GIGABYTE™

H262-P60

HPC Server – Ampere Altra - ARM Server - DP 2U 4-Nodes

User Manual

Rev. 1.0

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Disclaimer

Documentation Classifications

In order to assist in the use of this product, GIGABYTE provides the following types of documentation:

- User Manual: detailed information & steps about the installation, configuration and use of this product (e.g. motherboard, server barebones), covering hardware and BIOS.
- User Guide: detailed information about the installation & use of an add-on hardware or software component (e.g. BMC firmware, rail-kit) compatible with this product.
- Quick Installation Guide: a short guide with visual diagrams that you can reference easily for installation purposes of this product (e.g. motherboard, server barebones).

Please see the support section of the online product page to check the current availability of these documents.

For More Information

For related product specifications, the latest firmware and software, and other information please visit our website at http://www.gigabyte.com

For GIGABYTE distributors and resellers, additional sales & marketing materials are available from our reseller portal: http://reseller.b2b.gigabyte.com

For further technical assistance, please contact your GIGABYTE representative or visit https://esupport.gigabyte.com/ to create a new support ticket

For any general sales or marketing enquiries, you may also message GIGABYTE server directly by email: server.grp@gigabyte.com

Conventions

The following conventions are used in this user's guide:

	**NOTE!** Gives bits and pieces of additional information related to the current topic.
	**CAUTION!** Gives precautionary measures to avoid possible hardware or software problems.
	**WARNING!** Alerts you to any damage that might result from doing or not doing specific actions.

Server Warnings and Cautions

Before installing a server, be sure that you understand the following warnings and cautions.

WARNING!

To reduce the risk of electric shock or damage to the equipment:

- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
- Unplug all the power cords from the power supplies to disconnect power to the equipment.

WARNING!

To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.

WARNING!

This server is equipped with high speed fans. Keep away from hazardous moving fan blades during servicing.

WARNING!

This equipment is not suitable for use in locations where children are likely to be present.

WARNING!

This equipment is intended to be used in Restrict Access Location. The access can only be gained by Skilled person.

Only authorized by well trained professional person can access the restrict access location.

CAUTION!

- Do not operate the server for long periods with the access panel open or removed. Operating the server in this manner results in improper airflow and improper cooling that can lead to thermal damage.
- Danger of explosion if battery is incorrectly replaced.
- Replace only with the same or equivalent type recommended by the manufacturer.
- Dispose of used batteries according to the manufacturer's instructions.

Electrostatic Discharge (ESD)

CAUTION!

ESD CAN DAMAGE DRIVES, BOARDS, AND OTHER PARTS. WE RECOMMEND THAT YOU PERFORM ALL PROCEDURES AT AN ESD WORKSTATION. IF ONE IS NOT AVAILABLE, PROVIDE SOME ESD PROTECTION BY WEARING AN ANTI-STATIC WRIST STRAP ATTACHED TO CHASSIS GROUND -- ANY UNPAINTED METAL SURFACE -- ON YOUR SERVER WHEN HANDLING PARTS.

Always handle boards carefully. They can be extremely sensitive to ESD. Hold boards only by their edges without any component and pin touching. After removing a board from its protective wrapper or from the system, place the board component side up on a grounded, static free surface. Use a conductive foam pad if available but not the board wrapper. Do not slide board over any surface.

System power on/off: To remove power from system, you must remove the system from rack. Make sure the system is removed from the rack before opening the chassis, adding, or removing any non hot-plug components.

Hazardous conditions, devices and cables: Hazardous electrical conditions may be present on power, telephone, and communication cables. Turn off the system and disconnect the cables attached to the system before servicing it. Otherwise, personal injury or equipment damage can result.

Electrostatic discharge (ESD) and ESD protection: ESD can damage drives, boards, and other parts. We recommend that you perform all procedures in this chapter only at an ESD workstation. If one is not available, provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground (any unpainted metal surface on the server) when handling parts.

ESD and handling boards: Always handle boards carefully. They can be extremely sensitive to electrostatic discharge (ESD). Hold boards only by their edges. After removing a board from its protective wrapper or from the system, place the board component side up on a grounded, static free surface. Use a conductive foam pad if available but not the board wrapper. Do not slide board over any surface.

Installing or removing jumpers: A jumper is a small plastic encased conductor that slips over two jumper pins. Some jumpers have a small tab on top that can be gripped with fingertips or with a pair of fine needle nosed pliers. If the jumpers do not have such a tab, take care when using needle nosed pliers to remove or install a jumper; grip the narrow sides of the jumper with the pliers, never the wide sides. Gripping the wide sides can dam-age the contacts inside the jumper, causing intermittent problems with the function con-trolled by that jumper. Take care to grip with, but not squeeze, the pliers or other tool used to remove a jumper, or the pins on the board may bend or break.

CAUTION!

Risk of explosion if battery is replaced incorrectly or with an incorrect type. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Table of Contents

Chapter 1 Hardware Installation

1-1 Installation Precautions

The motherboard/system contain numerous delicate electronic circuits and components which can become damaged as a result of electrostatic discharge (ESD). Prior to installation, carefully read the user manual and follow these procedures:

- Prior to installation, do not remove or break motherboard S/N (Serial Number) sticker or warranty sticker provided by your dealer. These stickers are required for warranty validation.
- Always remove the AC power by unplugging the power cord from the power outlet before installing or removing the motherboard or other hardware components.
- When connecting hardware components to the internal connectors on the motherboard, make sure they are connected tightly and securely.
- When handling the motherboard, avoid touching any metal leads or connectors.
- It is best to wear an electrostatic discharge (ESD) wrist strap when handling electronic components such as a motherboard, CPU or memory. If you do not have an ESD wrist strap, keep your hands dry and first touch a metal object to eliminate static electricity.
- Prior to installing the motherboard, please have it on top of an antistatic pad or within an electrostatic shielding container.
- Before unplugging the power supply cable from the motherboard, make sure the power supply has been turned off.
- Before turning on the power, make sure the power supply voltage has been set according to the local voltage standard.
- Before using the product, please verify that all cables and power connectors of your hardware components are connected.
- To prevent damage to the motherboard, do not allow screws to come in contact with the motherboard circuit or its components.
- Make sure there are no leftover screws or metal components placed on the motherboard or within the computer casing.
- Do not place the computer system on an uneven surface.
- Do not place the computer system in a high-temperature environment.
- Turning on the computer power during the installation process can lead to damage to system components as well as physical harm to the user.
- If you are uncertain about any installation steps or have a problem related to the use of the product, please consult a certified computer technician.

1-2 Product Specifications

NOTE:

We reserve the right to make any changes to the product specifications and product-related information without prior notice.

