Lanner

Network Appliance Platforms

Hardware Platforms for Network Computing

NCA-5540
User Manual

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.

Icon Description

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.

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Federal Communication Commission Interference Statement

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

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

FCC Caution

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

Note

1. An unshielded-type power cord is required in order to meet FCC emission limits and also to prevent interference to the nearby radio and television reception. It is essential that only the supplied power cord be used.

2. Use only shielded cables to connect I/O devices to this equipment.

3. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Important

1. Operations in the 5.15-5.25GHz band are restricted to indoor usage only.

2. This device meets all the other requirements specified in Part 15E, Section 15.407 of the FCC Rules.

Safety Guidelines

Follow these guidelines to ensure general safety:

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

Consignes de sécurité

Suivez ces consignes pour assurer la sécurité générale :

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

Lithium Battery Caution

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

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.

Operating Safety

► Electrical equipment generates heat. Ambient air temperature may not be adequate to cool equipment to acceptable operating temperatures without adequate circulation. Be sure that the room in which you choose to operate your system has adequate air circulation.
► Ensure that the chassis cover is secure. The chassis design allows cooling air to circulate effectively. An open chassis permits air leaks, which may interrupt and redirect the flow of cooling air from internal components.
► Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. ESD damage occurs when

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electronic components are improperly handled and can result in complete or intermittent failures. Be sure to follow ESD-prevention procedures when removing and replacing components to avoid these problems.

► Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. If no wrist strap is available, ground yourself by touching the metal part of the chassis.

► Periodically check the resistance value of the antistatic strap, which should be between 1 and 10 megohms (Mohms).

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).

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).

► Suitable for installation in Information Technology Rooms in accordance with Article 645 of the National Electrical Code and NFPA 75.

► The machine can only be used in a restricted access location and must be installed by a skilled person.

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 (green-and-yellow) 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.
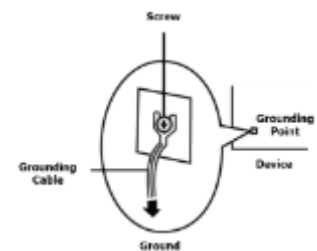
Procédure de mise à la terre pour source d'alimentation CC

- ► 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.
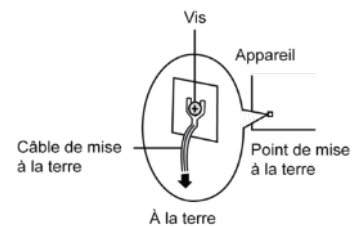
CAUTION: TO DISCONNECT POWER, REMOVE ALL POWER CORDS FROM UNIT.
注意：要断开电源，请将所有电源线从本机上拔下。
WARNUNG: Wenn Sie das Gerät zwecks Wartungsarbeiten vom Netz trennen müssen, müssen Sie beide Netzteile abnehmen.
ATTENTION: DÉBRANCHER LES TOUT CORDONS D'ALIMENTATION POUR DÉCONNECTER L'UNITÉ DU SECTEUR.

Table of Contents

CHAPTER 1: PRODUCT OVERVIEW

The NCA-5540, a high-performance 1U rackmount network security appliance, is powered by the 5th Gen Intel® Xeon® Scalable Processors (Emerald Rapids) and it delivers optimized network traffic management and enhanced virtualized network security capabilities.

Package Content

Your package contains the following items:

- ▶ 1x NCA-5540 Network Security Platform
- ▶ 1x CPU Heatsink
- ▶ 2x Processor Carrier (1x E1A for XCC CPU Series, 1x E1B for MCC CPU Series)
- ▶ 2x Power Cable
- ▶ 1x RJ45 Console Cable, 1x RJ45 LAN Cable
- ▶ 2x SATA Cable, 2x SATA Power Cable
- ▶ 1x Short Ear Rackmount Kit with Screws

Ordering Information

SKU No.	Main Features
NCA-5540A	5th Gen Intel® Xeon® Scalable Processors, 300W CPU TDP, 1U CPU Sink, 5x System Fans, 4x NCS2 or 2x N2S NIC Modules, Support For HHHL PCIe Card (75W)
NCA-5540B	5th Gen Intel® Xeon® Scalable Processors, 225W CPU TDP, 1U CPU Sink, 5x System Fans, 4x NCS2 or 2x N2S NIC Modules, Support For HHHL PCIe Card (75W)
NCA-5540C	5th Gen Intel® Xeon® Scalable Processors, 300W CPU TDP, 1U CPU Sink, 5x System Fans, 4x NCS2 or 2x N2S NIC Modules, Support For HHHL PCIe Card (75W), IPMI Support
NCA-5540D	5th Gen Intel® Xeon® Scalable Processors, 225W CPU TDP, 1U CPU Sink, 5x System Fans, 4x NCS2 or 2x N2S NIC Modules, Support For HHHL PCIe Card (75W), IPMI Support

Optional Accessories

Model No.	Description
IAC-TPM04A	TPM Module (SPI)
NCS2-LCM6210A	LCM Module for NCS2 (By Project)
IAC-AST2600	IPMI Card
Riser Kit for NCA-5540	Riser Card Kit for rear slot
Slide Rail Kit	Slide Kit for 1U chassis
Power Supply	AC CRPS Power Supply Unit Kit
Power Supply	DC CRPS Power Supply Unit Kit

System Specifications

Form Factor		1U 19" Rackmount
Platform	Processor Options	5th Gen Intel® Xeon® Scalable Processors Family
	CPU TDP	SKU A/C: 300W; SKU B/D: 225W
	CPU Socket	1x LGA4677
	Chipset	Intel® Emmitsburg PCH
	Security Acceleration	Intel® QuickAssist Technology
BIOS		AMI SPI Flash BIOS
System Memory	Technology	DDR5 4800MHz RDIMM
	Max. Capacity	768GB
	Socket	12x 288-pin DIMM Sockets
Networking	Ethernet Ports	2x GbE RJ45 w/LED MGT by Intel® i226-LM (Support UEFI PXE; Default Disabled)
	NIC Module Slot	4x NCS2 NIC Module Slots OR 2x N2S NIC Modules Slots
LOM	I/O Interface	SKU A/B: N/A; SKU C/D: Yes, 1x LOM Port (via BMC Chip)
	OPMA slot	SKU A/B: N/A; SKU C/D: Yes (Support AST2600 IPMI Card)
I/O Interface	Reset Button	1x Reset Button (Default software reset control by GPIO)
	LED Indicators	Power/Status/Storage LED Indicators, refer to **Appendix A**
	Power Button	1x ATX Power Switch
	Console Port	1x RJ45 Console Port
	USB Port	2x USB 3.0 Ports
	LCD Module	N/A (Default); LCM Module (Optional)
	Display Port	Yes (VGA via IAC-AST2600 IPMI Card) (SKU C/D Only)
	Power Input	AC Power Inlet on PSU
Storage	HDD/SSD Support	2x 2.5" HDD/SSD
	Onboard Slots	1x M.2 2280 B+M-Key (SATA); 2x M.2 NvME (PCIe) 2280 M-Key
Expansion	PCIe	1x PCIE*8 HH/HL (Optional)
Miscellaneous	Watchdog	Yes
	Internal RTC w/ Li Battery	Yes
	TPM	N/A (Default); Yes (Optional)
Cooling	Processor	Passive CPU Heatsink
	System	5x Smart Fans
Environmental Parameters	Temperature	0~40ºC Operating; -40~70ºC Non-Operating
	Humidity (RH)	5~90% Operating; 5~95% Non-Operating
System Dimensions	Size (WxDxH)	438 x 650 x 44 mm
	Weight	10.5kg
Package Dimensions	Size (WxDxH)	739 x 582 x 215mm
	Weight	18.5kg
Power	Type/Watts	1300W CRPS AC PSU
Approvals and Compliance		RoHS, CE/FCC Class A, UL, UKCA

Front Panel

No.		Description
F1	Reset button	1x Reset Button
F2	LED Indicators	System Power System Status HDD/SSD Activity
F3	USB Ports	2x USB 3.0
F4	LAN Port	2x RJ45 port
F5	LOM Port	1x LOM Port (via BMC Card)
F6	Console Port	1x Console Port
F7	NIC Module Slot	4x NCS2 Slim Type Module OR 2x N2S NIC Module (Optional)

Rear Panel
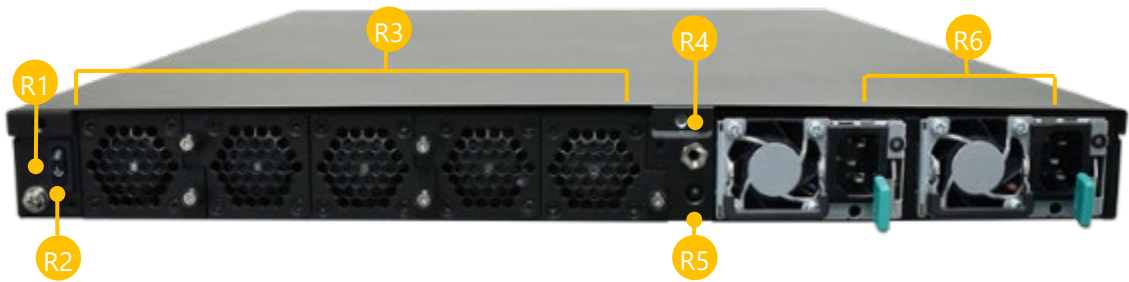
No.	Description	
R1	Ground Hole	1x Ground screw hole
R2	Power Switch	1x Power Switch I/O Button
R3	Fans	5x Smart Fans
R4	ESD Jack	1x ESD screw hole
R5	Alarm Reset	1x Alarm Reset Button
R6	Power Supply	2x 1300W AC 1+1 Redundant CRPS Power Supply (Default); 2x 1600W DC 1+1 Redundant CRPS Power Supply (Optional)

Motherboard Information

Block Diagram

The block diagram indicates how data flows among components on the motherboard.
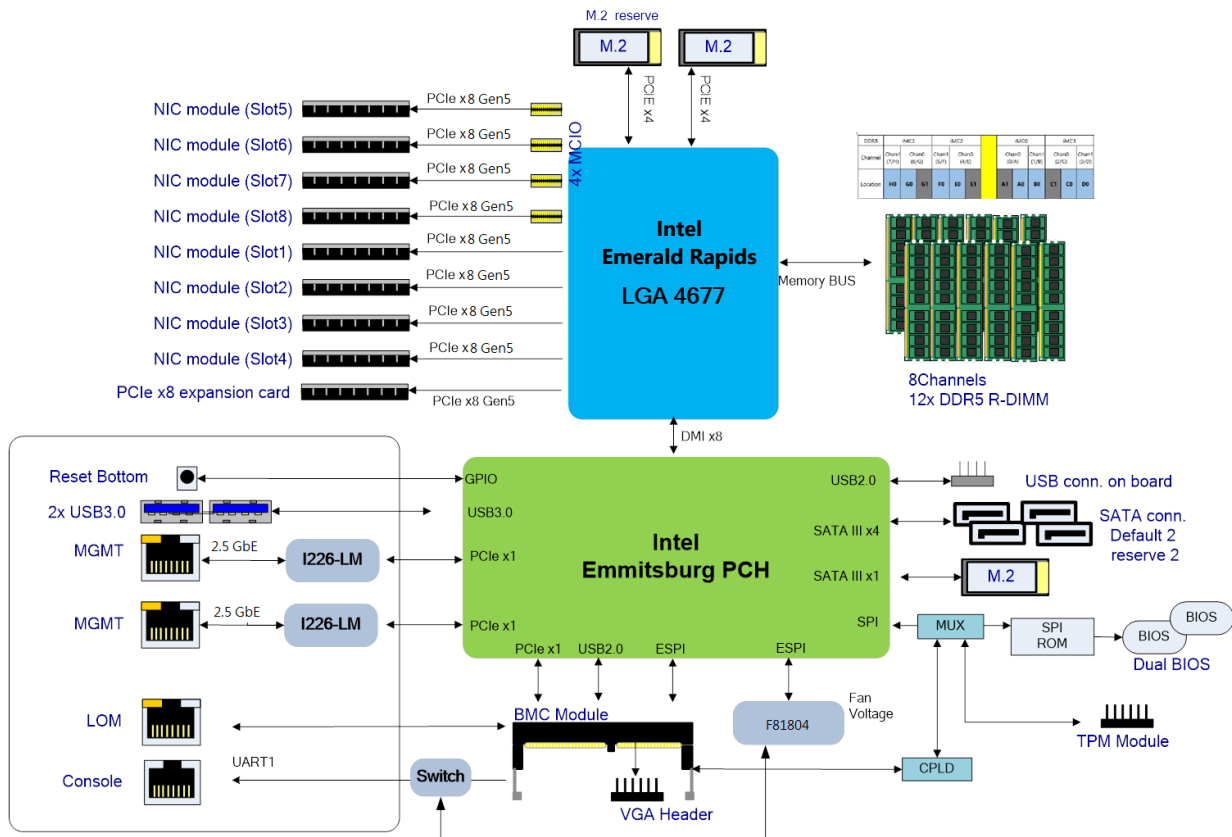
Internal Jumpers and Connectors

The pin headers on the motherboard are often associated with important functions. With the shunt (Jumper) pushed down on the designated pins (the pin numbers are printed on the circuit board, surrounding the pin header), certain feature can be enabled or disabled. While changing the jumpers, make sure your system is turned off.

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JSATA2 JSATA4 JSATA3 JSATA1

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JMERCVR1
JCLRPAS1

JSPI_TPM1
JDUAL1

JNGFF3

ATX1

JLCM1

JSATAPW2 JCOM1
JSATAPW1

C

OPMA1

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JBMC_SGPIO1

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JP12V_DIMM1

J12

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D

JPCIESL5

JIPMB1

JRST1

SW2

SW1

JRAID_CON1

MCIO2

JATX2

MCIO1

JATX1

MCIO4

JATX4

MCIO3

JATX3

E

BAT1

JATX5

JATX6

CP2D C04C (02)

JPCIESL1

JPCIESL2

JPCIESL4

JBMC_UART1

JPCIESL3

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JESPI1: ESPI CS1# Flow (ESPI Mode)

Pin No.	Description
1-2	CS1# To BMC (Default)
2-3	CS1# To ESPI CONN

JMERCVR1: ME FW Update

Pin No.	Description
1-2	Normal (Default)
2-3	ME Force Update

JCLRPAS1: Password Clear

Pin No.	Description
1-2	Normal (Default)
2-3	Password Clear

JDUAL1: Select CS for Flash Fixture

Pin No.	Description
1-2, 3-4	Flash 1st BIOS (Default)
1-3, 2-4	Flash 2nd BIOS

JFOR_PWRON1: Force PWRON Options

Pin No.	Description
1-2	Disable (Default)
2	Enable

J13: BIOS Boot Up Select

Pin No.	Description
1-2	Force Boot Up from BIOS1 (Default)
2-3	Force Boot Up from BIOS2

J12: Disable Dual BIOS Function

Pin No.	Description
1-2	Enable Dual BIOS (Default)
2-3	Disable Dual BIOS

JP12V_DIMM1: P12V_DIMM Status

Pin No.	Description
1-2	P12V_DIMM Off in S5 (Default)
2-3	P12V_DIMM on in S5

JRST1: Select Front Panel Reset

Pin No.	Description
1-2	Hardware Reset
2-3	Software Reset (Default)

JBMC_INIT1

Pin No.	Description
1-2	N/A
2-3	Normal Boot Flow (Default)

JCMOS1: CMOS Clear

Pin No.	Description
1-2	Normal (Default)
2-3	Clear CMOS

JBIOSRCVR1: BIOS Recovery Mode

Pin No.	Description
1-2	Normal Mode (Default)
2-3	Recover BIOS

JGP1: GPIO1 Conn

Pin No.	Description	Pin No.	Description
1	GPO_B_1	2	GPI_B_1
3	GPO_B_2	4	GPI_B_2
5	GPO_B_3	6	GPI_B_3
7	GPO_B_4	8	GPI_B_4
9	GND	10	GND
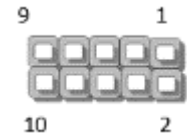
JATX11

Pin No.	Description	Pin No.	Description
1	GND	2	+P12V
3	GND	4	+P12V
5	GND	6	+P12V
7	GND	8	+P12V
9	GND	10	+P12V

JATX7

Pin No.	Description	Pin No.	Description
1	GND	7	+P12VS_PCIe_A
2	GND	8	+P12VS_PCIe_A
3	GND	9	+P12VS_PCIe_A
4	GND	10	+P12VS_PCIe_A
5	GND	11	+P12VS_PCIe_A
6	GND	12	+P3V3

ATX1

Pin No.	Description	Pin No.	Description
1	GND	2	+P12V_STBY_PSU
3	GND	4	+P5V
5	GND	6	+P12V
7	GND	8	+P12V
9	GND	10	+P12V
11	GND	12	+P12V
13	GND	14	+P12V
15	GND	16	+P12V
17	GND	18	+P12V
19	GND	20	+P12V
21	GND	22	+P3V3
23	GND	24	+P3V3

JCOM1

Pin No.	Description	Pin No.	Description
1	COM2_DCD#	2	COM2_DSR#
3	COM2_RX	4	COM2_RTS
5	COM2_TX	6	COM2_CTS#
7	COM2_DTR	8	COM2_RI#
9	GND	10	N/C

JSPI_TPM1

Pin No.	Description	Pin No.	Description
1	SPI_HD1#	2	SPI_CS1#
3	SPI_CS0#	4	+P3V3_SPI_PCH_AUX
5	SPI_MISO_TPM	6	HEADER_SPI_PCH_IO3
7	KEY	8	SPI_CLK_TPM
9	GND	10	SPI_MOSI_TPM
11	IRQ_TPM_SPI#_R	12	N/C
13	SPI_TPM_CS0#	14	RST_PLTRST_PLD_B_N

JLCM1

Pin No.	Description
1	LCM_TX
2	LCM_RX
3	GND
4	+P5V

JUSB1

Pin No.	Description	Pin No.	Description
1	+P5V_USB2	2	+P5V_USB2
3	USB20_L_N0	4	USB20_L_N1
5	USB20_L_P0	6	USB20_L_P1
7	GND	8	GND
9	GND	10	GND

JESPI80PORT1

Pin No.	Description	Pin No.	Description
1	+P5V_USB2	2	+P5V_USB2
3	USB20_L_N0	4	USB20_L_N1
5	USB20_L_P0	6	USB20_L_P1
7	GND	8	GND
9	GND	10	GND

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JPMB1

Pin No.	Description
1	+P3V3_AUX_PSU
2	N/C
3	FM_PS_EN_PSU_N
4	GND
5	PWRGD_PS_PWROK
6	PMBUS_CLK_PSU_R
7	PMBUS_DAT_PSU_R
8	PMBUS_ALERT#_R

JVGA1

Pin No.	Description	Pin No.	Description
1	DAC_RO	2	GND
3	DAC_GO	4	GND
5	DAC_BO	6	GND
7	HSYNC_O	8	N/C
9	VSYNC_O	10	GND
11	DDC_DATA	12	DDC_CLK

JPLD1

Pin No.	Description
1	+P3V3_AUX
2	JTAG_PLD_TDO
3	JTAG_PLD_TDI
4	JTAG_PLD_TMS
5	GND
6	JTAG_PLD_TCK

JBMC_SGPIO1

Pin No.	Description
1	SGPIO_DEBUG_PLD_CLK
2	SGPIO_DEBUG_PLD_DOUT
3	SGPIO_DEBUG_PLD_DIN
4	SGPIO_DEBUG_PLD_LD_N
5	GND

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JIPMB1

Pin No.	Description
1	SMB_IPMB_STBY_CMOS_ISO_SDA
2	GND
3	SMB_IPMB_STBY_CMOS_ISO_SCL
4	+P5V_AUX

JATX1, JATX2, JATX3, JATX4, JATX5, JATX6

Pin No.	Description	Pin No.	Description
1	GND	2	GND
3	+P3V3	4	+P12V

JBMC_UART1

Pin No.	Description
1	+P3V3_AUX
2	BMC_UART5_RX
3	GND
4	BMC_UART5_TX

CHAPTER 2: 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 handling the installation steps.

Opening the Chassis

1. Loosen the two (2) thumb screws on the rear panel.

2. Gently slide the top cover backward a bit.

3. Lift the cover up to remove it.

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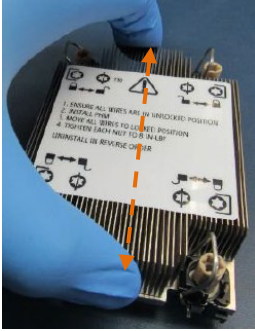
Tool	Description	
T-30 Torx Bit©	Set to 0.904 N.m. (or 8 in/lbf ± 10%) for tightening the nuts which fasten the PHM on the bolster plate.	
ESD Protection (ESD gloves, ESD-safe work surface, ESD-safe shoes, grounded wrist strap etc.)	During the entire assembly process, at least wear a pair of ESD gloves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

Note: The images of tools shown in this document are merely for reference; the actual tools you use might differ.

Parts Explanation:

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

Heatsink (1U)	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		
Processor Tray		

Processor Carrier Assembly

1. 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.

2. 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.
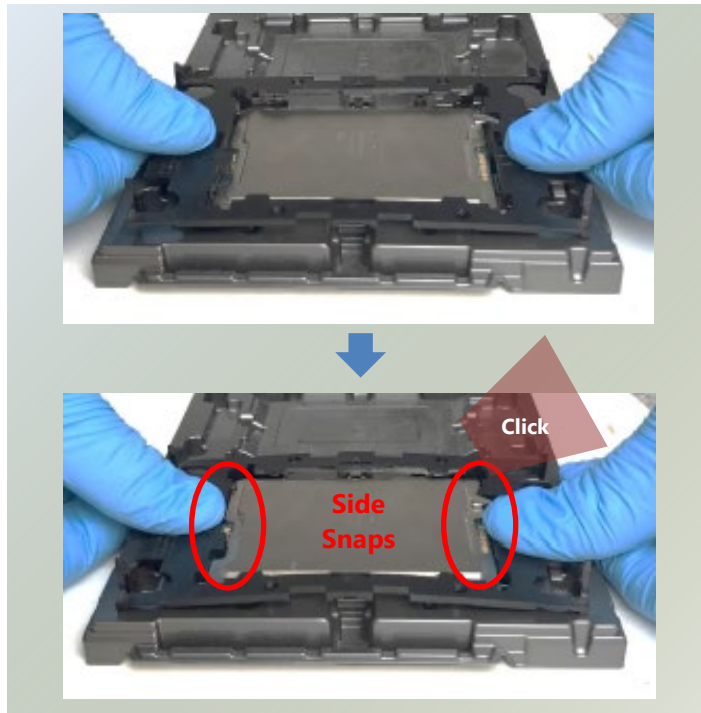
3. Check the two side snap latches on the carrier and verify that they have latched to the package. If not then press down on top of the side snap latches until they snap into place.
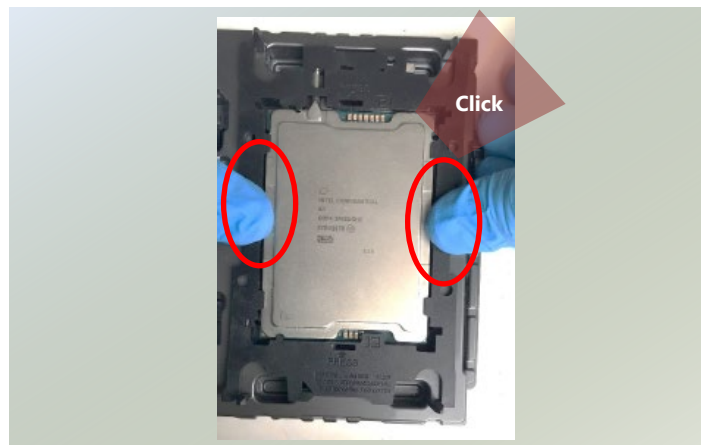
Processor Carrier Assembly to Heatsink

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

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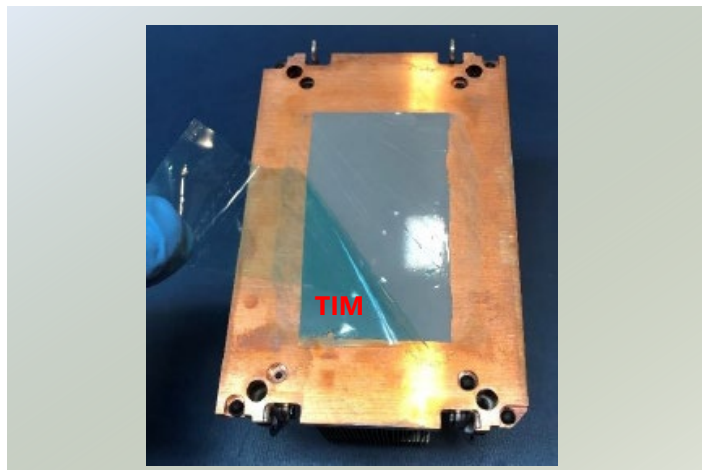
2. Turn the heatsink over and set the Anti-Tilt wires to the locked position (outward position).
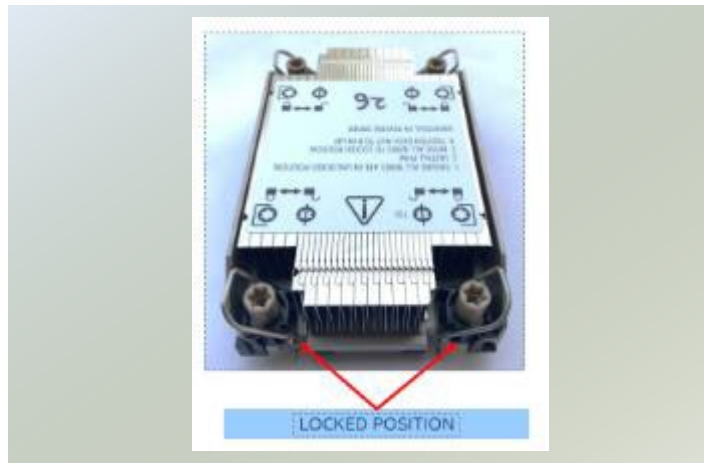
3. Align Pin 1 indicator of Processor carrier and corner cut out of Heatsink. If there are two corners cut out, either orientation is fine.

