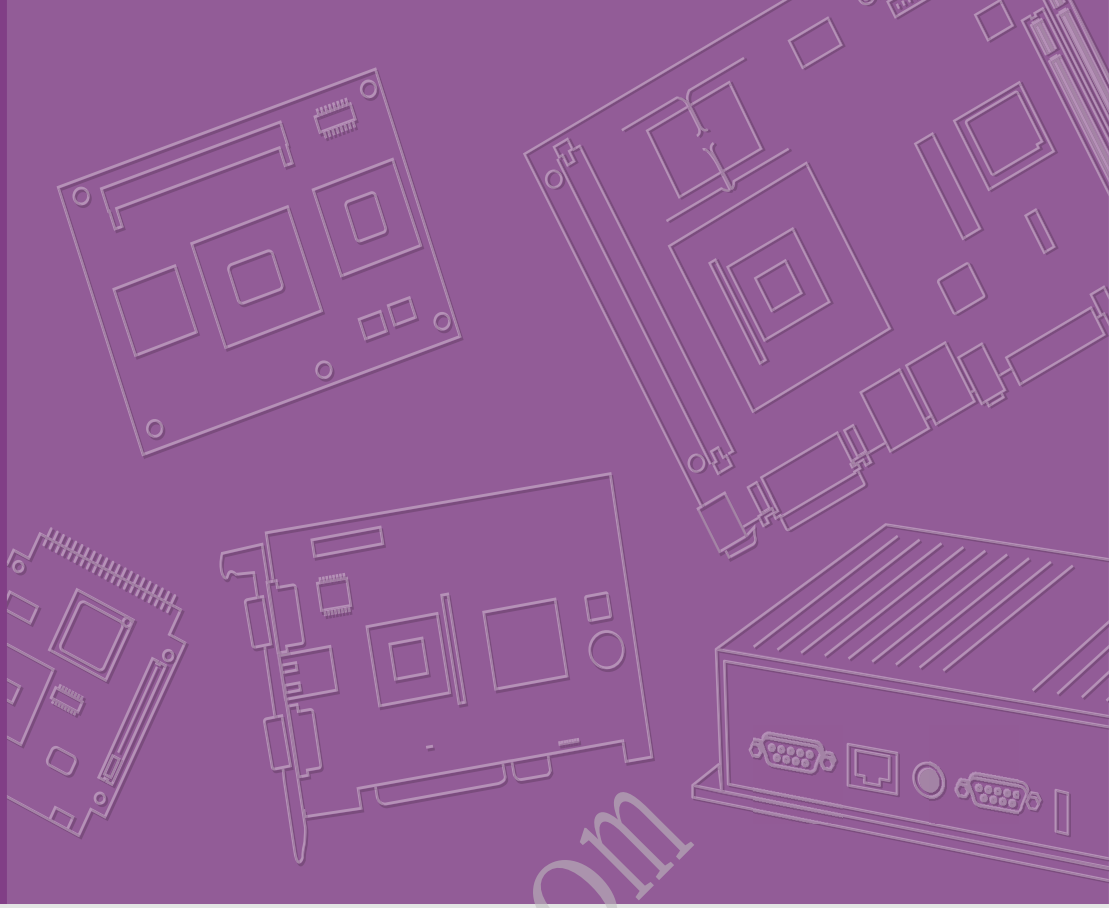

User Manual

ASMB-927 Series

Dual LGA4677 4th Gen Intel® Xeon® Scalable EATX Server Board with 16 DDR5, 4 PCIe x16, 9 SATA 3.0, 6 USB 3.2 (Gen1), Dual 10GbE, and IPMI

ADVANTECH

Enabling an Intelligent Planet

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Product Warranty (2 years)

Advantech warrants the original purchaser that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to products that have been repaired or altered by persons other than repair personnel authorized by Advantech, or that have been subject to misuse, abuse, accident, or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most customers never need to use our repair service. However, if an Advantech product is defective, it will be repaired or replaced free of charge during the warranty period. For out-of-warranty repairs, customers are billed according to the cost of replacement materials, service time, and freight. Consult your dealer for more details.

If you believe that your product is defective, follow the steps outlined below.

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages displayed when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any relevant information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandise authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a completed Repair and Replacement Order Card, and a proof of purchase date (such as a photocopy of your sales receipt) into a shippable container. Products returned without a proof of purchase date are not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Part No. 2002092700 Edition 1

February 2024

A Message to the Customer

Advantech Customer Services

Each and every Advantech product is built to the most exacting specifications to ensure reliable performance in the harsh and demanding conditions typical of industrial environments. Whether your new Advantech equipment is destined for the laboratory or the factory floor, you can be assured that your product will provide the reliability and ease of operation for which the name Advantech has come to be known. Your satisfaction is our primary concern. Here is a guide to Advantech's customer services. To ensure you get the full benefit of our services, please follow the instructions below carefully.

Technical Support

We want you to get the maximum performance from your products. So if you run into technical difficulties, we are here to help. For the most frequently asked questions, you can easily find answers in your product documentation. These answers are normally a lot more detailed than the ones we can give over the phone.

So please consult this manual first. If you still cannot find the answer, gather all the information or questions that apply to your problem, and with the product close at hand, call your dealer. Our dealers are well trained and ready to give you the support you need to get the most from your Advantech products. In fact, most problems reported are minor and are easily solved over the phone.

In addition, free technical support is available from Advantech engineers every business day. We are always ready to give advice on application requirements or specific information on the installation and operation of any of our products.

Declaration of Conformity

FCC Class A

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

Initial Inspection

Before installing motherboard, please make sure that the following materials have been shipped:

- 1 x ASMB-927 Startup Manual
- 1 x SATA data cable
- 1 x SATA power cable
- 2 x CPU power cables (8P)
- 2 x CPU carriers
- 1 x I/O port bracket
- 1 x M.2 screw

If any of these items are missing or damaged, contact distributor or sales representative immediately. We have carefully inspected the ASMB-927 mechanically and electrically before shipment. It should be free of marks and scratches and in perfect working order upon receipt. When unpacking the ASMB-927, check it for signs of shipping damage. (For example, damaged box, scratches, dents, etc.) If it is damaged or it fails to meet the specifications, notify our service department or local sales representative immediately. Also notify the carrier. Retain the shipping carton and packing material for inspection by the carrier. After inspection, we will make arrangements to repair or replace the unit.

Order Information

Part Number	Chipset	Memory	GbE/10GbE LAN	IPMI	Graphics
ASMB-927T2-00A1	C741	16 x DDR5 RDIMM	-/2	Yes	AST2600

Contents

Chapter 1

Overview

1.1 Introduction

The ASMB-927 serverboard is the most advanced 4th Gen Intel Xeon Scalable series board for industrial and medical equipment, as well as HPC applications that require high-performance computing power and multi-expansion slots. This serverboard supports the 4th Gen Intel Xeon Scalable series processor and DDR5 RDIMM 4800MHz memory up to 4TB. ASMB-927 provides four PCIe x16 slots and two PCIe x8 slots in Gen5 high speed. All of the PCIe x16 slots support Compute Express Link (CXL) as well. Additionally, the ASMB-927 features dual 10GbE Ethernet LAN ports that eliminate network bottlenecks.

Utilizing the Intel C741 chipset, the ASMB-927 boasts a variety of high-end features. With 6 USB3.2 Gen1 and 3 USB 2.0 ports, 9 onboard SATA III connectors, and 1 M.2 2280 connector, this board offers unparalleled I/O capabilities. Furthermore, it supports RAID 0, 1, 5, and 10, ensuring superior data storage and high-speed peripheral connectivity. These advanced features make the ASMB-927 the ideal choice for industrial and medical equipment, as well as HPC applications that require top-tier performance and reliability.

1.2 Features

General

- **Intel Xeon processor scalable family support:** The ASMB-927 is equipped with two CPU sockets, which enables it to support the 4th Gen Intel Xeon Scalable series processors.
- **High performance I/O capability:** 2 x 10GbE ports, 4 x PCIe x16 slots + 2 x PCIe x8 slots, 9 x SATA ports, 1 x M.2 connector, 6 x USB3.2 Gen1 and 3 x USB 2.0 ports.
- **Standard EATX form factor with industrial features:** The ASMB-927 provides industrial features like long product lifecycle, reliable operation under wide temperature range, watchdog timer, etc.
- **IPMI 2.0 support:** The ASMB-927 is equipped with an AST2600 BMC chip and supports IPMI 2.0 (Intelligent Platform Management Interface 2.0) via dedicated LAN port.
- **KVM over IP:** The KVM over IP function allows BIOS level remote control of the ASMB-927 through your own computer.

1.3 Specifications

Table 1.1: Specifications

Processor	
CPU	■ Dual Intel LGA4677 Xeon processor sockets ■ Supports 4th Gen Intel Xeon scalable family, up to 60 cores ■ Supports the TDP of processor up to 225 W (please consider extended air thermal solution while using CPU> 205 W TDP)
System Memory	
Total Slots	16 (1 DIMM per channel)
Capacity	Maximum 4TB ECC RDIMM
Memory Type	DDR5 ECC-REG 3200/3600/4000/4400/4800 MHz
Memory Size	Each memory slot supports 16GB, 32GB, 64GB, 128GB and 256GB memory modules
Memory Voltage	1.2 V
Error Detection	■ Corrects single-bit errors ■ Detects double-bit errors (using ECC memory)
On-Board Devices	
Chipsets	Intel C741 PCH
Network Controllers	Intel X710, supports dual 10GbE ports
VGA	Aspeed AST2600 with 64 MB VGA memory provides basic 2D VGA function.
EC	ITE IT5121VG provide motherboard keyboard mouse, RS-232, and hardware monitor functions
BMC	Realtek RTL8211 for dedicated BMC LAN
Input/Output	
Storage	■ 8 x SATA3.0 via mini SAS HD (SFF-8643), supports RAID 0, 1, 5,10 ■ 1 x SATA 3.0 ■ 1 x M.2 2242/2280 (SATA or PCIe)
LAN	■ 2 x RJ-45 LAN ports (2 x 10GbE LAN) ■ 1 x RJ-45 dedicated IPMI LAN port(10/100/1000 base-T) for IPMI only, there is no regular LAN function
USB	■ 6 x USB3.2 Gen1 (4 rear/2 onboard) ■ 3 x USB2.0 (2 onboard/1 type A)
Graphic	1 x VGA
Keyboard/Mouse	PS/2 keyboard and mouse via internal header
Serial Port	1 x RS232 port at rear window, 1 x internal header (2 x 5P pitch: 2.50 mm), both ports are RS-232 (5 V)
Power Connector	
System Power	1 x 24-pin SSI EPS 12 V power connector (Input 12 V, 5 V, 3.3 V, 5 Vsb)
CPU Power	4 x 8-pin SSI EPS 12 V power connector for CPU & memory power (12 V)
PCIe Power	1 x 8-pin 12 V power connector for PCIe slot 12 V input

Table 1.1: Specifications	
Expansion Slots	
PCI Express	■ 4 x PCIe Gen5 X16 slots – Slot 1: PCIe X16 slot, signal from CPU0, CXL support – Slot 3: PCIe X16 slot, signal from CPU0, CXL support – Slot 5: PCIe X16 slot, signal from CPU0, CXL support – Slot 6: PCIe X16 slot, signal from CPU1, CXL support ■ 2 x PCIe Gen5 X8 slots – Slot 2: PCIe X8 slot, signal from CPU1 – Slot 4: PCIe X8 slot, signal from CPU1
System BIOS	
BIOS Type	256 Mb SPI Flash EEPROM with AMI BIOS
PC Health Monitoring	
Voltage	Monitors for CPU Cores, +3.3 V, +5 V, +12 V, +5 VSB, VBAT
FAN	■ 2 x 4-pin headers for CPU cooler ■ 5 x 4-pin headers for system fans ■ All fans with tachometer status monitoring ■ Thermal control for all fan connectors
Temperature	■ Monitoring for CPU ■ Monitoring for system external thermal sensor
Other Features (Case Open)	■ Chassis intrusion detection
Operating Environment/Compliance	
RoHS	RoHS Directive 2011/65/EU and (EU) 2015/863
Environmental Spec.	■ Operating Temperature: 0 ~ 40°C ■ Non-operating Temperature: -40 ~ 85°C ■ Operating Relative Humidity: 10 ~ 90% non-condensing ■ Non-operating Relative Humidity: 10 ~ 95% non-condensing

1.4 Board Layout, Jumpers, and Connectors

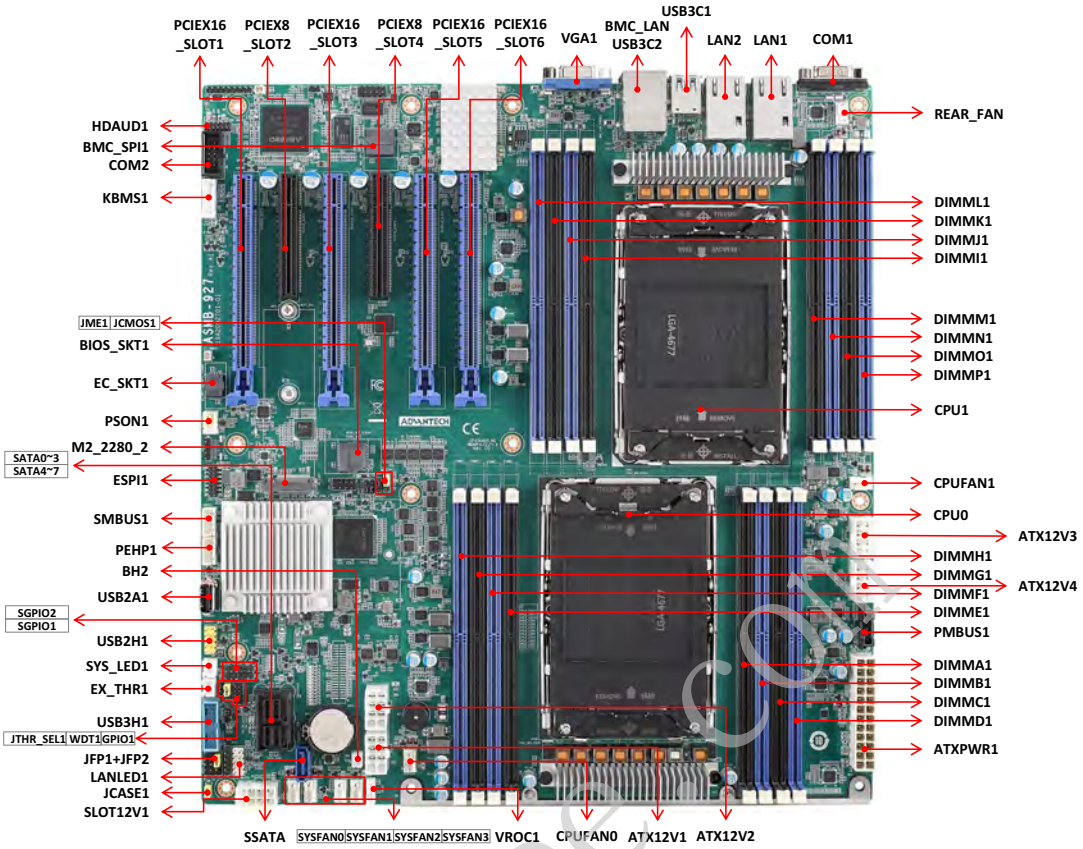


Figure 1.1 Board Layout

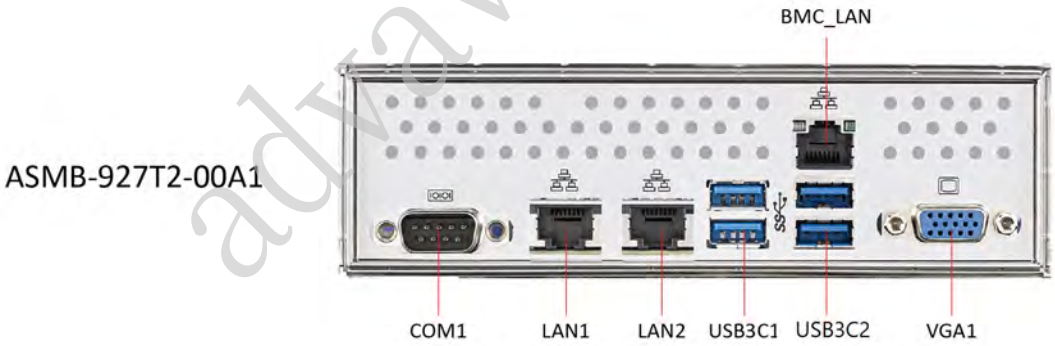


Figure 1.2 Rear I/O

Table 1.2: Onboard LAN LED color definition

100 Mbps/1 Gbps/10 Gbps LAN Link/Activity LED Scheme

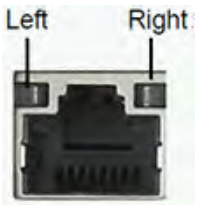
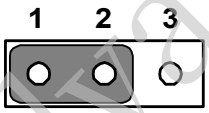
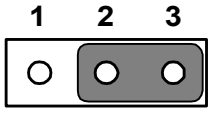
		LAN1 & LAN 2	
		Left LED	Right LED
100 Mbps	Link Active		
1 Gbps	Link Active	Amber Amber	Green Blinking green
10 Gbps	Link Active	Green Green	Green Blinking green

Table 1.3: Jumpers

Label	Function	Default
JCASE1	Chassis case open alarm	1-2
JCMOS1	CMOS clear	1-2
JME1	ME update	1-2
PSON1	AT(1-2)/ATX(2-3)	2-3
JTHR_SEL	Internal (1-2) and external (2-3) thermistor selection	1-2
JWDT1	Watchdog reset	1-2



Keep CMOS data/
Disable ME update/



Clear CMOS data/
Enable ME update/

Table 1.4: Connectors	
Label	**Function**
ATXPWR1	ATX 24-pin main power connector
ATX12V1, ATX12V3	Processor power connector (mandatory)
ATX12V2, ATX12V4	Processor power connector (reserved)
BH2	For optional battery kit
BIOS_SKT1	BIOS SPI ROM
BMC_SPI1	BMC SPI ROM
BMC_LAN	IPMI dedicated LAN connector
COM1	RS-232 connector
COM2	RS-232 header
CPUFAN0, CPUFAN1	CPU FAN connector
DIMMA1, DIMMB1, DIMMC1, DIMMD1, DIMME1, DIMMF1, DIMMG1, DIMMH1	DDR5 from CPU0
DIMMI1, DIMMJ1, DIMMK1, DIMML1, DIMMM1, DIMMN1, DIMMO1, DIMMP1	DDR5 from CPU1
DIMMA1, DIMMC1, DIMME1, DIMMG1, DIMMI1, DIMMK1, DIMMM1, DIMMO1	DCPMM slot
EC_SKT1	EC EEPROM
ESPI1	eSPI connector
EX_THR1	Connector for external thermistor
GPIO1	GPIO connector
HDAUD1	Audio header
JFP1, JFP2, JFP3	Front panel header
KBMS2	External keyboard and mouse connector
LAN1, LAN2	10 Gbps LAN connector
LANLED1	LAN LED extension connector
M2_2280_2	M.2 connector (SATA & PCIe x4)
PCIEX16_SLOT1	PCIe x16 slot (CPU0)
PCIEX8_SLOT2	PCIe x8 slot (CPU1)
PCIEX16_SLOT3	PCIe x16 slot (CPU0)
PCIEX8_SLOT4	PCIe x8 slot (CPU1)
PCIEX16_SLOT5	PCIe x16 slot (CPU0)
PCIEX16_SLOT6	PCIe x16 slot (CPU1)
PEHP1	NVMe RAID LED control
PMBUS1	PMBUS connector to communicate with the power supply
SATA0~SATA3, SATA4~7	SATA via SFF-8643
SGPIO1	SATA0~3 SGPIO header
SGPIO2	SATA4~7 SGPIO header
SLOT12V1	For PCIe slot 12V input only
SMBUS1	SMBus header
SSATA	SATA connector

Table 1.4: Connectors	
SYSFAN0~SYSFAN3, REAR_FAN	System FAN connector
SYS_LED1	System LED connector
USB2H1	USB 2.0 port (9-pin header)
USB2A1	USB 2.0 port (Type-A)
USB3C1, USB3C2, USB3H1	USB 3.2 port 1, 2(rear I/O); USB 3.2 port 3, 4(rear I/O); USB 3.2 port 5, 6 (20-pin header)
VGA1	VGA connector

Table 1.5: Onboard LED			
LED	**Description**	**LED Definition**	
+5V_LED1	Power on LED	Off: Power off	On (green): System on
+5V_SB_LED1	Standby LED	Off: No input AC power	On (green): System on, in sleep mode, or in soft-off mode
BMC_HBLED1	BMC heartbeat LED	Blinking (green): Controller is working normally	

1.5 Block Diagram

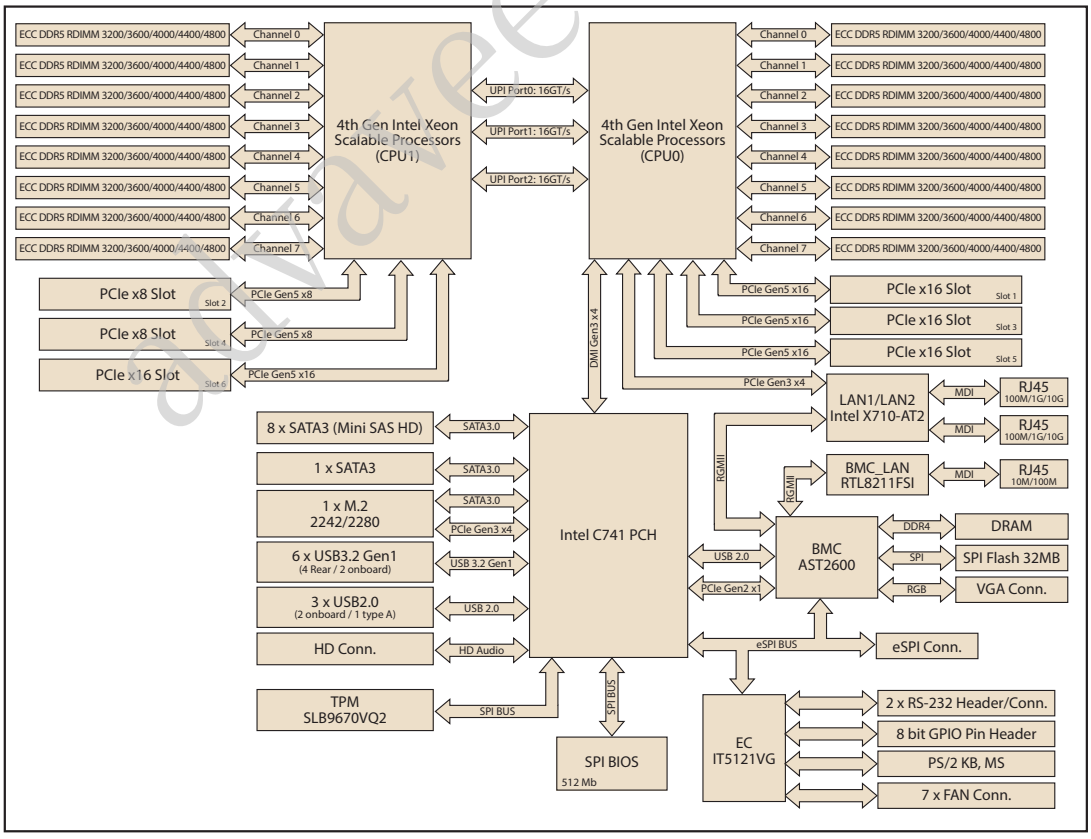


Figure 1.3 Block Diagram

1.6 System Memory

The ASMB-927 has 16 288-pin memory slots for DDR5 3200/3600/4000/4400/4800 MHz memory modules with a maximum capacity of 4TB (maximum 256GB for each DIMM). The ASMB-927 supports registered DIMM memory modules.

1.7 Memory Installation

Memory performance is affected by different DIMM configurations. To reach optimal memory interleaving, be sure to install identical DIMM types with the same size, speed, and number of ranks on those memory slots corresponding to the correct processor.

The following table indicates recommended DIMM configurations with a single and dual processor, based on the guideline, you may adjust your memory configuration according to your PCIe expansion card configuration.

Table 1.6: DIMM configuration with single CPU

Channel		DIMMA1	DIMMB1	DIMMC1	DIMMD1	DIMME1	DIMMF1	DIMMG1	DIMMH1
Quantity of memory installed	1	v							
			v						
						v			
							v		
	2	v						v	
				v		v			
	4	v		v		v		v	
	6	v		v	v	v	v	v	
		v	v	v		v		v	v
			v	v	v	v	v		v
		v	v		v		v	v	v
	8	v	v	v	v	v	v	v	v

Note! *3, 5, 7 DIMMs are not recommended DIMM slots.*

Table 1.7: DIMM configuration with dual CPUs

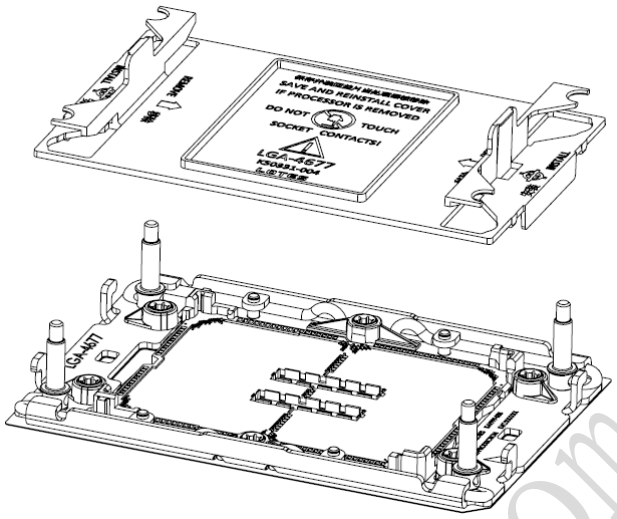
Channel		DIM MA1	DIM MB1	DIM MC1	DIM MD1	DIM ME1	DIM MF1	DIM MG1	DIM MH1	DIM MI1	DIM MJ1	DIM MK1	DIM ML1	DIM MM1	DIM MN1	DIM MO1	DIM MP1
Quantity of memory installed	2	V								V							
			V								V						
						V								V			
							V								V		
	4	V						V		V						V	
				V		V						V		V			
	8	V		V		V		V		V		V		V		V	
	12	V		V	V	V	V	V		V		V	V	V	V	V	
		V	V	V		V		V	V	V	V	V		V		V	V
			V	V	V	V	V		V		V	V	V	V	V		V
		V	V		V		V	V	V	V	V		V		V	V	V
	16	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V

Note! *1, 3, 5, 7, 9, 11, 13, 15 DIMMs are not recommended DIMM slots when dual CPUs are installed.*

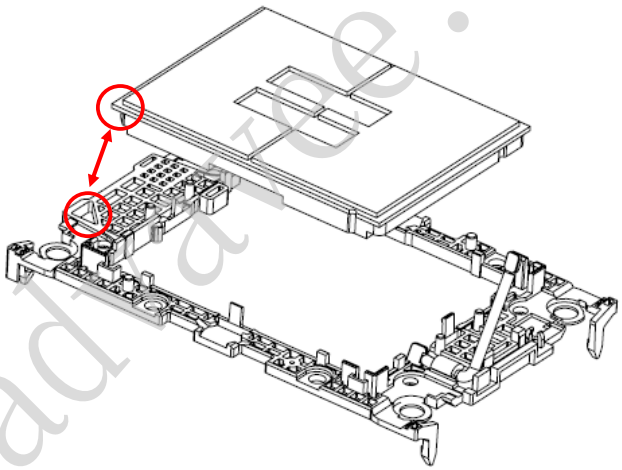
1.8 Processor Installation

The ASMB-927 is designed for the Intel Xeon processor scalable family.

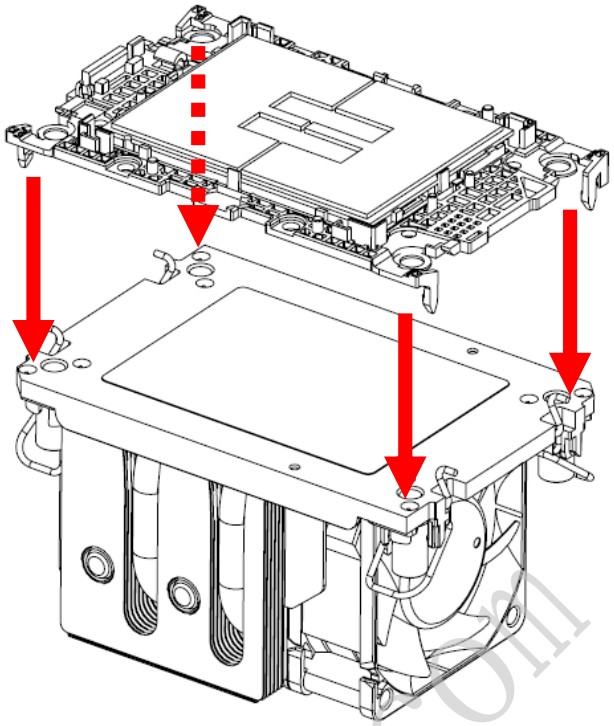
1. Remove dust cover.



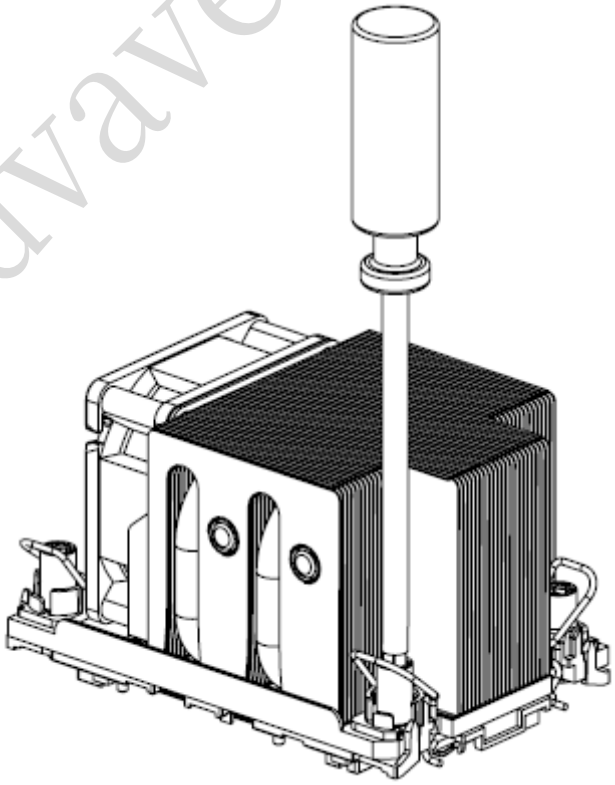
2. Install CPU on CPU clip and align with pin 1 mark.



3. Install the CPU clip assembly on the heatsink as a processor + heatsink module.



4. Put the processor heatsink module into the motherboard bolster plate by using a T-30 screwdriver (follow heatsink label directions 1 to 4). For best durability, 8.0 in-lbf torque is recommended.



Chapter 2

Connections

2.1 Introduction

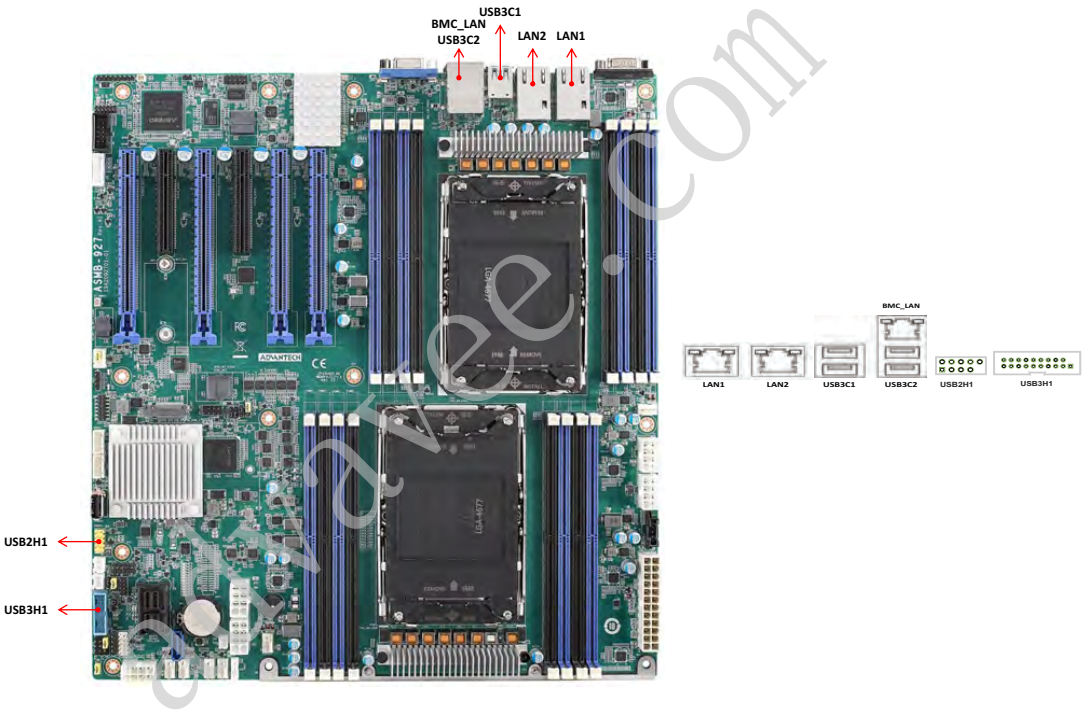
You can access most of the connectors from the top of the board as it is being installed in the chassis. If you have a large number of cards installed, you may need to partially remove a card to make all the connections.

