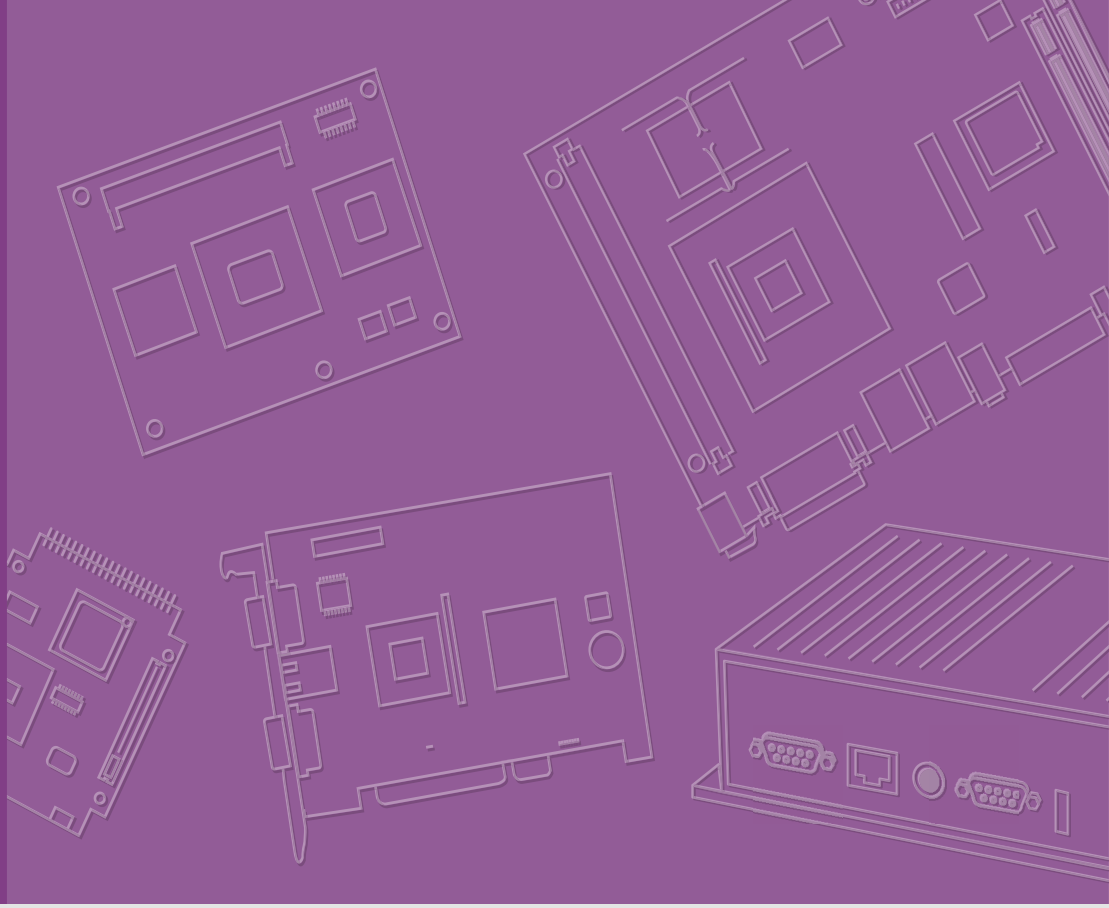

User Manual

AIMB-592

AMD EPYC 7003 Zen 3 Core, Micro-ATX with 4 x PCIe x16 Slots, 2 x 10GbE LAN, 2 x 2.5GbE LAN, 5 x USB 3.2 Gen1, IPMI 2.0

ADVANTECH

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Product Warranty (2 Years)

Advantech warrants to you, 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 any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which 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 of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

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 you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful 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 fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is 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. 2006059201 Edition 2

Printed in China May 2025

Declaration of Conformity

FCC Class B

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CPU Compatibility

Processor Number	Code Name	Max TDP	Freq (GHz)	Mfg. Tech	Smart cache (L3)	Result
AMD EPYC™ 7713P	Milan	225W	3.675GHz	7nm	256MB	Pass
AMD EPYC™ 7543P	Milan	225W	3.7GHz	7nm	256MB	Pass
AMD EPYC™ 7313P	Milan	155W	3.7GHz	7nm	128MB	Pass

ECC Memory Compatibility

Category	Speed	Capacity	Vendor	Module P/N	Chip P/N	ADVANTECH P/N	ECC	Result
DDR4	3200	64GB	Micron	MTA36ASF8G72PZ-3G2F1UI	2BF75 DBCJT	96D4-64G3200ER-M2	ECC	PASS
DDR4	3200	128GB	Samsung	SQR-RD4N28G3K2SRMB	SEC 207 K4ABG045WM 3CAE	SQR-RD4N28G3K2 SRMB	ECC	PASS

Ordering Information

P/N	USB 3.2 (Rear)	USB 3.2 (Internal)	VGA	PCIe x16 Gen4	DDR 4 Memory	10GbE LAN	2.5GbE LAN	IPMI 2.0	BMC	BMC LAN	SATA III	M.2 M-Key	TPM	Slimline
AIMB-592SF-0AA1	4	1	1	4	6	2	2	Yes	1 (AST2500)	1	8	1	1	2 (PCIe x4)
AIMB-592SL-0AA1	4	1	1	4	6	0	2	No	1 (AST2510)*	0	8	1	1	2 (PCIe x4)

* No BMC function

Initial Inspection

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

- 1 x AIMB-592 AMD EPYC 7003 Zen 3 Core Micro-ATX Motherboard
- 4 x SATA HDD cable
- 1 x I/O port bracket
- 1 x Warranty Card
- 2 x M.2 screws
- 1 x Startup Manual

If any of these items are missing or damaged, contact your distributor or sales representative immediately. We have carefully inspected the AIMB-592 mechanically and electrically before shipment. It should be free of marks and scratches and in perfect working order upon receipt. As you unpack the AIMB-592, 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 your 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.

Contents

Chapter 1

General Information

1.1 Introduction

The AIMB-592 motherboard utilizes the AMD EPYC 7003 Zen 3 Core processor, catering to industrial applications that necessitate high-performance computing and advanced power management capabilities. It supports the AMD EPYC 7003 Zen 3 Core, boasting a sizable 256MB L3 cache and DDR4 3200 MHz with a maximum capacity of 768GB (6 x 128GB per slot). The motherboard offers extensive I/O connectivity, including 4 x PCIe x16 slots, up to 2 x 10GbE LAN, 2 x 2.5GbE LAN, 5 x USB 3.2 Gen1, 8 x SATA III ports, and IPMI 2.0.

1.2 Features

- **Rich I/O connectivity:** up to dual 10GbE LAN and dual 2.5 Gbe LAN via PCIe x1 bus, 4 x PCIe x16 slot (Gen4), 5 x USB 3.2 Gen1, 2 slimline SAS connector support 2 x PCIe x4 SAS.
- **Standard Micro-ATX form factor with industrial features:** The AIMB-592 is a full featured Micro-ATX motherboard with balanced expandability and performance.
- **Diverse Storage Devices:** SATA HDD, M.2 M-Key SSD
- **Optimized Integrated Graphics:** No integrated graphics

1.3 Specifications

1.3.1 Processor

- CPU: AMD EPYC™ 7003 Series Processors
- BIOS: AMI BIOS 256 Mb SPI
- SATA hard disk drive interface: On-board SATA connectors with data transmission rates up to 600 MB

1.3.2 Memory

- RAM: Up to 768GB in six slots, 288-pin DIMM sockets. Supports 6 channels up to DDR4 3200MHz RDIMM.
  - ECC compatibility

1.3.3 Input/Output

- **PCIe slot:** 4 x PCIe x16 expansion slot
- **Serial port:** a serial port of RS-232
- **USB port:** Supports up to 5 x USB 3.2 Gen1 ports with transmission rates up to 5Gbps.
- **GPIO:** AIMB-592 supports 8-bit GPIO from super I/O for general-purpose con troll application.

1.3.4 Graphics

- **Controller:** ASPEED AST2500/AST2510 BMC Chip
- **VGA:** VGA up to 1920 x 1200 @ 60Hz

1.3.5 Ethernet LAN

- Supports up to 2 x 10/100/1000/2500 Mbps Ethernet ports via PCI Express x1 bus and 2 x 100/1000/10000 Mbps Ethernet ports via PCI Express x4 bus.

- **Controller:** LAN1/LAN2: Intel i226-LM (AIMB-592SF/AIMB-592SL)LAN3/LAN4: Intel X550 (AIMB-592SF); LAN5: BMC LAN (AIMB-592SF)

1.3.6 Industrial Features

- **Watchdog timer:** It can generate a system reset. The watchdog timer is programmable, with each unit equal to one second or one minute (255 levels).

1.3.7 Mechanical and Environmental Specifications

- **Operating temperature:** 0 ~ 60°C (32 ~ 140°F, depending on CPU).
- **Storage temperature:** -40 ~ 85°C (-40 ~ 185°F).
- **Power supply voltage:** +5V, 3.3V, 12V, 12V_8P
- **Power requirements:**

Operation	+5V	3.3V	12V	12V_8P
Configuration: AMD EPYC 7543P 32-Core Processor 2.79GHz, with RDIMM DDR4 3200 128GB*6pcs	0.936A	1.8062A	0.005A	17.61060A
Standby (5Vsb)	3A			

Measure the maximum current of the system under maximum load (CPU: Top speed, RAM & Graphics: Full loading)

- **Board size:** 244 x 244 mm (9.6" x 9.6")
- **Board weight:** 0.3 kg

1.4 Jumpers and Connectors

Connectors on the AIMB-592 motherboard link it to devices such as hard disk drives and a keyboard. In addition, the board has a number of jumpers used to configure your system for your application.

The tables below list the function of each of the board jumpers and connectors. Later sections in this chapter give instructions on setting jumpers. Chapter 2 gives instructions for connecting external devices to your motherboard.

1.5 Board layout: Jumper and Connector Locations

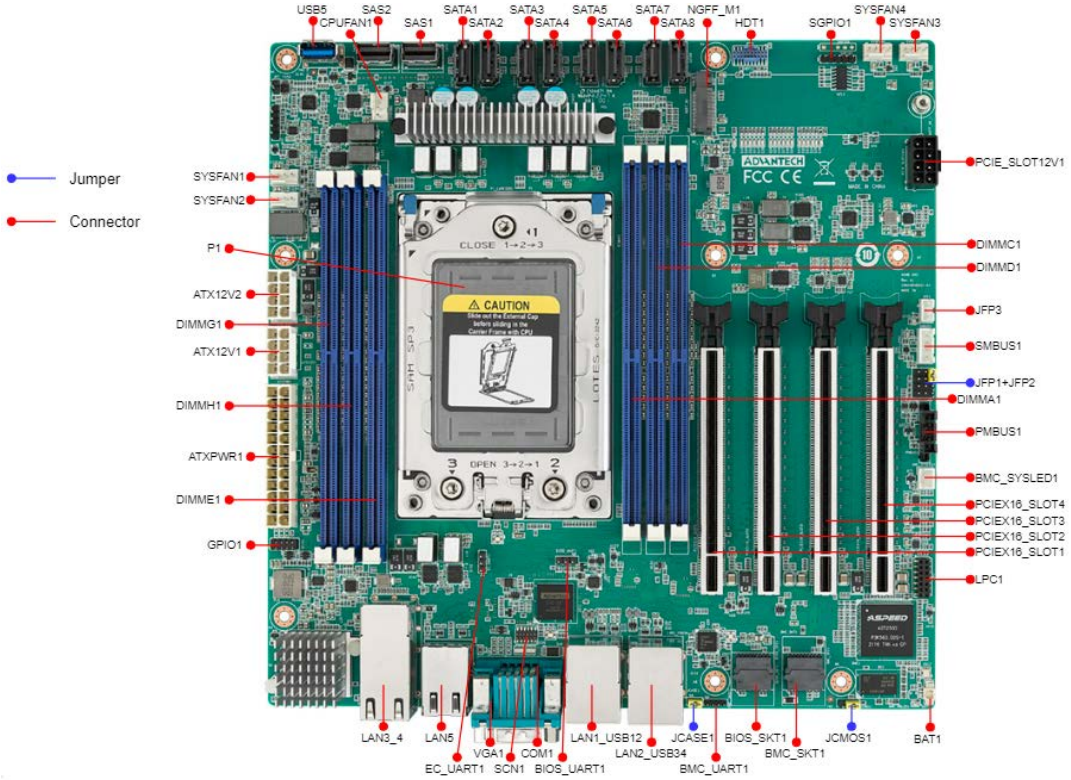
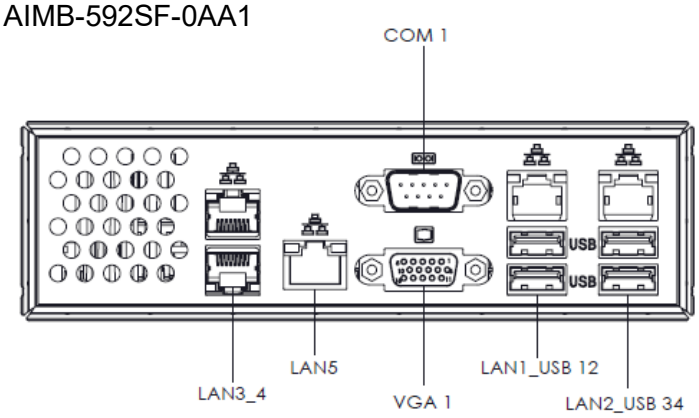


Figure 1.1 Board Layout

AIMB-592SF-0AA1



AIMB-592SL-0AA1

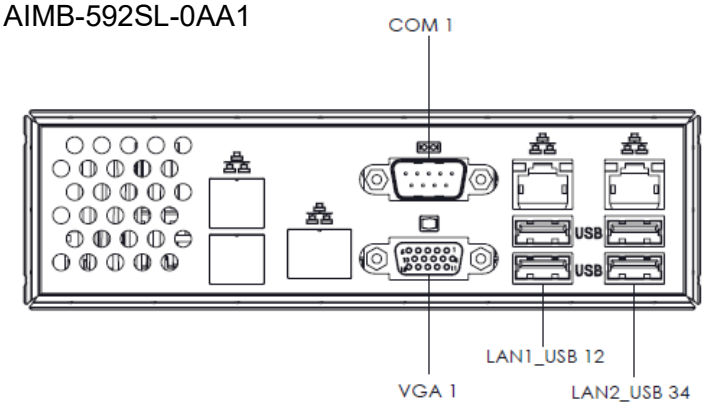


Figure 1.2 Rear I/O of the Two SKUs

Table 1.1: Jumper Setting List		
	Description	**Part Reference**
1	Clear CMOS jumper	JCMOS1
2	Case open pin header	JCASE1
3	Front Panel1 + Front Panel2 header	JFP1+JFP2

Table 1.2: Connector/Header List:		
	Description	**Part Reference**
1	10G LAN Port *2	LAN3_4
2	BMC LAN	LAN5
3	BMC VGA	VGA1
4	COM Port	COM1
5	2.5G LAN + USB 3.2 Gen1 *2	LAN1_USB12
6	2.5G LAN + USB 3.2 Gen1 *2	LAN2_USB34
7	BIOS SPI ROM socket	BIOS_SKT1
8	BMC ROM socket	BMC_SKT1
9	Battery Holder	BAT1
10	LPC Debug header	LPC1
11	PCIe x16 slot	PCIEX16_SLOT1
12	PCIe x16 slot	PCIEX16_SLOT2
13	PCIe x16 slot	PCIEX16_SLOT3
14	PCIe x16 slot	PCIEX16_SLOT4
15	System Error Led wafer	BMC_SYSLED1
16	PMBus wafer	PMBUS1
17	HW SMBUS	SMBUS1
18	Front Panel3	JFP3
19	Graphics Card 12V slot	PCIE_SLOT12V1
20	System FAN3 connector	SYSFAN3
21	System FAN4 connector	SYSFAN4
22	Serial GPIO	SGPIO1
23	AMD Debug connector	HDT1
24	M.2 M-Key 2280 slot	NGFF_M1
25	SATA connector	SATA8
26	SATA connector	SATA7
27	SATA connector	SATA6
28	SATA connector	SATA5
29	SATA connector	SATA4
30	SATA connector	SATA3
31	SATA connector	SATA2
32	SATA connector	SATA1
33	Slimline SAS 4i connector	SAS1
34	Slimline SAS 4i connector	SAS2
35	CPU FAN connector	CPUFAN1
36	USB 3.2 Gen1 vertical connector	USB5
37	System FAN1 connector	SYSFAN1
38	System FAN2 connector	SYSFAN2

Table 1.2: Connector/Header List:		
39	ATX 12V IN connector	ATX12V2
40	ATX 12V IN connector	ATX12V1
41	ATX 24-pin IN connector	ATXPWR1
42	GPIO header	GPIO1
43	DDR4 RDIMM slot	DIMME1
44	DDR4 RDIMM slot	DIMMH1
45	DDR4 RDIMM slot	DIMMG1
46	DDR4 RDIMM slot	DIMMA1
47	DDR4 RDIMM slot	DIMMD1
48	DDR4 RDIMM slot	DIMMC1
49	CPU socket	P1
50	EC programing header	SCN1

1.6 AIMB-592 Board Diagram

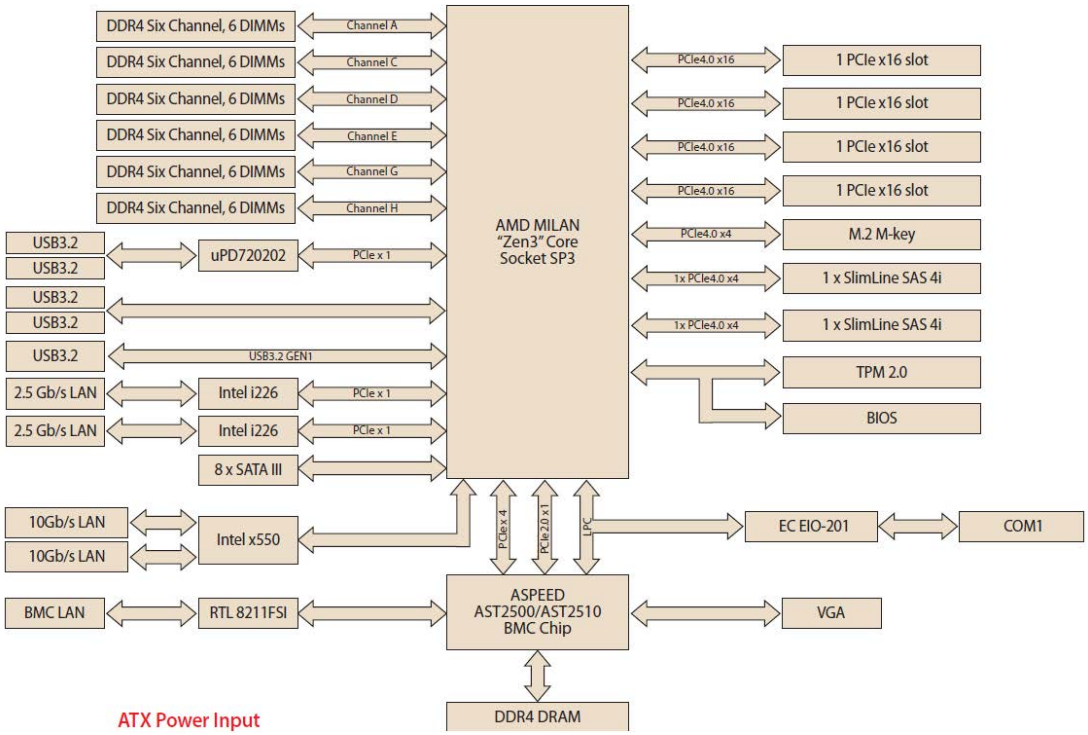


Figure 1.3 AIMB-592 Board Diagram

1.7 Safety Precautions

Warning! *Always completely disconnect the power cord from the chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges. Only experienced electronics personnel should open the PC chassis.*

Caution! *Always ground yourself to remove any static charge before touching the motherboard. Modern electronic devices are very sensitive to electrostatic discharges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not in the chassis.*

Caution! *The computer is provided with a battery-powered real-time clock circuit. There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.*

Caution! *There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.*

1.8 Jumper Settings

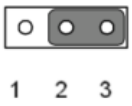
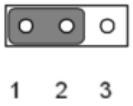
This section provides instructions on how to configure your motherboard by setting the jumpers. It also includes the motherboard's default settings and your options for each jumper.

1.8.1 How to Set Jumpers

You can configure your motherboard to match the needs of your application by setting the jumpers. A jumper is a metal bridge that closes an electrical circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To "close" (or turn ON) a jumper, you connect the pins with the clip. To "open" (or turn OFF) a jumper, you remove the clip. Sometimes a jumper consists of a set of three pins, labeled 1, 2, and 3. In this case you connect either pins 1 and 2, or 2 and 3. A pair of needle-nose pliers may be useful when setting jumpers.

1.8.2 CMOS Clear (JCMOS1)

Pin	Signal Pin Definition
1	+V1.5_RTC_JMP
2	+V1.5_RTC
3	GND

Table 1.3: JCMOS1		
Function	**Jumper Settings**	
Keep CMOS data (Default)		1-2
Clear CMOS data		2-3

1.9 System Memory

The AIMB-592 has six 288-pin memory sockets and supports up to DDR4 3200MHz RDIMM with maximum capacity of 768 GB (Maximum 128 GB for each DIMM).

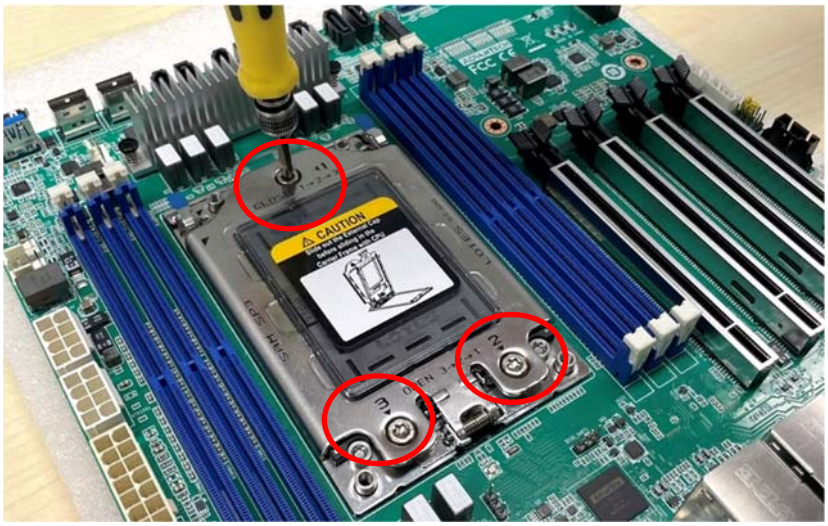
1.10 Memory Installation Procedures

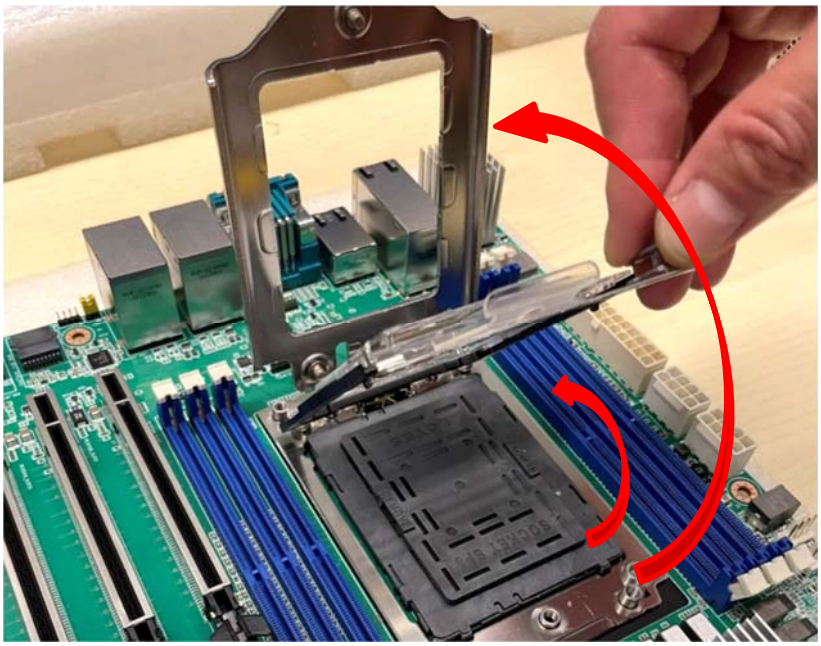
To install DIMMs, first make sure the two handles of the DIMM socket are in the "open" position, i.e., the handles lean outward. Slowly slide the DIMM module along the plastic guides on both ends of the socket. Then firmly but gently (avoid pushing down too hard) press the DIMM module well down into the socket, until you hear a click when the two handles have automatically locked the memory module into the correct position of the DIMM socket. To remove the memory module, just push both handles outward, and the memory module will be ejected by the mechanism.

1.11 Processor Installation

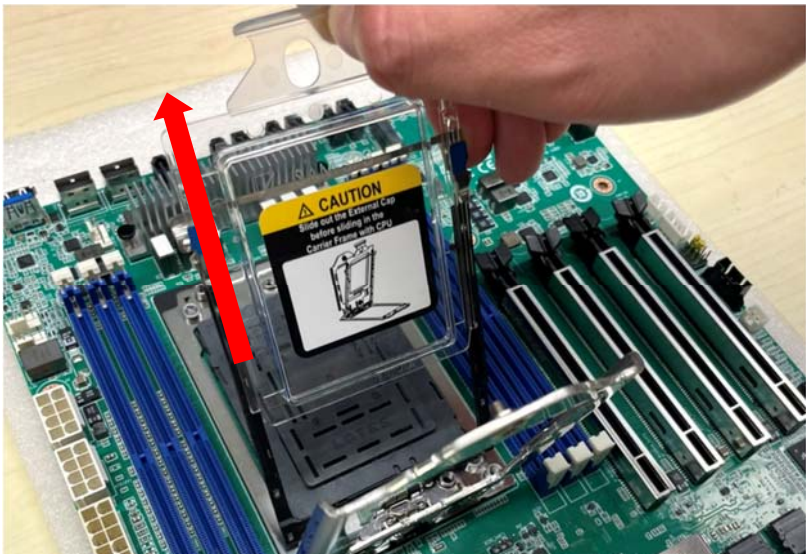
The AIMB-592 is designed for AMD EPYC 7003 Series processors. Please follow the processor installation as below.

1. Unscrew the three screws (shown above in red circles) on the top of the socket retention mechanism (SRM), then rotate the retention frame and rail frame (with external cap).

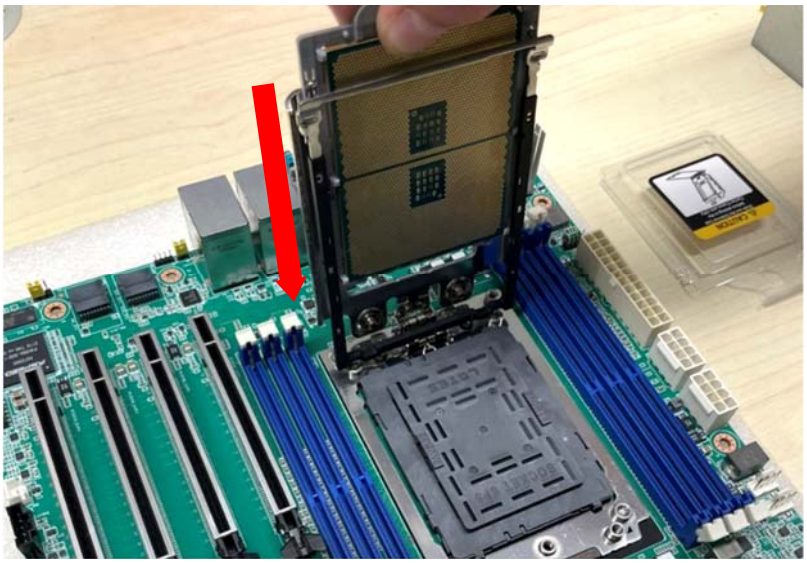


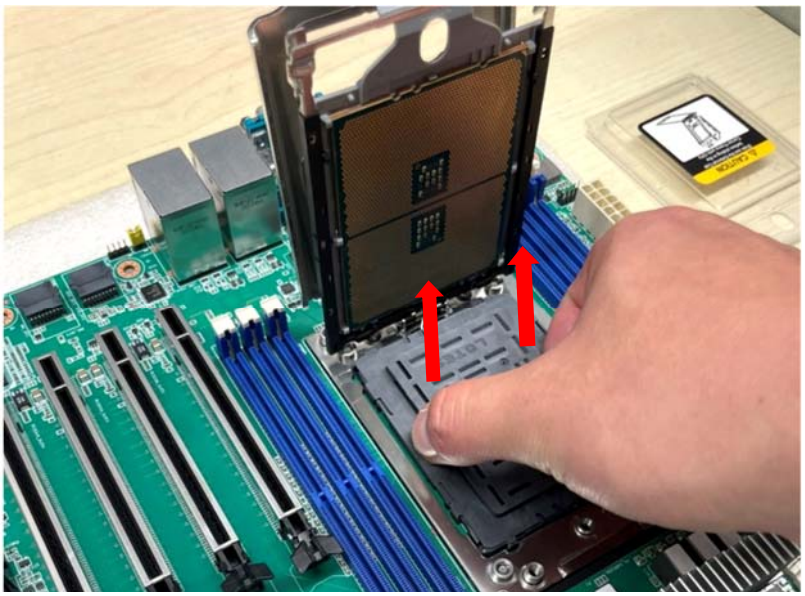


2. Remove the external cap by pulling upwards.

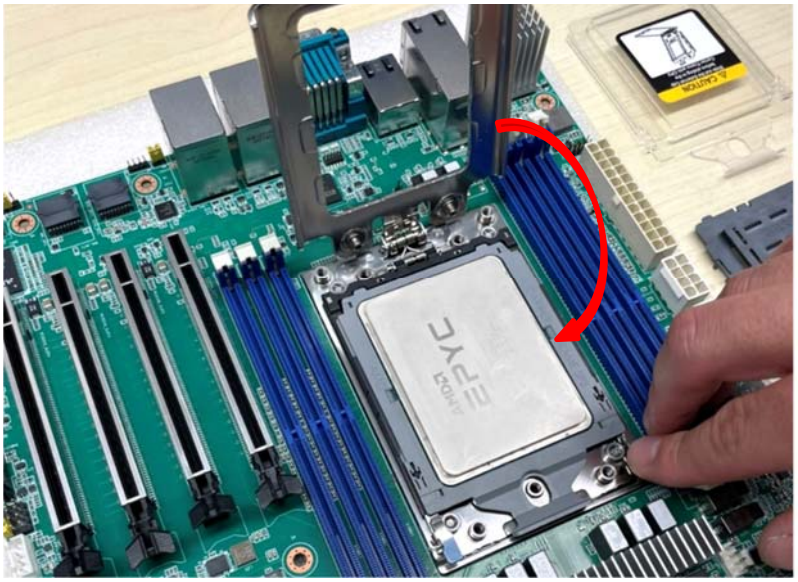


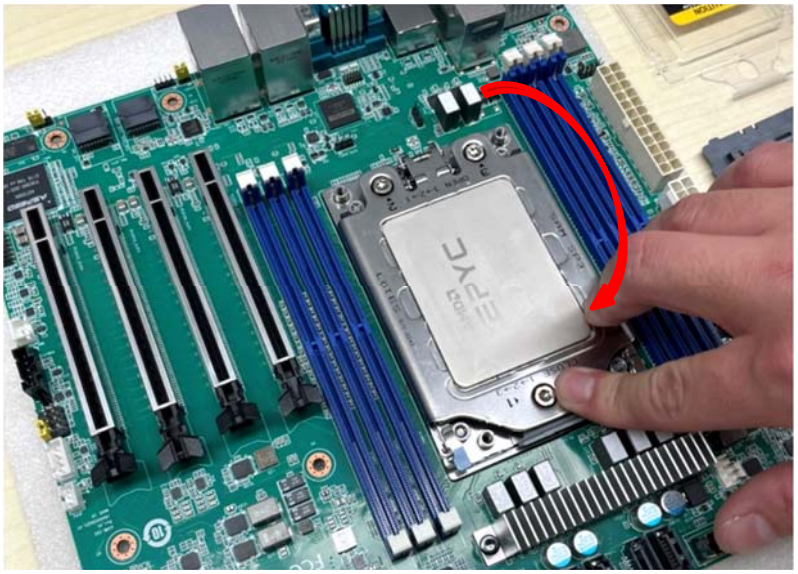
3. Install the carrier frame/CPU package to the rail frame, and then remove the PnP cover cap. Be very careful not to drop the PnP cover cap into the exposed contact field during the removal process.



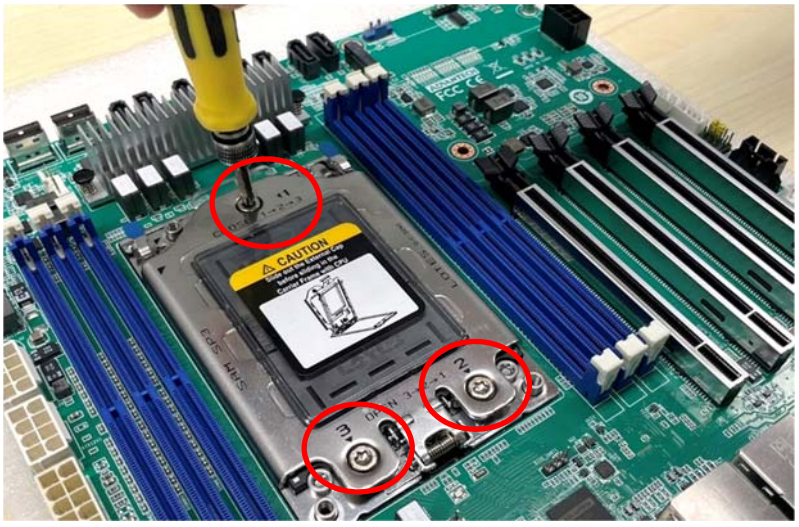


4. Rotate and push the rail frame and retention frame until they are in the horizontal position.

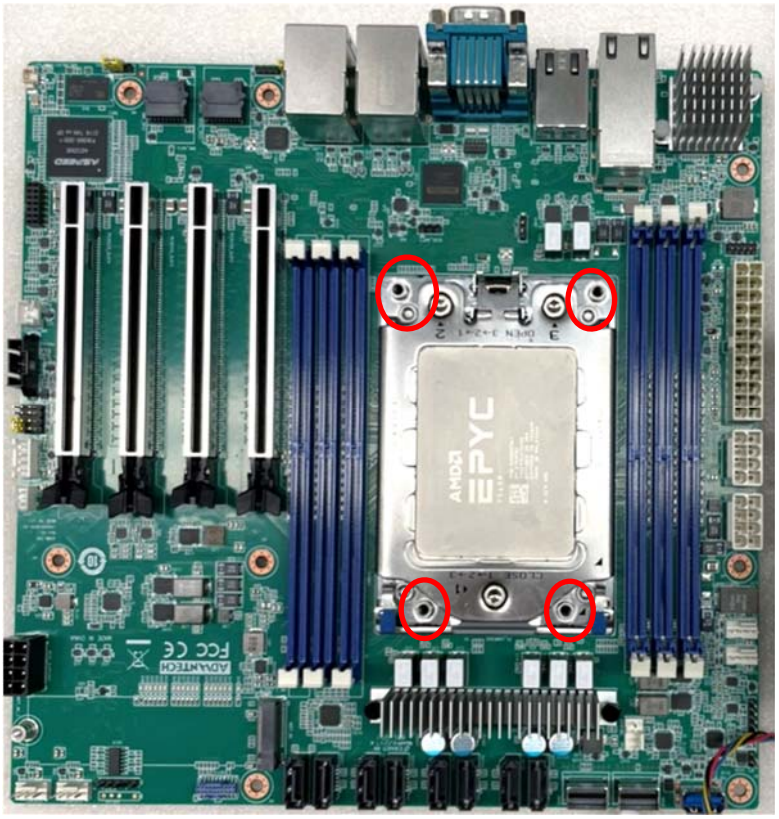


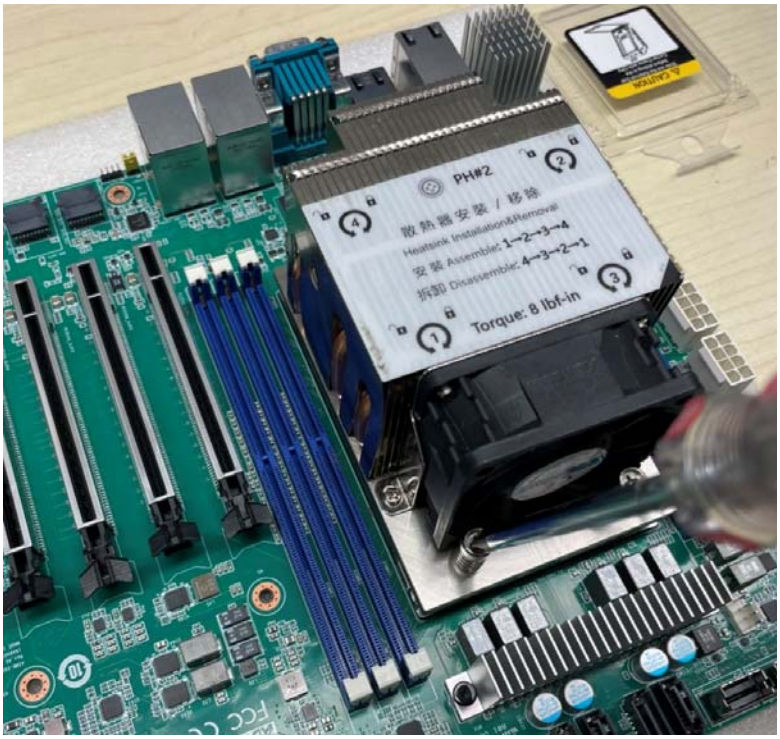


5. Tighten the three screws (shown above in red circles) by using a T-20 screwdriver.



6. Install the processor heatsink module into the socket retention mechanism (SRM) by using a T-20 screwdriver (follow the heatsink label direction 1-2-3-4).





