Lanner

Edge Computing Appliance Platform

Hardware Platforms for Edge Computing

ECA-6040
User Manual

Version: 1.0

Date of Release:2024-11-04

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.

Technical Support

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.

Contact Information

Taiwan Corporate Headquarters

Lanner Electronics Inc.

7F, No.173, Sec.2, Datong Rd.

Xizhi District, New Taipei City 22184,

Taiwan

立端科技股份有限公司

221 新北市汐止區

大同路二段 173 號 7 樓

T: +886-2-8692-6060

F: +886-2-8692-6101

E: contact@lannerinc.com

China

Beijing L&S Lancom Platform Tech. Co., Ltd.

Guodong LOFT 9 Layer No. 9 Huinan Road,

Huilongguan Town, Changping District, Beijing

102208 China

T: +86 010-82795600

F: +86 010-62963250

E: service@ls-china.com.cn

USA

Lanner Electronics Inc.

47790 Westinghouse Drive

Fremont, CA 94539

T: +1-855-852-6637

F: +1-510-979-0689

E: sales_us@lannerinc.com

Canada

Lanner Electronics Canada Ltd

3160A Orlando Drive

Mississauga, ON

L4V 1R5 Canada

T: +1 877-813-2132

F: +1 905-362-2369

E: sales_ca@lannerinc.com

Europe

Lanner Europe B.V.

Wilhelmina van Pruisenweg 104

2595 AN The Hague

The Netherlands

T: +31 70 701 3256

E: sales_eu@lannerinc.com

Copyright and Trademarks

Aknowledgement

Intel® and Intel® Xeon® are trademarks of Intel Corporation or its subsidiaries in the U.S. and/or other countries. Microsoft Windows and MS-DOS are registered trademarks of Microsoft Corp. All other product names or trademarks are properties of their respective owners.

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.
- Avoid wearing loose clothing or jewelry that could catch in the chassis. Secure ties, scarves, and roll up 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.
- Turn off and unplug the power 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.
- Extreme heat can cause a battery to explode or leak flammable liquid or gas.
- Low air pressure can cause a battery to explode or leak flammable liquid or gas.
- CAUTION: Risk of explosion if the battery is replaced with an incorrect type. Dispose of used batteries according to the provided 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

- Ensure the room has sufficient air circulation, as electrical equipment generates heat, and ambient temperature alone may not cool it adequately.
- 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 wrist strap with good skin contact. If unavailable, ground yourself by touching the chassis's metal part.
- 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

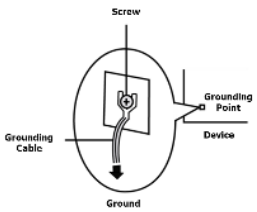
Before turning on the device, ground the grounding cable of the equipment. Proper grounding (grounding) is very important to protect the equipment against the harmful effects of external noise and to reduce the risk of electrocution in the event of a lightning strike. To uninstall the equipment, disconnect 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.

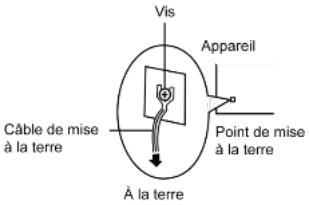
Grounding Procedure for DC Power Source

- 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.



Important

1. For DC power supply, TQ LB In=12, Wiring rage= 22-16AWG, Wire Type= Cu
2. The unit is intended to be supplied by a UL/IEC 62368-1 certified DC power source with ES1 output rated -57 V DC to -40 V DC, minimum 7-10 A with Maximum ambient temperature 65 °C or higher and altitude 5000 m.
3. This equipment must be grounded and the power cord for the equipment should be connected to a socket-outlet with earthing connection.

Table of Contents

CHAPTER 1: PRODUCT OVERVIEW

The ECA-6040 is powered by the 4th & 5th Gen Intel Xeon Scalable Processors and is a scalable, high-performance platform for telecom operators aiming to build and deploy open, efficient and secure 5G radio access networks

Main Features

- 4th & 5th Gen Intel®Xeon Scalable Processors
- 16x DDR5 RDIMM, Max. 1024 GB System Memory
- Short Depth Chassis and Front I/O Design
- 2x FHFL PCIe*16 Slot, 2x LP, and 1x OCP 3.0 NIC Slot
- 1x GbE RJ45 Port, 2x UBS 3.0 Ports, 1x OCP3.0, Secure BMC/TPM 2.0
- 1x M.2 NVMe (PCIe) 2242/2260 M-Key, 1x M.2 NVMe (PCIe) 2280 M-Key
- 4x 2.5'' HDD/SSD OR 4x 2.5'' U.2 SSD (Optional)
- 6x Smart Fans

Package Content

Your package contains the following items:

- 1x Edge Computing Platform
- 1x CPU Heatsink
- 2x Processor Carrier (E1A for XCC CPU Series), 2x Processor Carrier (E1B for MCC CPU Series)
- 2x Power Supply Unit
- 1x LAN Cable, 1x Mini DP VGA Cable
- 1x Short Ear Rack Mount Kit with screws

NOTE: Using a Mini DP VGA cable is more convenient for software installation or building software.

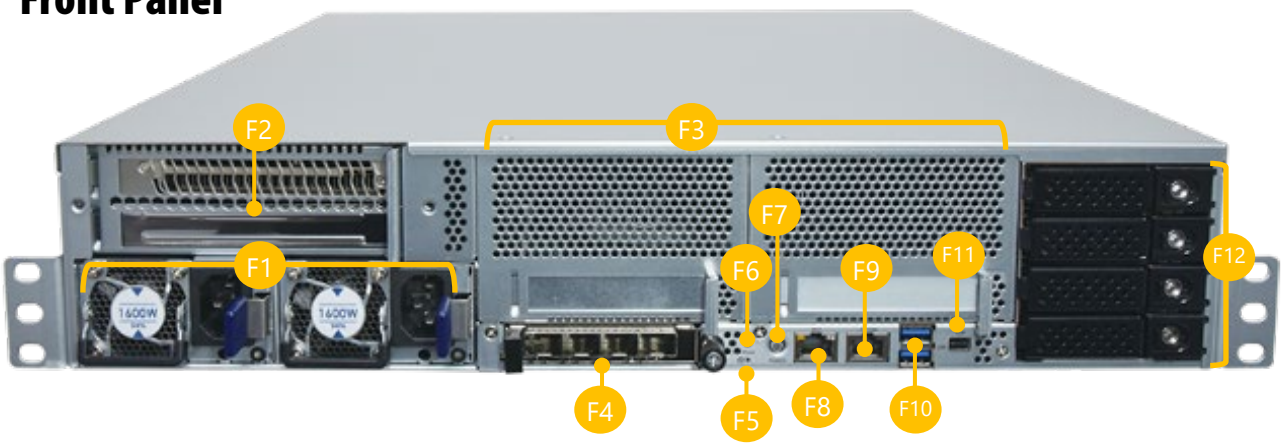
Ordering Information

SKU No.	Description
ECA-6040A	4th & 5th Gen Intel® Xeon® Scalable Processors, Intel® QAT, 1x GbE RJ45, 2x FHFL, 2x LP, 1x OCP3.0

System Specifications

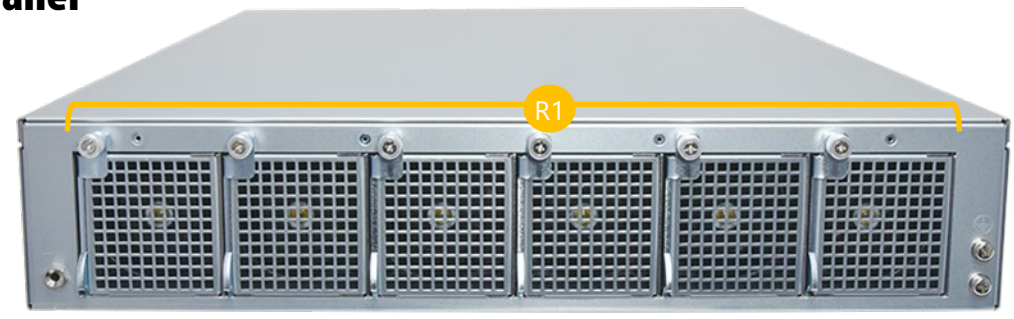
Form Factor		2U 19" Rackmount
Platform	Processor Options	Intel® Xeon® Processor Scalable Family (Codenamed Sapphire Rapids-SP/EMR-SP/Rapids-EE)
	CPU Socket	1x LGA 4677
	Chipset	Intel®C741
	Security Acceleration	Intel® QuickAssist Technology
BIOS		AMI SPI Flash BIOS
System Memory	Technology	DDR5 4800MHz RDIMM
	Max. Capacity	1024GB
	Socket	16x 288-Pin RDIMM
Networking	Ethernet Ports	1x GbE RJ45 w/ LED (for MGMT)
LOM	OPMA Slot	Support AST2600 IPMI Module
	IO Interface	1x LOM Port via BMC CHip
I/O Interface	Reset Button	1x Reset Button (Default SW Reset)
	Power Button	1x ATX Power Switch
	LED Indicator	Power / Status LED Indicator
	Console Port	1x RJ45 Console Port
	USB Port	2x USB 3.0 Port
	Display Port	1x MiniDP via IPMI Module
Storage	HDD/SSD Support	4x 2.5" HDD/SSD Tray OR 4x 2.5" U.2 (Optional)
	Onboard Slots	1x M.2 2280 M-Key for NVMe; 1x M.2 2242/2260 M-Key for NVMe
Expansion	PCIe	2x FHFL (PCIe*16, Double Width, 300W) w/ Default 1600W PSU OR FHFL (PCIe*16, Double-Width, 350-400W) by Optional 2000W PSU; 2x LP (PCIe*8)
	OCP 3.0	1x OCP 3.0 Slot
Miscellaneous	Watchdog	Yes
	Internal RTC w/ Li Battery	Yes
	TPM	TPM 2.0
Cooling	Processor	Passive CPU Heatsink
	System	6x Swappable Smart Fans
Environmental Parameters	Temperature	Operating Temperature: 0°C~40°C Storage Temperature: -20˚C ~70˚C
	Humidity (RH)	Operating: 5% ~ 90% RH Storage: 5% ~ 95% RH
System Dimensions	Size (WxDxH)	438 x 580.1 x 88mm
	Weight	20 KG
Package Dimensions	Size (WxDxH)	600 x 930 x 270mm
	Weight	21 KG
Power	Type/Watts	1600W AC Redundant (Optional: 2000W AC Redundant)
	Input	AC 200~240V @ 50-60Hz
Approvals and Compliance		RoHS Directive (EU) 2015/863, CE/FCC Class A, UL
OS Support		Linux

Front Panel



No.	Description	
F1	Power Supply	AC Redundant PSU
F2	PCIe Expansion	2x FH 3/4L PCIe*16 Expansion Slot
F3	PCIe Expansion	2x LP PCIe*8 Expansion Slot
F4	OCP NIC	1x OCP 3.0 NIC Slot
F5	LED Indicator	Power/Status LED Indicator
F6	Reset Button	For Software Reset (control by CPLD)
F7	Power Button	1x Power Button
F8	MGT Port	1x 1GbE RJ45 Management Port
F9	Console Port	1x RJ45 Console Port
F10	USB Port	2x USB 3.0 Port
F11	Display Port	1x Mini-VGA Port
F12	HDD/SSD Tray	4x 2.5" HDD/SSD Removable Trays

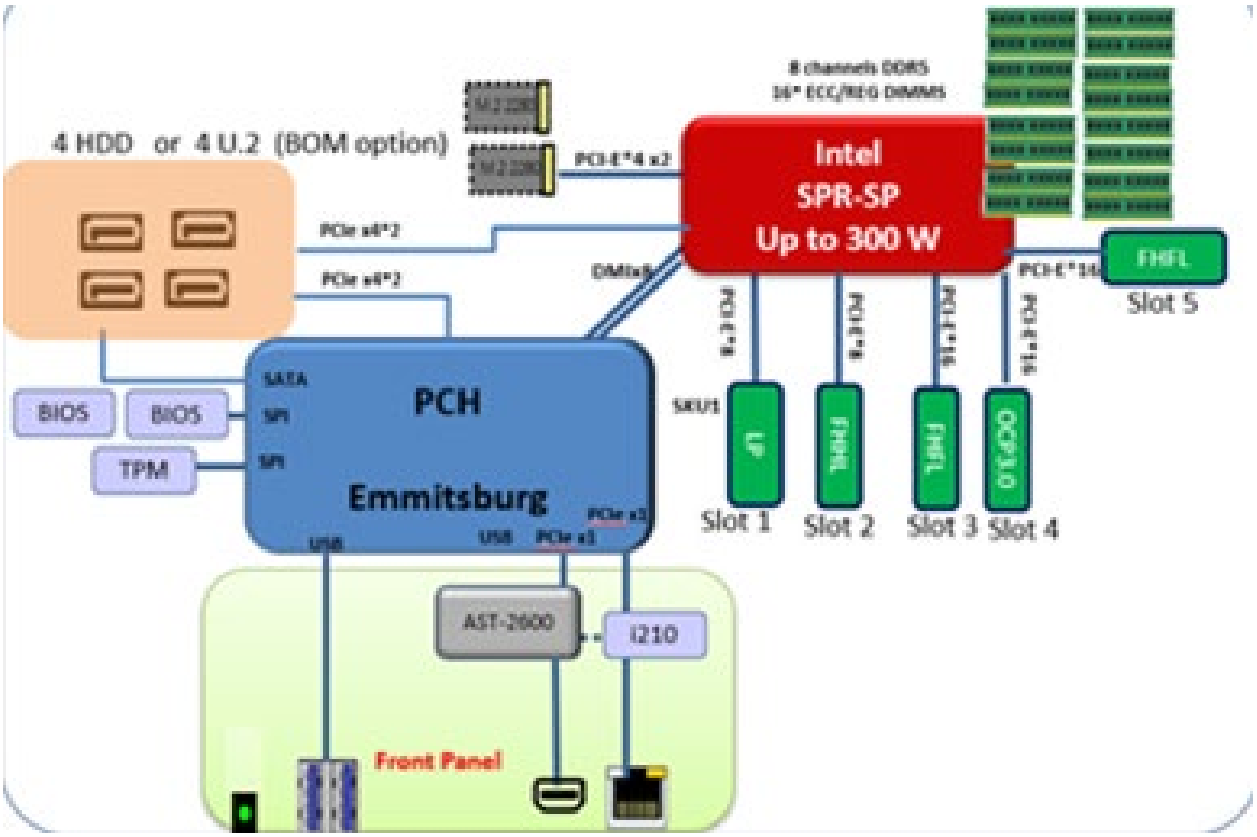
Rear Panel



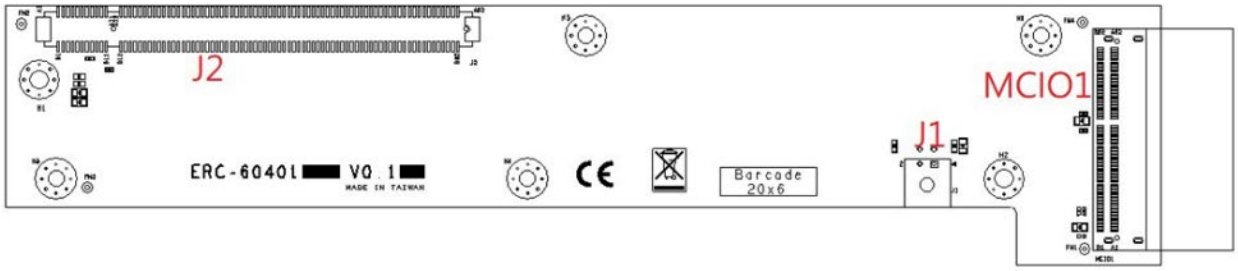
No.	Description	
R1	Smart Fans	6x Swappable Smart Fans

CHAPTER 2: MOTHERBOARD INFORMATION

Block Diagram



Internal Jumpers and Connectors



1. J2: Gen 3 PCI Express x16 Slot

Pin #	Description	Pin #	Description
B1	P12V	A1	NC
B2	P12V	A2	P12V
B3	P12V	A3	P12V
B4	GND	A4	GND
B5	SMB_SCL	A5	NC
B6	SMB_CDA	A6	NC
B7	GND	A7	NC
B8	P3V3	A8	NC
B9	NC	A9	P3V3
B10	P3V3_AUX	A10	P3V3
B11	WAKE#	A11	PERST
B12	NC	A12	GND
B13	GND	A13	REFCLK+
B14	CPUPETP0	A14	REFCLK-
B15	CPUPETN0	A15	GND
B16	GND	A16	CPUPERP0
B17	NC	A17	CPUPERN0
B18	GND	A18	GND
B19	CPUPETP1	A19	NC
B20	CPUPETN1	A20	GND
B21	GND	A21	CPUPERP1
B22	GND	A22	CPUPERN1
B23	CPUPETP2	A23	GND
B24	CPUPETN2	A24	GND
B25	GND	A25	CPUPERP2
B26	GND	A26	CPUPERN2
B27	CPUPETP3	A27	GND
B28	CPUPETN3	A28	GND
B29	GND	A29	CPUPERP3
B30	NC	A30	CPUPERN3
B31	NC	A31	GND
B32	GND	A32	NC

B33	CPUPETP4	A33	NC
B34	CPUPETN4	A34	GND
B35	GND	A35	CPUPERP4
B36	GND	A36	CPUPERN4
B37	CPUPETP5	A37	GND
B38	CPUPETN5	A38	GND
B39	GND	A39	CPUPERP5
B40	GND	A40	CPUPERN5
B41	CPUPETP6	A41	GND
B42	CPUPETN6	A42	GND
B43	GND	A43	CPUPERP6
B44	GND	A44	CPUPERN6
B45	CPUPETP7	A45	GND
B46	CPUPETN7	A46	GND
B47	GND	A47	CPUPERP7
B48	NC	A48	CPUPERN7
B49	GND	A49	GND
B50	CPUPETP8	A50	NC
B51	CPUPETN8	A51	GND
B52	GND	A52	CPUPERP8
B53	GND	A53	CPUPERN8
B54	CPUPETP9	A54	GND
B55	CPUPETN9	A55	GND
B56	GND	A56	CPUPERP9
B57	GND	A57	CPUPERN9
B58	CPUPETP10	A58	GND
B59	CPUPETN10	A59	GND
B60	GND	A60	CPUPERP10
B61	GND	A61	CPUPERN10
B62	CPUPETP11	A62	GND
B63	CPUPETN11	A63	GND
B64	GND	A64	CPUPERP11
B65	GND	A65	CPUPERN11
B66	CPUPETP12	A66	GND
B67	CPUPETN12	A67	GND
B68	GND	A68	CPUPERP12
B69	GND	A69	CPUPERN12
B70	CPUPETP13	A70	GND
B71	CPUPETN13	A71	GND
B72	GND	A72	CPUPERP13
B73	GND	A73	CPUPERN13

B74	CPUPETP14	A74	GND
B75	CPUPETN14	A75	GND
B76	GND	A76	CPUPERP14
B77	GND	A77	CPUPERN14
B78	CPUPETP15	A78	GND
B79	CPUPETN15	A79	GND
B80	GND	A80	CPUPERP15
B81	NC	A81	CPUPERN15
B82	NC	A82	GND
1	GND	PAD1	NC
2	GND	PAD2	NC

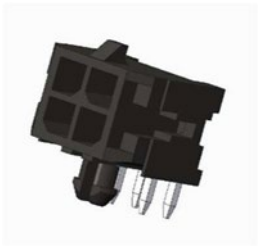
2. MCIO1: PCI Express x16 Slot

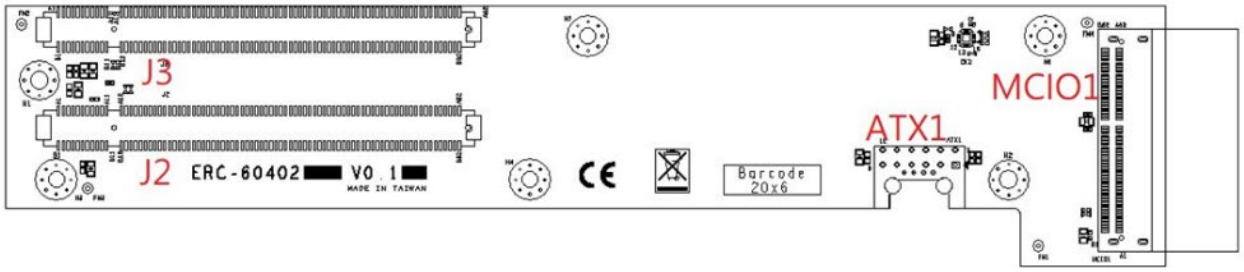
Pin #	Description	Pin #	Description
A1	GND	B1	GND
A2	PRSNTB _ N	B2	P3V3_AUX
A3	PERST	B3	P3V3_AUX
A4	GND	B4	GND
A5	CPUPERN7	B5	WAKE#
A6	CPUPERP7	B6	NC
A7	GND	B7	GND
A8	CPUPERN6	B8	SMB_SCL
A9	CPUPERP6	B9	SMB_CDA
A10	GND	B10	GND
A11	CPUPERN5	B11	CPUPETN7
A12	CPUPERP5	B12	CPUPETP7
A13	GND	B13	GND
A14	CPUPERN4	B14	CPUPETP6
A15	CPUPERP4	B15	CPUPETN6
A16	GND	B16	GND
A17	CPUPERN3	B17	CPUPETN5
A18	CPUPERP3	B18	CPUPETP5
A19	GND	B19	GND
A20	CPUPERN2	B20	CPUPETP4
A21	CPUPERP2	B21	CPUPETN4
A22	GND	B22	GND
A23	CPUPERN1	B23	CPUPETN3
A24	CPUPERP1	B24	CPUPETP3
A25	GND	B25	GND
A26	CPUPERN0	B26	CPUPETP2
A27	CPUPERP0	B27	CPUPETN2

A28	GND	B28	GND
A29	REFCLK+	B29	CPUPETN1
A30	REFCLK-	B30	CPUPETP1
A31	GND	B31	GND
A32	CPUPERN15	B32	CPUPETN0
A33	CPUPERP15	B33	CPUPETP0
A34	GND	B34	GND
A35	CPUPERN14	B35	P3V3
A36	CPUPERP14	B36	P3V3
A37	GND	B37	GND
A38	NC	B38	NC
A39	CPUPERN13	B39	P3V3
A40	CPUPERP13	B40	P3V3
A41	GND	B41	GND
A42	CPUPERN12	B42	P3V3
A43	CPUPERP12	B43	P3V3
A44	GND	B44	GND
A45	CPUPERN11	B45	CPUPETN15
A46	CPUPERP11	B46	CPUPETP15
A47	GND	B47	GND
A48	CPUPERN10	B48	CPUPETP14
A49	CPUPERP10	B49	CPUPETN14
A50	GND	B50	GND
A51	CPUPERN9	B51	CPUPETN13
A52	CPUPERP9	B52	CPUPETP13
A53	GND	B53	GND
A54	CPUPERN8	B54	CPUPETP12
A55	CPUPERP8	B55	CPUPETN12
A56	GND	B56	GND
A57	CPUPETN9	B57	CPUPETN11
A58	CPUPETP9	B58	CPUPETP11
A59	GND	B59	GND
A60	CPUPETP8	B60	CPUPETP10
A61	CPUPETN8	B61	CPUPETN10
A62	GND	B62	GND
PAD1	GND	1	GND
PAD2	GND	2	GND

3. J1: Power Connector

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





1. J2: Gen 3 PCI Express x16 Slot

Pin #	Description	Pin #	Description
B1	P12V	A1	NC
B2	P12V	A2	P12V
B3	P12V	A3	P12V
B4	GND	A4	GND
B5	SMB_SCL	A5	NC
B6	SMB_CDA	A6	NC
B7	GND	A7	NC
B8	P3V3	A8	NC
B9	NC	A9	P3V3
B10	P3V3_AUX	A10	P3V3
B11	WAKE#	A11	PERST
B12	NC	A12	GND
B13	GND	A13	REFCLK+
B14	CPUPETP0	A14	REFCLK-
B15	CPUPETN0	A15	GND
B16	GND	A16	CPUPERP0
B17	NC	A17	CPUPERN0
B18	GND	A18	GND
B19	CPUPETP1	A19	NC
B20	CPUPETN1	A20	GND
B21	GND	A21	CPUPERP1
B22	GND	A22	CPUPERN1
B23	CPUPETP2	A23	GND
B24	CPUPETN2	A24	GND
B25	GND	A25	CPUPERP2

B26	GND	A26	CPUPERN2
B27	CPUPETP3	A27	GND
B28	CPUPETN3	A28	GND
B29	GND	A29	CPUPERP3
B30	NC	A30	CPUPERN3
B31	NC	A31	GND
B32	GND	A32	NC
B33	CPUPETP4	A33	NC
B34	CPUPETN4	A34	GND
B35	GND	A35	CPUPERP4
B36	GND	A36	CPUPERN4
B37	CPUPETP5	A37	GND
B38	CPUPETN5	A38	GND
B39	GND	A39	CPUPERP5
B40	GND	A40	CPUPERN5
B41	CPUPETP6	A41	GND
B42	CPUPETN6	A42	GND
B43	GND	A43	CPUPERP6
B44	GND	A44	CPUPERN6
B45	CPUPETP7	A45	GND
B46	CPUPETN7	A46	GND
B47	GND	A47	CPUPERP7
B48	NC	A48	CPUPERN7
B49	GND	A49	GND

2. J3: Gen 3 PCI Express x16 Slot

Pin #	Description	Pin #	Description
B1	P12V	A1	NC
B2	P12V	A2	P12V
B3	P12V	A3	P12V
B4	GND	A4	GND
B5	SMB_SCL	A5	NC
B6	SMB_CDA	A6	NC
B7	GND	A7	NC
B8	P3V3	A8	NC
B9	NC	A9	P3V3
B10	P3V3_AUX	A10	P3V3
B11	WAKE#	A11	PERST
B12	NC	A12	GND
B13	GND	A13	REFCLK+
B14	CPUPETP8	A14	REFCLK-

B15	CPUPETN8	A15	GND
B16	GND	A16	CPUPERP8
B17	NC	A17	CPUPERN8
B18	GND	A18	GND
B19	CPUPETP9	A19	NC
B20	CPUPETN9	A20	GND
B21	GND	A21	CPUPERP9
B22	GND	A22	CPUPERN9
B23	CPUPETP10	A23	GND
B24	CPUPETN10	A24	GND
B25	GND	A25	CPUPERP10
B26	GND	A26	CPUPERN10
B27	CPUPETP11	A27	GND
B28	CPUPETN11	A28	GND
B29	GND	A29	CPUPERP11
B30	NC	A30	CPUPERN11
B31	NC	A31	GND
B32	GND	A32	NC
B33	CPUPETP12	A33	NC
B34	CPUPETN12	A34	GND
B35	GND	A35	CPUPERP12
B36	GND	A36	CPUPERN12
B37	CPUPETP13	A37	GND
B38	CPUPETN13	A38	GND
B39	GND	A39	CPUPERP13
B40	GND	A40	CPUPERN13
B41	CPUPETP14	A41	GND
B42	CPUPETN14	A42	GND
B43	GND	A43	CPUPERP14
B44	GND	A44	CPUPERN14
B45	CPUPETP15	A45	GND
B46	CPUPETN15	A46	GND
B47	GND	A47	CPUPERP15
B48	NC	A48	CPUPERN15
B49	GND	A49	GND

3. MCIO11: PCI Express x16 Slot

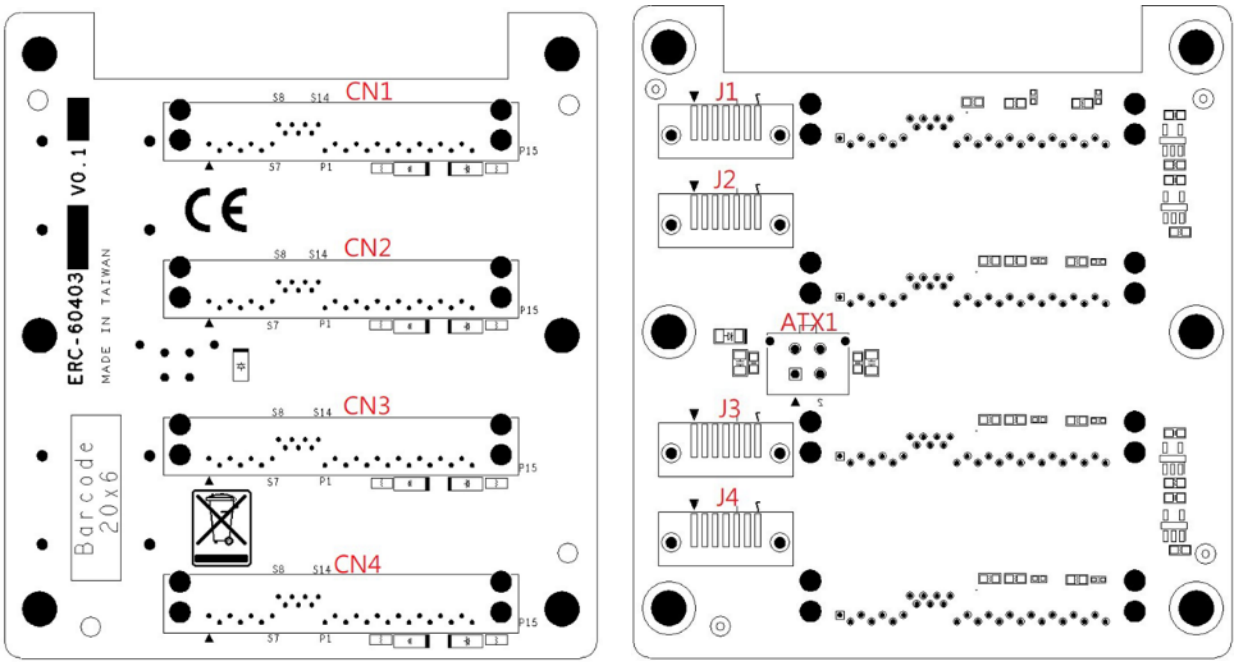
Pin #	Description	Pin #	Description
A1	GND	B1	GND
A2	PRSNTB _ N	B2	P3V3_AUX
A3	PERST	B3	P3V3_AUX

A4	GND	B4	GND
A5	CPUPERN7	B5	WAKE#
A6	CPUPERP7	B6	NC
A7	GND	B7	GND
A8	CPUPERN6	B8	SMB_SCL
A9	CPUPERP6	B9	SMB_CDA
A10	GND	B10	GND
A11	CPUPERN5	B11	CPUPETN7
A12	CPUPERP5	B12	CPUPETP7
A13	GND	B13	GND
A14	CPUPERN4	B14	CPUPETP6
A15	CPUPERP4	B15	CPUPETN6
A16	GND	B16	GND
A17	CPUPERN3	B17	CPUPETN5
A18	CPUPERP3	B18	CPUPETP5
A19	GND	B19	GND
A20	CPUPERN2	B20	CPUPETP4
A21	CPUPERP2	B21	CPUPETN4
A22	GND	B22	GND
A23	CPUPERN1	B23	CPUPETN3
A24	CPUPERP1	B24	CPUPETP3
A25	GND	B25	GND
A26	CPUPERN0	B26	CPUPETP2
A27	CPUPERP0	B27	CPUPETN2
A28	GND	B28	GND
A29	REFCLK+	B29	CPUPETN1
A30	REFCLK-	B30	CPUPETP1
A31	GND	B31	GND
A32	CPUPERN15	B32	CPUPETN0
A33	CPUPERP15	B33	CPUPETP0
A34	GND	B34	GND
A35	CPUPERN14	B35	P3V3
A36	CPUPERP14	B36	P3V3
A37	GND	B37	GND
A38	NC	B38	NC
A39	CPUPERN13	B39	P3V3
A40	CPUPERP13	B40	P3V3
A41	GND	B41	GND
A42	CPUPERN12	B42	P3V3
A43	CPUPERP12	B43	P3V3
A44	GND	B44	GND

A45	CPUPERN11	B45	CPUPETN15
A46	CPUPERP11	B46	CPUPETP15
A47	GND	B47	GND
A48	CPUPERN10	B48	CPUPETP14
A49	CPUPERP10	B49	CPUPETN14
A50	GND	B50	GND
A51	CPUPERN9	B51	CPUPETN13
A52	CPUPERP9	B52	CPUPETP13
A53	GND	B53	GND
A54	CPUPERN8	B54	CPUPETP12
A55	CPUPERP8	B55	CPUPETN12
A56	GND	B56	GND
A57	CPUPETN9	B57	CPUPETN11
A58	CPUPETP9	B58	CPUPETP11
A59	GND	B59	GND
A60	CPUPETP8	B60	CPUPETP10
A61	CPUPETN8	B61	CPUPETN10
A62	GND	B62	GND
PAD1	GND	PAD2	GND
PAD3	GND	PAD4	GND

4. ATX1: Power Connector

Pin #	Description
1	+P12V
2	+P12V
3	+P12V
4	+P12V
5	+P12V
6	+P12V
7	GND
8	GND
9	GND
10	GND
11	GND
12	GND
S1	NC
S2	NC
S3	NC
S4	NC



1. ATX1: HDD Power Connector

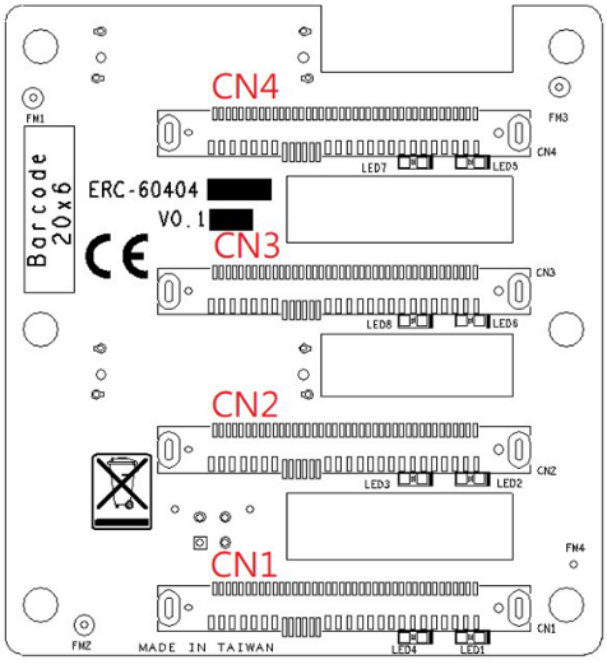
Pin #	Description
1	GND
2	GND
3	+P12V
4	+P5V

