Lanner

Network Appliance Platform

Hardware Platforms for Network Computing

NCA-6530
User Manual

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About this Document

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

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

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

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.

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Acknowledgment

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

Electrical Safety Instructions

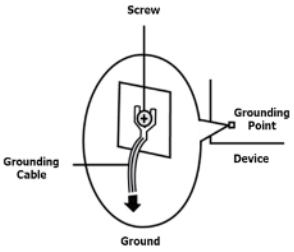
Before turning on the device, ground the grounding cable of the equipment. Proper grounding (grounding) is very important to protect the equipment against the harmful effects of external noise and to reduce the risk of electrocution in the event of a lightning strike. To uninstall the equipment, disconnect 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 6 mm2 or 8AWG.

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 6 mm2 ou 8 AWG.

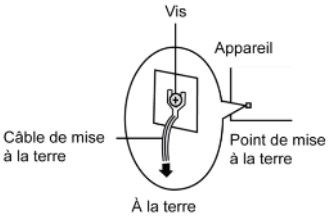
Grounding Procedure for This Device

- Connect the grounding cable to the ground.
- The protection device for the DC power source must provide 40A current.
- This protection device must be connected to the power source before DC power.



Procédure de mise à la terre l'équipement

- Branchez le câble de mise à la terre à la terre.
- L'appareil de protection pour la source d'alimentation CC doit fournir 40A de courant.
- Cet appareil de protection doit être branché à la source d'alimentation avant l'alimentation CC.



Warning

- This equipment must be grounded. The power cord for product should be connected to a socket-outlet with earthing connection.
- Product shall be used with Class 1 laser device modules.
- 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 be installed and serviced by skilled person.

Avertissement

- Cet équipement doit être mis à la terre. La fiche d'alimentation doit être connectée à une prise de terre correctement câblée
- Le produit doit être utilisé avec des modules de dispositifs laser de classe 1.
- Peut être installé dans des salles de matériel de traitement de l'information conformément à l'article 645 du National Electrical Code et à la NFPA 75.
- Les matériels sont destinés à être installés dans des EMPLACEMENTS À ACCÈS RESTREINT.

For DC input, this unit is intended to be supplied by an UL listed power source, rated 48V to 60Vdc, 40A min, 60A max, and an altitude operation 5000m min.

Table of Contents

CHAPTER 1: PRODUCT OVERVIEW

Thank you for choosing NCA-6530. The NCA-6530, a high-performance 2U rackmount network appliance, is powered by Intel® Xeon® Processor Scalable Family (Codenamed Sapphire Rapids-SP) and supports up to 8x NIC slots, Max. 1536GB system memory, 6x hot-swappable fans, 1600W/2000W redundant PSUs, Intel® QAT and optional PCIE.

Package Content

Your package contains the following items:

- 1x NCA-6530 Network Security Platform
- 2x Power Cables, 1x RJ45 Console Cable, 1x RJ45 LAN Cable, 1x RJ45 Cross-over LAN Cable
- 2x CPU Heatsink
- 2x Processor Carrier (E1A for XCC CPU Series), 2x Processor Carrier (E1B for MCC CPU Series)
- 10x 2.5" HDD Screws (SKU A/C only)
- 12x U.2 NvME Screw Sets (SKU B/D only)
- 2x Short Ear Rack Mount Kit with Screws

Ordering Information

SKU No.	Description
NCA-6530A	Up To 2x Sapphire Rapids-SP (350W), 2x GbE RJ45 MGMT, AST2600 MGMT with 1600W 1+1 Redundancy PSU, 2x 2.5''HDD
NCA-6530B	Up To 2x Sapphire Rapids-SP (350W), 2x GbE RJ45 MGMT, AST2600 MGMT with 1600W 1+1 Redundancy PSU, 12x 2.5'' NVME HDD
NCA-6530C	Up To 2x Sapphire Rapids-SP (185W), 2x GbE RJ45 MGMT, AST2600 MGMT with 2000W 1+1 Redundancy PSU, 2x 2.5''HDD
NCA-6530D	Up To 2x Sapphire Rapids-SP (185W), 2x GbE RJ45 MGMT, AST2600 MGMT with 2000W 1+1 Redundancy PSU, 12x 2.5'' NVME HDD

Optional Accessories

Model	Description
Riser Card Kit-1 RC-65301A	Riser card kit for rear FH/HL dual-slot PCIe bracket with fan
Riser Card Kit-2 RC-65301A	Riser card kit for rear FH/HL dual-slot PCIe bracket without fan
Riser Card Kit-3 RC-65301A	Riser card kit for rear FH/HL dual-slot PCIe bracket with fan
Riser Card Kit-4 RC-65301A	Riser card kit for rear FH/HL dual-slot PCIe bracket without fan
FAN KIT 60 NCA-6530A	Swappable Fan kit, suitable for NCA-6530A/B/C/D

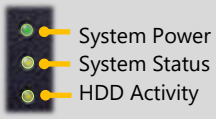
Note: If any component is missing or damaged, please contact your dealer immediately for assistance.

System Specifications

Form Factor		2U 19" Rackmount
Platform	Processor Options	Intel® Xeon® Processor Scalable Family (Sapphire Rapids-SP)
	CPU Socket	2x LGA4677
	Chipset	Intel® C741
	Security Acceleration	Intel® QuickAssist Technology
BIOS		AMI SPI Flash BIOS
System Memory	Technology	DDR5 4800 MHz R-DIMM
	Max. Capacity	1536GB
	Socket	24x 288-pin DIMM
Networking	Ethernet Ports	2x GbE RJ45 Intel® i350-AM2
	Bypass	Depends on NIC Module Specifications
	NIC Module Slot	8x NIC Module Slots
LOM	IO Interface	1x RJ45 LOM Port via BMC for remote management
	OPMA Slot	IPMI Onboard
I/O Interface	Reset Button	1x Reset Button
	LED Indicators	Power/Status/Storage LED Indicators
	Power Button	1x ATX Power Switch
	Console Port	1x RJ45 Console Port
	USB Port	2x USB 3.0 Ports
	LCD Module	Yes, 2x20 Character LCM w/4 x Keypads
	Display Port	1x VGA Port (Internal Pin Header)
	Power Input	AC Power Inlet on PSU
Storage	HDD/SSD Support	SKU A&C : 2x 2.5" HDD/SSD Swappable SKU B&D : 12x U.2 NVMe SSD Swappable
	Onboard Slots	2x M.2 2280 M-Key NVME; 1x M.2 2280 M-Key SATA
Expansion	PCIe	SKU A: N/A (Default); 2x PCIE x16 Gen5 FH/HL single-slot bracket; up to 75W (Optional) SKU B: N/A (Default); 2x PCIE x16 Gen5 FH/HL single-slot bracket, up to 75W (Optional) SKU C: N/A (Default); 2x PCIE x16 Gen5 FH/FL dual-slot bracket, up to 300W (Optional) SKU D: N/A (Default); 2x PCIE x16 Gen5 FH/FL dual-slot bracket, up to 300W (Optional)
Miscellaneous	Watchdog	YES
	Internal RTC with Li Battery	YES
	TPM	TPM 2.0 (Optional)
Cooling	Processor	Passive CPU Heatsink
	System	6x Individual Hot-swappable Cooling Smart Fans
Environmental Parameters	Temperature	0~40°C Operating -20~70°C Non-Operating
	Humidity (RH)	5~90% Operating; 5~95% Non-Operating
System Dimensions	(WxDxH)	438mm x 760mm x 88mm
	Weight	21.2kg
Package Dimensions	(WxDxH), Weight	588mm x 926mm x 303mm, 31.2kg
Power	Type/Watts	1600W/2000W, 1+1 ATX Redundant PSUs
	Input	AC 200~240V @50~60 Hz Noted: Please input in high voltage to ensure the power supply output sufficient power.
Approvals and Compliance		RoHS, CE/FCC Class A, UL

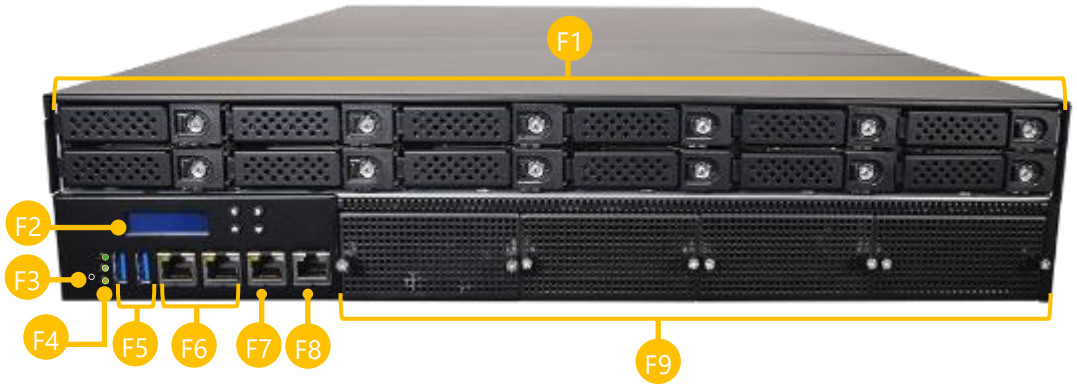
Front Panel

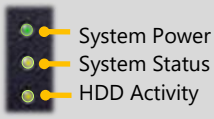
NCA-6530A / NCA-6530C

No.	Description	
F1	HDD/SSD Bays	2x 2.5" HDD/SSD Trays
F2	LCM	16x2 Character LCD, 4x Keypads
F3	Reset Button	1x Software Reset Button
F4	LED Indicators	 System Power System Status HDD Activity
F5	USB Port	2x USB 3.0 Ports
F6	LAN Port	2x GbE RJ45 Ports
F7	LOM Port	1x RJ45 LOM Port for Remote Management
F8	Console Port	1x RJ45 Console Port
F9	NCS2 Module	8x Standard NIC Module Slots

Note: Please refer to Appendix A: LED Indicator Explanations for descriptions of the LED Indicators.

NCA-6530B / NCA-6530D

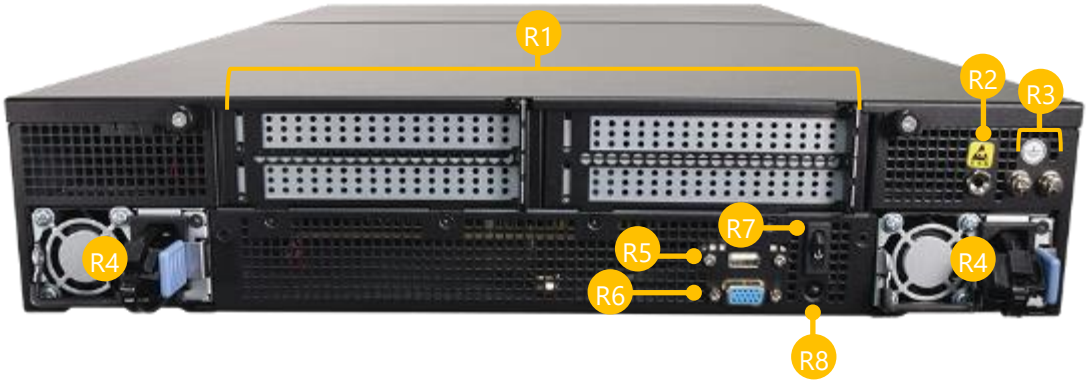


No.	Description	
F1	HDD/SSD Bays	12x U.2 NVMe SSD Trays
F2	LCM	16x2 Character LCD, 4x Keypads
F3	Reset Button	1x Software Reset Button
F4	LED Indicators	
F5	USB Port	2x USB 3.0 Ports
F6	LAN Port	2x GbE RJ45 Ports
F7	LOM Port	1x RJ45 LOM Port for Remote Management
F8	Console Port	1x RJ45 Console Port
F9	NCS2 Module	8x Standard NIC Module Slots

Note: Please refer to Appendix A: LED Indicator Explanations for descriptions of the LED Indicators.

Rear Panel

NCA-6530

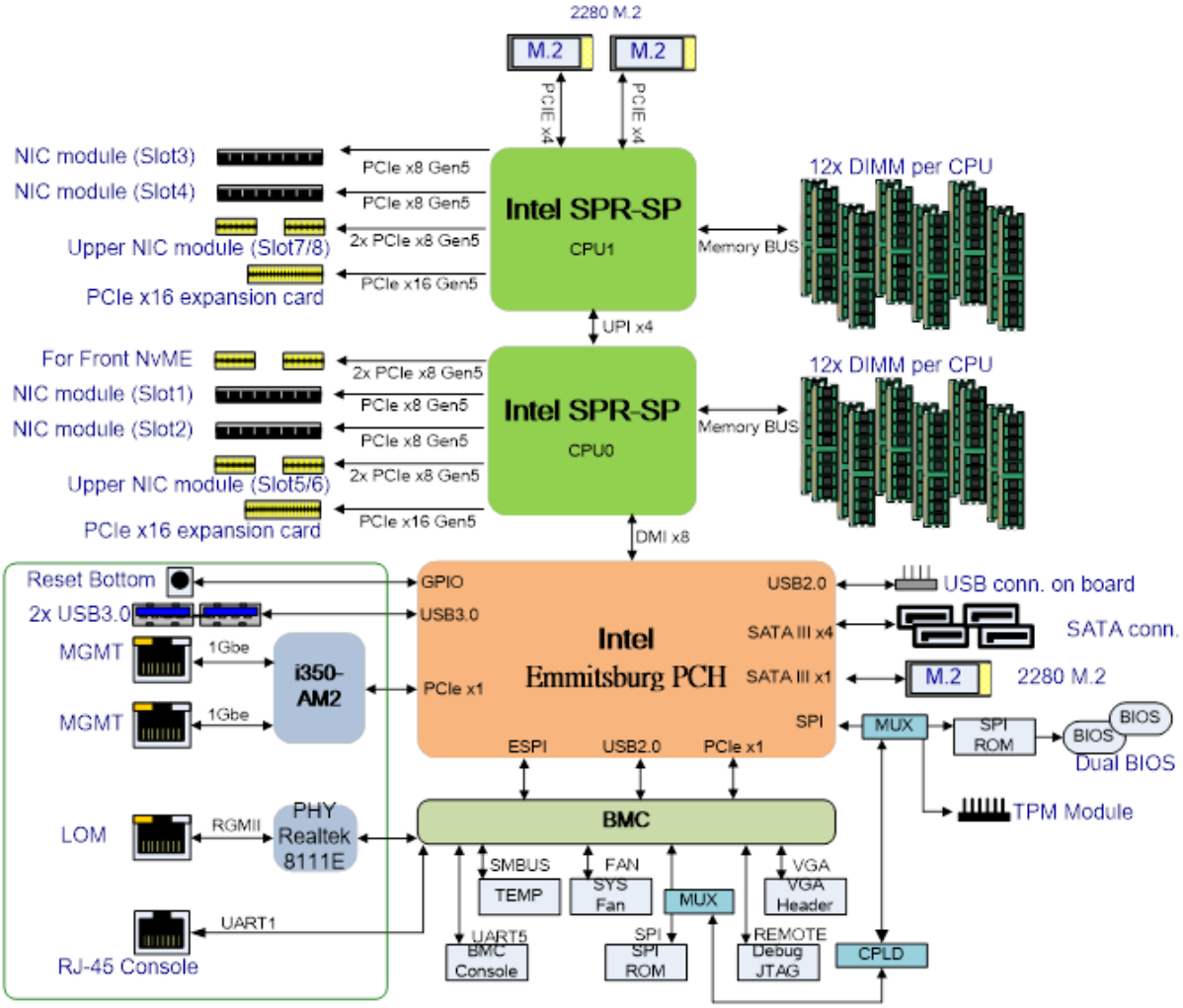


No.	Description	
R1	Rear PCIe Expansion	SKU A/B: 2x PCIE x16 FH/HL at Rear Side (Optional); SKU C/D: 2x PCIE x16 FH/FL at Rear Side (Optional);
R2	ESD Jack	1x Semi-Shearing hole for ESD screws
R3	Ground Hole	2x Semi-Shearing Hole for Grounding screws
R4	Power Supply	2x 1+1 Redundant Power Supply
R5	USB Port	1x Semi-Shearing Hole for USB Port (Optional)
R6	VGA/Console Port	1x Semi-Shearing Hole by DB9 or DB15 (Optional)
R7	Power Switch	1x Power Button
R8	Alarm Reset	1x Alarm Reset Button, an audible alarm will sound when the system's redundant power is missing.

CHAPTER 2: MOTHERBOARD INFORMATION

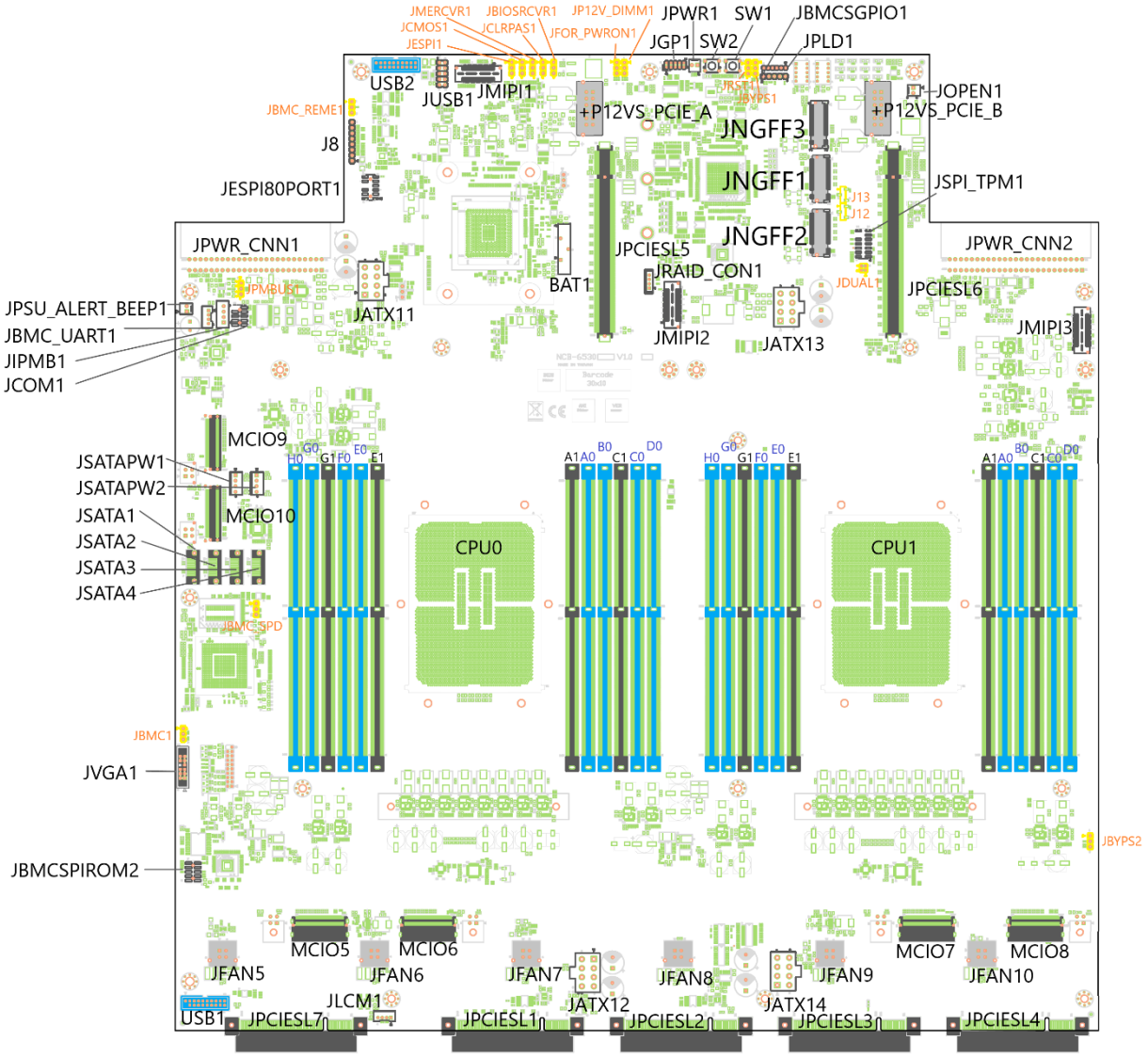
Block Diagram

The block diagram indicates how data flows among components on the motherboard. Please refer to the following figure for the motherboard layout design.



Motherboard Layout

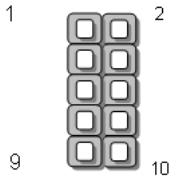
The motherboard layout shows the connectors and jumpers on the board. Refer to the following picture as a reference of the pin assignments and the internal connectors.



Internal Jumper & Connectors

JUSB1: USB 2.0

Pin	Description	Pin	Description
1	+P5V_USB2	2	+P5V_USB2
3	USB20_L_N0	4	USB20_L_N1
5	USB20_L_P0	6	USB20_L_P1
7	USBGND1	8	USBGND1
9	USBGND1	10	USBGND1

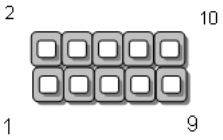


PLD1: CPLD pin header

Pin	Description	Pin	Description
1	+P3V3_AUX	2	JTAG_PLD_TDO
3	JTAG_PLD_TDI	4	JTAG_PLD_TMS
5	GND	6	JTAG_PLD_TCK

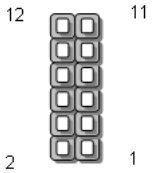
JGP1

Pin	Description	Pin	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



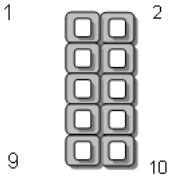
JESPI80PORT1

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



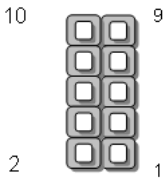
JBMCSPIROM2

Pin	Description	Pin	Description
1	BMC_SPI_HD1#	2	BMC_SPI_DEDI_IO2
3	BMC_SPI_DEDI_CS0	4	+P3V3_SPI_BMC_AUX
5	BMC_SPI_DEDI_MISO	6	BMC_SPI_DEDI_IO3
7		8	BMC_SPI_DEDI_CLK
9	GND	10	BMC_SPI_DEDI_MOSI



JCOM1

Pin	Description	Pin	Description
1	BMC_COM2_DCD#	2	BMC_COM2_DSR#
3	BMC_COM2_RX	4	BMC_COM2_RTS
5	BMC_COM2_TX	6	BMC_COM2_CTS#
7	BMC_COM2_DTR	8	BMC_COM2_RI#
9	IOGND2	10	

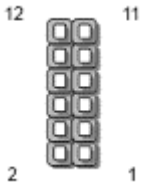


Note

The rear console (COM1) and the front LCM (LCM1) uses the same pin. Only **one** pin can be supported for use at a time.

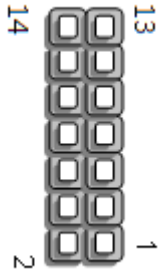
JVGA1

Pin	Description	Pin	Description
1	DAC_RO	2	GND
3	DAC_GO	4	GND
5	DAC_BO	6	GND
7	HSYNC_O	8	
9	VSYNC_O	10	GND
11	DDC_DATA	12	DDC_CLK



JSPI_TPM1

Pin	Description	Pin	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		8	SPI_CLK_TPM
9	GND	10	SPI_MOSI_TPM
11	IRQ_TPM_SPI#_R	12	
13	SPI_TPM_CS0#	14	RST_PLTRST_PLD_B_N



JBMC_SGPIO1

Pin	Description
1	SGPIO_DEBUG_PLD_CLK
2	SGPIO_DEBUG_PLD_DOUT
3	SGPIO_DEBUG_PLD_DIN
4	SGPIO_DEBUG_PLD_LD_N
5	GND

J8

Pin	Description
1	+P3V3_AUX
2	JTAG_ASD_TDO_CONN
3	JTAG_ASD_TDI_CONN
4	JTAG_ASD_NTRST_N_CONN
5	
6	JTAG_ASD_TMS_CONN
7	GND
8	JTAG_ASD_TCK_CONN

JPMBUS1

Pin	Description
1	SMB_PMBUS_STBY_LVC3_R_SDA
2	GND
3	SMB_PMBUS_STBY_LVC3_R_SCL

JSATAPW1 & JSATAPW2

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

JBMC_UART1

Pin	Description
1	+P3V3_AUX
2	BMC_UART5_RX
3	GND
4	BMC_UART5_TX

JRAID_CON1

Pin	Description
1	GND
2	PU_KEY_CONN_PIN2_R
3	GND
4	FM_PCH_SATA_RAID_KEY_R

JLCM1

Pin	Description
1	GND
2	BMC_LCM_TX
3	BMC_LCM_RX
4	+P5V

JPWR1

Pin	Description
1	GND
2	FP_PWR_BTN_N

JOPEN1

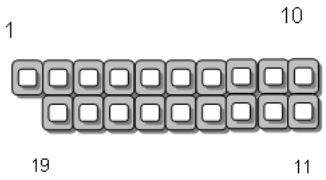
Pin	Description
1	FP_CHASSIS_INTRUSION
2	GND

JFAN5~10

Pin	Description
1	GND
2	BMC_PWMOUT1
3	+P12V
4	BMC_FAN_TECH_IN3

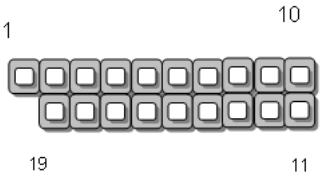
USB2

Pin	Description	Pin	Description
1		2	USB3_P09_RXN
3	USB3_P09_RXP	4	GND
5	USB3_P09_TXN	6	USB3_P09_TXP
7	GND	8	USB20_P11_DN
9	USB20_P11_DP	10	
11	USB20_P13_DP	12	USB20_P13_DN
13	GND	14	USB3_P08_TXP
15	USB3_P08_TXN	16	GND
17	USB3_P08_RXP	18	USB3_P08_RXN
19		20	



USB1

Pin	Description	Pin	Description
1		2	USB3_P09_RXN2
3	USB3_P09_RXP2	4	GND
5	USB3_P09_TXN2	6	USB3_P09_TXP2
7	GND	8	USB20_P11_DN2
9	USB20_P11_DP2	10	
11	USB20_P13_DP2	12	USB20_P13_DN2
13	GND	14	USB3_P08_TXP2
15	USB3_P08_TXN2	16	GND
17	USB3_P08_RXP2	18	USB3_P08_RXN2
19		20	



JPSU_ALART_BEEP: BEEP ALERT

SW1: Front Panel RST Button

SW2: Power ON Button

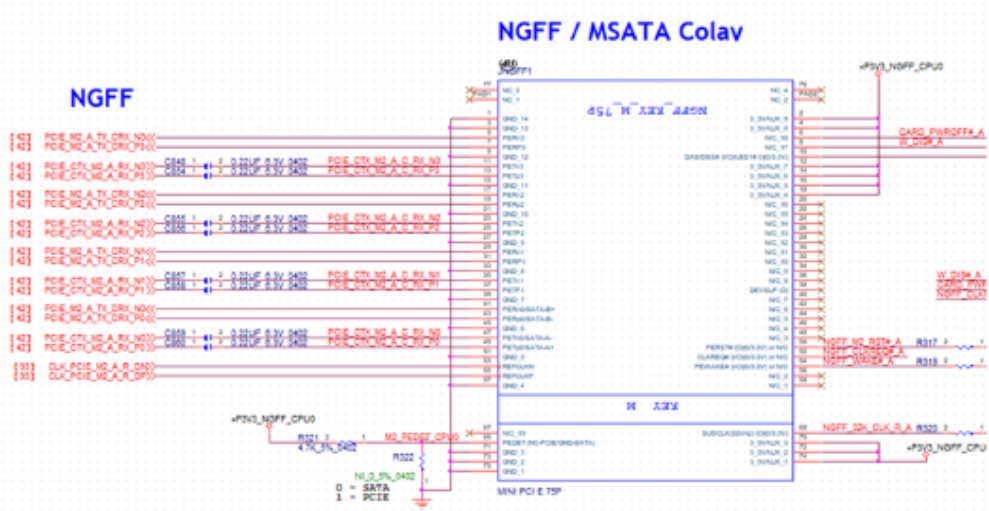
JSATA1~4

Pin	Description
1	GND
2	TX_P
3	TX_N
4	GND
5	RX_N
6	RX_P
7	GND

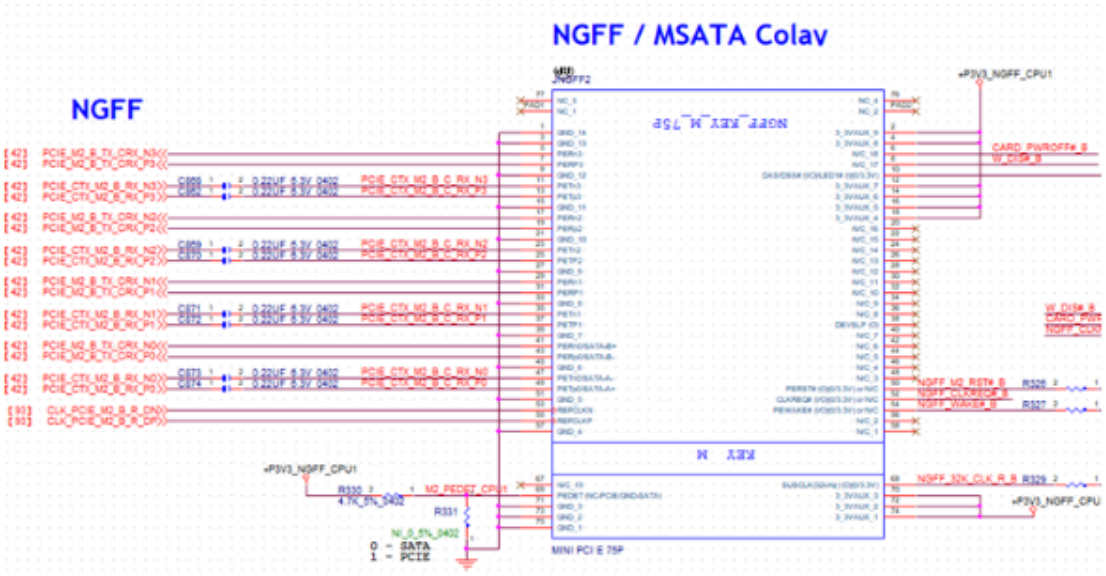
JBMC_REME1

Pin	Description
1	+P3V3_AUX
2	FM_ASD_EN_DET
3	

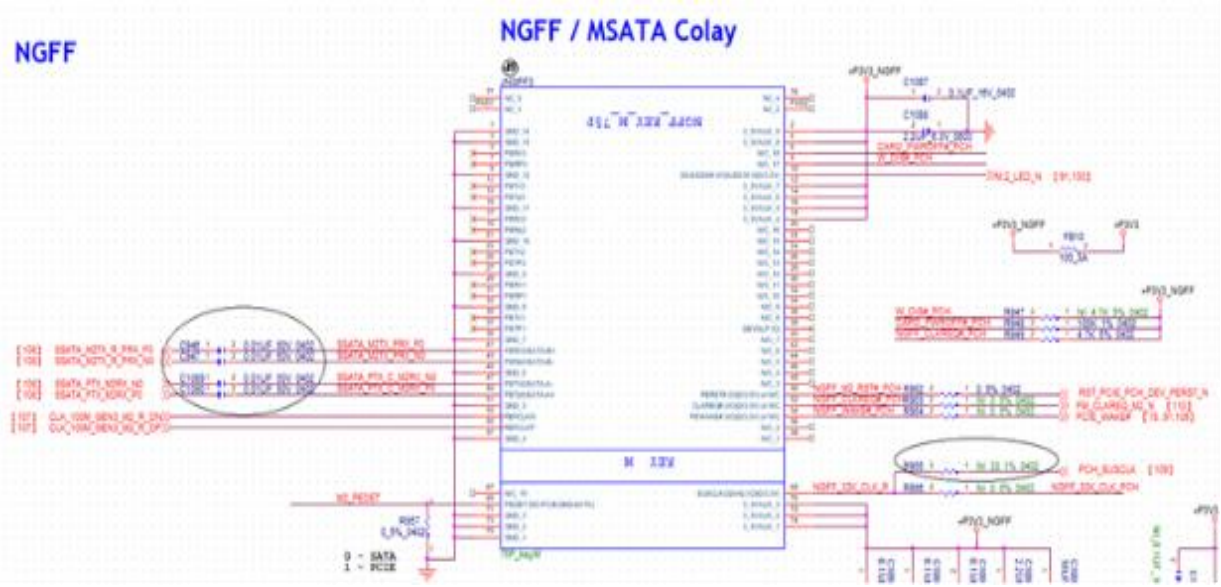
JNGFF1



JNGFF2



JNGFF3



Power Connector

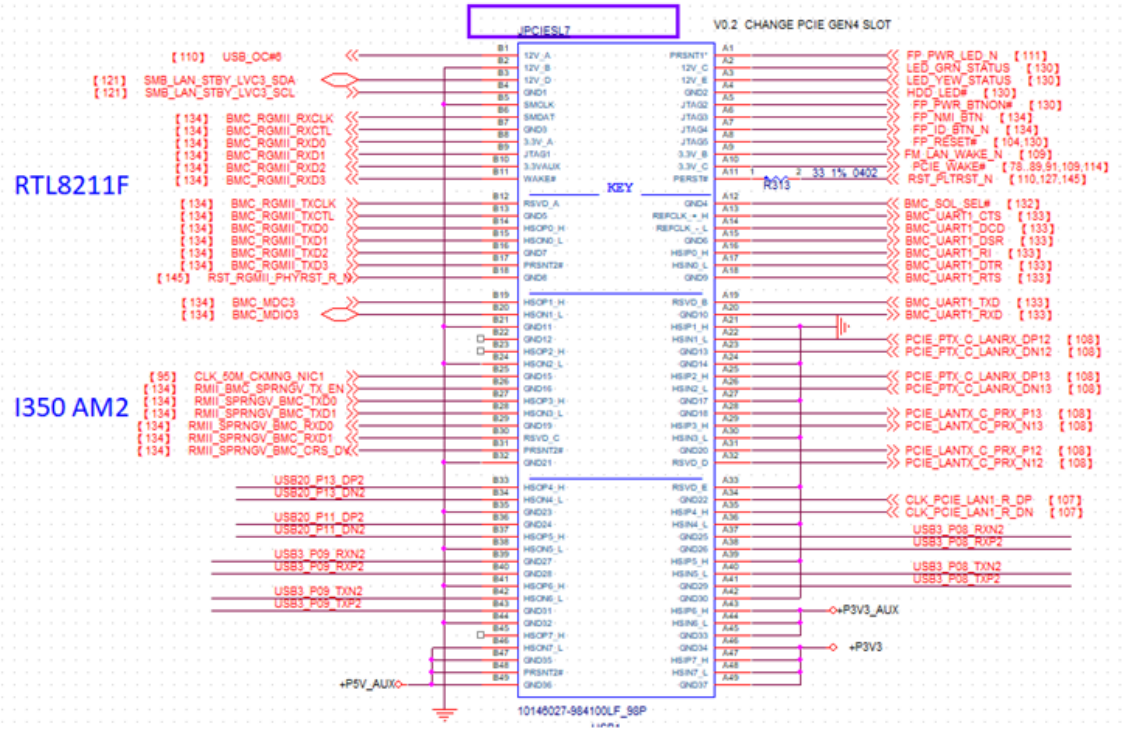
JATX11~14: 8-Pin Power Connector

Pin	Description	Pin	Description
1	GND	2	+P12V
3	GND	4	+P12V
5	GND	6	+P12V
7	GND	8	+P12V

+P12VS_PCIE_A~B: 12-Pin Power Connector

Pin	Description	Pin	Description
1	GND	2	GND
3	GND	4	GND
5	GND	6	GND
7	+P12VS_PCIE	8	+ P12VS_PCIE
9	+P12VS_PCIE	10	+P12VS_PCIE
11	+P12VS_PCIE	12	+P3V3

JPCIESL7: I/O Card

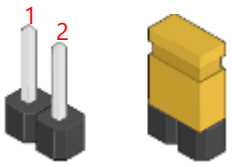
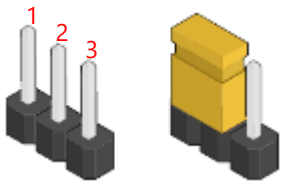
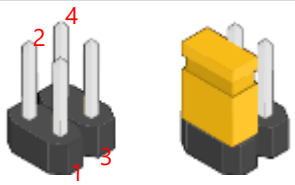


Internal Jumpers

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

Jumper Setting

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

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

JESPI1 (1-2)

1-2 To BMC (Default)

2-3 To ESPI CONN

Pin	Description
1	
2	ESPI_CS0_N
3	ESPI_CS0_N_LFRAME_N_HDR

JFOR_PWRON1(1-2)

1-2 Normal Operation (Default)

2-3 Force PFR CPLD Update

Pin	Description
1	
2	FM_FORCE_PWRON_LVC3
3	+P3V3_AUX

JBYPS2 (2-3)

1-2 Force Bypass of CPU0

2-3 Normal Operation (Default)

Pin	Description
1	
2	FM_CPU1_SKTOCC_N
3	FM_CPU1_SKTOCC_LVT3_N

JBYPS1 (2-3)

1-2 Force Bypass of CPU1

2-3 Normal Operation (Default)

Pin	Description
1	
2	FM_CPU0_SKTOCC_N
3	FM_CPU0_SKTOCC_LVT3_N

JCLRPAS1 (1-2)

1-2 Normal (Default)

2-3 Password Clear

Pin	Description
1	
2	FM_PASSWORD_CLEAR_N
3	GND

JMERCVR1 (1-2)

1-2 Normal Mode (Default)

2-3 ME Force Update

Pin	Description
1	
2	FM_ME_RCVR_N
3	GND

JCMOS1 (1-2)

1-2 Normal (Default)

2-3 Clear CMOS

Pin	Description
1	+VRTC
2	RST_RTCRST_N
3	PD_PCH_RTCRST#

JBMC1 (1-2)

1-2 Normal (Default)

2-3 BMC Update

Pin	Description
1	
2	FM_FORCE_BMC_UPDATE_N
3	GND

JBMC_SPD (2-3)

1-2 BMC SPD Remote Debug Disabled (Default)

2-3 BMC SPD Remote Debug Enabled

Pin	Description
1	
2	GND
3	FM_SPD_SWITCH_CTRL_N

J12 (1-2)

1-2 Enable Dual BIOS (Default)

2-3 Disable Dual BIOS

Pin	Description
1	+P3V3_AUX
2	DUAL_BIOS_DIS
3	GND

JBIOSRCVR1 (1-2)

1-2 Normal Mode (DFLT)

2-3 Recover BIOS

Pin	Description
1	
2	FM_PCH_BIOS_RCVR_MODE
3	+P1V05_AUX_PCH

JP12V_DIMM1 (1-2)

1-2 P12V_DIMM Off in S5 (Default)

2-3 P12V_DIMM On in S5

Pin	Description
1	
2	FM_DIMM_12V_S5_N
3	GND

J13 (1-2)

1-2 Force Boot up from BIOS1 (Default)

2-3 Force Boot up from BIOS2

Pin	Description
1	+P3V3_AUX
2	BIOS_BOOT_SEL
3	GND

JDUAL1 (1-2, 3-4)

1-2, 3-4 Flash 1st BIOS (Default)

1-3, 2-4 Flash 2nd BIOS

Pin	Description
1	SPI_CS0#
2	SPI_PCH_MUXED_CS0_N
3	SPI_PCH_MUXED_CS1_N
4	SPI_CS1#

JRST1 (1-2)

1-2 Hardware Reset (Default)

2-3 Software Reset

CHAPTER 3: HARDWARE SETUP

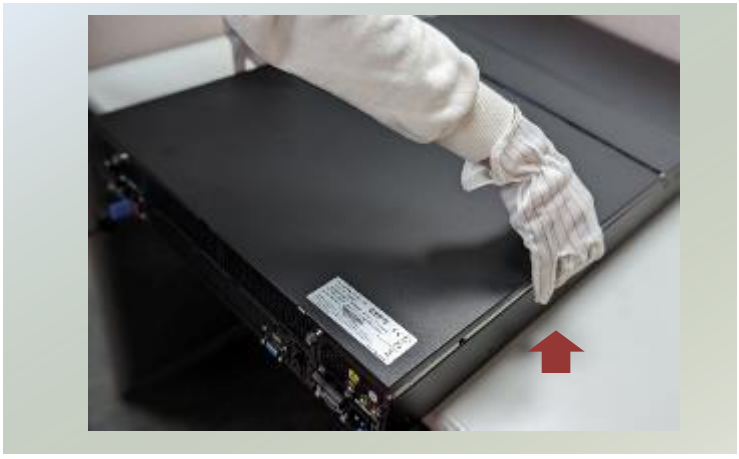
To reduce the risk of personal injury, electric shock, or damage to the system, please remove all power connections to completely shut down the device. Also, please wear ESD protection gloves when conducting the steps in this chapter.