Chapter 2

Connecting Peripherals

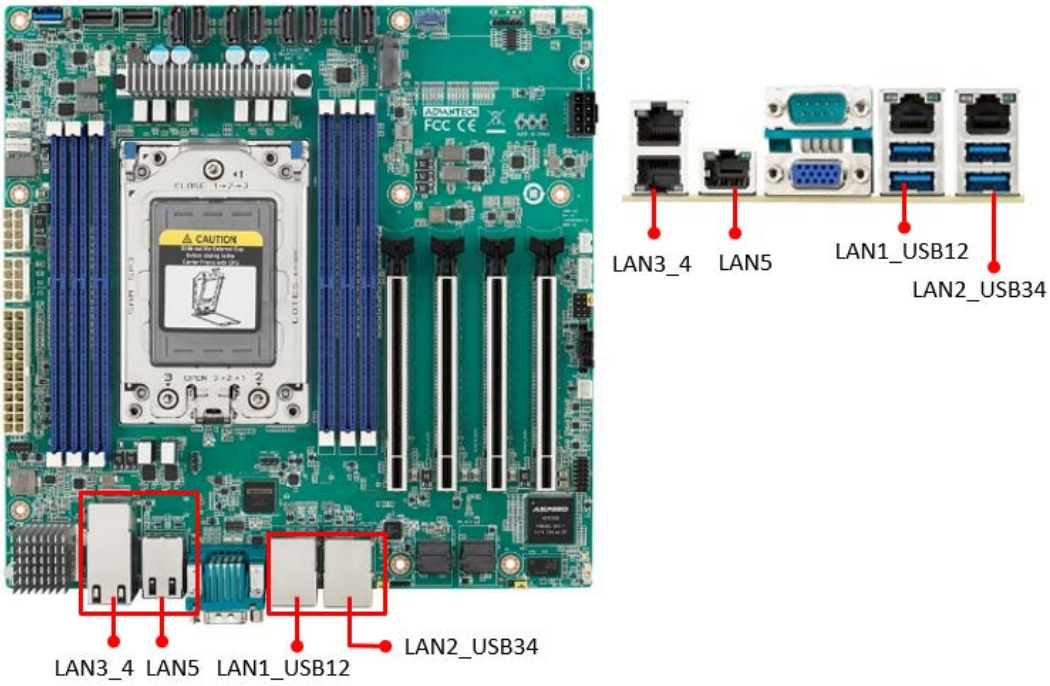
2.1 Introduction

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 number of cards installed or have a packed chassis, you may need to partially remove the card to make all the connections.

2.2 LAN and USB Ports (LAN1_USB12 / LAN2_USB34 / LAN3_4/LAN5)

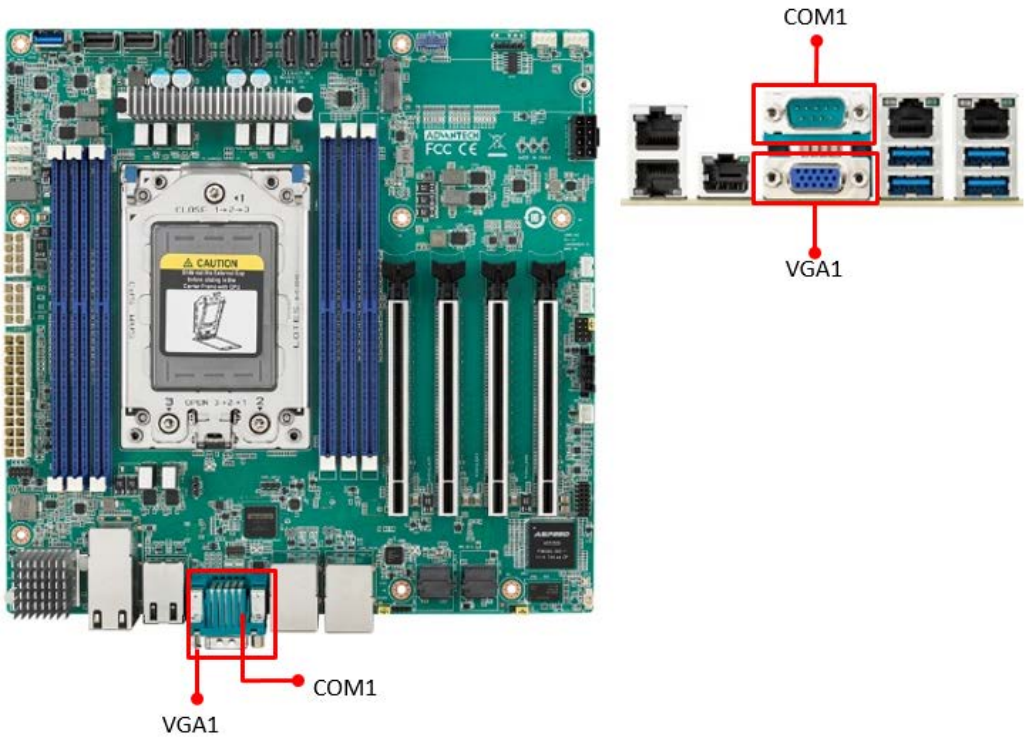
The AIMB-592 provides up to five USB 3.2 Gen1 ports (4 x USB ports on the rear side, 1 x USB port via the board pin header). The USB interface complies with USB Specification Rev 3.2 Gen1 supporting transmission rates up to 5 Gbps. The USB interface can be disabled in the system BIOS setup.

The AIMB-592 is equipped with up to two 2.5G Mbps and two 10G Mbps Ethernet LAN adapters and one BMC LAN which are supported by all major network operating systems. The RJ-45 jacks on the rear panel provide convenient LAN connections.

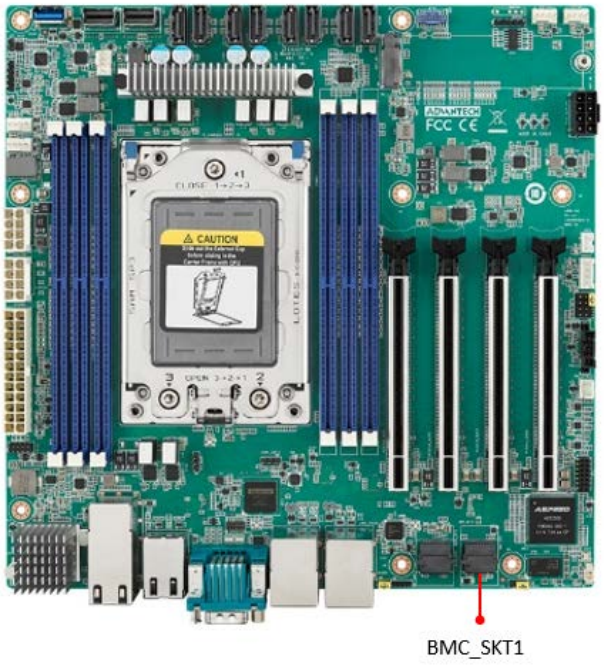


2.3 VGA and Serial Ports (VGA1/COM1)

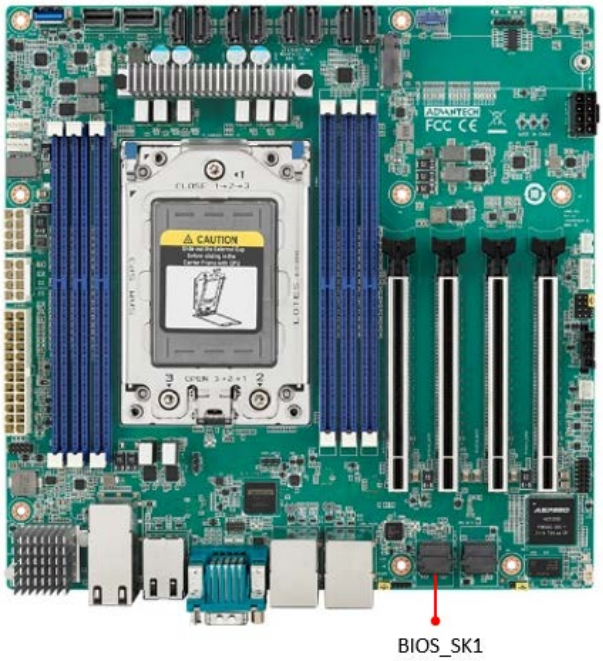
The AIMB-592 includes VGA1 interfaces that can drive conventional VGA1 displays. The serial port supports RS-232 and can connect to serial devices, such as a mouse or a printer, or to a communications network.



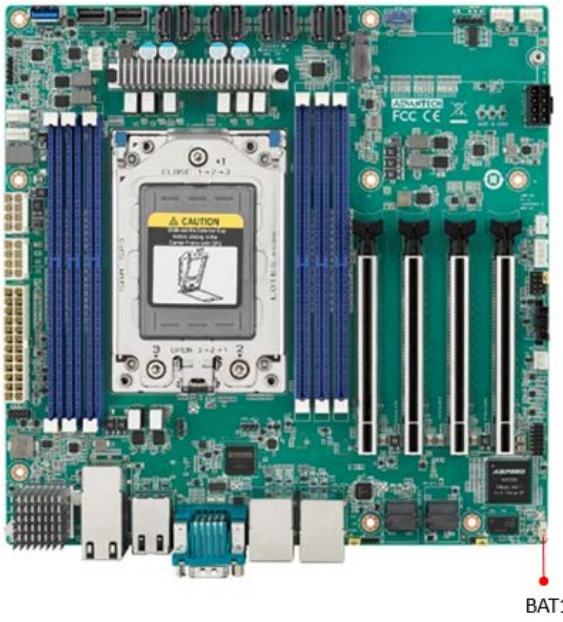
2.4 BMC ROM Socket (BMC_SKT1)

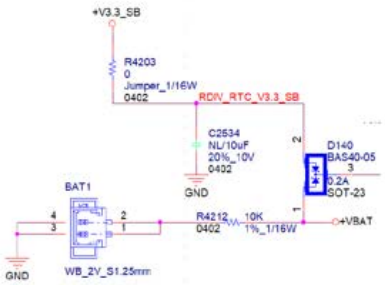


2.5 BIOS SPI ROM Socket (BIOS_SKT1)



2.6 Battery Holder (BAT1)

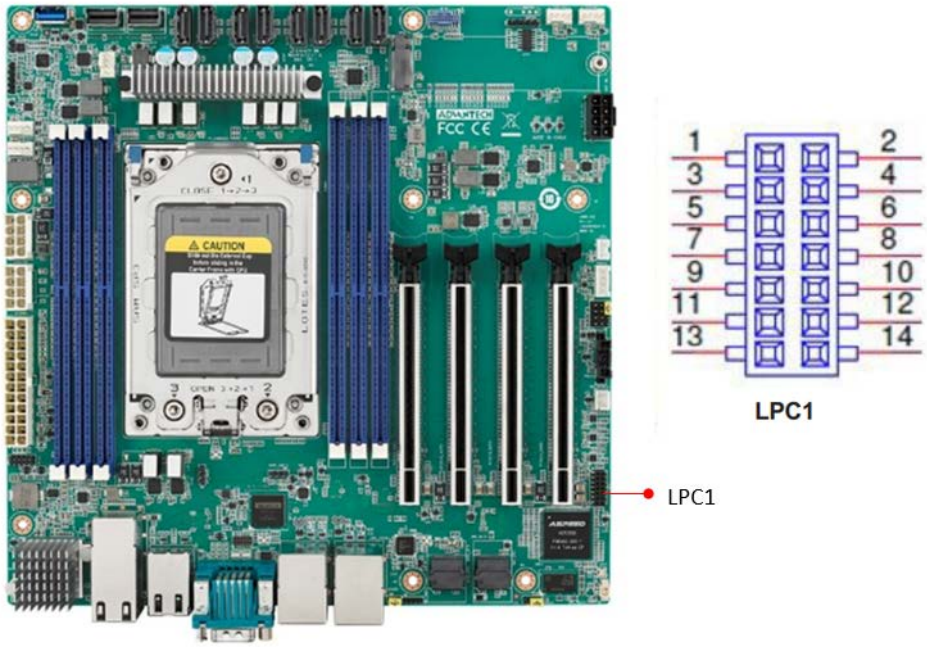




Pin	Signal
1	+VBAT
2	+VBAT
3	GND
4	GND

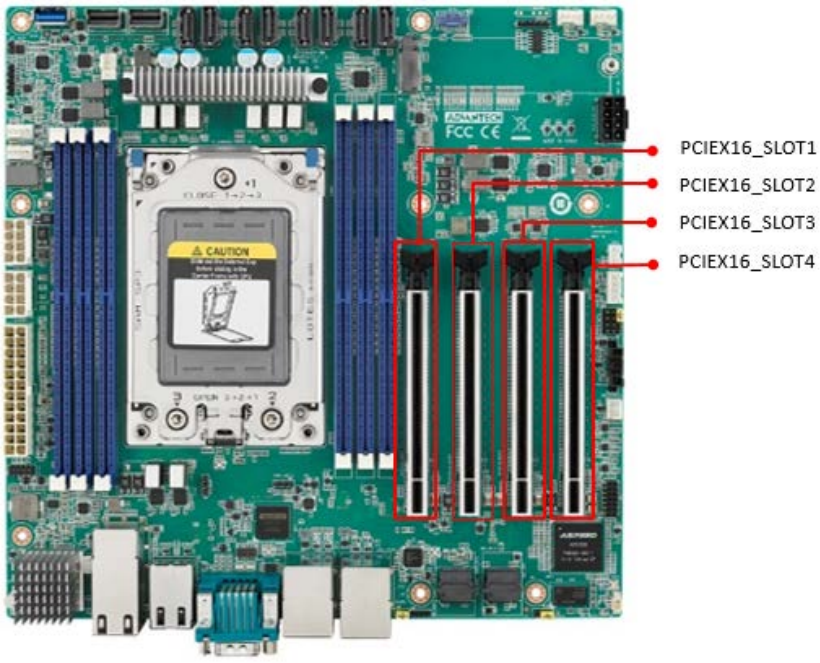
2.7 LPC Connector (LPC1)

The AIMB-592 has one LPC connector for BIOS usage.



2.8 PCIe Expansion Slot (PCIEX16_SLOT1 / PCIEX16_SLOT2 / PCIEX16_SLOT3 / PCIEX16_SLOT4)

The AIMB-592 provides four PCIe x16 slots that can support up to two double-deck cards.

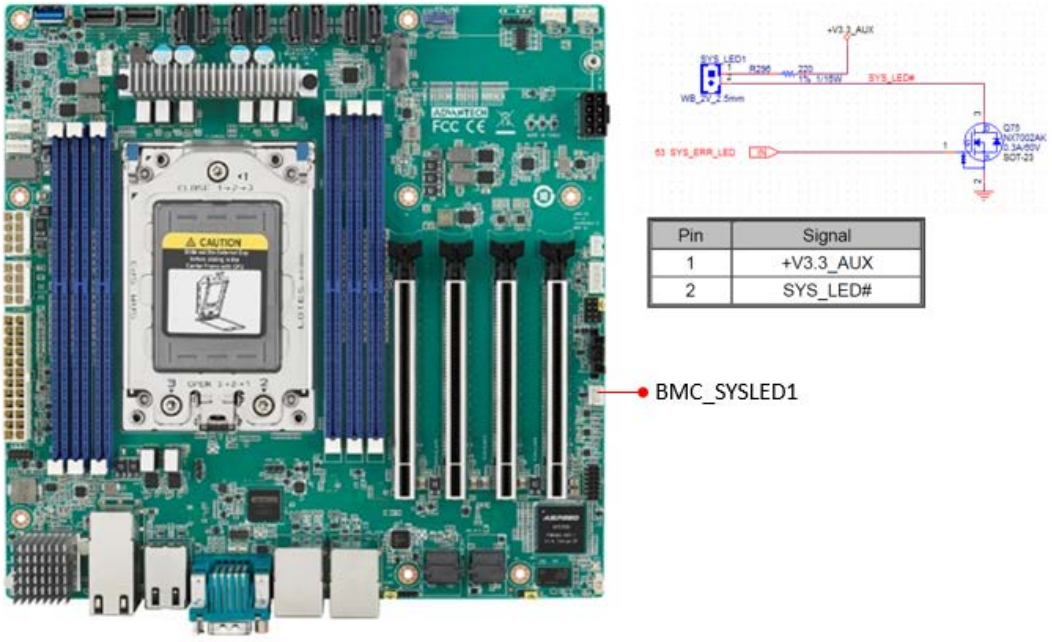


Note!

1. *16_SLOT4: There will be institutional interference with the connectors at LPC1, SYS_LED1, JFP1+JFP2, JFP3, SMBUS1, SLOT12V1, PMBUS1, SYSFAN3, SYSFAN4. The actual situation will depend on the length of the graphics card.*
2. *Under POST, only BMC VGA output is supported. External graphics cards installed in the PCIe slot must have drivers installed in order to display normally under the OS.*
3. *Depending on the fan used, if installing the graphics card in PCIEX-16_SLOT1, it should be removed using the steps below:*
   • When using with an STD Cooler (1970004817N001): Remove the memory installed in the DIMMC1 slot before removing the graphics card.
   • When using with a Customized VC Heatsink: Remove the fan, then uninstall the DIMMC1 memory module before removing the graphics card.
4. *If users intend to insert an add-on card, it is recommended to use one that supports PCIe Gen4.*

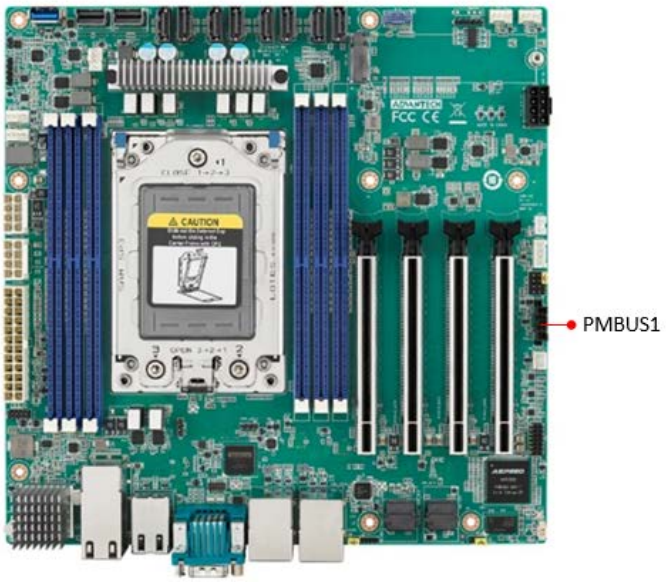
2.9 System Error LED Wafer (BMC_SYSLED1)

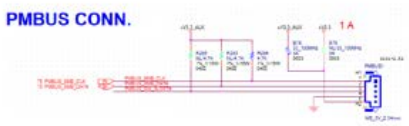
The System Error LED wafer is used to identify the chassis location via the "ipmitool chassis identify" command.



2.10 PMBus Wafer (PMBUS1)

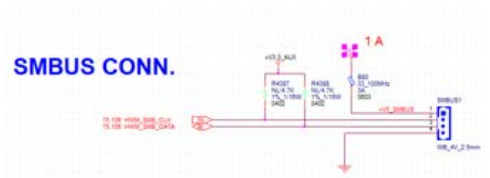
The PMBUS connector is for communicating with a power supply that supports the PMBUS function.





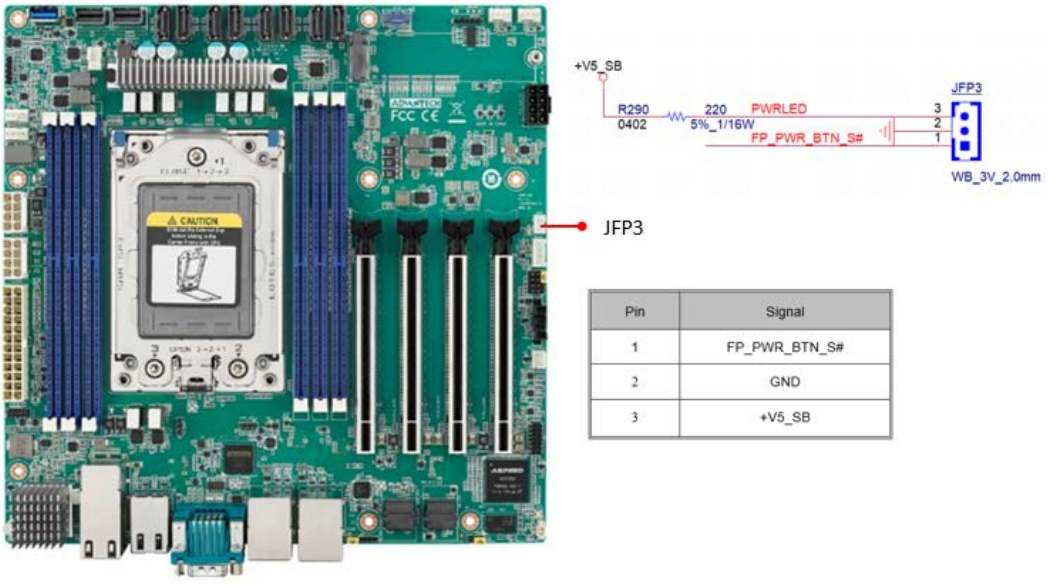
Pin	Signal
1	PMBUS_SMB_CLK
2	PMBUS_SMB_DATA
3	PMBUS_SW_ALERT#
4	GND
5	+V3.3_AUX

2.11 Hardware SMBUS (SMBUS1)



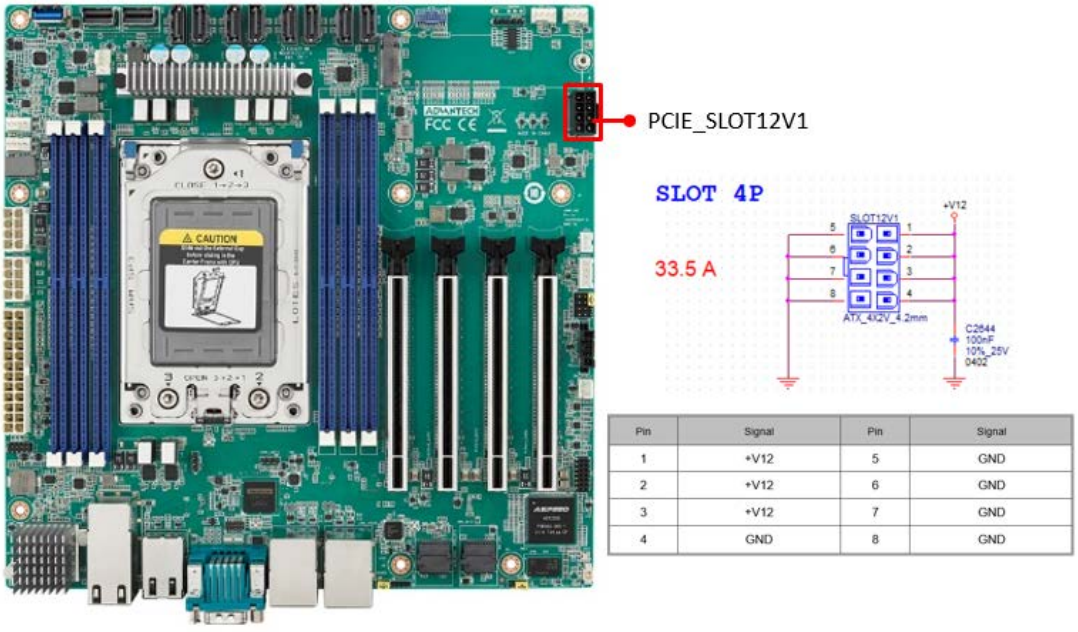
Pin	Signal
1	+V5
2	HWM_SMB_CLK
3	HWM_SMB_DATA
4	GND

2.12 Front Panel3 (JFP3)



Pin	Signal
1	FP_PWR_BTN_S#
2	GND
3	+V5_SB

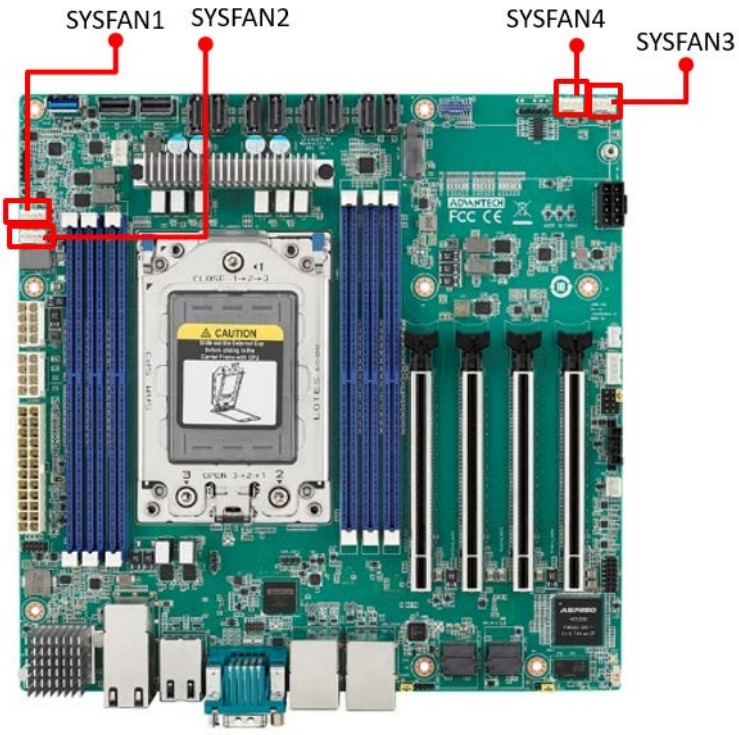
2.13 Graphics Card 12V Slot (PCIE_SLOT12V1)

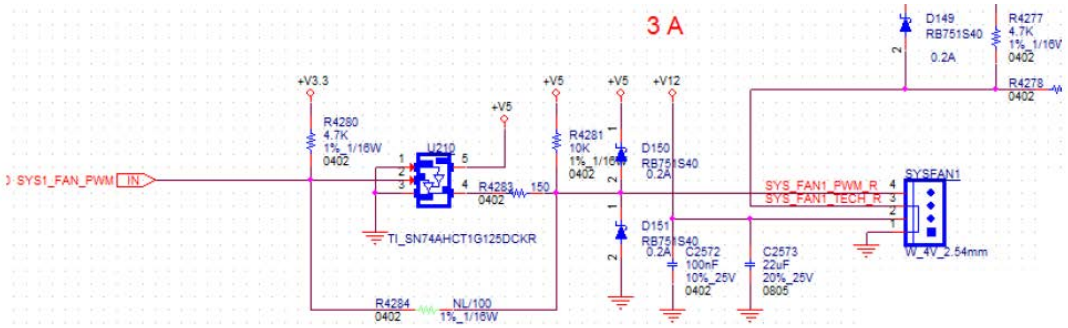


Pin	Signal	Pin	Signal
1	+V12	5	GND
2	+V12	6	GND
3	+V12	7	GND
4	GND	8	GND

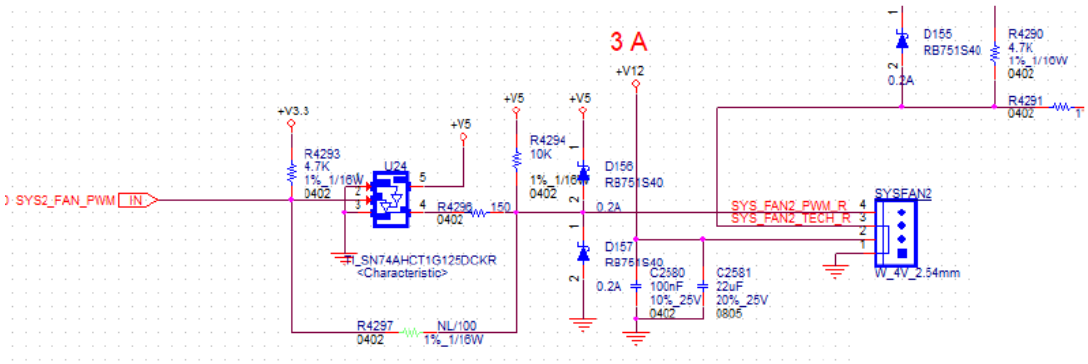
Note! *This connector is only necessary if PCIe cards that draw more than 70 watts from the PCIe bus are fully installed in four slots on the mother-board and it is only for power input usage.*

2.14 System FAN Connector (SYSFAN1 / SYSFAN2 / SYSFAN3 / SYSFAN4)

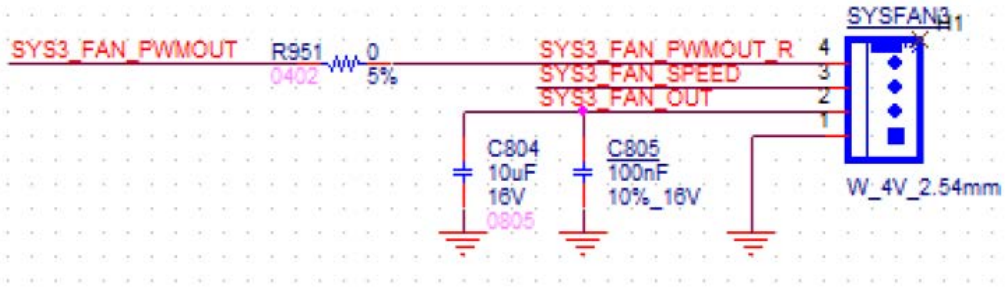




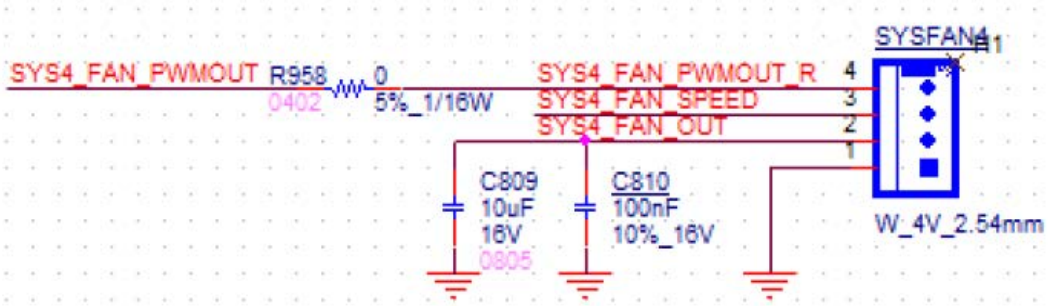
Pin	Signal
1	GND
2	+V12
3	SYS1_FAN_TACH
4	SYS_FAN1_PWM



Pin	Signal
1	GND
2	+V12
3	SYS2_FAN_TACH
4	SYS2_FAN_PWM

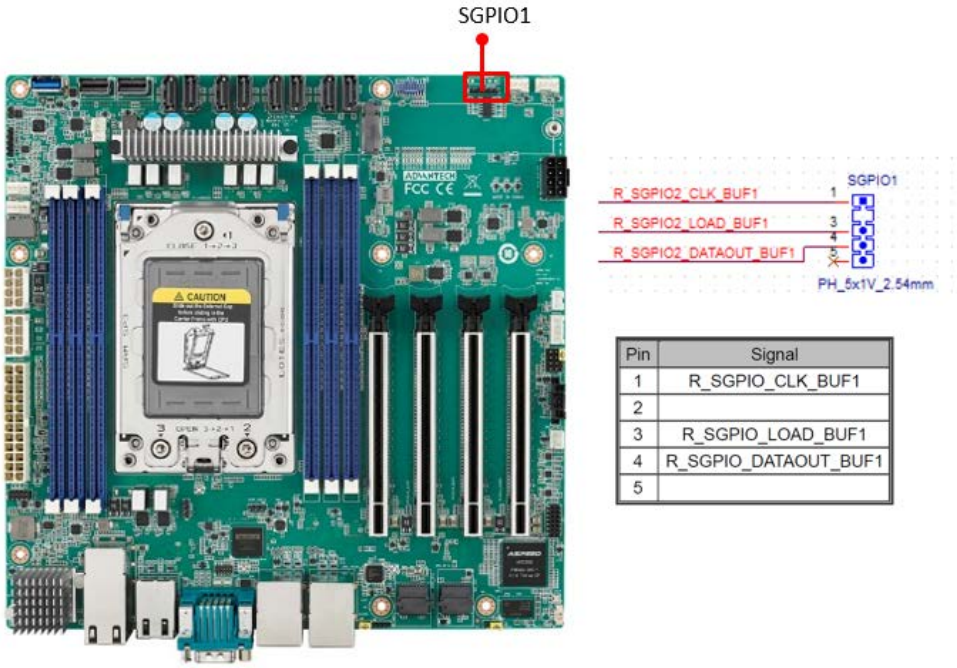


Pin	Signal
1	GND
2	SYS3_FAN_OUT
3	SYS3_FAN_SPEED
4	SYS3_FAN_PWMOUT



Pin	Signal
1	GND
2	SYS4_FAN_OUT
3	SYS4_FAN_SPEED
4	SYS4_FAN_PWMOUT

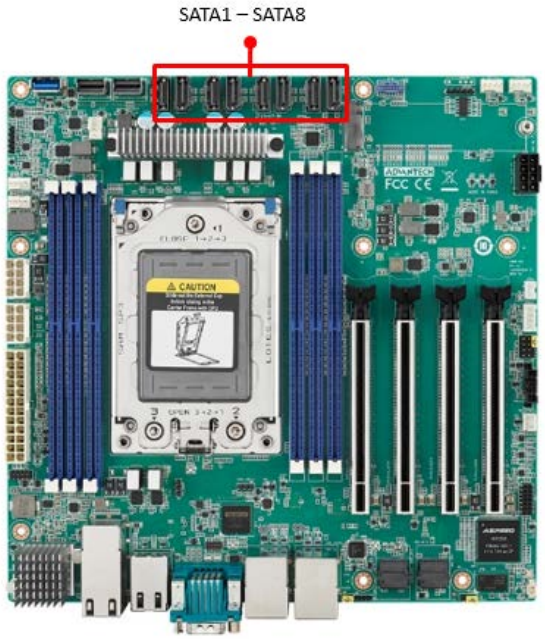
2.15 Serial General Purpose I/O Connector (SGPIO1)



Pin	Signal
1	R_SGPIO_CLK_BUF1
2	
3	R_SGPIO_LOAD_BUF1
4	R_SGPIO_DATAOUT_BUF1
5	

2.16 Serial ATA Interface Connector (SATA1~8)

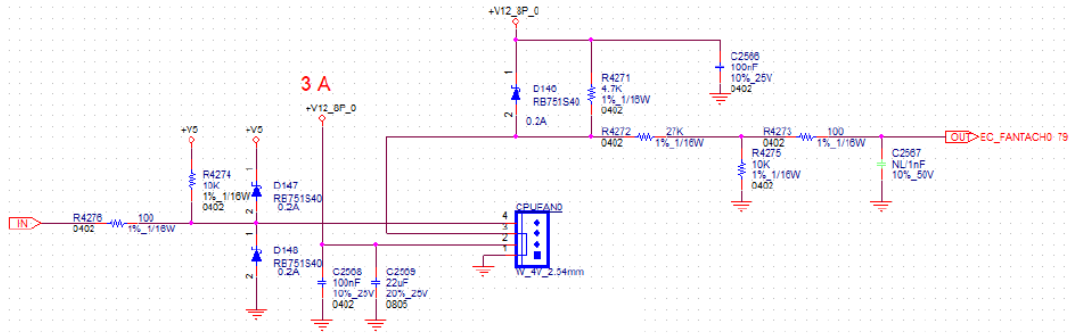
The AIMB-592 features eight Serial ATA III interfaces (up to 600 MB/s) and eases cabling to hard drives with long and space-saving cables.



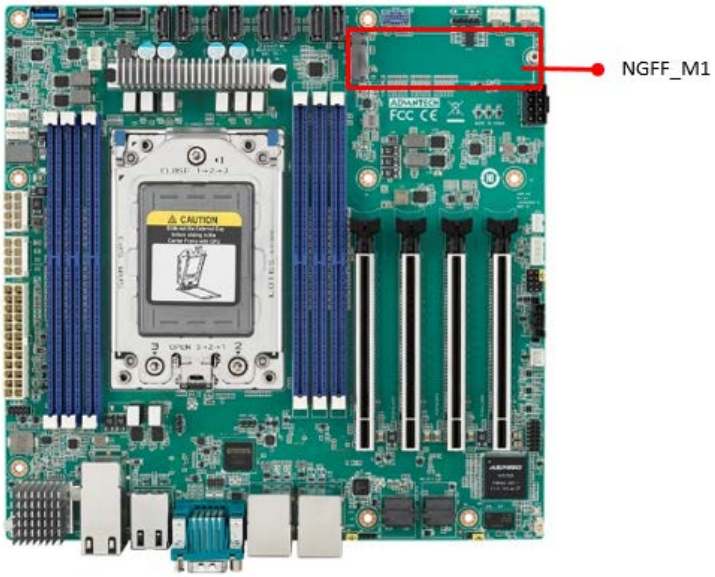
2.17 CPU Fan Connector (CPUFAN1)

If a fan is used, this connector supports cooling fans that draw up to 2A (24W).