2.2 USB Ports and LAN Port

The USB ports comply with USB 2.0 and USB 3.2 Gen1. Transmission rates of up to 480 Mbps (USB 2.0)/5Gbps (USB 3.2 Gen1) and fuse protection are supported. The USB interface can be disabled in the system BIOS setup.

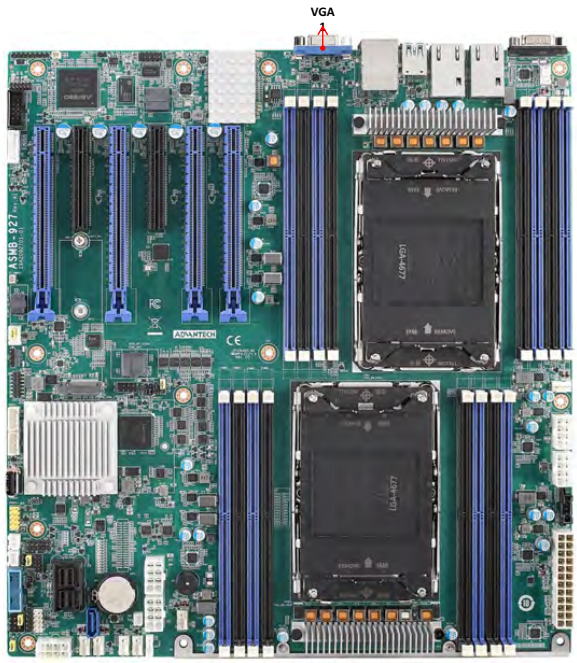
ASMB-927 is equipped with two 10GbE. They are all with RJ-45 jacks and supported by all major network operating systems. BMC_LAN is the dedicated BMC LAN, while LAN2 is the shared BMC LAN.

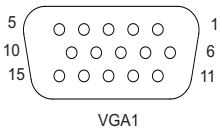
For the USB cable used by USB3H1 connector, please refer to the optional accessories in the ASMB-927 datasheet.



2.3 VGA Connector (VGA1)

The ASMB-927 includes a VGA interface that can drive conventional CRT and LCD displays.

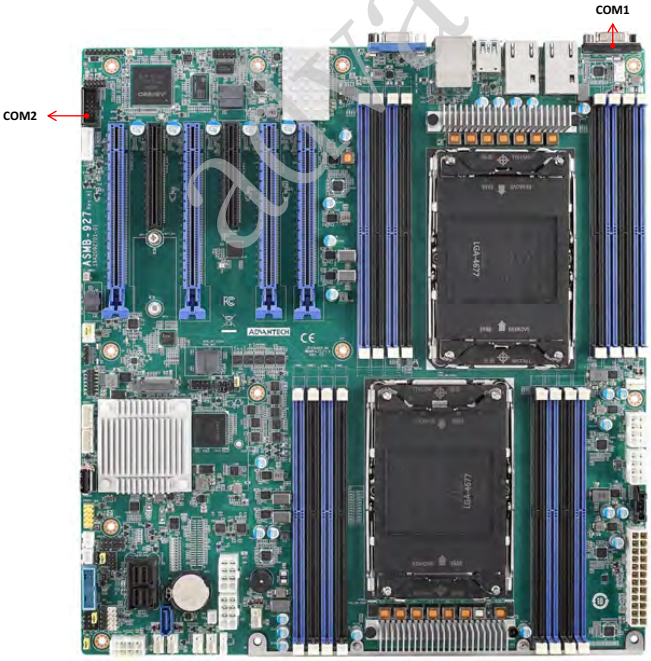


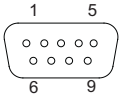


VGA1

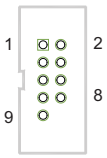
2.4 Serial Ports (COM1~2)

The ASMB-927 offers one serial port on the rear plate and one 2.50mm onboard with 2 x 5-pin pitches.





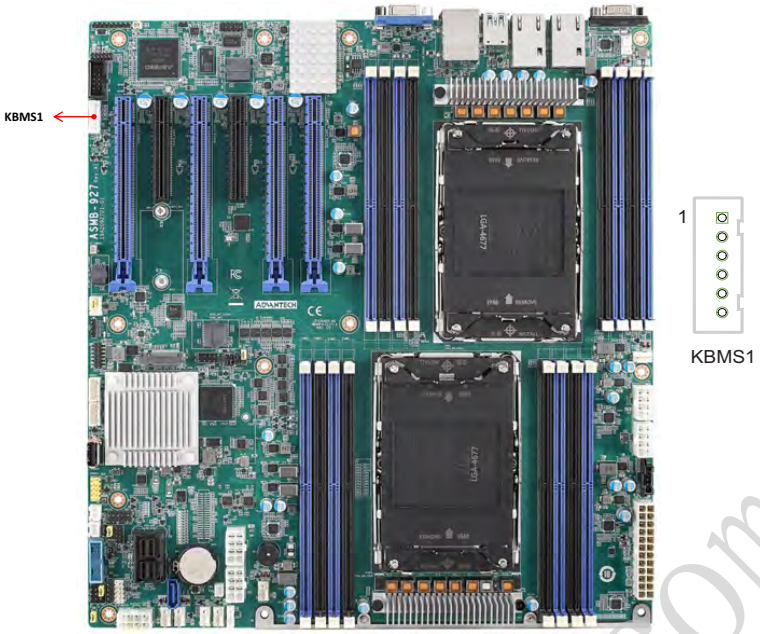
COM1



COM2

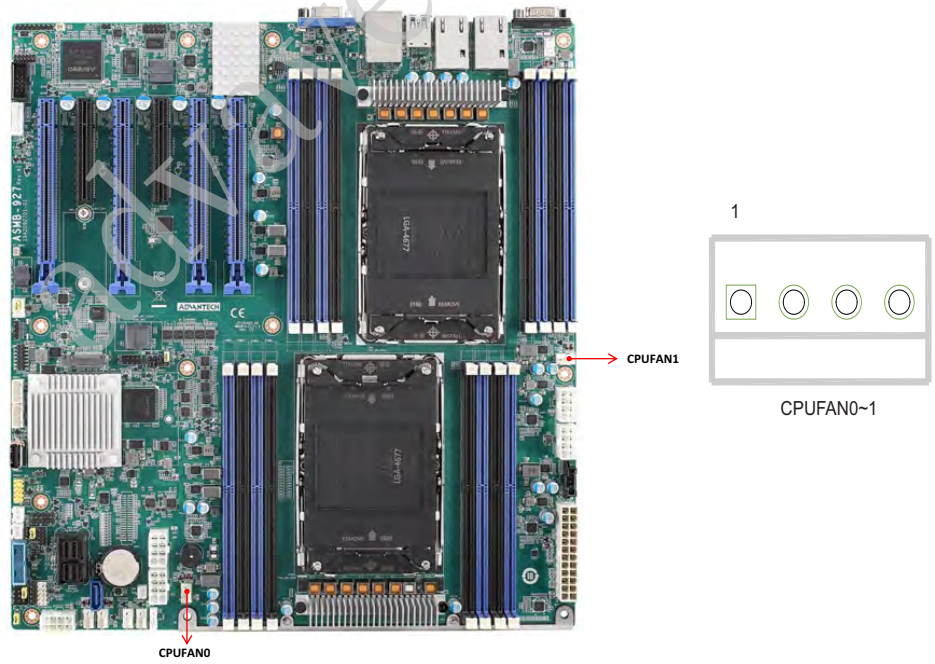
2.5 PS2 Keyboard and Mouse Connectors (KBMS1)

The 6-pin KBMS1 connector is for additional keyboard & mouse device usage.

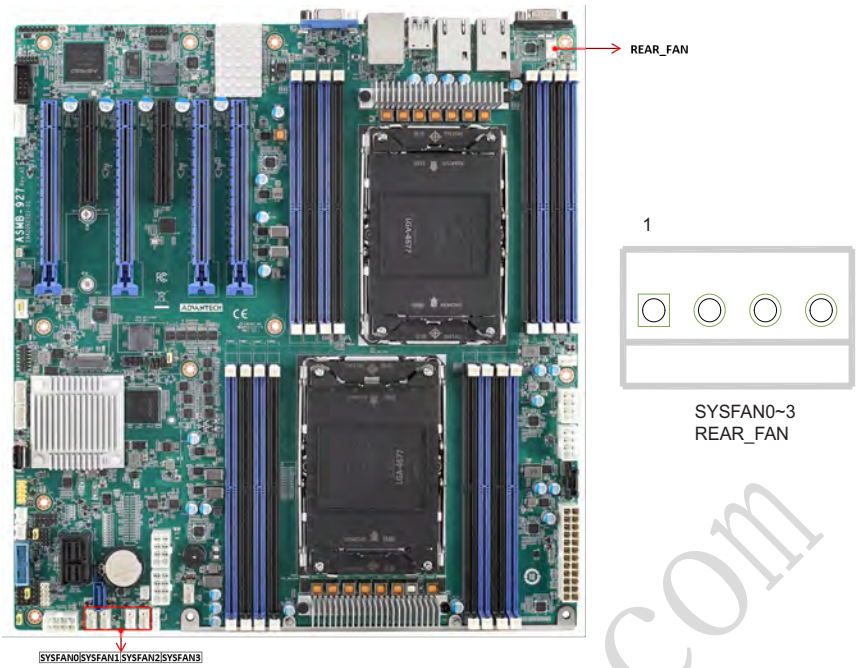


2.6 CPU Fan Connector (CPUFAN0~1)

If a fan is used, this connector supports cooling fans that draw up to 1.5A (18 W).

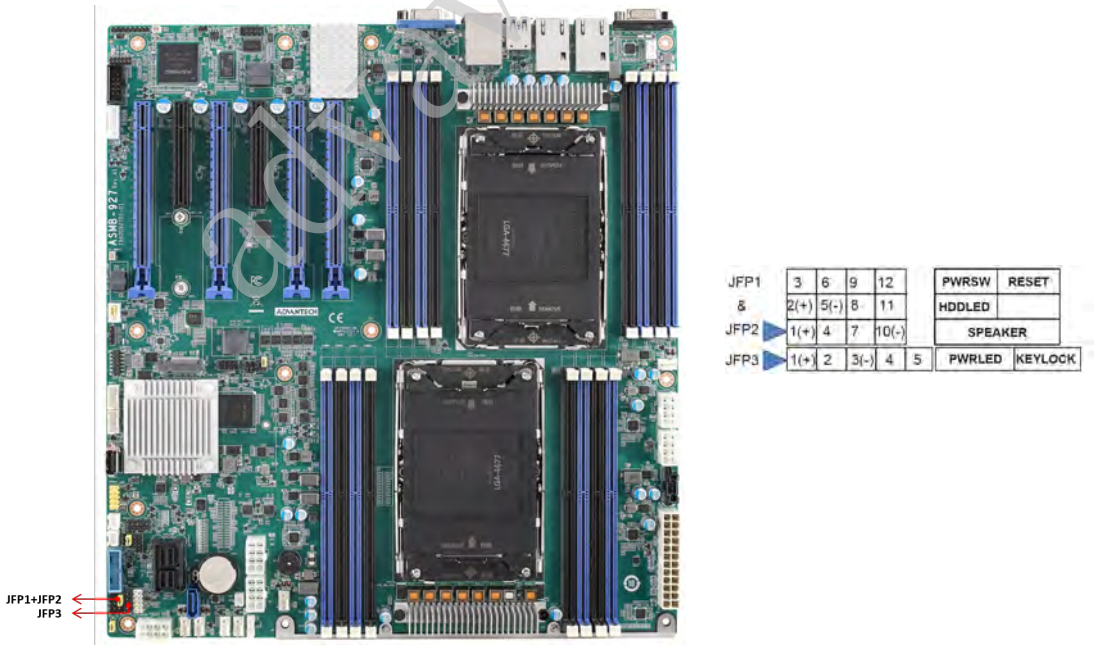


2.7 System Fan Connector (SYSFAN0~3, REAR_FAN)



2.8 Front Panel Connector (JFP1, JFP2, JFP3)

There are several external switches and LEDs to monitor and control the ASMB-927.

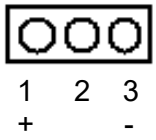


2.8.1 Power LED (JFP3)

JFP3 pins 1 and 3 are for the power LED. Refer to Appendix B for detailed information on the pin assignments. If an ATX power supply is used, the system's power LED status will be as indicated.

Table 2.1: ATX power supply LED status

ACPI Power Mode	LED (ATX power)
System on (S0)	On
System hibernation(S4)	Slow flashes
System off (S5)	Off

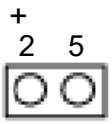


2.8.2 External Speaker (JFP2 Pins 1, 4, 7, 10)

JFP2 pins 1, 4, 7, and 10 connect to an external speaker. The ASMB-927 provides an onboard buzzer as an alternative. To enable the buzzer, set pins 7-10 closed.

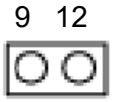
2.8.3 HDD LED Connector (JFP1 Pins 2 & 5)

You can connect an LED to JFP1 to indicate when the HDD is active.



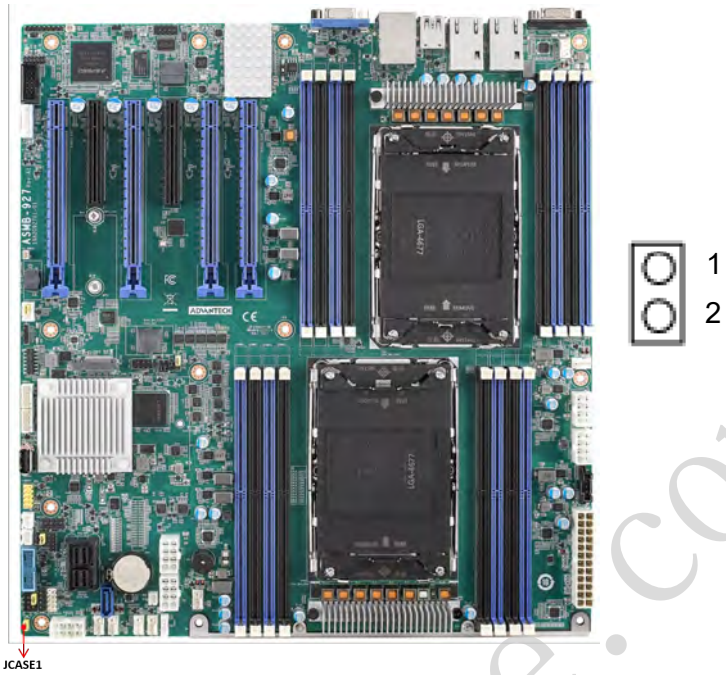
2.8.4 Reset Connector (JFP1 Pins 9 & 12)

Many computer cases offer the convenience of a reset button.



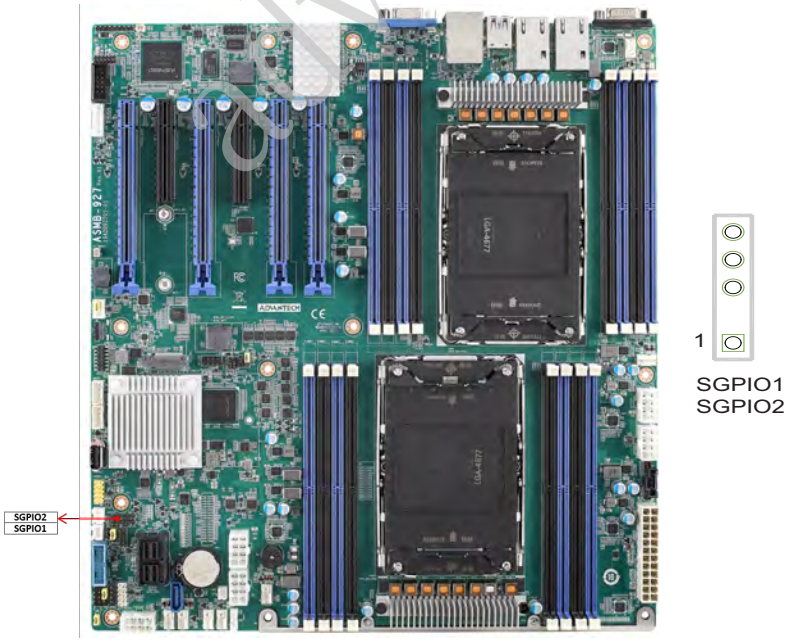
2.9 Case Open (JCASE1)

A chassis intrusion header is located at JCASE1 on the motherboard. Attach the appropriate cable from the chassis to be informed of a chassis intrusion when the chassis has been opened. The default function is disabled and pin 1-2 is bridged by a jumper cap.

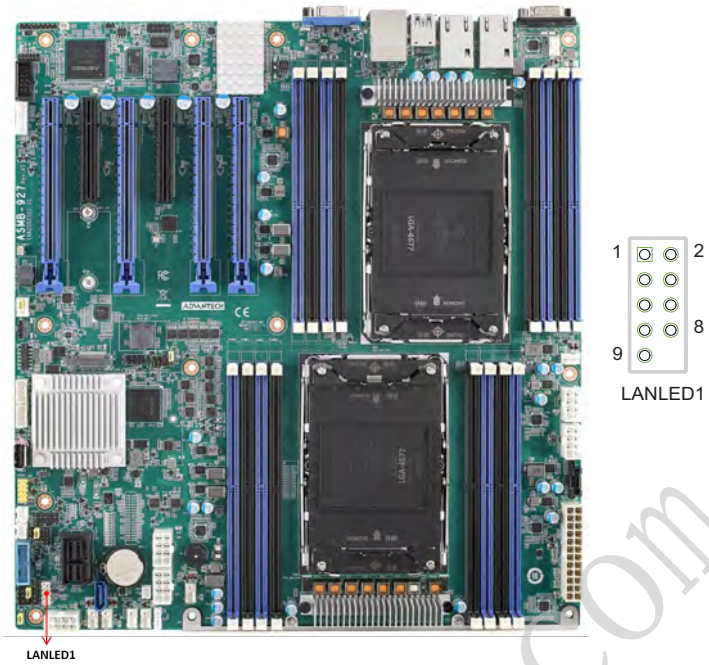


2.10 SATA SGPIO (SGPIO1)

SGPIO1 and SGPIO2 are connected to the hard drive backplane for interpreting hard drive LED signals.

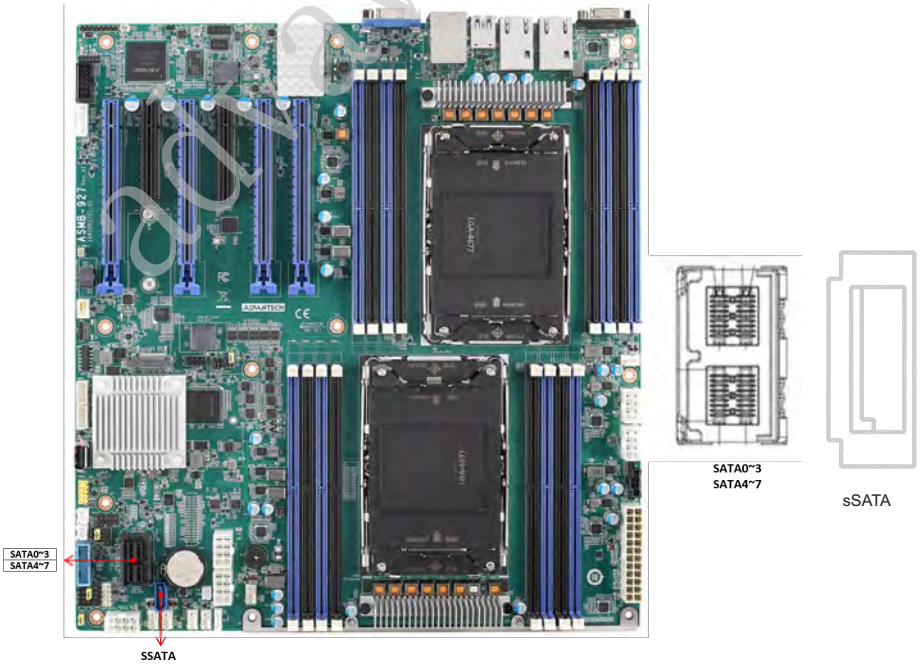


2.11 Front Panel LAN Indicator Connector (LANLED1)



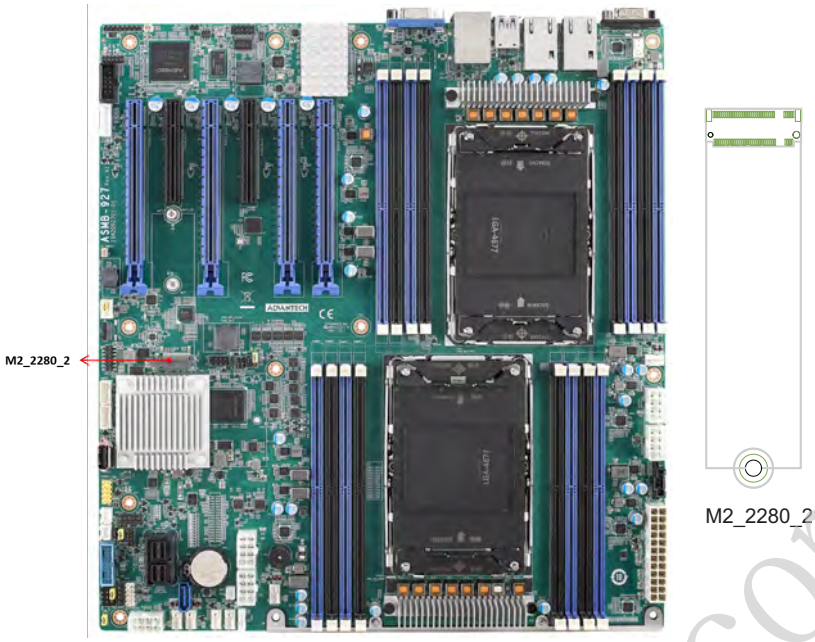
2.12 SATA and sSATA (SATA 0~3, SATA 4~7)

The ASMB-927 features eight SATA III ports (6 Gbps) via SFF-8643 connectors and one 7-pin SATA port.



2.13 M.2 Connector (M2_2280_2)

The M.2 2280 connector supports both SATA and PCIe SSD components.



2.14 PCIe Expansion Slots

The ASMB-927 provides six expansion slots that can support up to three double-deck cards (with chassis HPC-7485). The riser card for 1U or 2U chassis can be used in slot 6 only, and the PCIe link is from CPU1.

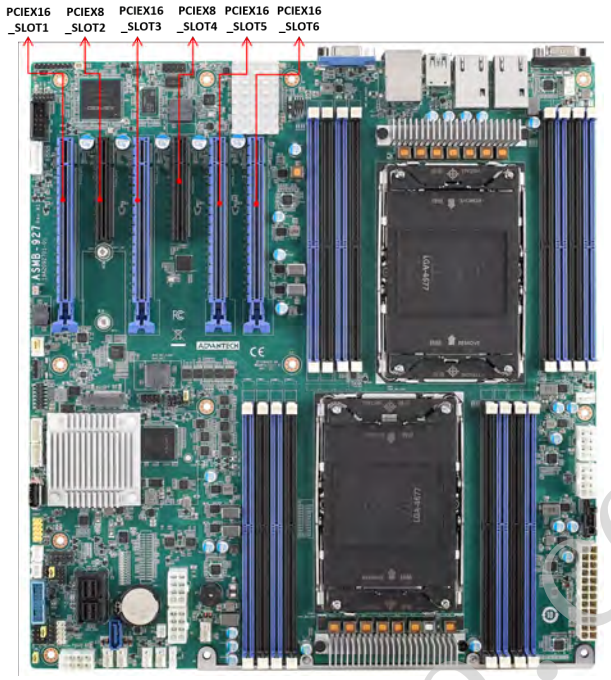


Table 2.2: PCIe slots

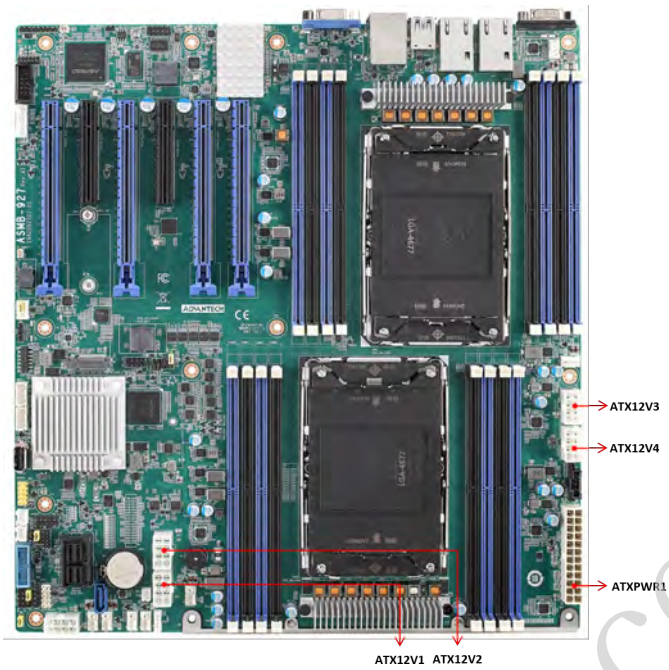
	Slot length	Link	PCIe generation	PCIe link from
SLOT1	PCI-E x16	PCI-E x16	5	CPU0
SLOT2	PCI-E x8	PCI-E x8	5	CPU1
SLOT3	PCI-E x16	PCI-E x16	5	CPU0
SLOT4	PCI-E x8	PCI-E x8	5	CPU1
SLOT5	PCI-E x16	PCI-E x16	5	CPU0
SLOT6	PCI-E x16	PCI-E x16	5	CPU1

Table 2.3: PCIe expansion slots

	Part number	Description	Remarks
Riser Card	ASMB-RF28-20B1	ASMB-RF28 (2U Gen5 riser card)	2 x PCI-E x8
	ASMB-RF2F-10B1	ASMB-RF2F (2U Gen5 riser card)	1 x PCI-E x16
	ASMB-RF1F-10B1	ASMB-RF1F (1U Gen5 riser card)	1 x PCI-E x16

Note: Refer to page 67. BIOS setting [X8,X8] is required for slot 6 when using ASMB-RF28-20B1.

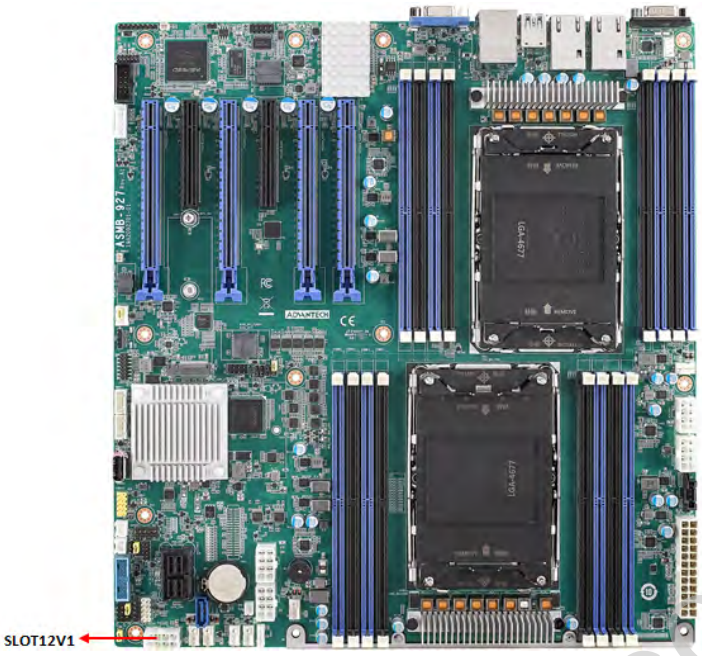
2.15 Auxiliary Power Connector (ATXPWR1/ ATX12V1/ATX12V2/ATX12V3/ATX12V4)



Note!

1. *Please use a power supply of SSI type; minimum output should be at least 700 W with 5 Vsb @2.5 A.*
2. *The ATXPWR1 & ATX12V1 & ATX12V3 should be all connected with the power supply, otherwise the ASMB-927 will not boot up normally.*

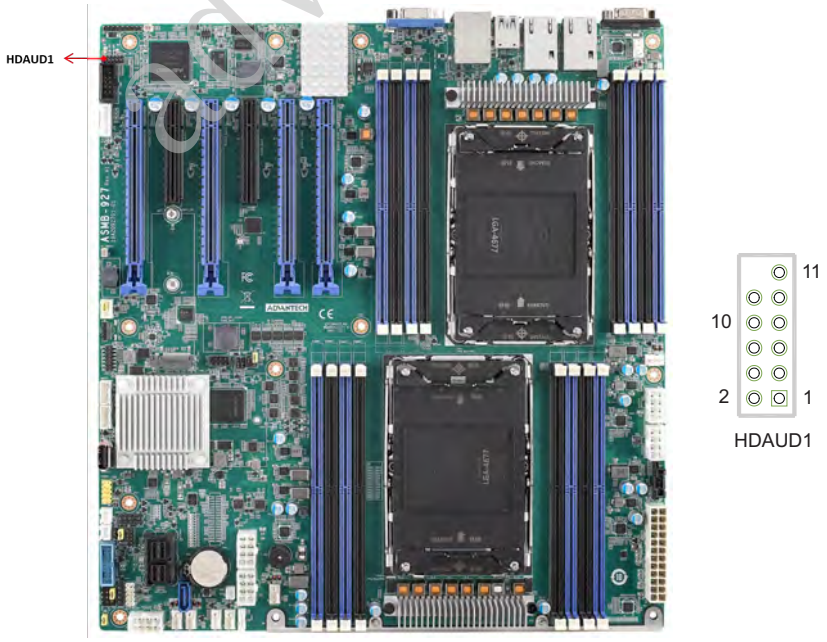
2.16 PCIe Power Connector (SLOT12V1)



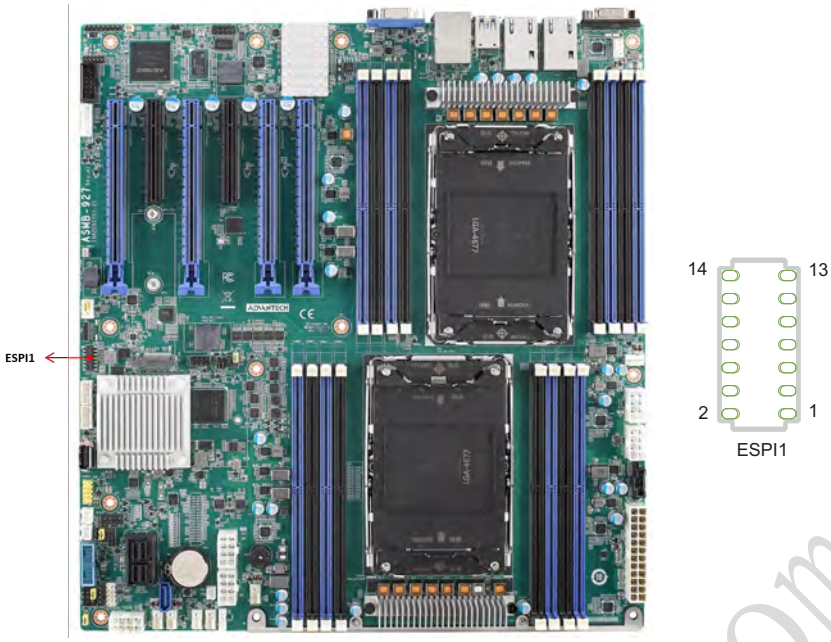
Note! *This SLOT12V1 connector is only necessary if PCIe cards that draw more than 70 watts from the PCIe bus are installed on the motherboard.*

2.17 HD Audio Interface Connector (HDAUD1)

The ASMB-927 has one audio connector for Advantech's audio board (P/N: PCA-AUDIO-HDB1E) installation.

