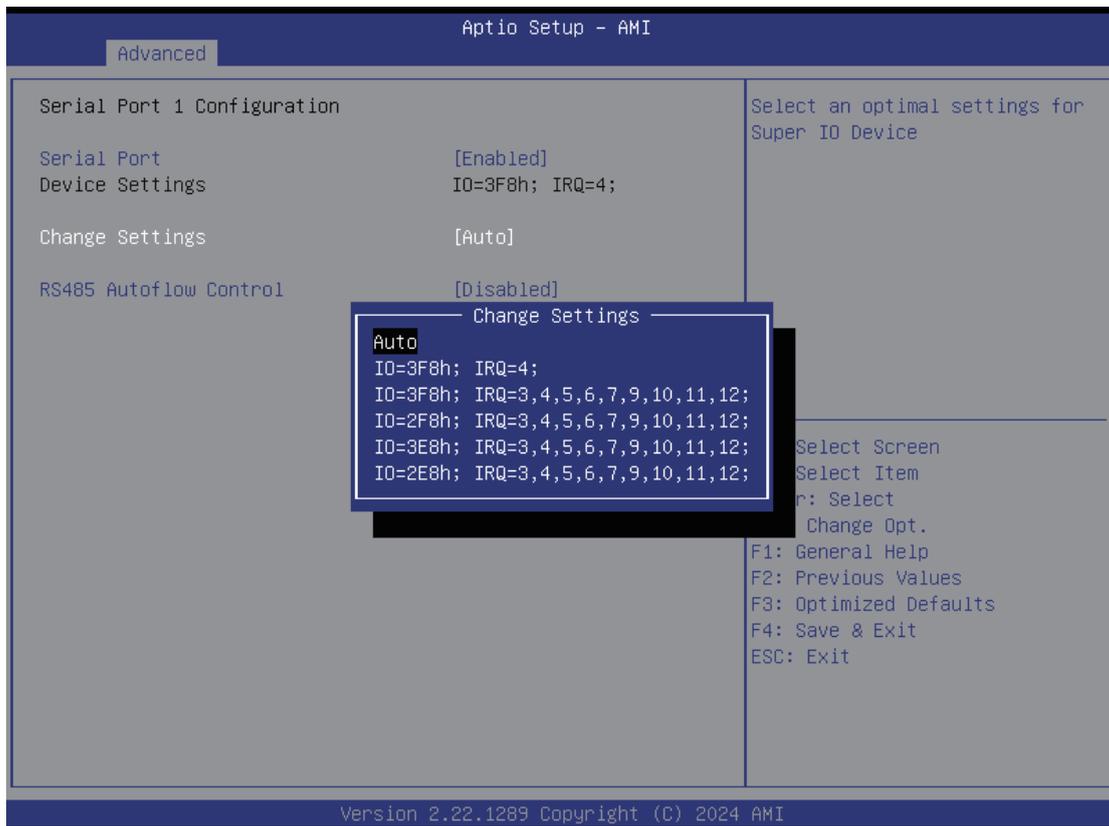
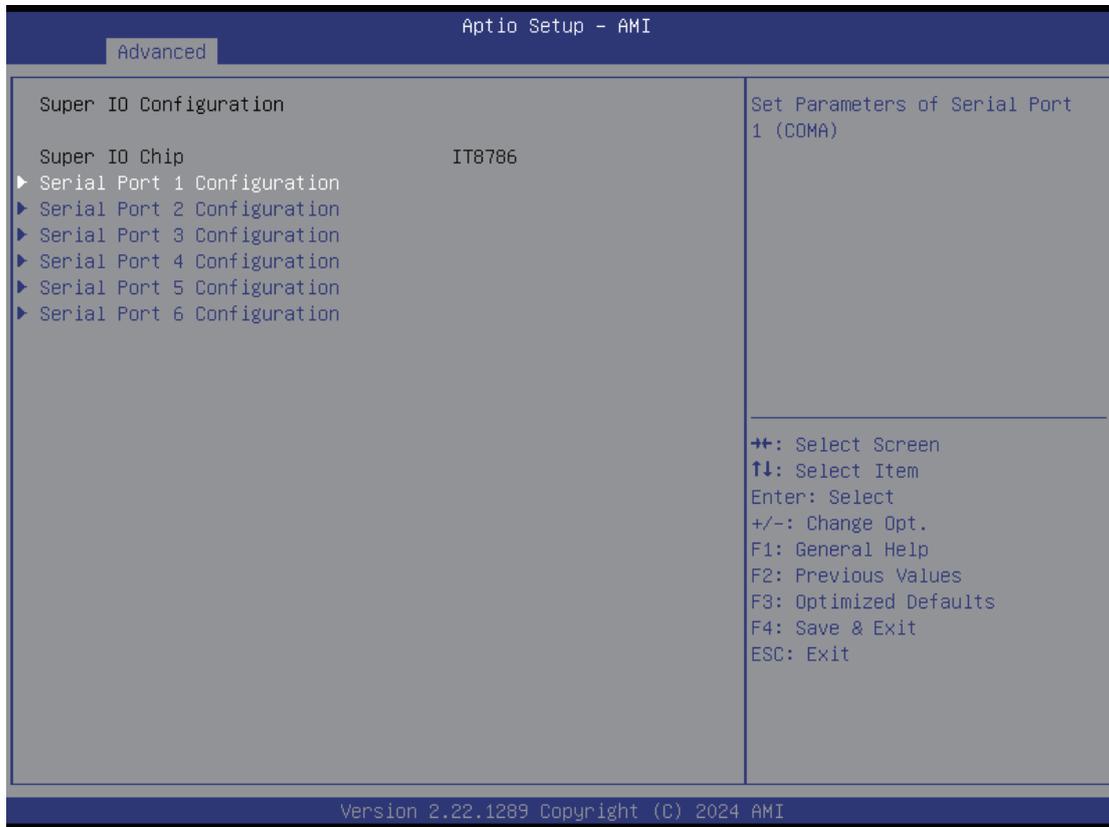
The Sleep and Hibernation options are off by default. If you need to Enable the Sleep and Hibernation options in the operating system, you need to set Enable Hibernation to Enabled. Set the ACPI Sleep State to S3 (Suspend to RAM).