Pin	Signal
1	GND
2	+V12_8P_0
3	EC_FANTACH0
4	EC_CPU_PWM



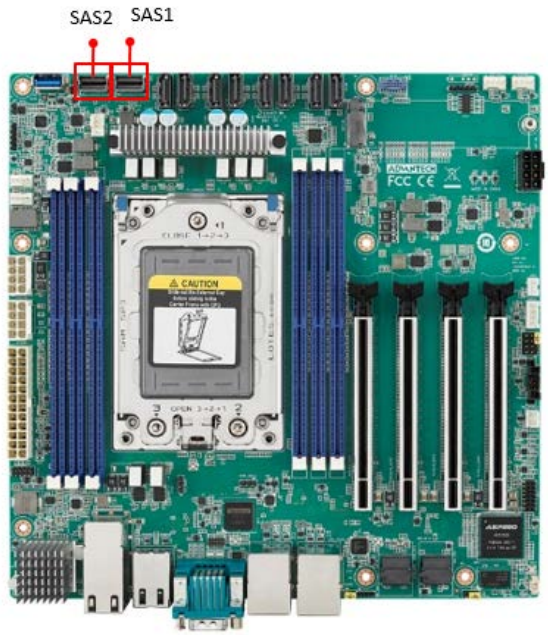
2.18 NGFF M.2 M-Key (NGFF_M1)



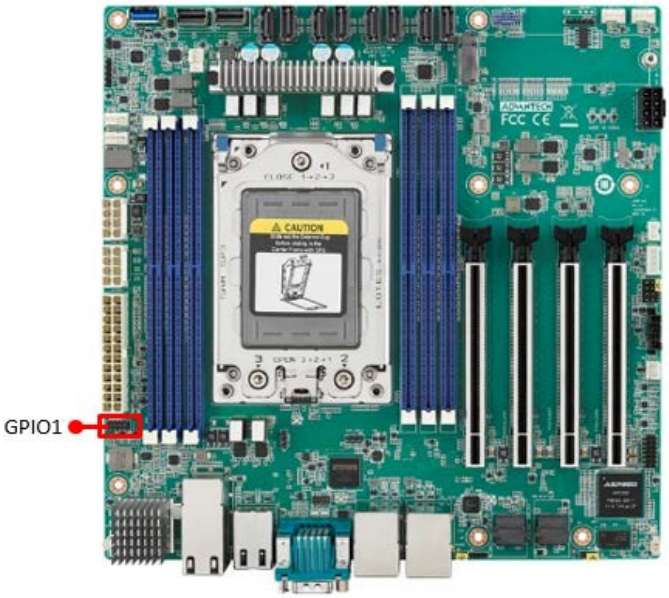
- M.2 M-Key: 2280: Supports SATA III or PCIe x4 interfaces and compatible with NVMe devices.

2.19 Slimline SAS 4i Connector (SAS1/SAS2)

This connector supports PCIE Gen 4 signals.



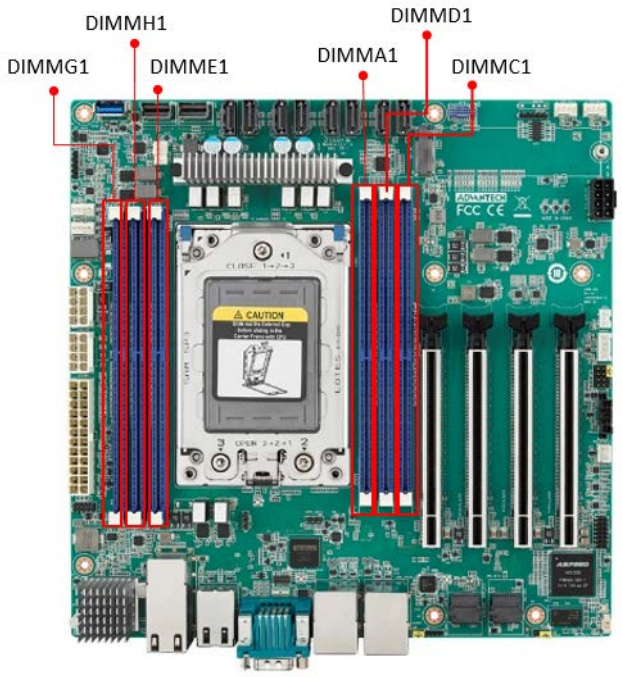
2.20 General Purpose I/O Connector (GPIO1)



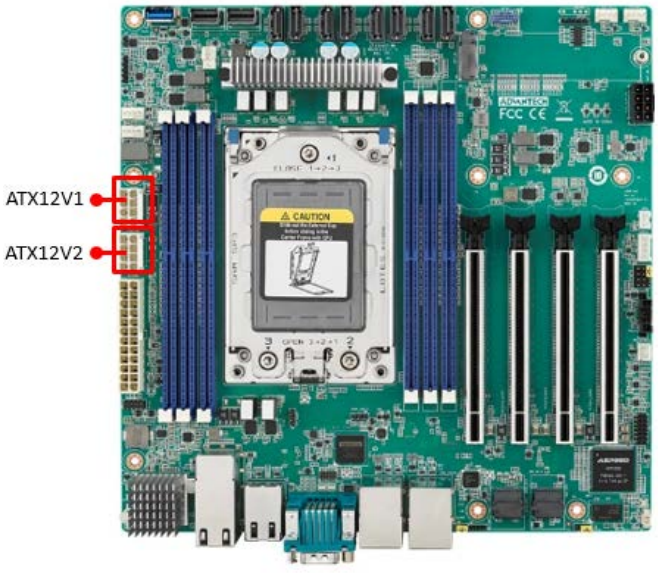
2.21 USB 3.2 Gen1 Vertical Connector (USB5)

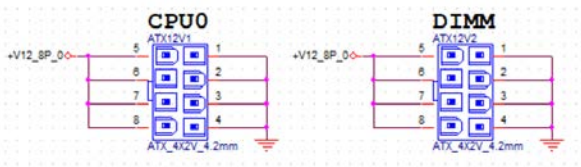
The USB port complies with USB 3.2 Gen 1, supports transmission speeds of up to 5 Gbps, and includes fuse protection.

2.22 DDR4 RDIMM Slot (DIMME1 / DIMMH1 / DIMMG1/ DIMMA1 / DIMMD1 / DIMMC1)

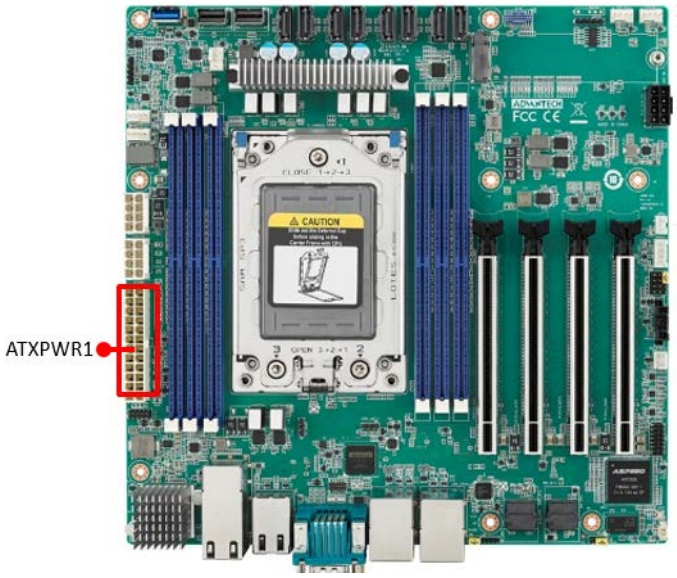


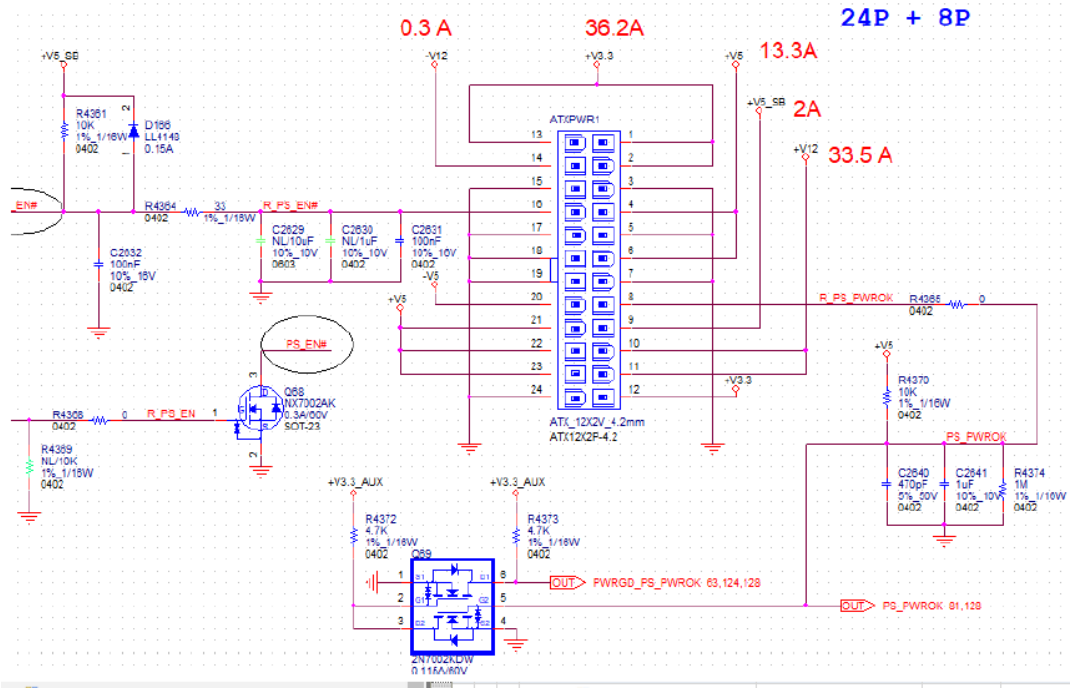
2.23 ATX Power Connector (ATX12V1 / ATX12V2 / ATXPWR1)





Pin	Signal	Pin	Signal
1	GND	5	+V12_8P_0
2	GND	6	+V12_8P_0
3	GND	7	+V12_8P_0
4	GND	8	+V12_8P_0





Pin	Signal Pin Definition	Pin	Signal Pin Definition
1	+V3.3	13	+V3.3
2	+V3.3	14	-V12
3	GND	15	GND
4	+V5	16	PS_ON#
5	GND	17	GND
6	+V5	18	GND
7	GND	19	GND
8	PWR_OK	20	-V5
9	+V5_SB	21	+V5
10	+V12	22	+V5
11	+V12	23	+V5
12	+V3.3	24	GND

This connector is for an ATX Micro-Fit power supply. The plugs from the power supply are designed to fit these connectors from only one direction. Determine the proper orientation and push down firmly until the connectors join completely.

Note!

1. *Please connect the ATX12V1 and ATX12V2 connector with the PSU ATX 12V 8-pin connector, otherwise the AIMB-592 will not boot up normally.*
2. *For a fully configured system, we recommend that you use a power supply unit (PSU) that complies with ATX 12 V Specification 2.0 (or later version) and minimum output should be at least 700W.*

Chapter 3

BIOS and BMC Operation

3.1 Introduction

AMI BIOS has been integrated into many motherboards, and has been very popular for over a decade. With the AMI BIOS Setup program, you can modify BIOS settings to control the special features of your computer. The Setup program uses a number of menus for making changes. This chapter describes the basic navigation of the AIMB-592 setup screens.

3.2 BIOS Setup

The AIMB-592 Series system has AMI BIOS built in, with a SETUP utility that allows users to configure required settings or to activate certain system features.

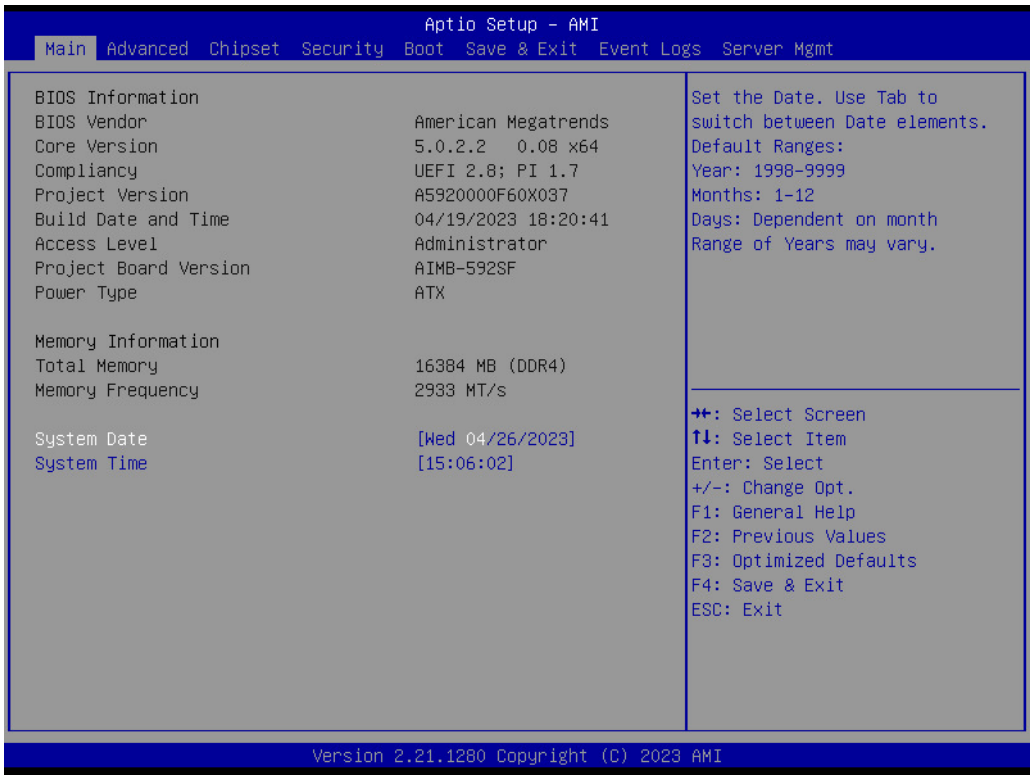
The Setup saves the configuration in the flash memory of the motherboard. When the power is turned off, the battery on the board supplies the necessary power to preserve the flash memory.

When the power is turned on, press the <Del> or <Esc> button during the BIOS POST (Power-On Self Test) to access the CMOS SETUP screen.

Control Keys	
< ← >< → >	Select Screen
< ↑ >< ↓ >	Select Item
<Enter>	Select
<+/->	Change Opt
<F1>	General help
<F2>	Previous Values
<F3>	Optimized Defaults
<F4>	Save & Exit
<Esc>	Exit

3.2.1 Main Menu

Press <Del> to enter the AMI BIOS CMOS Setup Utility. The Main Menu will appear on the screen. Use the <Arrow> keys to select among the items and press <Enter> to accept or enter a sub-menu.



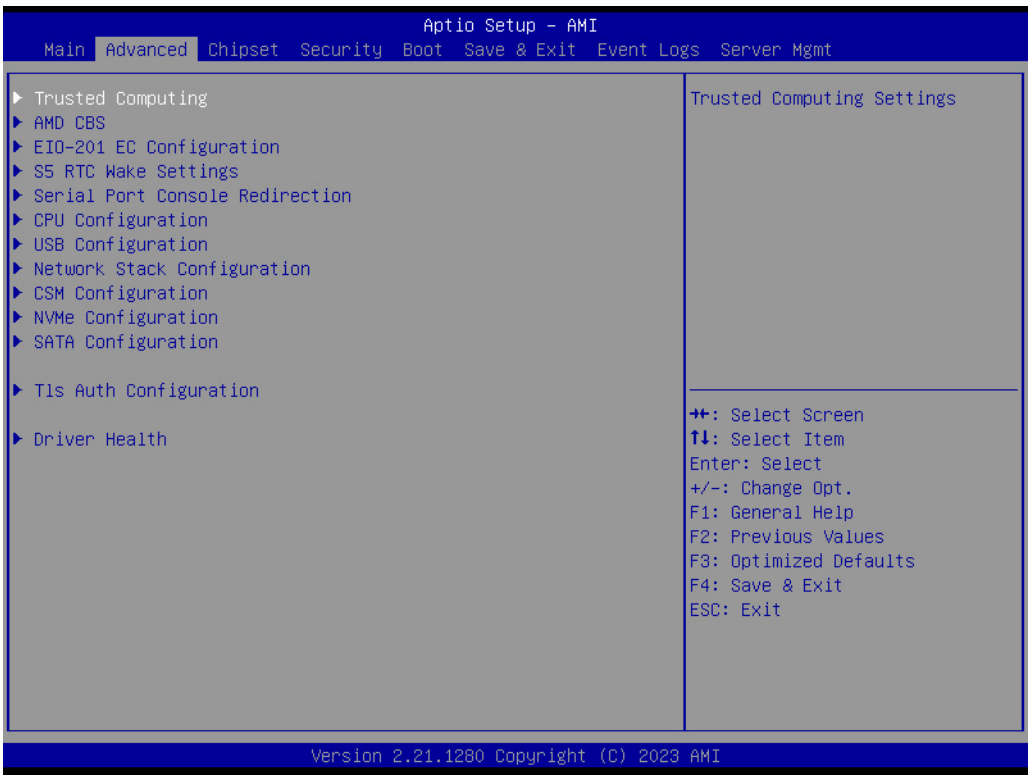
The Main BIOS setup screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured; options in blue can. The right frame displays the key legend.

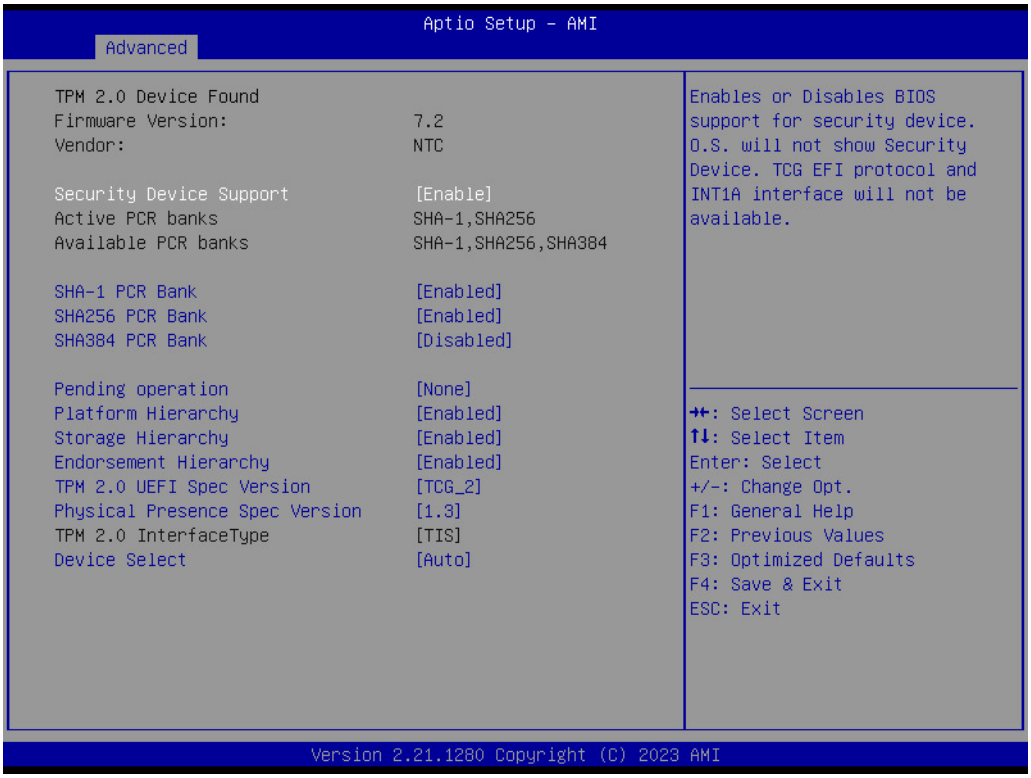
Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

- **System Time / System Date**
  Use this option to change the system time and date. Highlight the System Time or System Date using the <Arrow> keys. Enter new values via the keyboard. Press the <Tab> or <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.

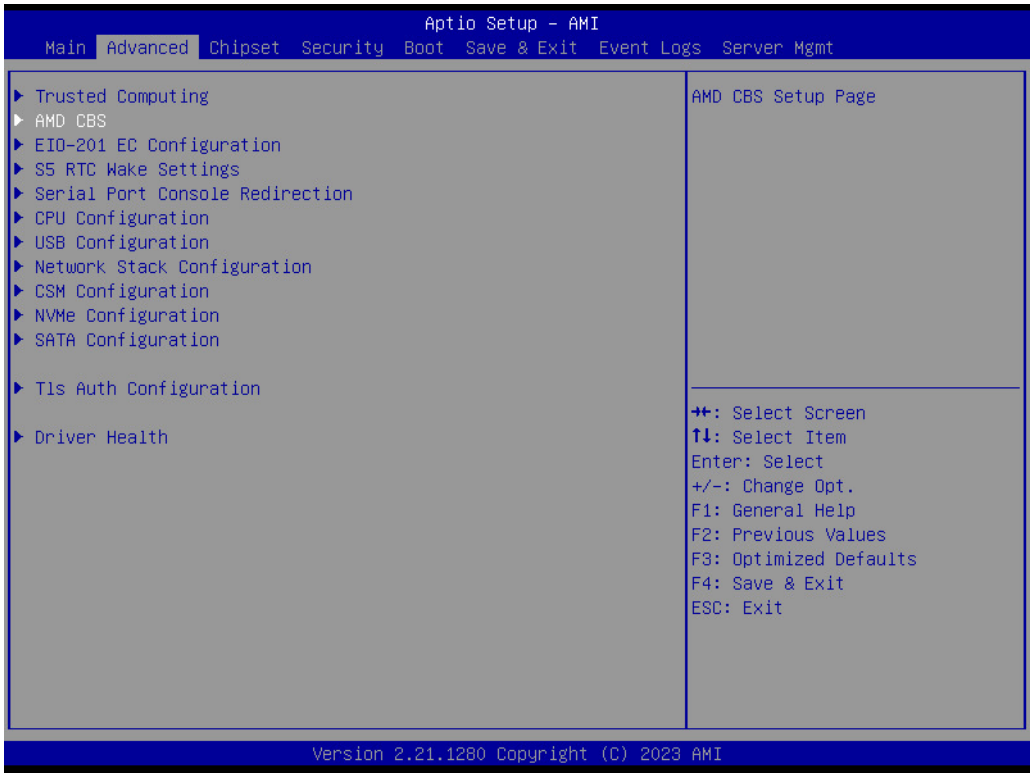
3.2.2 Advanced BIOS Features

Select the Advanced tab from the AIMB-592 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 screen is shown below. The sub-menus are described on the following pages.

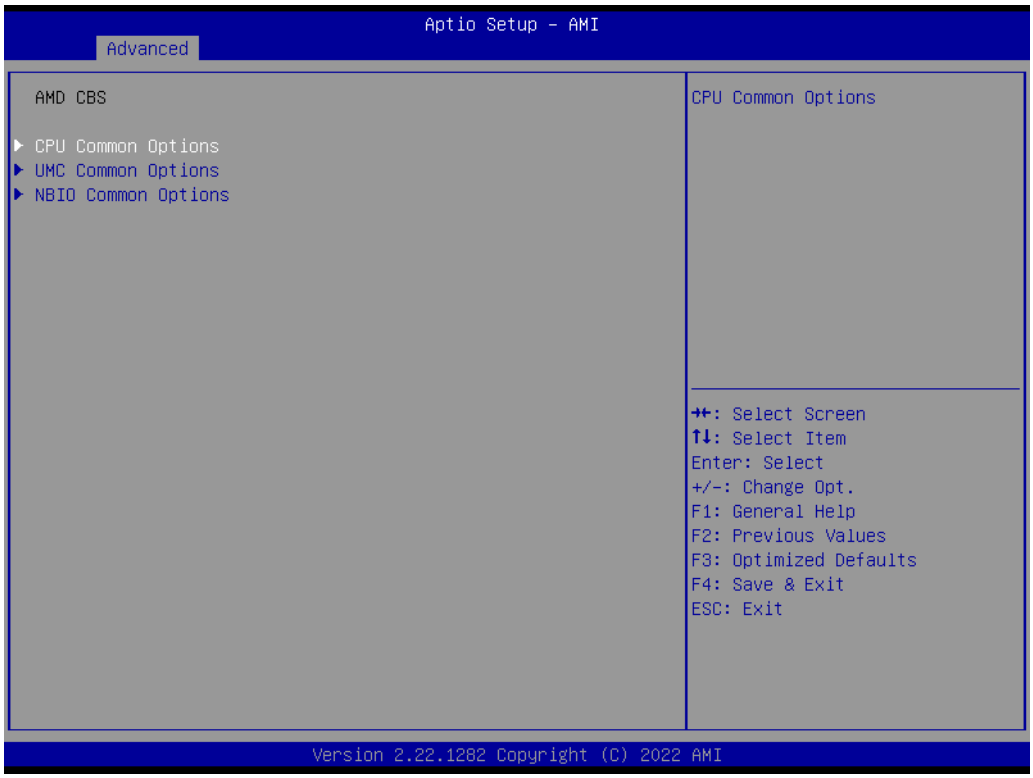




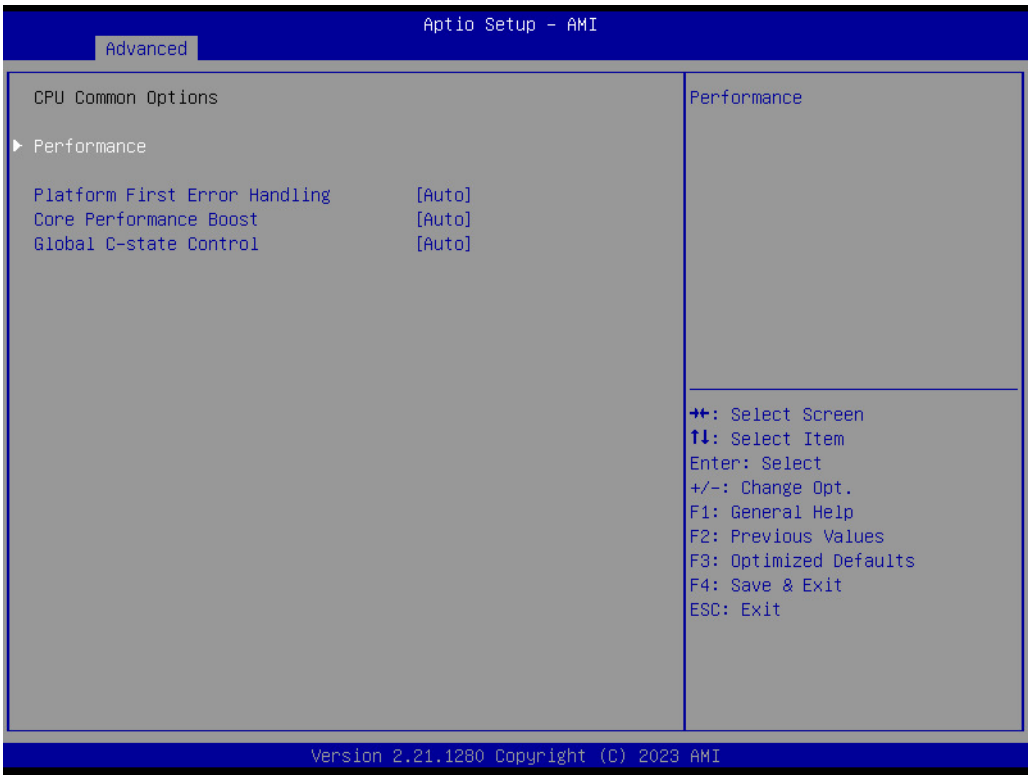
3.2.2.1 AMD CBS



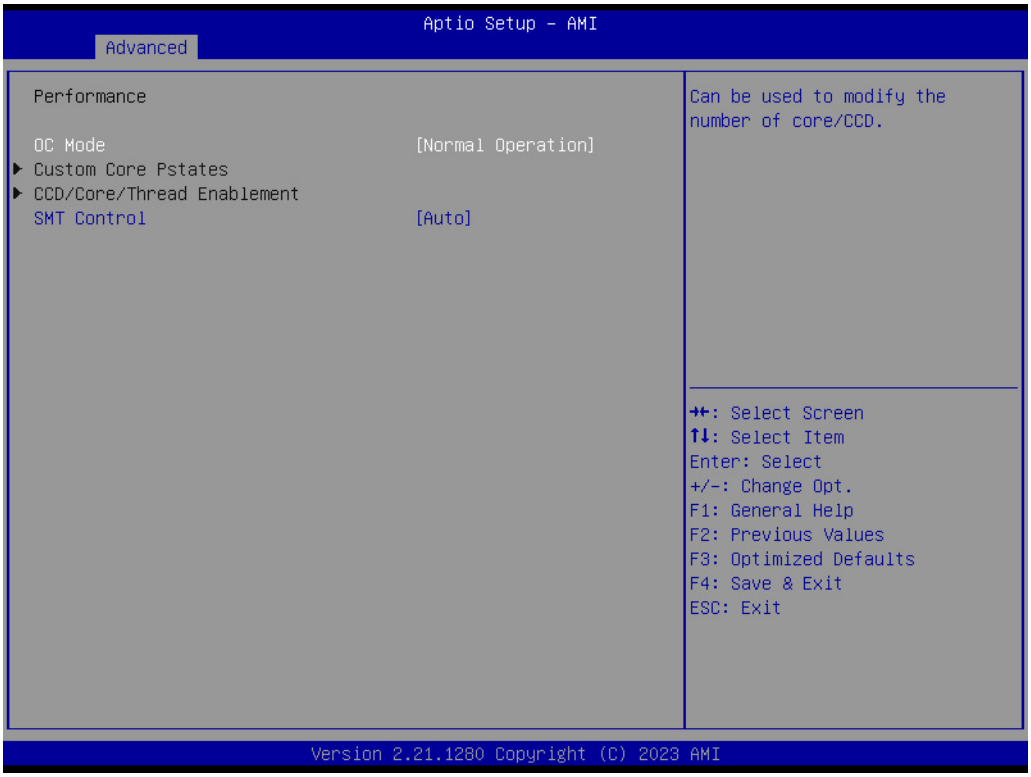
AMD CBS Setup Page



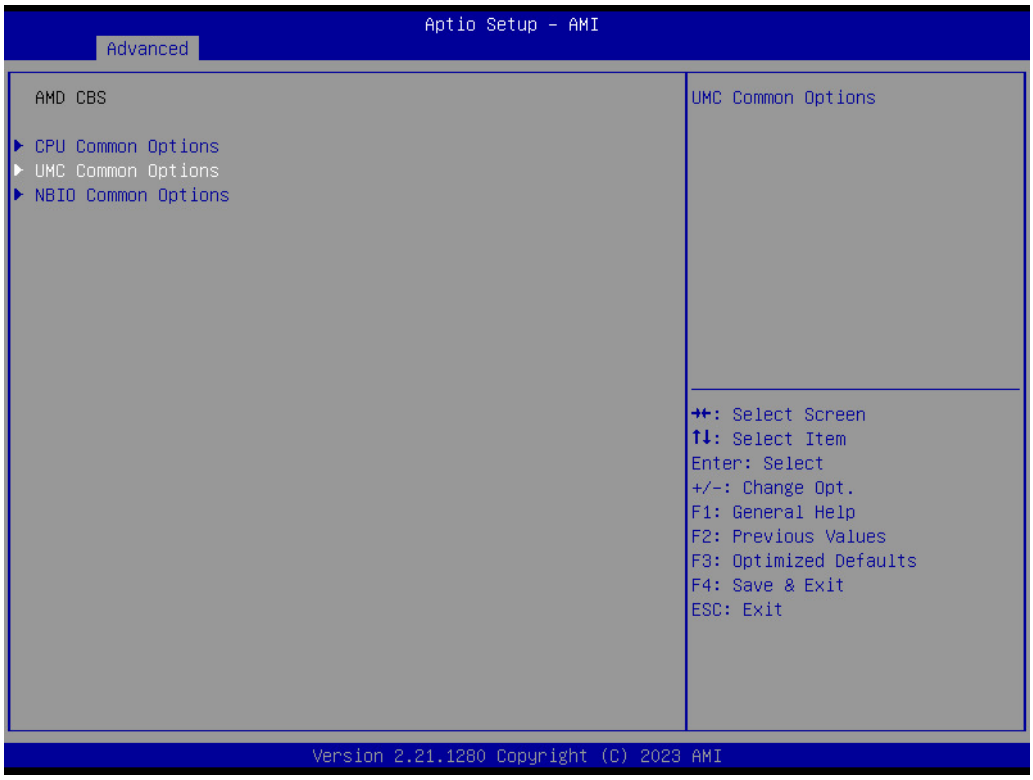
CPU Common Options - Performance



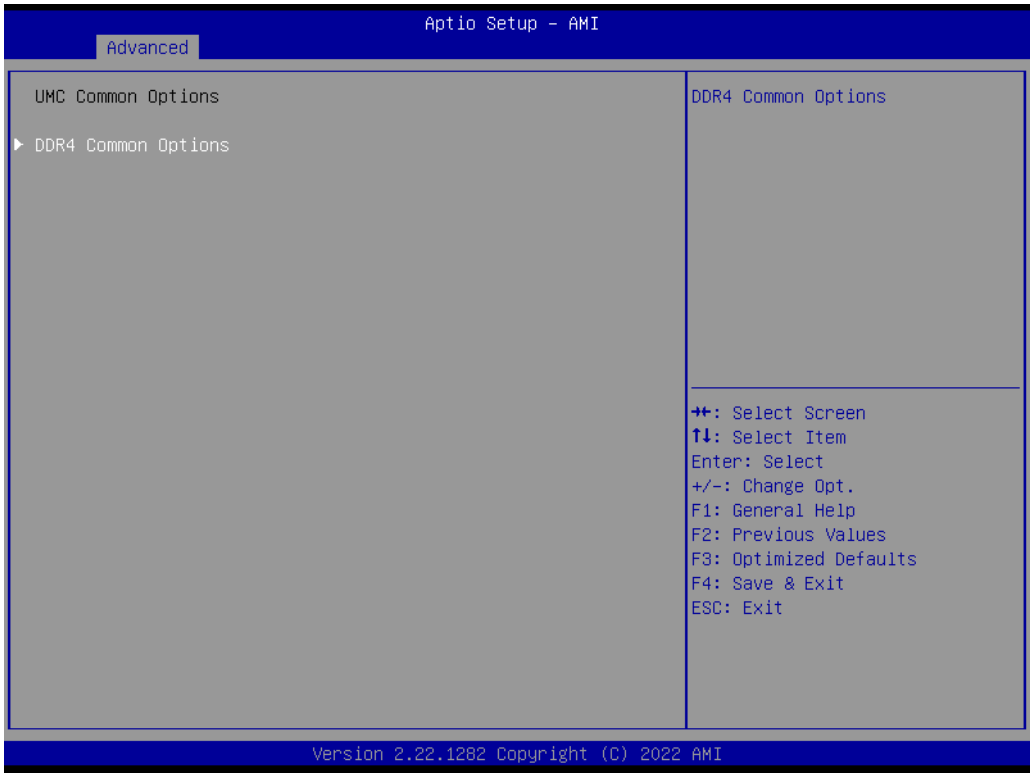
- Platform First Error Handling [Auto]
- Core Performance Boost [Auto]
- Global C-state Control [Auto]



- OC Mode [Normal Operation] Can be used to modify the number of core/CCD.
  Custom Core P-states
  CCD/Core/Thread Enablement
- SMT Control [Auto]

