Lanner

Edge Computing Appliance Platform

Hardware Platforms for Edge Computing

ECA-5540
User Manual

Version: 1.4

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About this Document

This manual describes the overview of the various functionalities of this product, and the information you need to get it ready for operation. It is intended for those who are:

- responsible for installing, administering and troubleshooting this system or Information Technology professionals.
- assumed to be qualified in the servicing of computer equipment, such as professional system integrators, or service personnel and technicians.

The latest version of this document can be found on Lanner's official website, available either through the product page or through the Lanner Download Center page with a login account and password.

Conventions & Icons

The icons are used in the manual to serve as an indication of interest topics or important messages.

Icon	Usage
 **Note or Information**	This mark indicates that there is something you should pay special attention to while using the product.
 **Warning or Important**	This mark indicates that there is a caution or warning and it is something that could damage your property or product.

Online Resources

To obtain additional documentation resources and software updates for your system, please visit the Lanner Download Center. As certain categories of documents are only available to users who are logged in, please be registered for a Lanner Account at http://www.lannerinc.com/ to access published documents and downloadable resources.

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In addition to contacting your distributor or sales representative, you could submit a request at our **Lanner Technical Support** and fill in a support ticket to our technical support department.

Documentation Feedback

Your feedback is valuable to us, as it will help us continue to provide you with more accurate and relevant documentation. To provide any feedback, comments or to report an error, please email contact@lannerinc.com. Thank you for your time.

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Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of 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 instruction, 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.

FCC Caution

- Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.
- This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Note

1. An unshielded-type power cord is required in order to meet FCC emission limits and also to prevent interference to the nearby radio and television reception. It is essential that only the supplied power cord be used.
2. Use only shielded cables to connect I/O devices to this equipment.
3. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Important

1. Operations in the 5.15-5.25GHz band are restricted to indoor usage only.
2. This device meets all the other requirements specified in Part 15E, Section 15.407 of the FCC Rules.

Safety Guidelines

Follow these guidelines to ensure general safety:

- Keep the chassis area clear and dust-free during and after installation.
- Do not wear loose clothing or jewelry that could get caught in the chassis. Fasten your tie or scarf and roll up your sleeves.
- Wear safety glasses if you are working under any conditions that might be hazardous to your eyes.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.
- Disconnect all power by turning off the power and unplugging the power cord before installing or removing a chassis or working near power supplies
- Do not work alone if potentially hazardous conditions exist.
- Never assume that power is disconnected from a circuit; always check the circuit.

Consignes de sécurité

Suivez ces consignes pour assurer la sécurité générale :

- Laissez la zone du châssis propre et sans poussière pendant et après l'installation.
- Ne portez pas de vêtements amples ou de bijoux qui pourraient être pris dans le châssis. Attachez votre cravate ou écharpe et remontez vos manches.
- Portez des lunettes de sécurité pour protéger vos yeux.
- N'effectuez aucune action qui pourrait créer un danger pour d'autres ou rendre l'équipement dangereux.
- Coupez complètement l'alimentation en éteignant l'alimentation et en débranchant le cordon d'alimentation avant d'installer ou de retirer un châssis ou de travailler à proximité de sources d'alimentation.
- Ne travaillez pas seul si des conditions dangereuses sont présentes.
- Ne considérez jamais que l'alimentation est coupée d'un circuit, vérifiez toujours le circuit. Cet appareil génère, utilise et émet une énergie radiofréquence et, s'il n'est pas installé et utilisé conformément aux instructions des fournisseurs de composants sans fil, il risque de provoquer des interférences dans les communications radio.

Lithium Battery Caution

- There is risk of explosion if the battery is replaced by an incorrect type.
- Dispose of used batteries according to the instructions.
- Installation should be conducted only by a trained electrician or only by an electrically trained person who knows all installation procedures and device specifications which are to be applied.
- Do not carry the handle of power supplies when moving to another place.
- Please conform to your local laws and regulations regarding safe disposal of lithium battery.
- Disposal of a battery into fire or a hot oven, or mechanically crushing or cutting of a battery can result in an explosion.
- Leaving a battery in an extremely high temperature environment can result in an explosion or the leakage of flammable liquid or gas.
- A battery subjected to extremely low air pressure may result in an explosion or the leakage of flammable liquid or gas.
- CAUTION: Risk of Explosion if Battery is replaced by an Incorrect Type. Dispose of Used Batteries According to the Instructions."

Avertissement concernant la pile au lithium

- Risque d'explosion si la pile est remplacée par une autre d'un mauvais type.
- Jetez les piles usagées conformément aux instructions.
- L'installation doit être effectuée par un électricien formé ou une personne formée à l'électricité connaissant toutes les spécifications d'installation et d'appareil du produit.
- Ne transportez pas l'unité en la tenant par le câble d'alimentation lorsque vous déplacez l'appareil.
- ATTENTION: Risque d'explosion si la batterie est remplacée par un type incorrect. Mettre au rebus les batteries usagées selon les instructions."

Operating Safety

- Electrical equipment generates heat. Ambient air temperature may not be adequate to cool equipment to acceptable operating temperatures without adequate circulation. Be sure that the room in which you choose to operate your system has adequate air circulation.
- Ensure that the chassis cover is secure. The chassis design allows cooling air to circulate effectively. An open chassis permits air leaks, which may interrupt and redirect the flow of cooling air from internal components.
- Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. ESD damage occurs when electronic components are improperly handled and can result in complete or intermittent failures. Be sure to follow ESD-prevention procedures when removing and replacing components to avoid these problems.
- Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. If no wrist strap is available, ground yourself by touching the metal part of the chassis.
- Periodically check the resistance value of the antistatic strap, which should be between 1 and 10 megohms (Mohms).
- Product shall be used with Class 1 laser device modules.
- The unit is only for Skilled person to install and maintenance
- The device can only be used in a fixed location such as a lab or a machine room. When you install the device, ensure that the protective earthing connection of the socket-outlet is verified by a skilled person.

Sécurité de fonctionnement

- L'équipement électrique génère de la chaleur. La température ambiante peut ne pas être adéquate pour refroidir l'équipement à une température de fonctionnement acceptable sans circulation adaptée. Vérifiez que votre site propose une circulation d'air adéquate.
- Vérifiez que le couvercle du châssis est bien fixé. La conception du châssis permet à l'air de refroidissement de bien circuler. Un châssis ouvert laisse l'air s'échapper, ce qui peut interrompre et rediriger le flux d'air frais destiné aux composants internes.
- Les décharges électrostatiques (ESD) peuvent endommager l'équipement et gêner les circuits électriques. Des dégâts d'ESD surviennent lorsque des composants électroniques sont mal manipulés et peuvent causer des pannes totales ou intermittentes. Suivez les procédures de prévention d'ESD lors du retrait et du remplacement de composants.
- Portez un bracelet anti-ESD et veillez à ce qu'il soit bien au contact de la peau. Si aucun bracelet n'est disponible, reliez votre corps à la terre en touchant la partie métallique du châssis.
- Vérifiez régulièrement la valeur de résistance du bracelet antistatique, qui doit être comprise entre 1 et 10 mégohms (Mohms).
- Le produit doit être utilisé avec des modules de dispositifs laser de classe 1.
- Cette machine est réservée aux techniciens à installer et à entretenir
- L'appareil ne peut être utilisé que dans un lieu fixe, tel qu'un laboratoire ou une salle de machines. Lorsque vous installez l'appareil, assurez-vous que le raccordement à la terre de protection de la prise de courant a fait l'objet d'une vérification par une personne qualifiée.

Mounting Installation Precautions

The following should be put into consideration for rack-mount or similar mounting installations:

- Do not install and/or operate this unit in any place that flammable objects are stored or used in.
- The installation of this product must be performed by trained specialists; otherwise, a non-specialist might create the risk of the system's falling to the ground or other damages.
- Lanner Electronics Inc. shall not be held liable for any losses resulting from insufficient strength for supporting the system or use of inappropriate installation components.
- Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient

temperature (Tma) specified by the manufacturer.

- Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of airflow required for safe operation of the equipment is not compromised.
- Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- Reliable Grounding - Reliable grounding of rack mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

Installation & Operation

- This equipment must be grounded. The power cord for product should be connected to a socket-outlet with earthing connection.
  Cet équipement doit être mis à la terre. La fiche d'alimentation doit être connectée à une prise de terre correctement câblée

- Suitable for installation in Information Technology Rooms in accordance with Article 645 of the National Electrical Code and NFPA 75.
  Peut être installé dans des salles de matériel de traitement de l'information conformément à l'article 645 du National Electrical Code et à la NFPA 75.

- The machine can only be used in a restricted access location and must be installed by a skilled person.
  Les matériels sont destinés à être installés dans des EMPLACEMENTS À ACCÈS RESTREINT.

Warning

Class I Equipment. This equipment must be earthed. The power plug must be connected to a properly wired earth ground socket outlet. An improperly wired socket outlet could place hazardous voltages on accessible metal parts.
"Product shall be used with Class 1 laser device modules."

Avertissement

Équipement de classe I. Ce matériel doit être relié à la terre. La fiche d'alimentation doit être raccordée à une prise de terre correctement câblée. Une prise de courant mal câblée pourrait induire des tensions dangereuses sur des parties métalliques accessibles.
"Le produit doit être utilisé avec des modules de dispositifs laser de classe 1."

Electrical Safety Instructions

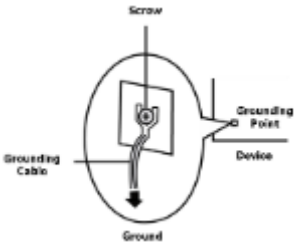
Before turning on the device, ground the grounding cable of the equipment. Proper grounding (grounding) is very important to protect the equipment against the harmful effects of external noise and to reduce the risk of electrocution in the event of a lightning strike. To uninstall the equipment, disconnect the ground wire after turning off the power. A ground wire is required and the part connecting the conductor must be greater than 4 mm2 or 10 AWG.

Consignes de sécurité électrique

- Avant d'allumer l'appareil, reliez le câble de mise à la terre de l'équipement à la terre.
- Une bonne mise à la terre (connexion à la terre) est très importante pour protéger l'équipement contre les effets néfastes du bruit externe et réduire les risques d'électrocution en cas de foudre.
- Pour désinstaller l'équipement, débranchez le câble de mise à la terre après avoir éteint l'appareil.
- Un câble de mise à la terre est requis et la zone reliant les sections du conducteur doit faire plus de 4 mm2 ou 10 AWG.

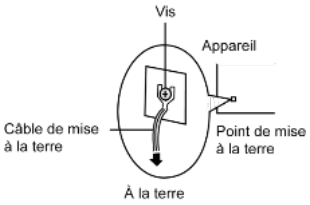
Grounding Procedure for DC Power Source

- Connect the grounding cable to the ground.
- The protection device for the DC power source must provide 30 A current.
- This protection device must be connected to the power source before DC power.



Procédure de mise à la terre pour source d'alimentation CC

- Branchez le câble de mise à la terre à la terre.
- L'appareil de protection pour la source d'alimentation CC doit fournir 30 A de courant.
- Cet appareil de protection doit être branché à la source d'alimentation avant l'alimentation CC.



Instruction for the installation of the conductor to building earth by a skilled person.

Table of Contents

CHAPTER 1: PRODUCT OVERVIEW

Lanner's ECA-5540 offers a scalable, high-performance platform for telecom operators to build and deploy 5G radio access networks that are open, efficient, and secure. The appliance is specifically designed for distributed/centralized RAN deployments and enables operators to enable multi-access edge computing and services with ease.

Main Features

- 5th Gen Intel® Xeon® Scalable Processors
- Intel® vRAN Boost Support
- Short Depth Chassis and Front I/O Design
- 16x DDR5 4000MHz RDIMM, Max. 1024GB
- 1x OCP 3.0 NIC Module
- 1x M.2 NVMe 2280, 1x M.2 NVMe 2242/2260, 2x 2.5" SATA/ U.2
- 1x FHFL PCIe *16 Slot, 2x LP or 1x FHHL Slot (PCIE*8)
- Secure IPMI and TPM 2.0 Module onboard
- A NVIDIA-Certified System for Industrial Edge

Package Content

Your package contains the following items:

- 1x ECA-5540 Edge Computing Platform
- 1x RJ45 Console Cable, 1x RJ45 LAN Cable, 1x VGA cable
- 2x Power Cable
- 1x GPS Antenna (ECA-5540C Only)
- 1x Short Ear Rack Mount Kit with screws

Ordering Information

SKU No.	Description
ECA-5540A	5th Gen Intel® Xeon® Scalable Processors with QAT (by CPU SKU), 1x GbE RJ45, 1x FHFL PCIe, 2x LP PCIe (by CPU SKU), 1x OCP 3.0 NIC, 6x Smart Fans
ECA-5540B	5th Gen Intel® Xeon® Scalable Processors with QAT (by CPU SKU), 1x GbE RJ45, 1x FHFL PCIe, 1x FHHL PCIe (by CPU SKU), 1x OCP 3.0 NIC, 6x Smart Fans
ECA-5540C	5th Gen Intel® Xeon® Scalable Processors with QAT, 1x GbE RJ45, 1x FHHL PCIe, 6x Smart Fans

Optional Accessories

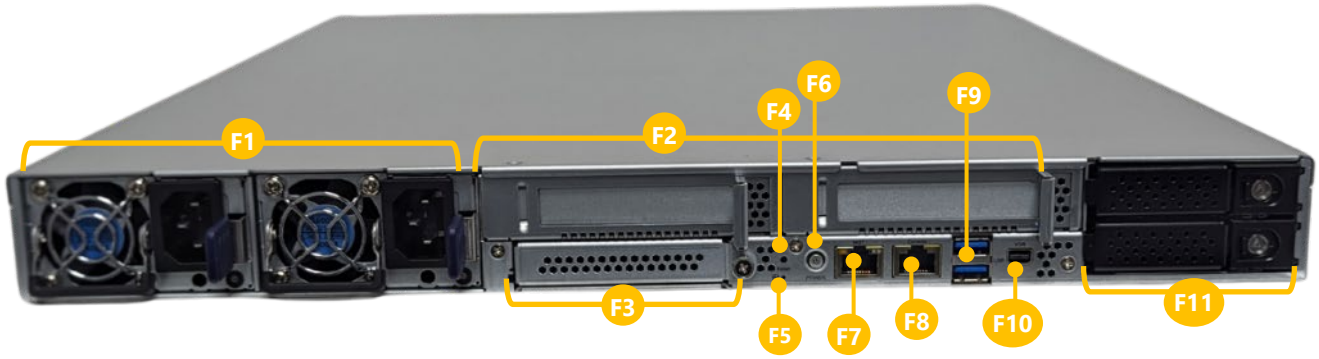
Model	Description
DC CRPS Power Module	Power Supply Unit Kit
Fan Kit	Smart Fan Kit
Slide Rackmount Rail Kit	Slide rackmount rail kit with screws

System Specifications

Form Factor		1U 19" Rackmount
Platform	Processor Options	5th Gen Intel® Xeon® Scalable Processors (Codenamed Emerald Rapids)
	CPU Socket	1x LGA 4677 socket type
	Chipset	Emmisburg PCH
	Security Acceleration	N/A (by CPU SKU)
BIOS		AMI SPI Flash BIOS
System Memory	Technology	DDR5 4000MHz RDIMM
	Max. Capacity	1024GB
	Socket	16x 288pin DIMM
Networking	Ethernet Ports	2x 1GbE RJ45 (Intel® i210-AT); 12x 10G SFP+ [SKU C Only]
	IEEE 1588	Yes
	GPS	Yes
LOM	IO Interface	1x LOM Port
	OPMA slot	Yes, IAC-AST2600 IPMI Module installed on board
I/O Interface	Reset Button	1x Reset Button (Default SW Reset)
	Power Button	1x Power Button
	LED Indicator	Power / Status, refer to **Appendix A**
	Console Port	1x RJ45 Console Port
	MGT Port	1x RJ45 Management Port
	USB Port	2x USB 3.0 Port
	Display	Mini-DP via IAC-AST2600 IPMI card
	Power Input	Dual DC Power Inlet
Storage	HDD/SSD Support	2x 2.5" HDD/SSD [SKU A/B Only]
	Onboard Slots	1x M.2 2280 M-Key for NVMe Module; 1x M.2 2242/2260 for NVMe Module
Expansion	PCIe	SKU A: 1x FHFL (PCIe*16, double width, 350W); 2x LP (PCIe*8) SKU B: 1x FHFL (PCIe*16, double width, 350W); 1x FHHL (PCIe*8) SKU C: 1x FHHL (PCIe*8)
	OCP 3.0	1x OCP 3.0 NIC Slot [SKU A/B Only]
Miscellaneous	Watchdog	Yes
	Internal RTC w/ Li Battery	Yes
	TPM	Yes, IAC-TPM04A Module installed on board
Cooling	Processor	Passive CPU heat sink
	System	6x Swappable Smart Fans
Environmental Parameters	Temperature	SKU A: 0~40˚C Operating; SKU B: -5~50˚C Operating; -40~70˚C Storage
	Humidity (RH)	5~90% RH Operating; 5~95% RH Storage
System Dimensions	(WxDxH)	438 x 580 x 44mm
	Weight	TBD
Package Dimensions	(WxDxH)	TBD
	Weight	TBD
Power	Type/Watts	1600W AC PSU
	Input	110-240V
Approvals and Compliance		RoHS Directive (EU) 2015/863, CE/FCC Class A, UL, NEBS Compliance

Front Panel

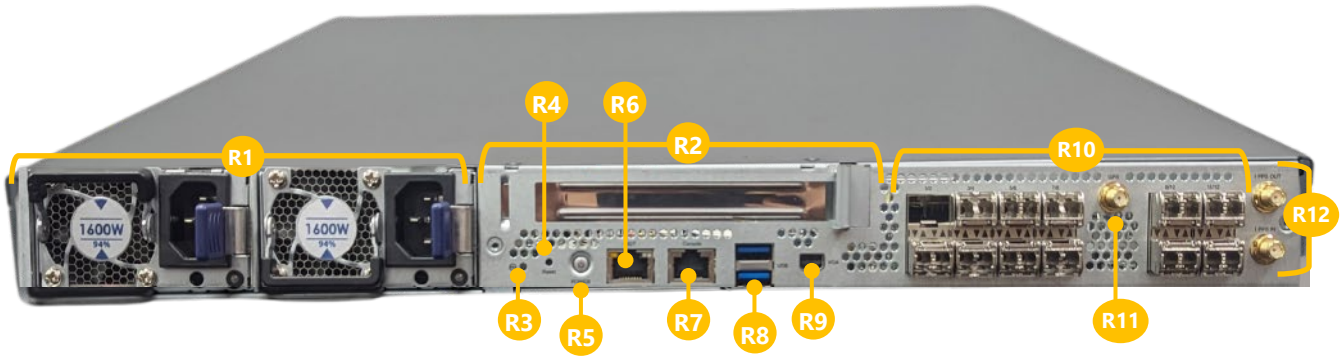
ECA-5540A / ECA-5540B



No.	Description	
F1	Power Supply	AC 1+1 Redundant Power Supply
F2	PCIe Expansion	2x PCIe LP Slots (SKU A) or 1x PCIe*8 FHHL Slot (SKU B)
F3	OCP NIC	1x OCP 3.0 NIC Slot
F4	Reset Button	1x Reset Button
F5	LED Indicators	Power / Status LED Indicators
F6	Power Button	1x Power Button
F7	MGT Port	1x 1GbE RJ45 Management Port
F8	Console Port	1x 1GbE RJ45 Console Port
F9	USB Port	2x USB 3.0 Port
F10	Display Port	1x VGA Port
F11	SSD/HDD	2x SATA Drive Bays

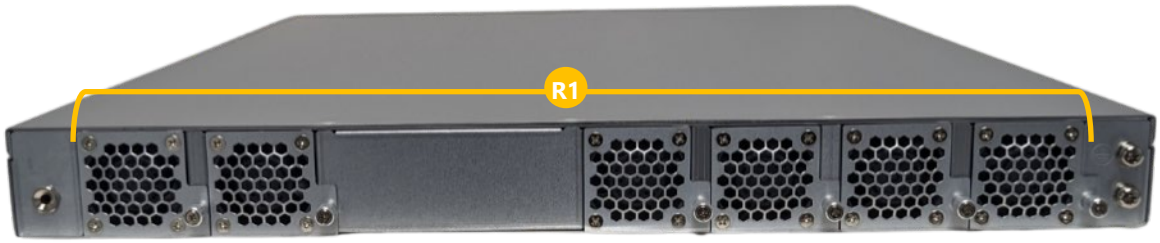
Front Panel

ECA-5540C



No.	Description	
R1	Power Supply	AC 1+1 Redundant Power Supply
R2	PCIe Expansion	1x PCIe*8 FHHL Slot
R3	LED Indicators	Power / Status LED Indicators
R4	Reset Button	1x Reset Button
R5	Power Button	1x Power Button
R6	MGT Port	1x 1GbE RJ45 Management Port
R7	Console Port	1x 1GbE RJ45 Console Port
R8	USB Port	2x USB 3.0 Port
R9	Display Port	1x VGA Port
R10	LAN Port	12x 10G SFP+ Ports
R11	Antenna	1x GPS Antenna Hole
R12	1PPS Connector	IEEE 1588v2 1PPS IN/OUT Connector

Rear Panel

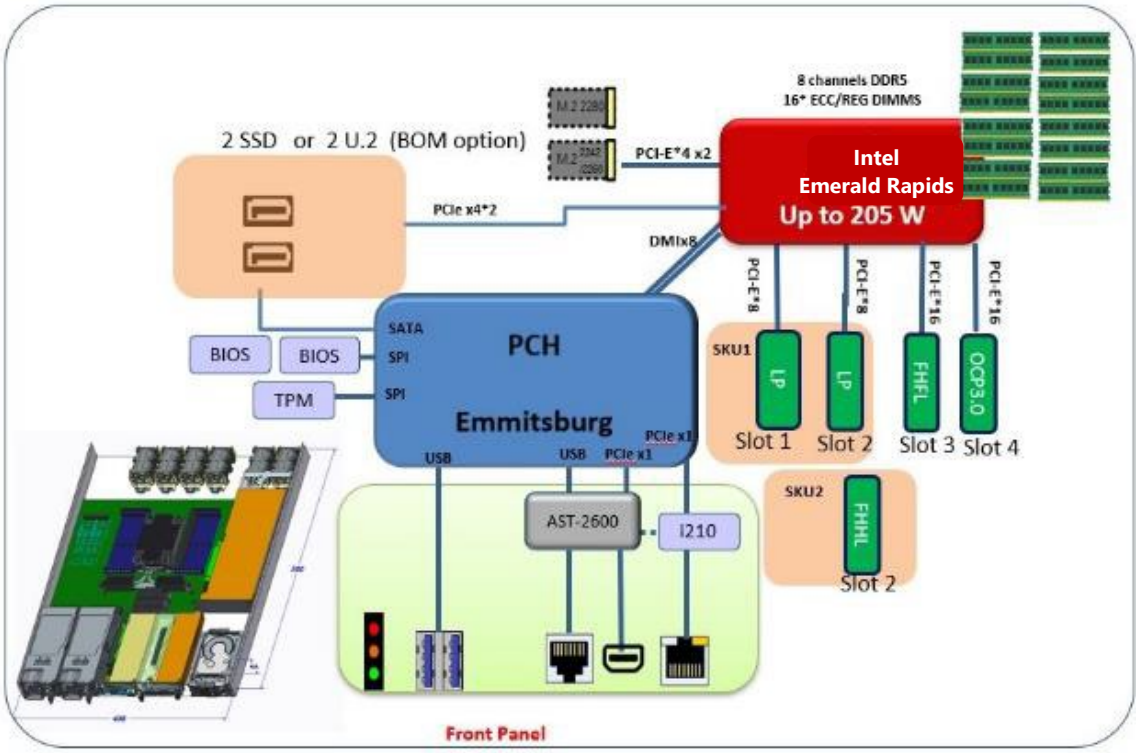


No.	Description	
R1	Fan	6x Swappable Smart Fans

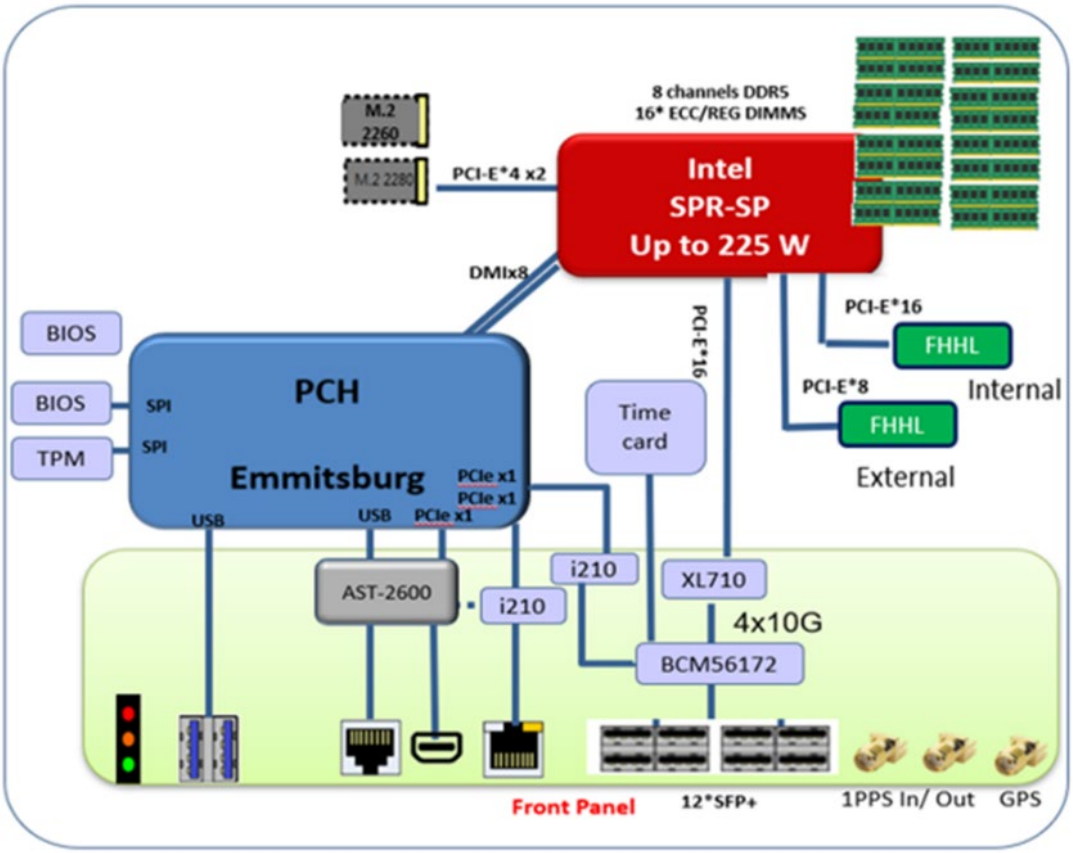
CHAPTER 2: MOTHERBOARD INFORMATION

Block Diagram

ECA-5540A / ECA-5540B

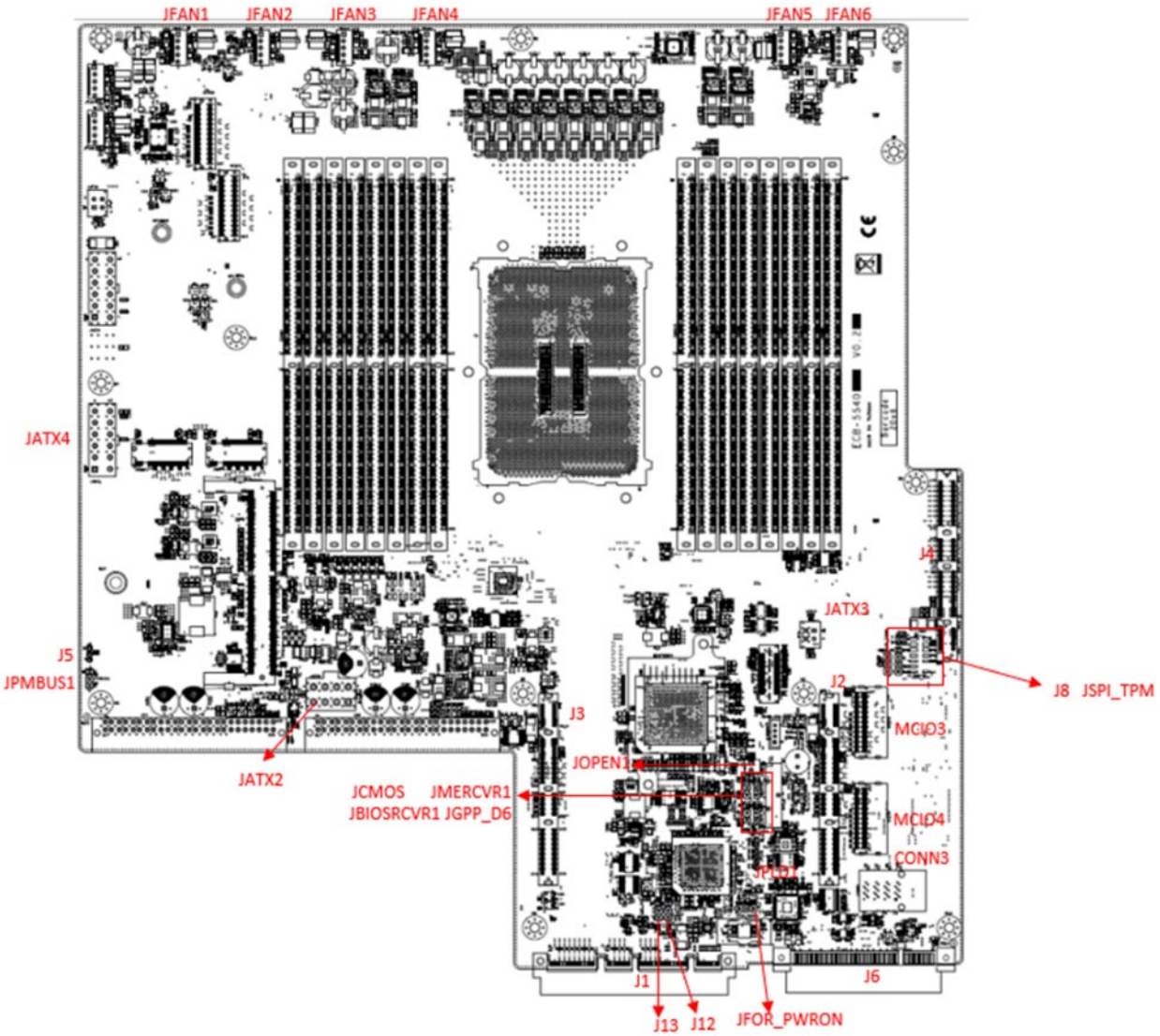


ECA-5540C



Motherboard Layout

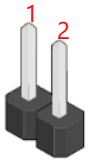
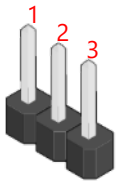
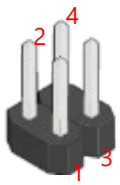
The motherboard layout shows the connectors and jumpers on the board. Refer to the following picture as a reference of the pin assignments and the internal connectors.



Internal Jumpers and Connectors

The pin headers on the motherboard play a crucial role in controlling key functions. By placing a shunt (jumper) over the specified pins (whose numbers are labeled on the circuit board around the pin header), you can activate or deactivate specific features. Always ensure that your system is powered off before adjusting the jumpers.

To short the designated pins, push the jumper down, so that they become **SHORT**. To make the pins setting **OPEN**, remove the jumper cap.

2-pin Header		3-pin Header		4-pin Header	
					
Open	Short	Open	(1-2) Jumped	Open	(1-2) Jumped

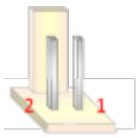
Connectors Pin Assignment

1. JFAN1~JFAN6: For Fan Module Connection

Pin #	Description
1	PWM control
2	RPM sense
3	RPM sense
4	+12V
5	GND

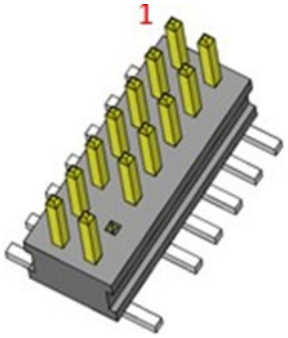
2. JOPEN1: Case Open Indication

Pin #	Description
1	FP_CHASSIS_INTRUSION
2	GND



3. JSPITPM: For Lanner TPM Module (IAC-TPM04) or SPI Fixture Debug Purpose

Pin #	Description	Pin #	Description
1	SPI_HOLD#	2	SPI_CS1#
3	SPI_CS0#	4	SPI_3V3
5	SPI_MISO	6	SPI_IO3
7	NC	8	SPI_CLK
9	GND	10	SPI_MOSI
11	TPM_PIRQ#	12	Key
13	TPM_CS0#	14	TPM_PLTRST#



4. J5: For System or BMC Console Debug Purpose

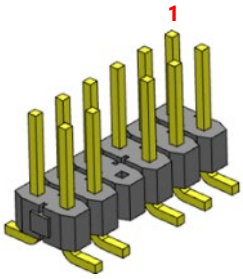
Pin #	Description
1	RX
2	TX
3	GND

5. JPMBUS1: For Lanner Power Debug Purpose

Pin #	Description
1	SMB_PMBUS_STBY_LVC3_R_SDA
2	GND
3	SMB_PMBUS_STBY_LVC3_R_SCL

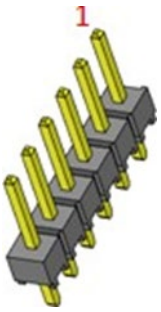
6. JESPI80PORT: For Lanner eSPI Fixture Debug Purpose

Pin #	Description	Pin #	Description
1	ESPI_CLK	2	ESPI_IO1
3	ESPI_RST#	4	ESPI_IO0
5	ESPI_CS#	6	+P3V3
7	ESPI_IO3	8	Key
9	ESPI_IO2	10	GND
11	+P3V3_AUX	12	NC



7. JPLD1: For Lanner CPLD Debug Purpose

Pin #	Description
1	CPLD_3V3
2	JTAG_TDO
3	JTAG_TDI
4	JTAG_TMS
5	GND
6	JTAG_TCK



8. JFOR_PWRON: For Power Debug Purpose

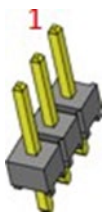
Pin #	Description
1-2	Normal
2-3	FORCE POWER ON

9. JCMOS: For Clear CMOS

Pin #	Description
1-2	Normal
2-3	Clear CMOS

10. J12: For Dual BIOS Enable

Pin #	Description
1-2	Enable
2-3	Disable



11. J13: For Boot Up BIOS Selection

Pin #	Description
1-2	First BIOS
2-3	Second BIOS

12. JGPP_D6: For Flash Descriptor Security Override

Pin #	Description
1-2	Normal
2-3	Override

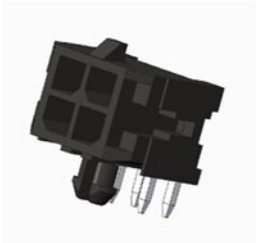
13. JMERCVR1: For ME Force Update

Pin #	Description
1-2	Normal
2-3	ME Force Update

14. JBIOSRCVR1: For Recover BIOS

Pin #	Description
1-2	Normal
2-3	Recover BIOS

15. JATX3: HDD Power CONN

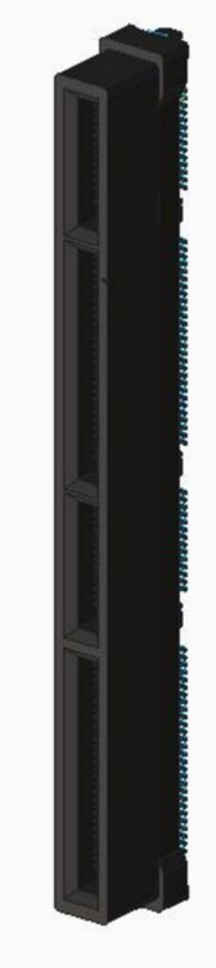


Pin #	Description
1	GND
2	GND
3	+P5V
4	+P12V

16. J2,J3: OCP X8 Slot

Pin #	Description	Pin #	Description
OB1	NC	OA1	NC
OB2	NC	OA2	NC
OB3	NC	OA3	WAKE#
OB4	NC	OA4	NC
OB5	NC	OA5	NC
OB6	NC	OA6	NC
OB7	NC	OA7	NC
OB8	NC	OA8	NC
OB9	NC	OA9	NC
OB10	+P3V3_AUX	OA10	NC
OB11	NC	OA11	NC
OB12	+P3V3	OA12	NC
OB13	+P3V3	OA13	NC
OB14	NC	OA14	NC
B1	+P12V	A1	GND