## 4.2.4 Super IO Configuration

COM1 supports RS232, and COM2 supports RS485.

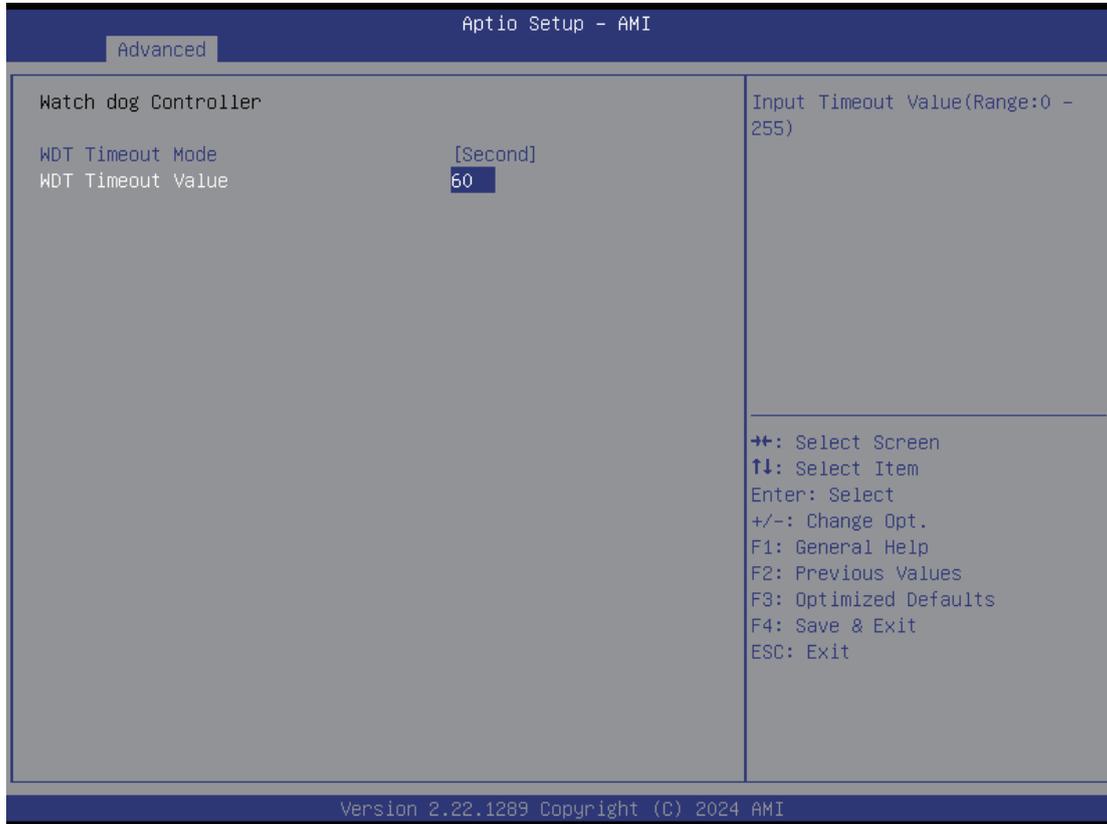
The Change Settings option allows configuration of the IRQ address for the COM ports.