Corner cut out w/ Pin 1
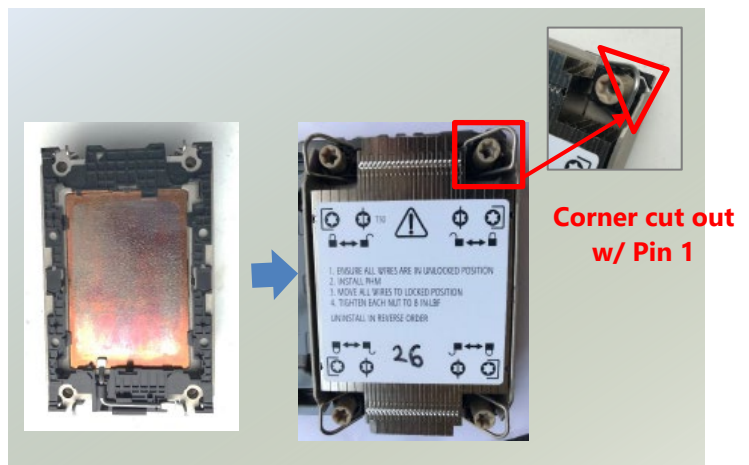
4. Place the heatsink ensure latching features on Processor carrier and heatsink are aligned during assembly.

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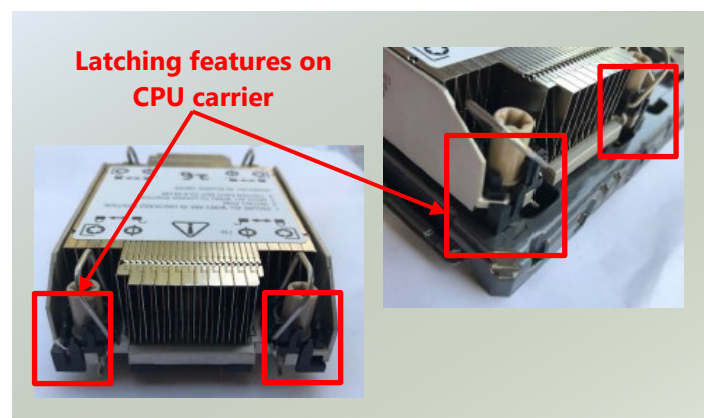
5. Press heatsink down firmly to engage carrier latching features to the heatsink at four corners.

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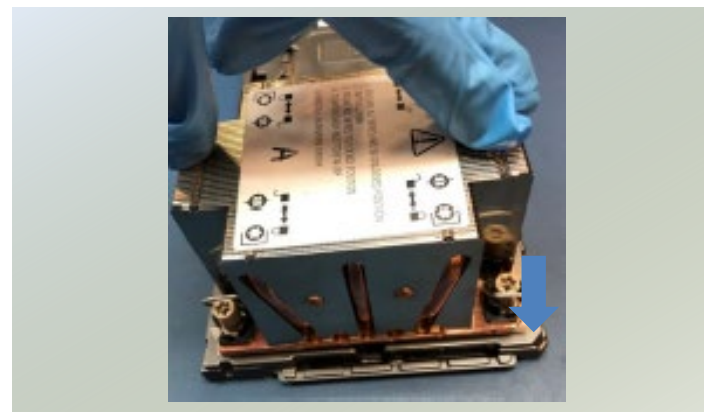
6. If carrier latching features do not latch the heatsink properly, engage each latching features by pressing the heatsink at the unlatched corner. You may hear a clicking sound when latched.
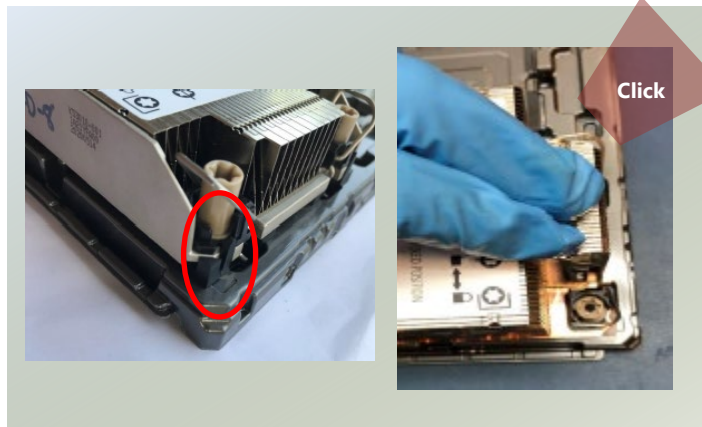
System Assembly PHM to Motherboard

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.
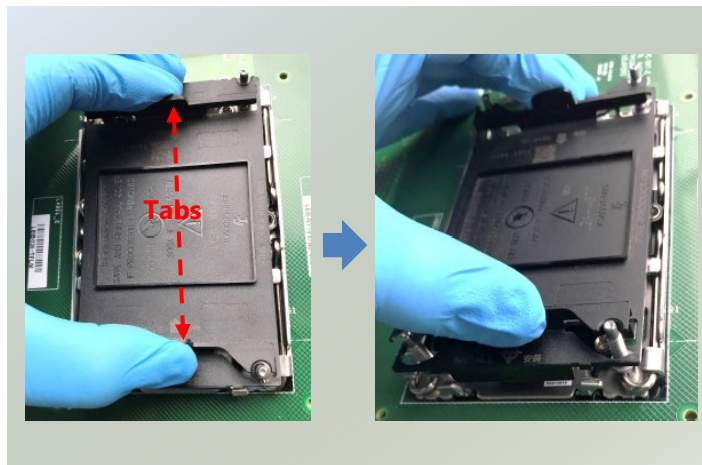
2. Set each anti-tilt wire to inward or unlocked position on the heatsink.
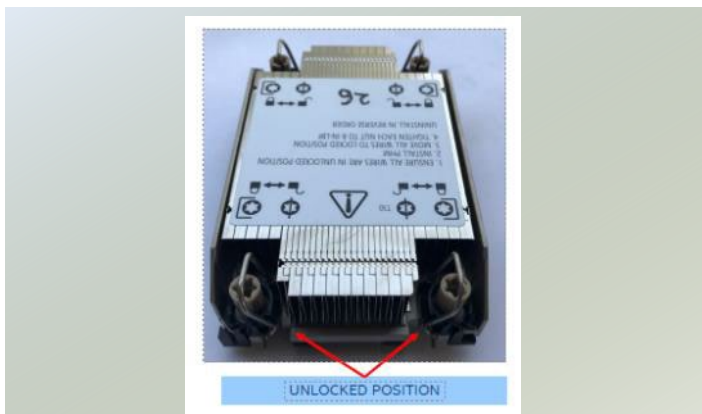
3. Lift up the PHM. Turn the PHM over to locate the PIN1 corner on processor carrier and processor.

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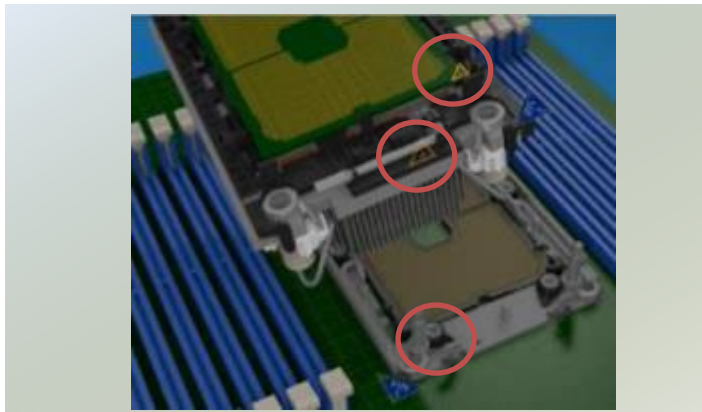
4. Then turn the PHM right side up. Line up the PIN1 corner of the PHM to the bolster plate PIN1 corner. Lower the PHM vertically down over the bolster plate studs.
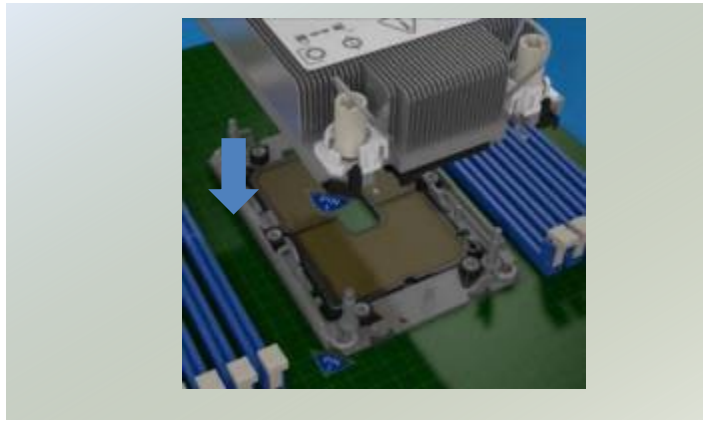
5. Set all four Anti-Tilt wires into the locked position (outward position.)

Locked Position
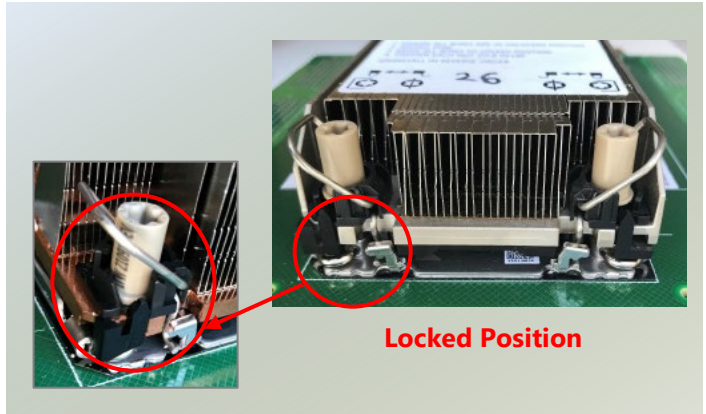
6. Next is to tighten the nuts on the heatsink using a diagonal pattern tightening sequence. Diagonal sequence is regardless of starting point. Primary step is Second nut driven is in diagonally opposite corner to the First nut.
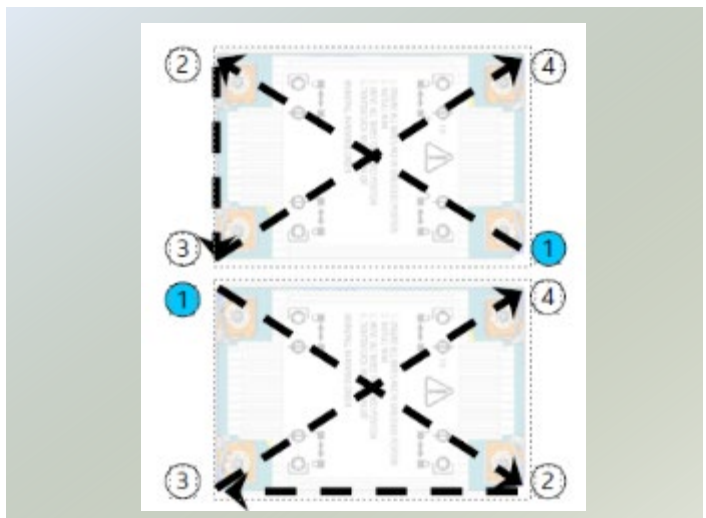
7. Tighten all nuts on heatsink using a torque driver with a T30 bit to 8 in-lbf ± 10%.

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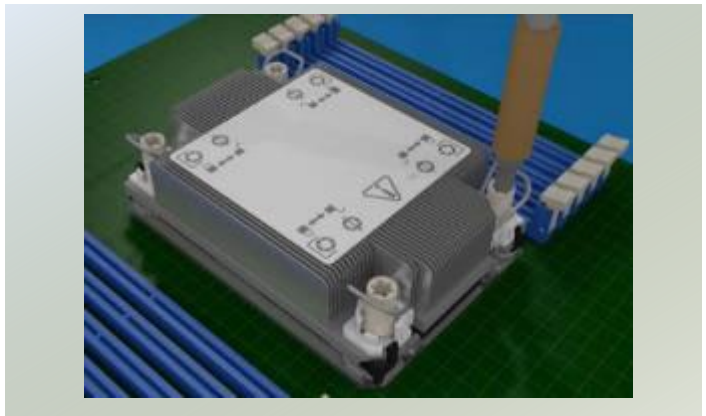
Installing the System Memory

The motherboard supports DDR5 registered DIMM memory for heavy-duty operations. Please follow the steps below to install the DIMM memory modules. The CPU have 12 DIMM sockets (6 on each sides)
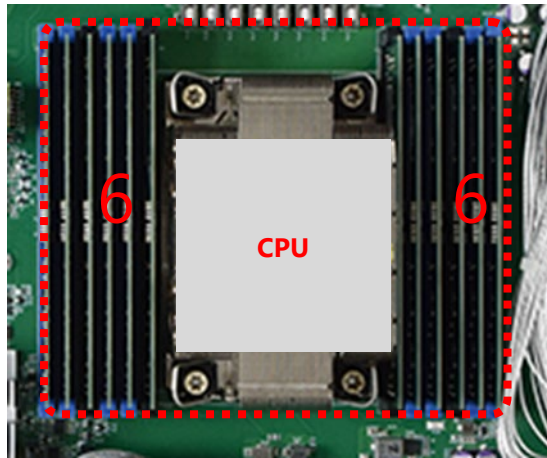
- Supported Capacities: 8/16/32/64 GB
- Maximum RAM: **768GB** (64GB per slot)

DIMM Population Guidelines

Please do follow the memory module installation instructions to install the DIMM, and make sure the DIMM population guidelines are met:

- Each CPU requires at least 1 memory module to boot and run from.
- If you do not plan to fill up all the sockets with 12 memory modules, always start with the blue ones for optimal performance.
- Try to split the DIMMs evenly across the CPUs.
- Please use memory modules of the same capacity, speed and from the same manufacturer to avoid compatibility issues.
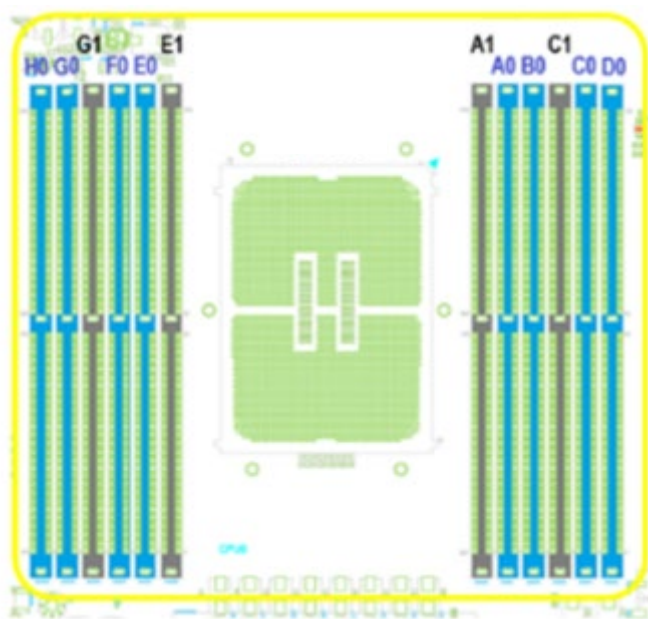
Sapphire Rapids DDR5 Only DIMM Configurations Diagram

DDR5	iMC3			iMC2			CPU	iMC0			iMC1			SPR							
Channel	Chan1 (7/H)	Chan0 (6/G)		Chan1 (5/F)	Chan0 (4/E)			Chan0 (0/A)		Chan1 (1/B)	Chan0 (2/C)		Chan1 (3/D)	SNC2	All2All	SNC4 (XCC only)	Hemi Note9	Quad (XCC only) Note9	Mirror	SGX Note#6	Interleaving Note8
Location	H0	G0	G1	F0	E0	E1		A1	A0	B0	C1	C0	D0								
1 DIMM									DDR5						Y						
				DDR5											Y						
										DDR5					Y						
			DDR5												Y						
2 DIMM		DDR5							DDR5					Y			Y				2
					DDR5							DDR5		Y			Y				2
4 DIMM		DDR5			DDR5				DDR5			DDR5		Y		Y	Y	Y			4
6 DIMM		DDR5		DDR5	DDR5				DDR5			DDR5	DDR5	Y	Y						6
	DDR5	DDR5			DDR5				DDR5	DDR5		DDR5		Y	Y						6
	DDR5			DDR5	DDR5					DDR5		DDR5	DDR5	Y	Y						6
	DDR5	DDR5		DDR5					DDR5	DDR5			DDR5	Y	Y						6
8 DIMM	DDR5	DDR5		DDR5	DDR5				DDR5	DDR5		DDR5	DDR5	Y		Y	Y	Y	Y	Y	8
12 DIMM	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5		DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	Y		Y	Y	Y			8+4

Memory Module Installation Instructions

Please follow the steps below to install the DIMM memory modules.

1. Power off the system.
2. Pull open the DIMM slot latches.
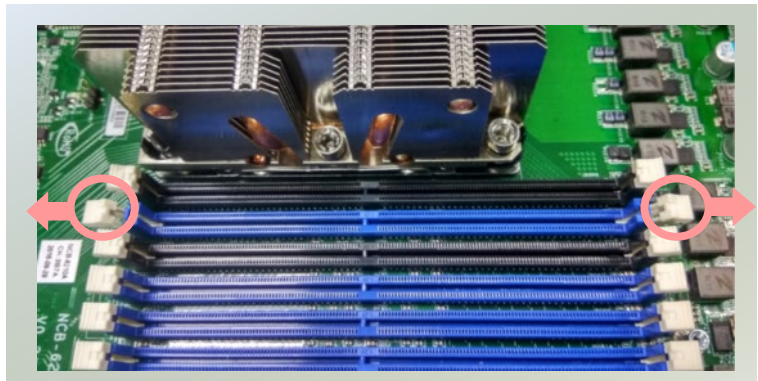
3. Align the notch of the DIMM module with the socket key in the slot.
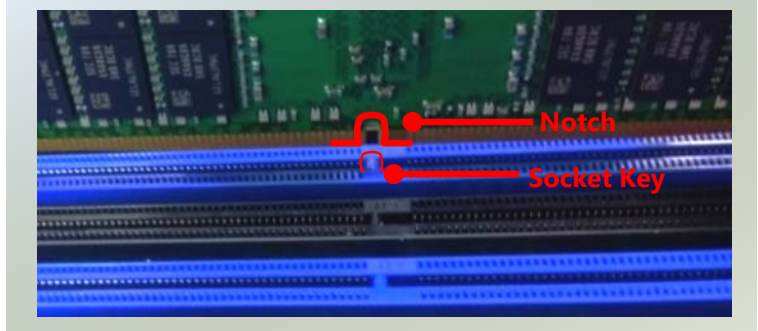
4. Insert the module into the slot until it is firmly seated.
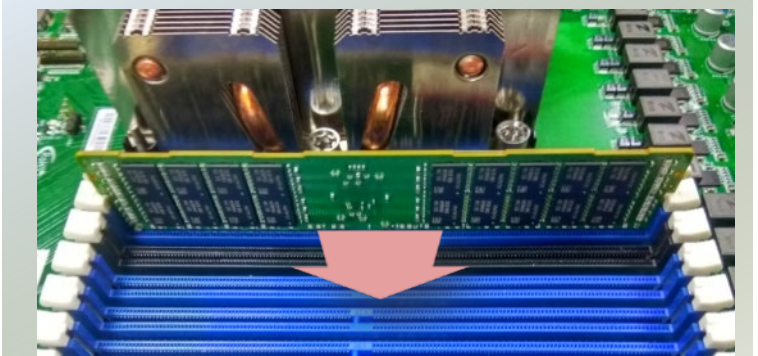
Installing TPM Module (Optional)

The motherboard provides one TPM slot. Follow the procedures below for installing a TPM module.

1. Power off the system and open the chassis cover.
2. Locate the TPM slot on the motherboard.
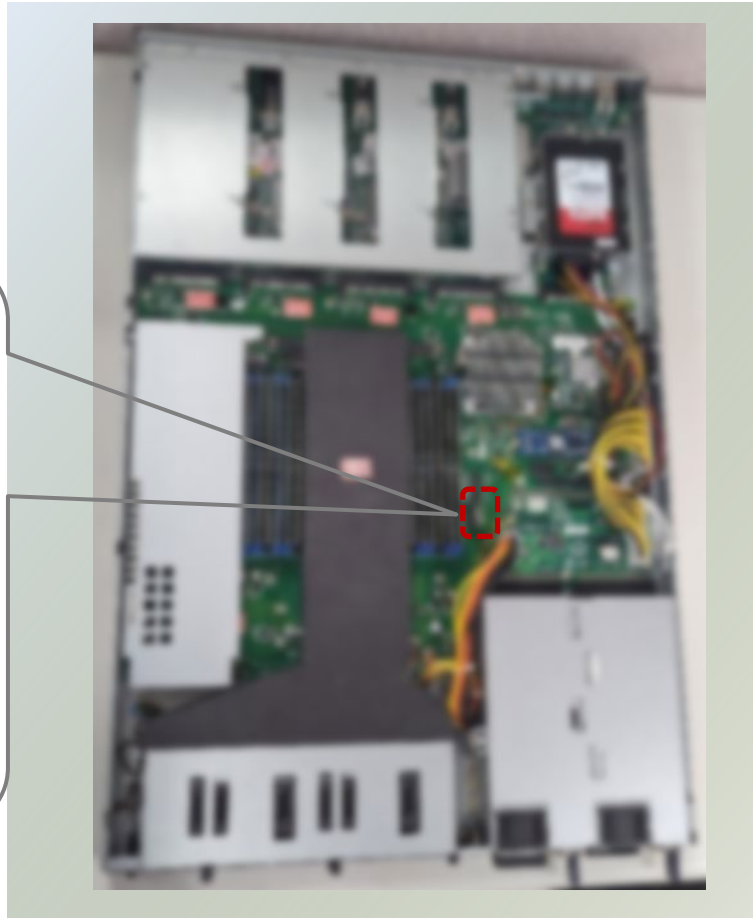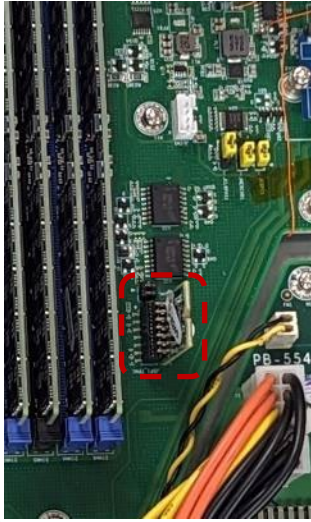
3. Insert the TPM module into the pins until it is fully seated.

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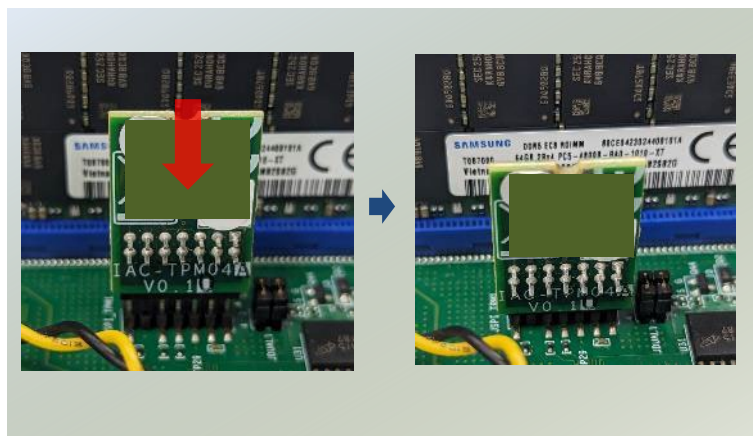
Installing IPMI Module (Optional)

The system provides one IPMI slot for remote monitoring expansion. Follow the procedures below for installation.

1. Power off the system and open the chassis cover.
2. Locate the IPMI socket on the motherboard.
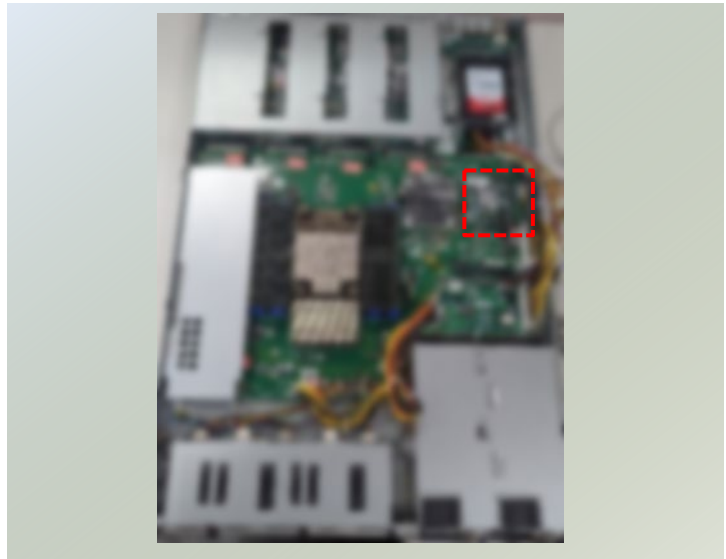
3. Align the notch of the IPMI card with the socket key in the slot.
4. Insert at 30 degrees into the socket until it is fully seated in the connector.
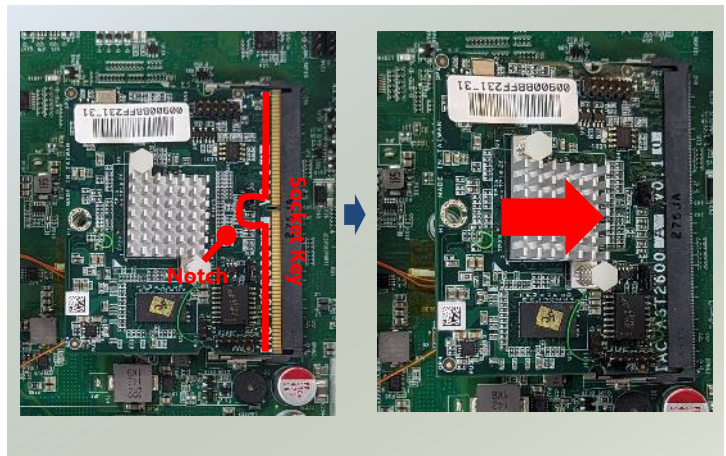
5. Push down on the IPMI card and secure it with one (1) screw.