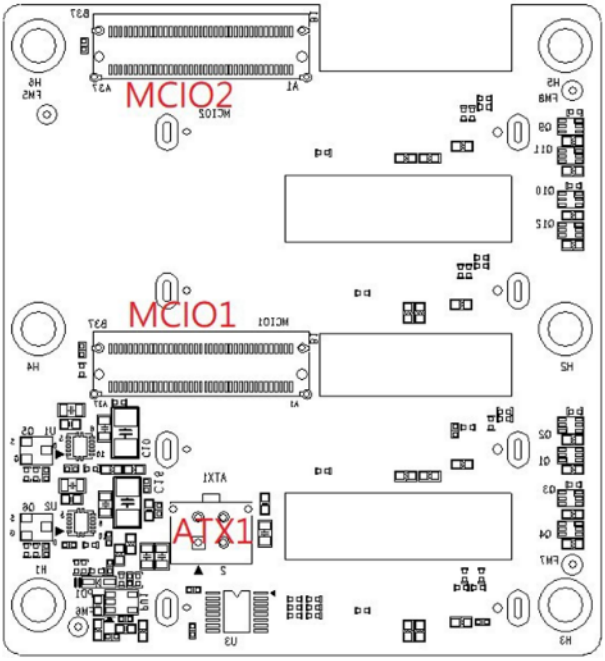
2. CN1/CN2/CN3/CN4: SAS Connector

Pin #	Description	Pin #	Description
S1	GND	P1	TP
S2	SATA_TXP	P2	TP
S3	SATA_TXN	P3	TP
S4	GND	P4	GND
S5	SATA_RXN	P5	PRESENT
S6	SATA_RXP	P6	GND
S7	GND	P7	+P5V
S8	GND	P8	+P5V
S9	NC	P9	+P5V
S10	NC	P10	GND
S11	GND	P11	LED_HDD
S12	NC	P12	GND
S13	NC	P13	+P12V
S14	GND	P14	+P12V
		P15	+P12V
1	NC	3	NC
2	NC	4	NC

3. J1/J2/J3/J4: SATA Connector

Pin #	Description
1	GND
2	SATA_TXP
3	SATA_TXN
4	GND
5	SATA_RXN
6	SATA_RXP
7	GND
PAD1	GND
PAD2	GND



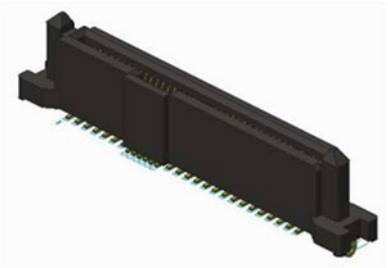


1. ATX1: HDD Power Connector

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

2. CN1/CN2/CN3/CN4: SAS Connector

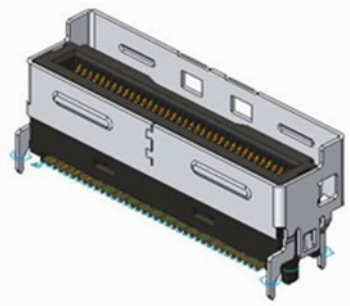
Pin #	Description	Pin #	Description
S1	GND	E1	NC
S2	NC	E2	NC
S3	NC	E3	+P3V3_AUX
S4	GND	E4	NC
S5	NC	E5	PERST2_N
S6	NC	E6	NC
S7	GND	E7	PE_CLK_P
S8	GND	E8	PE_CLK_N



S9	NC	E9	GND
S10	NC	E10	PE_TX_P0
S11	GND	E11	PE_TX_N0
S12	NC	E12	GND
S13	NC	E13	PE_RX_N0
S14	GND	E14	PE_RX_P0
S15	NC	E15	GND
S16	GND	E16	NC
S17	PE_TX_P1	E17	PE_TX_P3
S18	PE_TX_N1	E18	PE_TX_N3
S19	GND	E19	GND
S20	PE_RX_N1	E20	PE_RX_N3
S21	PE_RX_P1	E21	PE_RX_P3
S22	GND	E22	GND
S23	PE_TX_P2	E23	SMB_SCL
S24	PE_TX_N2	E24	SMB_SDA
S25	GND	E25	NC
S26	PE_RX_N2	P1	PE_WAKE#
S27	PE_RX_P2	P2	NC
S28	GND	P3	NC
P10	PRSNTB_N	P4	NC
P11	ACT_N	P5	GND
P12	HOTPLUG_N	P6	GND
P13	+P12V	P7	NC
P14	+P12V	P8	NC
P15	+P12V	P9	NC
PAD1	NC	PAD2	NC

3. MCIO1: U.2 x8 Connector

Pin #	Description	Pin #	Description
A1	GND	B1	GND
A2	REFCLK+	B2	CPUPERP1
A3	REFCLK-	B3	CPUPERN1
A4	GND	B4	GND
A5	CPUPETP1	B5	CPUPERP2
A6	CPUPETN1	B6	CPUPERN2
A7	GND	B7	GND
A8	CPUPETP2	B8	CPUPERP3
A9	CPUPETN2	B9	CPUPERN3
A10	GND	B10	GND
A11	CPUPETP3	B11	CPUPERP0

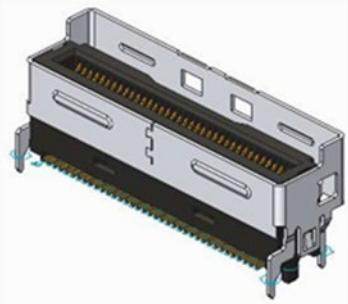


A12	CPUPETN3	B12	CPUPERN0
A13	GND	B13	GND
A14	CPUPETP0	B14	CPUPERP0
A15	CPUPETN0	B15	CPUPERN0
A16	GND	B16	GND
A17	CPUPETP0	B17	CPUPERP1
A18	CPUPETN0	B18	CPUPERN1
A19	GND	B19	GND
A20	CPUPETP1	B20	CPUPERP2
A21	CPUPETN1	B21	CPUPERN2
A22	GND	B22	GND
A23	CPUPETP2	B23	CPUPERP3
A24	CPUPETN2	B24	CPUPERN3
A25	GND	B25	GND
A26	CPUPETP3	B26	REFCLK+
A27	CPUPETN3	B27	REFCLK-
A28	GND	B28	GND
A29	PWR_ON_N	B29	SMB_SCL
A30	PWR_ON_N	B30	SMB_CDA
A31	GND	B31	GND
A32	PWRFL_N	B32	WAKE#
A33	PWRFL_N	B33	PRSNTB_N
A34	GND	B34	GND
A35	PRSNTB_N	B35	+P3V3_AUX
A36	PERST_N	B36	+P3V3_AUX
A37	GND	B37	GND
HM1	GND	HM2	GND
HM3	GND	HM4	GND

4. MCIO2: U.2 x8 Connector

Pin #	Description	Pin #	Description
A1	GND	B1	GND
A2	REFCLK+	B2	CPUPERP1
A3	REFCLK-	B3	CPUPERN1
A4	GND	B4	GND
A5	CPUPETP1	B5	CPUPERP2
A6	CPUPETN1	B6	CPUPERN2
A7	GND	B7	GND
A8	CPUPETP2	B8	CPUPERP3
A9	CPUPETN2	B9	CPUPERN3
A10	GND	B10	GND

A11	CPUPETP3	B11	CPUPERP0
A12	CPUPETN3	B12	CPUPERN0
A13	GND	B13	GND
A14	CPUPETP0	B14	CPUPERP0
A15	CPUPETN0	B15	CPUPERN0
A16	GND	B16	GND
A17	CPUPETP0	B17	CPUPERP1
A18	CPUPETN0	B18	CPUPERN1
A19	GND	B19	GND
A20	CPUPETP1	B20	CPUPERP2
A21	CPUPETN1	B21	CPUPERN2
A22	GND	B22	GND
A23	CPUPETP2	B23	CPUPERP3
A24	CPUPETN2	B24	CPUPERN3
A25	GND	B25	GND
A26	CPUPETP3	B26	REFCLK+
A27	CPUPETN3	B27	REFCLK-
A28	GND	B28	GND
A29	NC	B29	NC
A30	NC	B30	NC
A31	GND	B31	GND
A32	NC	B32	WAKE#
A33	NC	B33	NC
A34	GND	B34	GND
A35	NC	B35	+P3V3_AUX
A36	PERST_N	B36	+P3V3_AUX
A37	GND	B37	GND
HM1	GND	HM2	GND
HM3	GND	HM4	GND

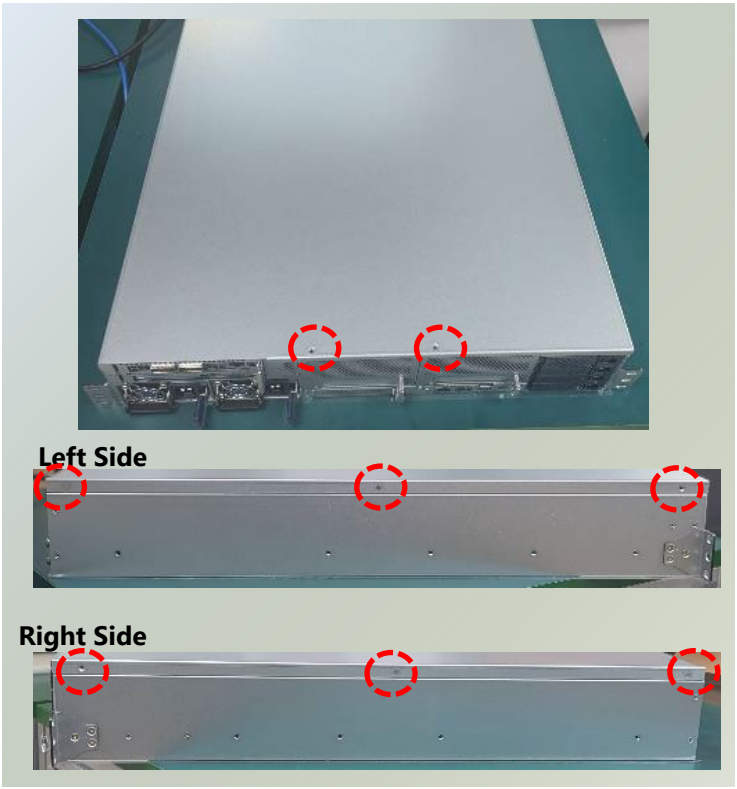


CHAPTER 3: HARDWARE SETUP

To reduce the risk of personal injury, electric shock, or damage to the system, please remove all power connections to shut down the device completely, and wear ESD protection gloves when conducting the steps in this chapter. Do not open the chassis cover when the system is in operation or after it has been powered on.

Opening the Chassis

1. Power off the system.
2. Unscrew the two (2) screws on the top cover, the three (3) screws on the right and left side chassis.



3. Gently slide the cover forward a bit.

4. Lift the cover up to remove.

Installing the CPU

Please note that the system delivered to you includes the heatsink and processor. This processor comes with a rather sophisticated design, therefore, the assembly of which must be handled with exclusive tools and extreme care by professionals.

Installing the processor onto the motherboard involves three stages:

1. Processor carrier assembly
2. Processor carrier assembly to heatsink.
3. System assembly PHM (Processor + Heat Sink Module) to motherboard

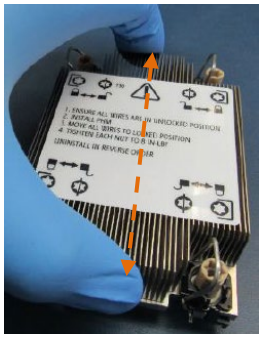
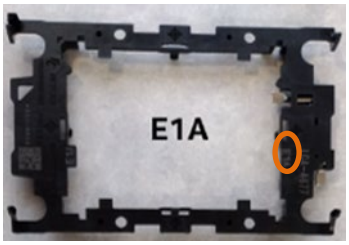
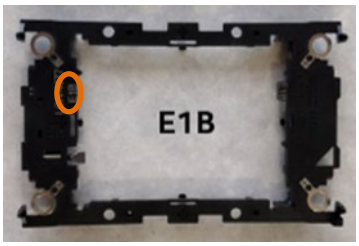
Tools Required

Tool	Description	
T-30 Torx Bit©	Set to 0.904 N.m. (or 8 in/lbf ± 10%) for tightening the nuts which fasten the PHM on the bolster plate.	
ESD Protection (ESD gloves, ESD-safe work surface, ESD-safe shoes, grounded wrist strap etc.)	During the entire assembly process, at least wear a pair of ESD gloves to avoid damaging or contaminating the electronic parts while enhancing your own safety.	

Note: The images of tools shown in this document are for reference only; the actual tools you use might be different

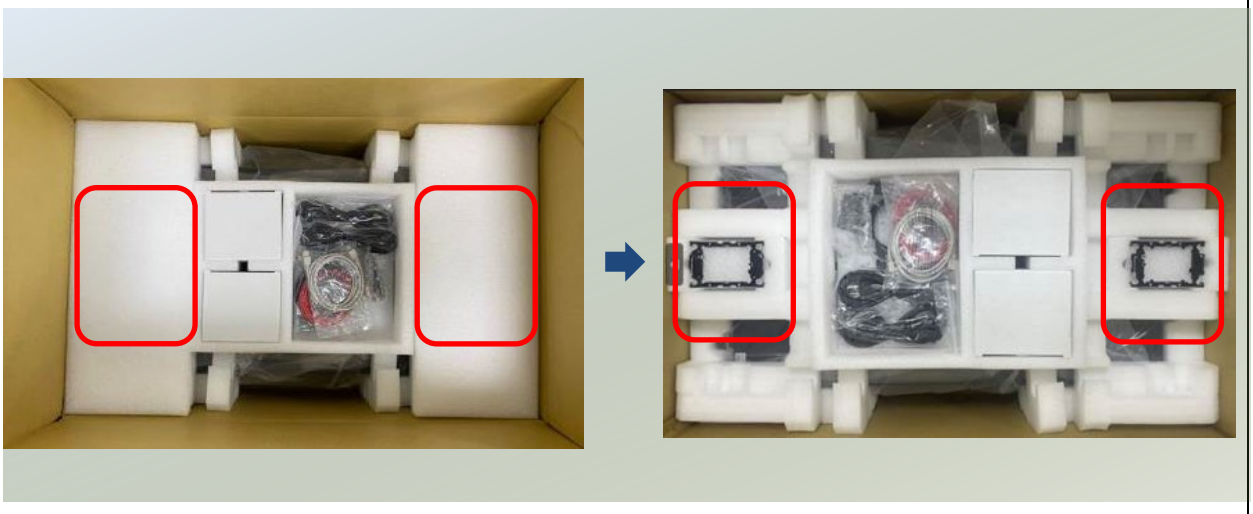
Parts Defined:

Item	Description	
Processor	Please avoid touching the gold fingers or package lands of the processor even if you are wearing ESD gloves.	 

Heatsink (1U & 2U)	When handling heatsink, always grip it along the axis of the fins of the heatsink to avoid fin damage. Fins or soldering of fins might be damaged by handling heatsink holding along the long side of the heatsink.	 
Processor Carrier	5th Gen Intel® Xeon® Scalable Processors are available in two different carriers, each requiring the correct CPU SKU for the specific die type: XCC or MCC. Standard package default contains 2x E1A (for XCC CPU) and 2x E1B (for MCC CPU) processor carriers. Please make sure to match the proper carrier with the CPU type. E1X codes are marked on Carrier and CPU.  	
Processor Tray		

Processor Carrier Assembly

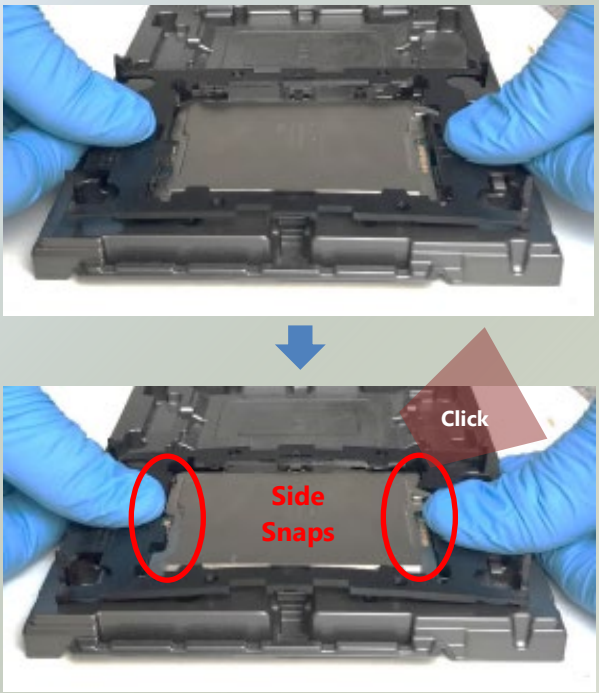
1. Locate the Processor carriers in package box and lift out.



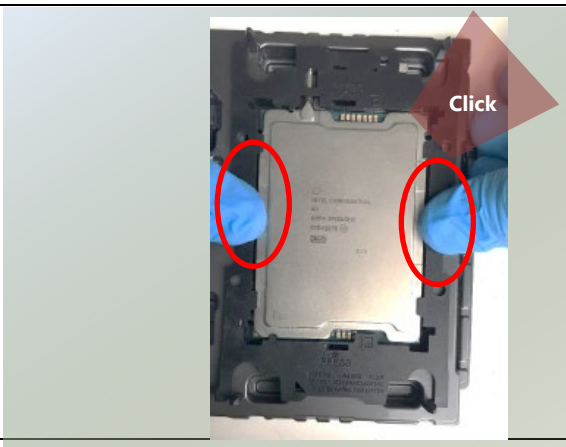
2. Place the processor carrier on top of the processor that is in the package tray aligning **Pin 1** marks on the processor carrier to **Pin 1** of the processor.

Note: Make sure that the keying feature tabs of the processor carrier are aligned to the slots in the processor properly. If not, check that the correct processor carrier is being used.

3. Using both hands place the thumbs on the side of the carrier at the opposite end of the TIM brake lever. Push down on one side at a time slightly pressing in the outward motion until a snap sound is heard.

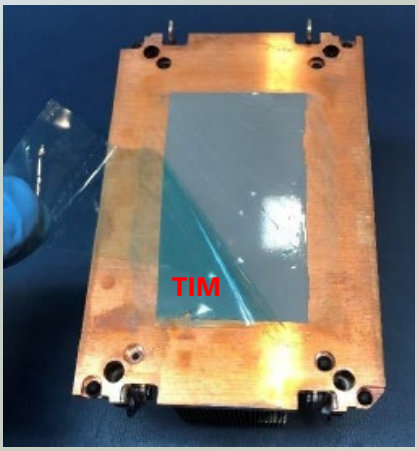


4. Check the two side snap latches on the carrier and verify that they have latched to the package. If not then press down on top of the side snap latches until they snap into place.



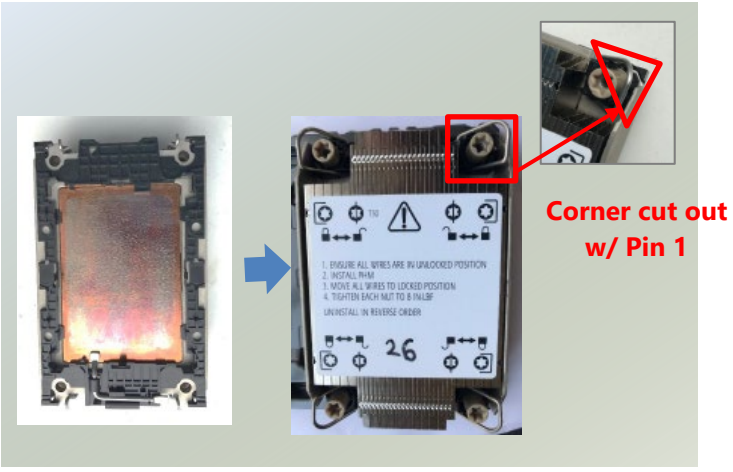
Processor Carrier Assembly to Heatsink

1. If there is TIM (Thermal Interface Material) protective film on the base of heatsink, remove it.

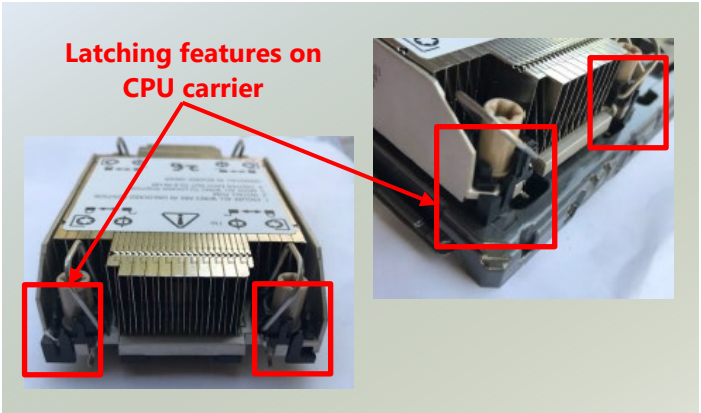


2. Turn the heatsink over and set the Anti-Tilt wires to the locked position (outward position).

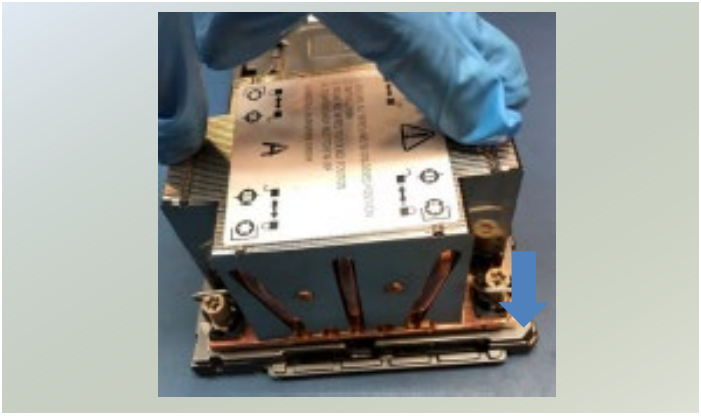
3. Align Pin 1 indicator of Processor carrier and corner cut out of Heatsink. If there are two corners cut out, either orientation is fine.



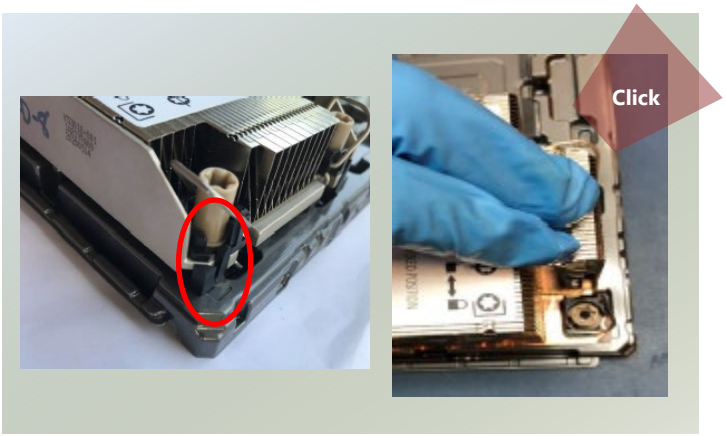
4. Place the heatsink ensure latching features on Processor carrier and heatsink are aligned during assembly.



5. Press heatsink down firmly to engage carrier latching features to the heatsink at four corners.

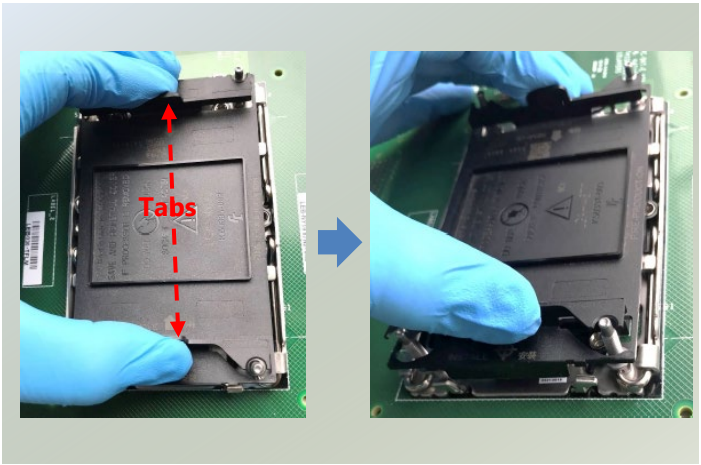


6. If carrier latching features do not latch the heatsink properly, engage each latching features by pressing the heatsink at the unlatched corner. You may hear a clicking sound when latched.



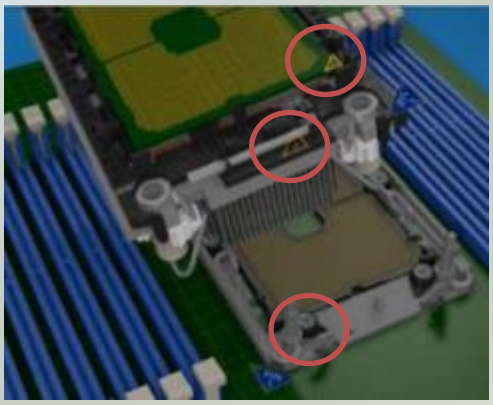
System Assembly PHM to Motherboard

1. Locate the processor placement on the motherboard. Hold finger grips on socket cover and squeeze in on the grip tabs. Then pull the cover up and off vertically to remove.

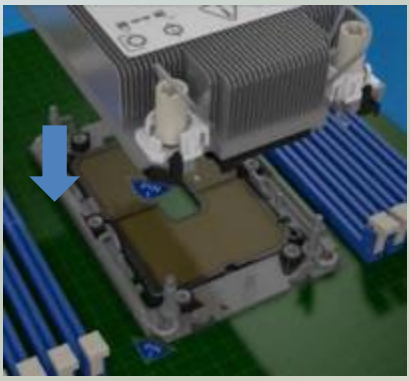


2. Set each anti-tilt wire to inward or unlocked position on the heatsink.

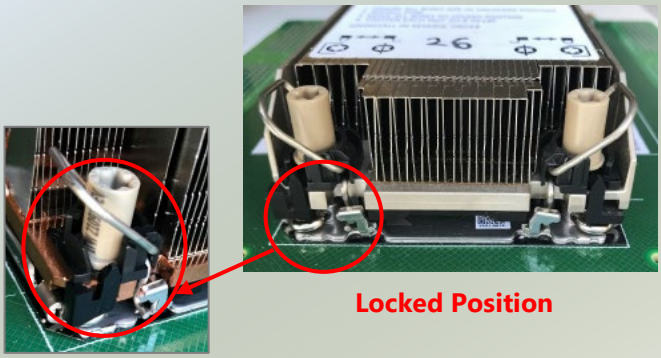
3. Lift up the PHM. Turn the PHM over to locate the PIN1 corner on processor carrier and processor.



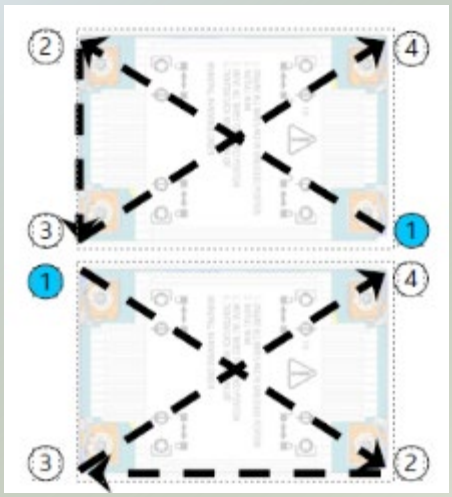
4. Then turn the PHM right side up. Line up the PIN1 corner of the PHM to the bolster plate PIN1 corner. Lower the PHM vertically down over the bolster plate studs.



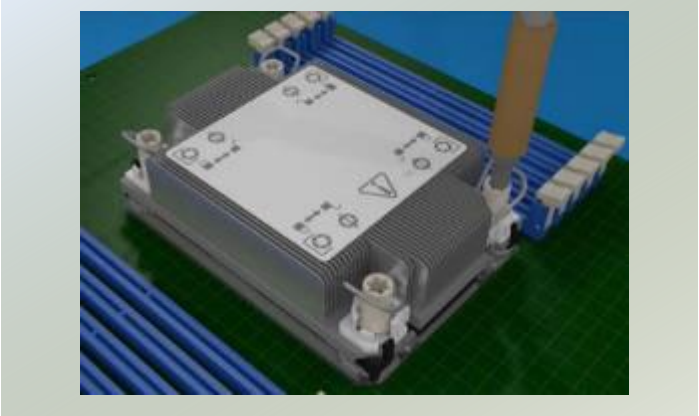
5. Set all four Anti-Tilt wires into the locked position (outward position.)



6. Next is to tighten the nuts on the heatsink using a diagonal pattern tightening sequence. Diagonal sequence is regardless of starting point. Primary step is Second nut driven is in diagonally opposite corner to the First nut.



7. Tighten all nuts on heatsink using a torque driver with a T30 bit to 8 in-lbf ± 10%.



Installing the System Memory

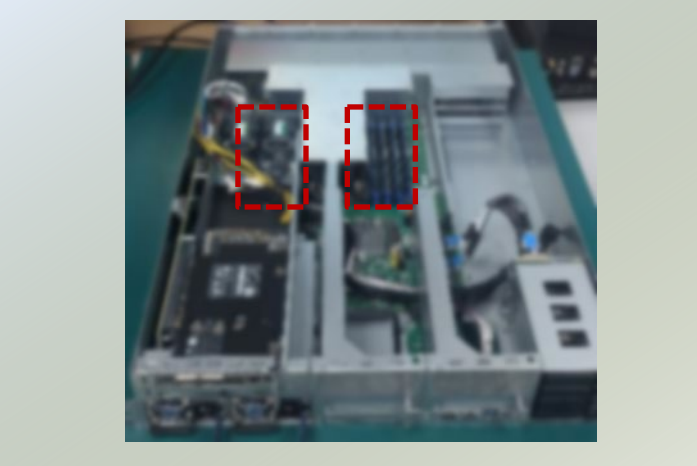
The motherboard supports 16 memory slots for DDR5 registered DIMM.

Supported System Memory Summary

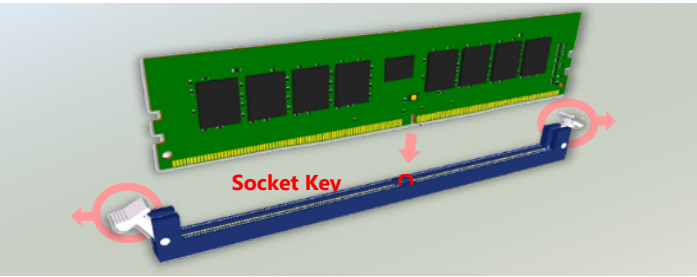
Total Slots	16
Supported DIMM Capacity	8GB, 16GB, 32GB, 64GB
Memory Size	Maximum 1024GB RDIMM (64GB*16)
Memory Type	DDR5 ECC RDIMM 4000MHZ
Minimum DIMM Installed	At least 1 memory module to boot and run from.

Memory Module Installation Instructions

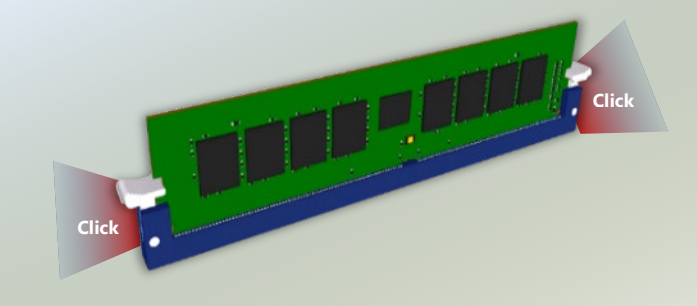
1. Power off the system and open the chassis.
2. Locate the DIMM memory modules slots on the motherboard.



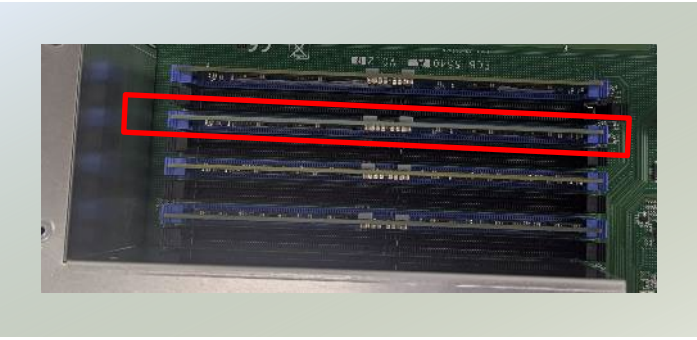
3. Pull open the DIMM slot latches. Align the notch of the memory module with the socket key in the slot.



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



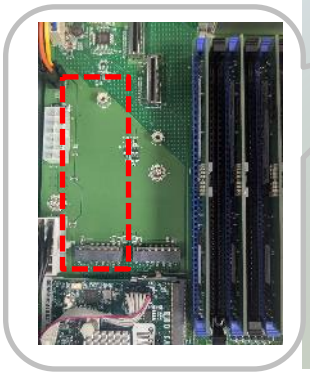
5. The memory module have been installed.