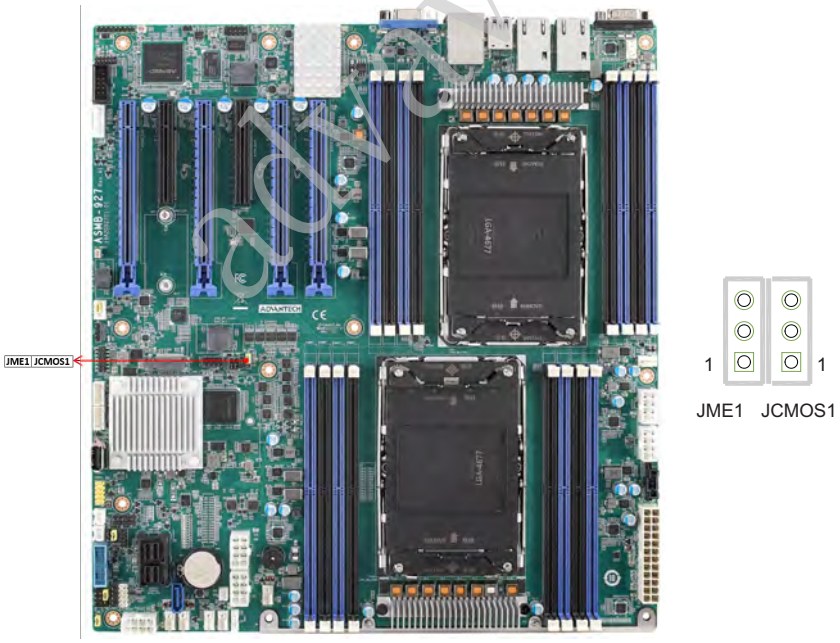


2.18 ESPI Connector (ESPI1)

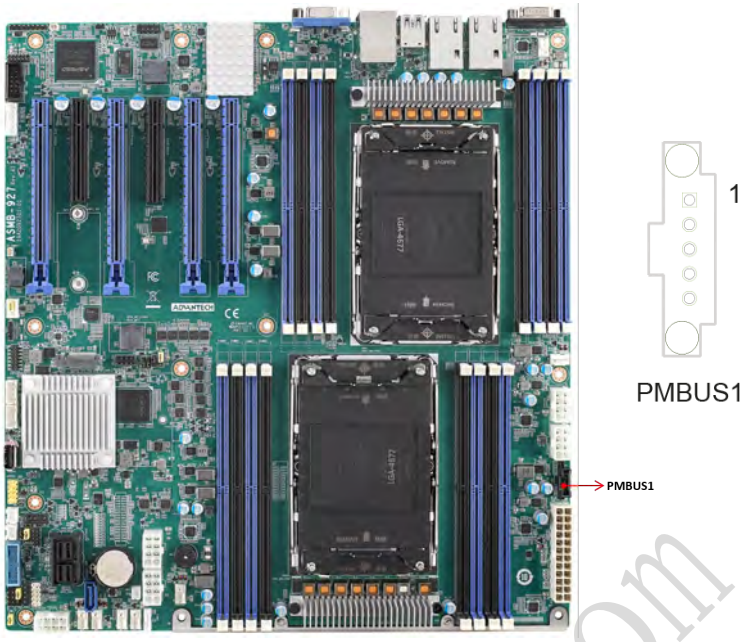


2.19 CMOS Clear and ME Update Connector (JCMOS1, JME1)

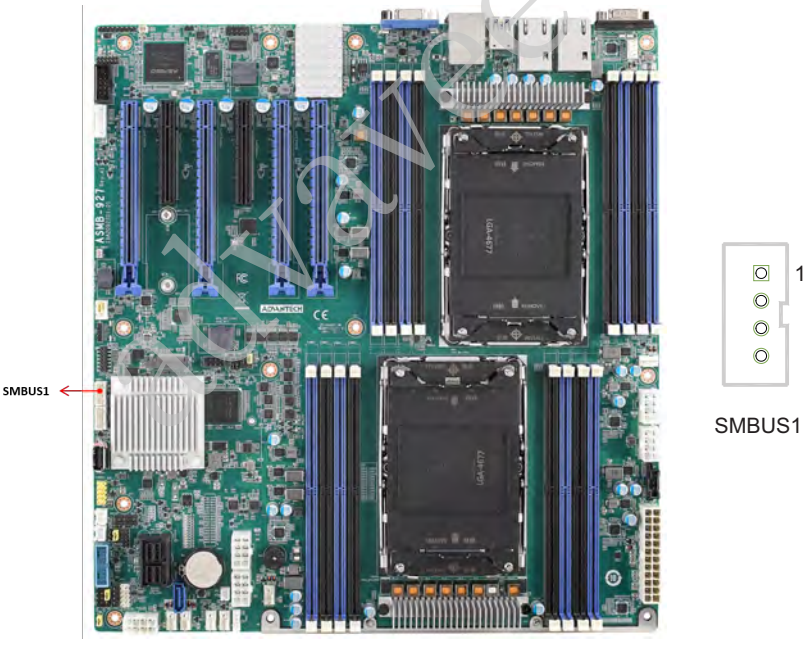
Setting jumpers from pin 1-2 to pin 2-3, then back to pin 1-2 to reset CMOS data and enable ME update.



2.20 PMBUS Connector (PMBUS1)

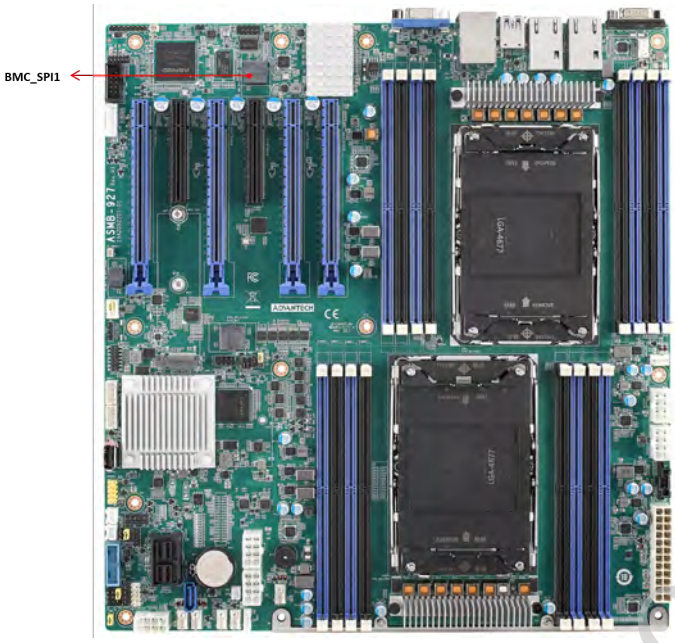


2.21 Front Panel SMBUS Connector (SMBUS1)

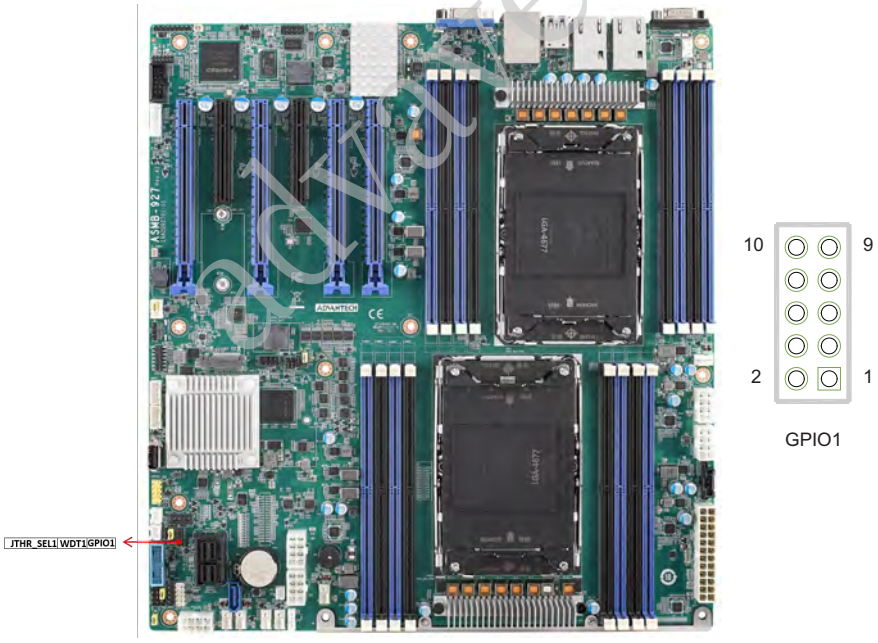


2.22 BMC IC Socket (BMC_SPI1)

Enabling IPMI feature through BMC_SPI1. The BMC image has already been pre-installed on ASMB-927.



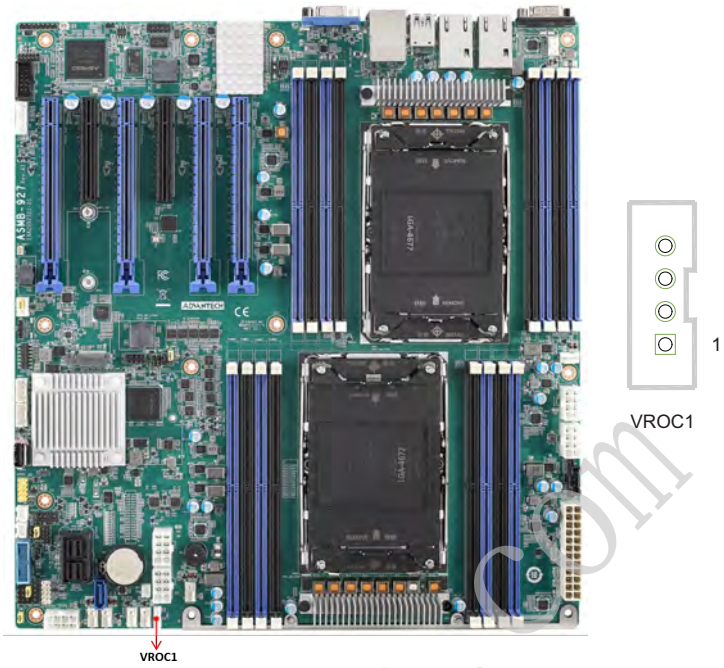
2.23 GPIO Connector (GPIO1)



GPIO1

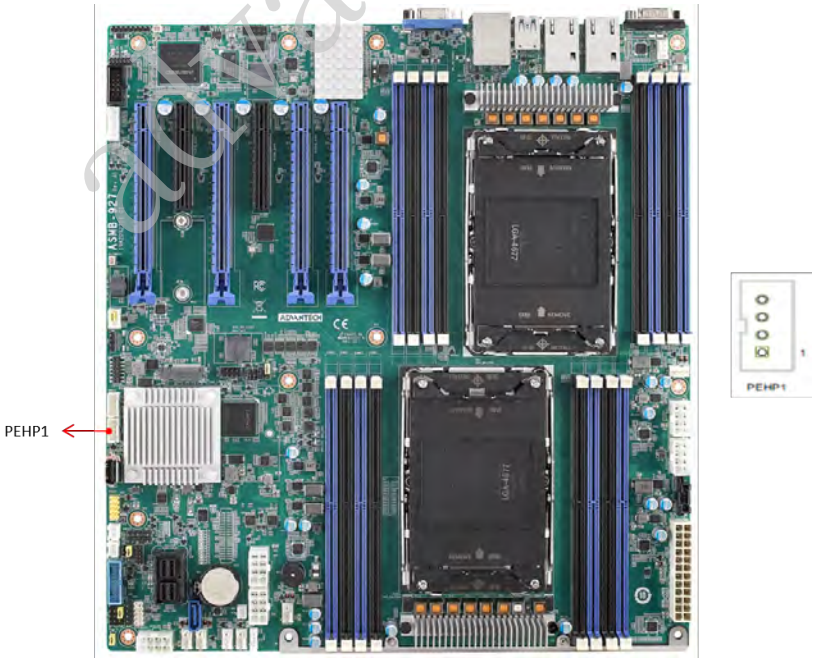
2.24 Intel Virtual RAID (VROC1)

The Intel VROC license key of VMD allows NVMe SSDs to connect via PCIe and directly manage the CPU for better RAID performance. Enable NVMe SSD RAID, hot-plug, and LED management features via VROC connector.



2.25 NVMe RAID LED Control (PEHP1)

Connect to storage chassis to enable the NVMe RAID LED control feature.

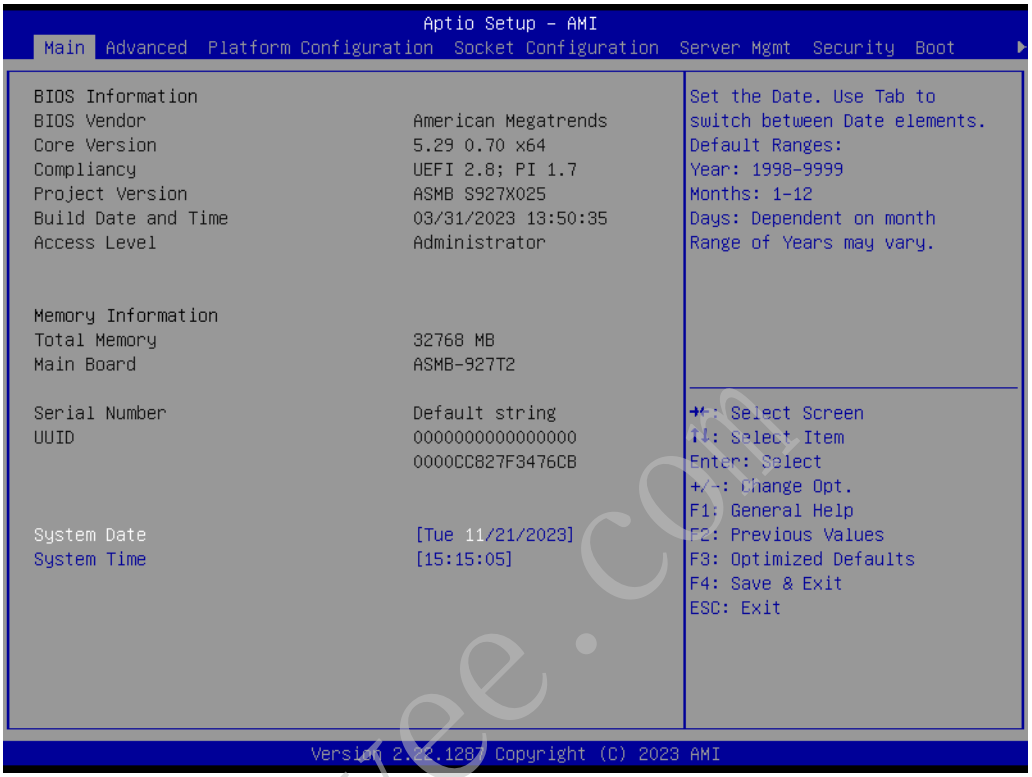


Chapter 3

AMI BIOS

3.1 Introduction

With the AMI BIOS setup program, you can modify BIOS settings and control the special features of your computer. The setup program uses a number of menus for making changes and turning special features on or off. This chapter describes the basic navigation of the ASMB-927 setup screens.



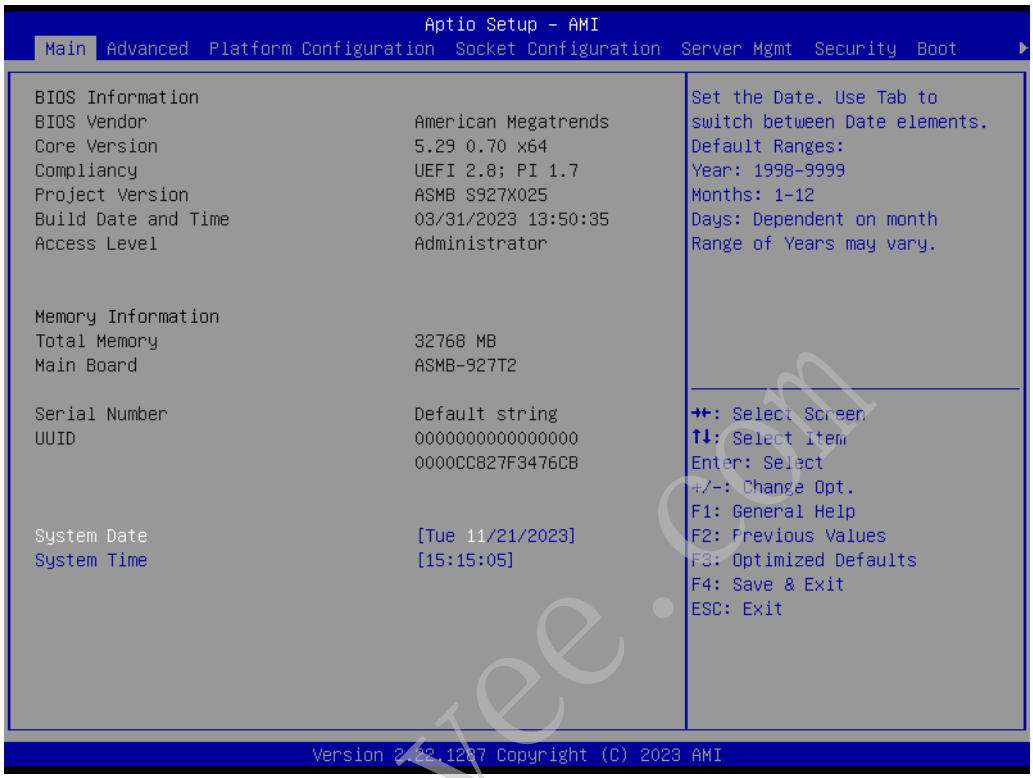
AMI's BIOS ROM has a built-in setup program that allows users to modify the basic system configuration. This type of information is stored in a battery-backed up CMOS so it retains the setup information when the power is turned off.

Note! *The BIOS setup screens shown in this chapter are for reference only, they may not exactly match what you see on your display.*

3.2 BIOS Setup

3.2.1 Main Menu

Press <Del> during bootup to enter the AMI BIOS CMOS setup utility; the main menu will appear on the screen. Use arrow keys to select among the items and press <Enter> to accept or enter the sub-menu.



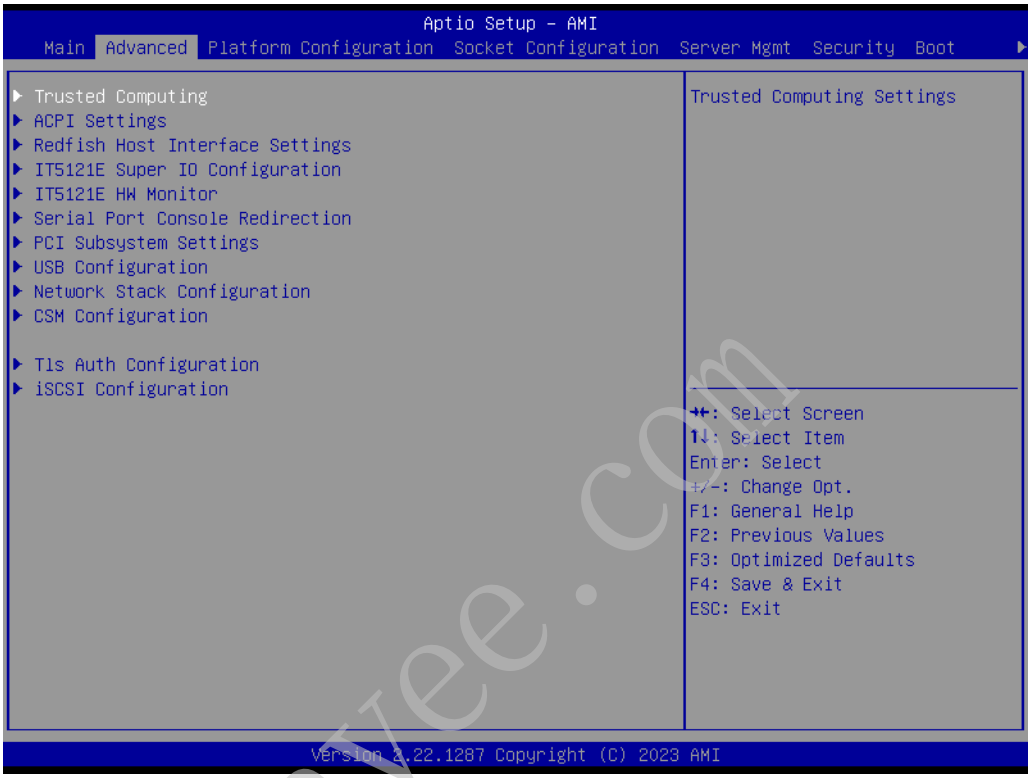
The Main BIOS setup screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured; options in blue can be. The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

- **System Date/System Time**

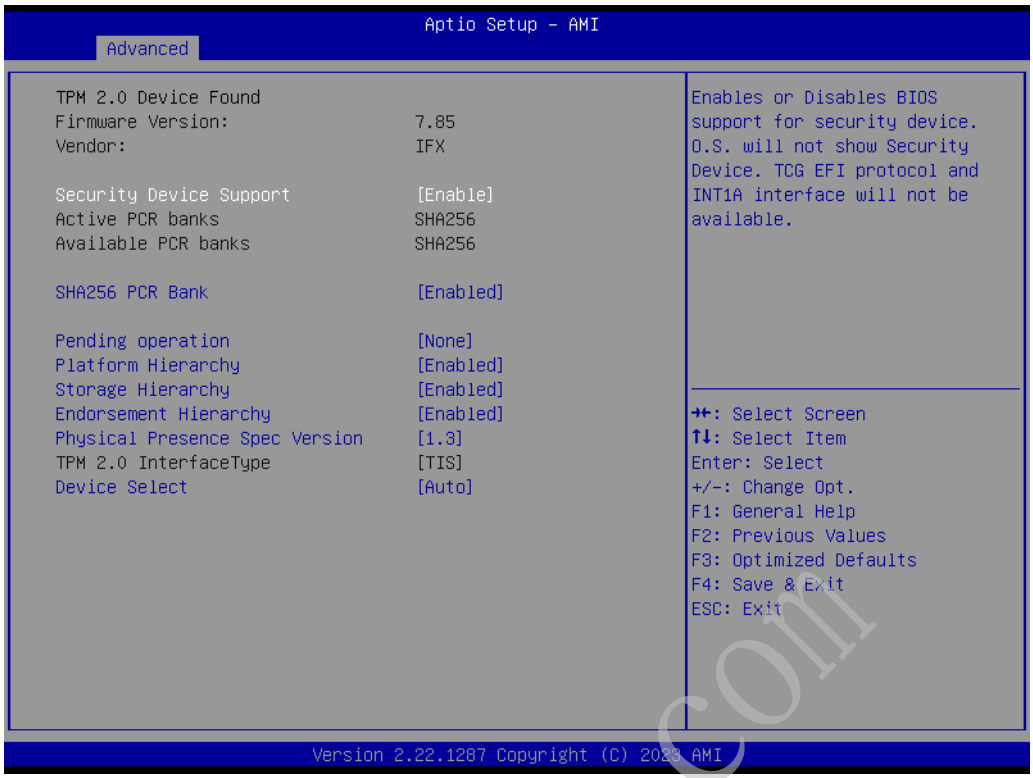
  Use this option to change the system time and date. Highlight System Time or System Date using the arrow keys. Enter new values through the keyboard. Press the <Tab> key or the arrow keys to move between fields. The date must be entered in MM/DD/YY format. The time must be entered in HH:MM:SS format.

3.2.2 Advanced BIOS Features Setup

Select the advanced tab from the ASMB-927 setup screen to enter the advanced BIOS setup screen. You can select any of the items in the left frame of the screen, such as CPU configuration, to go to the sub menu for that item. You can display an advanced BIOS setup option by highlighting it using the arrow keys. All advanced BIOS setup options are described in this section. The advanced BIOS setup screens are shown below. The sub menus are described on the following pages.

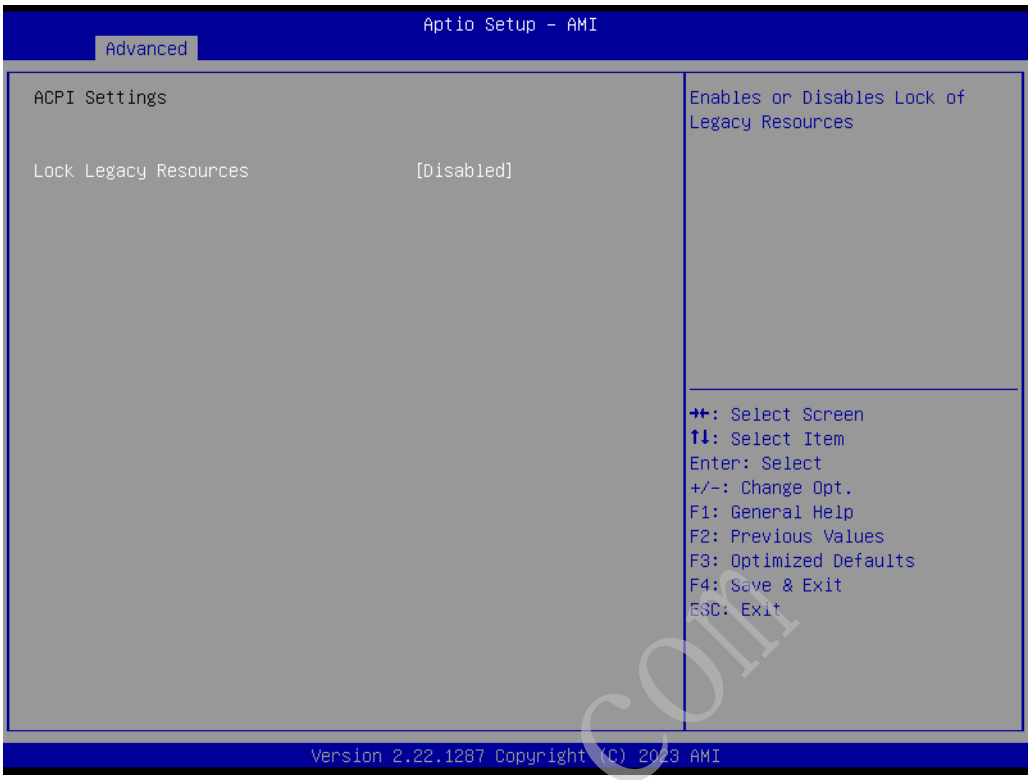


3.2.2.1 Trusted Computing



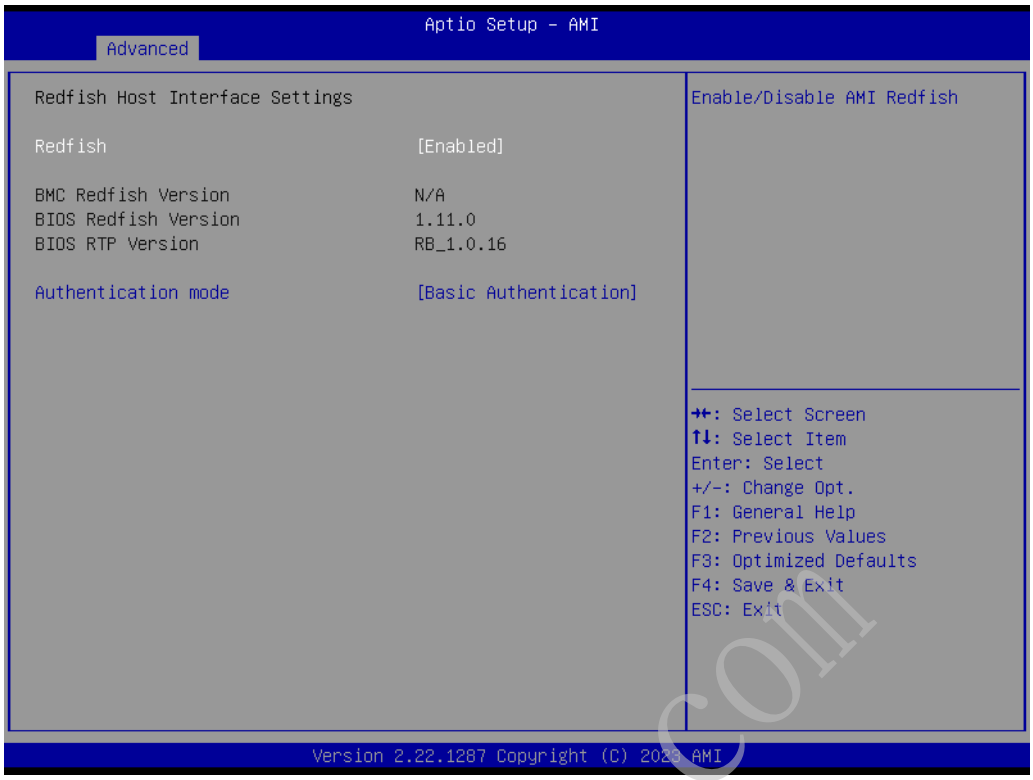
- **Security Device Support**
  Enables or disables BIOS support for security devices.

3.2.2.2 ACPI Settings



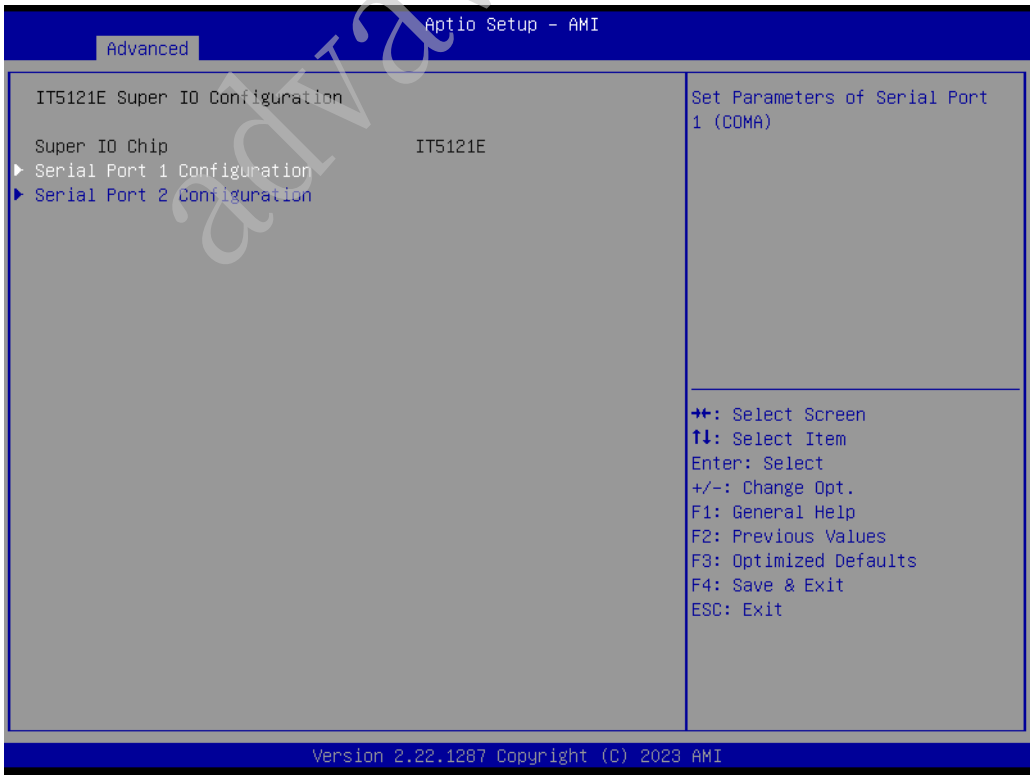
- **Lock Legacy Resources**
  Enable or disable the lock legacy resources feature.

3.2.2.3 Redfish Host Interface Settings

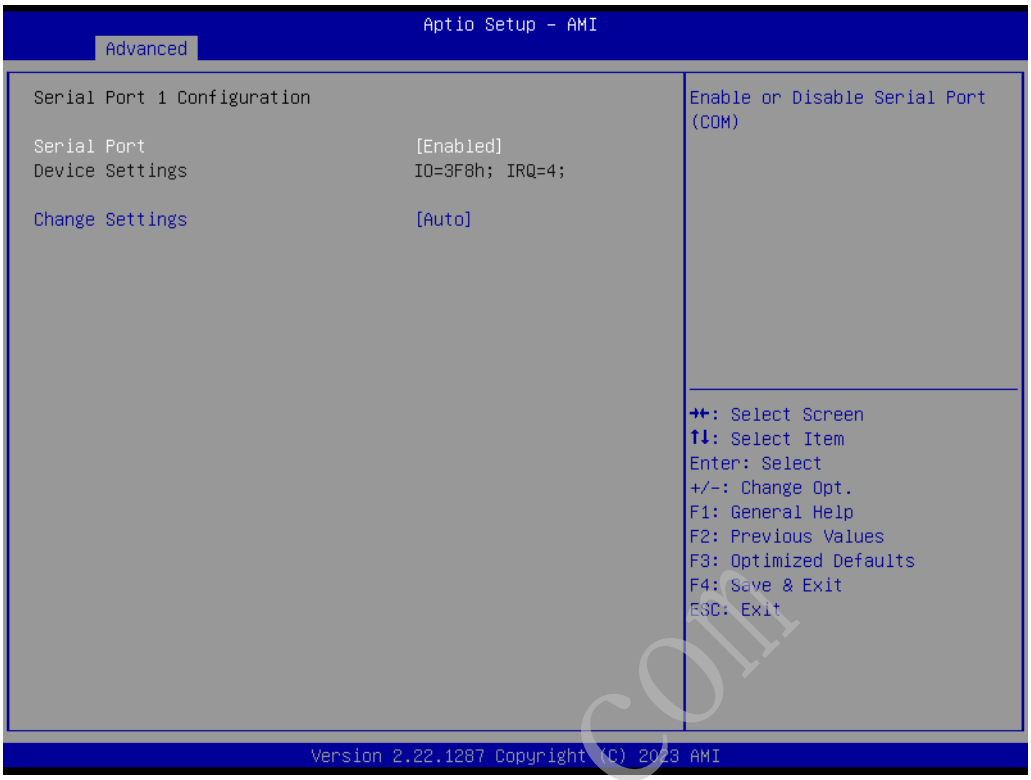


- **Redfish**
  Enable or disable the BMC Redfish feature.