B2	+P12V	A2	GND
B3	+P12V	A3	GND
B4	+P12V	A4	GND
B5	+P12V	A5	GND
B6	+P12V	A6	GND
B7	NC	A7	SMB_SCL
B8	NC	A8	SMB_CDA
B9	NC	A9	NC
B10	PERST	A10	PRSNTA_N
B11	+P3V3	A11	NC
B12	NC	A12	PRSNTB_N
B13	GND	A13	NC
B14	REFCLK+	A14	NC
B15	REFCLK-	A15	NC
B16	GND	A16	GND
B17	CPUPETN7	A17	CPUPERN7
B18	CPUPETP7	A18	CPUPERP7
B19	GND	A19	GND
B20	CPUPETN6	A20	CPUPERN6
B21	CPUPETP6	A21	CPUPERP6
B22	GND	A22	GND
B23	CPUPETN5	A23	CPUPERN5
B24	CPUPETP5	A24	CPUPERP5
B25	GND	A25	GND
B26	CPUPETN4	A26	CPUPERN4
B27	CPUPETP4	A27	CPUPERP4
B28	GND	A28	GND
B29	GND	A29	GND
B30	CPUPETN3	A30	CPUPERN3
B31	CPUPETP3	A31	CPUPERP3
B32	GND	A32	GND
B33	CPUPETN2	A33	CPUPERN2
B34	CPUPETP2	A34	CPUPERP2
B35	GND	A35	GND
B36	CPUPETN1	A36	CPUPERN1
B37	CPUPETP1	A37	CPUPERP1
B38	GND	A38	GND
B39	CPUPETN0	A39	CPUPERN0
B40	CPUPETP0	A40	CPUPERP0
B41	GND	A41	GND
B42	PRSNTB	A42	PRSNTB

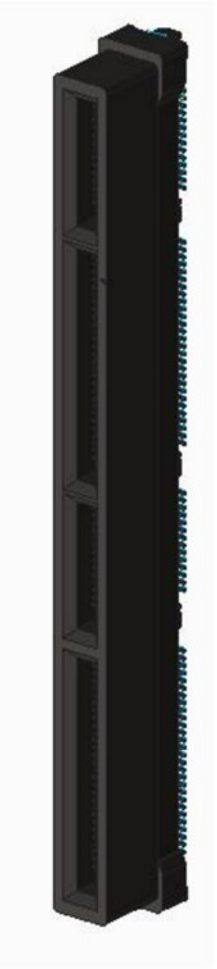


B43	NC	A43	NC
B44	NC	A44	NC
B45	NC	A45	NC
B46	NC	A46	NC
B47	NC	A47	NC
B48	NC	A48	NC
B49	NC	A49	NC
B50	NC	A50	NC
B51	NC	A51	NC
B52	NC	A52	NC
B53	NC	A53	NC
B54	NC	A54	NC
B55	NC	A55	NC
B56	NC	A56	NC
B57	NC	A57	NC
B58	NC	A58	NC
B59	NC	A59	NC
B60	NC	A60	NC
B61	NC	A61	NC
B62	NC	A62	NC
B63	NC	A63	NC
B64	NC	A64	NC
B65	NC	A65	NC
B66	NC	A66	NC
B67	NC	A67	NC
B68	NC	A68	NC
B69	NC	A69	NC
B70	NC	A70	NC

17. J4: OCP X16 Slot

Pin #	Description	Pin #	Description
OB1	NC	OA1	NC
OB2	NC	OA2	NC
OB3	NC	OA3	WAKE#
OB4	NC	OA4	NC
OB5	NC	OA5	NC
OB6	NC	OA6	NC
OB7	NC	OA7	NC
OB8	NC	OA8	NC
OB9	NC	OA9	NC
OB10	+P3V3_AUX	OA10	NC

OB11	NC	OA11	NC
OB12	+P3V3	OA12	NC
OB13	+P3V3	OA13	NC
OB14	NC	OA14	NC
B1	+P12V	A1	GND
B2	+P12V	A2	GND
B3	+P12V	A3	GND
B4	+P12V	A4	GND
B5	+P12V	A5	GND
B6	+P12V	A6	GND
B7	NC	A7	SMB_SCL
B8	NC	A8	SMB_CDA
B9	NC	A9	NC
B10	PERST	A10	PRSNTA_N
B11	+P3V3	A11	NC
B12	NC	A12	PRSNTB_N
B13	GND	A13	NC
B14	REFCLK+	A14	NC
B15	REFCLK-	A15	NC
B16	GND	A16	GND
B17	CPUPETN0	A17	CPUPERN0
B18	CPUPETP0	A18	CPUPERP0
B19	GND	A19	GND
B20	CPUPETN1	A20	CPUPERN1
B21	CPUPETP1	A21	CPUPERP1
B22	GND	A22	GND
B23	CPUPETN2	A23	CPUPERN2
B24	CPUPETP2	A24	CPUPERP2
B25	GND	A25	GND
B26	CPUPETN3	A26	CPUPERN3
B27	CPUPETP3	A27	CPUPERP3
B28	GND	A28	GND
B29	GND	A29	GND
B30	CPUPETN4	A30	CPUPERN4
B31	CPUPETP4	A31	CPUPERP4
B32	GND	A32	GND
B33	CPUPETN5	A33	CPUPERN5
B34	CPUPETP5	A34	CPUPERP5
B35	GND	A35	GND
B36	CPUPETN6	A36	CPUPERN6
B37	CPUPETP6	A37	CPUPERP6

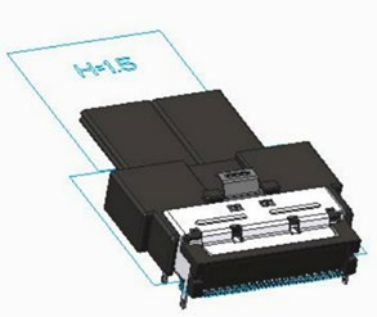


B38	GND	A38	GND
B39	CPUPETN7	A39	CPUPERN7
B40	CPUPETP7	A40	CPUPERP7
B41	GND	A41	GND
B42	PRSNTB	A42	PRSNTB
B43	GND	A43	GND
B44	CPUPETN8	A44	CPUPERN8
B45	CPUPETP8	A45	CPUPERP8
B46	GND	A46	GND
B47	CPUPETN9	A47	CPUPERN9
B48	CPUPETP9	A48	CPUPERP9
B49	GND	A49	GND
B50	CPUPETN10	A50	CPUPERN10
B51	CPUPETP10	A51	CPUPERP10
B52	GND	A52	GND
B53	CPUPETN11	A53	CPUPERN11
B54	CPUPETP11	A54	CPUPERP11
B55	GND	A55	GND
B56	CPUPETN12	A56	CPUPERN12
B57	CPUPETP12	A57	CPUPERP12
B58	GND	A58	GND
B59	CPUPETN13	A59	CPUPERN13
B60	CPUPETP13	A60	CPUPERP13
B61	GND	A61	GND
B62	CPUPETN14	A62	CPUPERN14
B63	CPUPETP14	A63	CPUPERP14
B64	GND	A64	GND
B65	CPUPETN15	A65	CPUPERN15
B66	CPUPETP15	A66	CPUPERP15
B67	GND	A67	GND
B68	NC	A68	NC
B69	NC	A69	NC
B70	PRSNTB_N	A70	NC

18. MCIO3: U.2 X8 Connector

Pin #	Description	Pin #	Description
B1	GND	A1	GND
B2	REFCLK+	A2	CPUPERP1
B3	REFCLK-	A3	CPUPERN1
B4	GND	A4	GND
B5	CPUPETP1	A5	CPUPERP2
B6	CPUPETN1	A6	CPUPERN2

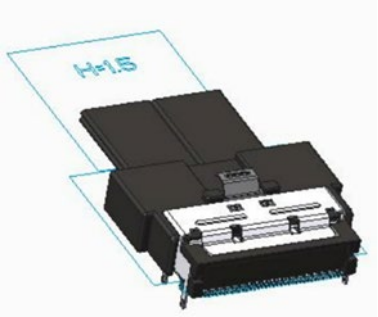
B7	GND	A7	GND
B8	CPUPETP2	A8	CPUPERP3
B9	CPUPETN2	A9	CPUPERN3
B10	GND	A10	GND
B11	CPUPETP3	A11	CPUPERP0
B12	CPUPETN3	A12	CPUPERN0
B13	GND	A13	GND
B14	CPUPETP0	A14	CPUPERP0
B15	CPUPETN0	A15	CPUPERN0
B16	GND	A16	GND
B17	CPUPETP0	A17	CPUPERP1
B18	CPUPETN0	A18	CPUPERN1
B19	GND	A19	GND
B20	CPUPETP1	A20	CPUPERP2
B21	CPUPETN1	A21	CPUPERN2
B22	GND	A22	GND
B23	CPUPETP2	A23	CPUPERP3
B24	CPUPETN2	A24	CPUPERN3
B25	GND	A25	GND
B26	CPUPETP3	A26	REFCLK+
B27	CPUPETN3	A27	REFCLK-
B28	GND	A28	GND
B29	PWR_ON_N	A29	SMB_SCL
B30	PWR_ON_N	A30	SMB_CDA
B31	GND	A31	GND
B32	PWRFL_N	A32	WAKE#
B33	PWRFL_N	A33	PRSNTB_N
B34	GND	A34	GND
B35	PRSNTB_N	A35	+P3V3_AUX
B36	PERST_N	A36	+P3V3_AUX
B37	GND	A37	GND
B38	GND	HM2	GND
B39	GND	HM4	GND



19. MCIO4: U.2 X8 Connector

Pin #	Description	Pin #	Description
B1	GND	A1	GND
B2	REFCLK+	A2	CPUPERP1
B3	REFCLK-	A3	CPUPERN1
B4	GND	A4	GND
B5	CPUPETP1	A5	CPUPERP2

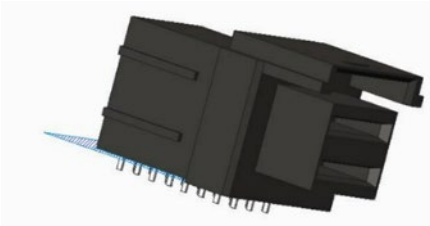
B6	CPUPETN1	A6	CPUPERN2
B7	GND	A7	GND
B8	CPUPETP2	A8	CPUPERP3
B9	CPUPETN2	A9	CPUPERN3
B10	GND	A10	GND
B11	CPUPETP3	A11	CPUPERP0
B12	CPUPETN3	A12	CPUPERN0
B13	GND	A13	GND
B14	CPUPETP0	A14	CPUPERP0
B15	CPUPETN0	A15	CPUPERN0
B16	GND	A16	GND
B17	CPUPETP0	A17	CPUPERP1
B18	CPUPETN0	A18	CPUPERN1
B19	GND	A19	GND
B20	CPUPETP1	A20	CPUPERP2
B21	CPUPETN1	A21	CPUPERN2
B22	GND	A22	GND
B23	CPUPETP2	A23	CPUPERP3
B24	CPUPETN2	A24	CPUPERN3
B25	GND	A25	GND
B26	CPUPETP3	A26	REFCLK+
B27	CPUPETN3	A27	REFCLK-
B28	GND	A28	GND
B29	GND	A29	SMB_SCL
B30	GND	A30	SMB_CDA
B31	GND	A31	GND
B32	NC	A32	WAKE#
B33	NC	A33	NC
B34	GND	A34	GND
B35	NC	A35	+P3V3_AUX
B36	PERST_N	A36	+P3V3_AUX
B37	GND	A37	GND
B38	GND	HM2	GND
B39	GND	HM4	GND



20. CONN3: SATA Connector

Pin #	Description	Pin #	Description
A1	NC	B1	NC
A2	NC	B2	NC
A3	GND	B3	GND
A4	SATA_P1_RXP	B4	SATA_P0_RXP

A5	SATA_P1_RXN	B5	SATA_P0_RXN
A6	GND	B6	GND
A7	SATA_P3_RXP	B7	SATA_P2_RXP
A8	SATA_P3_RXN	B8	SATA_P2_RXN
A9	GND	B9	GND
C1	NC	D1	NC
C2	NC	D2	NC
C3	GND	D3	GND
C4	SATA_P1_TXP	D4	SATA_P0_TXP
C5	SATA_P1_TXN	D5	SATA_P0_TXN
C6	GND	D6	GND
C7	SATA_P3_TXP	D7	SATA_P2_TXP
C8	SATA_P3_TXN	D8	SATA_P2_TXN
C9	GND	D9	GND



21. J6: X8 Slot (EIO-55401)

Pin #	Description	Pin #	Description
B1	+12V	A1	+P5V_DSW
B2	+12V	A2	NC
B3	+12V	A3	+P5V_AUX
B4	+12V	A4	+P5V_AUX
B5	+12V	A5	+P5V_AUX
B6	+12V	A6	+P5V_AUX
B7	+12V	A7	+P5V_AUX
B8	+12V	A8	NC
B9	NC	A9	+P5V
B10	NC	A10	+P5V
B11	NC	A11	NC
B12	FM_BMC_PWRBTN_OUT_R_N	A12	GND
B13	GND	A13	NC
B14	USB20_P2_DP	A14	NC
B15	USB20_P2_DN	A15	GND
B16	GND	A16	IPMI_COM1_TX
B17	USB20_OC2_N	A17	IPMI_COM1_RX
B18	GND	A18	GND
B19	USB20_P0_DP	A19	NC
B20	USB20_P0_DN	A20	GND
B21	GND	A21	SMB_EIO_DAT
B22	GND	A22	SMB_EIO_CLK
B23	USB3_P4_TXP	A23	GND
B24	USB3_P4_TXN	A24	GND
B25	GND	A25	USB3_P5_TXP

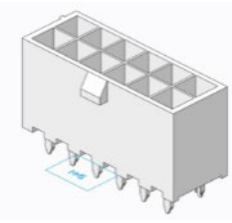
B26	GND	A26	USB3_P5_TXN
B27	USB3_P4_RXP	A27	GND
B28	USB3_P4_RXN	A28	GND
B29	GND	A29	USB3_P5_RXP
B30	LAN1_LINK_100_N	A30	USB3_P5_RXN
B31	LAN1_LINK_1000_N	A31	GND
B32	GND	A32	NC
B33	LAN1_MDI0P	A33	RST_PLTRST_N
B34	LAN1_MDI0N	A34	FM_PCH_PWRBTN_N
B35	GND	A35	FP_RESET_N
B36	GND	A36	RST_BMC_RSTBTN_OUT_N
B37	LAN1_MDI1P	A37	FP_CPLD_RST_BTN_N
B38	LAN1_MDI1N	A38	FP_PWR_BTN_N
B39	GND	A39	FP_PWR_BTN_NCT_N
B40	GND	A40	FM_BMC_PFR_PWRBTN_OUT_N
B41	LAN1_MDI2P	A41	FM_BMC_PWRBTN_OUT_N
B42	LAN1_MDI2N	A42	FP_BMC_PWR_BTN_R2_N
B43	GND	A43	RST_CPLD_RSTBTN_OUT_R_N
B44	GND	A44	FP_BMC_RST_BTN_N
B45	LAN1_MDI3P	A45	RST_BMC_RSTBTN_OUT_R_N
B46	LAN1_MDI3N	A46	FP_BMC_PWR_BTN_R_N
B47	GND	A47	PCH_GRN_GPPC_A_19
B48	LAN1_LINK_ACT_N	A48	PCH_YLW_GPPC_A_18
B49	GND	A49	GND

22. JATX2: GPU Power CONN

Pin #	Description	Pin #	Description
1	GND	2	+12V
3	GND	4	+12V
5	GND	6	+12V
7	GND	8	+12V

23. JATX4: GPU Power CONN

Pin #	Description	Pin #	Description
1	+12V	7	GND
2	+12V	8	GND
3	+12V	9	GND
4	+12V	10	GND
5	+12V	11	GND
6	+12V	12	GND

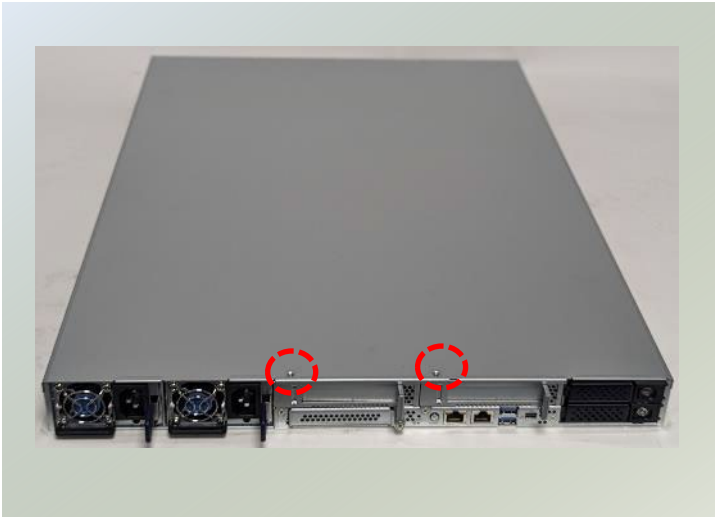


CHAPTER 2: HARDWARE SETUP

To minimize the risk of personal injury, electric shock, or system damage, ensure all power connections are disconnected to fully shut down the device. Additionally, wear ESD protection gloves while carrying out the procedures in this chapter.

Opening the Chassis

1. Power off the system.
2. Unscrew the two (2) screws on the top cover.



3. Gently slide the cover forward a bit.

4. Lift the cover up to remove.

Installing the System Memory

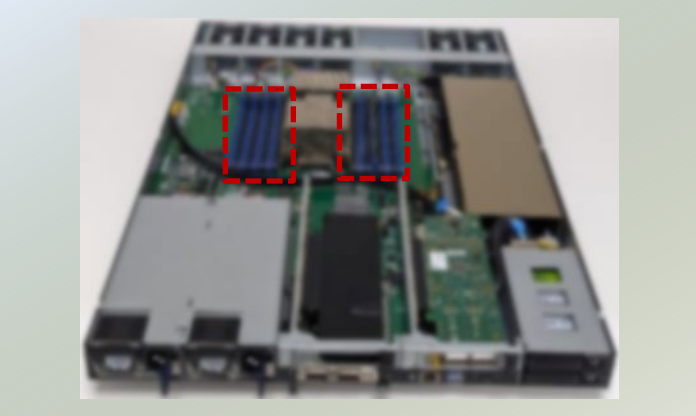
The motherboard supports 16 memory slots for DDR5 registered DIMM.

Supported System Memory Summary

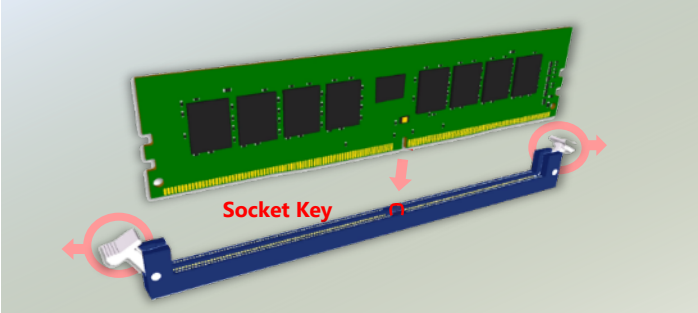
Total Slots	16
Supported DIMM Capacity	8GB, 16GB, 32GB, 64GB
Memory Size	Maximum 1024GB RDIMM (64GB*16)
Memory Type	DDR5 ECC RDIMM 4000MHZ
Minimum DIMM Installed	At least 1 memory module to boot and run from.

Memory Module Installation Instructions

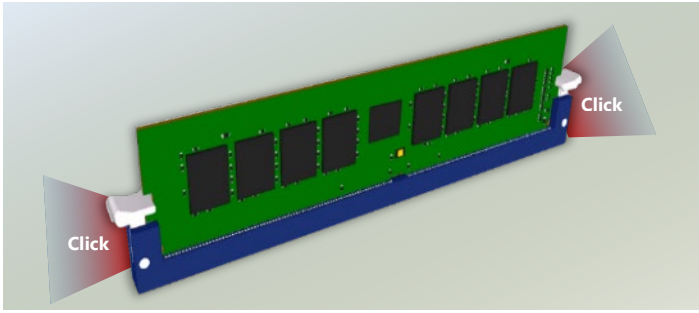
1. Power off the system and open the chassis.
2. Locate the DIMM memory modules slots on the motherboard.



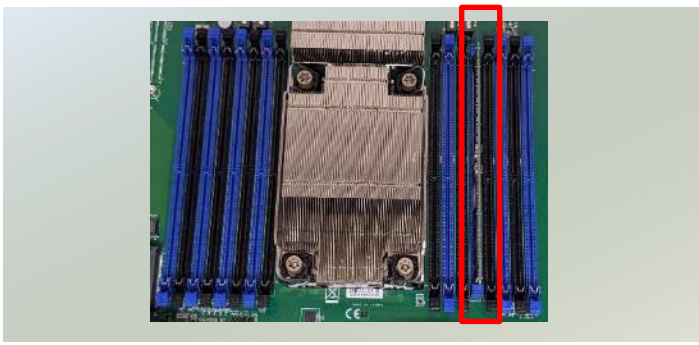
3. Pull open the DIMM slot latches. Align the notch of the memory module with the socket key in the slot.



4. Push the module down into the slot until it is firmly seated and clicks into place.



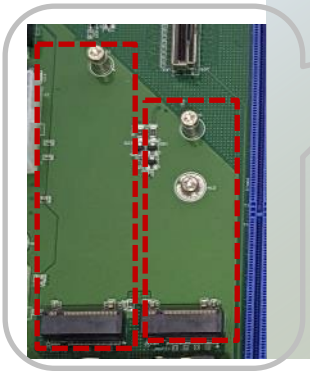
5. The memory module have been installed.

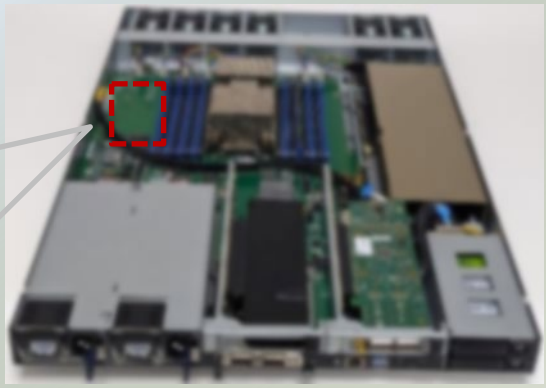


Installing M.2 Storage Modules (Optional)

This system supports one M.2 2280 and one M.2 2242 storage module slot. Please proceed with the following steps for installation.

1. Power down the system and open the chassis.
2. Locate the M.2 module slot on the motherboard.





3. Align the notch of the module card with the socket key in the pin slot.

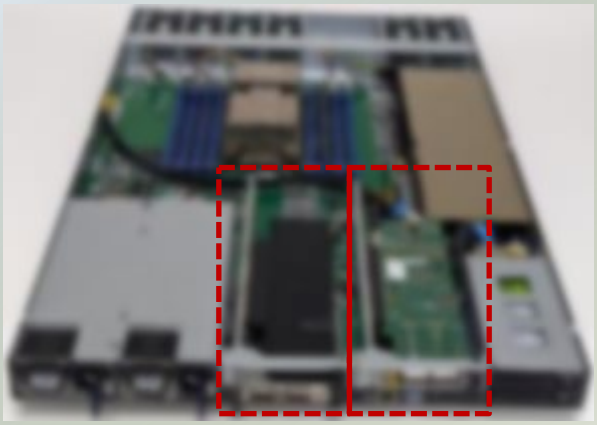
4. Insert the module card pins at 30 degrees into the socket until it is fully seated.

5. Push down on the module and secure it with a screw.
6. Follow the same steps to install a second storage module card.

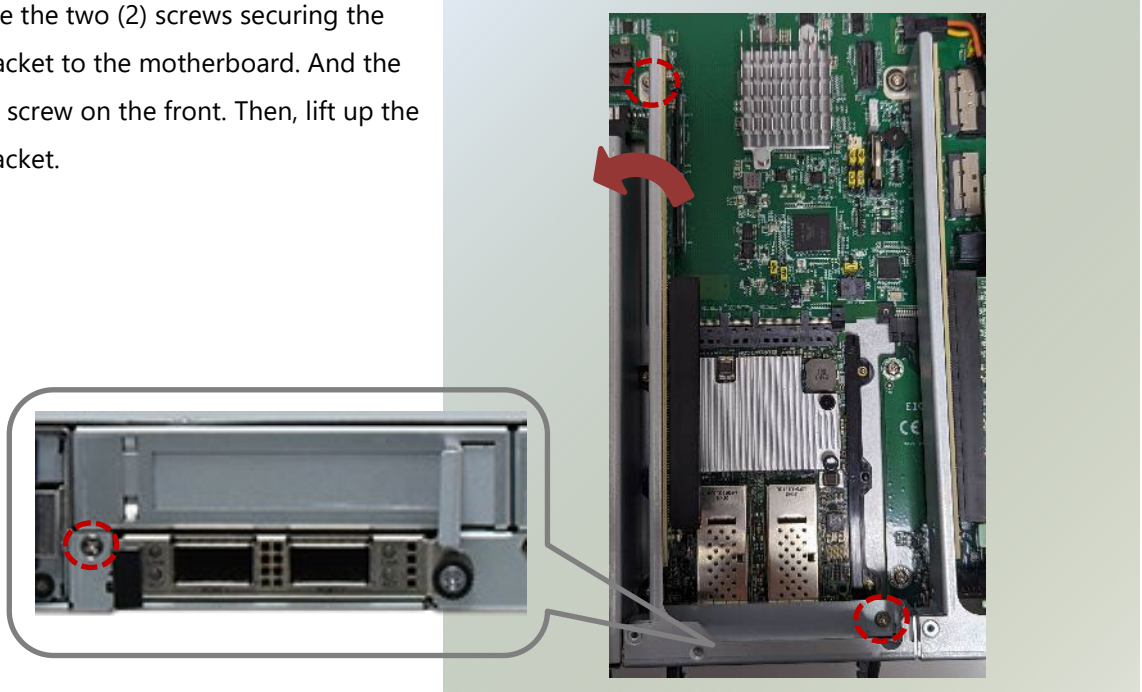
Installing Low-Profile PCIe Expansion Card (Optional, ECA-5540A Only)

ECA-5540A comes with two Low-Profile PCIe expansion slot (Optional) for graphics card, ethernet or accelerator card. Please proceed with the following steps for installation.

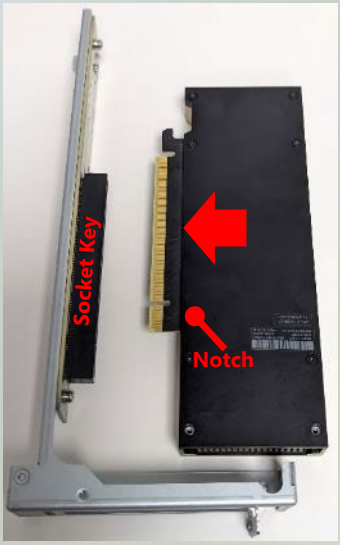
1. Power off the system and open the chassis cover.
2. Locate the LP PCIe slots. The slot bracket should be secured to the motherboard.



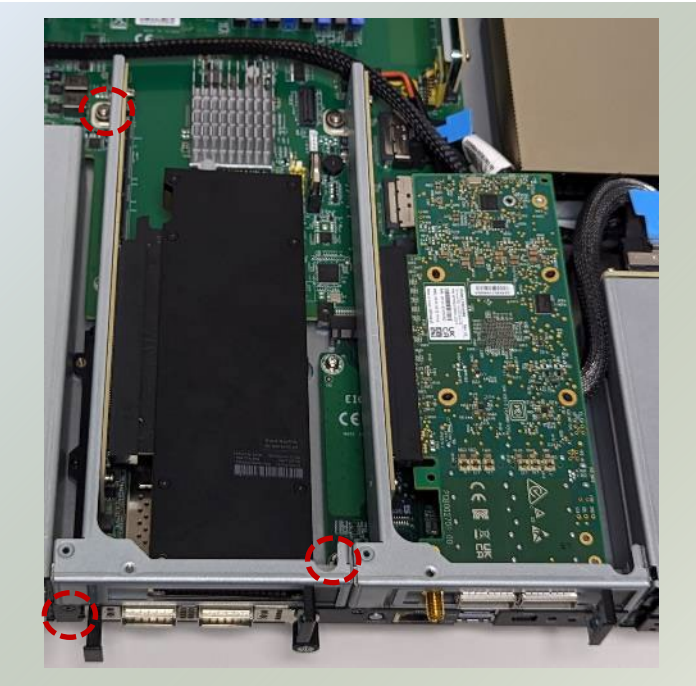
3. Remove the two (2) screws securing the slot bracket to the motherboard. And the one (1) screw on the front. Then, lift up the slot bracket.



4. Align the notch of the socket key in the pin slot, and slowly slide the GPU module card into the bracket until fully seated.



5. Install the bracket back onto the motherboard. Secure with three (3) screws. Repeat steps if installing a second module card.

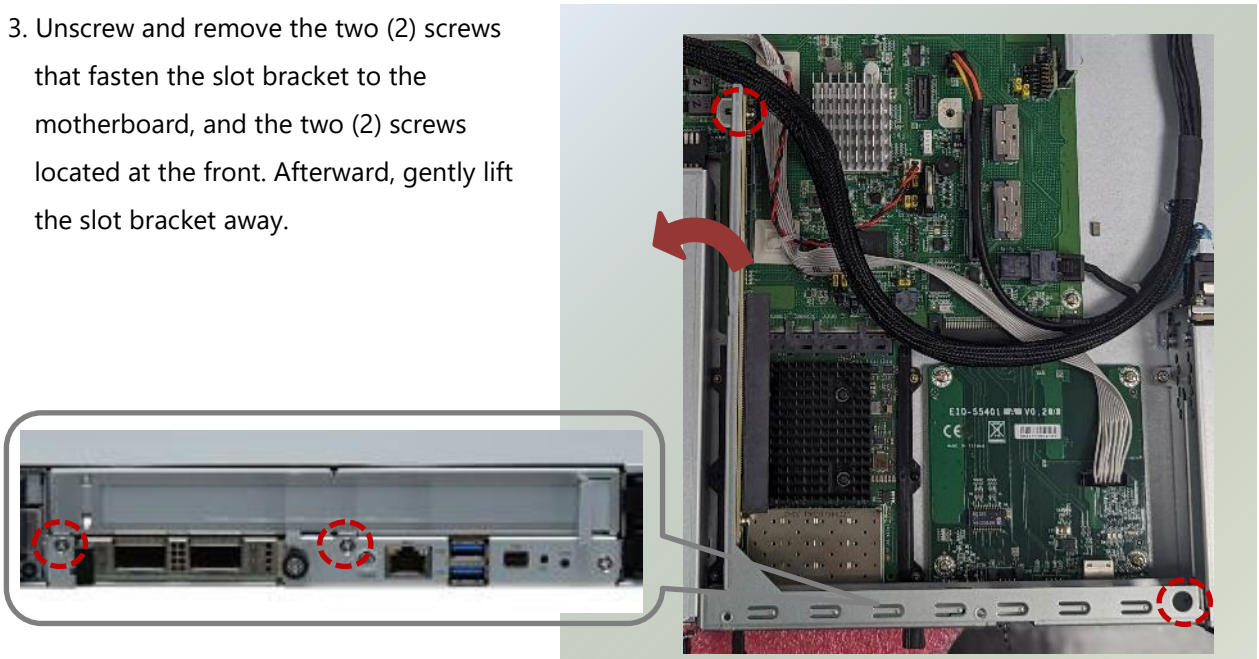


Installing FHHL PCIe Expansion Card (Optional, ECA-5540B/C Only)

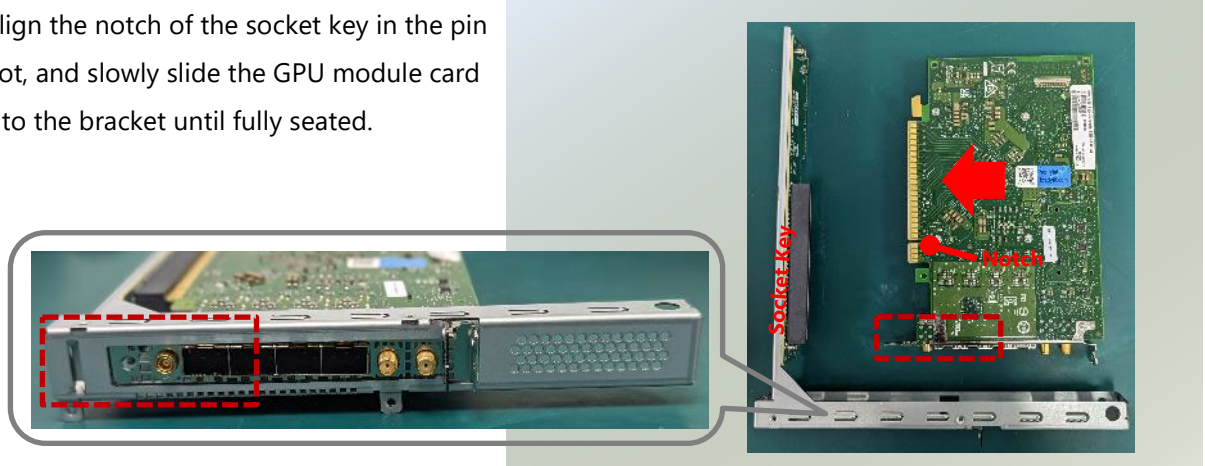
ECA-5540B and ECA-5540C comes with one FHHL PCIe expansion slot (Optional) for graphics card, ethernet or accelerator card. Please proceed with the following steps for installation.

1. Power off the system and open the chassis cover.
2. Locate the FHHL PCIe slot. The slot bracket should be secured to the motherboard.

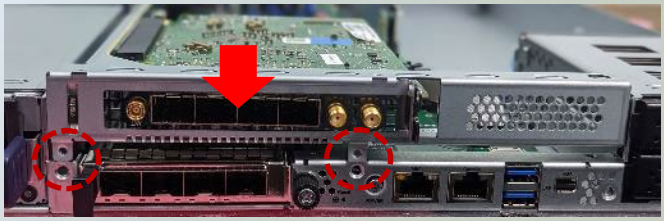
3. Unscrew and remove the two (2) screws that fasten the slot bracket to the motherboard, and the two (2) screws located at the front. Afterward, gently lift the slot bracket away.

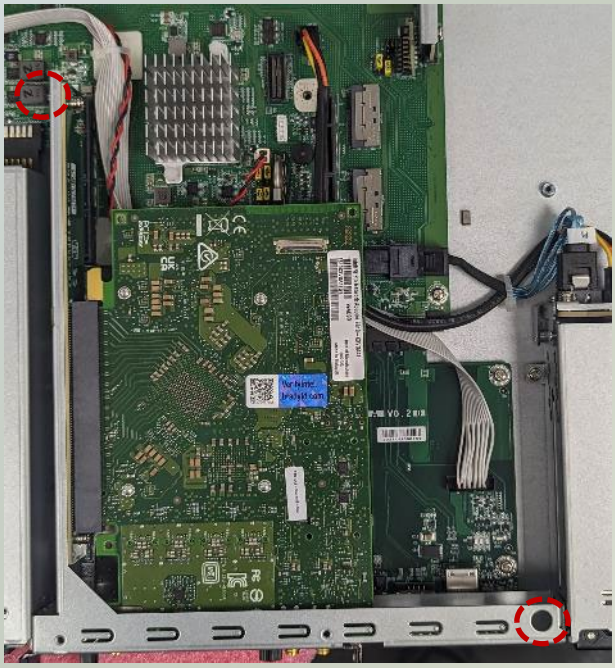


4. Align the notch of the socket key in the pin slot, and slowly slide the GPU module card into the bracket until fully seated.



5. Install the bracket back onto the motherboard. Secure with two (2) screws on the front, and two (2) screws on the bracket.



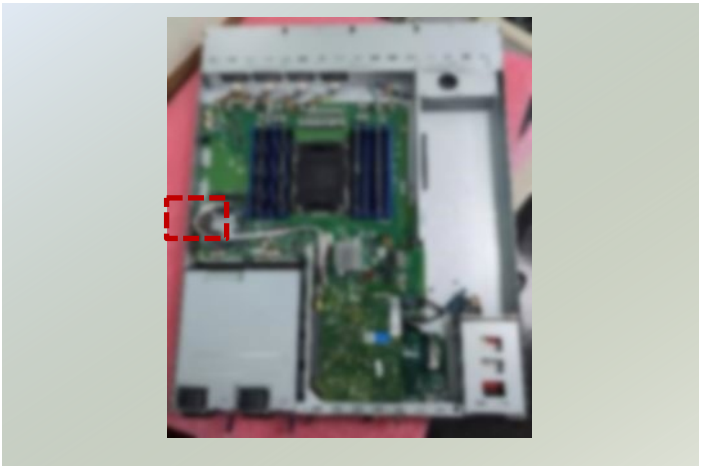


Installing FHFL PCIe Expansion Card (Optional, SKU A/B Only)

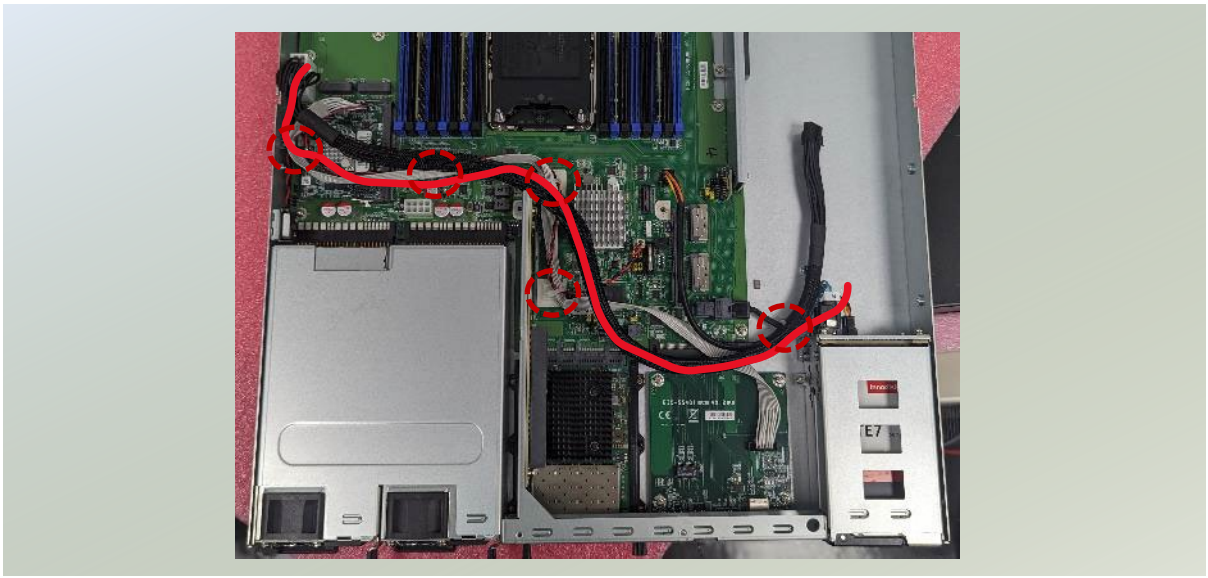
The ECA-5540A/B is equipped with a PCIe x16 FH/FL slot, suitable for GPU graphics or acceleration card expansion. Please proceed with the following steps for installation.