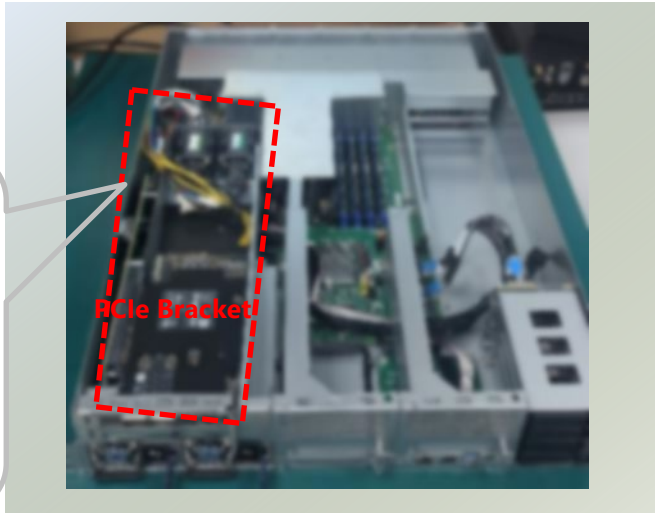


Installing M.2 NVMe Storage Modules (Optional)

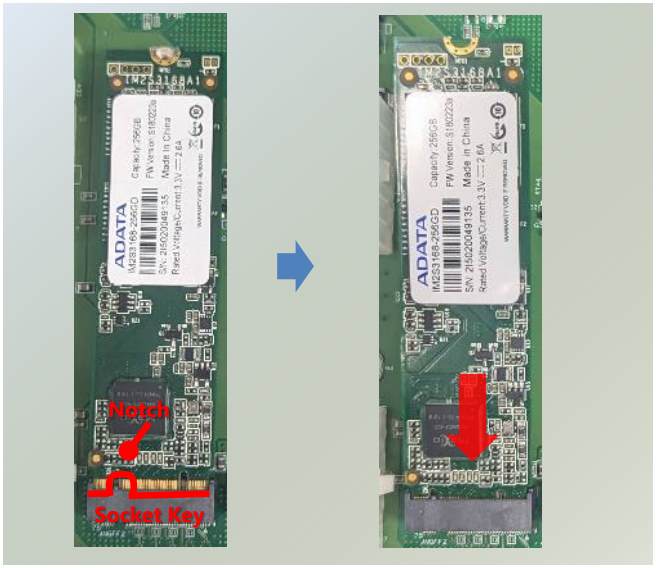
This system supports one M.2 2242/2260 M-Key slot for storage expansion. Please follow the procedure for installation.

1. Power down the system and open the top chassis. Then, remove the PCIe bracket.
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.

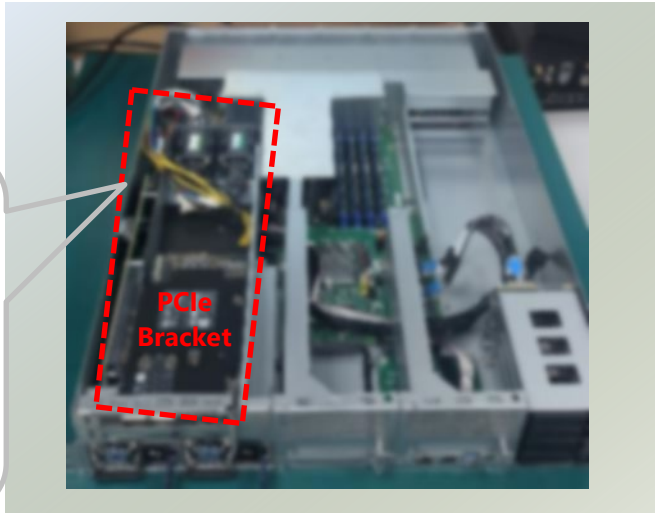


5. Push down on the module and secure it with a screw.

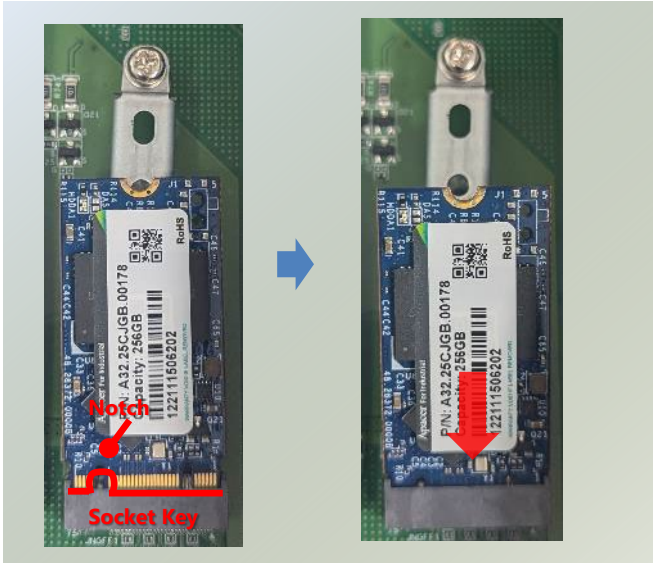
Installing M.2 SATA Storage Modules (Optional)

This system supports one M.2 2280 BB+M-Key slot for storage expansion. Please follow the procedure for installation.

1. Power down the system and open the top chassis. Then, remove the PCIe bracket.
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.

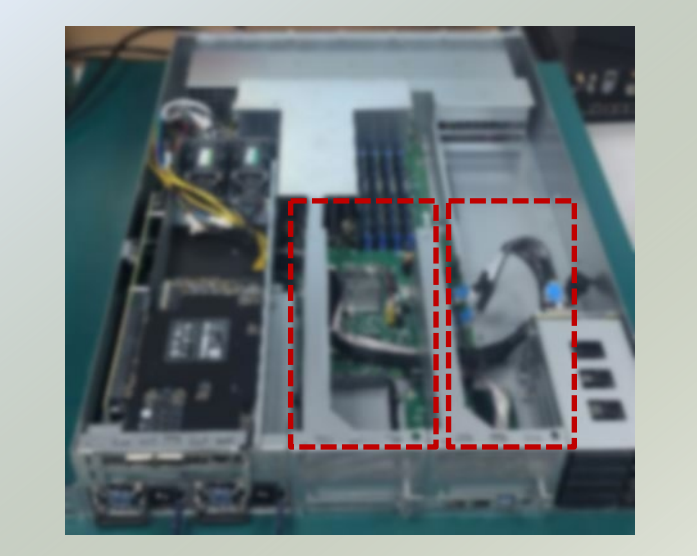


5. Push down on the module and secure it with a screw.

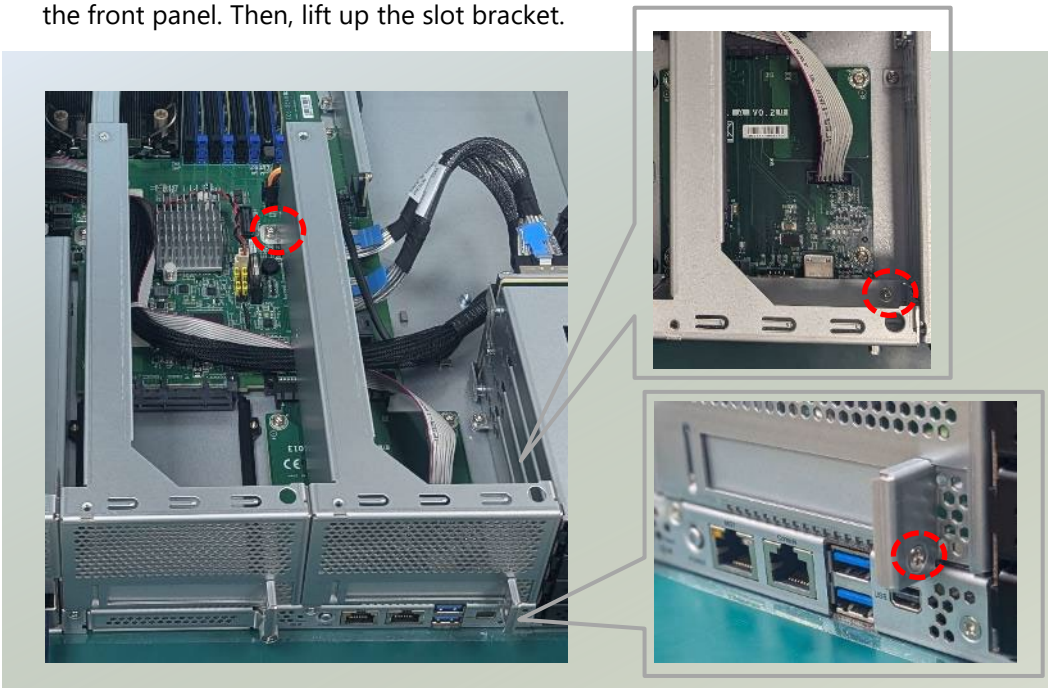
Installing Low-Profile PCIe Expansion Card (Optional)

ECA-6040 comes with two Low-Profile PCIe expansion slot for graphics card, ethernet or accelerator card. Please follow the instructions for installation.

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



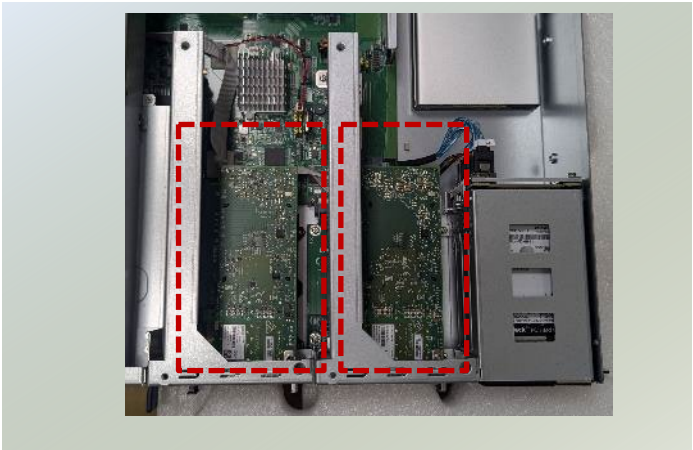
3. Remove the two (2) screws securing the slot bracket to the motherboard. And the one (1) screw on the front panel. Then, lift up the slot bracket.



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. Insert the clip and secure with one (1) screw.

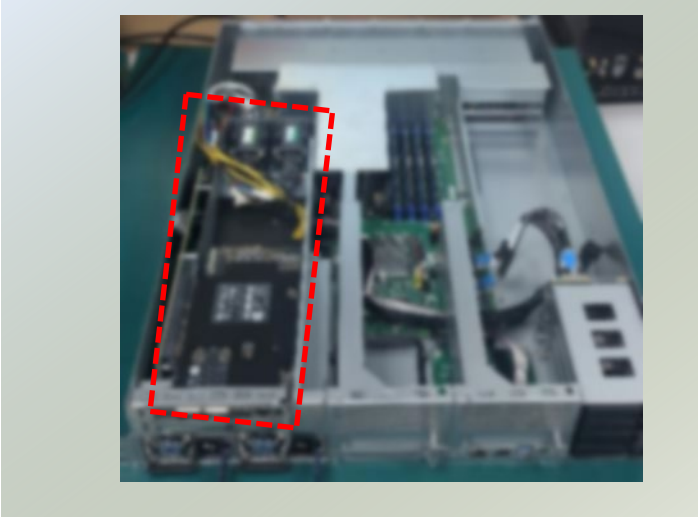
6. Install the bracket back onto the mother board. Secure with the original three (3) screws. Repeat steps if installing a second LP module card.



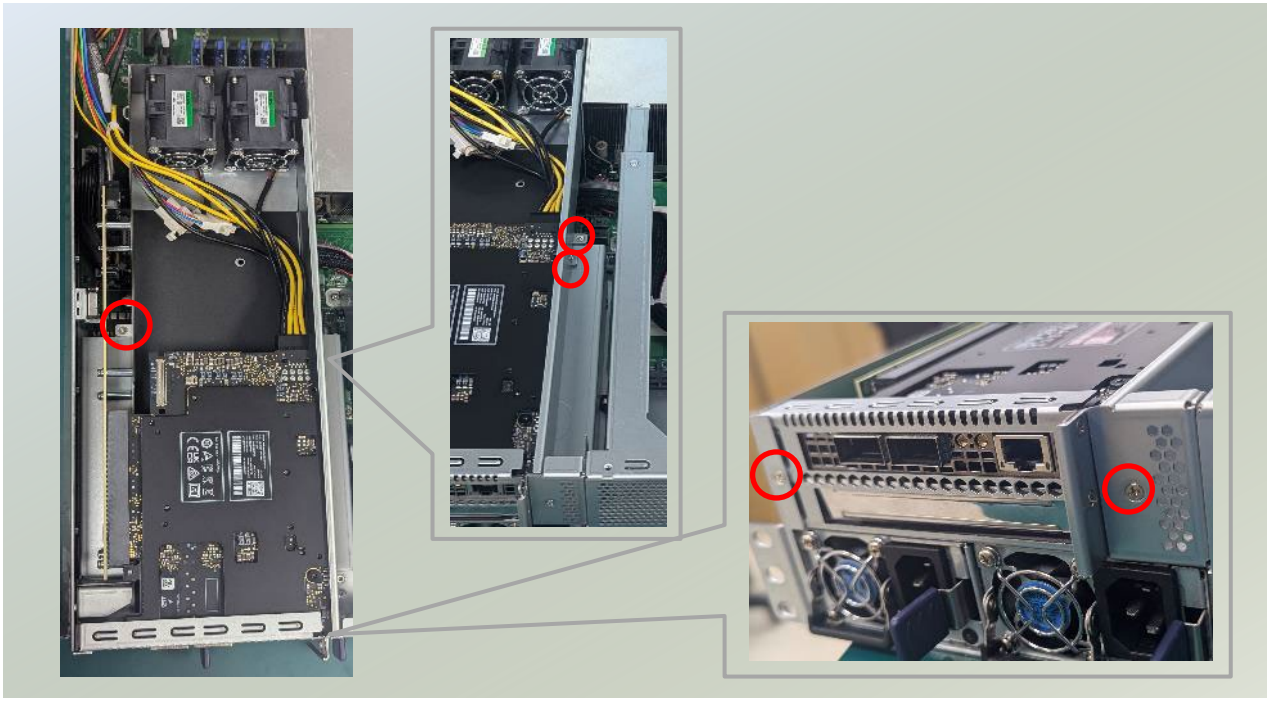
Installing PCIe Expansion Card (Optional)

ECA-6040 is equipped with two PCIe x16 FH3/4L slots, suitable for GPU graphics card or accelerator card expansion. Please follow the instructions for installation.

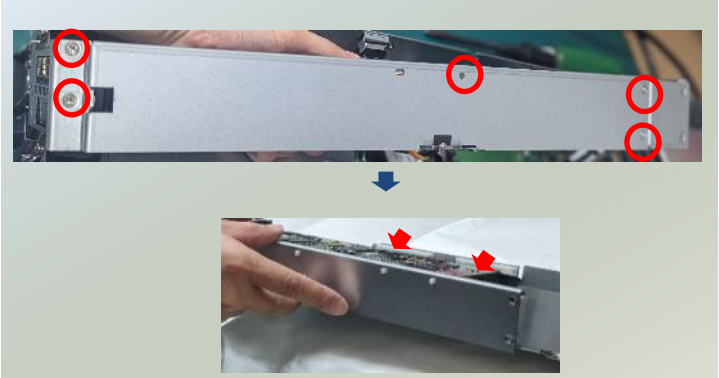
1. Power off the system and open the top chassis cover.
2. Locate the PCIe slot. The slot bracket should be secured to the motherboard.



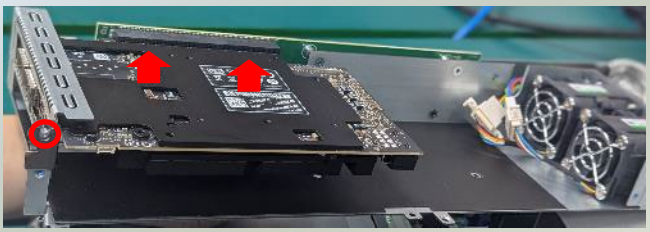
3. Remove the three (3) screws securing the slot bracket to the motherboard. And the two (2) screws on the front panel. Then, lift up the slot bracket.



4. Pick up the PCIe bracket, and unscrew the five (5) screws on the side panel.

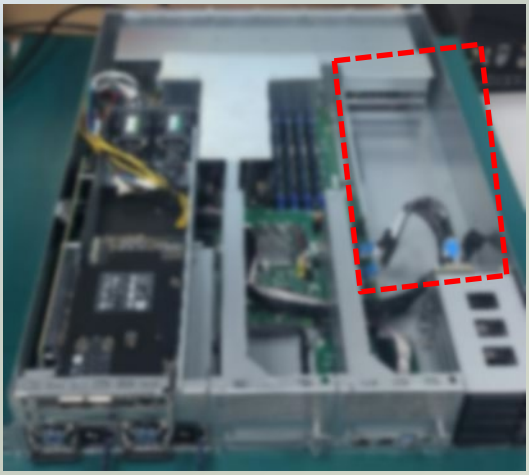


5. Align the GPU module pin slot to the socket key on the bracket. Slide the GPU module into the PCIe bracket until it is fully seated. Secure with one (1) screw.

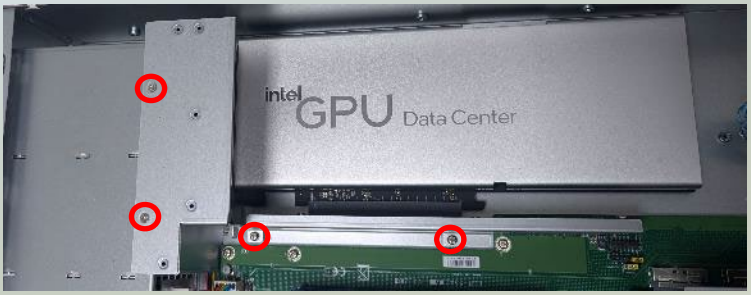


6. Install the bracket back onto the motherboard. Secure with the original screws.
7. Connect the cable to the module, and insert the other end of the cable into the corresponding connector on the motherboard.

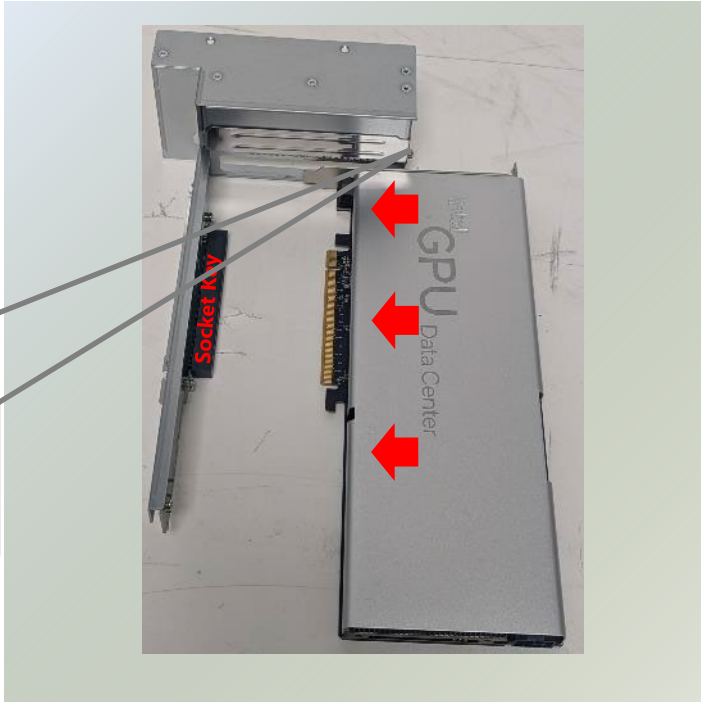
8. The second PCIe expansion slot is located on the top right corner of the system. Locate the PCIe slot. The slot bracket should be secured to the motherboard.



9. Remove the four (4) screws securing the slot bracket to the motherboard. Then, lift up the slot bracket.



10. Pick up the PCIe bracket, and 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. Secure with one (1) screw.



11. Install the bracket back onto the motherboard. Secure with the original screws.

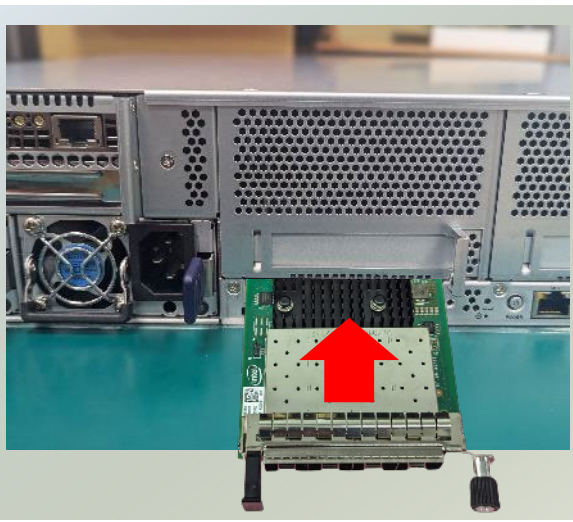
Installing OCP NIC (Optional)

The system supports one OCP NIC 3.0 module. Please follow the steps for installation.

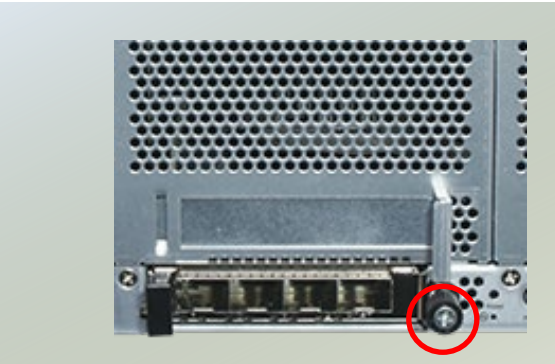
1. Power off the system and locate the OCP NIC module slot.

2. Rotate clockwise and loosen the lock-screw and remove the door.

3. Insert the OCP NIC.



4. Once the module is firmly seated, rotate counter-clockwise and tighten the lock-screw.



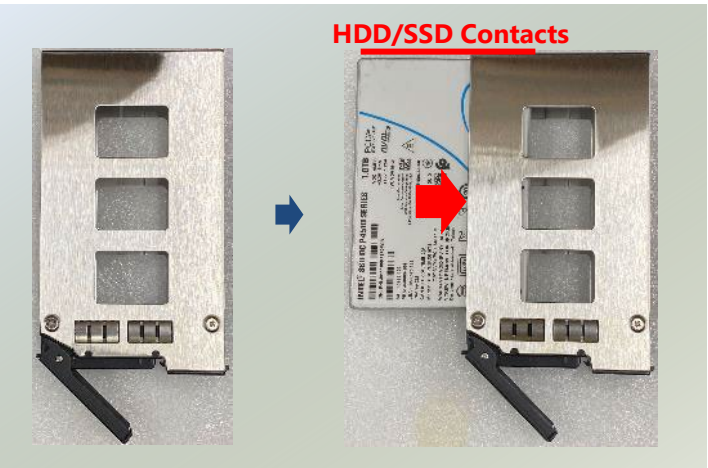
Installing the Disk Drives (Optional)

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

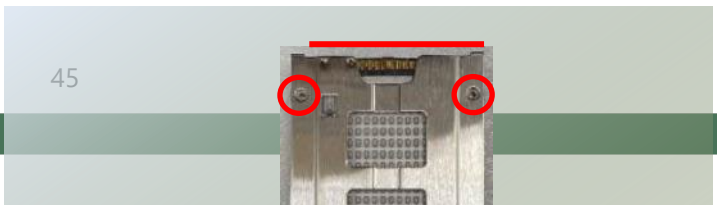
1. Power off the system. Locate the 2.5" disk bay on the front panel.

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.

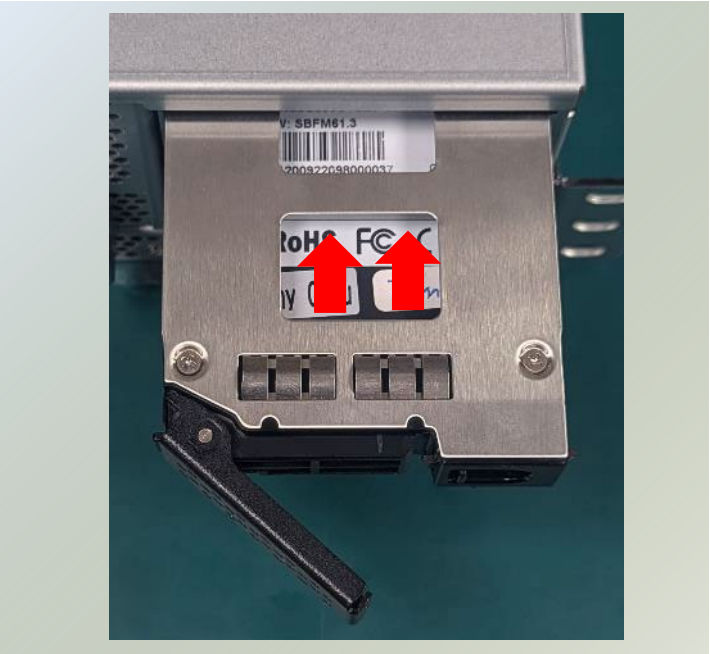


4. Then, turn the drive tray on the other side



(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.

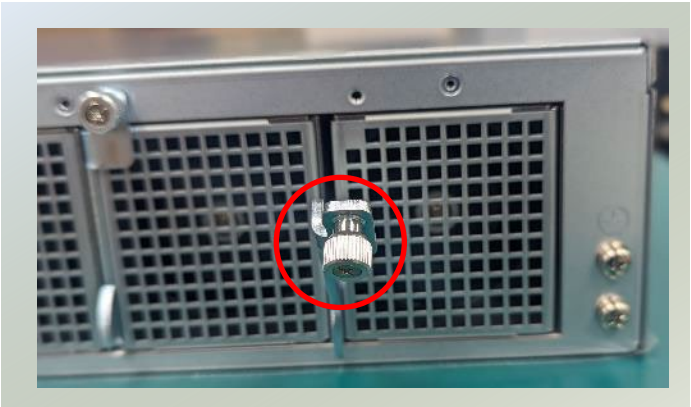


Replacing the Cooling Fans

Cooling fans may eventually wear out. Please refer to the steps below for replacing cooling fans. When using a new cooling fan, simply reverse the steps to install the fan back into the enclosure and system.

1. Power off the system and locate the Smart Fans at the rear panel.

2. Loosen the lock-screw of the Smart Fan you would like to replace.



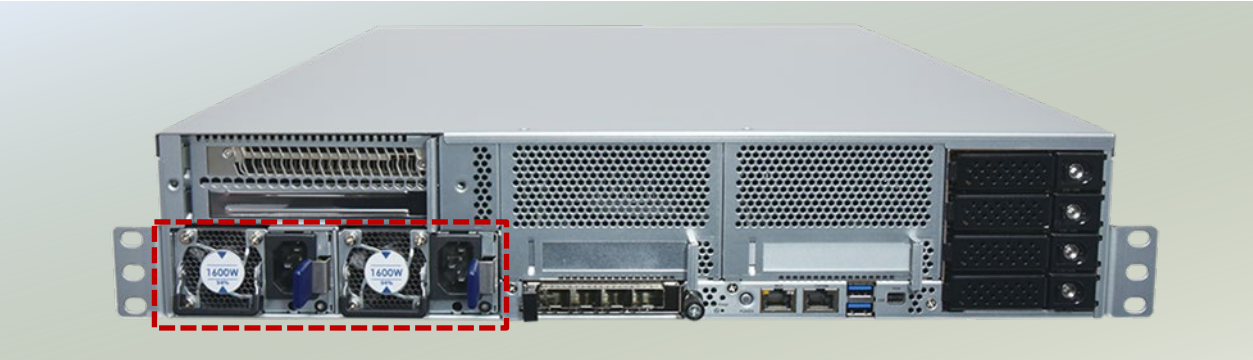
3. Hold on to the lock-screw and pull out the single fan.

4. Install a new fan back onto the enclosure of the system.

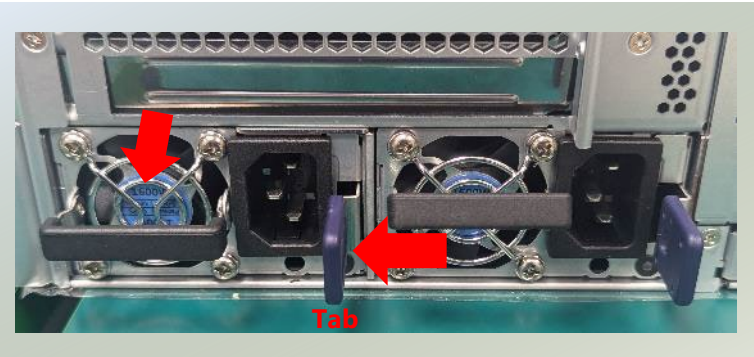
Replacing the Power Supply Units

Power supply units may wear down eventually. Please be noted that ECA-6040 series supports 1600W AC PSUs. Please prepare the power supply units that matching this capacity.

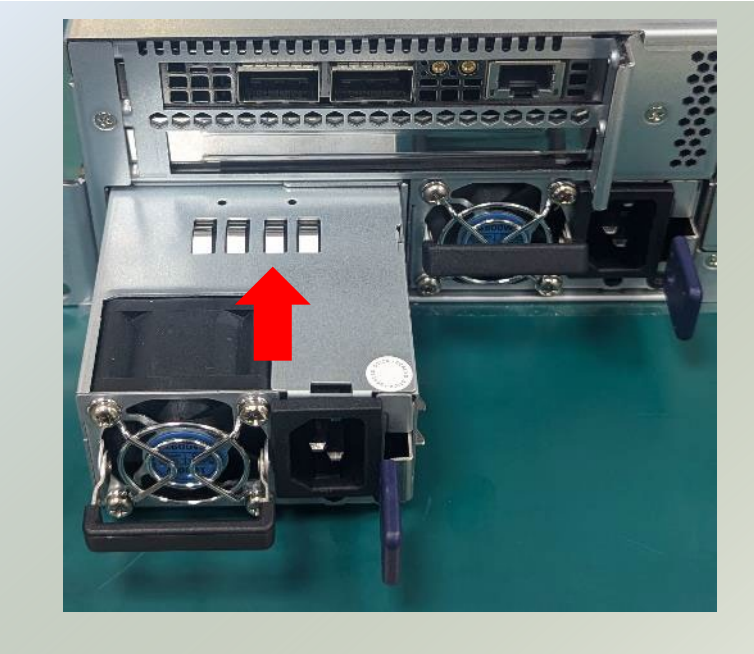
1. Power off the system. Locate the power supply units on the front panel.



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

This chapter will introduce the features of Lanner's BMC firmware and how to perform server remote management through it. The BMC firmware implements IPMI 2.0 based on ASPEED service processor. It performs all the BMC management tasks defined by IPMI 2.0. BMC firmware runs an embedded web-server for full configuration using Web UI.

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 • FRU information
	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 • TLS 1.2 and TLS 1.3 support
	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
- 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.

Field Replaceable Unit (FRU)

The BMC implements an interface for logical FRU inventory devices as specified in IPMI 2.0 specification. This functionality provides commands for system administrators to access and management the FRU inventory information.

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)

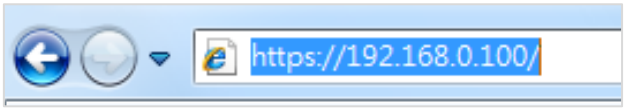
IPMI Commands Support List

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
FRU Device Commands		
Get FRU Inventory Area Info	Storage (0Ah)	10h
Read FRU Data	Storage (0Ah)	11h
Write FRU Data	Storage (0Ah)	12h
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

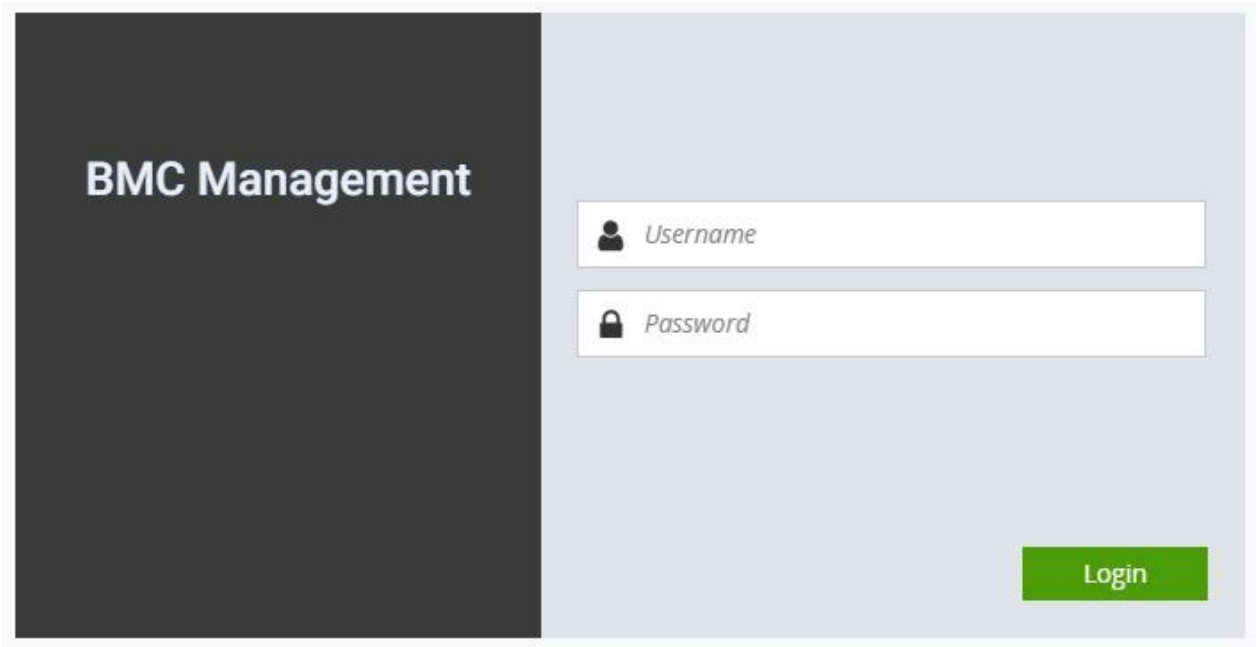
Delete SEL Entry	Storage (0Ah)	46h
Clear SEL	Storage (0Ah)	47h
Get SEL Time	Storage (0Ah)	48h
Set SEL Time	Storage (0Ah)	49h
Get SEL Time UTC Offset	Storage (0Ah)	5Ch
Set SEL Time UTC Offset	Storage (0Ah)	5Dh
LAN Device Commands		
Set LAN Configuration Parameters	Transport (0Ch)	01h
Get LAN Configuration Parameters	Transport (0Ch)	02h
Serial/Modem Device Commands		
Set 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.