## 4.2.5 Watch Dog Configuration

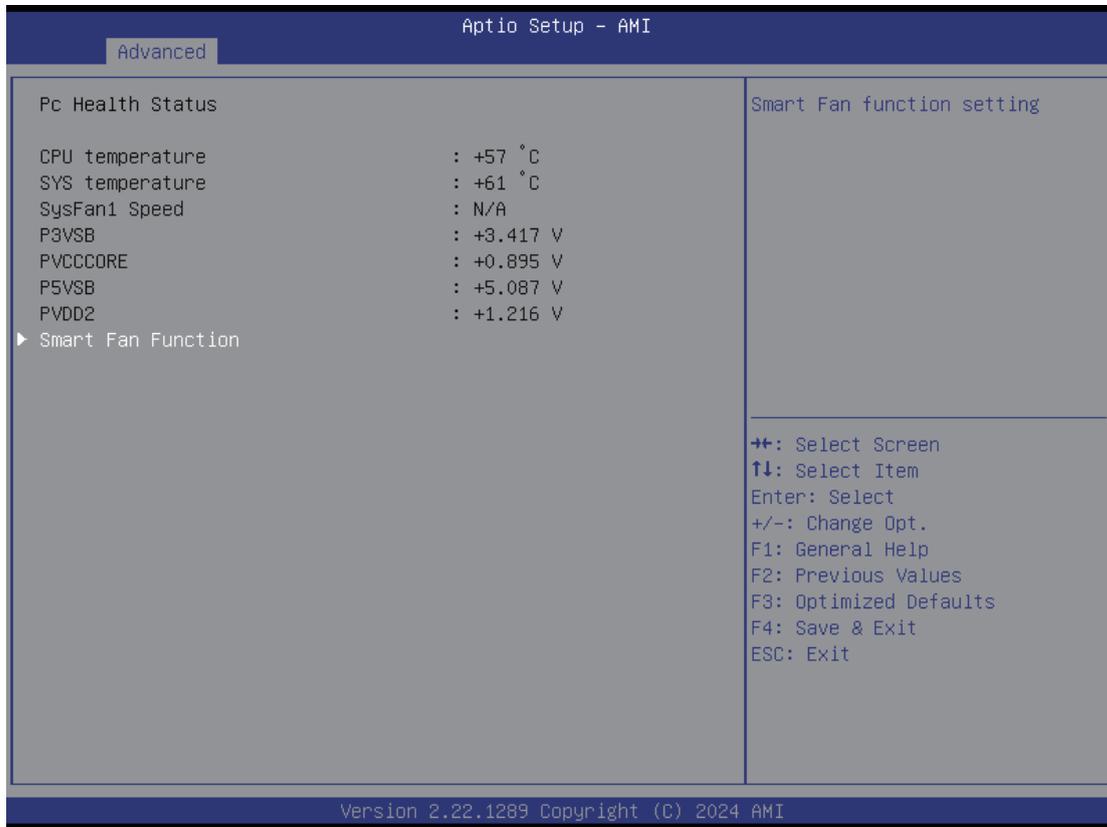
The APC-5712 supports the Watch Dog function, which can be set to the Second and Minute functions, and the WDT Timeout value can be set to a maximum of 255.

After enabling Watch Dog and setting the value, there needs to be a program in the operating system to perform the dog feeding operation; otherwise, the APC-5712 will automatically restart.



## 4.2.6 Hardware Monitor

In the Hardware Monitor, you can view the CPU temperature and the voltage values of the CPU and memory sticks.

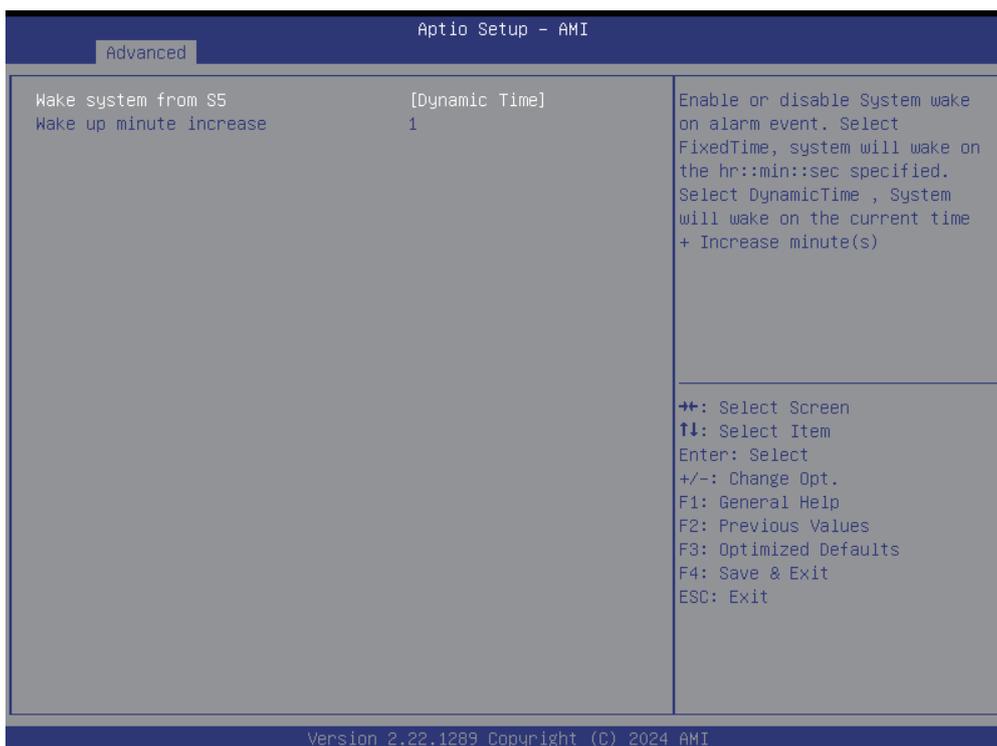


## 4.2.7 S5 RTC Wake Setting

The scheduled startup function is off by default.