GPU Power Cable Setup

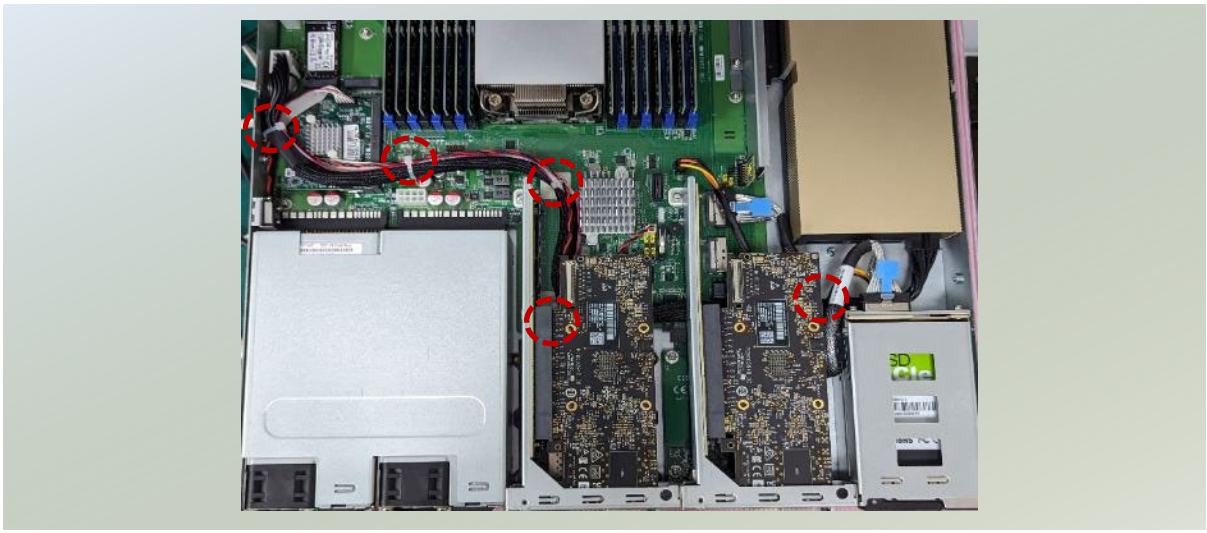
1. Power off the system and open the chassis cover.
2. Locate the GPU Power Cable socket.



3. Next, the power cable should follow the other cable path across the motherboard (as in red below).

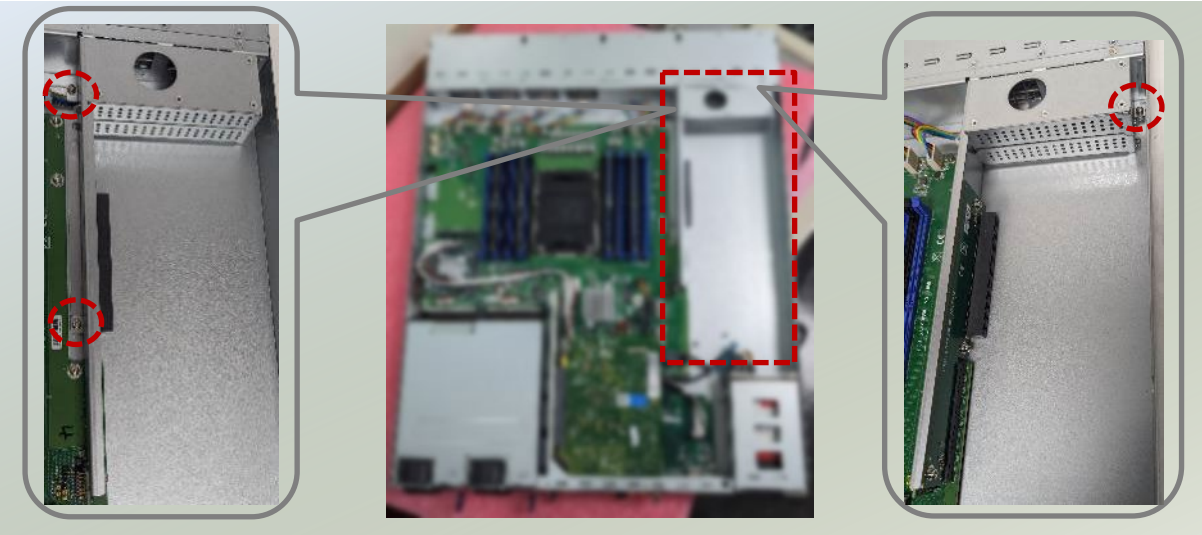


4. Please locate the zip ties marked by red circles in the image below. Carefully cut these ties, then secure them again, including the GPU power cable into the bundle.



GPU Graphic Card Installation

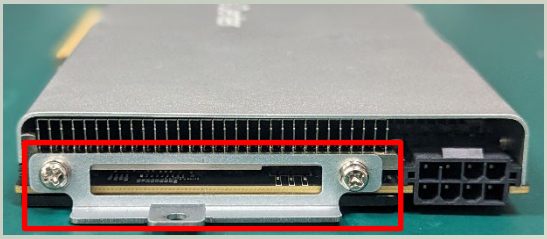
1. Locate the PCIe bracket on the motherboard, and unscrew the two (2) screws on the left side and one (1) screw on the right side of the bracket.



2. Next, pick up the GPU module and secure the ***metal holding bracket*** to the GPU module with two (2) screws.

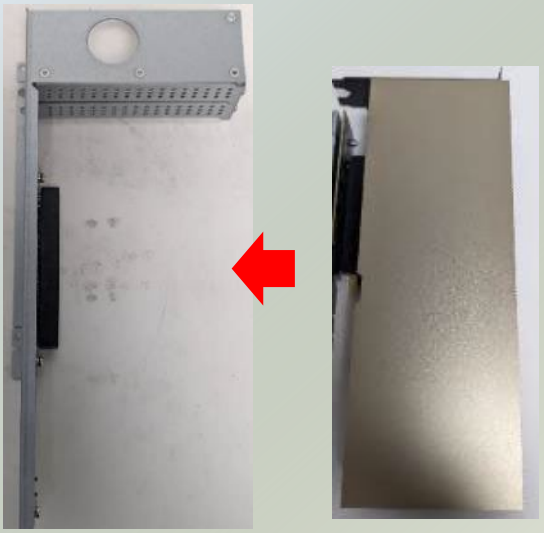
For Nvidia® GPU

For Intel® GPU



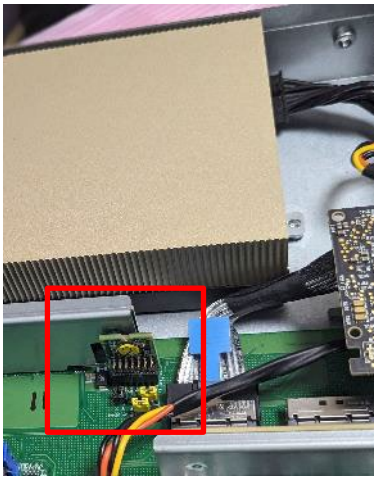
3. Then insert the power cable to the GPU module.

4. Then, pick up the PCIe bracket, align the GPU module pin slot to the socket key on the bracket. Slide the GPU module into the PCIe bracket until it is fully seated



5. Align the bracket on the motherboard and secure it with the three original screws.

Watch out for the TPM Module when placing the bracket back onto the motherboard.



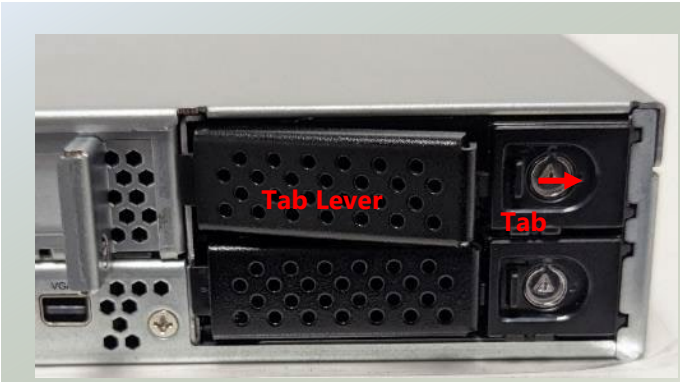
6. Fasten a single screw to secure the metal holding bracket in place.

Installing the Disk Drives (Optional, SKU A/B Only)

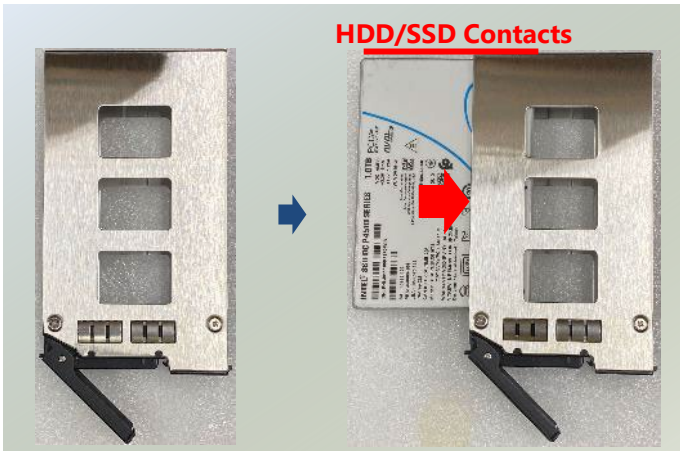
This system supports two 2.5" SATA SSD drive bays. Please follow the instructions to install the disk drives.

1. Power off the system. Locate the 2.5" disk bay on the front panel.

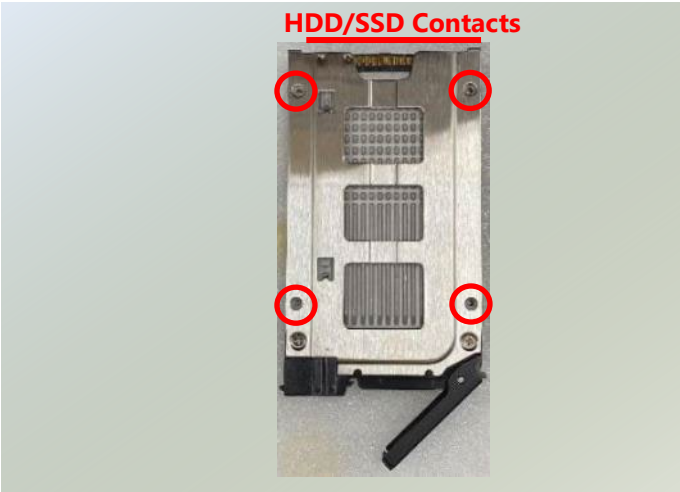
2. To remove the tray, push the tab for the tab lever to slide open, and then hold the tab lever to pull out the tray.



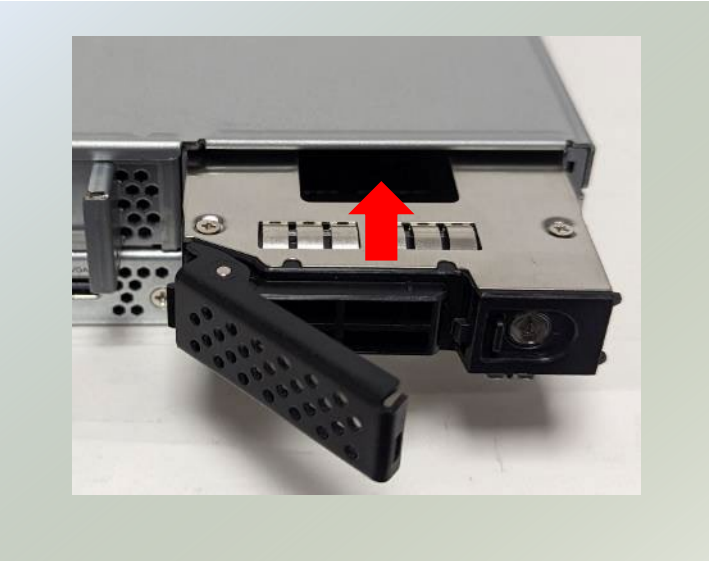
3. Slide one 2.5" SSD into the tray and make sure the SSD contacts are facing outwards.



4. Then, turn the drive tray on the other side (bottom side), and secure the SSD with two (2) screws on each side.



5. Place the mounted disk tray back into the system. Gently slide the tray in until it is securely seated, then press the tab lever until it clicks, indicating it is locked in place.

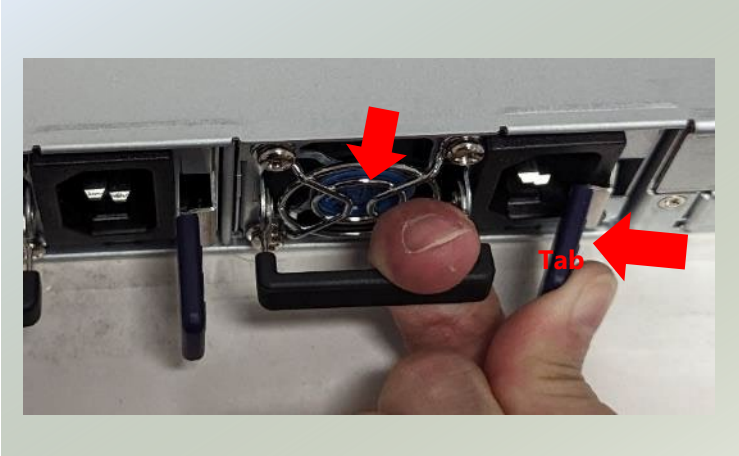


Replacing the Power Supply Units

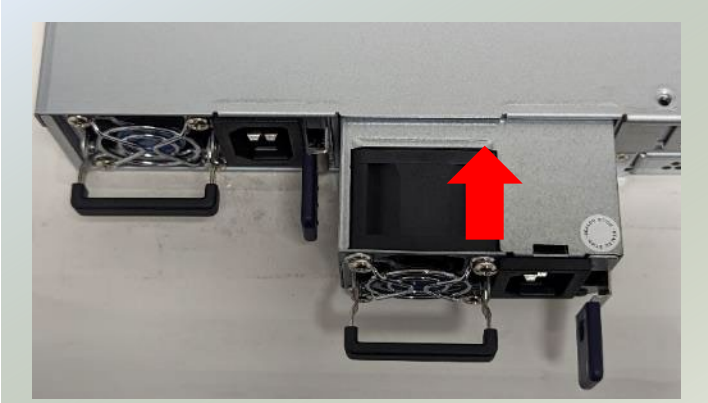
Power supply units may wear down eventually. Please be noted that ECA-5540 series supports 1600W AC PSUs. Please prepare the power supply units that matching this capacity.

1. Power off the system. Locate the power supply units on the front panel.

2. Press on the tab and hold the handle to pull out the power supply unit.



3. Insert a new power supply unit. Push the unit in until it clicks into place. Repeat steps if replacing a second power supply unit.



CHAPTER 3: REMOTE SERVER MANAGEMENT

Overview

This document specifies the BMC firmware features. The BMC firmware implements IPMI 2.0 based on ASPEED service processor. It performs all the BMC management tasks defined by IPMI 2.0.
In addition, BMC firmware runs an embedded web-server for full configuration using Web UI, which has a low learning curve.

BMC Main Features

Feature		Description
IPMI 2.0 Standard Features	System Interface Support	• KCS (System Interface Support) • LAN (RMCP+)
	IPMI 2.0 based Management	• BMC stack with an IPMI 2.0 implementation
	System Management	• Sensor monitoring • System power management • Watchdog timer • Fan speed monitor and control
	Event Log	• System Event Log (SEL)
	Text Console Redirection: SOL	• Support in IPMI stack for SOL to remotely access BIOS and text console before OS booting
	User Management	• IPMI based user management • Multiple user permission level
Non-IPMI functions	Web User Interfaces	• BMC management via web user interface • Integrated KVM and Virtual Media
	User authorization	• RADIUS support • LDAP support
	Security	• SSL and HTTPS support
	Maintenance	• Auto-sync time with NTP server • Remote firmware update by Web UI or Linux tool
	SNMP v3 Access	• SNMP walk to get BMC info. • SNMP set to control system power status.

BMC Firmware Functional Description

System health monitoring

The BMC implements system sensor monitoring feature. It could monitor voltage, temperature, and current of critical components.

System Power Management

The BMC implements chassis power and resets functions for system administrators to control and manage the system power behavior. These functions can be activated by sending the IPMI 2.0 compatible chassis commands to the BMC over messaging interfaces. The following list summaries the supported functions.

- Chassis power on
- Chassis power off
- Chassis power cycle
- Chassis power reset
- Chassis power soft off
- Server's power status report

Watchdog Timer

The BMC provides an IPMI 2.0 compatible watchdog timer which can prevent the system from system hanging.

Fan Speed Control

BMC oversees fan speed control. The fan speed can be modified by varying the duty cycle of PWM signal. The fan speed control algorithm mainly refers to the readings of on-board temperature sensors.

System Event Log (SEL)

A non-volatile storage space is allocated to store system events for system status tracking.

Serial over LAN (SOL)

IPMI 2.0 SOL is implemented to redirect the system serial controller traffic over an IPMI session. System administrators can establish a SOL connection with a standard IPMI client, like IPMITOOL, to remotely interact with serial text-based interfaces such as OS command-line and serial redirected BIOS interfaces.

User Management

The BMC supports 9 IDs for IPMI user accounts. The maximum length of the username and password are 16 and 20 respectively, and the possible privilege levels are Callback, User, Operator, and Administrator. Moreover, the account creator can enable/disable the user account at any time. If not specified, the default user accounts are listed follows:

User Name	Password	User Access	Characteristics
admin	admin	Enabled	Password can be changed

Keyboard, Video, Mouse (KVM) Redirection

- The BMC provides keyboard, video, and mouse (KVM) redirection over LAN. This application is available remotely from the embedded web server.
- Support video recording, recorded videos to be downloaded & playable.

Virtual Media Redirection

- The BMC provides remote virtual CD and HD redirection. CD image could be mounted directly in KVM window. HD could be mounted by NFS and SAMBA.
- Efficient USB 2.0 based CD/DVD redirection with a typical speed of 20XCD.
- Completely secured transmission.

SNMP v3 access

The BMC provides SNMP v3 accessibility, user could use the SNMP after setup the related setting on the User List page. The following are some SNMP command examples.

1.3.6.1.4.1.51188.2.1.1 (Get Sensor Info, column-1: index, column-2: name, column-3: number, column-4: reading)

1.3.6.1.4.1.51188.1.1.0 (Get/Set Hostname)

1.3.6.1.4.1.51188.1.2.0 (Get BMC Version)

1.3.6.1.4.1.51188.1.3.0 (Get System Power Status, 0 for off, 1 for on)

1.3.6.1.4.1.51188.1.4.0 (System Power Control, 1 for off, 2 for on, 3 for cycle, 4 for soft-off)

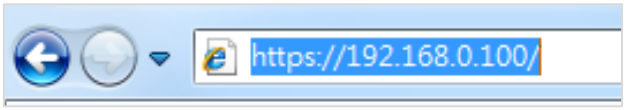
IPMI Commands Support List

COMMANDS	NETFN	CMD
IPM Device "Global" Commands		
Get Device ID	APP (06h)	00h
Cold Reset	APP (06h)	02h
Warm Reset	APP (06h)	03h
Get Device GUID	APP (06h)	08h
BMC Watchdog Timer Commands		
Reset Watchdog Timer	APP (06h)	22h
Set Watchdog Timer	APP (06h)	24h
Get Watchdog Timer	APP (06h)	25h
BMC Device and Messaging Commands		
Get System GUID	APP (06h)	37h
Get Channel Info	APP (06h)	42h
Set User Access	APP (06h)	43h
Get User Access	APP (06h)	44h
Set User Name	APP (06h)	45h
Get User Name	APP (06h)	46h
Set User Password	APP (06h)	47h
Chassis Device Commands		
Get Chassis Capabilities	Chassis (00h)	00h
Get Chassis Status	Chassis (00h)	01h
Chassis Control	Chassis (00h)	02h
Chassis Reset	Chassis (00h)	03h
Sensor Device Commands		
Get Sensor Reading Factors	S/E (04h)	23h
Get Sensor Hysteresis	S/E (04h)	25h
Get Sensor Threshold	S/E (04h)	27h
Get Sensor Event Enable	S/E (04h)	29h
Get Sensor Event Status	S/E (04h)	2Bh
Get Sensor Reading	S/E (04h)	2Dh
Get Sensor Type	S/E (04h)	2Fh
SDR Device Commands		
Get SDR Repository Info	Storage (0Ah)	20h
Get SDR Repository Allocation Info	Storage (0Ah)	21h
Get SDR	Storage (0Ah)	23h
Get SDR Repository Time	Storage (0Ah)	28h
SEL Device Commands		
Get SEL Info	Storage (0Ah)	40h
Get SEL Allocation Info	Storage (0Ah)	41h
Get SEL Entry	Storage (0Ah)	43h
Delete SEL Entry	Storage (0Ah)	46h
Clear SEL	Storage (0Ah)	47h
Get SEL Time	Storage (0Ah)	48h
Set SEL Time	Storage (0Ah)	49h

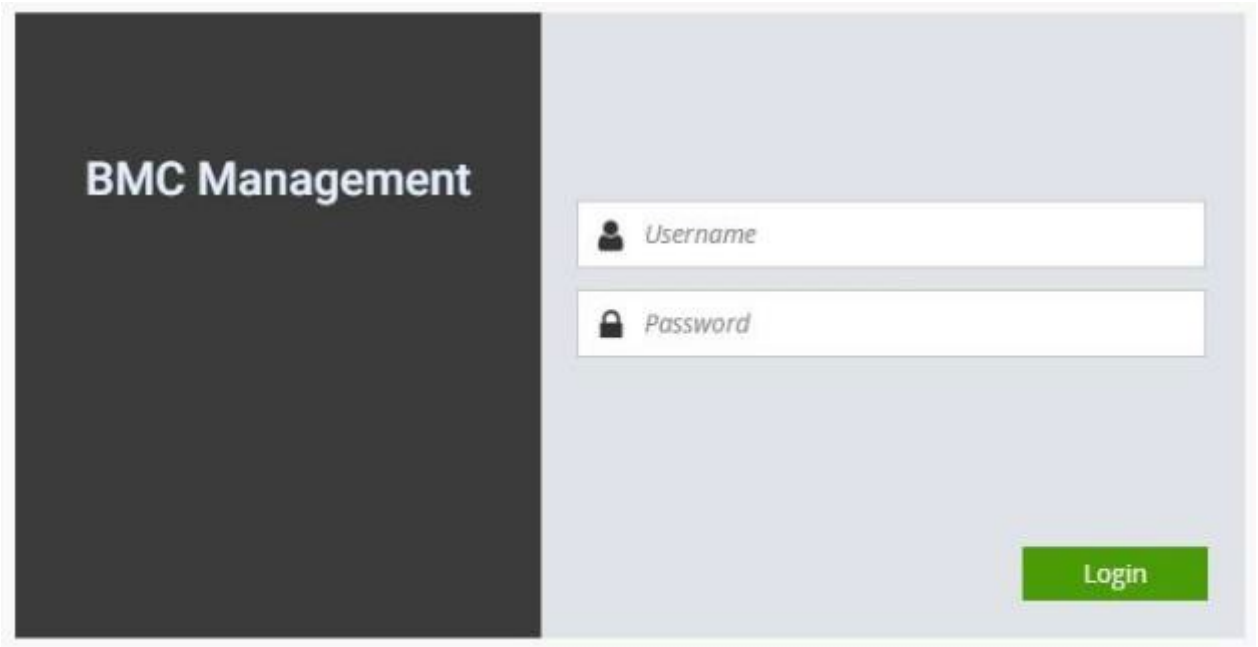
Get SEL Time UTC Offset	Storage (0Ah)	5Ch
Set SEL Time UTC Offset	Storage (0Ah)	5Dh
LAN Device Commands		
Set LAN Configuration Parameters	Transport (0Ch)	01h
Get LAN Configuration Parameters	Transport (0Ch)	02h
Serial/Modem Device Commands		
Set User Callback Options	Transport (0Ch)	1Ah
Get User Callback Options	Transport (0Ch)	1Bh
SOL Activating	Transport (0Ch)	20h
Set SOL Configuration Parameters	Transport (0Ch)	21h
Get SOL Configuration Parameters	Transport (0Ch)	22h

Using BMC Web UI

In the address bar of your Internet browser, input the IP address of the remote server to access the BMC interface of that server.



Initial access of BMC prompts you to enter username and password. A screenshot of the login screen is given below:



Login Page

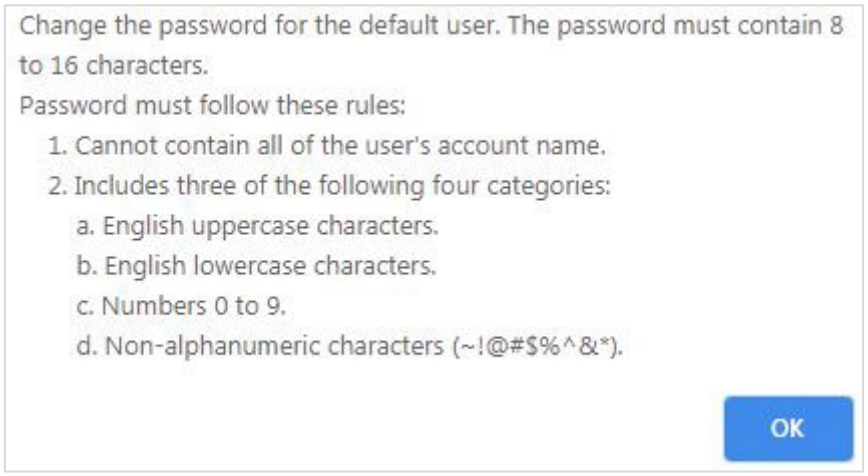
- **Username**: Enter your username in this field.
- **Password**: Enter your password in this field.
- **Login**: After entering the required credentials, click the **Login** to log in to Web UI.

Note: (1) If not specified, the default IP to access BMC is https://192.168.0.100.
(2) Please use **https** to access Web UI.

Default User Name and Password

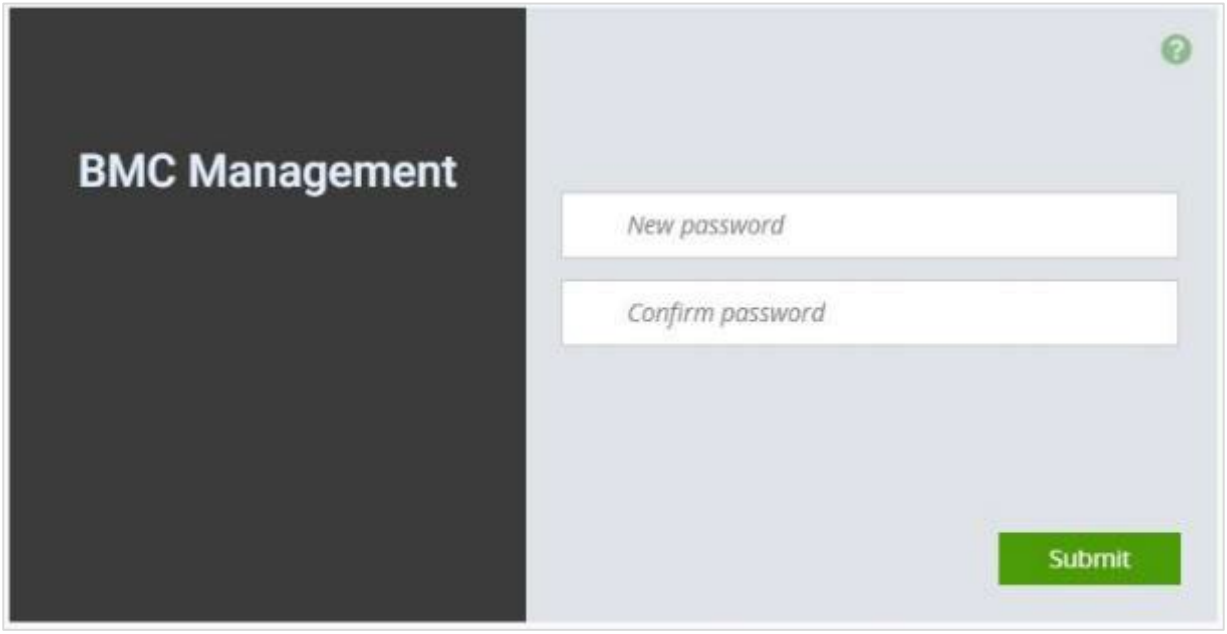
- **Username:** admin
- **Password**: admin

The default username and password are in lower-case characters. When you log in using the default username and password, you will get full administrative rights, and it will ask you to change the default password once you log in. The dialog is shown below:



Change the default password - Dialog

Clicking **OK** will take you to set a password.



Change the default password – Set password

Note: Duplicate usernames shouldn't exist across various authentication methods like LDAP, RADIUS or IPMI since the privilege of one Authentication method is overwritten by another authentication method during logging in, and hence the correct privilege cannot be returned properly.

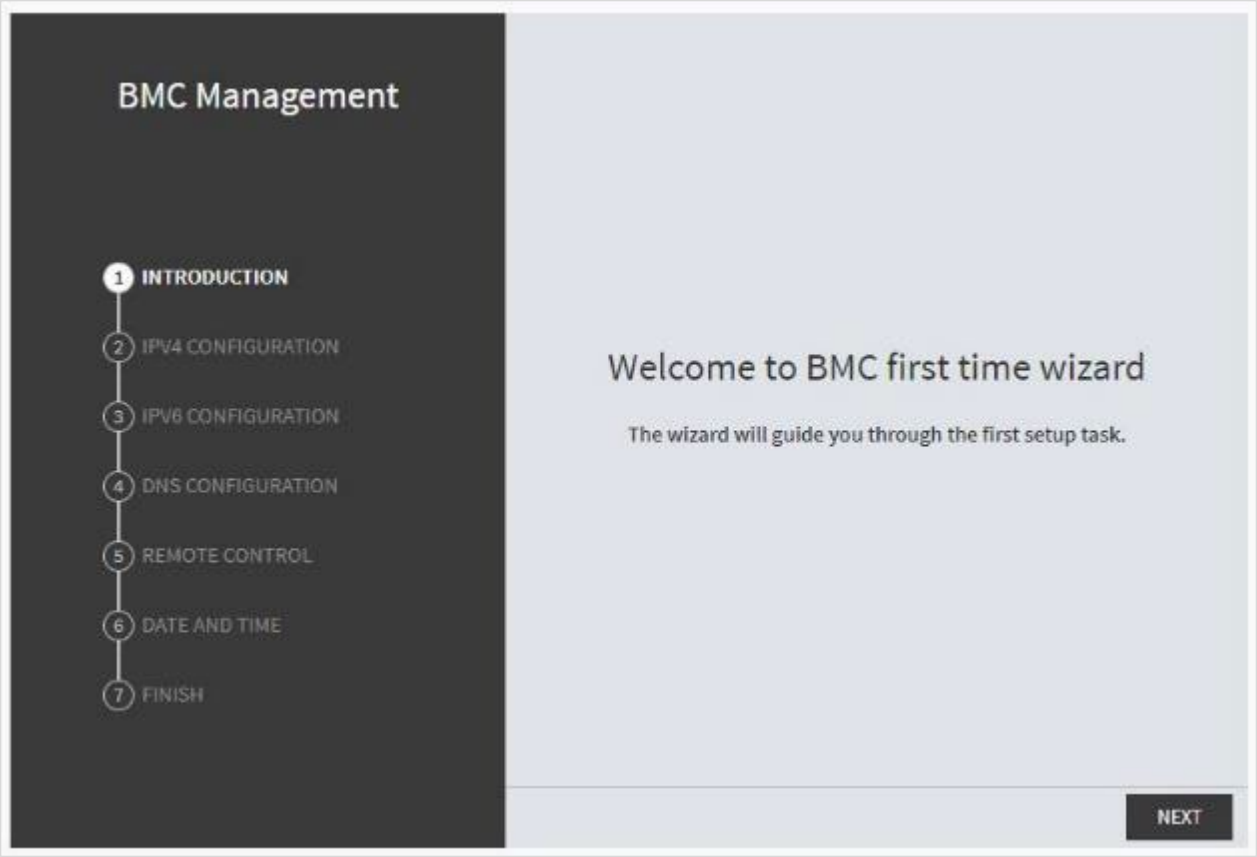
Wizard Welcome Page Introduction

After the first-time login, you will see first time wizard welcome page as the following picture. Please press the "Next" button and configure your BMC step by step.

On the "IPv4", "IPv6" and "DNS" pages, you could specify the hostname and network settings of BMC.

On the "Remote Control" page, you could specify allowed IP region which could access KVM and Remote media web pages.

On the "Date and Time" page, you could specify the NTP and time settings.



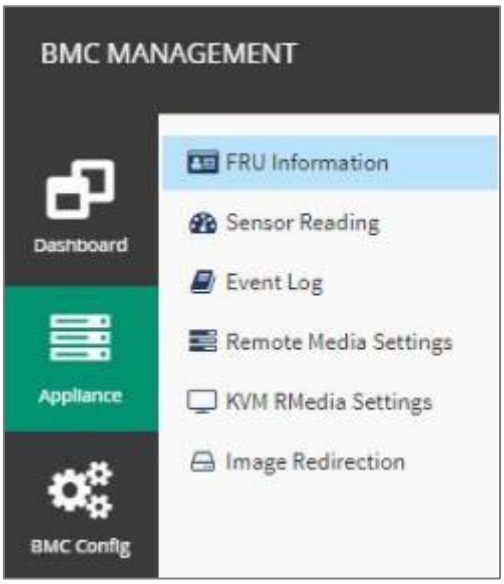
In the final page, please press "Finish" button to complete the first-time wizard. BMC will be rebooted and apply new settings. You could reconnect to the Web UI after a few minutes.

Web UI Layout Introduction

The BMC Web UI consists of various menu items:

Menu Bar

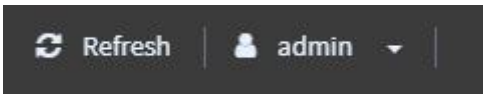
A screenshot of the menu bar is shown below:



Menu Bar

Quick Button and Logged-in User

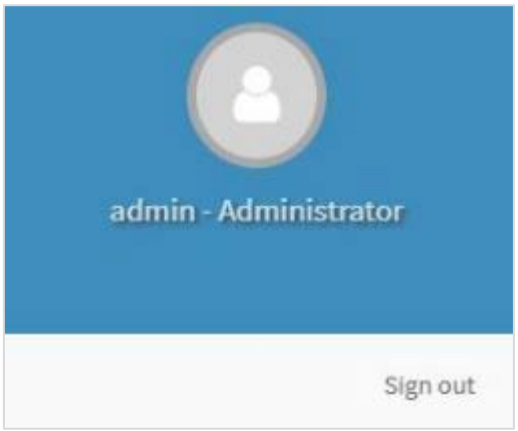
The user information and quick buttons are located at the top right of the Web UI.



User Information

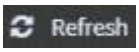
Logged-in user information: Click the icon  to view the logged-in user information.

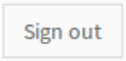
A screenshot of the logged-in user information is shown below:



Logged-in User Information

The logged-in user information shows the logged-in user's username, privilege, with the quick buttons allowing you to perform the following functions:

- **Refresh**: Click the icon 

to reload the current page.
- **Sign out**: Click the icon 

to log out of the Web UI.

Logged-in user and its privilege level

This option shows the logged-in username and privilege. There are four kinds of privileges:

- **User**: Only valid commands are allowed.
- **Operator**: All BMC commands are allowed except for the configuration commands that can change the behavior of the out-of-hand interfaces.
- **Administrator**: All BMC commands are allowed.
- **No Access:** Login access denied.