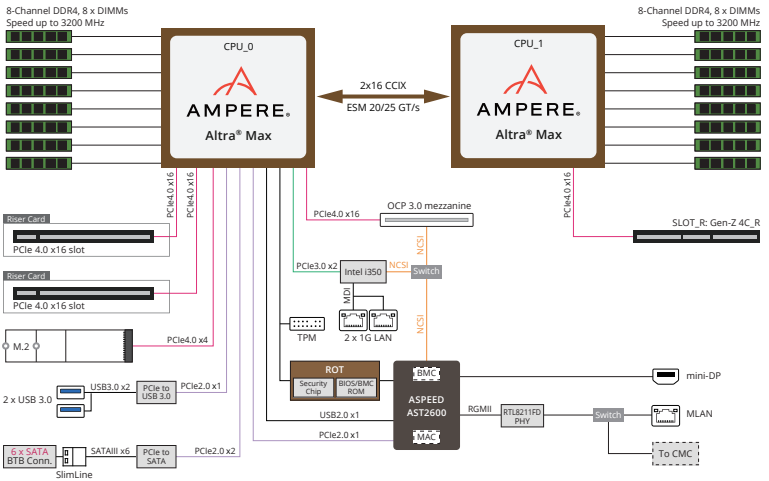
CPU	◆ Ampere® Altra® Max or Altra® Processor ◆ Dual processors, 7nm technology ◆ Up to 128-core per processor, TDP up to 190W NOTE: If only 1 CPU is installed, some PCIe or memory functions might be unavailable
Socket	**Per Node:** ◆ 2 x LGA 4926 **Total:** ◆ 8 x LGA 4926
Chipset	◆ System on Chip
Memory	**Per Node:** ◆ 16 x DIMM slots **Total:** ◆ 64 x DIMM slots ◆ DDR4 memory supported only ◆ 8-Channel memory per processor architecture ◆ RDIMM modules up to 256GB supported ◆ LRDIMM modules up to 256GB supported ◆ Up to 4TB of memory capacity supported per processor ◆ Memory speed: Up to 3200 MHz
LAN	**Per Node:** ◆ 2 x 1GbE LAN ports (1 x Intel® I350-AM2) ◆ 1 x Dedicated management port **Total:** ◆ 8 x 1GbE LAN ports (1 x Intel® I350-AM2) ◆ 4 x Dedicated management ports ◆ 1 x 10/100/1000 *CMC global management port *CMC: Chassis Management Controller, to monitor all status of computing nodes
Video	◆ Integrated in Aspeed® AST2600 ◆ 2D Video Graphic Adapter with PCIe bus interface ◆ 1920x1200@60Hz 32bpp, DDR4 SDRAM Management chip on CMC board: Integrated in Aspeed® AST2520A2-GP

Storage	**Per node:** ◆ 6 x 2.5" SATA hot-swappable HDD/SSD bays **Total:** ◆ 24 x 2.5" SATA hot-swappable HDD/SSD bays
Expansion Slots	**Per node:** ◆ 2 x Low profile half-length slots with PCIe x16 (Gen4 x16 bus) ◆ 1 x OCP 3.0 mezzanine slot with PCIe Gen4 x8 or x16 bandwidth* 1 x M.2 slot: ◆ M-key ◆ PCIe Gen4 x4 ◆ Supports 2280/22110 cards **Total:** ◆ 8 x Low profile half-length slots with PCIe x16 (Gen4 x16 bus) ◆ 4 x OCP 3.0 mezzanine slot with PCIe Gen4 x8 or x16 bandwidth* ◆ 4 x M.2 slots: ◆ - M-key ◆ - PCIe Gen4 x4 ◆ - Supports 2280/22110 cards *NOTE: Gen4 x16 available for Ampere Altra Max processor only
Internal I/O	**Per Node:** ◆ 1 x M.2 slot ◆ 1 x TPM header ◆ 1 x BMC SGPIO header ◆ 1 x JTAG BMC header ◆ 1 x PLD header ◆ 1 x Clear CMOS jumper ◆ 1 x IPMB connector
Front I/O	**Per node:** ◆ 1 x Power button with LED ◆ 1 x ID button with LED ◆ 1 x Status LED ◆ 1 x System reset button **Total:** ◆ 4 x Power button with LED ◆ 4 x ID button with LED ◆ 4 x Status LED ◆ 4 x System reset button *1 x CMC status LED*Only one CMC status LED per system

Rear I/O	**Per node:** ◆ 2 x USB 3.2 Gen1 ◆ 1 x Mini DP ◆ 2 x RJ45 ◆ 1 x RJ45 MLAN **Total:** ◆ 8 x USB 3.2 Gen1 ◆ 4 x Mini DP ◆ 8 x RJ45 ◆ 4 x RJ45 MLAN ◆ *1 x CMC global management port *Only one CMC global management port per system
Backplane I/O	◆ Total 24 x ports, each node handles 6 x ports ◆ Speed and bandwidth: SATA 6Gb/s or SAS 12Gb/s per port
TPM	◆ 1 x TPM header with SPI interface ◆ Optional TPM2.0 kit: CTM010
Power Supply	◆ 2 x 2200W redundant PSUs ◆ 80 PLUS Platinum ◆ AC Input: 100-127V~/ 14A, 47-63Hz 200-240V~/ 12.6A, 47-63Hz ◆ DC Output: Max 1200W/ 100-127V~ +12.12V/ 95.6A +12Vsb/ 3.5A - Max 2200W/ 200-240V +12.12V/ 178.1A +12Vsb/ 3.5A System power supply requires C19 type power cord

System Management	◆ Aspeed® AST2600 management controller ◆ GIGABYTE Management Console (AMI MegaRAC SP-X) web interface ◆ Dashboard ◆ HTML5 KVM ◆ Sensor Monitor (Voltage, RPM, Temperature, CPU Status …etc.) ◆ Sensor Reading History Data ◆ FRU Information ◆ SEL Log in Linear Storage / Circular Storage Policy ◆ Hardware Inventory ◆ Fan Profile ◆ System Firewall ◆ Power Consumption ◆ Power Control ◆ LDAP / AD / RADIUS Support ◆ Backup & Restore Configuration ◆ Remote BIOS/BMC/CPLD Update ◆ Event Log Filter ◆ User Management ◆ Media Redirection Settings ◆ PAM Order Settings ◆ SSL Settings ◆ SMTP Settings
Operating Properties	◆ Operating temperature: 10°C to 35°C ◆ Operating humidity: 8-80% (non-condensing) ◆ Non-operating temperature: -40°C to 60°C ◆ Non-operating humidity: 20%-95% (non-condensing)
System Dimension	◆ 2U 4 Nodes - Rear access ◆ 440mm (W) x 87.5mm (H) x 840mm (D)

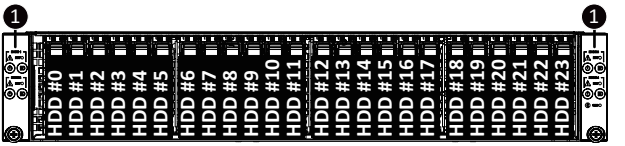
1-3 System Block Diagram



- **Please Go to Chapter 4 Motherboard Components for Riser Slot information.**

Chapter 2 System Appearance

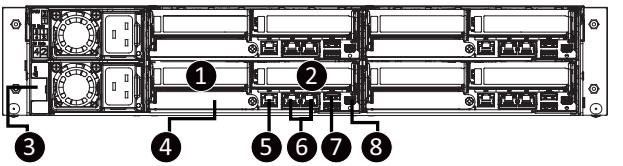
2-1 Front View



No.	Decription
1.	Front Panel LEDs and buttons

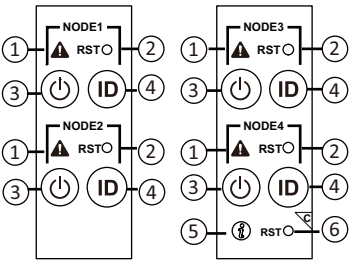
- **Please Go to Chapter 2-3 Front Panel LED and Buttons for detail description of function LEDs.**

2-2 Rear View



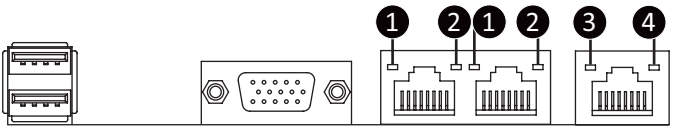
No.	Decription
1.	PCIe Card Slot #1
2.	PCIe Card Slot #2
3.	CMC LAN Port
4.	Mezzanine Card Slot (Option/OCP V3.0 Card)
5.	10/100/1000 Server Management LAN Port
6.	GbE LAN Port x 2
7.	USB 3.0 Port x 2
8.	Mini DP Port