Opening the Chassis

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

2. Gently pull the cover backwards a bit.

3. Lift the cover up to remove.



Installing the CPU

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

Installing the processor onto the motherboard involves three stages:

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

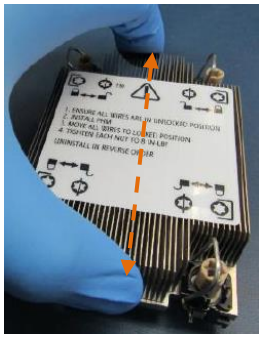
Tools Required

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

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

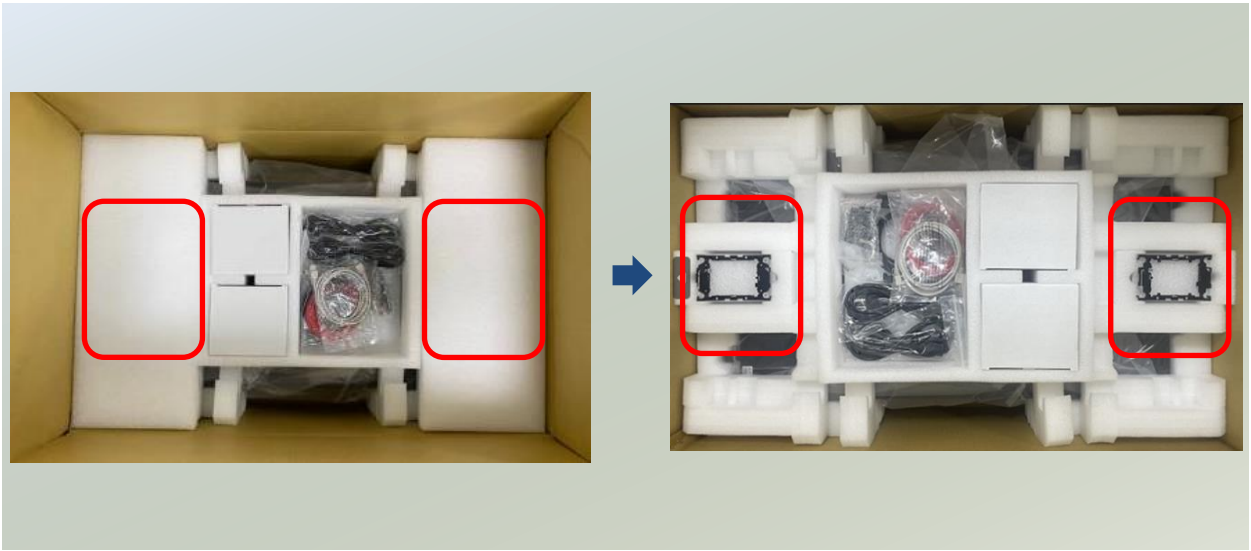
Parts Explanation:

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

Heatsink (1U & 2U)	When handling heatsink, always grip it along the axis of the fins of the heatsink to avoid fin damage. Fins or soldering of fins might be damaged by handling heatsink holding along the long side of the heatsink.	 
Processor Carrier		
Processor Tray		

Processor Carrier Assembly

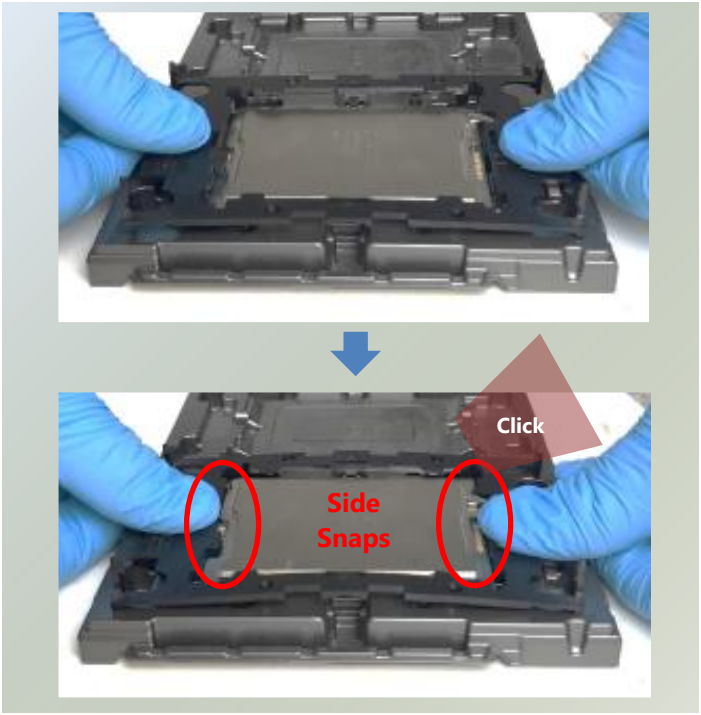
1. Locate the Processor carriers in package box and lift out.



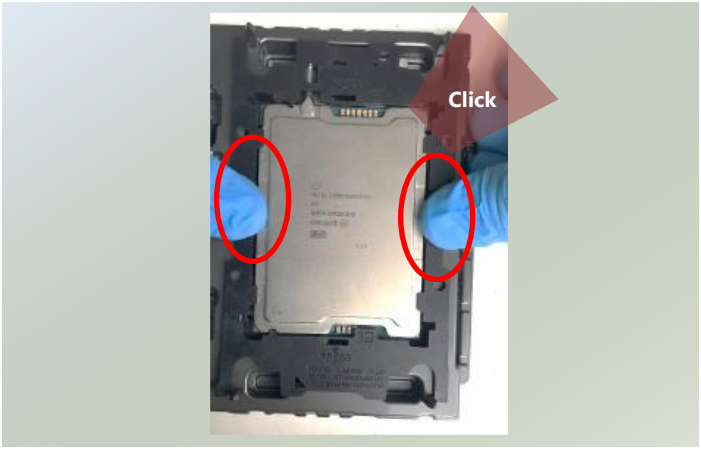
2. Place the processor carrier on top of the processor that is in the package tray aligning **Pin 1** marks on the processor carrier to **Pin 1** of the processor.

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

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

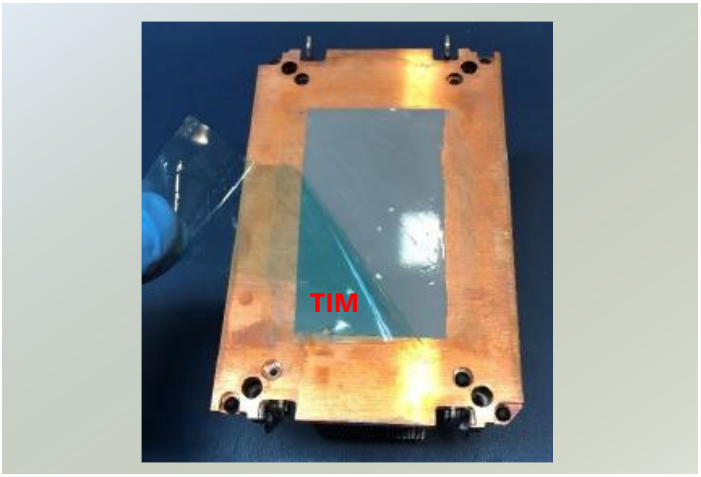


4. Check the two side snap latches on the carrier and verify that they have latched to the package. If not then press down on top of the side snap latches until they snap into place.

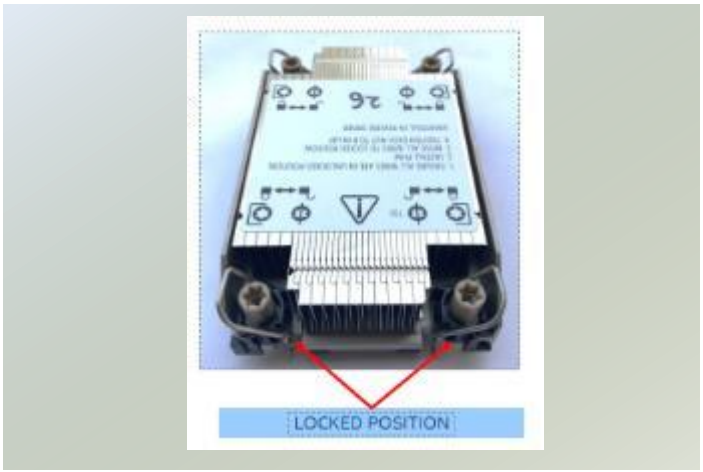


Processor Carrier Assembly to Heatsink

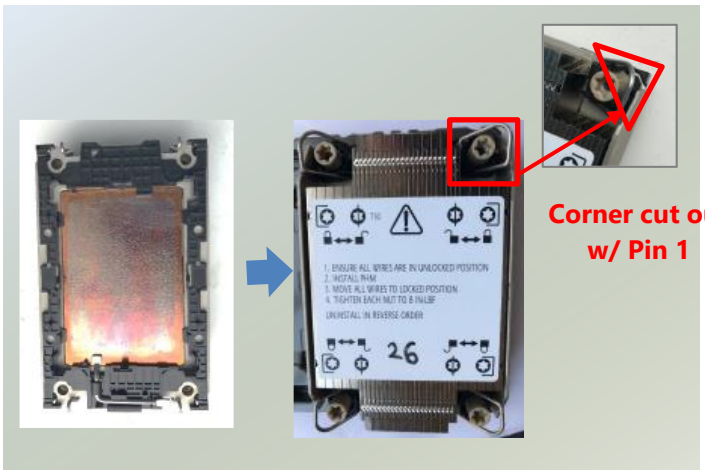
1. If there is TIM (Thermal Interface Material) protective film on the base of heatsink, remove it.



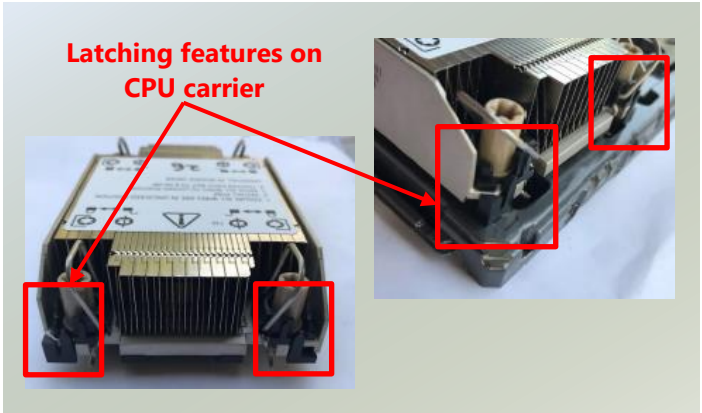
2. Turn the heatsink over and set the Anti-Tilt wires to the locked position (outward position).



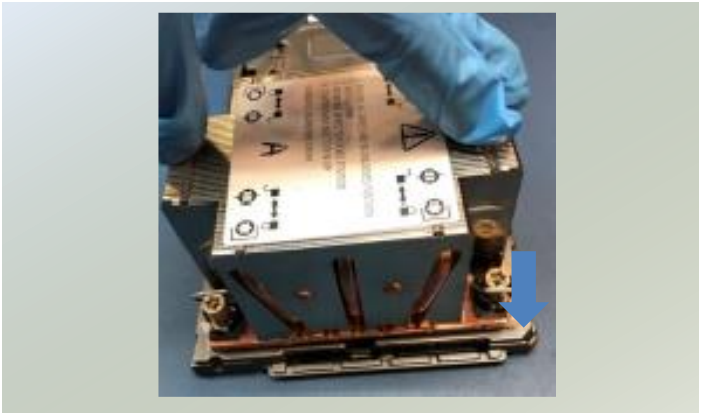
3. Align Pin 1 indicator of Processor carrier and corner cut out of Heatsink. If there are two corners cut out, either orientation is fine.



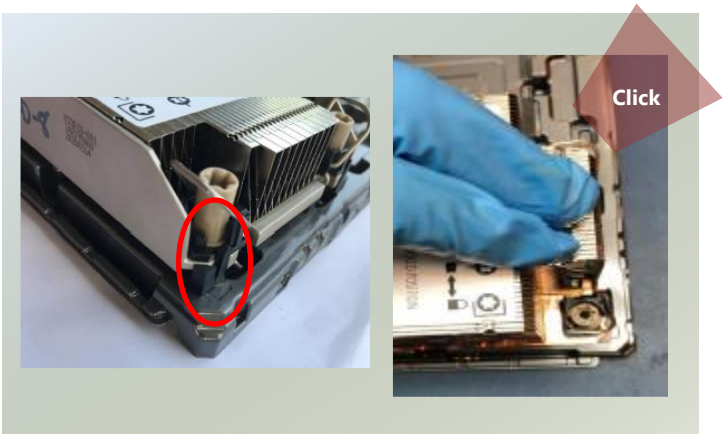
4. Place the heatsink ensure latching features on Processor carrier and heatsink are aligned during assembly.



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

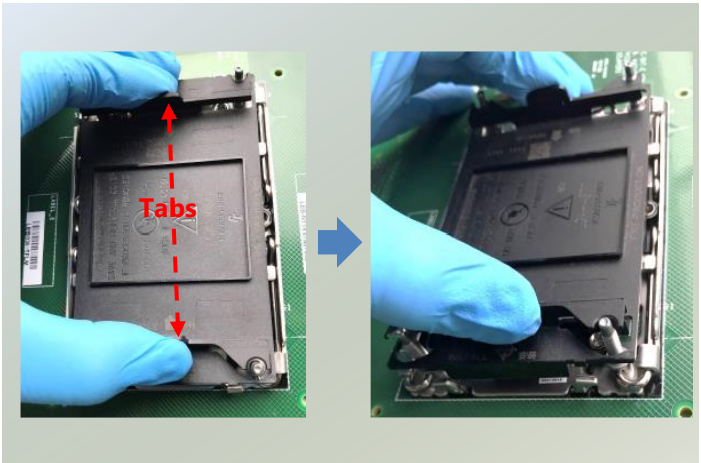


6. If carrier latching features do not latch the heatsink properly, engage each latching features by pressing the heatsink at the unlatched corner. You may hear a clicking sound when latched.



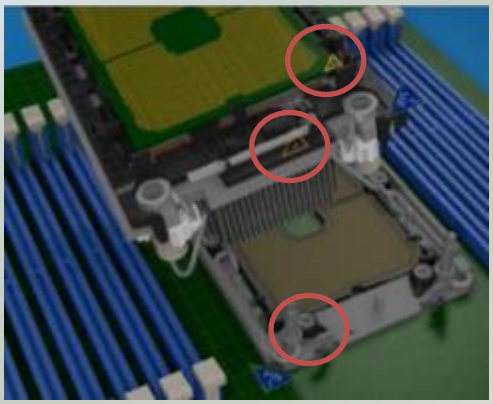
System Assembly PHM to Motherboard

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

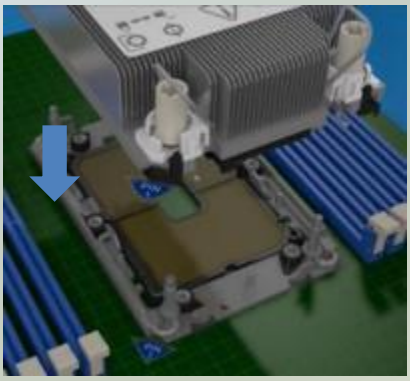


2. Set each anti-tilt wire to inward or unlocked position on the heatsink.

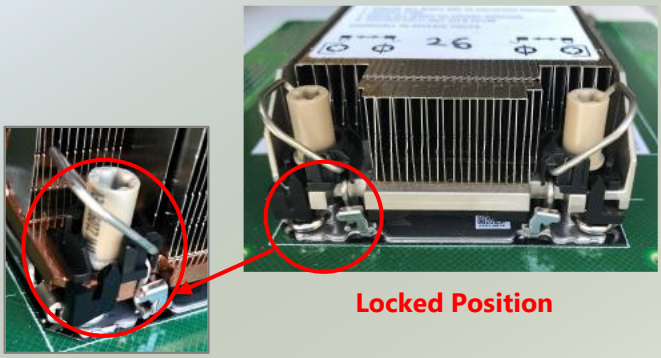
3. Lift up the PHM. Turn the PHM over to locate the PIN1 corner on processor carrier and processor.



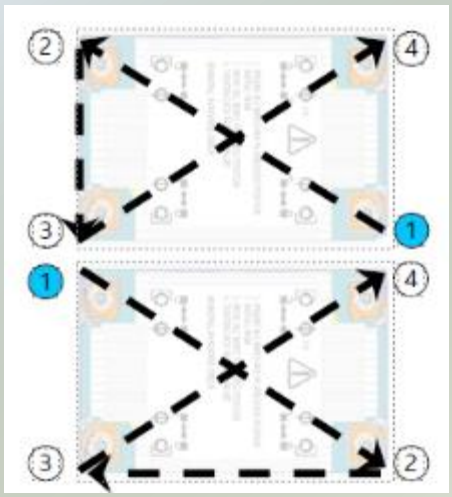
4. Then turn the PHM right side up. Line up the PIN1 corner of the PHM to the bolster plate PIN1 corner. Lower the PHM vertically down over the bolster plate studs.



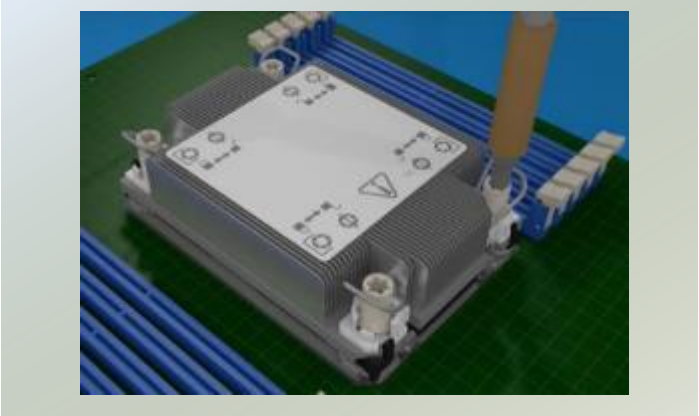
5. Set all four Anti-Tilt wires into the locked position (outward position.)



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

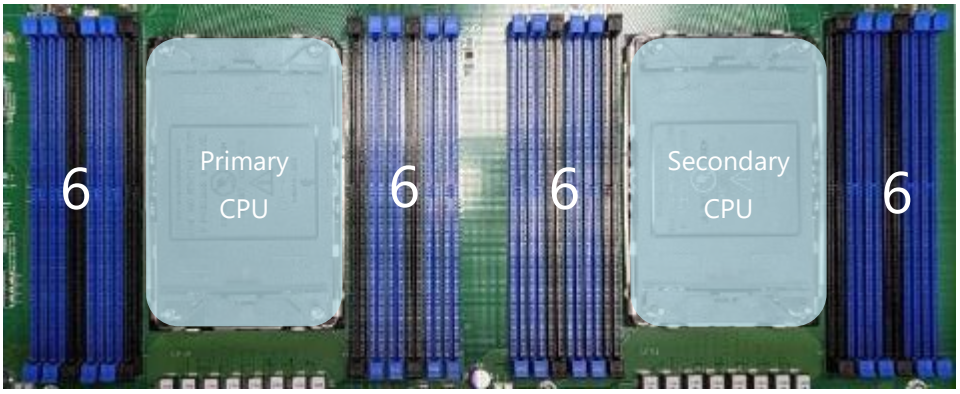


7. Tighten all nuts on heatsink using a torque driver with a T30 bit to 8 in-lbf ± 10%.



Installing the System Memory

The motherboard supports DDR5 registered DIMM memory for heavy-duty operations. Please follow the steps below to install the DIMM memory modules. The primary CPU and the secondary CPU both have 12 DIMM sockets (6 on each side).

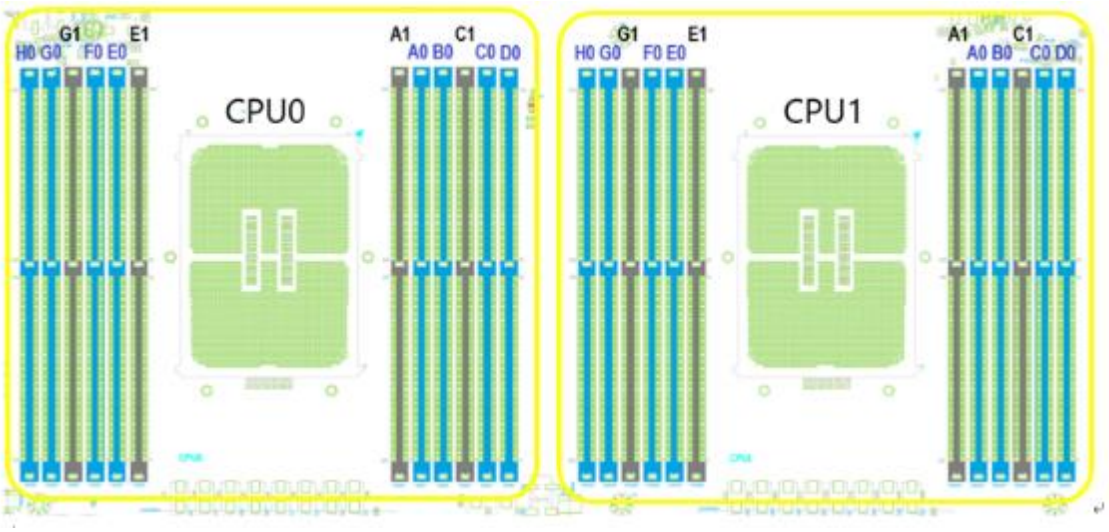


- Supported Capacities: 8/16/32/64 GB
- Maximum RAM: **1536GB** (64GB per slot)

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 24 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				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

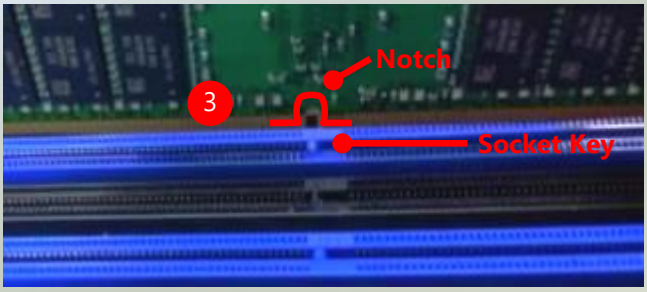
CPU

Memory Module Installation Instructions

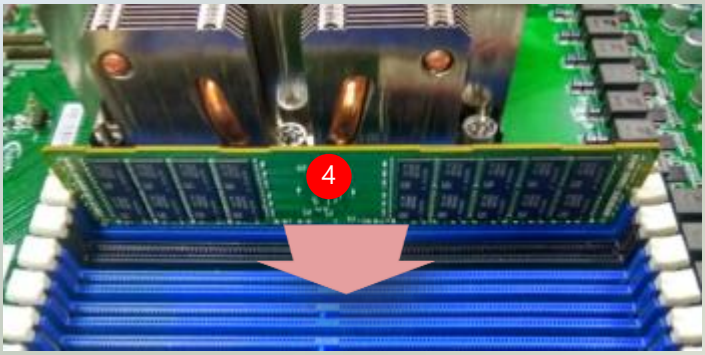
Please follow the steps below to install the DIMM memory modules.

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.



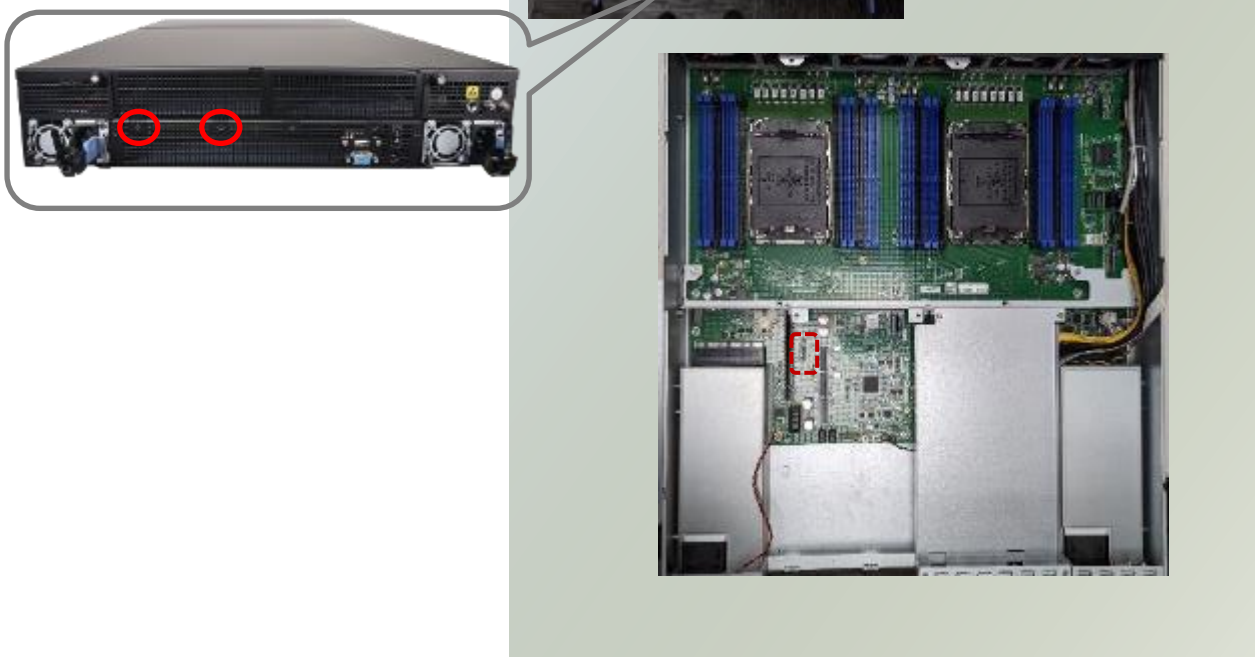
4. Insert the module into the slot until it is firmly seated. The motherboard of NCA-6530 is designed with 20 DDR DIMM sockets.



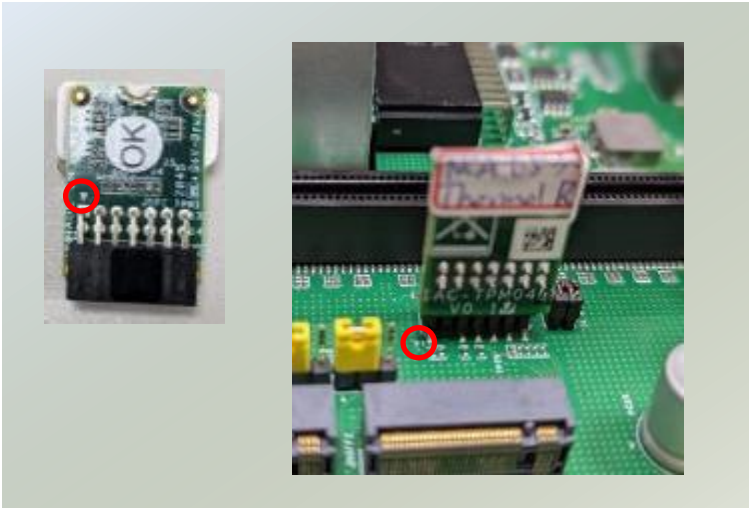
Installing TPM Module (Optional)

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. Unscrew the two (2) screws of the PCIe bracket cover on the rear panel. Lift the PCIe slot bracket cover up. Locate the TPM pin slot on the motherboard.



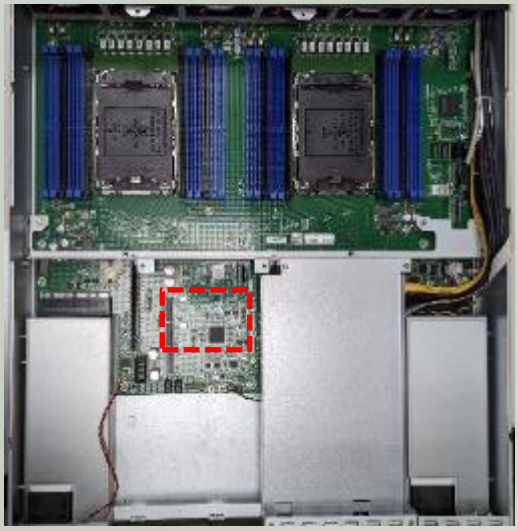
2. Insert the TPM module into the pins until it is fully seated.



Installing the M.2 SSD Storage (Optional)

NCA-6530 support two M.2 slot for additional NVMe storage expansion. Please follow the steps for installation.

1. Power off the system and open the chassis cover.
2. Unscrew the two (2) screws of the PCIe bracket cover on the rear panel. Lift the PCIe slot bracket cover up. Locate the two M.2 slots on the motherboard.



3. Align the notch of the M.2 storage module with the socket key in the pin slot.

4. Insert the M.2 storage module at 30 degrees into the socket until it is fully seated.

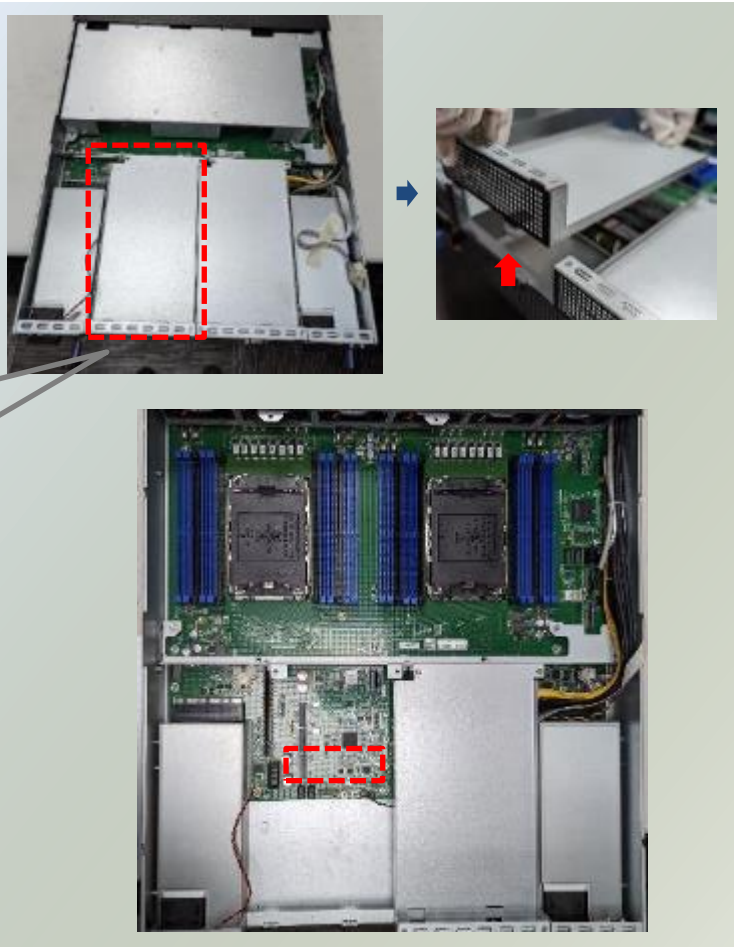
5. Push down on the module and secure it with a screw.

6. Repeat steps if installing a second storage module.

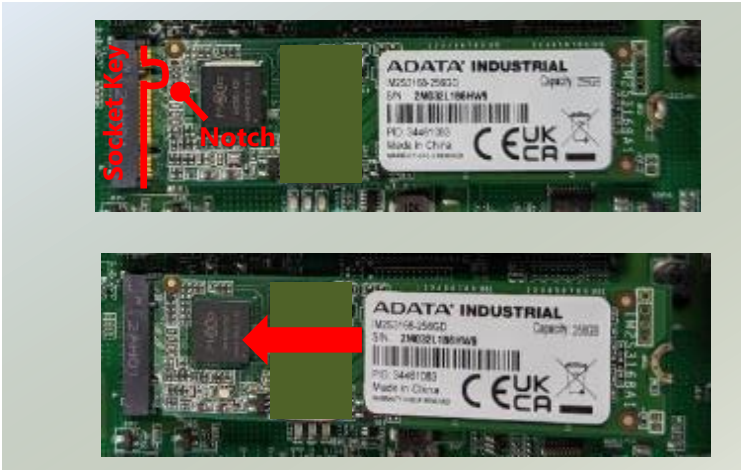
Installing the M.2 SATA Storage (Optional)

NCA-6530 support one M.2 slot for additional SATA storage expansion. Please follow the steps for installation.

1. Power off the system and open the chassis cover.
2. Unscrew the two (2) screws of the PCIe bracket cover on the rear panel. Lift the PCIe slot bracket cover up. Locate the M.2 slot on the motherboard.



3. Align the notch of the M.2 storage module with the socket key in the pin slot.
4. Insert the M.2 storage module at 30 degrees into the socket until it is fully seated.



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

Installing the LAN Card (A & B SKU, Optional)

NCA-6530A and NCA-6530B supports two PCIe x16 FH/HL dual slot for LAN card expansion. The LAN module card installation is a rather complex installation process, and must be handled with care. Please read through the instructions below to make sure you have acquired the necessary knowledge and comply with the requirements.