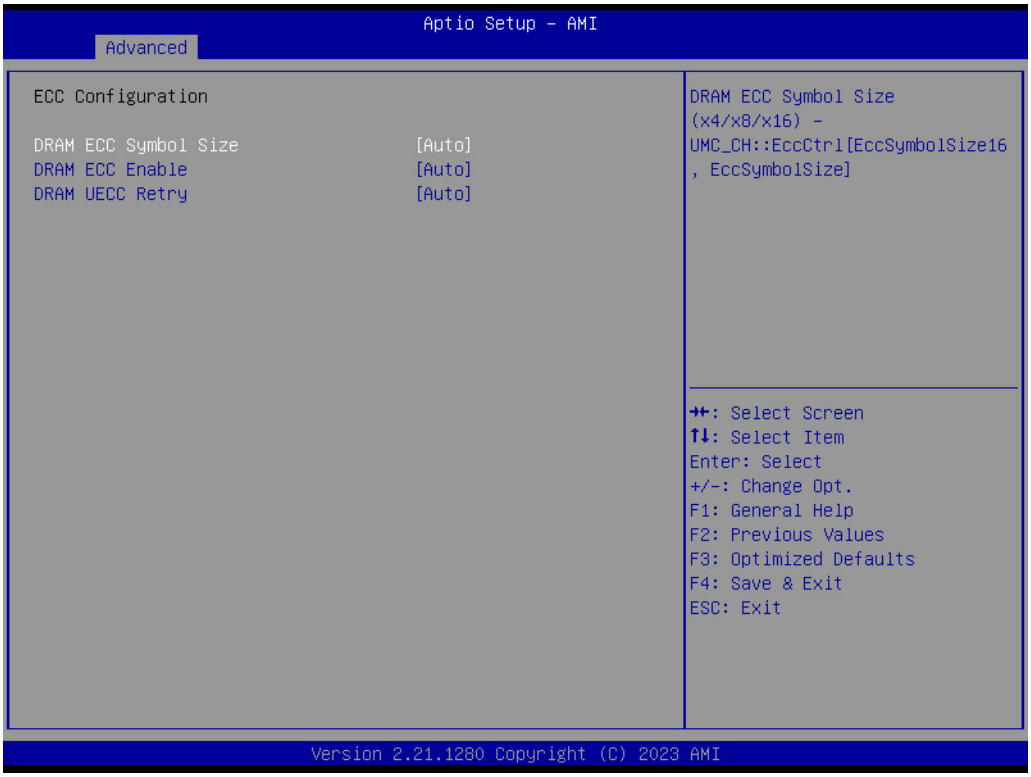


UMC Common Options - DDR4 Common Options

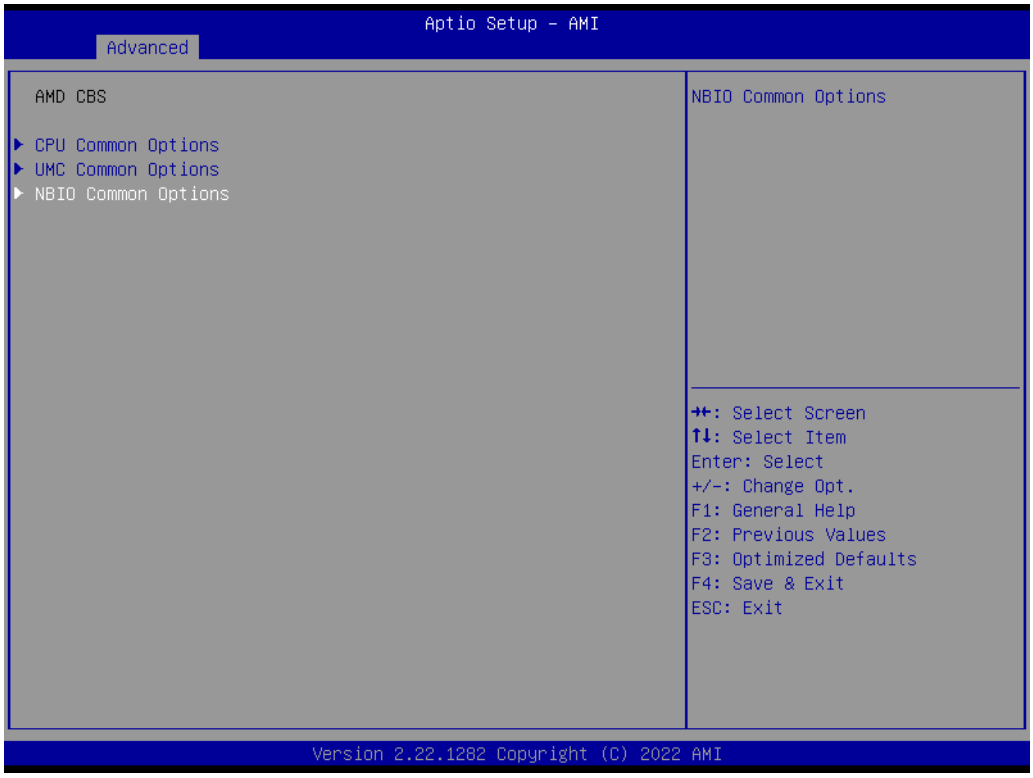


DDR4 Common Options - Common RAS

DDR4 Common Options - Common RAS - ECC Configuration



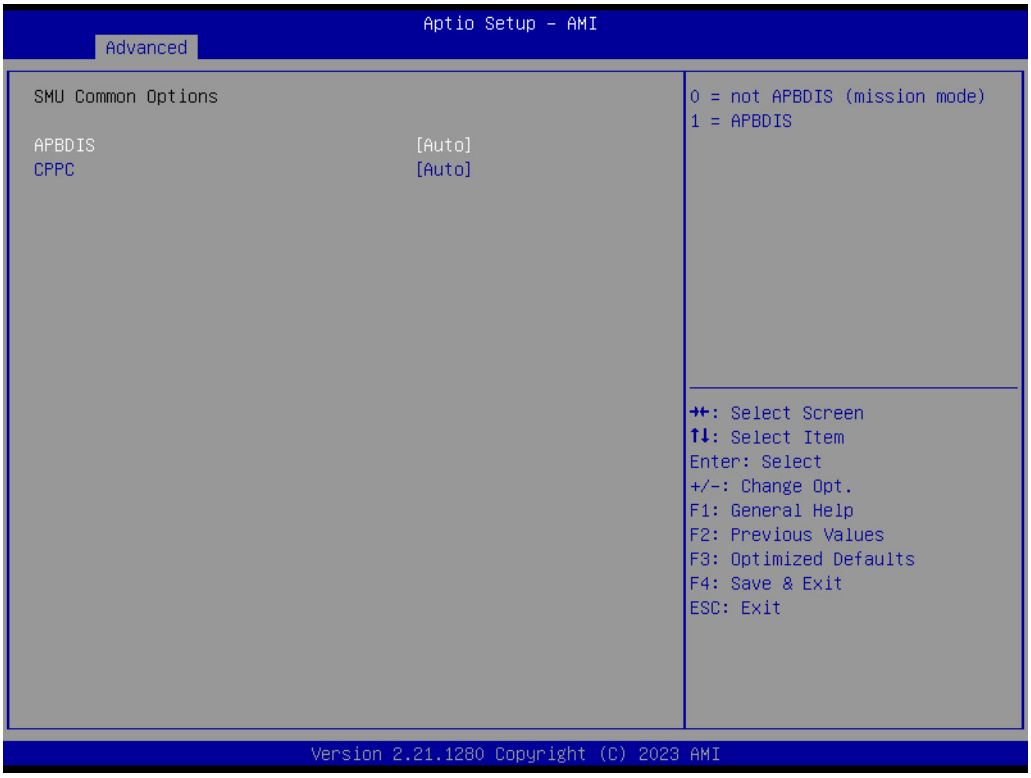
- DRAM ECC Symbol Size [Auto]
- DRAM ECC Enable [Auto]
- DRAM UECC Retry [Auto]



NBIO Common Options

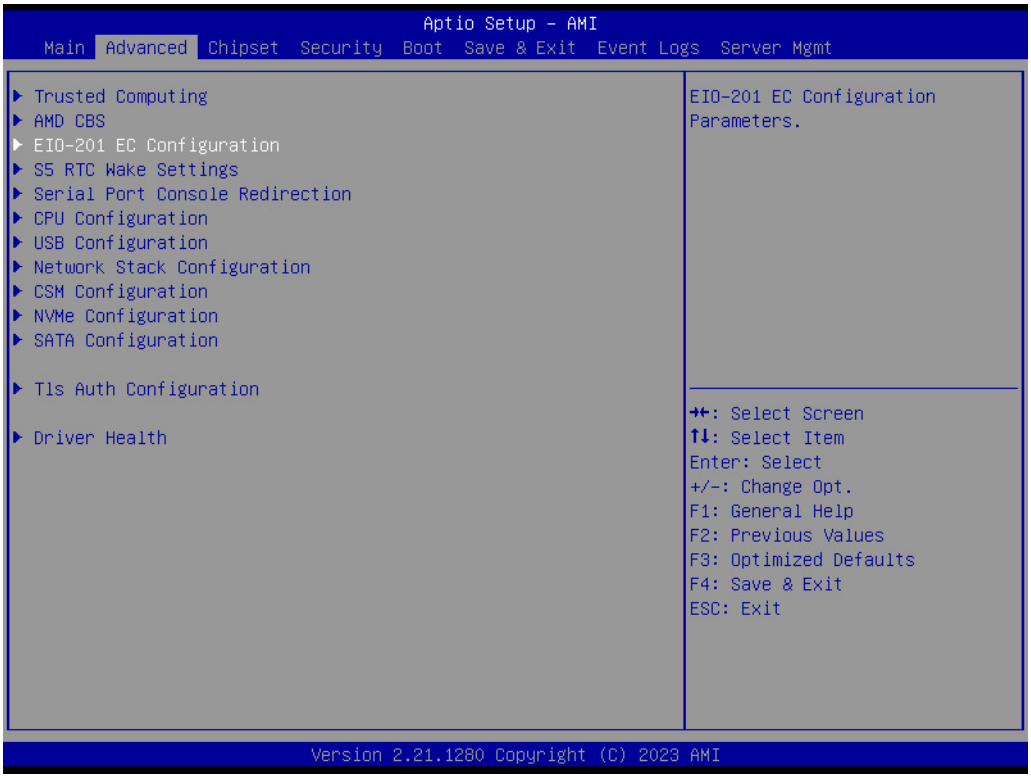
- IOMMU [Disabled]
- PCIe ARI Support [Auto]
- PCIe ARI Enumeration [Auto]
- SMU Common Options

SMU Common Options

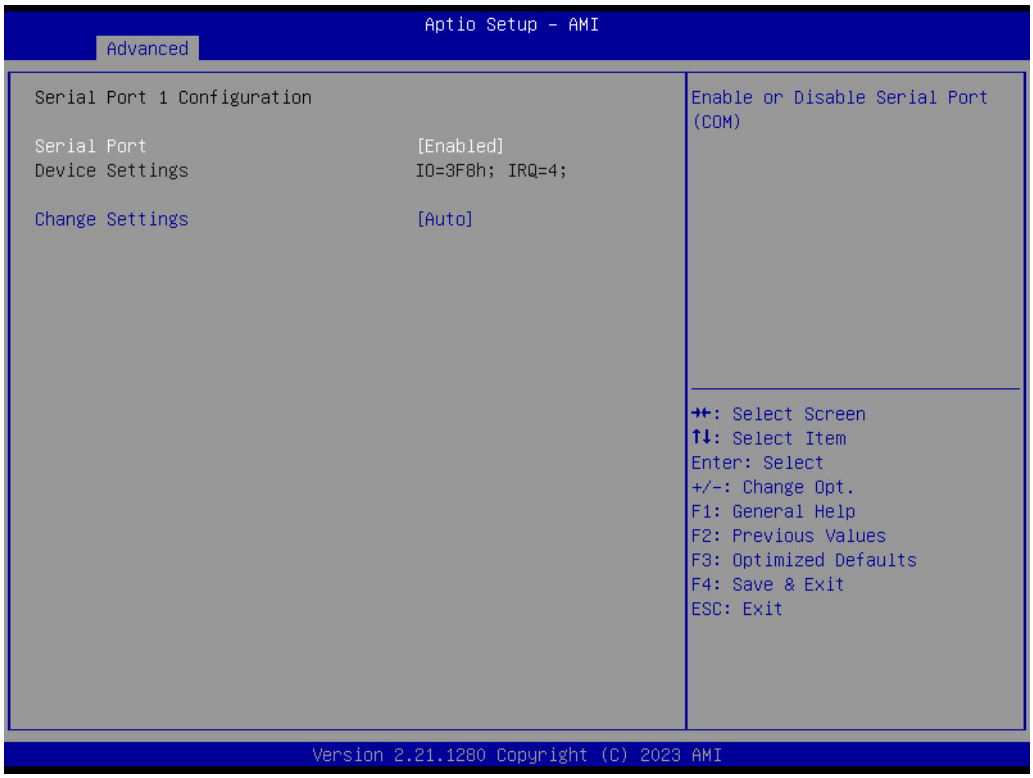


- APBDIS [Auto]
- CPPC [Auto]

3.2.2.2 EIO-201 EC Configuration

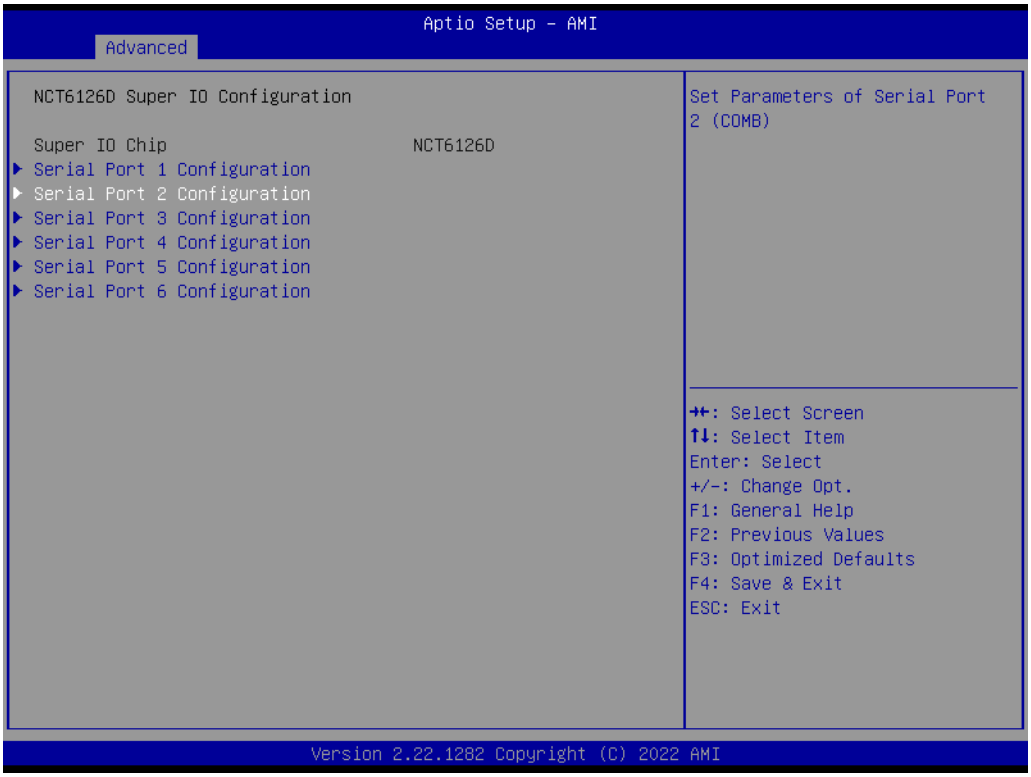


- Serial Port 1 Configuration
  Set Parameters of Serial Port1 (COMA).



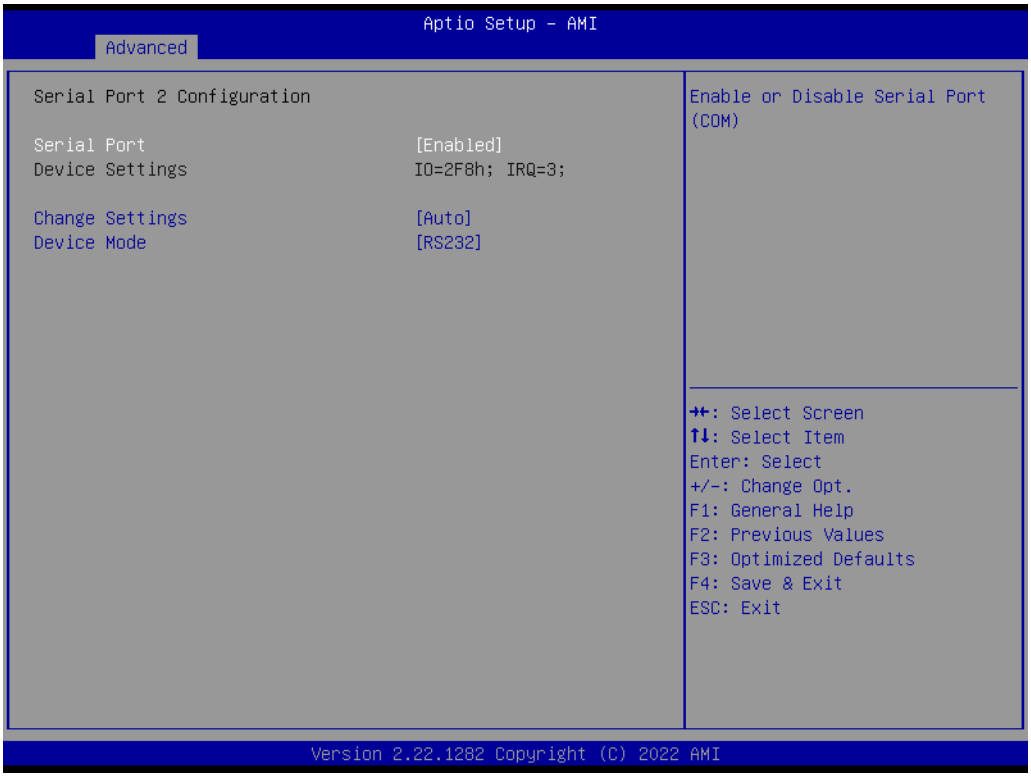
  – Serial Port
    Enable or Disable Serial Port (COM)
    - Serial Port [Enable]
    - Device Settings IO=3F8h; IRQ=4;
    - Change Settings [Auto]

- Serial Port 2 Configuration
  Set Parameters of Serial Port2 (COMB).



]

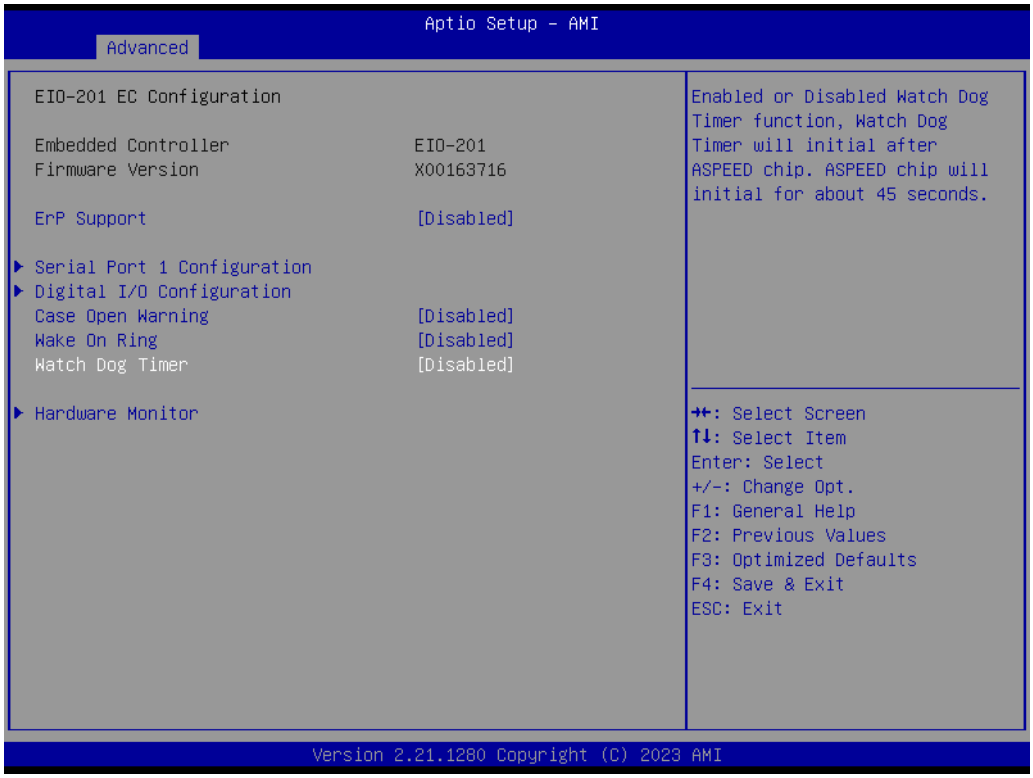
  - Serial Port
    Enable or Disable Serial Port (COM).



  - Serial Port [Enable]
  - Device Settings IO=2F8h; IRQ=3;

– Change Settings [Auto]
– Device Mode [RS232]

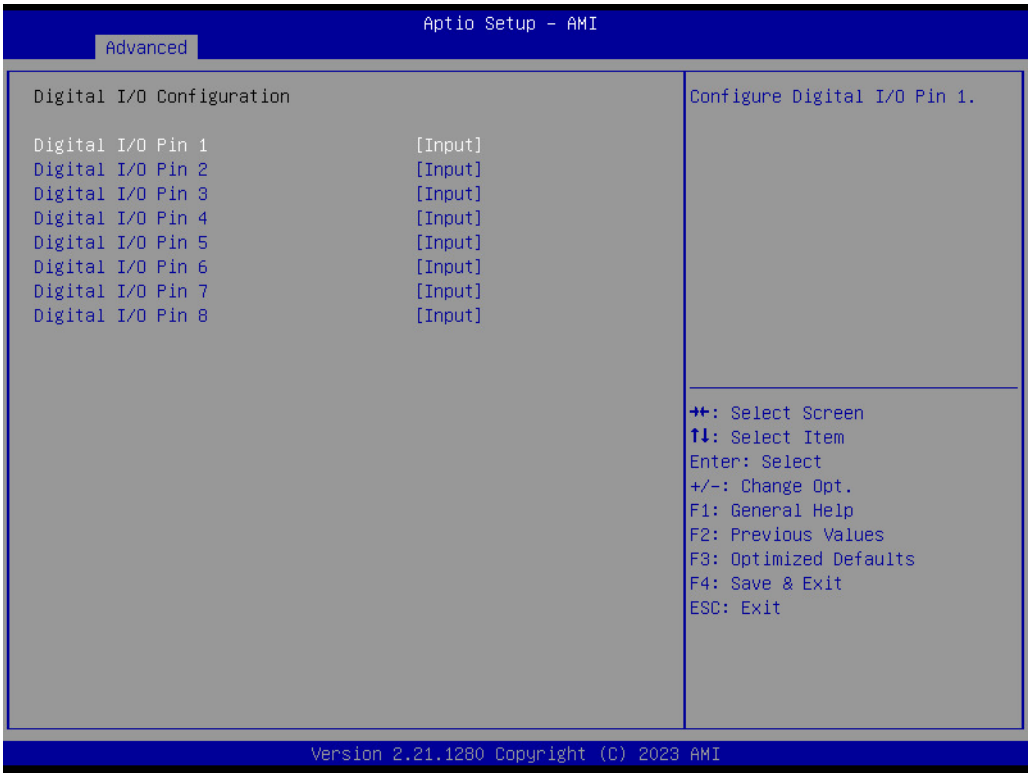
■ Digital I/O Configuration
Configure Digital I/O Pins.



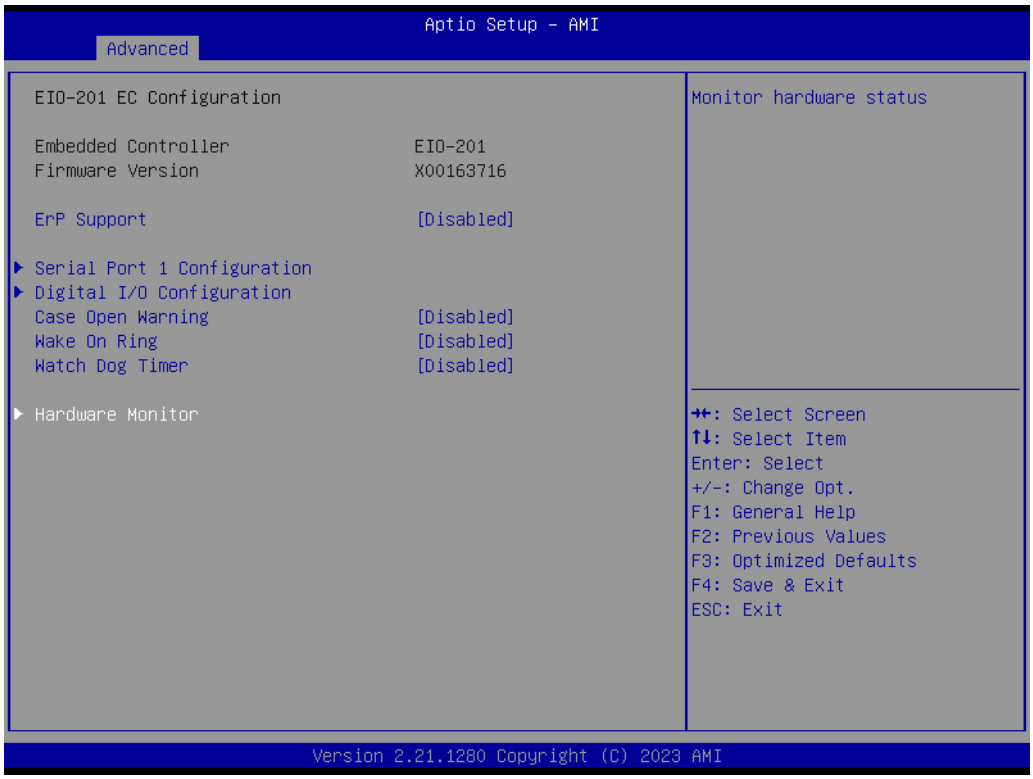
■ Case Open Warning [Disabled]
■ Wake On Ring [Disabled]
■ Watch Dog Timer [Disabled]

Note!

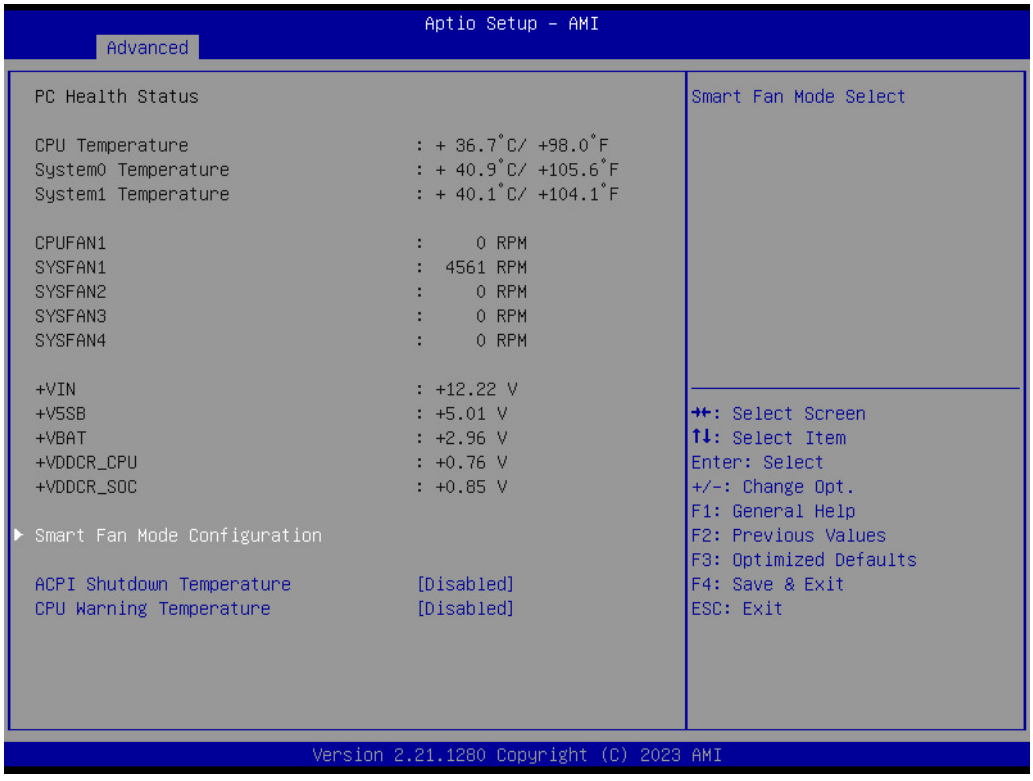
1. *The Watchdog Timer will initialize after the ASPEED chip starts up, which takes approximately 45 seconds.*
2. *A continuous series of short beeps indicates a case open or high temperature warning.*
3. *A single short beep that repeats continuously indicates a case open or temperature warning.*



- Digital I/O Pin 1 [Input]
- Digital I/O Pin 2 [Input]
- Digital I/O Pin 3 [Input]
- Digital I/O Pin 4 [Input]
- Digital I/O Pin 5 [Input]
- Digital I/O Pin 6 [Input]
- Digital I/O Pin 7 [Input]
- Digital I/O Pin 8 [Input]



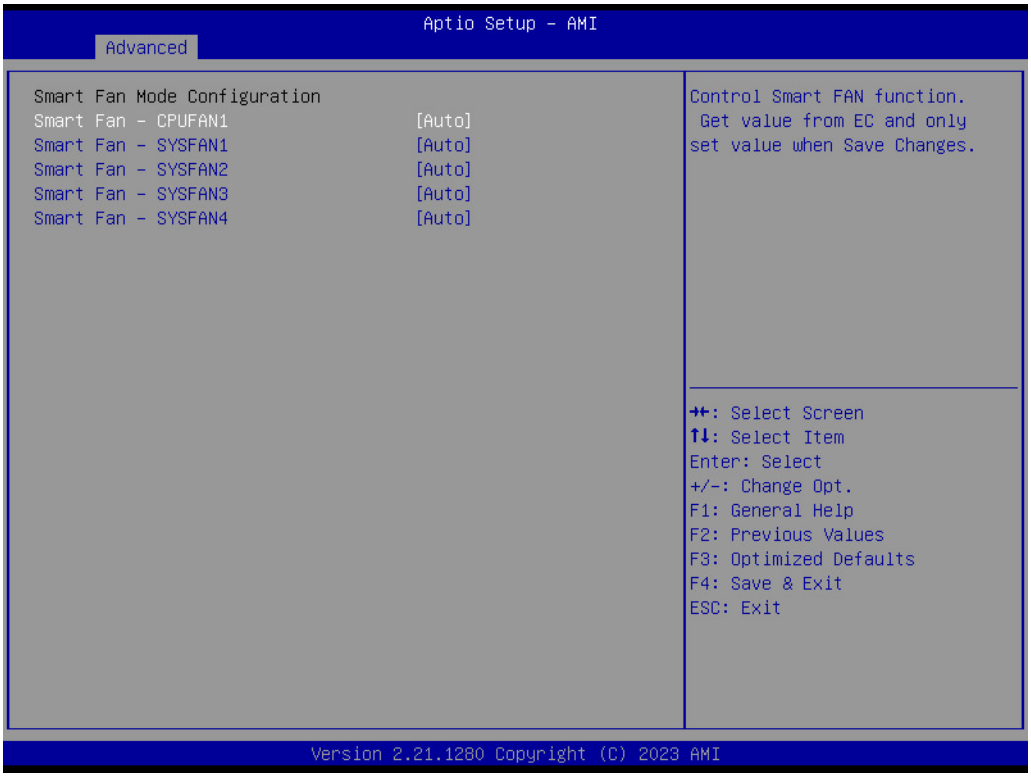
- Hardware Monitor
  Monitor hardware status



- Smart Fan Mode Configuration
  Smart Fan Mode Select
- ACPI Shutdown Temperature [Disabled]
- CPU Warning Temperature [Disabled]

Note!

1. *If the actual fan speed is under 500RPM, it will show "0RPM" on BIOS menu and EC tool.*
2. *A repeating pattern of two short beeps followed by one long beep indicates a CPU temperature warning.*

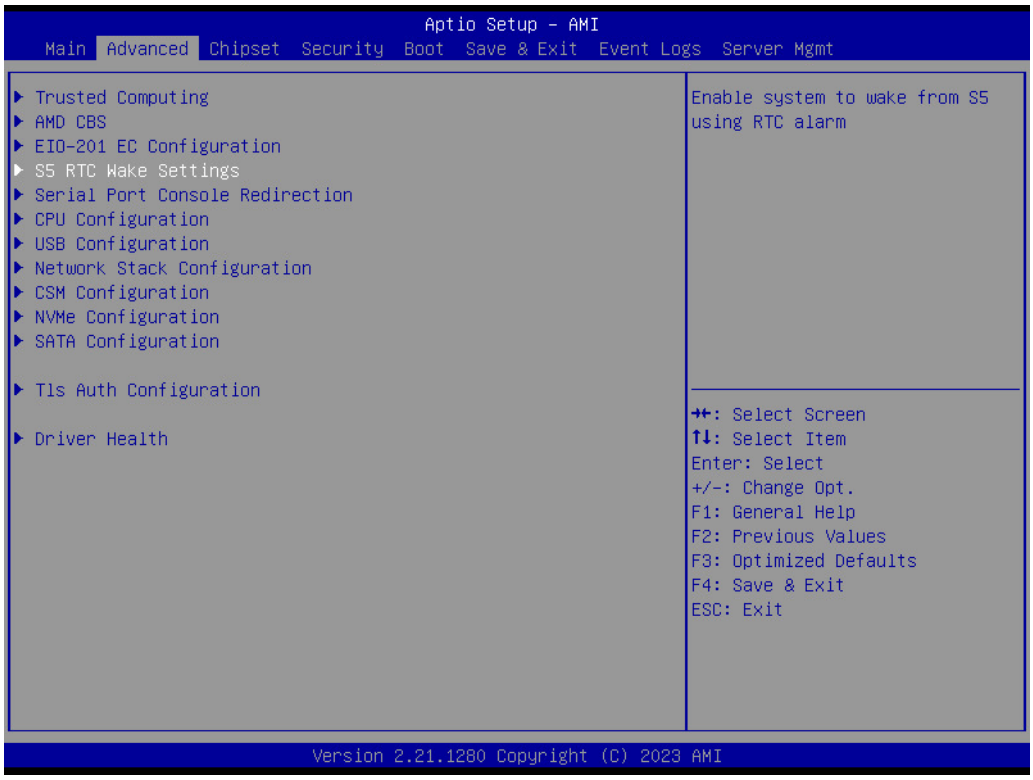


The Smart FAN Control function retrieves values from the EC (Embedded Controller) and only applies changes when settings are saved.

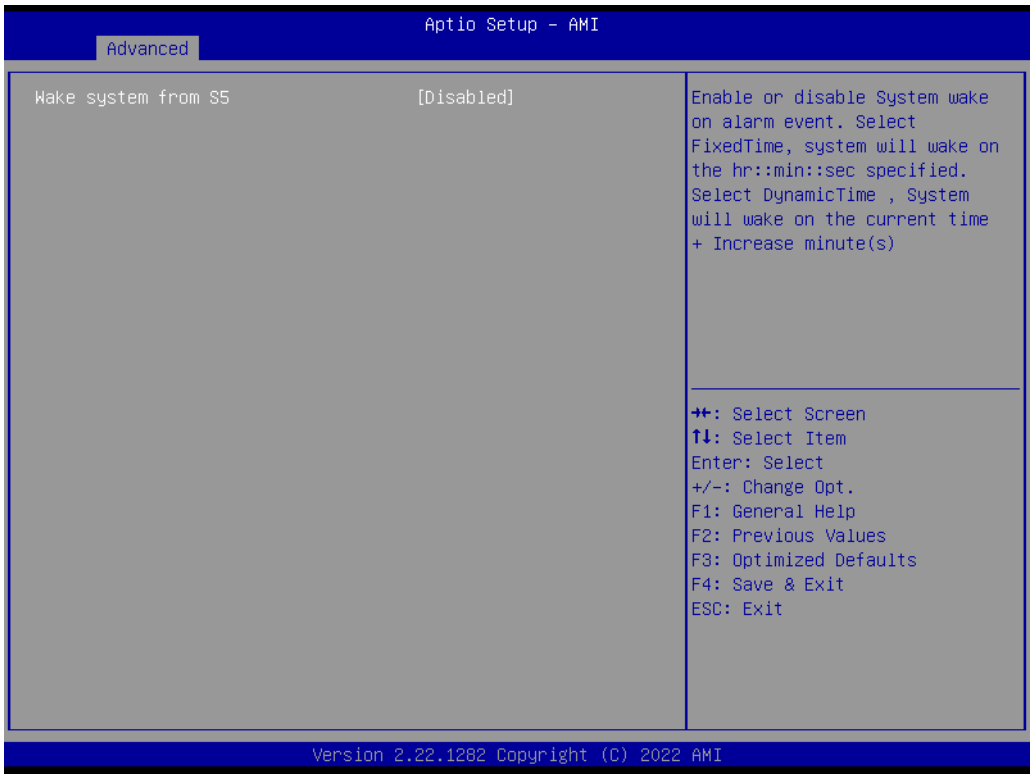
- Smart Fan – CPUFAN1 [Auto]
- Smart Fan – SYSFAN1 [Auto]
- Smart Fan – SYSFAN2 [Auto]
- Smart Fan – SYSFAN3 [Auto]
- Smart Fan – SYSFAN4 [Auto]

-

3.2.2.3 S5 RTC Wake Settings

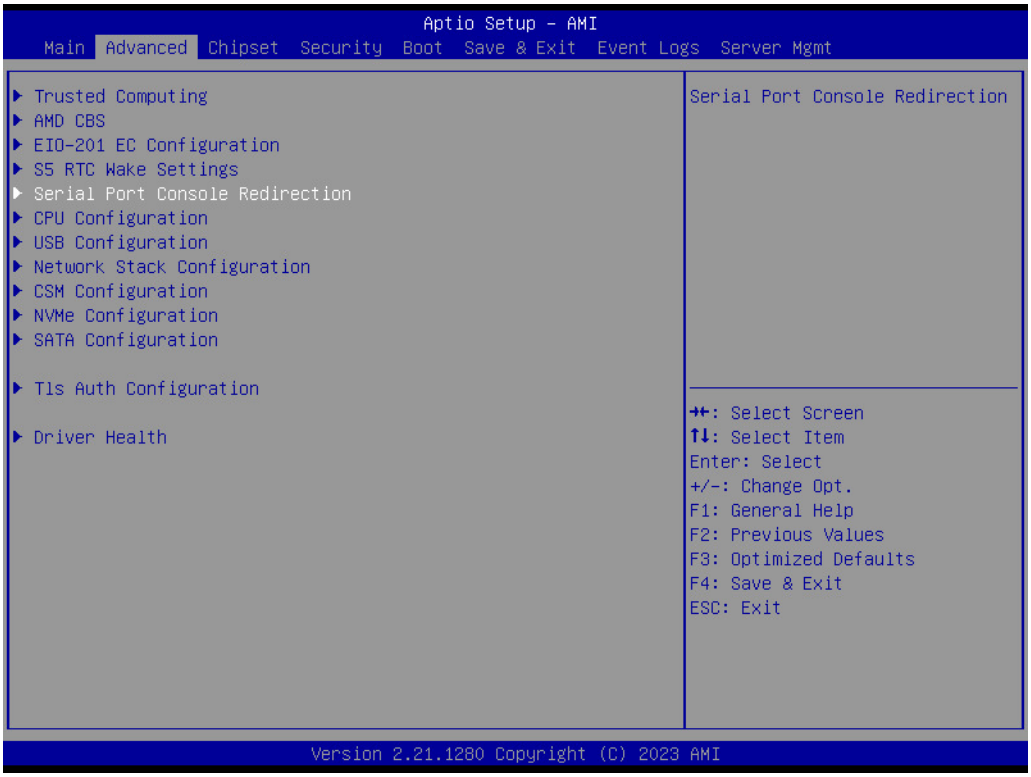


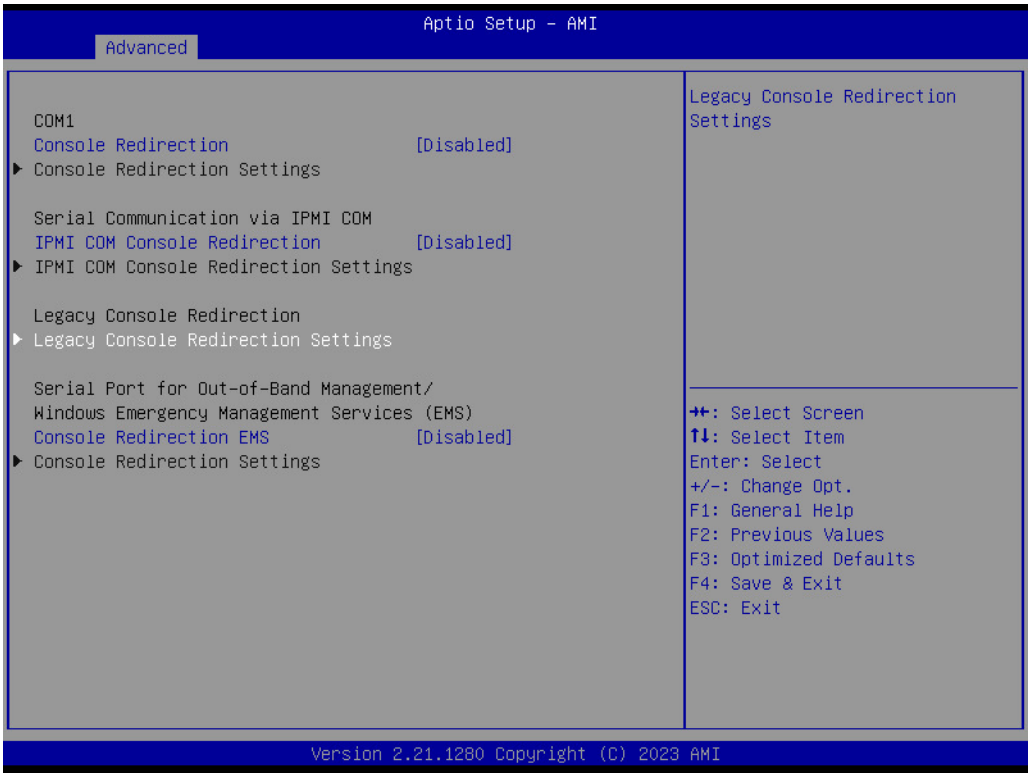
- Wake system from S5 [Disabled]



Enable/Disable System wake on alarm event. If “FixedTime” is selected, the system will wake on the hr:min:sec specified. When "DynamicTime" is selected, the system will wake after the specified number of minutes has passed from the current time.