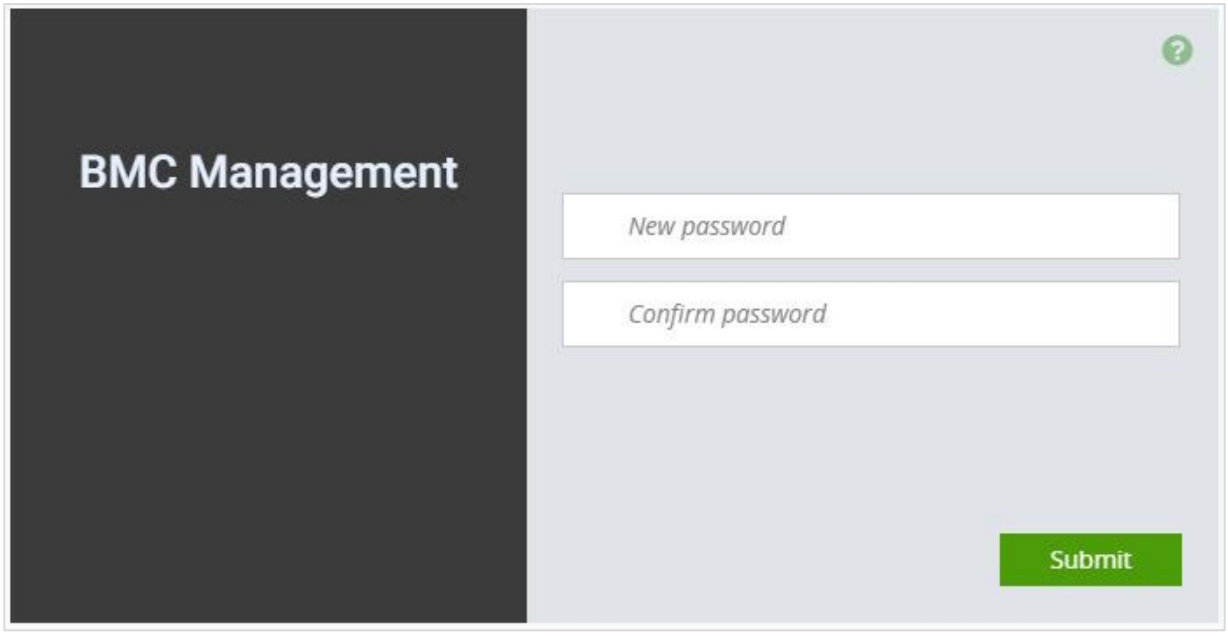
Default User Name and Password

- **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.

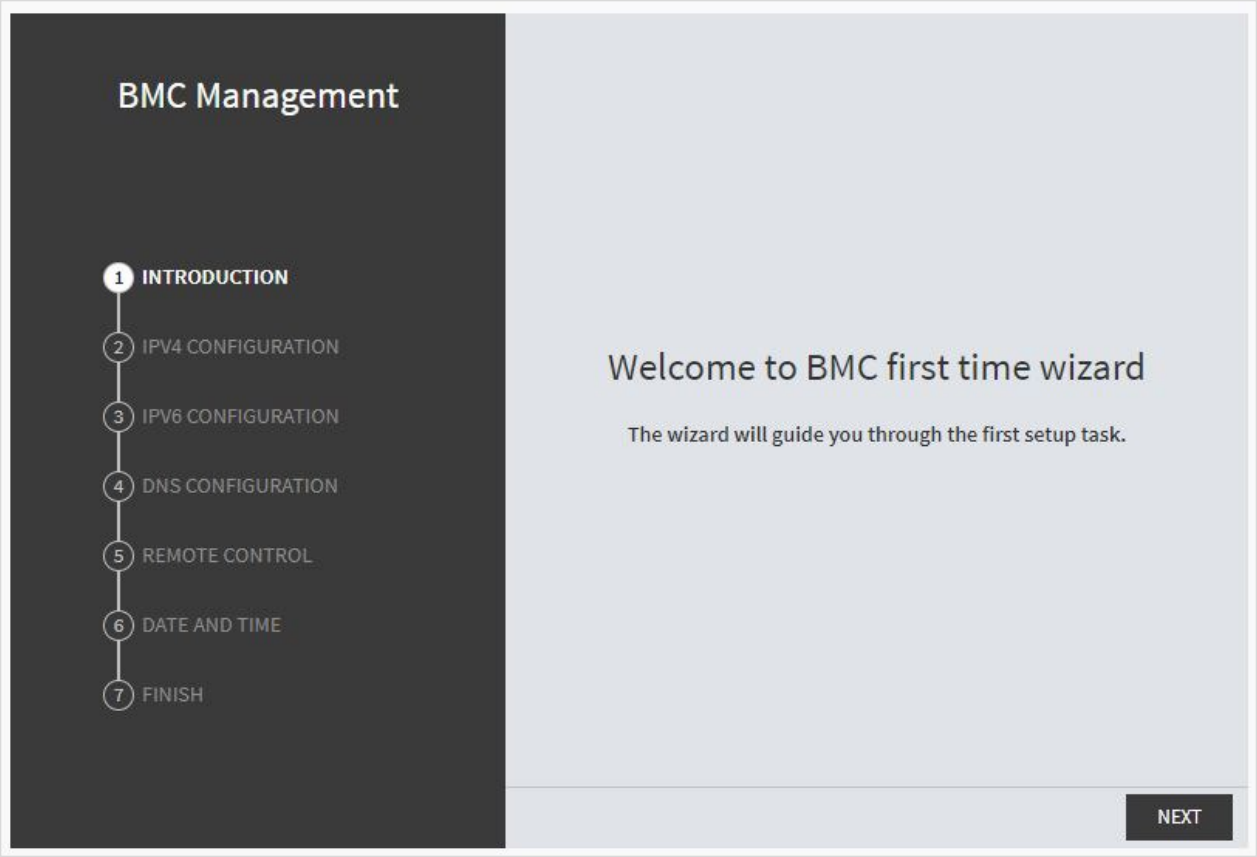
First Time Wizard

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.



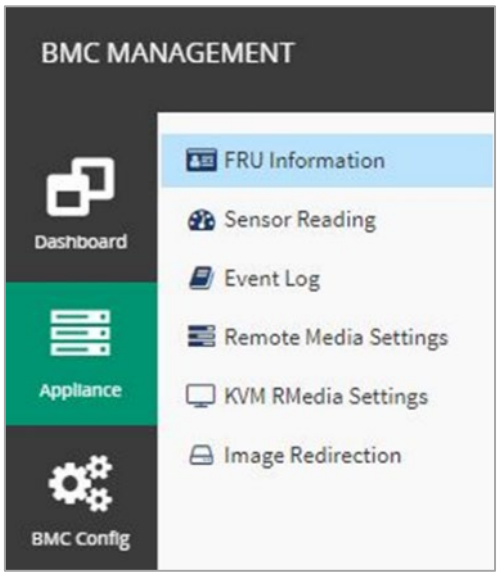
In the final page, please press “Finish” button to complete the first-time wizard. BMC will be rebooted and apply new settings. You could reconnect to the WebUI after a few minutes.

Web UI Layout

The BMC Web UI consists of various menu items:

Menu Bar

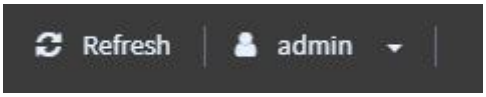
A screenshot of the menu bar is shown below, please select the page you would like to navigate.



Menu Bar

Quick Button and Logged-in User

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

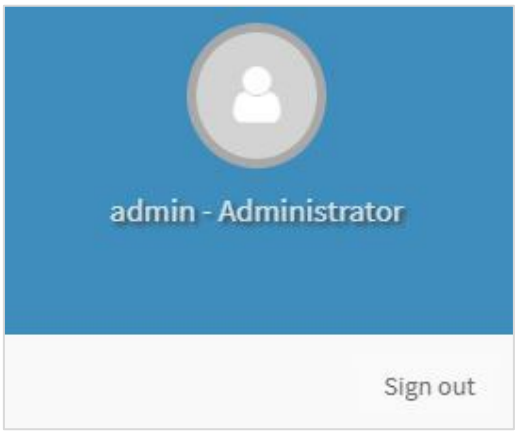


User Information

Logged-in user information: Click the icon 

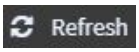
to view the logged-in user information.

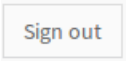
A screenshot of the logged-in user information is shown below:



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

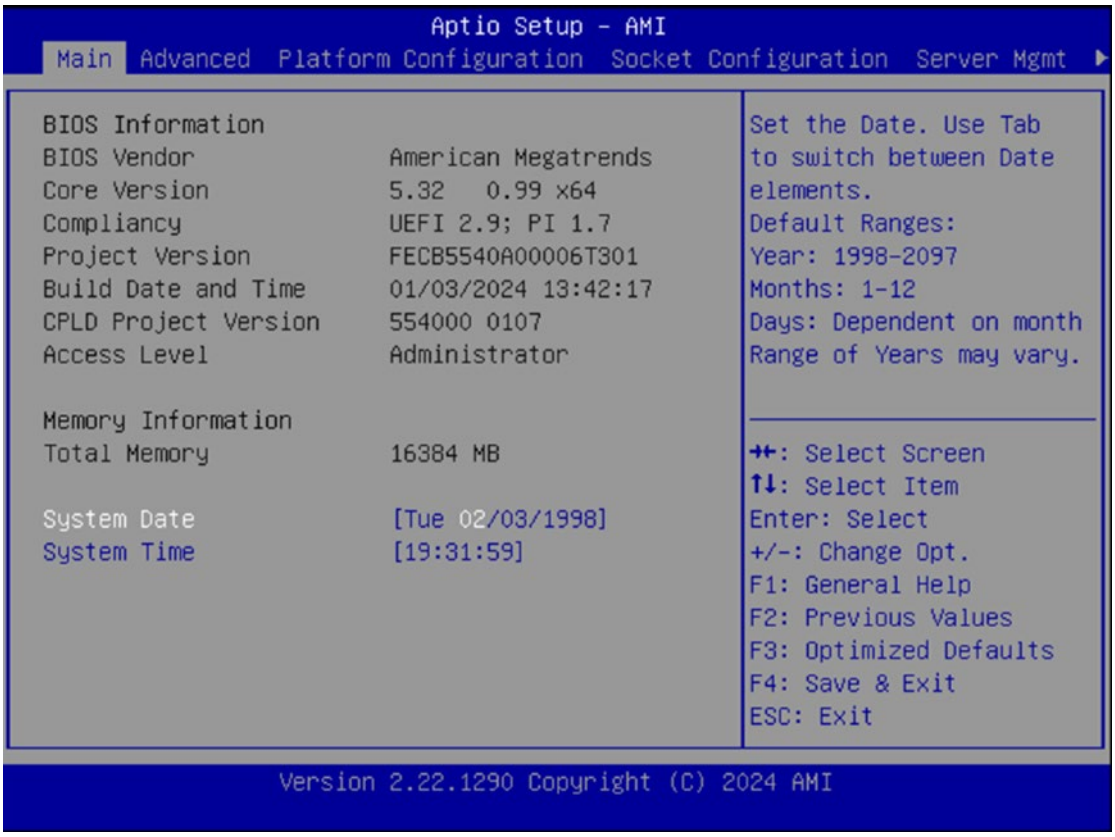
To enter the BIOS setup utility, simply follow the steps below:

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

Main Page

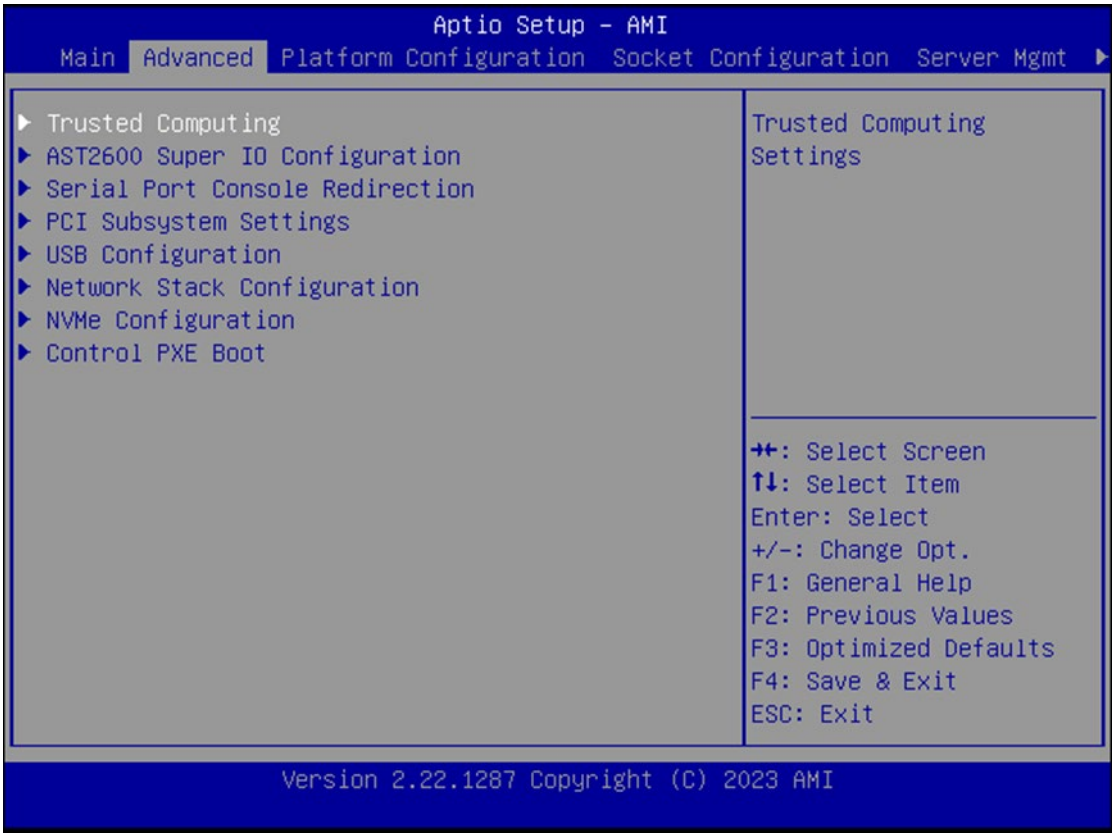
Setup main page contains BIOS information and project version information.



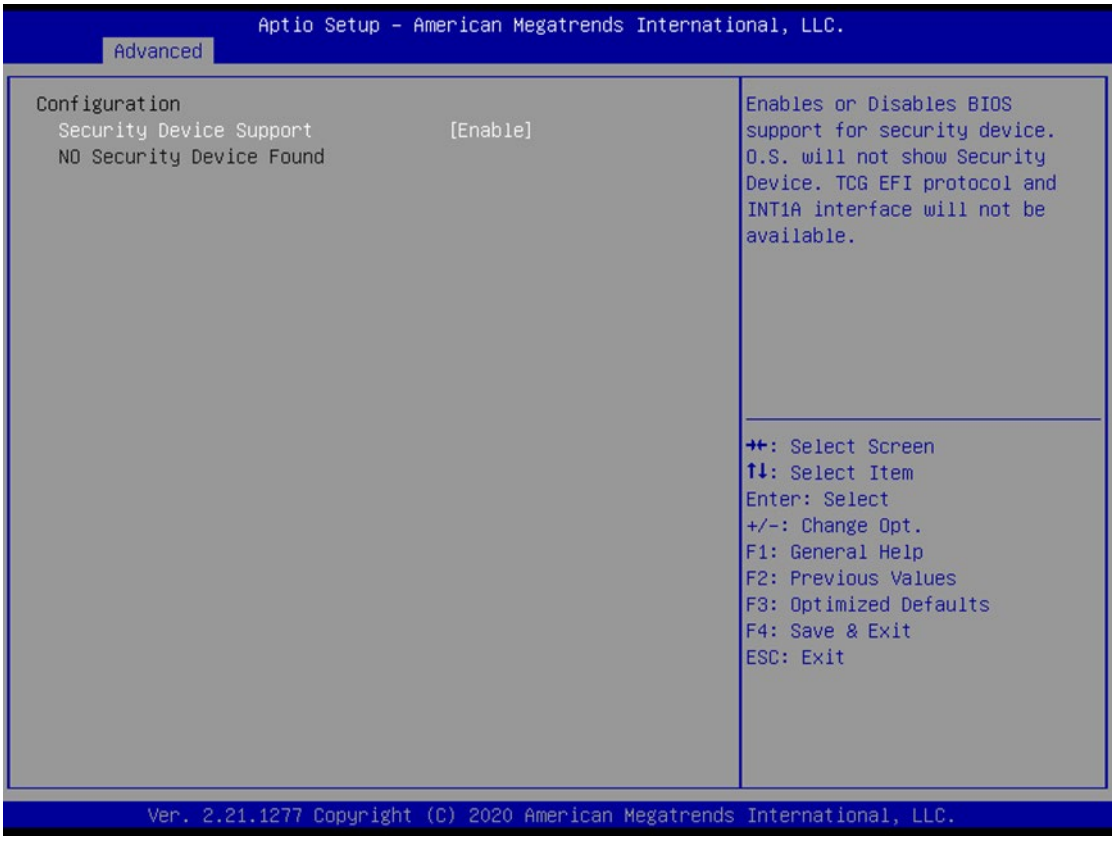
Feature	Description
BIOS Information	BIOS Vendor: American Megatrends Core Version: AMI Kernel version, CRB code base, X64 Compliancy : UEFI version, PI version BIOS Version : BIOS release version Build Date and Time : MM/DD/YYYY Access Level: Administrator / User
Memory Information	Total Memory: by 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.

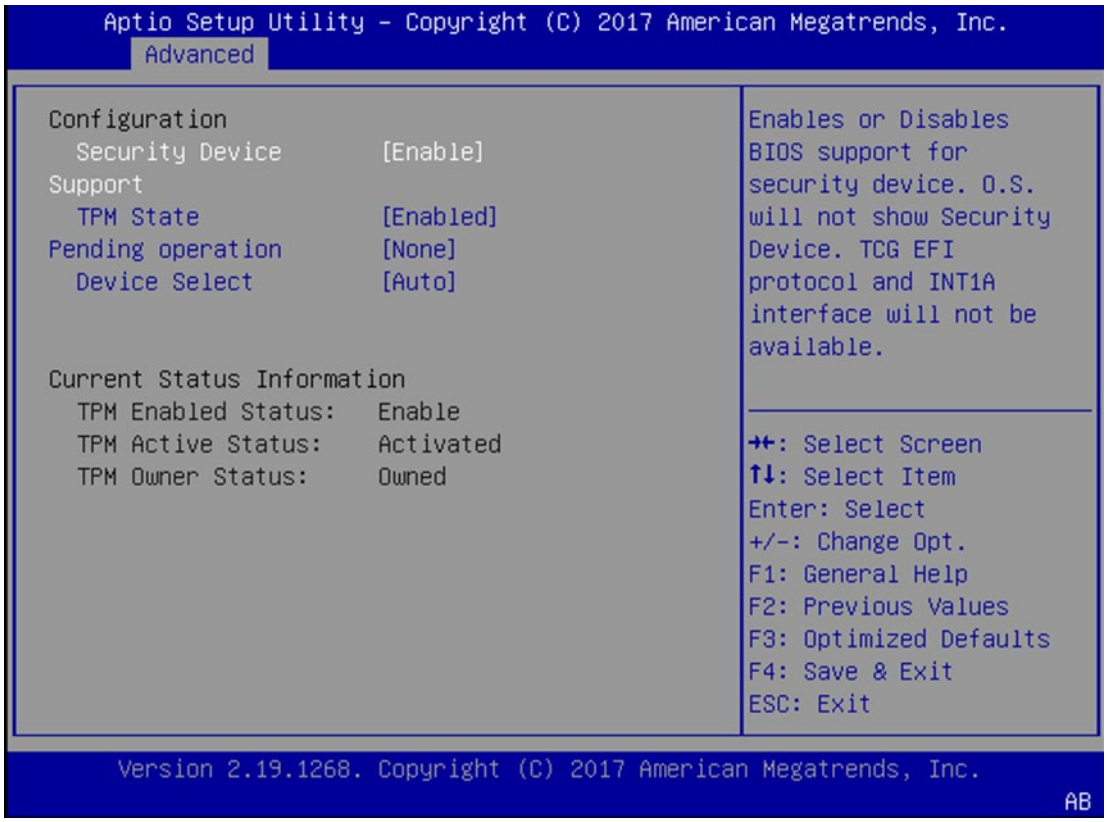


Trusted Computing



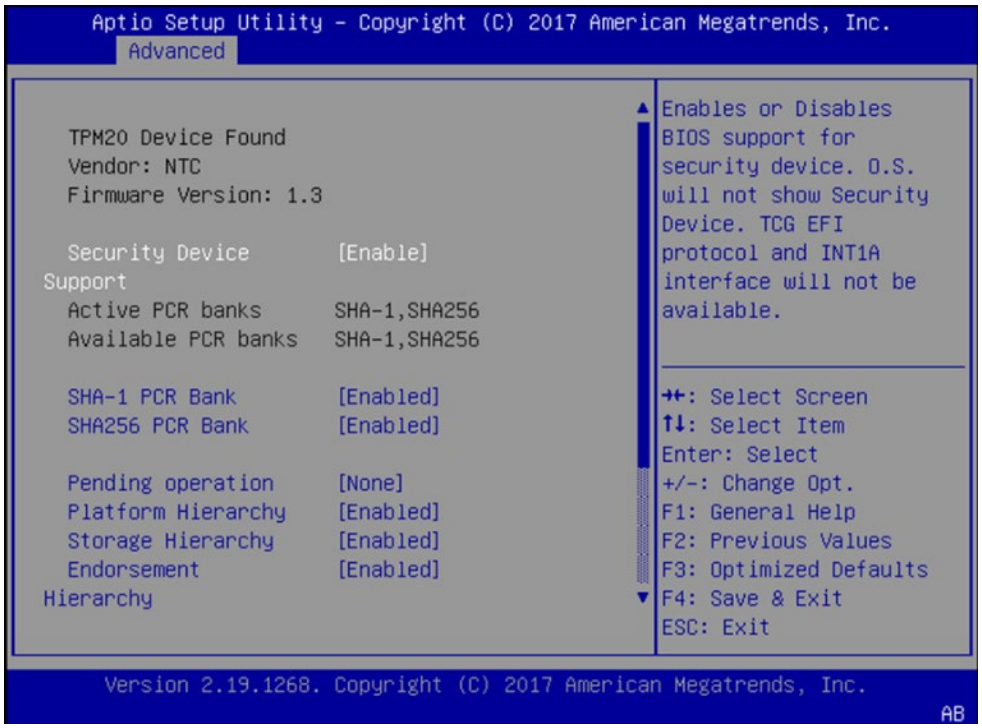
Feature	Options	Description
Security Device Support	Enabled Disabled	Enables or disables BIOS support for security device. By disabling this function, OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

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.

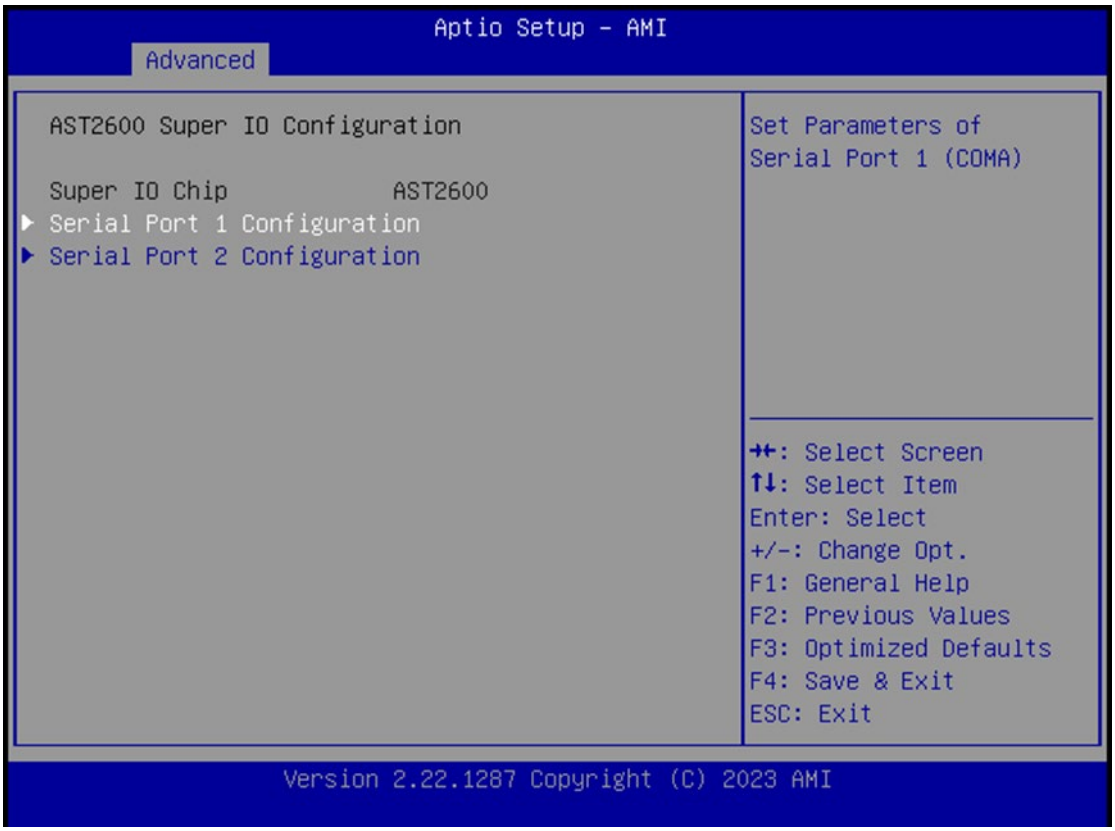
Trusted Computing (TPM2.0)



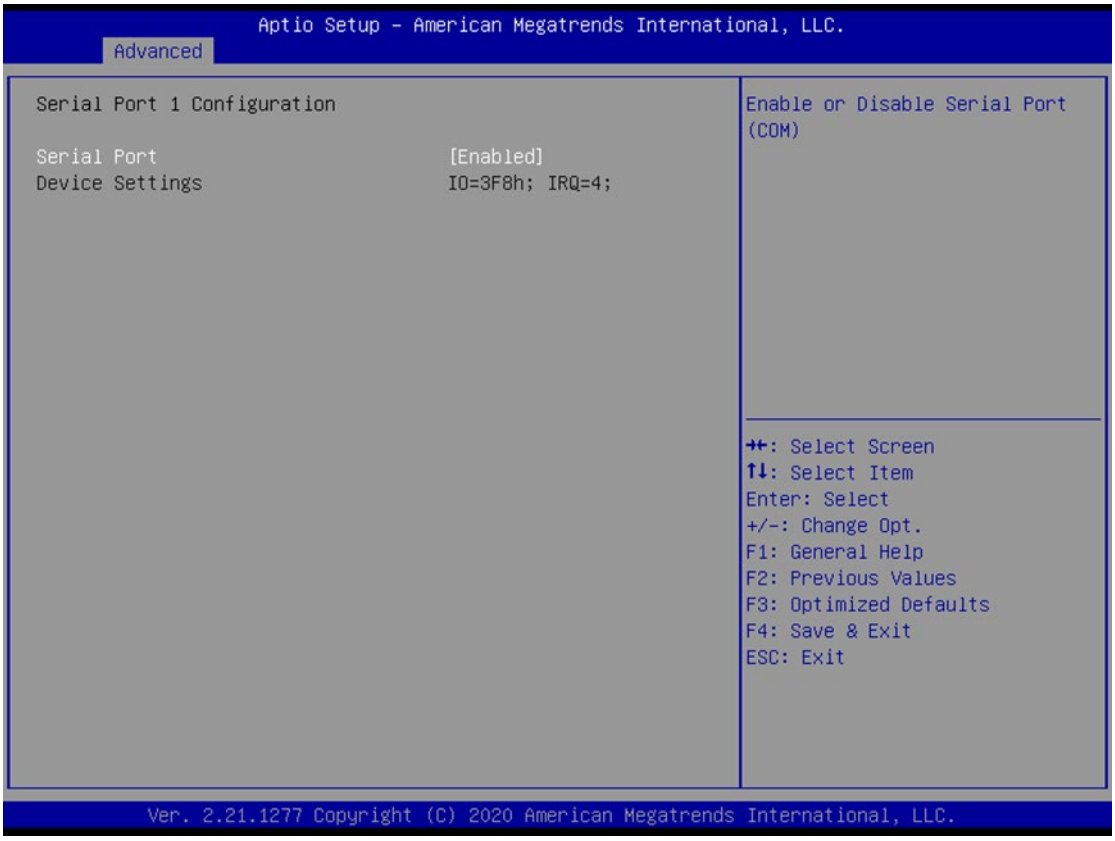
Feature	Options	Description
Security Device Support	Enabled Disabled	Enables or disables BIOS support for security device. By disabling this function, OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
SHA-1 PCR Bank	Enabled Disabled	Enables or disables SHA-1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

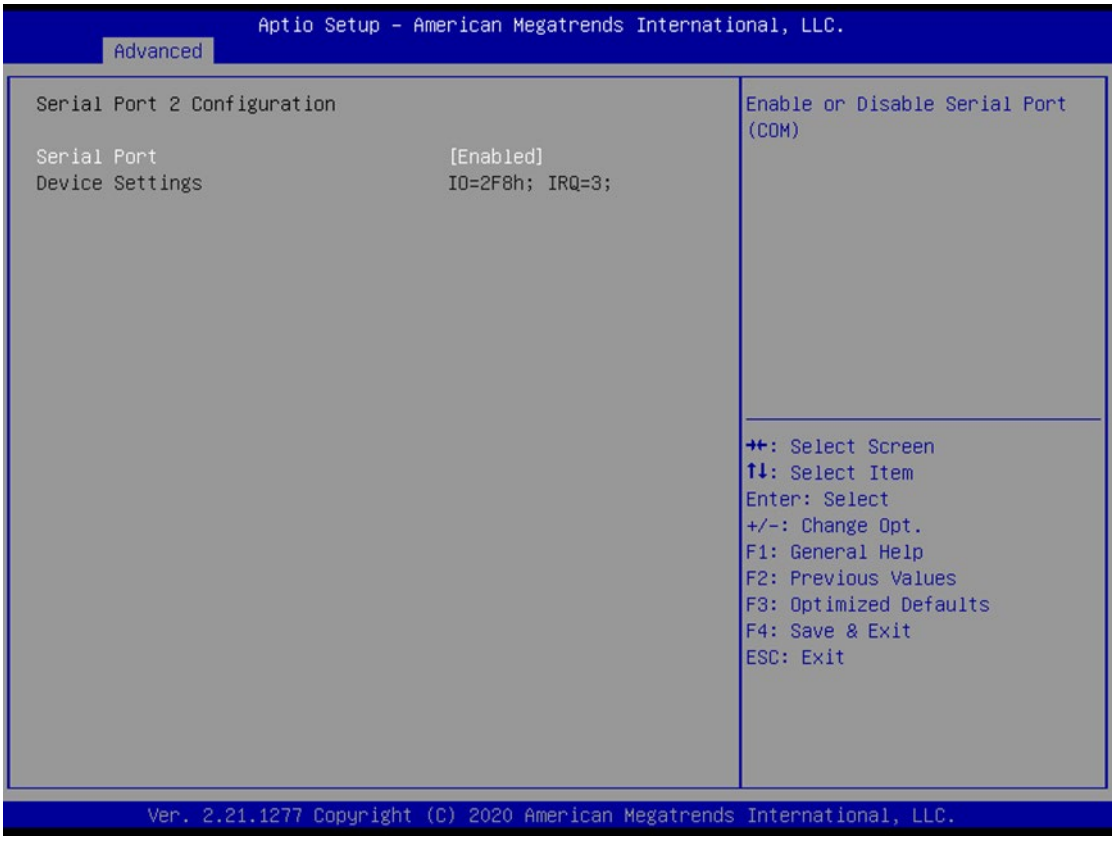


Serial Port 1 Configuration



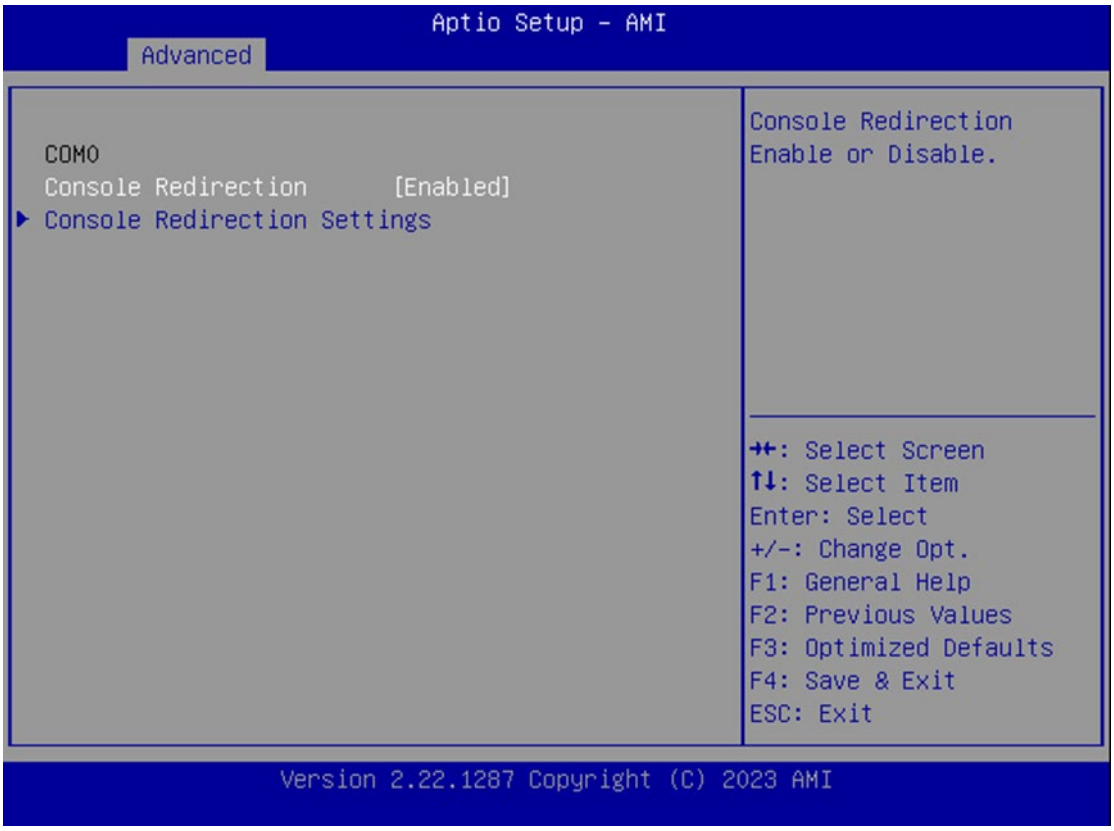
Feature	Options	Description
Serial Port	Enabled Disabled	Enable or Disable Serial Port (COM)
Device Settings	NA	IO=3F8h; IRQ = 4