Help

Help: The **Help** icon  is located at the top right of each page in Web UI. Click this help icon to view more detailed field descriptions.

CHAPTER 4: BIOS SETUP

BIOS is a firmware embedded on an exclusive chip on the system's motherboard. Lanner's BIOS firmware offering including market-proven technologies such as Secure Boot and Intel Boot Guard technology deliver solid commitments for the shield protection against malware, uncertified sequences and other named cyber threats.

BIOS Setup

To enter the BIOS setup utility, simply follow the steps below:

1. Boot up the system.
2. Pressing the **<Tab>** or **<Del>** key immediately allows you to enter the Setup utility, and then you will be directed to the BIOS main screen. The instructions for BIOS navigations are as below:

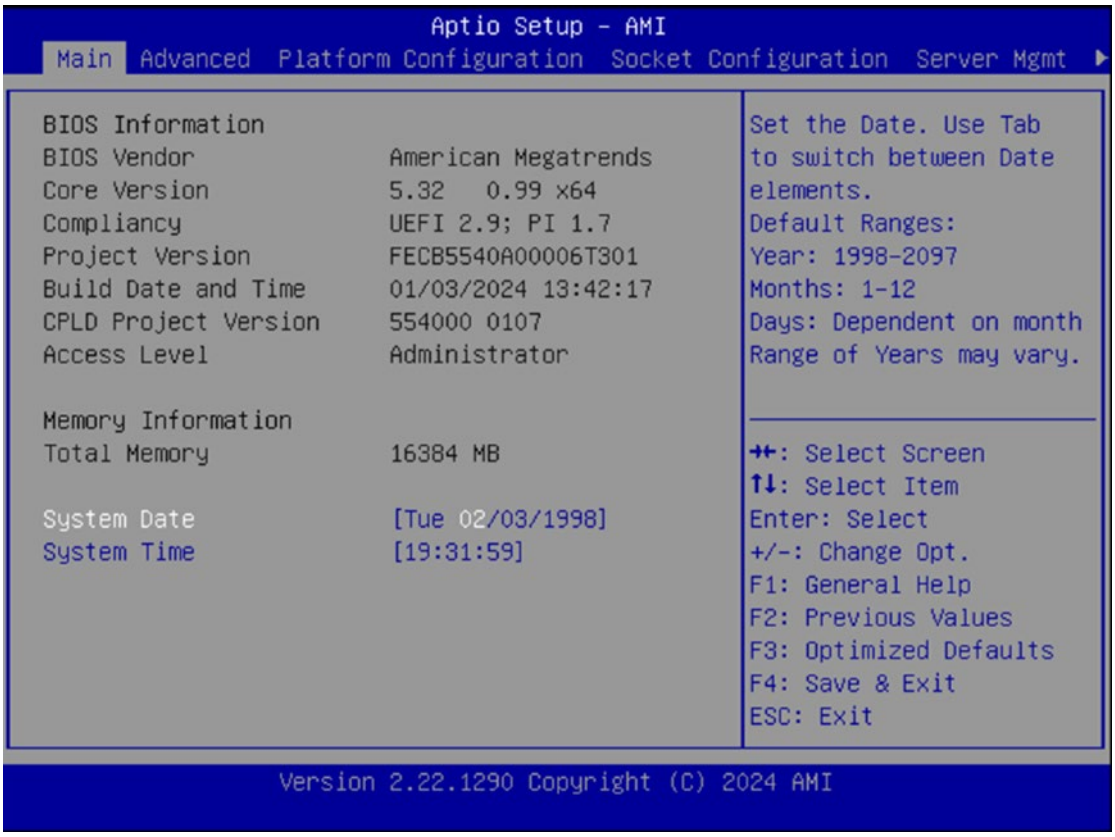
Control Keys	Description
→←	select a setup screen
↑↓	select an item/option on a setup screen
<Enter>	select an item/option or enter a sub-menu
+/-	adjust values for the selected setup item/option
F1	display General Help screen
F2	retrieve previous values, such as the last configured parameters during the last time you entered BIOS
F3	load optimized default values
F4	save configurations and exit BIOS
<Esc>	exit the current screen

Note

1. The **BIOS default setting** has the **PCIe x16 slot for GPU add-on cards DISABLED**. The ECA-5540 supports both Sapphire Rapids SP and Sapphire Rapids EE processors.
2. For configurations with the Sapphire Rapids SP processor, which supports 80 lanes, and 1x PCIe x16 slot (GPU card), 2x M.2 slots, 2x U.2 (SATA) slots, 2x PCIe x8 slots, OCP PCIe x16 slot.
3. However, if the system is configured with the Sapphire Rapids EE processor, which only supports 48 lanes, it cannot support all the above slots simultaneously. Therefore, the PCIe x16 slot for the GPU card is disabled by default.

Main Page

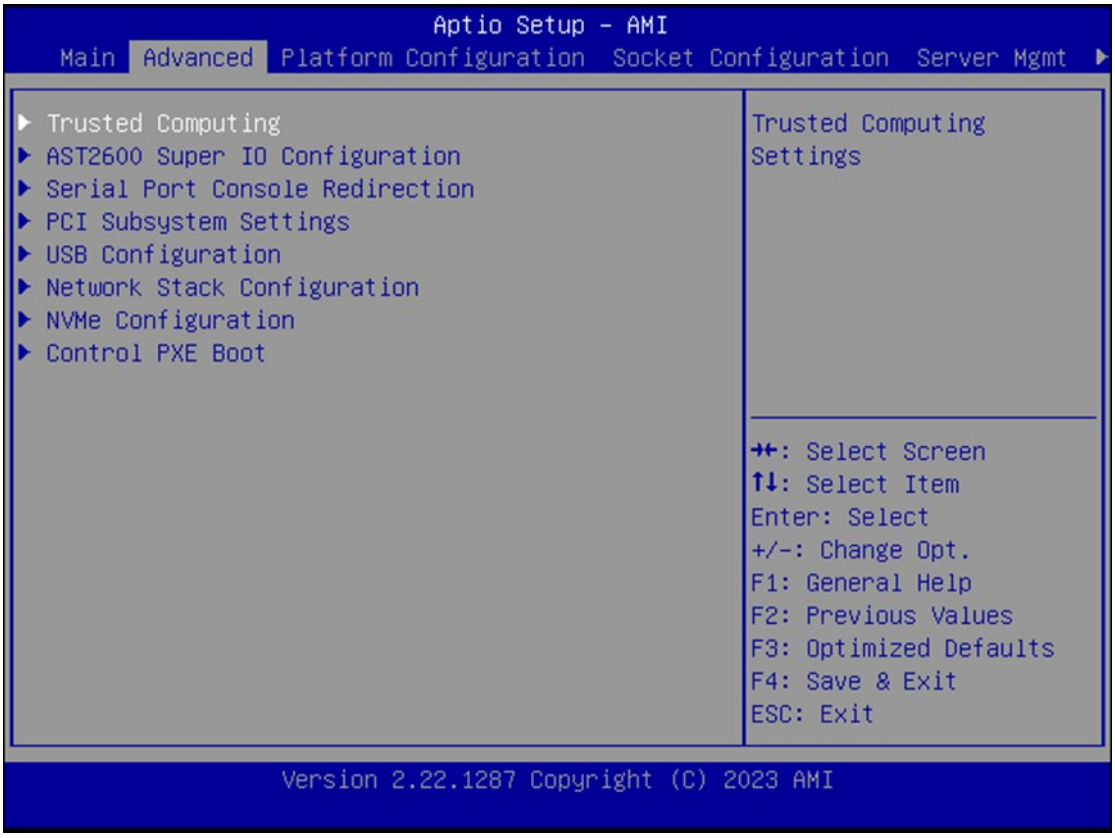
Setup main page contains BIOS information and project version information.



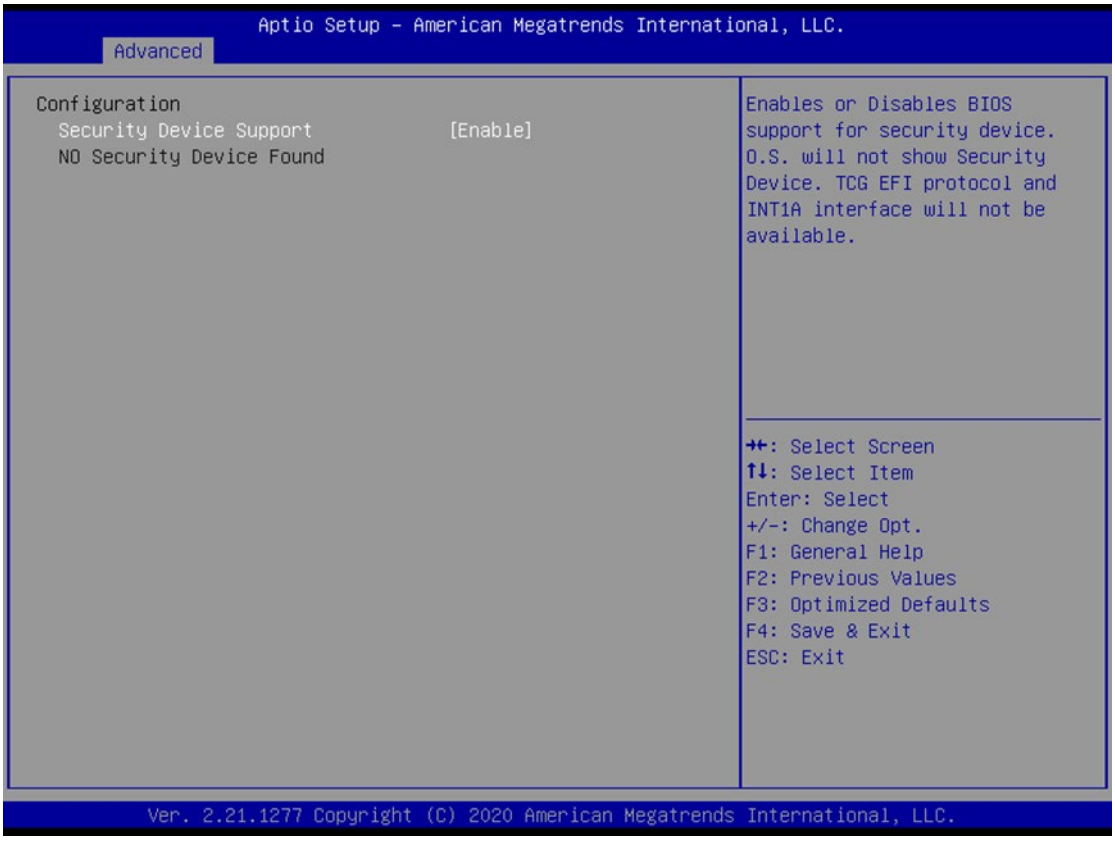
Feature	Description
BIOS Information	BIOS Vendor: American Megatrends Core Version :AMI Kernel version, CRB code base, X64 Compliancy : UEFI version, PI version BIOS Version : BIOS release version Build Date and Time : MM/DD/YYYY Access Level: Administrator / User
Memory Information	Total Memory: by case
System Date	To set the Date, use **<Tab>** to switch between Date elements. Default Range of Year: 1998-2097 Default Range of Month: 1-12 Days: dependent on Month.
System Time	To set the Date, use **<Tab>** to switch between Date elements.

Advanced Page

Select the **Advanced** menu item from the BIOS setup screen to enter the "Advanced" setup screen. Users can select any of the items in the left frame of the screen.

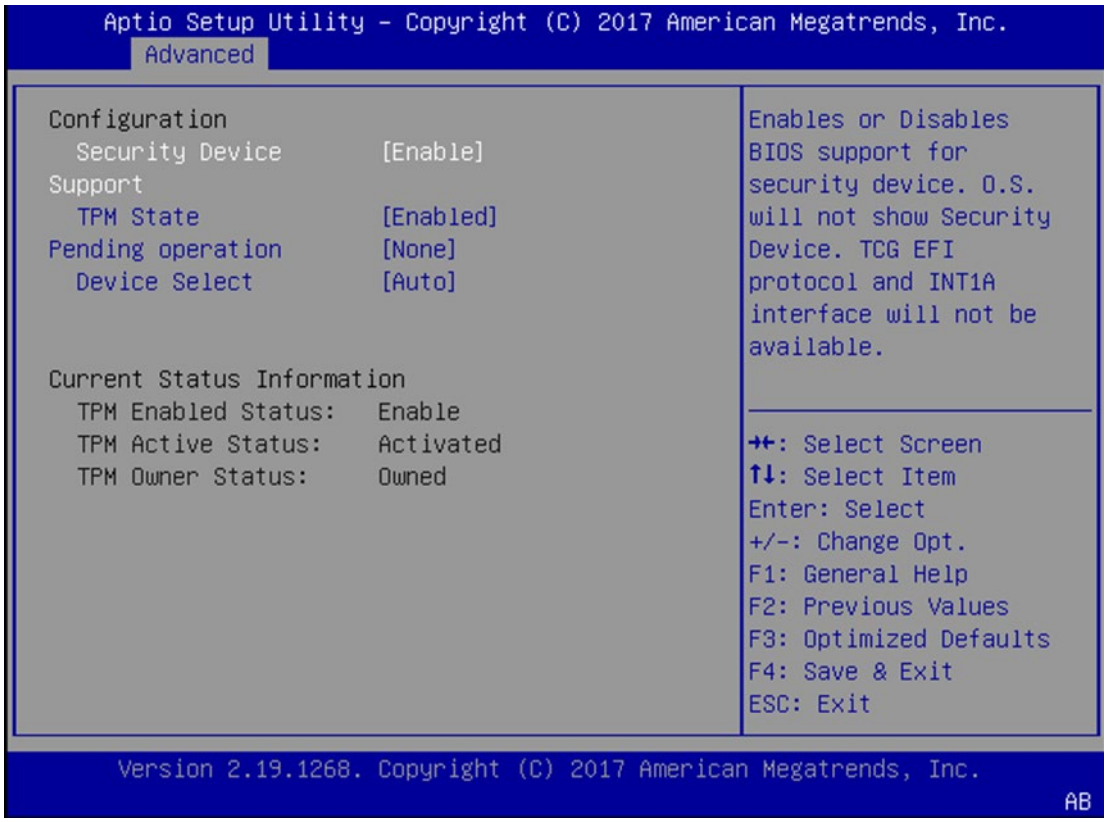


Trusted Computing



Feature	Options	Description
Security Device Support	Enabled Disabled	Enables or disables BIOS support for security device. By disabling this function, OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

Trusted Computing (TPM1.2)



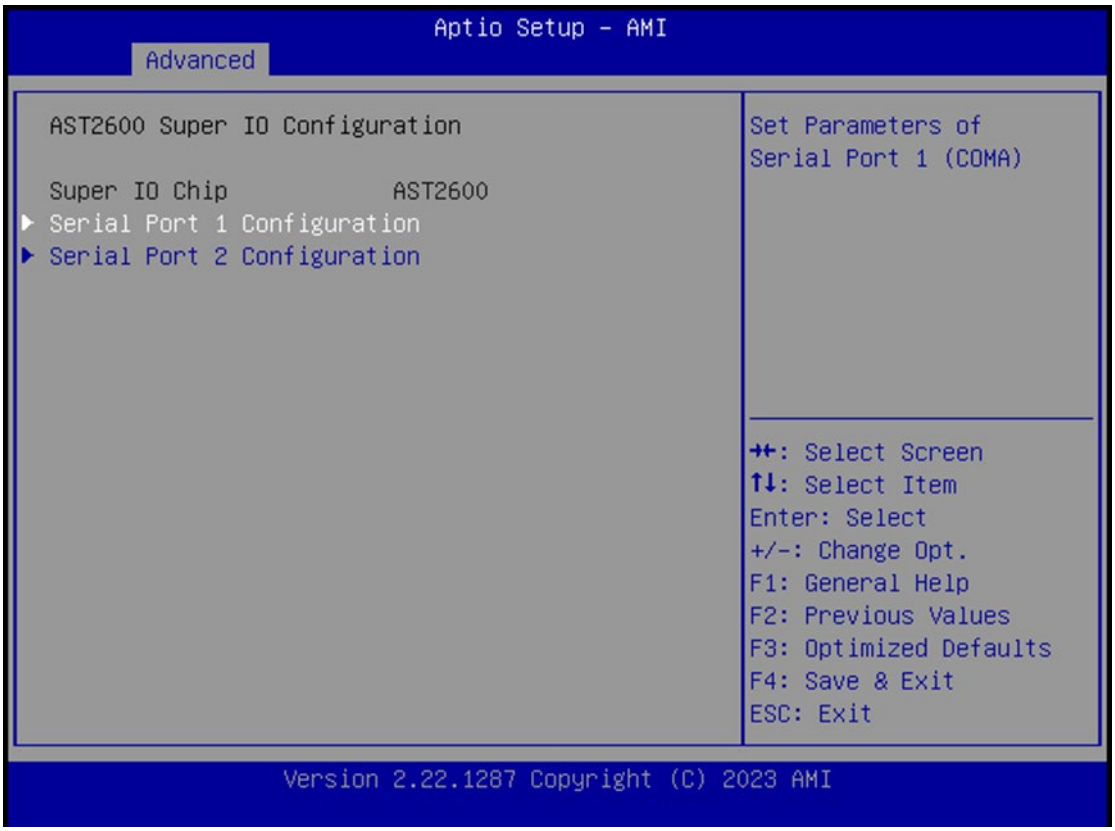
Feature	Options	Description
Security Device Support	Enabled Disabled	Enables or disables BIOS support for security device. By disabling this function, OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
TPM State	Enabled Disabled	Enables or disables Security Device. NOTE: Your computer will reboot during restart in order to change State of the Device.
Pending operation	None TPM Clear	Schedules an Operation for the Security Device. NOTE: Your computer will reboot during restart in order to change State of Security Device.
Device Select	TPM 1.2 TPM 2.0 Auto	**TPM 1.2** will restrict support to TPM 1.2 devices; while **TPM 2.0** will restrict support to TPM 2.0 devices; **Auto** will support both with the default set to TPM 2.0 devices. If not found, TPM 1.2 devices will be enumerated.

Trusted Computing (TPM2.0)

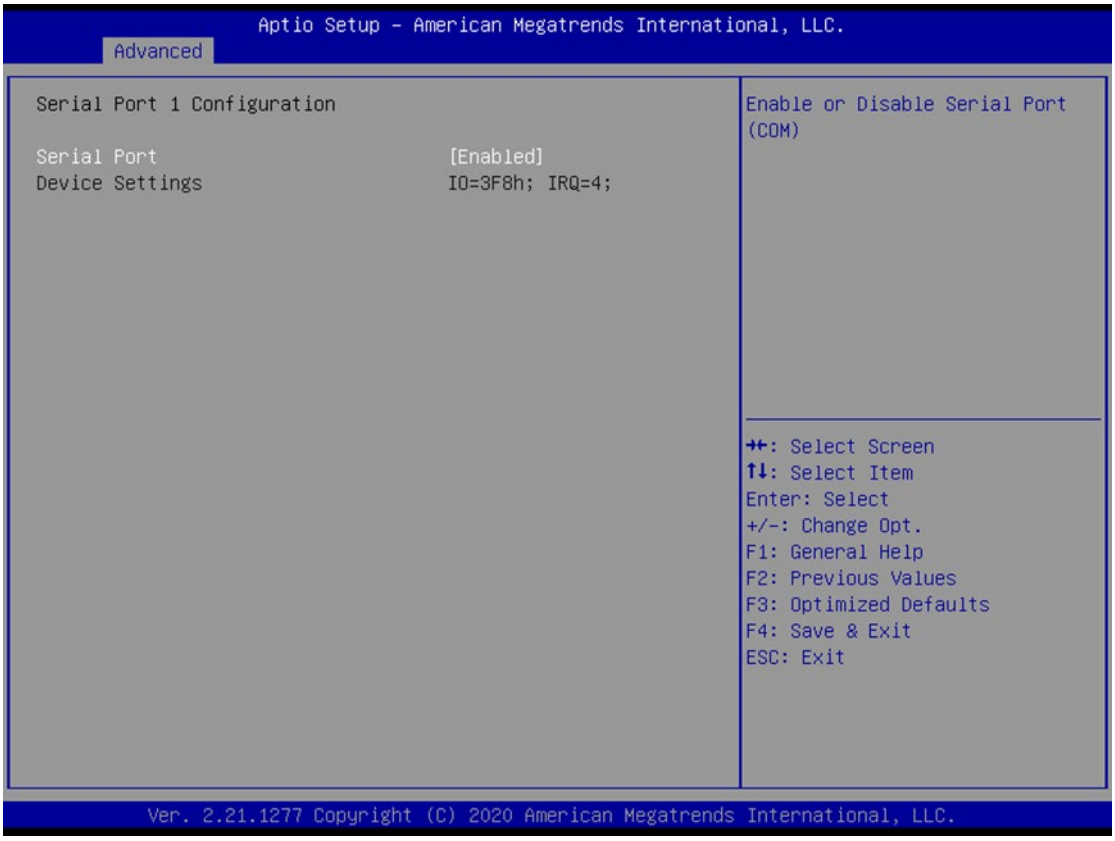
Feature	Options	Description
Security Device Support	Enabled Disabled	Enables or disables BIOS support for security device. By disabling this function, OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
SHA-1 PCR Bank	Enabled Disabled	Enables or disables SHA-1 PCR Bank.

SHA256 PCR Bank	Enabled Disabled	Enables or disables SHA256 PCR Bank.
Pending operation	None TPM Clear	Schedules an Operation for the Security Device. NOTE: Your computer will reboot during restart in order to change State of Security Device.
Platform Hierarchy	Enabled Disabled	Enables or disables Platform Hierarchy.
Storage Hierarchy	Enabled Disabled	Enables or disables Storage Hierarchy.
Endorsement Hierarchy	Enabled Disabled	Enables or disables Endorsement Hierarchy.
Physical Presence Spec Version	1.2 1.3	Select to tell OS to support PPI Spec Version 1.2 or 1.3. NOTE: Some HCK tests might not support 1.3.
TPM 20 InterfaceType	TIS	Select **TPM 20 Device** for the Communication Interface.
Device Select	TPM 1.2 TPM 2.0 Auto	**TPM 1.2** will restrict support to TPM 1.2 devices; while **TPM 2.0** will restrict support to TPM 2.0 devices; **Auto** will support both with the default set to TPM 2.0 devices. If not found, TPM 1.2 devices will be enumerated.

AST2600 Super IO Configuration

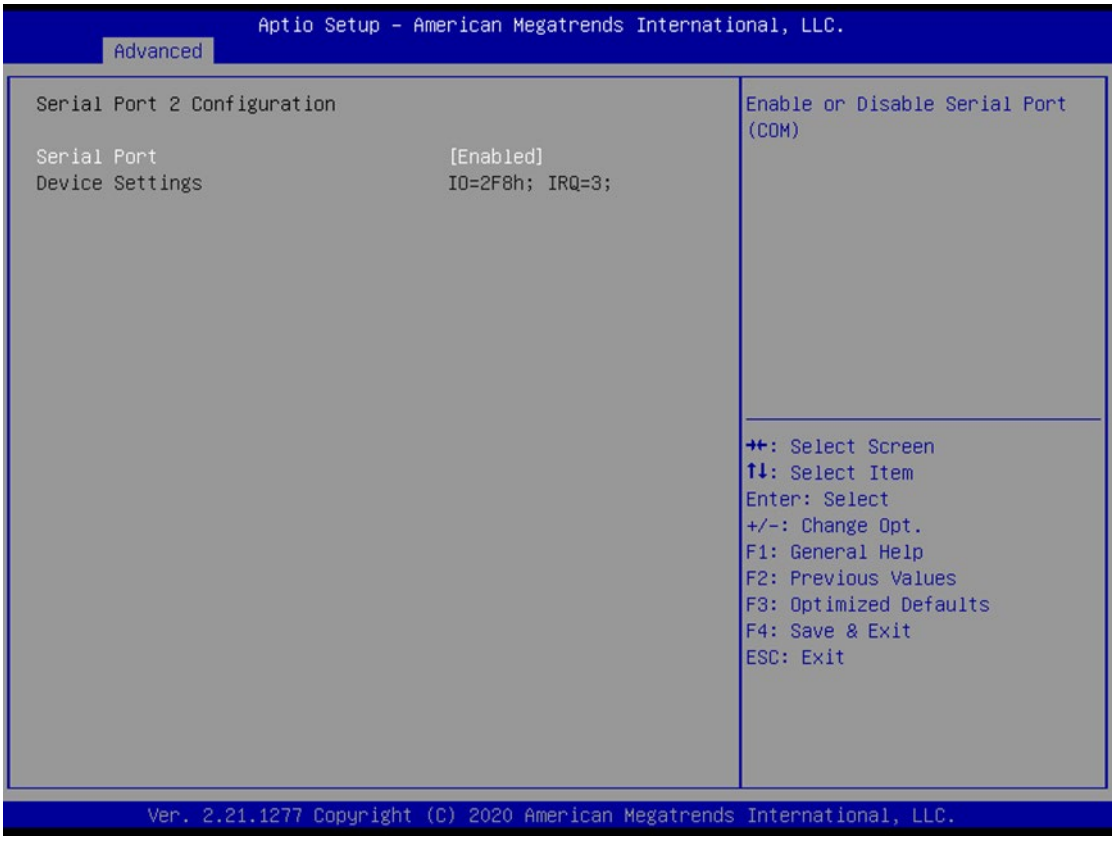


Serial Port 1 Configuration



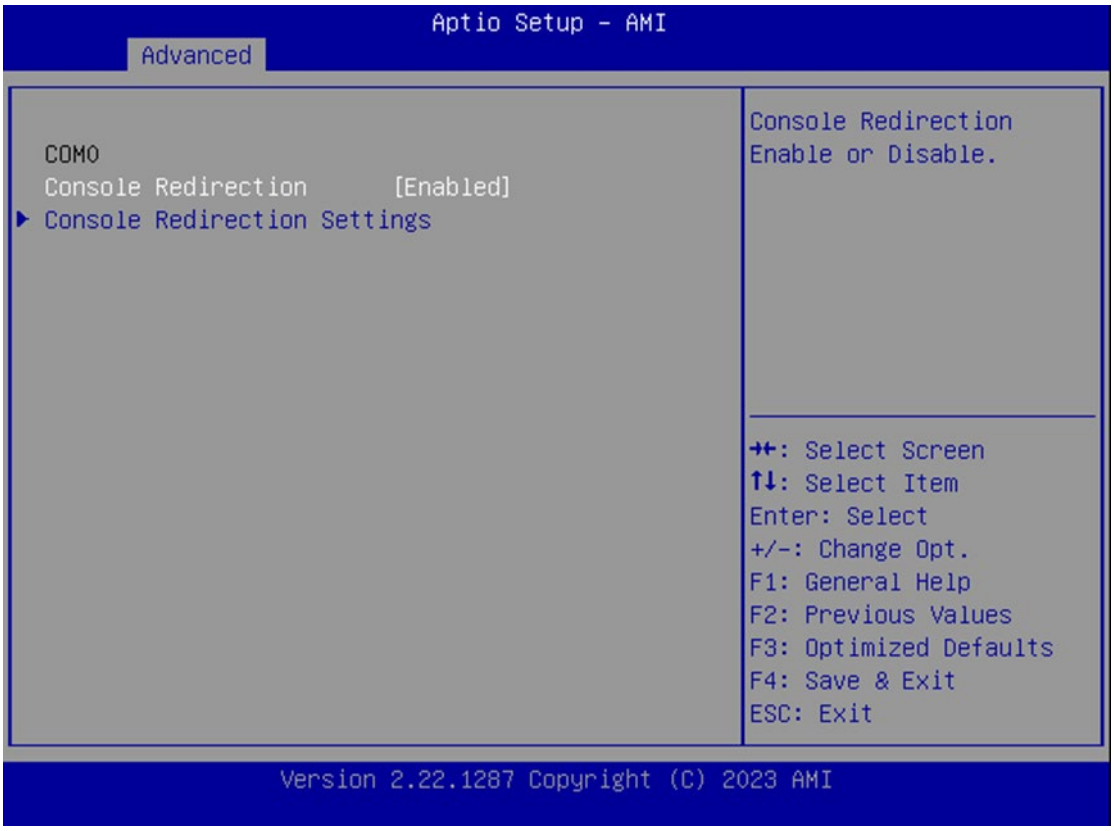
Feature	Options	Description
Serial Port	Enabled Disabled	Enable or Disable Serial Port (COM)
Device Settings	NA	IO=3F8h; IRQ = 4

Serial Port 2 Configuration



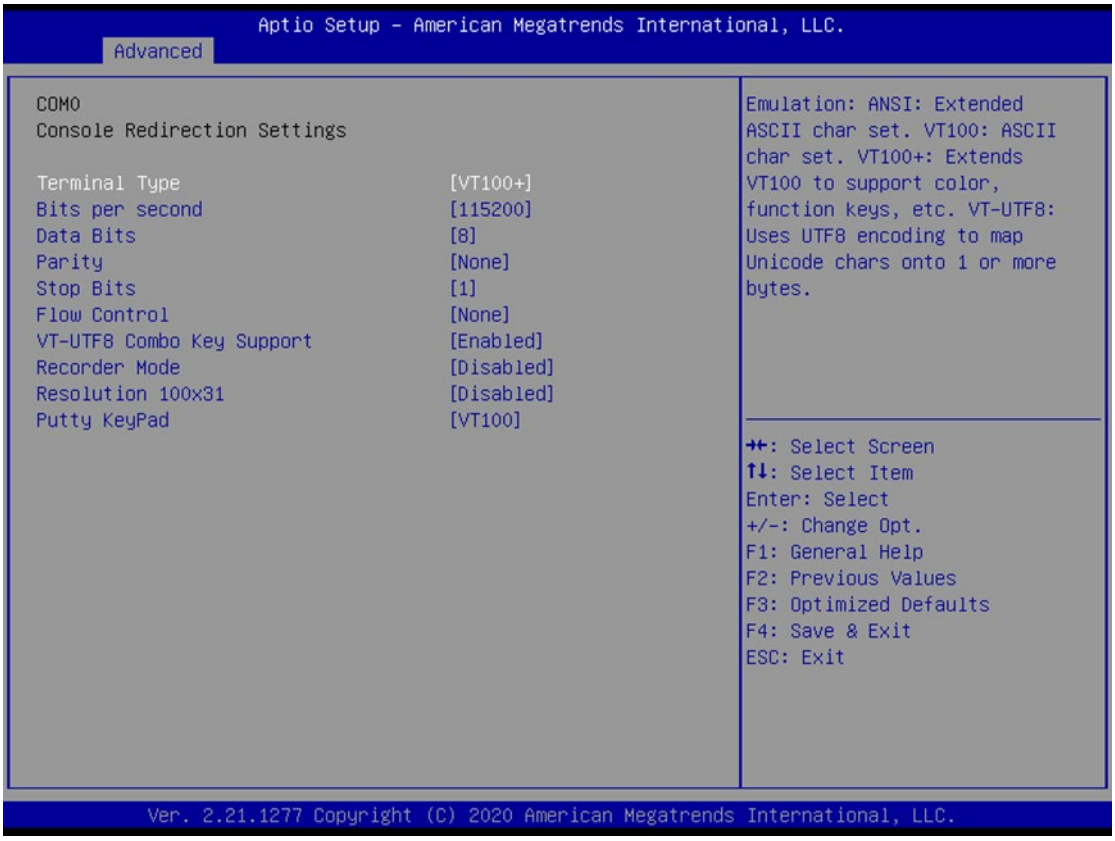
Feature	Options	Description
Serial Port	Enabled Disabled	Enables or disables Serial Port 2
Device Settings	NA	IO=2F8h; IRQ = 3

Serial Port Console Redirection



Feature	Options	Description
COM0 Console Redirection	Enabled Disabled	Enables or disables Console Redirection

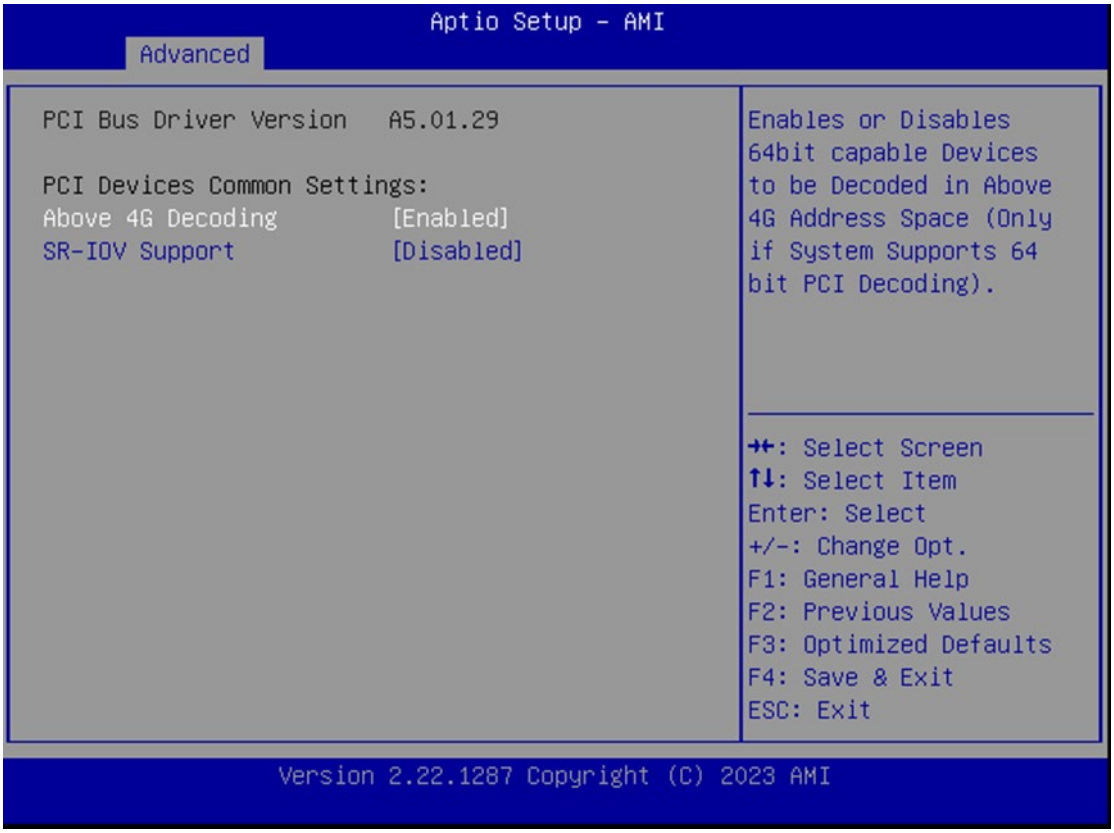
Console Redirection Settings



Feature	Options	Description
Terminal Type	VT100 VT100+ VT-UTF8 ANSI	**VT100**: ASCII char set **VT100+**:Extends VT100 to support color, function keys, etc. **VT-UTF8**:Uses UTF8 encoding to map Unicode chars onto 1 or more bytes **ANSI**: Extended ASCII char set
Bits per second	9600 19200 38400 57600 115200	Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
Data Bits	7 8	Data Bits
Parity	None Even Odd Mark Space	A parity bit can be sent with the data bits to detect some transmission errors.
Stop Bits	1 2	Indicates the end of a serial data packet.

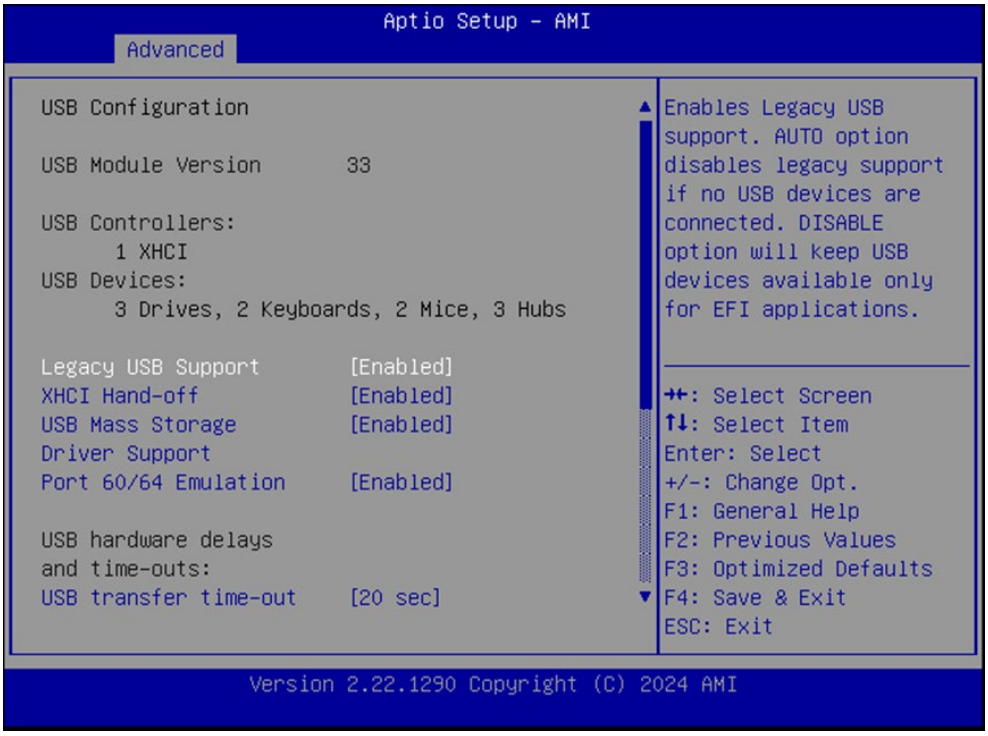
Flow Control	None Hardware RTS/CTS	Flow Control can prevent data loss from buffer overflow.
VT-UTF8 Combo Key Support	Disabled Enabled	Enables VT-UTF8 Combination Key Support for ANSI/VT100 terminals
Recorder Mode	Disabled Enabled	With this mode enabled, only text will be sent. This is to capture Terminal data.
Resolution 100x31	Disabled Enabled	Enables or disables extended terminal resolution
Putty KeyPad	VT100 LINUX XTERM86 SCO ESCN VT400	Selects FunctionKey and KeyPad on Putty.