1. Expansion Components

a.) The LAN Expansion Kit (Optional) will include:

- 1x PCIe bracket
- 1x screw packet

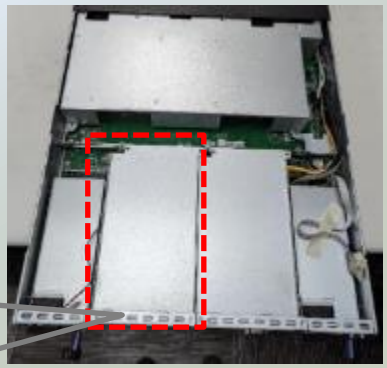
b.) Customer Owned or Additional Purchase:

- 1x LAN Module

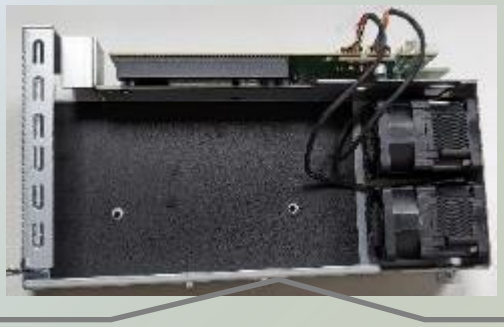
PCIe Bracket

LAN Module

2. Power off the system and open the chassis cover.
3. Unscrew the two (2) screws on the rear panel. Lift the PCIe slot bracket cover up.

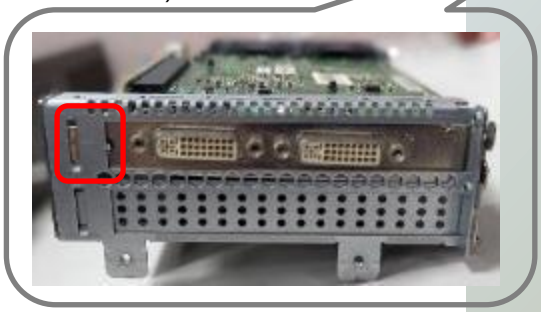


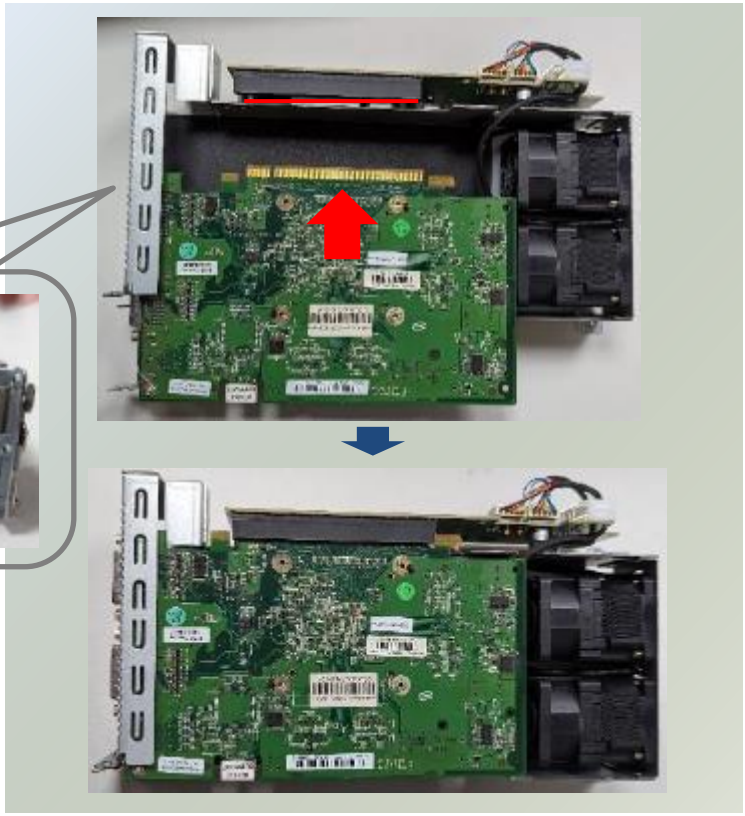
4. Pick up the new PCIe bracket, unscrew the four (4) screws on the side to remove the side metal partition.



5. Align the LAN module to the PCIe bracket. Slide the LAN module into the PCIe bracket until it is completely seated.

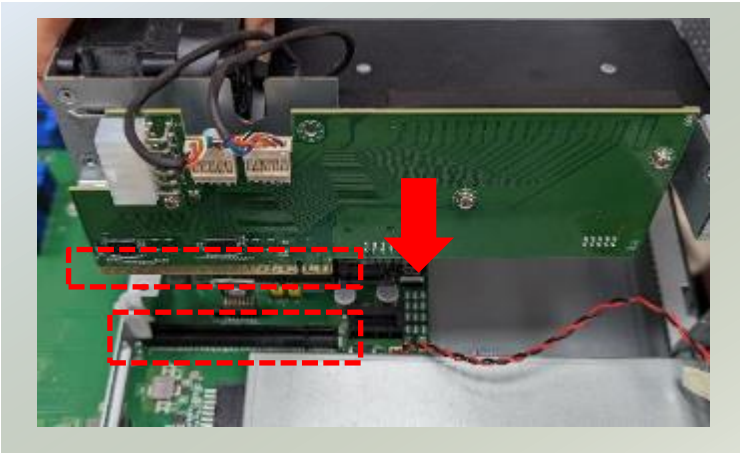
Make sure the side bar slides in properly (as pictured below).



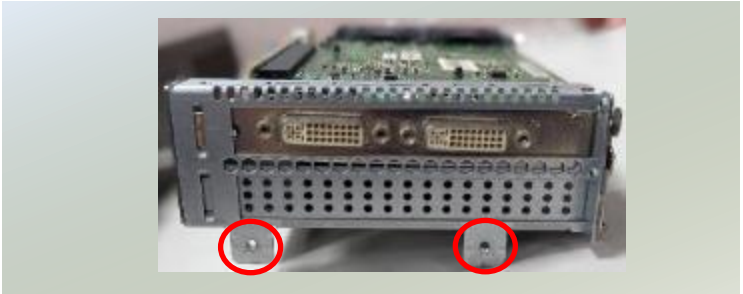


6. Place the metal partition back in place and secure with the original four (4) screws.

7. Align the socket key on the bracket to the socket key on the motherboard. Gently insert until it is firmly seated.



8. Secure with two (2) original screws on the rear panel. The LAN module installation is complete.



Installing the GPU Graphic Card (C & D SKU, Optional)

NCA-6530C and NCA-6530D supports two PCIe x16 FH/FL dual slot for GPU graphics card expansion. The GPU graphic card requires a rather complex installation process; therefore, the assembly must be handled with care. Please read through the instructions in this section to make sure you have acquired the necessary knowledge and comply with the requirements.

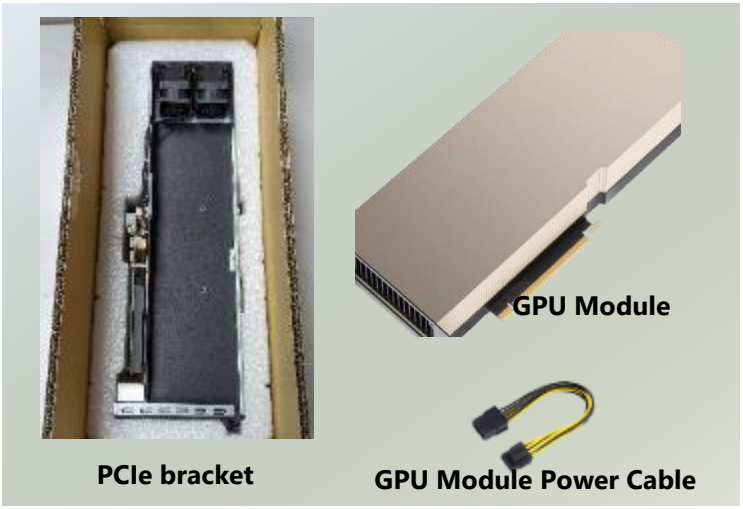
1. Expansion Components

a.) The GPU Expansion Kit (Optional) will include:

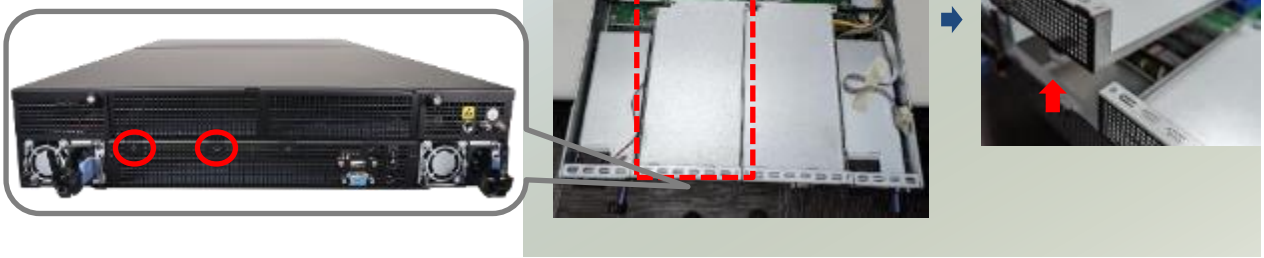
- 1x PCIe bracket
- 1x GPU power cable
- 1x screw packet

b.) Customer Owned:

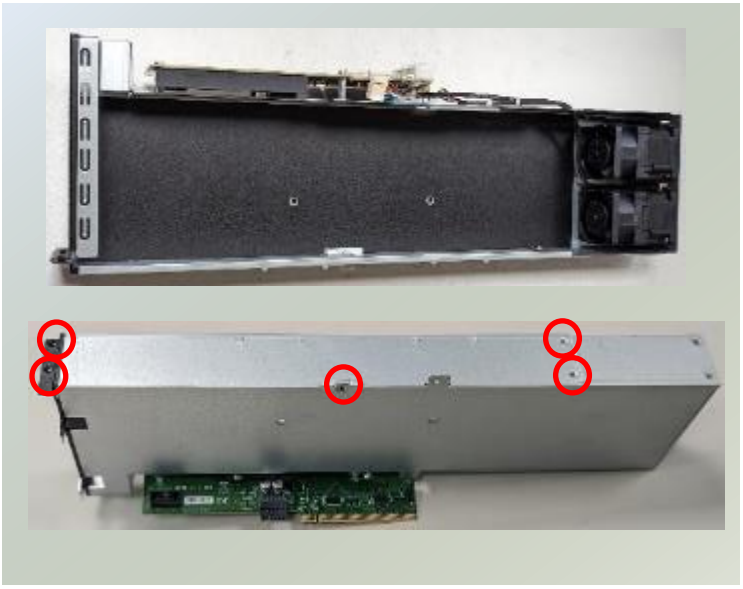
- 1x GPU module



2. Power off the system and open the chassis cover.
3. Unscrew the two (2) screws on the rear panel. Lift the PCIe slot bracket cover up.

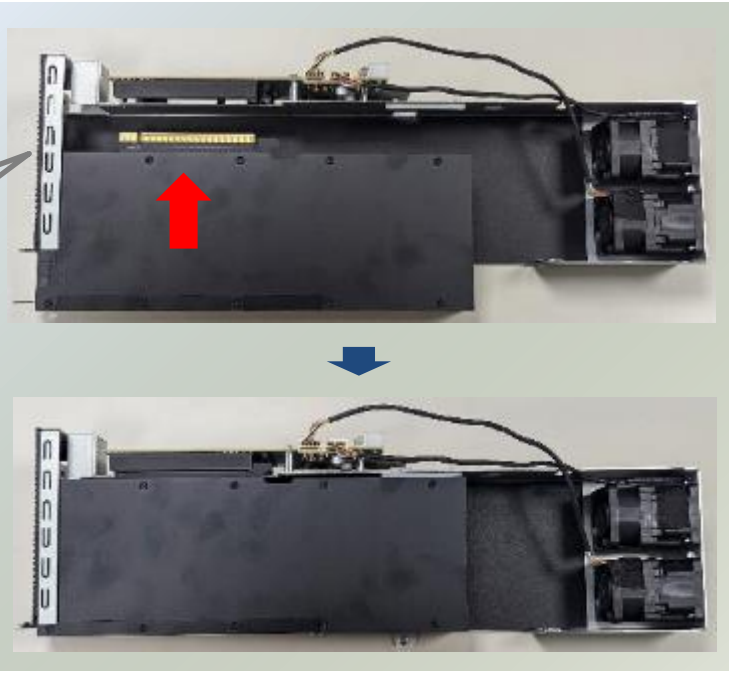


4. Pick up the new PCIe bracket, unscrew the five (5) screws on the side to remove the side metal partition.



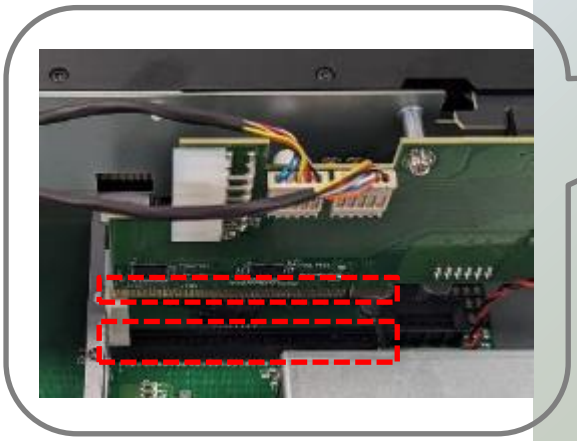
5. Align the GPU module to the PCIe bracket. Slide the GPU module into the PCIe bracket until it is completely seated.

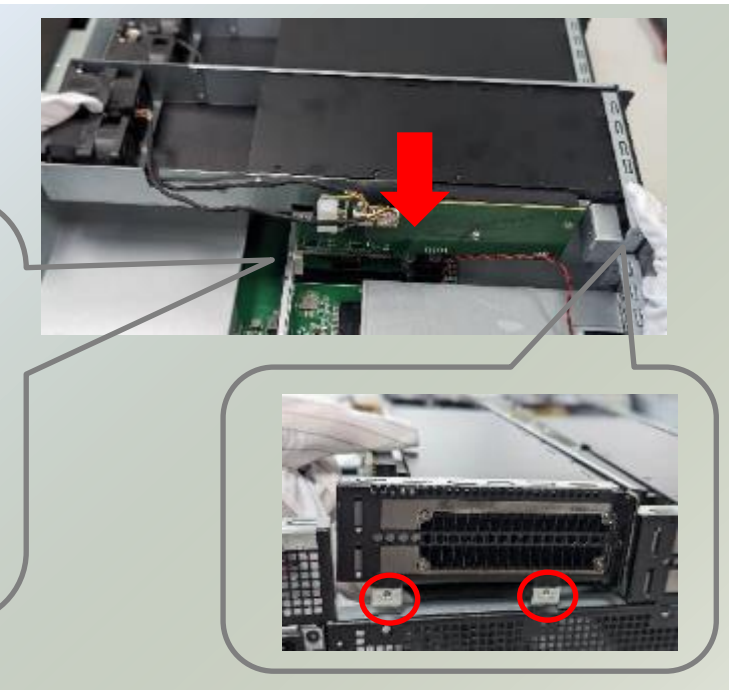
Make sure the side bar slides in properly (as pictured below).



6. Place the metal partition back in place and secure with the original five (5) screws.

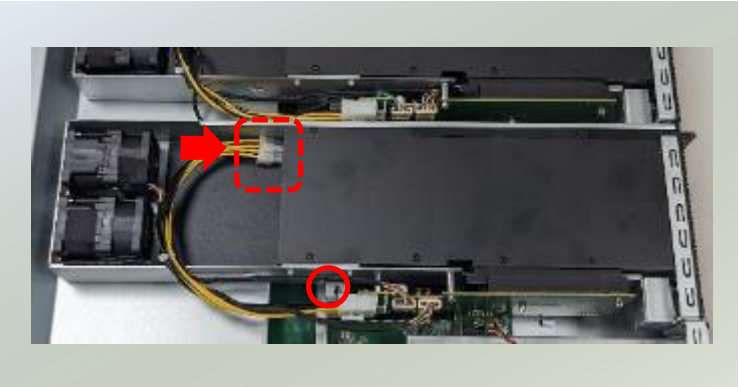
7. Align the socket key on the bracket to the socket key on the motherboard. Gently insert until it is firmly seated. Then, secure with two (2) original screws on the rear panel.





8. Lastly, secure with one (1) screw on the side of the bracket, and insert the GPU power cable to the GPU module. The other end of the power cable should have been pre-installed on the bracket.

   Repeat steps 3 through 8 if installing a second GPU module. The GPU module installation is now complete.



Note

GPU Power Cable Definition by GPU, for example:

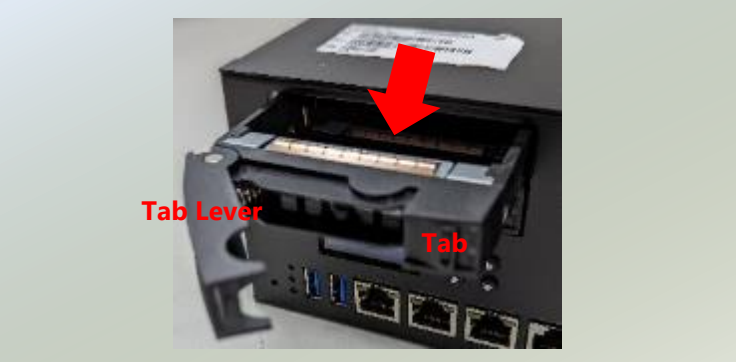
- NVDIA, H100 (PCI Express 5.0*16; Gen 5*8; Gen4*16): Power Connector PCIE 16 Pin Cable P=4.2
- NVDIA, A100 (PCI Express 4.0*16): Power Connector CPU 8 Pin Cable P=4.2
- NVDIA, M60 (PCI Express 3.0 ×16): Power Connector CPU 8 Pin Cable P=4.2
- NVDIA, A5000 (PCI Express 4.0 ×16): Power Connector PCIE 8 Pin Cable P=4.2

Installing the Disk Drive(s) (A & C SKU, Optional)

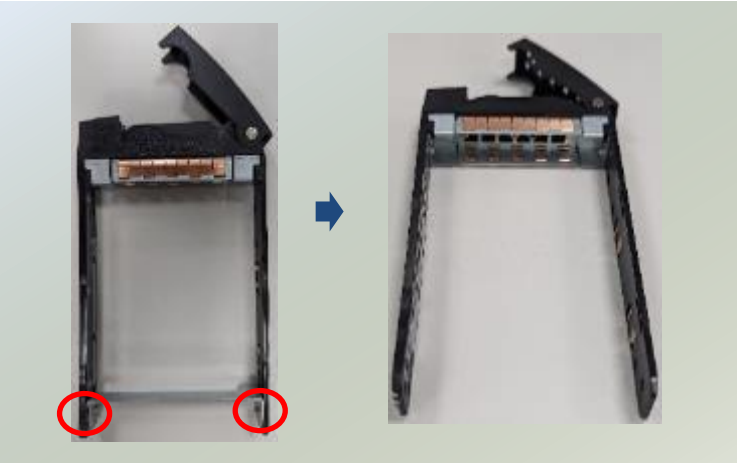
NCA-6530A and NCA-6530C is built with two 2.5" HDD/SSD swappable drive bays. Please follow the steps for installation.

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

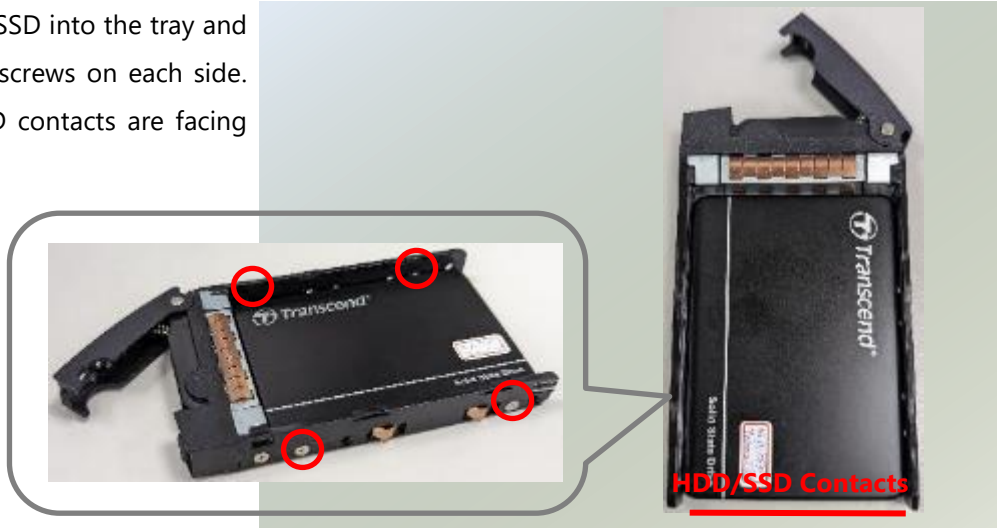
2. To remove the tray, push down on the tab and for the tab lever to slide open, and then hold the tab lever to pull out the tray.



3. Unscrew one (1) screw on each side of the tray and remove the metal partition.



4. Slide one 2.5" HDD/SSD into the tray and secure with two (2) screws on each side. Make sure HDD/SSD contacts are facing outwards.



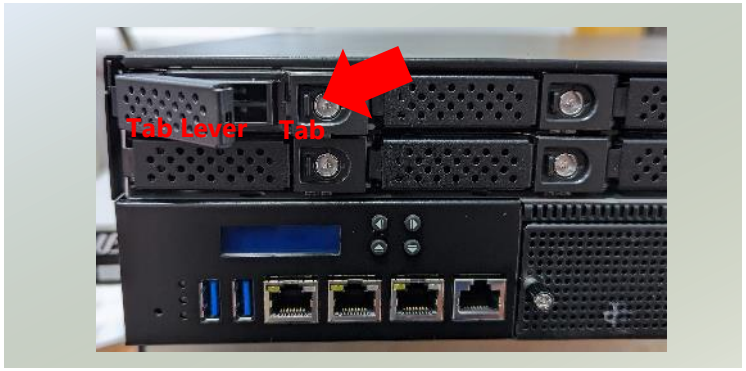
5. Place the mounted disk tray back into position in the system. Gently push the tray until it is firmly seated and press the tab lever until it clicks into place.

Installing the Disk Drive(s) (B & D SKU, Optional)

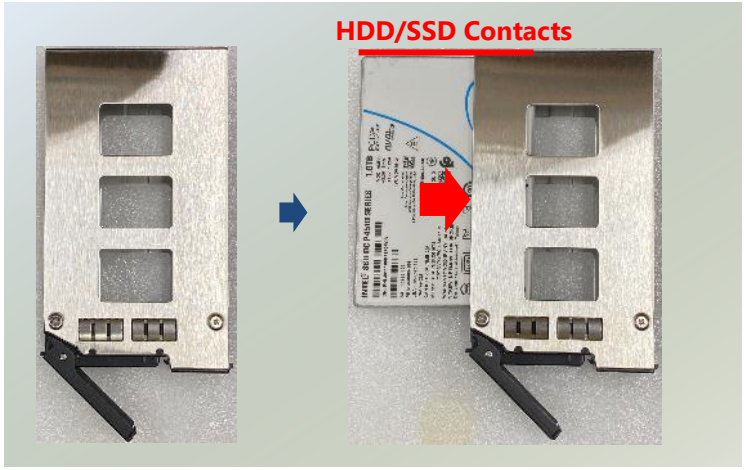
NCA-6530B and NCA-6530D is built with twelve 2.5" NVME SSD swappable drive bays. Please follow the steps for installation.

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

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



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



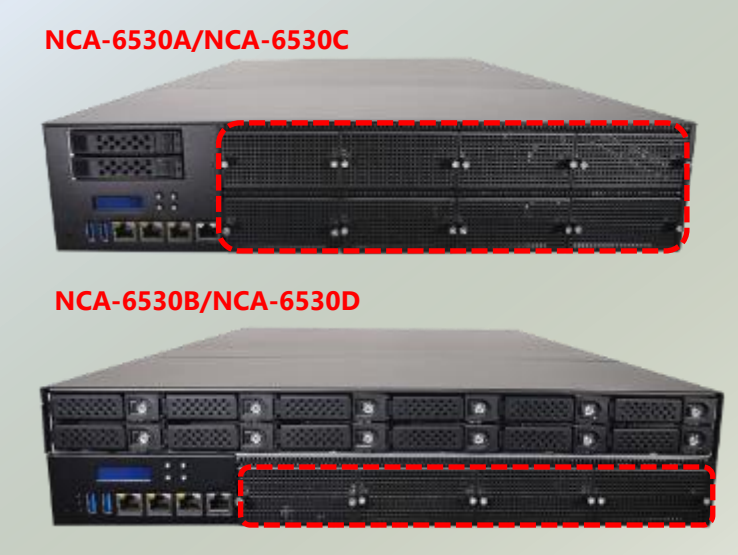
4. Then, turn the drive tray on the other side, and secure the SSD with two (2) screws on each side.

5. Place the mounted disk tray back into position in the system. Gently push the tray until it is firmly seated and press the tab lever until it clicks into place.

Installing the NIC Modules (Optional)

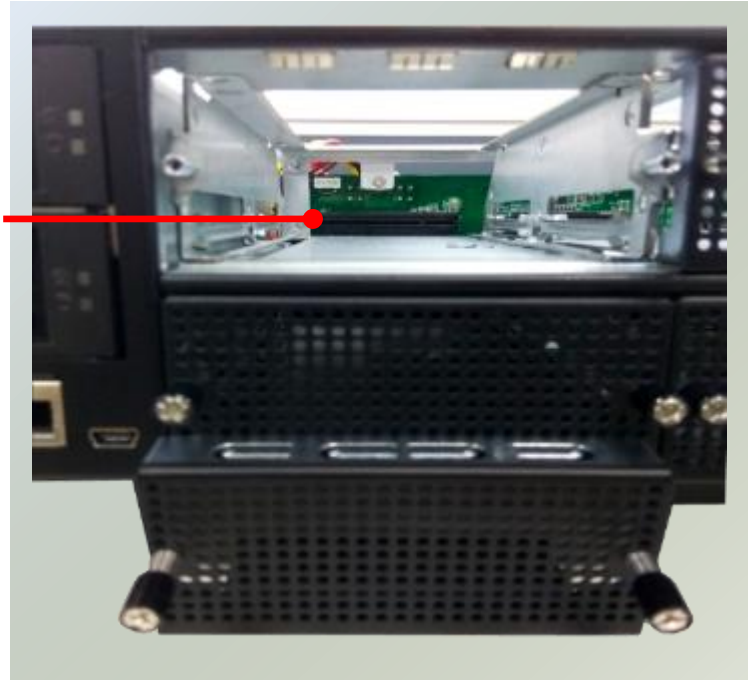
NCA-6530 comes with 8 NIC Ethernet module slots for network bandwidth expansion. Please follow the steps for installation.

1. On the front panel, select a NIC module slot.

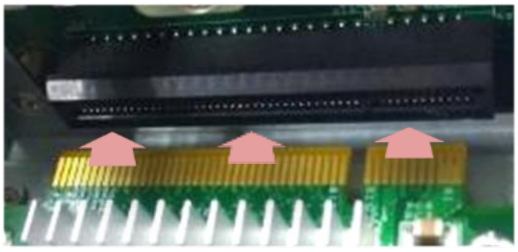


2. Rotate clockwise and loosen the two lock-screws.

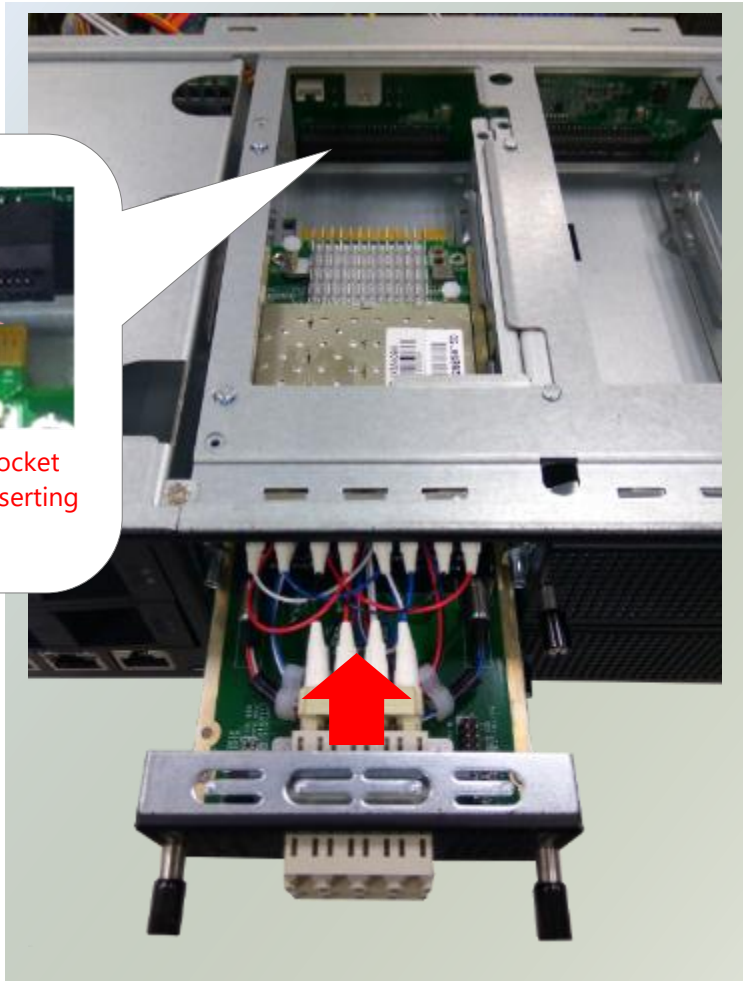
3. Remove the door and locate the PCIe socket for module insertion.



4. Insert a NIC module. (The module shown in the image below is for reference only).



Align the golden fingers to the PCIe socket on the motherboard carefully while inserting the module.

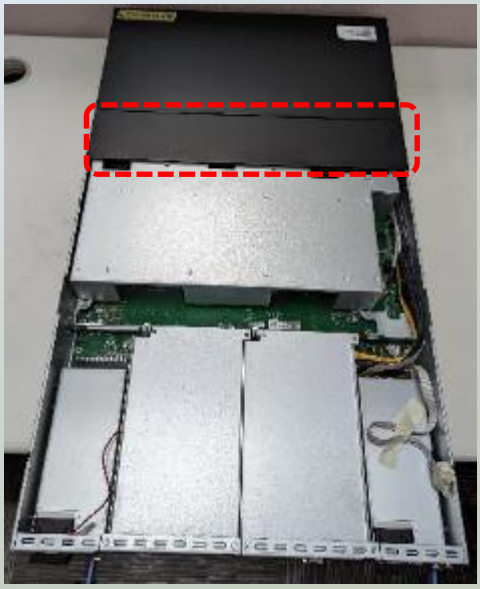


5. Once the module is firmly seated, rotate counter-clockwise and tighten the two lock-screws.

Replacing the Cooling Fans

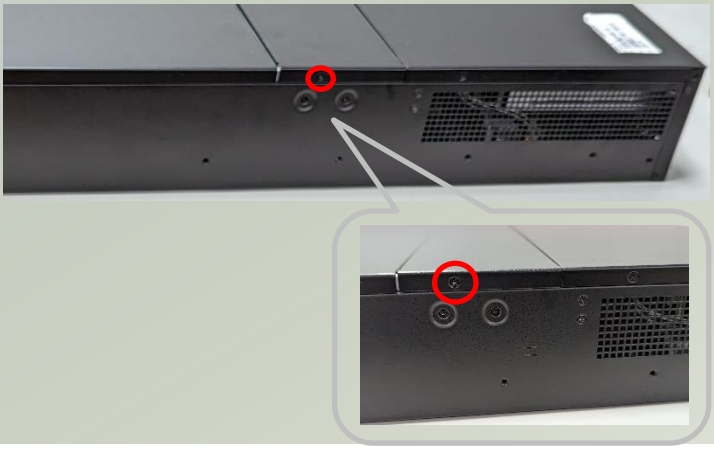
Cooling fans may wear down eventually. Please refer to the steps below for replacing cooling fans.

1. Power off the system and open the chassis cover. Locate the metal partition covering the fans.
2. Unscrew the one (1) screw on each side of the system, then lift the metal partition up.



Right Side

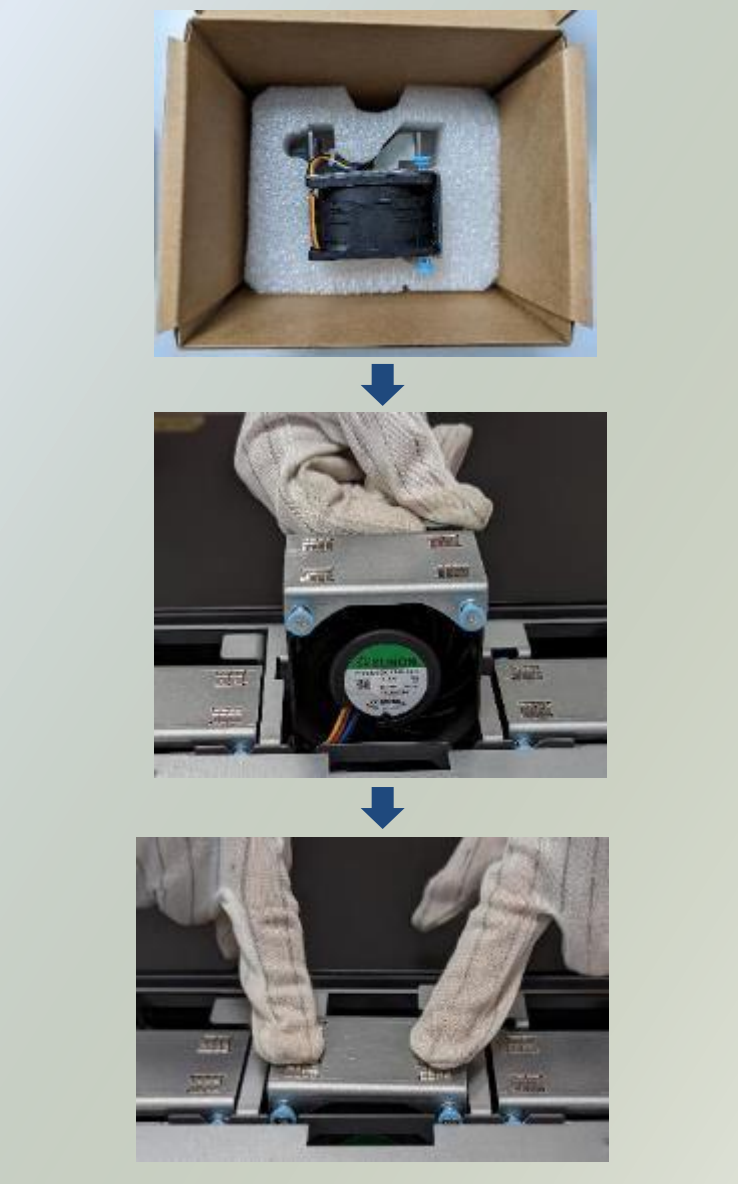
Left Side



3. Locate the cooling fans.

4. Choose the fan you would like to replace, hold on to the side metal tab and gently pull the fan up.

5. Next, lift the new fan from its box and holding the metal tab, gently insert the new fan until firmly seated.



6. Once completed replacing new fans, then place the metal partition over the fans and secure with two (2) original screws on both sides.

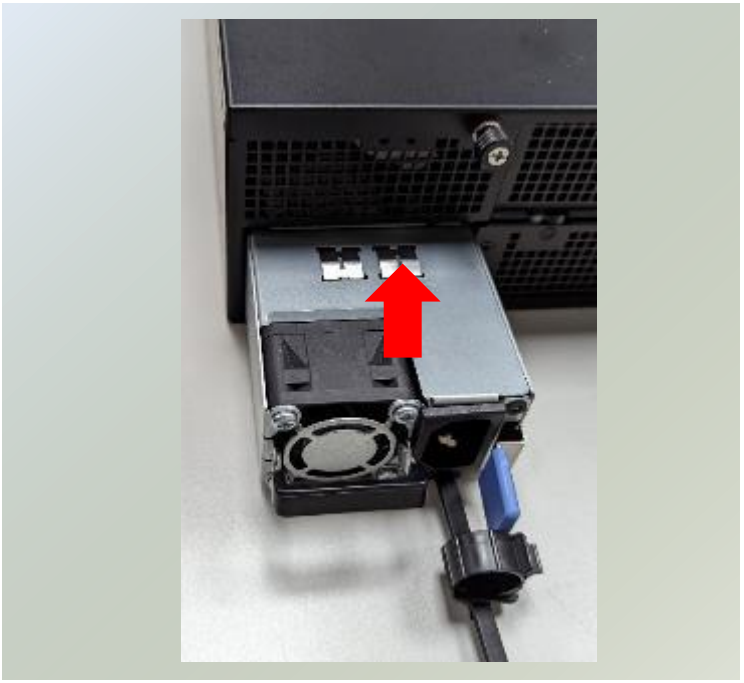
Replacing the Power Supply Units

Power supply units may wear down eventually. Please be noted that NCA-6530 series supports 1600W/2000W PSUs, depending on the ordering preferences. Please prepare the power supply units that matching this capacity.