2-3 Front Panel LED and Buttons



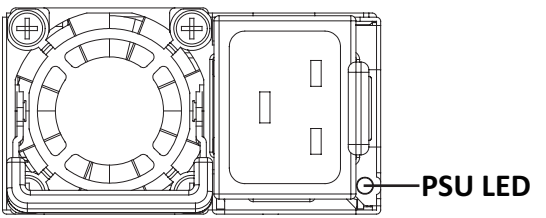
No.	Name	Color	Status	Description
1.	System Status LED	Green	On	System is operating normally.
		Amber	On	Critical condition, may indicate: System fan failure System temperature
			Blink	Non-critical condition, may indicate: Redundant power module failure Temperature and voltage issue Chassis intrusion
		N/A	Off	System is not ready, may indicate: POST error NMI error Processor or terminator missing
2.	Reset Button	--	--	Press this button to reset the system.
3.	Power button with LED	Green	On	System is powered on
		N/A	Off	• System is not powered on or in ACPI S5 state (power off)
4.	ID Button with LED			Press the button to activate system identification
5.	Enclosure	Green	On	System is operating normally.
		Amber	On	Critical condition, may indicates: Power module failure System fan failure Power supply voltage issue System temperature
			Blink	Non-critical condition, may indicates: Redundant power module failure Temperature and voltage issue
6.	CMC Reset Button	--	--	Press this button to reset the CMC.

2-4 Rear System LAN LEDs



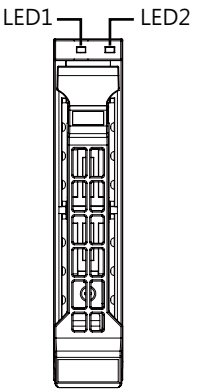
No.	Name	Color	Status	Description
1.	1GbE Speed LED	Yellow	On	1Gbps data rate
		Green	On	100 Mbps data rate
		N/A	Off	10 Mbps data rate
2.	1GbE Link/ Activity LED	Green	On	Link between system and network or no access
			Blink	Data transmission or receiving is occurring
		N/A	Off	No data transmission or receiving is occurring

2-5 Power Supply Unit LED



State	Description
OFF	No AC power to all power supplies
0.5Hz Green Blinking	AC present / only standby on / Cold redundant mode
2Hz Green Blinking	Power supply firmware updateing mode
Amber	AC cord unplugged or AC power lost; with a second power supply in parallel still with AC input power
	Power supply critical event causing shut down: failure, OCP, OVP, fan failure and UVP
0.5Hz Amber Blinking	Power supply warning events where the power supply continues to operate: high temp, high power, high current and slow fan

2-6 Hard Disk Drive LEDs



RAID SKU		LED1	Locate	HDD Fault	Rebuilding	HDD Access	HDD Present (No Access)
No RAID configuration (via PCH/HBA)	Disk LED (LED on Back Panel)	Green	ON(*1)	OFF		BLINK (*2)	OFF
		Amber	OFF	OFF		OFF	OFF
	Removed HDD Slot (LED on Back Panel)	Green	ON(*1)	OFF		--	--
		Amber	OFF	OFF		--	--
RAID configuration (via HW RAID Card or SW RAID Card)	Disk LED	Green	ON	OFF		BLINK (*2)	OFF
		Amber	OFF	ON	(Low Speed: 2 Hz)	OFF	OFF
	Removed HDD Slot	Green	ON(*1)	OFF	(*3)	--	--
		Amber	OFF	ON	(*3)	--	--

LED 2	HDD Present	No HDD
Green	ON	OFF

NOTE:

*1: Depends on HBA/Utility Spec.

*2: Blink cycle depends on HDD's activity signal.

*3: If HDD is pulled out during rebuilding, the disk status of this HDD is regarded as faulty.

Chapter 3 System Hardware Installation

Pre-installation Instructions

Computer components and electronic circuit boards can be damaged electrostatic discharge. Working on computers that are still connected to a power supply can be extremely dangerous. Follow the simple guidelines below to avoid damage to your computer or injury to yourself.

- Always disconnect the computer from the power outlet whenever you are working inside the computer case.
- If possible, wear a grounded wrist strap when you are working inside the computer case. Alternatively, discharge any static electricity by touching the bare metal system of the computer case, or the bare metal body of any other grounded appliance.
- Hold electronic circuit boards by the edges only. Do not touch the components on the board unless it is necessary to do so. Do not flex or stress the circuit board.
- Leave all components inside the static-proof packaging until you are ready to use the component for the installation.

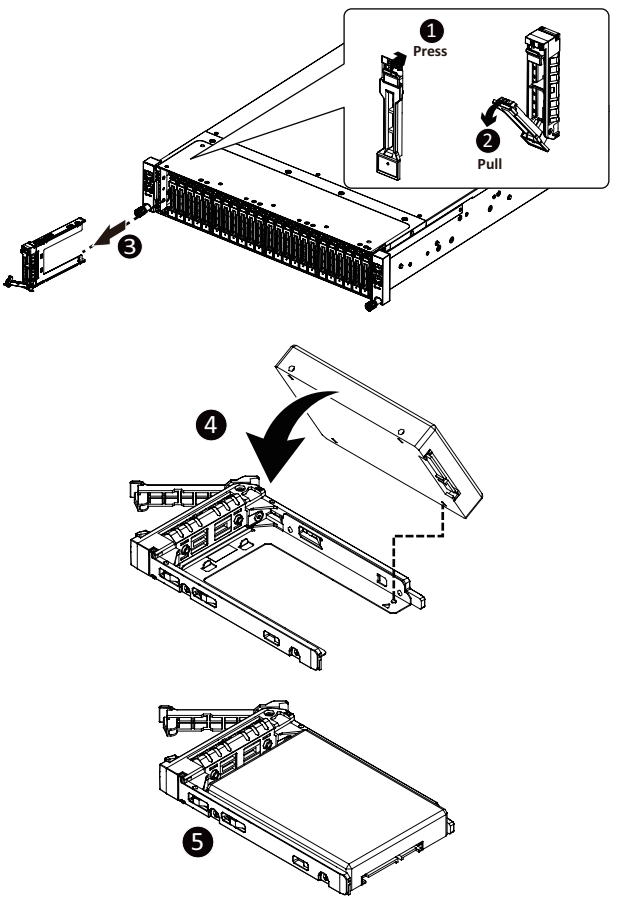
3-1 Installing the Hard Disk Drive

Read the following guidelines before you begin to install the Hard disk drive:

- **Take note of the drive tray orientation before sliding it out.**
- **The tray will not fit back into the bay if inserted incorrectly.**
- **Make sure that the HDD is connected to the HDD connector on the backplane.**

Follow these instructions to install the Hard disk drive:

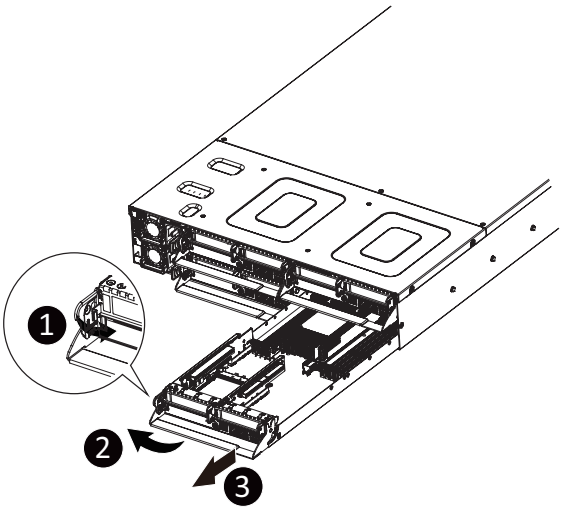
1. Press the release button.
2. Extend the locking lever.
3. Pull the locking lever to remove the HDD tray.
4. Align the hard disk drive with the positioning stud on the HDD tray.
5. Slide hard disk drive into the blank HDD tray.
6. Reinsert the HDD tray into the slot and close the locking lever.