PCI Subsystem Settings



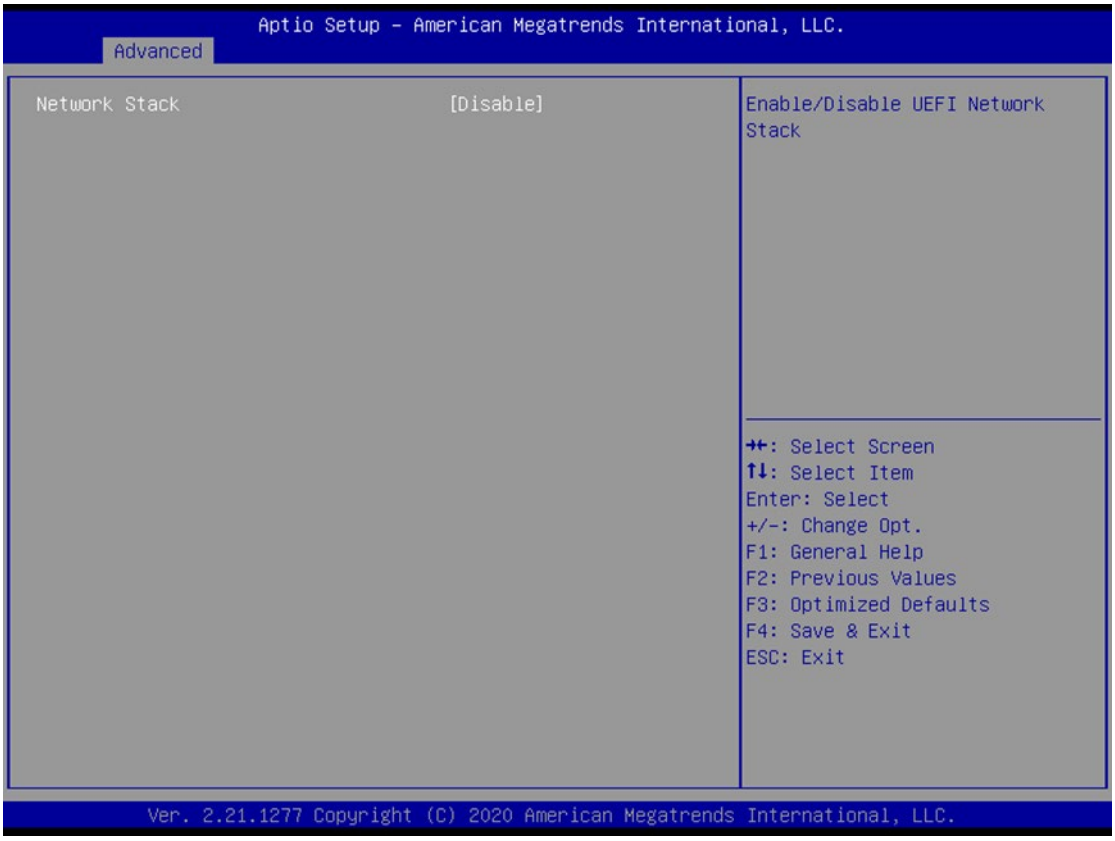
Feature	Options	Description
Above 4G Decoding	Disabled Enabled	Enables or disables 64bit capable Devices to be Decoded in Above 4G Address Space (Only if System Supports 64 bit PCI Decoding)
SR-IOV Support	Disabled Enabled	If the system has SR-IOV capable PCIe Devices, this option enables or disables Single Root IO Virtualization Support.

USB Configuration



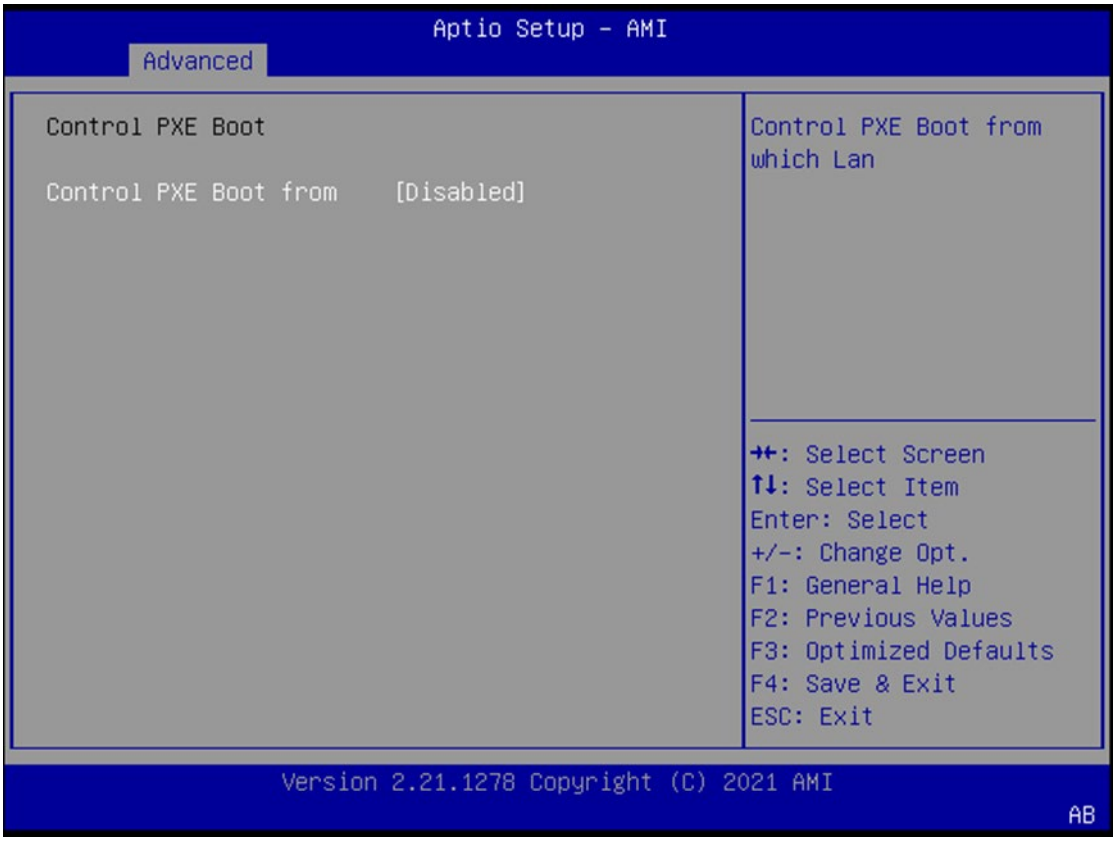
Feature	Options	Description
Legacy USB Support	Enabled Disabled Auto	Enables Legacy USB support. **Auto** option disables legacy support if no USB devices are connected; **Disabled**option will keep USB devices available only for EFI applications.
XHCI Hand-off	Enabled Disabled	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Enabled Disabled	Enables or disables USB Mass Storage Driver Support.
Port 60/64 Emulation	Enabled Disabled	Enables I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OSes.
USB Transfer Time-out	1 sec 5 sec 10 sec 20 sec	The time-out value for Control, Bulk, and Interrupt transfers
Device Reset Time-out	10 sec 20 sec 30 sec 40 sec	USB mass storage device Start Unit command time-out
Device Power-up Delay	Auto Manual	Maximum time the device will take before it properly reports itself to the Host Controller. **Auto** uses default value: for a Root port, it is 100 ms, for a Hub port the delay is taken from Hub descriptor.

Network Stack Configuration



NVMe Configuration

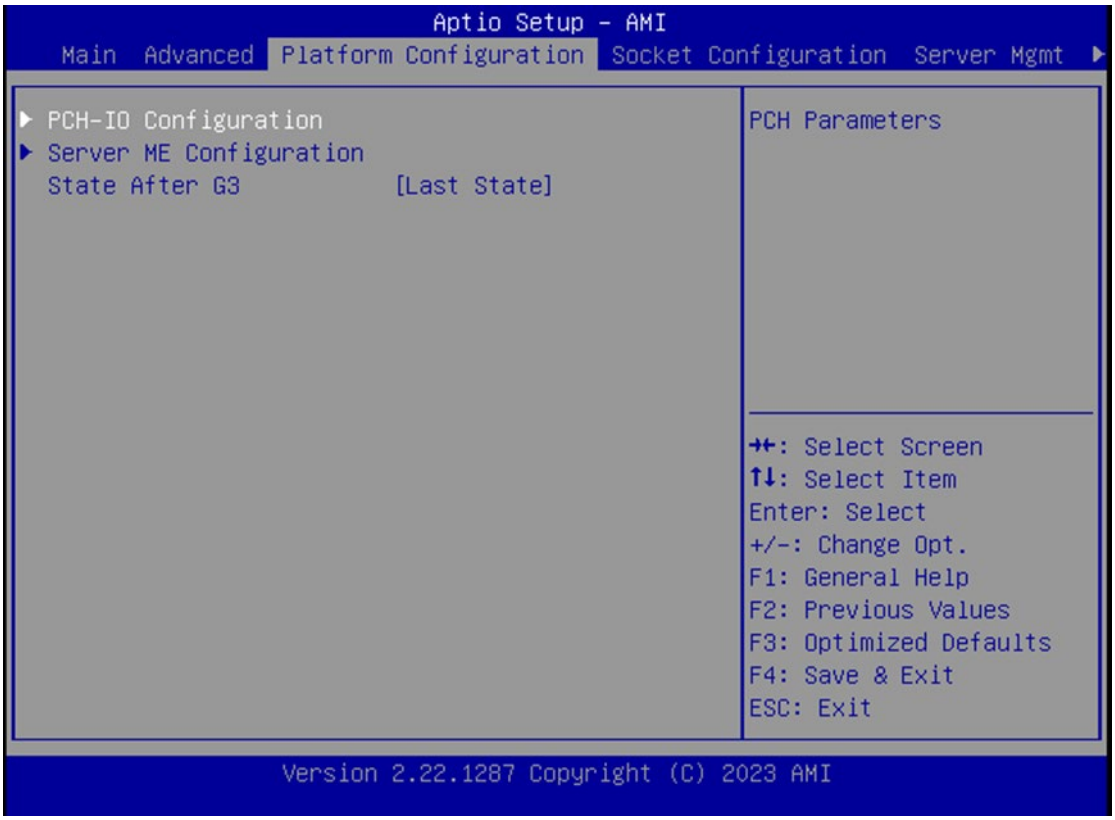
Control PXE Boot



Feature	Options	Description
Control Legacy PXE Boot from	Disabled Enabled	Select On Board LAN# Boot

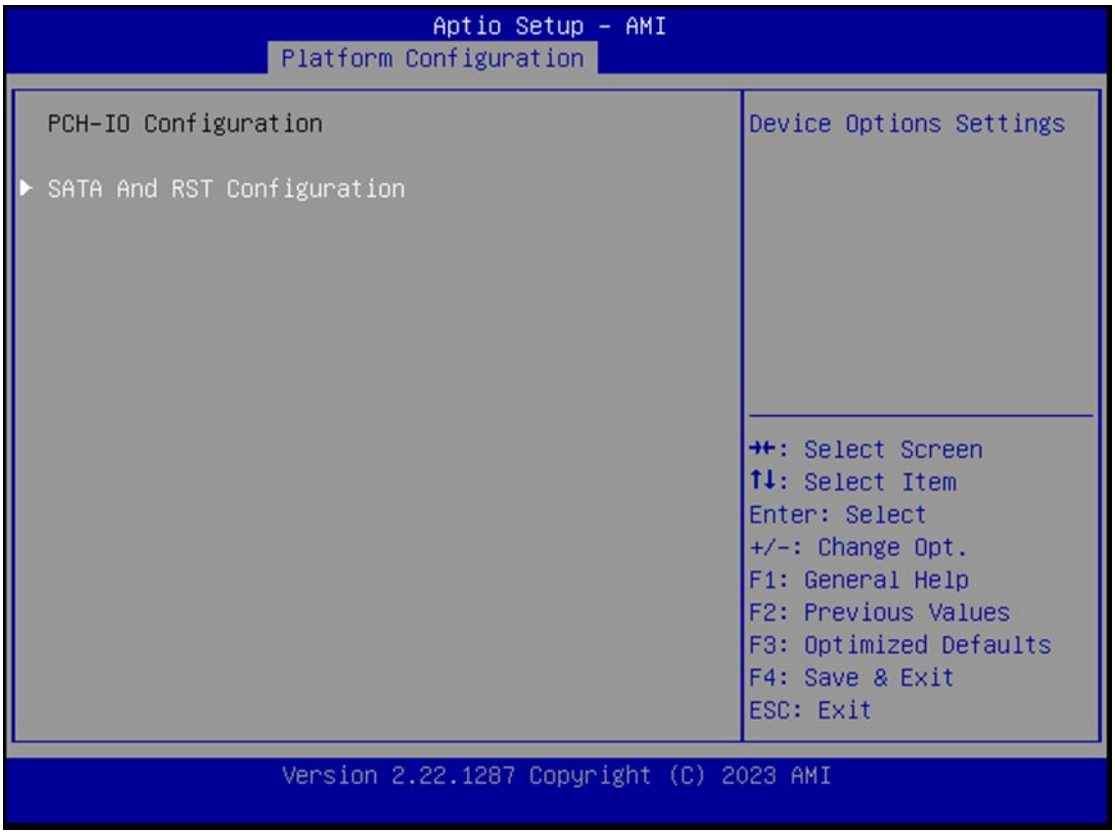
Platform Configuration

Select the Platform menu item from the BIOS setup screen to enter the Platform Setup screen. Users can select any of the items in the left frame of the screen.



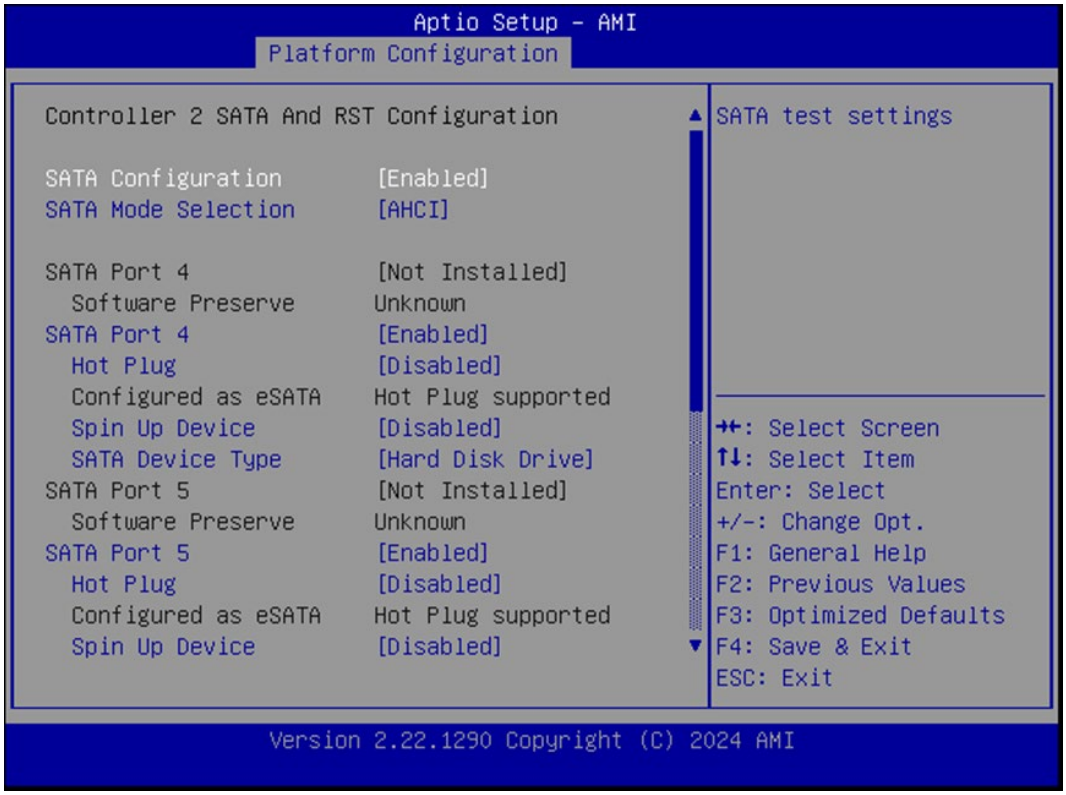
Feature	Options	Description
PCH Configuration	None	Displays and provides option to change the PCH Settings
Server ME Configuration	None	Configure Server ME Technology Parameters
State After G3	Power ON Power Off Last State	Select S0/S5 for ACPI state after a G3

PCH Configuration



Feature	Options	Description
SATA And RST Configuration	N/A	

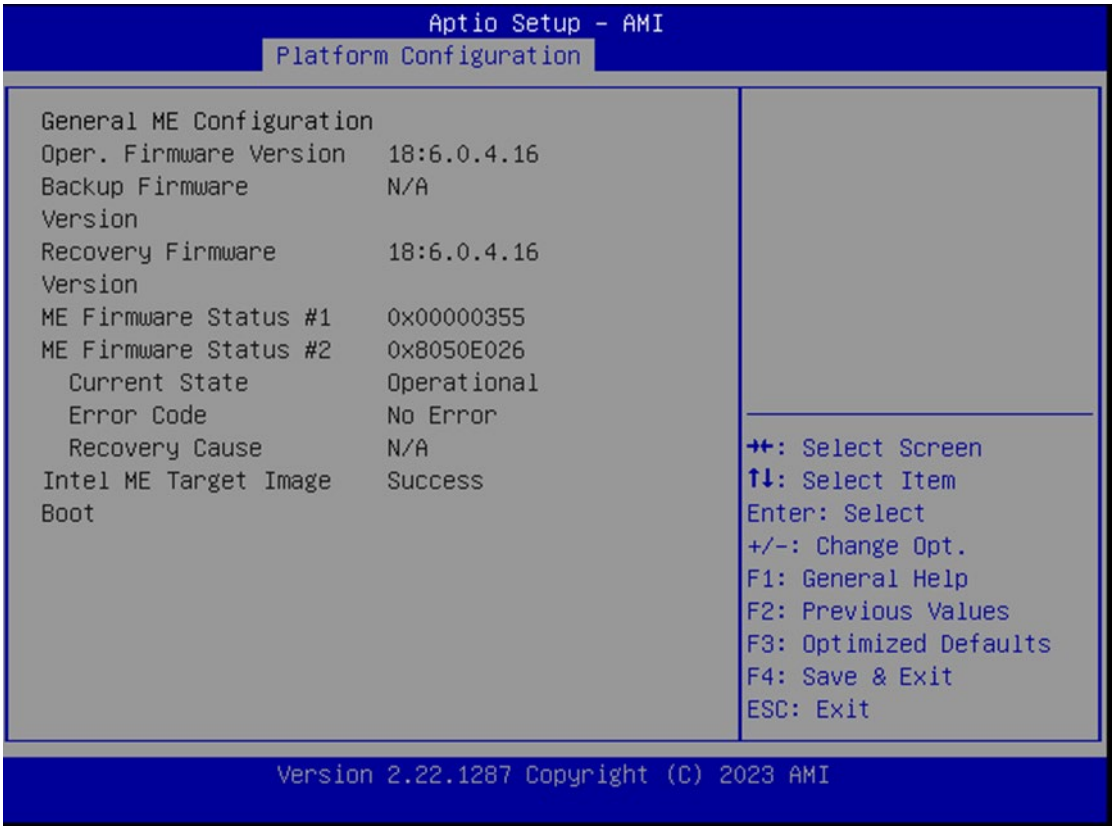
Controller 2 SATA and RST Configuration



Feature	Options	Description
SATA Configuration	Disabled Enabled	Enables or disables SATA Controller
SATA Mode Selection	AHCI	Determines how SATA controller(s) operate.
Port4	Disabled Enabled	Enable or Disable SATA Port
Hot Plug	Disabled Enabled	Designates this port as Hot Pluggable.
Configured as eSATA	Disabled Enabled	Configures port as External SATA (eSATA)
Spin Up Device	Disabled Enabled	If enabled for any of ports Staggerred Spin Up will be performed and only the drives which have this option enabled will spin up at boot. Otherwise all drives spin up at boot.
SATA Device Type	Hard Disk Drive Solid State Drive	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive
Port5	Disabled Enabled	Enable or Disable SATA Port
Hot Plug	Disabled Enabled	Designates this port as Hot Pluggable.
Configured as eSATA	Disabled Enabled	Configures port as External SATA (eSATA)

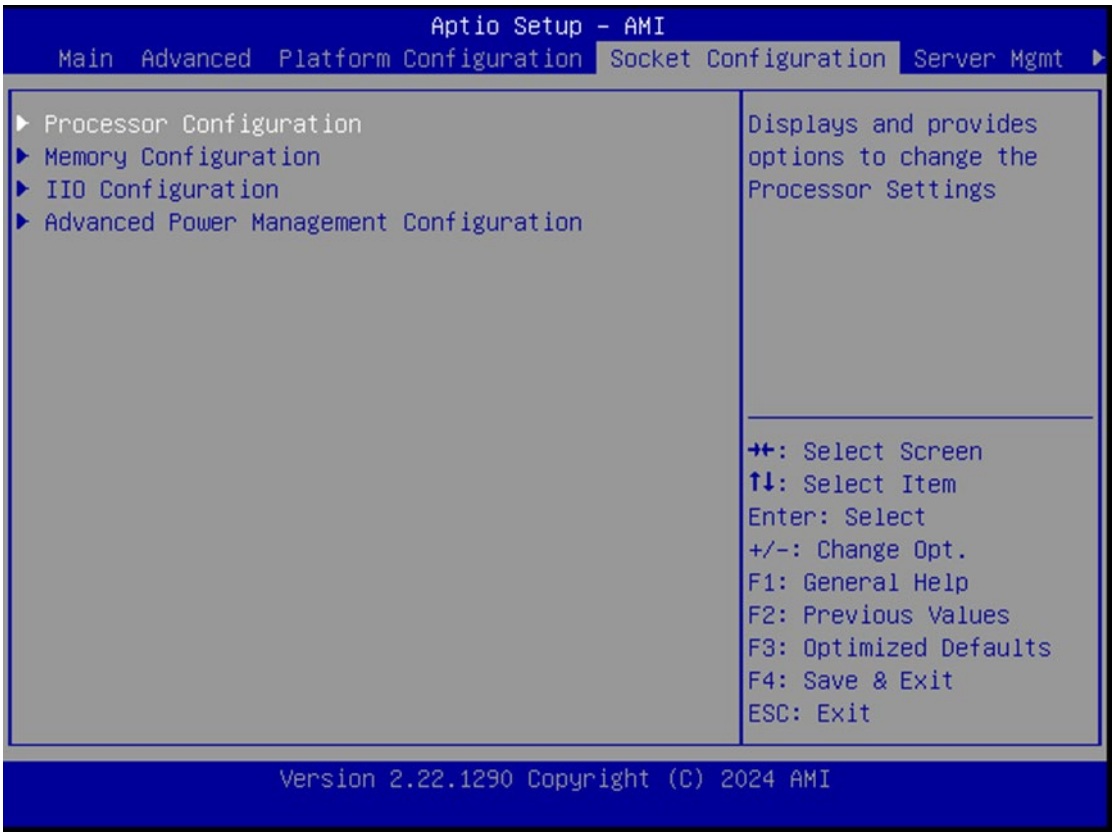
Spin Up Device	Disabled Enabled	If enabled for any of ports Staggerred Spin Up will be performed and only the drives witch have this option enabled will spin up at boot. Otherwise all drives spin up at boot.
SATA Device Type	Hard Disk Drive Solid State Drive	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive
Port6	Disabled Enabled	Enable or Disable SATA Port
Hot Plug	Disabled Enabled	Designates this port as Hot Pluggable.
Configured as eSATA	Disabled Enabled	Configures port as External SATA (eSATA)
Spin Up Device	Disabled Enabled	If enabled for any of ports Staggerred Spin Up will be performed and only the drives witch have this option enabled will spin up at boot. Otherwise all drives spin up at boot.
SATA Device Type	Hard Disk Drive Solid State Drive	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive
Port7	Disabled Enabled	Enable or Disable SATA Port
Hot Plug	Disabled Enabled	Designates this port as Hot Pluggable.
Configured as eSATA	Disabled Enabled	Configures port as External SATA (eSATA)
Spin Up Device	Disabled Enabled	If enabled for any of ports Staggerred Spin Up will be performed and only the drives which have this option enabled will spin up at boot. Otherwise all drives spin up at boot.
SATA Device Type	Hard Disk Drive Solid State Drive	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive

Server ME Configuration



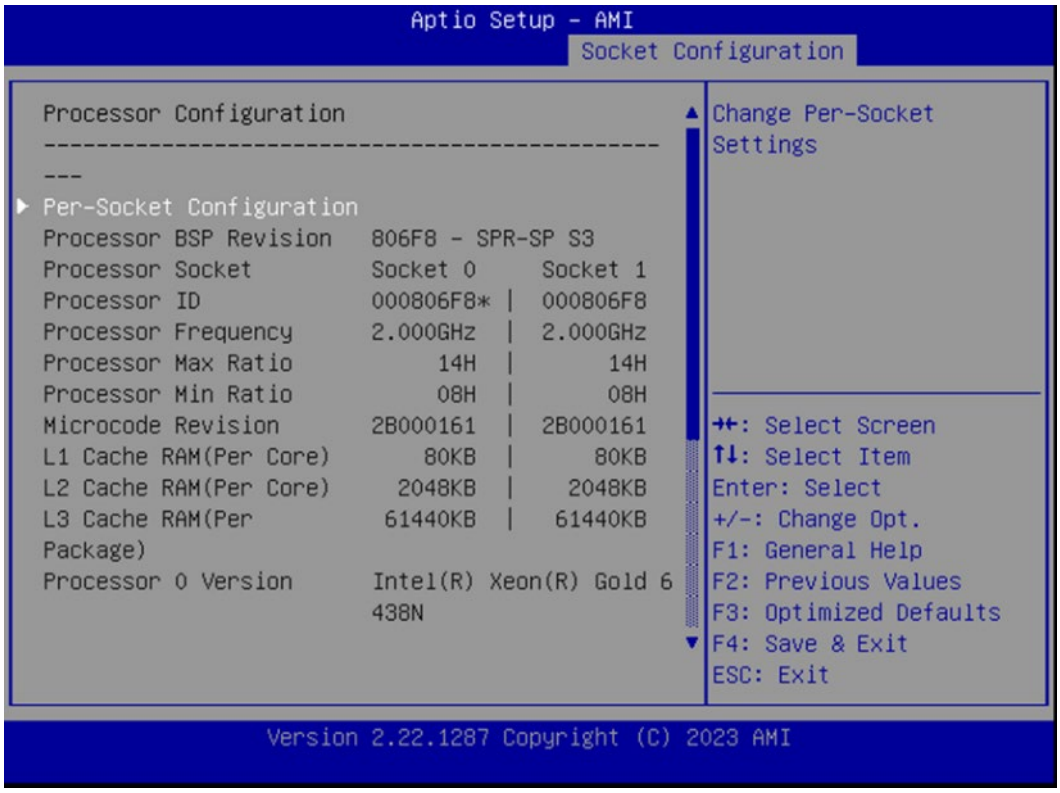
Socket

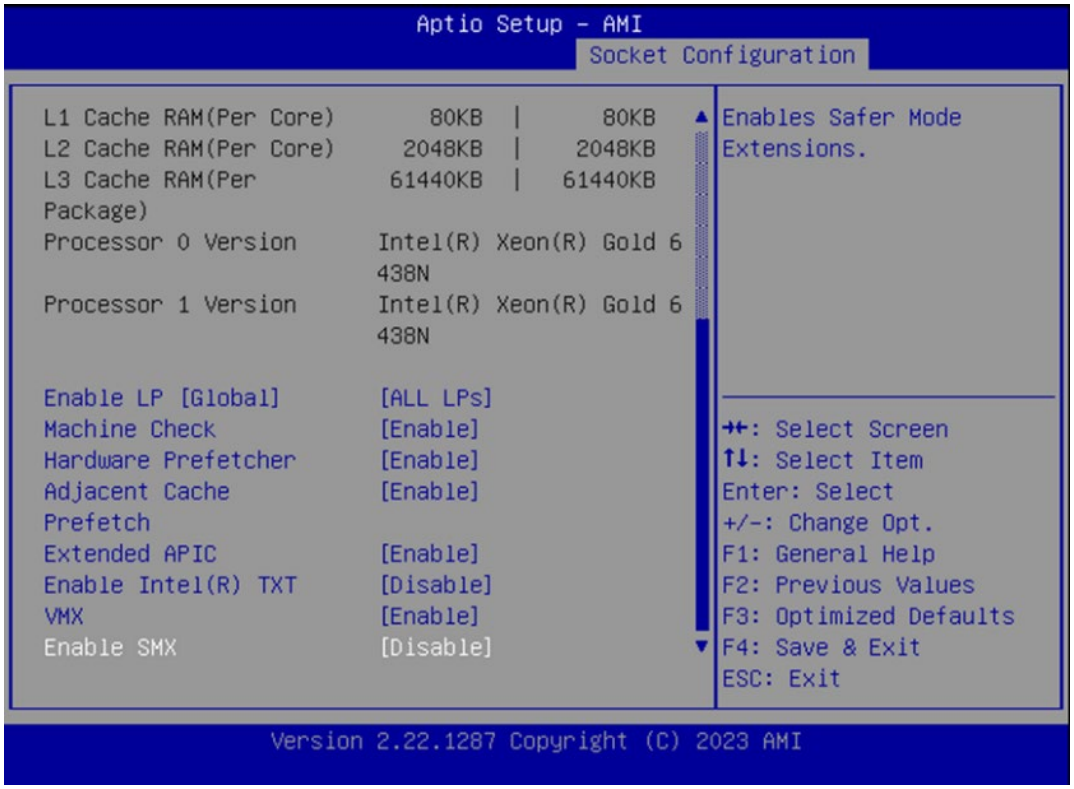
Select the Socket menu item from the BIOS setup screen to enter the Socket Setup screen. Users can select any of the items in the left frame of the screen.



Feature	Options	Description
Processor Configuration	None	Displays and provides option to change the Processor Settings
Memory Configuration	None	Displays and provides option to change the Memory Settings
IIO Configuration	None	Displays and provides option to change the IIO Settings
Advanced Power Management Configuration	None	Displays and provides option to change the Power Management Settings

Processor Configuration

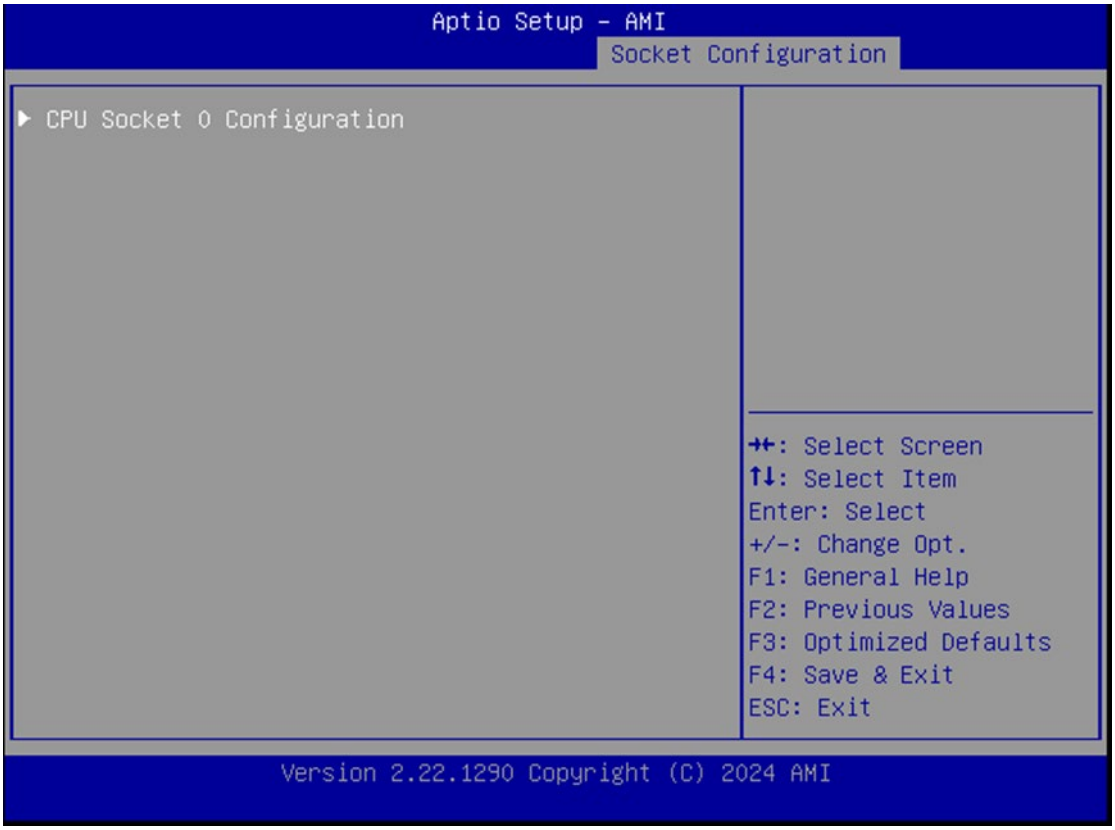




Feature	Options	Description
Enable LP	ALL LPs Single LP	Enables Logical processor (Software Method to Enable/Disable Logical Processor threads)
Machine Check	Disabled Enabled	Enable or Disable the Machine Check

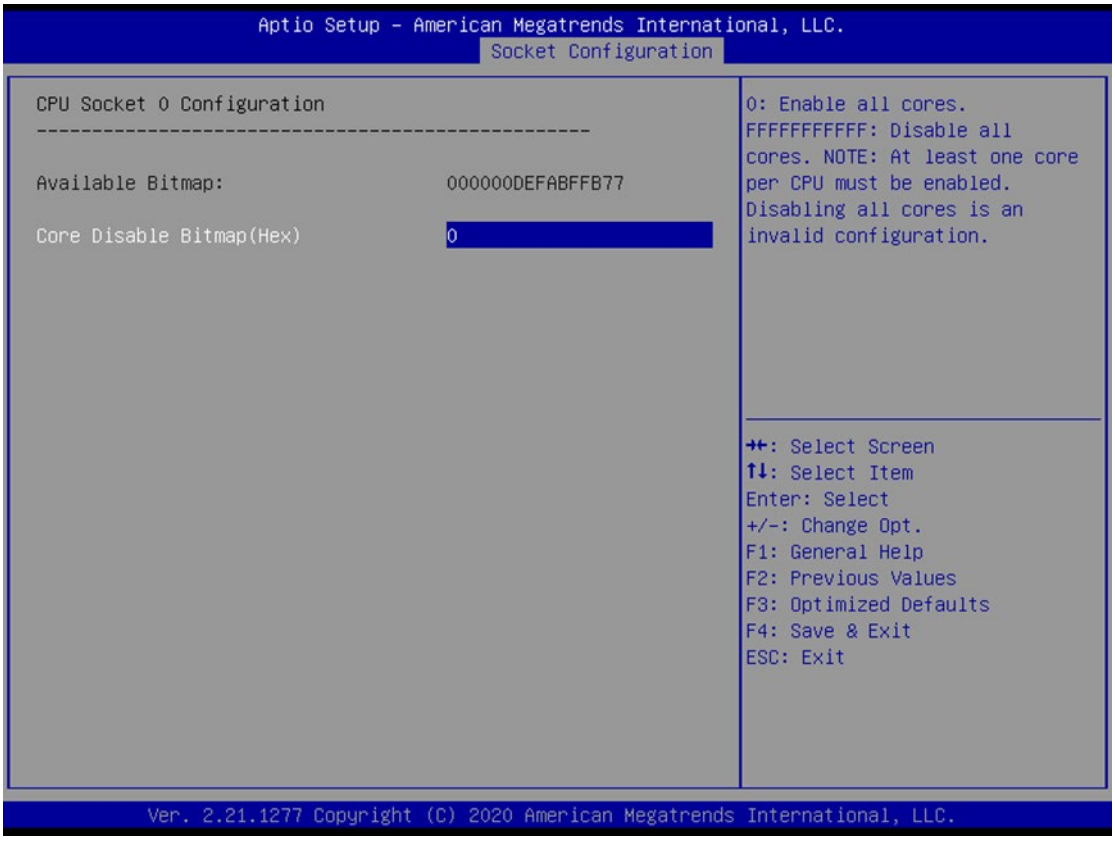
Hardware Prefetcher	Disabled Enabled	= MLC Streamer Prefetcher (MSR 1A4h Bit [0])
Adjacent Cache Prefetcher	Disabled Enabled	= MLC Spatial Prefetcher (MSR 1A4h Bit [1])
Extended APIC	Disabled Enabled	Enables or disables extended APIC support
Enable Intel® TXT	Disabled Enabled	Enables Intel(R) TXT
VMX	Disabled Enabled	Enables the Vanderpool Technology, which takes effect after reboot.
Enable SMX	Disabled Enabled	Enables Safer Mode Extensions