1. On the rear panel, locate the power supply unit(s).

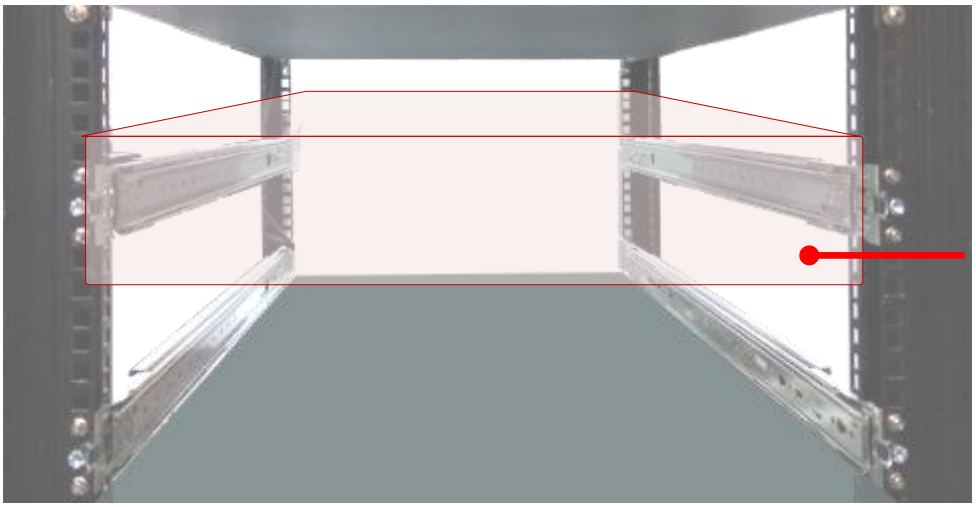
2. Press and hold the handle to pull out the power supply unit.

3. Insert a new power supply unit. Push the unit in until it clicks into place.



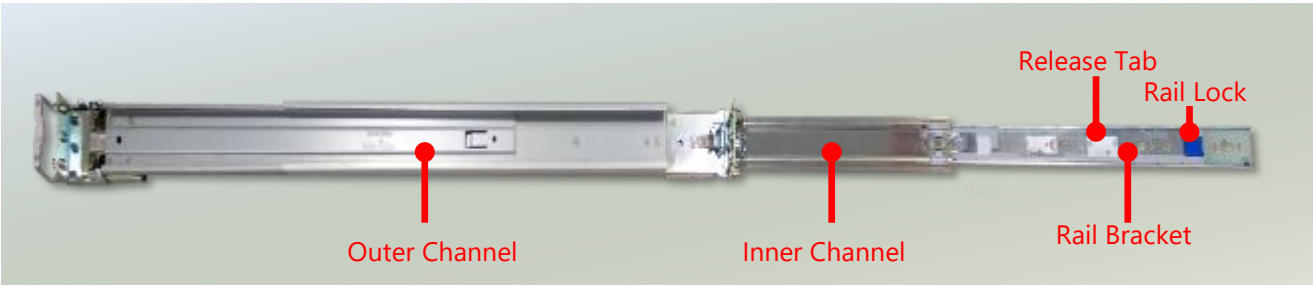
Mounting the System

The system can be installed in a rack using the Slide Rail Kit (optional), sold separately, plus Short Mounting Ear brackets (optional). This method is rather complicated, but the slidable rails allow you to access the system easily while solidly securing the system in the rack. Please follow the steps below for installation.



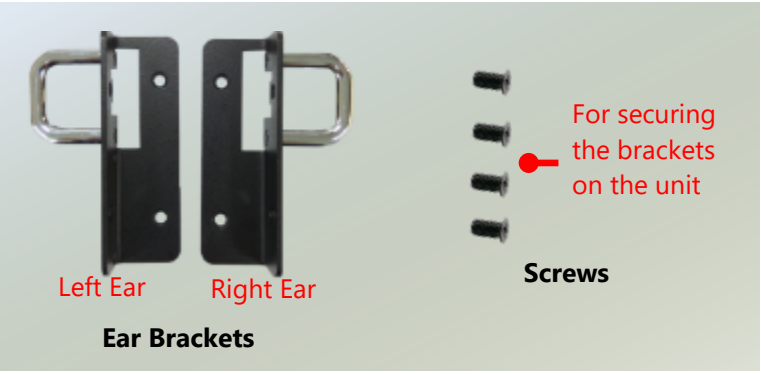
1. Check the package contents of the Slide Rail Kit. The kit shall include the following items:
   - #1 pack of 12pcs M4x4 screws
   - #2 pack of 2pcs M4x4 screws
   - 2x Slide Rails

The rail consists of the following parts:



Assembling the Ear Brackets

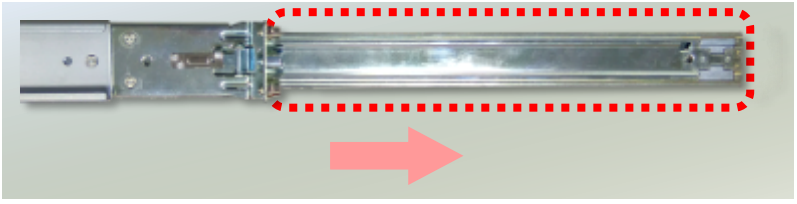
1. Check the package contents. The supplied mounting kit shall include the items below:
   - 2x Standard Ear Brackets
   - 1x pack of screws



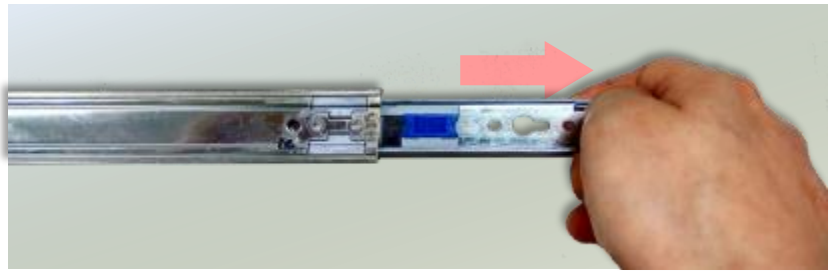
2. Install the ear brackets on both sides of the system using the provided screws, two (2) screws on each side.

Attaching the Rail Brackets

1. Unpack a slide rail and slide the **inner channel** all the way to the end.

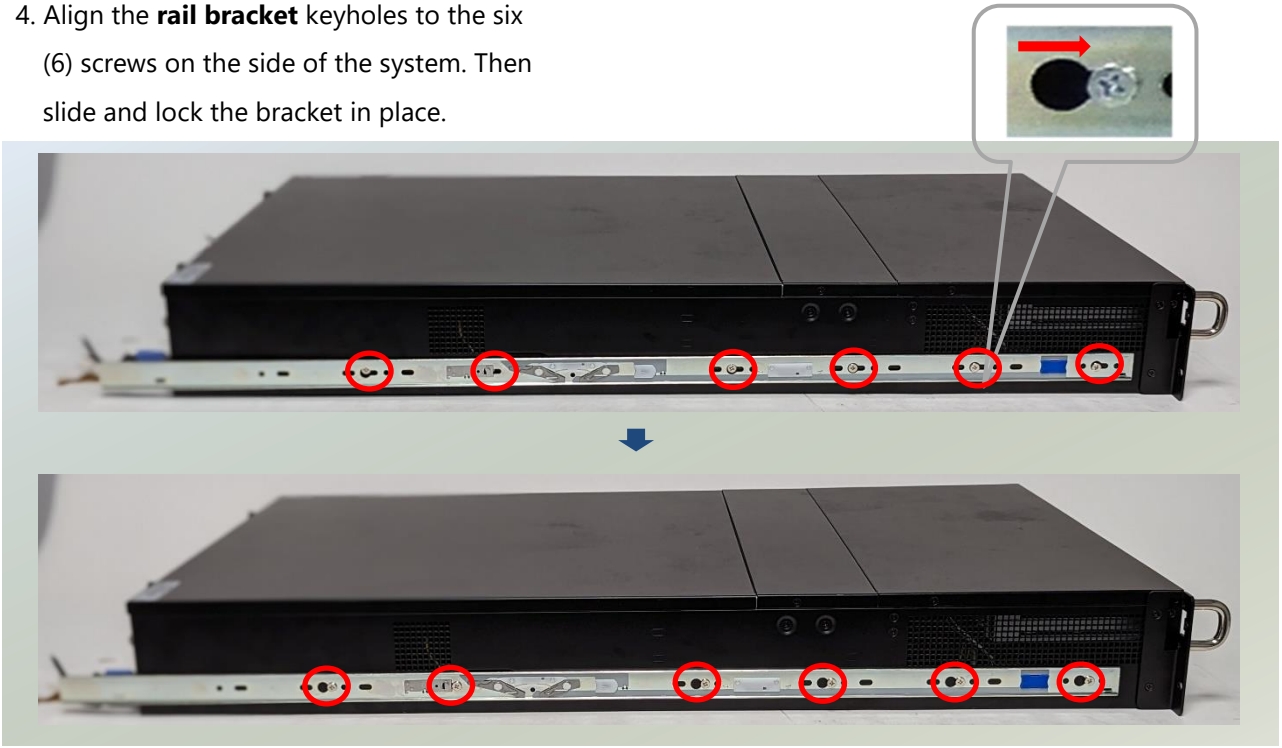


2. Remove the **rail bracket** from the **inner channel** by pushing the Release Tab on the **rail bracket** outwards while sliding it out. Stretch the **rail bracket** to the fullest.



3. Attach six (6) screws on each side of the system.

4. Align the **rail bracket** keyholes to the six (6) screws on the side of the system. Then slide and lock the bracket in place.

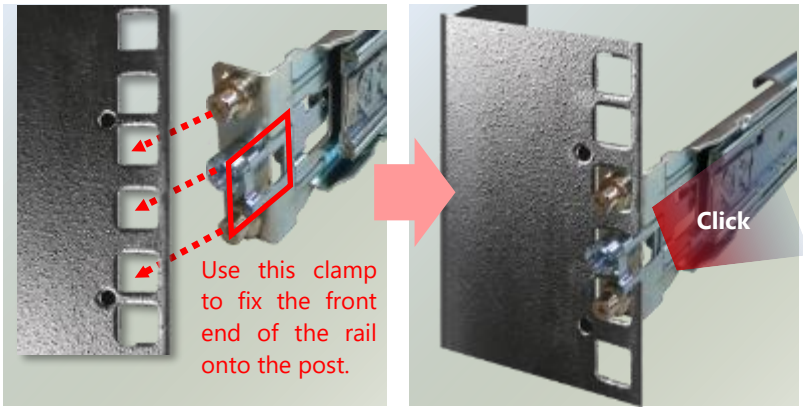


5. Last step, screw in the one (1) screw (from #2 Screw Pack) on each side to secure the rail bracket to the system.

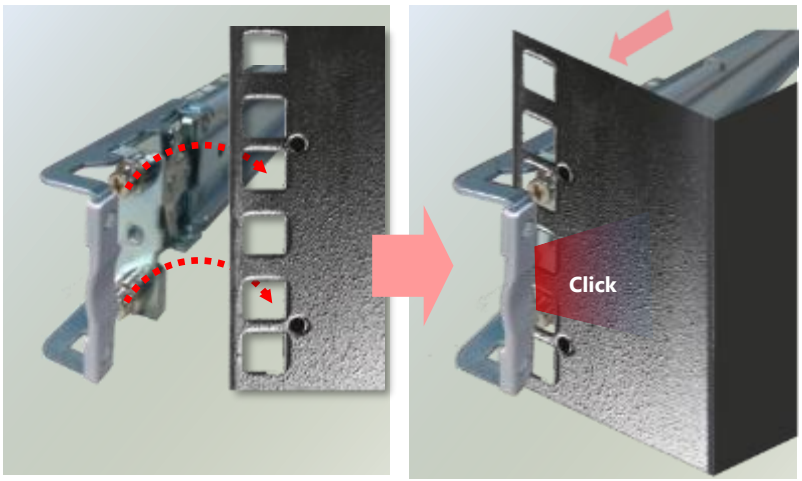
Installing the Slide Rails

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

1. This slide-rails does NOT require screw-fixing. Simply aim at three (3) available screw holes on the rack front and snap the rail (outer channel) front into the rack post, as shown in the image below. You should hear a "click" sound once it is firmly attached.

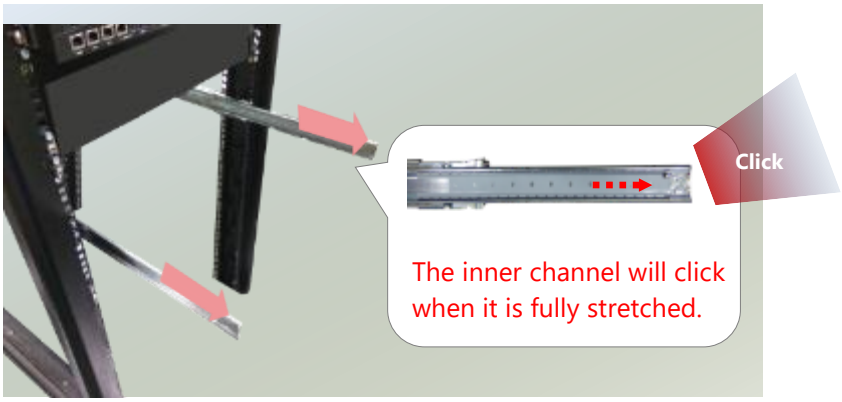


2. For the rear rack installation, slide the rail (outer channel) to aim and engage the bolts on the rail's rear end with the two (2) available holes on the post, and the rail assembly will click into place.

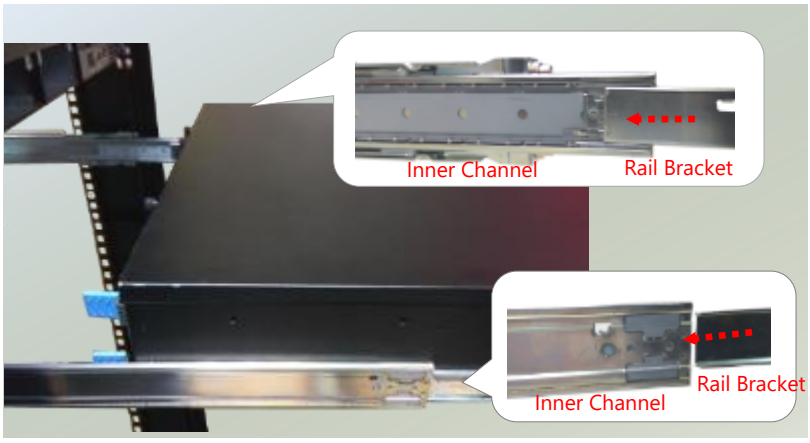


Installing the System into the Rack

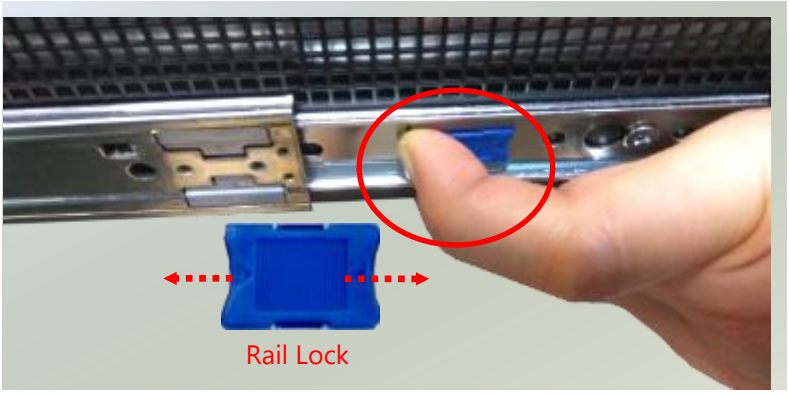
1. Stretch both of the **inner channel** out to their fullest extent. You will hear a click sound when they are fully stretched and locked.



2. Hold the system with its front facing you, lift the chassis and gently engage the **rail brackets** with the **inner channel**, as shown in the image below, and then push the system into the cabinet.



3. When pushing in the system, please also push and hold the Rail Lock tab on both brackets.



4. The system has completed installation in the rack.

Removing the System from the Rack

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

CHAPTER 4: REMOTE SERVER MANAGEMENT

Overview

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

BMC Main Features

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

BMC Firmware Functional Description

System health monitoring

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

System Power Management

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

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

Watchdog Timer

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

Fan Speed Control

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

Field Replaceable Unit (FRU)

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

System Event Log (SEL)

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

Serial over LAN (SOL)

IPMI 2.0 SOL is implemented to redirect the system serial controller traffic over an IPMI session. System administrators are able to 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 is allowed to 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.

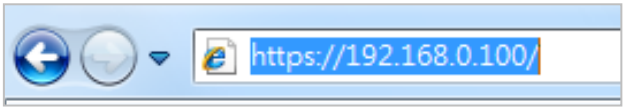
IPMI Commands Support List

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

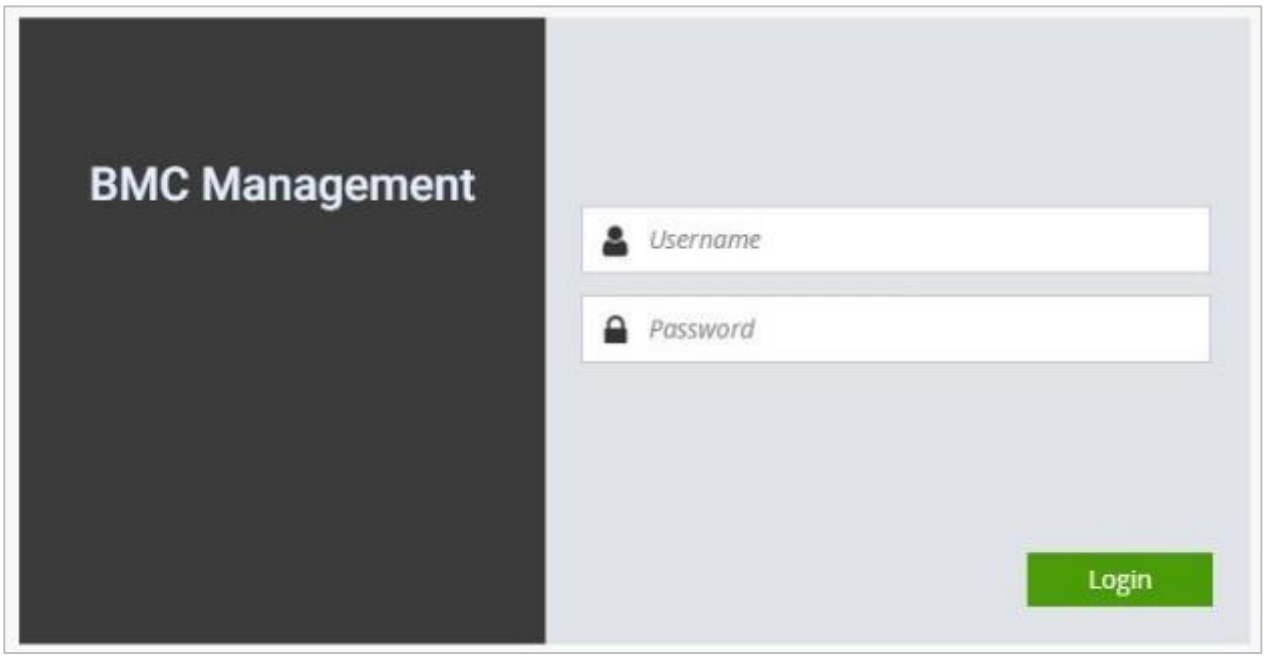
Get SEL Entry	Storage (0Ah)	43h
Delete SEL Entry	Storage (0Ah)	46h
Clear SEL	Storage (0Ah)	47h
Get SEL Time	Storage (0Ah)	48h
Set SEL Time	Storage (0Ah)	49h
Get SEL Time UTC Offset	Storage (0Ah)	5Ch
Set SEL Time UTC Offset	Storage (0Ah)	5Dh
LAN Device Commands		
Set LAN Configuration Parameters	Transport (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

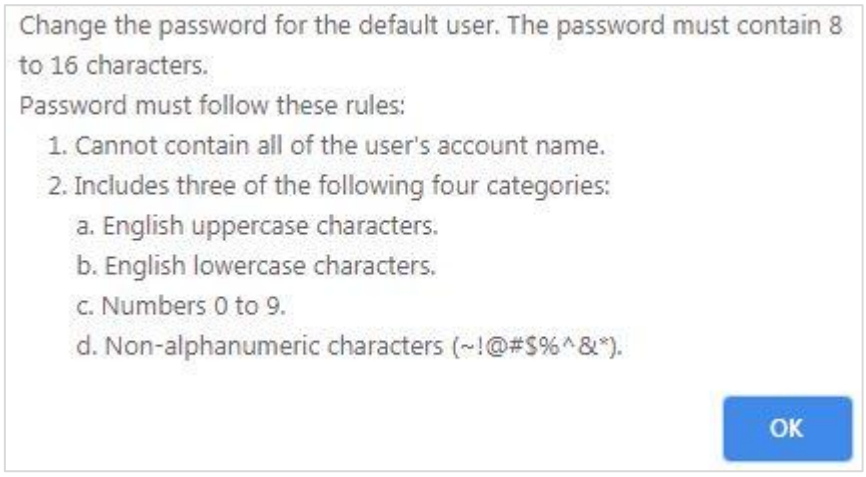
- **Username**: Enter your username in this field.
- **Password**: Enter your password in this field.
- **Sign me in**: After entering the required credentials, click the **Sign me in** to log in to Web UI.

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

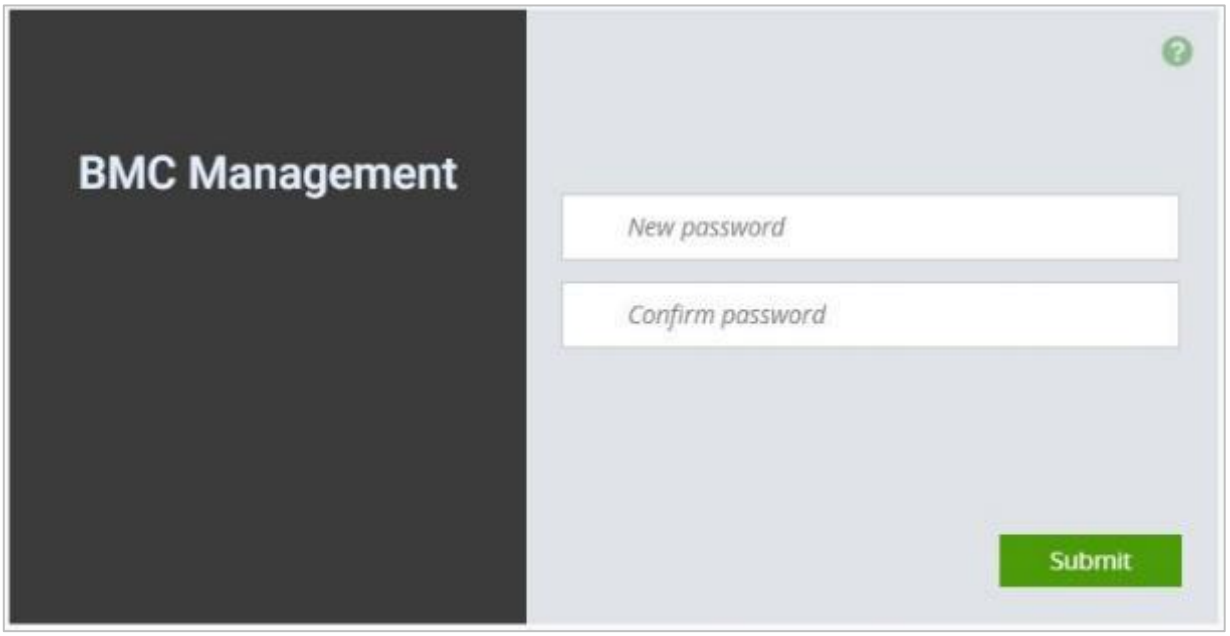
- **Username:** admin
- **Password**: admin

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 on **OK** will bring you to the User Management Configuration page to set a password.



Change the default password – Set password

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

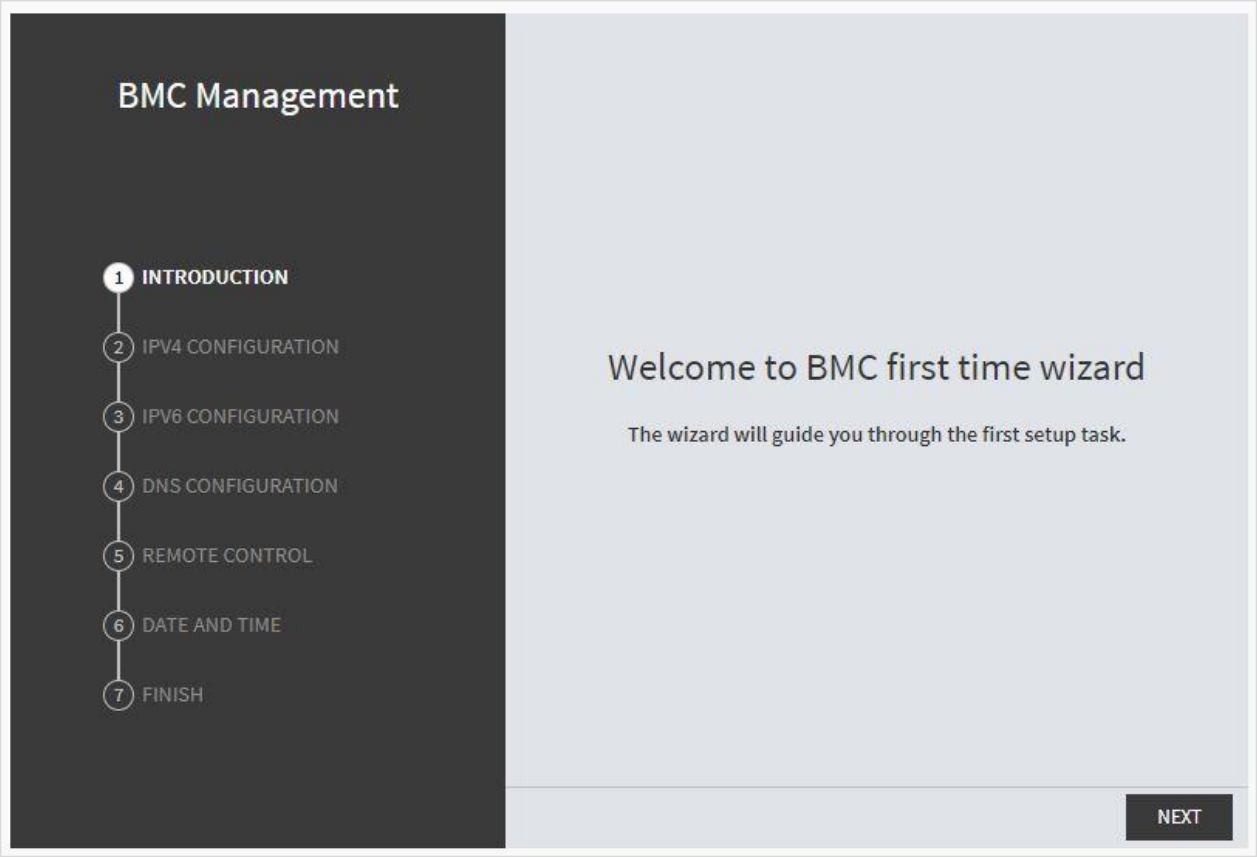
Wizard Welcome Page Introduction

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

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

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

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



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

Web UI Layout Introduction

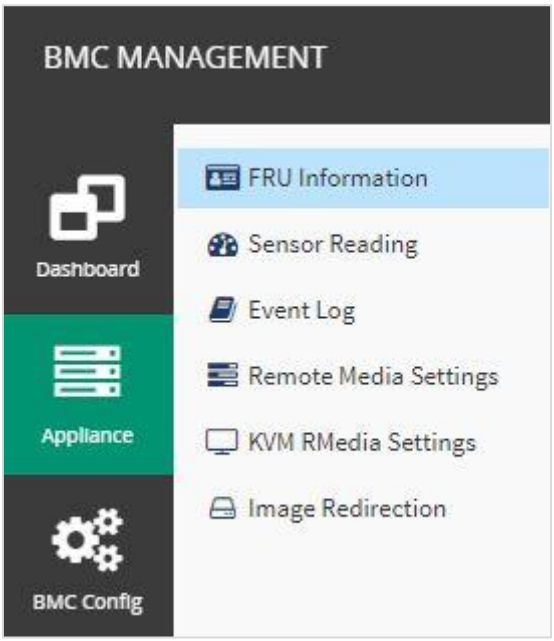
The BMC Web UI consists of various menu items:

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

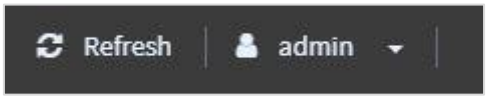
A screenshot of the menu bar is shown below:



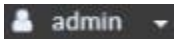
Menu Bar

Quick Button and Logged-in User

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

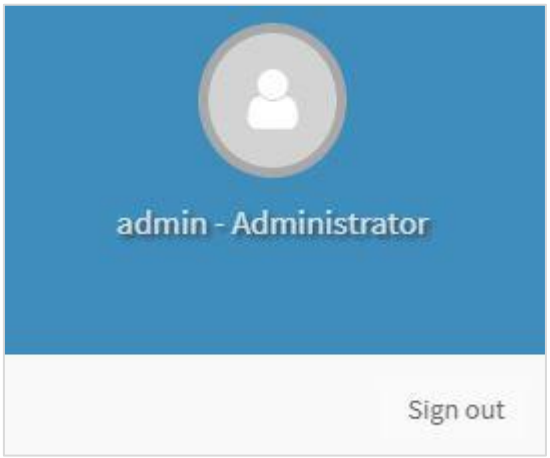


User Information

Logged-in user information: Click the icon 

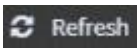
to view the logged-in user information.

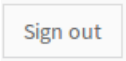
A screenshot of the logged-in user information is shown below:



Logged-in User Information

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

- **Refresh**: Click the icon 

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

to log out of the Web UI.

Logged-in user and its privilege level

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

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

Help

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

CHAPTER 5: 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.

Enter BIOS Setup

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

1. Boot up the system.
2. Press **<Delete>** during the boot-up if you connect a keyboard to this unit. But if you connect a PC to this unit through console USB/Serial connection, then press **<Tab>**. Your system should be running POST (Power-On-Self-Test) upon booting up.
3. Then you will be directed to the BIOS main screen.
4. Instructions of BIOS navigations:

Control Keys	Description
→←	select a setup screen, for instance, [Main], [Advanced], [Platform], [Socket], [Server Mgmt], [Security], [Boot], and [Save & Exit]
↑↓	select an item/option on a setup screen
<Enter>	select an item/option or enter a sub-menu
+/-	to adjust values for the selected setup item/option
F1	to display General Help screen
F2	to retrieve previous values, such as the parameters configured the last time you had entered BIOS.
F3	to load optimized default values
F4	to save configurations and exit BIOS
<Esc>	exit the current screen

Main Page

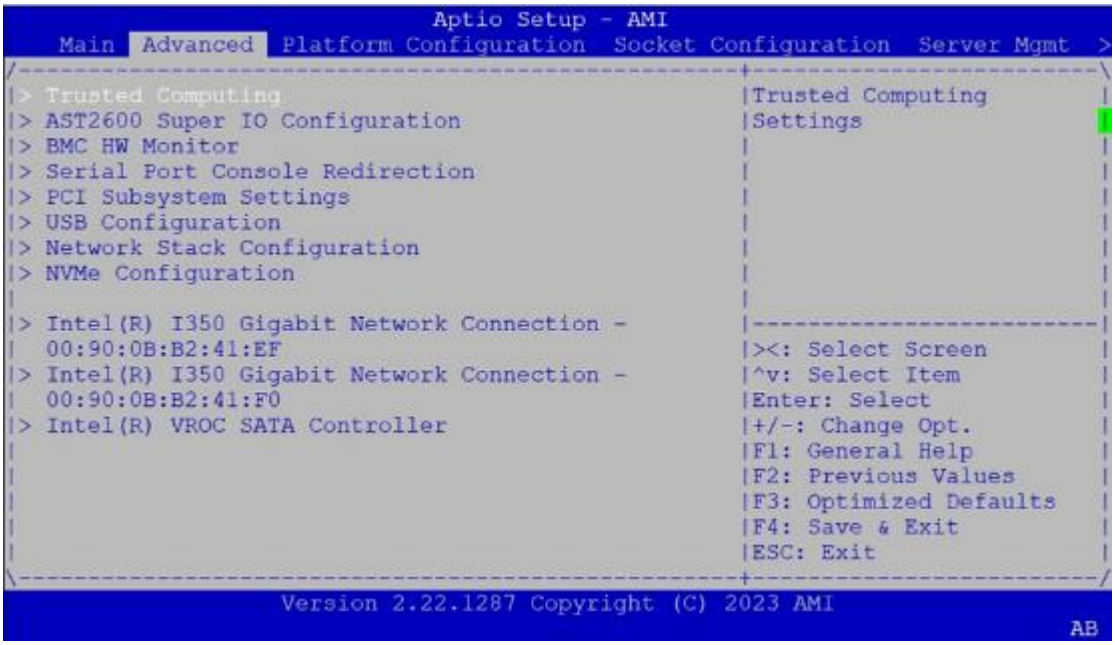
Setup Main Page contains BIOS information and project version information.

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

Item	Description
BIOS Information	BIOS Vendor: American Megatrends Core Version: AMI Kernel version, CRB code base, X64 Compliancy: UEFI version, PI version BIOS Version: BIOS release version Build Date and Time: MM/DD/YYYY 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.