3-2 Removing the Node

Follow these instructions to remove a node:

1. Press the release latch while simultaneously pushing down the tray handle for the node.
2. Pull the node out of the system.
3. To install the node, push the node back into the system.



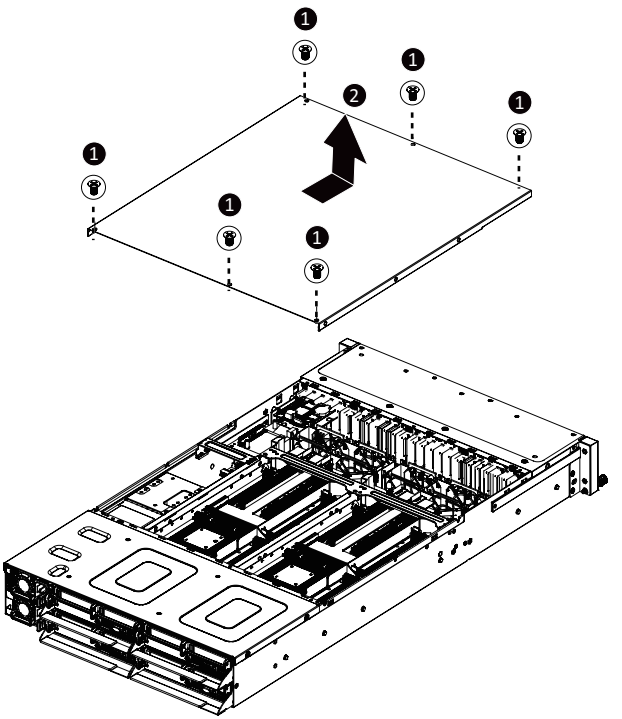
3-3 Removing Chassis Cover

Before you remove or install the system cover

- **Make sure the system is not turned on or connected to AC power.**

Follow these instructions to remove the system cover:

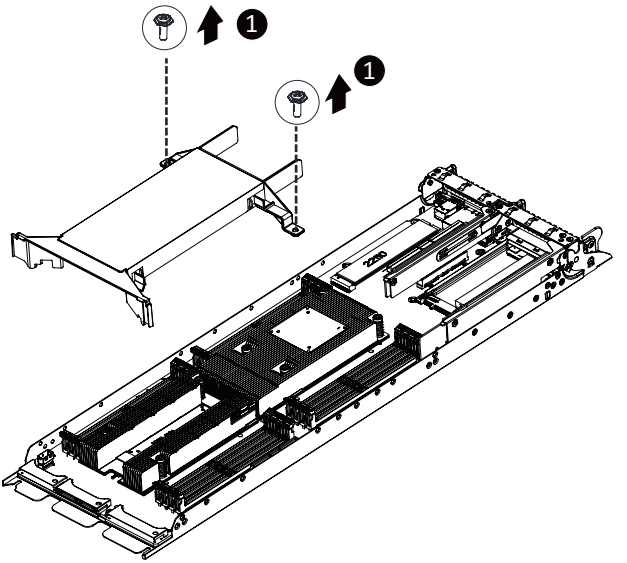
1. Loosen and remove the six screws securing the back cover.
2. Slide the cover to the rear of the system and remove the cover in the direction of the arrow.



3-4 Removing and Installing the Fan Duct

Follow these instructions to remove/install the fan duct:

1. Remove the two screws securing the fan ducts.
2. Lift up to remove the fan ducts
3. To install the fan duct, align the fan duct with the guiding groove. Push down the fan duct into chassis until its firmly seats, then install the four screws to secure the fan ducts in place.



3-5 Removing and Installing the Heatsink

Read the following guidelines before you begin to install the heatsink:

- **Always turn off the computer and unplug the power cord from the power outlet before installing the heatsink to prevent hardware damage.**
- **Unplug all cables from the power outlets.**
- **Disconnect all telecommunication cables from their ports.**
- **Place the system unit on a flat and stable surface.**
- **Open the system according to the instructions.**

WARNING!

Failure to properly turn off the server before you start installing components may cause serious damage. Do not attempt the procedures described in the following sections unless you are a qualified service technician.

Follow these instructions to remove the heatsink:

1. Loosen the four captive screws securing the heatsink to the system.
2. Lift and remove the heatsink.

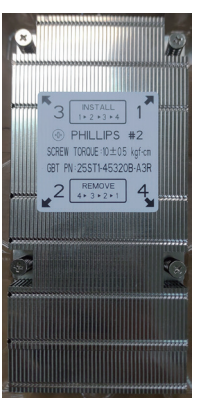
WARNING!

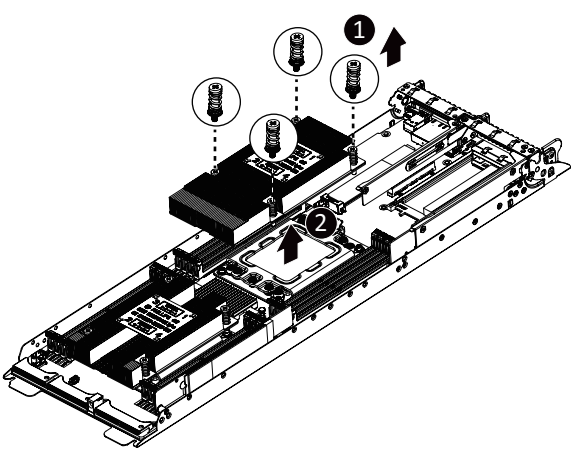
CPU0 and CPU1 use different CPU heatsinks. See the following images for using the correct heatsink.

Failure to observe the warning could result in damage to the equipment.

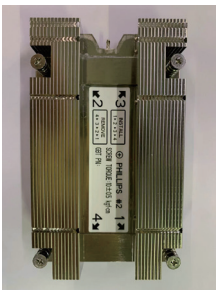
- **When installing the heatsink to CPU, use PHILLIPS #2-Lobe driver to tighten 4 captive nuts in sequence as 1-4.**
- **The screw tightening torque: 0 ± 0.5 kgf-cm (22.0± 1.0 lbf-in).**

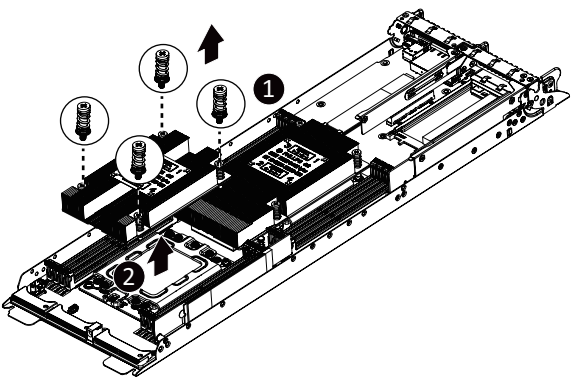
CPU0 Heatsink





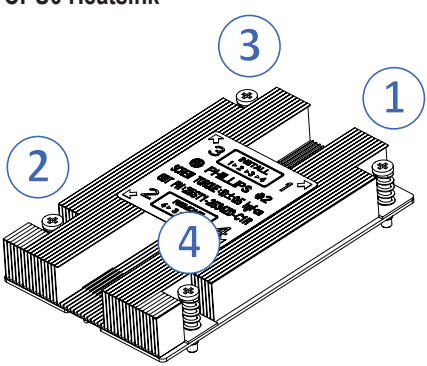
CPU1 Heatsink:



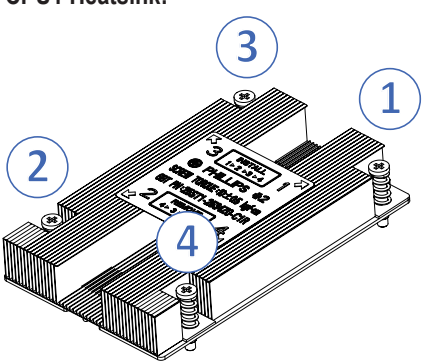


To install the heatsink, reverse the steps above while ensuring that you tighten the captive screws in sequential order (1→2→3→4) as seen in the image below.