3.2.2.4 Serial Port Console Redirection

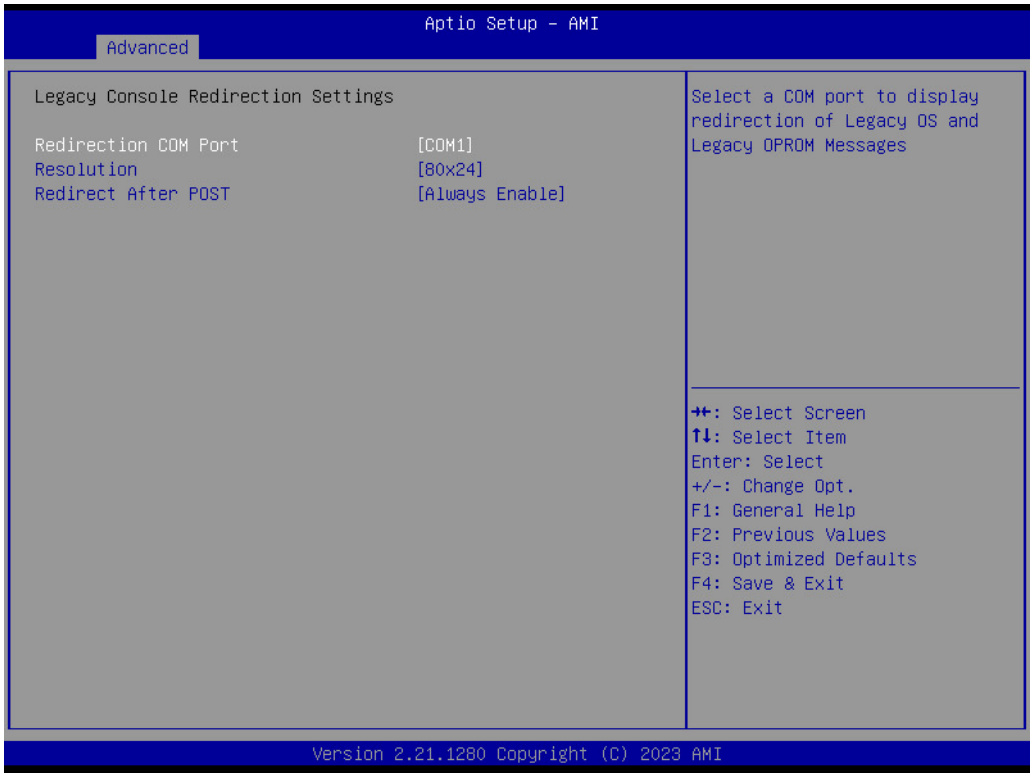




- Console Redirection [Disabled]
- IPMI COM Console Redirection [Disabled]
- Console Redirection EMS [Disabled]

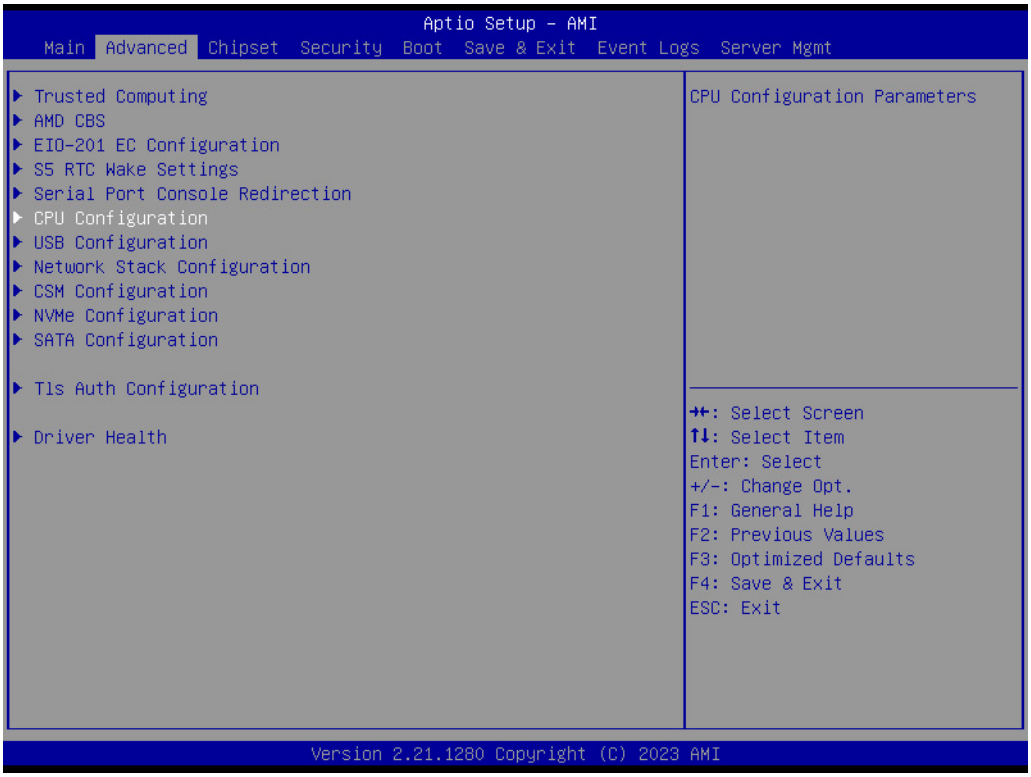
Serial Port Console Redirection – Legacy Console Redirection Settings

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



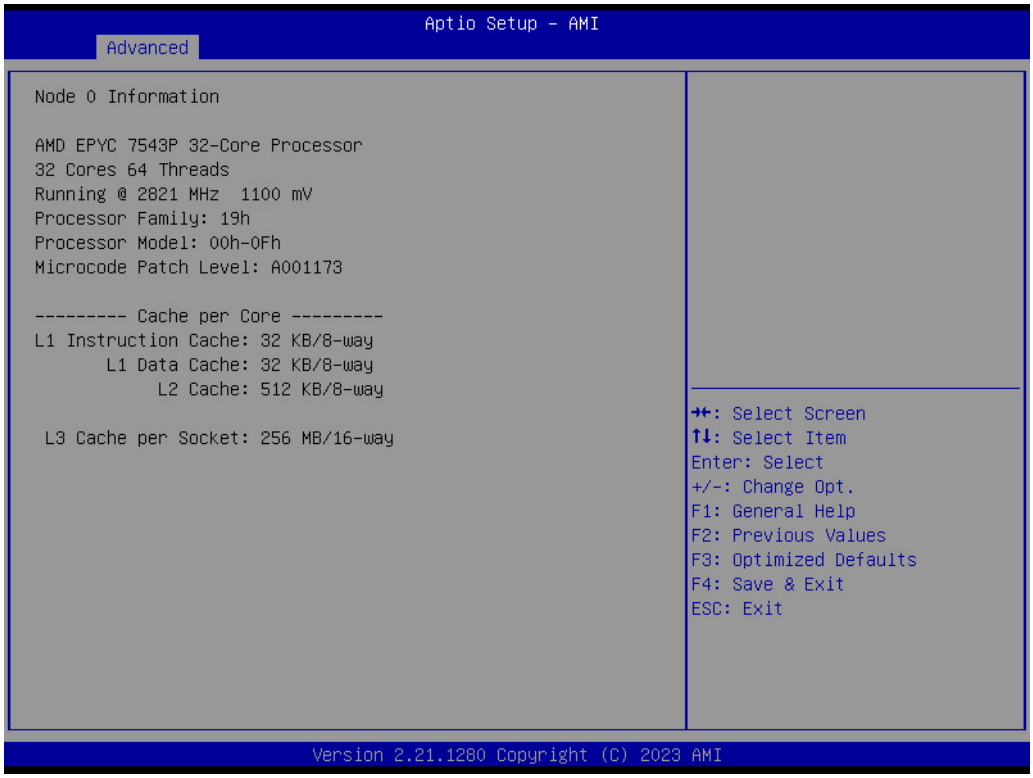
- Redirection COM Port [COM1]
- Resolution [80x24]
- Redirect After POST [Always Enable]

3.2.2.5 CPU Configuration

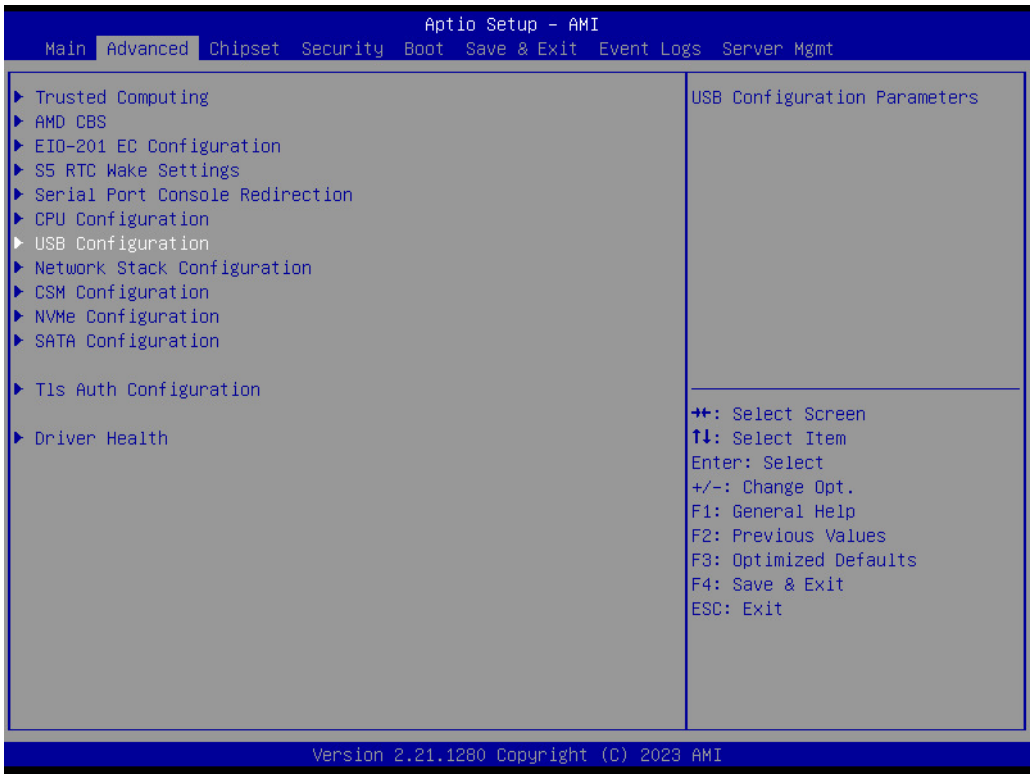


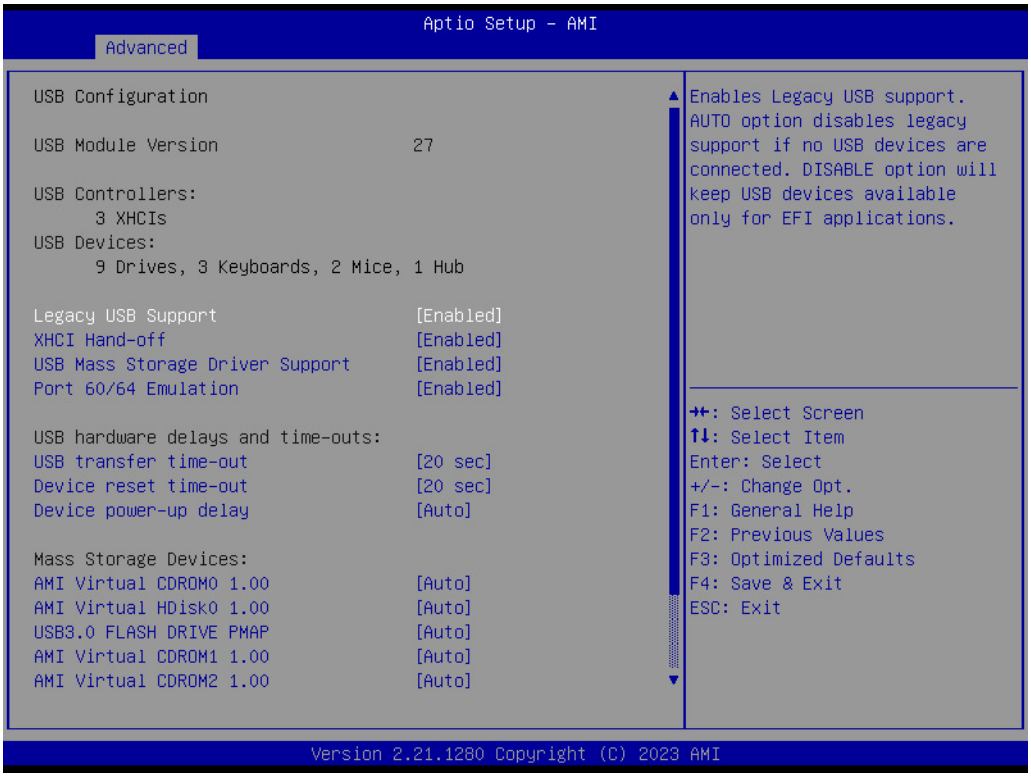
- SVM Mode [Enable]
- Node 0 Information

CPU Configuration - Node 0 Information

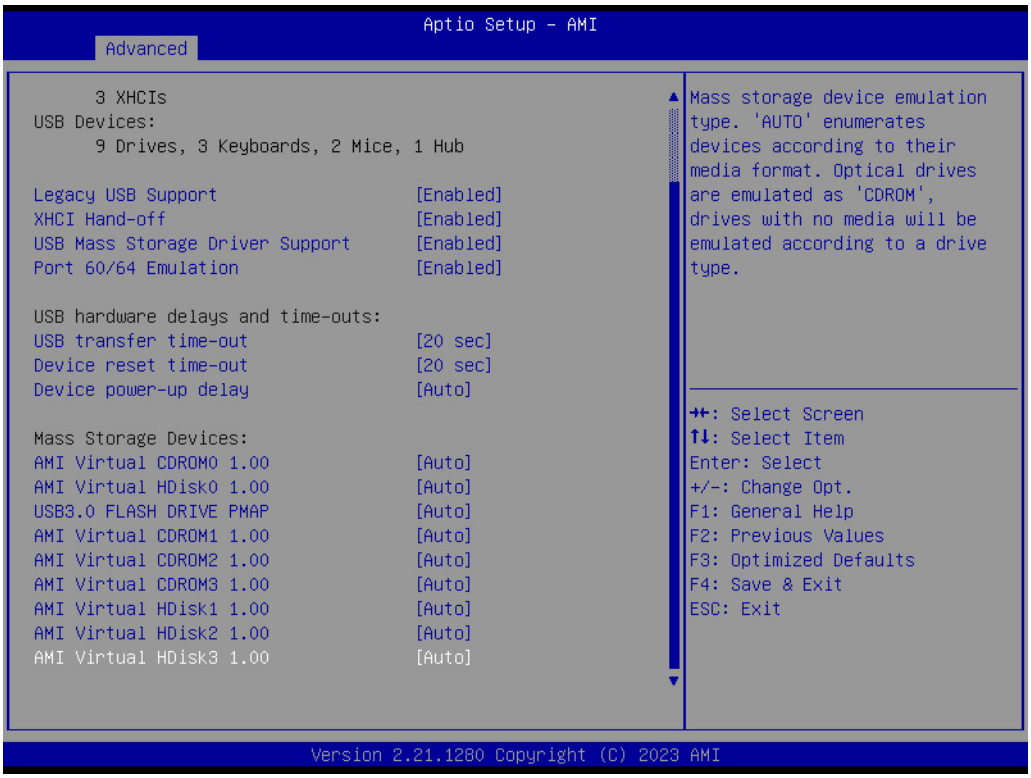


3.2.2.6 USB Configuration

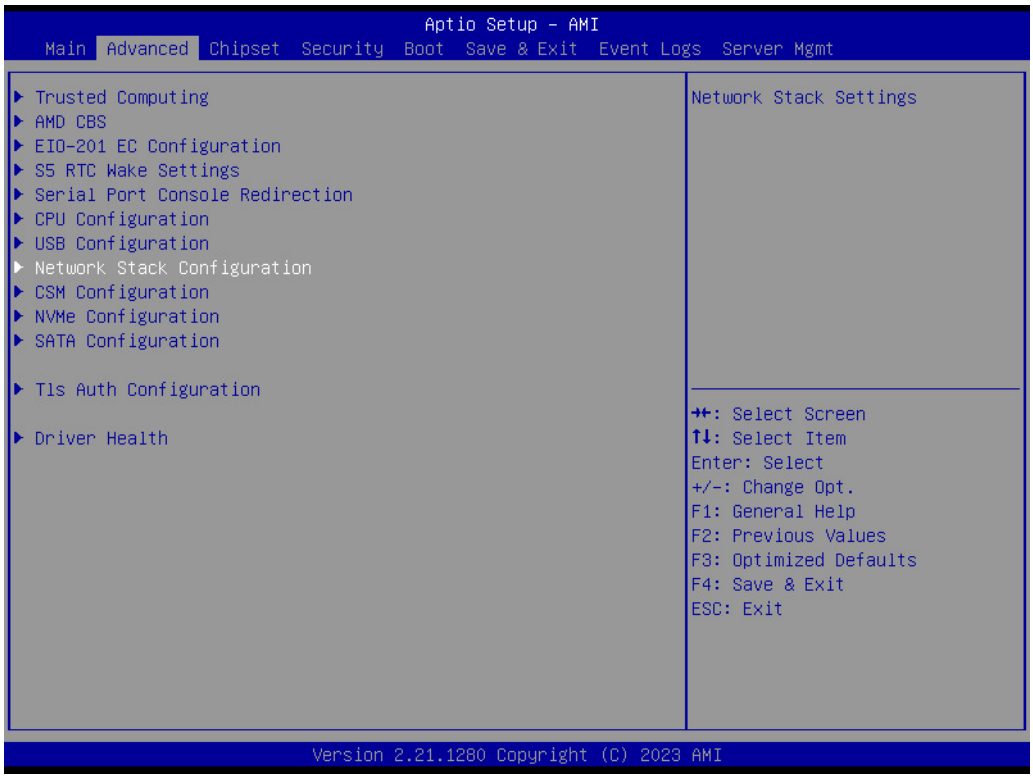


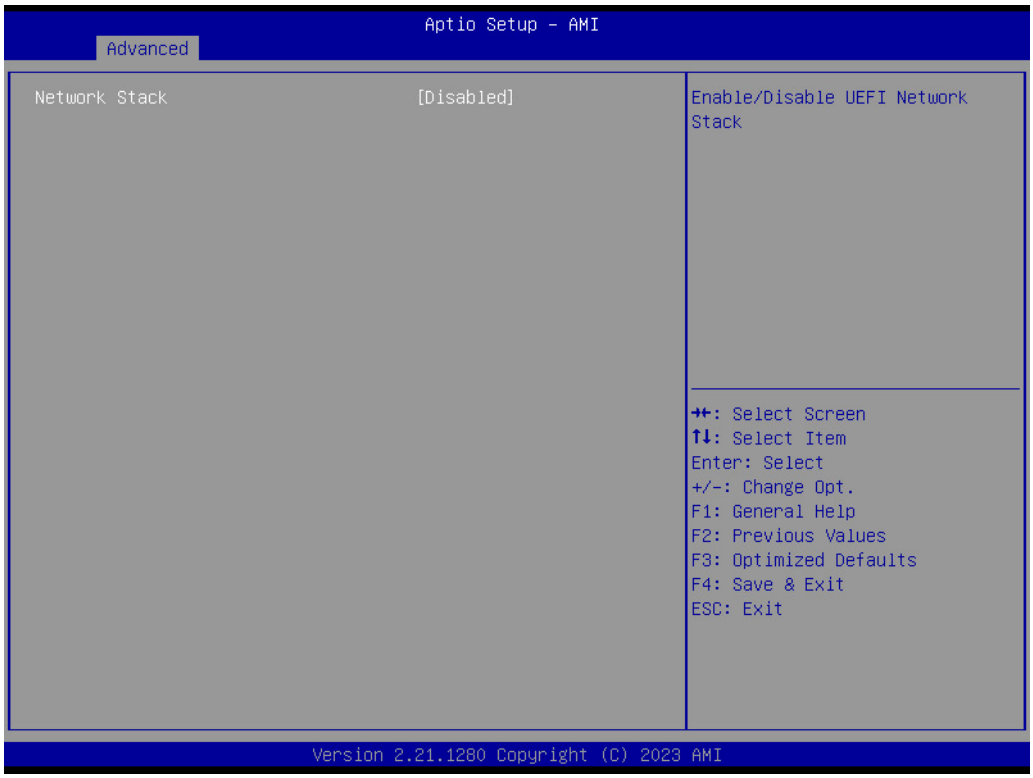


- Legacy USB Support [Enabled]
  Enables Legacy USB support, the AUTO option disables legacy support if no USB devices are connected. The DISABLE option will keep USB devices available only for EFI applications.
- XHCI Hand-off [Enabled]
- USB Mass Storage Driver Support [Enabled]
- Port 60/64 Emulation [Enabled]



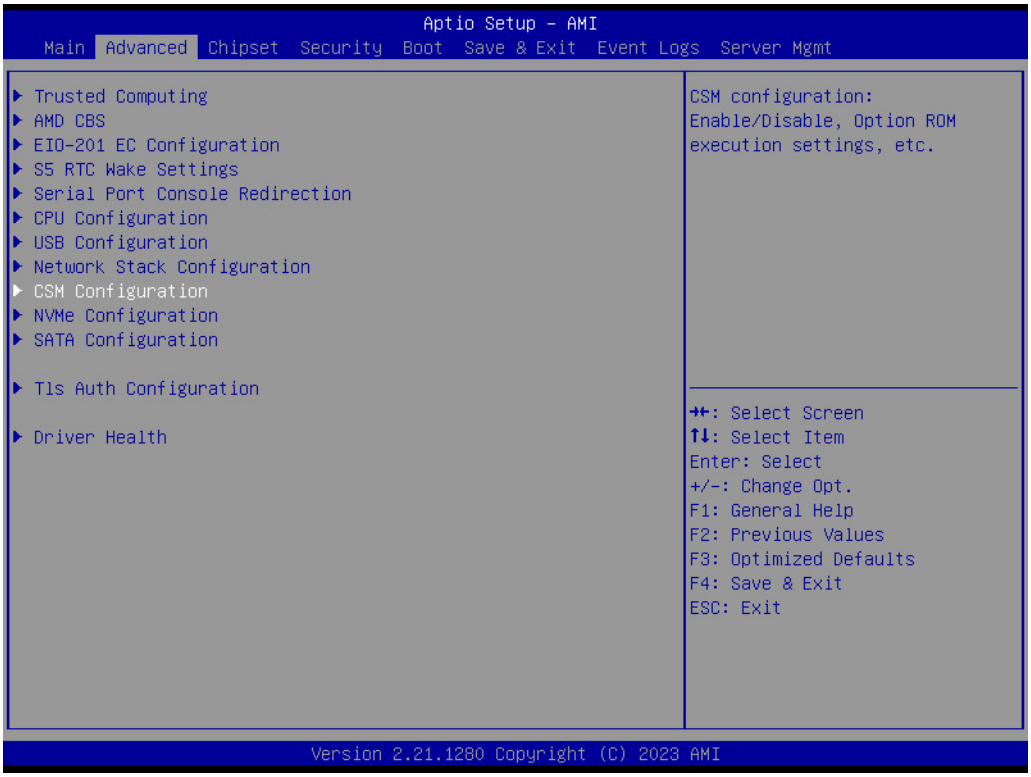
3.2.2.7 Network Stack Configuration

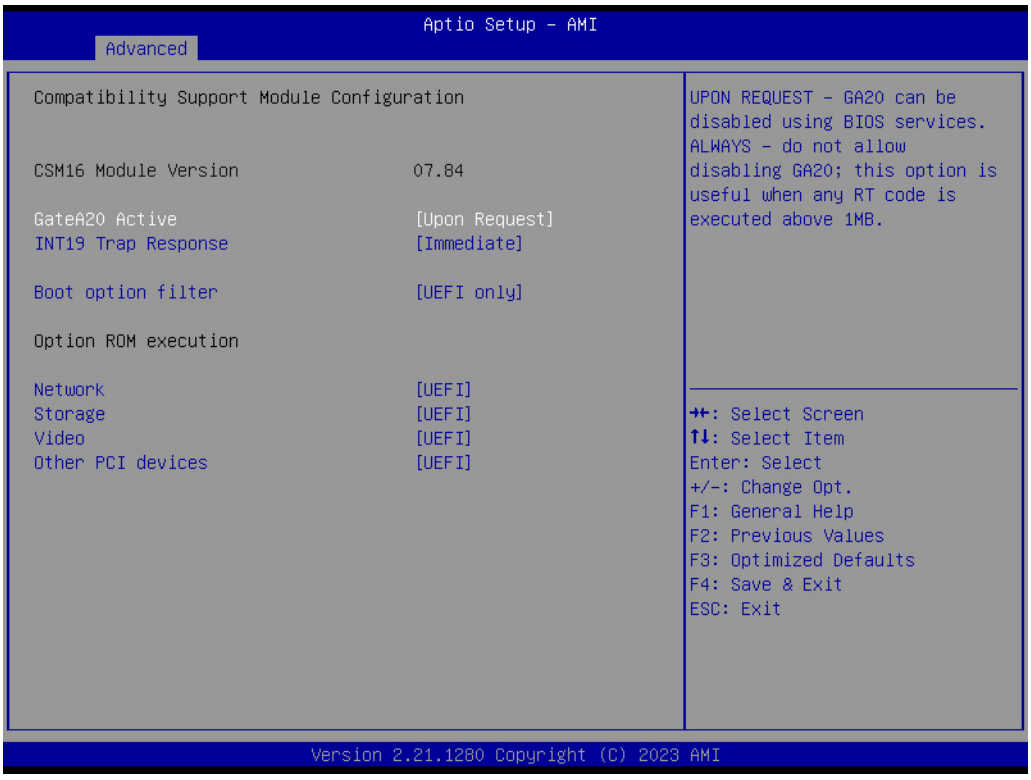




- Network Stack [Disabled]
  Enable/Disable UEFI Network Stack

3.2.2.8 CSM Configuration

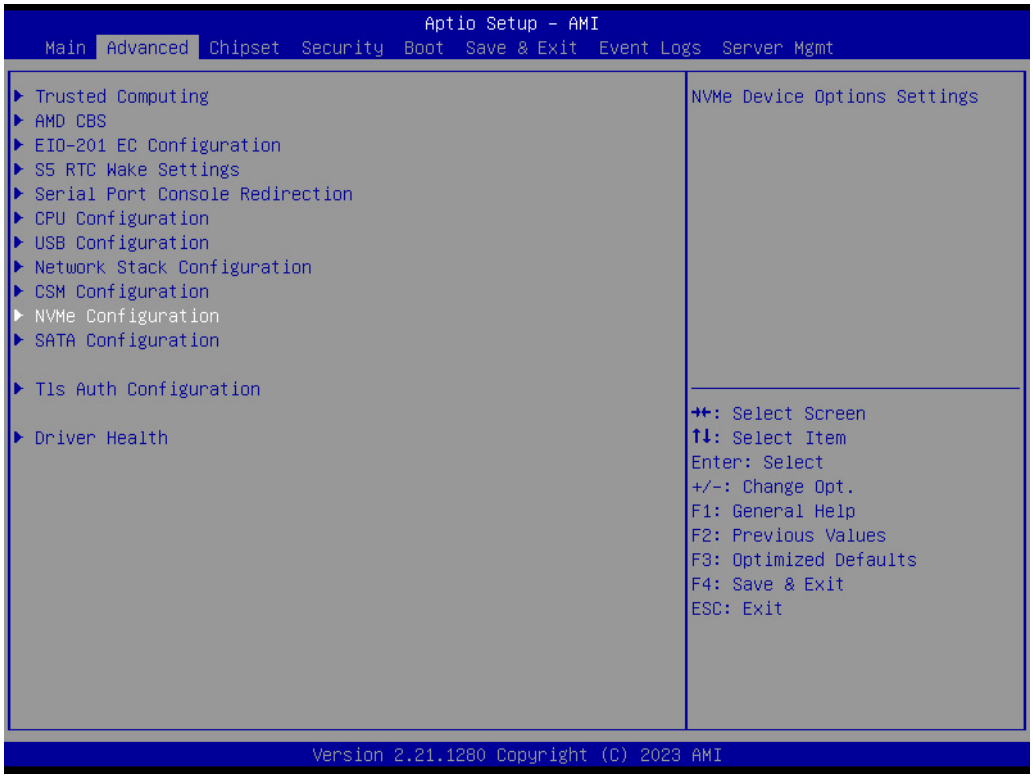




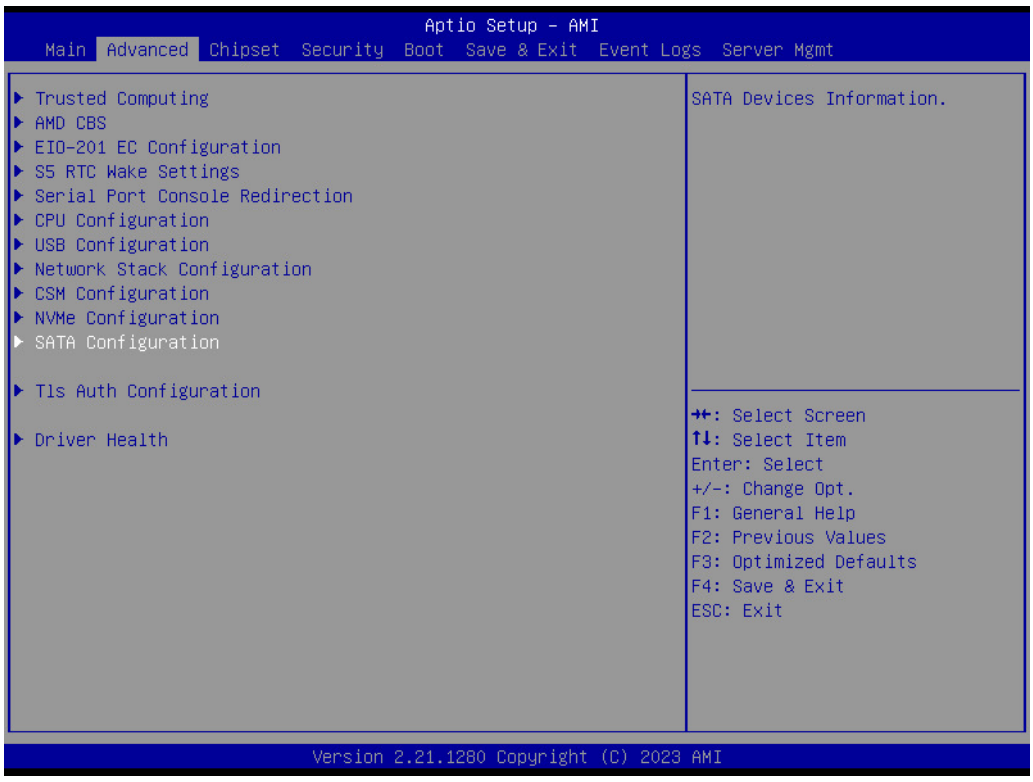
- GateA20 Active [Upon Request]
  UPON REQUEST – GA20 can be disabled using BIOS services.
  ALWAYS – do not allow disabling GA20; this option is useful when any RT code is executed above 1MB.
- INT19 Trap Response [Immediate]
- Boot option filter [UEFI only]

- Network [UEFI]
- Storage [UEFI]
- Video [UEFI]
- Other PCI devices [UEFI]