Serial Port 2 Configuration



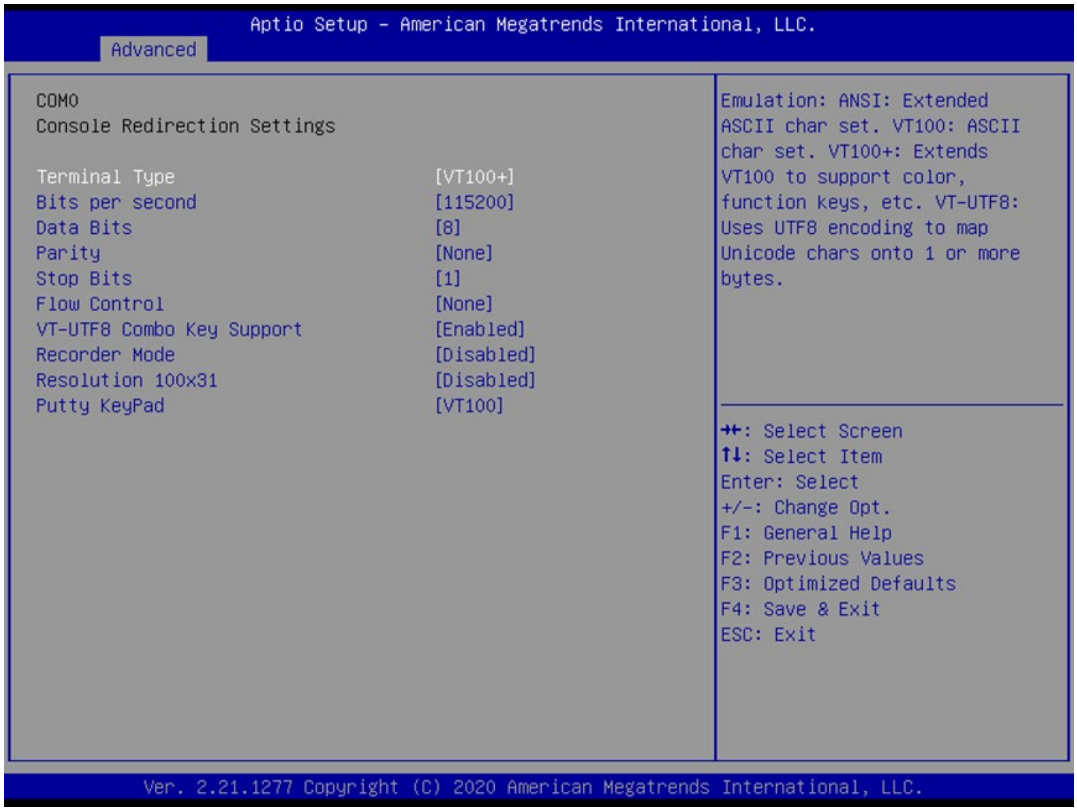
Feature	Options	Description
Serial Port	Enabled Disabled	Enables or disables Serial Port 2
Device Settings	NA	IO=2F8h; IRQ = 3

Serial Port Console Redirection



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

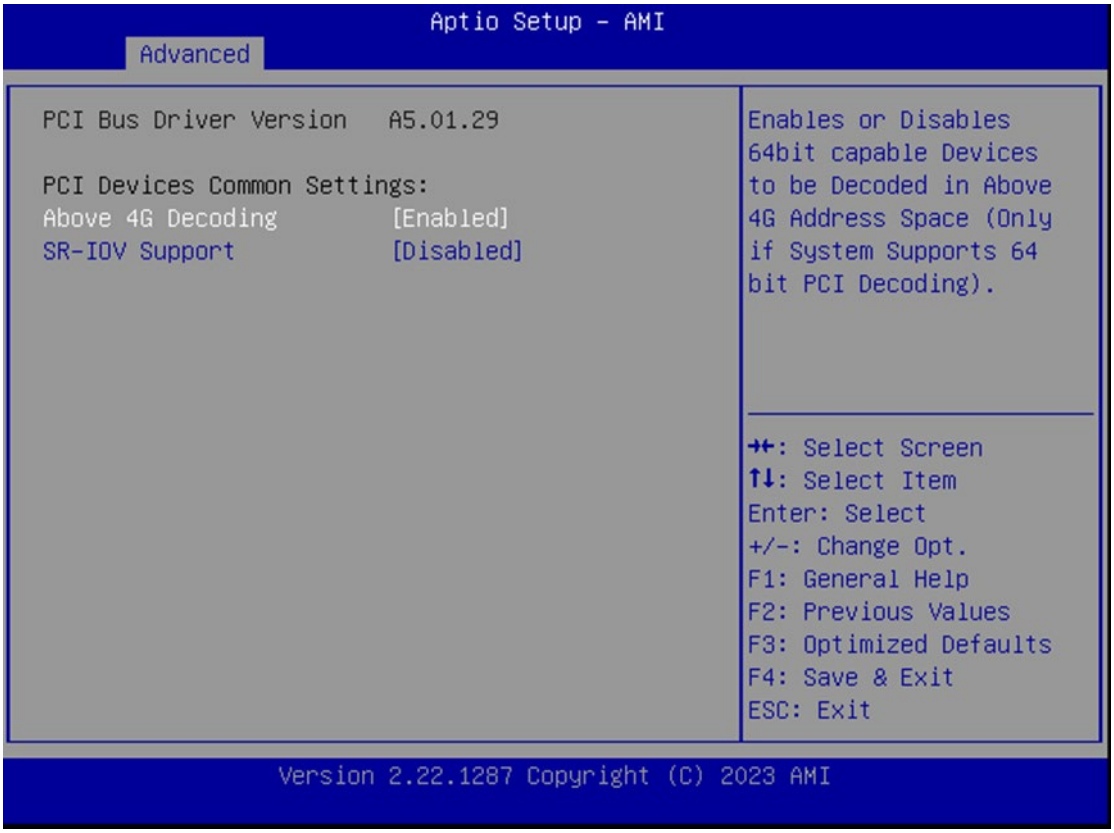
Console Redirection Settings



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	Disabled	Enables VT-UTF8 Combination Key Support for ANSI/VT100

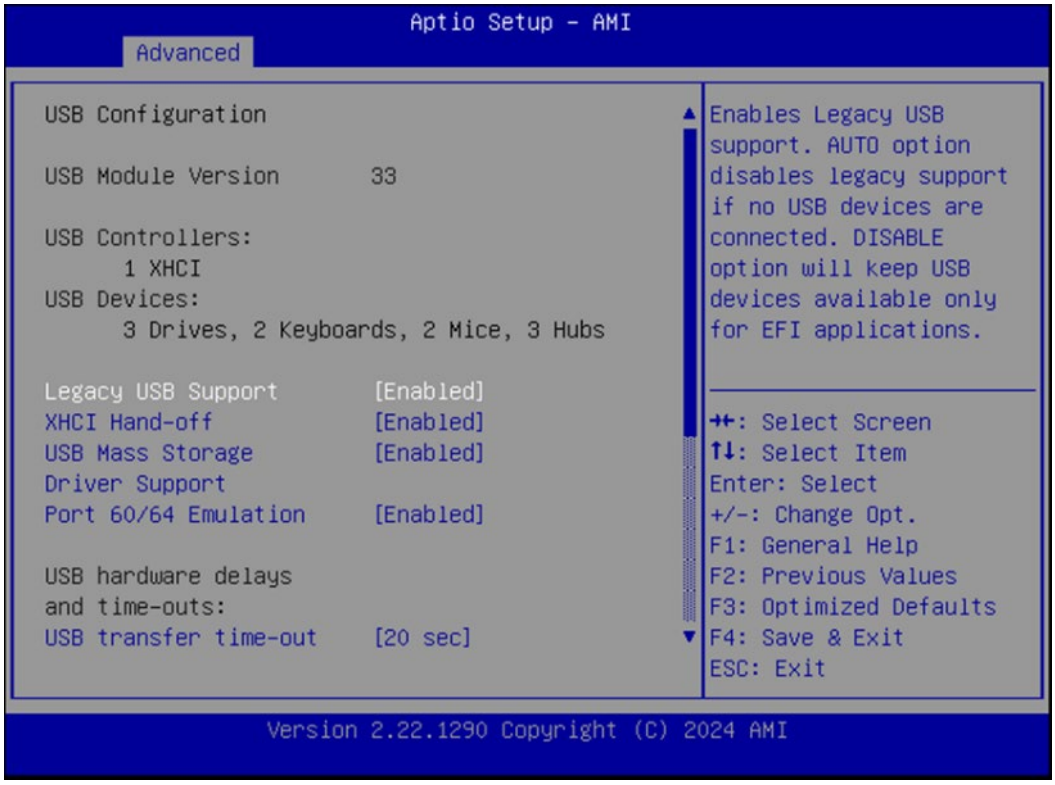
Key Support	Enabled	terminals
Recorder Mode	Disabled Enabled	With this mode enabled, only text will be sent. This is to capture Terminal data.
Resolution 100x31	Disabled Enabled	Enables or disables extended terminal resolution
Putty KeyPad	VT100 LINUX XTERM86 SCO ESCN VT400	Selects FunctionKey and KeyPad on Putty.

PCI Subsystem Settings



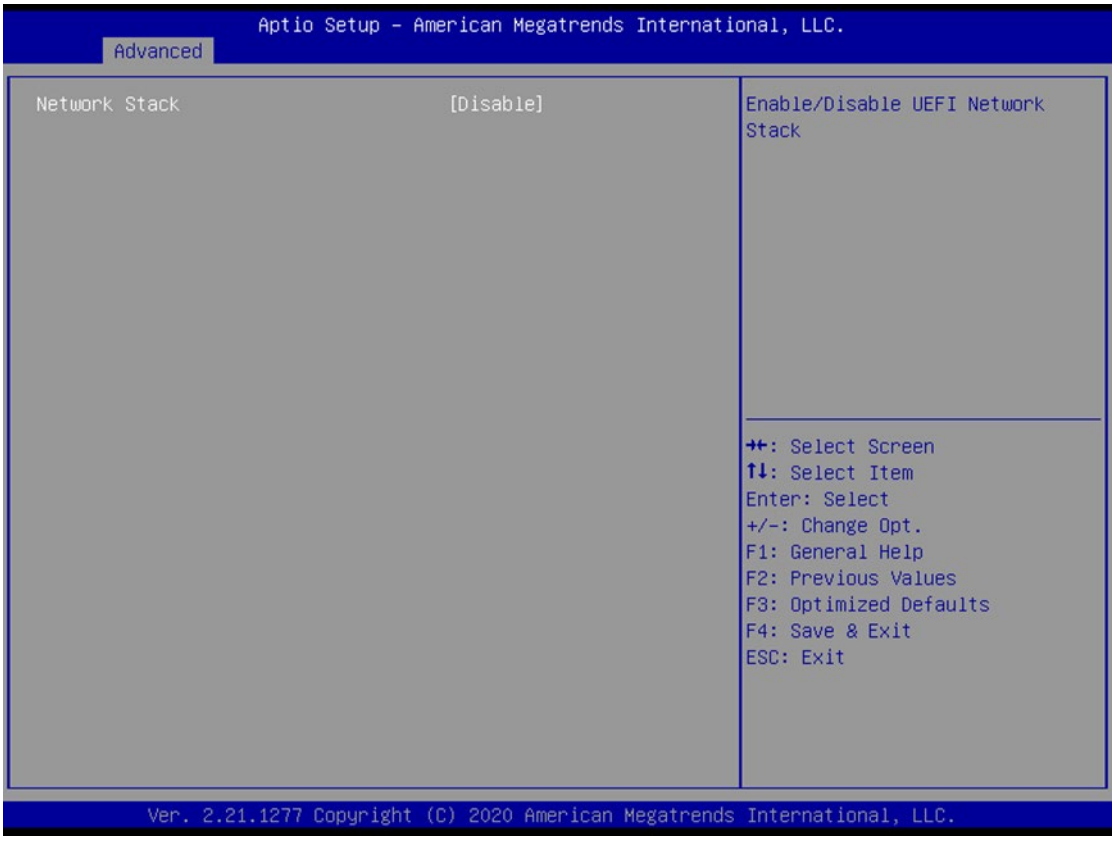
Feature	Options	Description
Above 4G Decoding	Disabled Enabled	Enables or disables 64bit capable Devices to be Decoded in Above 4G Address Space (Only if System Supports 64 bit PCI Decoding)
SR-IOV Support	Disabled Enabled	If the system has SR-IOV capable PCIe Devices, this option enables or disables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

USB Configuration



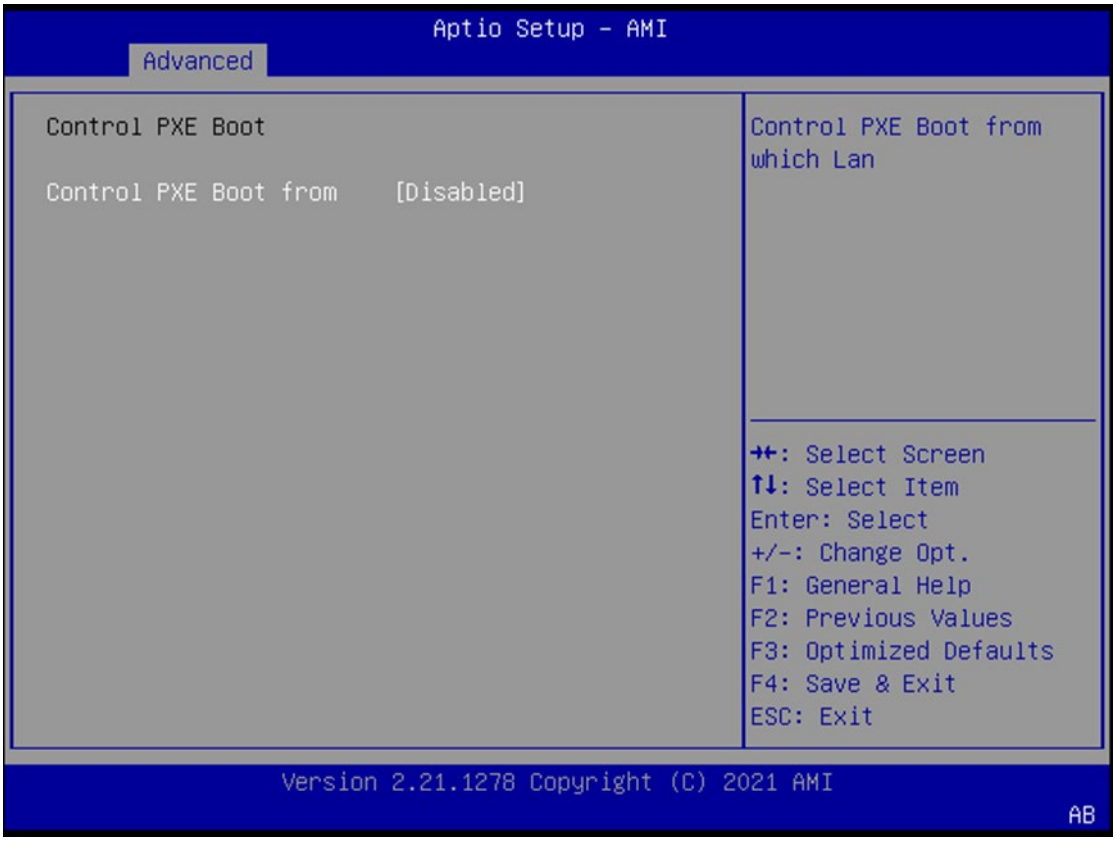
Feature	Options	Description
Legacy USB Support	Enabled Disabled Auto	Enables Legacy USB support. **Auto** option disables legacy support if no USB devices are connected; **Disabled**option will keep USB devices available only for EFI applications.
XHCI Hand-off	Enabled Disabled	This is a workaround for 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

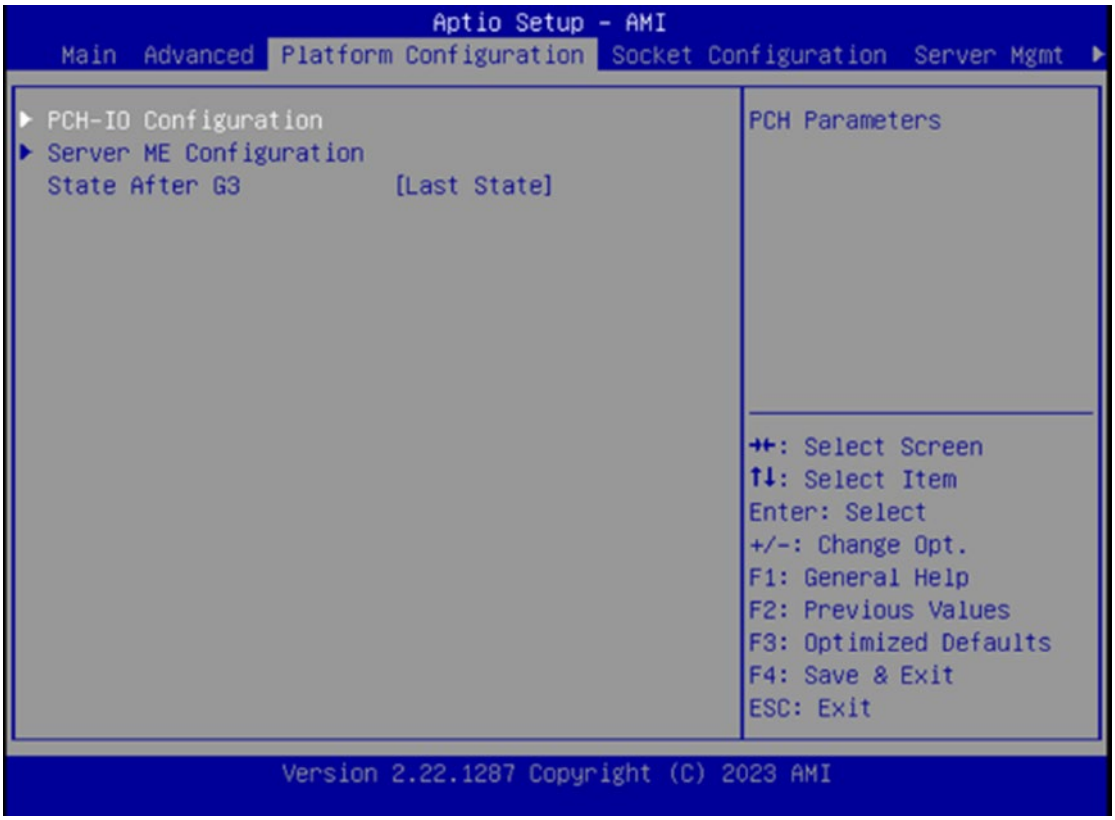
Control PXE Boot



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

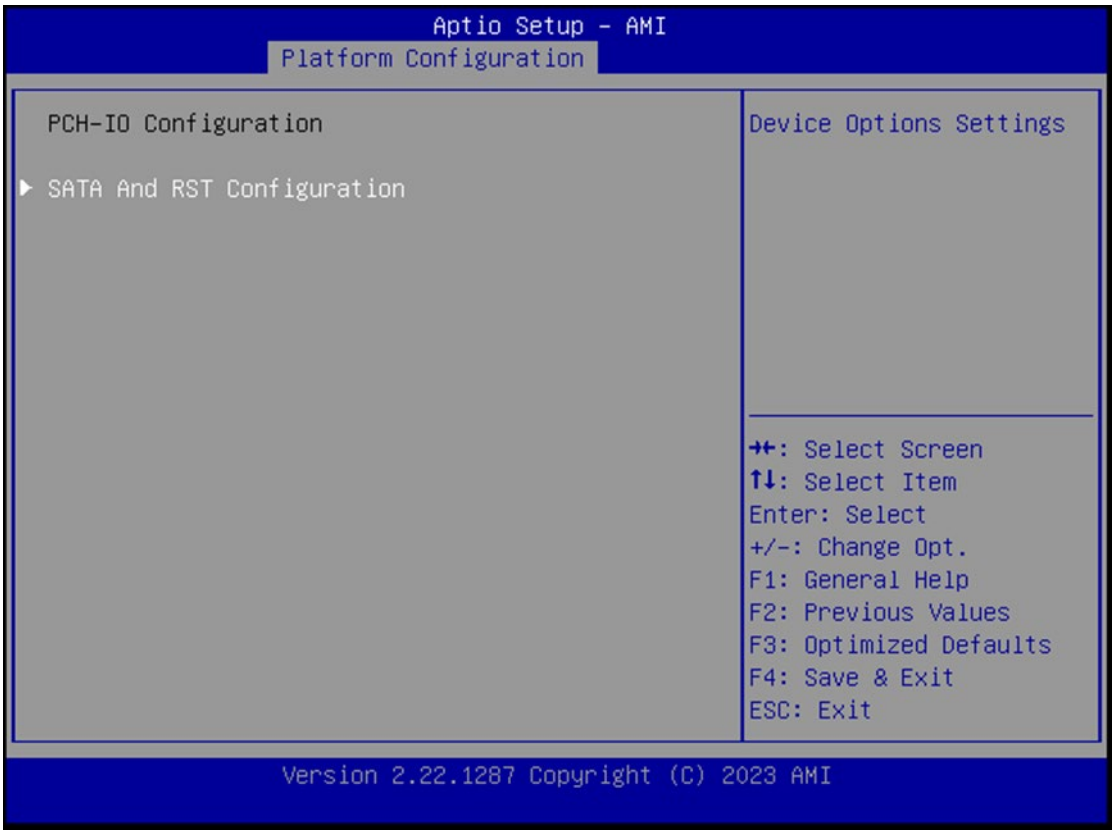
Platform Configuration

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.



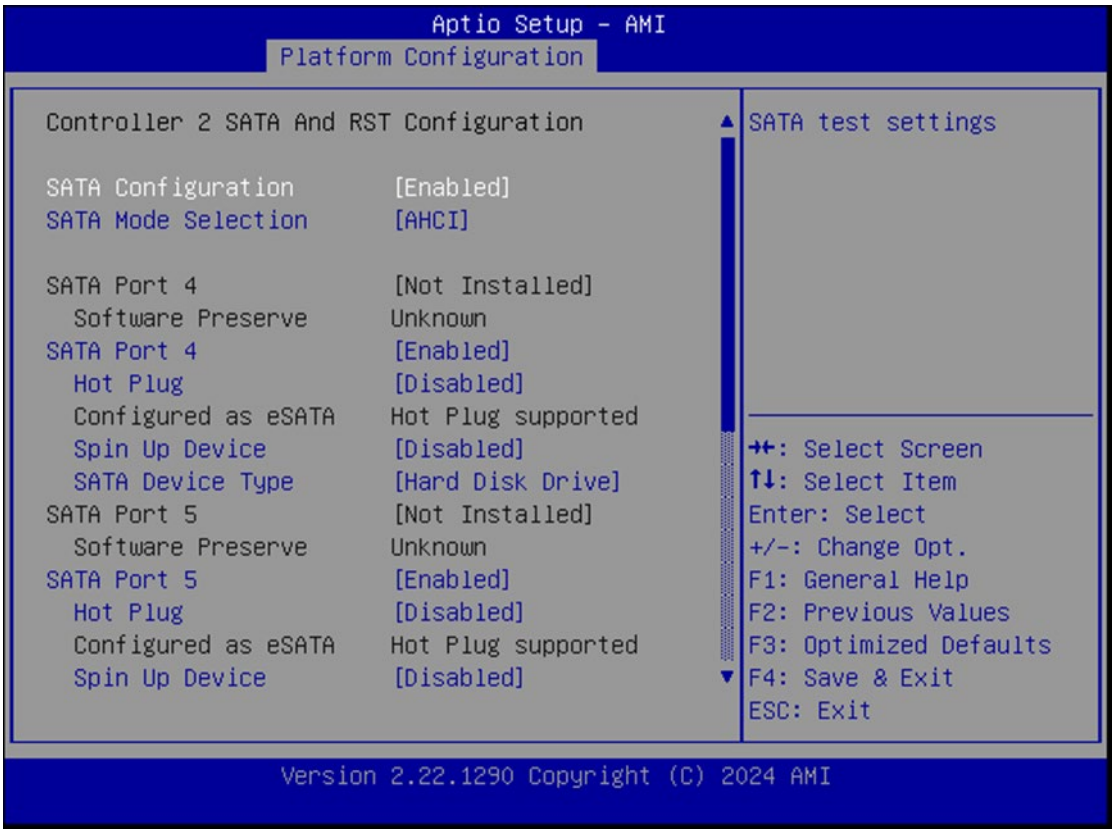
Feature	Options	Description
PCH Configuration	None	Displays and provides option to change the PCH Settings
Server ME Configuration	None	Configure Server ME Technology Parameters
State After G3	Power ON Power Off Last State	Select S0/S5 for ACPI state after a G3

PCH Configuration



Feature	Options	Description
SATA And RST Configuration	N/A	

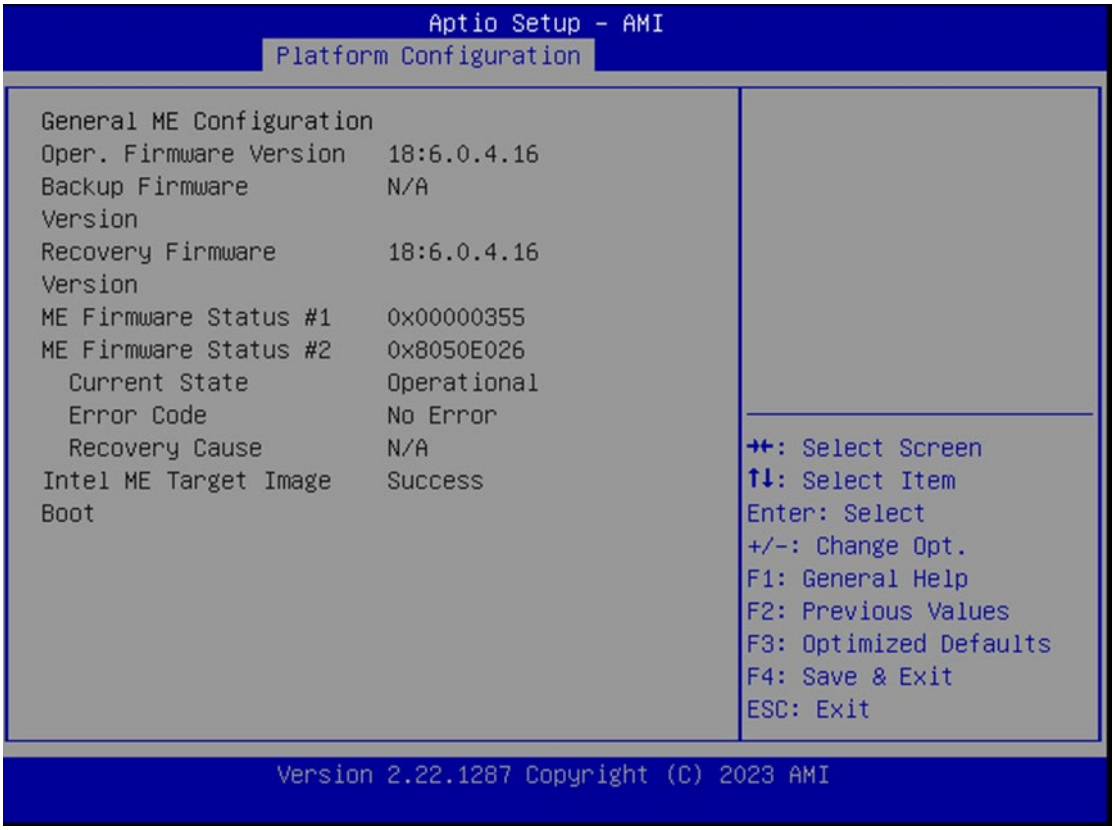
Controller 2 SATA and RST Configuration



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	Configures port as External SATA (eSATA)

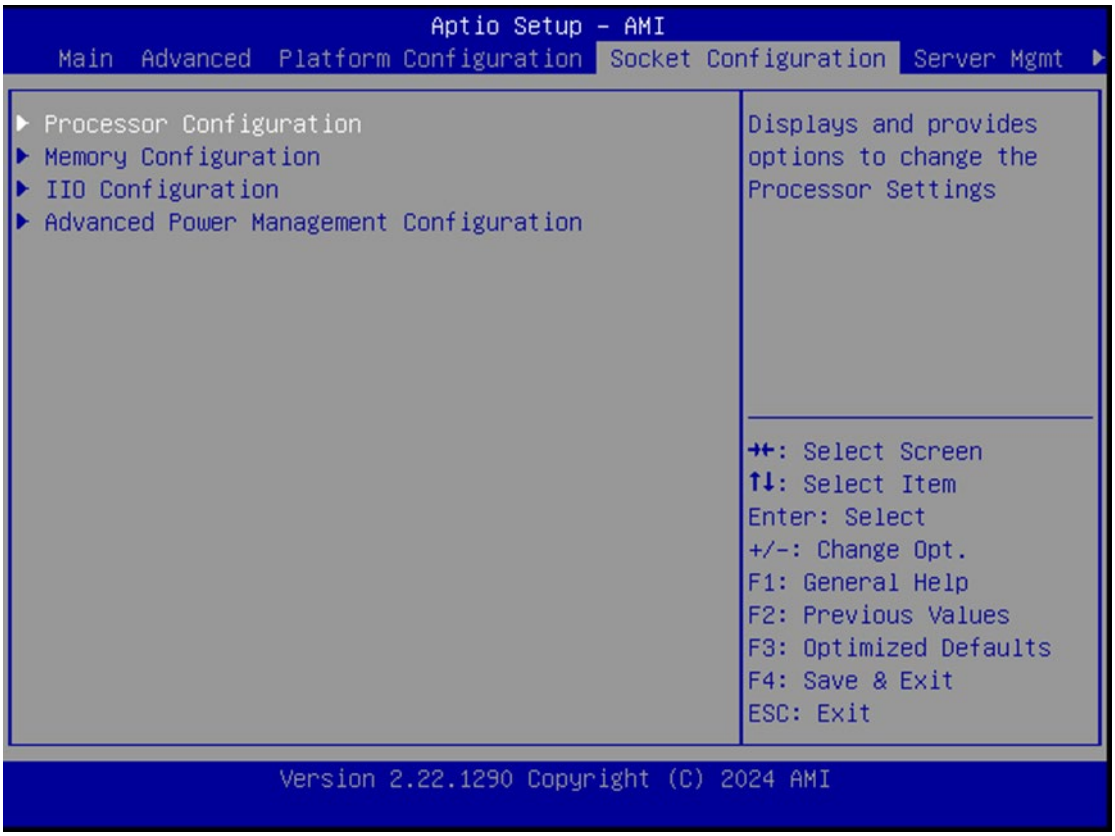
	Enabled	
Spin Up Device	Disabled Enabled	If enabled for any of ports Staggerred Spin Up will be performed and only the drives witch have this option enabled will spin up at boot. Otherwise all drives spin up at boot.
SATA Device Type	Hard Disk Drive Solid State Drive	Identify the SATA port is connected 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



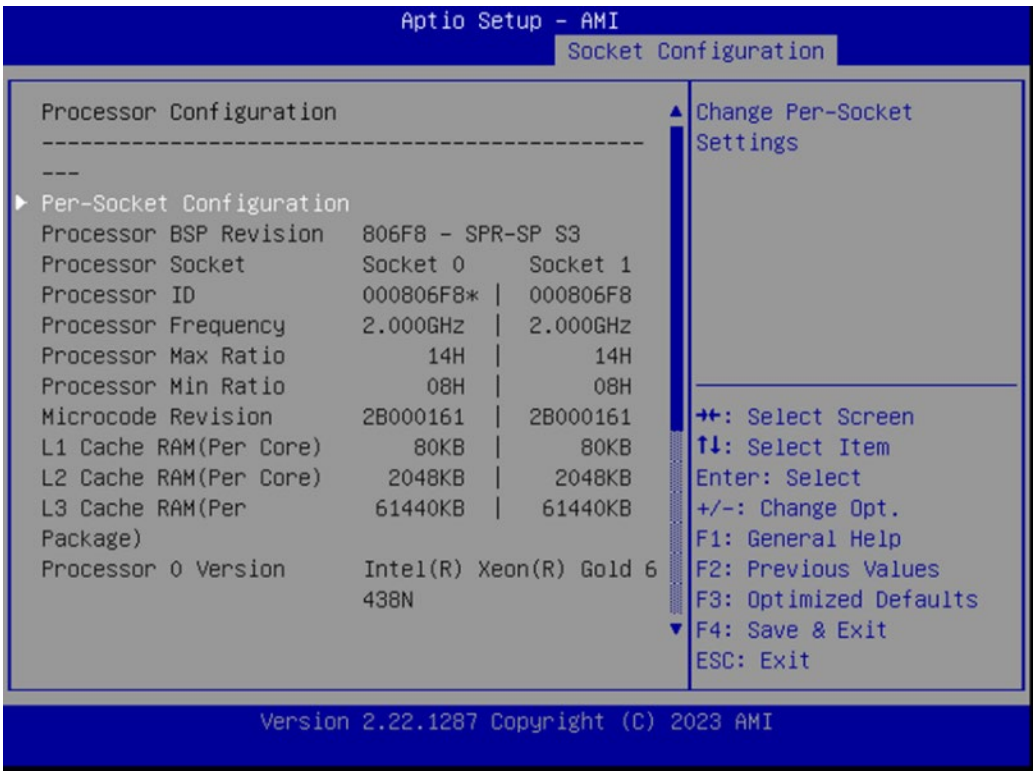
Socket

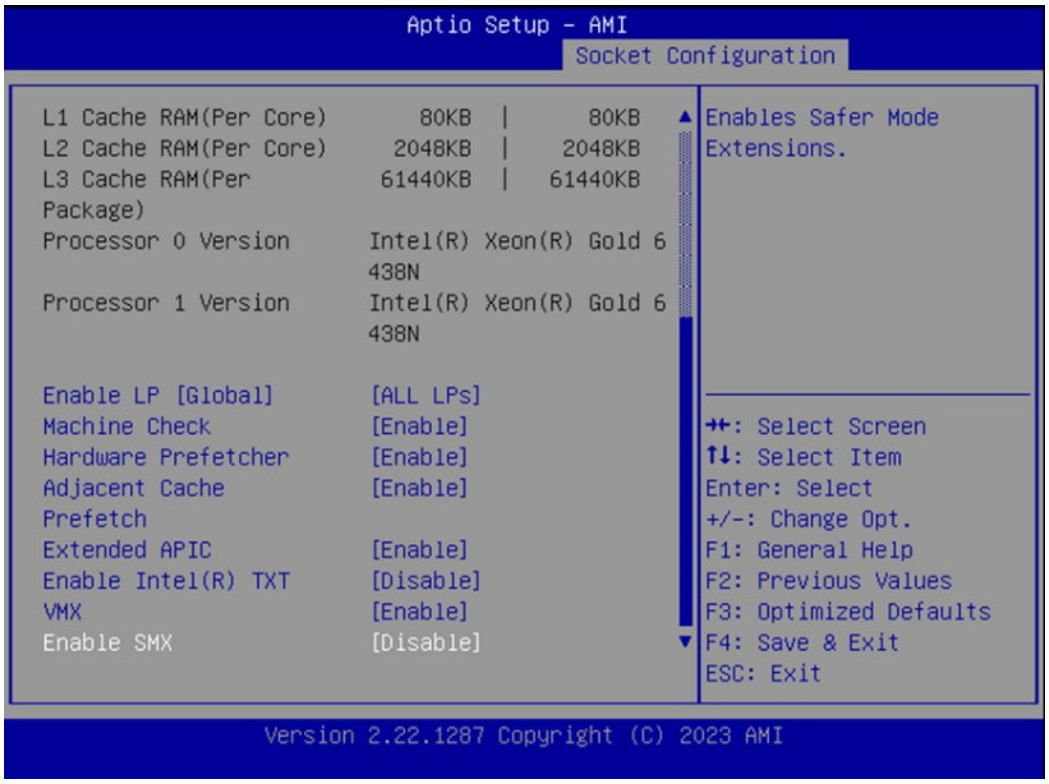
Select the Socket menu item from the BIOS setup screen to enter the Socket Setup screen. Users can select any of the items in the left frame of the screen.