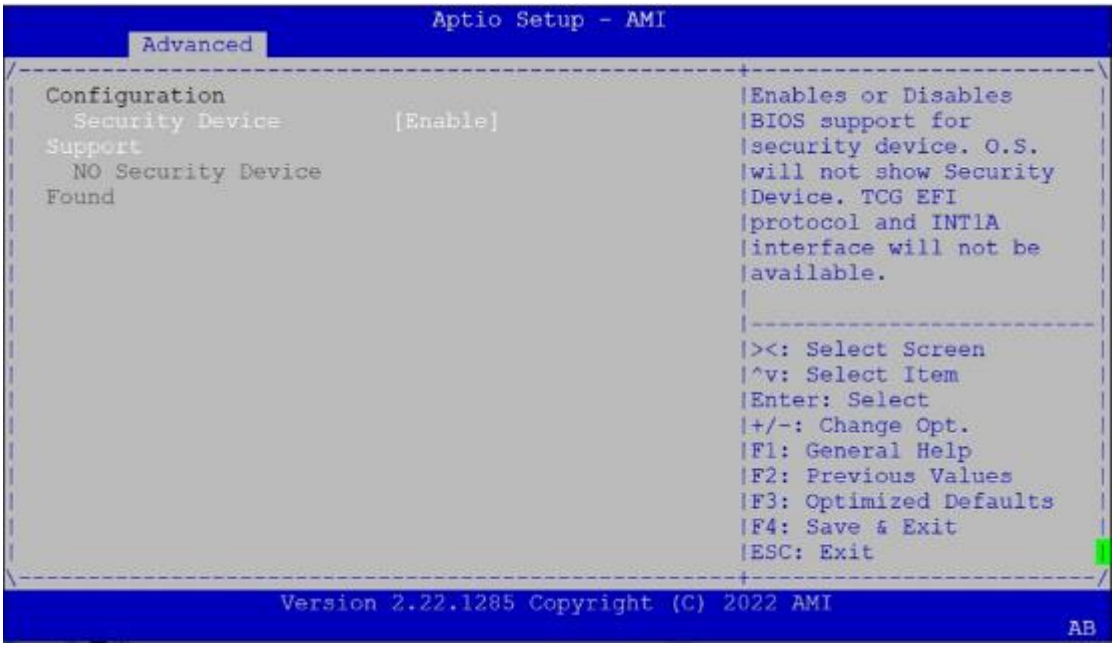
Advanced Setup

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



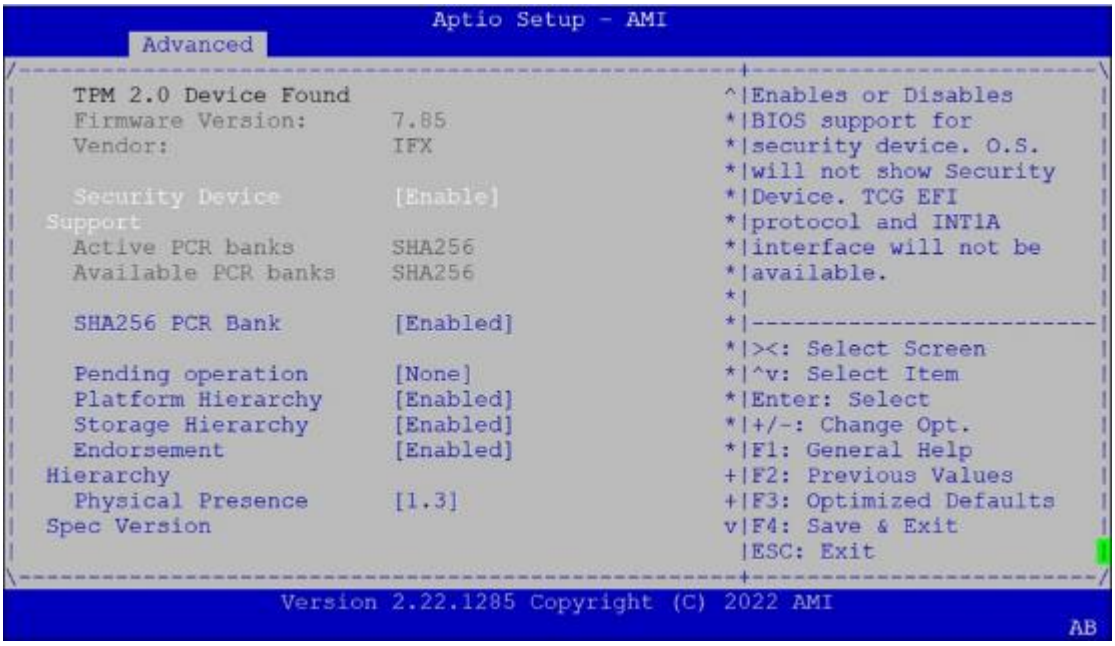
Trusted Computing

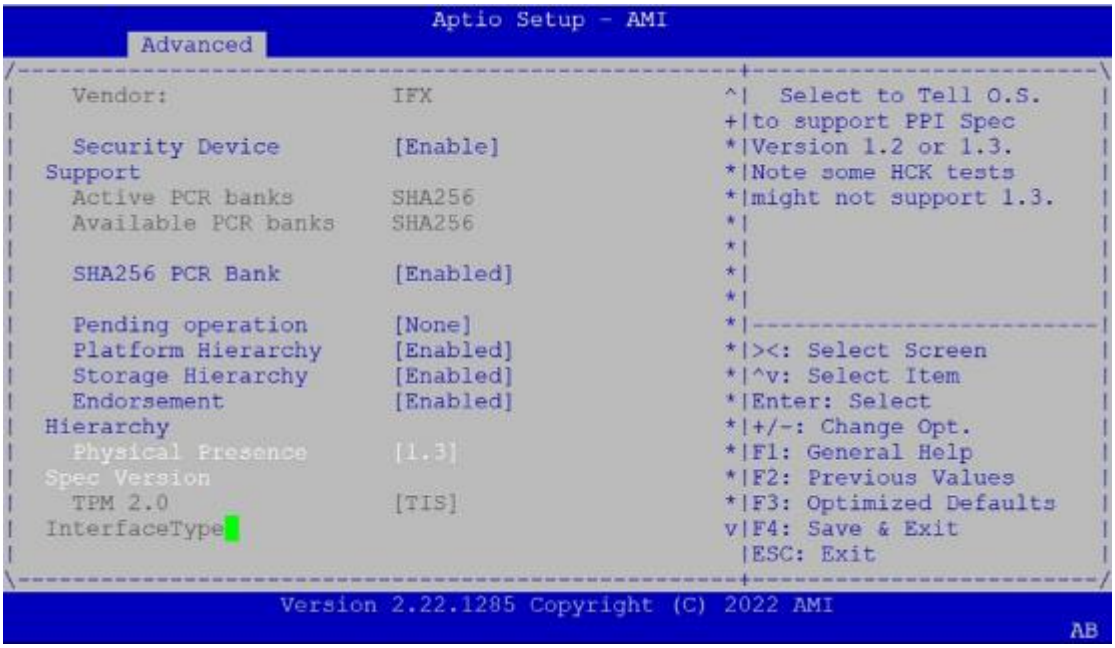
This option allows you to configure parameters regarding BIOS support for security device. Press <**Enter**> to access the submenu.



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

Trusted Computing (TPM2.0)



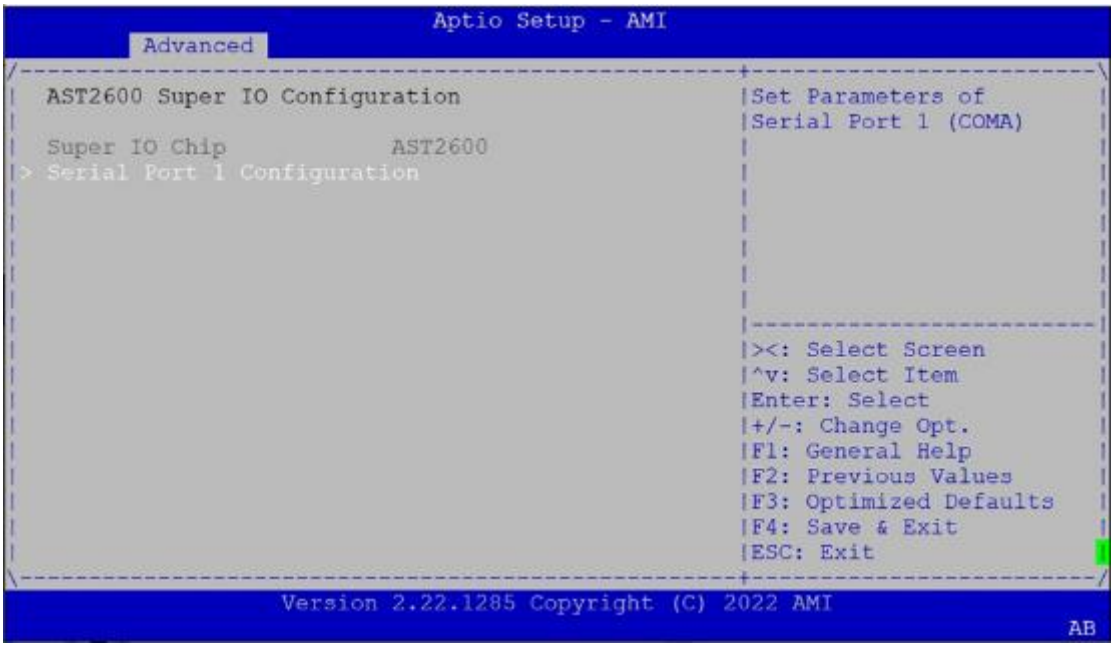


Item	Option	Description
Security Device Support	Enabled Disabled	Enables or disables BIOS support for security device. By disabling this function, OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
SHA256 PCR Bank	Enabled Disabled	Enables or disables SHA256 PCR Bank.
Pending operation	None TPM Clear	Schedules an Operation for the Security Device. NOTE: Your computer will reboot during restart in order to change State of Security Device.

Platform Hierarchy	Enabled Disabled	Enables or disables Platform Hierarchy.
Storage Hierarchy	Enabled Disabled	Enables or disables Storage Hierarchy.
Endorsement Hierarchy	Enabled Disabled	Enables or disables Endorsement Hierarchy.
Physical Presence Spec Version	1.2 1.3	Select to tell OS to support PPI Spec Version 1.2 or 1.3. NOTE: Some HCK tests might not support 1.3.
TPM 20 Interface Type	TIS	Select **TPM 20 Device** for the Communication Interface.

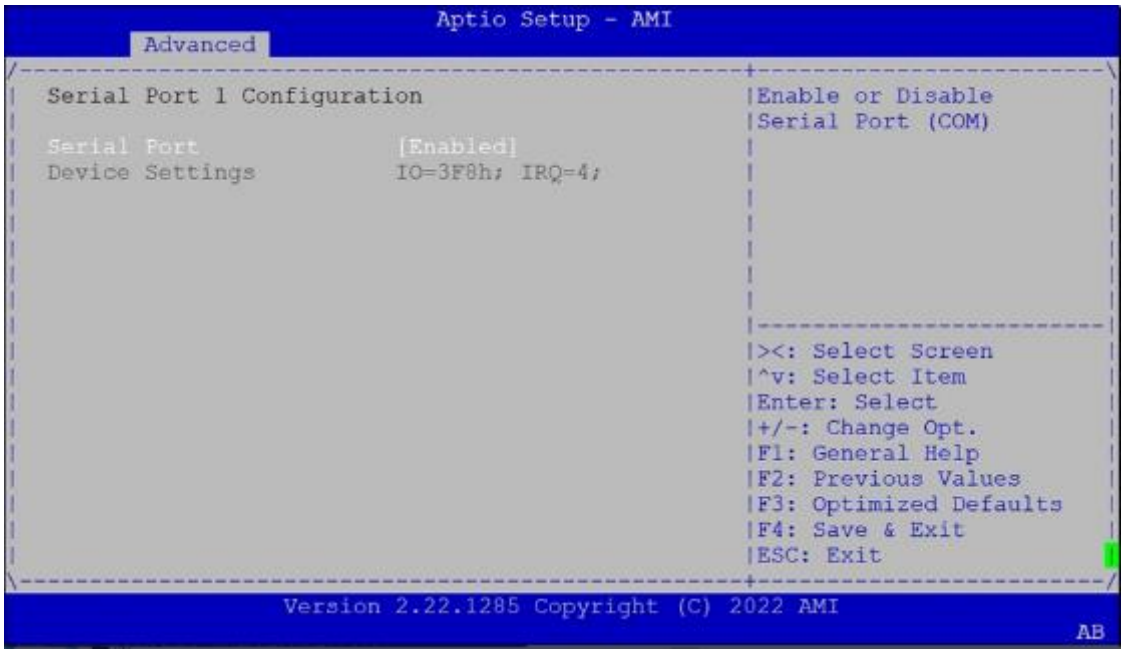
Super IO Configuration

This option allows you to configure parameters about Super IO Chip. Press <**Enter**> to access the submenu.



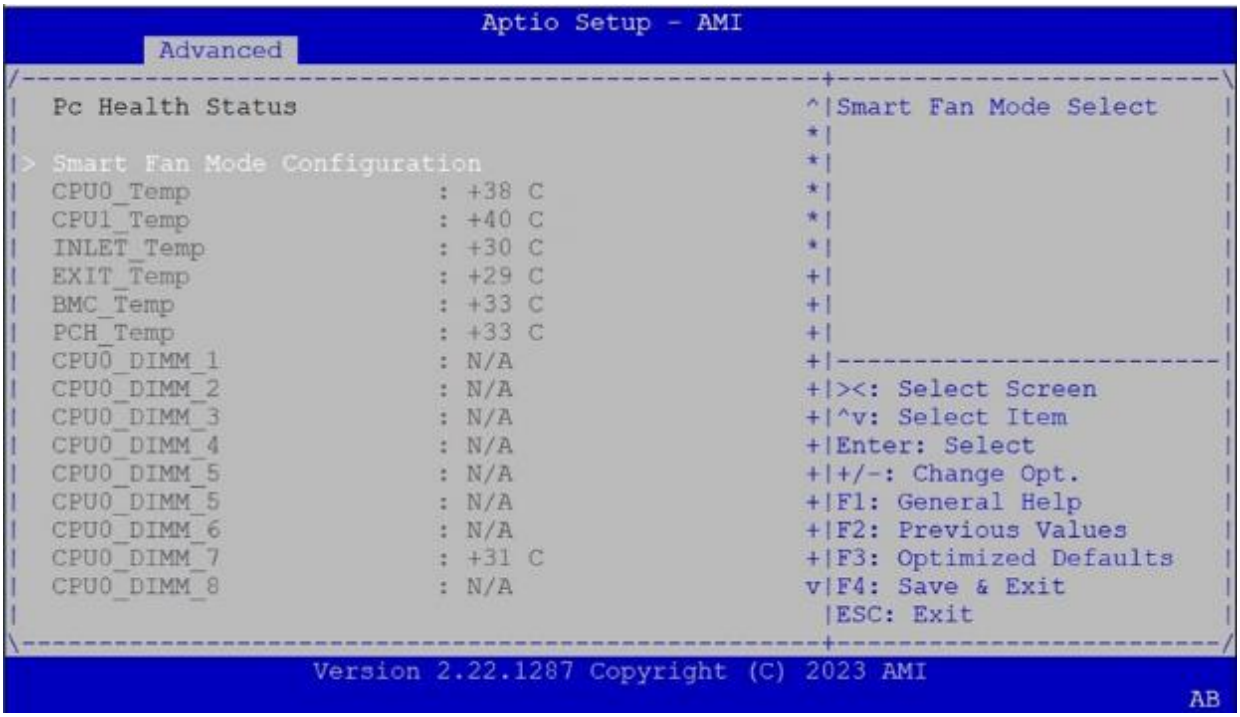
Serial Port 1 Configuration

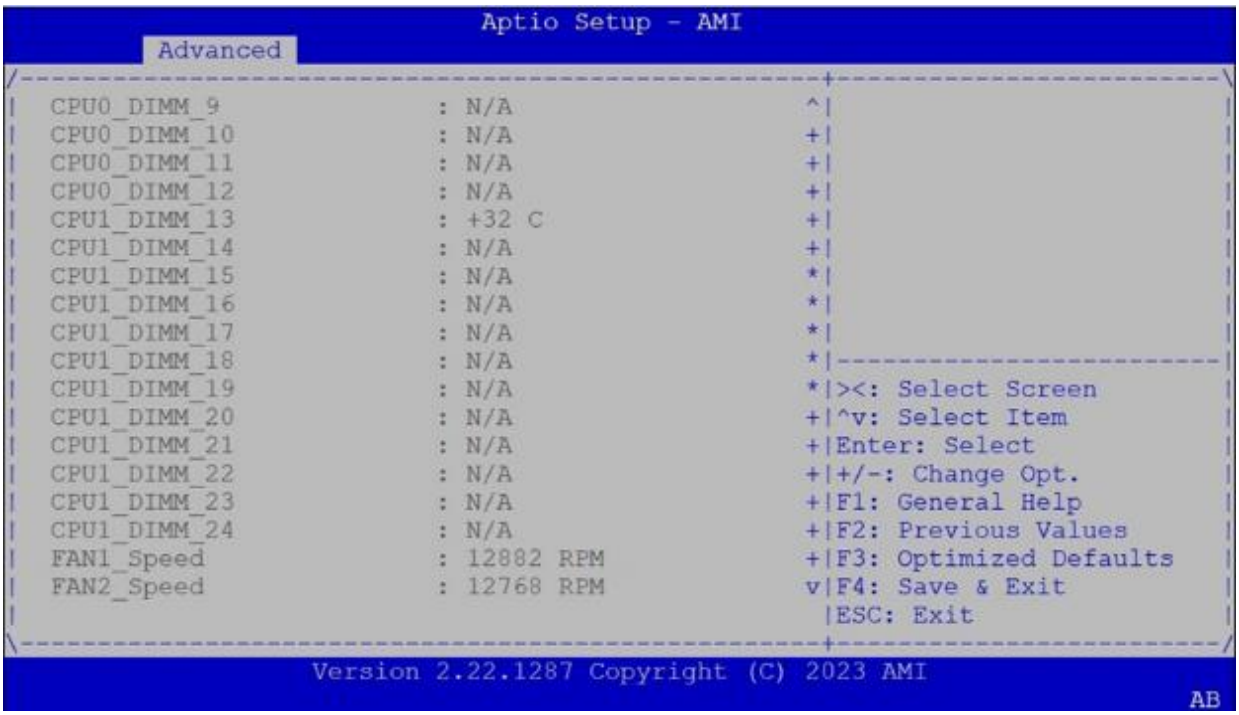
Select "Serial Port 1 Configuration" to enter sub setting screen.

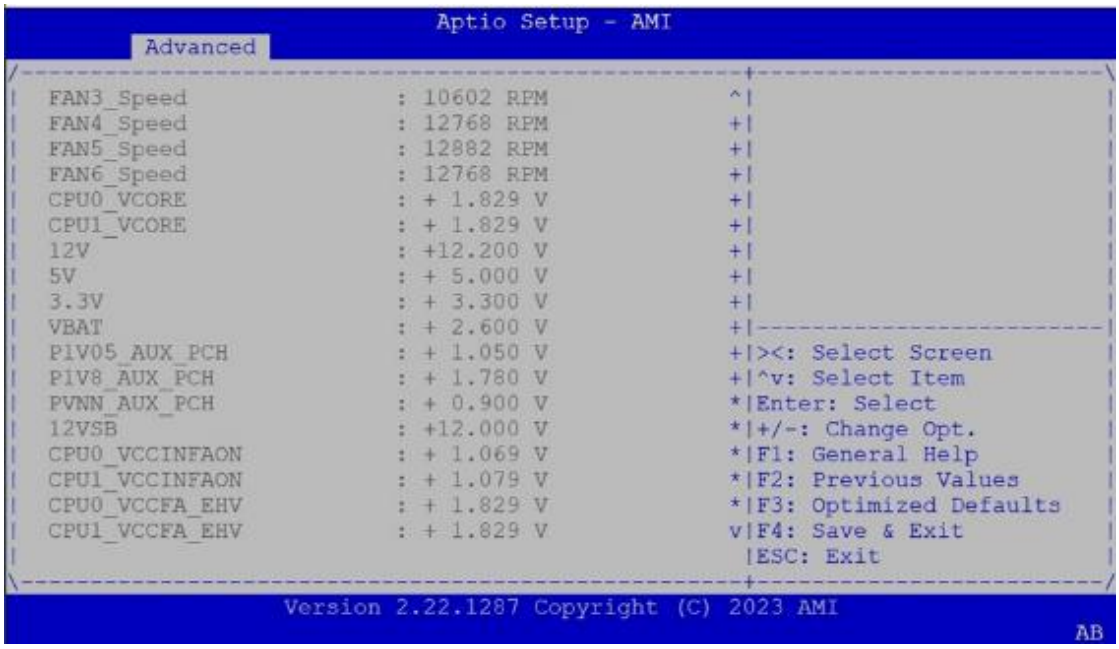


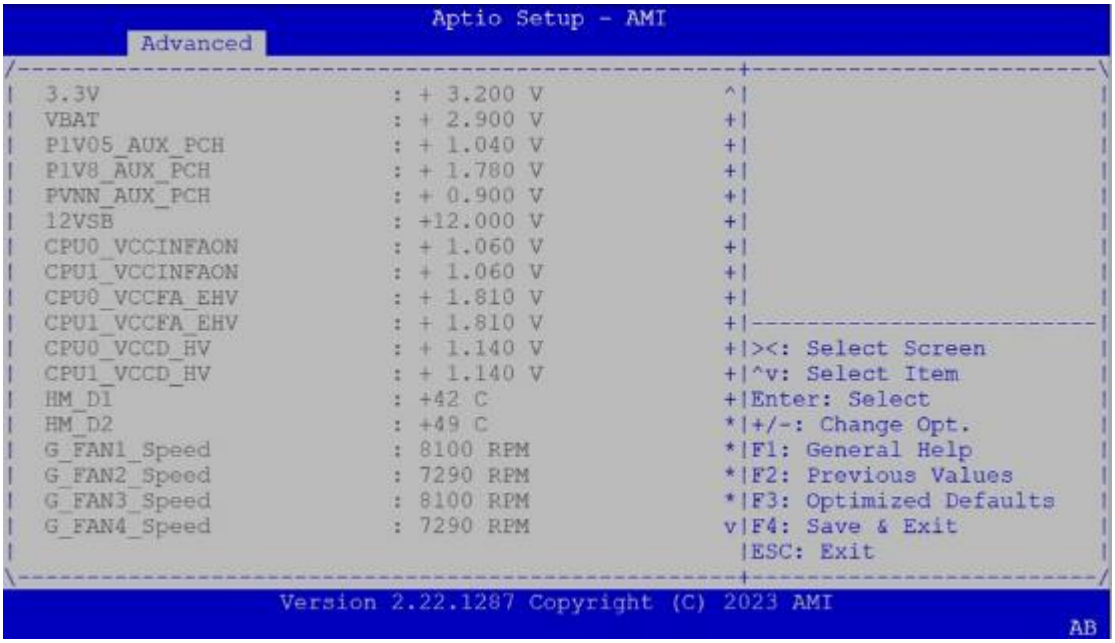
Item	Option	Description
Serial Port	Enabled Disabled	Enables or disables Serial Port 1.
Device Settings	NA	IO=3F8h; IRQ = 4

BMC HW Monitor





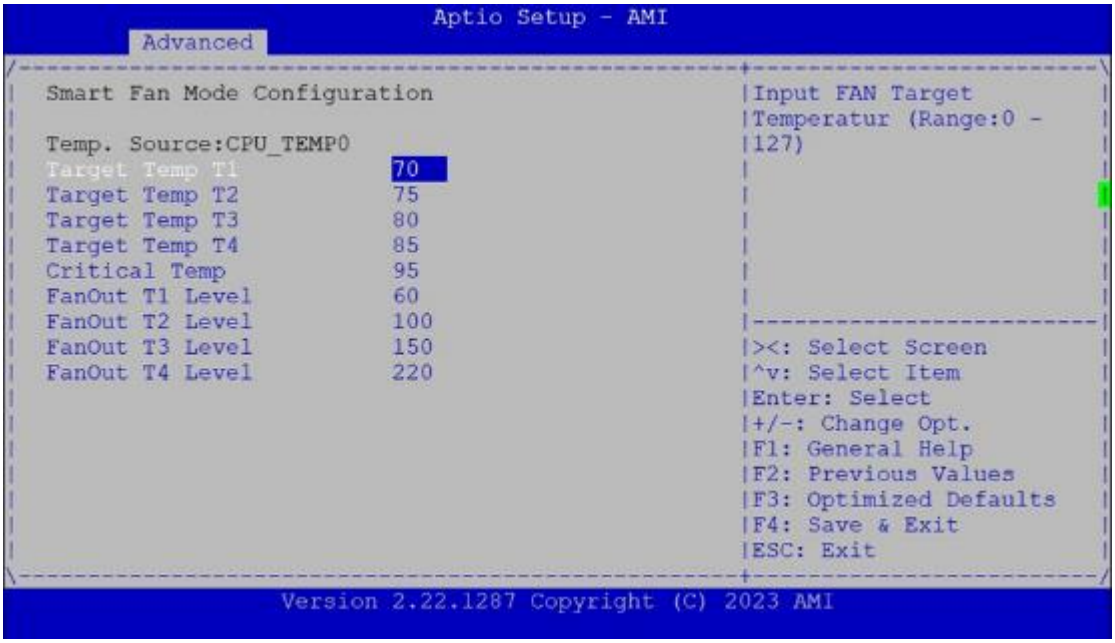




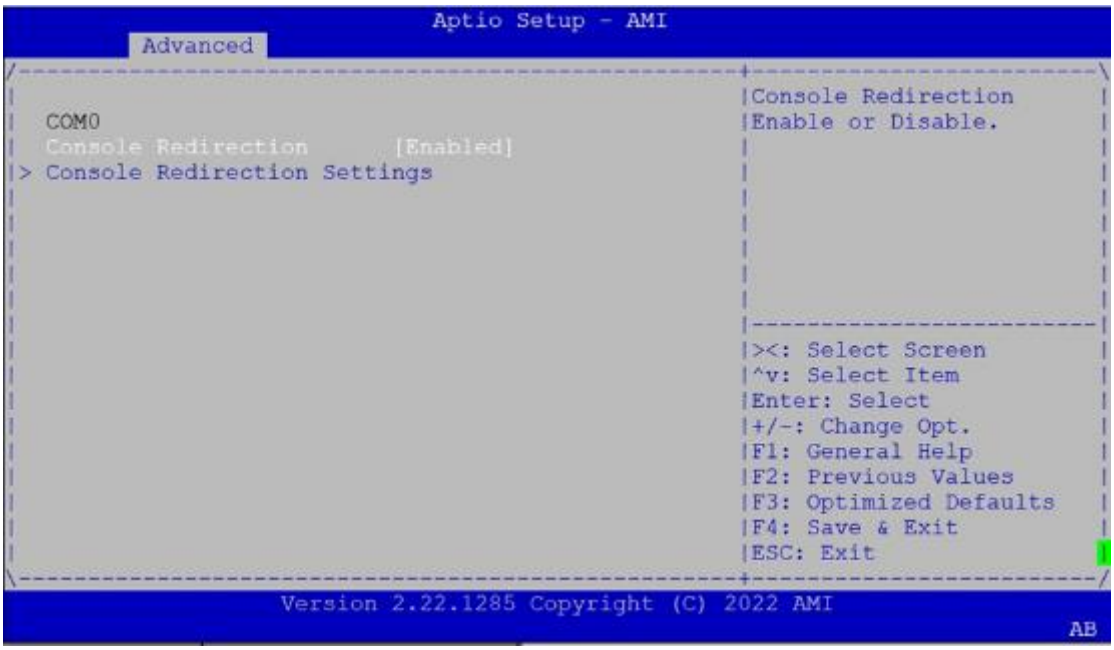
Feature	Description
CPU0 Temp	This value reports the CPU0 temperature
CPU1 Temp	This value reports the CPU1 temperature
INLET Temp	This value reports the INLET temperature
EXIT Temp	This value reports the System temperature
BMC Temp	This value reports the BMC temperature
PCH Temp	This value reports the PCH temperature
CPU0_DIMM_0~12	This value reports the CPU0_DIMM0~12 temperature
CPU1_DIMM13~24	This value reports the CPU1_DIMM0~24 temperature
FAN1 Speed	This value reports the Fan1 speed
FAN2 Speed	This value reports the Fan2 speed

FAN3 Speed	This value reports the Fan3 speed
FAN4 Speed	This value reports the Fan4 speed
FAN5 Speed	This value reports the Fan5speed
FAN6 Speed	This value reports the Fan6 speed
CPU0 VCORE	This value reports the CPU0 VCORE Input voltage
CPU1 VCORE	This value reports the CPU1 VCORE Input voltage
12V	This value reports the 12V Input voltage
5V	This value reports the 5V Input voltage
3V3	This value reports the 3.3V Input voltage
VBAT	This value reports the VBAT Input voltage
1V5V	This value reports the 1.05V Input voltage
1V8	This value reports the 1.08V Input voltage
PVNN	This value reports the VIN Input voltage
12VSB	This value reports the Standby 12V Input voltage
CPU0 VCCINFAON	This value reports the CPU0 VCCINFAON voltage
CPU1 VCCINFAON	This value reports the CPU1 VCCINFAON voltage
CPU0 VCCFA EHV	This value reports the CPU0 VCCFA_EHV voltage
CPU1 VCCFA EHV	This value reports the CPU1 VCCFA_EHV voltage
CPU0 VCCD HV	This value reports the CPU0 VCCD_HV voltage
CPU1 VCCD HV	This value reports the CPU1 VCCD_HV voltage
HM_D1	This value reports the environmental temperature of Graphics card1
HM_D2	This value reports the environmental temperature of Graphics card2
G_FAN1_SPEED	This value reports the GPU Fan1 speed
G_FAN2_SPEED	This value reports the GPU Fan2 speed
G_FAN3_SPEED	This value reports the GPU Fan3 speed
G_FAN4_SPEED	This value reports the GPU Fan4speed
G_FAN5_SPEED	This value reports the GPU Fan5 speed
G_FAN6_SPEED	This value reports the GPU Fan6 speed
G_FAN7_SPEED	This value reports the GPU Fan7 speed
G_FAN8_SPEED	This value reports the GPU Fan8 speed

Smart Fan Mode Configuration

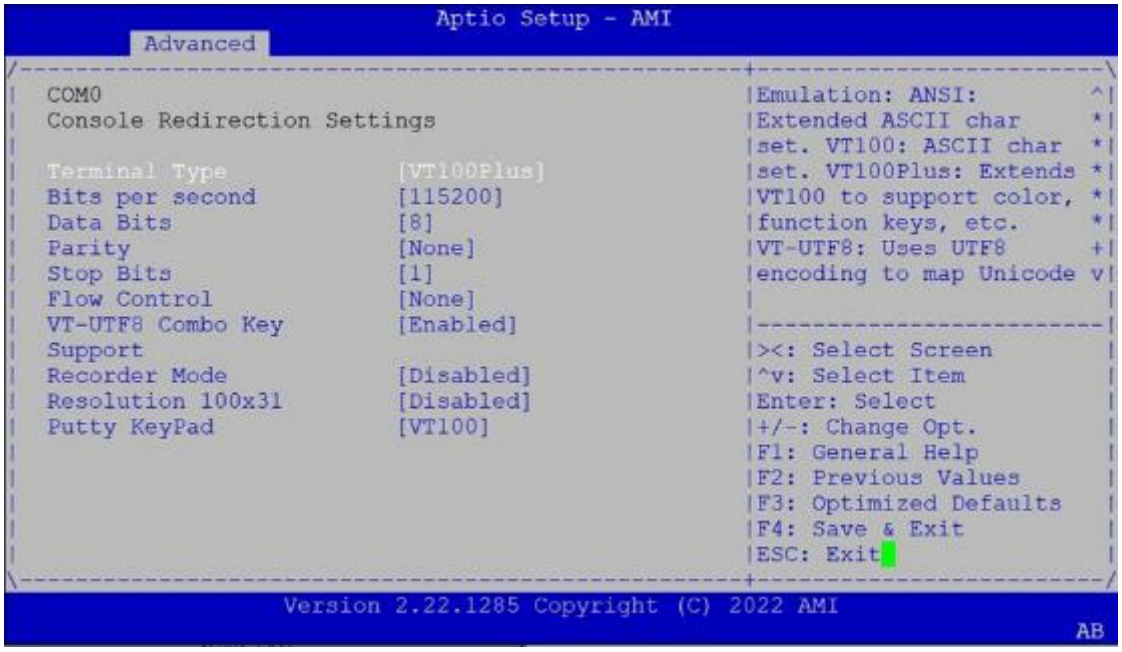


Serial Port Console Redirection



Item	Option	Description
COM0 Console Redirection	Enabled Disabled	Enables or disables Console Redirection

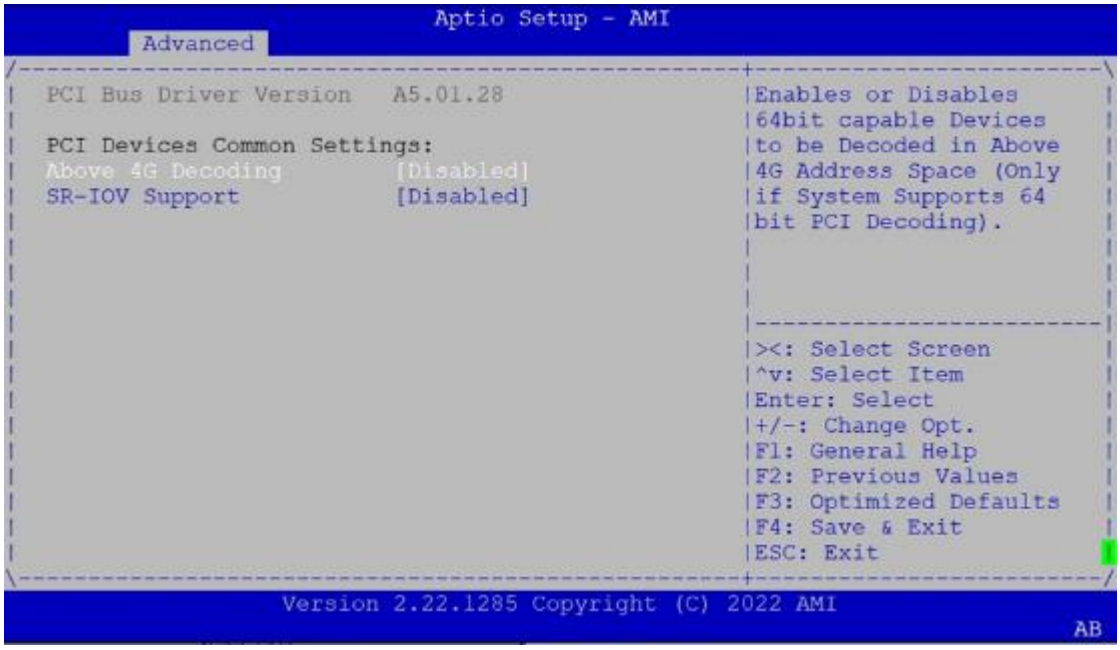
Console Redirection Settings



Item	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

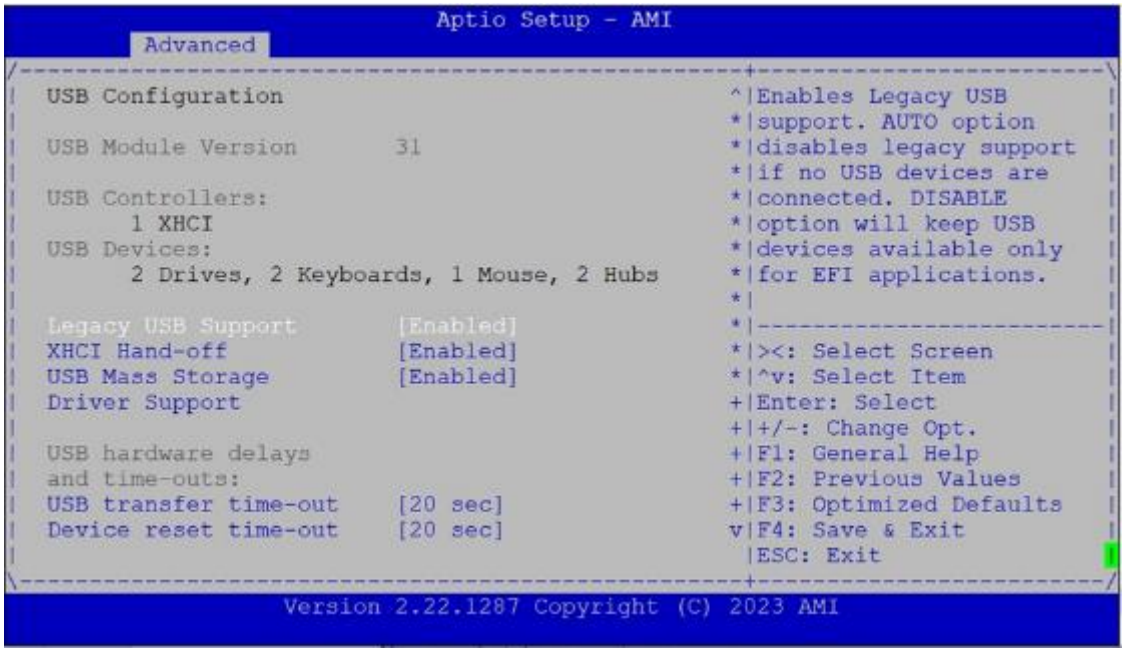
Recorder Mode	Disabled Enabled	With this mode enabled, only text will be sent. This is to capture Terminal data.
Resolution 100x31	Disabled Enabled	Enables or disables extended terminal resolution
Putty Keypad	VT100 LINUX XTERM86 SCO ESCN VT400	Selects Function Key and Keypad on Putty.