3.2.2.4 IT5121E Super IO Configuration

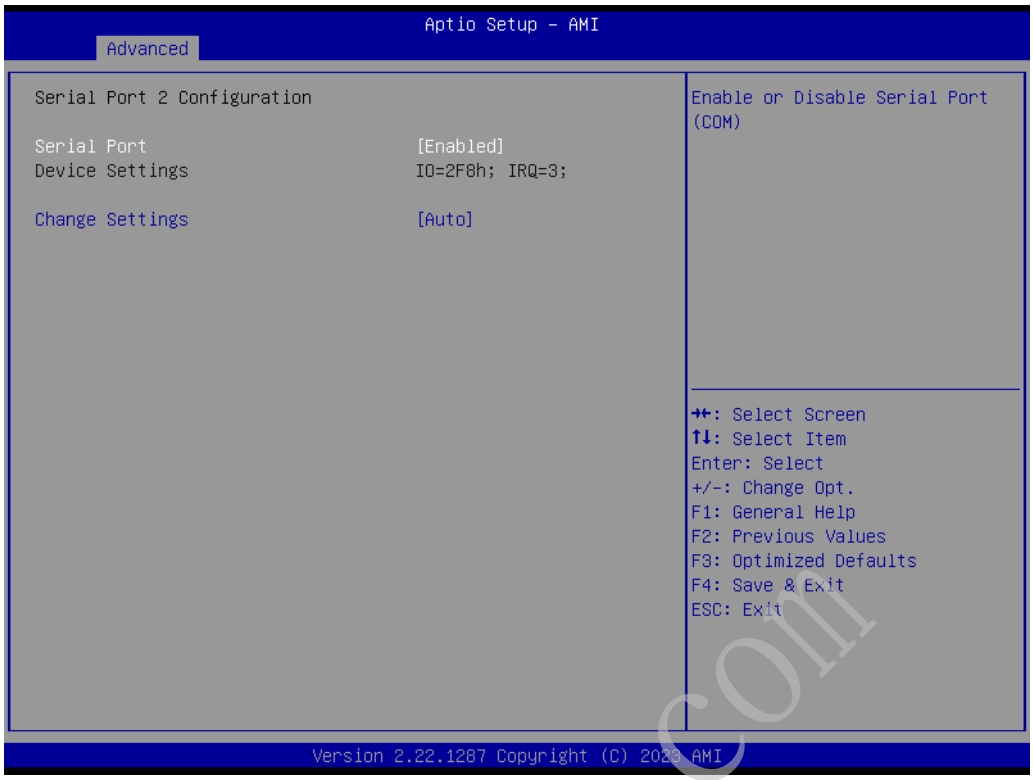


Serial Port 1 Configuration



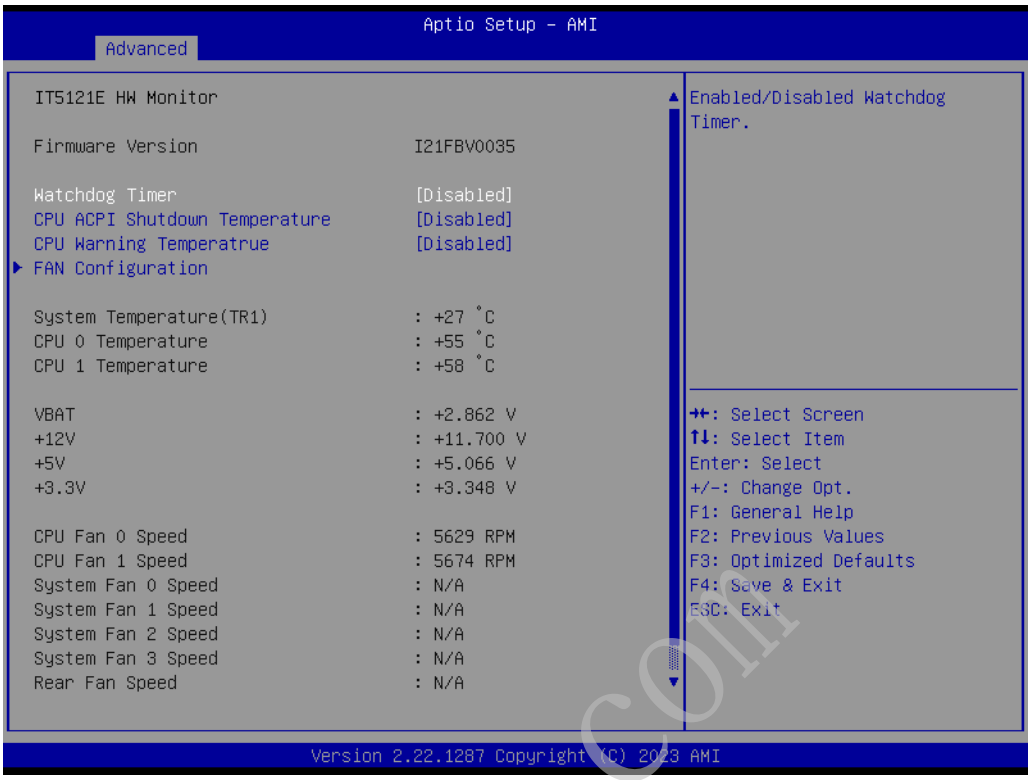
- **Serial Port**
  Enable or disable serial port 1.
- **Change Settings**
  To select an optimal setting for serial port 1. Default setting is "Auto".

Serial Port 2 Configuration



- **Serial Port**
  Enable or disable serial port 2.
- **Change Settings**
  To select an optimal setting for serial port 2. Default setting is "Auto".

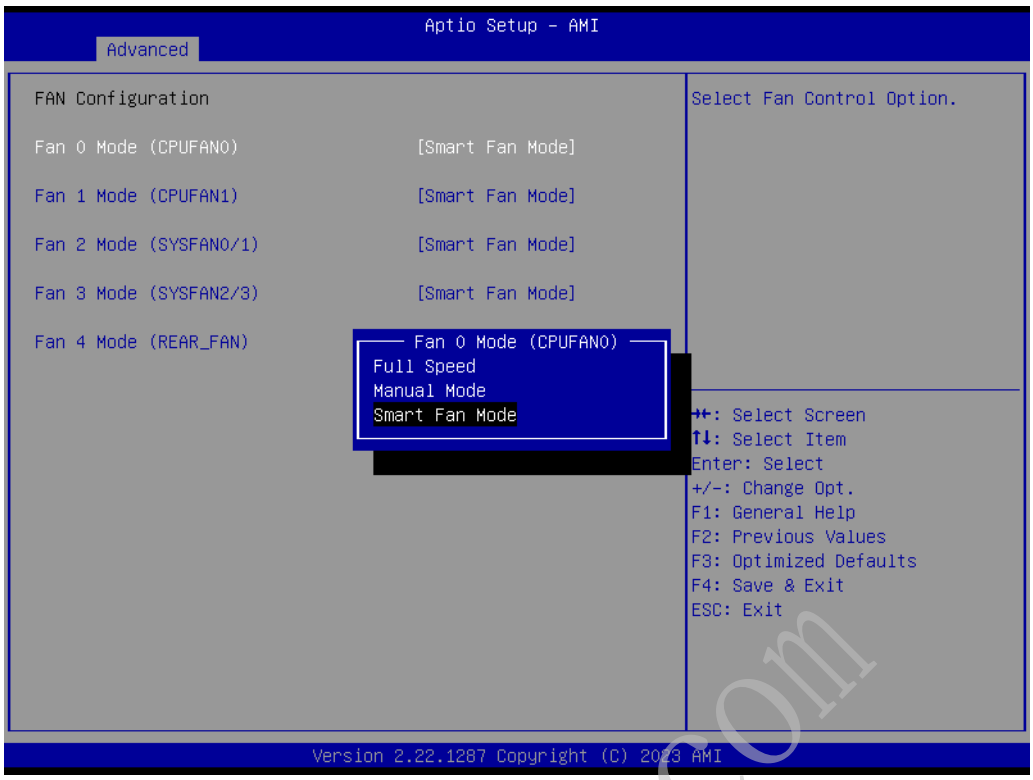
3.2.2.5 IT5121E HW Monitor

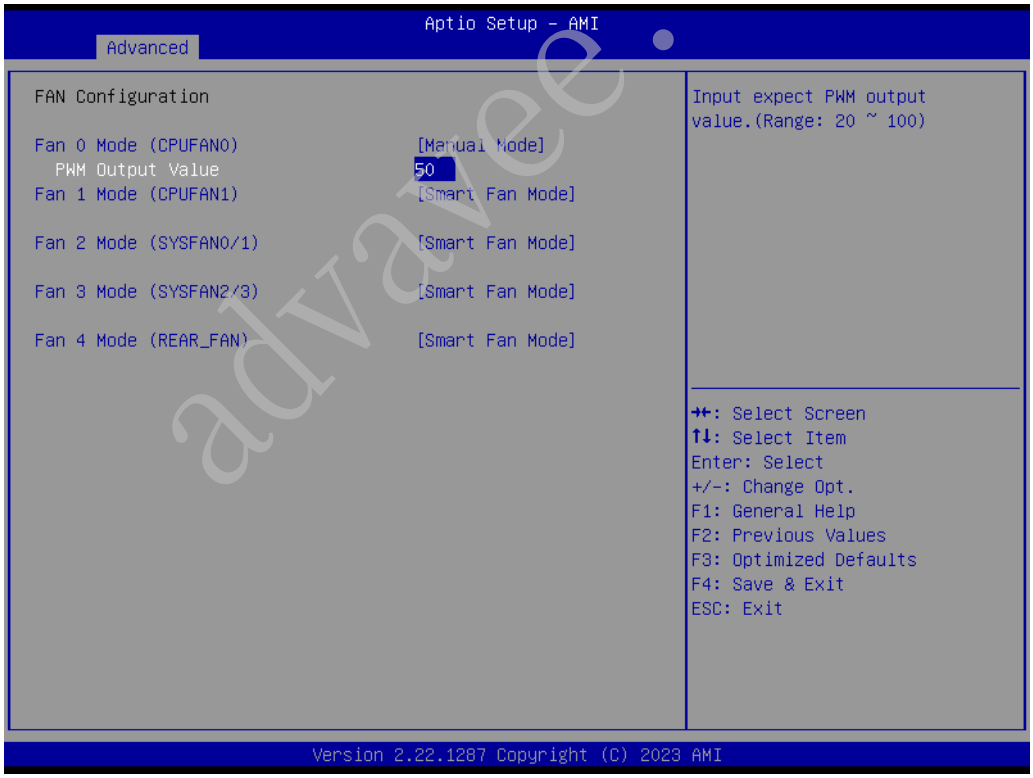


- **Watchdog Timer**
  Enable or disable the watchdog timer function.
- **CPU ACPI Shutdown Temperature**
  Enable or disable the ACPI shutdown temperature threshold. When the system reaches the shutdown temperature, it will be automatically shut down by the ACPI OS to protect the system from overheat damage.
- **CPU Warning Temperature**
  Enable or disable the CPU warning temperature threshold. When the system reaches the warning temperature, the speaker will beep.
- **Fan Configuration**
  Fan 0 mode controls CPUFAN0, Fan 1 mode controls CPUFAN1, FAN 2 mode controls SYSFAN0 and SYSFAN1, FAN 3 mode controls SYSFAN2 and SYSFAN3; and FAN4 mode controls REAR_FAN.

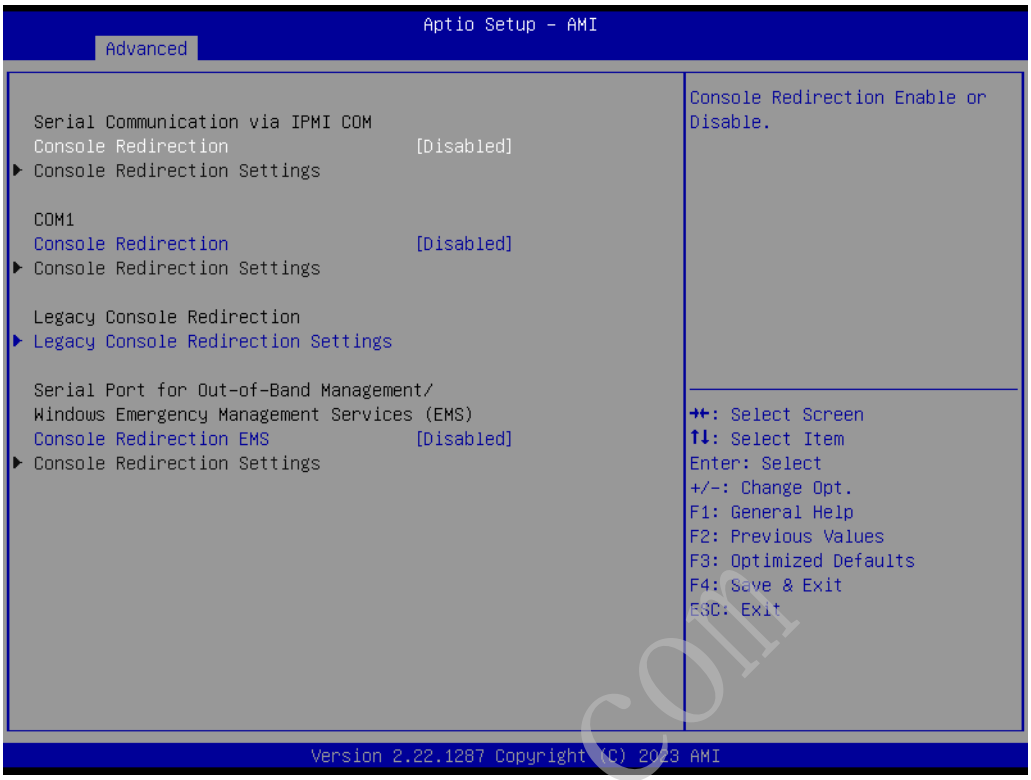
  The default of CPU/System FAN is Smart FAN mode and the BIOS will automatically control the FAN speed by CPU temperature.

  When set to manual mode, fan duty settings can be changed in the range of 20 ~100%. The default setting is 50%.

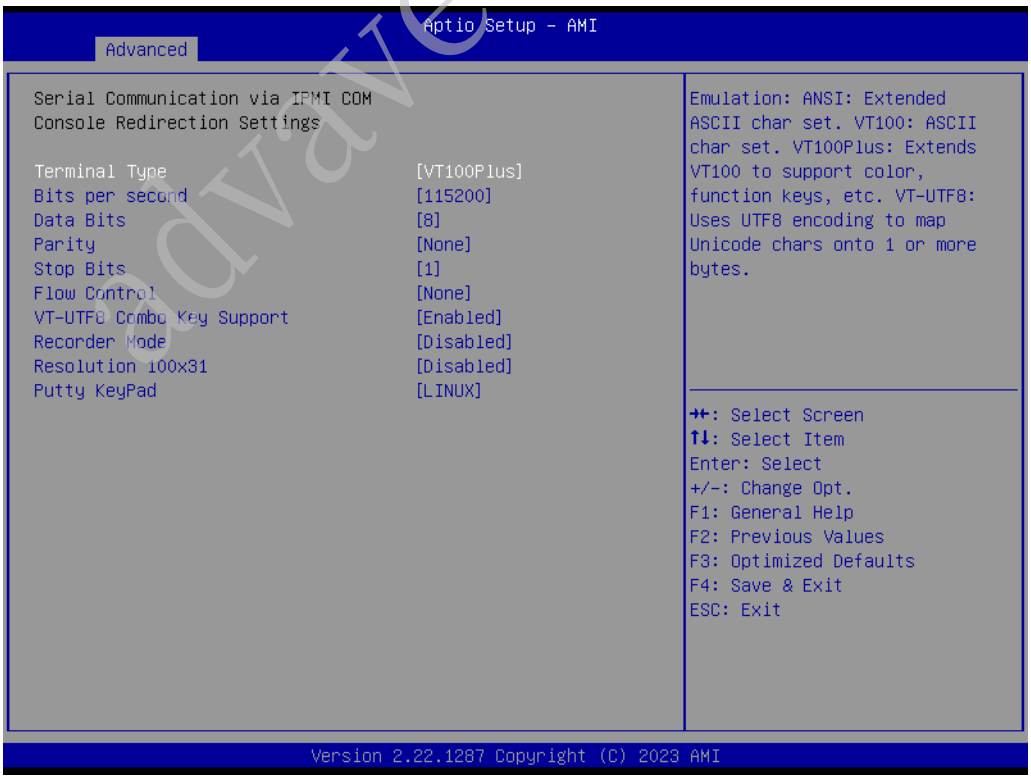

Aptio Setup – AMI
Advanced
FAN Configuration
Fan 0 Mode (CPUFAN0) [Smart Fan Mode]
Fan 1 Mode (CPUFAN1) [Smart Fan Mode]
Fan 2 Mode (SYSFAN0/1) [Smart Fan Mode]
Fan 3 Mode (SYSFAN2/3) [Smart Fan Mode]
Fan 4 Mode (REAR_FAN) [Smart Fan Mode]
Fan 0 Mode (CPUFAN0)
Full Speed
Manual Mode
Smart Fan Mode
Select Fan Control Option.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.22.1287 Copyright (C) 2023 AMI


Aptio Setup – AMI
Advanced
FAN Configuration
Fan 0 Mode (CPUFAN0) [Manual Mode]
PWM Output Value 50
Fan 1 Mode (CPUFAN1) [Smart Fan Mode]
Fan 2 Mode (SYSFAN0/1) [Smart Fan Mode]
Fan 3 Mode (SYSFAN2/3) [Smart Fan Mode]
Fan 4 Mode (REAR_FAN) [Smart Fan Mode]
Input expect PWM output value.(Range: 20 ~ 100)
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.22.1287 Copyright (C) 2023 AMI

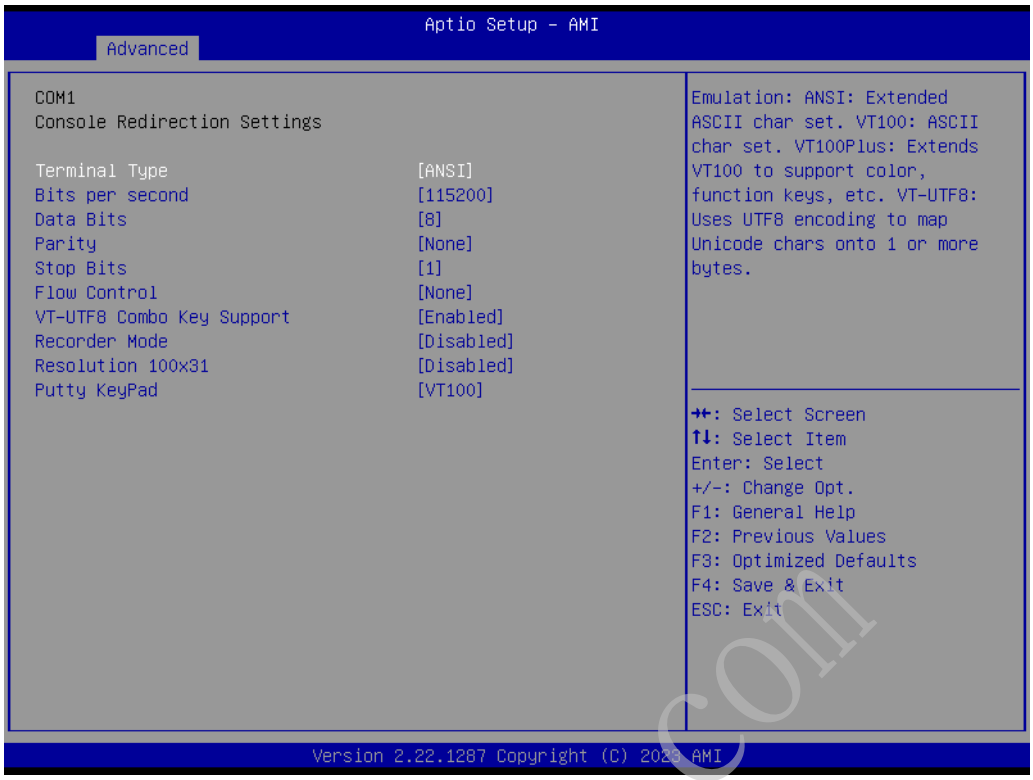
3.2.2.6 Serial Port Console Redirection



- **Serial Communication via IPMI COM**



COM1 Console Redirection Settings

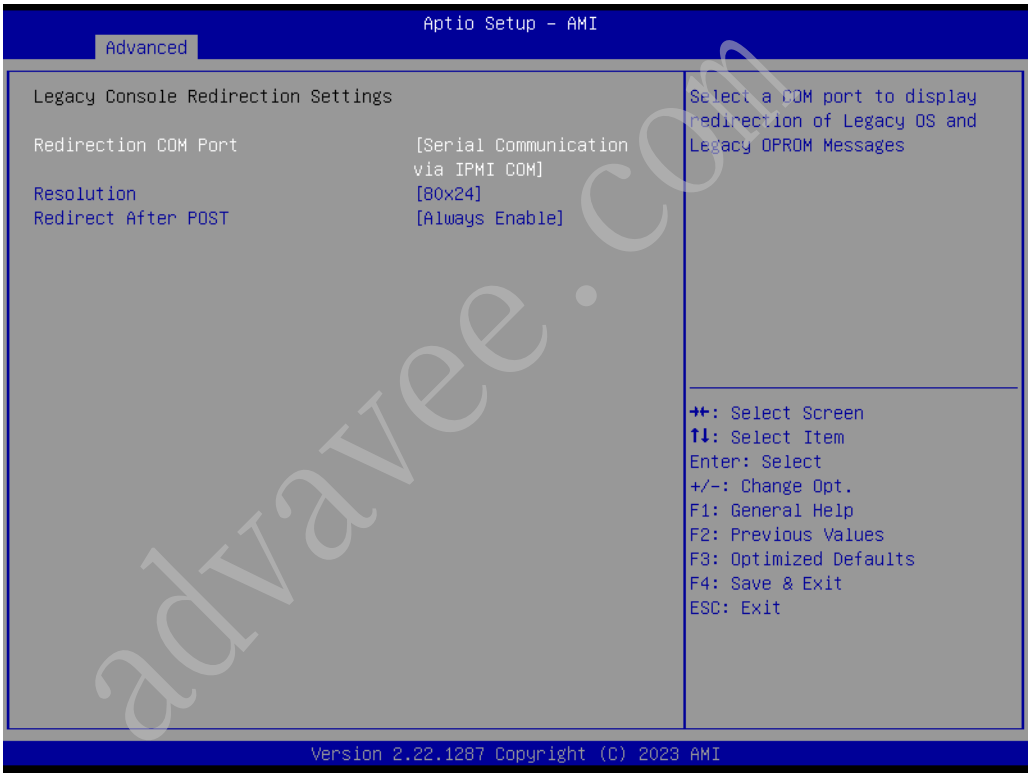


- **Terminal Type**
  Select a terminal type to be used for console redirection.
  Options available: VT100 / VT100+ / ANSI / VT-UTF8.
- **Bits Per Second**
  Select the baud rate for console redirection.
  Options available: 9600 / 19200 / 38400 / 57600 / 115200.
- **Data Bits**
- **Parity**
  A parity bit can be sent with the data bits to detect some transmission errors.
  Even: parity bit is 0 if the number of 1's in the data bits is even.
  Odd: parity bit is 0 if number of 1's the data bits is odd.
  Mark: parity bit is always 1. Space: Parity bit is always 0.
  Mark and Space Parity do not allow for error detection.
  Options available: None/Even/Odd/Mark/Space.
- **Stop Bits**
  Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.
  Options available: **1**/2.
- **Flow Control**
  Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.
  Options available: None/Hardware RTS/CTS.

- **VT-UTF8 Combo Key Support**
  Enable VT-UTF8 combination key support for ANSI/VT100 terminals
- **Recorder Mode**
  When this mode enabled, only text will be sent; this is to capture terminal data.
  Options available: Enabled/Disabled.
- **Resolution 100 x 31**
  Enables or disables the extended terminal resolution.
- **Putty Keypad**
  Select function key and keypad on putty, default setting is "VT100".

■ **Legacy Console Redirection Settings**

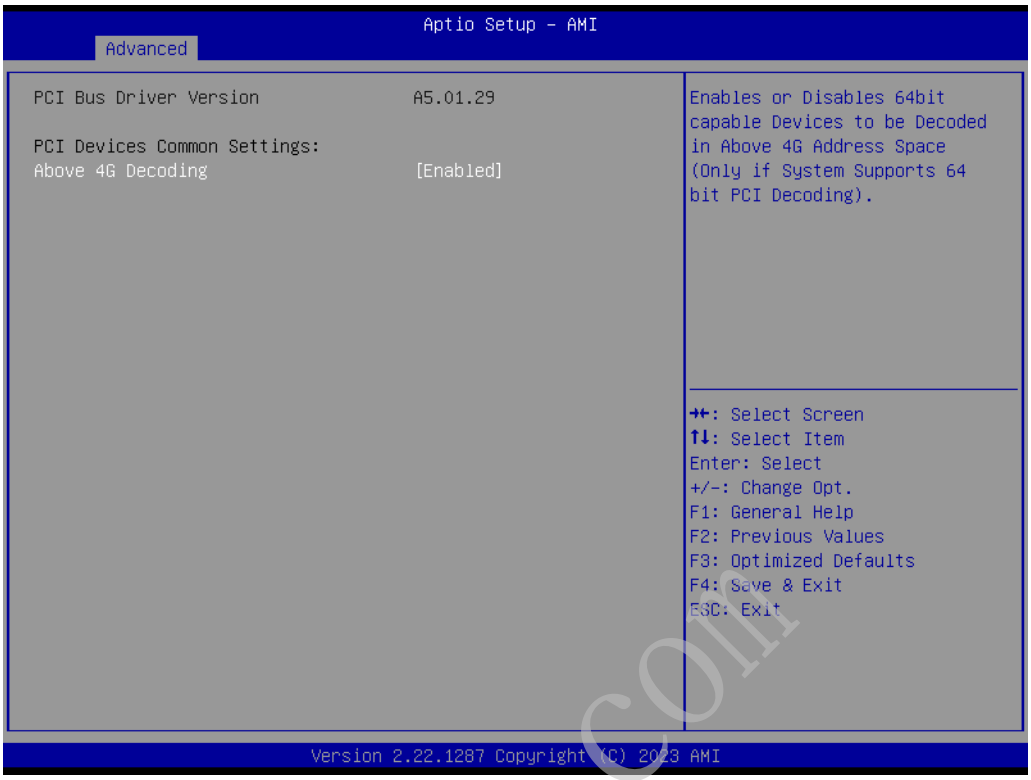
Select a COM port to display redirection of Legacy OS and Legacy OPROM messages.



Console Redirection Settings

- **Out-of-Band Mgmt Port**
  To select the com port user would like to set for having console redirection feature.
- **Terminal Type**
  Set as "VT100", "VT100+", "VT-UTF8", or "ANSI". "VT-UTF8" is the default setting.
- **Bits Per Second**
  To select serial port transmission. Speed must be matched on the other side. It can be set as "9600", "19200", "57600", or "115200". "115200" is the default setting.
- **Flow Control**
  Flow control can prevent data loss from buffer overflow. It can be set as "None", "Hardware RTS/CTS", or "Software Xon/Xoff". "None" is the default setting.
- **Data Bits**
- **Parity**
- **Stop Bits**

3.2.2.7 PCI Subsystem Settings



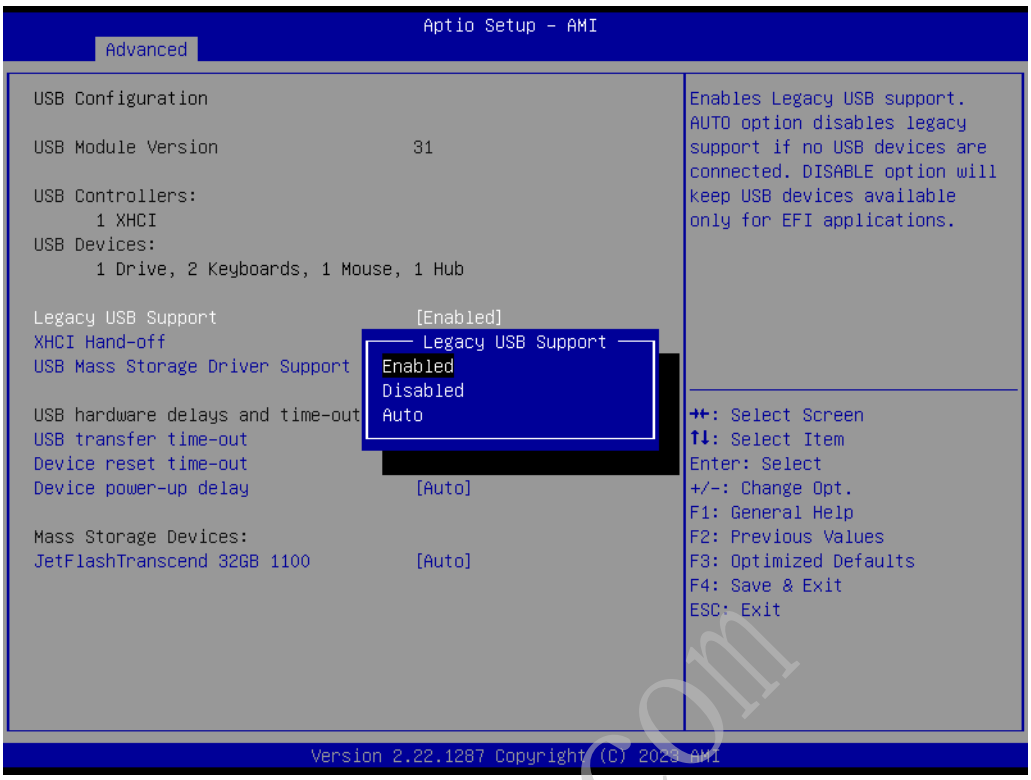
- **Above 4G Decoding**
  Enable or disables 64-bit capable devices to be decoded in above 4G address space (only if system supports 64-bit PCI decoding).

Note! *Some graphics or GPU cards need to enable 4G decoding.*

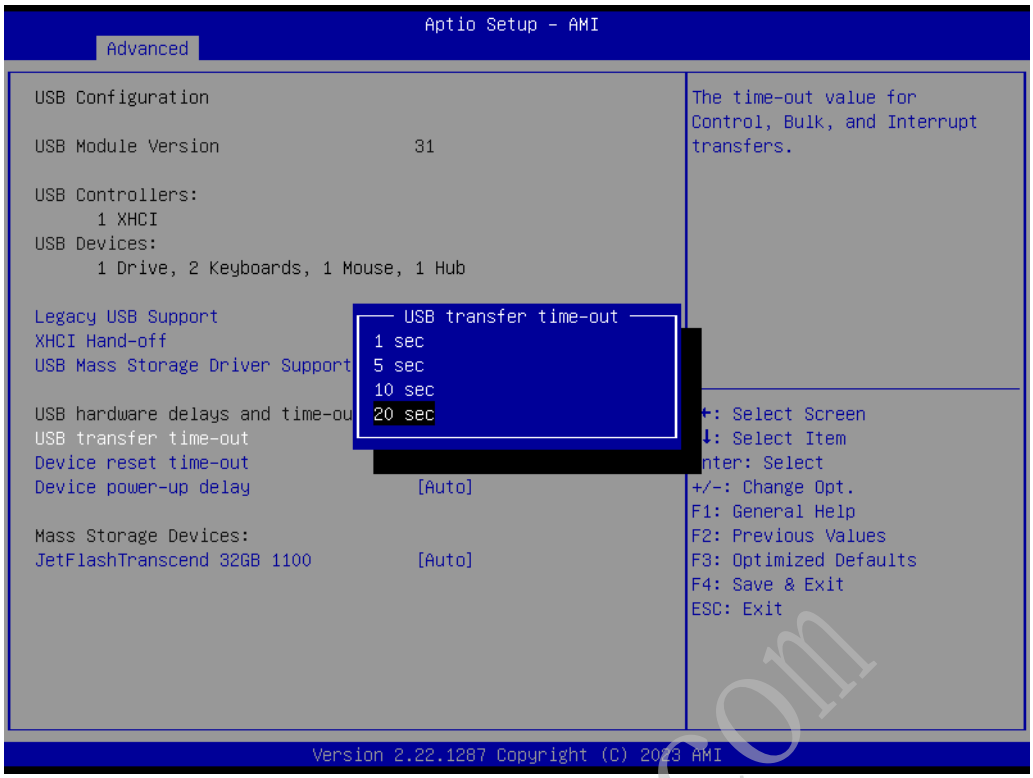
3.2.2.8 USB Configuration

- **Legacy USB Support**

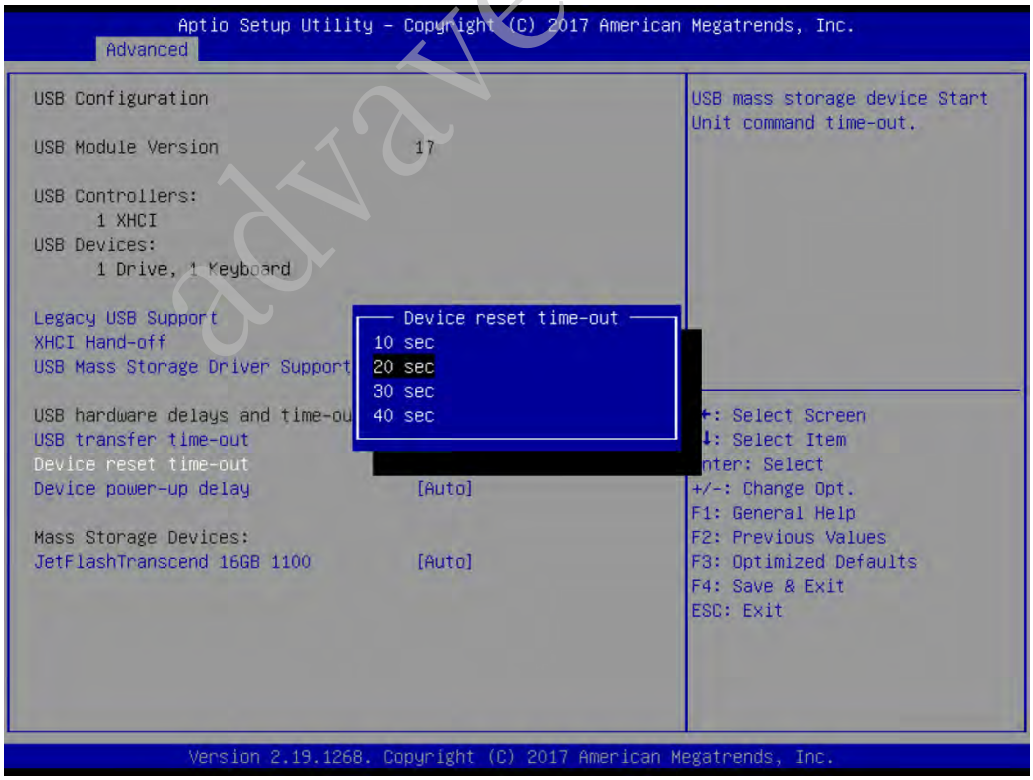
  This is for supporting USB device under a legacy OS such as DOS. When choosing "Auto", the system will automatically detect if any USB device is plugged into the computer and enable USB legacy mode when a USB device is plugged, or disable USB legacy mode when no USB device is attached. "Enabled" is the default setting.