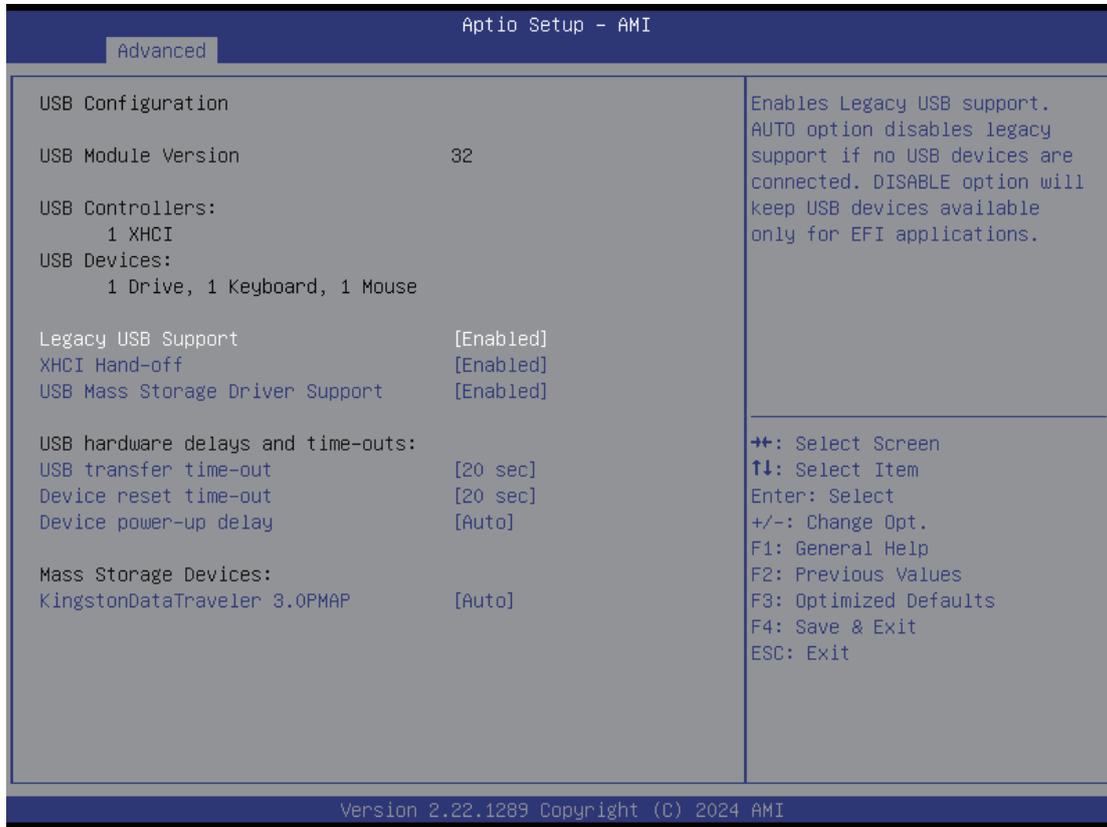
Under BIOS, set Wake system from S5 to Fixed Time, then set Wake up hour, minute, second, save and exit. Every day, when the time comes to the time set under S5 RTC Wake, the APC-5712 will automatically power on.

Under BIOS, set Wake system from S5 to Dynamic Time, and then set the value of Wake up minute increase to between 1 and 5, for example 3, save and exit. After each shutdown, wait for 3 minutes and the APC-5712 will automatically power on.



## 4.2.8 USB Configuration

The default setting of USB Mass Storage Driver Support is Enabled, and the USB flash drive can be read under BIOS. Set USB Mass Storage Driver Support to Disabled, and the USB flash drive will no longer be read in the BIOS.



## 4.2.9 Network Stack Configuration

The default setting of Network Stack in BIOS is Disabled, and it cannot be started over the network. When the Network Stack is set to Enabled in the BIOS, IPv4 PXE and IPv4 HTTP startup items will pop up. By setting the startup items to Enabled, the PXE function of APC-5712 is enabled.