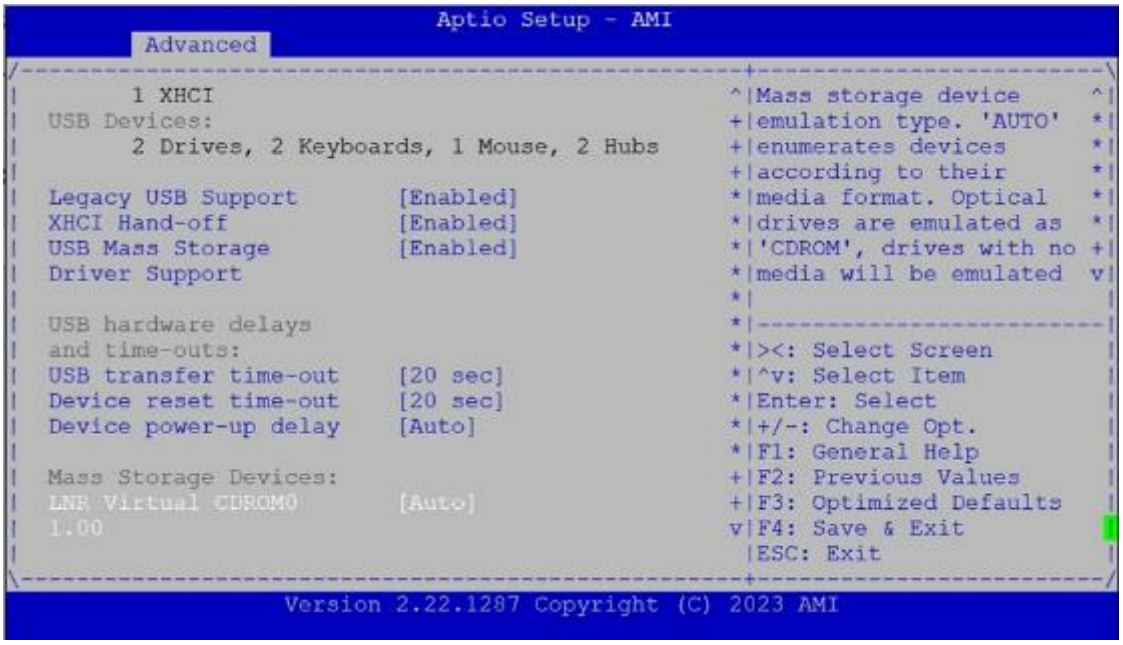
PCI Subsystem Settings



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

USB Configuration

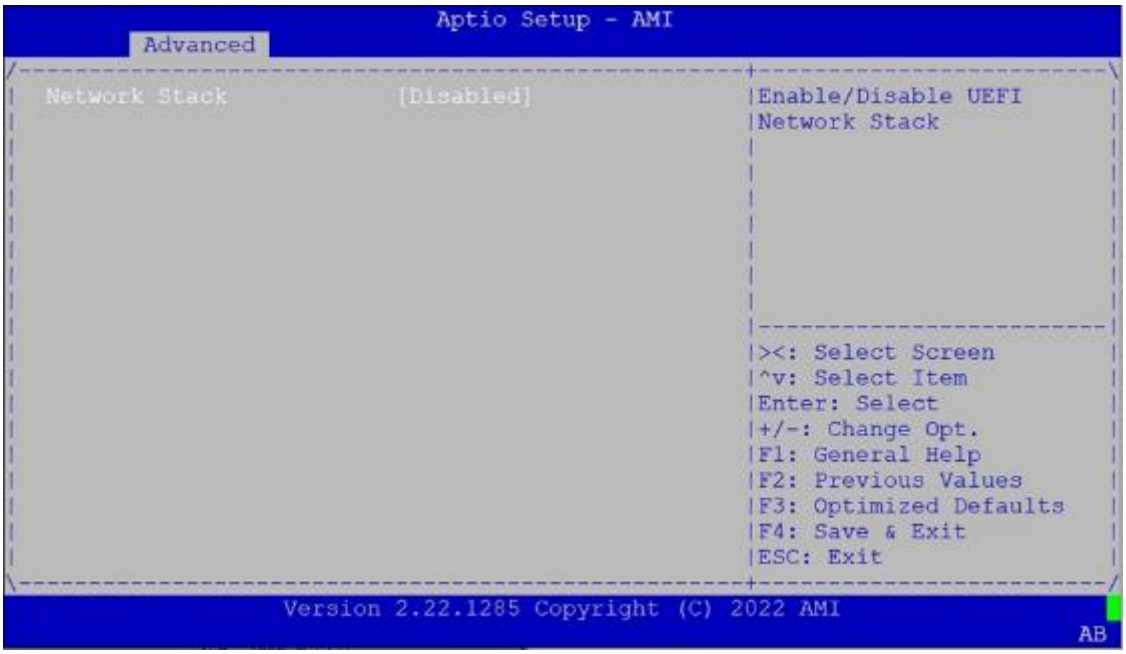




Item	Option	Description
Legacy USB Support	Enabled Disabled Auto	Enables Legacy USB support. **Auto** option disables legacy support if no USB devices are connected; **Disabled**option will keep USB devices available only for EFI applications.
XHCI Hand-off	Enabled Disabled	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.

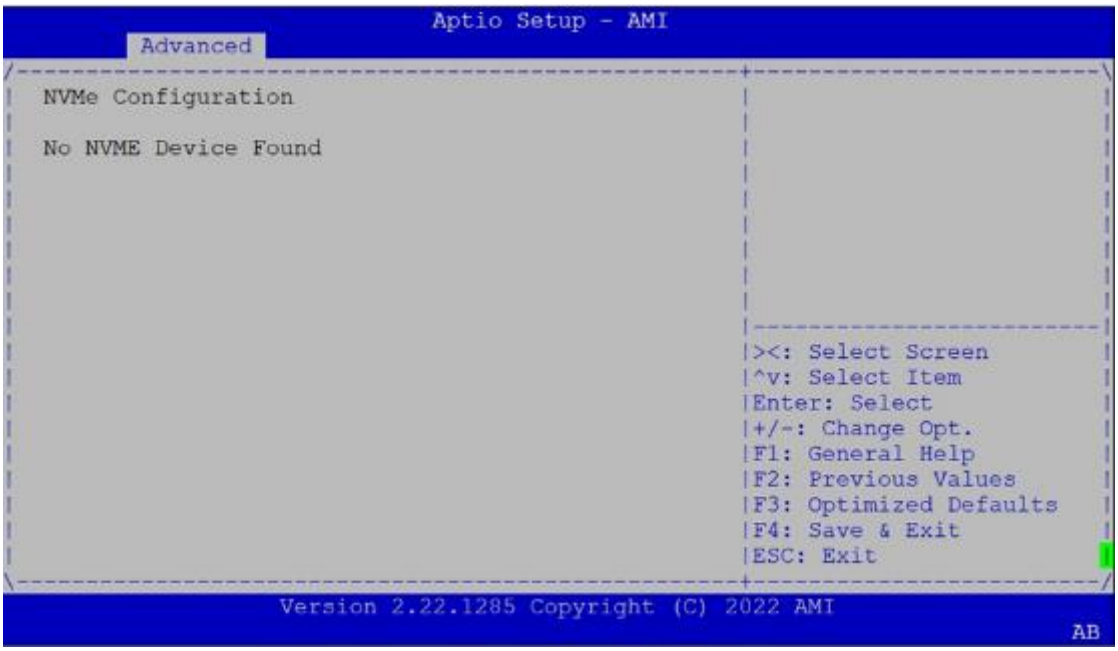
USB Mass Storage Driver Support	Enabled Disabled	Enables or disables USB Mass Storage Driver Support.
USB transfer time-out	1 sec 5 sec 10 sec 20 sec	The time-out value for Control, Bulk, and Interrupt transfers
Device reset time-out	1 sec 5 sec 10 sec 20 sec	USB mass storage device Start Unit command 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.

Network Stack Configuration

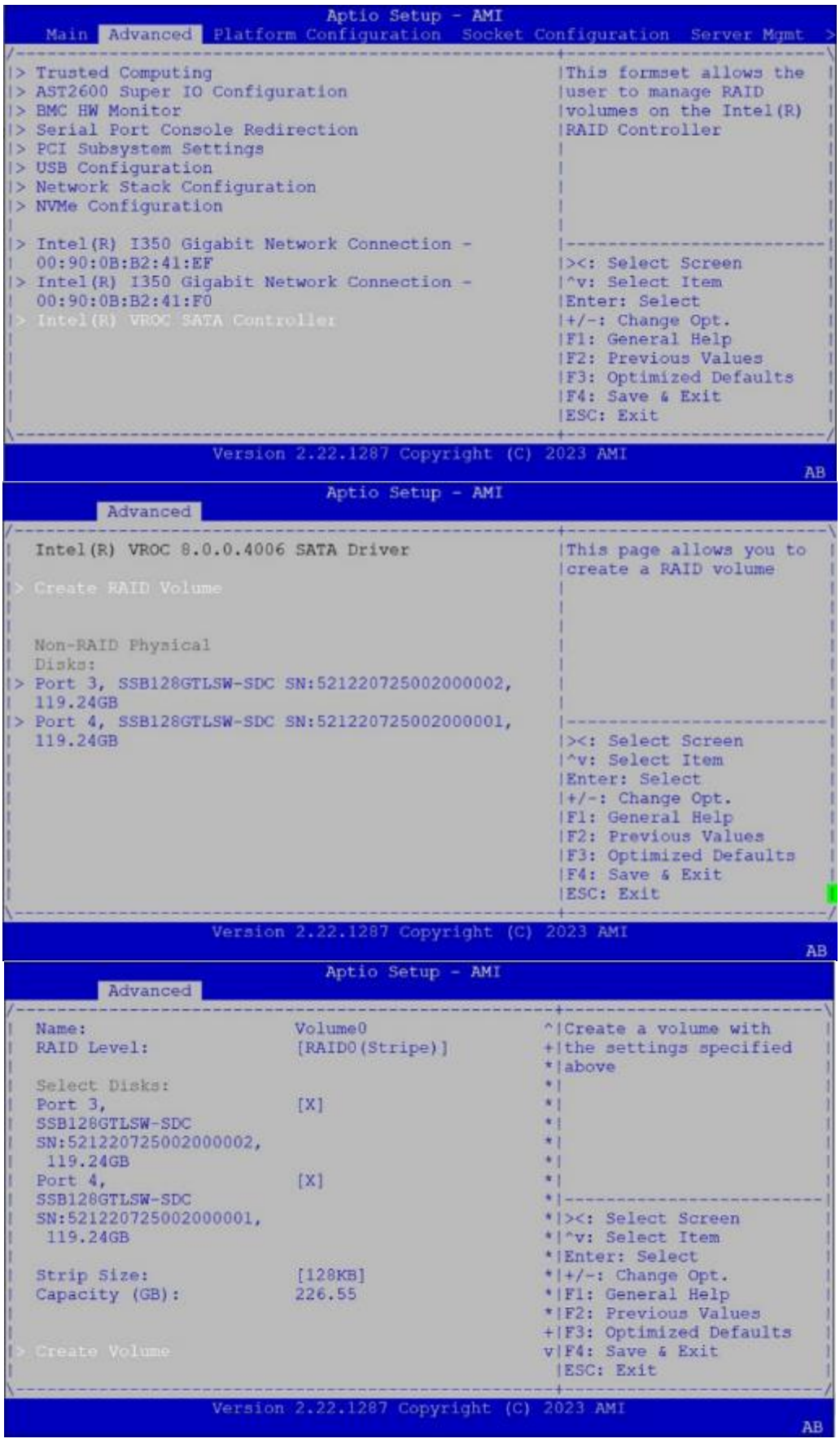


Item	Option	Description
Network Stack	Disabled Enabled	Enables or disables UEFI Network Stack
Ipv4 PXE Support	Disabled Enabled	Enables Ipv4 PXE Boot Support. If IPV4 is disabled, PXE boot option will not be created.
Ipv4 HTTP Support	Disabled Enabled	Enables Ipv4 HTTP Boot Support. If IPV4 is disabled, 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



RAID Controller

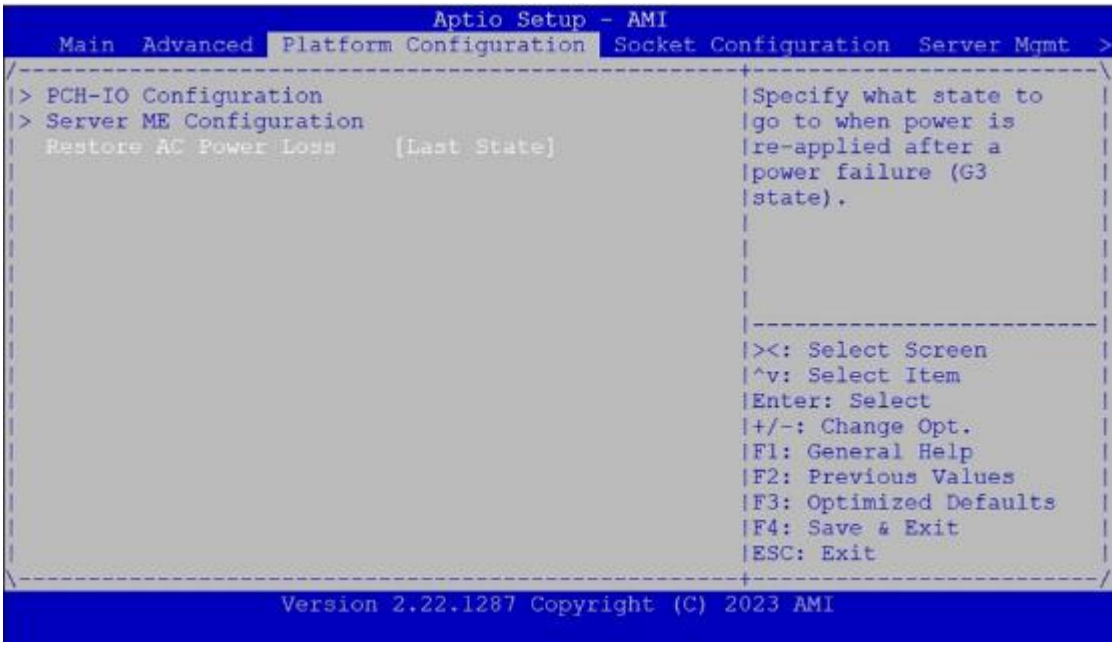


Item	Option	Description
RAID Level	RAID0(Stripe) RAID1(Mirror)	Select RAID Level
Select Disks:	Select disk	X – to Select Disk
Strip Size	4KB 8KB 16KB 32KB 64KB 128KB	Strip size
Create Volume	Yes No	Create a volume with the settings specified above

Use a SATA HDD, please change the [SATA] mode to [RAID] mode.

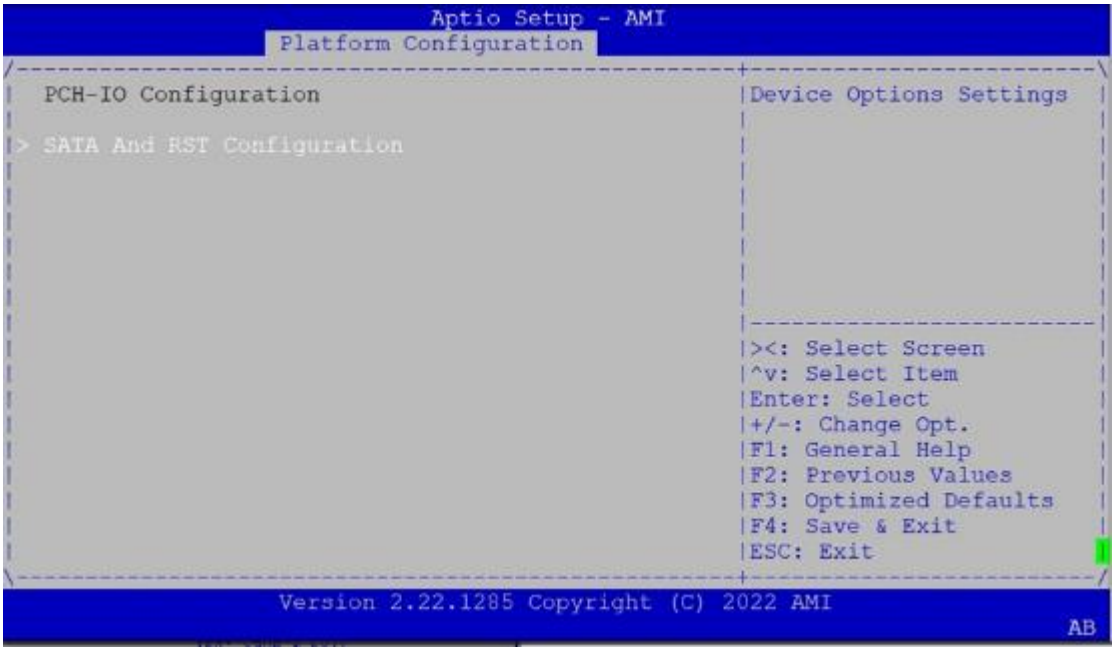
Platform Setup

Use [→] or [←] to select [Platform] setup screen. Under this screen, you may use [↑] [↓] to select an item on the left frame of the screen you want to configure.



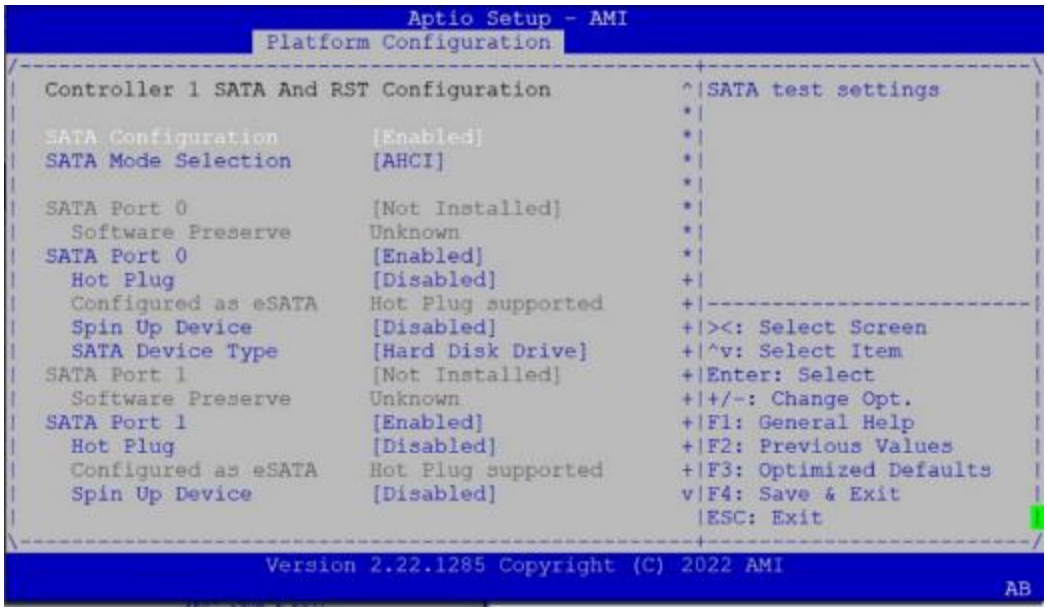
Item	Option	Description
PCH Configuration	None	Displays and provides option to change the PCH Settings
Server ME Configuration	None	Configure Server ME Technology Parameters
Restore AC Power Loss	Power On Power Off Last State	Select S0/S5 for ACPI state after a G3

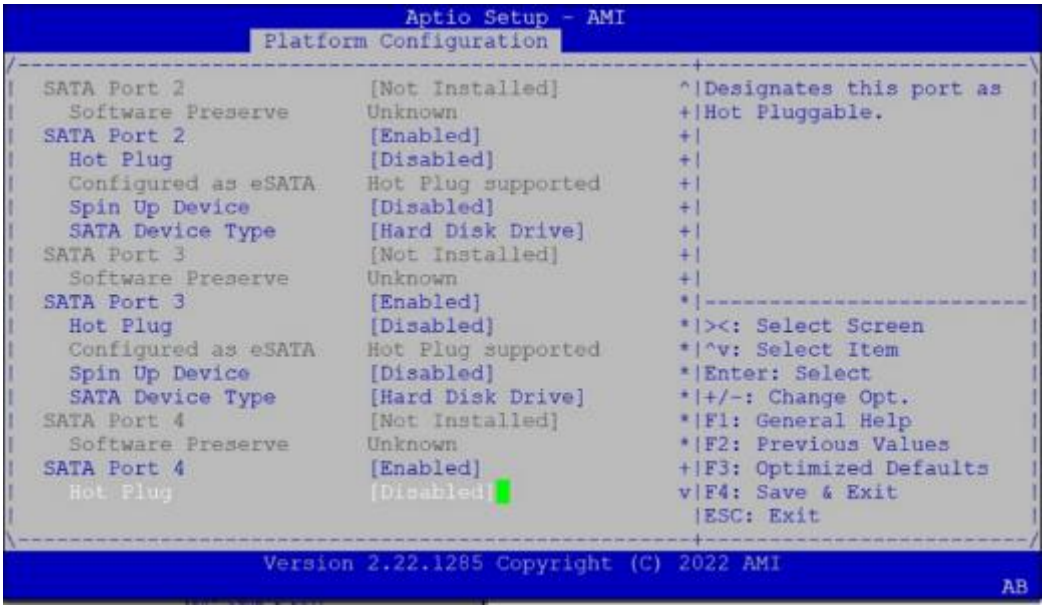
PCH-IO Configuration

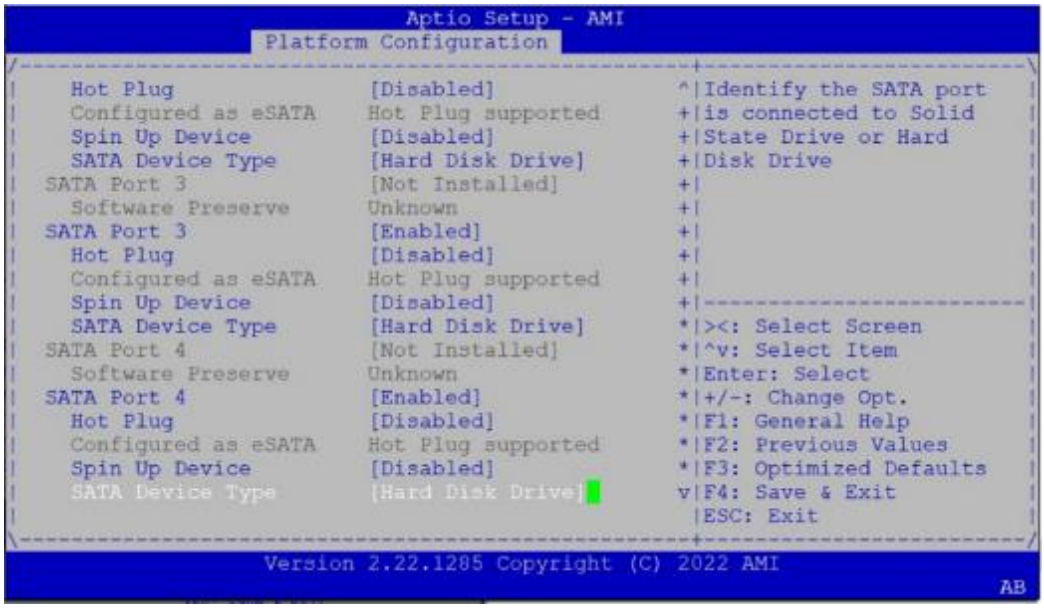


Item	Option	Description
PCH sSATA Configuration	None	sSATA devices and settings

PCH sSATA Configuration

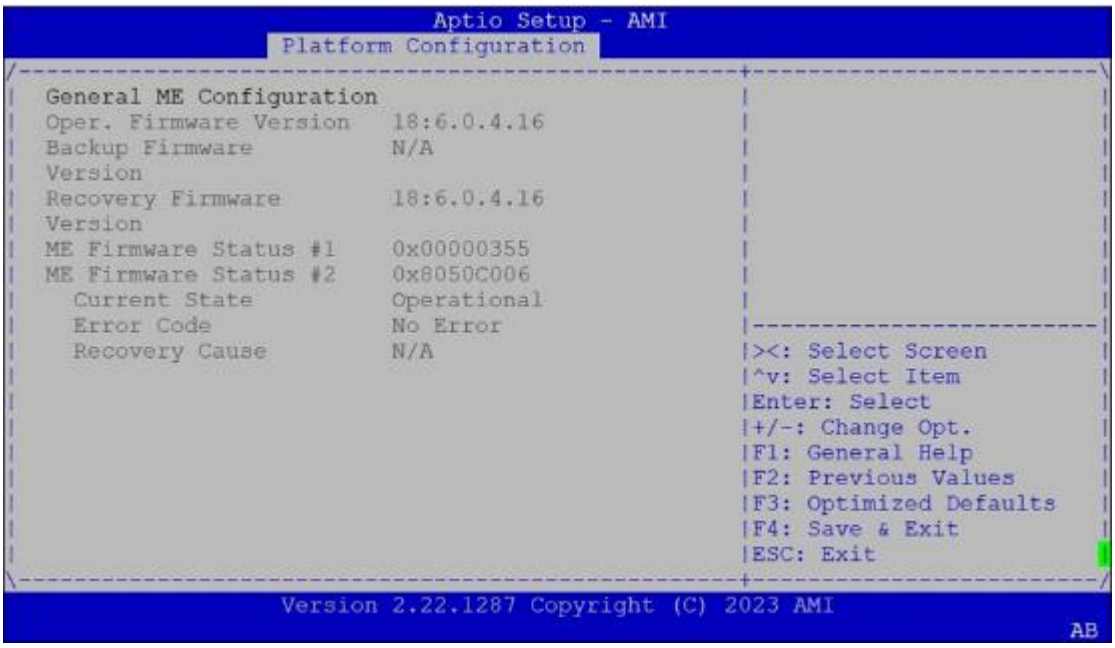






Item	Option	Description
SATA Controller	Disabled Enabled	Enables or disables SATA Controller
Configure SATA as	AHCI RAID	This will configure SATA as **RAID** or **AHCI**.
Port 0/2/3/4/5	Disabled Enabled	Enable or Disable SATA Port
Hot Plug	Disabled Enabled	Designates this port as Hot Pluggable.
Spin Up Device	Disabled Enabled	If enabled for any of ports Staggered Spin Up will be performed and only the drives witch have this option enabled will spin up at boot. Otherwise all drives spin up at boot.
SATA Device Type	Hard Disk Drive Solid State Drive	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive

Server ME Configuration

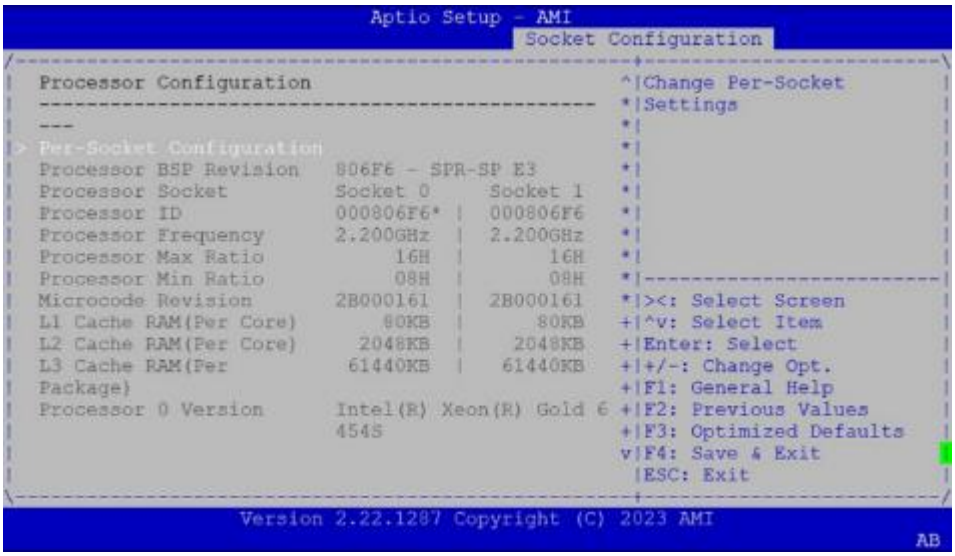


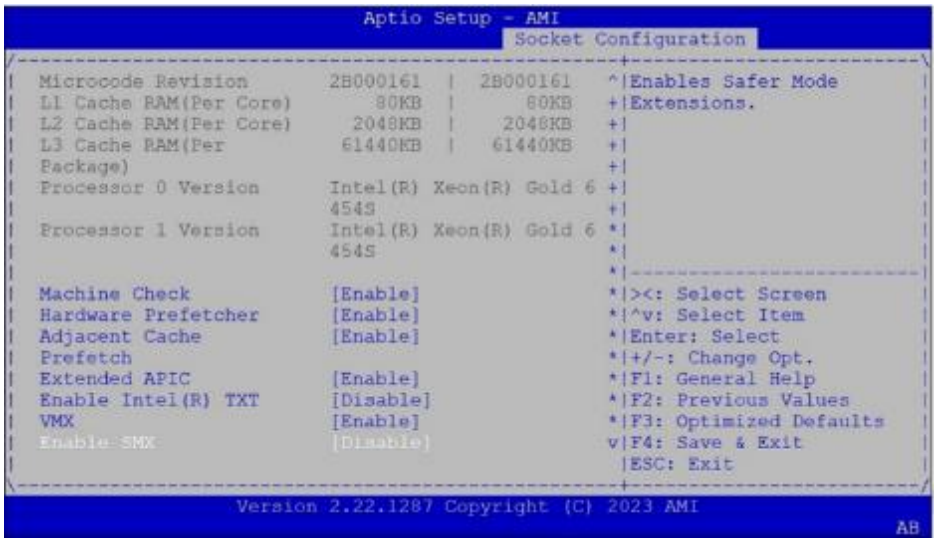
Socket Setup

Use [→] or [←] to select [Socket] setup screen. Under this screen, you may use [↑] [↓] to select an item in the left frame of the screen you want to configure.

Item	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

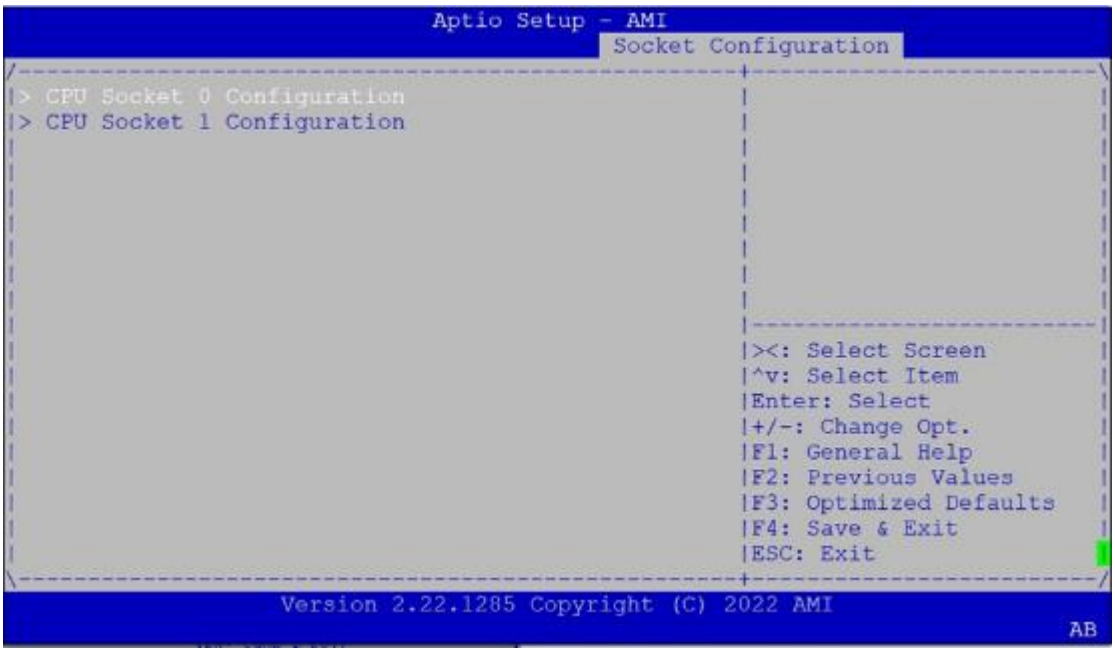
Processor Configuration





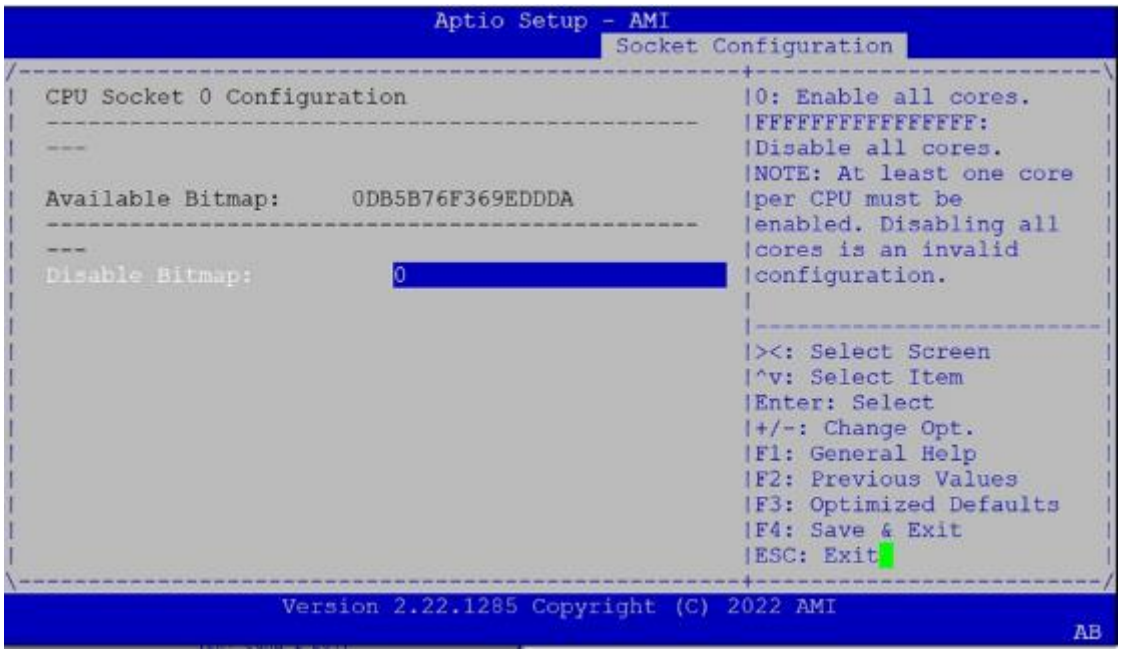
Item	Option	Description
Machine Check	Disabled Enabled	Enable or Disable the Machine Check
Hardware Prefetcher	Disabled Enabled	= MLC Streamer Prefetcher (MSR 1A4h Bit[0])
Adjacent Cache Prefetcher	Disabled Enabled	= MLC Spatial Prefetcher (MSR 1A4h Bit[1])
Extended APIC	Disabled Enabled	Enables or disables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

Per-Socket Configuration



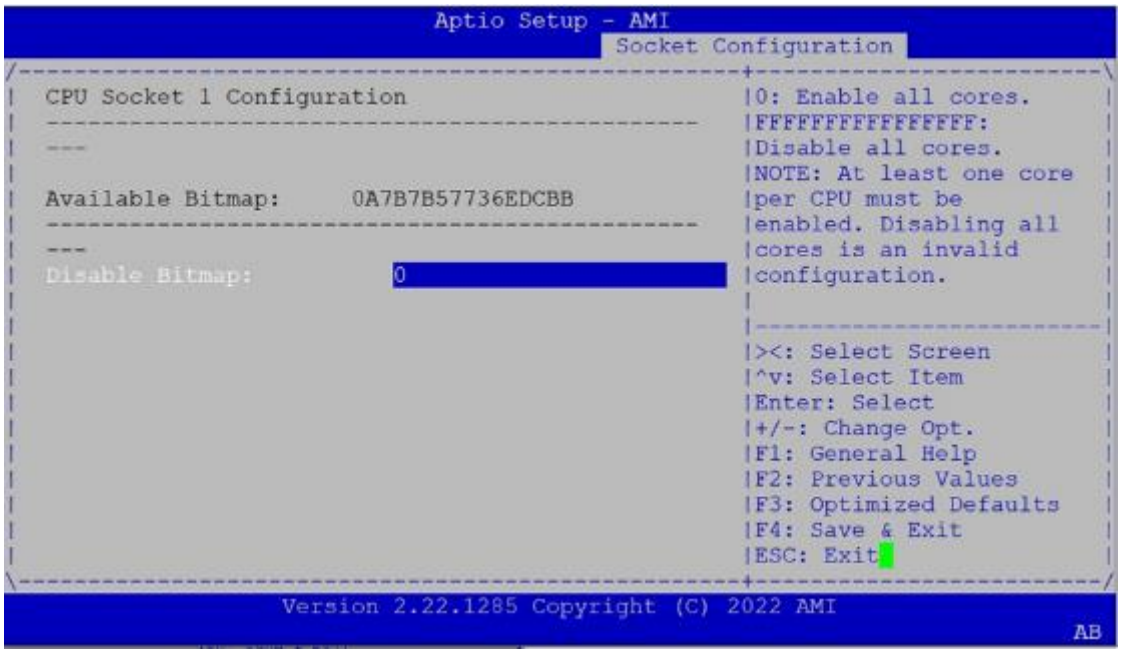
Item	Option	Description
CPU Socket0 Configuration	None	None
CPU Socket1 Configuration	None	None

CPU Socket 0 Configuration



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

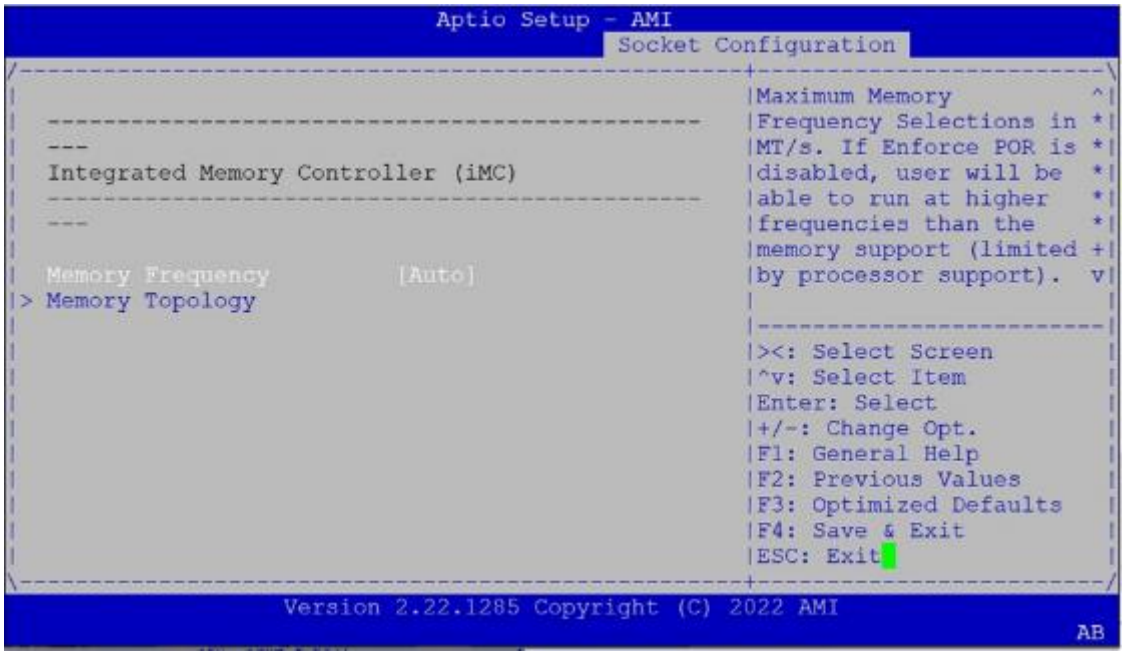
CPU Socket 1 Configuration



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

Memory Configuration

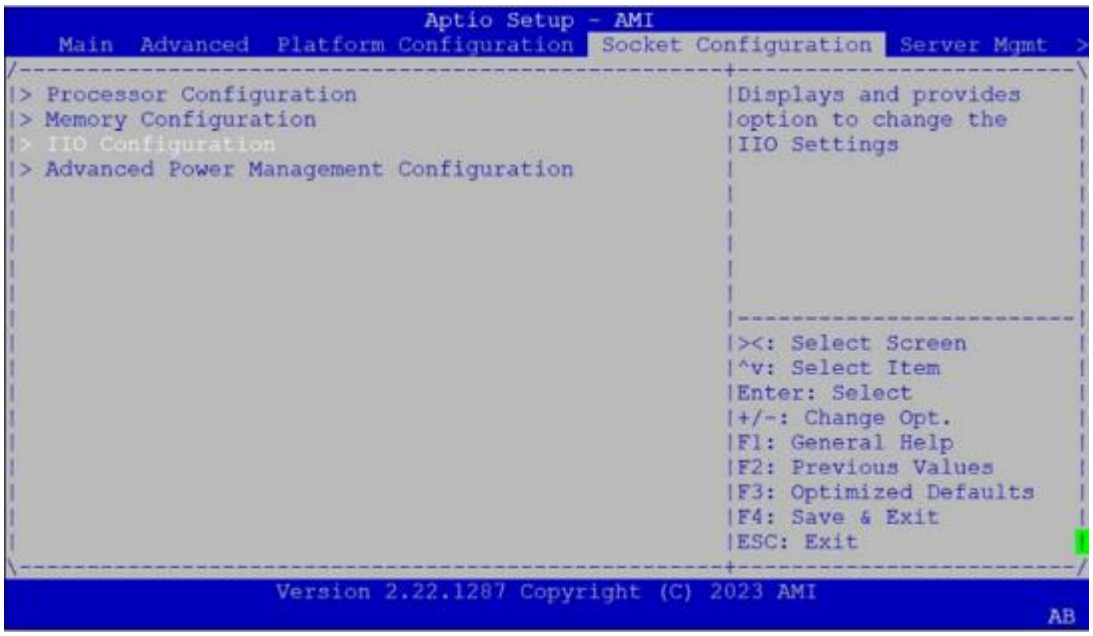
In Memory Configuration, you can change memory settings.