CPU0 Heatsink



CPU1 Heatsink:



3-6 Installing the CPU

Read the following guidelines before you begin to install the CPU:

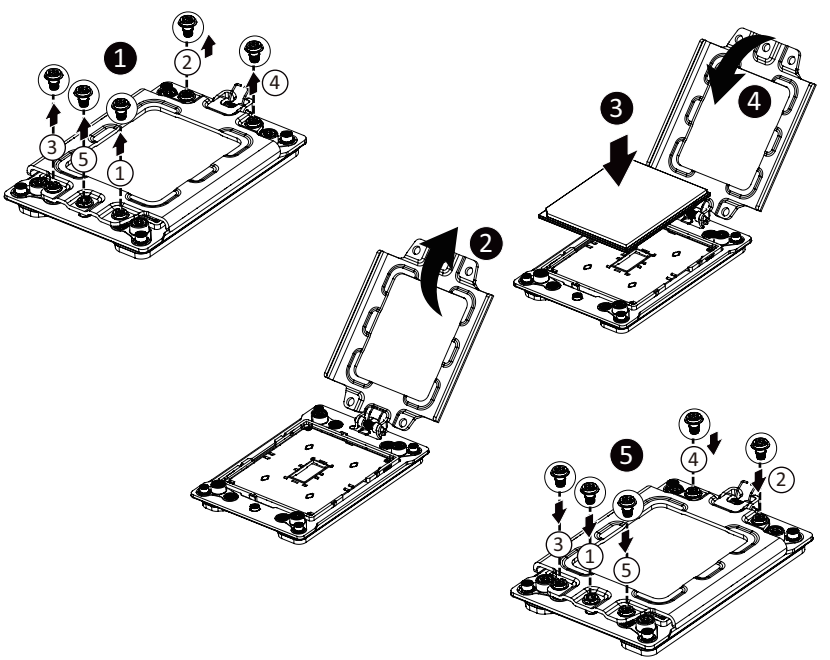
- **Make sure that the motherboard supports the CPU.**
- **Always turn off the computer and unplug the power cord from the power outlet before installing the CPU to prevent hardware damage.**
- **Unplug all cables from the power outlets.**
- **Disconnect all telecommunication cables from their ports.**
- **Place the system unit on a flat and stable surface.**
- **Open the system according to the instructions.**

WARNING!

Failure to properly turn off the server before you start installing components may cause serious damage. Do not attempt the procedures described in the following sections unless you are a qualified service technician.

Follow these instructions to install the CPU:

1. Loosen the three captive screws securing the CPU cover in sequential order (1g2g3g4g5).
2. Flip open the CPU cover.
3. Remove the CPU carrier from the CPU frame using the handle on the CPU carrier.
4. Install the CPU into place in the CPU socket.
5. Flip the CPU cover into place over the CPU socket.
6. Tighten the CPU cover screws in sequential order (1g2g3g4g5) to secure the CPU cover in place.
7. To remove the CPUs, follow steps 1-6 in reverse order.



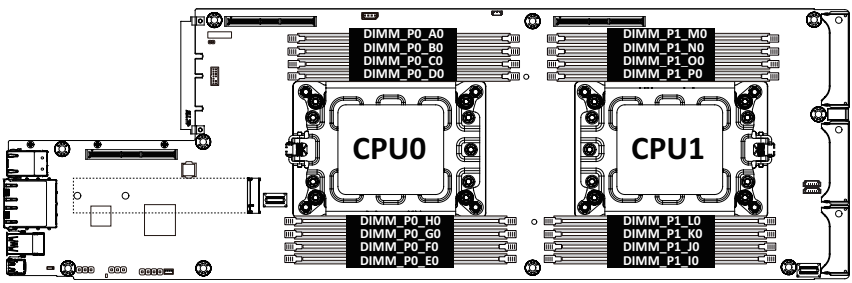
3-7 Installing Memory

Read the following guidelines before you begin to install the memory:

- **Make sure that the motherboard supports the memory. It is recommended that memory of the same capacity, brand, speed, and chips be used.**
- **Always turn off the computer and unplug the power cord from the power outlet before installing the memory to prevent hardware damage.**
- **Memory modules have a foolproof design. A memory module can be installed in only one direction. If you are unable to insert the memory, switch the direction.**

3-7-1 Eight Channel Memory Configuration

This motherboard provides 16 DDR4 memory sockets and supports Eight Channel Technology. After the memory is installed, the BIOS will automatically detect the specifications and capacity of the memory. Enabling eight Channel memory mode will be eight times of the original memory bandwidth.



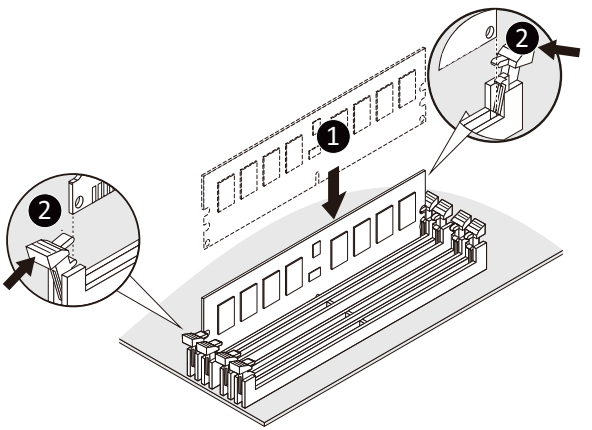
3-7-2 Installing the Memory

Before installing a memory module, make sure to turn off the computer and unplug the power cord from the power outlet to prevent damage to the memory module.

Be sure to install DDR4 DIMMs on this motherboard.

Follow these instructions to install the Memory:

1. Insert the DIMM memory module vertically into the DIMM slot, and push it down.
2. Close the plastic clip at both edges of the DIMM slots to lock the DIMM module.
3. Reverse the installation steps when you want to remove the DIMM module.