Per-Socket Configuration



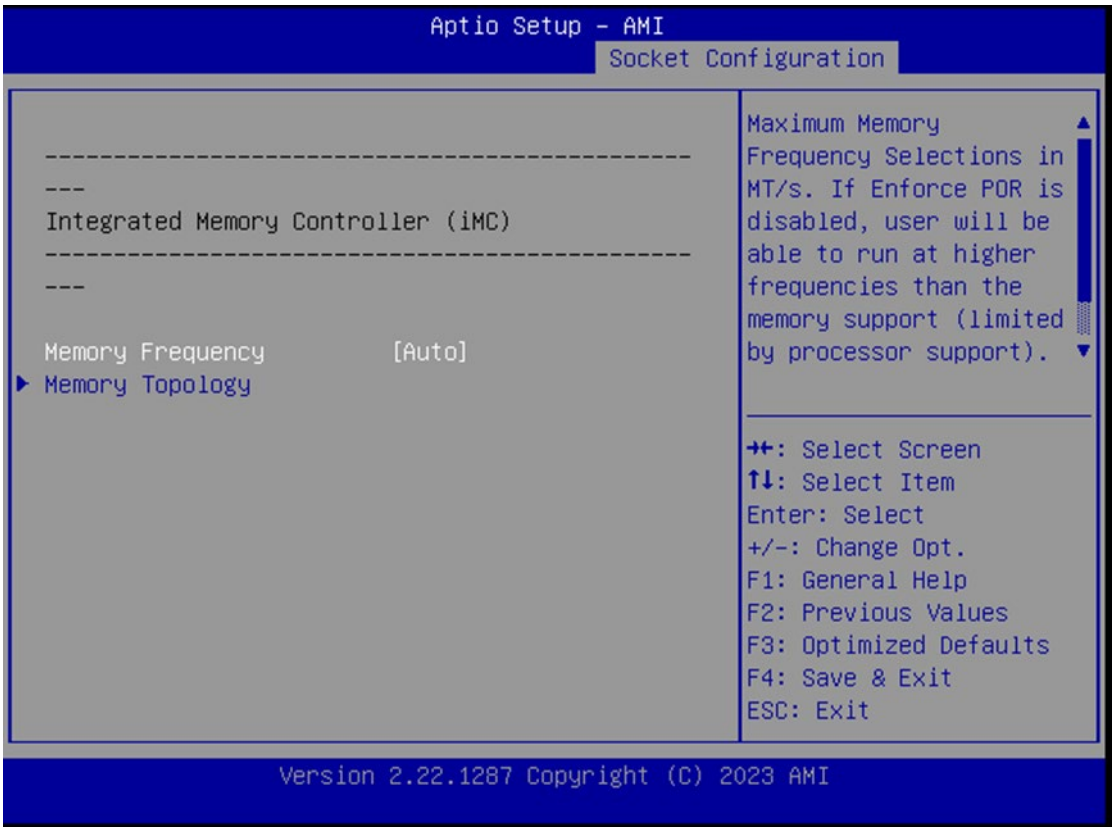
Feature	Options	Description
CPU Socket0 Configuration	None	None

CPU Socket0 Configuration



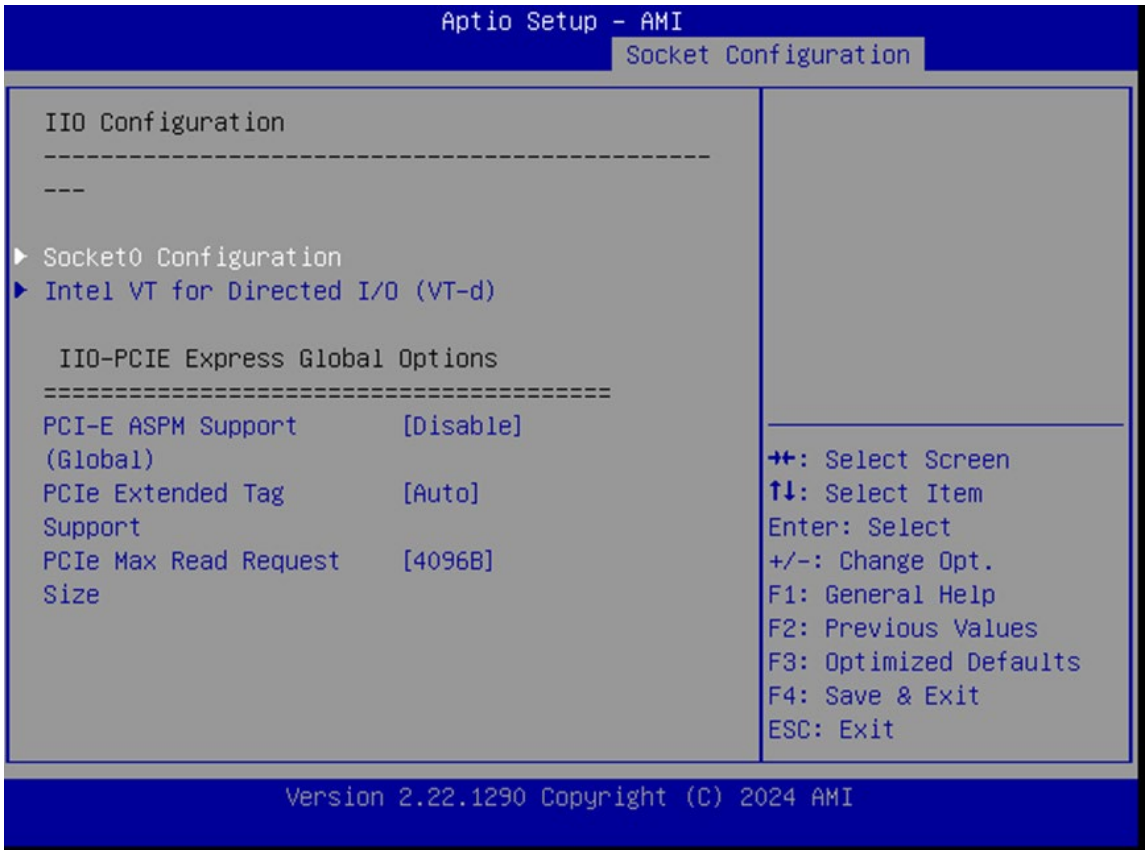
Feature	Options	Description
Core Disable Bitmap(Hex)	0	0: Enable all cores. FFFFFFFFFF: Disable all cores least one core per CPU must be enabled. Disabling all cores is an invalid configuration.

Memory Configuration



Feature	Options	Description
Memory Frequency	Auto 3200 3600 4000 4400 4800 5200 5600	Maximum Memory Frequency Selections in Mhz. Do not select Reserved.
Memory Topology	None	Displays memory topology with Dimm population information

IIO Configuration

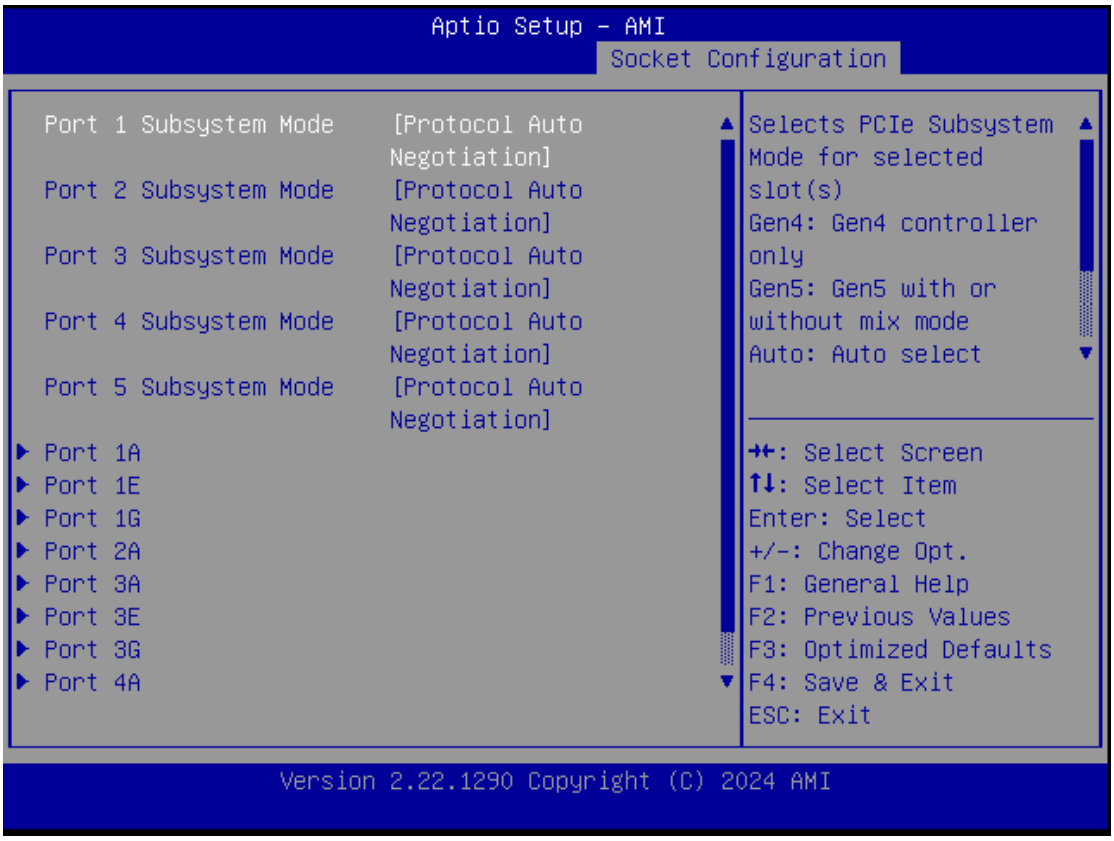


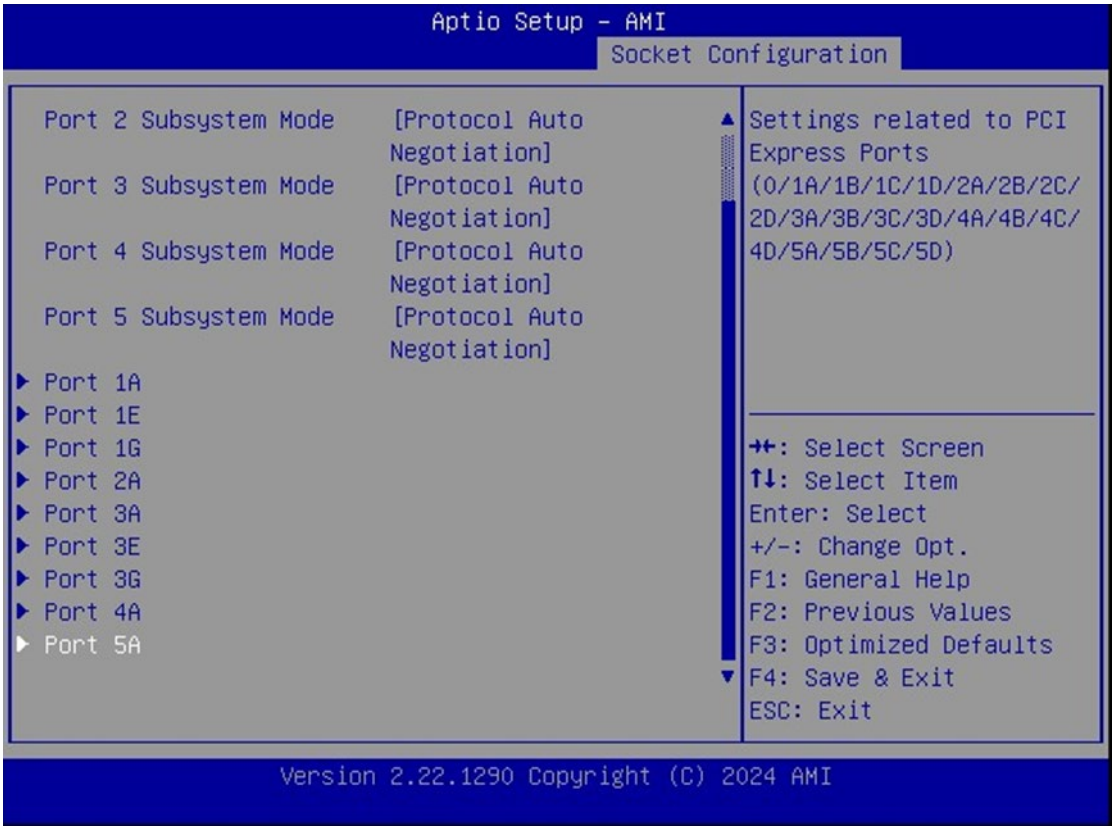
Feature	Options	Description
Socket0 Configuration	None	None
Intel® VT for Directed I/O (VT-d)	None	Press **<Enter>** to bring up the Intel® VT for Directed I/O (VT-d) Configuration menu.
PCI-E ASPM Support (Global)	Disable Per-Port	This option enables / disables the ASPM support for all downstream devices.
PCIe Extended Tag Enable	Auto Disabled	Auto/Enable - BIOS sets 8-bit Tag Field for PCIe Root Port/ EndPoint. Disable - BIOS sets 5-bit Tag Field for PCIe Root Port/EndPoint
PCIe Max Read Request Size	Auto 128B 256B 512B 1024B 2048B 4096B	Set Max Read Request Size in EndPoints

Note

If using the Sapphire Rapids EE processor, you can manually configure which slots to disable in this IIO Configuration section.

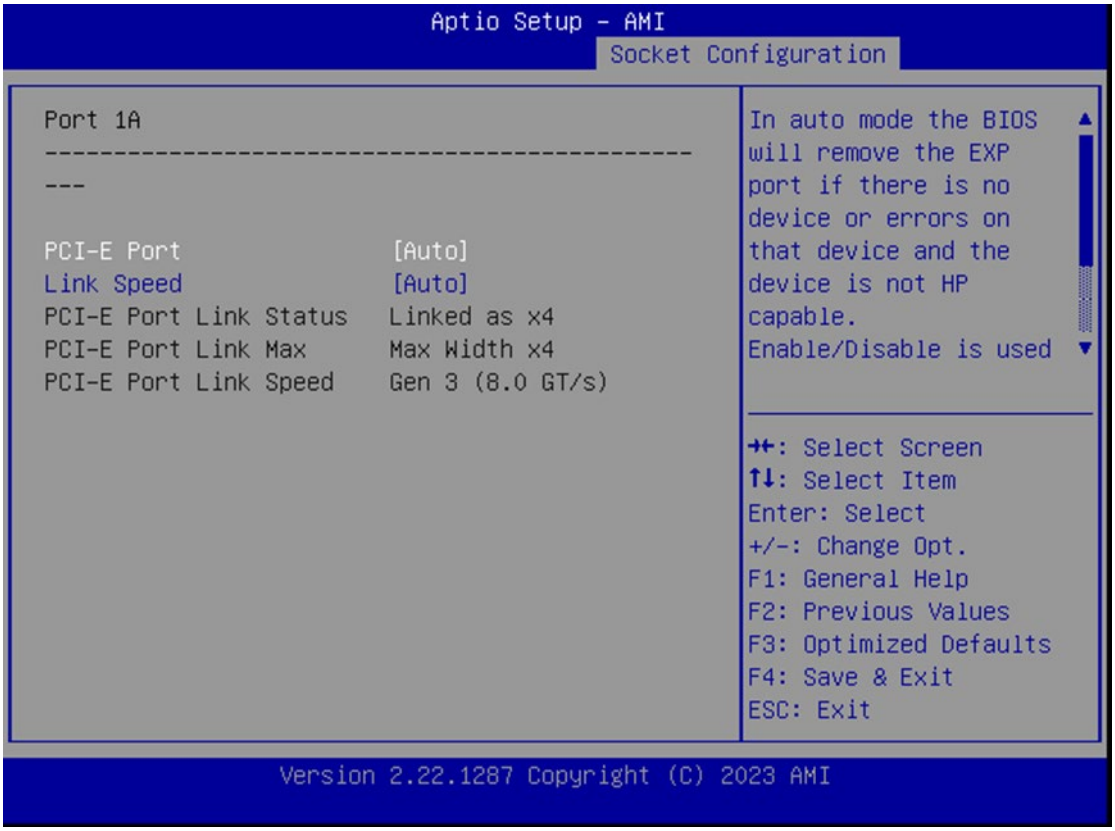
Socket0 Configuration





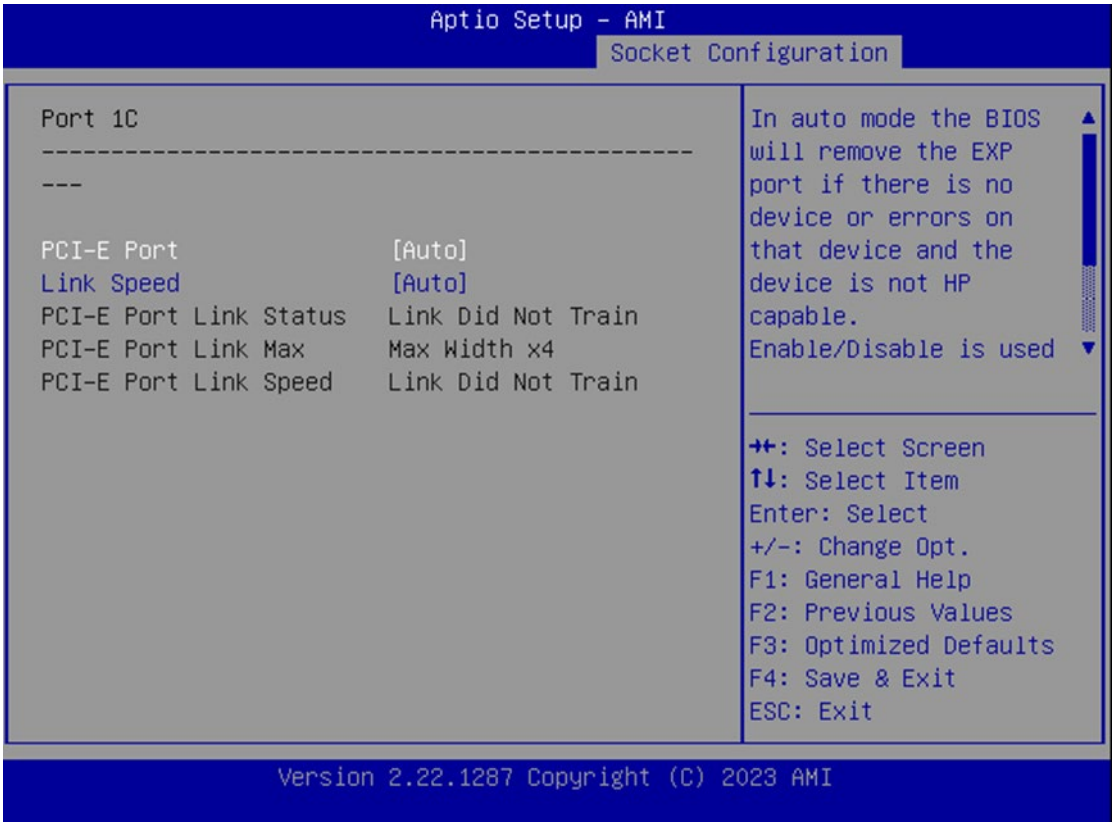
Feature	Options	Description
Port 1 Subsystem Mode	Gen5 Protocol Auto Negotiation	Selects PCIe Subsystem Mode for selected slot(s) Gen4: Gen4 controller only Gen5: Gen5 with or without mix mode Auto: Auto select
Port 2 Subsystem Mode	Gen5 Protocol Auto Negotiation	Selects PCIe Subsystem Mode for selected slot(s) Gen4: Gen4 controller only Gen5: Gen5 with or without mix mode Auto: Auto select
Port 3 Subsystem Mode	Gen5 Protocol Auto Negotiation	Selects PCIe Subsystem Mode for selected slot(s) Gen4: Gen4 controller only Gen5: Gen5 with or without mix mode Auto: Auto select
Port 4 Subsystem Mode	Gen5 Protocol Auto Negotiation	Selects PCIe Subsystem Mode for selected slot(s) Gen4: Gen4 controller only Gen5: Gen5 with or without mix mode Auto: Auto select
Port 4 Subsystem Mode	Gen5 Protocol Auto Negotiation	Selects PCIe Subsystem Mode for selected slot(s) Gen4: Gen4 controller only Gen5: Gen5 with or without mix mode
Port 1A		Control PCIEx8 slot
Port1E		Control M.2x4 slot
Port1G		Control M.2x4 slot
Port2A		Control OCPx16 slot
Port3A		Control PCIEx8 slot
Port3E		Control PCIE U.2 x4
Port3G		Control PCIE U.2 x4
Port4A		Control PCIEx16 GPU slot
Port5A		Control PCIEx16 GPU slot

Port 1A



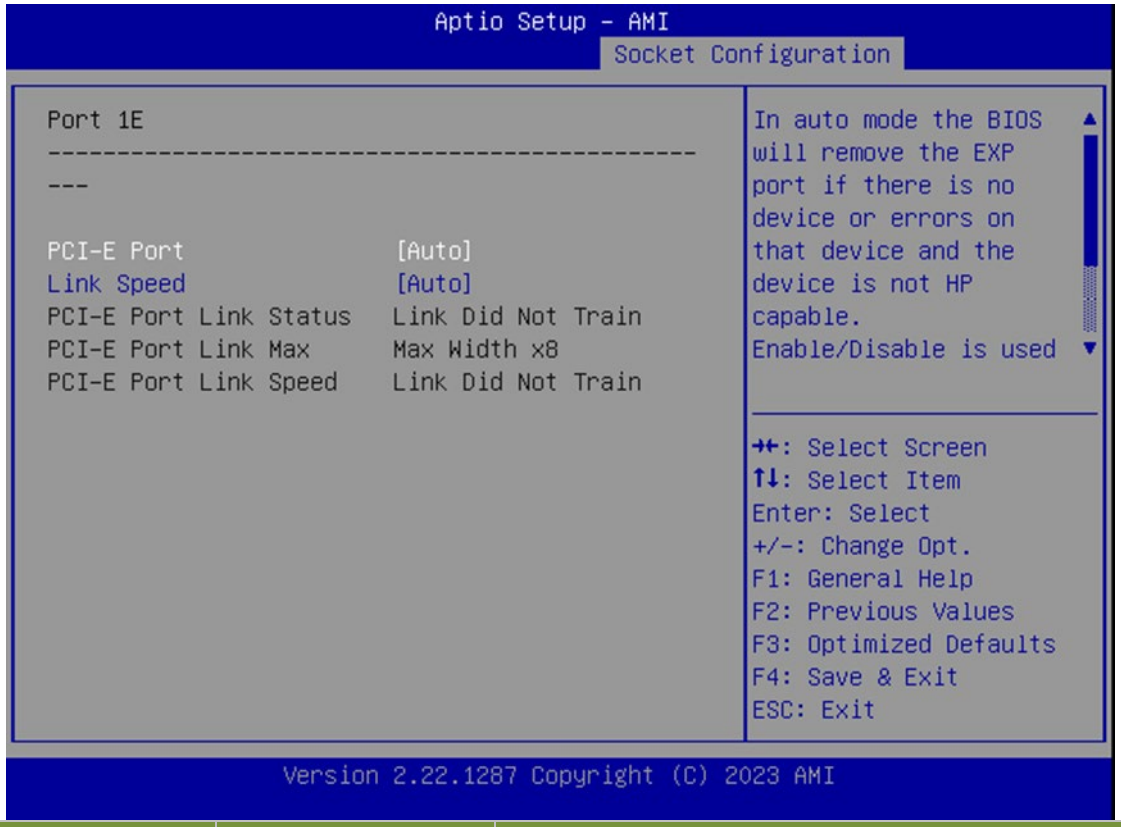
Feature	Options	Description
PCI-E Port	Auto No Yes	In auto mode the BIOS will remove the EXP port if there is no device or errors on that device and the device is not HP capable. Enable/Disable is used
Link Speed	Auto Gen 1 (2.5 GT/s) Gen 2 (5 GT/s) Gen 3 (8 GT/s) Gen 4 (16 GT/s) Gen 5 (32 GT/s)	Choose Link Speed for this PCIe port

Port 1C



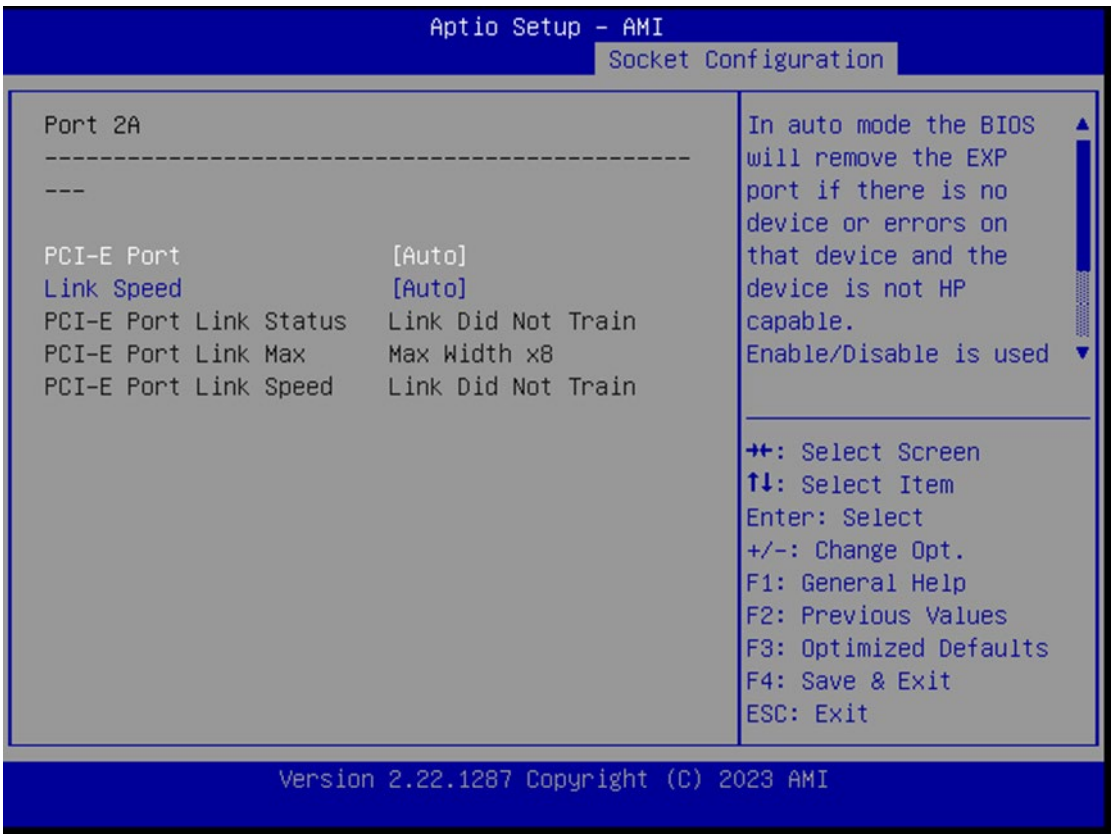
Feature	Options	Description
PCI-E Port	Auto No Yes	In auto mode the BIOS will remove the EXP port if there is no device or errors on that device and the device is not HP capable. Enable/Disable is used
Link Speed	Auto Gen 1 (2.5 GT/s) Gen 2 (5 GT/s) Gen 3 (8 GT/s) Gen 4 (16 GT/s) Gen 5 (32 GT/s)	Choose Link Speed for this PCIe port

Port 1E



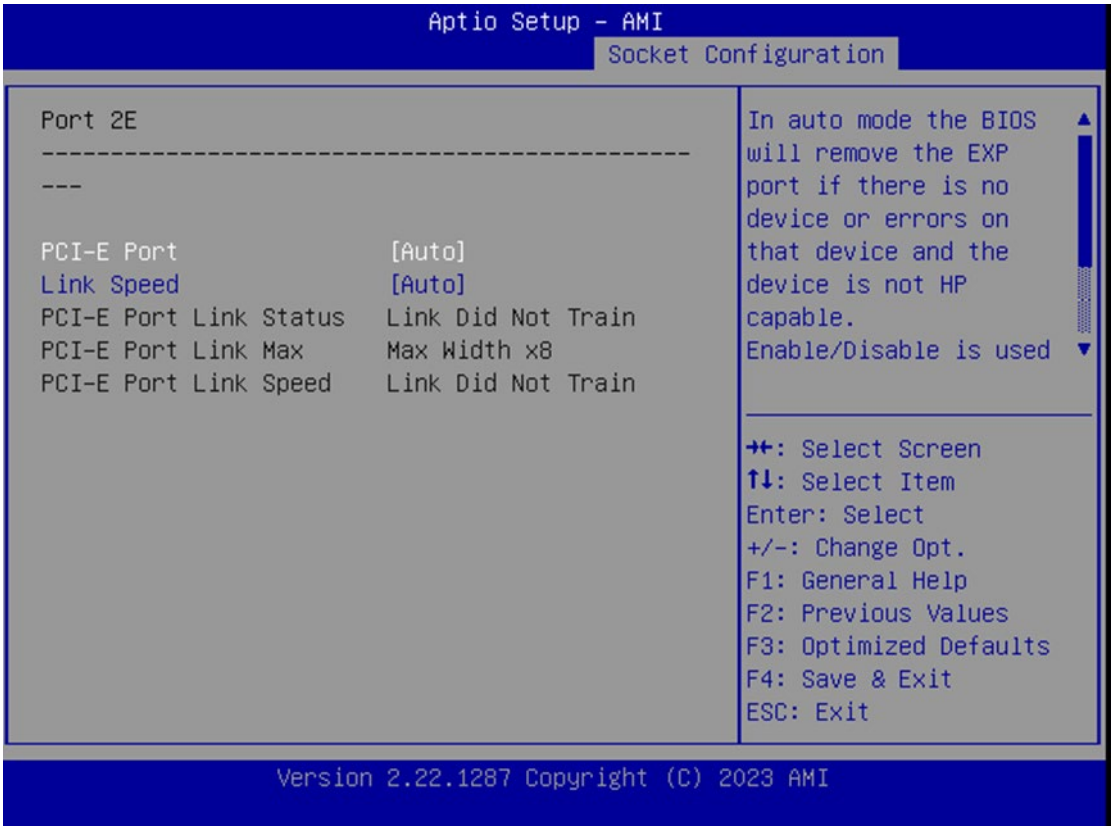
Feature	Options	Description
PCI-E Port	Auto No Yes	In auto mode the BIOS will remove the EXP port if there is no device or errors on that device and the device is not HP capable. Enable/Disable is used.
Link Speed	Auto Gen 1 (2.5 GT/s) Gen 2 (5 GT/s) Gen 3 (8 GT/s) Gen 4 (16 GT/s) Gen 5 (32 GT/s)	Choose Link Speed for this PCIe port

Port 2A



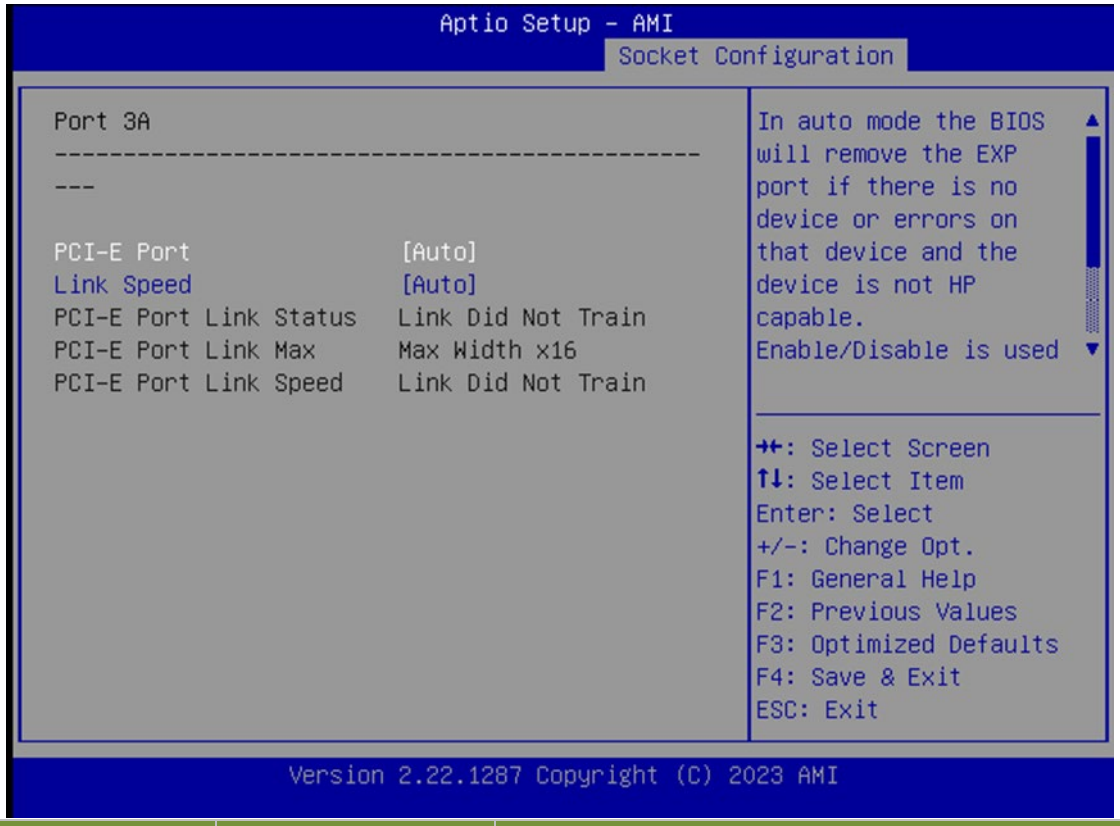
Feature	Options	Description
PCI-E Port	Auto No Yes	In auto mode the BIOS will remove the EXP port if there is no device or errors on that device and the device is not HP capable. Enable/Disable is used
Link Speed	Auto Gen 1 (2.5 GT/s) Gen 2 (5 GT/s) Gen 3 (8 GT/s) Gen 4 (16 GT/s) Gen 5 (32 GT/s)	Choose Link Speed for this PCIe port

Port 2E



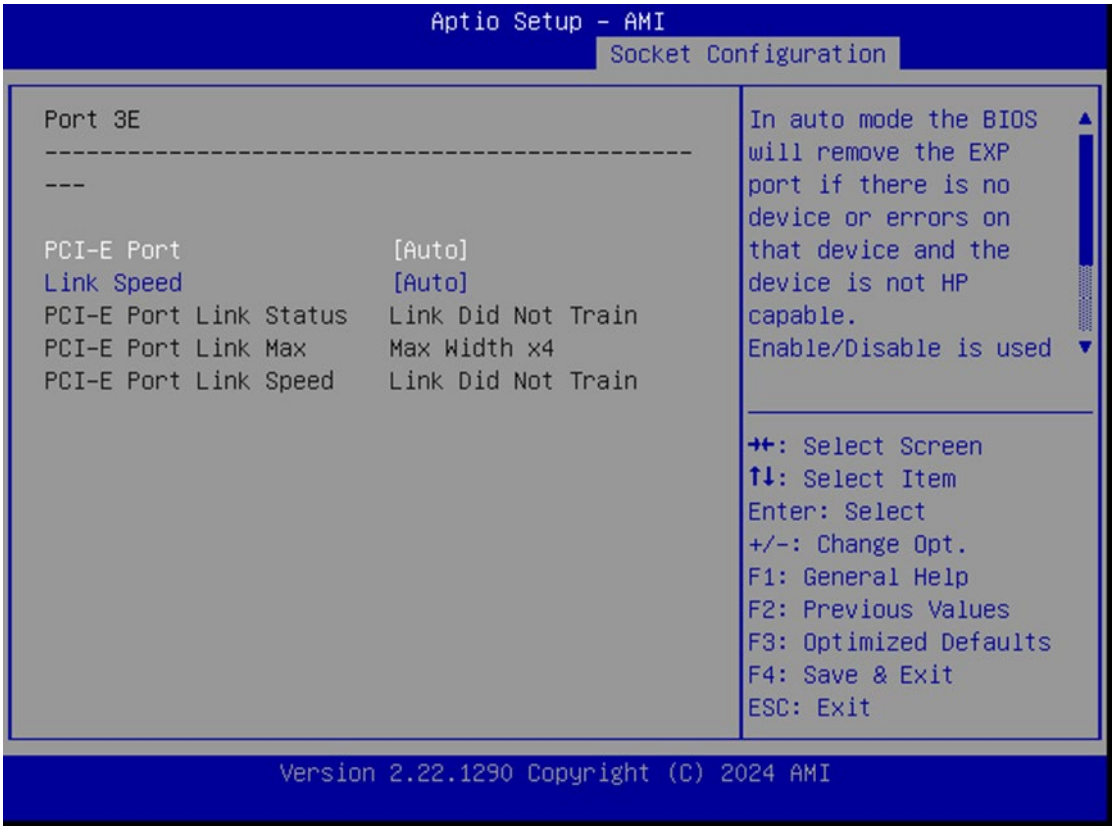
Feature	Options	Description
PCI-E Port	Auto No Yes	In auto mode the BIOS will remove the EXP port if there is no device or errors on that device and the device is not HP capable. Enable/Disable is used.
Link Speed	Auto Gen 1 (2.5 GT/s) Gen 2 (5 GT/s) Gen 3 (8 GT/s) Gen 4 (16 GT/s) Gen 5 (32 GT/s)	Choose Link Speed for this PCIe port