- **XHCI Hand-off**
  This is a workaround for OS without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver. "Enabled" is the default setting.
- **USB Mass Storage Driver Support**
  Enable or disable USB mass storage driver support.
- **USB Transfer Time-Out**
  Selects the USB transfer time-out value. [1,5,10, 20 seconds]

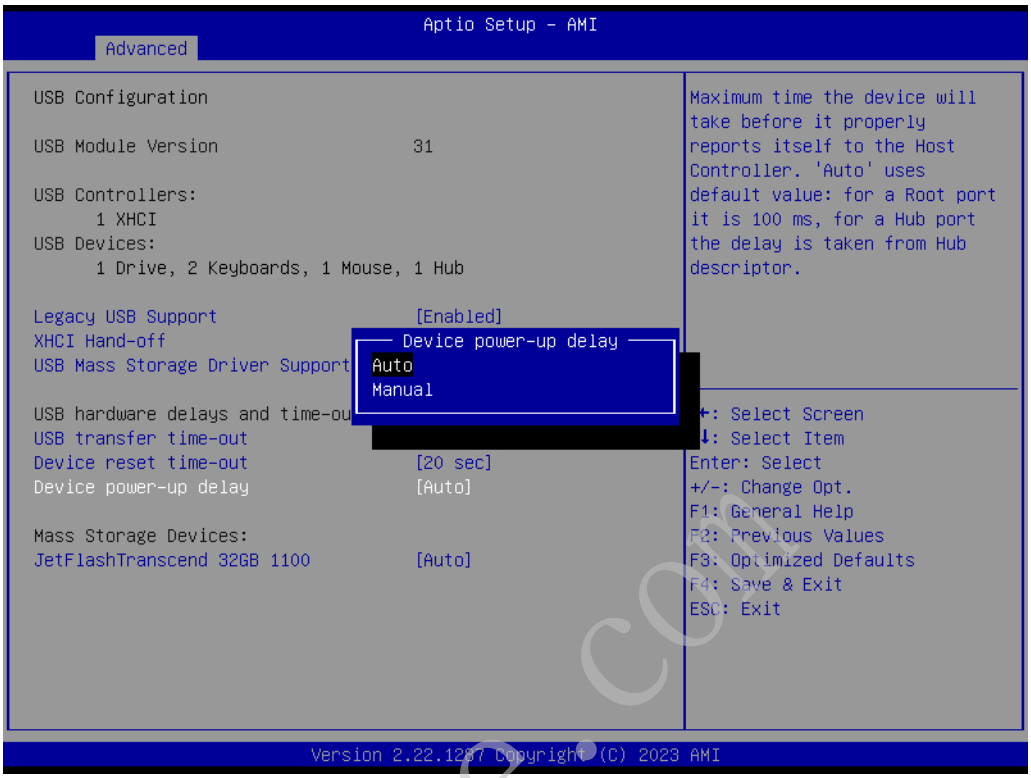


- **Device Reset Time-Out**
  Selects the USB device reset time-out value. [10, 20, 30, 40 seconds]



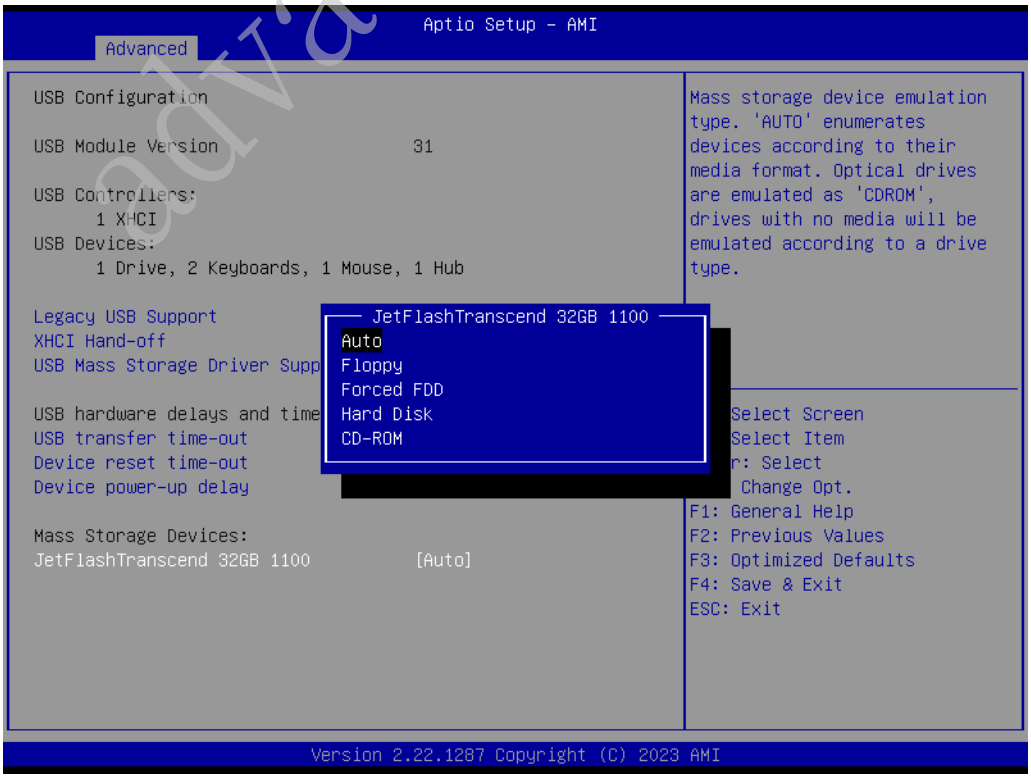
- **Device Power-up Delay**

  This item appears only when the device power-up delay item is set to [manual]. "Auto" is the default setting.



- **Mass Storage Devices**

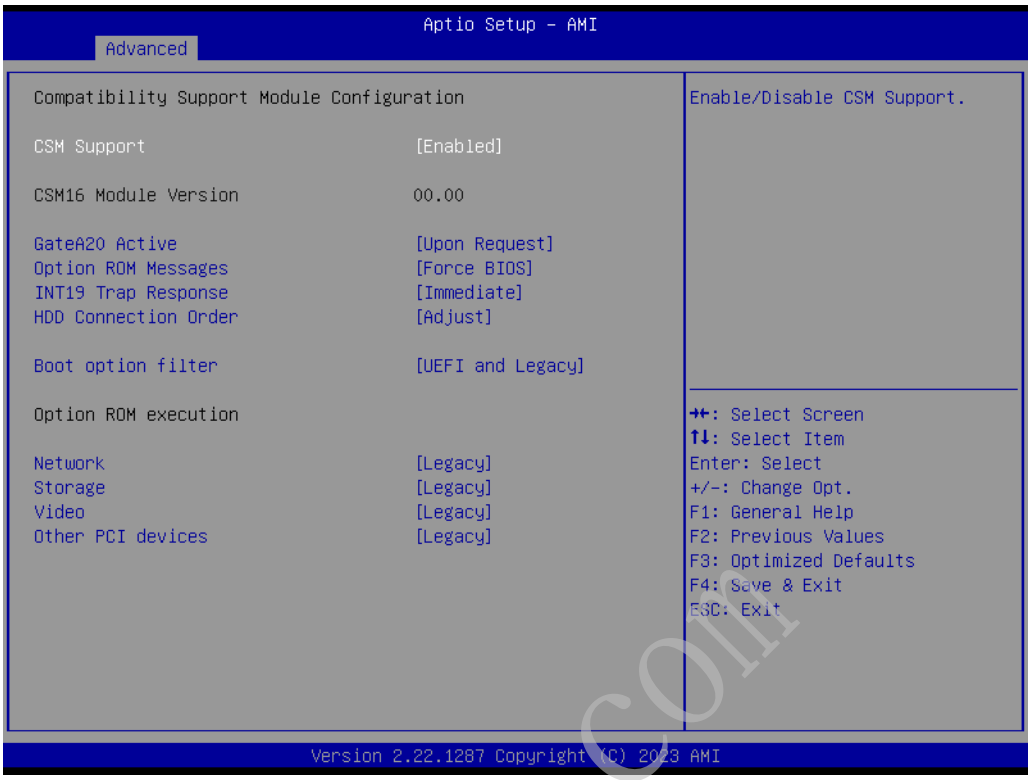
  Default is "Auto" to enumerate mass storage devices according to media format.



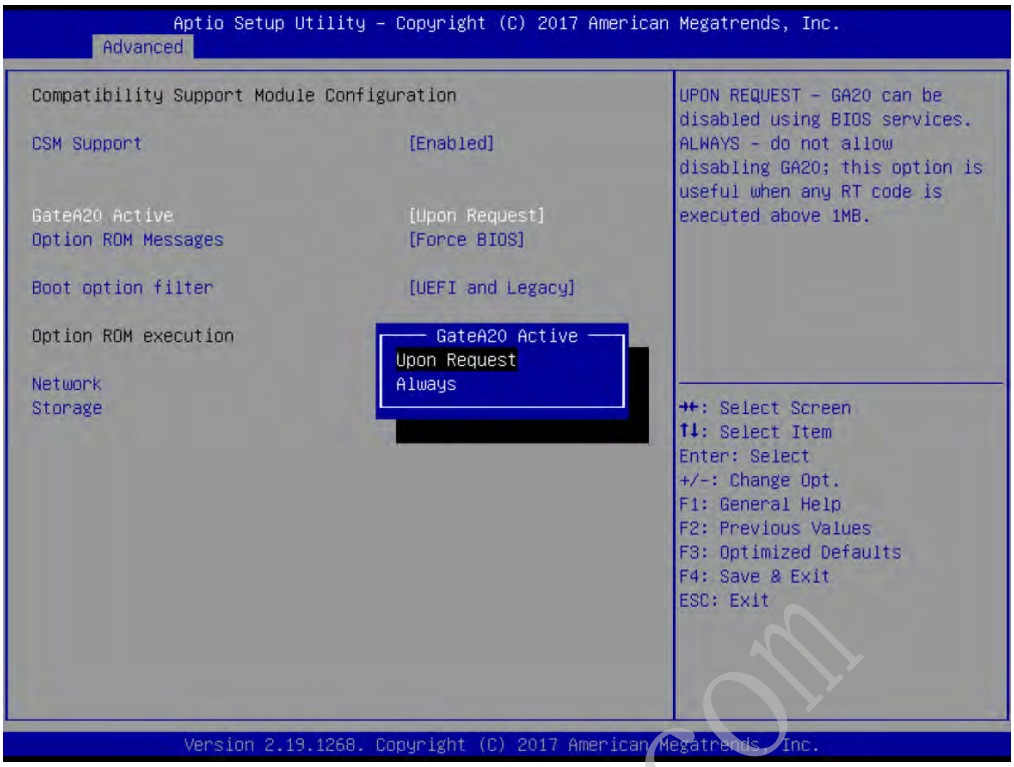
3.2.2.9 Network Stack Configuration

- **Network Stack**
  Enable or disable UEFI network stack.

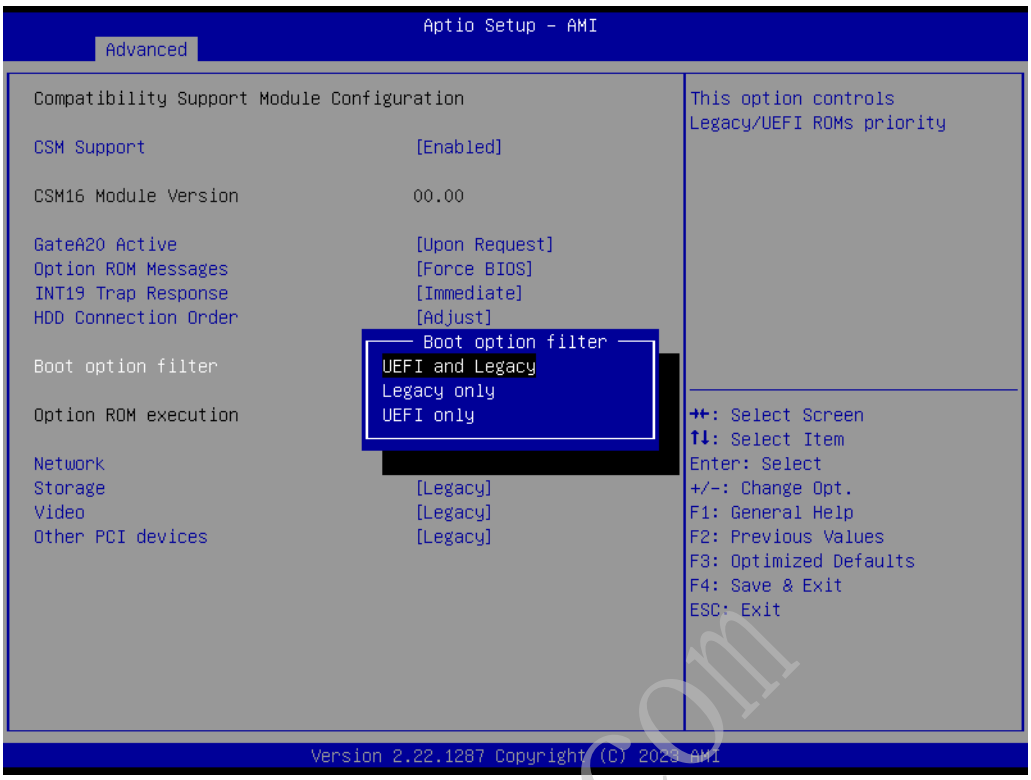
3.2.2.10 CSM Configuration



- **CSM Support**
  Enable or disable UEFI CSM (Compatibility Support Module) to support a legacy PC boot process.
- **GateA20 Active**
  This items is useful when RT code is executed above 1MB. When it's set as "Upon Request" GA20 can be disabled using BIOS services. When it's set as "Always" it does not allow disabling GA20.

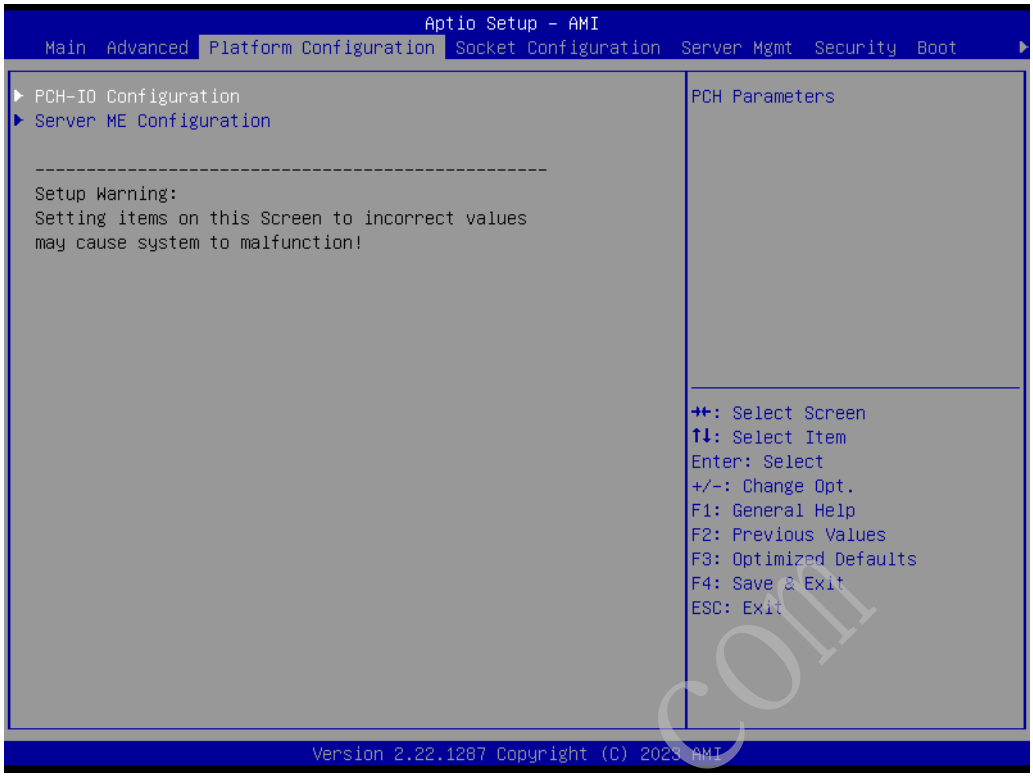


- **Option ROM Messages**
  Use "Force BIOS or keep current" to set the display mode for option ROM.
- **Boot Option Filter**
  Change UEFI/legacy ROM priority for boot option. "UEFI and Legacy" is the default setting.

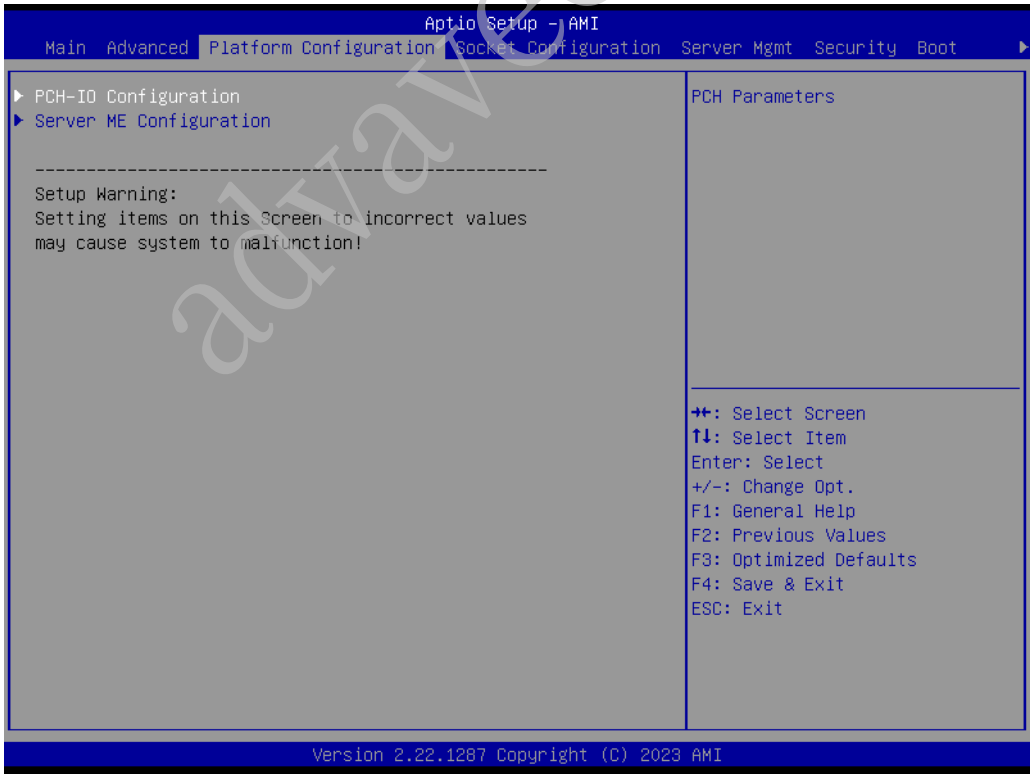


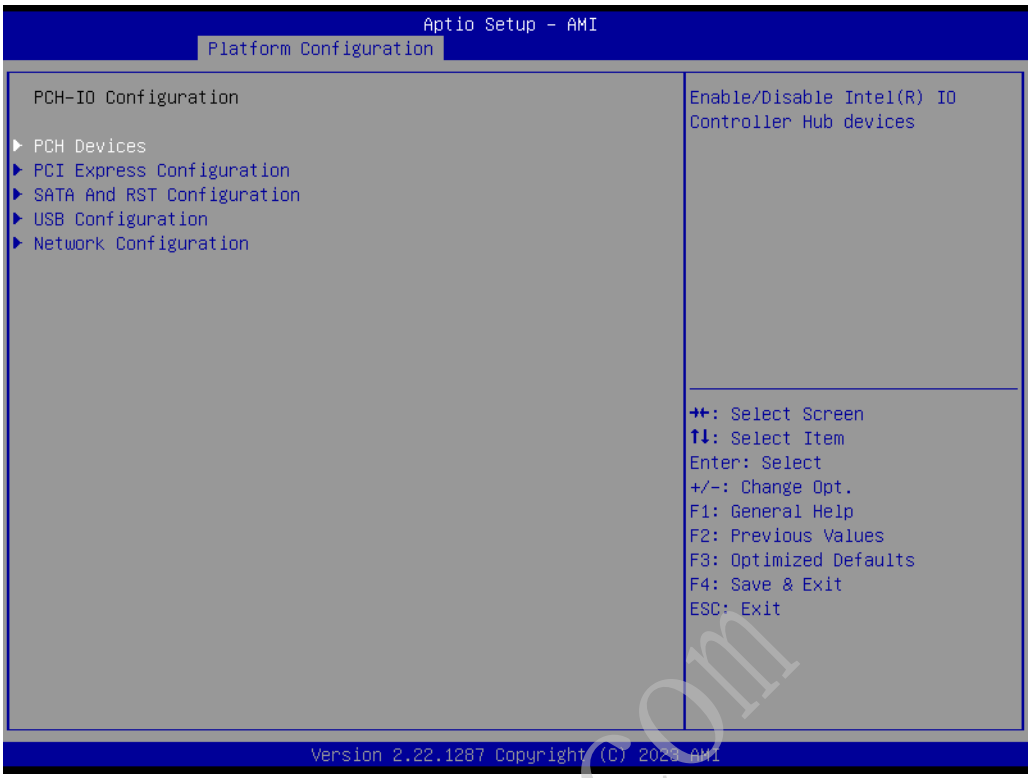
- **Network**
  Control the execution of UEFI and legacy PXE OpROM.
- **Storage**
  Control the execution of UEFI and legacy storage OpROM.
- **Video**
  Control the execution of UEFI and legacy video OpROM.
- **Other PCI Devices**
  Control the execution of UEFI and legacy other PCI devices OpROM.

3.2.3 Platform Configuration



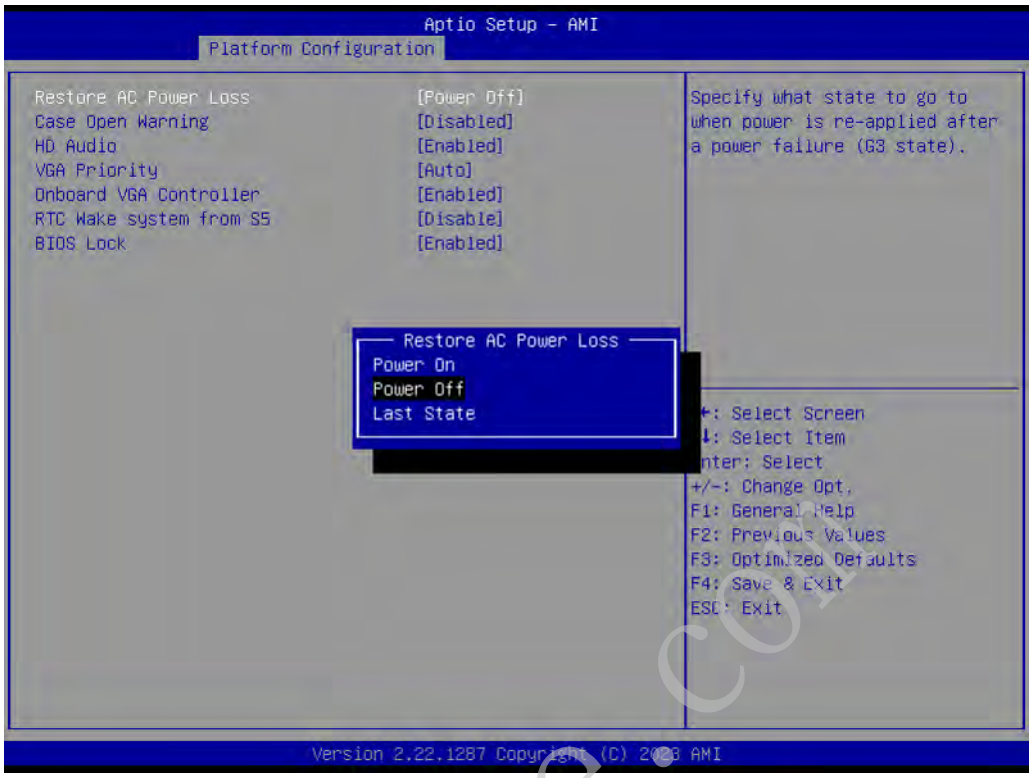
3.2.3.1 PCH Configuration





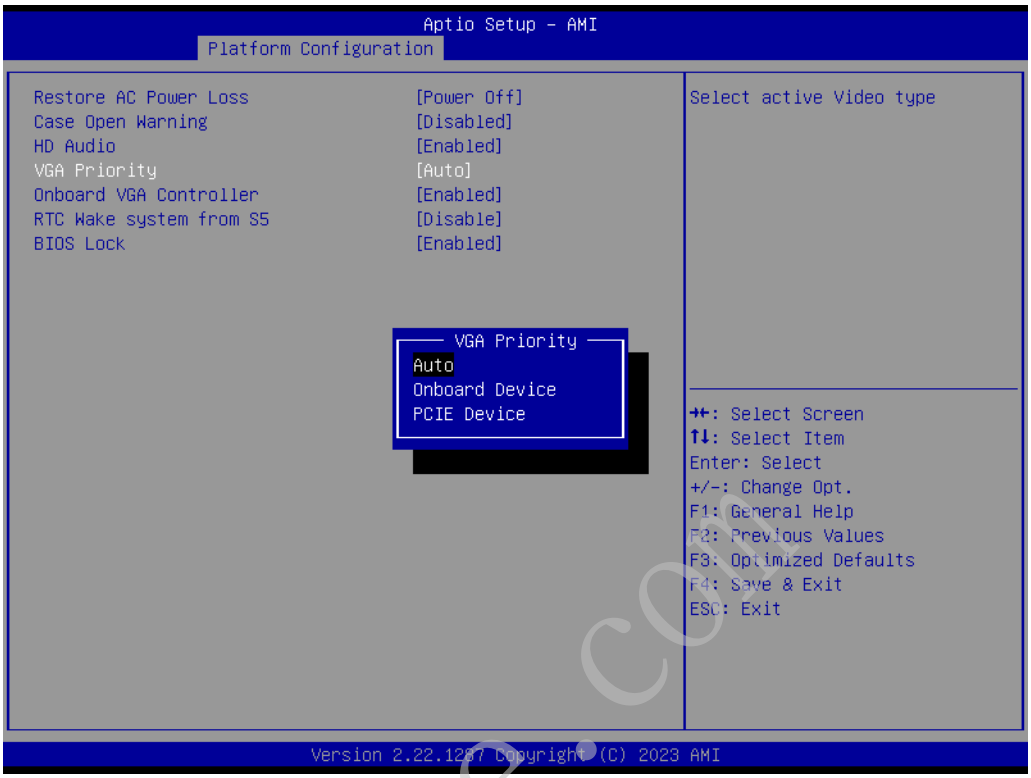
- **PCH Devices**
  This item is to set up IO controller hub devices.

- **Restore AC Power Loss**
  Specify what state to go to when power is re-applied after a power failure (G3 state). It can be set to "Power on", "Power Off", and "Last State" states.



  - **Case Open Warning**
    Enable or disable the chassis intrusion monitoring function. When enabled and the case is opened, the warning message will show in POST screen.
  - **HD Audio**
    Enable or disable HD audio devices.

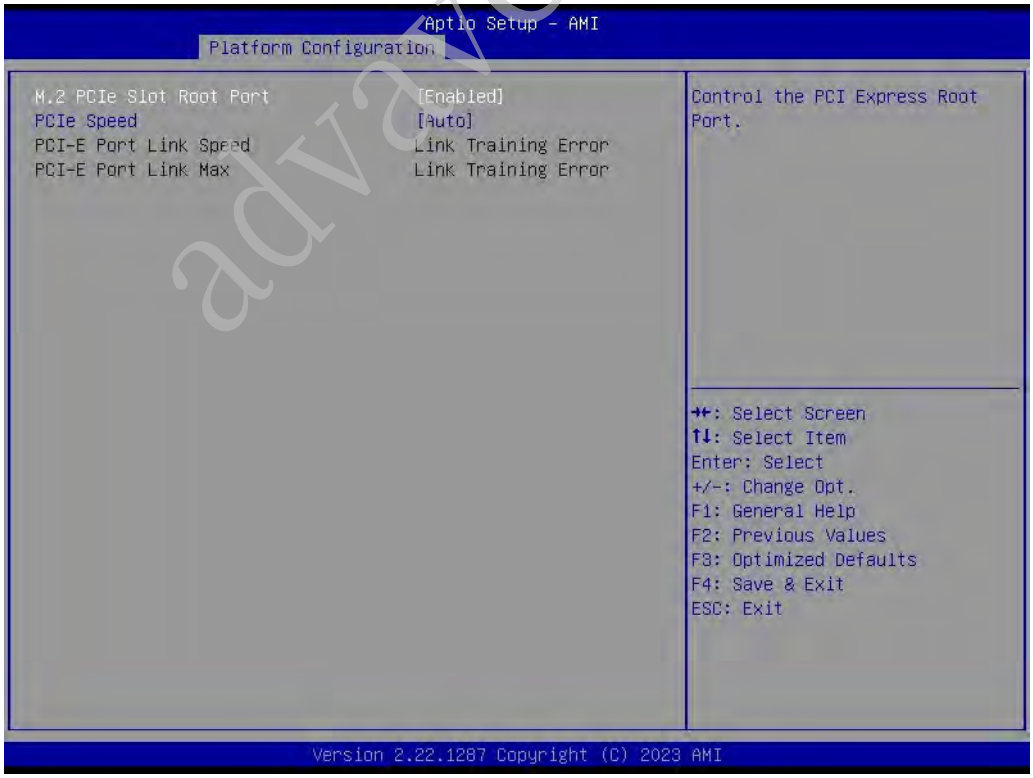
– **VGA Priority**
  Determines priority between onboard and 1st off-board video device found. "Auto" is the default setting.

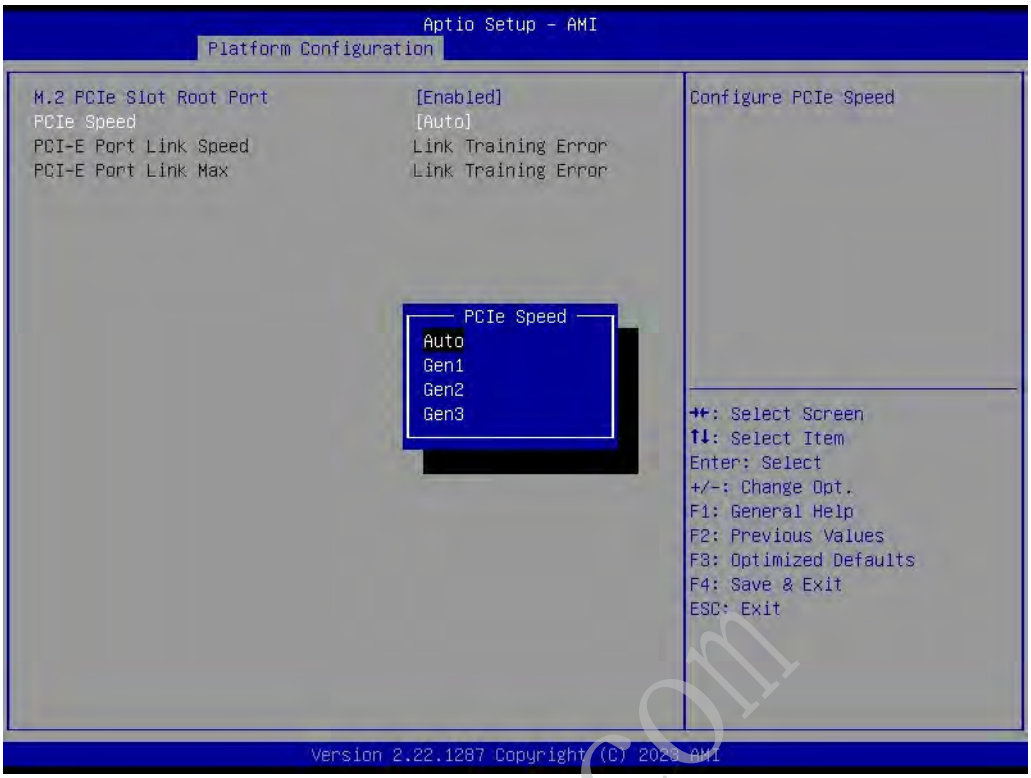


– **Onboard VGA Controller**
  Enable or disable onboard VGA controller.
– **RTC Wake System from S5**
  Enable or disable system wake on alarm event.