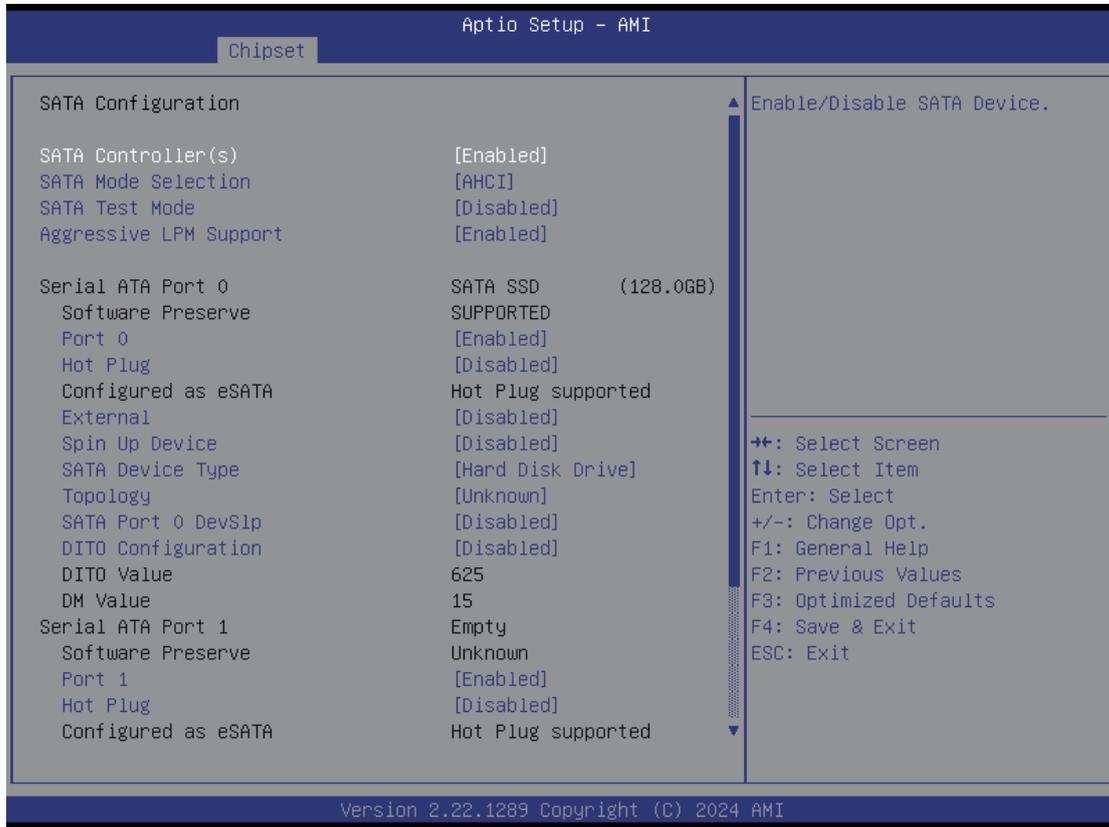
## 4.3 Chipset

The Chipset page under BIOS can manage SATA, State After G3, Wake On LAN functions.



### 4.3.1 SATA Configuration

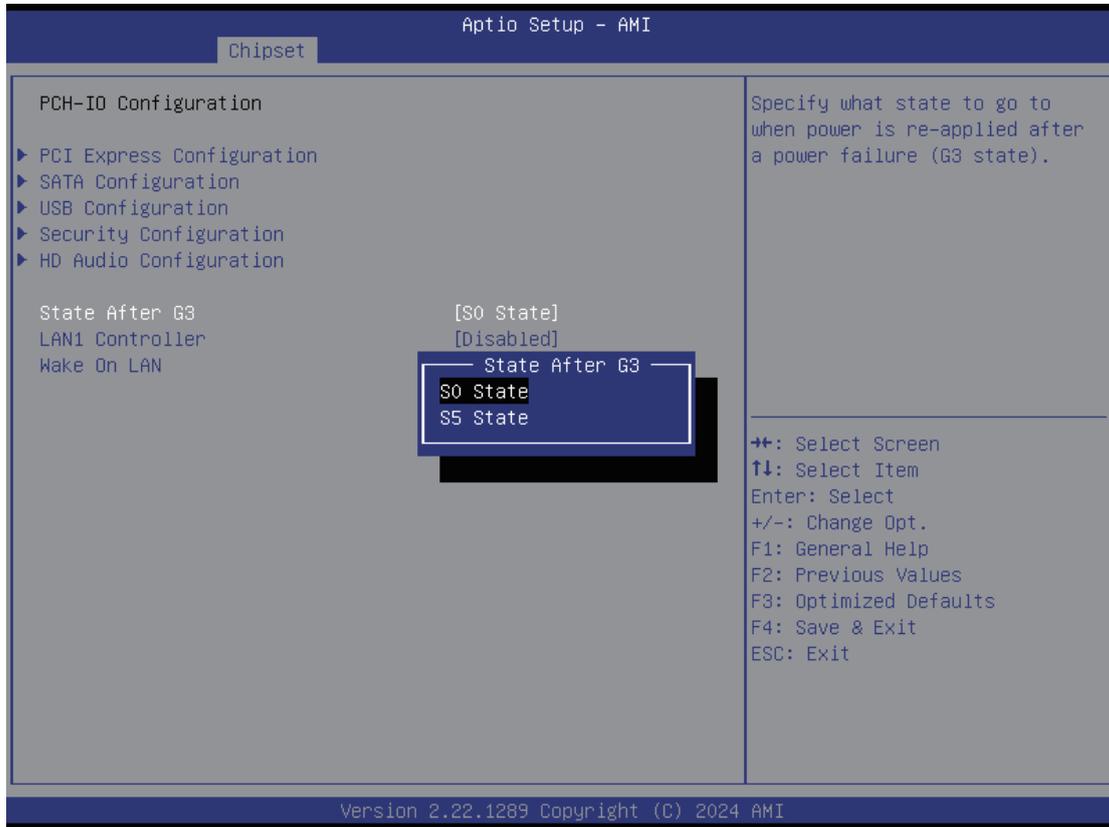
The SATA Controller is Enabled by default, and SATA SSDs can be read under BIOS. If the SATA Controller is set to Disabled, the BIOS will no longer read the SATA SSD information. If the SATA SSD is a system disk, the APC-5712 will not be able to enter the system.