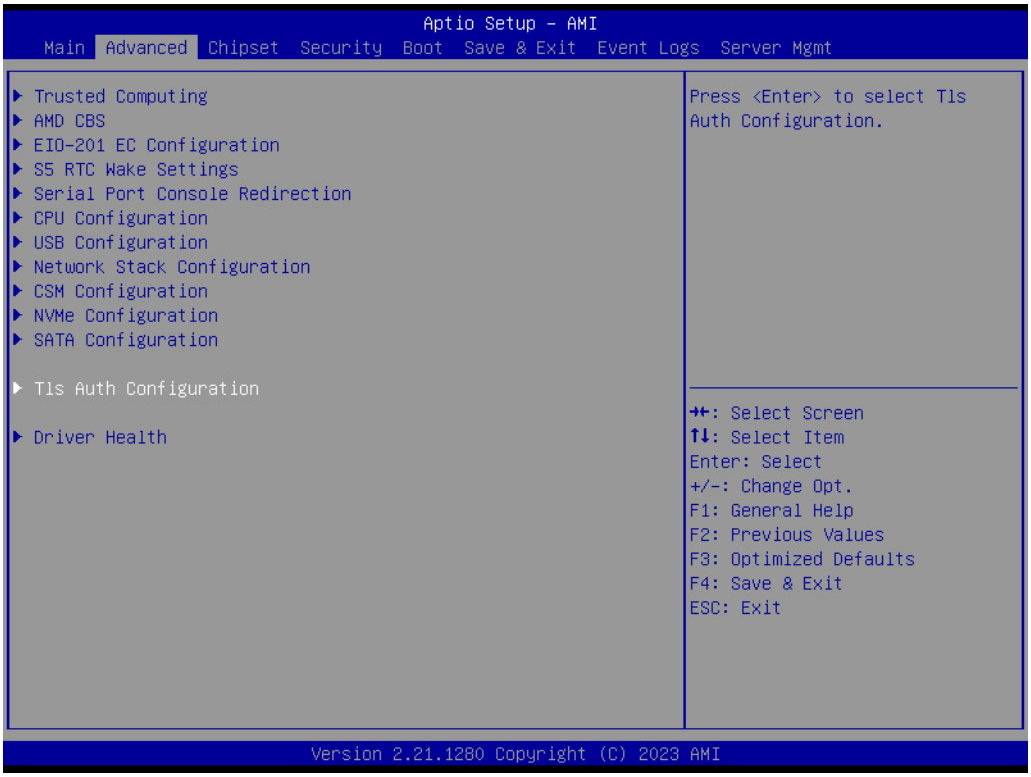
3.2.2.9 NVMe Configuration

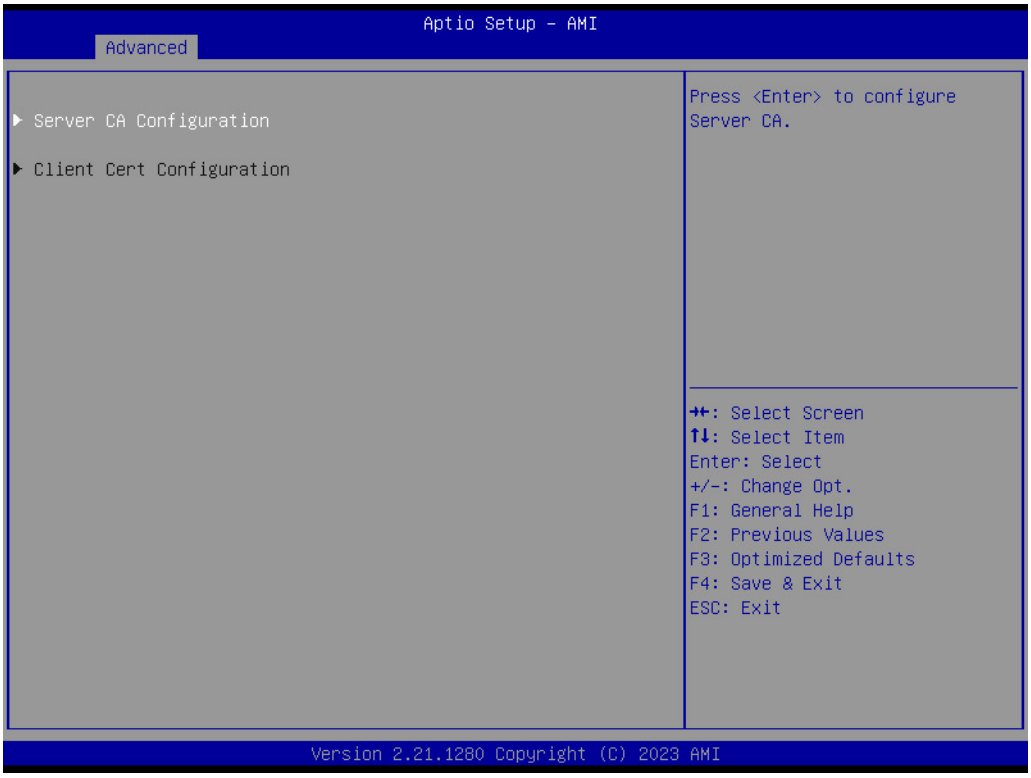


3.2.2.10 SATA Configuration



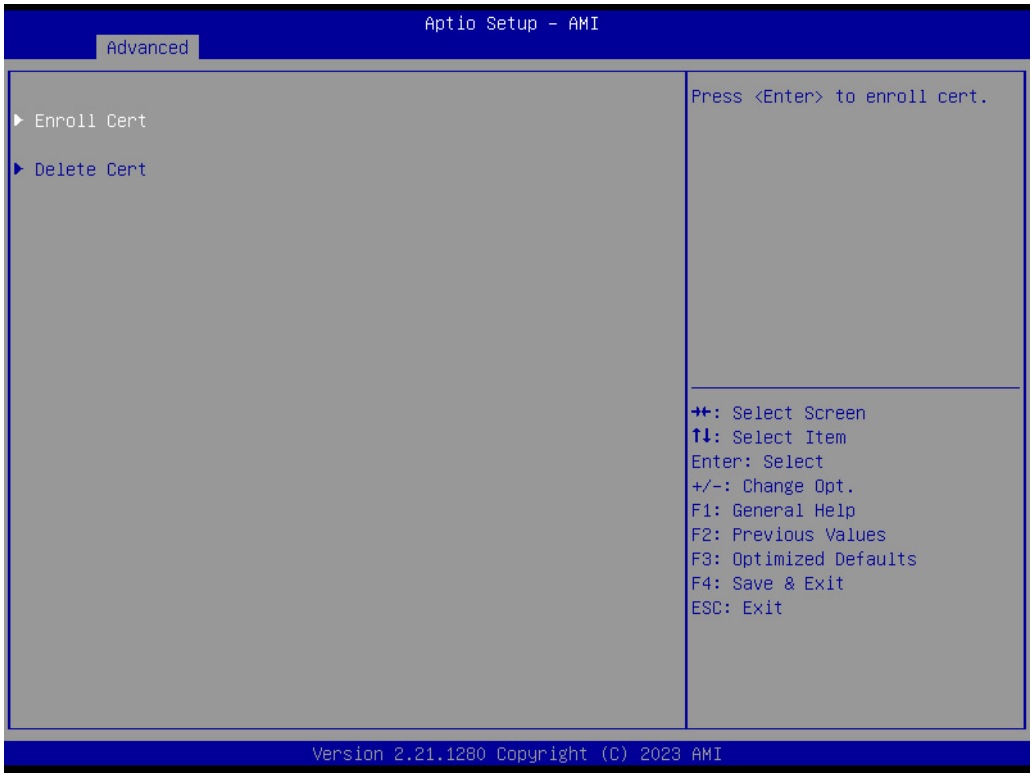
3.2.2.11 Tls Auth Configuration



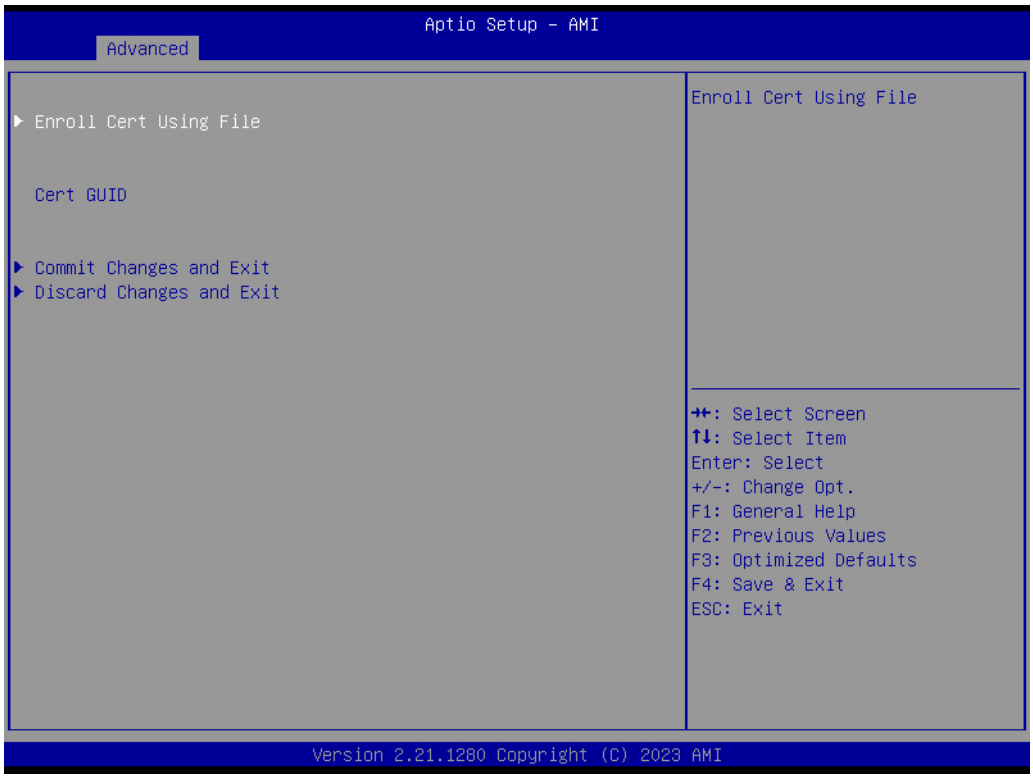


- Server CA Configuration
- Client Cert Configuration

Server CA Configuration – Enroll Cert



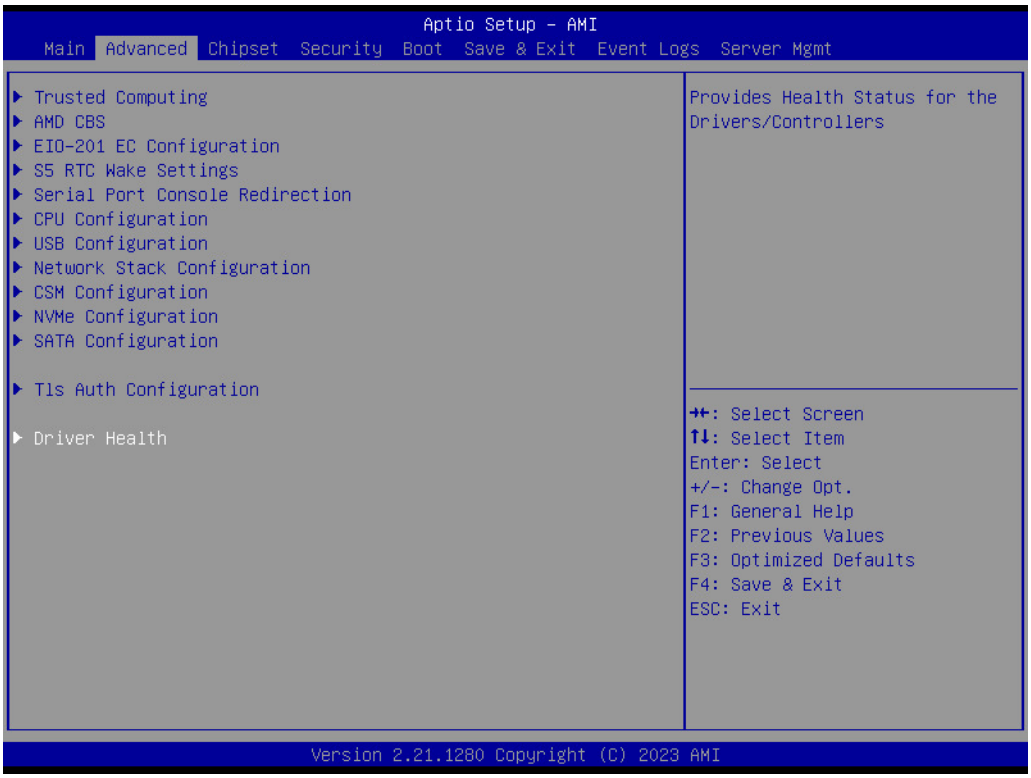
Server CA Configuration – Enroll Cert – Enroll Cert Using File

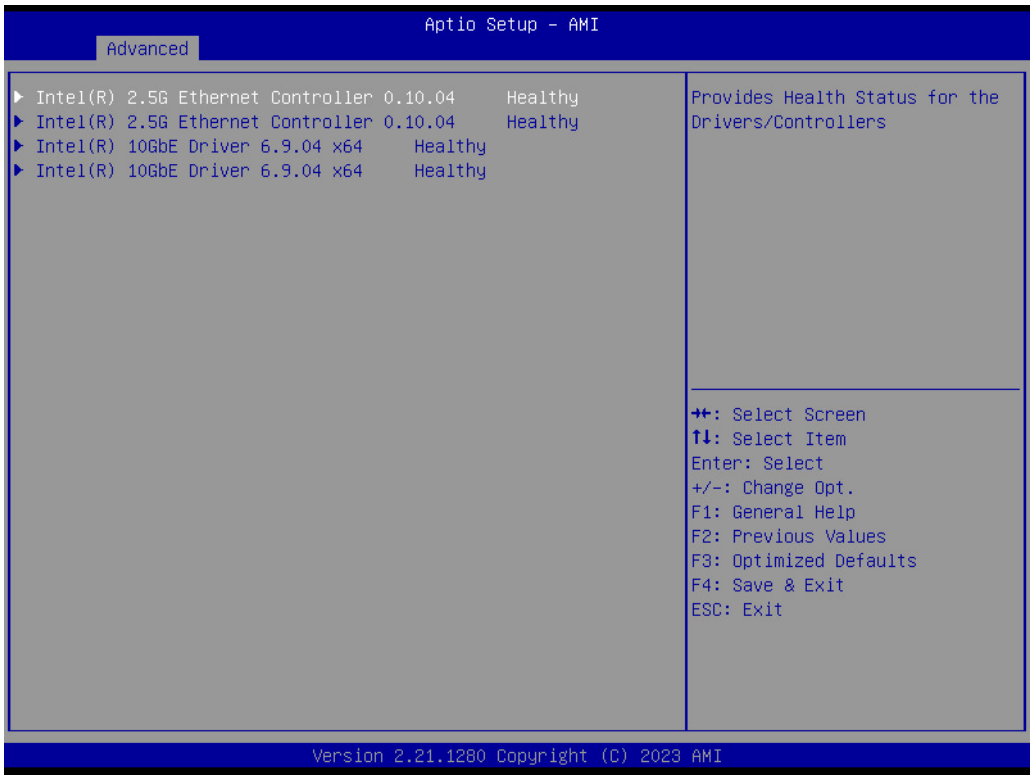


Server CA Configuration – Delete Cert

3.2.2.12 Driver Health

Provides Health Status for the Drivers/Controllers.

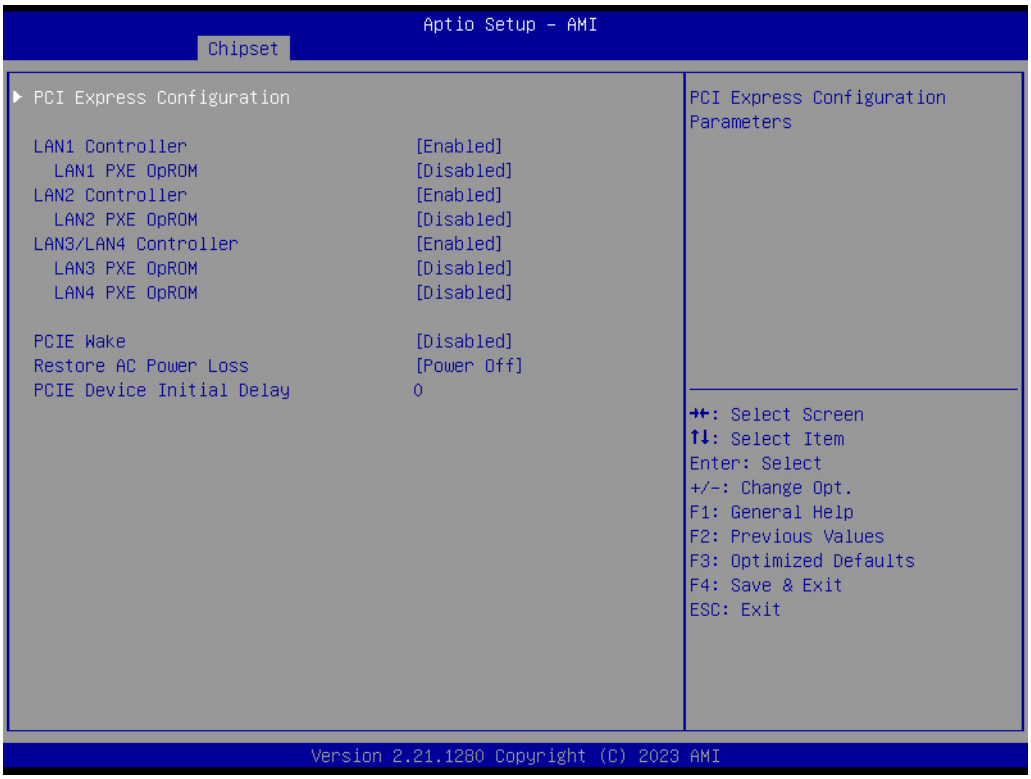




3.2.3 Chipset Configuration Settings

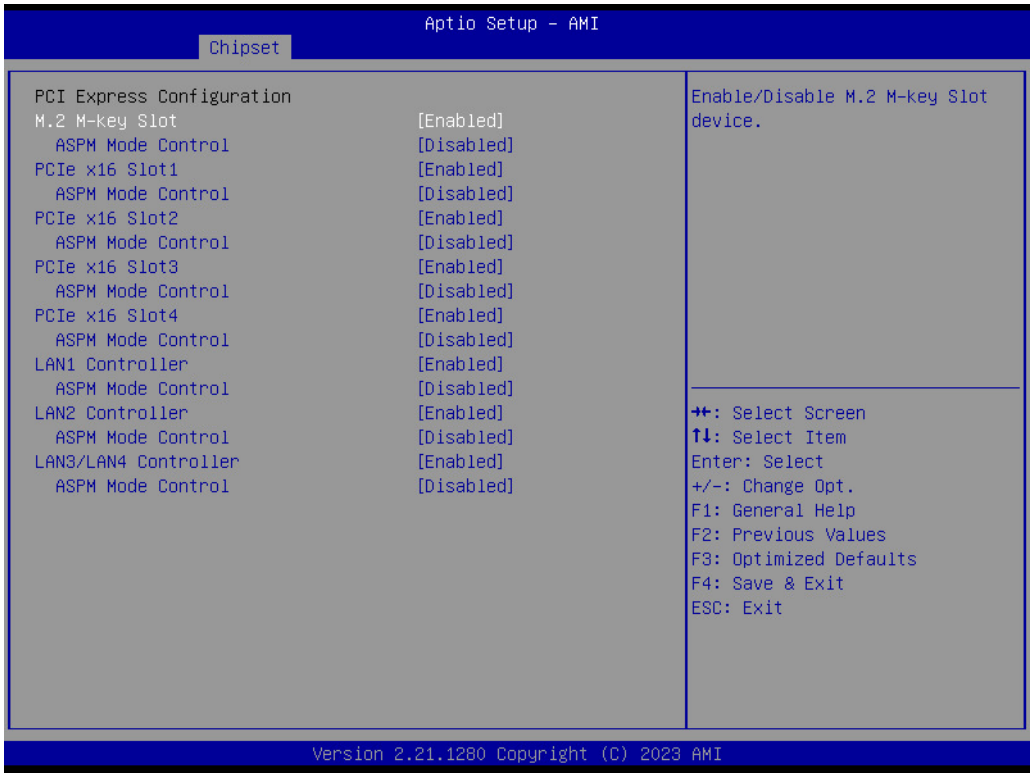
Select the chipset tab from the BIOS setup screen to enter the Chipset Setup screen. Users can select any item in the left frame of the screen, such as South Bridge Parameters, to go to the sub-menu for that item. Users can display a Chipset Setup option by highlighting it using the <Arrow> keys. All Chipset Setup options are described in this section. The Chipset Setup screens are shown below. The sub-menus are described on the following pages.

3.2.3.1 South Bridge



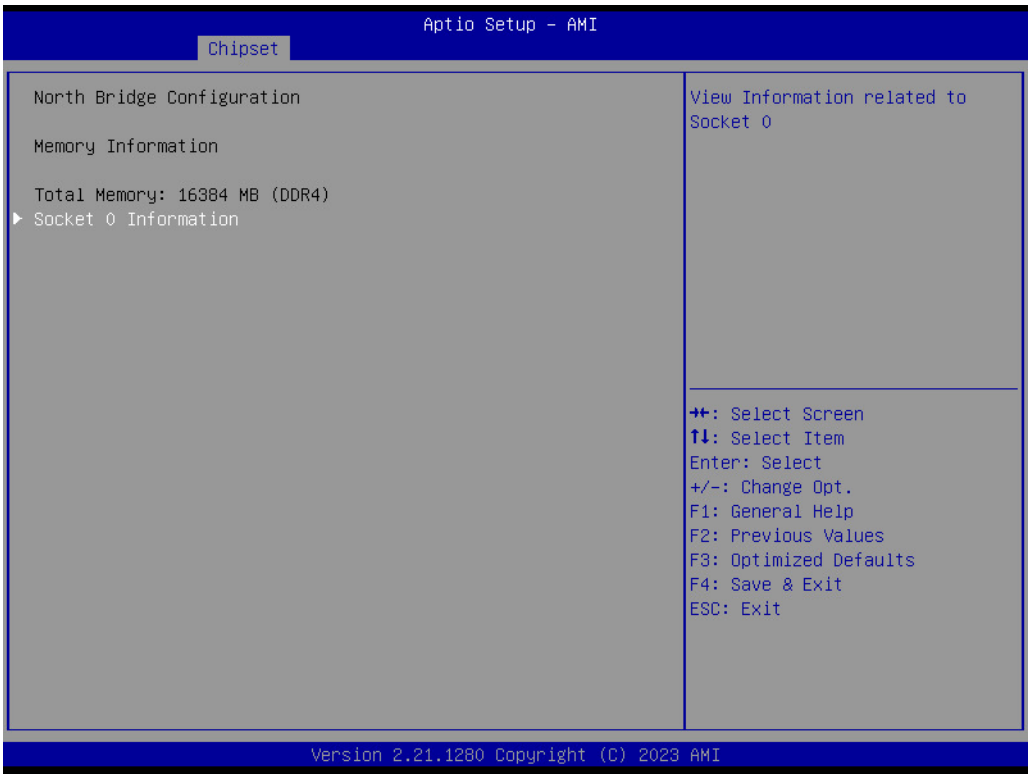
- LAN1 Controller [Enable]
- LAN2 Controller [Enable]
- LAN3/4 Controller [Enable]
- PCIE Wake [Disabled]
- Restore AC Power Loss [Power off]
- PCIE Device Initial Delay 0

- PCI Express Configuration
  The user can enable or disable PCI express devices.



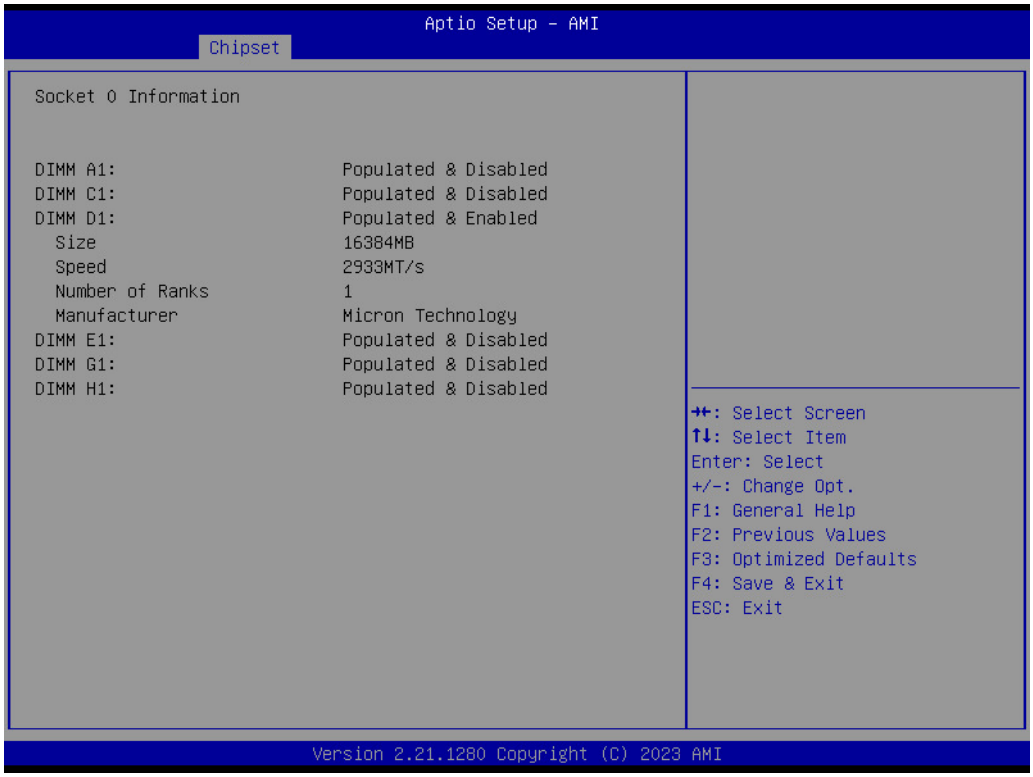
  - M.2 M-key Slot [Enabled]
  - PCIe x16 Slot1 [Enabled]
  - PCIe x16 Slot2 [Enabled]
  - PCIe x16 Slot3 [Enabled]
  - PCIe x16 Slot4 [Enabled]
  - LAN1 Controller [Enabled]
  - LAN2 Controller [Enabled]
  - LAN3/LAN4 Controller [Enabled]

3.2.3.2 North Bridge

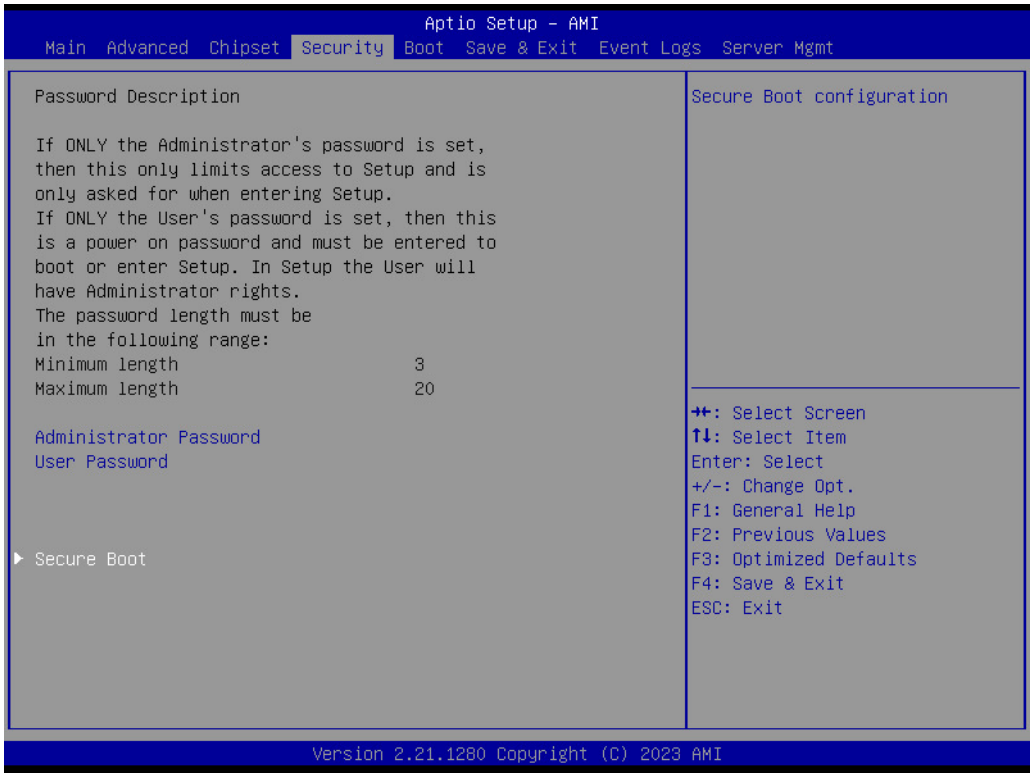


- Memory Information

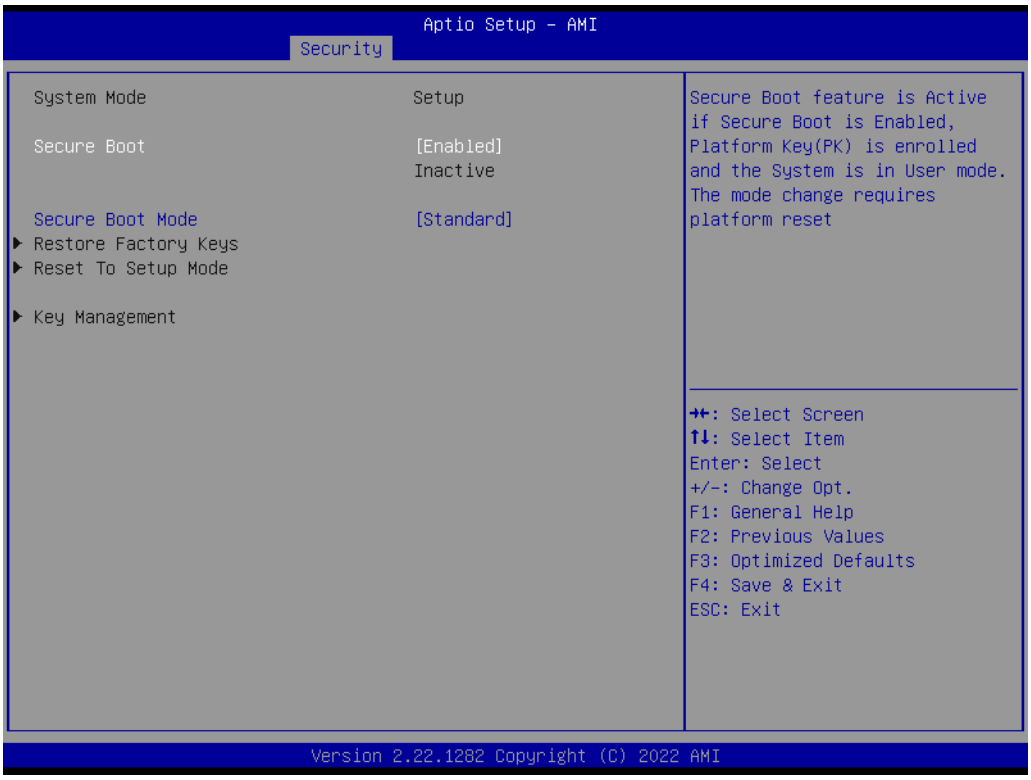
- Socket 0 Information



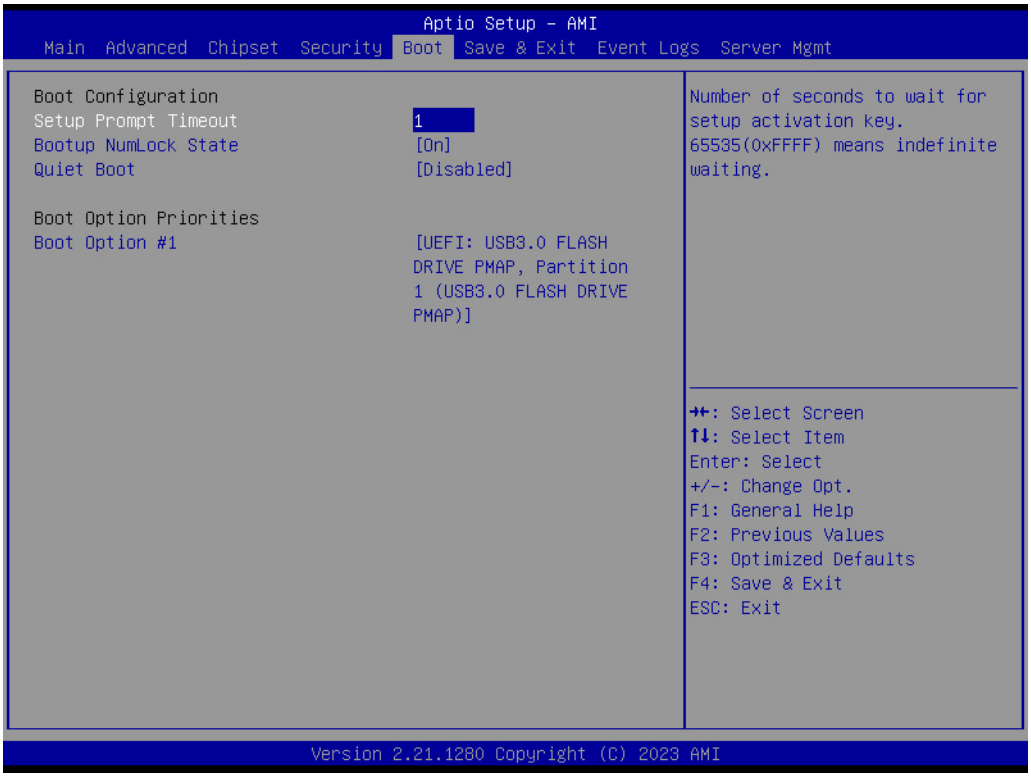
3.2.4 Security Settings



3.2.4.1 Secure Boot



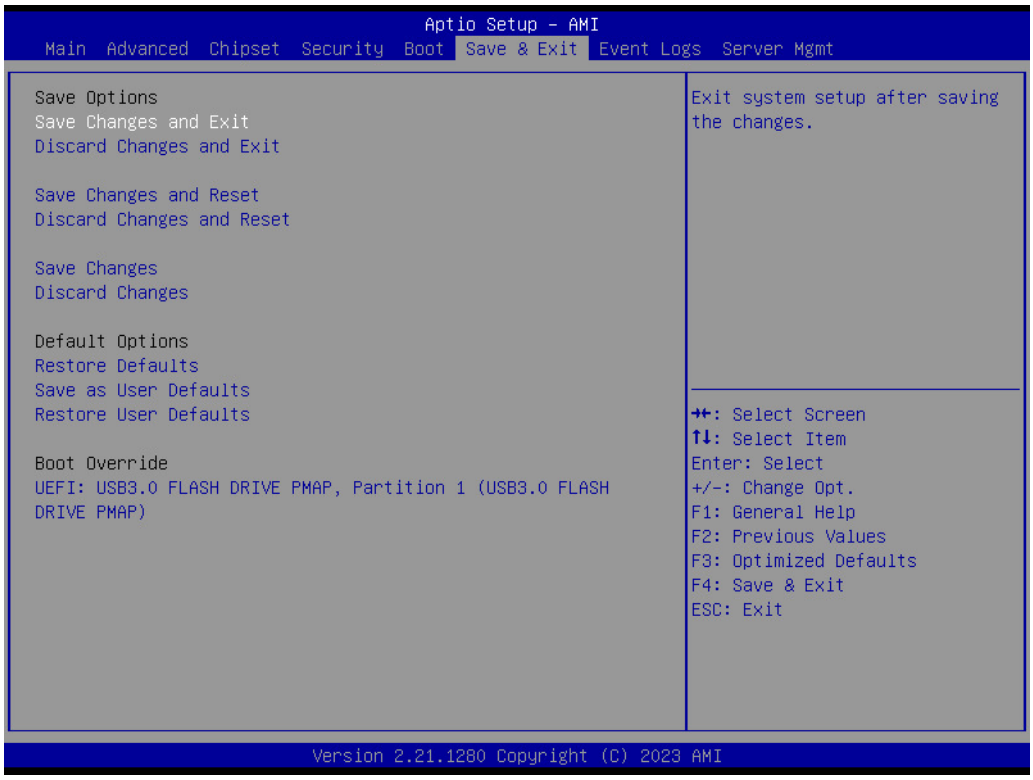
3.2.5 Boot Settings



- Setup Prompt Timeout
  Number of seconds to wait for setup activation key.

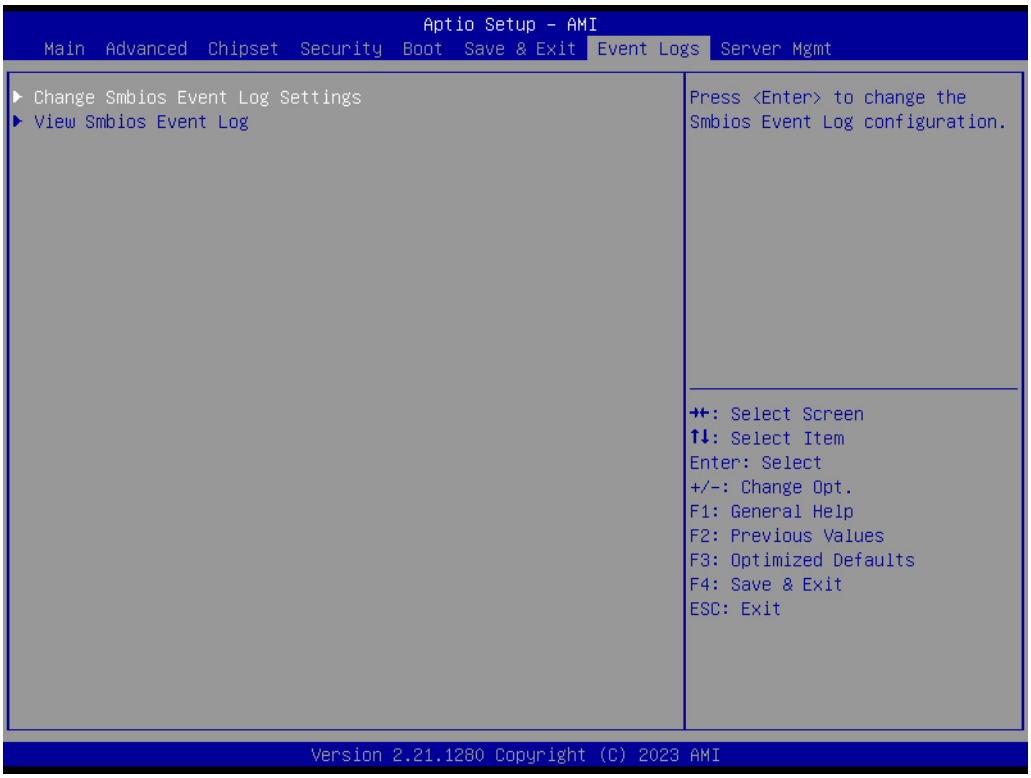
- Bootup NumLock
  State Select the keyboard NumLock state as "On" or "Off".
- Quiet Boot
  Enable or Disable the quiet boot option.
- Boot Option Priorities
  Sets the system boot priorities.

3.2.6 Save & Exit

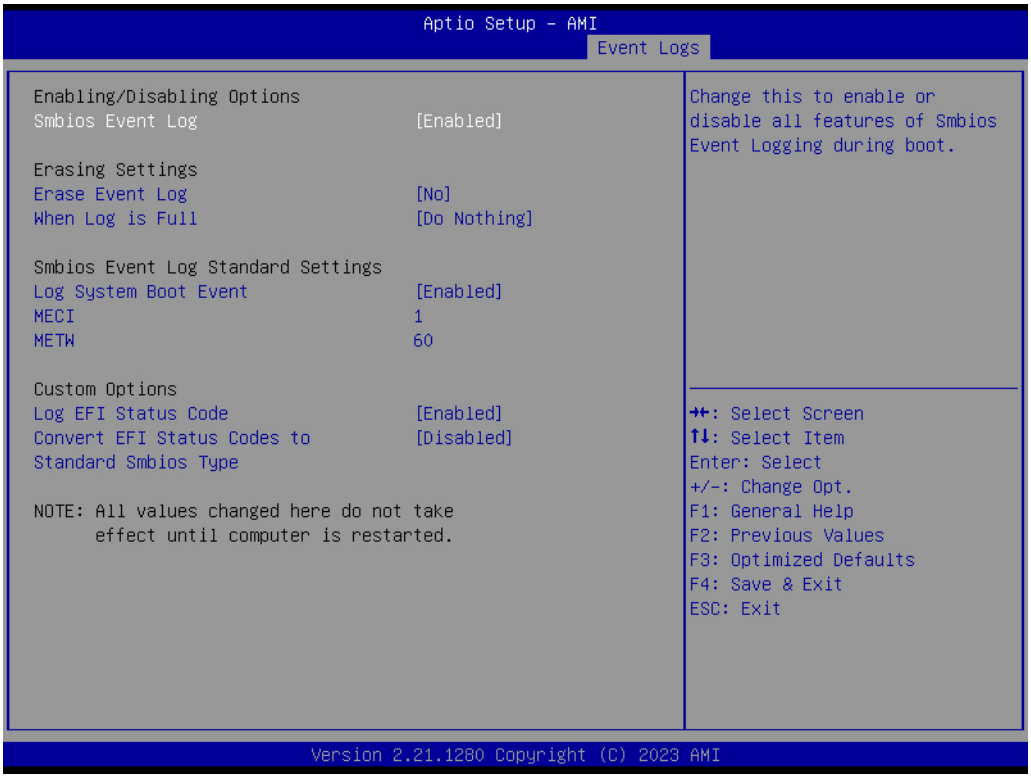


- Save Changes and Exit
  Exit system setup after saving the changes.
- Discard Changes and Exit
  Exit system setup without saving any changes.
- Save Changes and Reset
  Reset the system after saving changes.
- Discard Changes and Reset
  Reset system setup without saving any changes.
- Save Changes
  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.