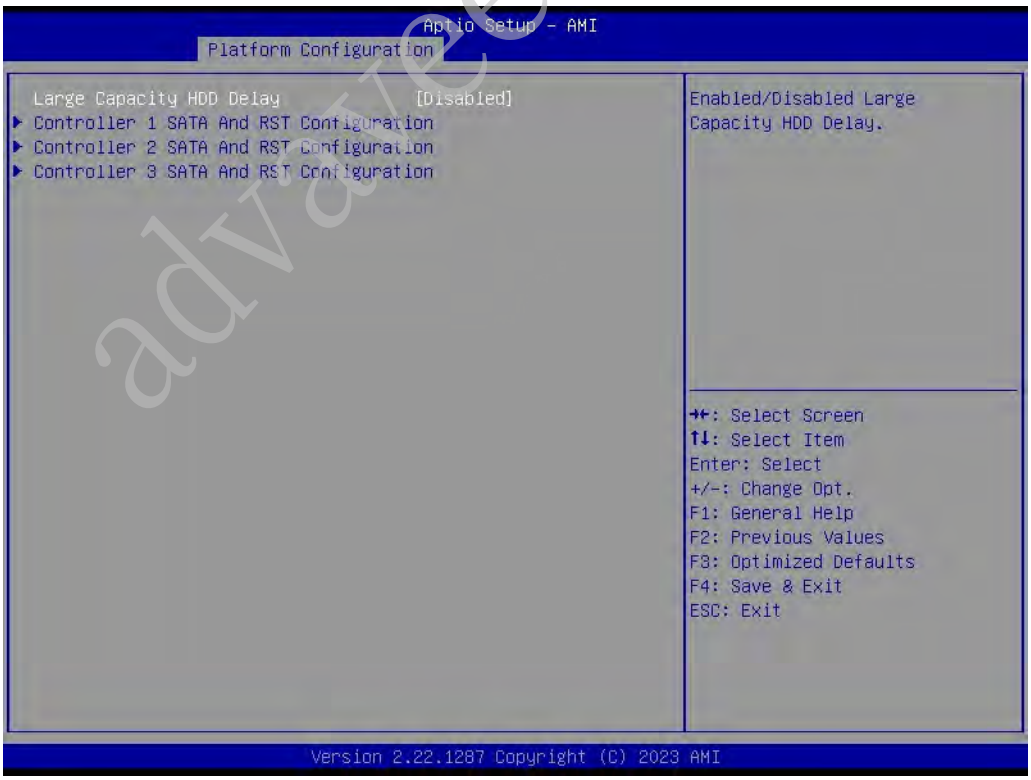
PCI Express Configuration

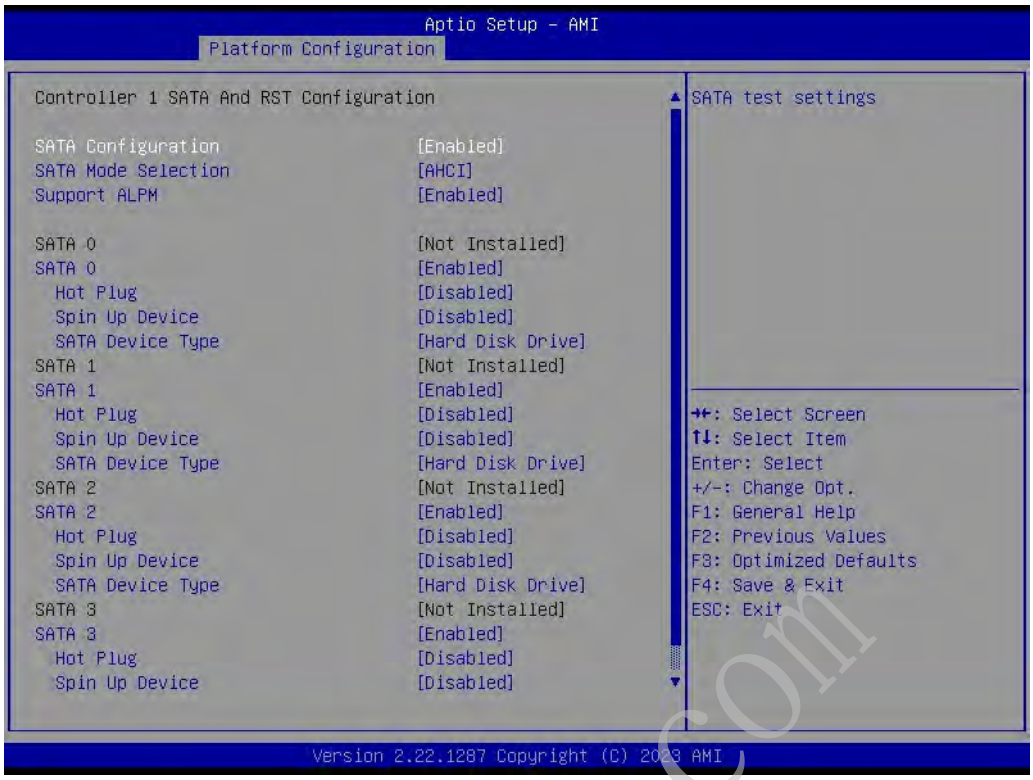
– **M.2 PCIe Slot Root Port**
PCIe root port settings.

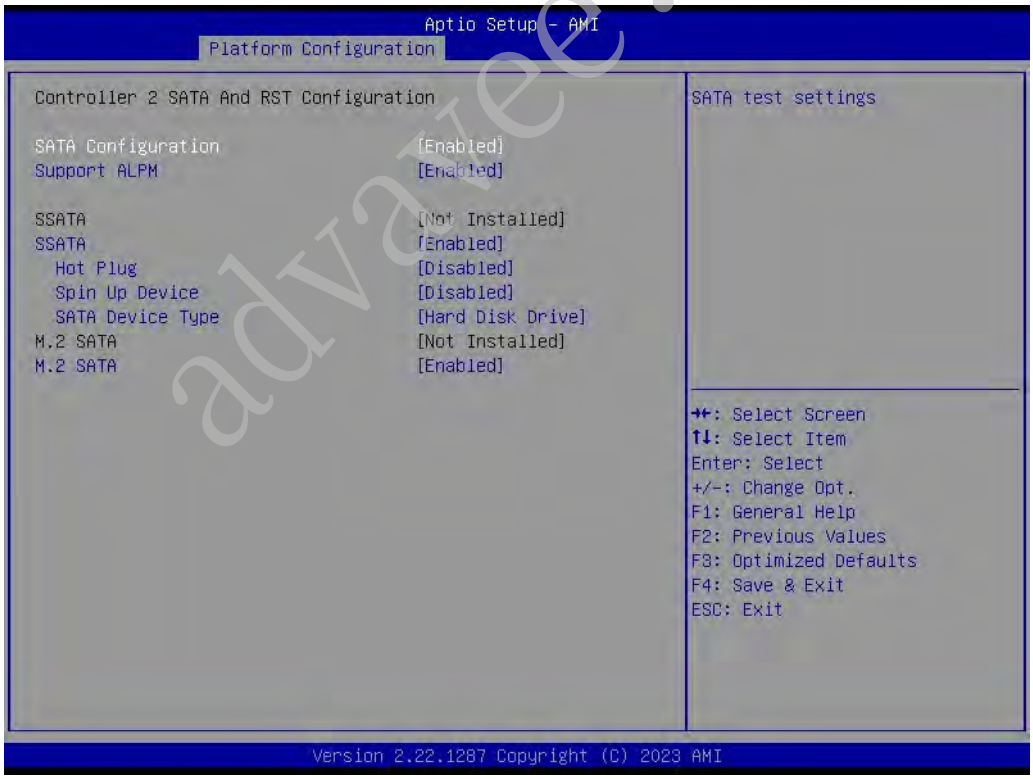


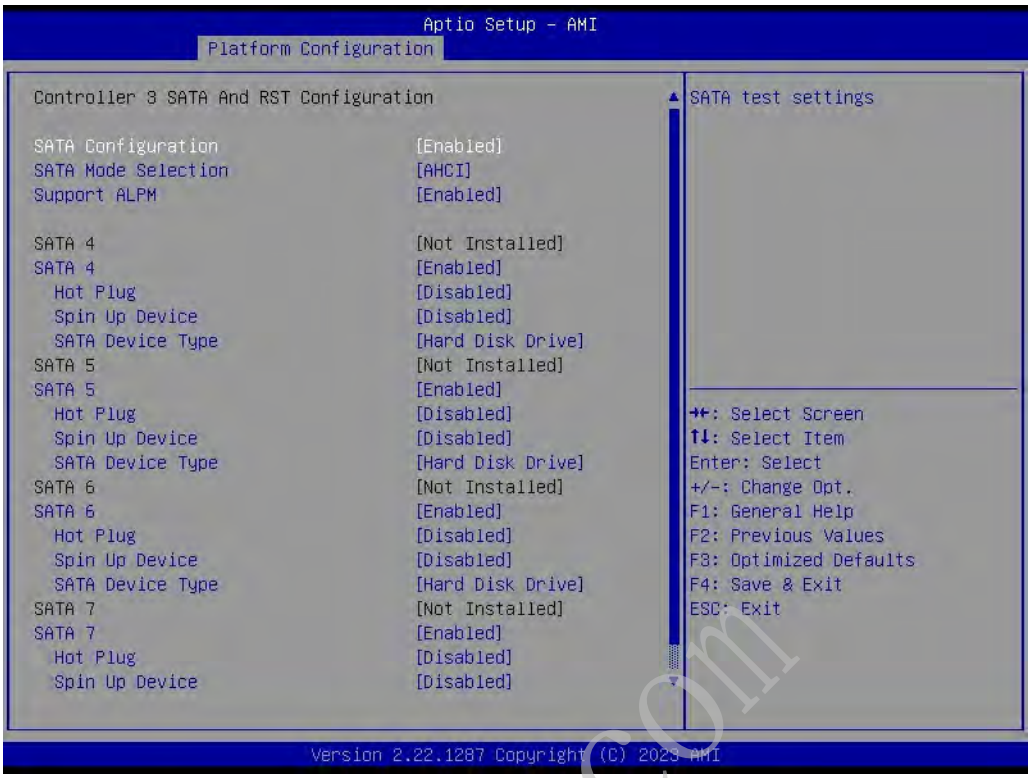


SATA RST Configuration







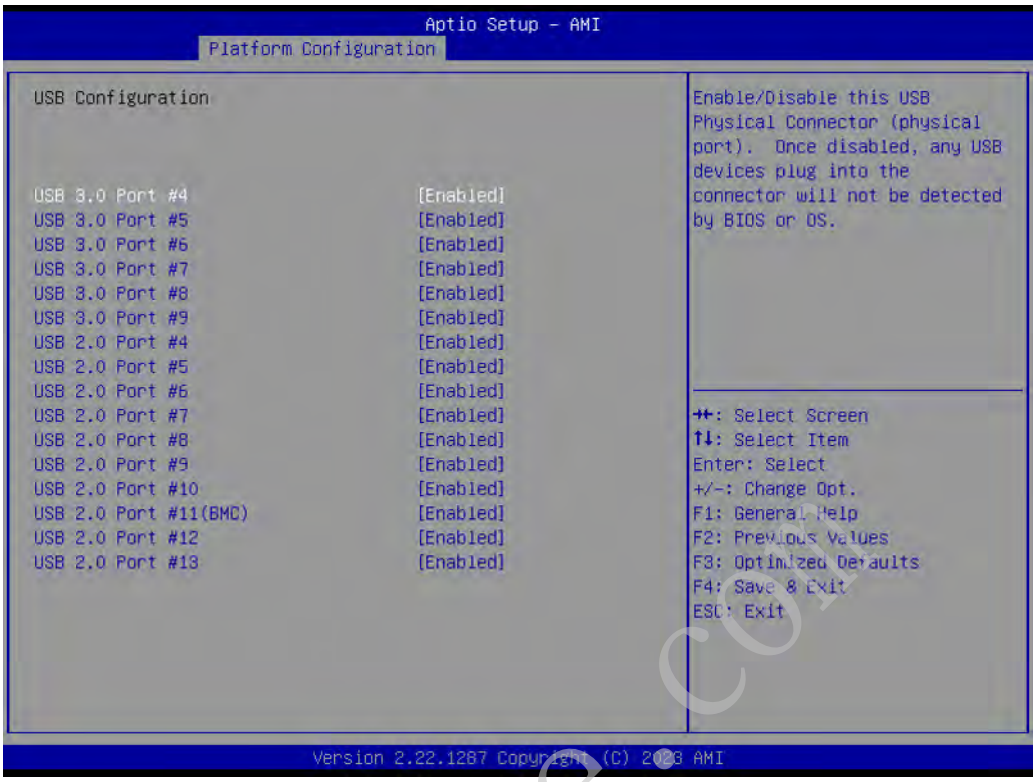


- **SATA Configuration**
  Enable or disable SATA devices.
- **SATA Mode Selection**
  Set as AHCI or RAID when SATA controllers are enabled.
- **Support ALPM**
  Enable or disable Aggressive Link Power Management (ALPM) protocol for Advanced Host controller Interface-compliant (AHCI) Serial ATA (SATA) devices.
- **SATA Port 0~7(SATA port 0~3 are for Controller 1, SATA port 4~7 are for Controller 3)**
  Enable or disable SATA port 0~7.
- **Hot Plug Port 0~7 (SATA port 0~3 are for Controller 1, SATA port 4~7 are for Controller 3)**
  Designates SATA port 0~7 as hot pluggable. "Disabled" is the default setting.
- **SATA Port 0~7 Spin Up Device (SATA port 0~3 are for Controller 1, SATA ports 4~7 are for Controller 3)**
  On an edge detect from 0 to 1, the PCH starts a COM RESET initialization sequence to the device. "Disabled" is the default setting.
- **SATA Port 0~7 Device Type (SATA port 0~3 are for Controller 1, SATA port 4~7 are for Controller 3)**
  To identify the SATA is connected to Solid State Drive or Hard Disk Drive.

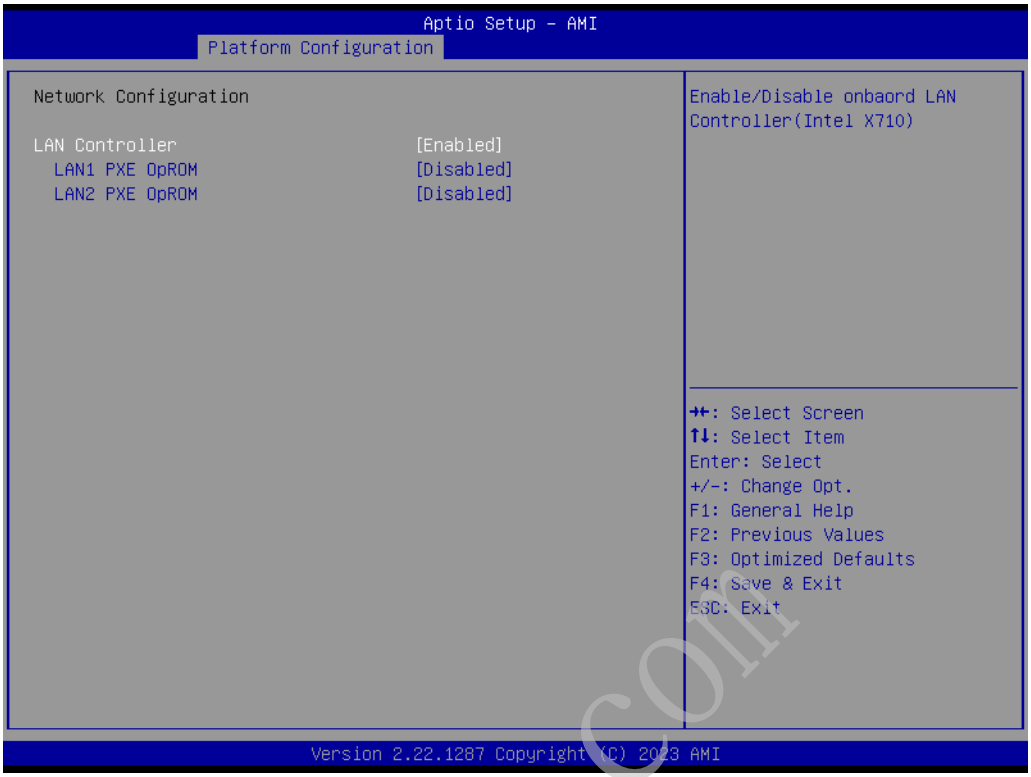
■ **PCH sSATA/M.2 Configuration (sSATAO and M.2 are for Controller 2)**

- **sSATA/M.2 controller**
  Enable or disable sSATA/M.2 controller.
- **SATA M.2 Port**
  Enable or disable SATA port.

- **USB Configuration**
  Enable/disable this USB physical connector (physical port). Once disabled, any USB devices plugged into the connector will not be detected by BIOS or OS.



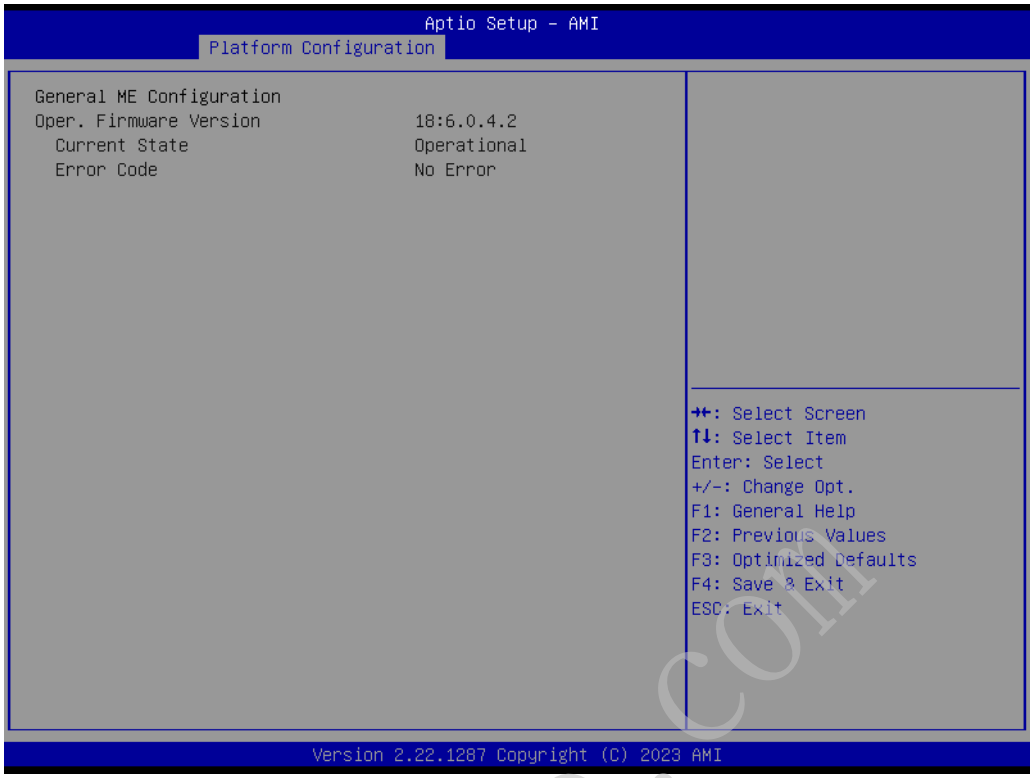
Networking



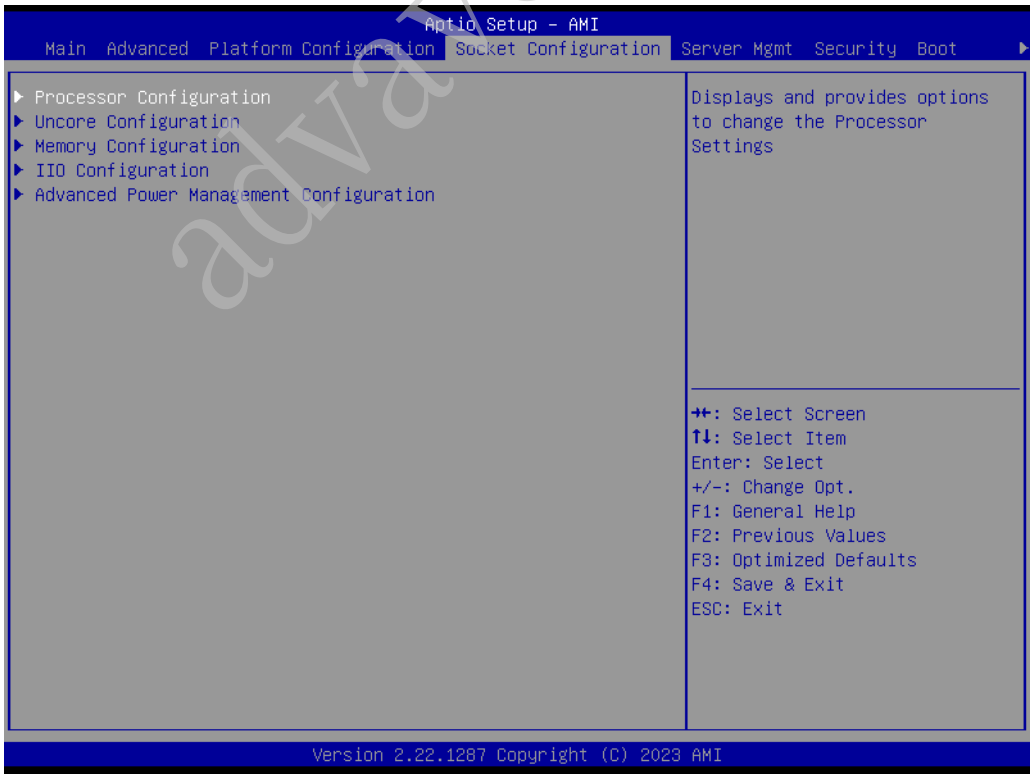
- **LAN Controller**
  Enable or disable Intel X710 controller support.
- **LAN1 PXE OpROM**
  Enable or disable boot option for Intel X710 controller.
- **LAN2 PXE OpROM**
  Enable or disable boot option for Intel X710 controller.

3.2.3.2 Server ME Configuration

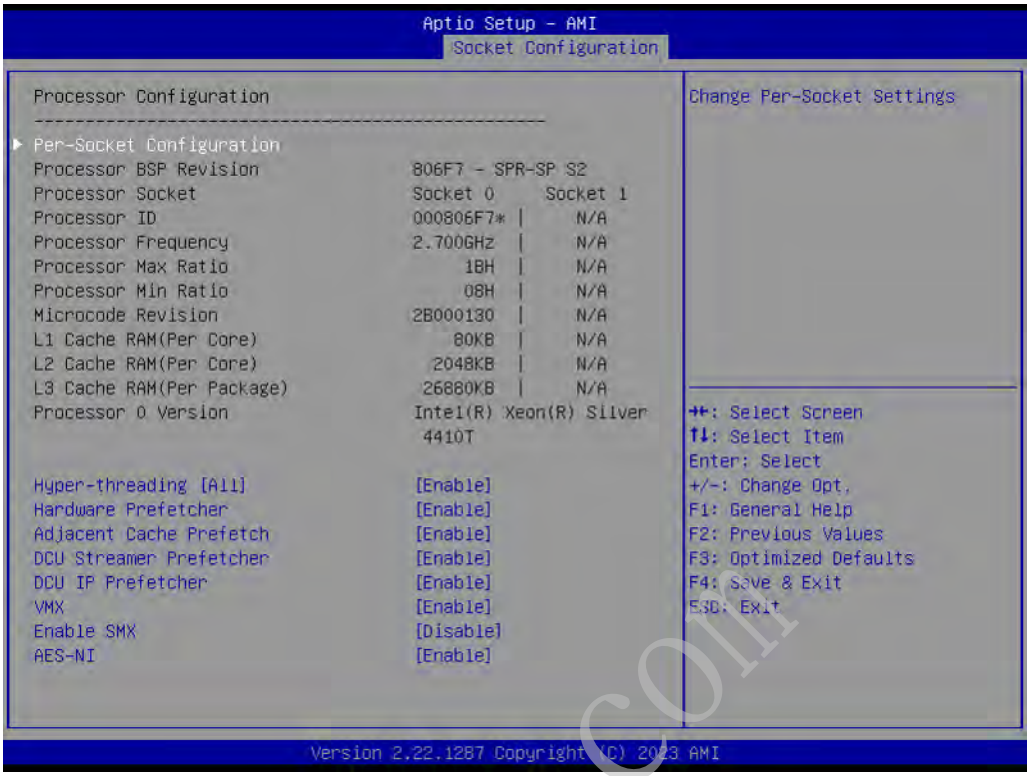
This page shows the server ME configuration information.



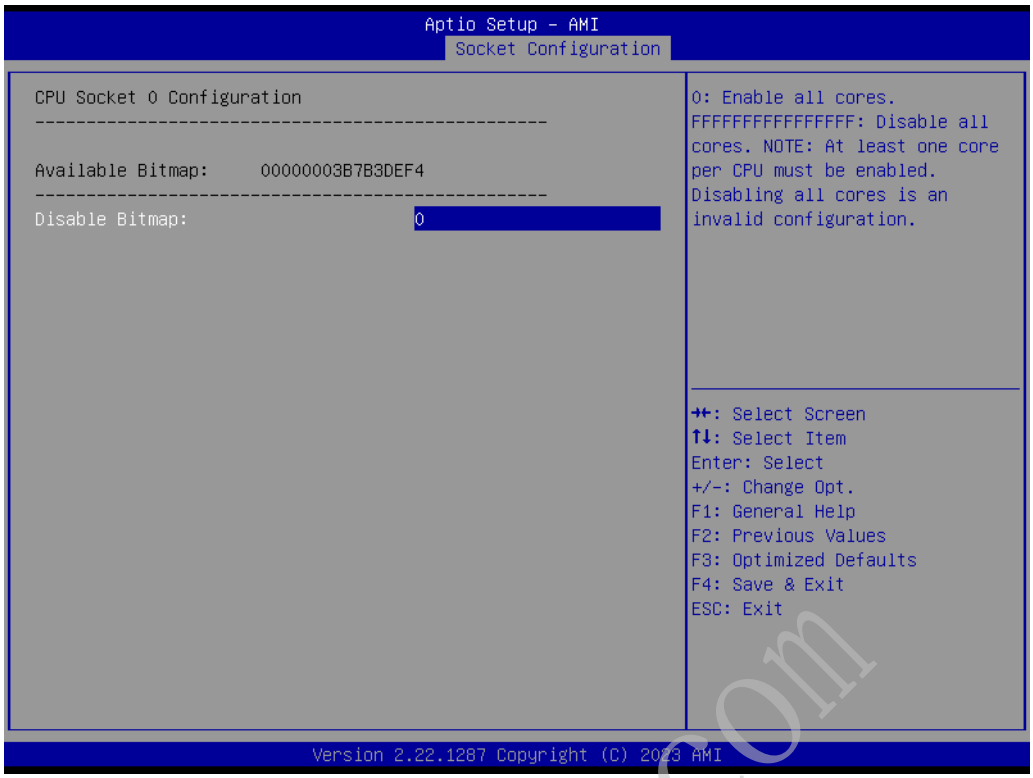
3.2.4 Socket Configuration



3.2.4.1 Processor Configuration

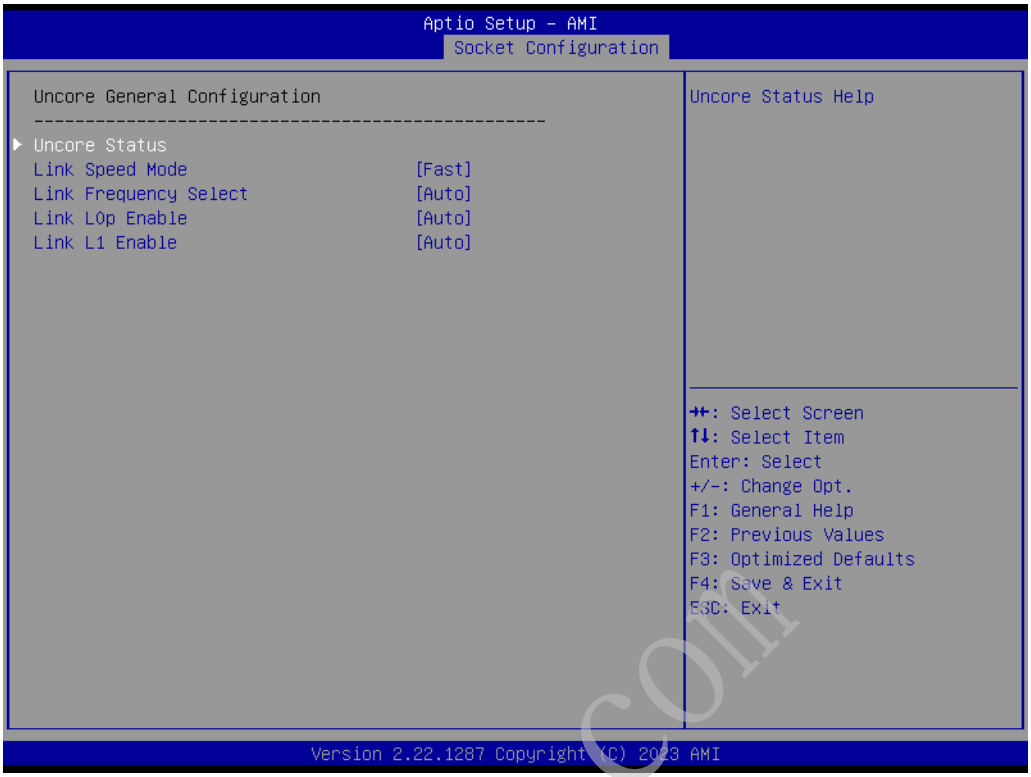


- **Per-Socket Configuration**
  Use this to select how many processor cores you want to activate when you are using a dual or quad core processor.

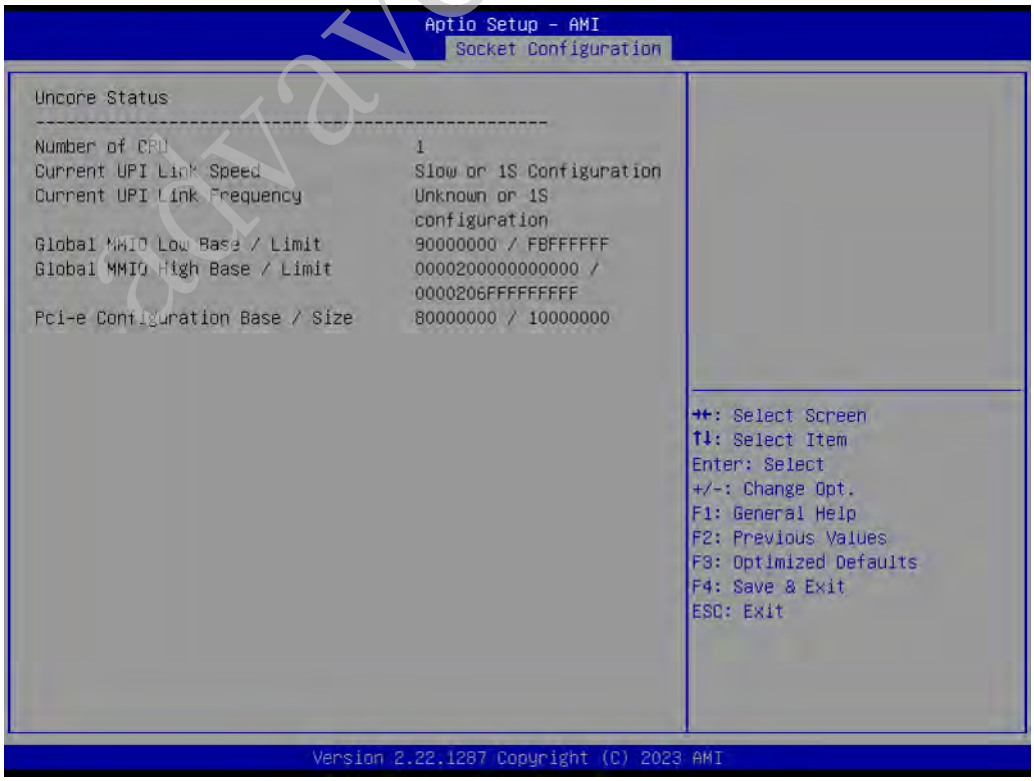


- **Hyper-Threading [All]**
  Enable or disable Intel Hyper Threading technology.
- **Hardware Prefetcher**
  Hardware Prefetcher is a technique that fetches instructions and/or data from memory into the CPU cache memory well before the CPU needs it, so that it can improve the load-to-use latency. “Enable" is the default setting.
- **Adjacent Cache Prefetch**
  The Adjacent Cache-Line prefetch mechanism, like automatic hardware prefetch, operates without programmer intervention. When enabled through the BIOS, two 64-byte cache lines are fetched into a 128-byte sector, regardless of whether the additional cache line has been requested or not. “Enable" is the default setting.
- **DCU Streamer Prefetcher**
  Enable prefetch of next L1 data line based upon multiple loads in same cache line.
- **DCU IP Prefetcher**
  Enable prefetch of next L1 line based upon sequential load history.
- **VMX**
  Enable or disable Intel Virtual Machine Extensions (VMX) for IA-32 processors that supports Intel® Vanderpool Technology.
- **Enable SMX**
  Enable or disable Safer Mode Extensions. Safer Mode Extensions (SMX) provide a means for system software to launch an MLE and establish a measured environment within the platform to support trust decisions by end users.
- **AES-NI**
  This item is to enable or disable CPU advanced encryption standard instructions. “Enable" is the default setting.