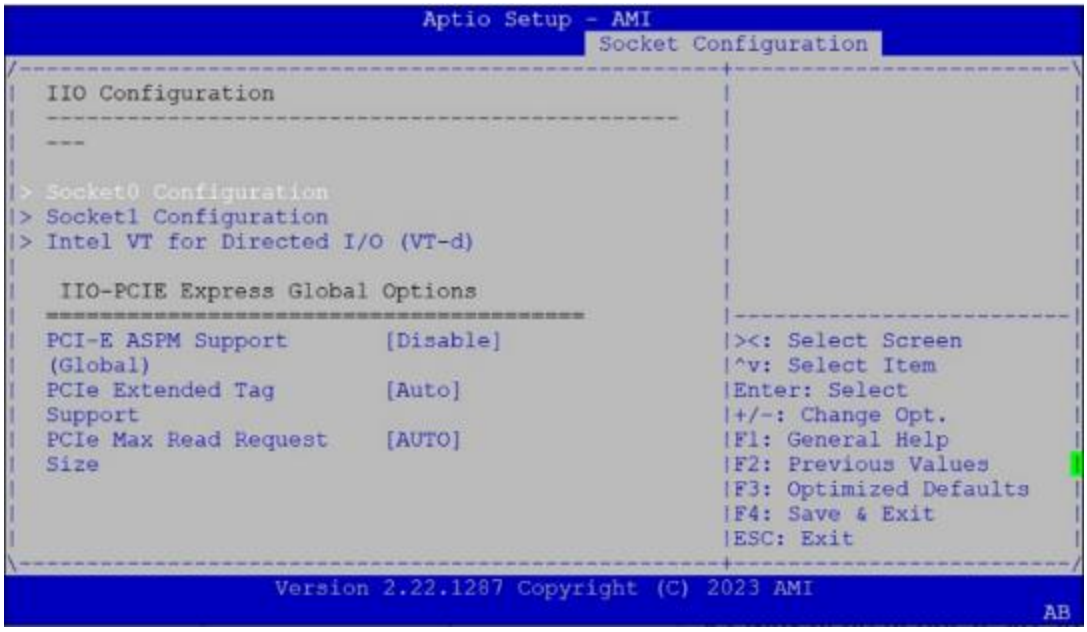


Item	Option	Description
Memory Frequency	Auto 3200 3600 4000 4400 4800 5200 5600	Maximum Memory Frequency Selections in Mhz. Do not select Reserved
Memory Topology	None	Displays memory topology with Dimm population information

IIO Configuration

In IIO Configuration, you can change socket settings and view the current parameters.



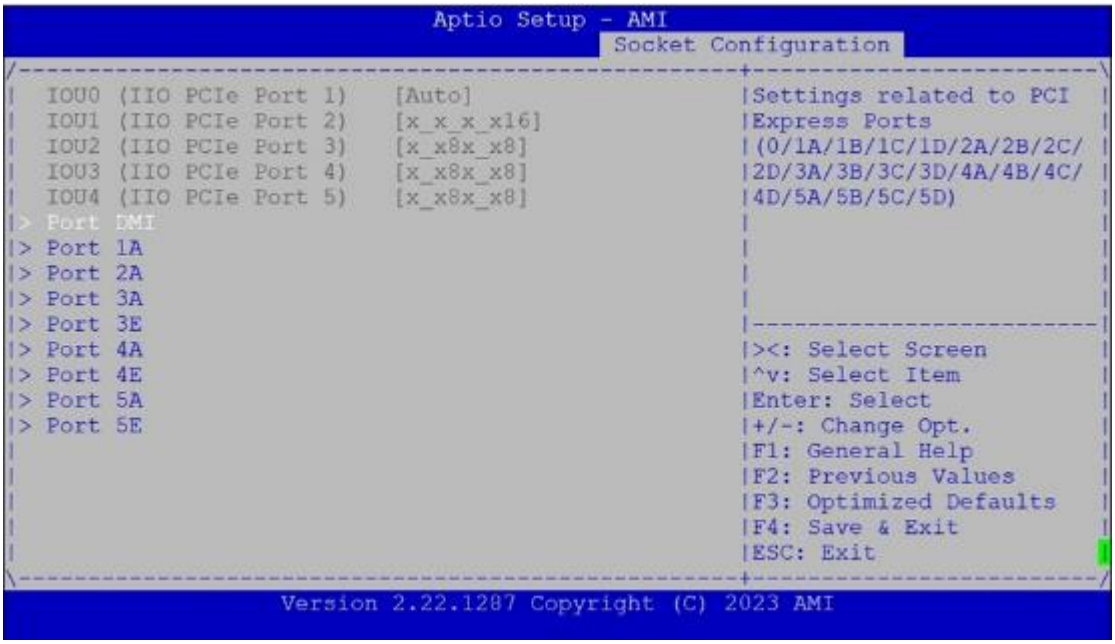


Item	Option	Description
Socket0 Configuration	None	None
Socket1 Configuration	None	None
Intel® VT for Directed I/O (VT-d)	None	Press **<Enter>** to bring up the Intel® VT for Directed I/O (VT-d) Configuration menu.
PCI-E ASPM Support (Global)	Disable Per-Port	This option Disable/ Per-Port the ASPM support 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

Socket 0 Configuration

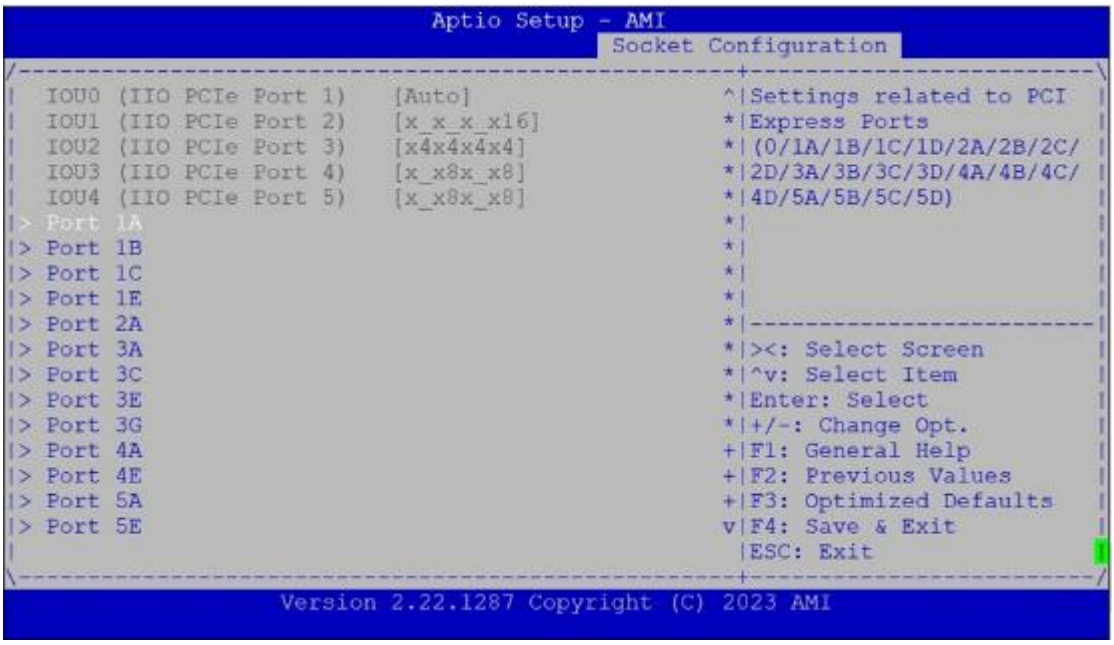
Enter to configure the settings related to PCI Express ports under Socket0.

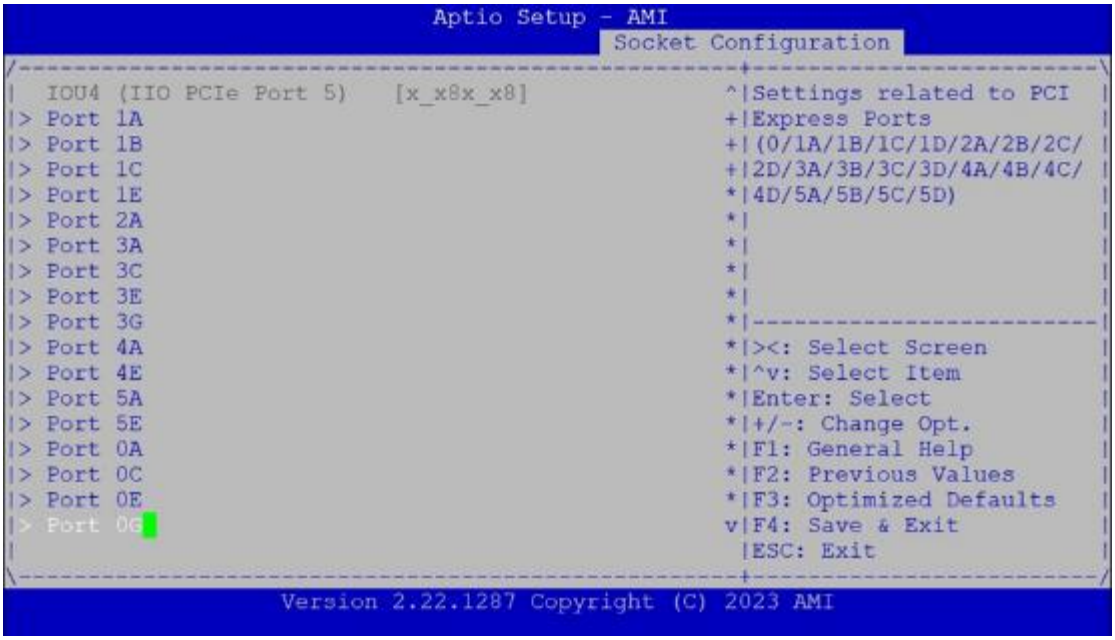


Item	Option	Description
Socket 0 Port 1A	None	Settings related to PCI Express Port 1A
Socket 0 Port 2A	None	Settings related to PCI Express Port 2A
Socket 0 Port 3A	None	Settings related to PCI Express Port 3A
Socket 0 Port 3E	None	Settings related to PCI Express Port 3E
Socket 0 Port 4A	None	Settings related to PCI Express Port 4A
Socket 0 Port 4E	None	Settings related to PCI Express Port 4E
Socket 0 Port 5A	None	Settings related to PCI Express Port 5A
Socket 0 Port 5E	None	Settings related to PCI Express Port 5E

Socket 1 Configuration

Enter to configure the settings related to PCI Express ports under Socket1.

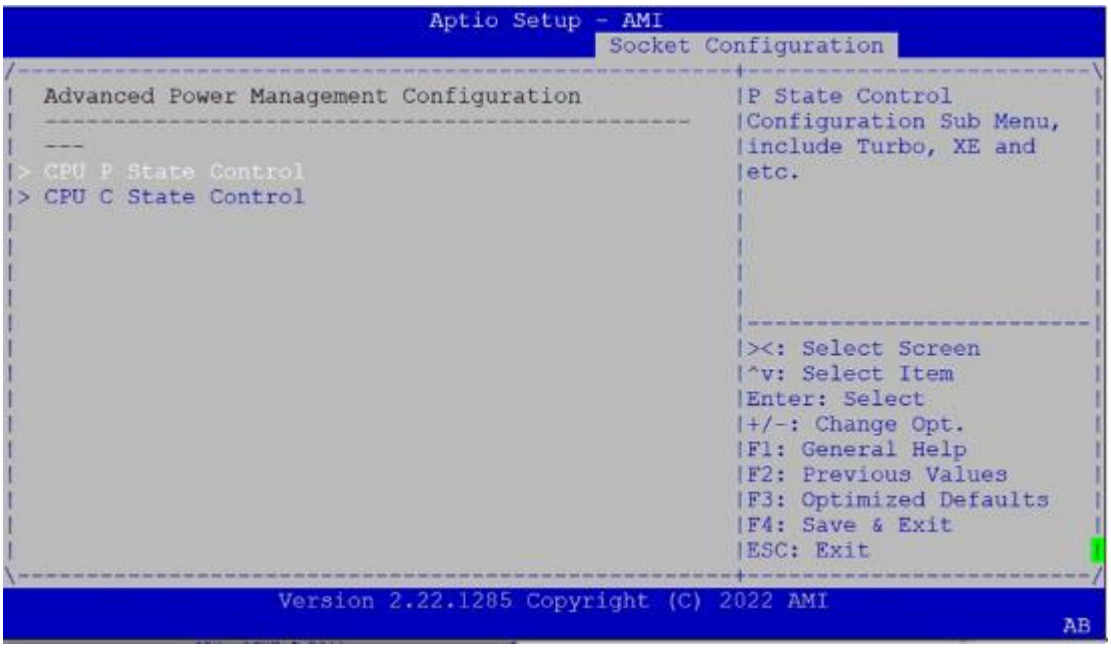




Item	Option	Description
Socket 1 Port 1A	None	Settings related to PCI Express Port 1A
Socket 1 Port 1B	None	Settings related to PCI Express Port 1B
Socket 1 Port 1C	None	Settings related to PCI Express Port 1C
Socket 1 Port 1E	None	Settings related to PCI Express Port 1E
Socket 1	None	Settings related to PCI Express Port 2A

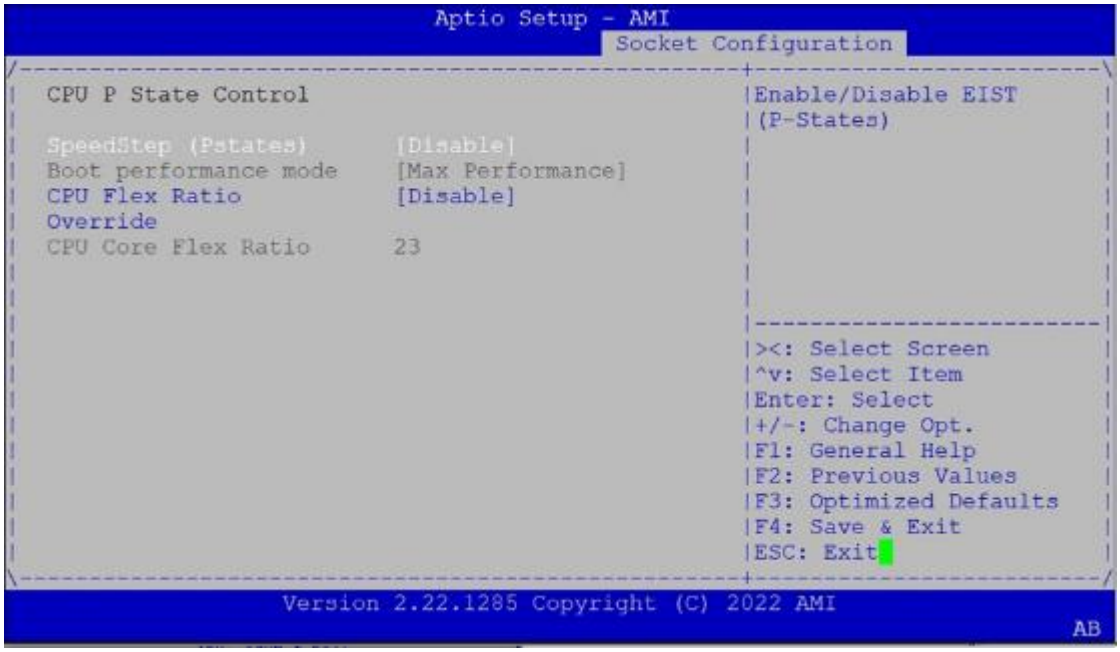
Port 2A		
Socket 1 Port 3A	None	Settings related to PCI Express Port 3A
Socket 1 Port 3C	None	Settings related to PCI Express Port 3C
Socket 1 Port 3E	None	Settings related to PCI Express Port 3E
Socket 1 Port 3G	None	Settings related to PCI Express Port 3G
Socket 1 Port 4A	None	Settings related to PCI Express Port 4A
Socket 1 Port 4E	None	Settings related to PCI Express Port 4E
Socket 1 Port 5A	None	Settings related to PCI Express Port 5A
Socket 1 Port 5E	None	Settings related to PCI Express Port 5E
Socket 1 Port 0A	None	Settings related to PCI Express Port 0A
Socket 1 Port 0C	None	Settings related to PCI Express Port 0C
Socket 1 Port 0E	None	Settings related to PCI Express Port 0E
Socket 1 Port 0G	None	Settings related to PCI Express Port 0G

Advanced Power Management Configuration



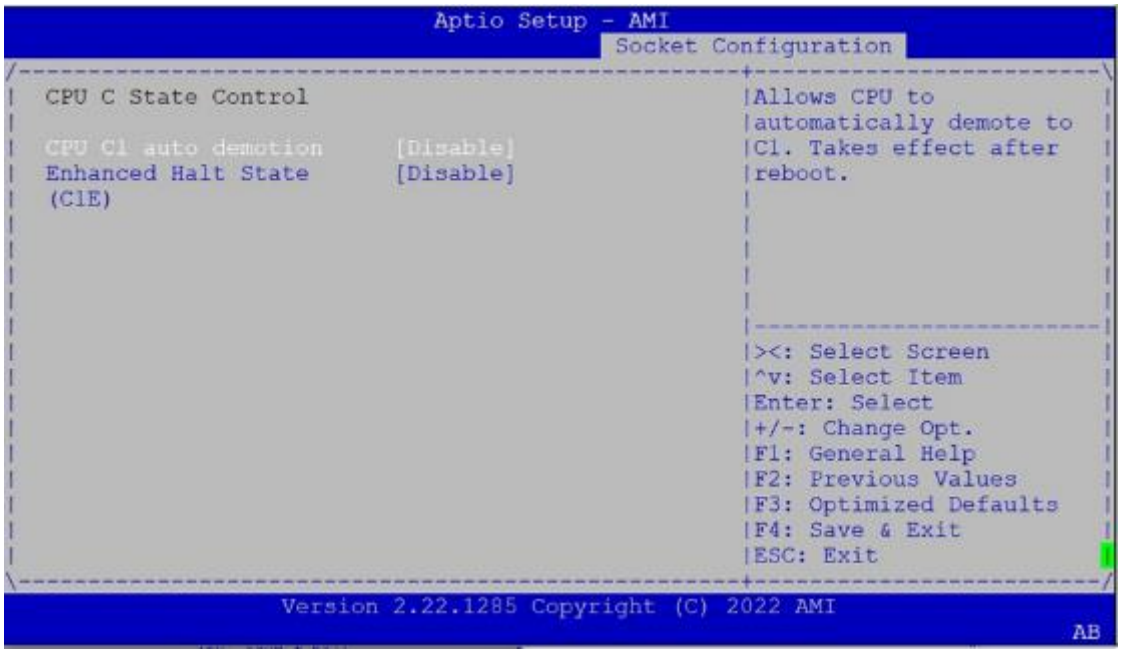
Item	Option	Description
CPU P State Control	None	P State Control Configuration Sub Menu, include Turbo, XE and etc.
CPU C State Control	None	CPU State Setting

CPU P State Control



Item	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

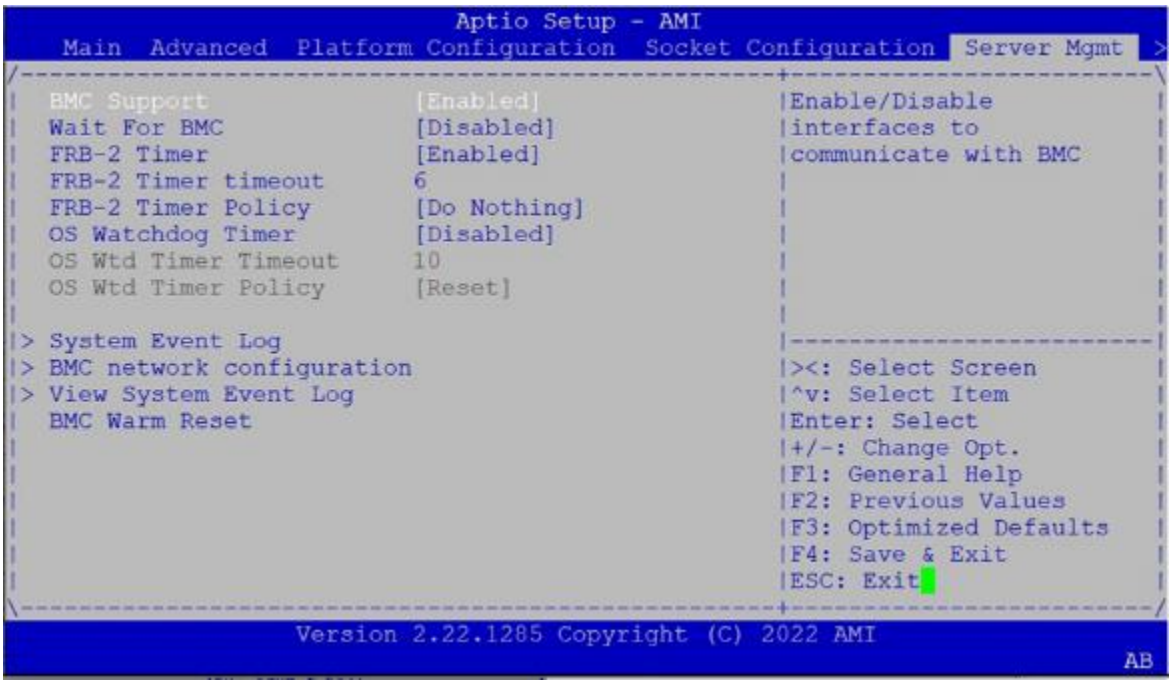
CPU C State Control



Item	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 Setup

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

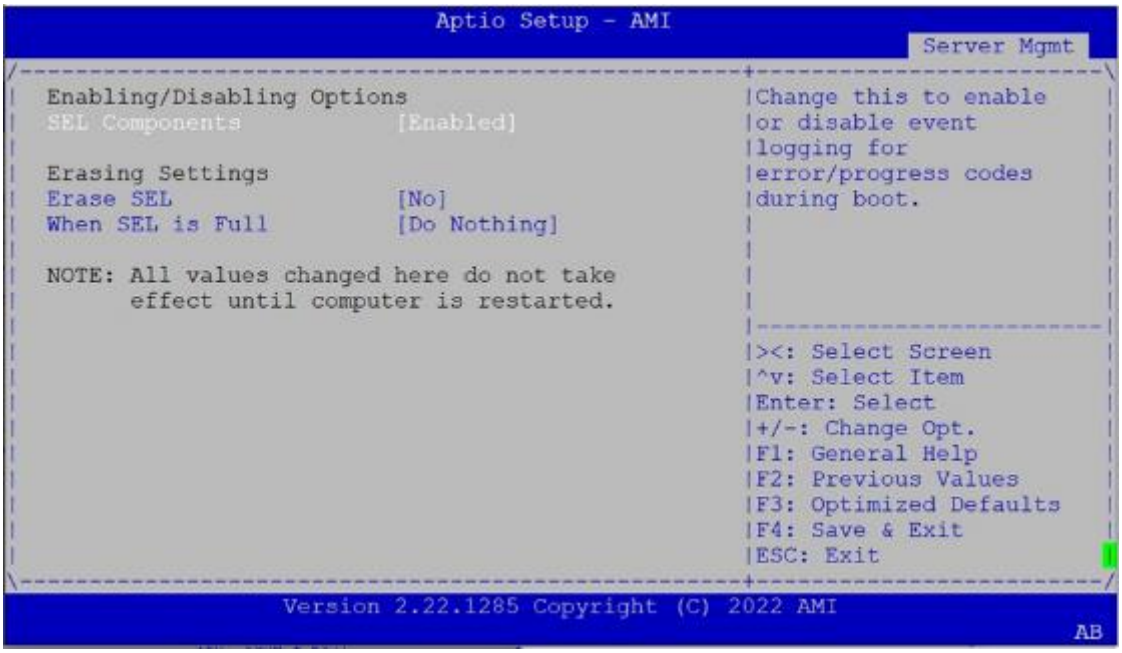


Item	Option	Description
BMC Support	Enabled Disabled	Enable or disables interfaces to communicate with BMC.
Wait For BMC	Enabled Disabled	Wait For BMC response for specified time out. In PILOTII, BMC starts at the same time when BIOS starts during AC power ON. It takes around 30 seconds to initialize 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.

OS Wtd Timer Timeout	5 minutes 10 minutes 15 minutes 20 minutes	Configure the length of the OS Boot Watchdog Timer. Not available if OS Boot Watchdog Timer is disabled.
OS Wtd Timer Policy	Do Nothing Reset Power Down Power Cycle	Configure how the system should respond if the OS Boot Watchdog Timer expires. Not available if OS Boot Watchdog Timer is disabled.
System Event Log	NA	Press **<Enter>** to change the SEL event log configuration.
BMC network configuration	NA	Configure BMC network parameters.
View System Event Log	NA	Press **<Enter>** to view the System Event Log Records.
BMC Warm Reset	NA	Press **<Enter>** to do Warm Reset BMC.

System Event Log

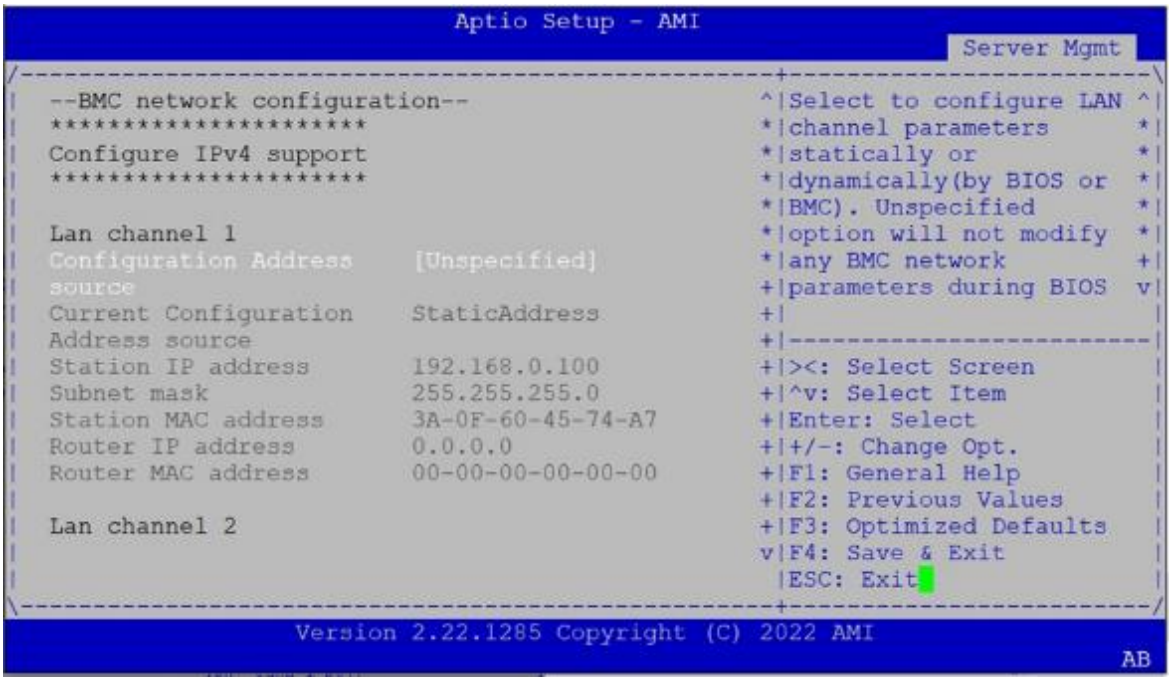
Use this option to change the SEL event log configuration.

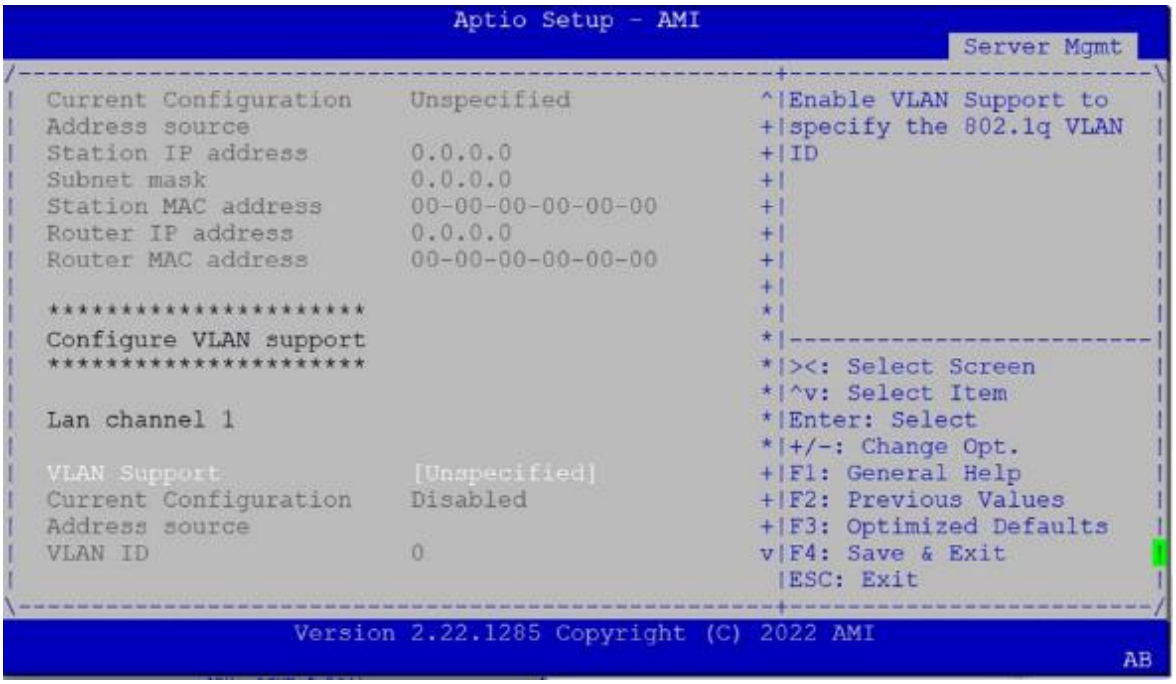


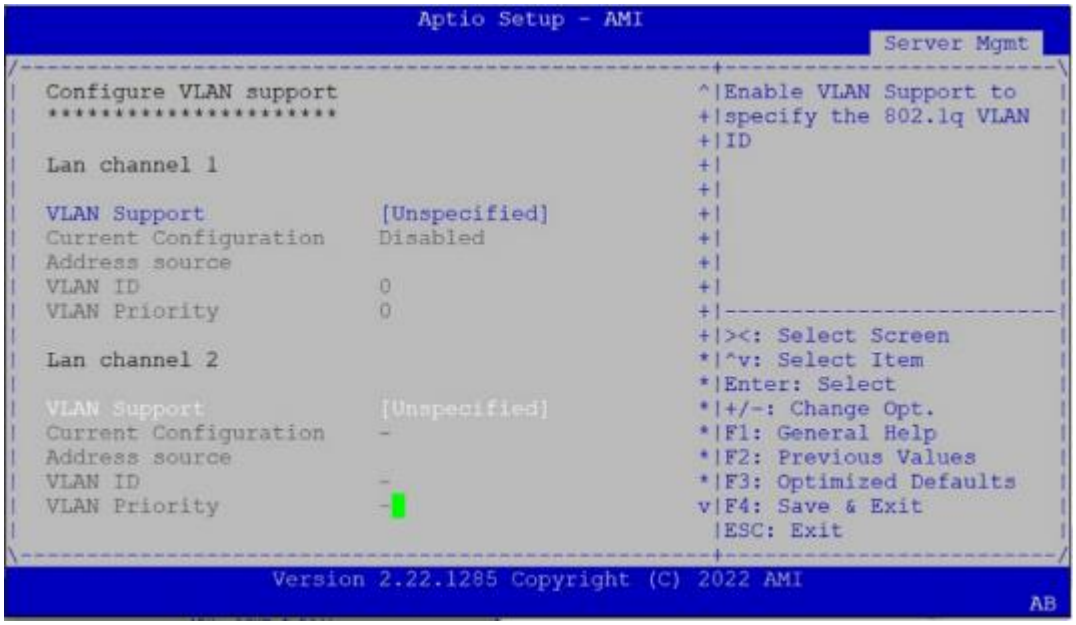
Item	Option	Description
SEL Components	Disabled Enabled	Enables or disables all features of System Event Logging during boot.
Erase SEL	NO Yes, On next reset Yes, On every reset	Choose options for erasing SEL.
When SEL is Full	Do Nothing Erase Immediately Delete Oldest Record	Choose options for reactions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

BMC Network Configuration

This option allows you to configure BMC network parameters.







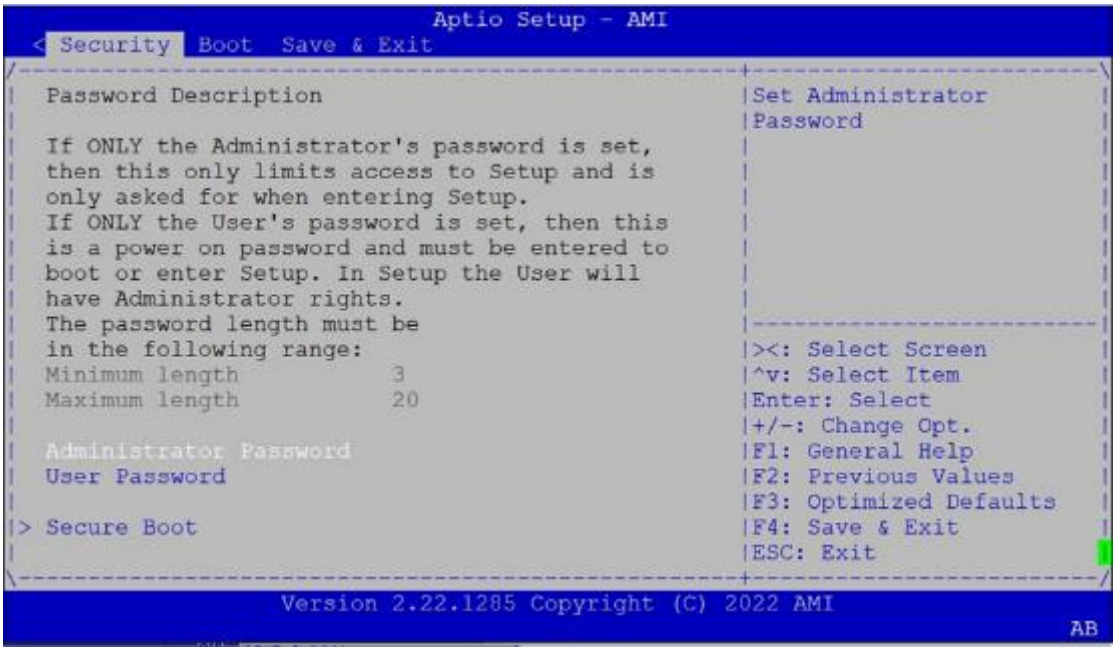
Item	Option	Description
Configuration Address source	Unspecified Static DynamicBmcDhcp DynamicBmcNoDhcp	Select to configure LAN channel parameters statically or dynamically (by BIOS or BMC). The **unspecified** option will not modify any BMC network parameters during BIOS phase.