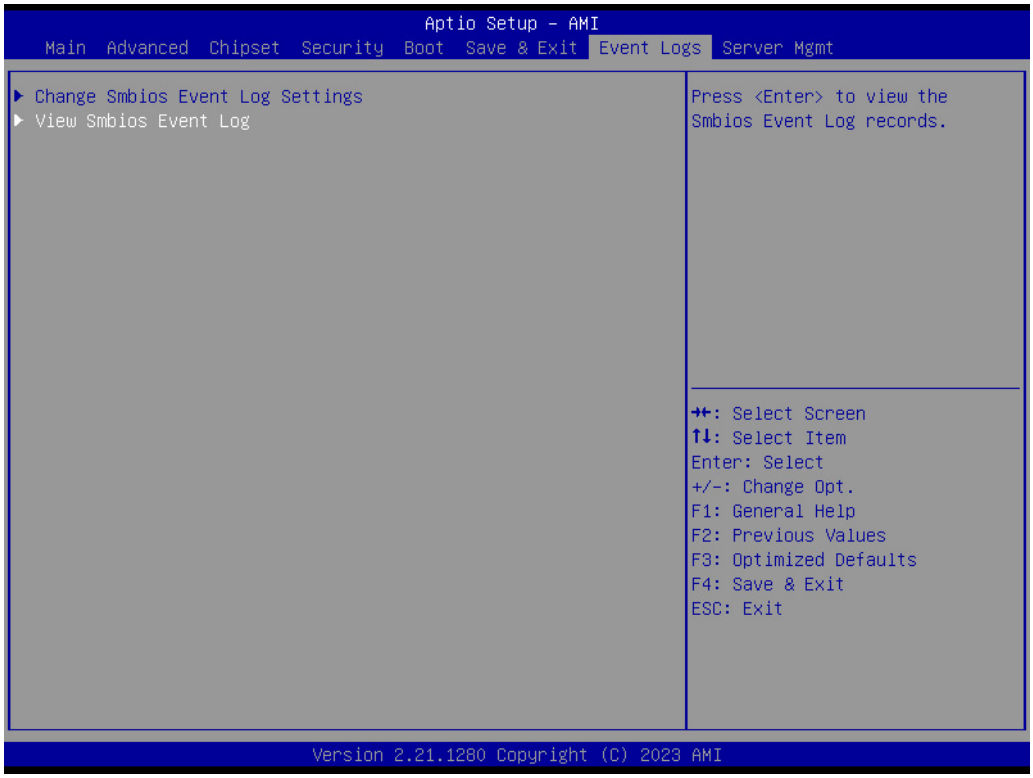
3.2.7 Event Logs

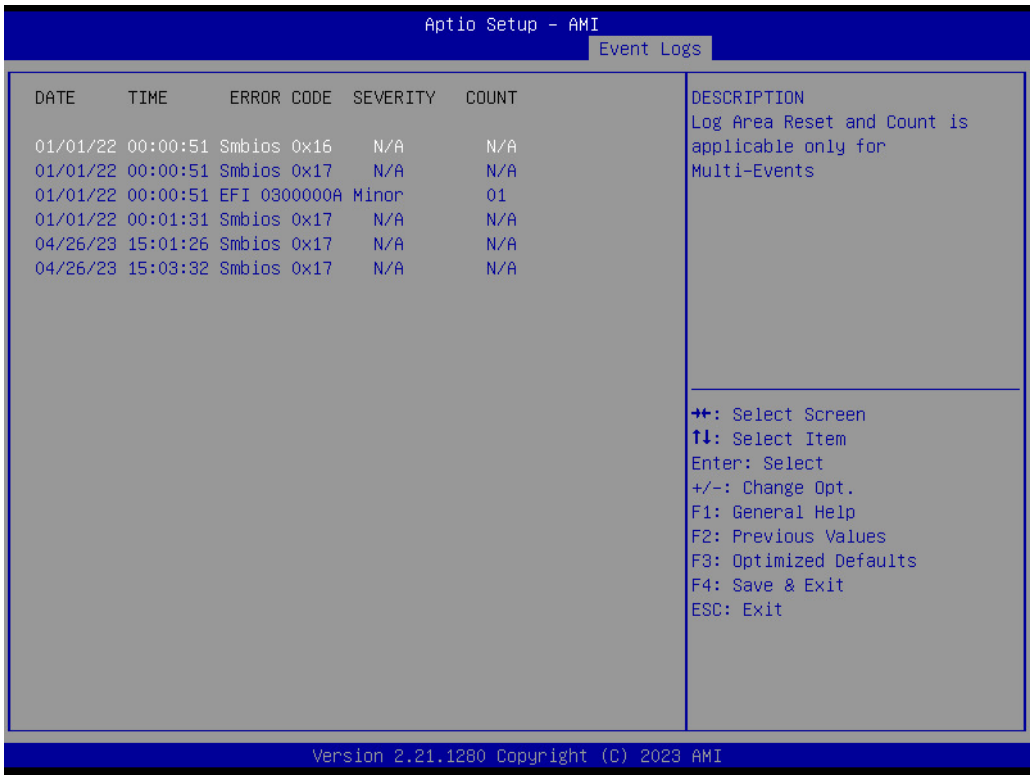


- Change Smbios Event Log Settings.



- View Smbios Event log.

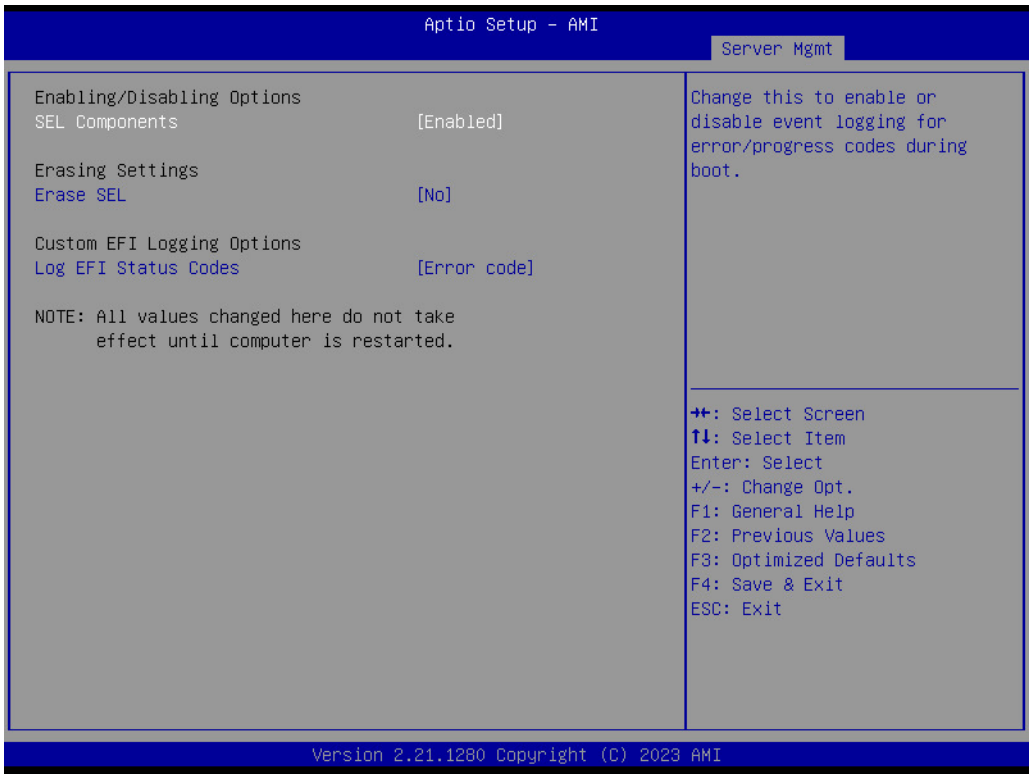




3.2.8 Server Mgmt

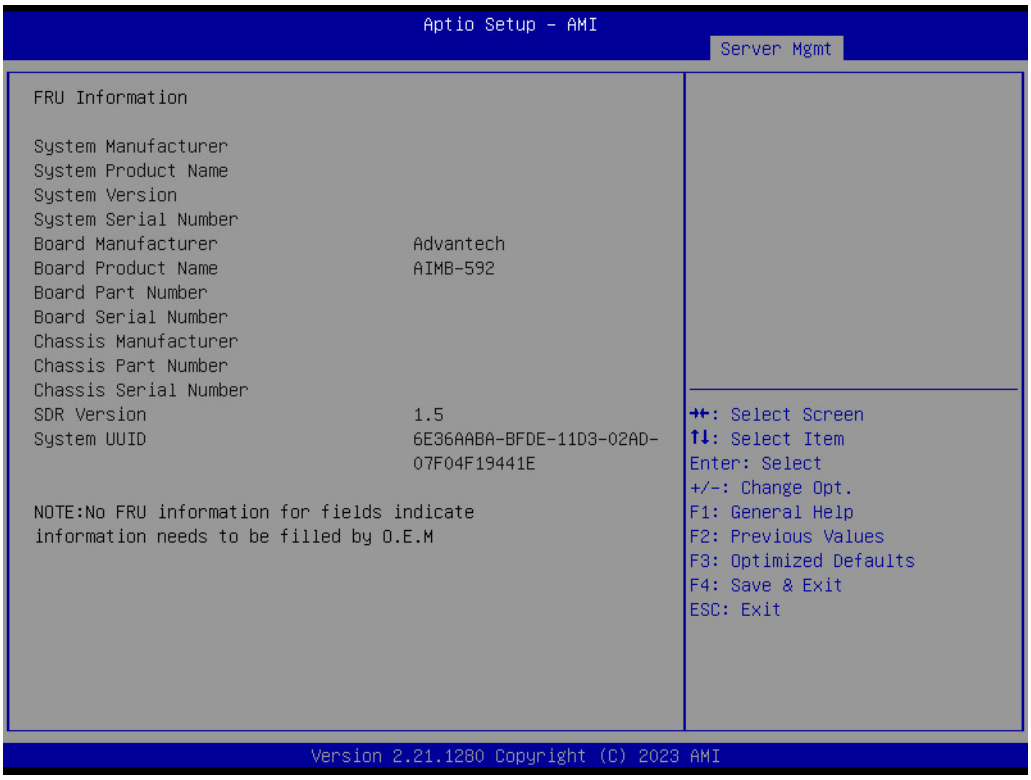
- BMC Support
  Enable or Disable interfaces to communicate with BMC.
- OS Watchdog Timer
  If enabled, this starts a BIOS timer which can only be shut off by Management Software after the OS loads.

3.2.8.1 System Event Log

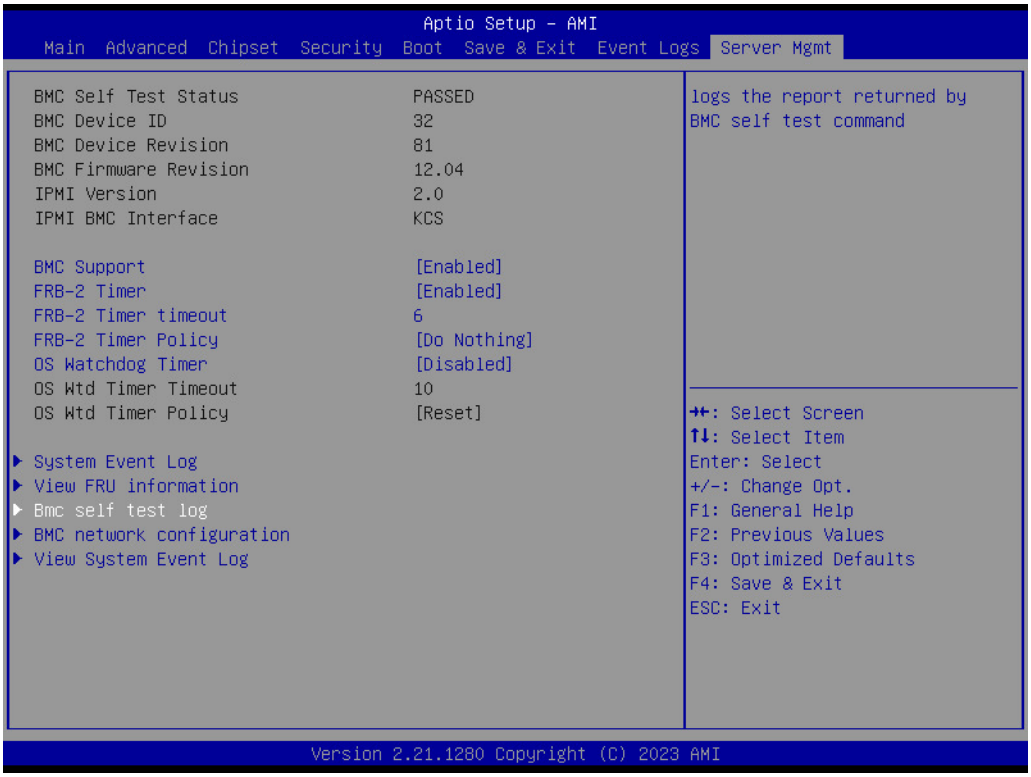


- SEL Components [Enabled]
- Erase SEL [No]
- Log EFI Status Codes [Error code]

3.2.8.2 View FRU information

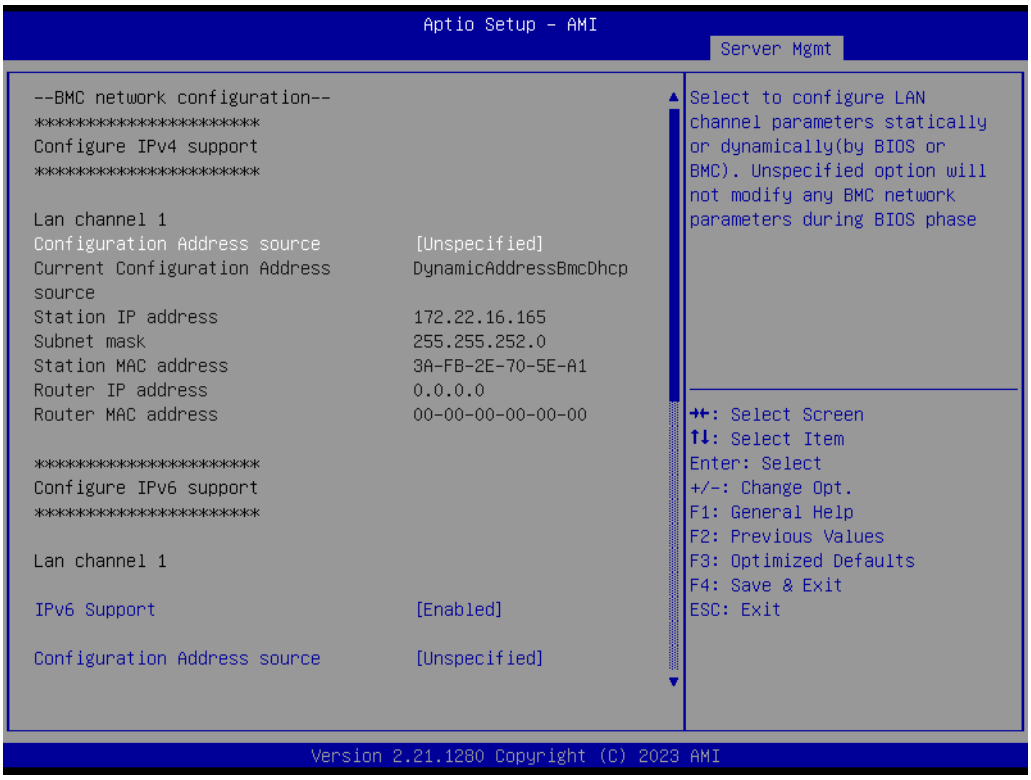


3.2.8.3 BMC Self Test Log



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

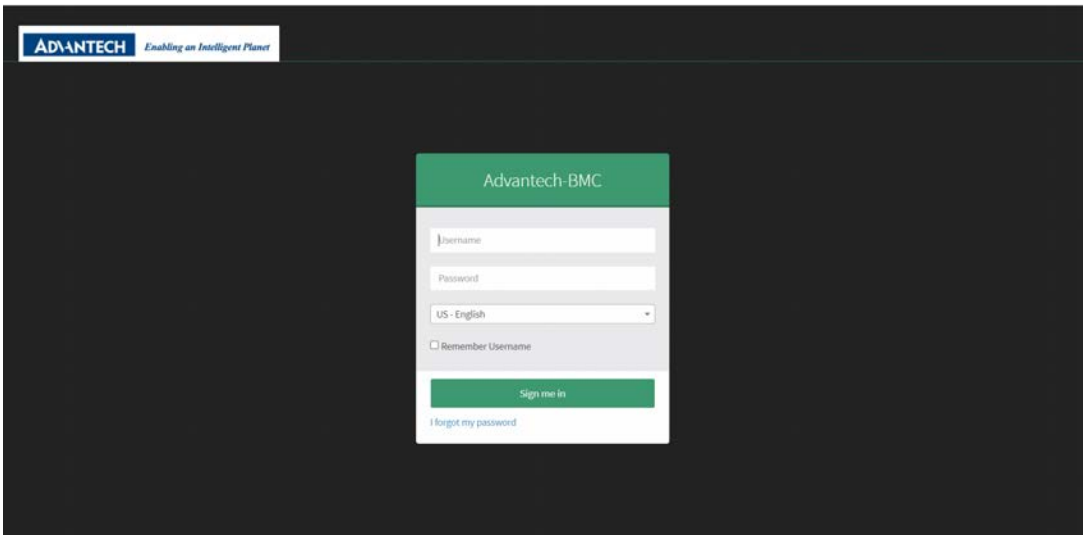
3.2.8.4 BMC Network Configuration



- Configuration Address Source
  Select to configure LAN channel parameters statically or dynamically (by BMC). The Unspecified option will not modify any BMC network parameters during the BIOS phase.

3.2.8.5 View System Event Log

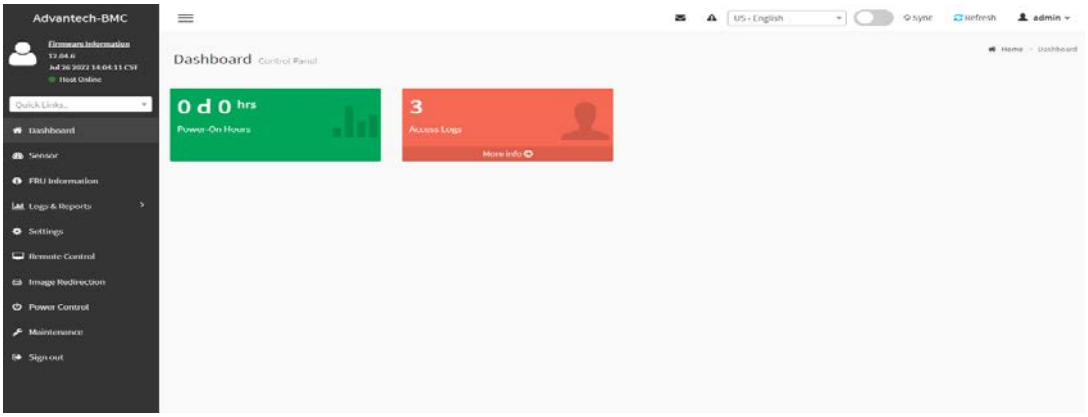
3.2.9 BMC - Setting of WEB Browser



- The user should check “Station IP address” of the BIOS menu (Section 3.8.4) before logging in the web browser and the URL should begin with “https://”
- Default user login
  Administrator: admin
  Password: admin
- It is mandatory to change the password for the default user at first successful login. Once the password is changed, the login page will be reloaded. Enter the username and modified password to log into the browser.
- Standard password format policies are enforced on the BMC. The password will need to include at least a capital letter, small capital letter, or special characters. The password management policies will also be enforced on the IPMI of the BMC interface.

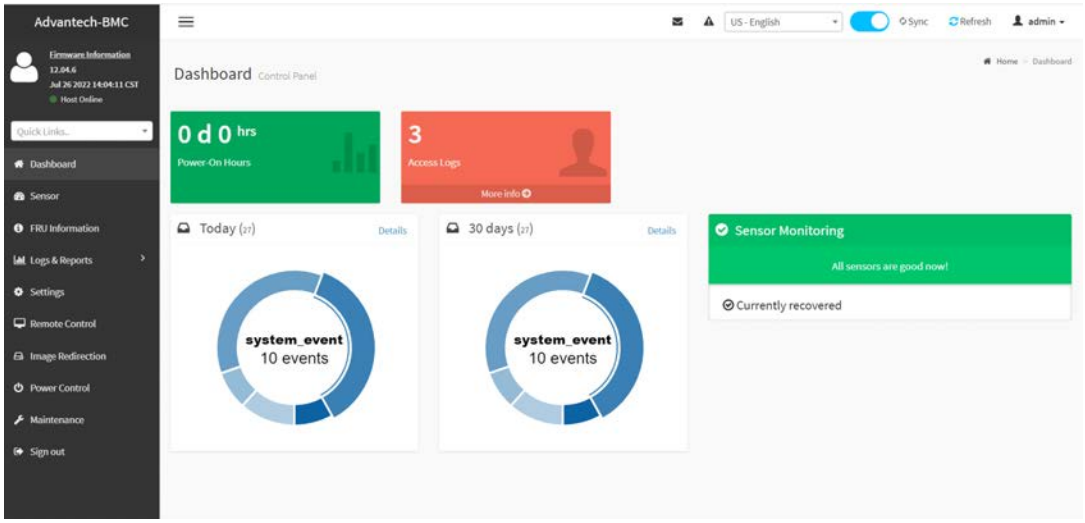
3.2.9.1 Dashboard Page

- OFF state



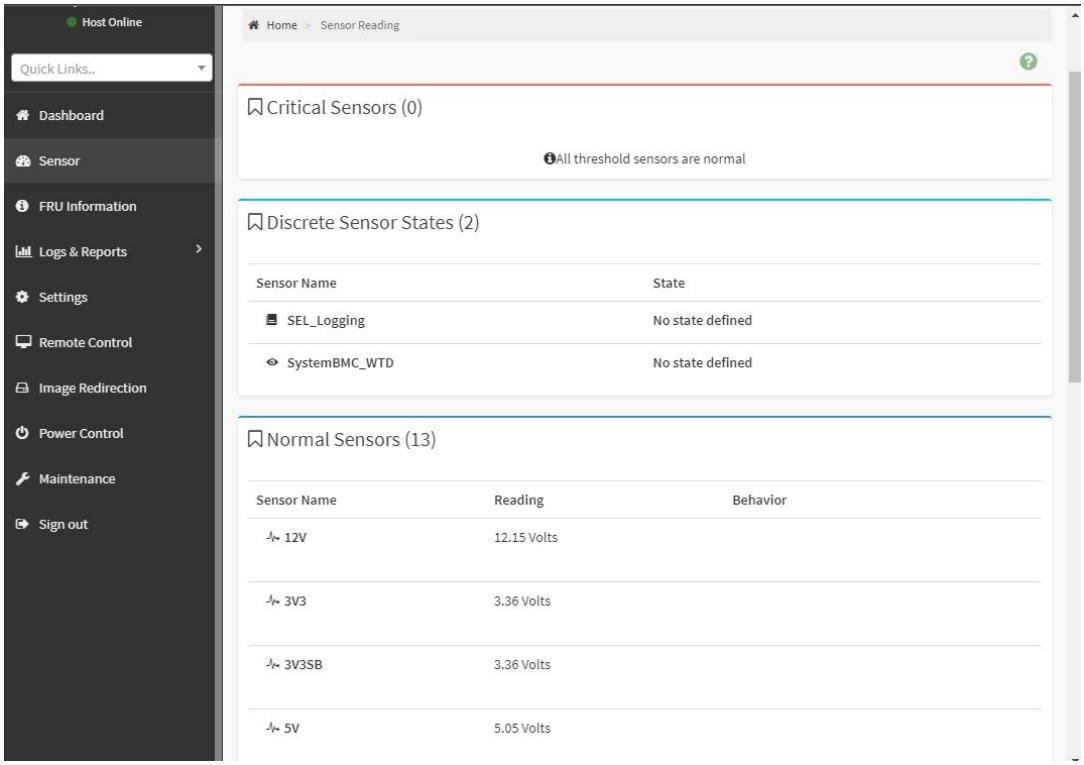
  – The dashboard page will show power-on hours and access log information only when the toggle button is in the OFF state. The area of power-on hours will keep on accumulating and it will reset to zero when the system is powered off, and access logs will show all events incurred by various sensors.

- ON state

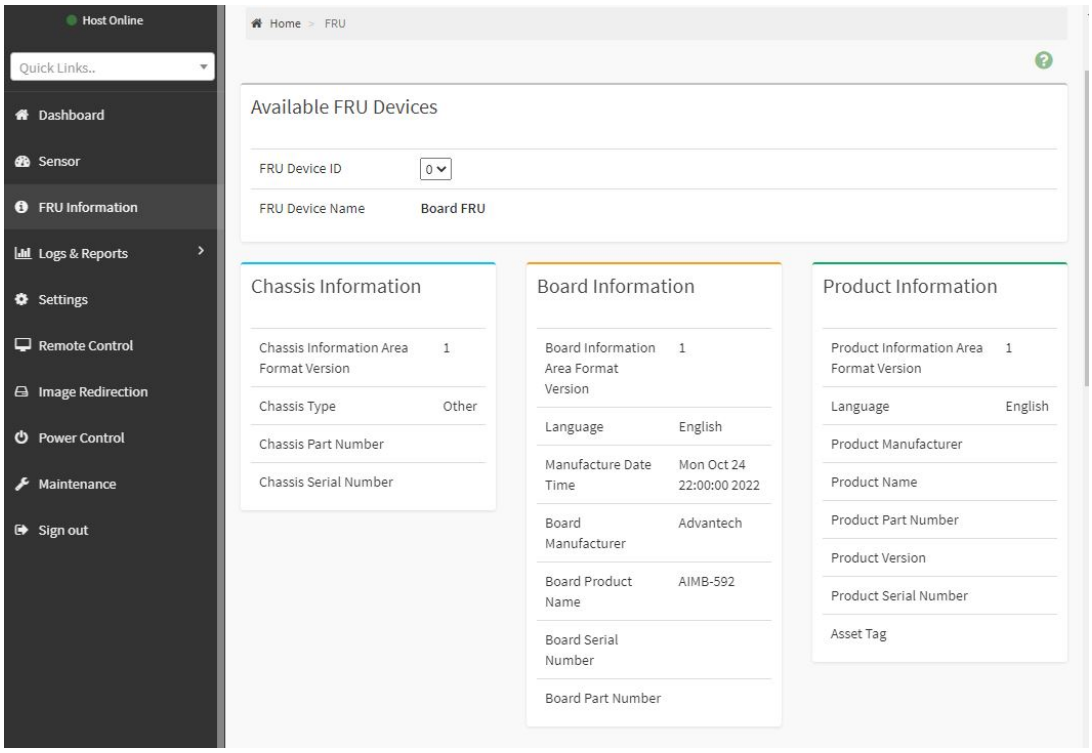


– When the toggle button is in the ON state, it will show ‘Today & 30 Days’ and ‘Sensor Monitoring’ information.

3.2.9.2 Sensor

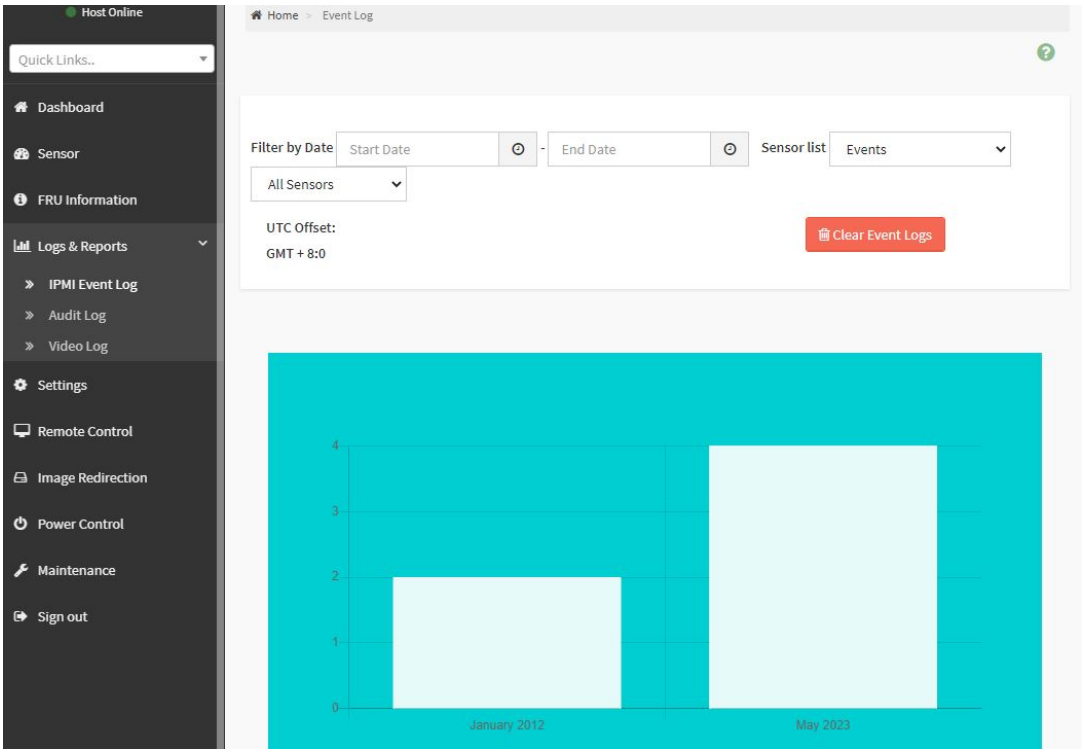


3.2.9.3 FRU Information

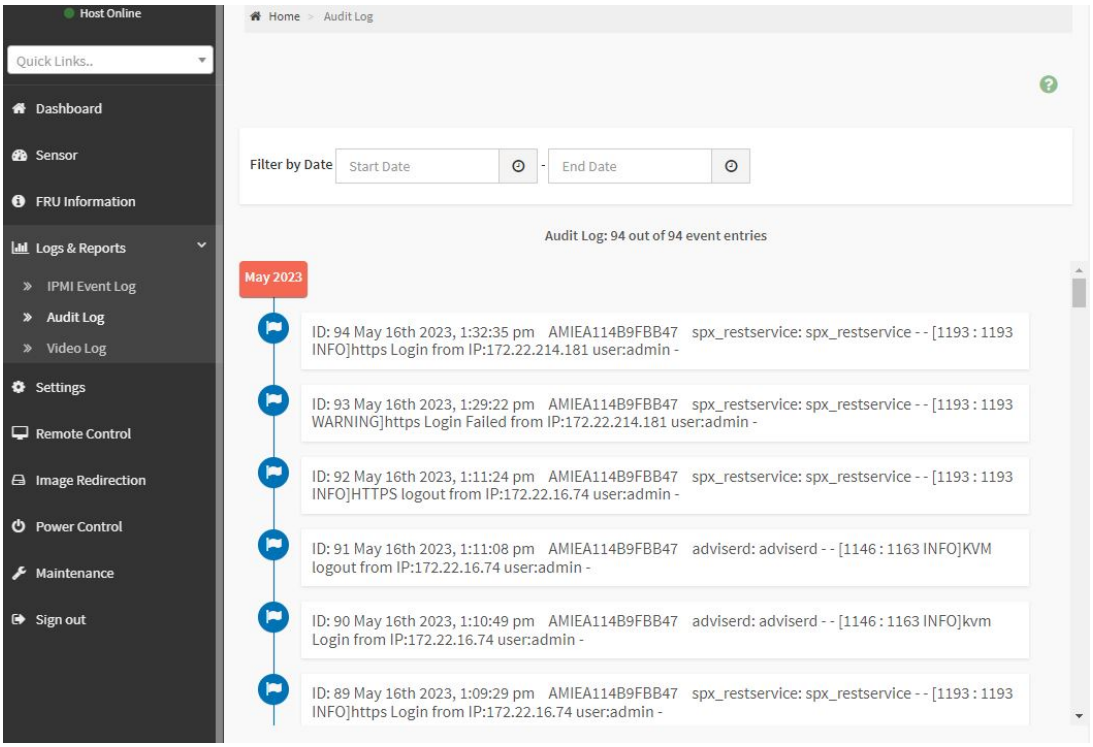


- Shows information of chassis, board or product information of a FRU device.

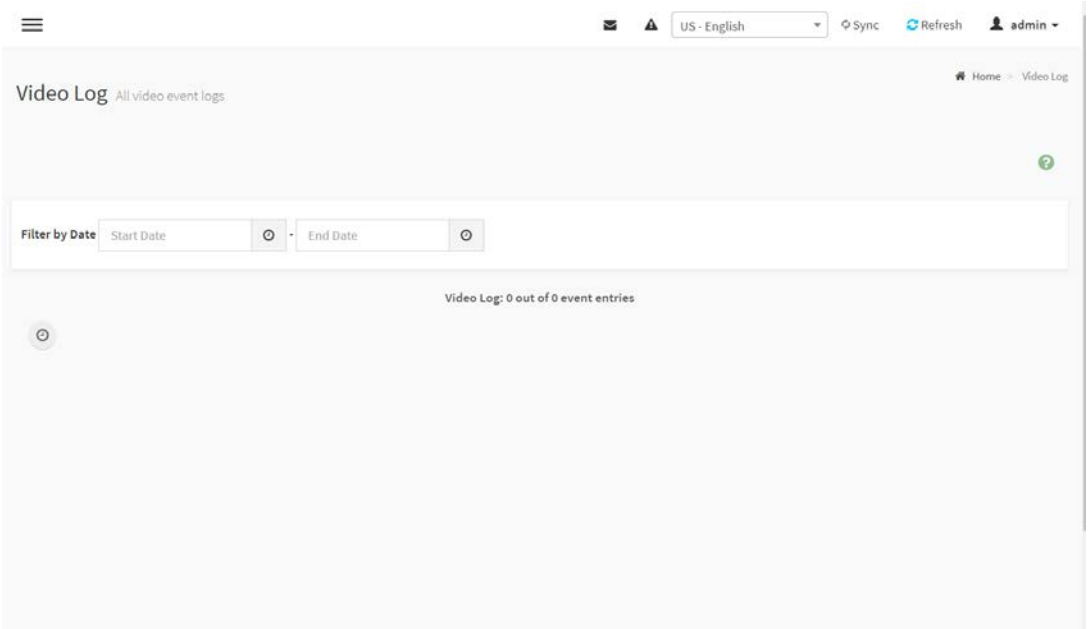
3.2.9.4 LOG & Reports - IPMI Event Log



3.2.9.5 LOG & Reports – Audit Log

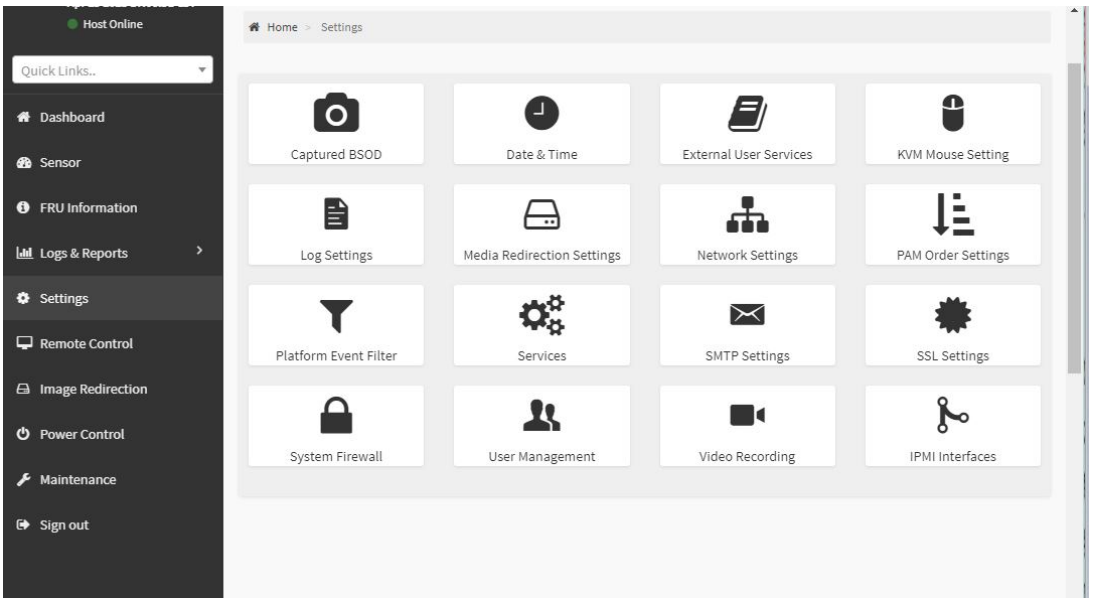


3.2.9.6 LOG & Reports – Video Log



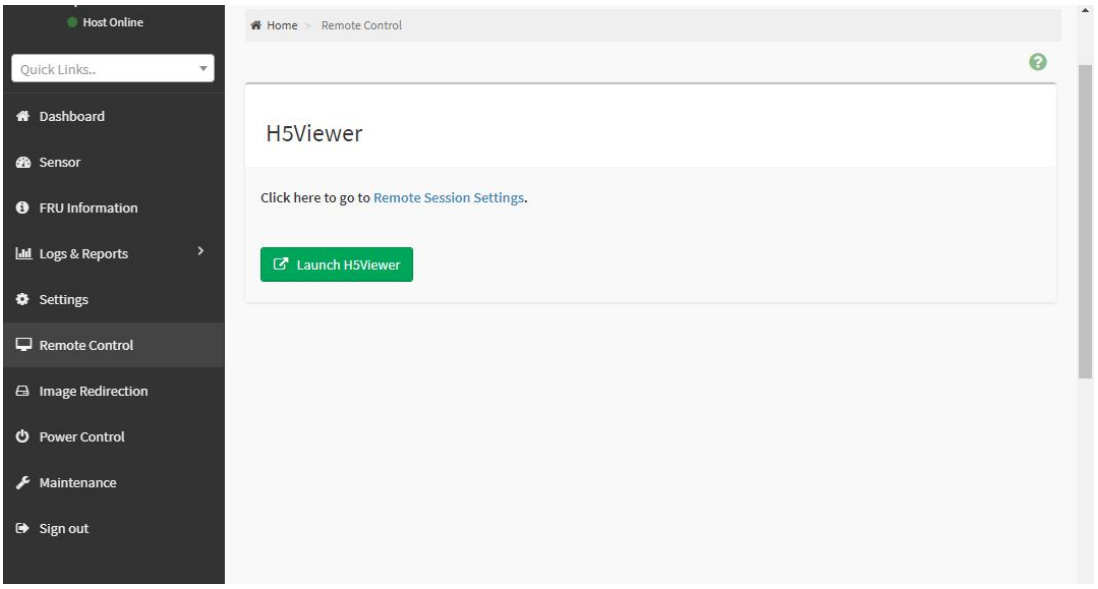
- This page will display the video log when “video trigger settings” is enabled, user can adjust under ““Setting -> Video Recording -> Auto Video Settings -> Video Trigger Settings” item.