3.2.4.2 Uncore General Configuration

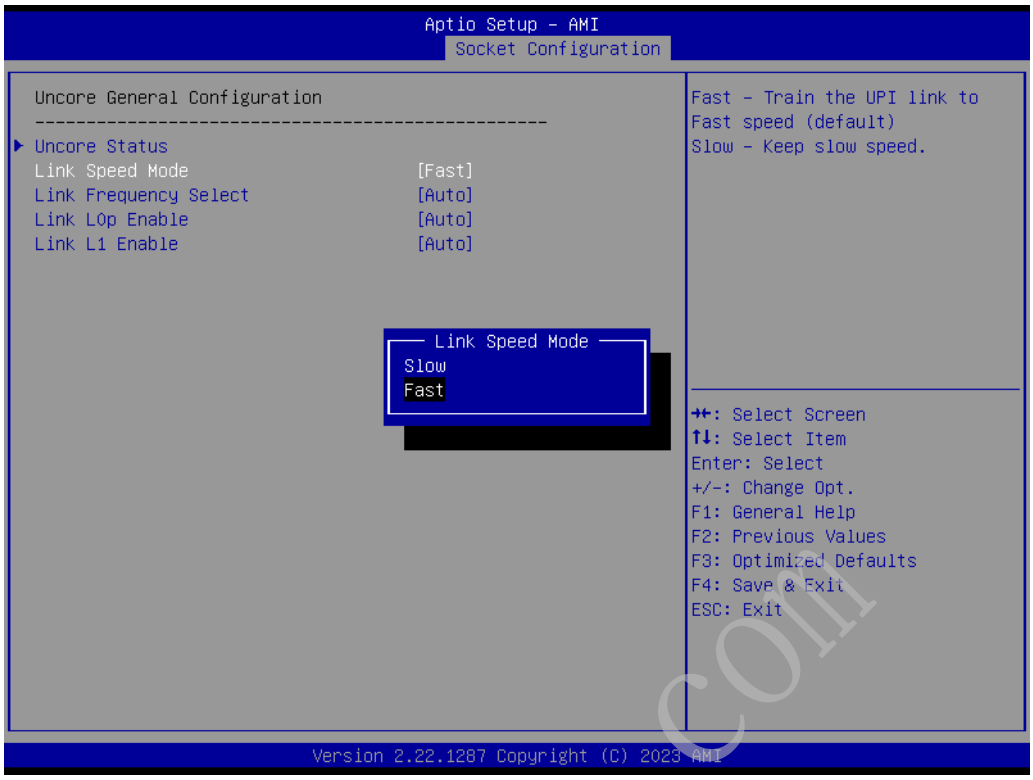


- **Uncore Status**
  Display information of Intel UltraPath Interconnect (UPI).



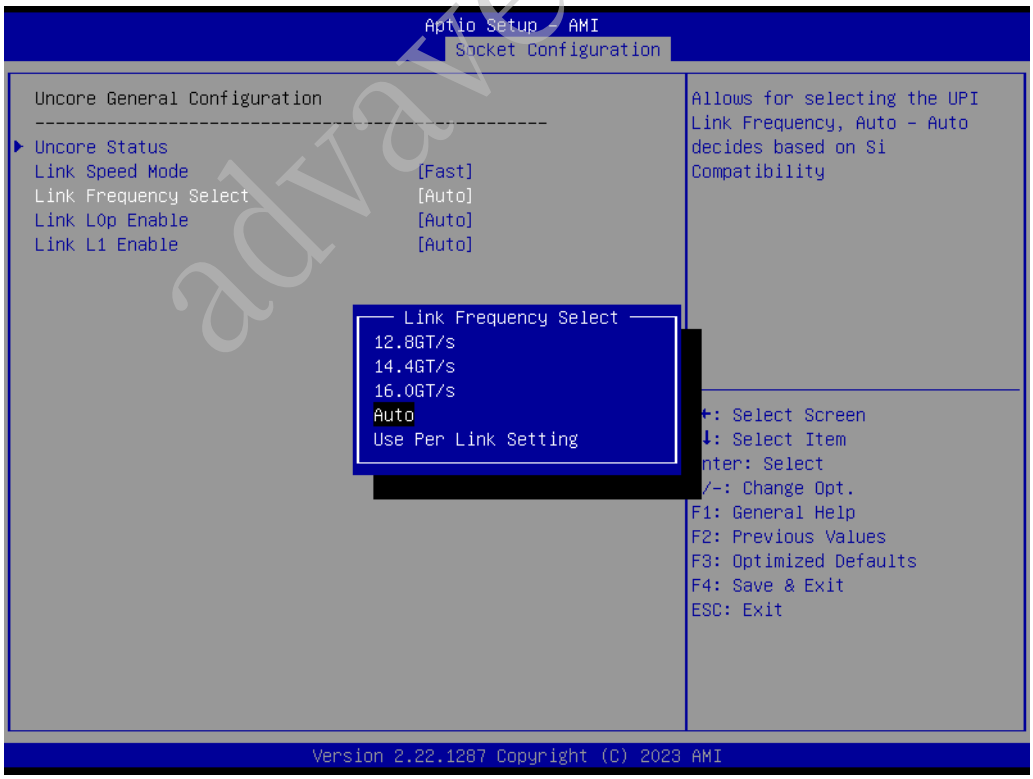
■ **Link Speed Mode**

Select the UPI link speed as either fast mode or slow mode.



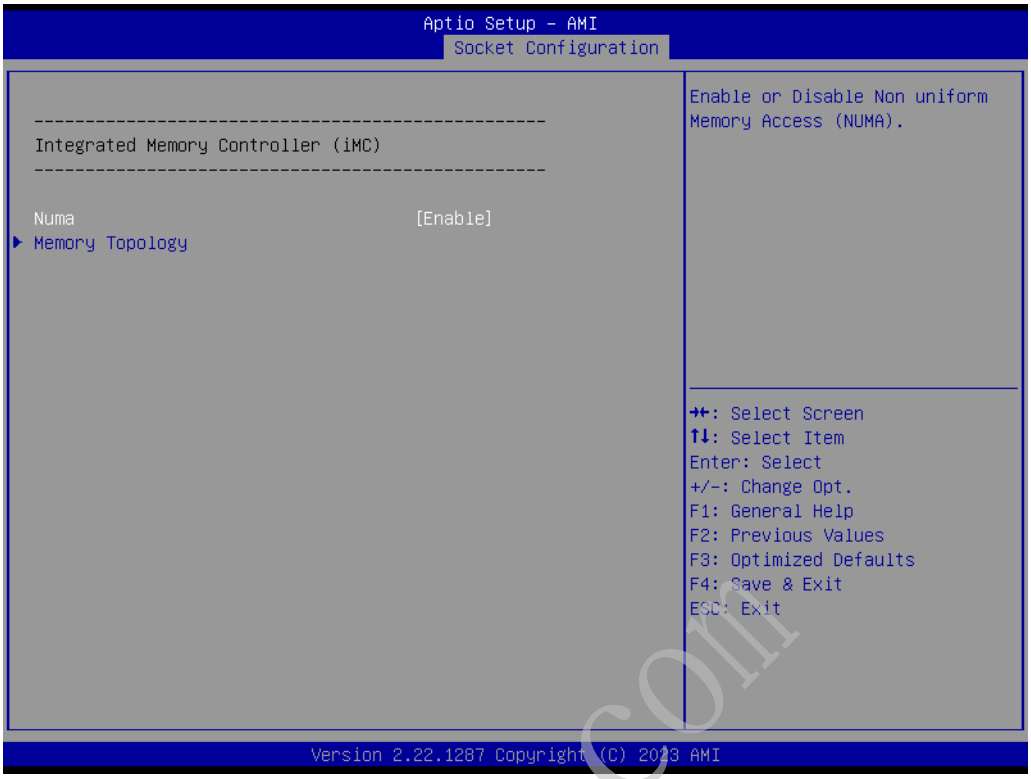
■ **Link Frequency Select**

Allows for selecting the UPI link frequency.



– **Link L0p Enable**
  Enable or disable UPI Link0p. "Auto" is the default setting.
– **Link L1 Enable**
  Enable or disable UPI Link1. "Auto" is the default setting.

3.2.4.3 Memory Configuration

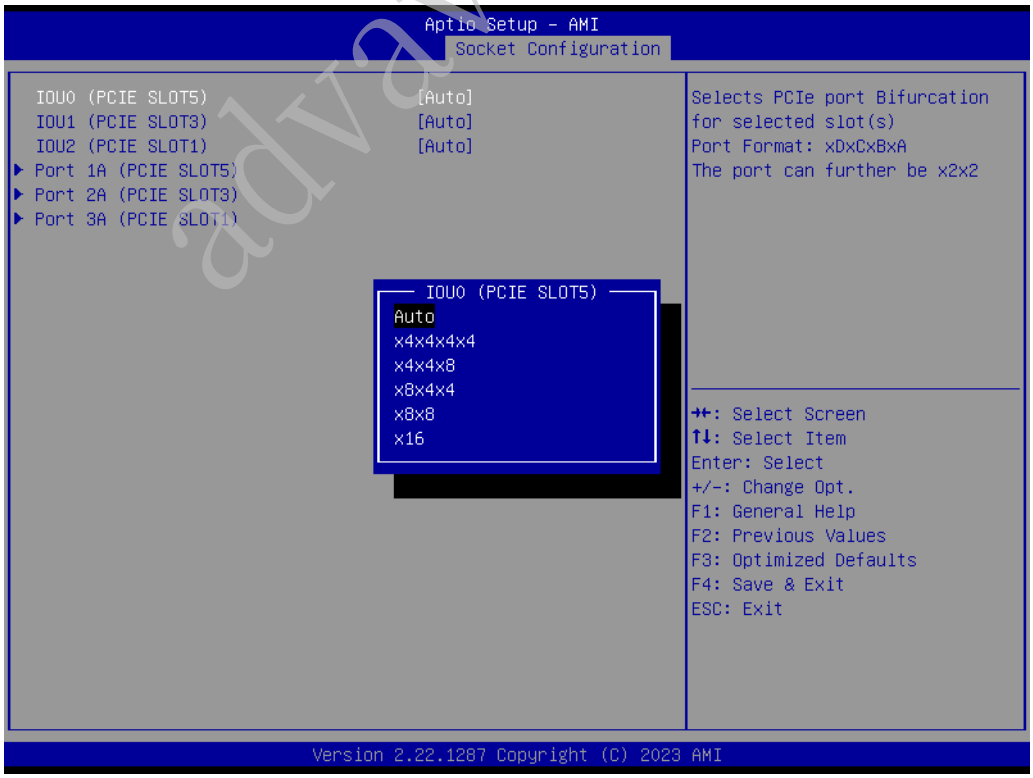


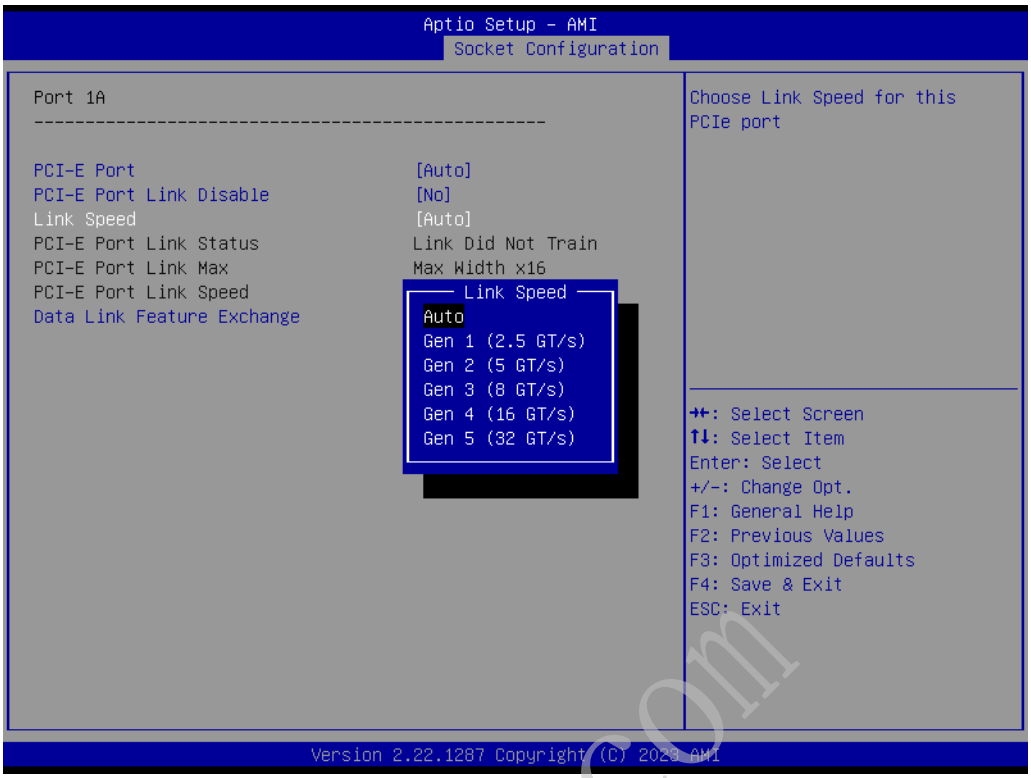
- **Numa**
  Enable or disable non uniform memory access (NUMA). The Numa function is used by dual CPUs.
- **Memory Technology**
  Display memory topology with DIMM population information.

3.2.4.4 IIO Configuration

- **Socket0 PCIe Configuration**

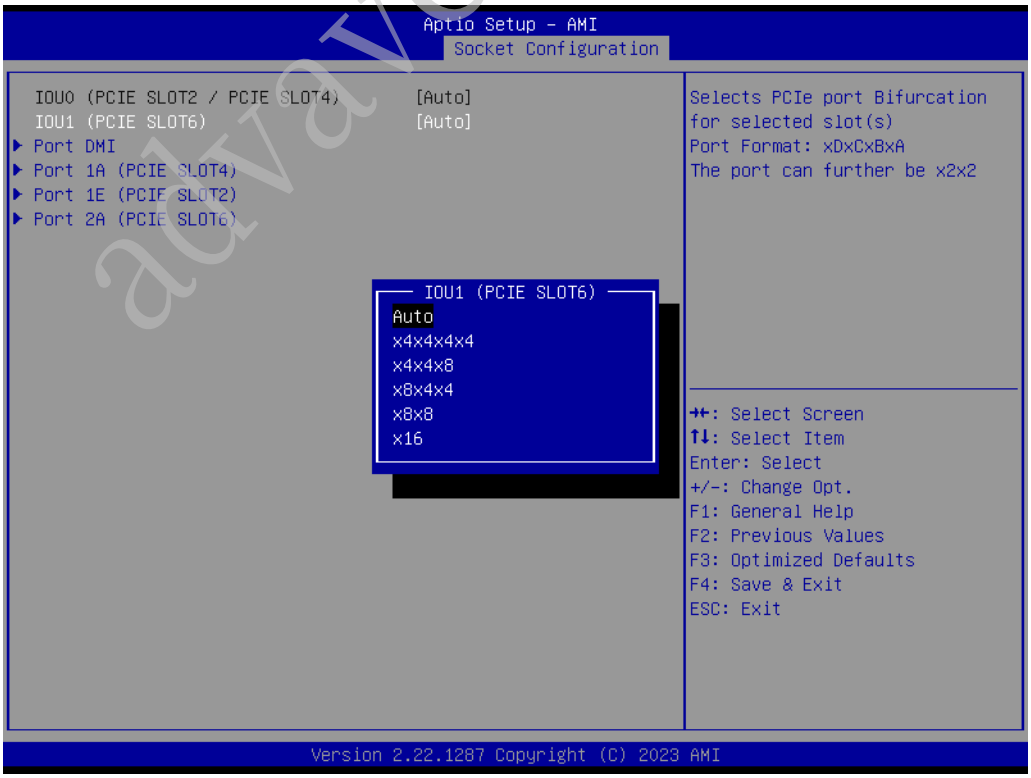
  PCIe port bifurcation control and select target link speed as Gen1, Gen2, Gen3,Gen4, or Gen5. "Auto" is the default setting.

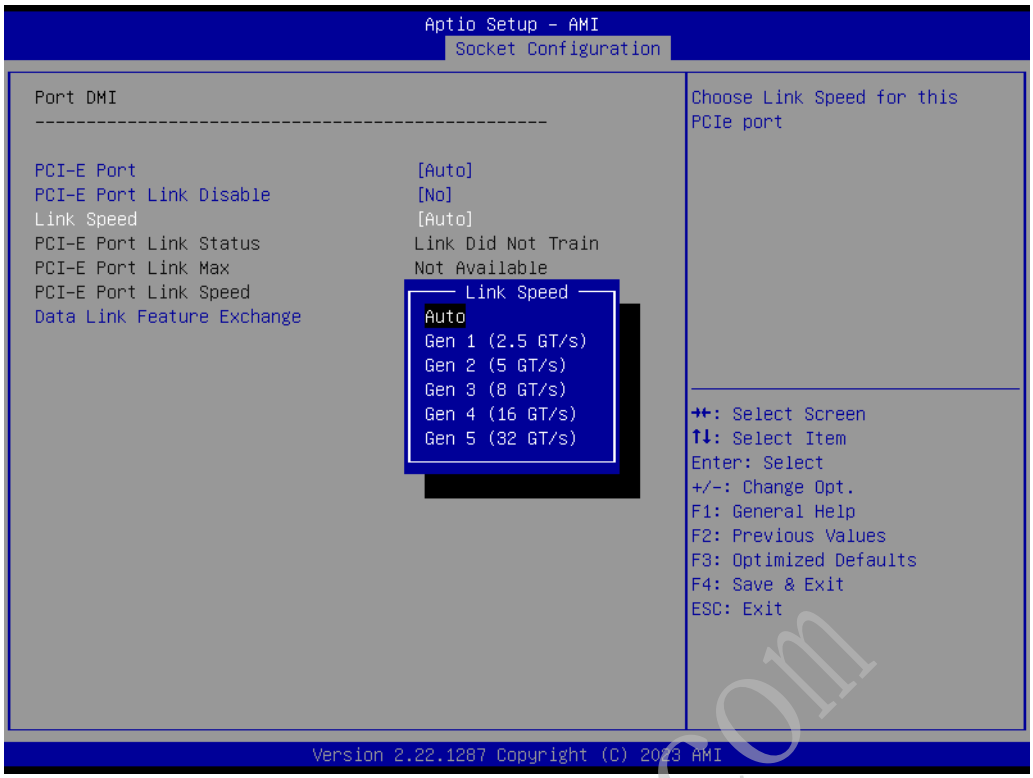




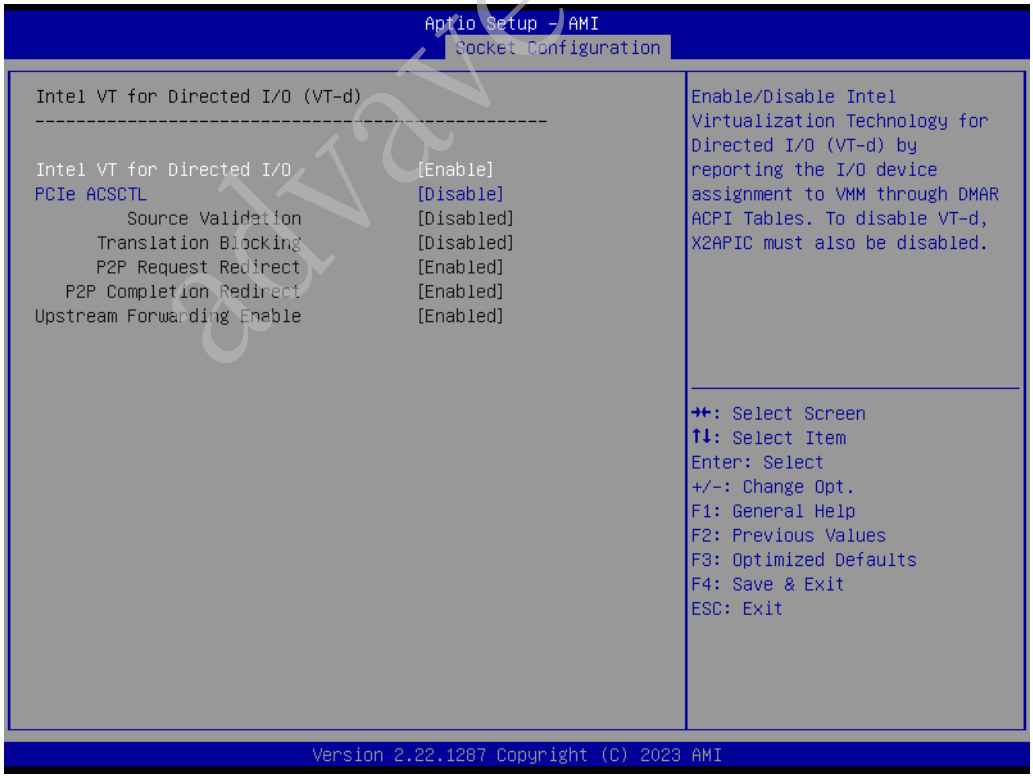
- **Socket1 PCIe Configuration**

  PCIe port bifurcation control and select target link speed as Gen1, Gen2, Gen3, Gen4, or Gen5. "Auto" is the default setting.

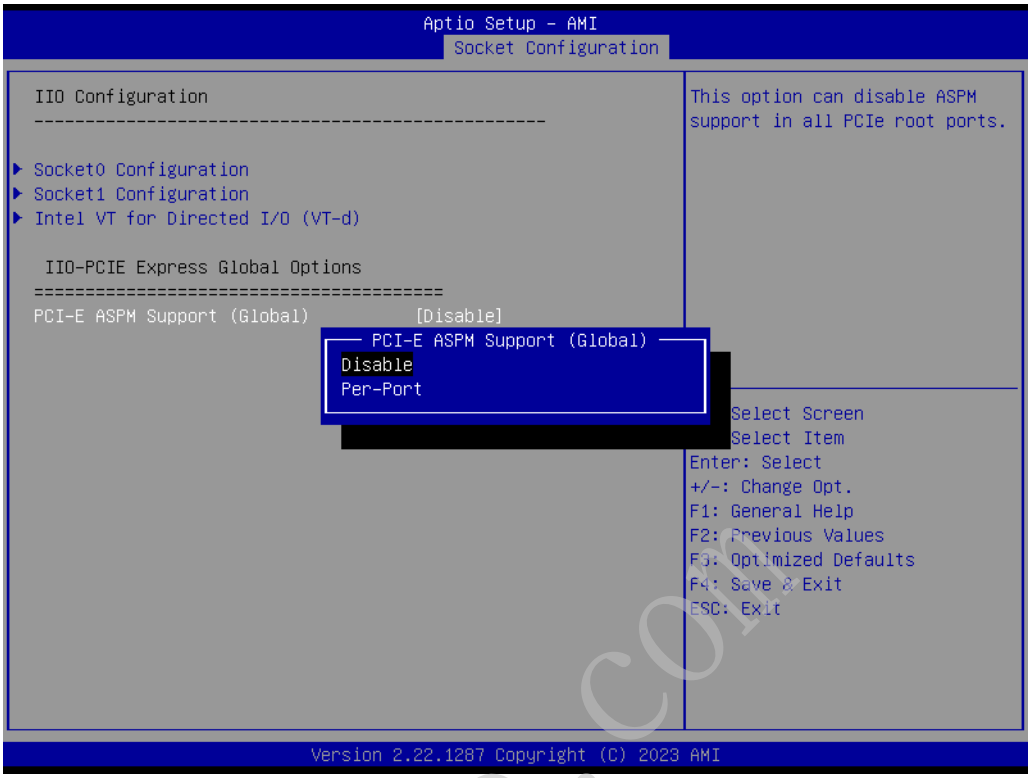




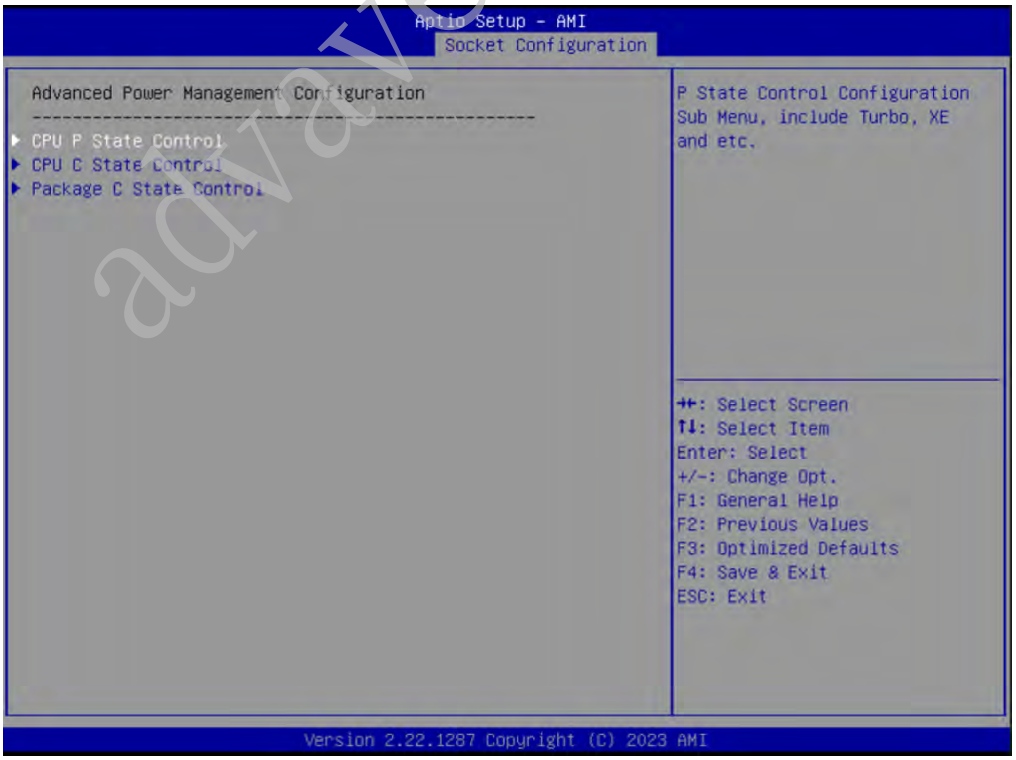
- **Intel VT for Directed I/O (VT-d)**
  Enable or disable Intel Virtualization Technology for directed I/O.



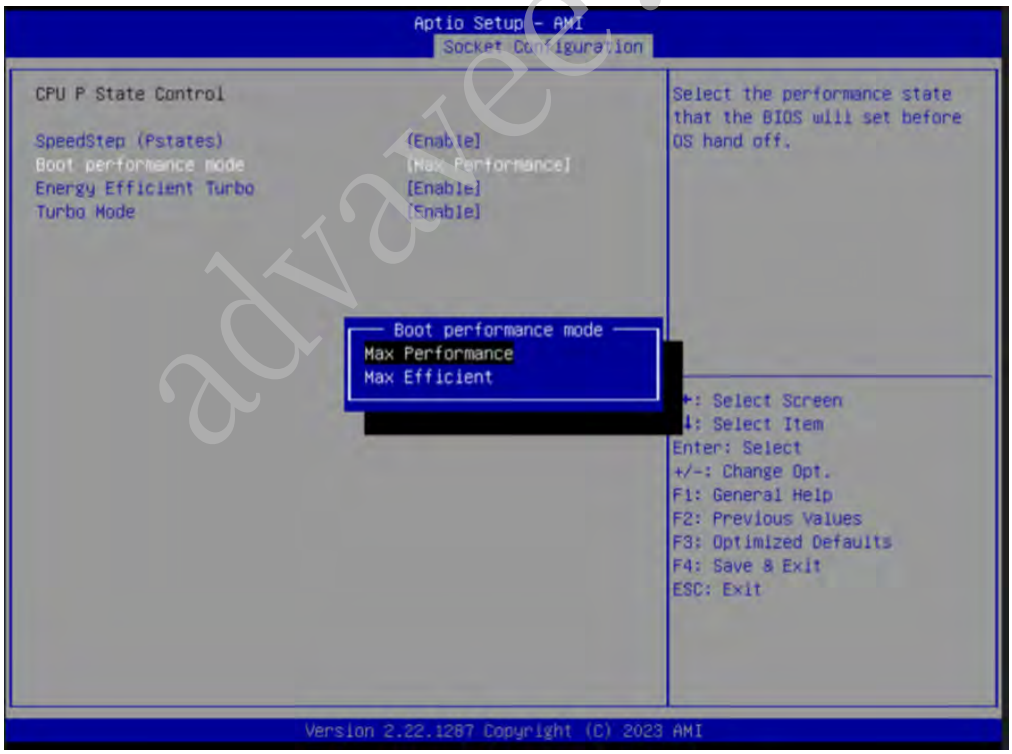
- **PCI-E ASPM Support (Global)**
  Sets the ASPM level to disable or per-port.



3.2.4.5 Advanced Power Management Configuration

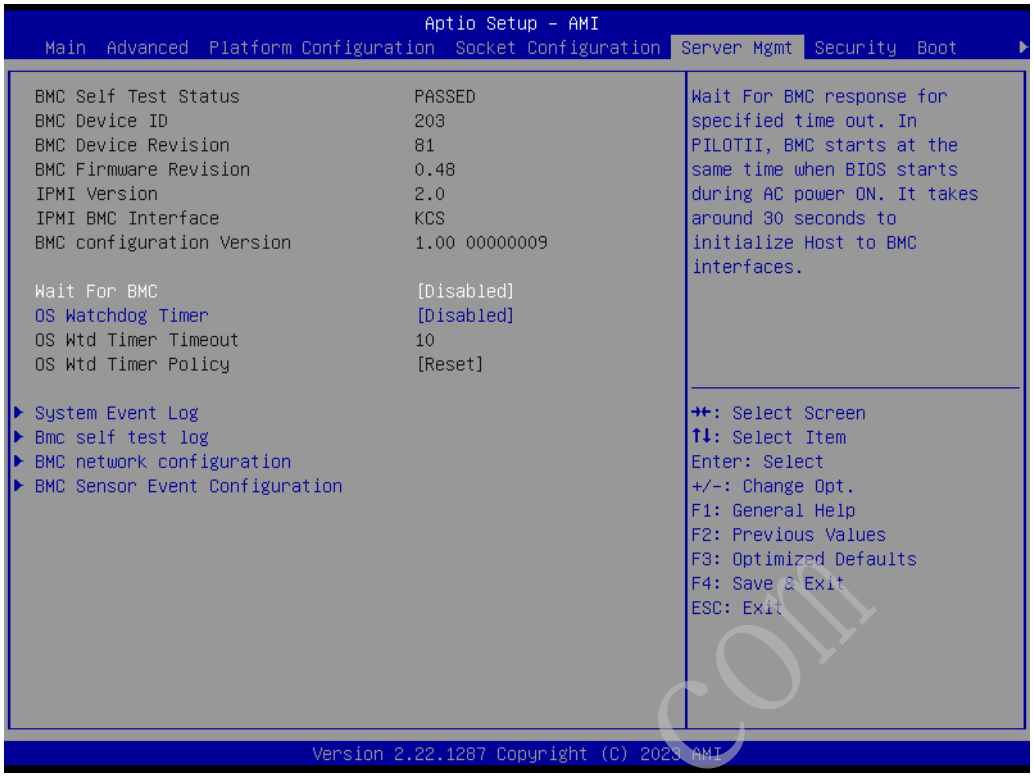


CPU P State Control



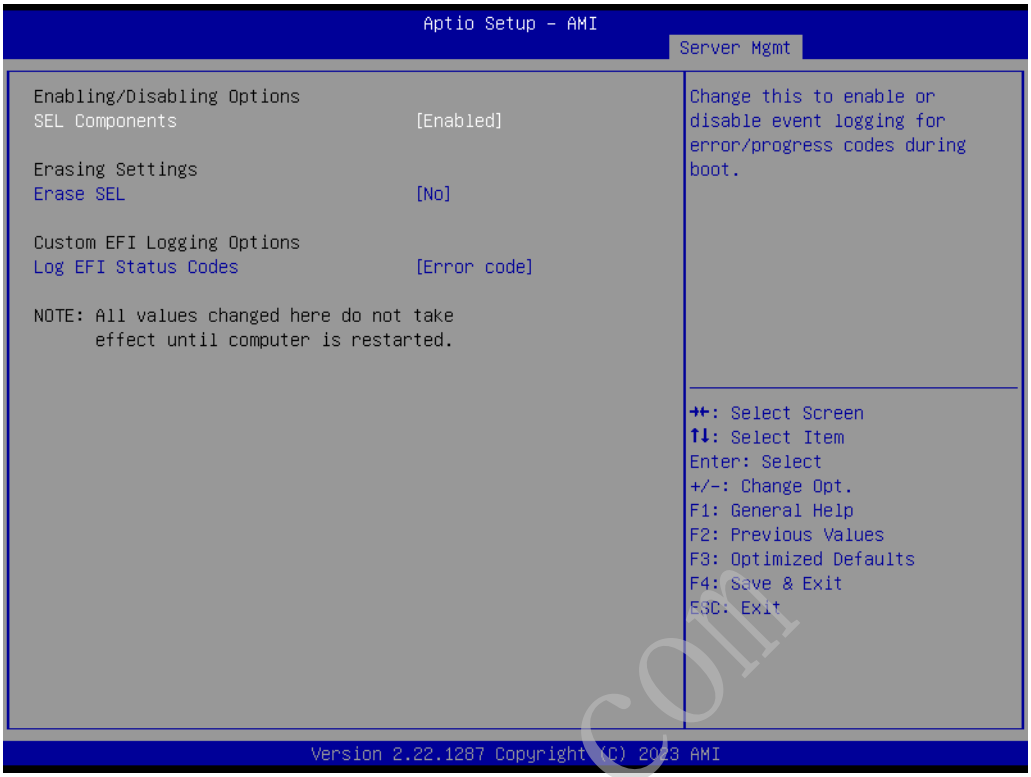
Package C State Control

3.2.5 Server Management



- **Wait for BMC**
  If enabled, motherboard will wait 30 ~ 60 seconds until BMC module boots up completely. After that, the normal BIOS post screen will be displayed.
  If disabled, motherboard will not wait for BMC module's response.
- **Wait for BMC counter**
  Initialize host to BMC interfaces. The MB beeps per 5 seconds to check it.
- **OS Watchdog Timer**
  If enabled, starts a BIOS timer which can only be shut off by management software after the OS loads. "Disabled" is the default setting.