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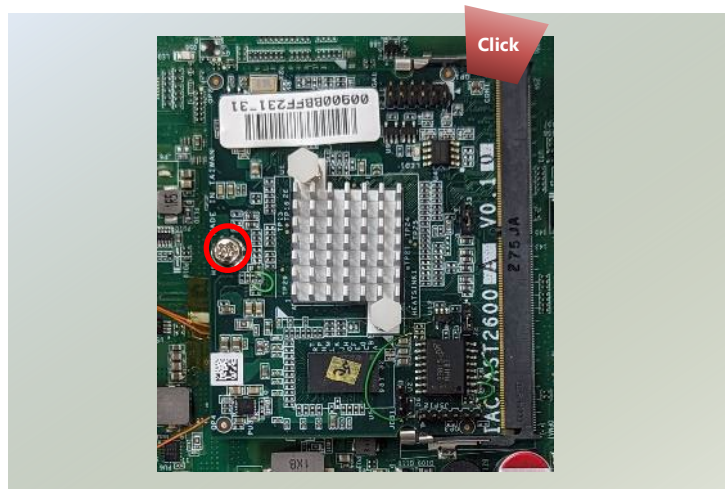
Installing the M.2 SATA Storage (Optional)

NCA-5540 comes with an additional M.2 storage card slot. Please follow the steps for installation.

1. Power off the system and open the chassis cover
2. Locate the M.2 slot on the motherboard.
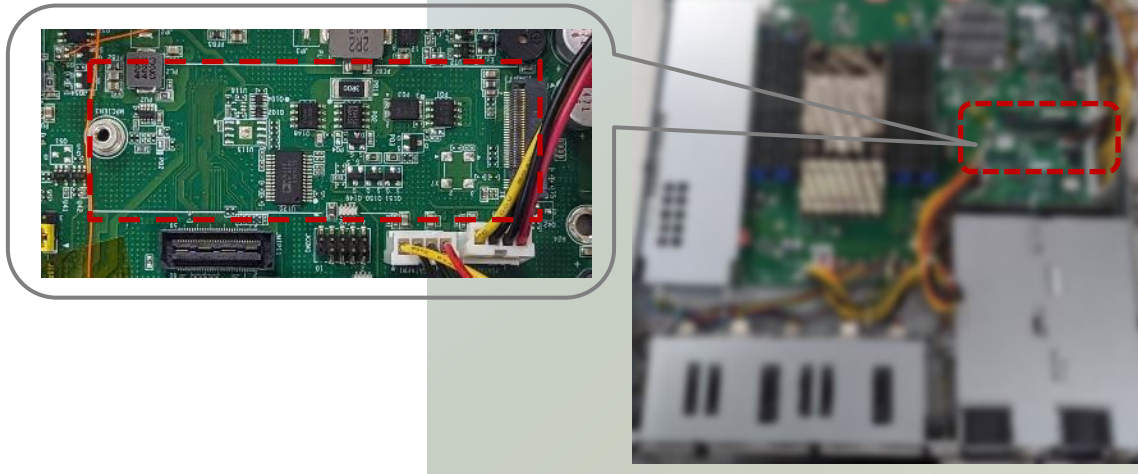
3. Align the notch of the M.2 memory card with the socket key in the pin slot.
4. Insert the M.2 memory card pins at 30 degrees into the socket until it is fully seated.
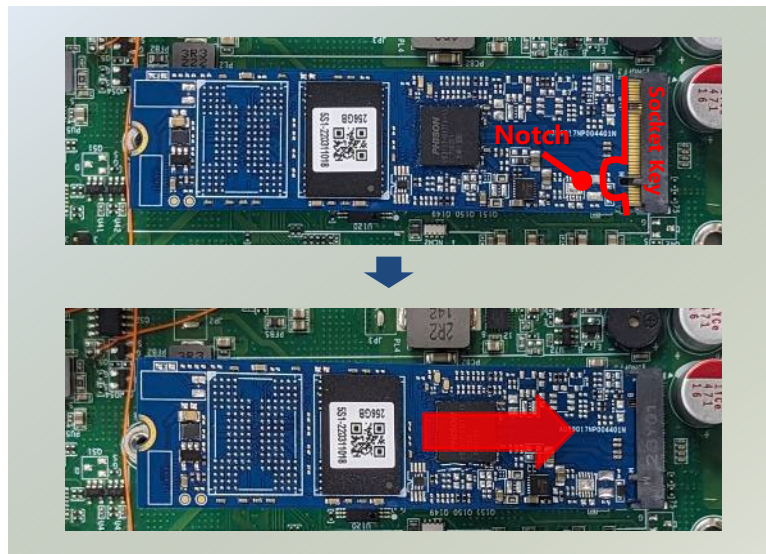
5. Push down on the module and secure it with a screw.

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Installing the M.2 NVMe Storage (Optional)

NCA-5540 comes with two additional M.2 NVMe storage card slot. Please follow the steps for installation.

1. Power off the system and open the chassis cover.

2. Locate and unscrew four (4) screws on the fan hood/shroud, and three (3) screws on the cover. Lift up and remove the fan hood/shroud and cover.
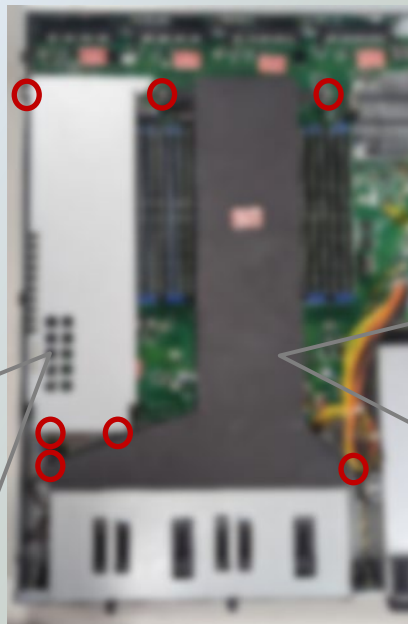
3. Locate the two M.2 slots on the motherboard.

4. Align the notch of the M.2 storage card with the socket key in the pin slot.

5. Insert the M.2 storage card pins at 30 degrees into the socket until it is fully seated.
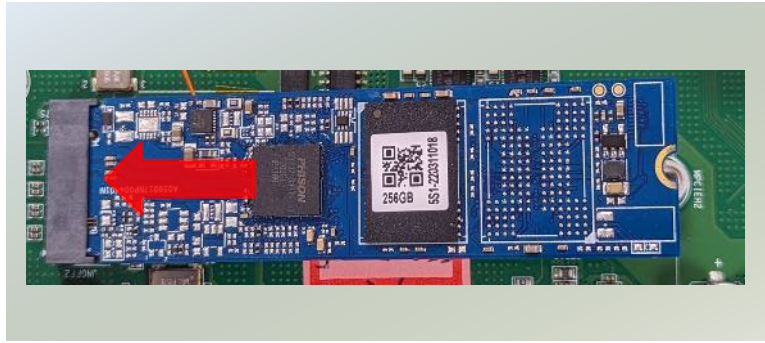
6. Push down on the module and secure it with a screw.

7. Repeat steps if installing a second storage module.
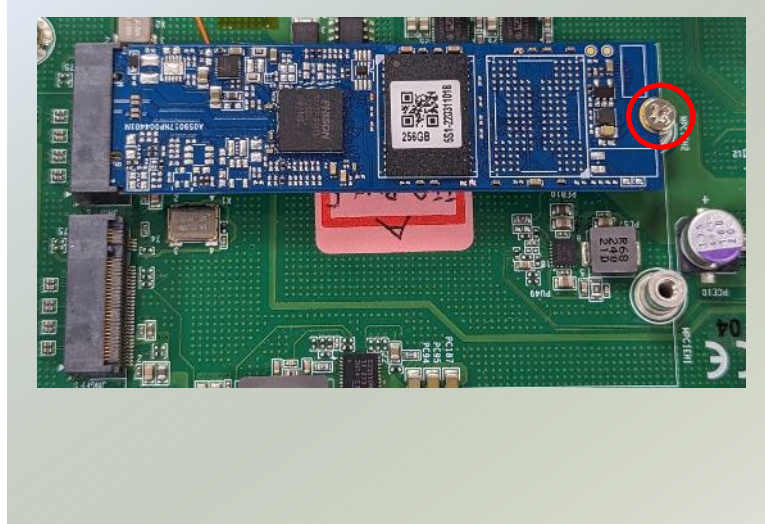
Installing the Disk Drive(s)

NCA-5540 is built with two 2.5" HDD/SSD slot drive bay. Please follow the steps for installation.

1. Power off the system and open the chassis cover.

2. Locate the 2.5" disk bay.

3. Loosen the three (3) screws that fixes the disk tray onto the motherboard. Gently pull out the disk tray.
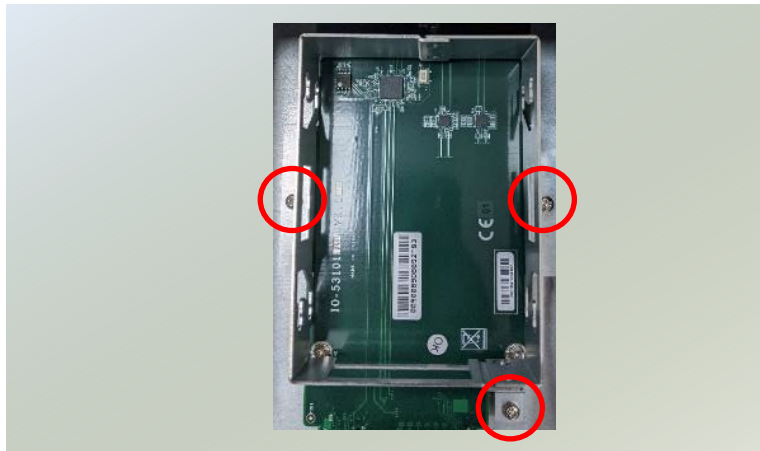
4. Mount the disk drive onto the empty tray. Make sure the disk drive's SATA contacts are facing towards the inside the system.

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5. Screw in the hard disk on both sides (two (2) screws on each side).
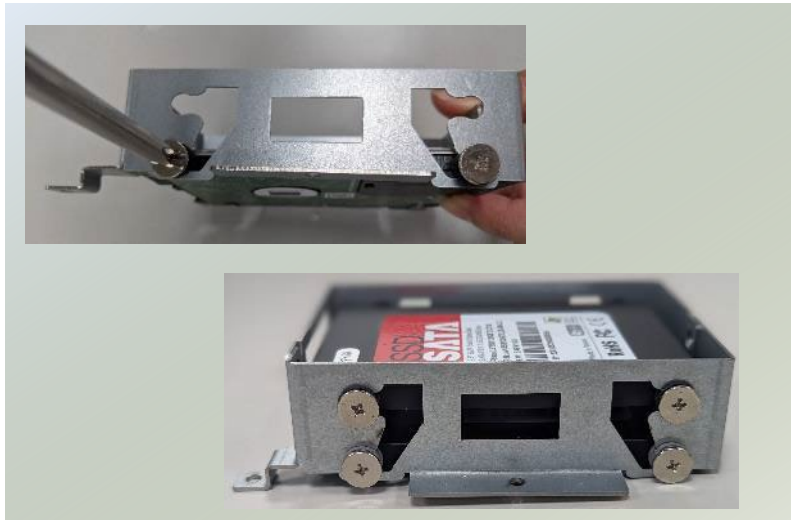
6. Install the tray back to the original position on the motherboard and secure with the three (3) screws.

7. Connect the SATA cable and SATA power cable to the hard disk.

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Installing the LCM Module (Optional)

NCA-5540 comes with module slots for LCM module expansion. Please follow the steps below for installation.

1. The LCM module package consists of:

▶ 1x LCM Panel

▶ 1x LCM connector cable

▶ 2x screws

LCM Module

Screws   **Connector Cable**

2. Power off the system and open the chassis cover.

3. On the front panel, select a module slot for LCM module placement.

4. Loosen the two lock-screws and remove the door.
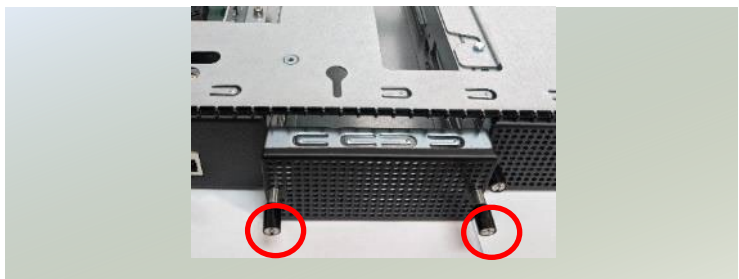
5. Locate the connector pin for LCM module cable insertion.
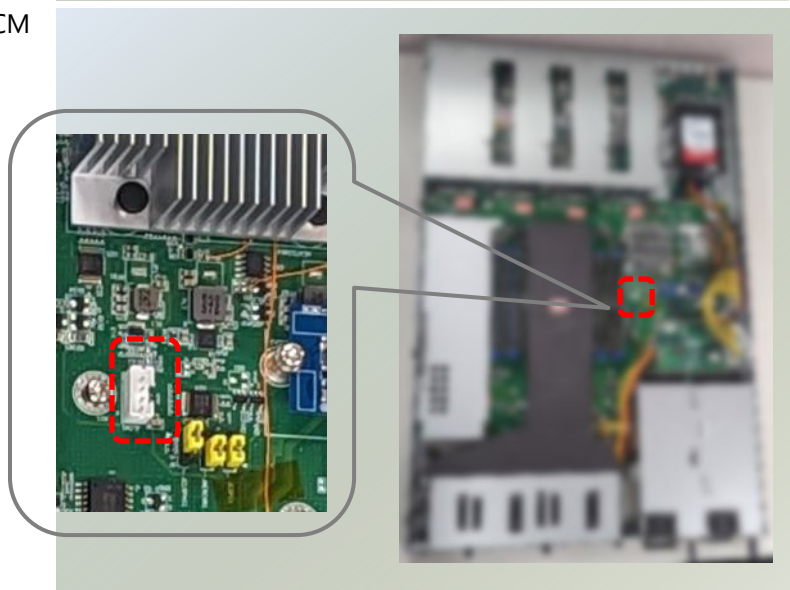
6. Install the LCM module into the module slot.

7. Insert the connector cable into the connector pin.

8. Secure the LCM module using the two (2) screws. Close the top cover of the system. The LCM module has been successfully installed

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Installing the NIC Modules

NCA-5540 comes with NIC Ethernet module slots for network bandwidth expansion. Please follow the steps for installation.

1. Power off the system and open the chassis cover.
2. On the front panel, select a NIC module slot.

3. Rotate clockwise and loosen the two (2) lock-screws and remove the door.

4. Insert a NIC module until the module is firmly seated. (Module shown in the image is for reference only),

5. Once the module is firmly seated, rotate counter-clockwise and tighten the two (2) lock-screws.

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Replacing the Cooling Fans

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

1. On the rear panel, loosen the lock-screw of the fan you would like to replace.

2. Hold onto the lock-screw and pull out the single fan. Disconnect its power cable connect from the motherboard.

3. Install a new fan by reversing the above steps.

Replacing the AC Power Supply Units

Power supply units wear down eventually. Please be noted that the NCA-5540 supports1300W PSU. Please prepare the power supply units matching this capacity.

1. On the rear panel, locate the power supply units and disconnect the power cords.
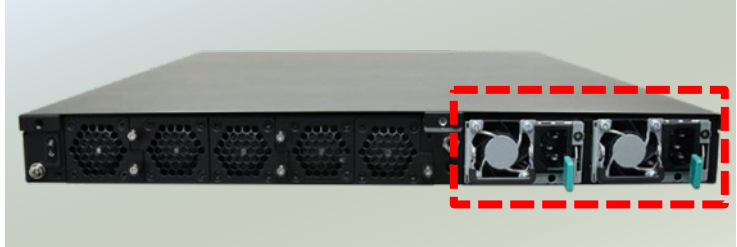
2. Hold the handle and pull out the original power supply unit.
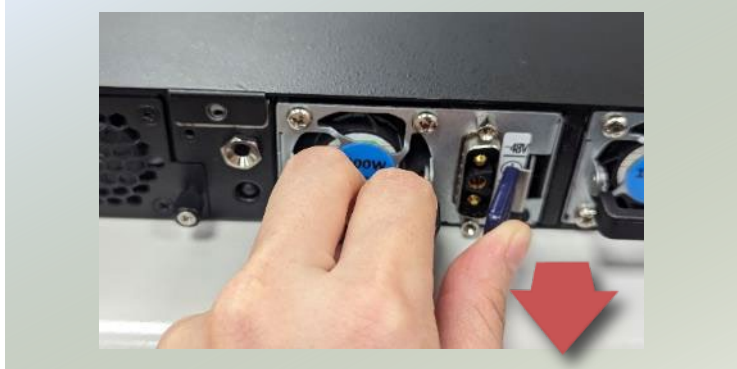
3. Insert a new power supply unit. Push the unit until it clicks into place.

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Mounting the System

There are two methods for installing this system into a rack:

▶ With **Mounting Ear Brackets** only

This method is quick and easy by fixing this system to the front posts of the rack, but it also makes servicing the system more difficult. Please note that the use of these brackets must go with a rack shelf or slide rails to prevent the chassis from falling over, for the <u>bracket assembly alone cannot provide sufficient support to the chassis</u>.
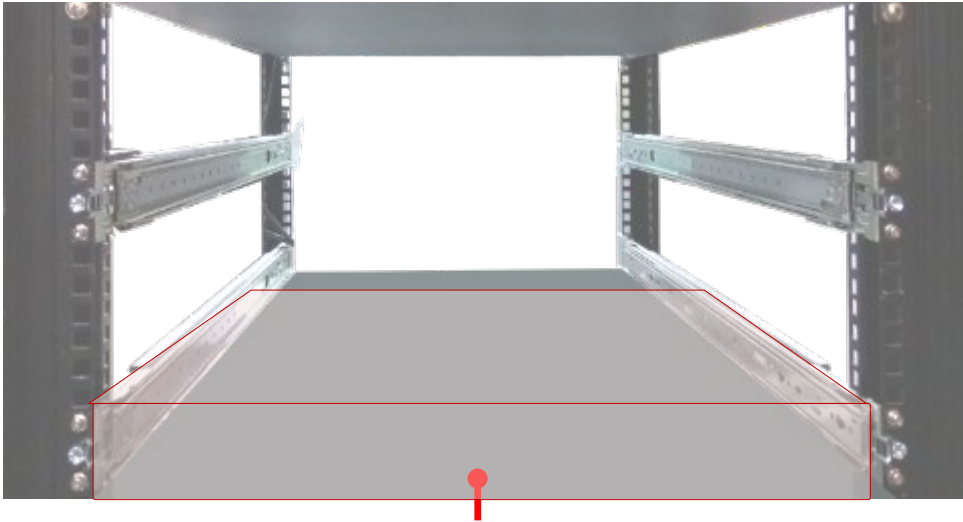
The system shall be installed on the rack along with a shelf or slide rails, for the "Mounting Ears" are meant to secure the system, not to support it.

▶ With **Slide Rail Kit + Mounting Ear Brackets**

This method is rather complicated, but the slidable rails allow you to access the system easily while securing it in the rack solidly.
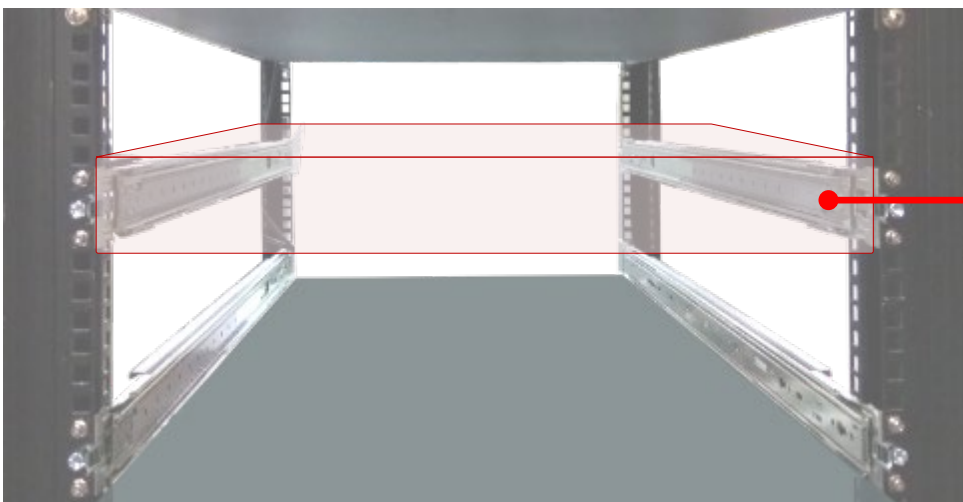
The Slide Rail Kit can secure the system while providing sufficient weight support for the device.

Installing the System Using Mounting Ear Brackets Only

1. Check the accessory pack for the following items:

   ▶ 1x Screw Pack

   ▶ 2x Ear Brackets

Screw Pack

Ear Brackets

2. Align the bracket to the side of the chassis and make sure the screw-holes are matched, and then secure the bracket onto the chassis with three provided screws.

3. Repeat Step 2 to attach the bracket to the other side of the chassis.

4. Install the chassis into the rack with the brackets fixed onto the posts using the provided screws. The actual approach you adopt and the needed parts for assembly will depend on the supporting accessory (shelf or rail kit) you use.

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Installing the System Using Mounting Ear Brackets Only
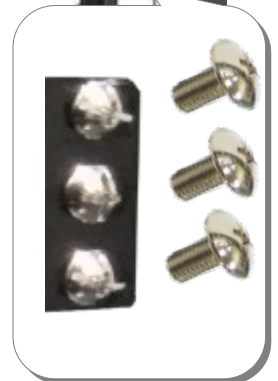
Installing the System Using the Slide Rail Kit (with Mounting Ear Brackets)

1. Check the package contents of the Slide Rail Kit. The kit shall include the following items:

   ▶ 1x pack of M4X4L screws (for securing the Rail Brackets on the system)

   ▶ 1x pack of 7.1 Round Hole screws (for securing the system on the rail posts)

   ▶ 2x Slide Rails

M4X4L Screws   **7.1 Round Hole Screws**

Slide Rails

A rail consists of the following parts:

Release Tab

Rail Lock

Outer Rail   Inner Rail   Rail Bracket

2. Unpack a slide rail and slide the Inner Rail all the way to the end.

3. Stretch the Rail Bracket to the fullest.
4. Remove the Rail Bracket from the Inner Rail by pushing the Release Tab on the bracket outwards while sliding it out.

Release Tab

Rail Bracket

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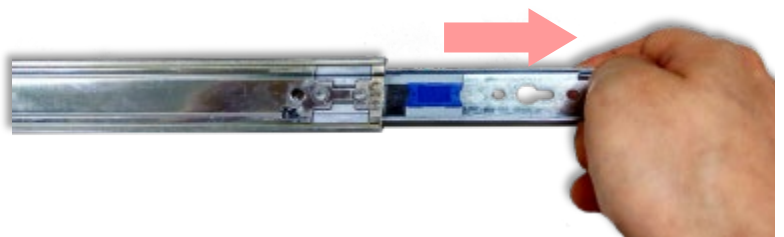
5. Align the bracket to the side of the chassis and make sure the screw-holes are matched, and then secure the bracket onto the chassis with three provided <u>M4X4L</u> screws.
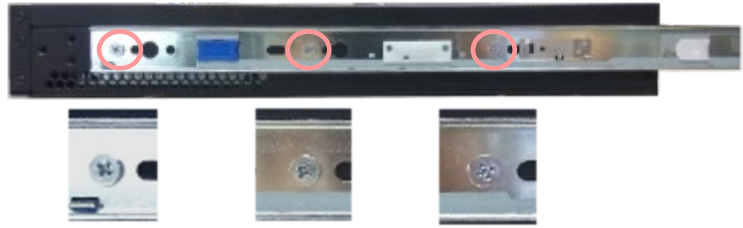
Align the screws with the holes indicated on the brackets and the screw holes on the side of the chassis.

6. Repeat Steps 2~5 to attach the bracket to the other side of the chassis.

7. Follow the instructions in <u>Installing the System Using Mounting Ear Brackets Only</u> to attach the Mounting Ear Brackets.

Right Rail Bracket

Left Rail Bracket

Right Mounting Ear Bracket

Left Mounting Ear Bracket

Now, you shall install the slide rail assemblies onto the rack.

8. This slide rail kit does NOT require screw-fixing. Simply aim at three available screw holes on the rack front and snap the rail front into the rack post as shown in the image. You should hear a "click" sound once it is firmly attached.