### 4.3.2 State After G3

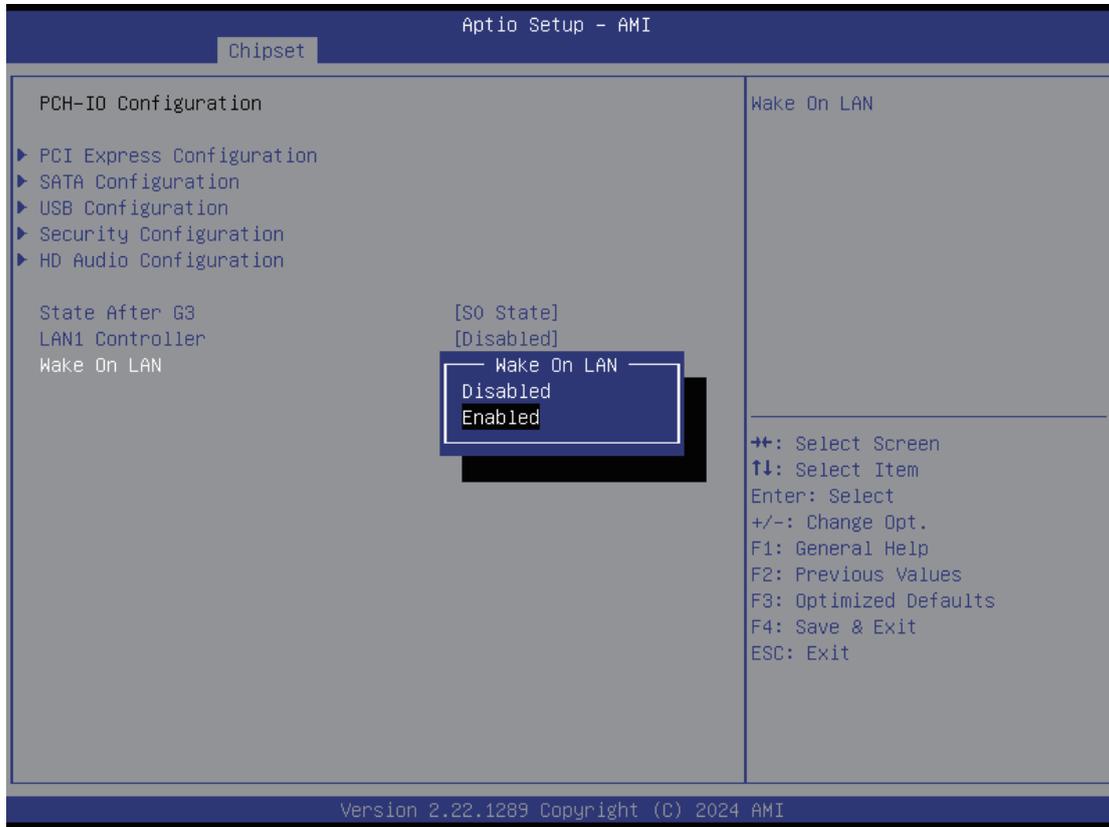
The default setting of State After G3 is S0 State. When the APC-5712 is powered on, it will automatically boot up.

Set the State After G3 to S5 State. When the APC-5712 is powered on, it will not boot up automatically.



### 4.3.3 Wake On LAN

Wake On LAN is set to Enabled by default, and APC-5712 supports wake-up via the network. After setting Wake On LAN to Disabled, the APC-5712 cannot be awakened via the network.