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

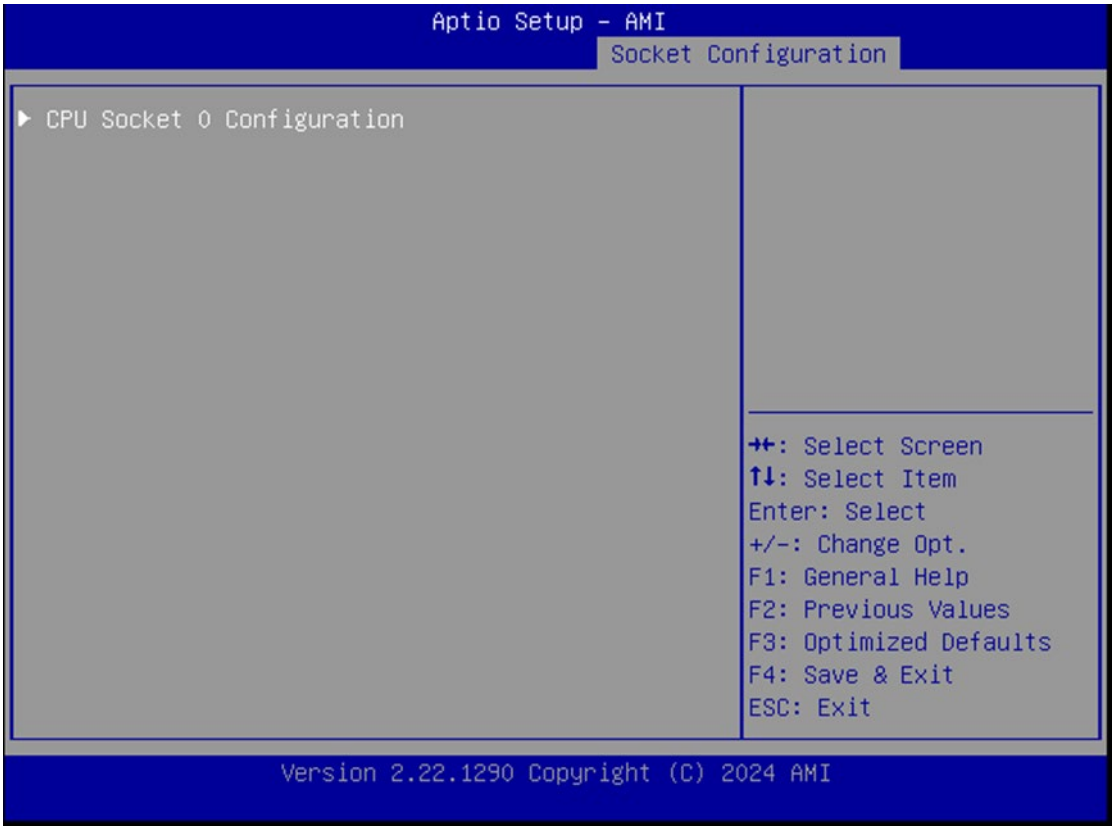




Feature	Options	Description
Enable LP	ALL LPs Single LP	Enables Logical processor (Software Method to Enable/Disable Logical Processor threads)
Machine Check	Disabled Enabled	Enable or Disable the Machine Check
Hardware	Disabled	= MLC Streamer Prefetcher (MSR 1A4h Bit [0])

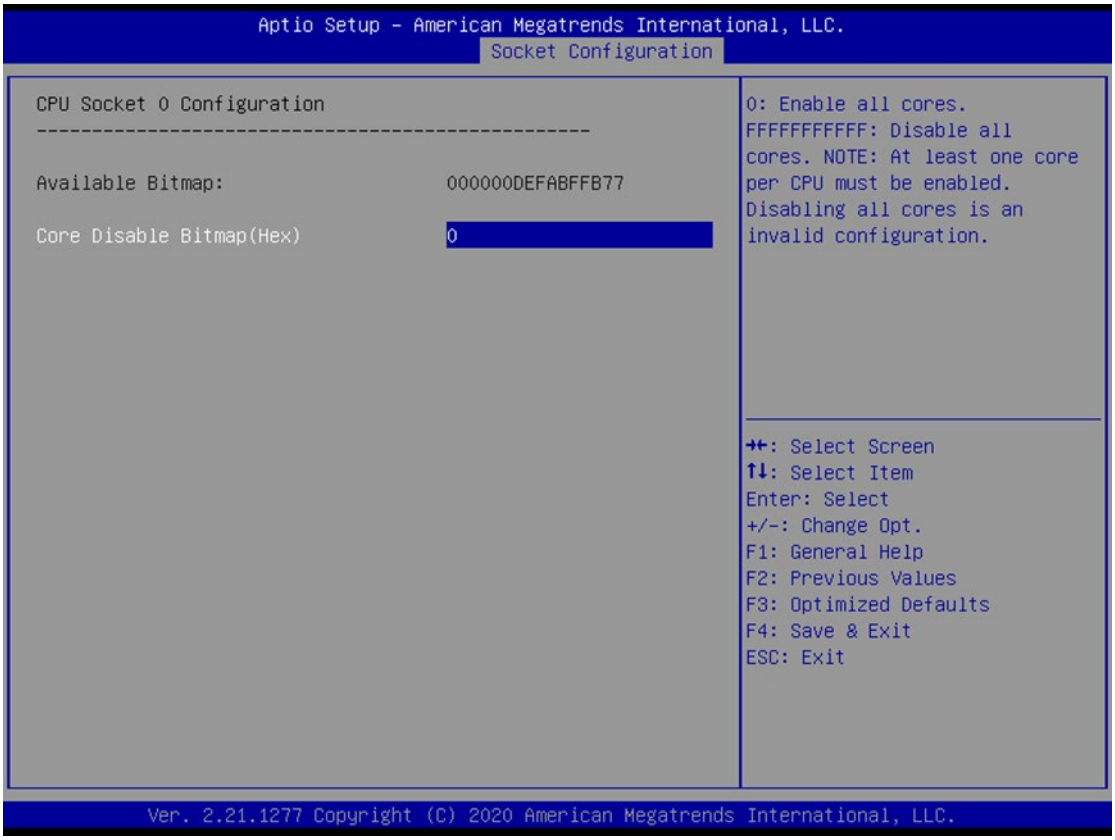
Prefetcher	Enabled	
Adjacent Cache Prefetcher	Disabled Enabled	= MLC Spatial Prefetcher (MSR 1A4h Bit [1])
Extended APIC	Disabled Enabled	Enables or disables extended APIC support
Enable Intel® TXT	Disabled Enabled	Enables Intel(R) TXT
VMX	Disabled Enabled	Enables the Vanderpool Technology, which takes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

Per-Socket Configuration



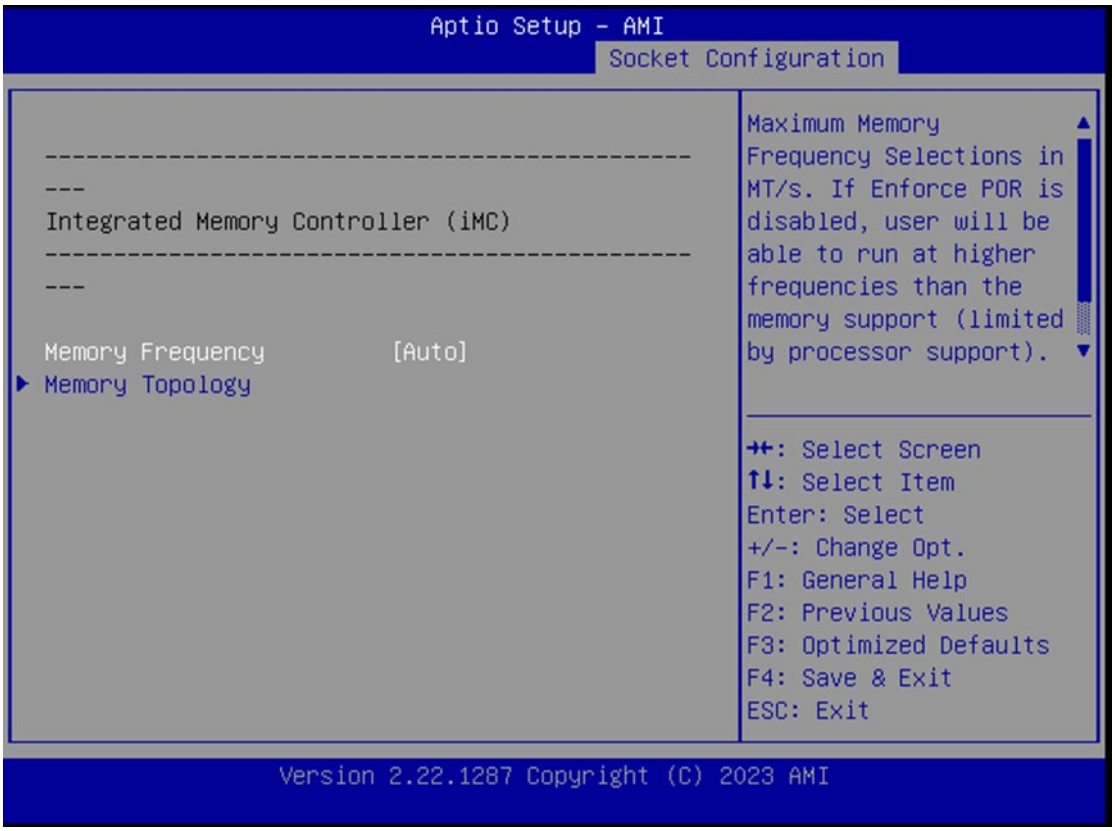
Feature	Options	Description
CPU Socket0 Configuration	None	None

CPU Socket0 Configuration



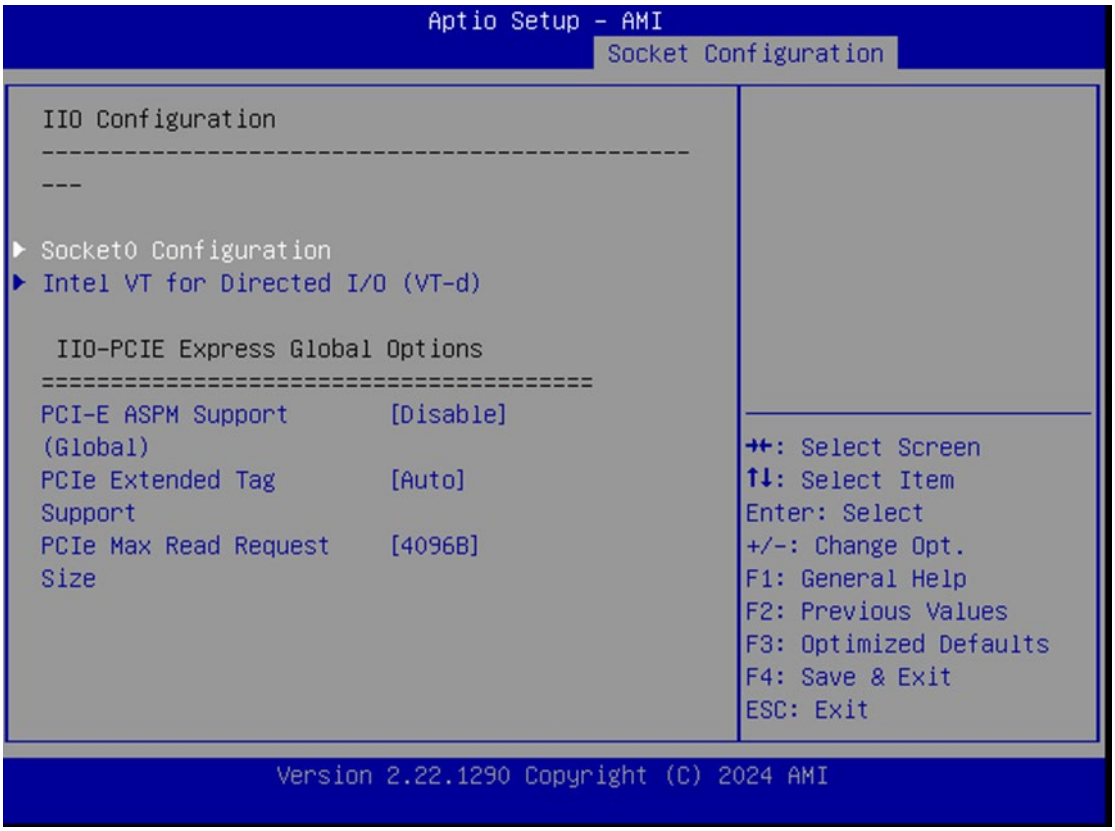
Feature	Options	Description
Core Disable Bitmap (Hex)	0	0: Enable all cores. FFFFFFFFFF: Disable all cores least one core per CPU must be enabled. Disabling all cores is an invalid configuration.

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

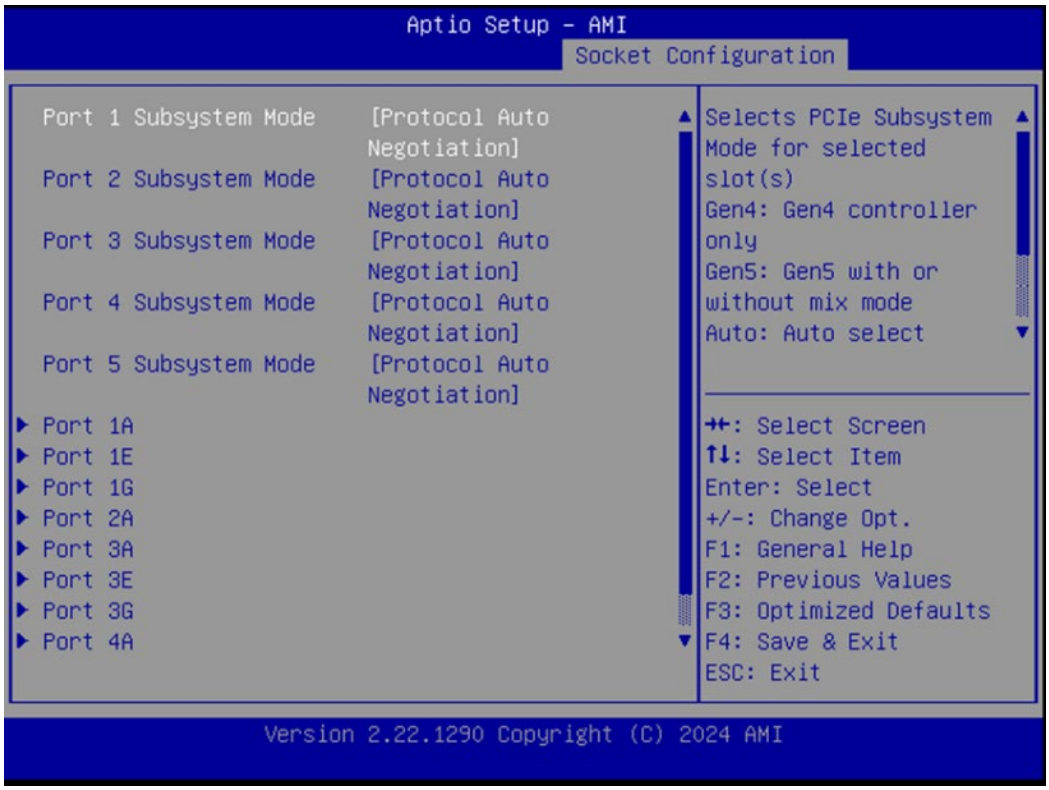


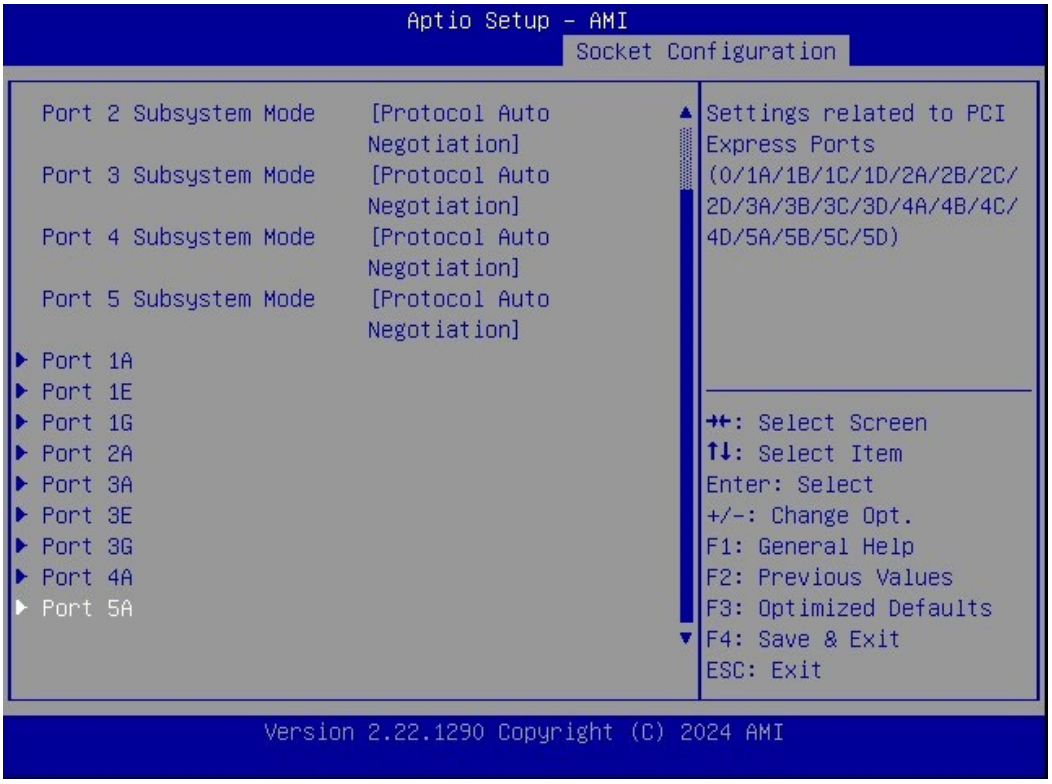
Feature	Options	Description
Socket0 Configuration	None	None
Intel® VT for Directed I/O (VT-d)	None	Press **<Enter>** to bring up the Intel® VT for Directed I/O (VT-d) Configuration menu.
PCI-E ASPM Support (Global)	Disable Per-Port	This option enables / disables the ASPM support for all downstream devices.
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

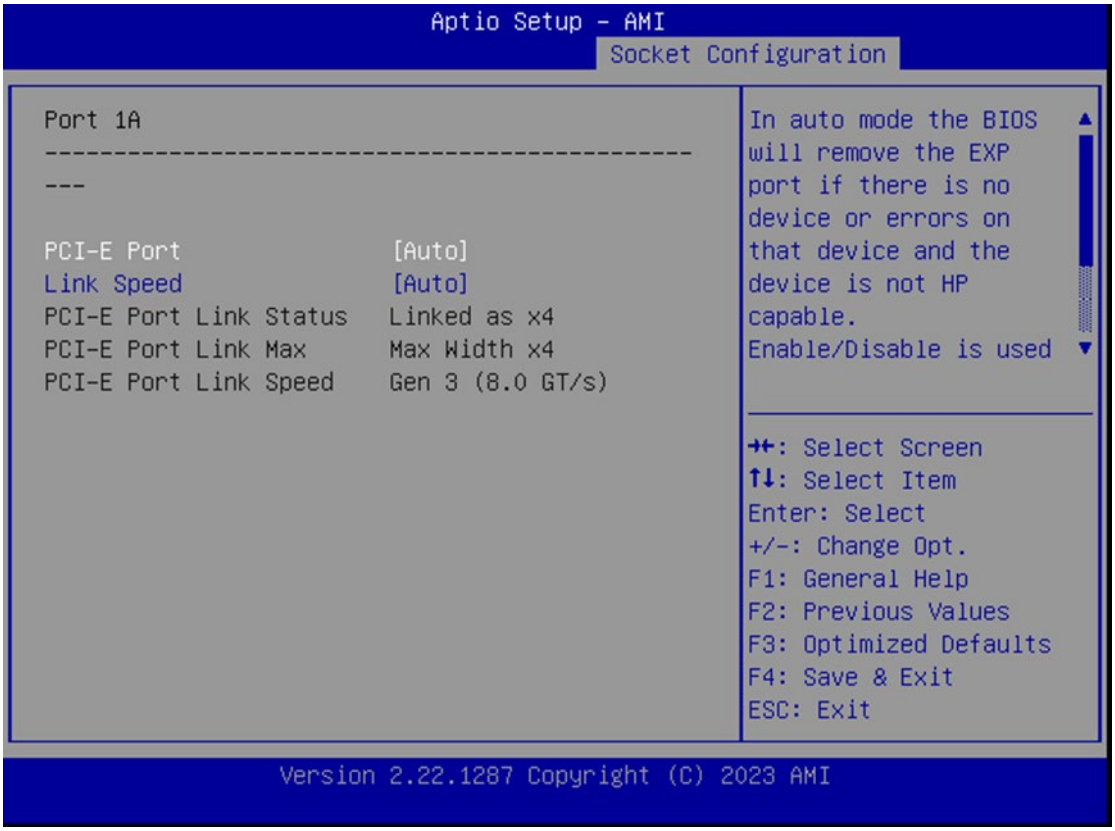




Feature	Options	Description
Port 1 Subsystem Mode	Gen5 Protocol Auto Negotiation	Selects PCIe Subsystem Mode for selected slot(s) Gen4: Gen4 controller only Gen5: Gen5 with or without mix mode Auto: Auto select
Port 2 Subsystem Mode	Gen5 Protocol Auto Negotiation	Selects PCIe Subsystem Mode for selected slot(s) Gen4: Gen4 controller only

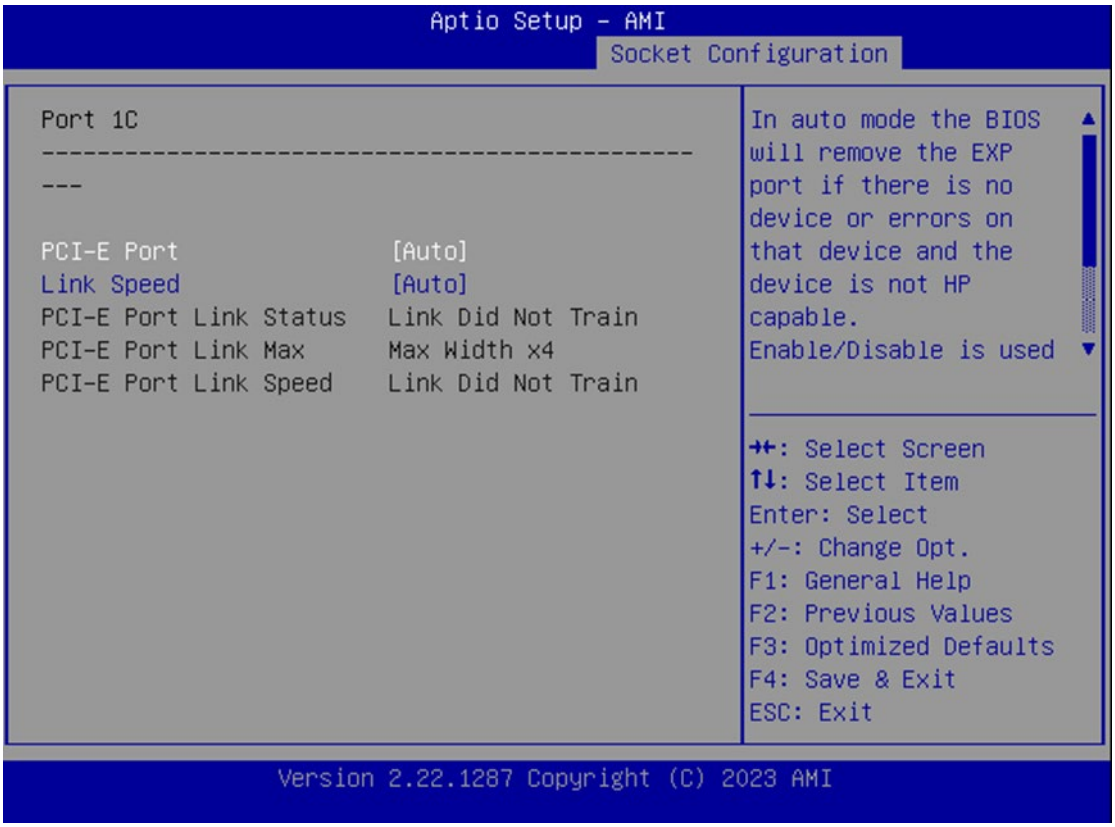
		Gen5: Gen5 with or without mix mode Auto: Auto select
Port 3 Subsystem Mode	Gen5 Protocol Auto Negotiation	Selects PCIe Subsystem Mode for selected slot(s) Gen4: Gen4 controller only Gen5: Gen5 with or without mix mode Auto: Auto select
Port 4 Subsystem Mode	Gen5 Protocol Auto Negotiation	Selects PCIe 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



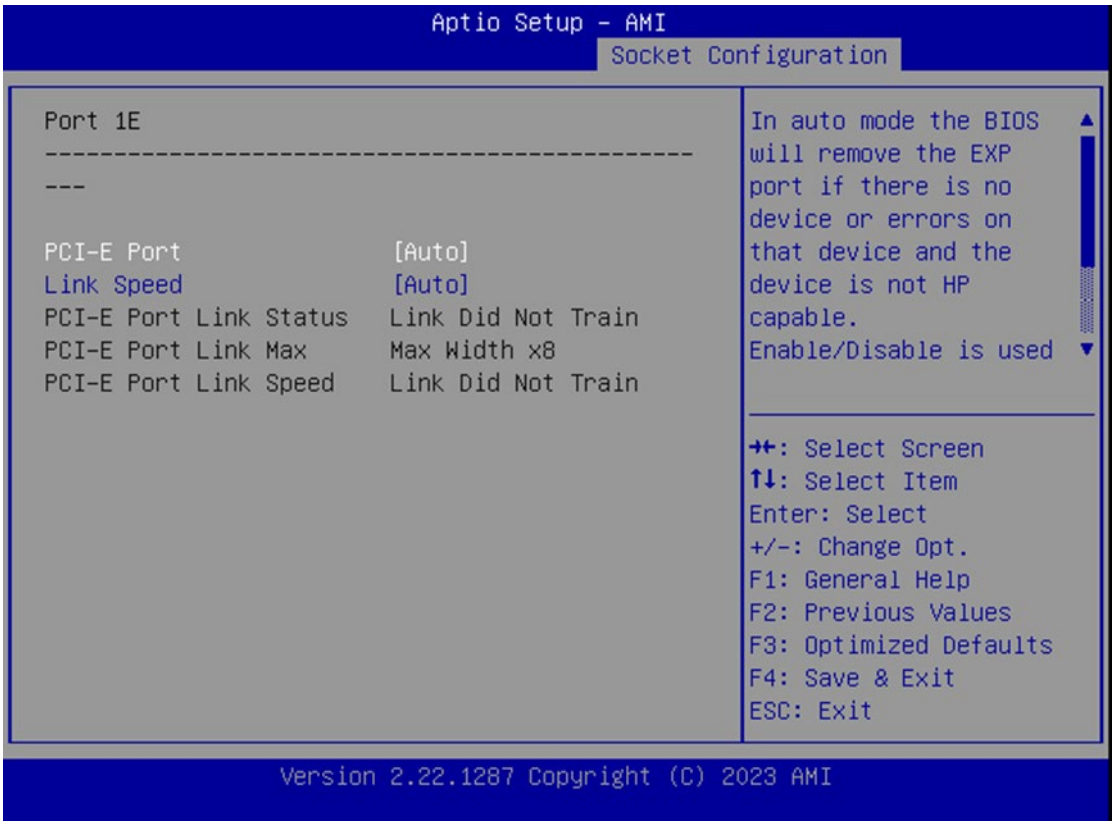
Feature	Options	Description
PCI-E Port	Auto No Yes	In auto mode the BIOS will remove the EXP port if there is no device or errors on that device and the device is not HP capable. Enable/Disable is used
Link Speed	Auto Gen 1 (2.5 GT/s) Gen 2 (5 GT/s) Gen 3 (8 GT/s) Gen 4 (16 GT/s) Gen 5 (32 GT/s)	Choose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

Port 1C



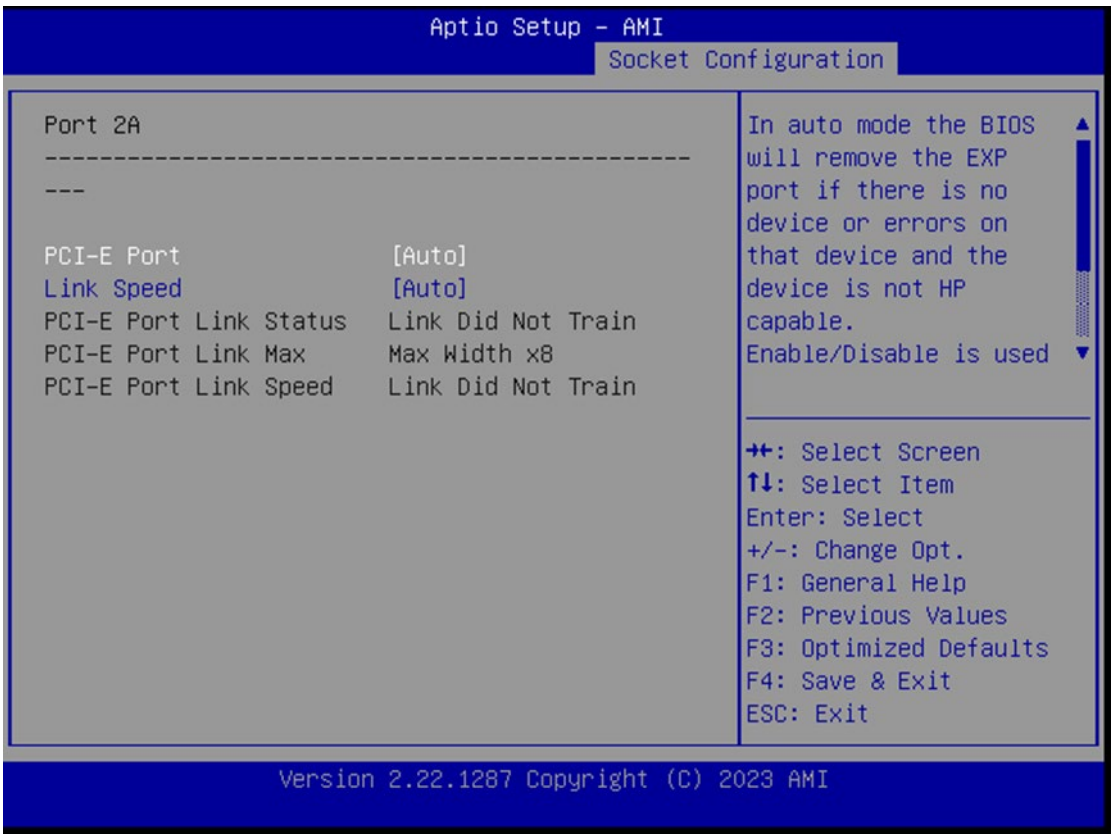
Feature	Options	Description
PCI-E Port	Auto No Yes	In auto mode the BIOS will remove the EXP port if there is no device or errors on that device and the device is not HP capable. Enable/Disable is used
Link Speed	Auto Gen 1 (2.5 GT/s) Gen 2 (5 GT/s) Gen 3 (8 GT/s) Gen 4 (16 GT/s) Gen 5 (32 GT/s)	Choose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