Use this clamp to fix the front end of the rail onto the post.
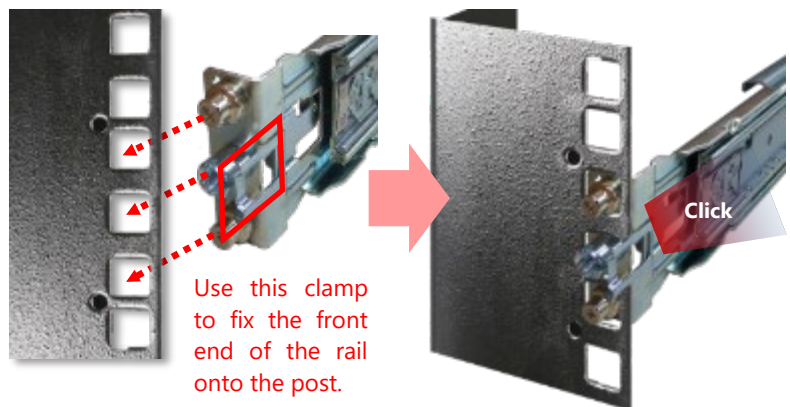
Click

9. For the rear rack installation, slide the rail to aim and engage the bolts on the rail's rear end with the two available holes on the post, and the rail assembly will click into place.
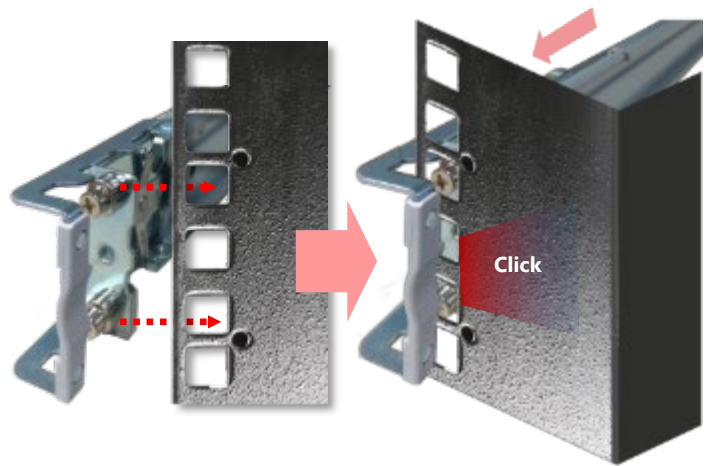
10. Stretch both of the Inner Rails out to their fullest extent. You will hear a click sound when they are fully stretched and locked.

The Inner Rail will click when it is fully stretched.
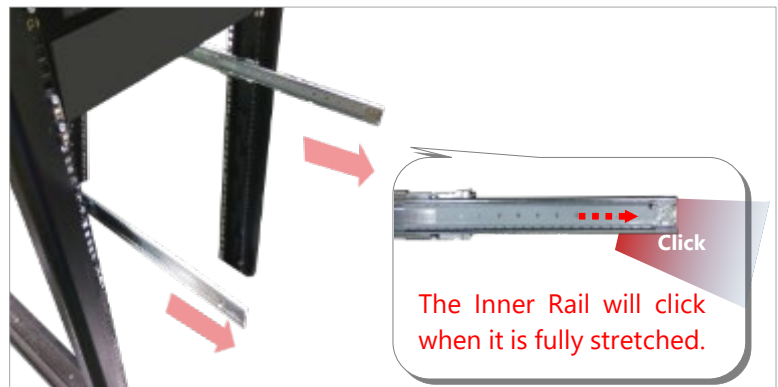
11. Hold the system with its front facing you, lift the chassis and gently engage the brackets on the system while aligning them with the Inner Rails as shown in the image, and then push the system into the cabinet.

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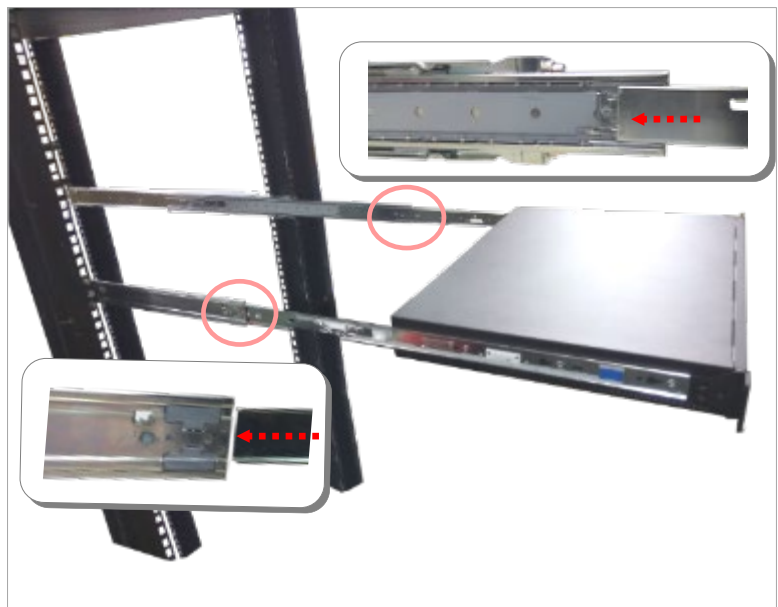
12. While pushing in the system, also push and hold the Rail Lock tab on both brackets.

Rail Lock
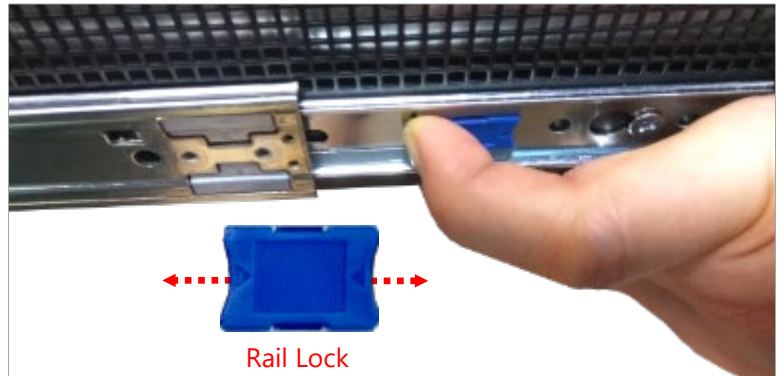
Push the system all the way in until it stops.

To remove the system from the rack, gently pull it outwards, towards you, while pushing the Release Tab on both sides of the brackets.

Release Tab

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CHAPTER 3: REMOTE SERVER MANAGEMENT (SKU C/SKU D)

BMC Overview

This document specifies the BMC firmware features. The BMC firmware implements IPMI 2.0 based on ASPEED service processor. It performs all the BMC management tasks defined by IPMI 2.0.

In addition, BMC firmware runs an embedded web-server for full configuration using Web UI, which has a low learning curve.

BMC Main Features

Feature		Description
IPMI 2.0 Standard Features	System Interface support	• KCS (System Interface Support) • LAN (RMCP+)
	IPMI 2.0 based Management	• BMC stack with an IPMI 2.0 implementation
	System Management	• Sensor monitoring • System power management • Watchdog timer • Fan speed monitor • 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
	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

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 reset 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.

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

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 User Callback Options	Transport (0Ch)	1Ah
Get User Callback Options	Transport (0Ch)	1Bh
SOL Activating	Transport (0Ch)	20h
Set SOL Configuration Parameters	Transport (0Ch)	21h
Get SOL Configuration Parameters	Transport (0Ch)	22h

Using BMC Web UI

In the address bar of your Internet browser, input the IP address of the remote server to access the BMC interface of that server.
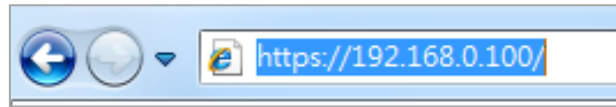
Initial access of BMC prompts you to enter the User Name and Password. A screenshot of the login screen is given below:
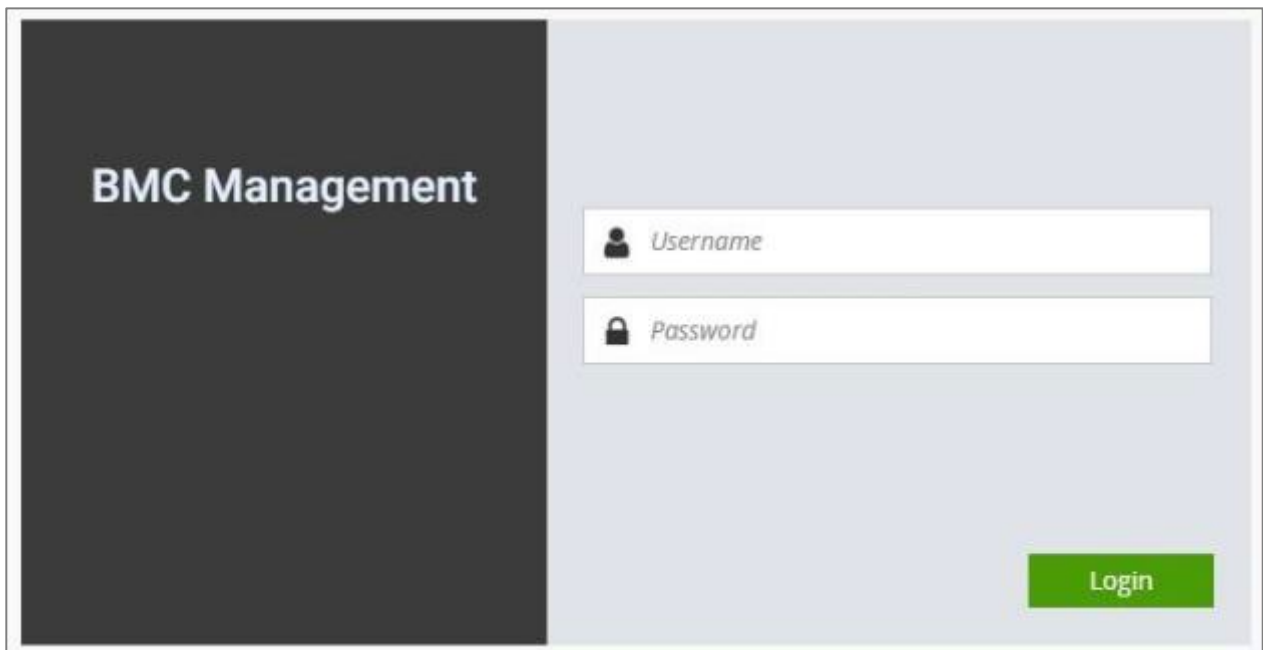
Login Page

- ▶ **Username**: Enter your username in this field.
- ▶ **Password**: Enter your password in this field.
- ▶ **Sign me in**: After entering the required credentials, click the **Sign me in** to log in to Web UI.
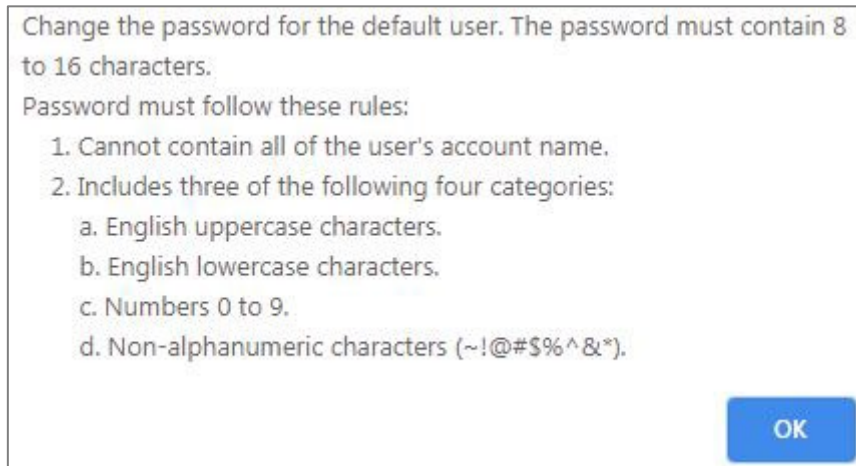
Note: (1) If not specified, the default IP to access BMC is https://192.168.0.100.
(2) Please use **https** to access Web UI.

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:
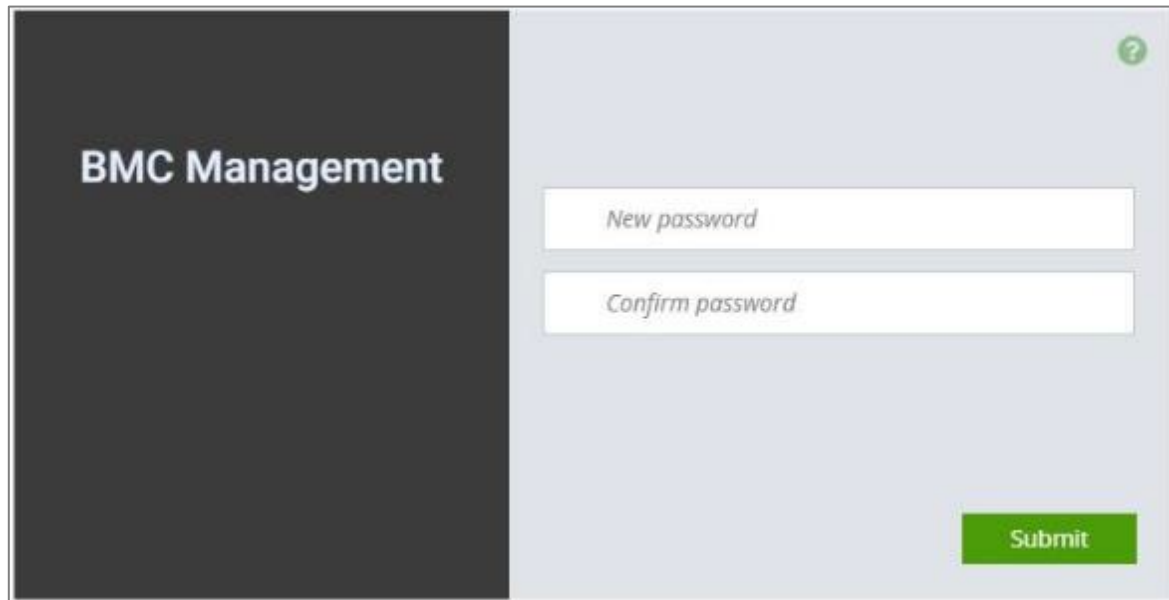
Change the default password - Dialog

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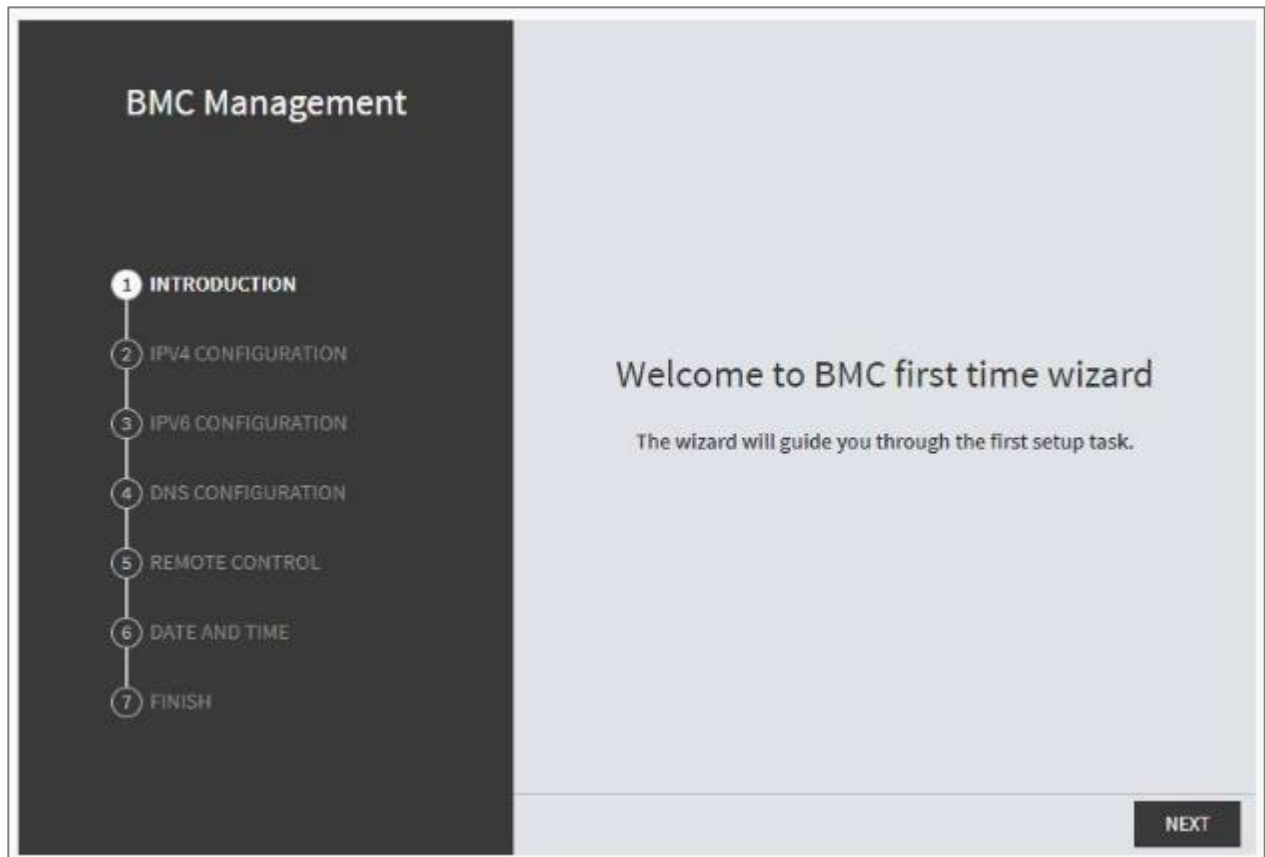
In the final page, please press "Finish" button to complete the first-time wizard. BMC will be rebooted and apply new settings. You could reconnect to the Web UI after a few minutes.

Web UI Layout

The BMC Web UI consists of various menu items:

Menu Bar

The menu bar displays the following:

- ▶ Dashboard
- ▶ Appliance – FRU Information
- ▶ Appliance – Sensor Reading
- ▶ Appliance – Event Log
- ▶ Appliance – Remote Media Settings
- ▶ Appliance – KVM RMedia Settings
- ▶ Appliance – Image Redirection
- ▶ BMC Config – Date and Time
- ▶ BMC Config – User Configuration – User List
- ▶ BMC Config – User Configuration – RADIUS Setup
- ▶ BMC Config – User Configuration – LDAP Setup
- ▶ BMC Config – User Configuration – LDAP Groups
- ▶ BMC Config – User Configuration – Login Block Settings
- ▶ BMC Config – Network Configuration – IP Settings
- ▶ BMC Config – Network Configuration – DNS Settings
- ▶ BMC Config – Network Configuration – Link Settings
- ▶ BMC Config – Network Configuration – SSL Certificate
- ▶ BMC Config – Network Configuration – Services
- ▶ BMC Config – Network Configuration – Remote Syslog
- ▶ BMC Config – Audit Log
- ▶ BMC Config – Maintenance – Firmware Update
- ▶ BMC Config – Maintenance – Restore Factory Defaults
- ▶ BMC Config – Maintenance – Preserve Configuration

A screenshot of the menu bar is shown below:
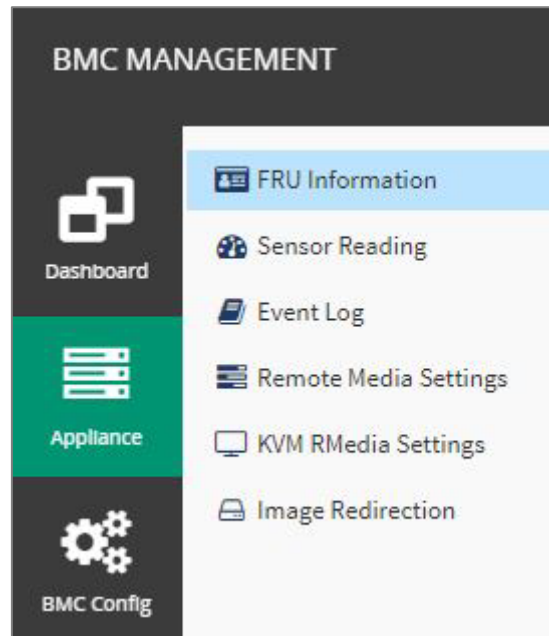
Menu Bar

Quick Button and Logged-in User

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

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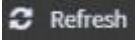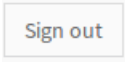
Logged-in user information: Click the icon to view the logged-in user information.

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

Logged-in User Information

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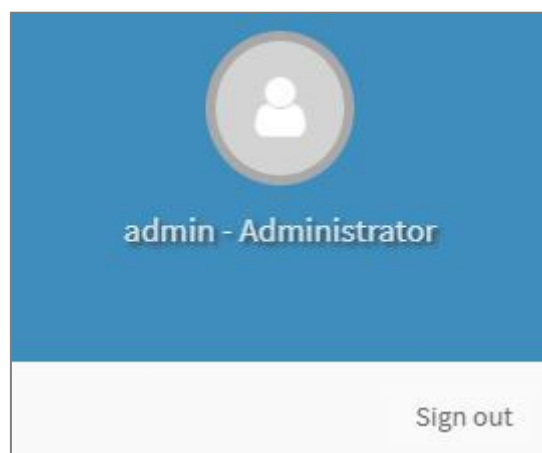
The logged-in user information shows the logged-in user's username, privilege, with the quick buttons allowing you to perform the following functions:

- **Refresh**: Click the icon [Refresh] to reload the current page.

- **Sign out**: Click the icon [Sign out] 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.

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CHAPTER 4: BIOS SETUP

The system has AMI BIOS built-in, with a SETUP utility that allows users to configure required settings or to activate certain system features. Pressing the <Tab> or <DEL> key immediately allows you to enter the Setup Utility.

Entering 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, 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.

(The screenshots presented in this section are for reference only)

```
                        Aptio Setup - AMI
 Main  Advanced  Platform Configuration  Socket Configuration  Server Mgmt  >
/-----------------------------------------------+----------------------\
|  BIOS Information                              |Set the Time. Use Tab |
|  BIOS Vendor             American Megatrends   |to switch between Time |
|  Core Version            5.31   0.80 x64       |elements.              |
|  Compliancy              UEFI 2.9; PI 1.7      |                       |
|  Project Version         FNCB6040C00006T023    |                       |
|  Build Date and Time     08/17/2023 16:46:00   |                       |
|  CPLD Project Version    604000 1007           |                       |
|  Access Level            Administrator         |                       |
|                                                |                       |
|  Memory Information                            |-----------------------|
|  Total Memory            32768 MB              |><: Select Screen      |
|                                                |^v: Select Item        |
|  System Date             [Fri 09/01/2023]      |Enter: Select          |
|  System Time             [00:22:00]            |+/-: Change Opt.       |
|                                                |F1: General Help       |
|                                                |F2: Previous Values    |
|                                                |F3: Optimized Defaults |
|                                                |F4: Save & Exit        |
|                                                |ESC: Exit              |
\-----------------------------------------------+----------------------/
           Version 2.22.1289 Copyright (C) 2023 AMI
```

Item	Description
BIOS Information	BIOS Vendor: American Megatrends Core Version: AMI Kernel version, CRB code base, X64 Compliancy : UEFI version, PI version Project Version: BIOS release version Build Date and Time: MM/DD/YYYY CPLD Project Version: CPLD release version 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: 2005-2099 Default range of Month: 1-12 Days: dependent on Month.
System Time	To set the Date, use **<Tab>** to switch between Date elements.