Port 3A



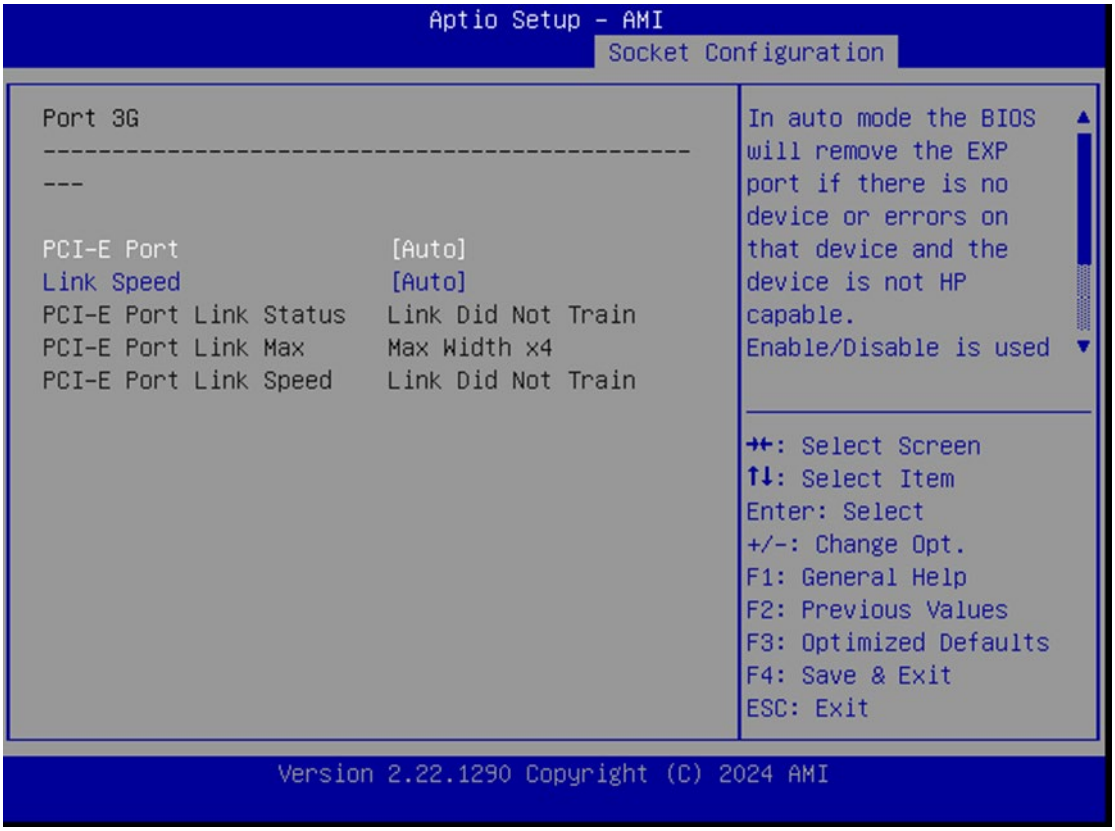
Feature	Options	Description
PCI-E Port	Auto No Yes	In auto mode the BIOS will remove the EXP port if there is no device or errors on that device and the device is not HP capable. Enable/Disable is used.
Link Speed	Auto Gen 1 (2.5 GT/s) Gen 2 (5 GT/s) Gen 3 (8 GT/s) Gen 4 (16 GT/s) Gen 5 (32 GT/s)	Choose Link Speed for this PCIe port

Port 3E



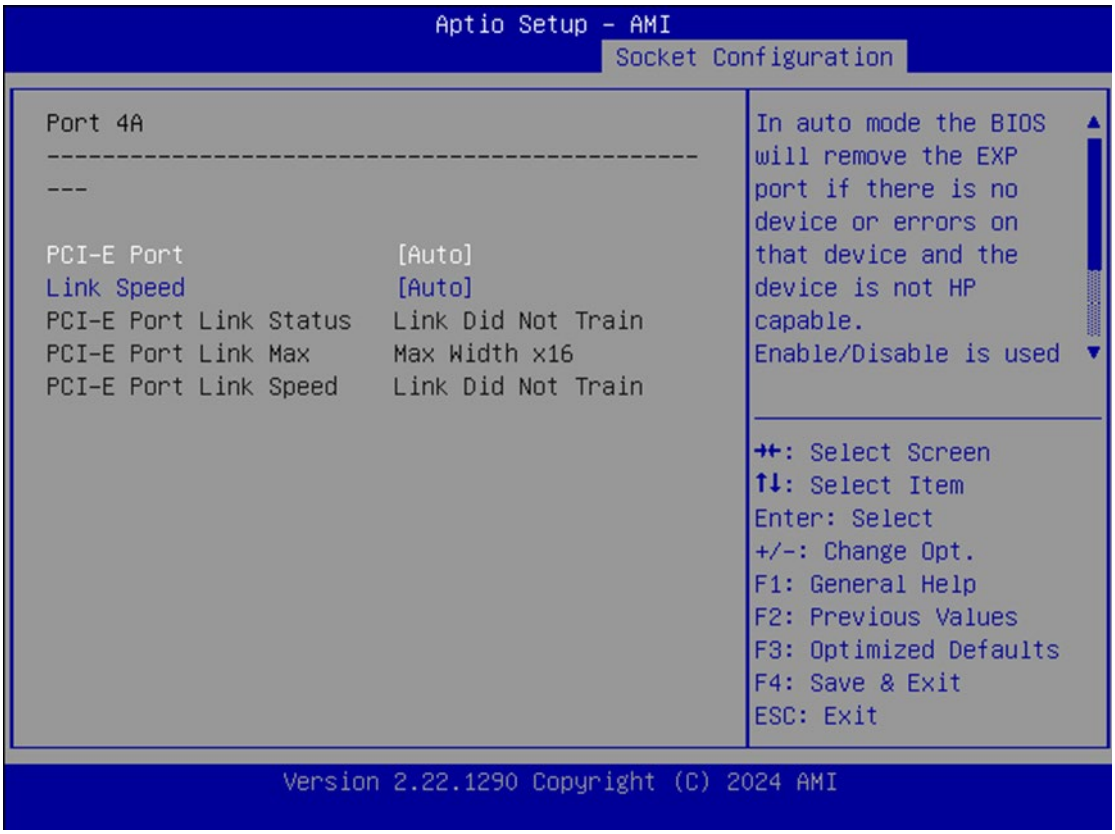
Feature	Options	Description
PCI-E Port	Auto No Yes	In auto mode the BIOS will remove the EXP port if there is no device or errors on that device and the device is not HP capable. Enable/Disable is used
Link Speed	Auto Gen 1 (2.5 GT/s) Gen 2 (5 GT/s) Gen 3 (8 GT/s) Gen 4 (16 GT/s) Gen 5 (32 GT/s)	Choose Link Speed for this PCIe port

Port 3G



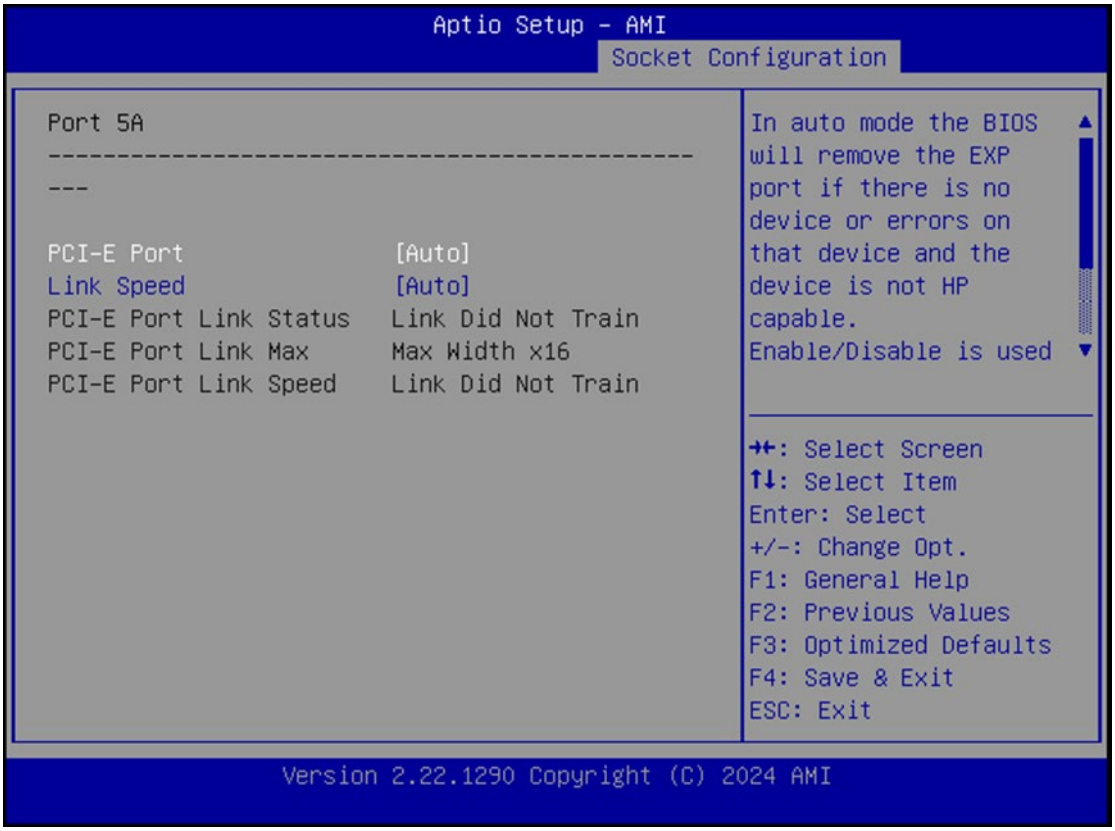
Feature	Options	Description
PCI-E Port	Auto No Yes	In auto mode the BIOS will remove the EXP port if there is no device or errors on that device and the device is not HP capable. Enable/Disable is used
Link Speed	Auto Gen 1 (2.5 GT/s) Gen 2 (5 GT/s) Gen 3 (8 GT/s) Gen 4 (16 GT/s) Gen 5 (32 GT/s)	Choose Link Speed for this PCIe port

Port 4A



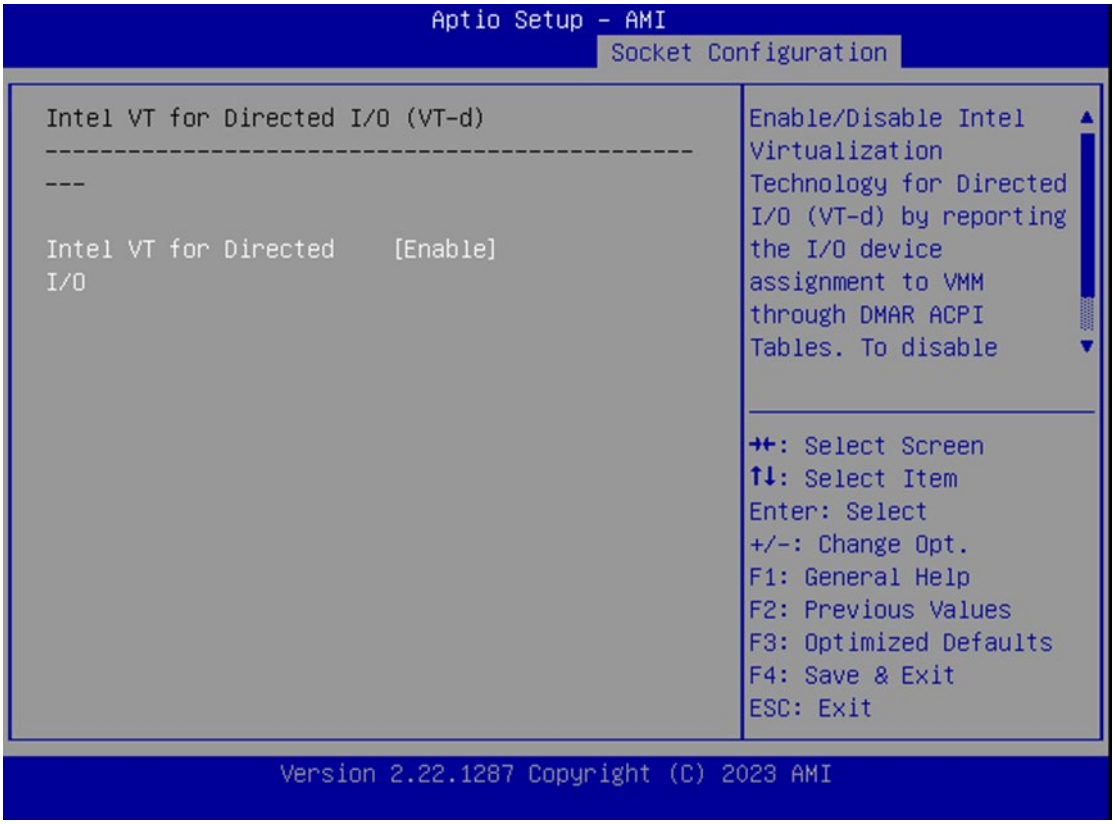
Feature	Options	Description
PCI-E Port	Auto No Yes	In auto mode the BIOS will remove the EXP port if there is no device or errors on that device and the device is not HP capable. Enable/Disable is used
Link Speed	Auto Gen 1 (2.5 GT/s) Gen 2 (5 GT/s) Gen 3 (8 GT/s) Gen 4 (16 GT/s) Gen 5 (32 GT/s)	Choose Link Speed for this PCIe port

Port 5A



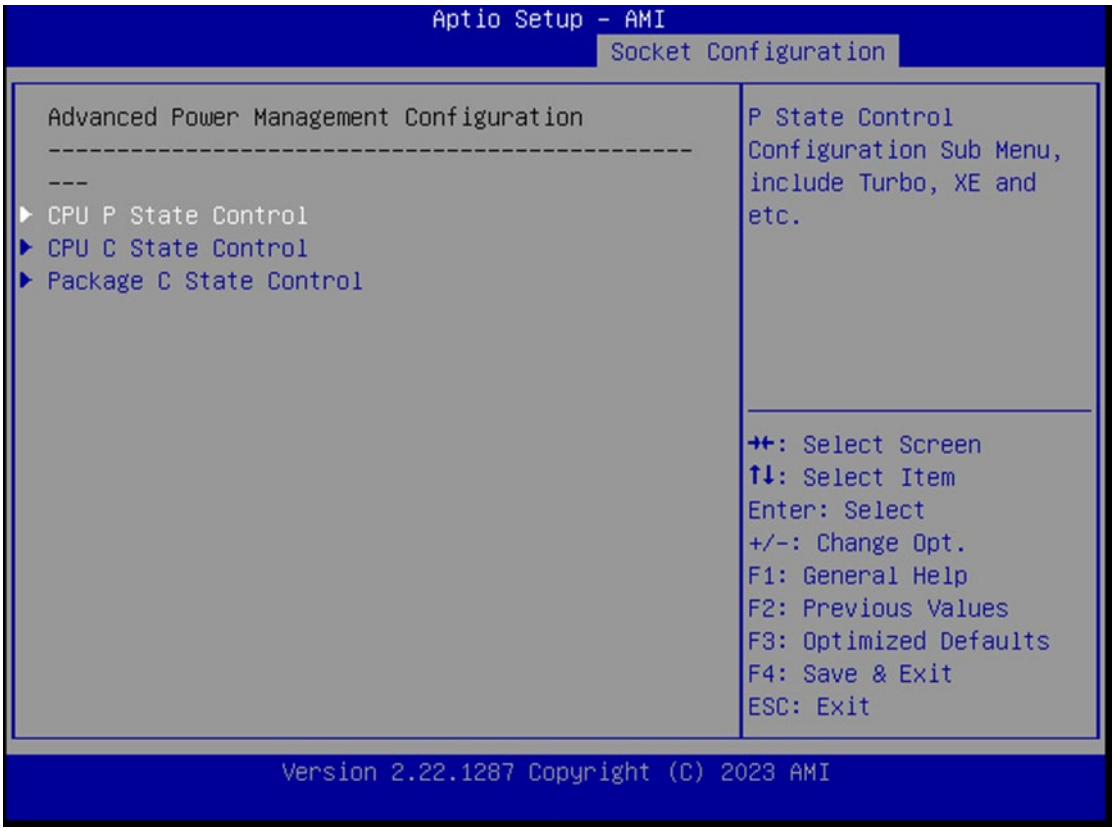
Feature	Options	Description
PCI-E Port	Auto No Yes	In auto mode the BIOS will remove the EXP port if there is no device or errors on that device and the device is not HP capable. Enable/Disable is used
Link Speed	Auto Gen 1 (2.5 GT/s) Gen 2 (5 GT/s) Gen 3 (8 GT/s) Gen 4 (16 GT/s) Gen 5 (32 GT/s)	Choose Link Speed for this PCIe port

Intel VT for Directed I/O (VT-d)



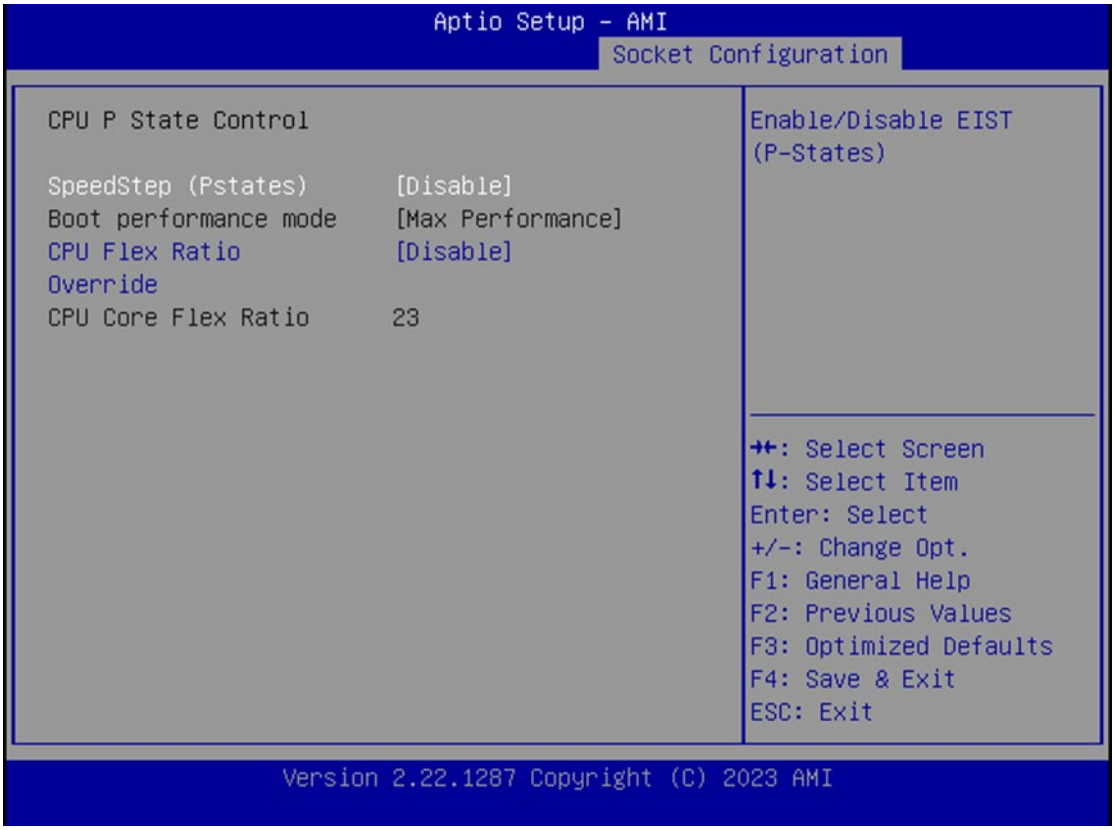
Feature	Options	Description
Intel VT for Directed I/O	Enable Disable	Enable/Disable Intel Virtualization Technology for Directed I/O (VT-d) by reporting the I/O device assignment to VMM through DMAR ACPI Tables. To disable

Advanced Power Management Configuration



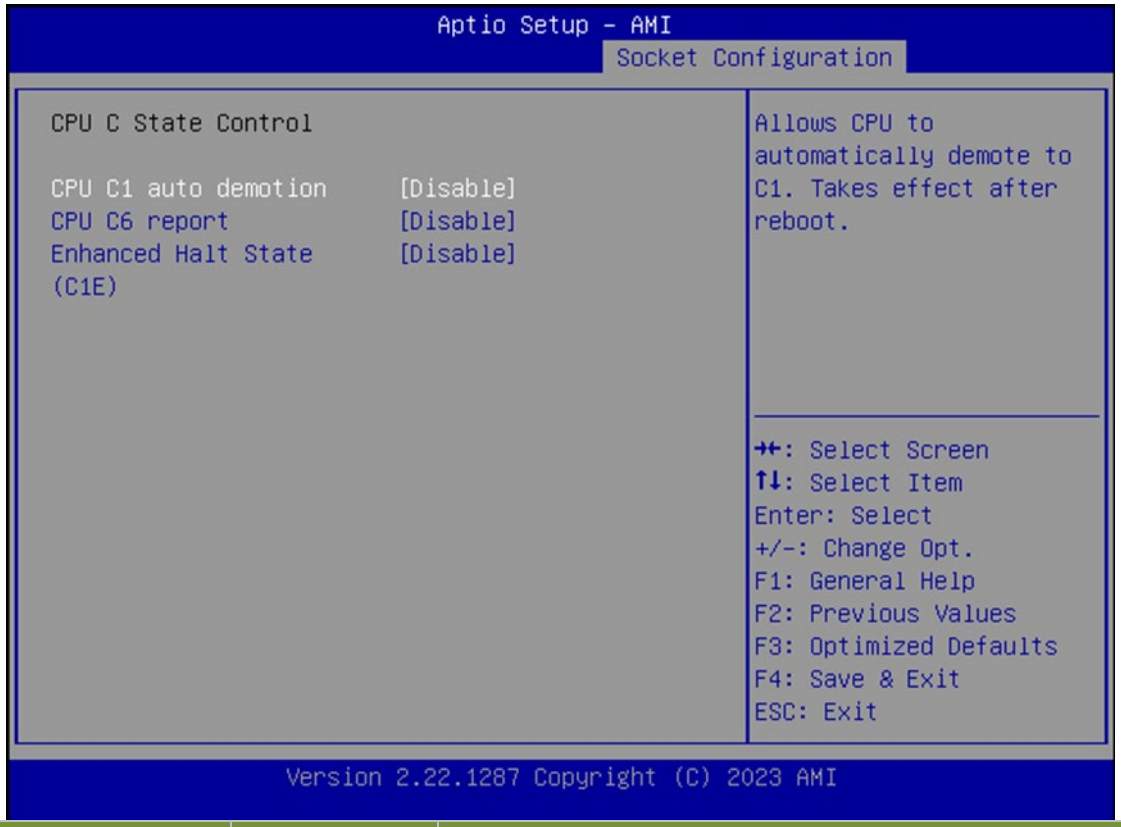
Feature	Options	Description
CPU P State Control	None	P State Control Configuration Sub Menu, include Turbo, XE and etc.
CPU C State Control	None	CPU C State setting
Package C State Control	None	P State Control Configuration Sub Menu, include Turbo, XE and etc.

CPU P State Control



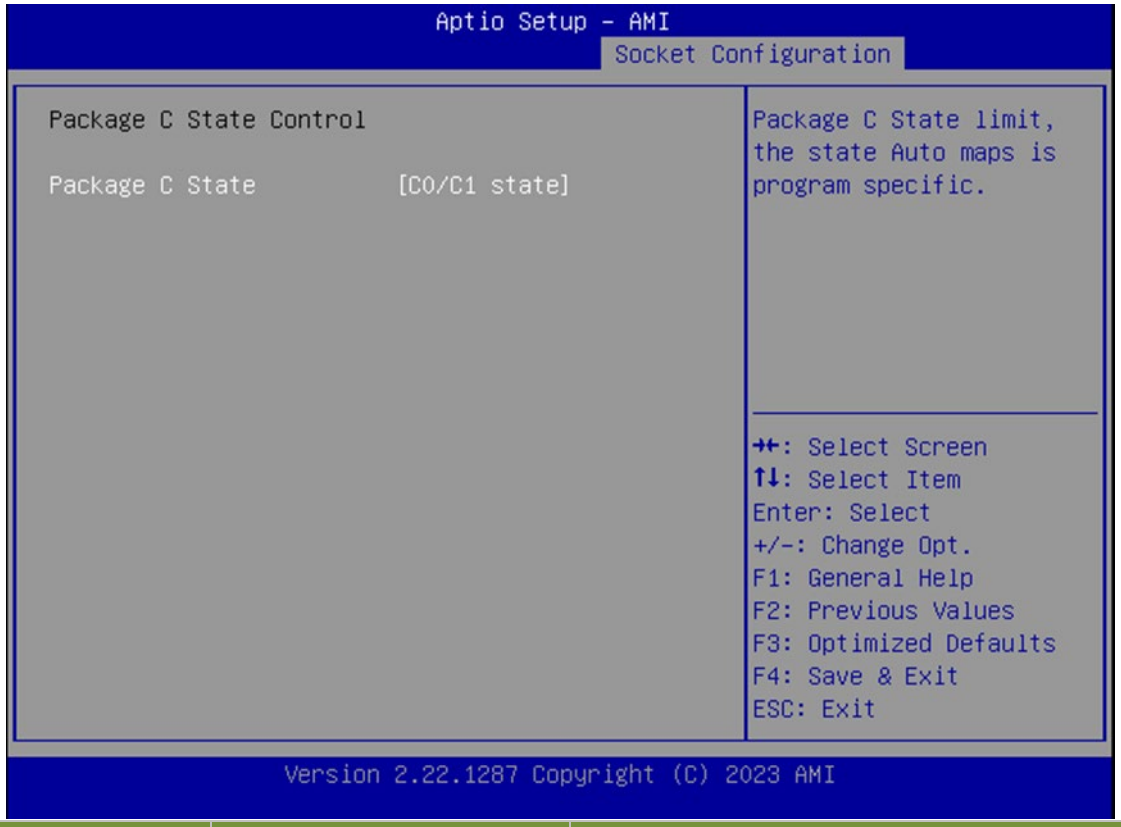
Feature	Options	Description
SpeedStep (Pstates)	Disabled Enabled	Enables or disables EIST (P-States)
Boot performance mode	Max Performance Max Efficient Set by Intel Node Manager	Select the performance state that the BIOS will set before OS hand off.
CPU Flex Ratio Override	Disabled Enabled	Enable/Disable CPU Flex Ratio Programming
CPU Core Flex Ratio	23	Non-Turbo Mode Processor Core Ratio Multiplier

CPU C State Control



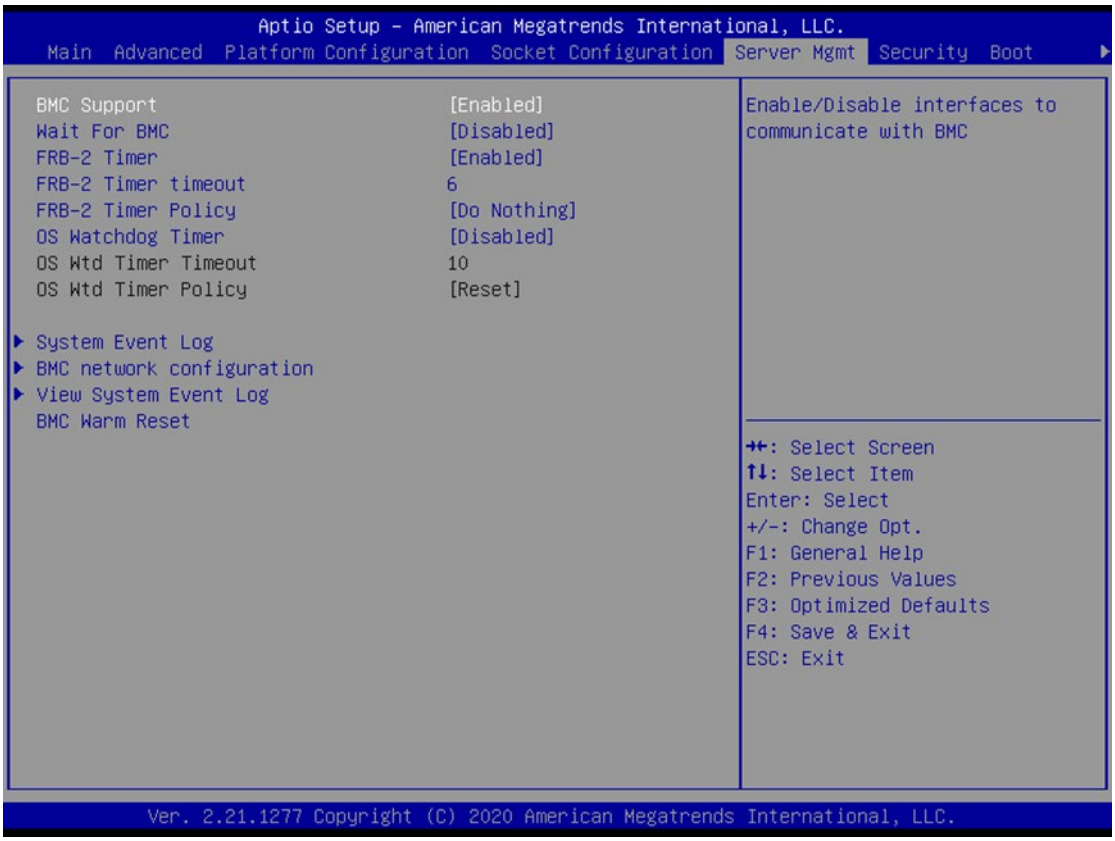
Feature	Options	Description
CPU C1 auto demotion	Disabled Enabled	Autonomous Core C-State Control
CPU C6 report	Disabled Enabled Auto	Enable/Disable CPU C6(ACPI C3) report to OS, Auto maps to enable
Enhanced Halt State (C1E)	Disabled Enabled	Core C1E auto promotion Control. Takes effect after reboot.

Package C State Control



Feature	Options	Description
Package C State	C0/C1 state C2 state C6 (non Retention) state C6 (Retention) state No Limit Auto	Package C State limit, the state Auto maps is program specific.

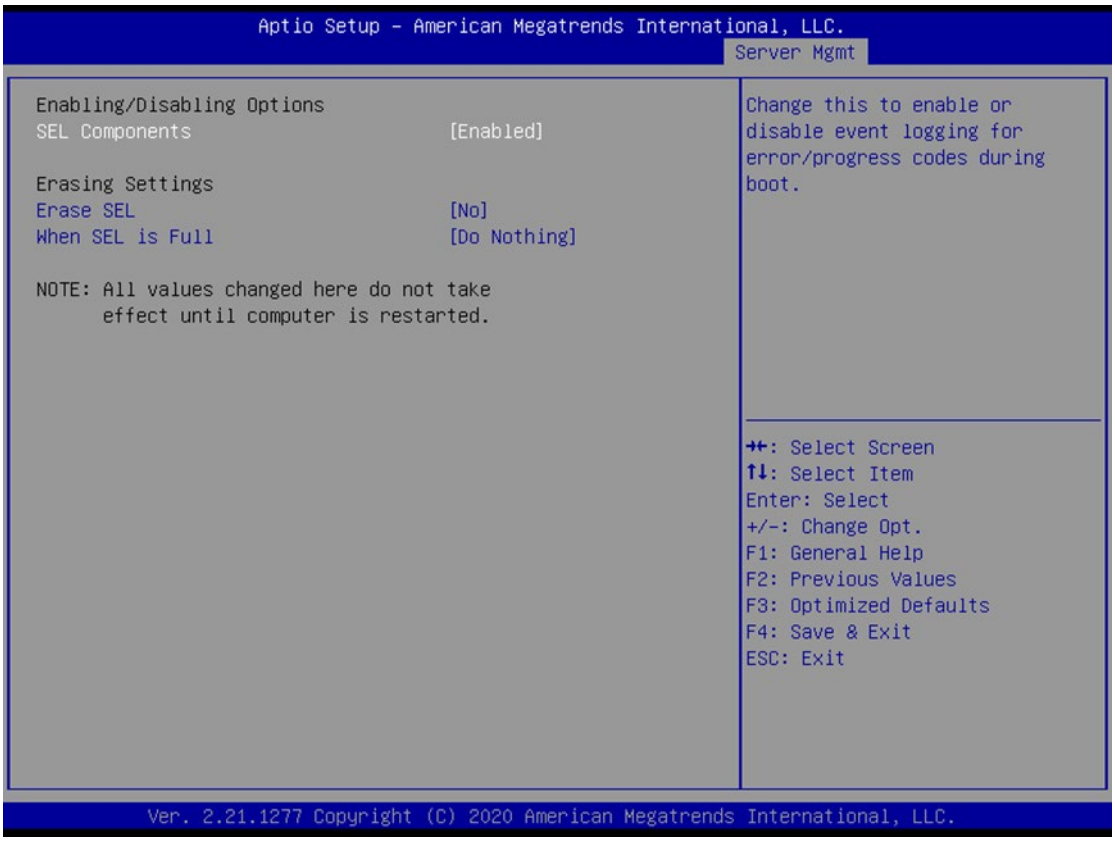
Server Mgmt



Feature	Options	Description
BMC Support	Enabled Disabled	Enable or disables interfaces to communicate with BMC.
Wait For BMC	Enabled Disabled	Wait For BMC response for specified time out. In PILOTII, BMC starts at the same time when BIOS starts during AC power ON. It takes around 30 seconds to initialize Host to BMC interfaces.
FRB-2 Timer	Enabled Disabled	Enables or disables FRB-2 timer (POST timer).
FRB-2 Timer timeout	6	Enter value Between 1 to 30 min for FRB-2 Timer Expiration
FRB-2 Timer Policy	Do Nothing Reset Power Down Power Cycle	Configure how the system should respond if the FRB-2 Timer expires. Not available if FRB-2 Timer is disabled.
OS Watchdog Timer	Enabled Disabled	If enabled, it starts a BIOS timer which can only be shut off by Management Software after the OS loads. It also helps verify that the OS is successfully loaded or follows the OS Boot Watchdog Timer policy.

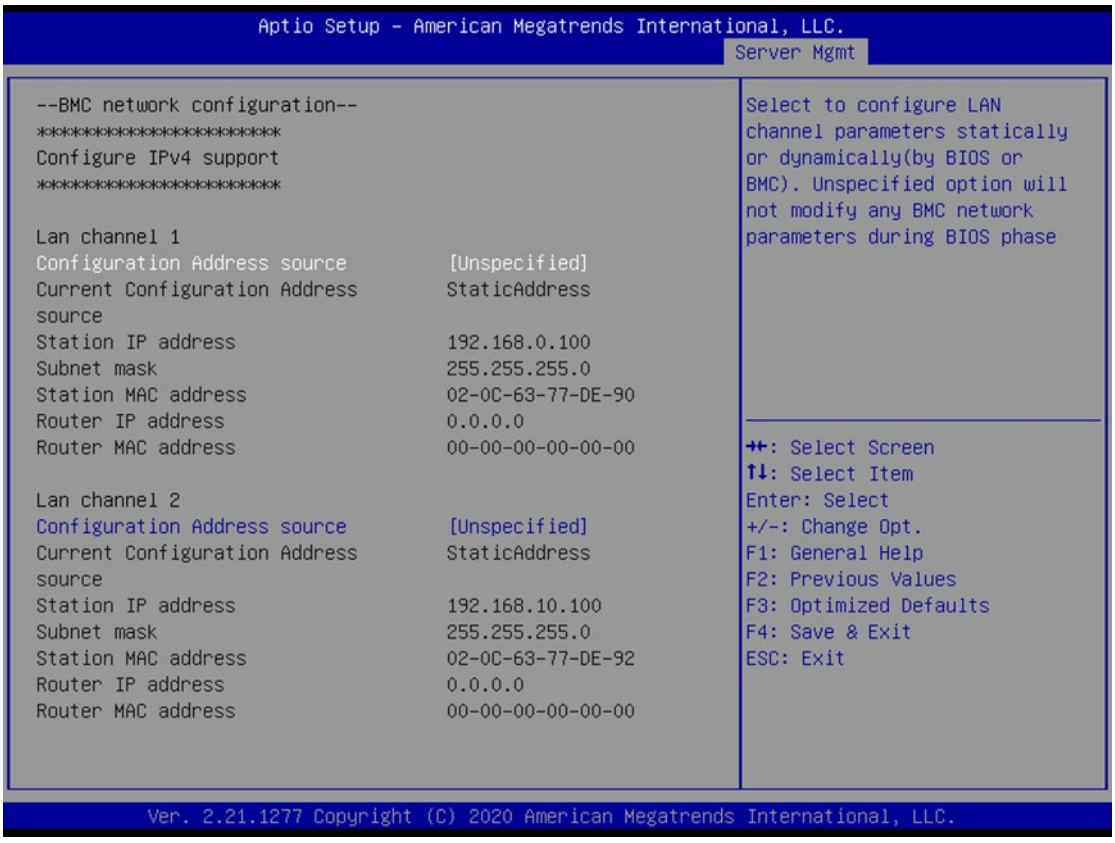
OS Wtd Timer Timeout	10	Enter the value Between 1 to 30 min for OS Boot Watchdog Timer Expiration. Not available if OS Boot Watchdog Timer is disabled.
OS Wtd Timer Policy	Do Nothing Reset Power Down Power Cycle	Configure how the system should respond if the OS Boot Watchdog Timer expires. Not available if OS Boot Watchdog Timer is disabled.
System Event Log	NA	Press **<Enter>** to change the SEL event log configuration.
BMC network configuration	NA	Configure BMC network parameters.
View System Event Log	NA	Press **<Enter>** to view the System Event Log Records.
BMC Warm Reset	NA	Press **<Enter>** to do Warm Reset BMC.