Port 1E



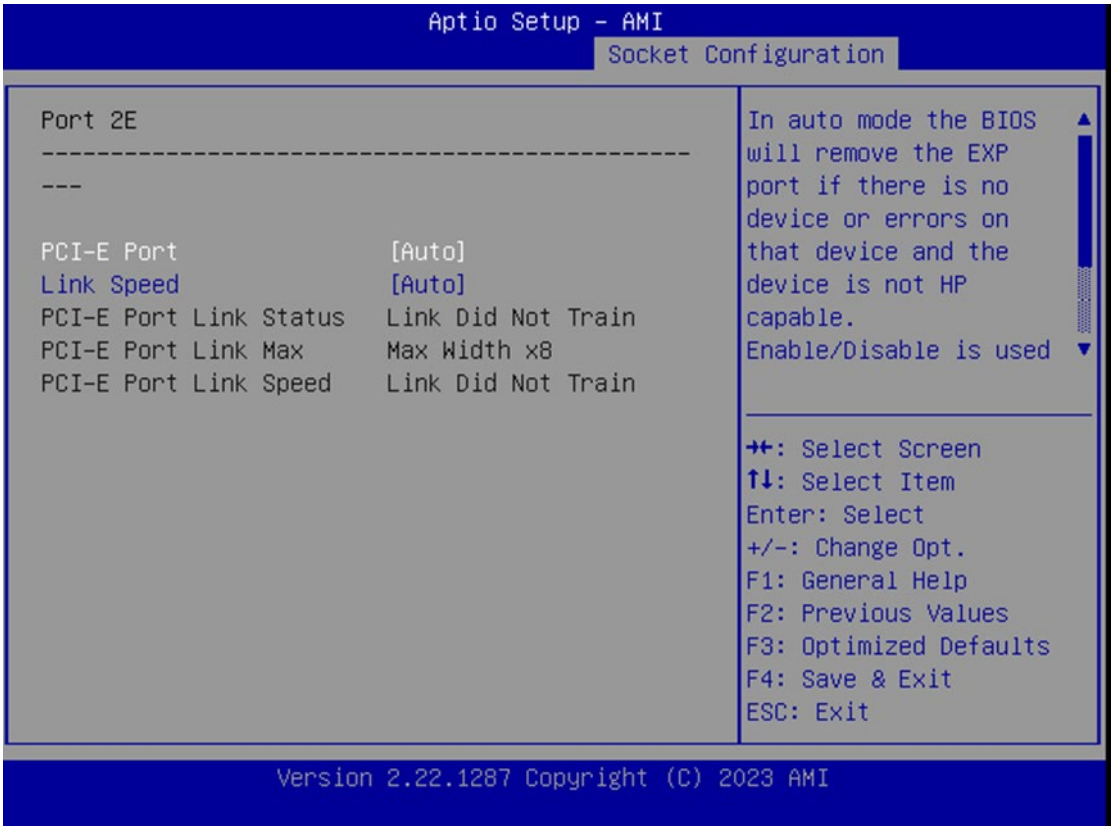
Feature	Options	Description
PCI-E Port	Auto No Yes	In auto mode the BIOS will remove the EXP port if there is no device or errors on that device and the device is not HP capable. Enable/Disable is used.
Link Speed	Auto Gen 1 (2.5 GT/s) Gen 2 (5 GT/s) Gen 3 (8 GT/s) Gen 4 (16 GT/s) Gen 5 (32 GT/s)	Choose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

Port 2A



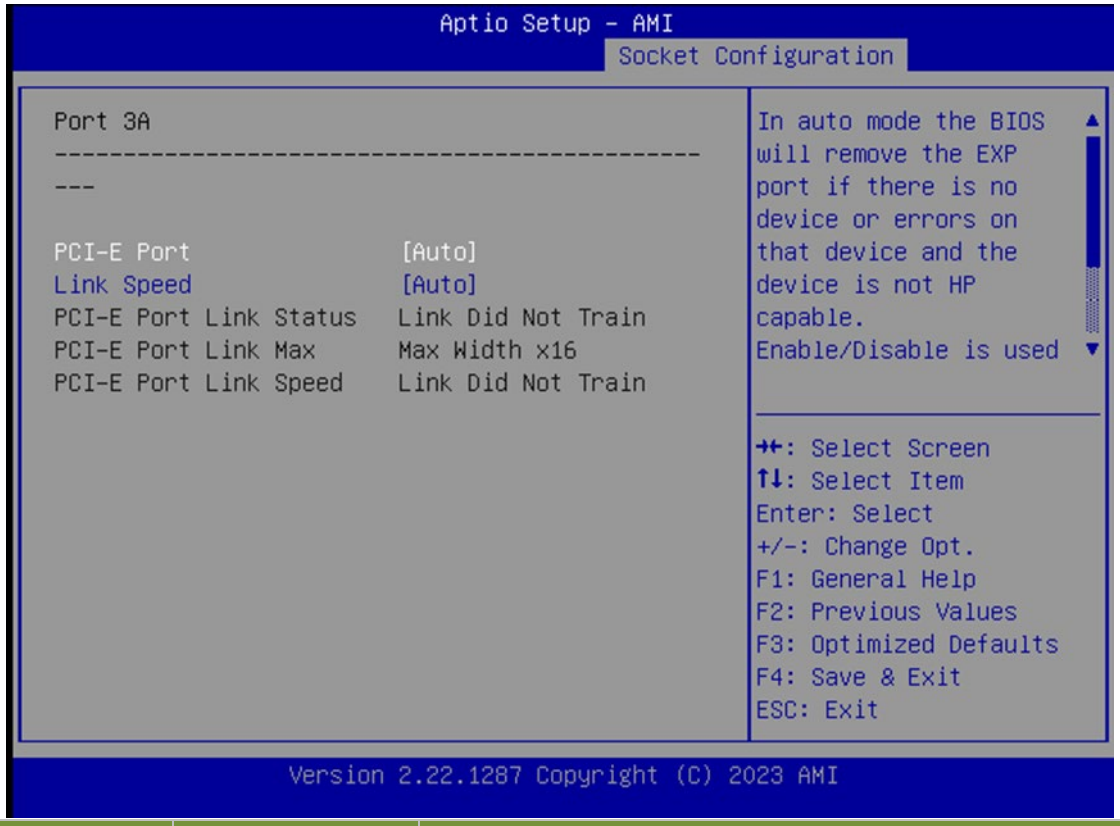
Feature	Options	Description
PCI-E Port	Auto No Yes	In auto mode the BIOS will remove the EXP port if there is no device or errors on that device and the device is not HP capable. Enable/Disable is used
Link Speed	Auto Gen 1 (2.5 GT/s) Gen 2 (5 GT/s) Gen 3 (8 GT/s) Gen 4 (16 GT/s) Gen 5 (32 GT/s)	Choose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

Port 2E



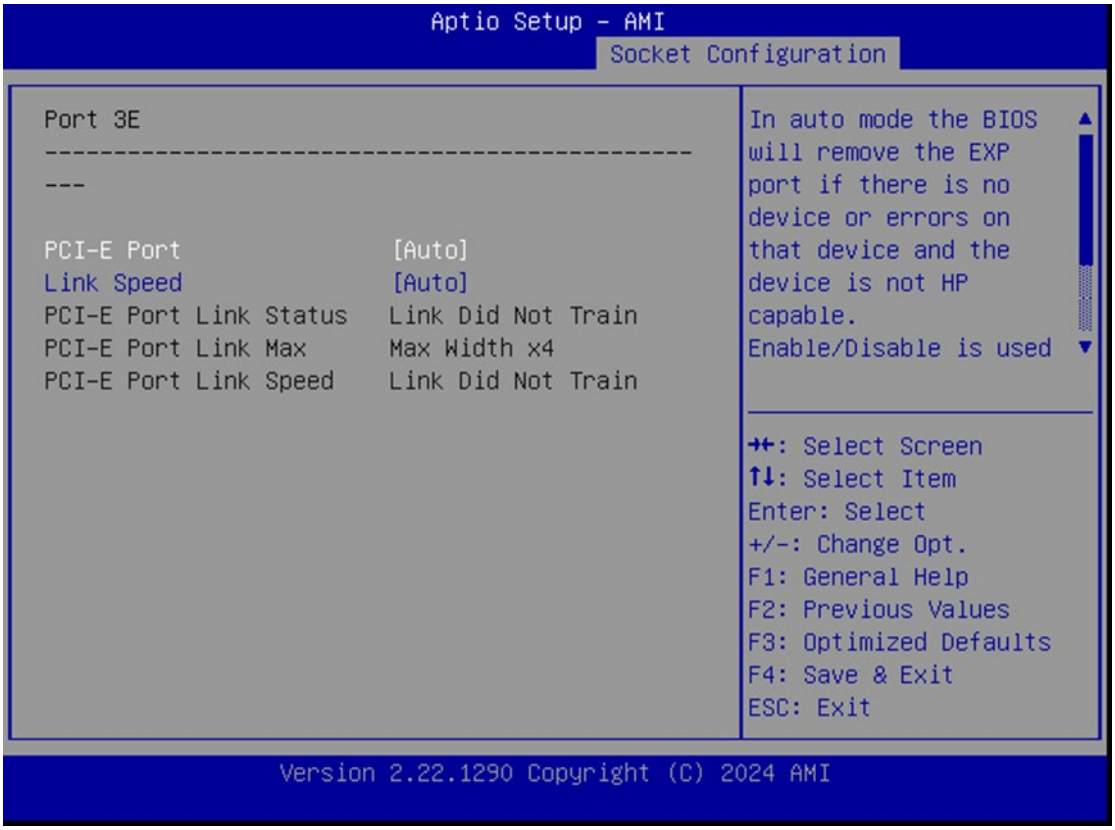
Feature	Options	Description
PCI-E Port	Auto No Yes	In auto mode the BIOS will remove the EXP port if there is no device or errors on that device and the device is not HP capable. Enable/Disable is used.
Link Speed	Auto Gen 1 (2.5 GT/s) Gen 2 (5 GT/s) Gen 3 (8 GT/s) Gen 4 (16 GT/s) Gen 5 (32 GT/s)	Choose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

Port 3A



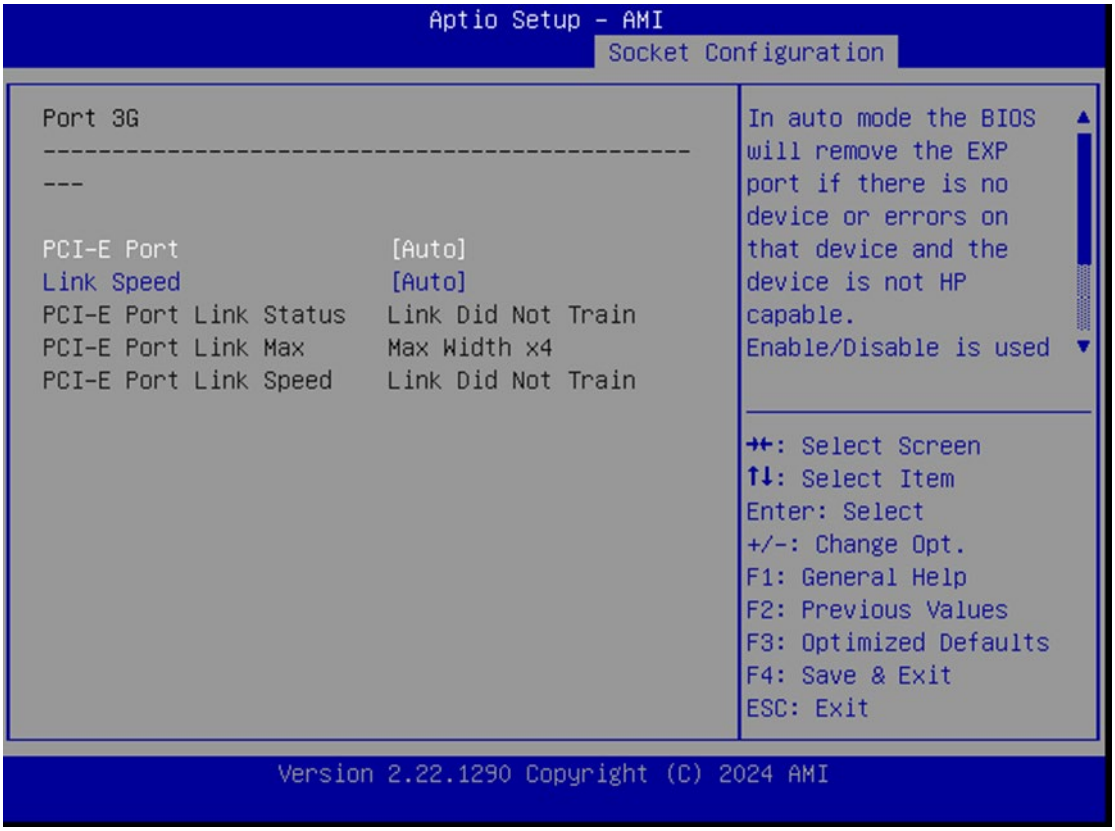
Feature	Options	Description
PCI-E Port	Auto No Yes	In auto mode the BIOS will remove the EXP port if there is no device or errors on that device and the device is not HP capable. Enable/Disable is used.
Link Speed	Auto Gen 1 (2.5 GT/s) Gen 2 (5 GT/s) Gen 3 (8 GT/s) Gen 4 (16 GT/s) Gen 5 (32 GT/s)	Choose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

Port 3E



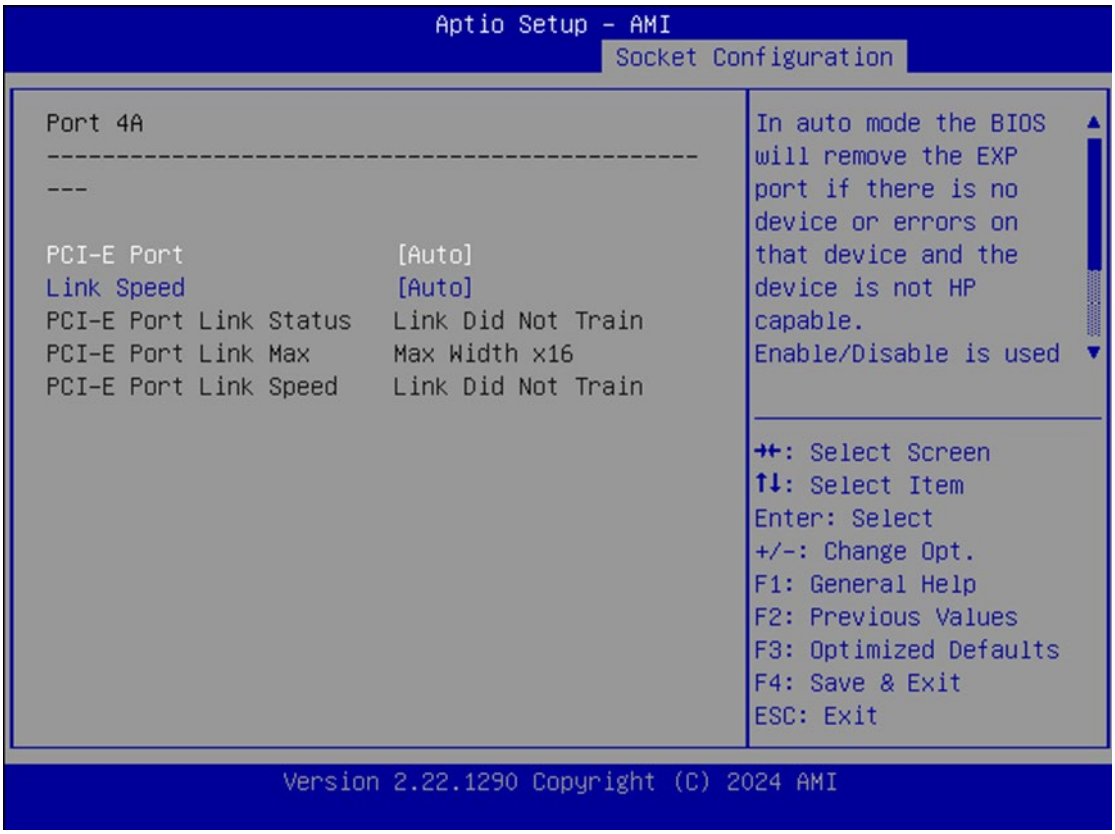
Feature	Options	Description
PCI-E Port	Auto No Yes	In auto mode the BIOS will remove the EXP port if there is no device or errors on that device and the device is not HP capable. Enable/Disable is used
Link Speed	Auto Gen 1 (2.5 GT/s) Gen 2 (5 GT/s) Gen 3 (8 GT/s) Gen 4 (16 GT/s) Gen 5 (32 GT/s)	Choose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

Port 3G



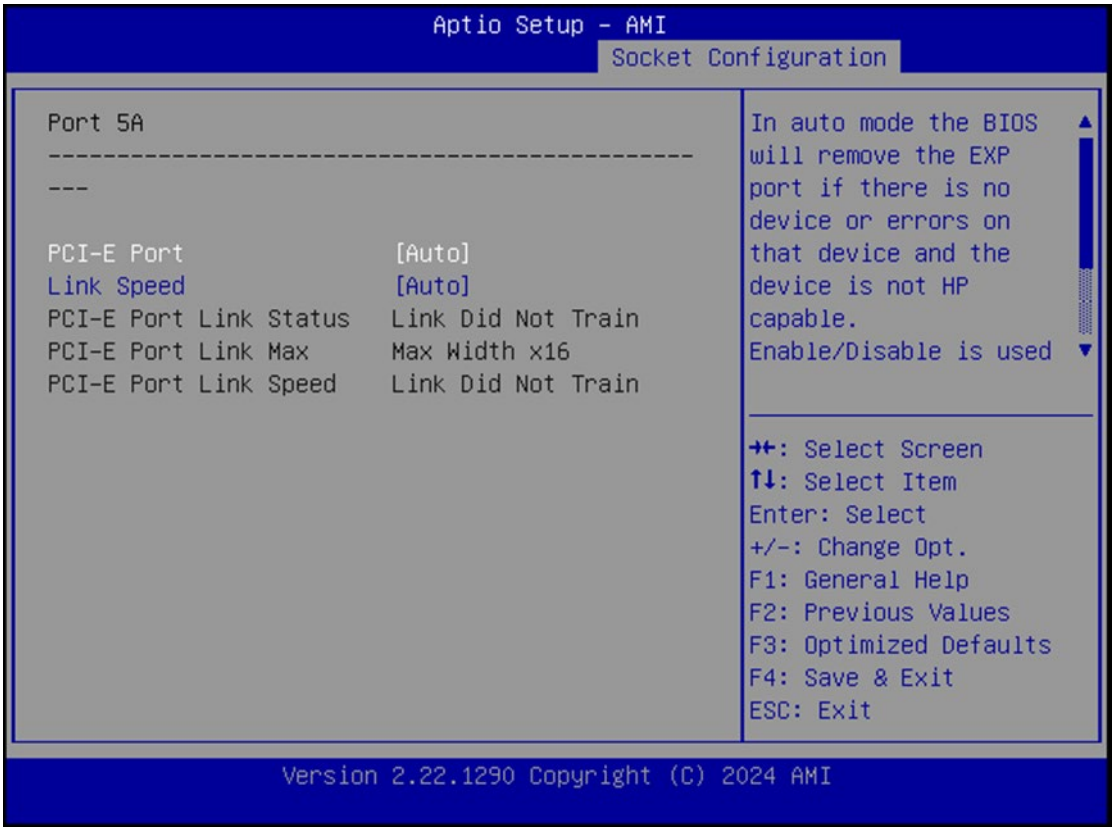
Feature	Options	Description
PCI-E Port	Auto No Yes	In auto mode the BIOS will remove the EXP port if there is no device or errors on that device and the device is not HP capable. Enable/Disable is used
Link Speed	Auto Gen 1 (2.5 GT/s) Gen 2 (5 GT/s) Gen 3 (8 GT/s) Gen 4 (16 GT/s) Gen 5 (32 GT/s)	Choose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

Port 4A



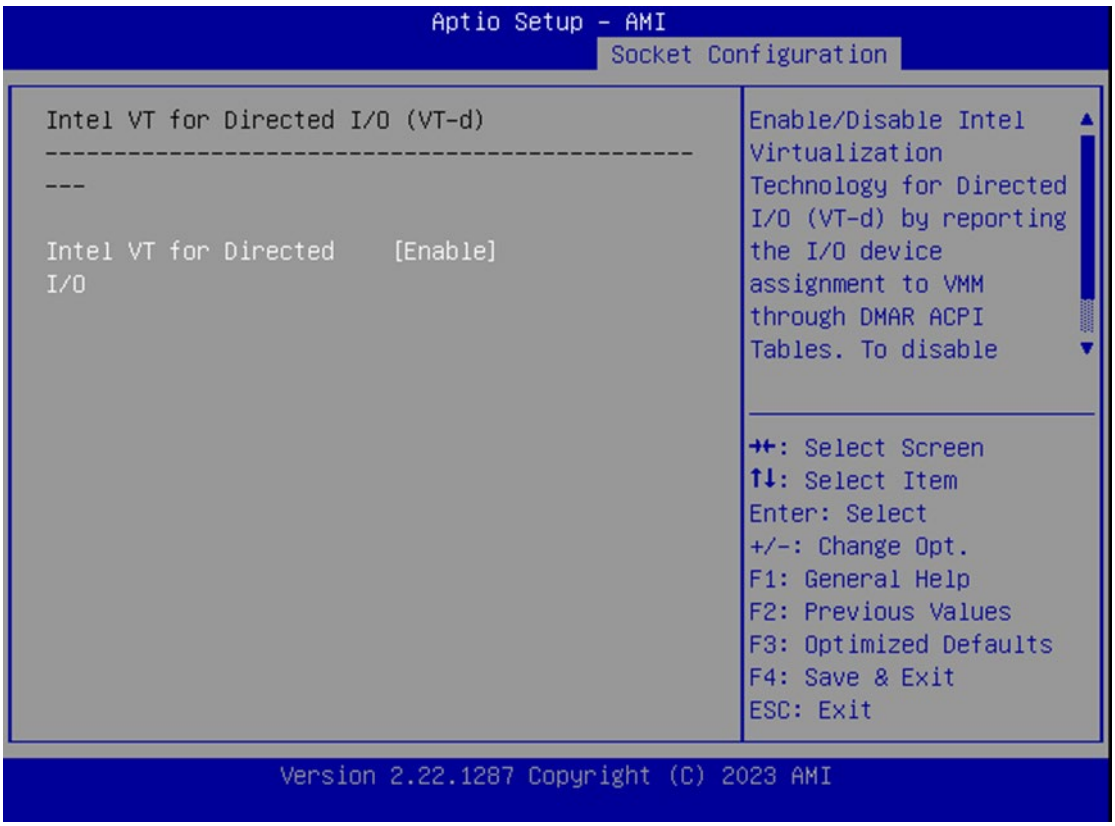
Feature	Options	Description
PCI-E Port	Auto No Yes	In auto mode the BIOS will remove the EXP port if there is no device or errors on that device and the device is not HP capable. Enable/Disable is used
Link Speed	Auto Gen 1 (2.5 GT/s) Gen 2 (5 GT/s) Gen 3 (8 GT/s) Gen 4 (16 GT/s) Gen 5 (32 GT/s)	Choose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

Port 5A



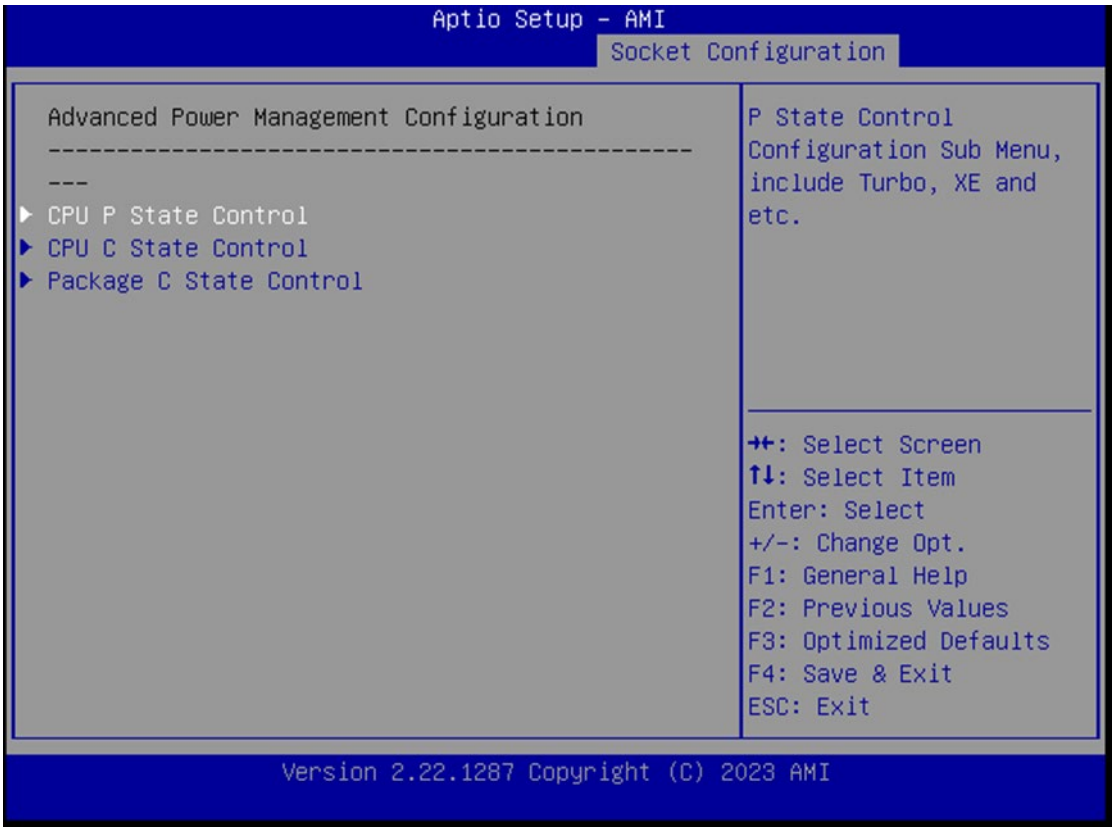
Feature	Options	Description
PCI-E Port	Auto No Yes	In auto mode the BIOS will remove the EXP port if there is no device or errors on that device and the device is not HP capable. Enable/Disable is used
Link Speed	Auto Gen 1 (2.5 GT/s) Gen 2 (5 GT/s) Gen 3 (8 GT/s) Gen 4 (16 GT/s) Gen 5 (32 GT/s)	Choose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

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



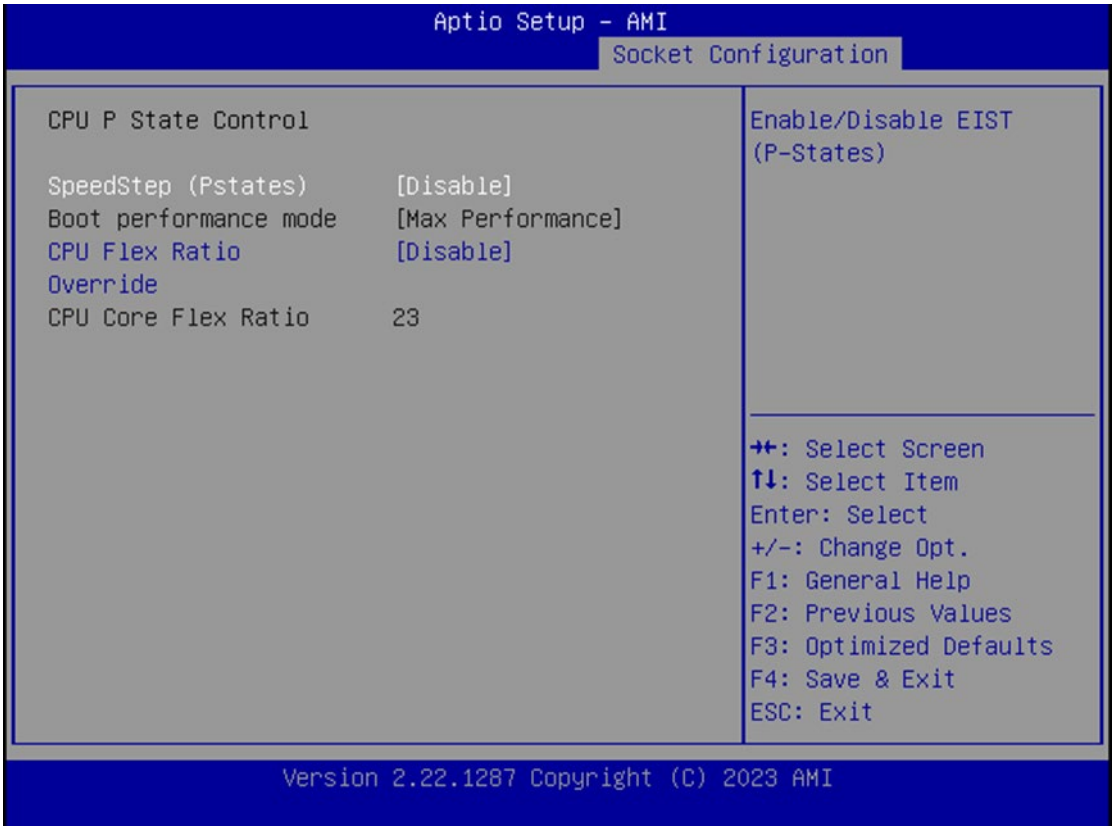
Feature	Options	Description
Intel VT for Directed I/O	Enable Disable	Enable/Disable Intel Virtualization Technology for Directed I/O (VT-d) by reporting the I/O device assignment to VMM through DMAR ACPI Tables. To disable

Advanced Power Management Configuration



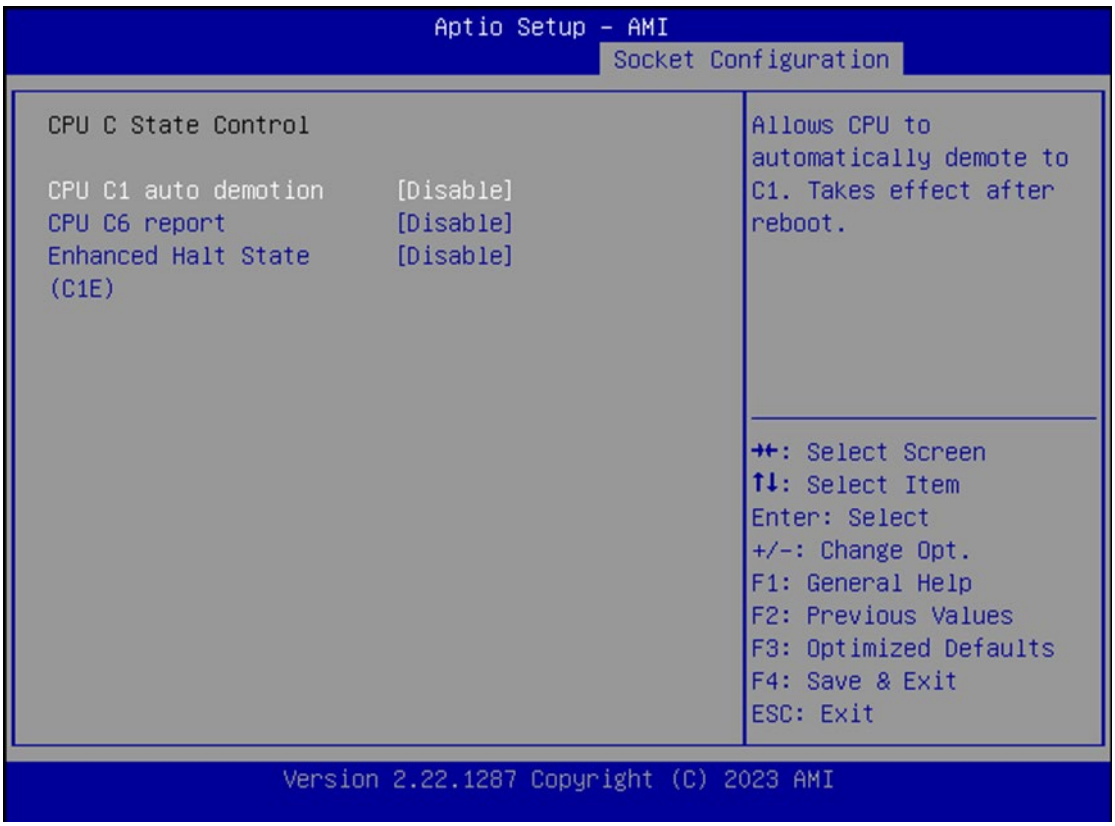
Feature	Options	Description
CPU P State Control	None	P State Control Configuration Sub Menu, include Turbo, XE and etc.
CPU C State Control	None	CPU C State setting
Package C State Control	None	P State Control Configuration Sub Menu, include Turbo, XE and etc.