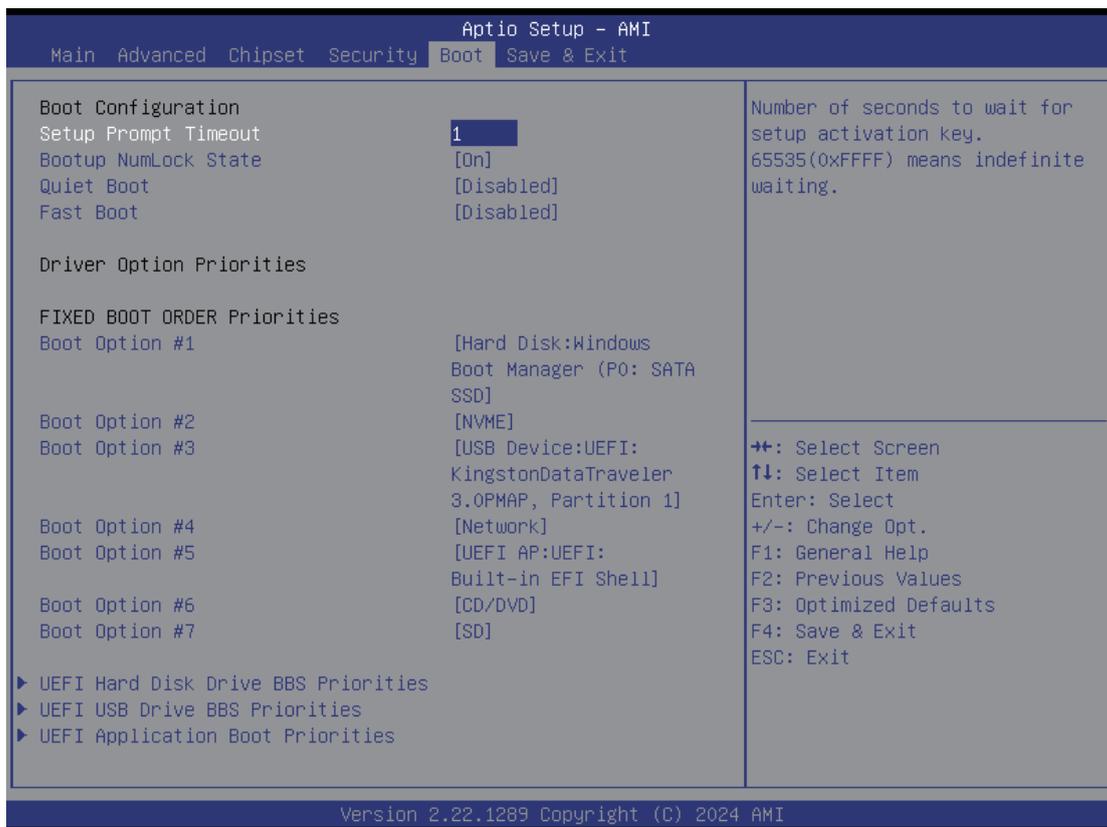
## 4.5 Boot

Under the BIOS, the BOOT page can set the display time of the startup logo, the status of the numeric keypad light, the sequence of startup items, etc.

The default value of the Setup Prompt Timeout is 1, and the logo is displayed for only 1 second when the device is turned on.

The default value of Boot NumLock State is On. After each startup, the number keys on the right side of the keyboard can be used by default.

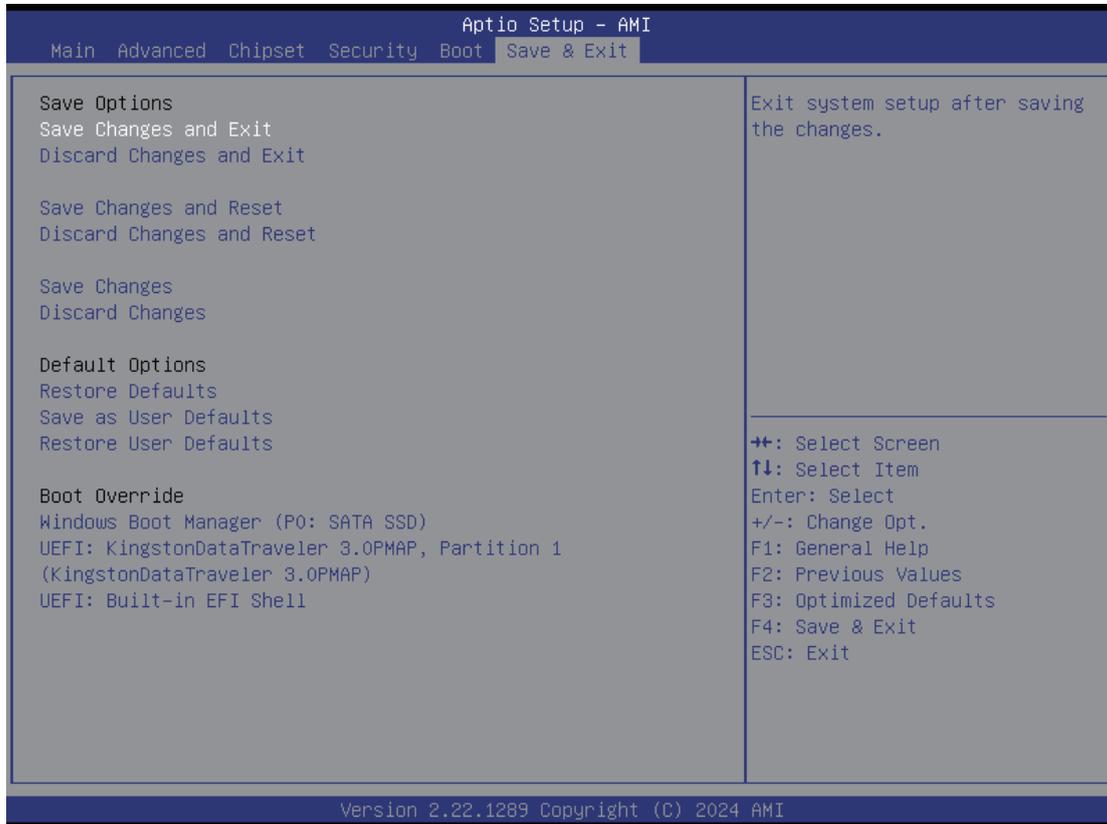
The Boot Option sets the order of startup items. If there are no executable startup items ahead, it will attempt to execute the next one.