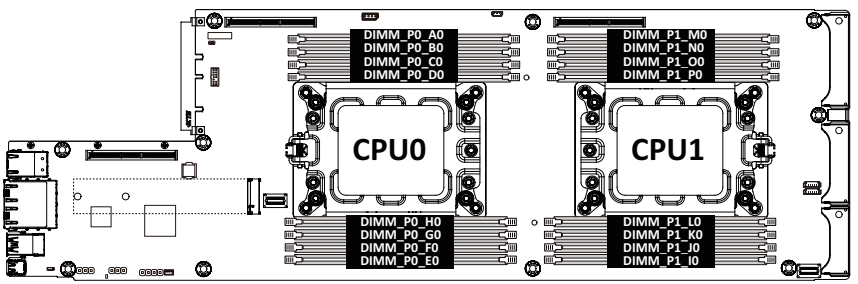


3-7-3 DIMM Population Table

Type	Ranks Per DIMM and Data Width	DIMM Capacity (GB)	Speed (MT/s); Voltage (V) Slot Per Channel (SPC) DIMM Per Channel (DPC)		
			1 Slot per Channel	2 Slots per Channel	
		DIMM Density	1DPC	1DPC	2DPC
		8Gb	1.2V	1.2V	1.2V
RDIMM	SRx4	16GB	3200	3200	3200
RDIMM	DRx8	16GB			

3-7-4 Altra Platform DDR4 Suggest Configuration Table

Channels Used	Channels used (✓ = Memory Installed)							
	DIMM_P0_E0	DIMM_P0_F0	DIMM_P0_G0	DIMM_P0_H0	DIMM_P0_D0	DIMM_P0_C0	DIMM_P0_B0	DIMM_P0_A0
1								✓
1	✓							
2	✓							✓
4	✓	✓					✓	✓
6	✓	✓	✓			✓	✓	✓
8	✓	✓	✓	✓	✓	✓	✓	✓

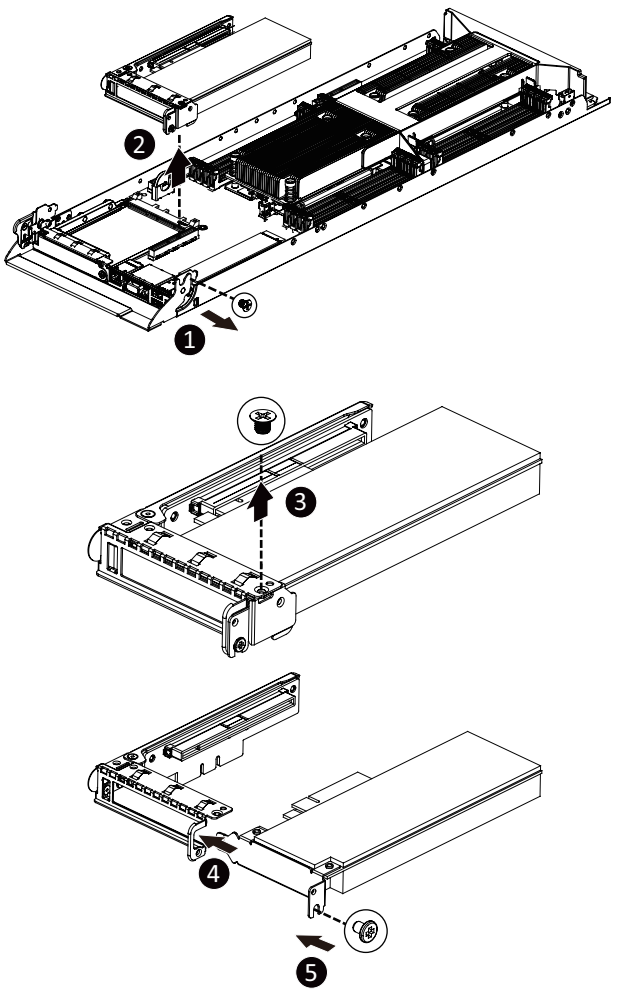


3-8 Installing the PCI Expansion Card

- **The PCI riser assembly does not include a riser card or any cabling as standard. To install a PCI card, a riser card must be installed.**

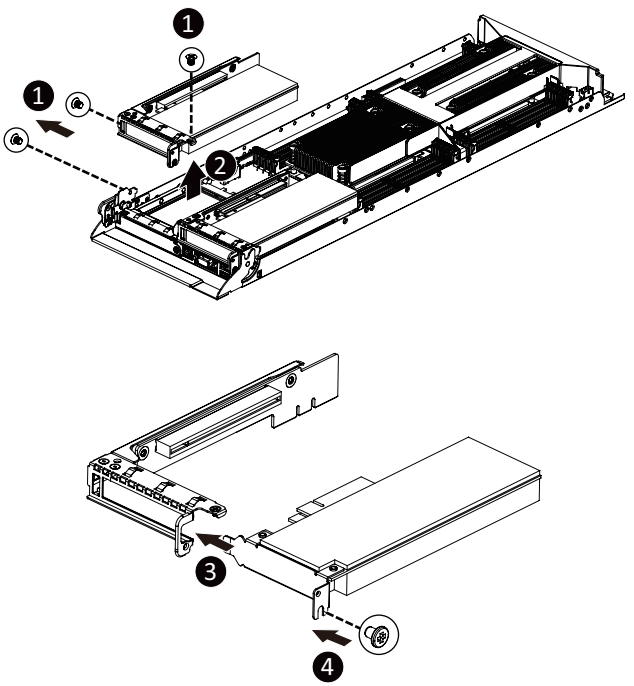
Follow these instructions to install the right PCI Expansion card:

1. Remove the two screws securing the riser bracket to the system.
2. Lift up the riser bracket out of system.
3. Align the PCI-E card to the riser guide slot and push in the direction of the arrow until the PCI-E card sits in the PCI card connector.
4. Secure the PCI-E card with a screw.
5. Reverse steps 1 - 3 to install the riser bracket back into the system.



Follow these instructions to install the left PCI Expansion card:

1. Remove the three screws on the riser bracket to the system.
2. Lift up the riser bracket out of system.
3. Remove the screw securing the side bracket to the riser bracket.
4. Remove the side bracket
5. Align the PCI-E card to the riser guide slot and push in the direction of the arrow until the PCI-E card sits in the PCI card connector.
6. Secure the PCI-E card with a screw.
7. Install the side bracket to the riser bracket.
8. Secure the side bracket to the riser bracket with a screw.
9. Reverse steps 1 - 2 to install the riser bracket back into the system.



3-9 Installing the Mezzanine Card

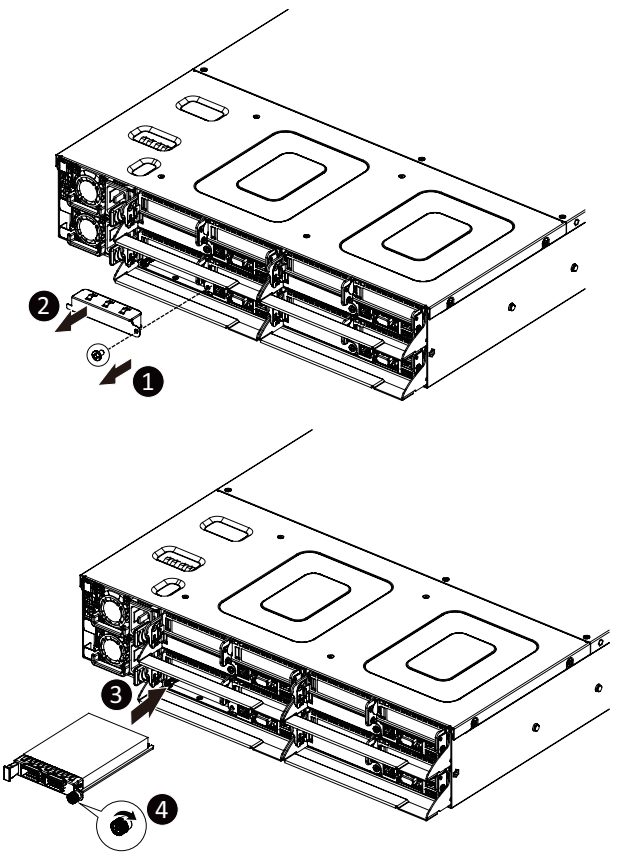
3-9-1 Installing the OCP 3.0 Mezzanine Card

Use of the following type of OCP 3.0 NIC is recommended:

- **OCP 3.0 SFF with pull tab**
- **OCP 3.0 SFF with ejector latch**

Follow these instructions to install an OCP 3.0 Mezzanine card:

1. Remove the one screw securing the OCP 3.0 card slot cover.
2. Remove the slot cover from the system.
3. Insert the OCP 3.0 card into the card slot ensuring that the card is firmly connected to the connector on the motherboard.
4. Tighten the thumbnail screw to secure the OCP 3.0 card in place.
5. Reverse steps 3-4 to replace the OCP 3.0 card.