CPU P State Control



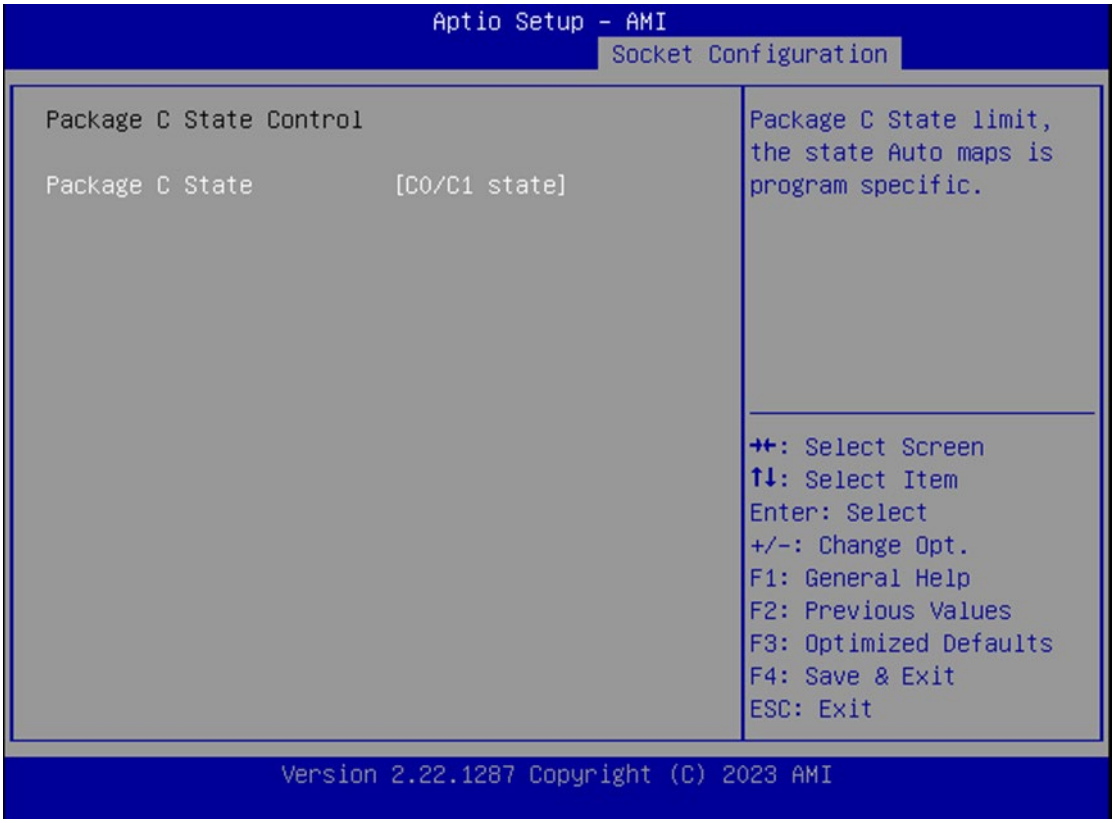
Feature	Options	Description
SpeedStep (Pstates)	Disabled Enabled	Enables or disables EIST (P-States)
Boot performance mode	Max Performance Max Efficient Set by Intel Node Manager	Select the performance state that the BIOS will set before OS hand off.
CPU Flex Ratio Override	Disabled Enabled	Enable/Disable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

CPU C State Control



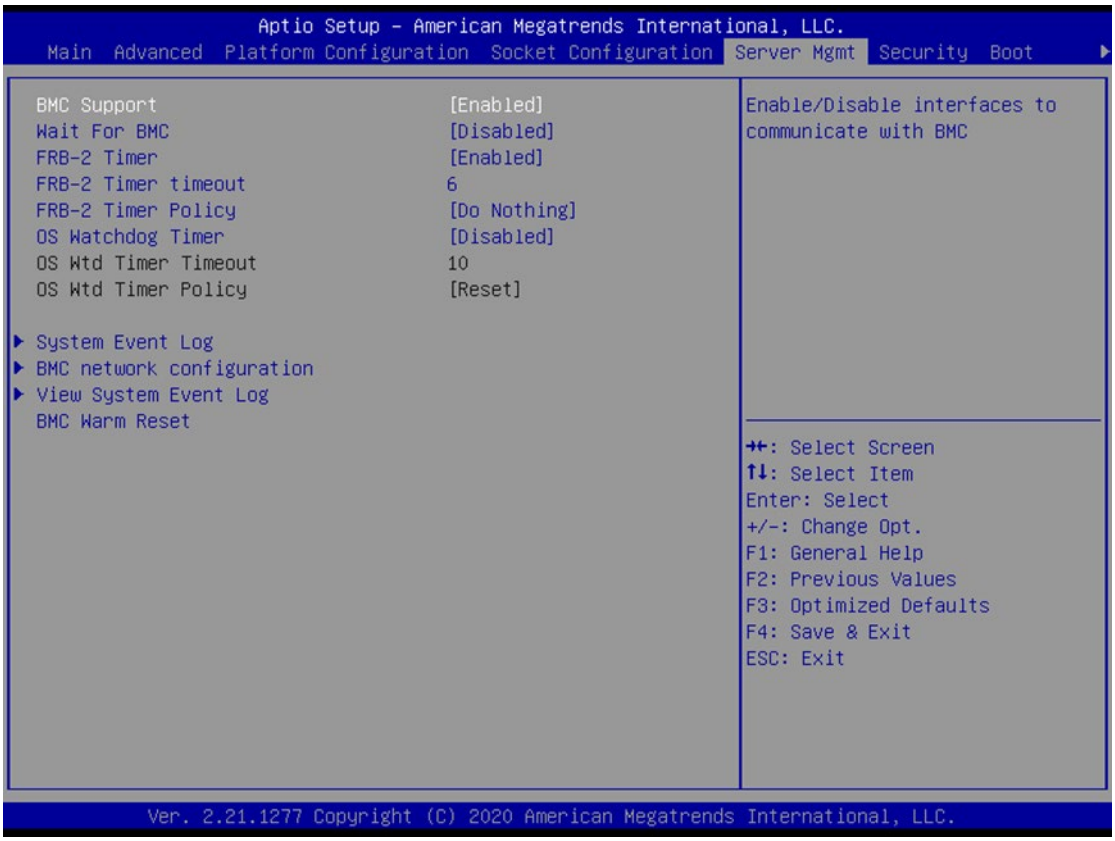
Feature	Options	Description
CPU C1 auto demotion	Disabled Enabled	Autonomous Core C-State Control
CPU C6 report	Disabled Enabled Auto	Enable/Disable CPU C6(ACPI C3) report to OS, Auto maps to enable
Enhanced Halt State (C1E)	Disabled Enabled	Core C1E auto promotion Control. Takes effect after reboot.

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.

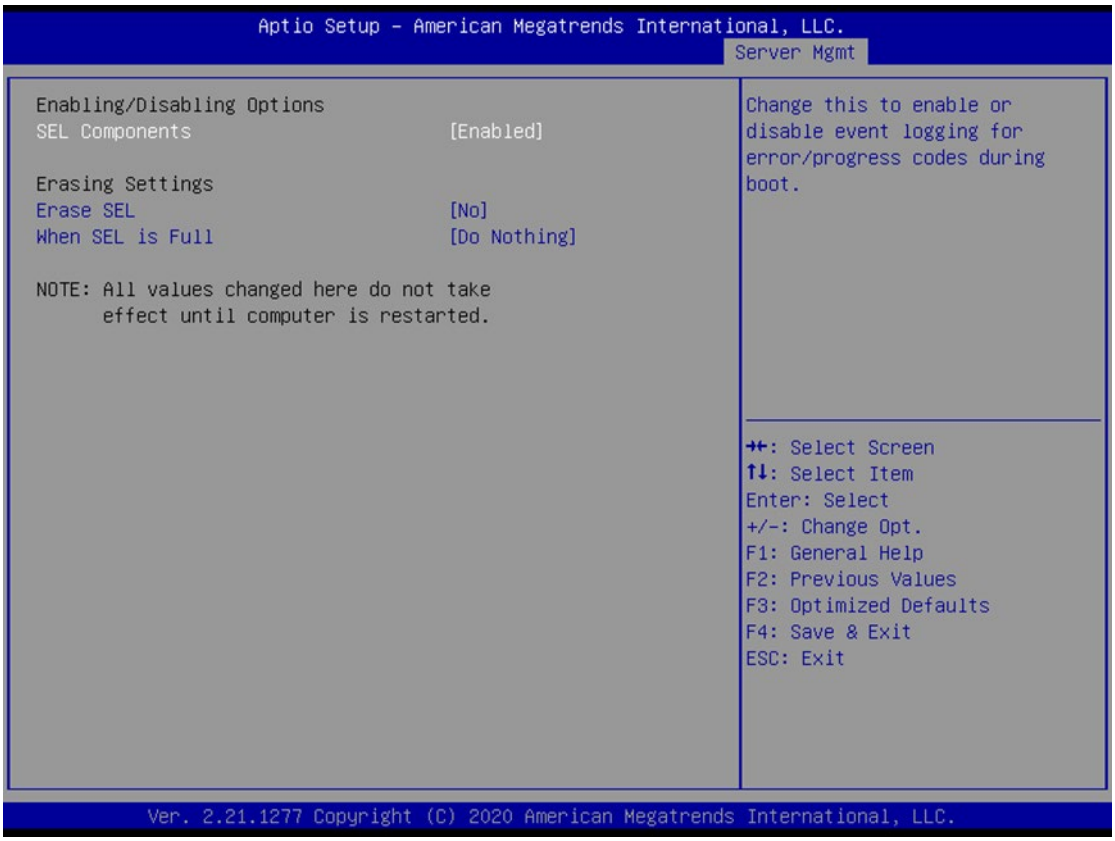
Server Mgmt



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.

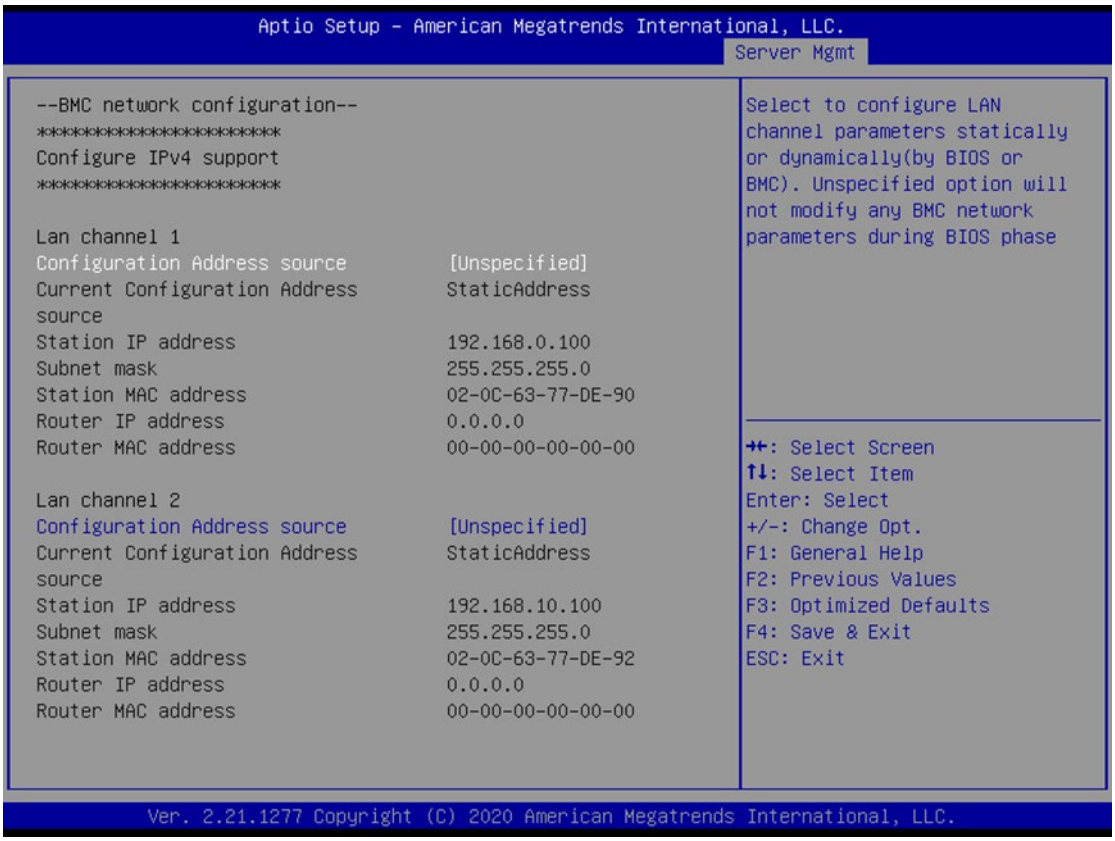
OS Wtd Timer Timeout	10	Enter the value Between 1 to 30 min for OS Boot Watchdog Timer Expiration. Not available if OS Boot Watchdog Timer is disabled.
OS Wtd Timer Policy	Do Nothing Reset Power Down Power Cycle	Configure how the system should respond if the OS Boot Watchdog Timer expires. Not available 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



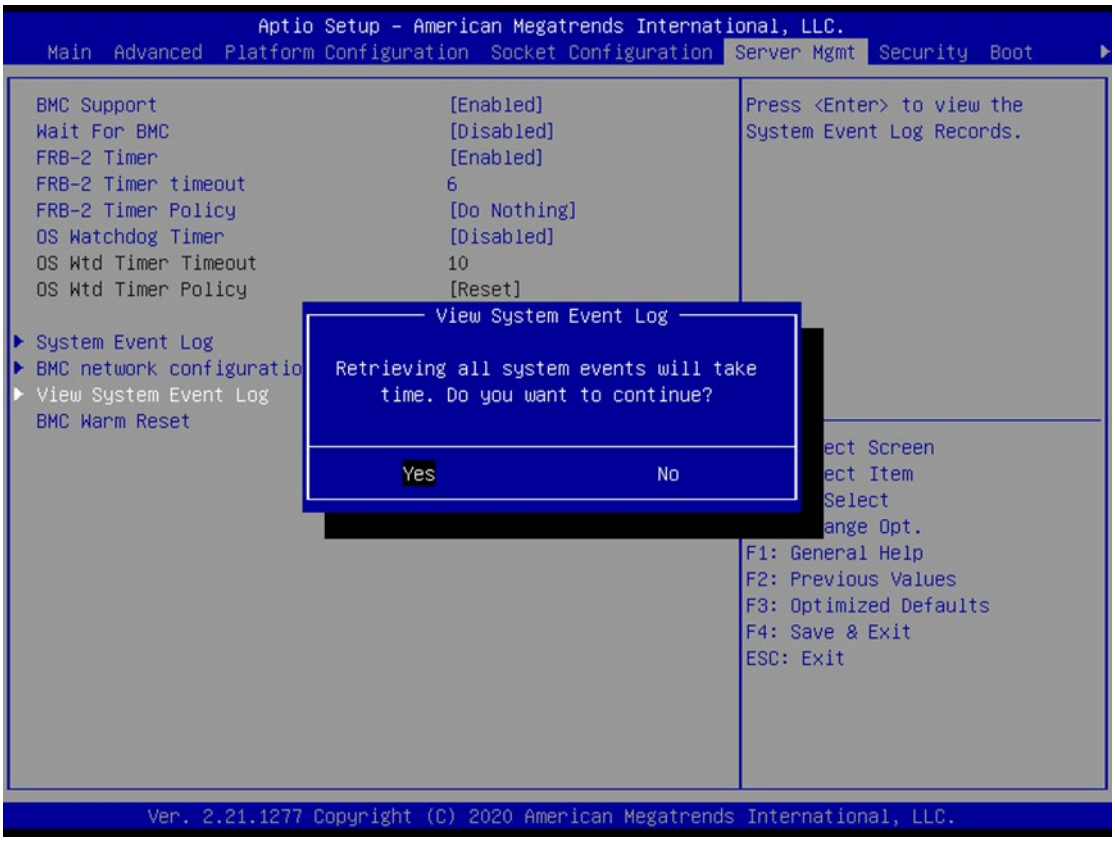
Feature	Options	Description
SEL Components	Disabled Enabled	Enables or disables all features of System Event Logging during boot.
Erase SEL	NO Yes, On next reset Yes, On every reset	Choose options for erasing SEL.
When SEL is Full	Do Nothing Erase Immediately Delete Oldest Record	Choose options for reactions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

BMC Network Configuration



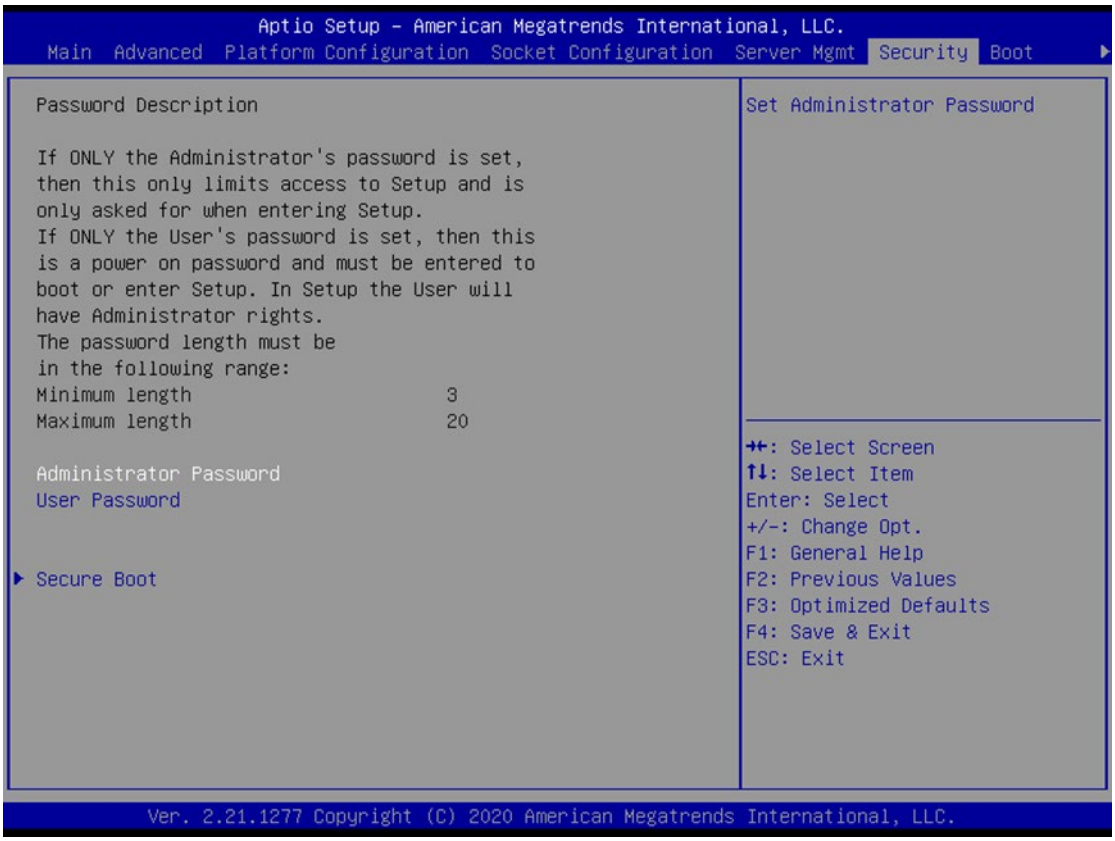
Feature	Options	Description
Configuration Address source	Unspecified Static DynamicBmcDhcp DynamicBmcNonDhcp	Select to configure LAN channel parameters statically or dynamically (by BIOS or BMC). The **unspecified** option will not modify any BMC network parameters during BIOS phase.

View System Event Log



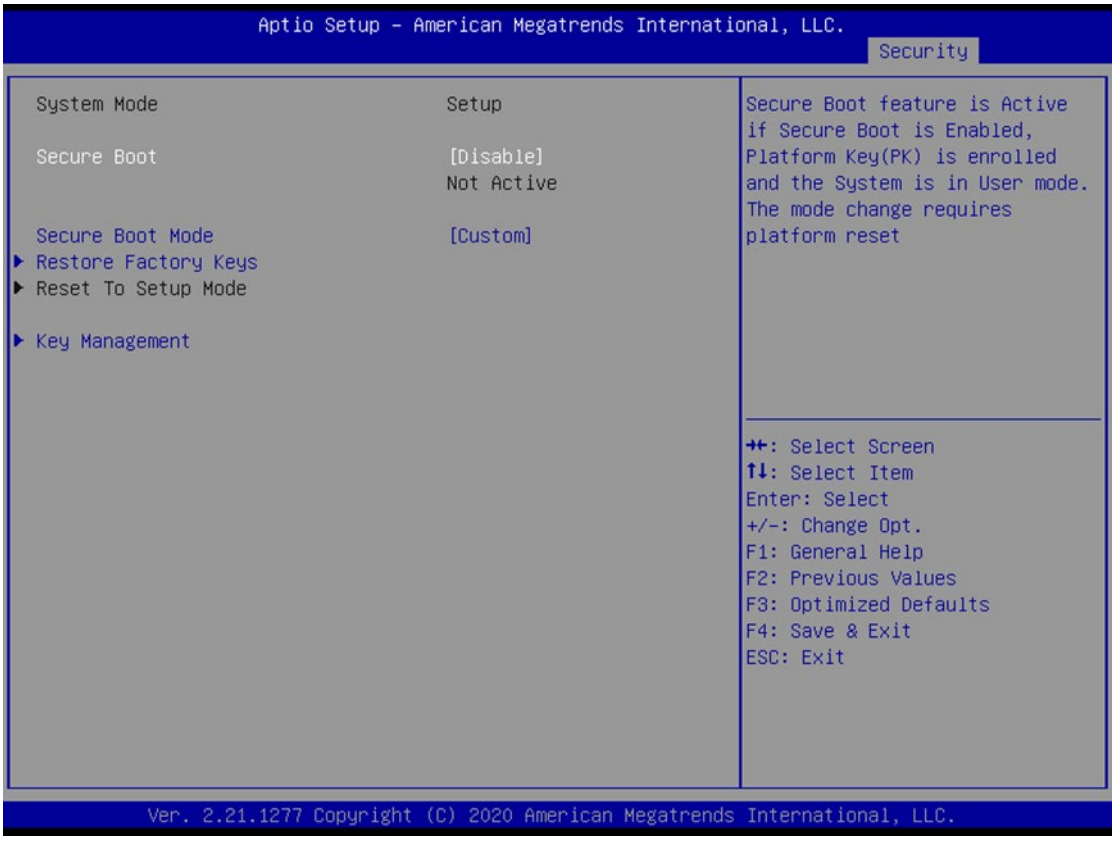
Security

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.



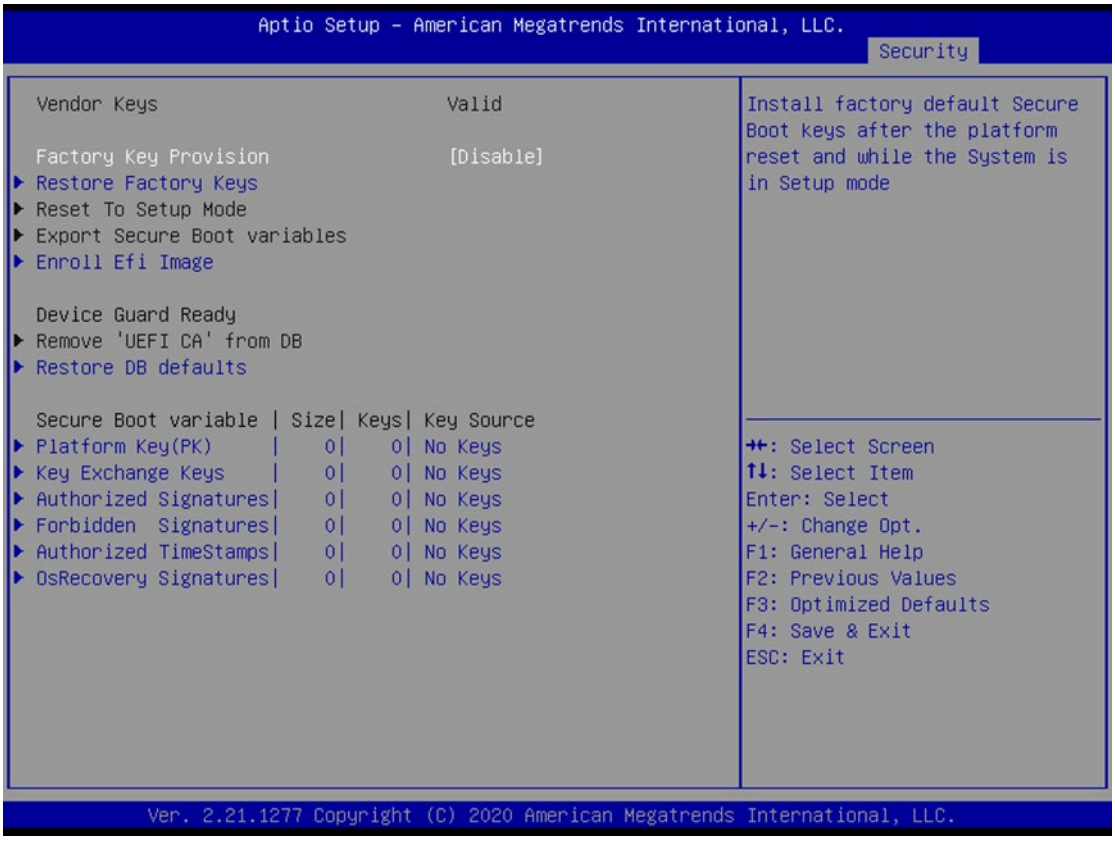
Feature	Description
Administrator Password	If ONLY the Administrator's password is set, it only limits access to Setup and is only asked for when entering Setup.
User Password	If ONLY the User's password is set, it serves as a power-on password and must be entered to boot or enter Setup. In Setup, the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

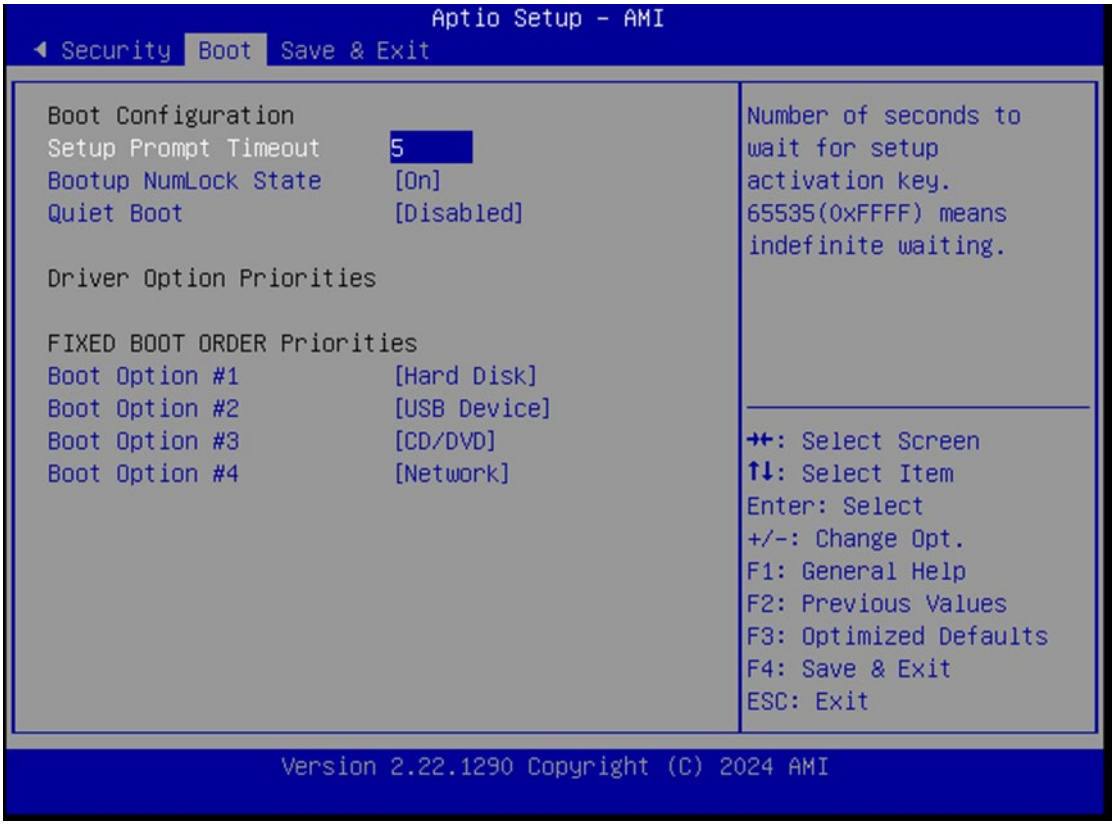
Key Management



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.

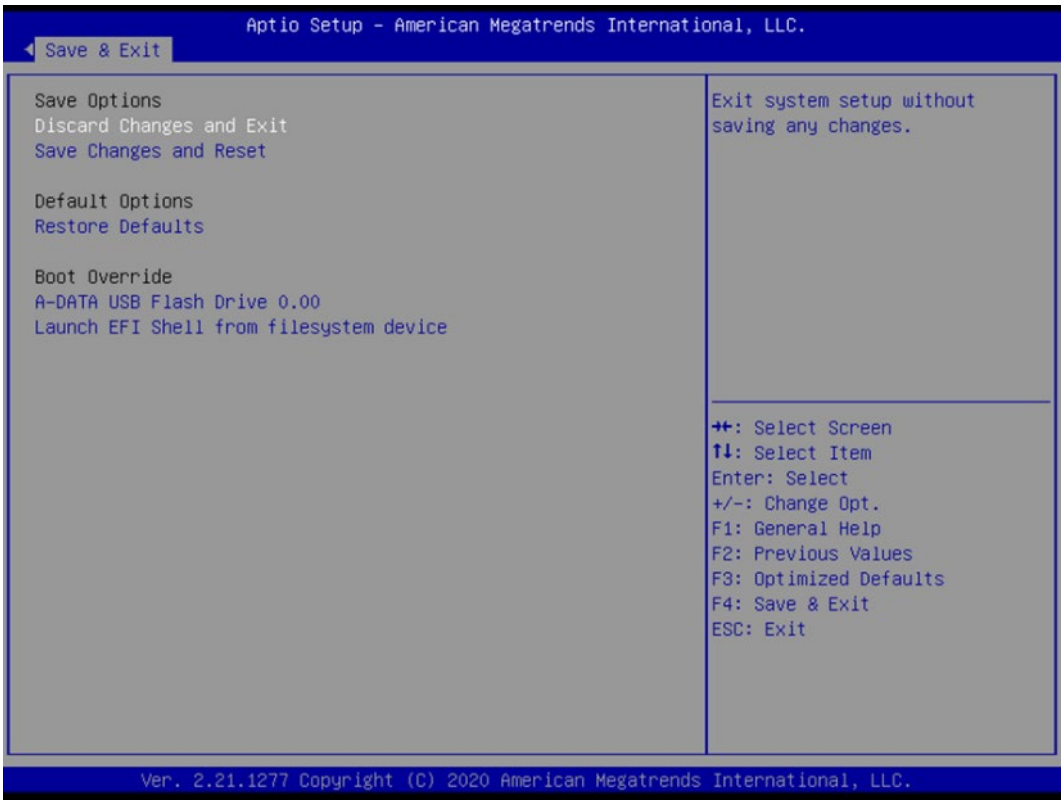


Feature	Options	Description
Setup Prompt Timeout	5	The Number of seconds to wait for setup activation key. 65535 means indefinite waiting.
BootupNumLock State	On Off	Select the keyboard NumLock state.
Quiet Boot	Disabled Enabled	Enables or disables Quiet Boot option.

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

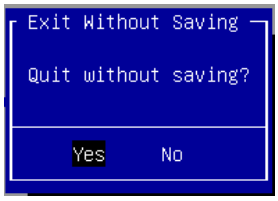
Save & Exit Menu

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.



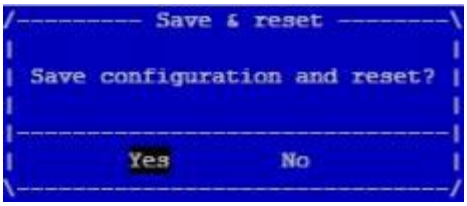
■ Discard Changes and Exit

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.



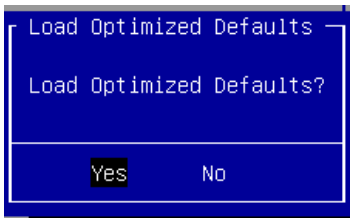
■ Save Changes and Reset

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

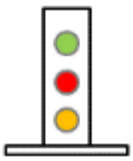
Restore default values for all setup options. Select "**Yes"** to load Optimized defaults.



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

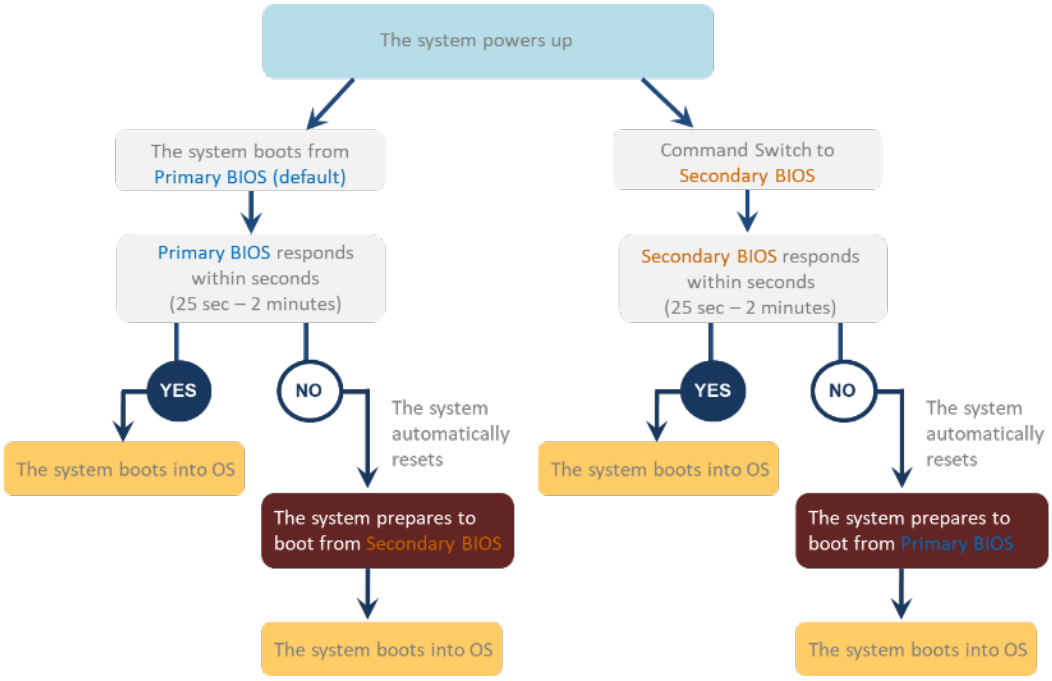
LED	COLOR ON LCM	COLOR ON BOARD	LED ACTION	DESCRIPTION
POWER	**Green**	**Green**	Steady	When system power on
	Off	Off	N/A	No power on
STATUS	**Green**	**Green**	Steady	control by GPIO
	Amber	**Red**	Steady	control by GPIO
	Off	Off	N/A	control by GPIO (Default) or No power on
HDD	**Amber**	**Amber**	Blinking	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: 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
	09: Cache RMA Problem	15: PS2	21: Shut Down
03: CMOS Data Lost	10: Memory Socket Bad	16: LAN	22: Panel Fail
04: FDC Fail	11: Hang Up Software	17: COM Port	23: CRT Fail
05: HDC Fail	12: Out Look Damage	18: Watchdog Timer	24: Others (Pls specify)
06: Bad Slot			

Request Party

Authorized Signature / Date

Confirmed By Supplier

Authorized Signature / Date