Advanced Setup

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.

```
                         Aptio Setup - AMI
    Main  Advanced  Platform Configuration  Socket Configuration  Server Mgmt  >
/----------------------------------------------+------------------------\
|> Trusted Computing                           |Trusted Computing       |
|> NCT7904D HW Monitor                         |Settings                |
|> F81804 Super IO Configuration               |                        |
|> Serial Port Console Redirection             |                        |
|> PCI Subsystem Settings                      |                        |
|> USB Configuration                           |                        |
|> Network Stack Configuration                 |                        |
|> NVMe Configuration                          |                        |
|> Control PXE Boot                            |                        |
|                                              |------------------------|
|                                              |><: Select Screen       |
|                                              |^v: Select Item         |
|                                              |Enter: Select           |
|                                              |+/-: Change Opt.         |
|                                              |F1: General Help        |
|                                              |F2: Previous Values     |
|                                              |F3: Optimized Defaults  |
|                                              |F4: Save & Exit         |
|                                              |ESC: Exit               |
\----------------------------------------------+------------------------/
              Version 2.22.1289 Copyright (C) 2023 AMI
```

Trusted Computing

Feature	Option	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 (TPM2.0)
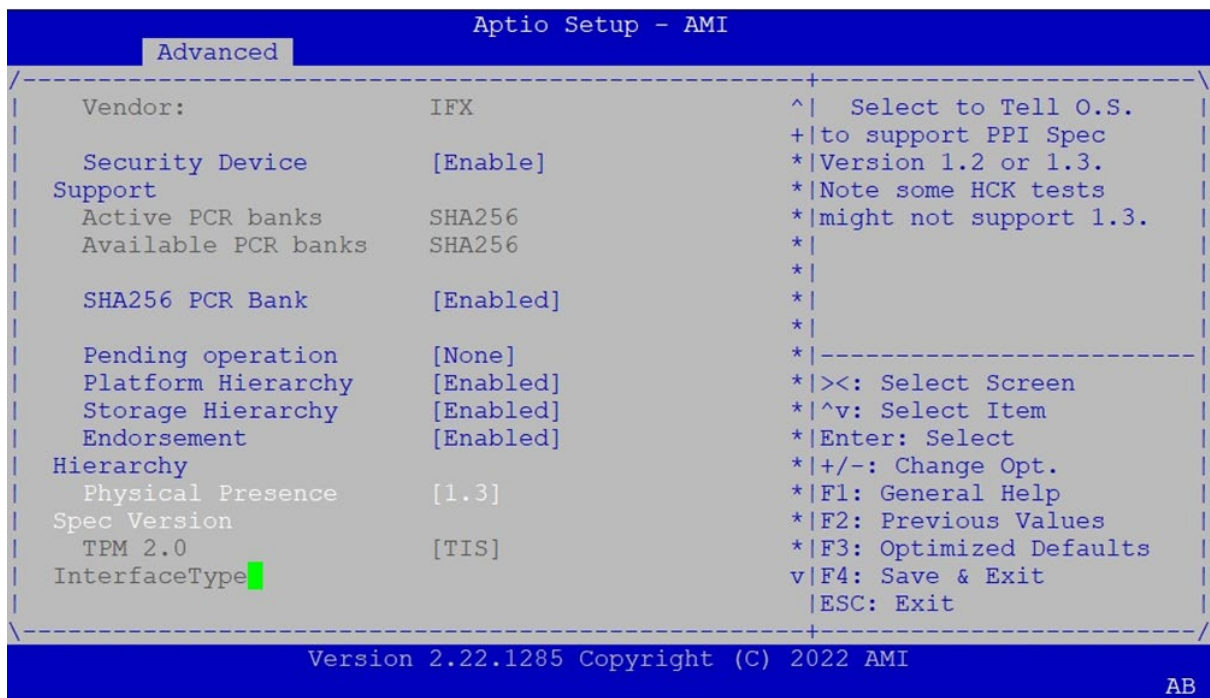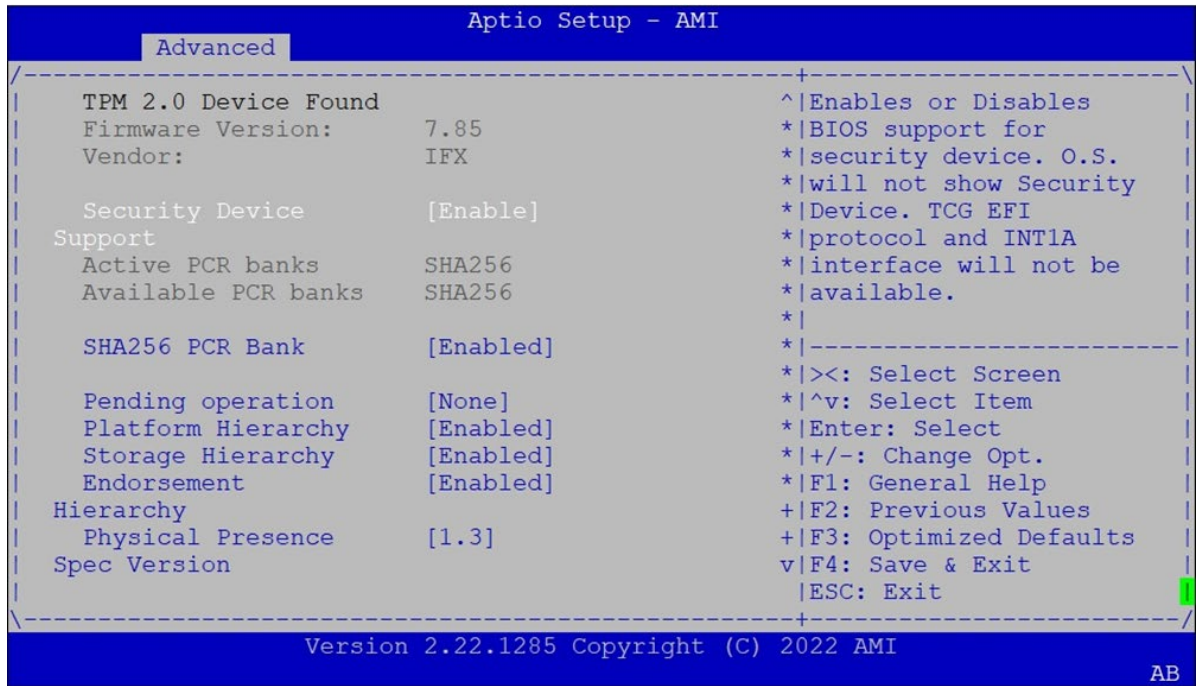
Feature	Options	Description
Security Device Support	Enabled Disabled	Enables or disables BIOS support for security device. By disabling this function, OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
SHA256 PCR Bank	Enabled Disabled	Enables or disables SHA256 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.

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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 Interface Type	TIS	Select **TPM 20 Device** for the Communication Interface.

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NCT7904D HW Monitor

```
                          Aptio Setup - AMI
              Advanced
/------------------------------------------------------------^|Smart Fan Mode Select-\
| Pc Health Status                                   *|                              |
|                                                    *|                              |
|> Smart Fan Mode Configuration                      *|                              |
| CPU Temp                    : +50 C                *|                              |
| SYS1 Temp                   : +48 C                *|                              |
| SYS2 Temp                   : +34 C                *|                              |
| Fan1A Speed                 : 9507 RPM             *|                              |
| Fan1B Speed                 : 8231 RPM             *|                              |
| Fan2A Speed                 : 9507 RPM             *|                              |
| Fan2B Speed                 : 8231 RPM             *|------------------------------|
| Fan3A Speed                 : 9507 RPM             *|><: Select Screen             |
| Fan3B Speed                 : 8231 RPM             *|^v: Select Item               |
| Fan4A Speed                 : 9507 RPM             *|Enter: Select                 |
| Fan4B Speed                 : 8231 RPM             *|+/-: Change Opt.              |
| 1V05                        : +1.042 V             +|F1: General Help              |
| VDIMM                       : +11.808 V            +|F2: Previous Values           |
| CPU VCORE                   : +1.810 V             +|F3: Optimized Defaults        |
| VSB5V                       : +5.040 V             v|F4: Save & Exit               |
|                                                     |ESC: Exit                     |
\-----------------------------------------------------------------------------------/
                  Version 2.22.1289 Copyright (C) 2023 AMI
                                                                                  AB
```

```
                          Aptio Setup - AMI
              Advanced
/-----------------------------------------------------------^|---------------------\
| SYS2 Temp                   : +33 C                ^|                              |
| Fan1A Speed                 : 9440 RPM             +|                              |
| Fan1B Speed                 : 8181 RPM             +|                              |
| Fan2A Speed                 : 9440 RPM             +|                              |
| Fan2B Speed                 : 8181 RPM             *|                              |
| Fan3A Speed                 : 9440 RPM             *|                              |
| Fan3B Speed                 : 8181 RPM             *|                              |
| Fan4A Speed                 : 9440 RPM             *|                              |
| Fan4B Speed                 : 8181 RPM             *|                              |
| 1V05                        : +1.046 V             *|------------------------------|
| VDIMM                       : +11.856 V            *|><: Select Screen             |
| CPU VCORE                   : +1.816 V             *|^v: Select Item               |
| VSB5V                       : +5.058 V             *|Enter: Select                 |
| 5V                          : +5.004 V             *|+/-: Change Opt.              |
| 12V                         : +11.928 V            *|F1: General Help              |
| P3V3                        : +3.300 V             *|F2: Previous Values           |
| VBAT                        : +3.042 V             *|F3: Optimized Defaults        |
| VSB3.3V                     : +3.264 V             v|F4: Save & Exit               |
|                                                     |ESC: Exit                     |
\-----------------------------------------------------------------------------------/
                  Version 2.22.1289 Copyright (C) 2023 AMI
                                                                                  AB
```

Feature	Description
CPU Temp	This value reports the CPU temperature
SYS1 Temp	This value reports the System temperature
SYS2 Temp	This value reports the System temperature (Close CPU)
FAN1A Speed	This value reports the Fan1A speed
FAN1B Speed	This value reports the Fan1B speed
FAN2A Speed	This value reports the Fan2A speed
FAN2B Speed	This value reports the Fan2B speed
FAN3A Speed	This value reports the Fan3A speed
FAN3B Speed	This value reports the Fan3B speed

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FAN4A Speed	This value reports the Fan4A speed
FAN4B Speed	This value reports the Fan4B speed
1V5V	This value reports the 1.05V Input voltage
VDIMM	This value reports the Memory Input voltage
CPU VCORE	This value reports the CPU VCORE Input voltage
VSB5V	This value reports the Standby 5V Input voltage
5V	This value reports the 5V Input voltage
12V	This value reports the 12V Input voltage
P3V3	This value reports the 3.3V Input voltage
VBA	This value reports the VBAT Input voltage
VSB3.3V	This value reports the Standby 3.3V Input voltage

Smart Fan Mode Configuration

```
                         Aptio Setup – AMI
           Advanced
/-----------------------------------------------+------------------------\
|  Smart Fan Mode Configuration                  |Fan Mode Select         |
|                                                |                        |
|  Fan Out Mode              [Smart Fan Mode]    |                        |
|  Target                    69                  |                        |
|  Temperature1(T1)                              |                        |
|  Target                    74                  |                        |
|  Temperature1(T2)                              |                        |
|  Target                    79                  |                        |
|  Temperature1(T3)                              |                        |
|  Target                    84                  |------------------------|
|  Temperature1(T4)                              |><: Select Screen       |
|  Critical Temperature      89                  |^v: Select Item         |
|  FanOut T1 Level           130                 |Enter: Select           |
|  FanOut T1 Leve2           150                 |+/-: Change Opt.        |
|  FanOut T1 Leve3           200                 |F1: General Help        |
|  FanOut T1 Leve4           220                 |F2: Previous Values     |
|                                                |F3: Optimized Defaults  |
|                                                |F4: Save & Exit         |
|                                                |ESC: Exit               |
\-----------------------------------------------+------------------------/
             Version 2.22.1289 Copyright (C) 2023 AMI
```

Feature	Option	Description
Fan Out Mode	Full Speed Mode Smart Fan Mode	Fan Mode Select

F81804 Super IO Configuration

```
                        Aptio Setup - AMI
      Advanced
/-------------------------------------------+--------------------------\
|  F81804 Super IO Configuration            |Set Parameters of         |
|                                           |Serial Port 1 (COMA)      |
|  Super IO Chip            F81804          |                          |
|> Serial Port 1 Configuration              |                          |
|> Serial Port 2 Configuration              |                          |
|                                           |                          |
|                                           |                          |
|                                           |                          |
|                                           |                          |
|                                           |                          |
|                                           |--------------------------|
|                                           |><: Select Screen         |
|                                           |^v: Select Item           |
|                                           |Enter: Select             |
|                                           |+/-: Change Opt.          |
|                                           |F1: General Help          |
|                                           |F2: Previous Values       |
|                                           |F3: Optimized Defaults    |
|                                           |F4: Save & Exit           |
|                                           |ESC: Exit                 |
\-------------------------------------------+--------------------------/
              Version 2.22.1287 Copyright (C) 2023 AMI
```
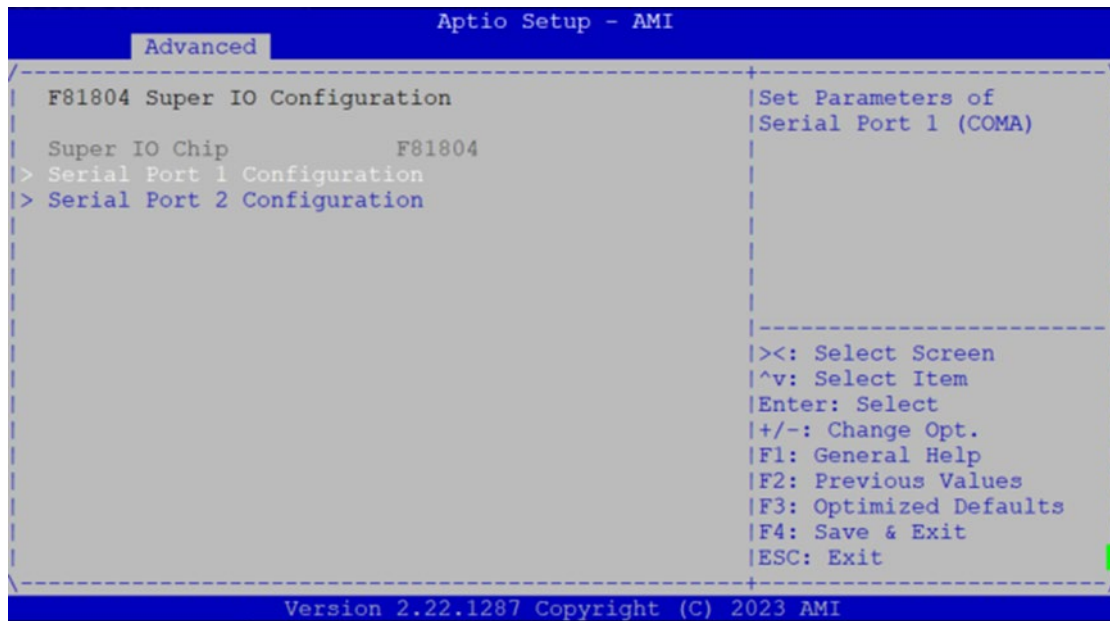
Serial Port 1 Configuration

Feature	Option	Description
Serial Port	Disabled Enabled	Enable or Disable Serial Port (COM)
Device Settings	N/A	IO=3F8h; IRQ=4;

Serial Port 2 Configuration
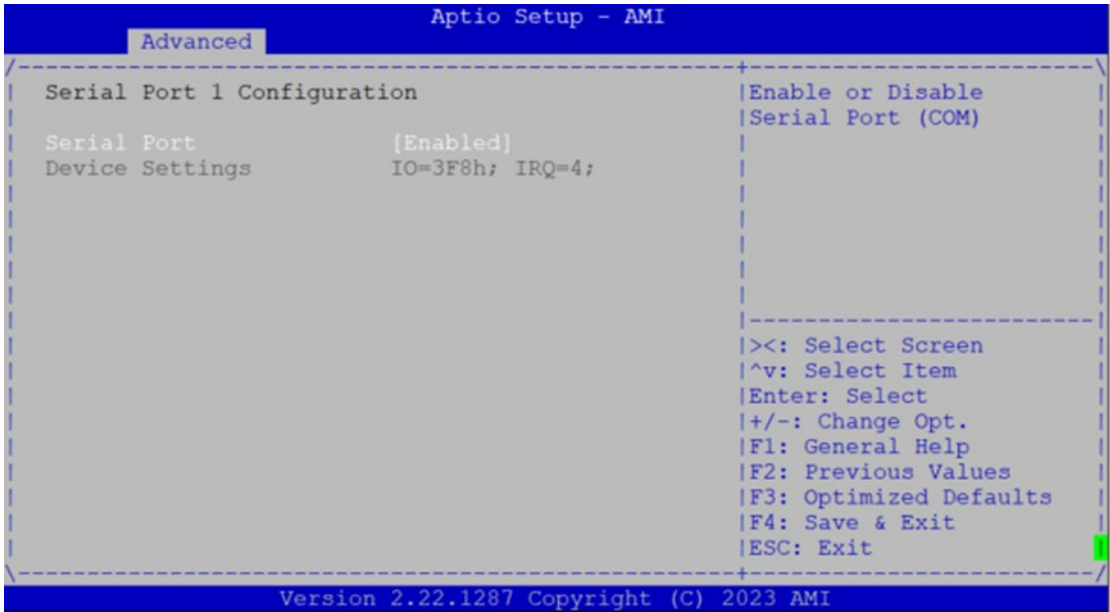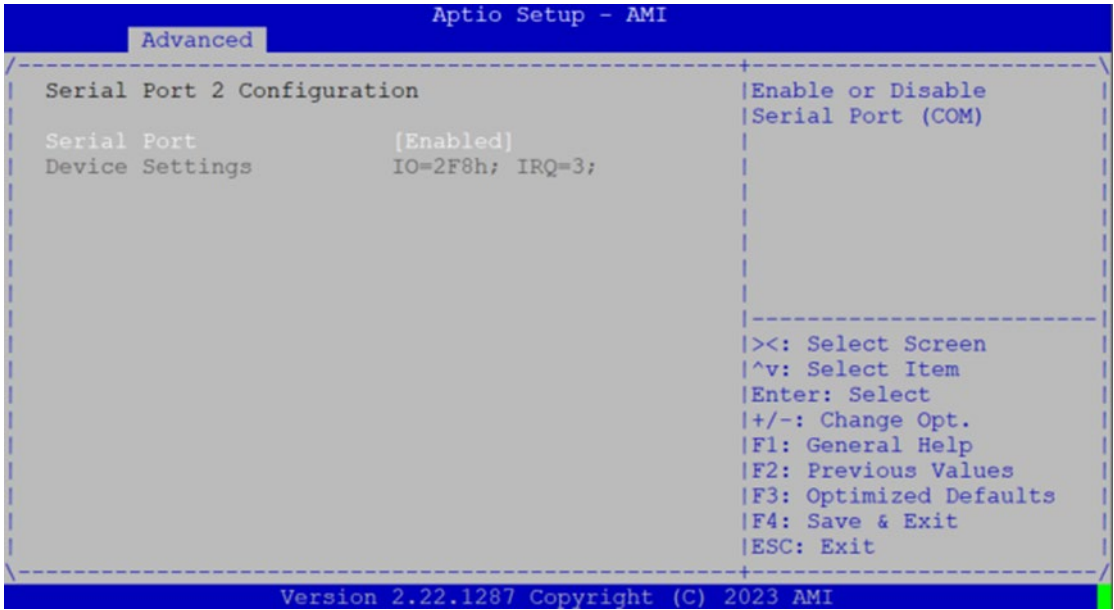
```
                         Aptio Setup - AMI
        Advanced
/---------------------------------------+-----------------------------\
| Serial Port 2 Configuration           |Enable or Disable            |
|                                       |Serial Port (COM)            |
| Serial Port            [Enabled]      |                             |
| Device Settings        IO=2F8h; IRQ=3;|                             |
|                                       |                             |
|                                       |                             |
|                                       |                             |
|                                       |                             |
|                                       |                             |
|                                       |                             |
|                                       |                             |
|                                       |-----------------------------|
|                                       |><: Select Screen            |
|                                       |^v: Select Item              |
|                                       |Enter: Select                |
|                                       |+/-: Change Opt.             |
|                                       |F1: General Help             |
|                                       |F2: Previous Values          |
|                                       |F3: Optimized Defaults       |
|                                       |F4: Save & Exit              |
|                                       |ESC: Exit                    |
\---------------------------------------+-----------------------------/
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```

Feature	Option	Description
Serial Port	Disabled Enabled	Enable or Disable Serial Port (COM)
Device Settings	N/A	IO=2F8h; IRQ=3;

Console Redirection Settings
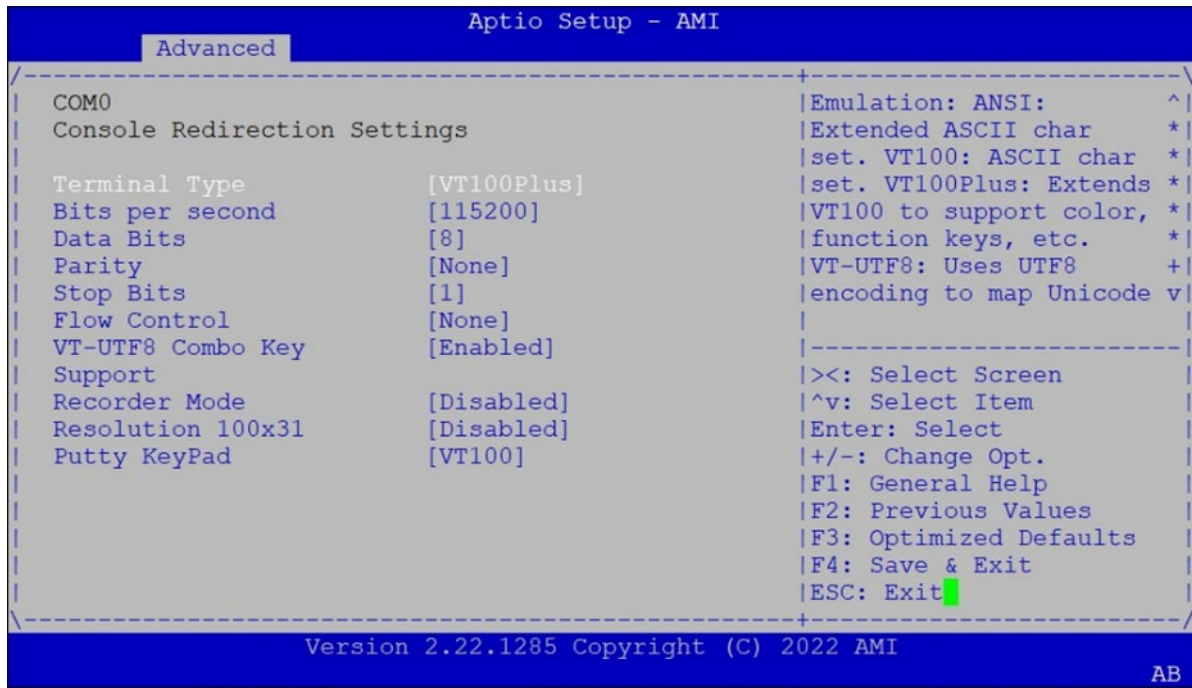
Feature	Option	Description
Terminal Type	VT100 VT100+ VT-UTF8 ANSI	VT100: ASCII char set VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes ANSI: Extended ASCII char set
Bits per second	9600 19200 38400 57600 115200	Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
Data Bits	7 8	Data Bits
Parity	None Even Odd Mark Space	A parity bit can be sent with the data bits to detect some transmission errors.
Stop Bits	1 2	Indicates the end of a serial data packet.
Flow Control	None Hardware RTS/CTS	Flow Control can prevent data loss from buffer overflow.
VT-UTF8 Combo Key Support	Disabled Enabled	Enables VT-UTF8 Combination Key Support for ANSI/VT100 terminals

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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 Function Key and Keypad on Putty.

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PCI Subsystem Settings

```
                          Aptio Setup - AMI
         Advanced
/----------------------------------76-----------+------------------------\
| PCI Bus Driver Version   A5.01.29             |Enables or Disables     |
|                                               |64bit capable Devices   |
| PCI Devices Common Settings:                  |to be Decoded in Above  |
| Above 4G Decoding          [Enabled]          |4G Address Space (Only  |
| SR-IOV Support             [Disabled]         |if System Supports 64   |
|                                               |bit PCI Decoding).      |
|                                               |                        |
|                                               |                        |
|                                               |                        |
|                                               |------------------------|
|                                               |                        |
|                                               |><: Select Screen       |
|                                               |^v: Select Item         |
|                                               |Enter: Select           |
|                                               |+/-: Change Opt.        |
|                                               |F1: General Help        |
|                                               |F2: Previous Values     |
|                                               |F3: Optimized Defaults  |
|                                               |F4: Save & Exit         |
|                                               |ESC: Exit               |
\-----------------------------------------------+------------------------/
               Version 2.22.1287 Copyright (C) 2023 AMI
```

Feature	Option	Description
Above 4G Decoding	Enabled Disabled	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

```
                      Aptio Setup - AMI
    Advanced
/--------------------------------------------+------------------------\
| USB Module Version      32                 ^|Maximum time the device ^|
|                                            +|will take before it     *|
| USB Controllers:                           *|properly reports itself *|
|     1 XHCI                                  *|to the Host Controller. *|
| USB Devices:                               *|'Auto' uses default     *|
|     None                                   *|value: for a Root port  *|
|                                            *|it is 100 ms, for a Hub +|
| Legacy USB Support      [Enabled]          *|port the delay is taken v|
| XHCI Hand-off           [Enabled]          *|                         |
| USB Mass Storage        [Enabled]          *|-------------------------|
| Driver Support                             *|><: Select Screen        |
| Port 60/64 Emulation    [Enabled]          *|^v: Select Item          |
|                                            *|Enter: Select            |
| USB hardware delays                        *|+/-: Change Opt.         |
| and time-outs:                             *|F1: General Help         |
| USB transfer time-out   [20 sec]           +|F2: Previous Values      |
| Device reset time-out   [20 sec]           +|F3: Optimized Defaults   |
| Device power-up delay   [Auto]             v|F4: Save & Exit          |
|                                             |ESC: Exit                |
\--------------------------------------------+-------------------------/
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```

Feature	Option	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.
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	1 sec 5 sec 10 sec 20 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.