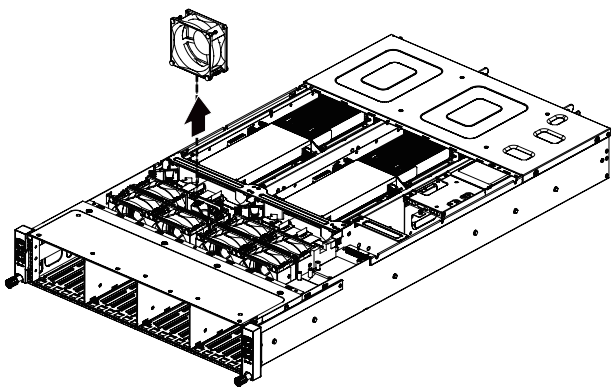
3-10 Replacing the Fan Assembly

- **Voltages can be present within the server whenever an AC power source is connected. This voltage is present even when the main power switch is in the off position. Ensure that the system is powered-down and all power sources have been disconnected from the server prior to replacing a system fan.**

Failure to observe these warnings could result in personal injury or damage to equipment.

Follow these instructions to replace the fan assembly:

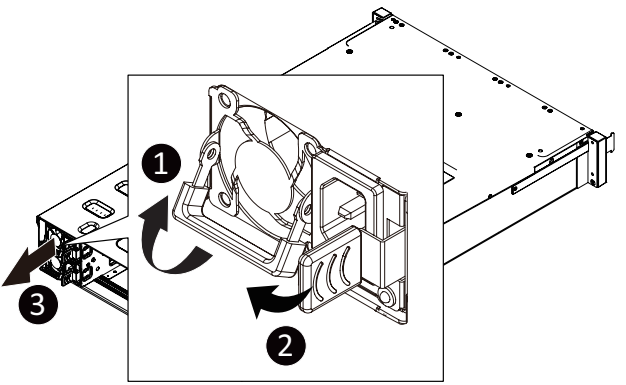
1. Lift up the fan assembly from the chassis.
2. Reverse the previous steps to install the replacement fan assembly.



3-11 Replacing the Power Supply

Follow these instructions to replace the power supply:

1. Pull up the power supply handle and press the retaining clip on the right side of the power supply along the direction of the arrow. At the same time, pull out the power supply by using its handle.
2. Insert the replacement power supply firmly into the chassis. Connect the AC power cord to the replacement power supply.



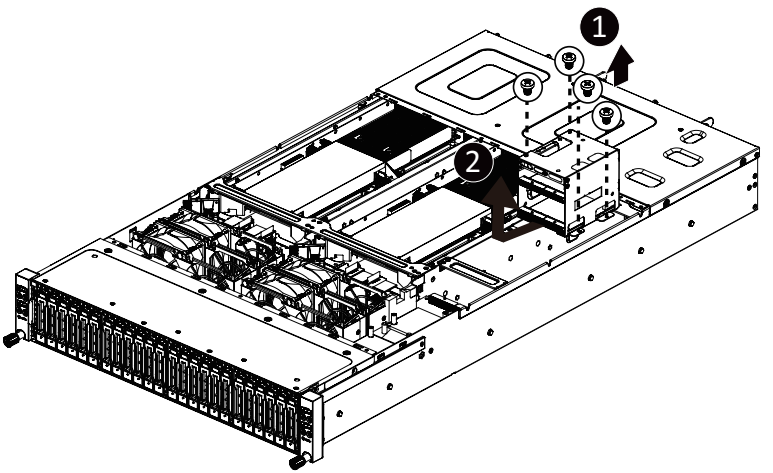
3-12 Replacing Power Distribution Board Cage

Before you remove or install the power distribution board cage:

- **Make sure the system is not turned on or connected to AC power.**

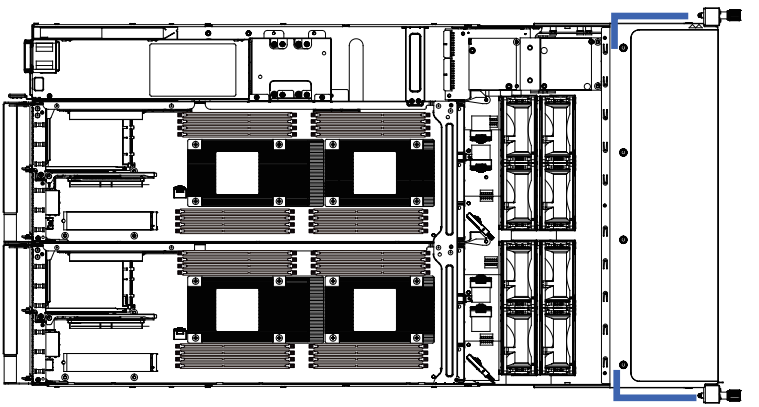
Follow these instructions to remove the power distribution board cage:

1. Loosen and remove the four screws securing the cage.
2. While holding the cage, slide the cage to the front of the system and remove the cage in the direction of the arrow.