## 4.6 Save & Exit

After modifying the Settings in the BIOS, you can choose to Save the modifications on the Save & Exit page and then exit, or you can abandon the modifications.

In the "Boot Override" below, you can select the startup item to enter the corresponding system.



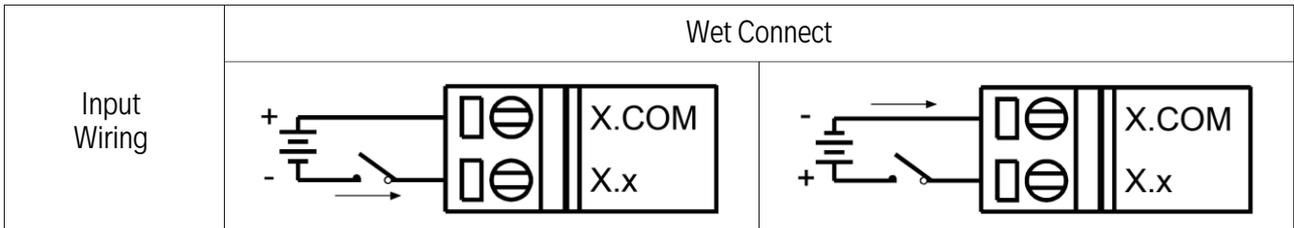
# Chapter 5 Q&A

This chapter explains and illustrates common problems that users may encounter when using the product.

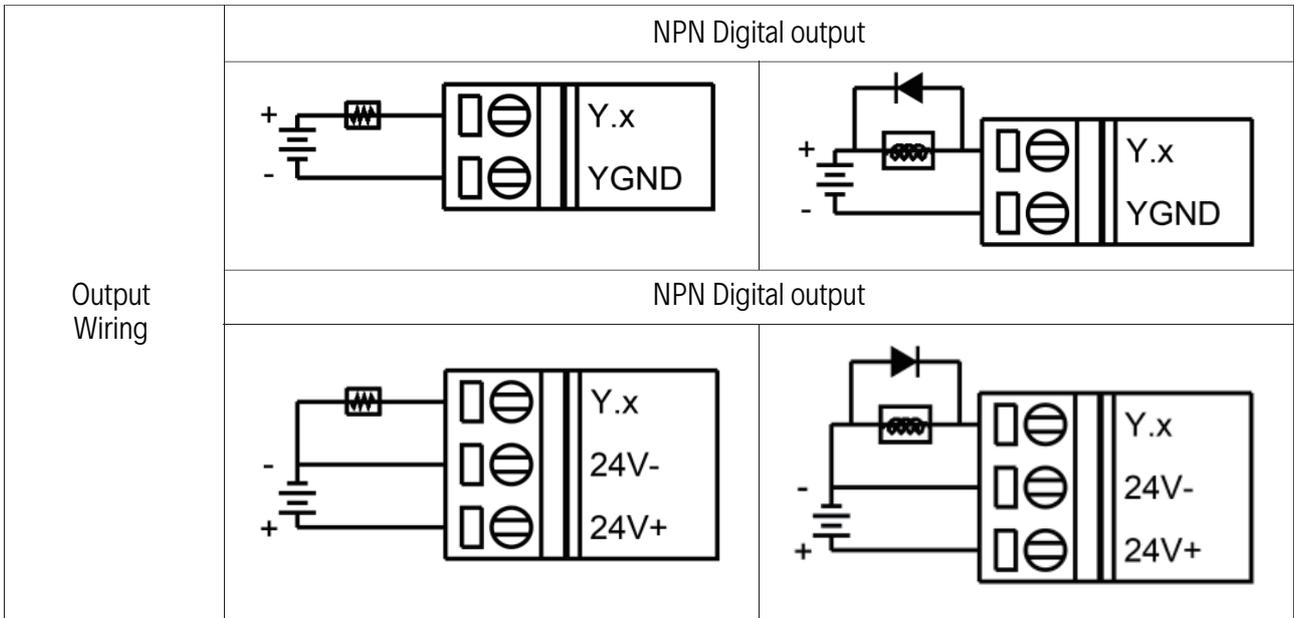
## 5.1 Digital IO Electrical Wiring Diagram

The below sections can be reference to by the field electrical engineer.

### DI Electrical Wiring Diagram



### DO Electrical Wiring Diagram





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