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Network Stack Redirection
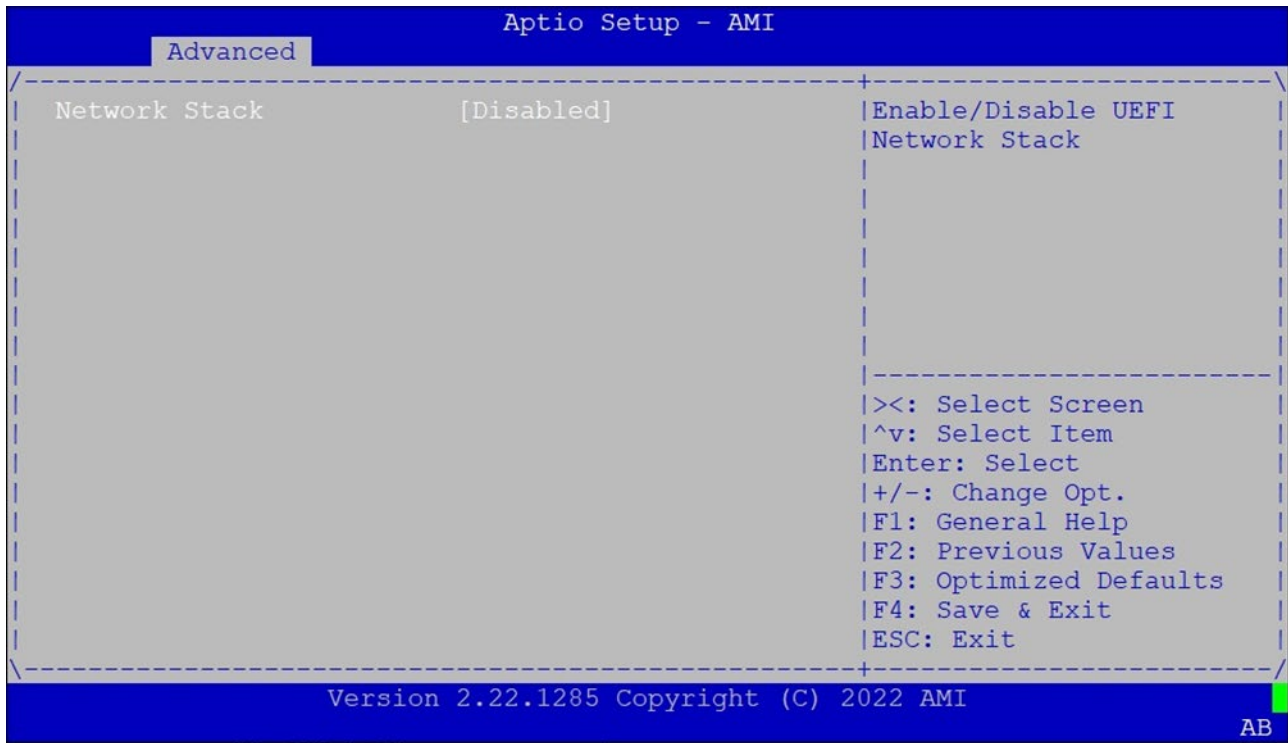
Feature	Option	Description
Network Stack	Disabled Enabled	Enables or disables UEFI Network Stack
Ipv4 PXE Support	Disabled Enabled	Enables Ipv4 PXE Boot Support. If IPV4 is disabled, PXE boot option will not be created.
Ipv4 HTTP Support	Disabled Enabled	Enables Ipv4 HTTP Boot Support. If IPV4 is disabled, HTTP boot option will not be created.
Ipv6 PXE Support	Disabled Enabled	Enables Ipv6 PXE Boot Support. If IPV6 is disabled, PXE boot option will not be created.
Ipv6 HTTP Support	Disabled Enabled	Enables Ipv6 HTTP Boot Support. If IPV6 is disabled, HTTP boot option will not be created.
PXE boot wait time	0	Wait time to press **<ESC>** key to abort the PXE boot
Media detect count	1	Number of times the presence of media will be checked

NVMe Configuration

```
                         Aptio Setup - AMI
   Advanced
/-------------------------------------------+-----------------------\
| NVMe Configuration                        |                       |
|                                           |                       |
| No NVME Device Found                      |                       |
|                                           |                       |
|                                           |                       |
|                                           |                       |
|                                           |                       |
|                                           |                       |
|                                           |                       |
|                                           |                       |
|                                           |-----------------------|
|                                           |><: Select Screen      |
|                                           |^v: Select Item        |
|                                           |Enter: Select          |
|                                           |+/-: Change Opt.       |
|                                           |F1: General Help       |
|                                           |F2: Previous Values    |
|                                           |F3: Optimized Defaults |
|                                           |F4: Save & Exit        |
|                                           |ESC: Exit              |
\-------------------------------------------+-----------------------/
           Version 2.22.1285 Copyright (C) 2022 AMI
                                                          AB
```

Control PXE Boot

```
                           Aptio Setup – AMI
            Advanced
/------------------------------------------------+-------------------------\
| Control PXE Boot                               |Control PXE Boot from    |
|                                                |which Lan                |
|  Control PXE Boot from     [Disabled]          |                         |
|                                                |                         |
|                                                |                         |
|                                                |                         |
|                                                |                         |
|                                                |                         |
|                                                |                         |
|                                                |                         |
|                                                |-------------------------|
|                                                |><: Select Screen        |
|                                                |^v: Select Item          |
|                                                |Enter: Select            |
|                                                |+/-: Change Opt.         |
|                                                |F1: General Help         |
|                                                |F2: Previous Values      |
|                                                |F3: Optimized Defaults   |
|                                                |F4: Save & Exit          |
|                                                |ESC: Exit                |
\------------------------------------------------+-------------------------/
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```

Feature	Option	Description
Control PXE Boot	Disabled Lan1 Lan2	Control PXE Boot from which Lan

Platform Setup

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.

```
                         Aptio Setup - AMI
   Main  Advanced  Platform Configuration  Socket Configuration  Server Mgmt  >
/--------------------------------------------------+-------------------------\
|> PCH-IO Configuration                            |Specify what state to    |
|> Server ME Configuration                         |go to when power is       |
|  Restore AC Power Loss      [Last State]         |re-applied after a        |
|                                                  |power failure (G3         |
|                                                  |state).█                  |
|                                                  |                          |
|                                                  |                          |
|                                                  |                          |
|                                                  |                          |
|                                                  |                          |
|                                                  |--------------------------|
|                                                  |><: Select Screen         |
|                                                  |^v: Select Item           |
|                                                  |Enter: Select             |
|                                                  |+/-: Change Opt.          |
|                                                  |F1: General Help          |
|                                                  |F2: Previous Values       |
|                                                  |F3: Optimized Defaults    |
|                                                  |F4: Save & Exit           |
|                                                  |ESC: Exit                 |
\--------------------------------------------------+-------------------------/
              Version 2.22.1289 Copyright (C) 2023 AMI
```
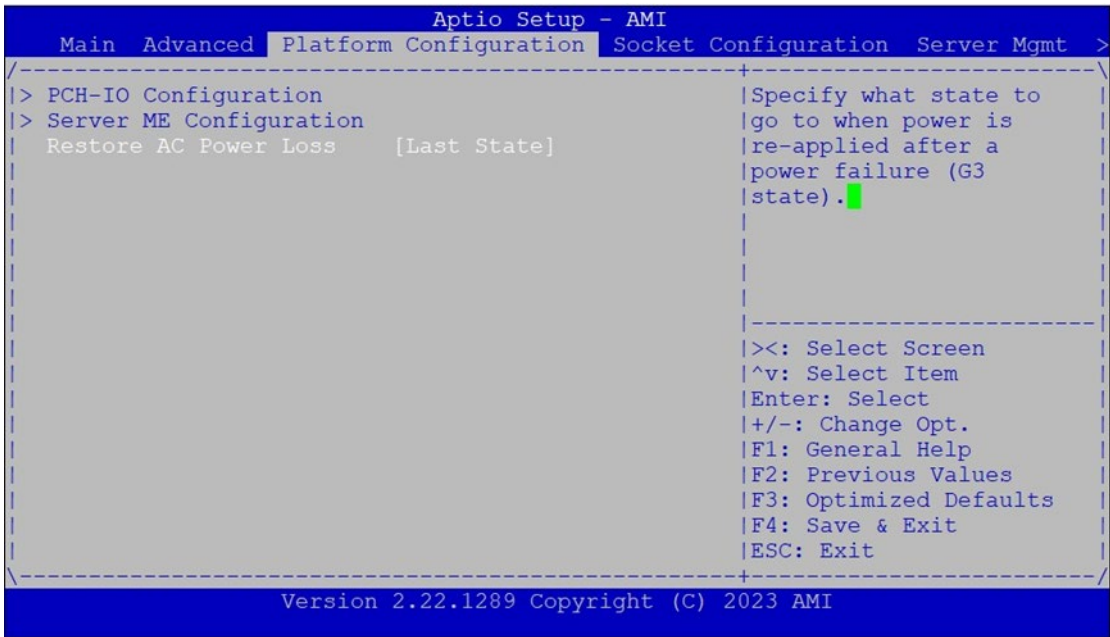
Feature	Option	Description
PCH Configuration	None	Displays and provides option to change the PCH Settings
Server ME Configuration	None	Configure Server ME Technology Parameters
Restore AC Power Loss	Power On Power Off Last State	Select S0/S5 for ACPI state after a G3

PCH-IO Configuration

```
                        Aptio Setup - AMI
                 Platform Configuration
/-------------------------------------------+-----------------------\
| PCH-IO Configuration                      |Device Options Settings |
|                                           |                        |
|> SATA And RST Configuration               |                        |
|                                           |                        |
|                                           |                        |
|                                           |                        |
|                                           |                        |
|                                           |                        |
|                                           |                        |
|                                           |                        |
|                                           |------------------------|
|                                           |><: Select Screen       |
|                                           |^v: Select Item         |
|                                           |Enter: Select           |
|                                           |+/-: Change Opt.        |
|                                           |F1: General Help        |
|                                           |F2: Previous Values     |
|                                           |F3: Optimized Defaults  |
|                                           |F4: Save & Exit         |
|                                           |ESC: Exit               |
\-------------------------------------------+-----------------------/
             Version 2.22.1285 Copyright (C) 2022 AMI
                                                              AB
```
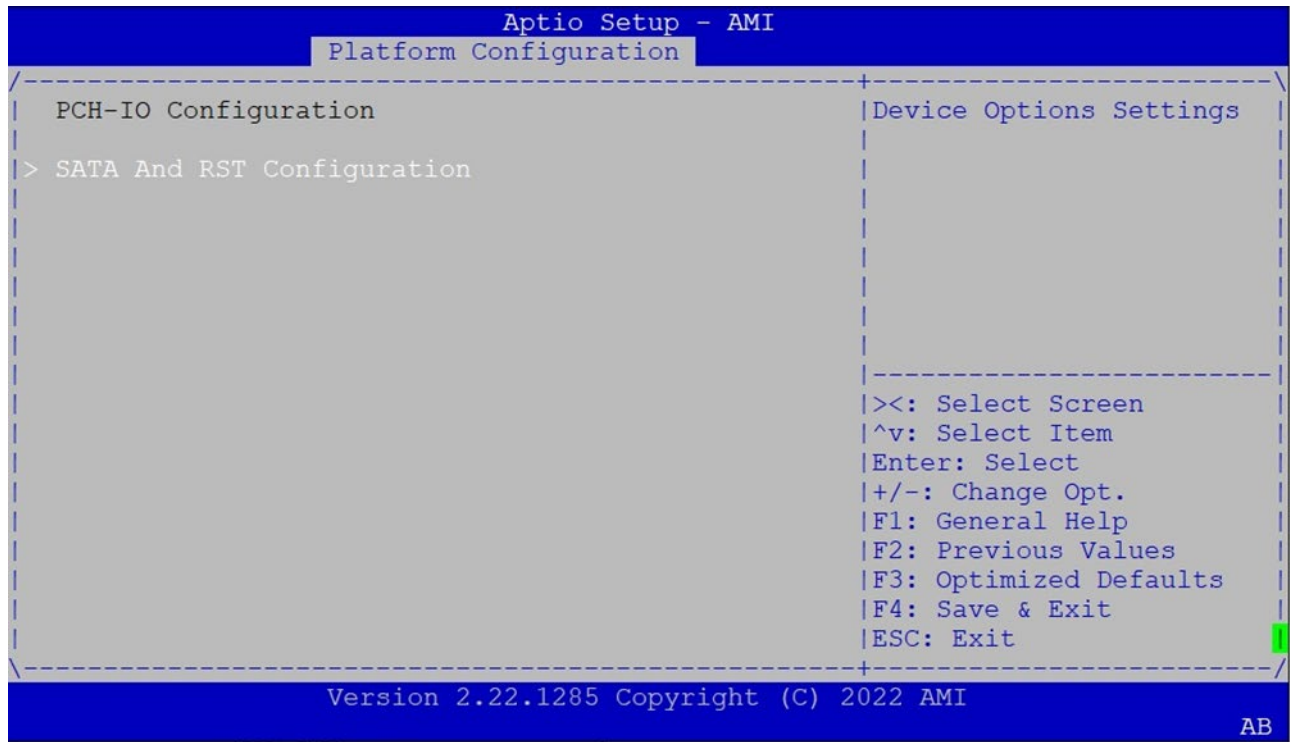
Item	Option	Description
SATA and RST Configuration	None	Device options settings

Controller 1 SATA and RST Configuration

```
                        Aptio Setup - AMI
                    Platform Configuration
/--------------------------------------------+----------------------------\
|> Controller 1 SATA And RST Configuration   |SATA Controller 1           |
|                                            |Device Options Settings     |
|                                            |                            |
|                                            |                            |
|                                            |                            |
|                                            |                            |
|                                            |                            |
|                                            |                            |
|                                            |                            |
|                                            |----------------------------|
|                                            |><: Select Screen           |
|                                            |^v: Select Item             |
|                                            |Enter: Select               |
|                                            |+/-: Change Opt.            |
|                                            |F1: General Help            |
|                                            |F2: Previous Values         |
|                                            |F3: Optimized Defaults      |
|                                            |F4: Save & Exit             |
|                                            |ESC: Exit                   |
\--------------------------------------------+----------------------------/
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```

Feature	Option	Description
Controller 1 SATA and RST Configuration	None	SATA Controller 1 Device Options Settings

PCH SATA and RST Configuration

```
                        Aptio Setup - AMI
                    Platform Configuration
/----------------------------------------------+------------------------\
| Controller 1 SATA And RST Configuration      ^|SATA test settings     |
|                                              *|                       |
| SATA Configuration        [Enabled]          *|                       |
| SATA Mode Selection       [AHCI]             *|                       |
|                                              *|                       |
| SATA Port 0               [Not Installed]    *|                       |
|   Software Preserve       Unknown            *|                       |
| SATA Port 0               [Enabled]          *|                       |
|   Hot Plug                [Disabled]         +|                       |
|   Configured as eSATA     Hot Plug supported +|-----------------------|
|   Spin Up Device          [Disabled]         +|><: Select Screen      |
|   SATA Device Type        [Hard Disk Drive]  +|^v: Select Item        |
| SATA Port 1               [Not Installed]    +|Enter: Select          |
|   Software Preserve       Unknown            +|+/-: Change Opt.       |
| SATA Port 1               [Enabled]          +|F1: General Help       |
|   Hot Plug                [Disabled]         +|F2: Previous Values    |
|   Configured as eSATA     Hot Plug supported +|F3: Optimized Defaults |
|   Spin Up Device          [Disabled]         v|F4: Save & Exit        |
|                                               |ESC: Exit              |
\----------------------------------------------+------------------------/
             Version 2.22.1285 Copyright (C) 2022 AMI
                                                                    AB
```

```
                        Aptio Setup - AMI
                    Platform Configuration
/----------------------------------------------+------------------------\
| SATA Port 2               [Not Installed]    ^|Designates this port as|
|   Software Preserve       Unknown            +|Hot Pluggable.         |
| SATA Port 2               [Enabled]          +|                       |
|   Hot Plug                [Disabled]         +|                       |
|   Configured as eSATA     Hot Plug supported +|                       |
|   Spin Up Device          [Disabled]         +|                       |
|   SATA Device Type        [Hard Disk Drive]  +|                       |
| SATA Port 3               [Not Installed]    +|                       |
|   Software Preserve       Unknown            +|                       |
| SATA Port 3               [Enabled]          *|-----------------------|
|   Hot Plug                [Disabled]         *|><: Select Screen      |
|   Configured as eSATA     Hot Plug supported *|^v: Select Item        |
|   Spin Up Device          [Disabled]         *|Enter: Select          |
|   SATA Device Type        [Hard Disk Drive]  *|+/-: Change Opt.       |
| SATA Port 4               [Not Installed]    *|F1: General Help       |
|   Software Preserve       Unknown            *|F2: Previous Values    |
| SATA Port 4               [Enabled]          +|F3: Optimized Defaults |
|   Hot Plug                [Disabled]         v|F4: Save & Exit        |
|                                               |ESC: Exit              |
\----------------------------------------------+------------------------/
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                                                                    AB
```

Feature	Option	Description
SATA Configuration	Disabled Enabled	Enables or disables SATA Controller
SATA Mode Selection	AHCI RAID	This will configure SATA as **RAID** or **AHCI**.
SATA Port 0/2/3/4/5	Disabled Enabled	Enable or Disable SATA Port
Hot Plug 0/2/3/4/5	Disabled Enabled	Designates this port as Hot Pluggable.
Spin Up Device	Disabled Enabled	If enabled for any of ports Staggered Spin Up will be performed and only the drives switch has 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


```
                        Aptio Setup - AMI
                    Platform Configuration
/--------------------------------------------+------------------------\
|  General ME Configuration                  |                        |
| Oper. Firmware Version      18:6.0.4.70    |                        |
| Backup Firmware             N/A            |                        |
| Version                                    |                        |
| Recovery Firmware           18:6.0.4.70    |                        |
| Version                                    |                        |
| ME Firmware Status #1       0x00000355     |                        |
| ME Firmware Status #2       0x80506026     |                        |
|   Current State             Operational    |                        |
|   Error Code                No Error       |------------------------|
|   Recovery Cause            N/A            |><: Select Screen       |
|                                            |^v: Select Item         |
|                                            |Enter: Select           |
|                                            |+/-: Change Opt.        |
|                                            |F1: General Help        |
|                                            |F2: Previous Values     |
|                                            |F3: Optimized Defaults  |
|                                            |F4: Save & Exit         |
|                                            |ESC: Exit               |
\--------------------------------------------+------------------------/
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                                                              AB
```

Socket Configuration

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.

```
                           Aptio Setup - AMI
    Main  Advanced  Platform Configuration  Socket Configuration  Server Mgmt  >
/----------------------------------------------+------------------------------\
|> Processor Configuration                      |Displays and provides         |
|> Memory Configuration                         |options to change the         |
|> IIO Configuration                            |Processor Settings            |
|> Advanced Power Management Configuration      |                              |
|                                               |                              |
|                                               |                              |
|                                               |                              |
|                                               |                              |
|                                               |                              |
|                                               |                              |
|                                               |------------------------------|
|                                               |><: Select Screen             |
|                                               |^v: Select Item               |
|                                               |Enter: Select                 |
|                                               |+/-: Change Opt.              |
|                                               |F1: General Help              |
|                                               |F2: Previous Values           |
|                                               |F3: Optimized Defaults        |
|                                               |F4: Save & Exit               |
|                                               |ESC: Exit                     |
\----------------------------------------------+------------------------------/
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                                                                          AB
```

Feature	Option	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	Option	Description
Enable LP(Global)	ALL LPs Single LP	Enables Logical processor (Software Method to Enable/Disable Logical Processor threads).
Machine Check	Disabled Enabled	Enable or Disable the Machine Check
Hardware Prefetcher	Disabled Enabled	= MLC Streamer Prefetcher (MSR 1A4h Bit [0])
Adjacent Cache Prefetcher	Disabled Enabled	= MLC Spatial Prefetcher (MSR 1A4h Bit [1])
Extended APIC	Disabled Enabled	Enables or disables extended APIC support
Enable Intel® TXT	Disabled Enabled	Enables Intel(R) TXT
VMX	Disabled Enabled	Enables the Vanderpool Technology, which takes effect after reboot.
Enable SMX	Disabled Enabled	Enables Safer Mode Extensions

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CPU Socket0 Configuration

```
                           Aptio Setup - AMI
                                   Socket Configuration
/----------------------------------------------+-------------------------\
| CPU Socket 0 Configuration                   |0: Enable all cores.     |
| -------------------------------------------- |FFFFFFFFFFFFFFFFF:       |
| ---                                          |Disable all cores.       |
|                                              |NOTE: At least one core  |
| Available Bitmap:      0C45A28ECC95CA99      |per CPU must be          |
| -------------------------------------------- |enabled. Disabling all   |
| ---                                          |cores is an invalid      |
| Disable Bitmap:                 0            |configuration.           |
|                                              |                         |
|                                              |-------------------------|
|                                              |><: Select Screen        |
|                                              |^v: Select Item          |
|                                              |Enter: Select            |
|                                              |+/-: Change Opt.         |
|                                              |F1: General Help         |
|                                              |F2: Previous Values      |
|                                              |F3: Optimized Defaults   |
|                                              |F4: Save & Exit          |
|                                              |ESC: Exit                |
\----------------------------------------------+-------------------------/
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```

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

Memory Configuration

```
                          Aptio Setup - AMI
                                  Socket Configuration
/------------------------------------------+--------------------------\
|                                          |Maximum Memory          ^|
|   ----------------------------------------  |Frequency Selections in *|
|   ---                                    |MT/s. If Enforce POR is *|
|   Integrated Memory Controller (iMC)     |disabled, user will be  *|
|   ----------------------------------------  |able to run at higher   *|
|   ---                                    |frequencies than the    *|
|                                          |memory support (limited +|
|   Memory Frequency        [Auto]         |by processor support).  v|
|>  Memory Topology                        |                         |
|                                          |-------------------------|
|                                          |><: Select Screen        |
|                                          |^v: Select Item          |
|                                          |Enter: Select            |
|                                          |+/-: Change Opt.         |
|                                          |F1: General Help         |
|                                          |F2: Previous Values      |
|                                          |F3: Optimized Defaults   |
|                                          |F4: Save & Exit          |
|                                          |ESC: Exit                |
\------------------------------------------+--------------------------/
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                                                                    AB
```

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

IIO Configuration

```
                        Aptio Setup - AMI
                                    Socket Configuration
/----------------------------------------+----------------------\
| IIO Configuration                      |                      |
| -------------------------------------- |                      |
| ---                                    |                      |
|                                        |                      |
|> Socket0 Configuration                 |                      |
|> Intel VT for Directed I/O (VT-d)      |                      |
|                                        |                      |
|  IIO-PCIE Express Global Options       |                      |
| ====================================== |                      |
| PCI-E ASPM Support      [Disable]      |----------------------|
| (Global)                               |><: Select Screen     |
| PCIe Extended Tag       [Auto]         |^v: Select Item       |
| Support                                |Enter: Select         |
| PCIe Max Read Request   [AUTO]         |+/-: Change Opt.      |
| Size                                   |F1: General Help      |
|                                        |F2: Previous Values   |
|                                        |F3: Optimized Defaults|
|                                        |F4: Save & Exit       |
|                                        |ESC: Exit             |
\----------------------------------------+----------------------/
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```

Feature	Option	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 Disable/ Per-Port the ASPM support for all downstream devices.
PCIe Extended Tag Enable	Disable Auto	Auto/Disable - BIOS sets 8-bit Tag Field for PCIe Root Port/End Point. Disable - BIOS sets 5-bit Tag Field for PCIe Root Port/End Point
PCIe Max Read Request Size	Auto 128B 256B 512B 1024B 2048B 4096B	Set Max Read Request Size in End Points