View System Event Log

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

Security Setup

Use [←] / [→] to select [Security] setup screen. Under this screen, you may use [↑] [↓] to select an item on the left frame of the screen that you would like to configure.



Item	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.

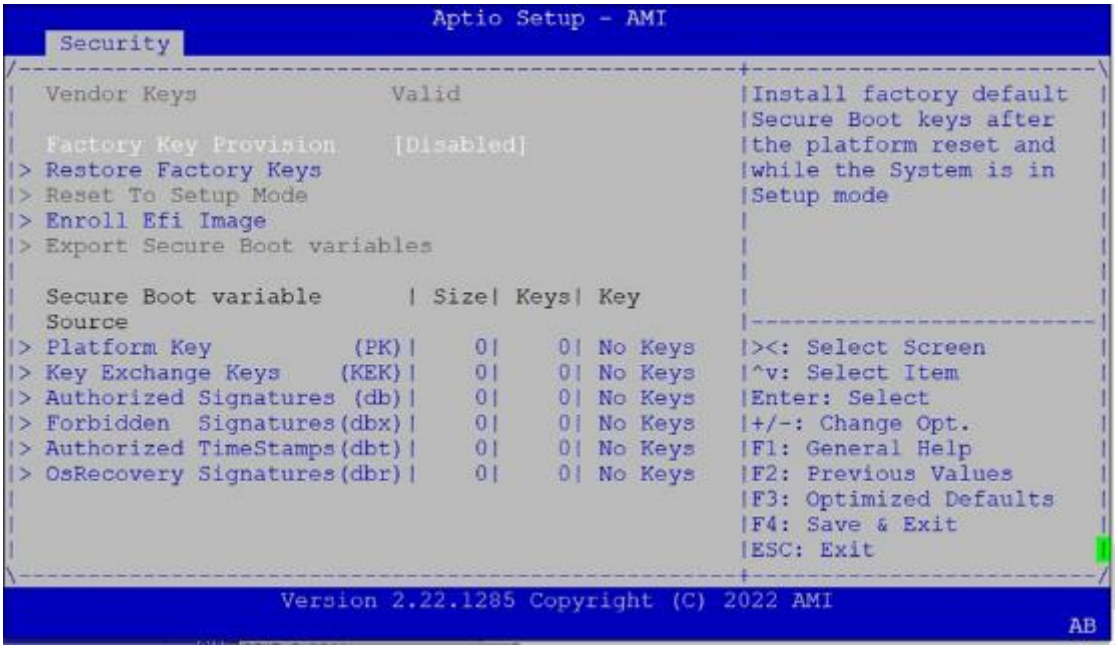
Secure Boot

This option allows you to customize Secure Boot settings.

Item	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

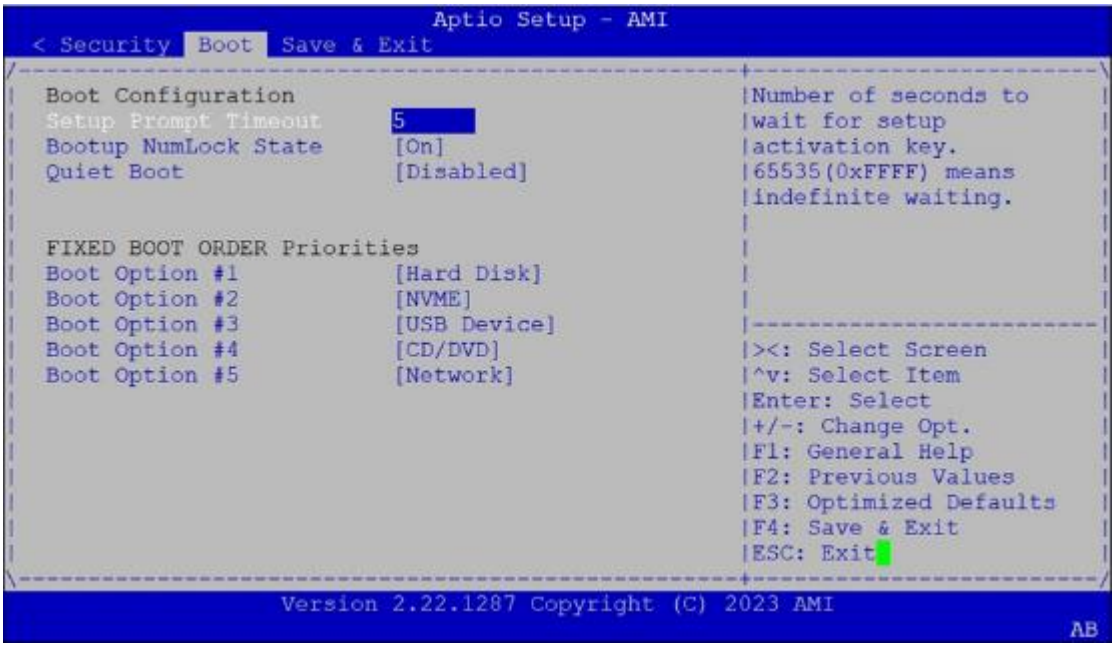
Allows you to provision advanced Secure Boot settings.



Item	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

Use [←] / [→] to select [Boot] setup screen. Under this screen, you may use [↑] [↓] to select an item on the left frame of the screen that you would like to configure.



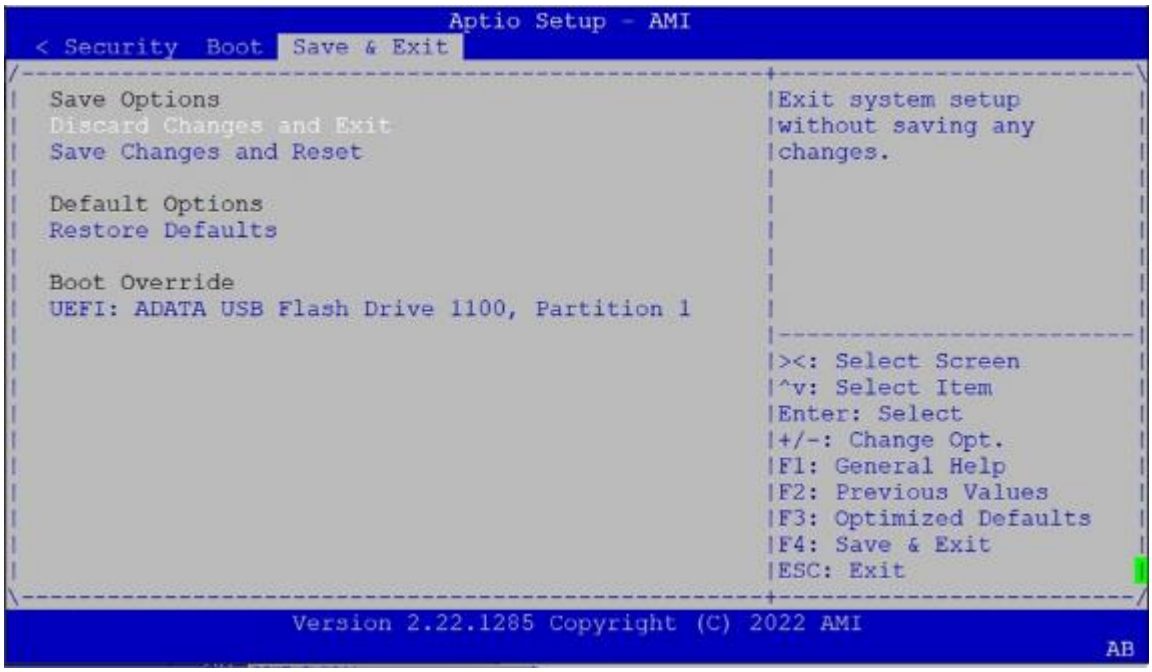
Item	Option	Description
Setup Prompt Timeout	5	The Number of seconds to wait for setup activation key. 65535 means indefinite waiting.
BootupNumLock State	On Off	Select the keyboard NumLock state.
Quiet Boot	Disabled Enabled	Enables or disables Quiet Boot option.

■ Choose boot priority from boot option group.

■ Choose specific boot device priority sequence from available Group device.

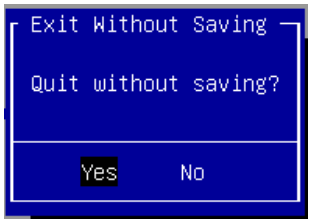
Save and Exit Setup

Use [←] / [→] to select [Save & Exit] setup screen. Under this screen, you may use [↑] [↓] to select an item on the left frame of the screen that you would like to configure.



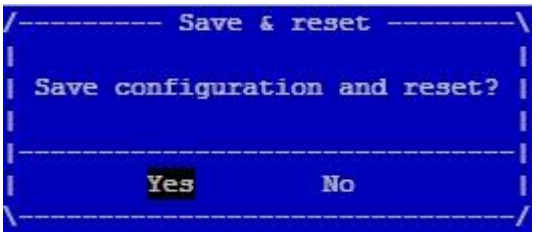
■Discard Changes and Exit

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



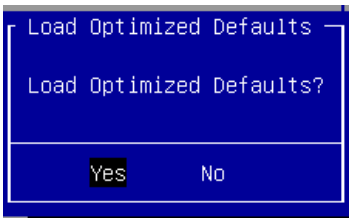
■Save Changes and Reset

When Users have completed the system configuration changes, select this option to save the changes and 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.



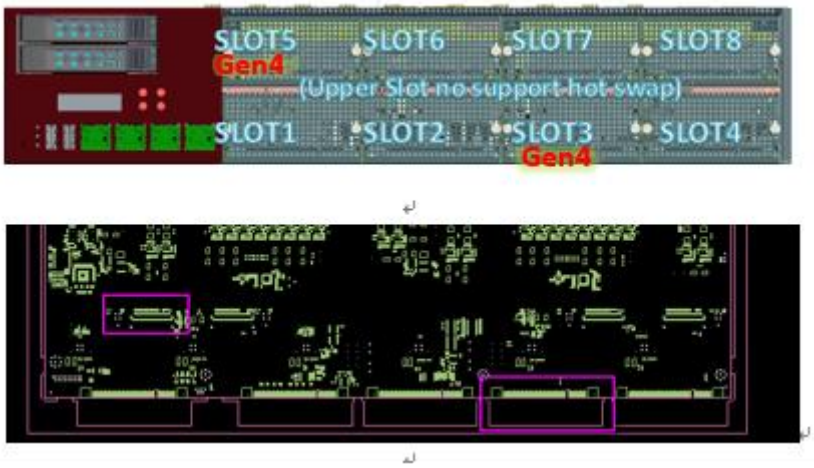
Note1: The items under Boot Override may not be the same images, it would depend on devices connected on the system.

Enable/Disable UPI3

Note: Applies to Sapphire Rapids CPU

UPI3 Enable (Default): When UPI3 is enabled, conditional speed limit to 16GT/s in Slot3 and Slot5.

UPI3 Disable (Optional): When UPI3 is disabled, CPU performance will be lowered.

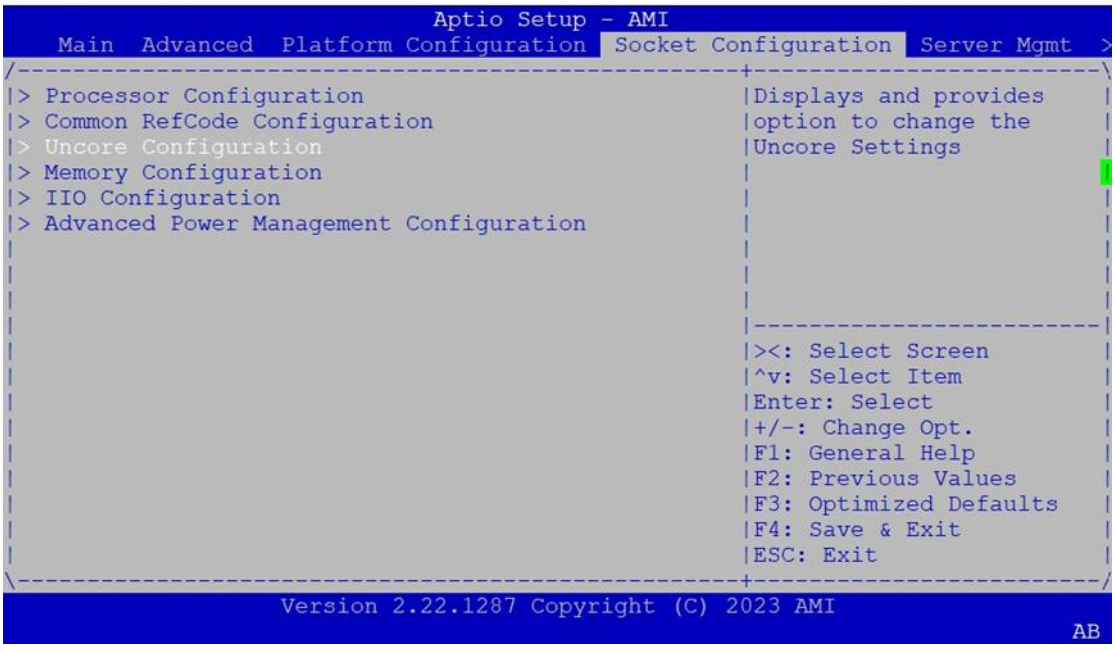


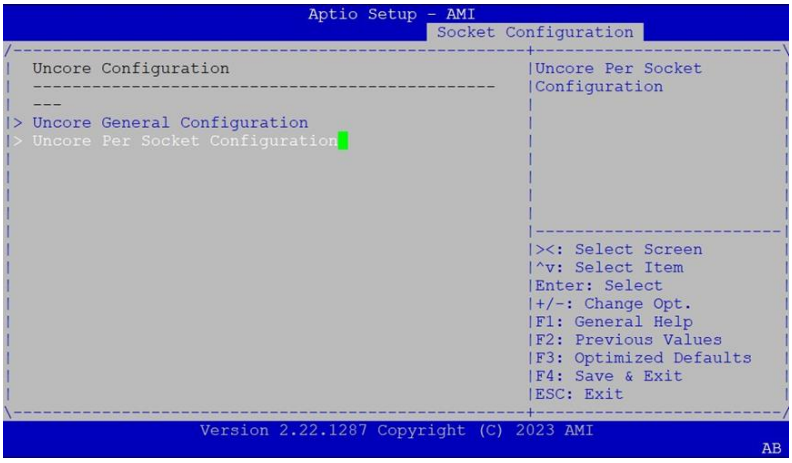
NCA-6530 UPI3 Enable (Default)

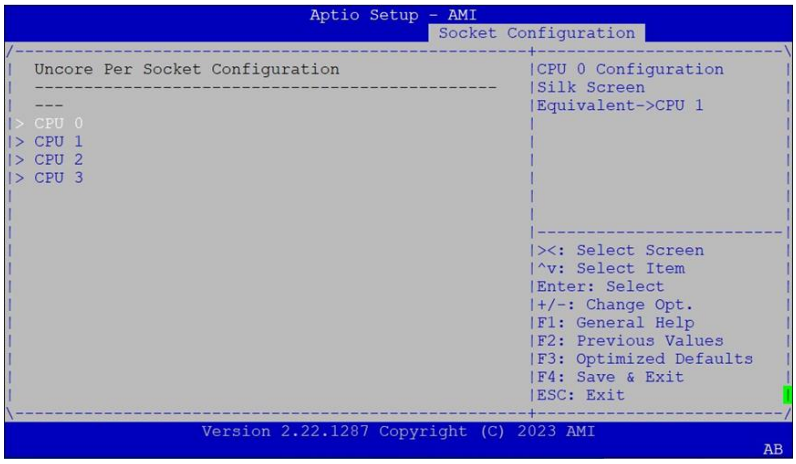
■ Disable UPI3

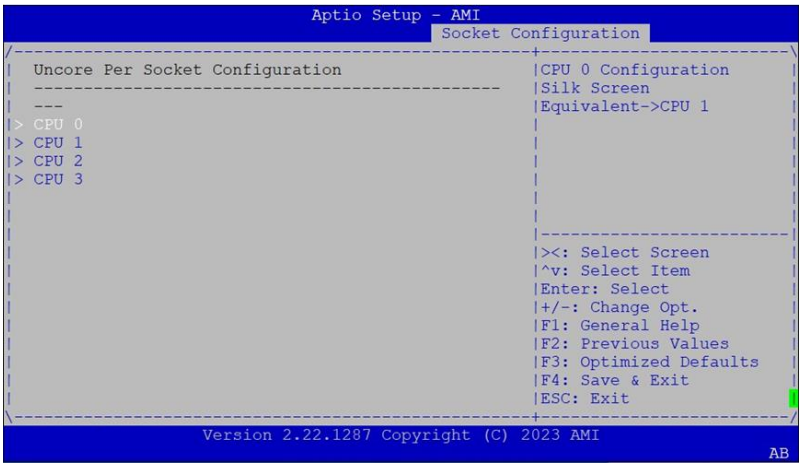
Procedure to disable UPI3, requires manually entering the engineering mode page (not commonly used).

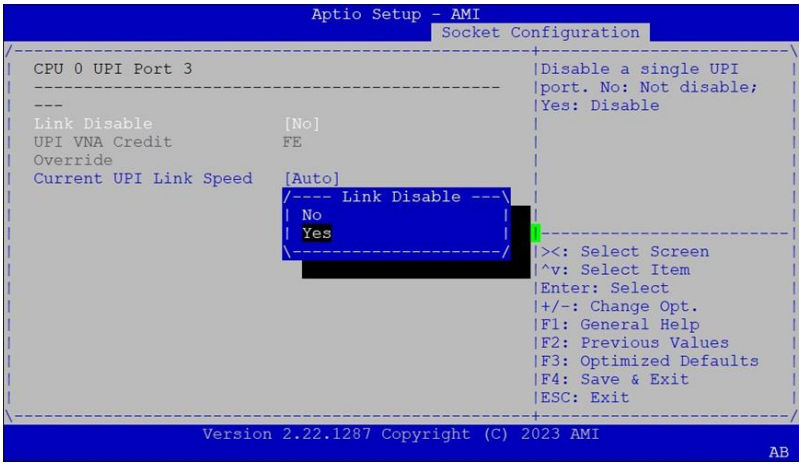
1. Press Control (Ctrl) + (\) keys to enter engineering mode page.
2. Select **Socket Configuration** tab → **Uncore Configuration** → **Uncore Per Socket Configuration**
3. Select **CPU 0** → **Port 3** then choose **[YES]** for **Link Disable**
4. Repeat, Select **[YES]** for **Link Disable**, for **CPU 1**, **CPU 2**, and **CPU 3**

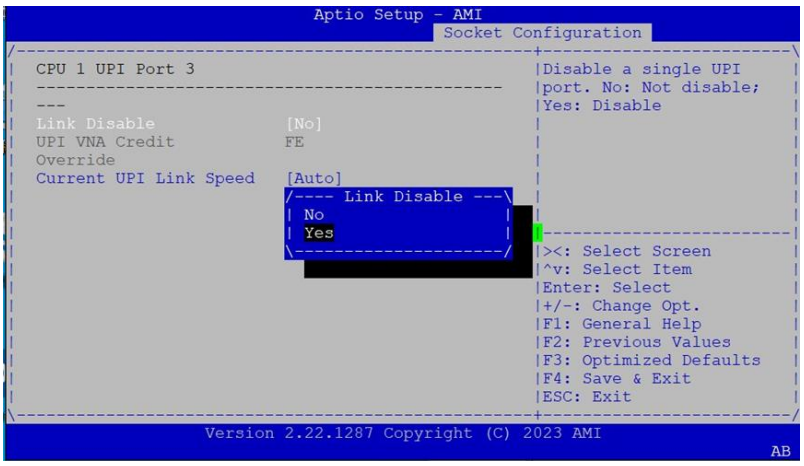


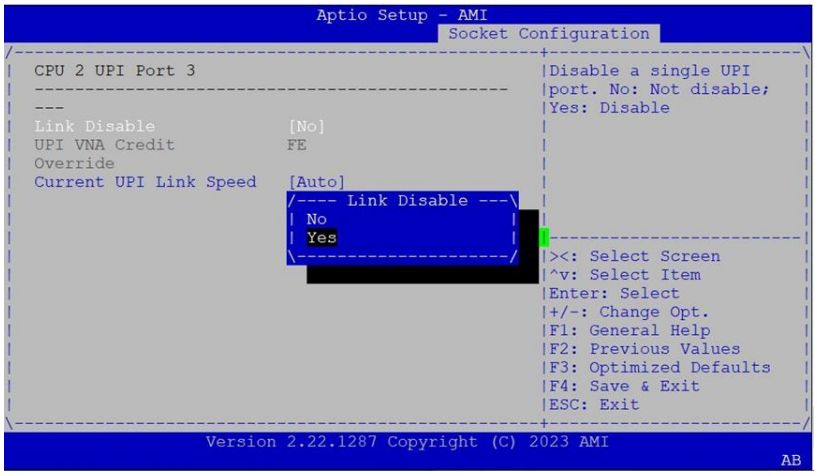

Aptio Setup - AMI
Socket Configuration
Uncore Configuration
> Uncore General Configuration
> Uncore Per Socket Configuration
Uncore Per Socket Configuration
><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.22.1287 Copyright (C) 2023 AMI
AB

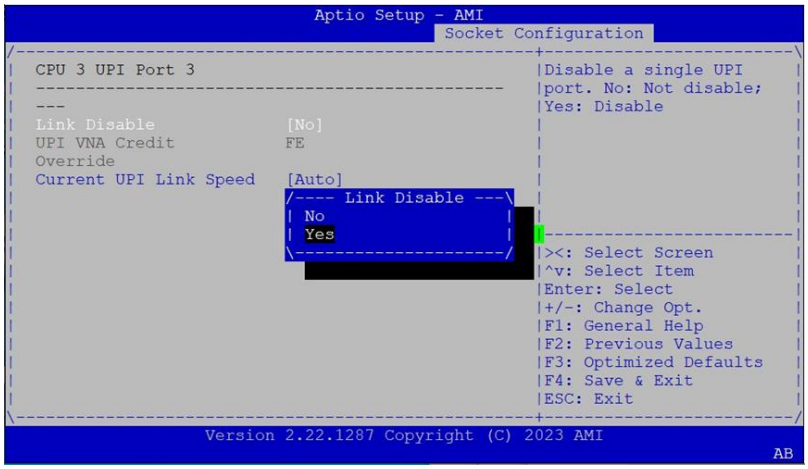

Aptio Setup - AMI
Socket Configuration
Uncore Per Socket Configuration
> CPU 0
> CPU 1
> CPU 2
> CPU 3
CPU 0 Configuration
Silk Screen
Equivalent->CPU 1
><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.22.1287 Copyright (C) 2023 AMI
AB


Aptio Setup - AMI
Socket Configuration
Uncore Per Socket Configuration
> CPU 0
> CPU 1
> CPU 2
> CPU 3
CPU 0 Configuration
Silk Screen
Equivalent->CPU 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 2.22.1287 Copyright (C) 2023 AMI
AB


Aptio Setup - AMI
Socket Configuration
CPU 0 UPI Port 3
Link Disable [No]
UPI VNA Credit Override FE
Current UPI Link Speed [Auto]
Link Disable
No
Yes
Disable a single UPI port. No: Not disable; Yes: Disable
><: 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
AB


Aptio Setup - AMI
Socket Configuration
CPU 1 UPI Port 3
Link Disable [No]
UPI VNA Credit FE
Override
Current UPI Link Speed [Auto]
Link Disable
No
Yes
Disable a single UPI port. No: Not disable; Yes: Disable
><: 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
AB


Aptio Setup - AMI
Socket Configuration
CPU 2 UPI Port 3
Link Disable [No]
UPI VNA Credit FE
Override
Current UPI Link Speed [Auto]
Link Disable
No
Yes
Disable a single UPI port. No: Not disable; Yes: Disable
><: 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
AB


Aptio Setup - AMI
Socket Configuration
CPU 3 UPI Port 3
Link Disable [No]
UPI VNA Credit FE
Override
Current UPI Link Speed [Auto]
Link Disable
No
Yes
Disable a single UPI port. No: Not disable; Yes: Disable
><: 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
AB

APPENDIX A: LED INDICATOR EXPLANATIONS

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

LED indicators

System Power
System Status
HDD Activity

- **System Power**

Solid Green	*The system is powered on*
Off	*The system is powered off*

- **System Status**

  This LED indicator is programmable. You could program it to display the operating status of the behaviors described below:

Solid Green	*Defined by GPIO*
Solid Red	*Defined by GPIO*
Off	*Defined by GPIO*

- **HDD Activity**

  If this LED blinks, it indicates data access activities; otherwise, it remains off.

Blinking Amber	*Indicates HDD activity including SATA / NVME*
Off	*No data access activity OR No power on*

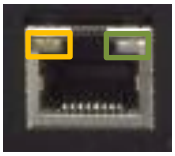
Note:

1. When cable is plug-in and network is linked. Both LED will be light up.
2. Without the Cable plug-in, the LED should be off.
3. If LAN Driver control the LED, the behavior will follow the driver.

- **RJ-45 LAN LED Indicators**

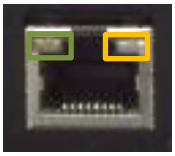
10/100/1G

Amber *Green/ Amber*



2.5G/10G

Green *Green/ Amber*



- **10M/100M/1GB RJ-45 Define:**

Speed	Amber (Active)	Green/Amber (Link)
10M	Blinking Amber – Indicates data access	OFF
100M	Blinking Amber – Indicates data access	ON (Green)
1G	Blinking Amber – Indicates data access	ON (Amber)

- **2.5G / 10G RJ-45 define:**

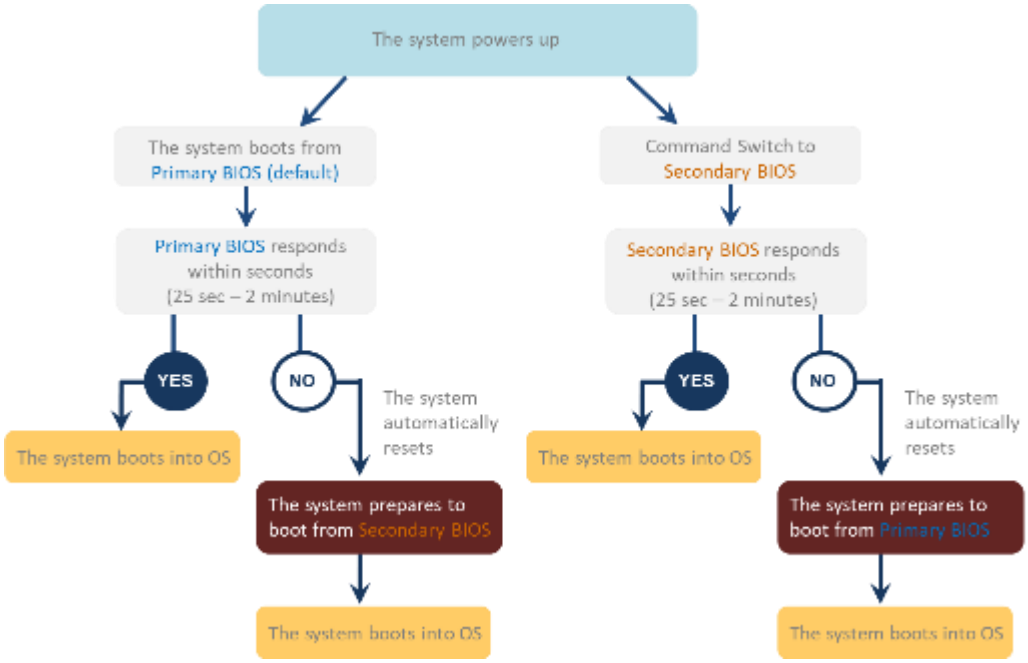
Speed	Amber (Active)	Green/Amber (Link)
2.4G	Blinking Amber – Indicates data access	ON (Green)
10G	Blinking Amber – Indicates data access	ON (Green)

APPENDIX B: DUAL BIOS INTRODUCTION

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

How Dual BIOS Works

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



2nd Gen Dual BIOS

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

- **Flexible recovery timer control**

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

- **Flexible Dual BIOS ROMs control.**

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

- **Flexible Dual BIOS ROMs switch**

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

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

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

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

Get Ready for BIOS Update

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

- Firmware and Flash Tool
- BIOS Engineering Spec

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

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

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

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

APPENDIX C: REDUNDANT POWER MODULE BEHAVIOR

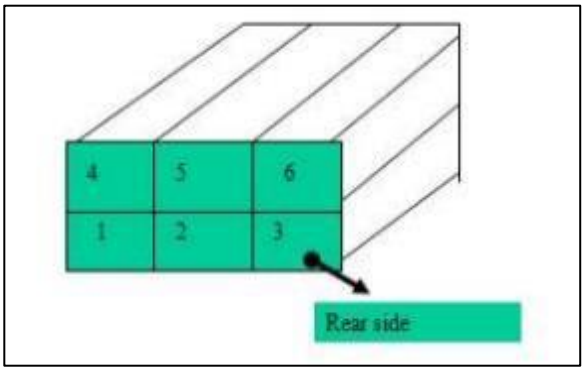
Define the Alarm and Mute behavior

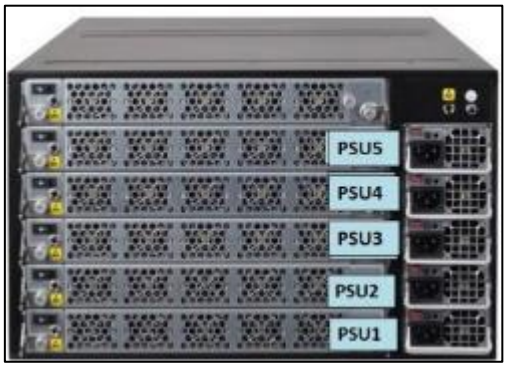
	Power Module Fail	Power Module Remove	Power Cord Remove
Buzzer	**Alarm**	**Alarm**	**Alarm**
Mute	Change back the Good PSU Module or Press the Mute Button	Put back the PSU Module or Press the Mute Button	Plug-in the Power cord or Press the Mute Button

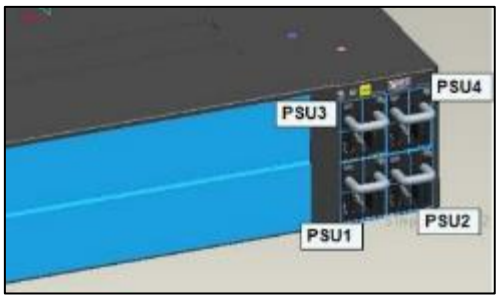
Define the sequence of the Power Module

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

Example :





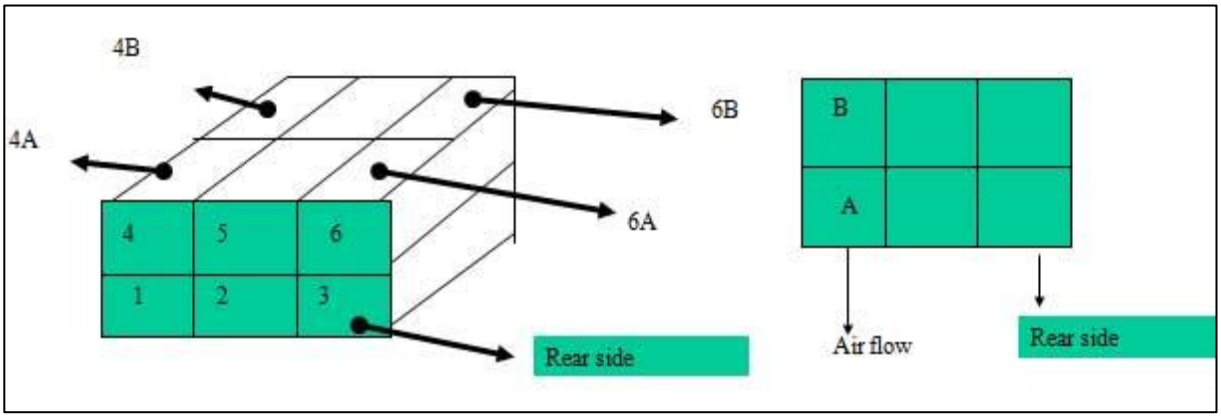


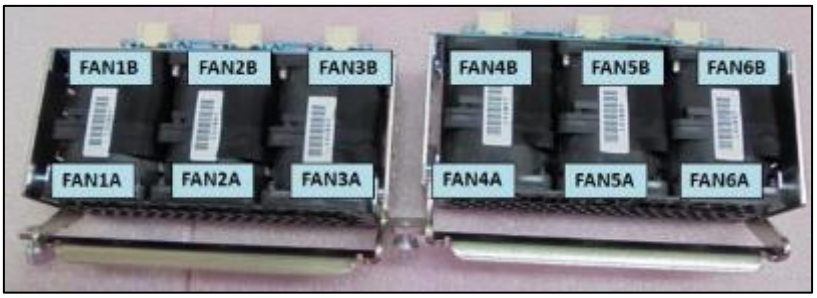
APPENDIX D: FAN SEQUENCE

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

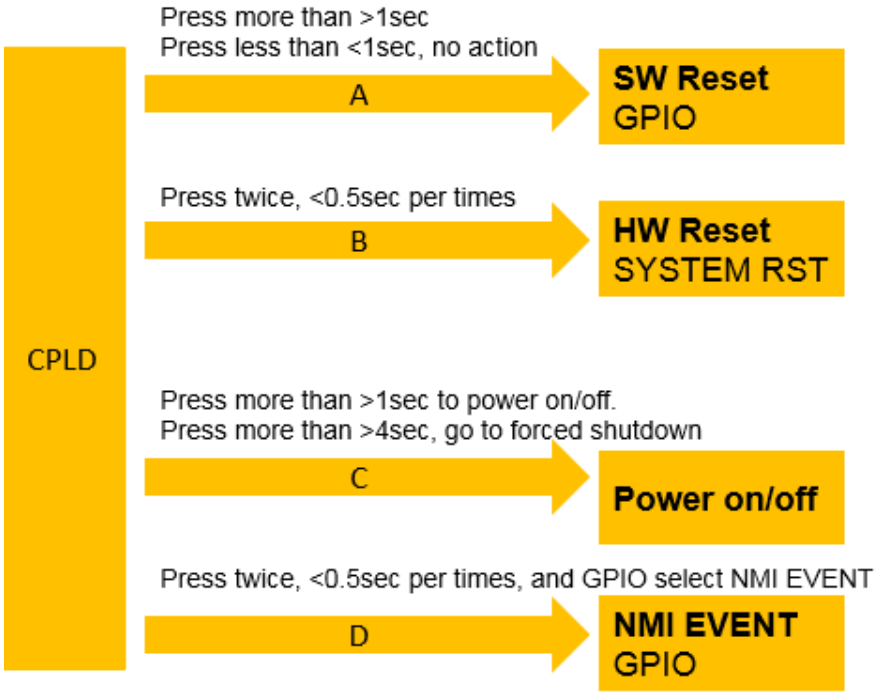
Example:





APPENDIX E: SMART POWER & RESET BUTTON

Smart Power and Reset Button – Control by CPLD



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
Level 3	±6 kV	±8 kV	8K Air
Level 4 (TBD)	±8 kV	±15 kV	New Requirement
			STD
Surge Immunity (LAN) IEC-61000-4-5	Test Level		
Level 0	25V		
Level 1	500V		
Level 2	1kV		V (Current)
Level 3 (TBD)	2kV		New Requirement
Level 4	4kV		
			STD
Electrical Fast Transient (EFT): IEC-61000-4-4			
Level 1	0.5kV		
Level 2	1kV		V (Current)
Level 3 (TBD)	2kV		New Requirement
Level 4	4kV		

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.

RMA Service Request Form

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

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

Item	Model Name	Serial Number	Configuration

Item	Problem Code	Failure Status

*Problem Code:

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

Request Party

Authorized Signature / Date

Confirmed By Supplier

Authorized Signature / Date