3.2.9.7 Settings

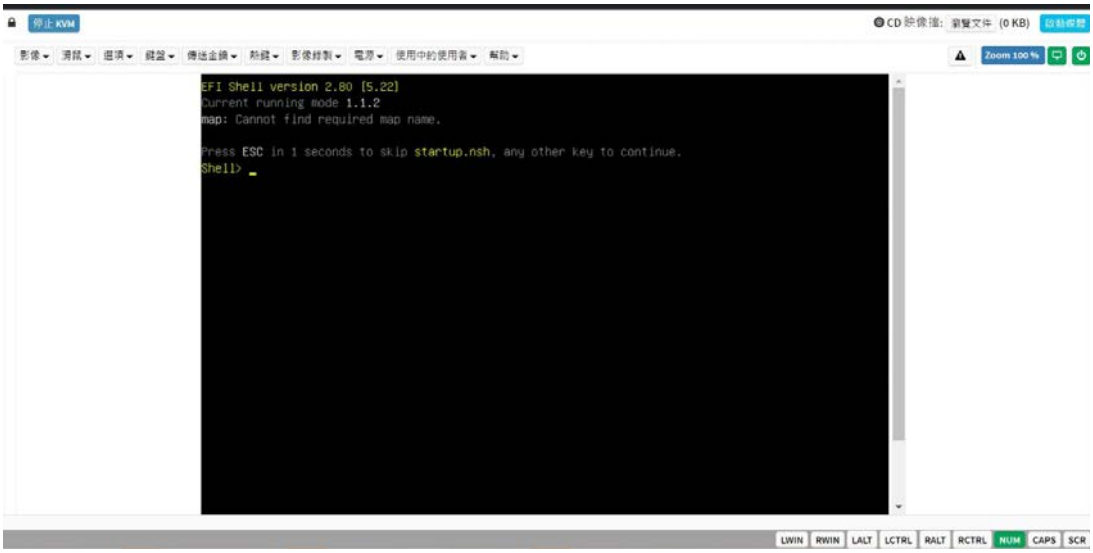


- Users can access various configuration settings through this page.

3.2.9.8 Remote Control

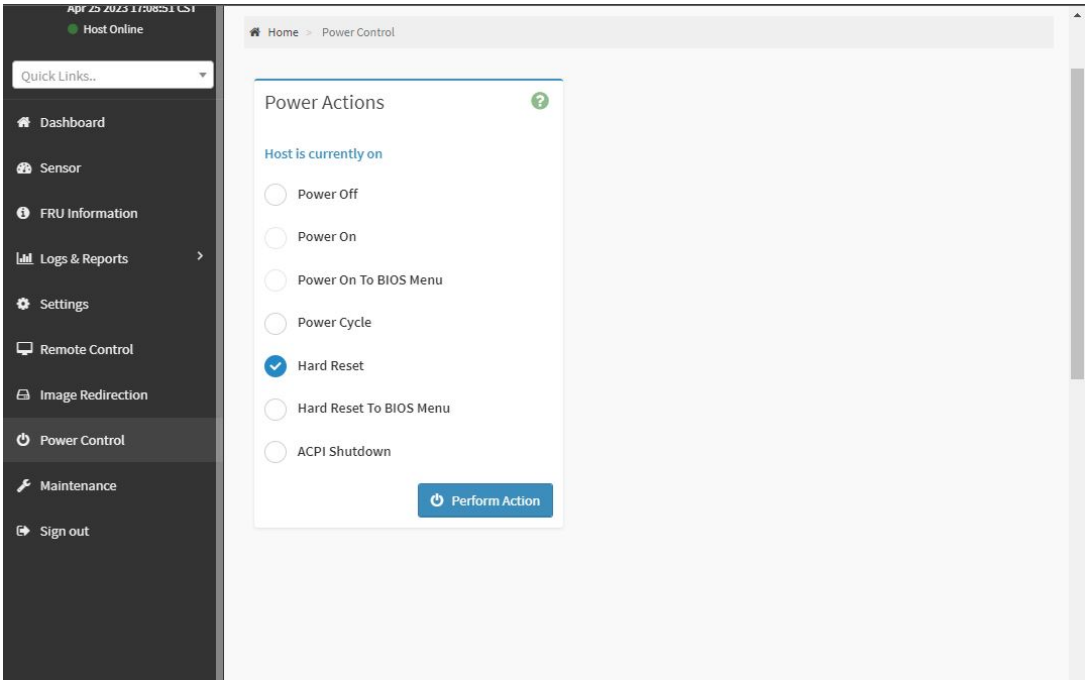


Remote Control – Launch H5viewer



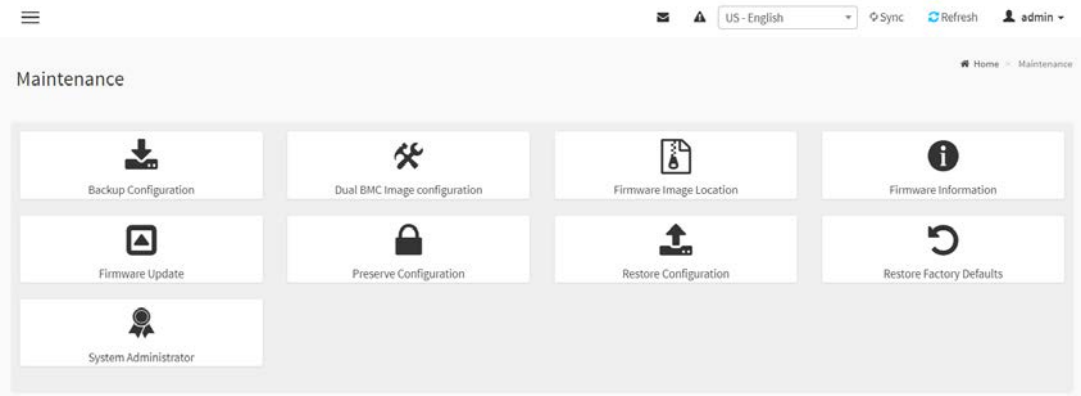
3.2.9.9 Image Redirection

3.2.9.10 Power Control



- This page allows the user to view and control the power of the system platform from a remote device.

3.2.9.11 Maintenance



Chapter 4

Software Introduction & Service

4.1 Introduction

The mission of Advantech Embedded Software Services is to "Enhance quality of life with Advantech platforms and Microsoft® Windows® embedded technology." We enable Windows® Embedded software products on Advantech platforms to more effectively support the embedded computing community. Customers are freed from the hassle of dealing with multiple vendors (hardware suppliers, system integrators, embedded OS distributors) for projects. Our goal is to make Windows® Embedded Software solutions easily and widely available to the embedded computing community.

4.2 Value-Added Software Services

Software API: An interface that allows application programs to request services from libraries and operating systems. It includes not only the necessary drivers but also a comprehensive set of user-friendly, intelligent, and integrated interfaces. This accelerates development, improves security, and adds value to Advantech platforms. Acting as a bridge between developers and their solutions, the API makes it easier to adopt and integrate Advantech embedded platforms with customer applications.

4.2.1 Software API

4.2.1.1 Control

GP I/O

General Purpose Input/Output is a flexible parallel interface that allows a variety of custom connections. It allows users to monitor the level of signal input or set the output status to switch on/off the device. Our API also provides Programmable GPIO, which allows developers to dynamically set the GPIO input or output status.

SMBus

SMBus is the System Management Bus defined by Intel Corporation in 1995. It is used in personal computers and servers for low-speed system management communications. The SMBus API allows a developer to interface with an embedded system environment and transfer serial messages using the SMBus protocols, allowing simultaneous control of multiple devices.

4.2.1.2 Display

Brightness Control

The Brightness Control API allows a developer to access embedded devices and easily control brightness.

Brightness Control

The Backlight API enables developers to turn the screen backlight on or off in embedded devices.

4.2.1.3 Monitor

Watchdog

A watchdog timer (WDT) is a device that performs a specific operation after a certain period of time if something goes wrong and the system does not recover on its own. A watchdog timer can be programmed to perform a warm boot (restarting the system) after a certain number of seconds.

Hardware Monitor

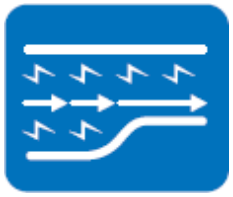
The Hardware Monitor (HWM) API is a system health supervision API that inspects certain condition indexes, such as fan speed, temperature and voltage.

4.2.1.4 Power Saving

CPU Speed

Makes use of Intel SpeedStep technology to save power consumption. The system will automatically adjust the CPU speed depending on the system loading.

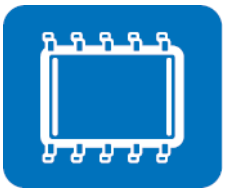
System Throtting



Refers to a series of methods for reducing power consumption in computers by lowering the clock frequency. This API allows the user to adjust the clock from 87.5% to 12.5%.

4.2.2 Software Utility

BIOS Flash



The BIOS Flash utility allows customers to update the flash ROM BIOS version, or use it to back up the current BIOS by copying it from the flash chip to a file on the customer's disk. The BIOS Flash utility also provides a command line version and an API for fast implementation into customized applications.

Monitoring

Monitoring is a utility for customers to monitor system health, like voltage, CPU and system temperature, and fan speed. These items are important to a device. If critical errors occur and are not solved immediately, permanent damage may occur.

Chapter 5

Chipset Software Installation Utility

5.1 Before You Begin

To facilitate the installation of the enhanced display drivers and utility software, read the instructions in this chapter carefully. The drivers for the AIMB-592 are available for download from the Advantech support website.

5.2 Introduction

The AMD Chipset Software Installation (CSI) utility installs the Windows INF files that outline to the operating system 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 2.0/3.2 support
- Identification of AMD chipset components in the Device Manager

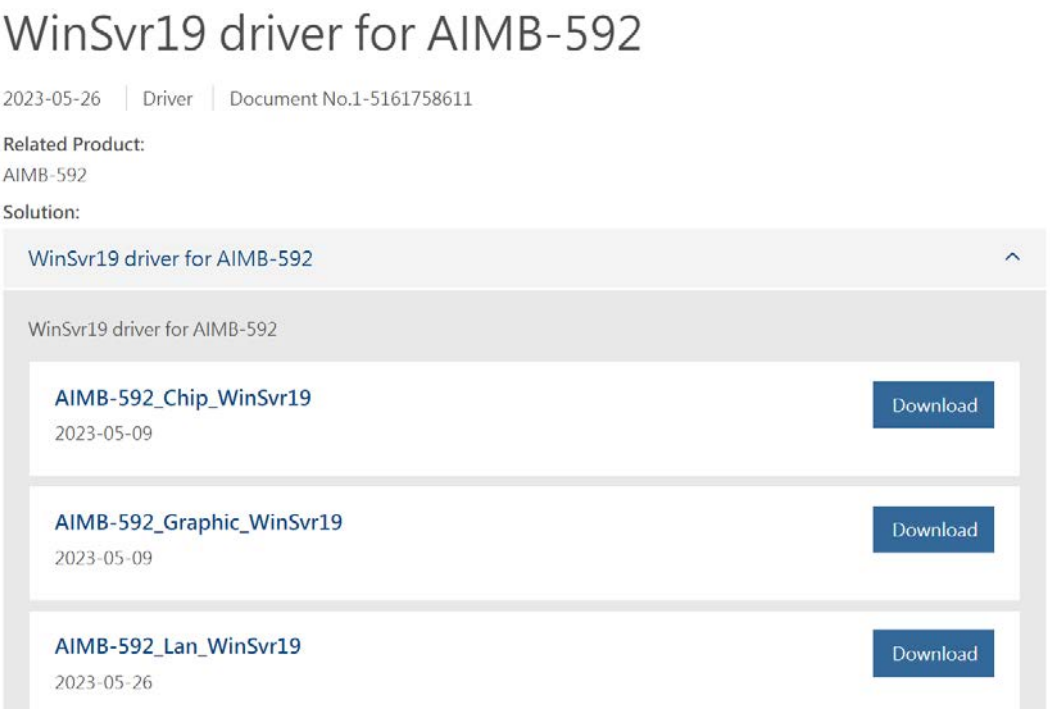
Note! *This utility is used for the following versions of Windows, and it has to be installed **before** installing all the other drivers:*

- *Windows Server 2019 Standard x64*
- *Windows Server 2016 Standard x64*

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

5.3 Windows Series Driver Setup

1. Visit the Advantech website and search for AIMB-592. There you can find the "Chip" driver available for download.



Chapter 6

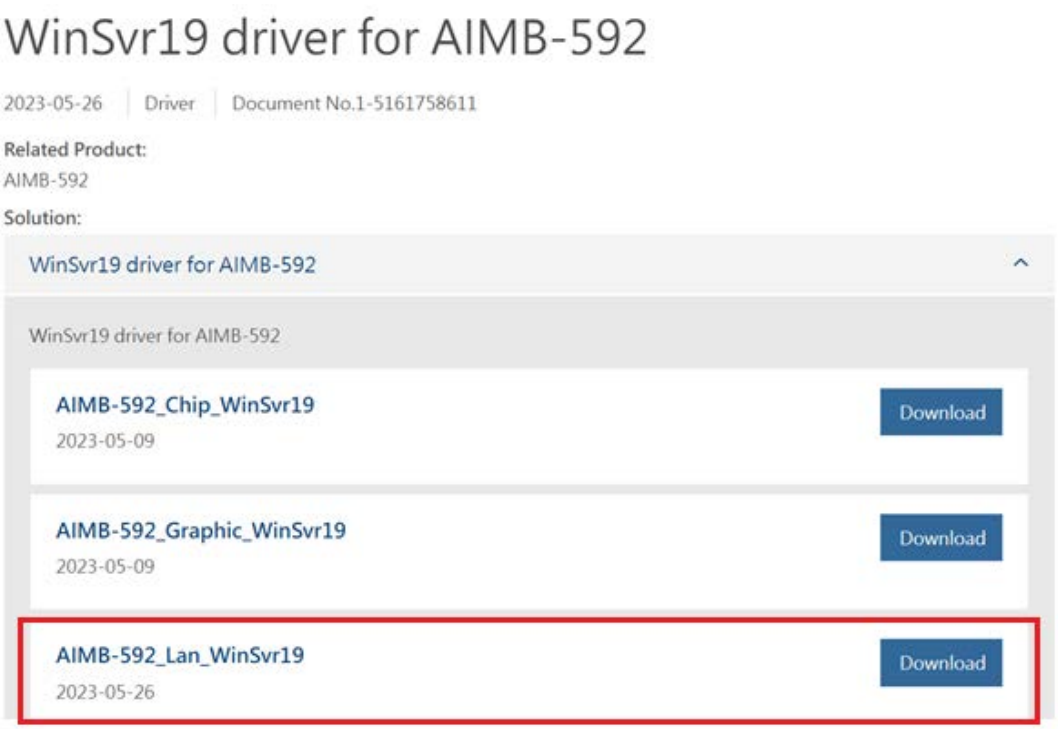
LAN Configuration

6.1 Introduction

The AIMB-592 features dual 2.5 Gigabit Ethernet LANs via dedicated PCI Express x1 lanes (Intel i226-LM for LAN1&2) that support 10/100/1000/2500 Mbps Ethernet and dual 10 Gigabit Ethernet LANs via dedicated PCI Express x4 lanes (Intel X550 for LAN3&4) that support 100/1000/10000 Mbps Ethernet.

6.2 Windows Series Driver Setup

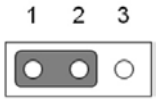
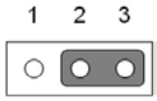
Visit the Advantech website and search for AIMB-592. You will see the "LAN" driver available for download.



Appendix A

Pin Assignments

A.1 CMOS Clear Jumper (JCMOS1)

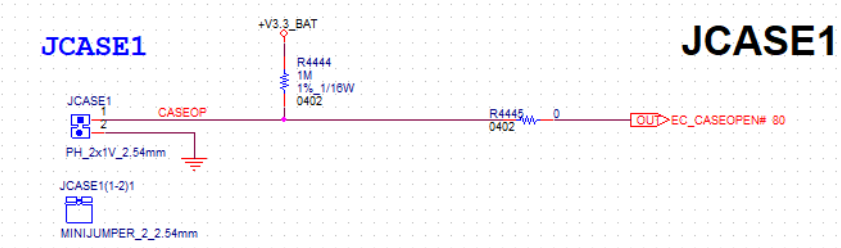
Table A.1: CMOS Clear Jumper (JCMOS1)	
Function	**Jumper Setting**
Keep COMS Data (Default)	
Clear CMOS Date	

Pin	Signal Pin Definition
1	+V1.5_RTC_JMP
2	+V1.5_RTC
3	GND

A.2 Front Panel1 + Front Panel2 Header (JFP1+JFP2)

Table A.2: Front Panel1 + Front Panel2 Header (JFP1+JFP2)			
Pin	**Signal Pin Definition**	**Pin**	**Signal Pin Definition**
1	FRP_SPK2	7	FRP_SPK3
2	+V3.3	8	HWM_SMB_DATA
3	FP_PWR_BTN_S#	9	FP_RST_BTN_S#
4		10	FRP_SPK4
5	SATA_LED#	11	HWM_SMB_CLK
6	GND	12	GND

A.3 Case Open Pin Header (JCASE1)



Case Open Pin Header (JCASE1)	
Pin	**Signal**
1	CASEOP
2	GND

A.4 ATX 12V IN Connector (ATX12V1/ ATX12V2)ATX/ AT Mode Selection (PSON1)

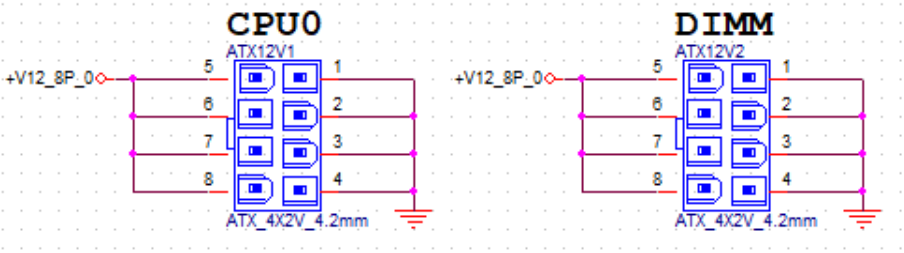


Table A.3: ATX 12V IN Connector (ATX12V1/ ATX12V2)ATX/AT Mode Selection (PSON1)

Pin	Signal	Pin	Signal
1	GND	5	+V12_8P_0
2	GND	6	+V12_8P_0
3	GND	7	+V12_8P_0
4	GND	8	+V12_8P_0

A.5 ATX 24-Pin IN Connector (ATXPWR1)

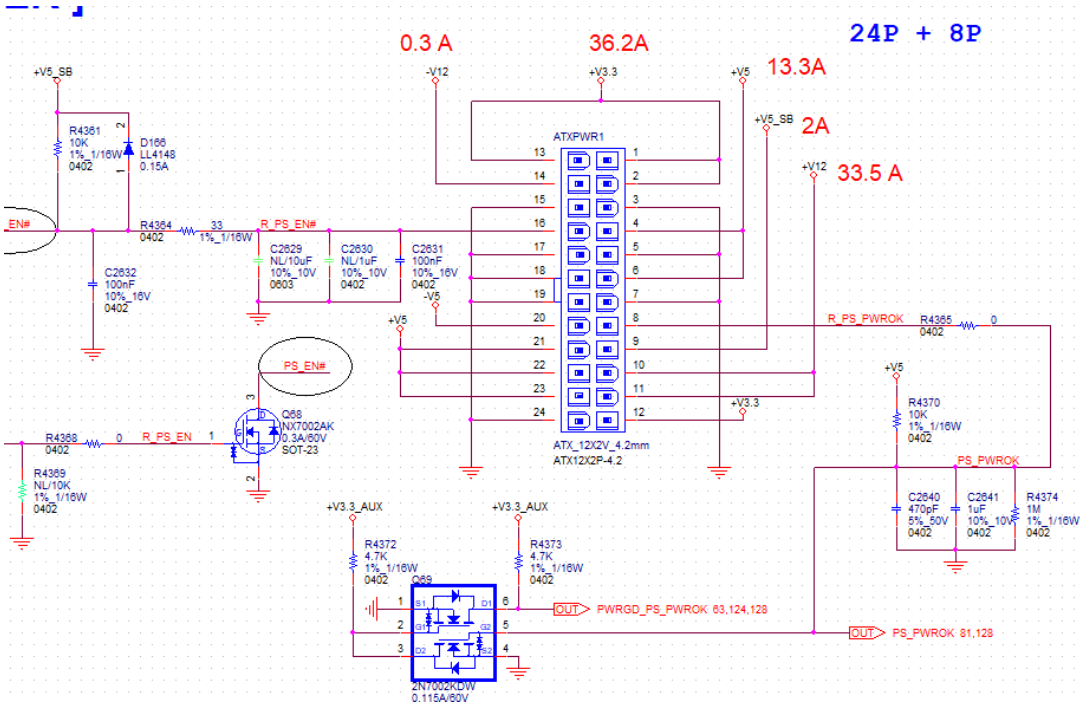


Table A.4: ATX 24-Pin IN Connector (ATXPWR1)			
Pin	**Signal**	**Pin**	**Signal**
1	+V3.3	13	+V3.3
2	+V3.3	14	-V12
3	GND	15	GND
4	+V5	16	PS_ON#
5	GND	17	GND
6	+V5	18	GND
7	GND	19	GND
8	PWR_OK	20	-V5
9	+V5_SB	21	+V5
10	+V12	22	+V5
11	+V12	23	+V5
12	+V3.3	24	GND

A.6 GPIO header (GPIO1)

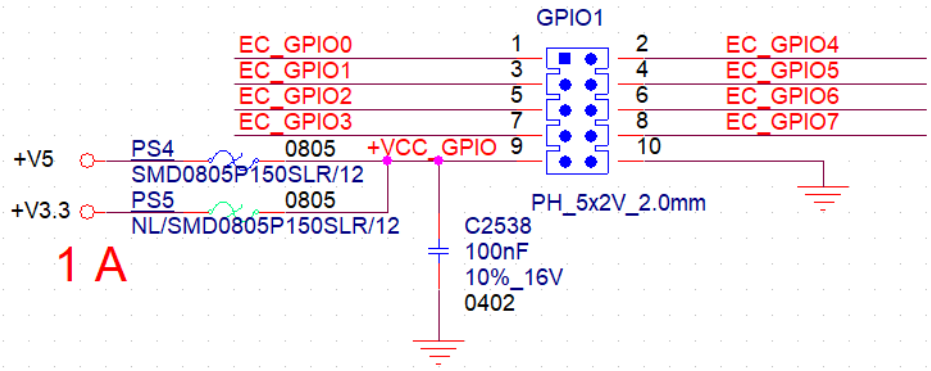


Table A.5: GPIO Header (GPIO1)			
Pin	**Signal**	**Pin**	**Signal**
1	**EC_GPIO0**	**2**	**EC_GPIO4**
3	**EC_GPIO1**	**4**	**EC_GPIO5**
5	**EC_GPIO2**	**6**	**EC_GPIO6**
7	**EC_GPIO3**	**8**	**EC_GPIO7**
9	**+V5**	**10**	**GND**

A.7 EC Programing Header (SCN1)

Table A.6: EC Programing Header (SCN1)

Pin	Signal	Pin	Signal
1	GND	2	RDC_TMS
3	GND	4	RDC_TDI
5	GND	6	RDC_TDO
7	GND	8	RDC_TCK
9	GND	10	GND
11	GND	12	SPI_RDC_CLK

A.8 System FAN Connector (SYSFAN1/SYSFAN2/ SYSFAN3/SYSFAN4)

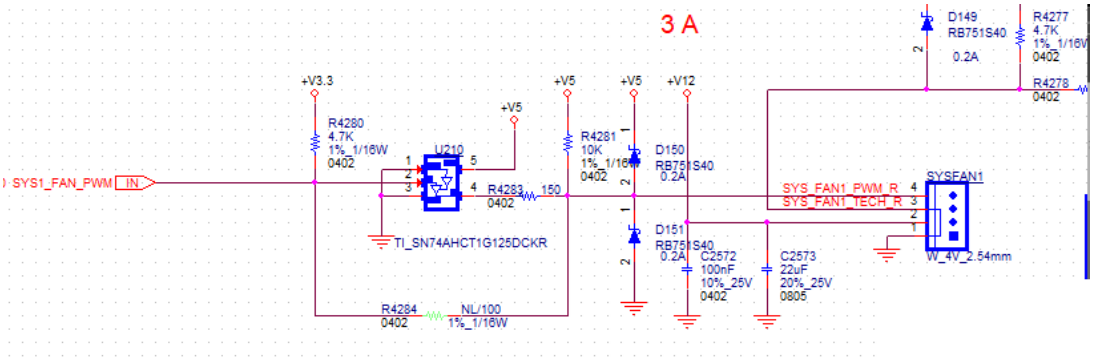


Table A.7: System FAN Connector (SYSFAN1)

Pin	Signal
1	GND
2	+V12
3	SYS1_FAN_TACH
4	SYS_FAN1_PWM

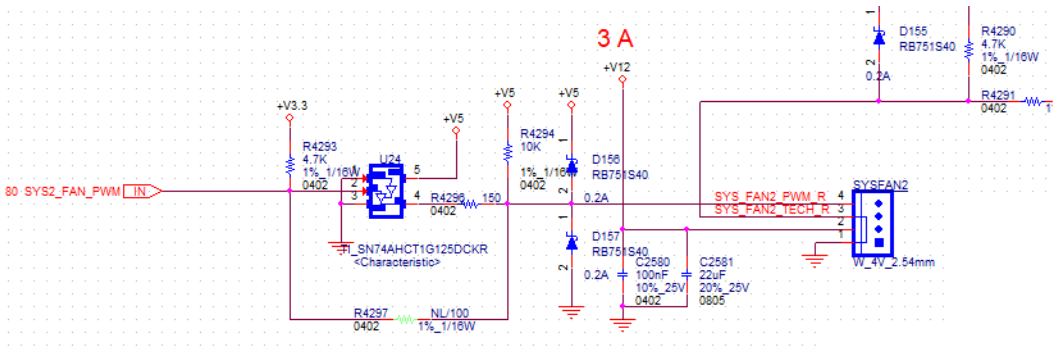


Table A.8: System FAN Connector (SYSFAN2)	
Pin	**Signal**
1	GND
2	+V12
3	SYS2_FAN_TACH
4	SYS2_FAN_PWM

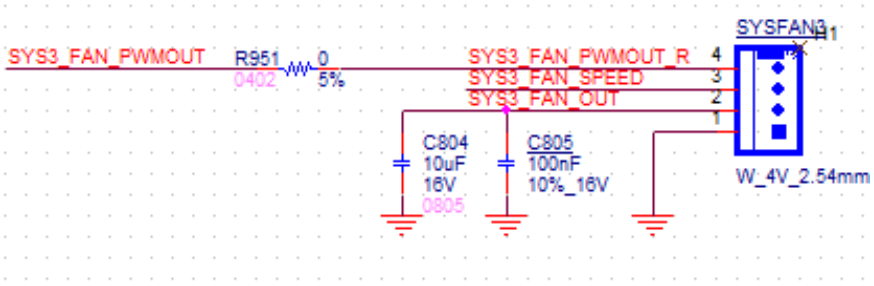


Table A.9: System FAN Connector (SYSFAN3)	
Pin	**Signal**
1	GND
2	SYS3_FAN_OUT
3	SYS3_FAN_SPEED
4	SYS3_FAN_PWMOUT

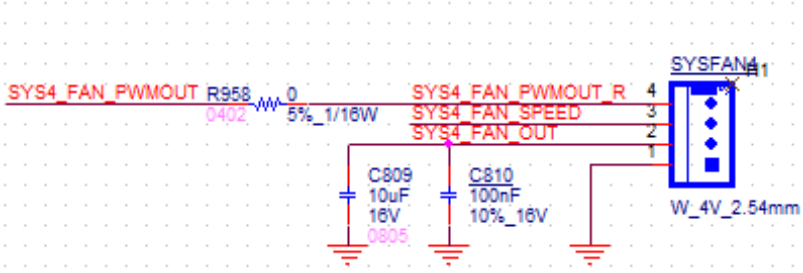


Table A.10: System FAN Connector (SYSFAN4)	
Pin	**Signal**
1	GND
2	SYS4_FAN_OUT
3	SYS4_FAN_SPEED
4	SYS4_FAN_PWMOUT

A.9 CPU FAN Connector (CPUFAN1)

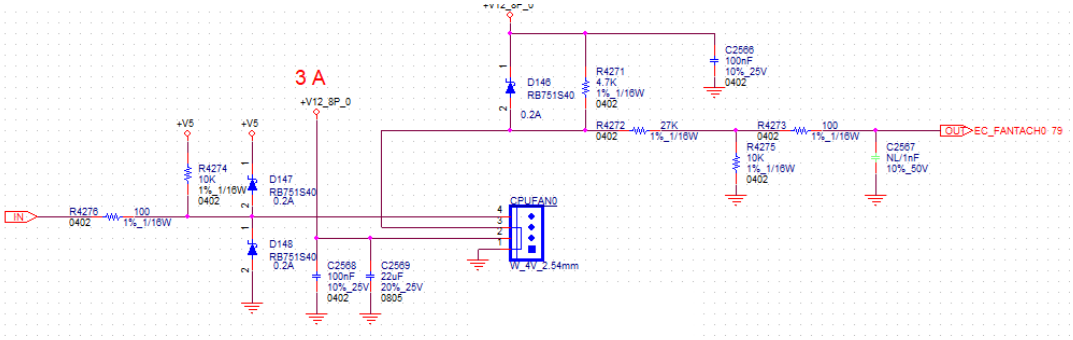


Table A.11: CPU FAN Connector (CPUFAN1)	
Pin	**Signal**
1	GND
2	+V12_8P_0
3	EC_FANTACH0
4	EC_CPU_PWM

A.10 Serial GPIO (SGPIO1)

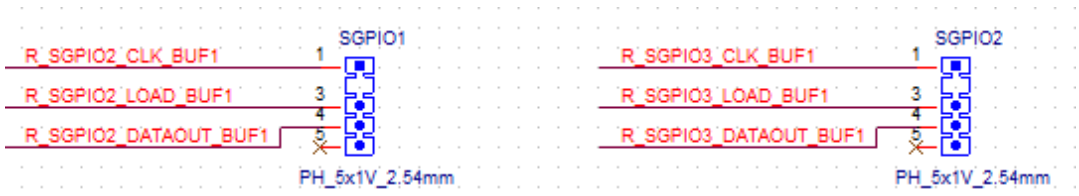


Table A.12: Serial GPIO (SGPIO1)

Pin	Signal
1	R_SGPIO_CLK_BUF1
2	
3	R_SGPIO_LOAD_BUF1
4	R_SGPIO_DATAOUT_BUF1
5	

A.11 System Error LED Wafer (BMC_SYSLED1)

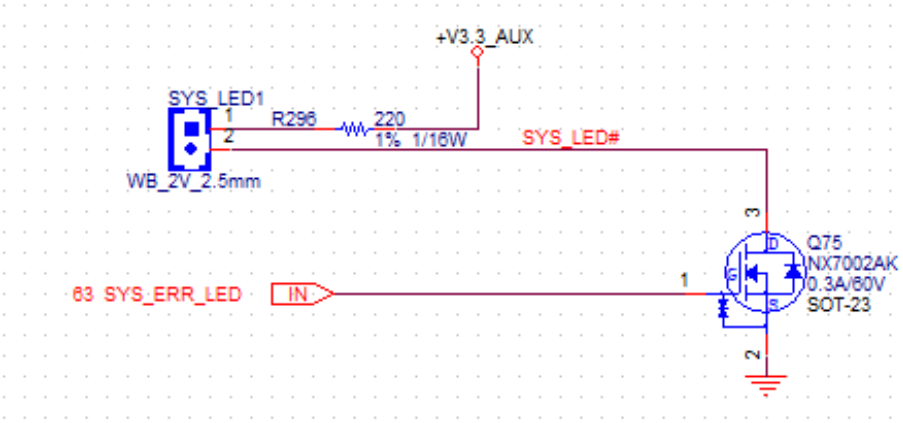


Table A.13: System Error LED Wafer (BMC_SYSLED1)

Pin	Signal
1	+V3.3_AUX
2	SYS_LED#

A.12 PMBus Wafer (PMBUS1)

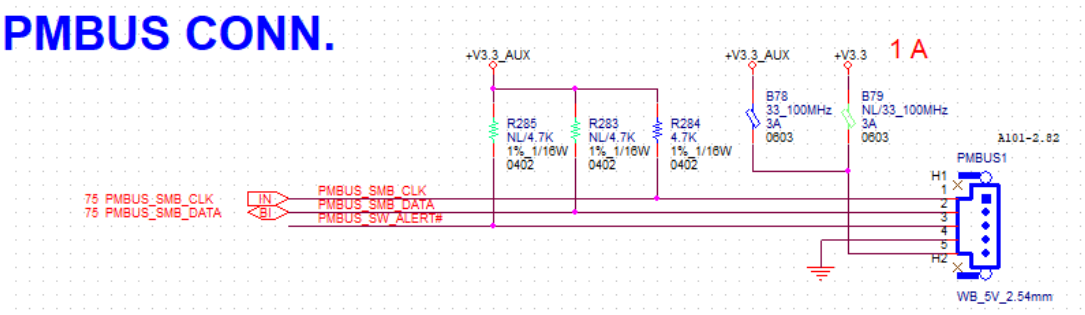


Table A.14: PMBus Wafer (PMBUS1)

Pin	Signal
1	PMBUS_SMB_CLK
2	PMBUS_SMB_DATA
3	PMBUS_SW_ALERT#
4	GND
5	+V3.3_AUX

A.13 HW SMBUS (SMBUS1)

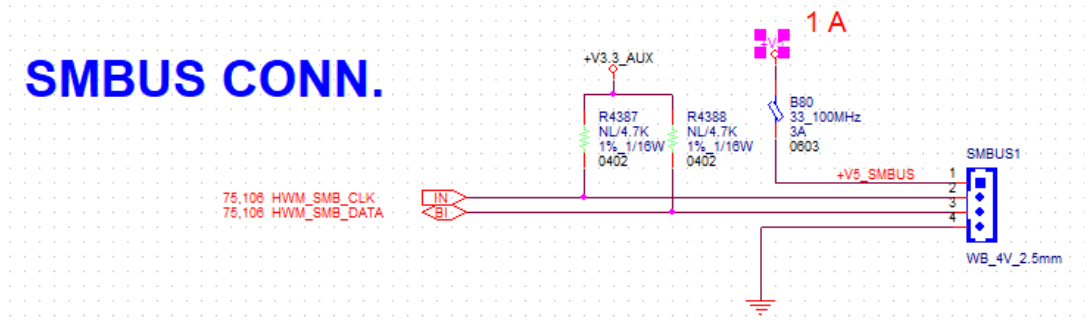


Table A.15: HW SMBUS (SMBUS1)

Pin	Signal
1	+V5
2	HWM_SMB_CLK
3	HWM_SMB_DATA
4	GND

A.14 Front Panel3 (JFP3)

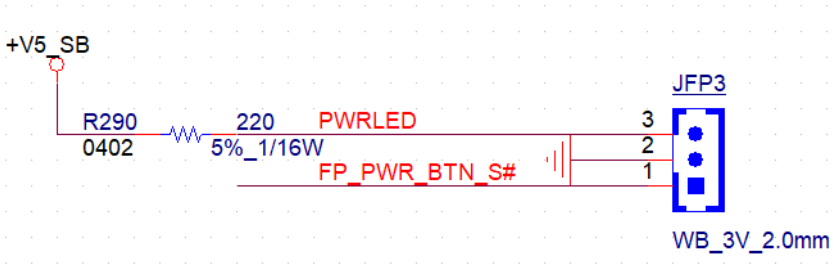


Table A.16: Front Panel3 (JFP3)	
Pin	**Signal**
1	FP_PWR_BTN_S#
2	GND
3	+V5_SB

A.15 Graphics Card 12V slot (SLOT12V1)

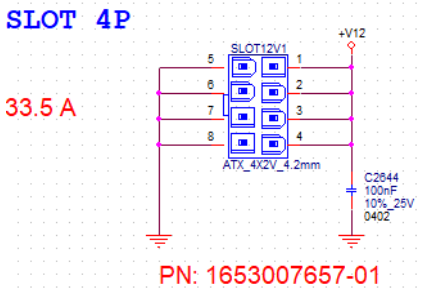


Table A.17: Graphics Card 12V slot (SLOT12V1)			
Pin	**Signal**	**Pin**	**Signal**
1	+V12	5	GND
2	+V12	6	GND
3	+V12	7	GND
4	GND	8	GND

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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.