Socket0 Configuration

```
                           Aptio Setup - AMI
                                Socket Configuration
/-------------------------------------------------+-----------------------\
|  IOU0 (IIO PCIe Port 1)    [x_x8x_x8]           |Settings related to PCI |
|  IOU1 (IIO PCIe Port 2)    [x_x8x_x8]           |Express Ports           |
|  IOU2 (IIO PCIe Port 3)    [x_x8x_x8]           |(0/1A/1B/1C/1D/2A/2B/2C/ |
|  IOU3 (IIO PCIe Port 4)    [x_x8x_x8]           |2D/3A/3B/3C/3D/4A/4B/4C/ |
|  IOU4 (IIO PCIe Port 5)    [x_x8x4x4]           |4D/5A/5B/5C/5D)          |
|> Port DMI                                       |                        |
|> Port 1A                                        |                        |
|> Port 1E                                        |                        |
|> Port 2A                                        |                        |
|> Port 2E                                        |------------------------|
|> Port 3A                                        |><: Select Screen       |
|> Port 3E                                        |^v: Select Item         |
|> Port 4A                                        |Enter: Select           |
|> Port 4E                                        |+/-: Change Opt.         |
|> Port 5A                                        |F1: General Help        |
|> Port 5C                                        |F2: Previous Values     |
|> Port 5E                                        |F3: Optimized Defaults  |
|                                                 |F4: Save & Exit         |
|                                                 |ESC: Exit               |
\-------------------------------------------------+------------------------/
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```

Feature	Option	Description
Port DMI	None	Settings related to PCI Express Port DMI
Port 1A	None	Settings related to PCI Express Port 1A
Port 1E	None	Settings related to PCI Express Port 1E
Port 2A	None	Settings related to PCI Express Port 2A
Port 2E	None	Settings related to PCI Express Port 2E
Port 3A	None	Settings related to PCI Express Port 3A
Port 3E	None	Settings related to PCI Express Port 3E
Port 4A	None	Settings related to PCI Express Port 4A
Port 4E	None	Settings related to PCI Express Port 4E
Port 5A	None	Settings related to PCI Express Port 5A
Port 5C	None	Settings related to PCI Express Port 5C
Port 5E	None	Settings related to PCI Express Port 5E

Advanced Power Management Configuration
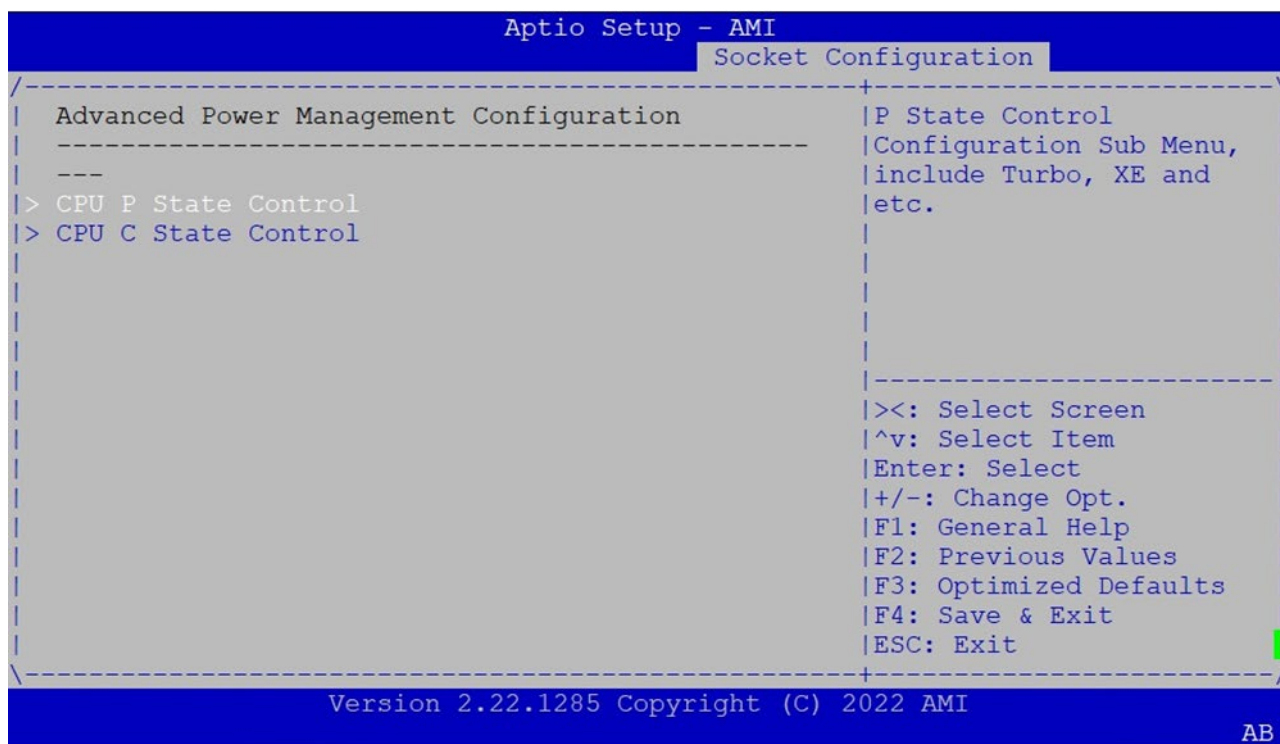
Feature	Option	Description
CPU P State Control	None	P State Control Configuration Sub menu, include Turbo, XE, etc.
CPU C State Control	None	CPU C State Settings

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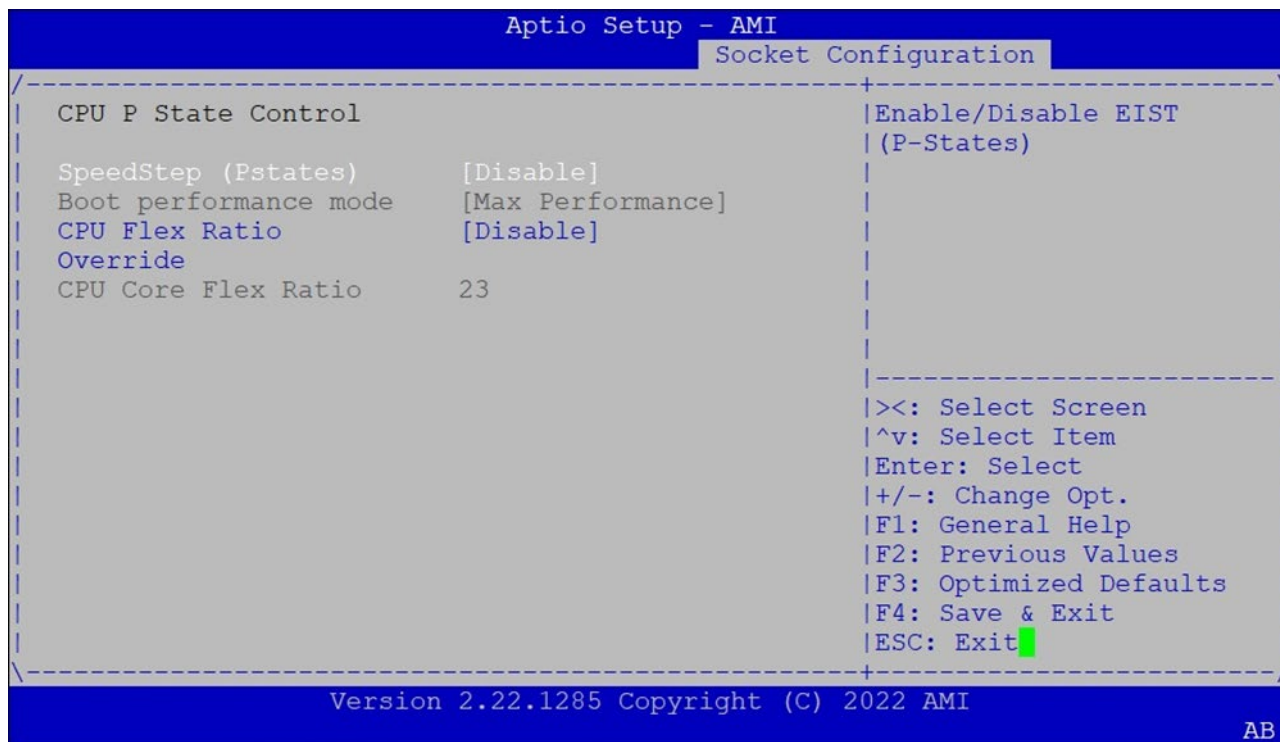
Feature	Option	Description
SpeedStep (Pstates)	Disabled Enabled	Enables or disables EIST (P-States)
Boot Performance Mode	Max Performance Max Efficient Set by Intel Node Manager	Select the performance state that the BIOS will set before OS hand off.
CPU Flex Ratio Override	Disabled Enabled	Enable/Disable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

CPU C State Control
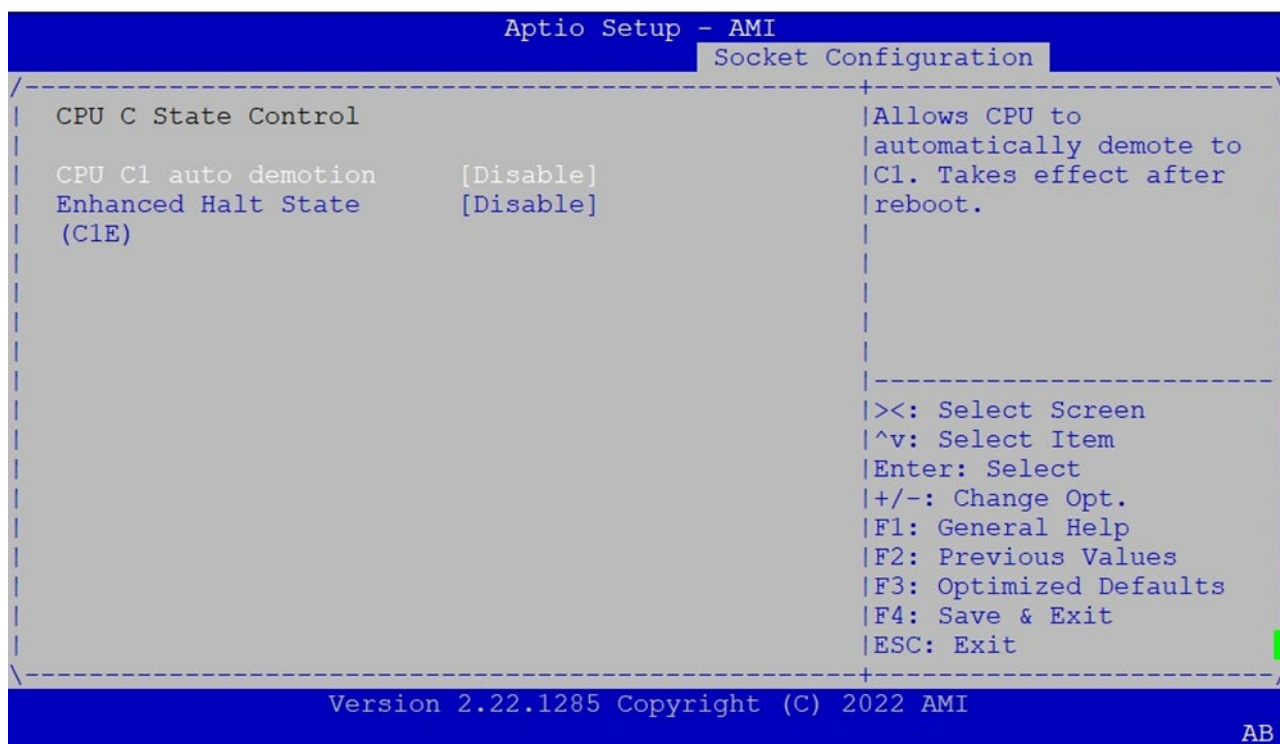
Feature	Option	Description
CPU C1 auto demotion	Disabled Enabled	Autonomous Core C-State Control
Enhanced Halt State (C1E)	Disabled Enabled	Core C1E auto promotion Control. Takes effect after reboot.

Server Mgmt (SKU A / SKU B)

Use [→] or [←] to select [Server Mgmt] setup screen. Under this screen, you may use [↑] [↓] to select an item you want to configure.

```
                          Aptio Setup - AMI
     Main  Advanced  Platform Configuration  Socket Configuration  Server Mgmt  >
/------------------------------------------------+----------------------------\
|  BMC Support              [Disabled]           |Enable/Disable              |
|                                                |interfaces to               |
|                                                |communicate with BMC        |
|                                                |                            |
|                                                |                            |
|                                                |                            |
|                                                |                            |
|                                                |                            |
|                                                |                            |
|                                                |                            |
|                                                |----------------------------|
|                                                |><: Select Screen           |
|                                                |^v: Select Item             |
|                                                |Enter: Select               |
|                                                |+/-: Change Opt.            |
|                                                |F1: General Help            |
|                                                |F2: Previous Values         |
|                                                |F3: Optimized Defaults      |
|                                                |F4: Save & Exit             |
|                                                |ESC: Exit                   |
\------------------------------------------------+----------------------------/
              Version 2.22.1289 Copyright (C) 2023 AMI
```
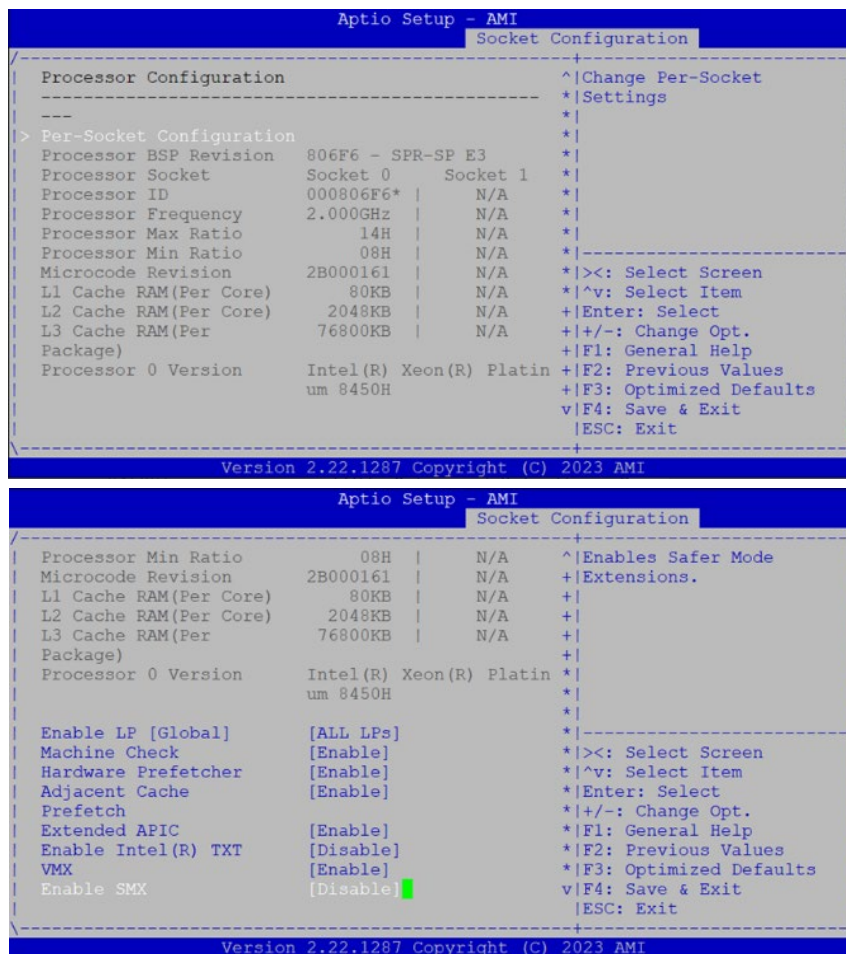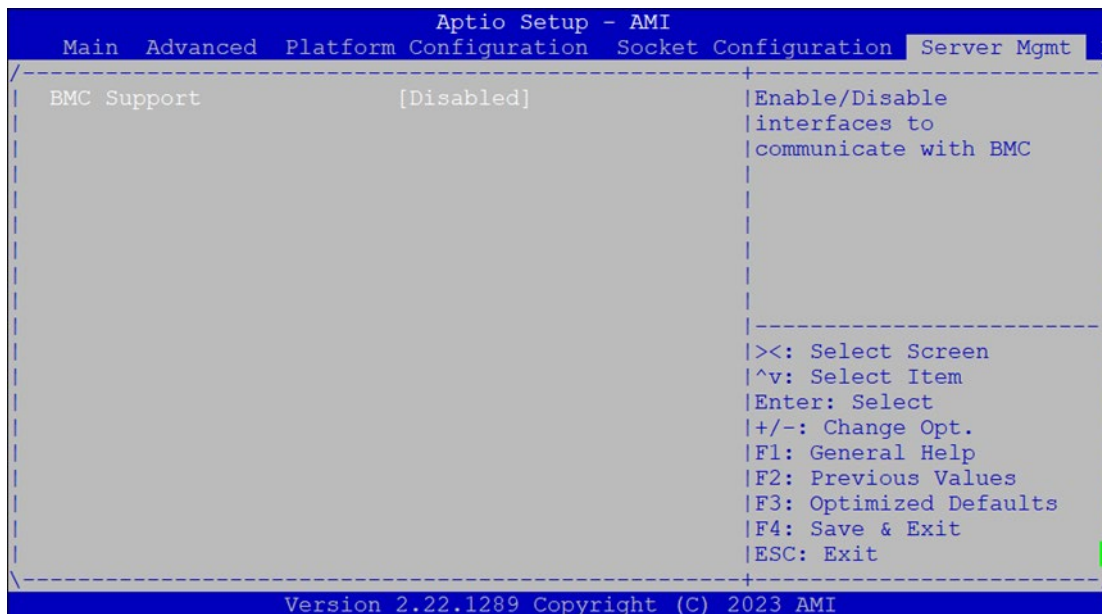
Feature	Option	Description
BMC Support	Disabled	This platform (SKU) doesn't support BMC.

Server Mgmt (SKU C / SKU D)

Use [→] or [←] to select [Server Mgmt] setup screen. Under this screen, you may use [↑] [↓] to select an item you want to configure.
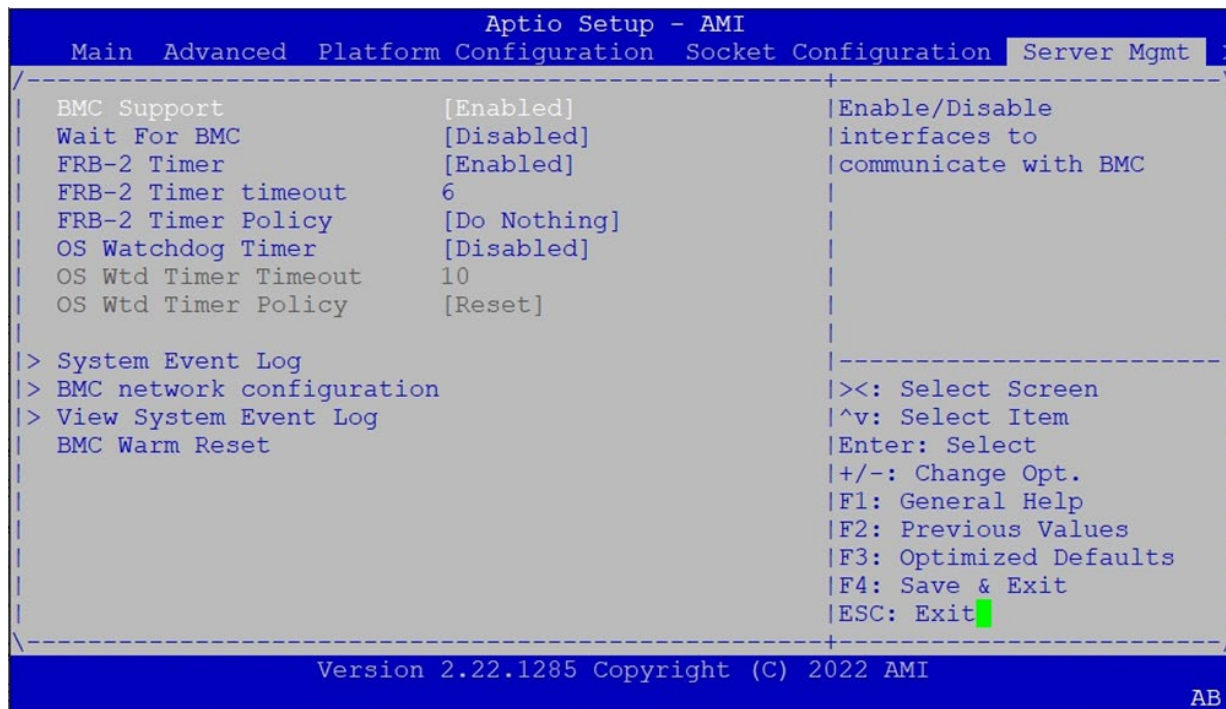
Feature	Option	Description
BMC Support	Enabled Disabled	Enable or disables interfaces to communicate with BMC.
Wait For BMC	Enabled Disabled	Wait For BMC response for specified time out. In PILOTII, BMC starts at the same time when BIOS starts during AC power ON. It takes around 30 seconds to initialize Host to BMC interfaces.
FRB-2 Timer	Enabled Disabled	Enables or disables FRB-2 timer (POST timer).
FRB-2 Timer timeout	3 minutes 4 minutes 5 minutes 6 minutes	Enter value Between 3 to 6 min for FRB-2 Timer Expiration value.
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.

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OS Wtd Timer Timeout	10 minutes	Configure the length of the OS Boot Watchdog Timer. Not available if OS Boot Watchdog Timer is disabled.
OS Wtd Timer Policy	Reset	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 (SKU C/SKU D)

Use this option to change the SEL event log configuration.

```
                        Aptio Setup - AMI
                                              Server Mgmt
/-----------------------------------------+-----------------------\
|  Enabling/Disabling Options             |Change this to enable  |
|  SEL Components          [Enabled]      |or disable event       |
|                                         |logging for            |
|  Erasing Settings                       |error/progress codes   |
|  Erase SEL              [No]            |during boot.           |
|  When SEL is Full       [Do Nothing]    |                       |
|                                         |                       |
|  NOTE: All values changed here do not take |                    |
|        effect until computer is restarted. |                    |
|                                         |                       |
|                                         |-----------------------|
|                                         |><: Select Screen      |
|                                         |^v: Select Item        |
|                                         |Enter: Select          |
|                                         |+/-: Change Opt.       |
|                                         |F1: General Help       |
|                                         |F2: Previous Values    |
|                                         |F3: Optimized Defaults |
|                                         |F4: Save & Exit        |
|                                         |ESC: Exit           I  |
\-----------------------------------------+-----------------------/
           Version 2.22.1285 Copyright (C) 2022 AMI
                                                       AB
```

Feature	Option	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 (SKU C/SKU D)

This option allows you to configure BMC network parameters.

```
                            Aptio Setup - AMI
                                                      Server Mgmt
/--------------------------------------------+------------------------\
|  --BMC network configuration--             ^|Select to configure LAN ^|
|  ***********************                    *|channel parameters       *|
|  Configure IPv4 support                     *|statically or            *|
|  ***********************                    *|dynamically(by BIOS or   *|
|                                             *|BMC). Unspecified        *|
|  Lan channel 1                              *|option will not modify   *|
|  Configuration Address      [Unspecified]   *|any BMC network          +|
|  source                                     +|parameters during BIOS   v|
|  Current Configuration      StaticAddress   +|                          |
|  Address source                             +|------------------------|
|  Station IP address         192.168.0.100   +|><: Select Screen        |
|  Subnet mask                255.255.255.0   +|^v: Select Item          |
|  Station MAC address        3A-0F-60-45-74-A7  +|Enter: Select         |
|  Router IP address          0.0.0.0         +|+/-: Change Opt.         |
|  Router MAC address         00-00-00-00-00-00  +|F1: General Help       |
|                                             +|F2: Previous Values      |
|  Lan channel 2                              +|F3: Optimized Defaults   |
|                                             v|F4: Save & Exit          |
|                                              |ESC: Exit                |
\--------------------------------------------+------------------------/
              Version 2.22.1285 Copyright (C) 2022 AMI
                                                                  AB
```

```
                            Aptio Setup - AMI
                                                      Server Mgmt
/--------------------------------------------+------------------------\
|  Current Configuration      Unspecified     ^|Enable VLAN Support to   |
|  Address source                             +|specify the 802.1q VLAN  |
|  Station IP address         0.0.0.0         +|ID                       |
|  Subnet mask                0.0.0.0         +|                          |
|  Station MAC address        00-00-00-00-00-00  +|                       |
|  Router IP address          0.0.0.0         +|                          |
|  Router MAC address         00-00-00-00-00-00  +|                       |
|                                             +|                          |
|  ***********************                    *|                          |
|  Configure VLAN support                     *|------------------------|
|  ***********************                    *|><: Select Screen        |
|                                             *|^v: Select Item          |
|  Lan channel 1                              *|Enter: Select            |
|                                             *|+/-: Change Opt.         |
|  VLAN Support               [Unspecified]   +|F1: General Help         |
|  Current Configuration      Disabled        +|F2: Previous Values      |
|  Address source                             +|F3: Optimized Defaults   |
|  VLAN ID                    0               v|F4: Save & Exit          |
|                                              |ESC: Exit                |
\--------------------------------------------+------------------------/
              Version 2.22.1285 Copyright (C) 2022 AMI
                                                                  AB
```

```
                           Aptio Setup - AMI
                                                        Server Mgmt
/------------------------------------------------+-----------------------\
|  Configure VLAN support                       ^|Enable VLAN Support to |
|  *********************                        +|specify the 802.1q VLAN|
|                                               +|ID                     |
|  Lan channel 1                                +|                       |
|                                               +|                       |
|  VLAN Support           [Unspecified]         +|                       |
|  Current Configuration  Disabled              +|                       |
|  Address source                               +|                       |
|  VLAN ID                0                      +|                       |
|  VLAN Priority          0                      +|-----------------------|
|                                               +|><: Select Screen      |
|  Lan channel 2                                *|^v: Select Item        |
|                                               *|Enter: Select          |
|  VLAN Support           [Unspecified]         *|+/-: Change Opt.       |
|  Current Configuration  -                      *|F1: General Help       |
|  Address source                               *|F2: Previous Values    |
|  VLAN ID                -                      *|F3: Optimized Defaults |
|  VLAN Priority          -                      v|F4: Save & Exit        |
|                                                |ESC: Exit              |
\------------------------------------------------+-----------------------/
             Version 2.22.1285 Copyright (C) 2022 AMI
                                                                      AB
```

Feature	Option	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 (SKU C/SKU D)

This option allows you to view the System Event Log Records.

```
                          Aptio Setup - AMI
     Main  Advanced  Platform Configuration  Socket Configuration  Server Mgmt  >
/-----------------------------------------------------+----------------------\
|  BMC Support              [Enabled]                 |Press <Enter> to view |
|  Wait For BMC             [Disabled]                |the System Event Log  |
|  FRB-2 Timer             [Enabled]                  |Records.              |
|  FRB-2 Timer timeout      6                         |                      |
|  FRB-2 Timer Policy      [Do Nothing]               |                      |
|  OS Watchdog Ti/--------- View System Event Log ----------\                |
|  OS Wtd Timer T|                                          |                |
|  OS Wtd Timer P|   Retrieving all system events will take |                |
|               |       time. Do you want to continue?      |                |
|> System Event L|                                          |----------------|
|> BMC network co|------------------------------------------|   Screen       |
|> View System Ev|         Yes                    No        |   Item         |
|  BMC Warm Reset\------------------------------------------/   ect          |
|                                                          e Opt.            |
|                                                    |F1: General Help       |
|                                                    |F2: Previous Values    |
|                                                    |F3: Optimized Defaults |
|                                                    |F4: Save & Exit        |
|                                                    |ESC: Exit              |
\-----------------------------------------------------+----------------------/
          Version 2.22.1285 Copyright (C) 2022 AMI
                                                               AB
```

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Security Setup

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.