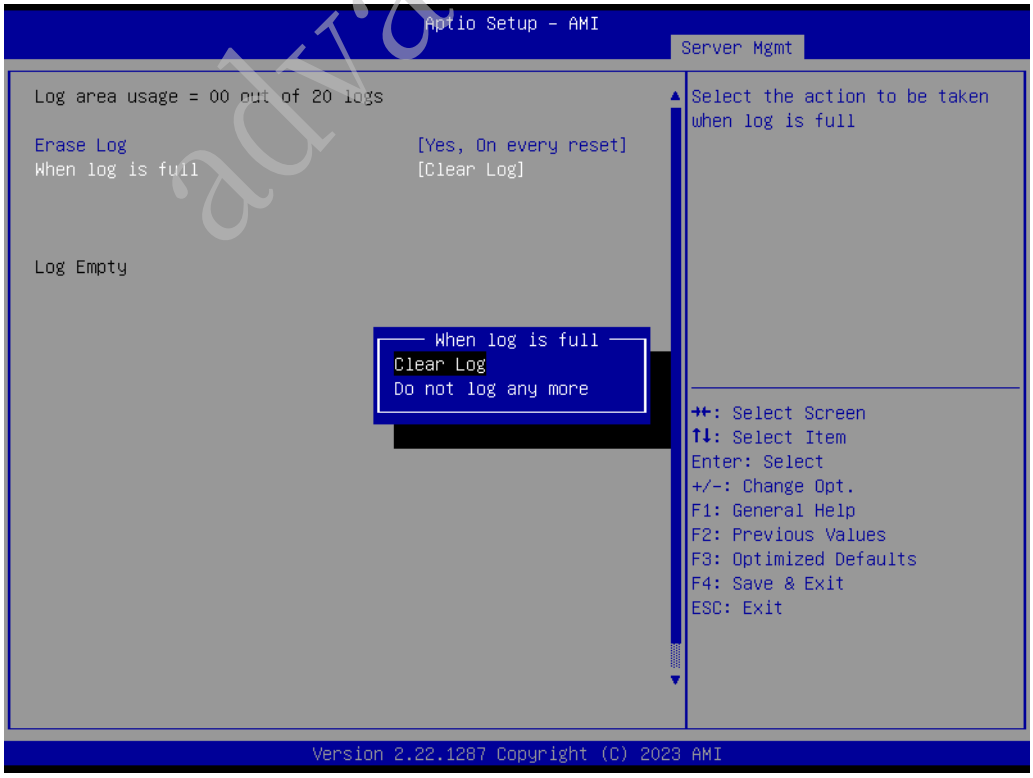
3.2.5.1 System Event Log



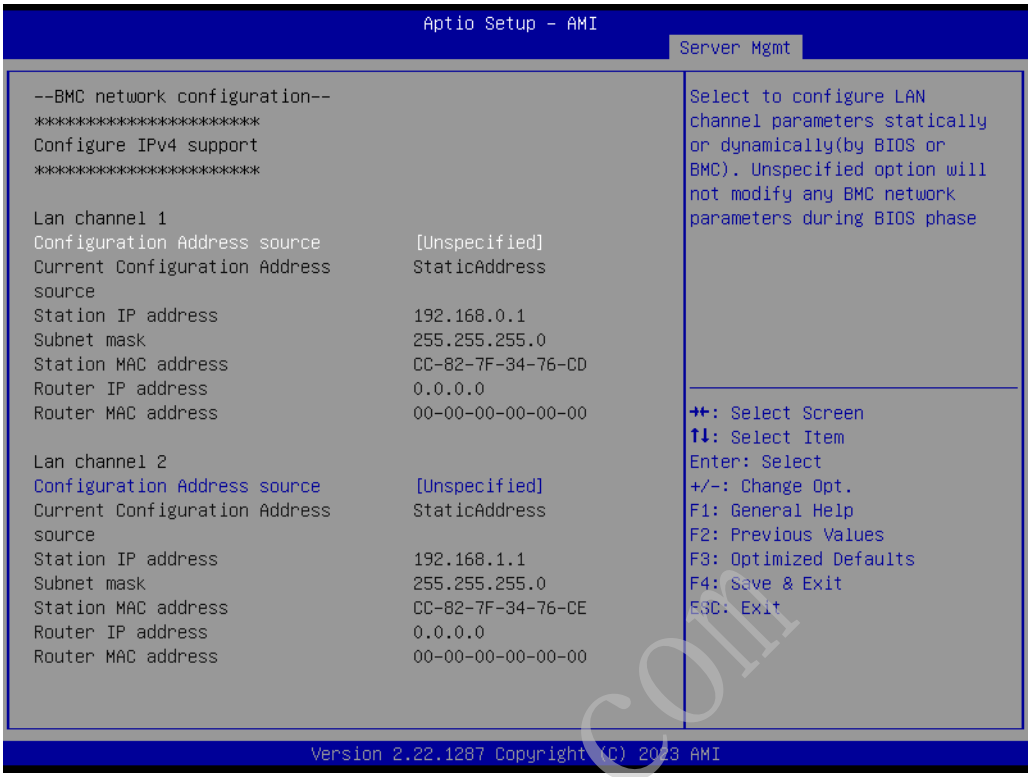
- **SEL Components**
  Enable or disable all features of system event logging during boot.
- **Erase SEL**
  Choose options for erasing SEL. "No" is the default setting.
- **Log EFI Status Codes**
  Disable the logging of EFI status codes or log only error code or only progress code or both.

3.2.5.2 BMC Self Test Log

- **Erase Log**
  Erase log options.
- **When Log Is Full**
  Select the action to be taken when log is full.

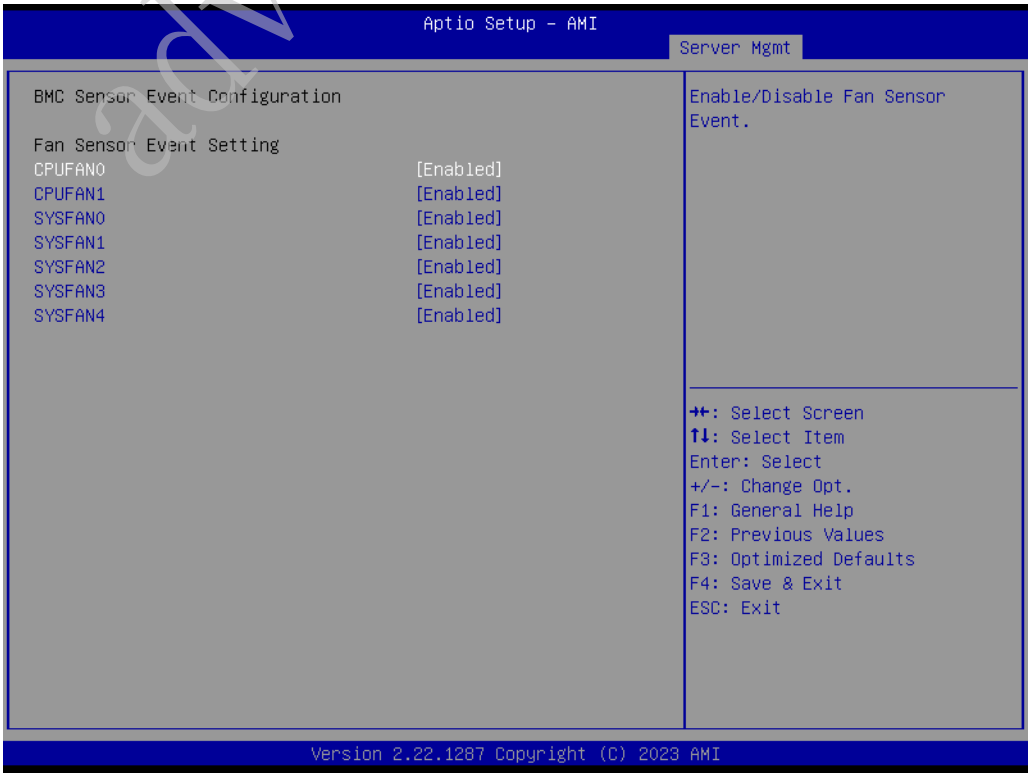


3.2.5.3 BMC Network Configuration

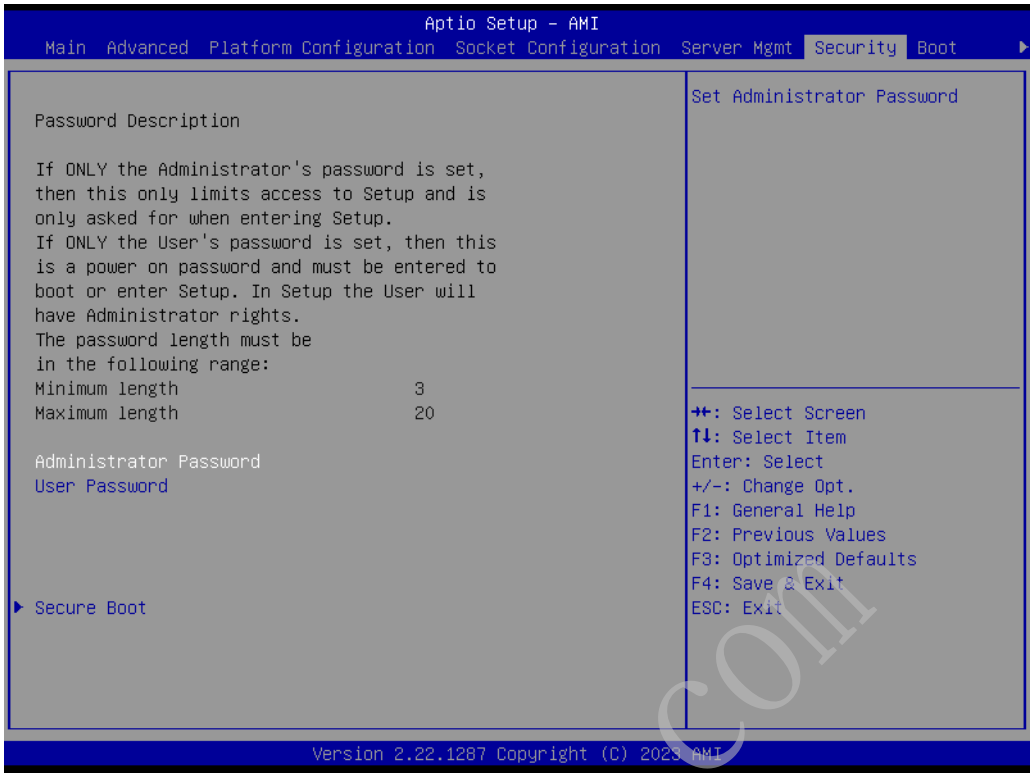


- **Configuring Address Source**
  Select to configure LAN channel parameters statically or dynamically (by BMC). Unspecified options will not modify any BMC network parameters during BIOS phase.

3.2.5.4 BMC Sensor Event Configuration



3.2.6 Security



Note! ***With AC power & Battery. Short CMOS1 Jumper:***

Date/Time & Password: Keep

Setting: reset to default

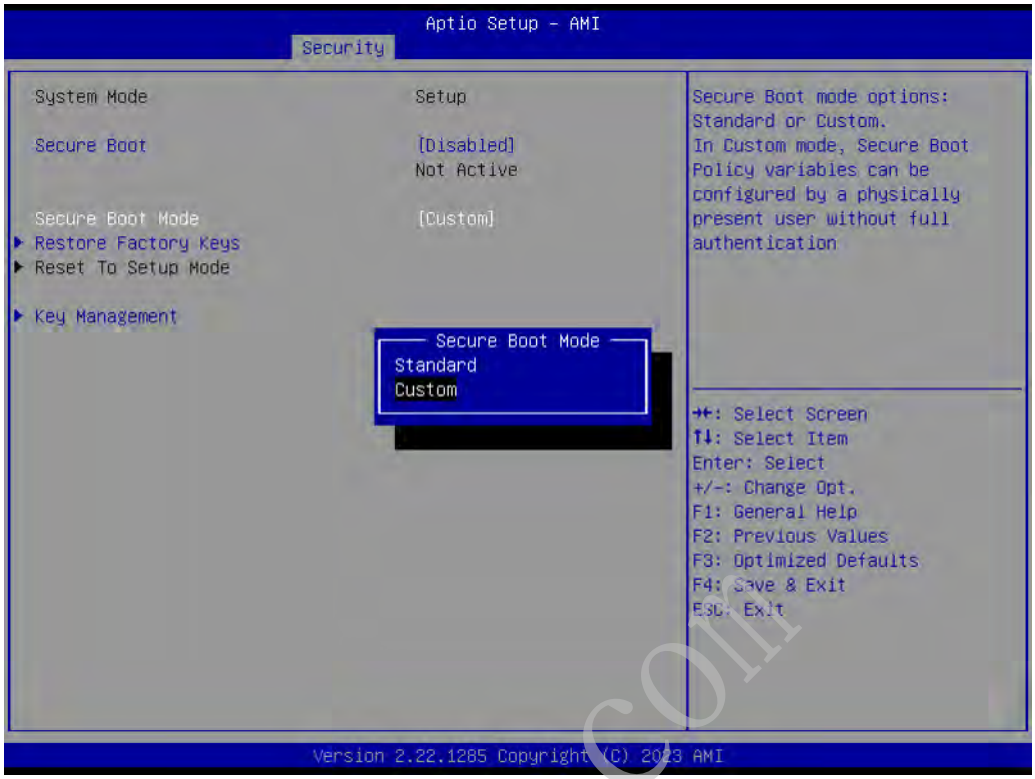
AC power and CMOS battery are removed. Short CMOS1 Jumper:

Date/Time: reset to default

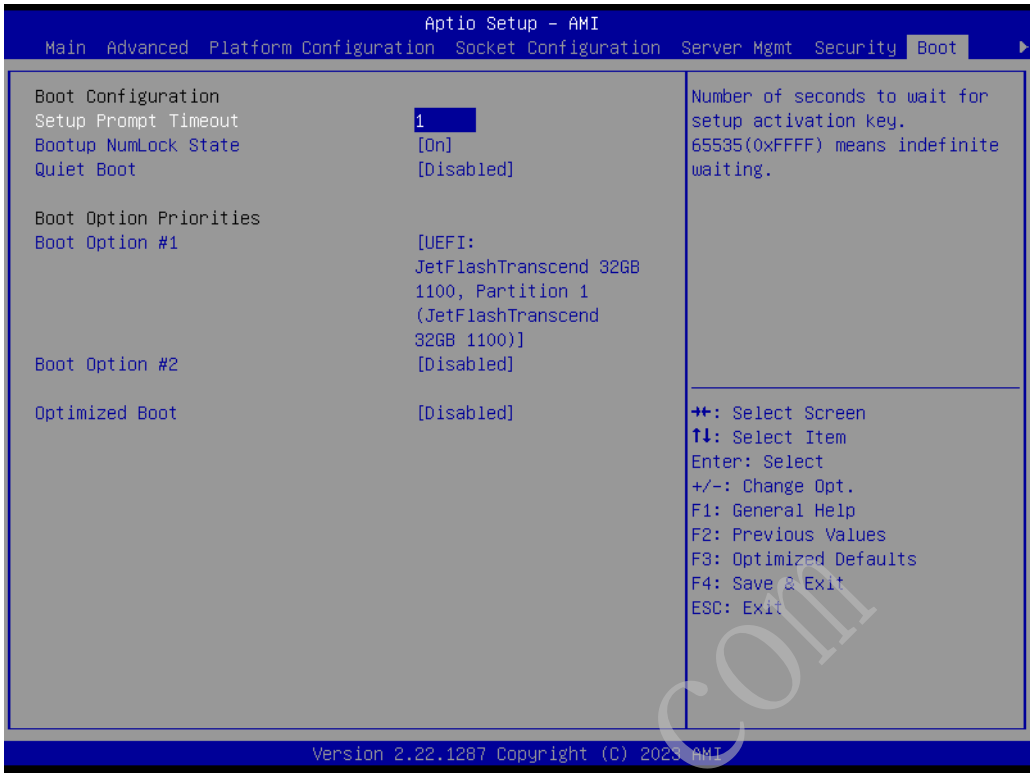
Password: Keep

Setting: reset to default

3.2.6.1 Secure Boot

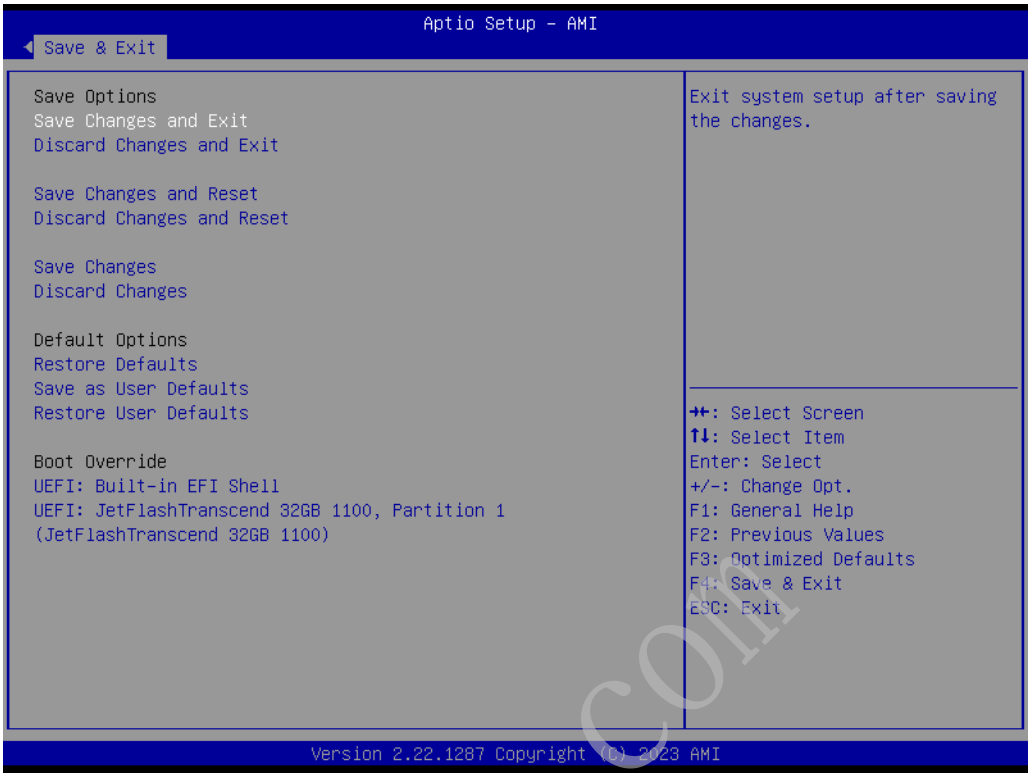


3.2.7 Boot



- **Setup Prompt Timeout**
  Number of seconds to wait for setup activation key. "1" is the default setting.
- **Bootup NumLock State**
  Select the keyboard NumLock state as "On" or "Off".
- **Quiet Boot**
  Enable or disable quiet boot option.
- **Boot Option Priorities**
  Sets the system boot priorities.

3.2.8 Save & Exit



- **Save Changes and Exit**
  Exit system setup after saving the changes.
- **Discard Changes and Exit**
  Exit system setup without saving any changes.
- **Save Changes and Reset**
  Reset the system after saving changes.
- **Discard Changes and Reset**
  Reset system setup without saving any changes.
- **Save Changes**
  Save changes done so far to any of the setup options.
- **Discard Changes**
  Discard changes done so far to any of the setup options.
- **Restore Defaults**
  Restore/Load default values for all the setup options.
- **Save as User Defaults**
  Save the changes done so far as user defaults.
- **Restore User Defaults**
  Restore the user defaults to all the setup options.

Chapter 4

Chipset Software Installation Utility

4.1 Before Beginning

To facilitate the installation of the enhanced display drivers and utility software, read the instructions in this chapter carefully. The drivers for the ASMB-927 are available online for download from the Advantech support website.

Before beginning, it is important to note that most display drivers need to have the relevant software application already installed on the system prior to installing the enhanced display drivers. In addition, many of the installation procedures assume that you are familiar with both the relevant software applications and operating system commands. Review the relevant operating system commands and the pertinent sections of your application software's user manual before performing the installation.

4.2 Introduction

The Intel Chipset Software Installation (CSI) utility installs the Windows INF files that outline the operating system on how the chipset components will be configured. This is needed for the proper functioning of the following features:

- Core PCI PnP services
- Serial ATA interface support
- USB 1.1/2.0/3.2 gen1 support
- Identification of Intel chipset components in the device manager

Note! *The chipset driver is used for the following versions of Windows, and it has to be installed before installing all the other drivers:*

Windows Server 2022 DataCenter x64	*x64*
Windows Server 2019 DataCenter x64	*x64*
Windows 11 Enterprise x64	*x64*
Windows 10 Enterprise x64	*x64*

Note! *It is necessary to update all the latest Microsoft hot fix files when using this OS.*

Chapter 5

Graphics Setup

5.1 Introduction

Install the ASPEED VGA driver to enable this function, which includes the following features:

- 32-bit 2D graphics engine on board for normal use.
- 64 MB RAM for this chip, the highest resolution is 1920x1200.

5.2 Windows Series Driver Setup

When the folder is displayed, navigate to the “Graphic” folder and click the executable file to complete the installation of the drivers for the OS that you need.

Note!

1. *If ASMB-927 carries an additional graphics card for VGA output, please set this additional graphic card as "major output" under the “Display properties” of OS.*
2. *The WDDM driver can support for the following OS versions:*
   - *Windows 10 x64 version*
   - *Windows 11 x64 version*
   - *Windows Server 2012R2 version (WHQL*
   - *Windows Server 2016 version (WHQL)*
   - *Windows Server 2019 version (WHQL)*
   - *Windows Server 2022 version (WHQL)*
3. *ASPEED Graphics WDDM Driver Limitation on Microsoft Windows OS.*
   - *It is a non-WHQL certified driver because ASPEED VGA is a 2D VGA, it cannot meet the WHQL requirement of WDDM drivers which require 3D VGA functions.*
   - *Because it is a non-WHQL certified driver, it may have some compatibility issues with some specific applications*

Chapter 6

LAN Configuration

6.1 LAN Configuration

6.1.1 Introduction

The ASMB-927 has two ten Gigabit Ethernet LAN connections, LAN1 and LAN2 - Intel® X710-AT2. They eliminate bottlenecks of network data flow and incorporate Gigabit Ethernet at 10 Gbps.

6.1.2 Features

- 100/1000 & 10G Base-T Ethernet controller
- 100/1000 & 10G Base-T triple-speed MAC
- Full duplex at 100/1000 Mbps or 10 Gbps and half duplex at 10/100/1000 Mbps
- Wake-on-LAN (WOL) support

6.1.3 Installation

The integrated Intel gigabit Ethernet controller supports all major network operating systems. However, the installation procedure varies with different operating systems. In the following sections, refer to the one that provides the driver setup procedure for the operating system you are using.

6.1.4 Windows Series Driver Setup

Select folder “LAN” then click the proper LAN driver for the OS.

Appendix A

Programming the Watchdog Timer

The ASMB-927's watchdog timer can be used to monitor system software operation and take corrective action if the software fails to function within the programmed period. This section describes the operation of the watchdog timer and how to program it.

A.1 Watchdog Timer Overview

The watchdog timer is built in to the EC controller IT5121VG. It provides the following functions for user programming:

- Can be enabled and disabled by user's program
- Timer can be set from 1 to 255 seconds
- Generates an interrupt or reset signal if the software fails to reset the timer before time-out

A.2 Programming the Watchdog Timer

The I/O port address of the watchdog timer is as below:

Table A.1: Adsresses

Address	Description	
0x57	Event - Warm Reset: 0x04	
0x5E	Warm Reset Timer (High BYTE)	Based 100ms
0x5F	Warm Reset Timer (Low BYTE)	

Here is an example to step by step program the Watchdog Timer.

Table A.2: Steps

Steps	Action	Description
00	Read 0x299 port	Clear I/O port
	Wait IBF clear	0x29A, BIT1, = 0
01	Write 0x89 to 0x29A	
	Wait IBF clear	0x29A, BIT1, = 0
02	Write 0x5E to 0x299 port	
	Wait IBF clear	0x29A, BIT1, = 0
03	Write 0x00 to 0x299 port	Set 10 sec (high byte)
	Wait IBF clear	0x29A, BIT1, = 0
04	Write 0x89 to 0x29A	
	Wait IBF clear	0x29A, BIT1, = 0
05	Write 0x5F to 0x299 port	
	Wait IBF clear	0x29A, BIT1, = 0
06	Write 0x64 to 0x299 port	Set 10 sec (low byte)
	Wait IBF clear	0x29A, BIT1, = 0
07	Write 0x89 to 0x29A	
	Wait IBF clear	0x29A, BIT1, = 0
08	Write 0x57 to 0x299 port	Watchdog Event
	Wait IBF clear	0x29A, BIT1, = 0
09	Write 0x04 to 0x299 port	(Warm) Reset event
	Wait IBF clear	0x29A, BIT1, = 0
10	Write 0x28 to 0x29A	Start watchdog
	Wait 1 ~ 9 sec	
	Wait IBF clear	0x29A, BIT1, = 0
11	Write 0x29 to 0x29A	Stop watchdog
	Wait IBF clear	0x29A, BIT1, = 0
12	Go to Step 07	

Appendix B

I/O Pin Assignments

B.1 USB2.0 Header (USB2H1)

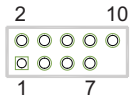


Table B.1: USB Header (USB2_78, USB2_910)			
Pin	**Signal**	**Pin**	**Signal**
1	USB_VCC5	2	USB_VCC5
3	USB_D-	4	USB_D-
5	USB_D+	6	USB_D+
7	GND	8	GND
9	Key	10	GND

B.2 USB 3.2 Gen1 Header (USB3H1)

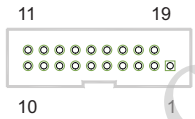


Table B.2: USB Header (USB5_6, USB7_8)			
Pin	**Signal**	**Pin**	**Signal**
1	+5 V	2	STDA_SSRX-
3	STDA_SSRX+	4	GND
5	STDA_SSTX-	6	STDA_SSTX+
7	GND	8	D-
9	D+	10	OC#
11	D+	12	D-
13	GND	14	STDA_SSTX+
15	STDA_SSTX-	16	GND
17	STDA_SSRX+	18	STDA_SSRX-
19	+5 V	20	

B.3 VGA Connector (VGA1)

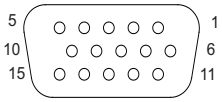


Table B.3: VGA Connector (VGA1)			
Pin	**Signal**	**Pin**	**Signal**
1	RED	9	VCC
2	GREEN	10	GND
3	BLUE	11	N/C
4	N/C	12	SDT
5	GND	13	H-SYNC
6	GND	14	V-SYNC
7	GND	15	SCK
8	GND		

B.4 RS-232 Interface (COM1)

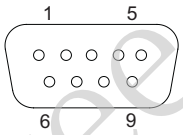


Table B.4: RS-232 Connector (COM1)	
Pin	**Signal**
1	DCD
2	RXD
3	TXD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

B.5 RS-232 Interface (COM2)

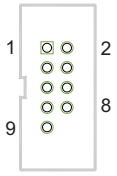


Table B.5: RS-232 header (COM2)	
Pin	**Signal**
1	DCD
2	DSR
3	RXD
4	RTS
5	TXD
6	CTS
7	DTR
8	RI
9	GND

B.6 External Keyboard Connector (KBMS1)

Table B.6: External keyboard connector (KBMS2)	
Pin	**Signal**
1	KB CLK
2	KB DATA
3	MS DATA
4	GND
5	VCC
6	MS CLK

B.7 System & CPU Fan Power Connector (CPUFAN0~1, SYSFAN0~3, REAR_FAN)

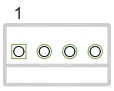


Table B.7: CPU FAN connector (CPUFAN0~1)

	CPUFAN0	CPUFAN1
1	GND	GND
2	+12 V	+12 V
3	FAN0 MODE_TACH	FAN1 MODE_TACH
4	FAN0 MODE_PWM	FAN1 MODE_PWM

Table B.8: SYS FAN connector (SYSFAN0~3, REAR_FAN)

	SYS FAN0	SYS FAN1	SYS FAN2	SYSFAN3	REAR_FAN
1	GND	GND	GND	GND	GND
2	+12 V	+12 V	+12 V	+12 V	+12 V
3	FAN2 MODE_TACH	FAN2 MODE_TACH	FAN3 MODE_TACH	FAN3 MODE_TACH	FAN4 MODE_TACH
4	FAN2 MODE_PWM	FAN2 MODE_PWM	FAN3 MODE_PWM	FAN3 MODE_PWM	FAN4 MODE_PWM

B.8 Power LED (JFP3)

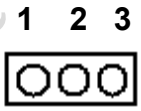


Table B.9: Power LED connector (JFP1)

Pin	Function
1	LED power (3.3 V)
2	NC
3	Ground

B.9 External Speaker Connector (JFP2)

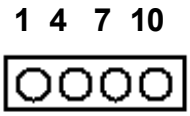


Table B.10: External speaker connector (JFP2)	
Pin	**Function**
1	SPK+
4	NC
7	BZ-
10	SPK-

B.10 Reset Connector (JFP1)

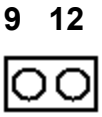


Table B.11: Reset connector (JFP1)	
Pin	**Signal**
9	RESET
12	GND

B.11 HDD LED Connector (JFP1)

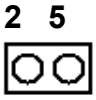


Table B.12: HDD LED connector (JFP1)	
Pin	**Signal**
2	HDD_LED+
5	HDD_LED-

B.12 ATX Soft Power Switch (JFP1)

Table B.13: ATX soft power switch (JFP1)	
Pin	**Signal**
3	PWR-BTN
6	GND

B.13 SMBus Connector (SMBUS1)

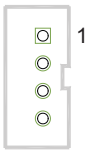


Table B.14: Front panel SMBus connector (SMBUS1)	
Pin	**Signal**
1	+3.3V_AUX
2	SMB_SCL_FRU
3	SMB_SDA_FRU
4	GND

B.14 USB & LAN Ports (LAN1, LAN2, USB3C1, BMC_LAN_USB3C2)

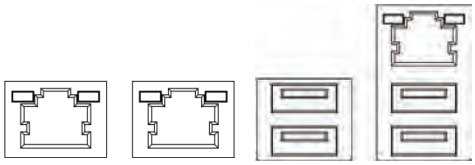


Table B.15: USB port			
Pin	**Signal**	**Pin**	**Signal**
1	VCC_DUAL	3	Data0+
2	Data0-	4	GND

Table B.16: Giga LAN 10/100/1000 Base-T RJ-45 port			
Pin	**Signal**	**Pin**	**Signal**
1	MID0+	4	MID2+
2	MID0-	5	MID2-
3	MID1+	7	MID3+
6	MID1-	8	MID3-

B.15 Audio Connector (HDAUD1)

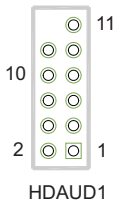


Table B.17: Front panel audio connector (HDAUD1)			
Pin	**Signal**	**Pin**	**Signal**
1	+V5_AUDIO	2	GND
3	ACZ_SYNC	4	ACZ_BITCLK
5	ACZ_SDOUT	6	ACZ_SDIN0
7	ACZ_SDIN1	8	ACZ_RST#
9	ACZ_12V	10	GND
11	GND	12	N/C

B.16 Case Open Connector (JCASE1)

Table B.18: Case open connector (JFP1)	
Pin	**Signal**
1	CASEOP
2	GND

B.17 Front Panel LAN LED Connector (LANLED1)

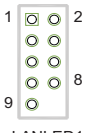


Table B.19: LAN LED connector (LANLED1)			
Pin	**Signal**	**Pin**	**Signal**
1	LAN1_ACT#	2	LAN2_ACT#
3	+3V3_LAN1LED	4	+3V3_LEN2LED
5	LAN3_ACT#	6	LAN4_ACT#
7	+3V3_LAN3LED	8	+3V3_LEN4LED
9	NC	10	NC

B.18 SATA SGPIO Connector (SGPIO1, SGPIO2)

Table B.20: SATA SGPIO connector (SGPIO1, SGPIO2)	
Pin	**Signal**
1	SCLOCK_PCH
2	NC
3	SLOAD_PCH
4	SDATAOUT0_PCH
5	SDATAOUT1_PCH

B.19 ESPI Connector (ESPI1)

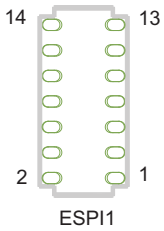


Table B.21: ESPI connector (ESPI1)			
Pin	**Signal**	**Pin**	**Signal**
1	IO1	2	CLK
3	IO0	4	RST
5	+V3.3	6	CS
7	GND	8	IO3
9	+V3.3_AUX	10	IO2
11	+V1.8_AUX	12	SMB_CLK
13	ALARM	14	SMB_DATA

B.20 Clear CMOS Connector (JCMOS1, JME1)

Table B.22: Clear CMOS connector (JCMOS1, JME1)		
Pin	**Signal**	**Signal**
	JCMOS1	JME1
1	NC	NC
2	RTC_RST_PCH	HDA_SDOUT_PCH
3	GND	+3.3V

B.21 PMBUS Connector (PMBUS1)

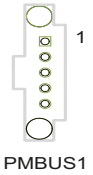


Table B.23: PMBUS connector (PMBUS1)	
Pin	**Signal**
1	SMB_SCL_PM
2	SMB_SDA_PM
3	SMB_ALT_PM
4	GND
5	+3.3V

B.22 GPIO Connector (GPIO1)

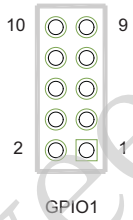


Table B.24: GPIO connector (GPIO1)			
Pin	**Signal**	**Pin**	**Signal**
1	SIO_GPIO0	2	SIO_GPIO4
3	SIO_GPIO1	4	SIO_GPIO5
5	SIO_GPIO2	6	SIO_GPIO6
7	SIO_GPIO3	8	SIO_GPIO7
9	VCC_GPIO0	10	GND

B.23 PEHP Connector

Table B.25: PEHP connector	
Pin	**Signal**
1	ALERT
2	CLK
3	DATA
4	GND

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Please verify specifications before quoting. This guide is intended for reference purposes only.

All product specifications are subject to change without notice.