System Event Log



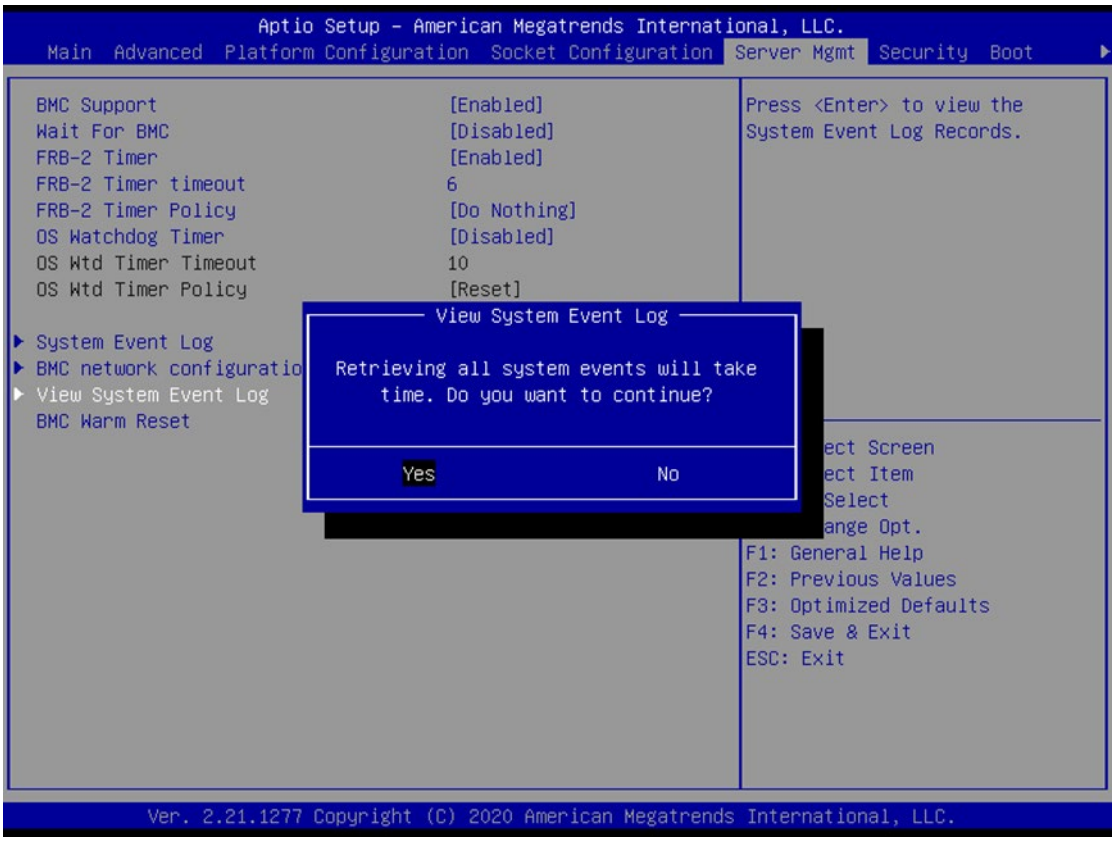
Feature	Options	Description
SEL Components	Disabled Enabled	Enables or disables all features of System Event Logging during boot.
Erase SEL	NO Yes, On next reset Yes, On every reset	Choose options for erasing SEL.
When SEL is Full	Do Nothing Erase Immediately Delete Oldest Record	Choose options for reactions to a full SEL.

BMC Network Configuration



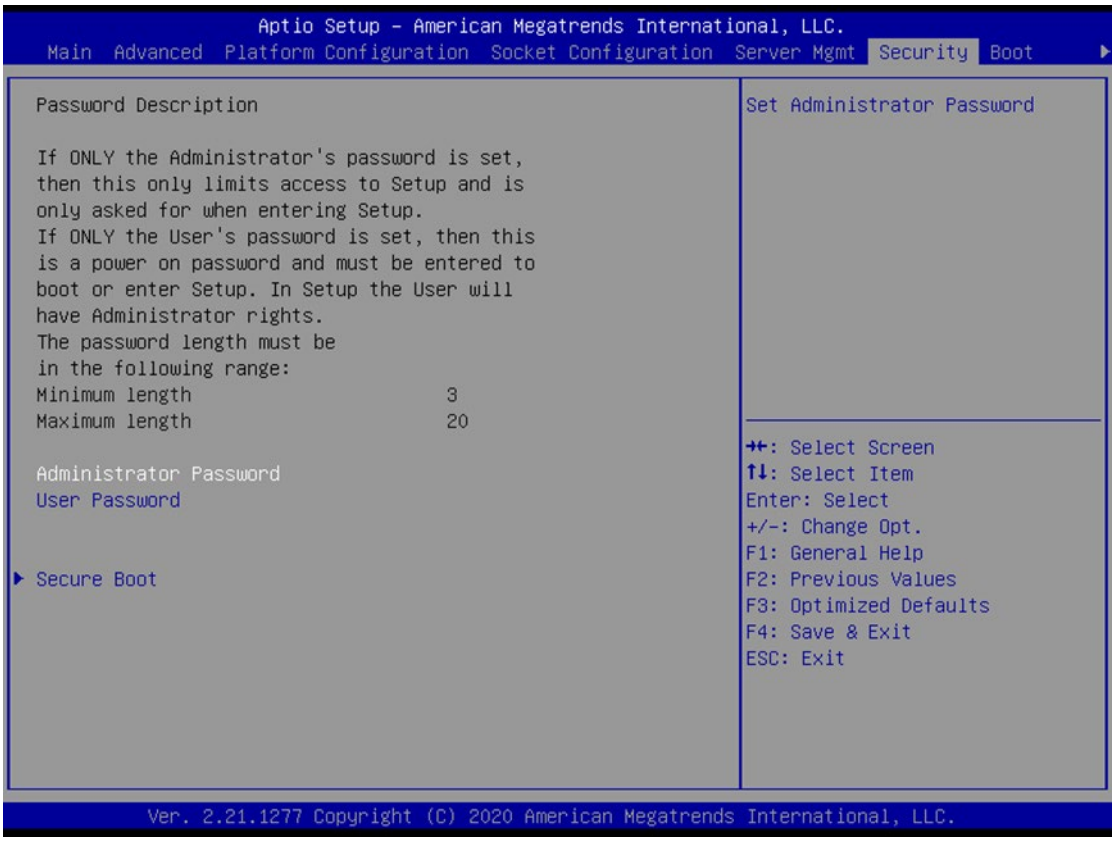
Feature	Options	Description
Configuration Address source	Unspecified Static DynamicBmcDhcp DynamicBmcNonDhcp	Select to configure LAN channel parameters statically or dynamically (by BIOS or BMC). The **unspecified** option will not modify any BMC network parameters during BIOS phase.

View System Event Log



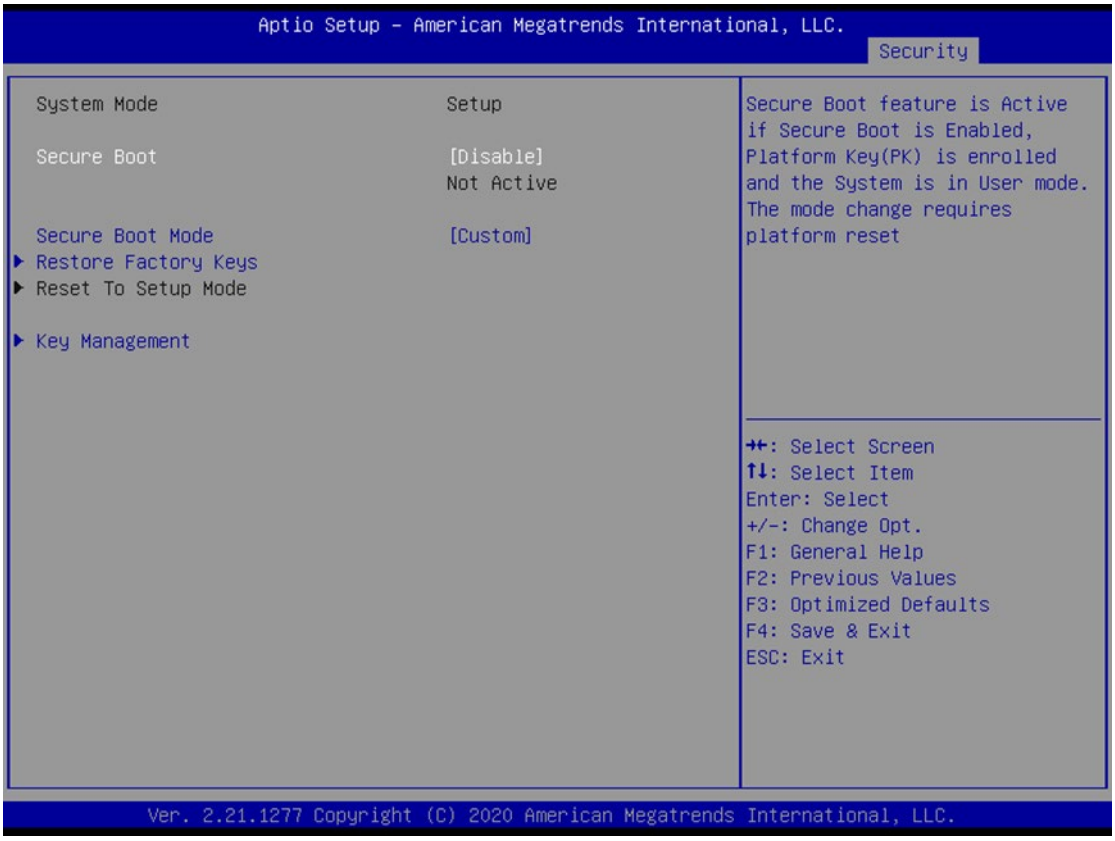
Security

Select the Security menu item from the BIOS setup screen to enter the Security Setup screen. Users can select any of the items in the left frame of the screen.



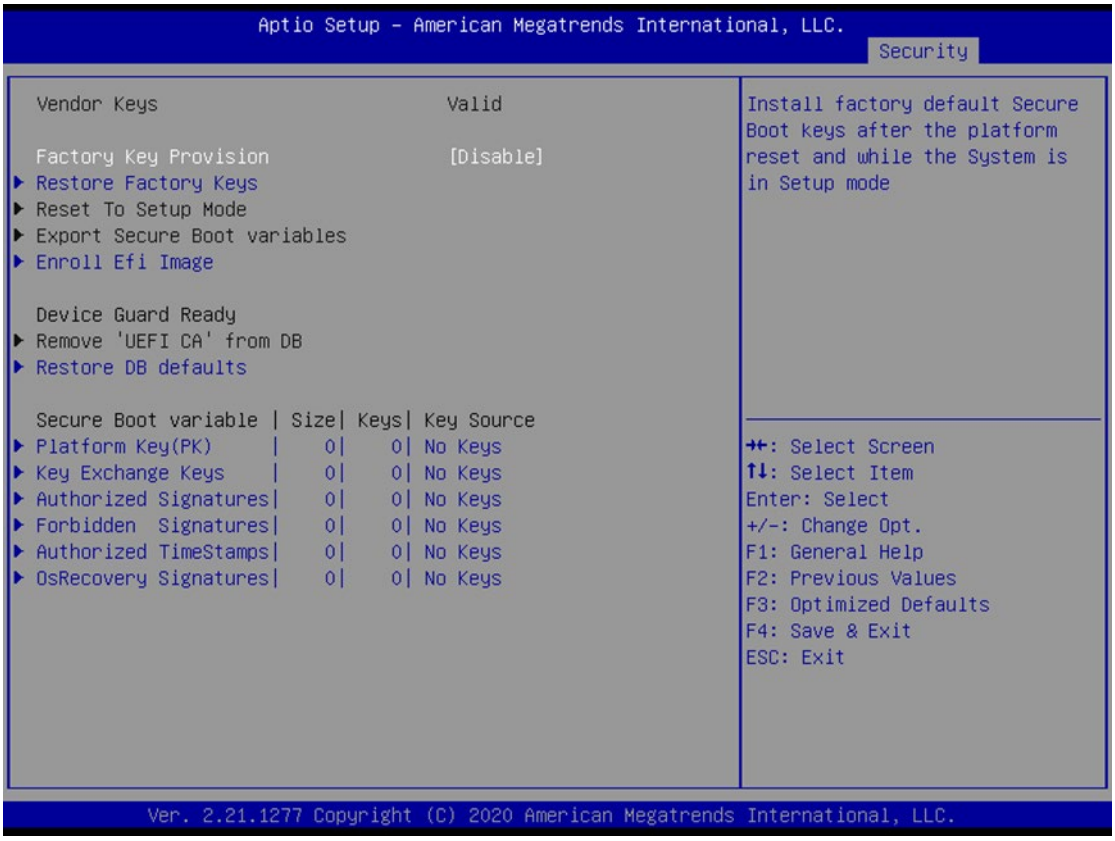
Feature	Description
Administrator Password	If ONLY the Administrator's password is set, it only limits access to Setup and is only asked for when entering Setup.
User Password	If ONLY the User's password is set, it serves as a power-on password and must be entered to boot or enter Setup. In Setup, the User will have Administrator rights.

Secure Boot



Feature	Options	Description
Secure Boot	Disabled Enabled	Secure Boot is activated when Platform Key (PK) is enrolled, System mode is User/Deployed, and CSM function is disabled.
Secure Boot Mode	Standard Custom	Secure Boot mode selector: In **Custom** mode, Secure Boot Variables can be configured without authentication

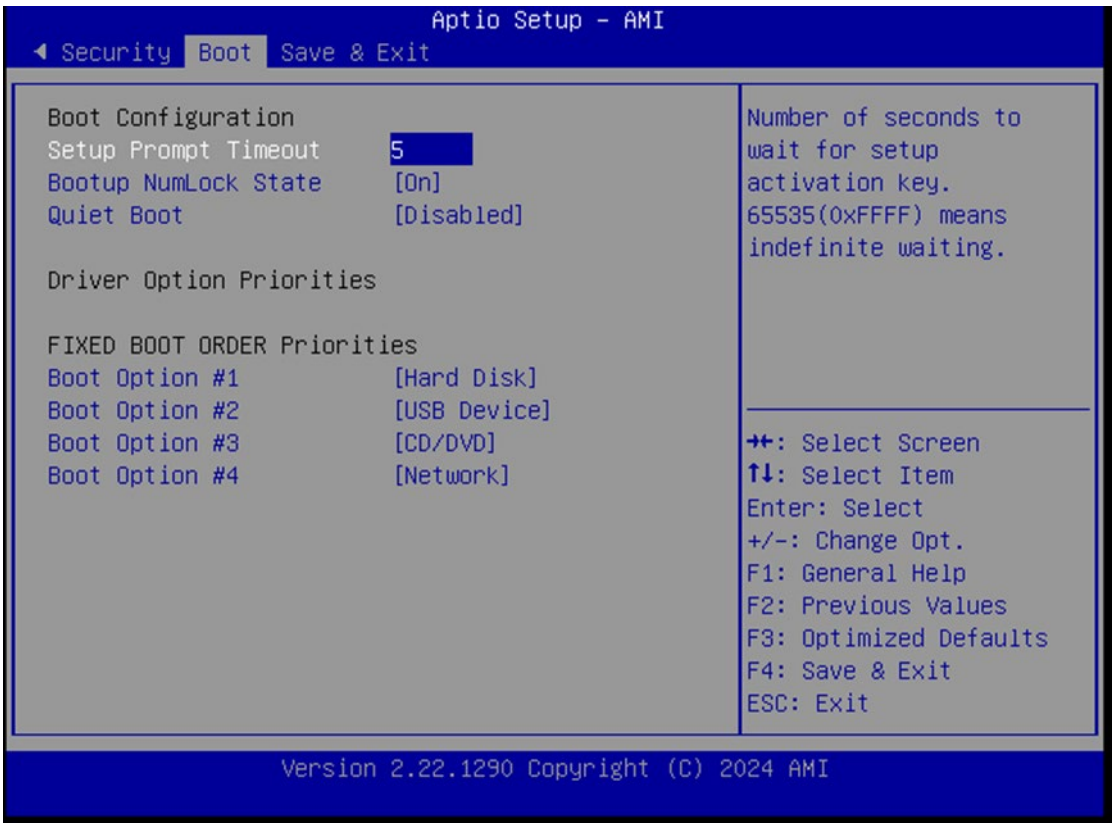
Key Management



Feature	Options	Description
Factory Key Provision	Disabled Enabled	Provision factory default keys on next re-boot only when System in Setup Mode.
Restore Factory Keys	None	Force System to User Mode. Configure NVRAM to contain OEM-defined factory default Secure Boot keys.
Enroll Efi Image	None	Allows the image to run in Secure Boot mode. Enroll SHA256 hash of the binary into Authorized Signature Database (db)

Boot Menu

Select the Boot menu item from the BIOS setup screen to enter the Boot Setup screen. Users can select any of the items in the left frame of the screen.

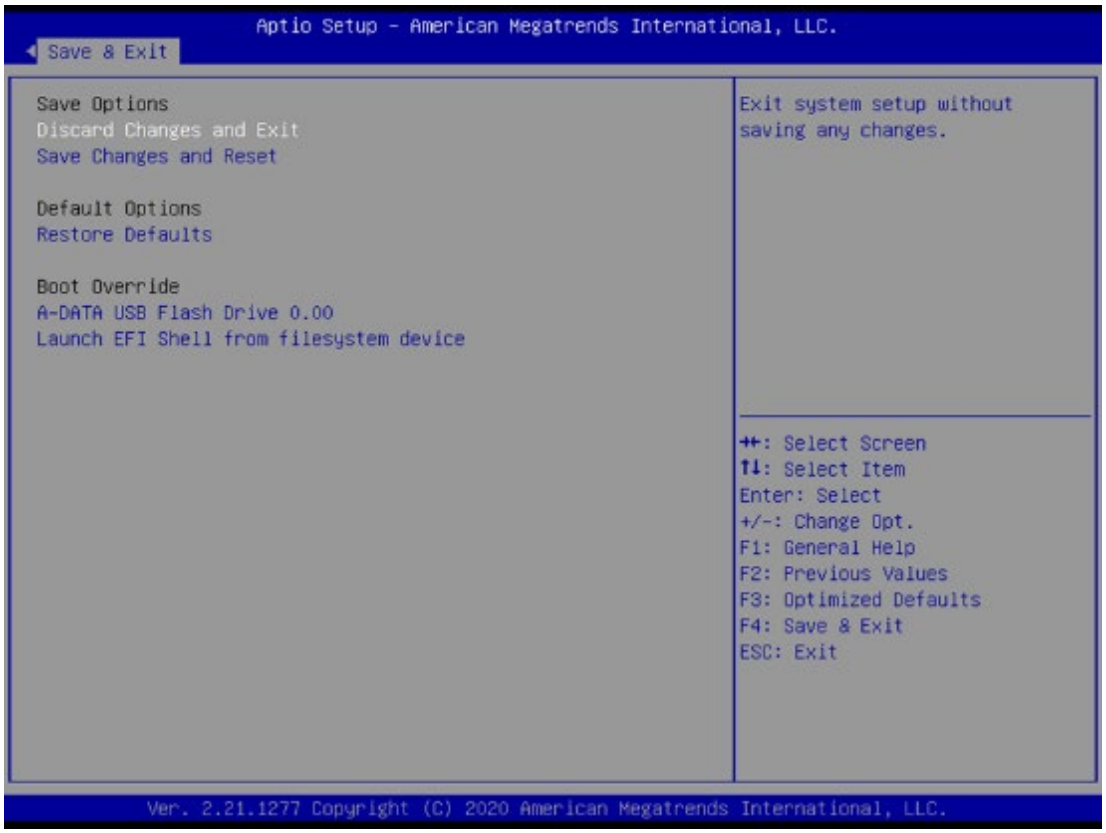


Feature	Options	Description
Setup Prompt Timeout	5	The Number of seconds to wait for setup activation key. 65535 means indefinite waiting.
BootupNumLock State	On Off	Select the keyboard NumLock state.
Quiet Boot	Disabled Enabled	Enables or disables Quiet Boot option.

- Choose boot priority from boot option group.
- Choose specifies boot device priority sequence from available Group device.

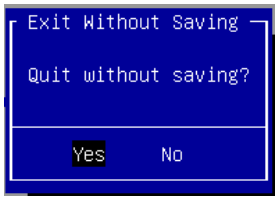
Save & Exit Menu

Select the Save and Exit menu item from the BIOS setup screen to enter the Save and Exit Setup screen. Users can select any of the items in the left frame of the screen.



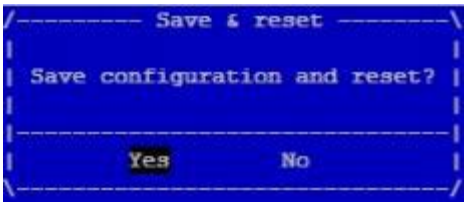
■ Discard Changes and Exit

Select this option to quit Setup without saving any modifications to the system configuration. The following window will appear after the "**Discard Changes and Exit**" option is selected. Select "**Yes"** to Discard changes and Exit Setup.



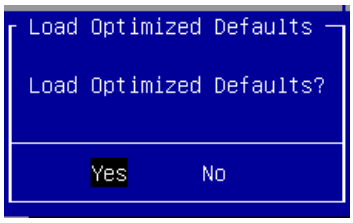
■ Save Changes and Reset

When Users have completed the system configuration changes, select this option to save the changes and exit from BIOS Setup in order for the new system configuration parameters to take effect. The following window will appear after selecting the "**Save Changes and Exit**" option is selected. Select "**Yes**" to Save Changes and Exit Setup.



■ Restore Defaults

Restore default values for all setup options. Select "**Yes"** to load Optimized defaults.

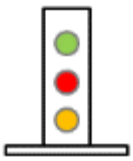


Note

The items under Boot Override may not have the same image as above, as it would depend on the actual devices connected on system.

APPENDIX A: LED INDICATOR EXPLANATIONS

System Power / Status / HDD Activity



Green: System Power
Red/Green: System Status
Amber: HDD Activity

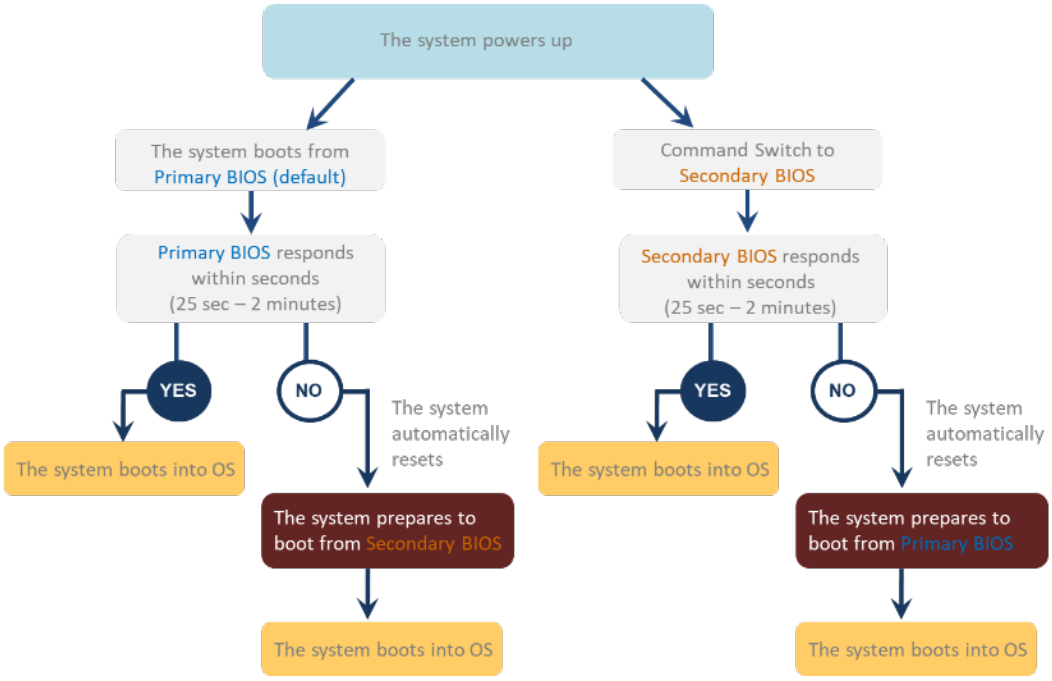
LED	COLOR ON LCM	COLOR ON BOARD	LED ACTION	DESCRIPTION
POWER	**Green**	**Green**	Steady	When system power on
	Off	Off	N/A	No power on
STATUS	**Green**	**Green**	Steady	control by GPIO
	Amber	**Red**	Steady	control by GPIO
	Off	Off	N/A	control by GPIO (Default) or No power on
HDD	**Amber**	**Amber**	Blinking	Blinking indicates HDD activity Include SATA / NVME
	Off	Off	N/A	No data access or No power on

APPENDIX B: DUAL BIOS INTRODUCTION

Failure when booting up BIOS is not uncommon and can occur most often during a power failure, a mishandled BIOS update, a malware attack resulting in data corruption. When it happens, recovering procedures consume considerable time and effort. Lanner understands this pain and have empowered our products with the Dual BIOS feature.

How Dual BIOS Works

Dual BIOS features two physical BIOS ROMs soldered onto the motherboard, carrying two separate BIOS images. If the Primary BIOS (default) is not functioning correctly and fails to respond within seconds (~25 seconds to 2 minutes, depend upon appliance), the system will invoke a bootup from the Secondary BIOS, automatically restarting the system and launch the operating system.



2nd Gen Dual BIOS

To provide increased flexibility and usage protection, Lanner has released the 2nd Gen Dual BIOS function on Lanner appliances. With 2nd Gen Dual BIOS, both the primary BIOS and secondary BIOS can be updated and flashed using the BIOS Tool to run different versions of BIOS ROMS independently for maximum compatibility. This additionally allow users to switch BIOS ROMS for booting up, toggling between primary BIOS and secondary BIOS.

- **Flexible recovery timer control**

Users can designate the amount of time before recovery BIOS launch. The amount of time is no longer fixed to 7 minutes.

- **Flexible Dual BIOS ROMs control.**

Users can flash both the Primary BIOS and Secondary BIOS, thus run different versions of BIOS ROMS independently for maximum compatibility.

- **Flexible Dual BIOS ROMs switch**

The 2nd Gen Dual BIOS allow users to choose one of the BIOS ROMS (Primary BIOS/Secondary BIOS) for booting up. Use software command prompt to toggle between Primary BIOS and Secondary BIOS.

	Gen1 Dual BIOS	Gen2 Dual BIOS
Function	Primary / Recovery 2ND BIOS for recovery purpose	Primary / Secondary (Peer to Peer) Both BIOS can let the system work
Detection Time	7 min	Seconds (By platform design)
2nd BIOS updated	Only using the SPI facility	By BIOS tool command or SPI facility
MAC/DMI	Only for BIOS1	For both BIOS
CPLD Interface	GPIO	LPC or eSPI (By Platform)

Figure 1. Gen 1 vs Gen 2 Dual BIOS comparison chart

Few things can shut down a computer as completely as a corrupted BIOS. With Dual BIOS feature, you will be guaranteed to enter a healthy OS to perform thorough troubleshooting before the situation is irreparable.

Get Ready for BIOS Update

Flashing a BIOS needs to be carefully completed, especially pertaining to a corrupted BIOS, which can lead to an unusable system if done incorrectly. To get ready for a BIOS update, acquire the following BIOS resources from Lanner technical support:

- Firmware and Flash Tool
- BIOS Engineering Spec

Before you start, make sure you select the correct firmware version, correct BIOS (Primary or Secondary) and go through the instructions for BIOS update in *BIOS Engineering Spec* thoroughly. If you cannot be certain if this version is correct for your system, please contact Lanner Technical Support.

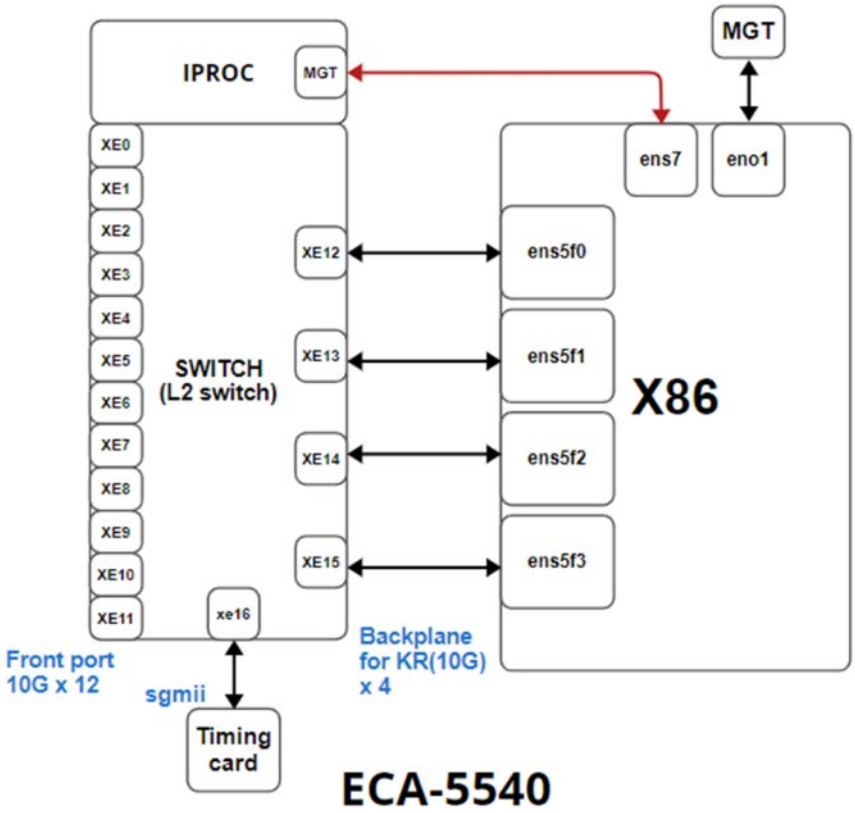
Note:
1. Dual BIOS feature cannot work with BIOS Boot Guard function
2. To update BIOS, it is mandatory to have both BIOS updated first. This is to avoid both BIOS having ME code variations, which could lead to unexpected risk and errors.
3. When the system enters BIOS menu or Option ROM, the system will not reboot automatically.

Warning
DO NOT power off or reset the system during BIOS updating process.

Disclaimer
Under no circumstances will Lanner accept responsibility or liability for damages of any kind whatsoever resulting or arising directly or indirectly from a BIOS update.

APPENDIX C: CONNECT TO IPROC VIA NETWORK

Step 1. X86 ethernet enp183s0f0(pci bus b7:00.0) set IP 192.168.100.X.



Step 2. Use telnet tool to connect to IPROC, when connecting to system, port set 23 (default), connect to bcm CLI port set 12345.

```
root@lanner-Default-string:~# telnet 192.168.100.1 12345
Trying 192.168.100.1...
Connected to 192.168.100.1.
Escape character is '^]'.

BCM.0>
```

```
BCM.0> ps
            ena/    speed/ link auto    STP                          lrn  inter    max  loop
      port  link    duplex scan neg?   state   pause  discrd ops   face frame  back
    xe0( 16) down   10G  FD   SW   No   Forward  TX RX   None   FA    SFI 16356
    xe1( 17) down   10G  FD   SW   No   Forward  TX RX   None   FA    SFI 16356
    xe2( 18) down   10G  FD   SW   No   Forward  TX RX   None   FA    SFI 16356
    xe3( 19) down   10G  FD   SW   No   Forward  TX RX   None   FA    SFI 16356
    xe4( 20) down   10G  FD   SW   No   Forward  TX RX   None   FA    SFI 16356
    xe5( 21) down   10G  FD   SW   No   Forward  TX RX   None   FA    SFI 16356
    xe6( 22) down   10G  FD   SW   No   Forward  TX RX   None   FA    SFI 16356
    xe7( 23) down   10G  FD   SW   No   Forward  TX RX   None   FA    SFI 16356
    xe8( 24) down   10G  FD   SW   No   Forward  TX RX   None   FA    SFI 16356
    xe9( 25) down   10G  FD   SW   No   Forward  TX RX   None   FA    SFI 16356
   xe10( 26) down   10G  FD   SW   No   Forward  TX RX   None   FA    SFI 16356
   xe11( 27) down   10G  FD   SW   No   Forward  TX RX   None   FA    SFI 16356
   xe12( 28) up     10G  FD   SW   Yes  Forward           None   FA     KR 16356
   xe13( 29) up     10G  FD   SW   Yes  Forward           None   FA     KR 16356
   xe14( 30) up     10G  FD   SW   Yes  Forward           None   FA     KR 16356
   xe15( 31) up     10G  FD   SW   Yes  Forward           None   FA     KR 16356
   xe16( 32) up      1G  FD   SW   No   Forward  TX RX   None   FA  SGMII 16356
BCM.0>
```

Step 3. Login to the system, account: root.

```
Welcome to Broadcom Linux
iProc login: root
```

APPENDIX D: PORT MAP

MGMT	Console

XE0	XE2	XE4	XE6
XE1	XE3	XE5	XE7

XE8	XE10
XE9	XE11

Switch Side	Ethernet Name
XE12	ens5f0
XE13	ens5f1
XE14	ens5f2
XE15	ens5f3

Front Port	ethernet name
MGMT	ens7

Switch Side	Connected Device
XE16	Timing Card (1588)

APPENDIX E: TERMS AND CONDITIONS

Warranty Policy

1. All products are under warranty against defects in materials and workmanship for a period of one year from the date of purchase.
2. The buyer will bear the return freight charges for goods returned for repair within the warranty period; whereas the manufacturer will bear the after service freight charges for goods returned to the user.
3. The buyer will pay for the repair (for replaced components plus service time) and transportation charges (both ways) for items after the expiration of the warranty period.
4. If the RMA Service Request Form does not meet the stated requirement as listed on "RMA Service," RMA goods will be returned at customer's expense.
5. The following conditions are excluded from this warranty:
   - Improper or inadequate maintenance by the customer
   - Unauthorized modification, misuse, or reversed engineering of the product
   - Operation outside of the environmental specifications for the product.

RMA Service

Requesting an RMA#

1. To obtain an RMA number, simply fill out and fax the "RMA Request Form" to your supplier.
2. The customer is required to fill out the problem code as listed. If your problem is not among the codes listed, please write the symptom description in the remarks box.
3. Ship the defective unit(s) on freight prepaid terms. Use the original packing materials when possible.
4. Mark the RMA# clearly on the box.

Note: Customer is responsible for shipping damage(s) resulting from inadequate/loose packing of the defective unit(s). All RMA# are valid for 30 days only; RMA goods received after the effective RMA# period will be rejected.

RMA Service Request Form

When requesting RMA service, please fill out the following form. Without this form enclosed, your RMA cannot be processed.

RMA No:	Reasons to Return: ▫ Repair(Please include failure details) ▫ Testing Purpose
Company:	Contact Person:
Phone No.	Purchased Date:
Fax No.:	Applied Date:
Return Shipping Address: _____ Shipping by: ▫ Air Freight ▫ Sea ▫ Express_____ ▫ Others:_____	

Item	Model Name	Serial Number	Configuration

Item	Problem Code	Failure Status

*Problem Code:

01:D.O.A.	07: BIOS Problem	13: SCSI	19: DIO
02: Second Time R.M.A.	08: Keyboard Controller Fail	14: LPT Port	20: Buzzer
03: CMOS Data Lost	09: Cache RMA Problem	15: PS2	21: Shut Down
04: FDC Fail	10: Memory Socket Bad	16: LAN	22: Panel Fail
05: HDC Fail	11: Hang Up Software	17: COM Port	23: CRT Fail
06: Bad Slot	12: Out Look Damage	18: Watchdog Timer	24: Others (Pls specify)

Request Party

Authorized Signature / Date

Confirmed By Supplier

Authorized Signature / Date