```
                        Aptio Setup – AMI
 < Security  Boot  Save & Exit
/------------------------------------------------+------------------------\
| Password Description                           |Set Administrator       |
|                                                |Password                |
| If ONLY the Administrator's password is set,   |                        |
| then this only limits access to Setup and is   |                        |
| only asked for when entering Setup.            |                        |
| If ONLY the User's password is set, then this  |                        |
| is a power on password and must be entered to  |                        |
| boot or enter Setup. In Setup the User will    |                        |
| have Administrator rights.                     |                        |
| The password length must be                    |------------------------|
| in the following range:                        |><: Select Screen       |
| Minimum length           3                     |^v: Select Item         |
| Maximum length           20                    |Enter: Select           |
|                                                |+/-: Change Opt.        |
| Administrator Password                         |F1: General Help        |
| User Password                                  |F2: Previous Values     |
|                                                |F3: Optimized Defaults  |
|> Secure Boot                                   |F4: Save & Exit         |
|                                                |ESC: Exit               |
\------------------------------------------------+------------------------/
            Version 2.22.1285 Copyright (C) 2022 AMI
                                                              AB
```
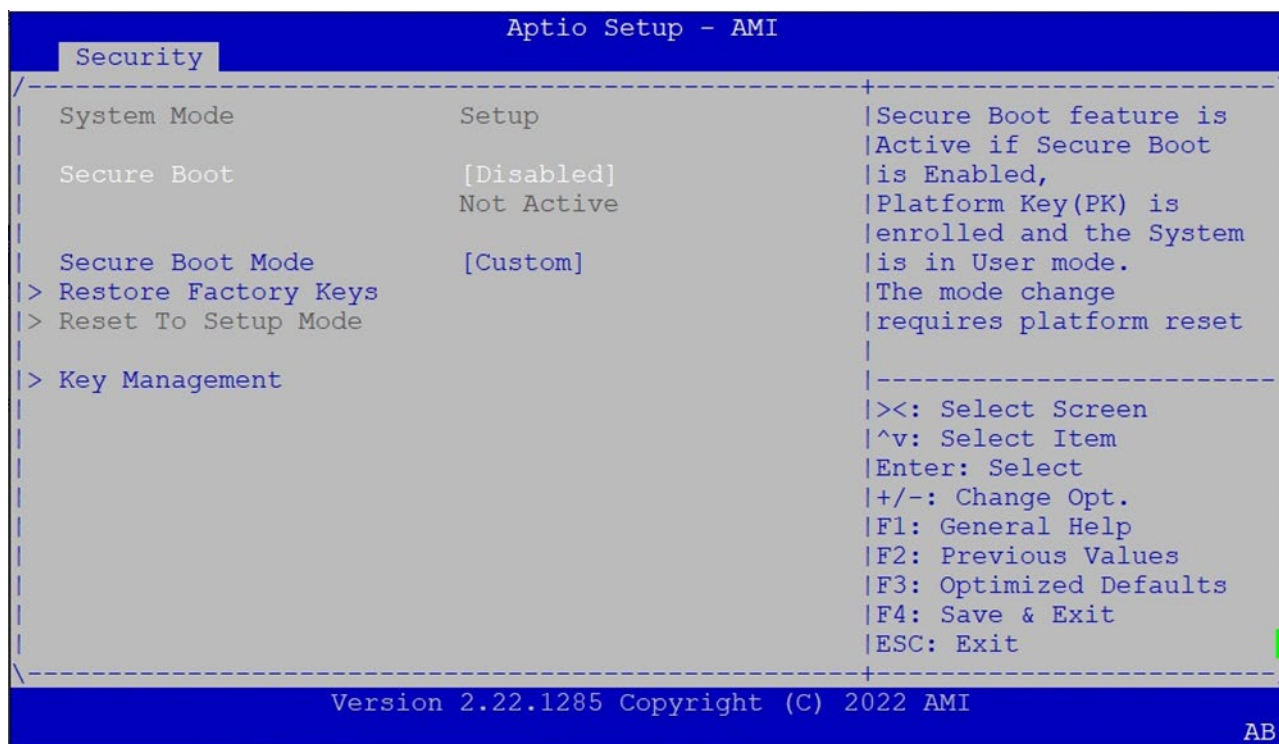
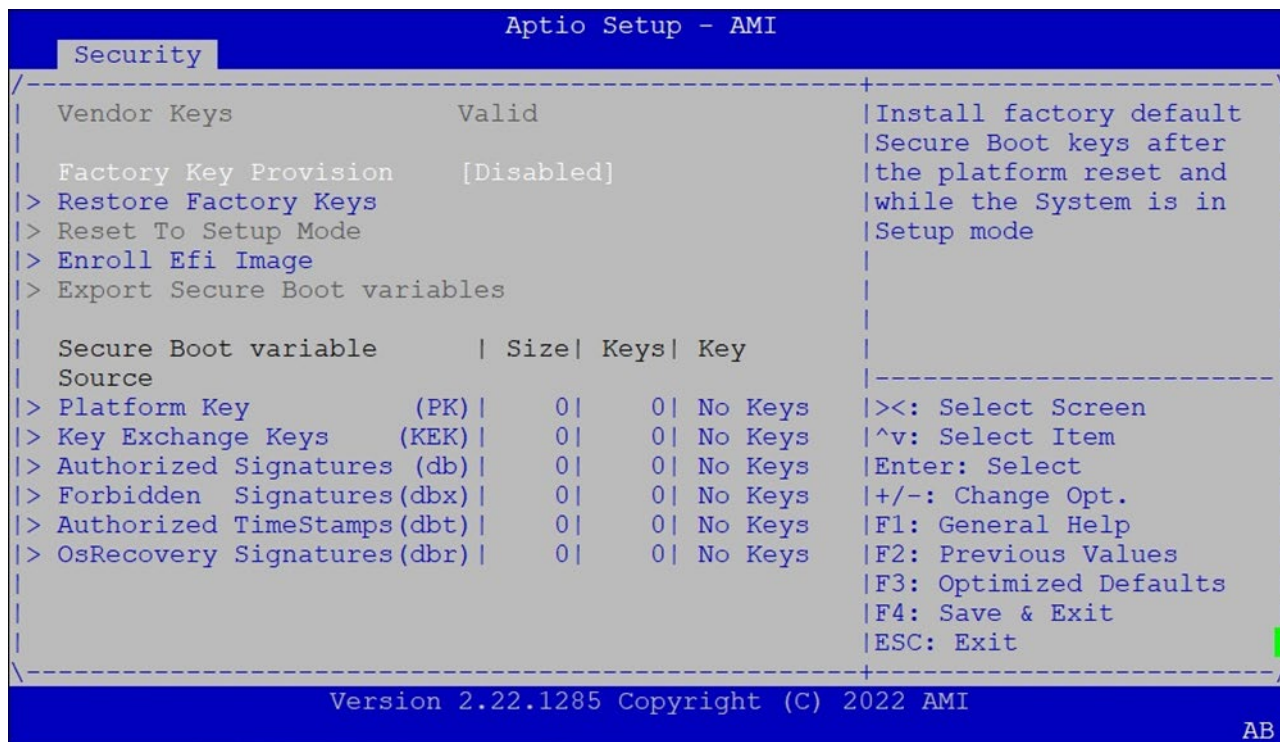| Feature	Description
Administrator Password	If ONLY the Administrator's password is set, it only limits access to Setup and is only asked for when entering Setup.
User Password	If ONLY the User's password is set, it serves as a power-on password and must be entered to boot or enter Setup. In Setup, the User will have Administrator rights.

Secure Boot

This option allows you to customize Secure Boot settings.

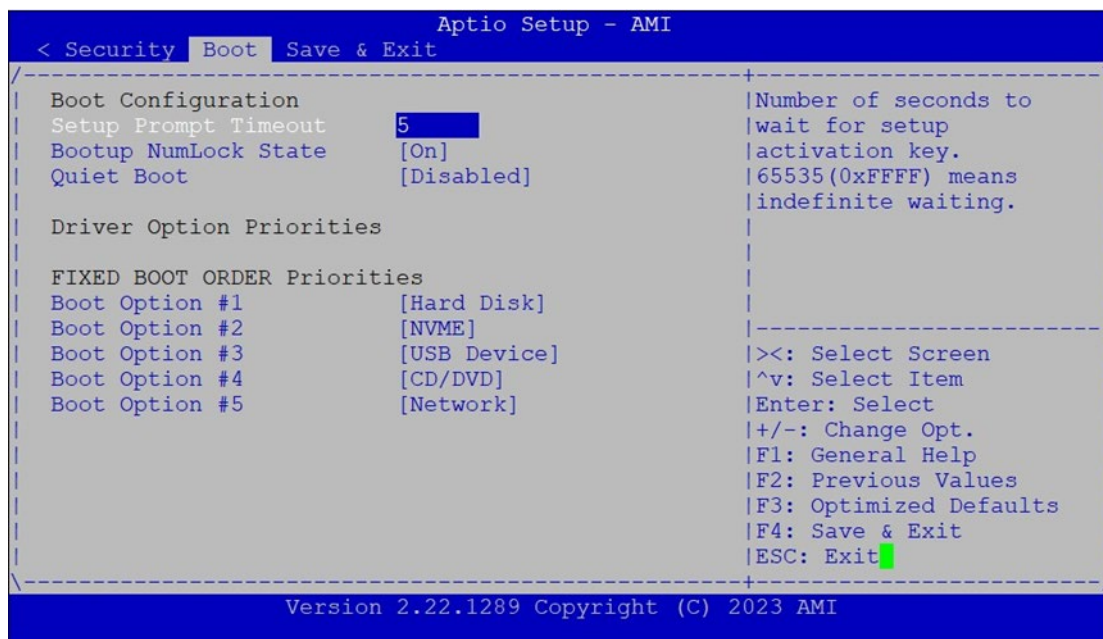| Feature	Option	Description
Secure Boot	Disabled Enabled	Secure Boot is activated when Platform Key (PK) is enrolled, System mode is User/Deployed, and CSM function is disabled.
Secure Boot Mode	Standard Custom	Secure Boot mode selector: In **Custom** mode, Secure Boot Variables can be configured without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

Key Management

```
                        Aptio Setup - AMI
   Security
/------------------------------------------+------------------------\
| Vendor Keys             Valid            |Install factory default |
|                                          |Secure Boot keys after  |
| Factory Key Provision    [Disabled]      |the platform reset and  |
|> Restore Factory Keys                    |while the System is in   |
|> Reset To Setup Mode                     |Setup mode              |
|> Enroll Efi Image                        |                        |
|> Export Secure Boot variables            |                        |
|                                          |                        |
| Secure Boot variable     | Size| Keys| Key   |                   |
| Source                                   |------------------------|
|> Platform Key        (PK)|    0|    0| No Keys |><: Select Screen  |
|> Key Exchange Keys  (KEK)|    0|    0| No Keys |^v: Select Item     |
|> Authorized Signatures (db)|  0|    0| No Keys |Enter: Select      |
|> Forbidden  Signatures(dbx)|  0|    0| No Keys |+/-: Change Opt.   |
|> Authorized TimeStamps(dbt)|  0|    0| No Keys |F1: General Help   |
|> OsRecovery Signatures(dbr)|  0|    0| No Keys |F2: Previous Values|
|                                          |F3: Optimized Defaults |
|                                          |F4: Save & Exit        |
|                                          |ESC: Exit              |
\------------------------------------------+------------------------/
               Version 2.22.1285 Copyright (C) 2022 AMI
                                                              AB
```

Feature	Option	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 Setup

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.
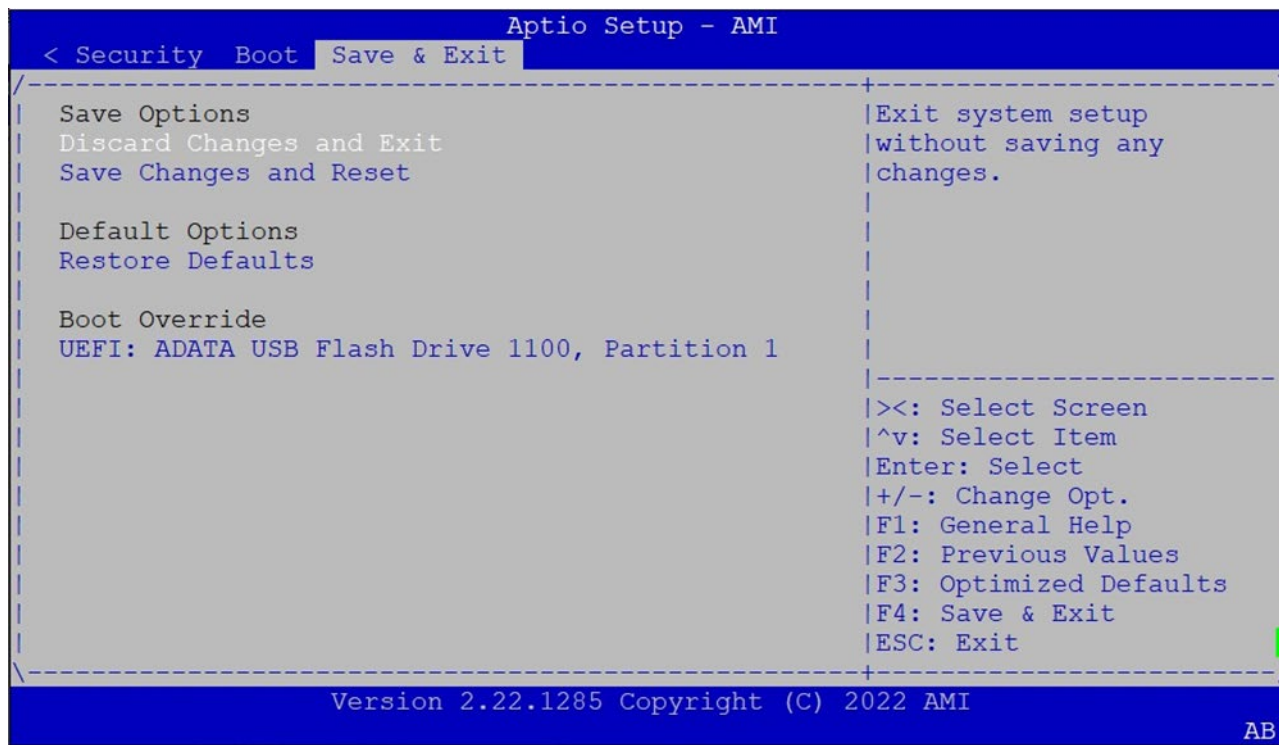
```
                       Aptio Setup - AMI
 < Security  Boot  Save & Exit
/-------------------------------------------------+-------------------------\
|  Boot Configuration                             |Number of seconds to     |
|  Setup Prompt Timeout        5                  |wait for setup           |
|  Bootup NumLock State        [On]               |activation key.          |
|  Quiet Boot                  [Disabled]         |65535(0xFFFF) means      |
|                                                 |indefinite waiting.      |
|  Driver Option Priorities                       |                         |
|                                                 |                         |
|  FIXED BOOT ORDER Priorities                    |                         |
|  Boot Option #1              [Hard Disk]        |                         |
|  Boot Option #2              [NVME]             |-------------------------|
|  Boot Option #3              [USB Device]       |><: Select Screen        |
|  Boot Option #4              [CD/DVD]           |^v: Select Item          |
|  Boot Option #5              [Network]          |Enter: Select            |
|                                                 |+/-: Change Opt.         |
|                                                 |F1: General Help         |
|                                                 |F2: Previous Values      |
|                                                 |F3: Optimized Defaults   |
|                                                 |F4: Save & Exit          |
|                                                 |ESC: Exit                |
\-------------------------------------------------+-------------------------/
               Version 2.22.1289 Copyright (C) 2023 AMI
```

Item	Option	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 specific boot device priority sequence from available Group device.

Save and Exit Setup

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.

```
                              Aptio Setup - AMI
    < Security  Boot  Save & Exit

/------------------------------------------------+------------------------\
|  Save Options                                  |Exit system setup       |
|  Discard Changes and Exit                      |without saving any      |
|  Save Changes and Reset                        |changes.                |
|                                                |                        |
|  Default Options                               |                        |
|  Restore Defaults                              |                        |
|                                                |                        |
|  Boot Override                                 |                        |
|  UEFI: ADATA USB Flash Drive 1100, Partition 1 |                        |
|                                                |------------------------|
|                                                |><: Select Screen       |
|                                                |^v: Select Item         |
|                                                |Enter: Select           |
|                                                |+/-: Change Opt.        |
|                                                |F1: General Help        |
|                                                |F2: Previous Values     |
|                                                |F3: Optimized Defaults  |
|                                                |F4: Save & Exit         |
|                                                |ESC: Exit               |
\------------------------------------------------+------------------------/
                    Version 2.22.1285 Copyright (C) 2022 AMI
                                                                       AB
```

■ **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.

```
+- Exit Without Saving -+
|                       |
| Quit without saving?  |
|                       |
|     Yes      No       |
+-----------------------+
```
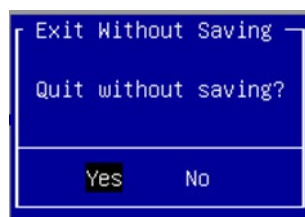
■ **Save Changes and Reset**

When Users have completed the system configuration changes, select this option to save the changes and reset 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 Reset" option is selected. Select "Yes" to Save Changes and reset.
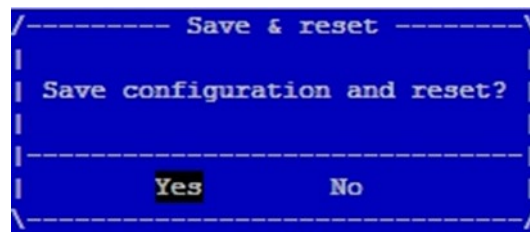
■ **Restore Defaults**

Restore default values for all setup options. Select "**Yes"** to load Optimized defaults.
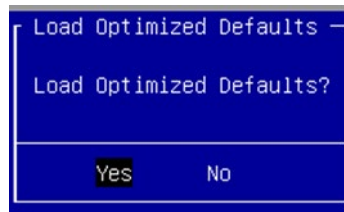
Note: The items under Boot Override may not be the same images, it would depend on devices connected on the system.

APPENDIX A: LED INDICATOR EXPLANATIONS

▶ System Power / Status / HDD Activity

The status explanations of LED indicators on Front Panel are as follows:

Green: System Power

Red/Green: System Status

Amber: HDD Activity

LED	COLOR	LED ACTION	DESCRIPTION
Power	**Green**	Steady	System is powered ON
	OFF	N/A	System is powered OFF
Status	**Green**	Steady	LED controlled by GPIO
	Red	Steady	
	OFF	N/A	System is powered OFF
Storage	**Amber**	Blinking	Storage (HDD/SATA/NVME) Active
	OFF	N/A	No Data Access

▶ RJ-45 LAN LED

2.5G/10G
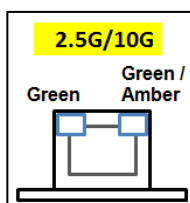
Green   Green / Amber

2.5Gb RJ-45 Define:

Speed	Green (Active)	Green/Amber (Link)
10/100M	Blinking / Data access	OFF
1G	Blinking / Data access	ON (Amber)
2.5G	Blinking / Data access	ON (Green)

1. When cable is plug-in and network is linked. Both LED will be bright. The behavior is as defined.

2. Without the Cable plug-in, the LED should be off

3. If LAN Driver controls the LED, the behavior will follow the driver

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.
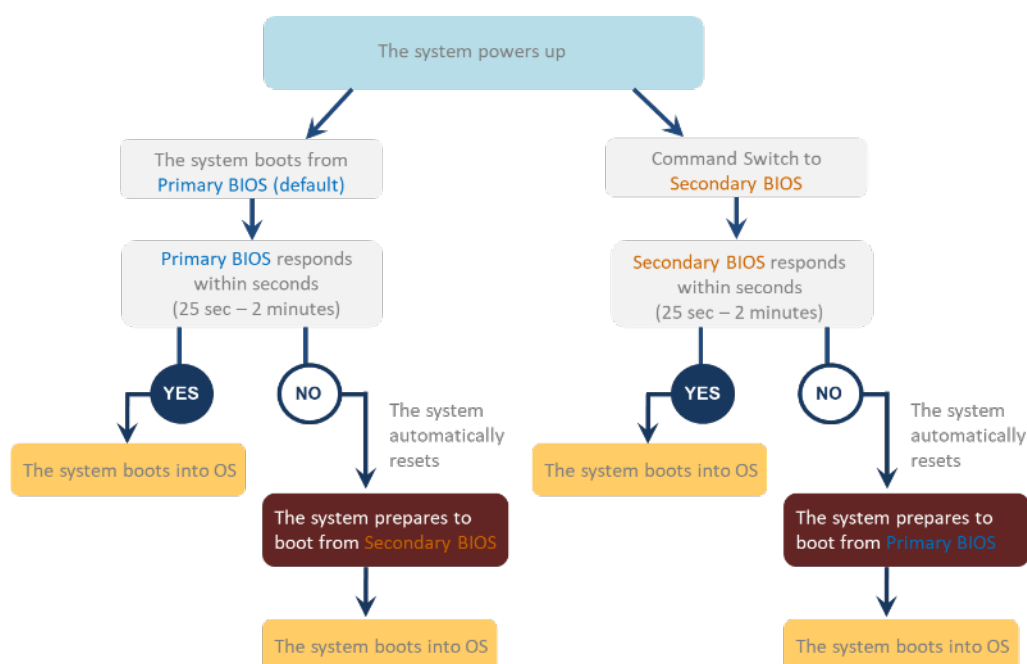
2nd Gen Dual BIOS

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.

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● **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: REDUNDANT POWER MODULE BEHAVIOR

Define Alarm and Mute behavior

	Power Module Fail	Power Module Remove	Power Cord Remove
Buzzer	Alarm	Alarm	Alarm
Mute	Change back the PSU Module or Press the Mute Button	Put back the PSU Module or Press the Mute Button	Plug-in the Power cord or Press the Mute Button

Define the Sequence of the Power Module

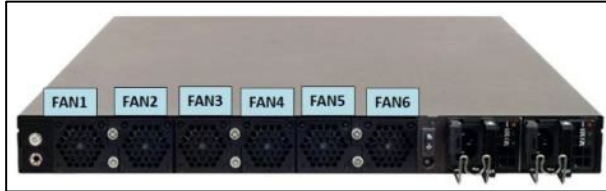PSU Sequence – The detection is from the left to the right side, from the bottom to the top.

Example:

APPENDIX D: FAN SEQUENCE

Define the Sequence of the Fan

Fan Sequence – The detection is from the left to the right side, from the bottom to the top side.

Example:

APPENDIX E: SMART POWER AND RESET BUTTON

Smart Power and Reset Button – Control by CPLD

Reset Button

Power Button
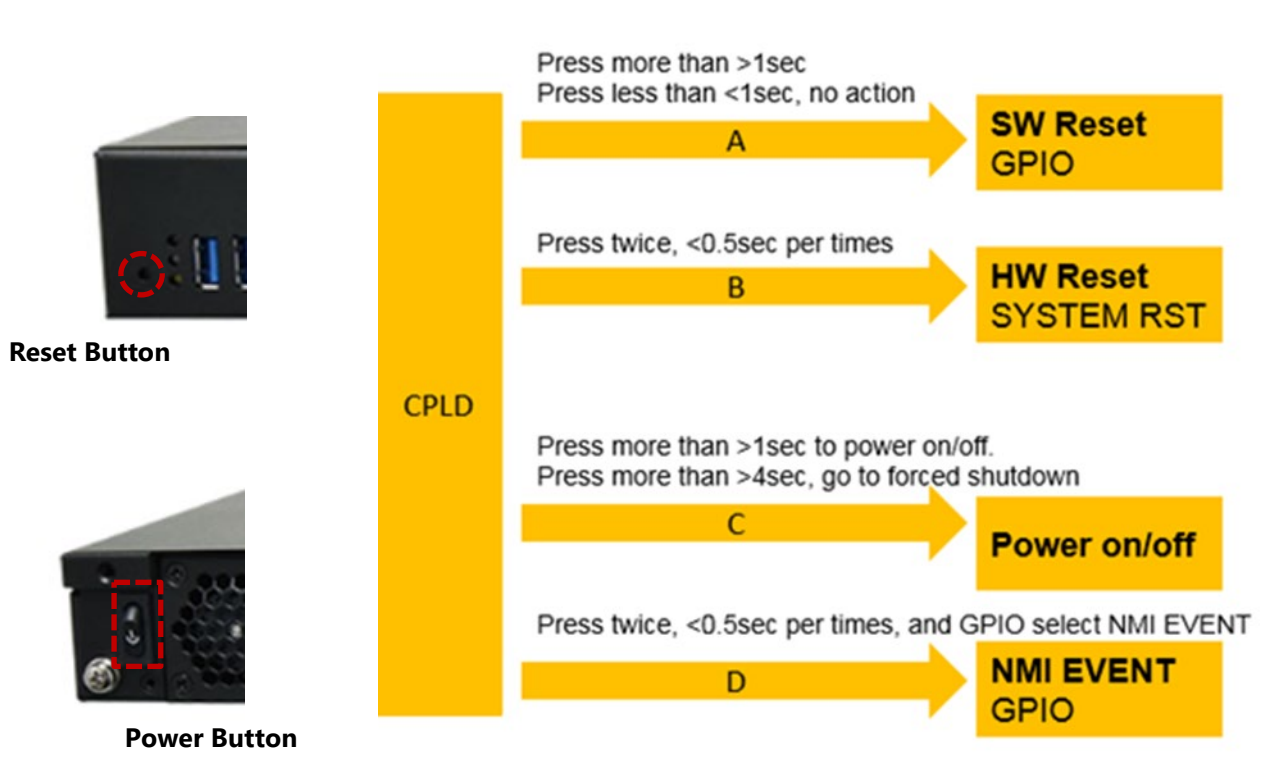
APPENDIX F: ESD/SURGE ENHANCEMENT

Electrostatic Discharge (ESD): IEC-61000-4-2	Contact Discharge	Air Discharge	STD
Level 1	±2 kV	±2 kV	
Level 2	±4 kV	±4 kV	4K Contact (Default)
Level 3	±6 kV	±8 kV	8K Air (Default)
Level 4 (TBD)	±8 kV	±15 kV	
			STD
Surge Immunity (LAN) IEC-61000-4-5	Test Level		
Level 0	25V		
Level 1	500V		
Level 2	1kV		V (Default for Power DM (L to N) Line to Line V (Default for LAN CM (S to G) Line to Ground
Level 3 (TBD)	2kV		V (Default for Power CM (L to G, N to G, L+N to G) Line to Ground
Level 4	4kV		
			STD
Electrical Fast Transient (EFT): IEC-61000-4-4			
Level 1	0.5kV		V (Default for LAN)
Level 2	1kV		V (Default for Power)
Level 3 (TBD)	2kV		
Level 4	4kV		

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APPENDIX G: 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 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.

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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 describe failure details) ☐ Testing Purpose
Company:				Contact Person:
Phone No.				Purchased Date:
Fax No.:				Apply Date:
Return Shipping Address: _____				
Shipping by: ☐ Air Freight ☐ Sea ☐ Express:_____ ☐ Others:_____				

Item	GP	Model Name	Serial Number	Configuration

Item	Problem Code	Failure Status

*Problem Code:

01:D.O.A.
02: Second Time R.M.A.
03: CMOS Data Lost
04: FDC Fail
05: HDC Fail
06: Bad Slot

07: BIOS Problem
08: Keyboard Controller Fail
09: Cache RMA Problem
10: Memory Socket Bad
11: Hang Up Software
12: Appearance Damage

13: SCSI
14: LPT Port
15: PS2
16: LAN
17: COM Port
18: Watchdog Timer

19: DIO
20: Buzzer
21: Shut Down
22: Panel Fail
23: CRT Fail
24: Others (Pls specify)

Requested by

Confirmed by supplier

_____
Authorized Signature / Date

_____
Authorized Signature / Date