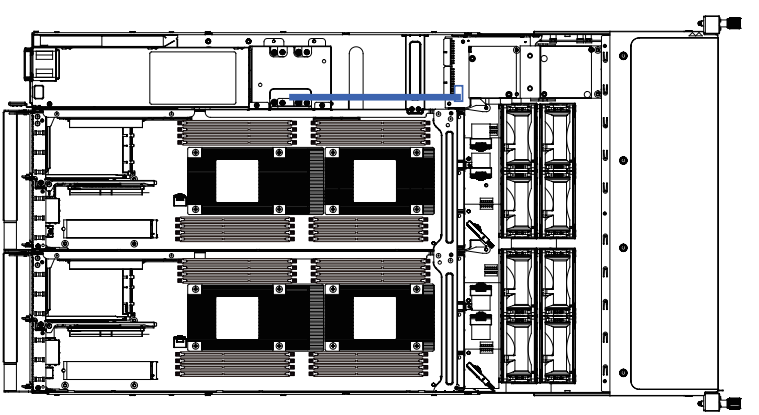


3-13 Cable Routing

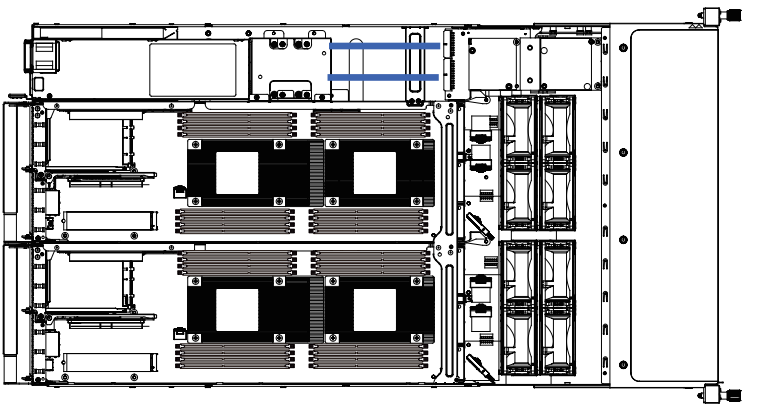
Front Switch Cable/Front LED Cable



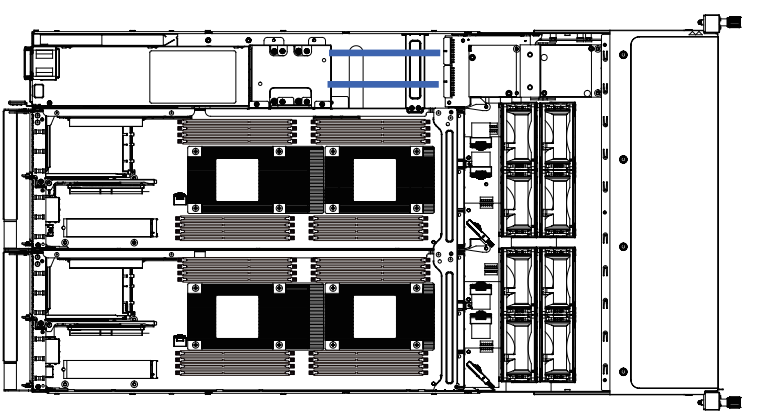
PMBus Cable



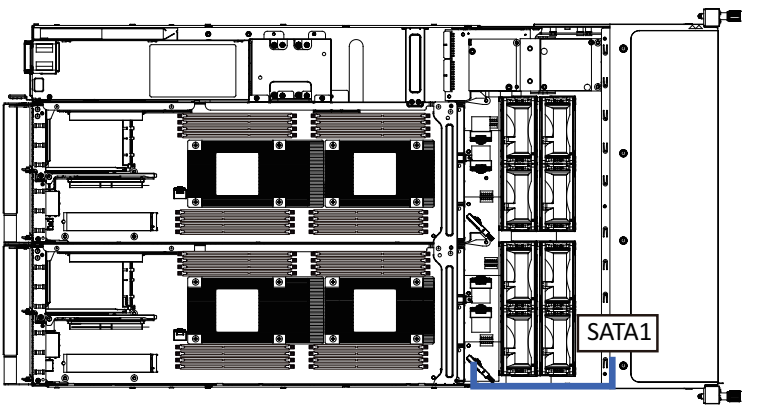
Power Distribution Board to Middle BoardCable (Top)



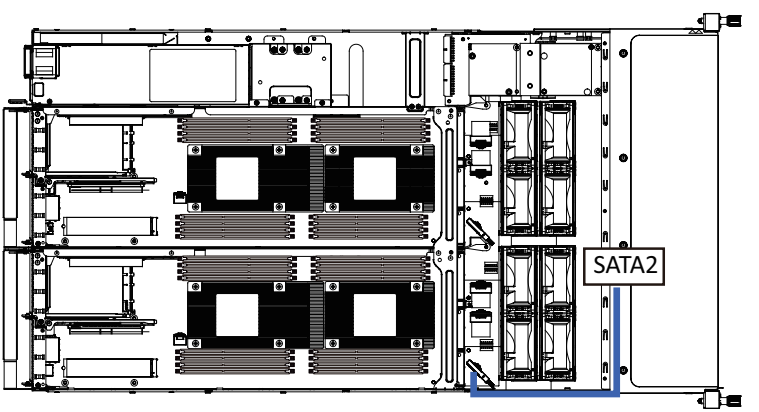
Power Distribution Board to Middle BoardCable (Bottom)



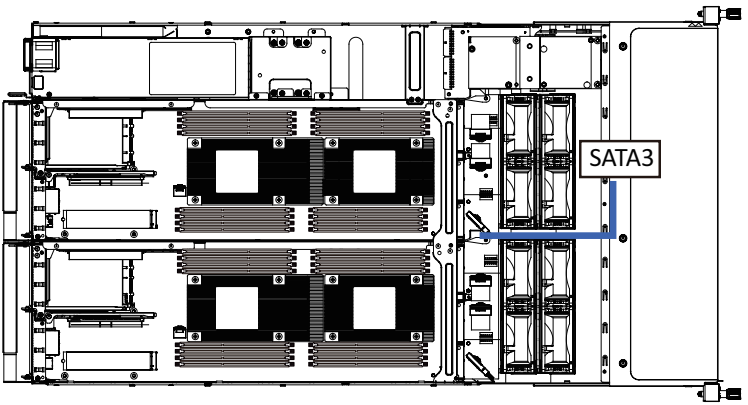
Top Middle Board to HDD Back Plane Board Cable (SATA1)



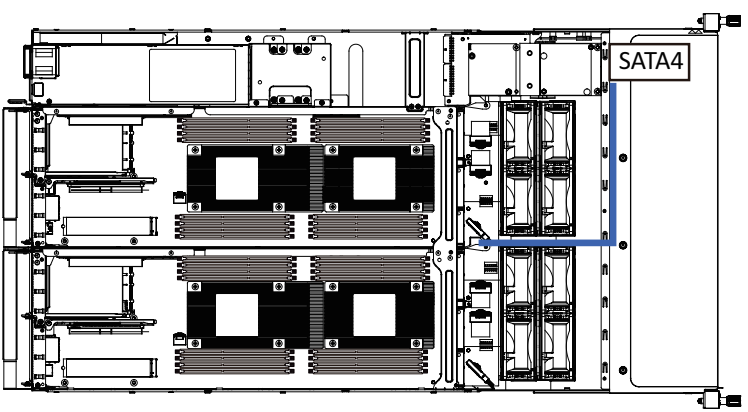
Bottom Middle Board to HDD Back Plane Board Cable (SATA2)



Top Middle Board to HDD Back Plane Board Cable (SATA3)



Bottom Middle Board to HDD Back Plane Board Cable (SATA4)



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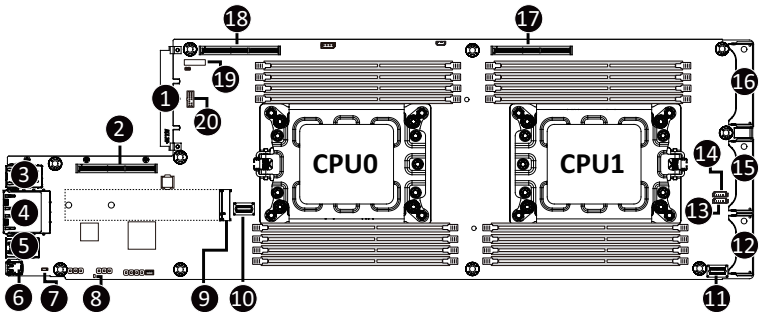
Chapter 4 Motherboard Components

4-1 Motherboard Components



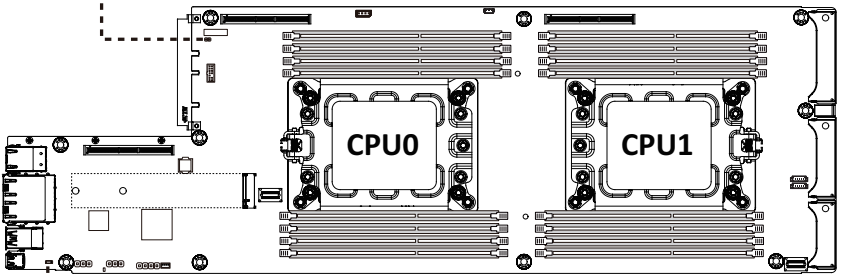
Item	Description
1	OCP Mezzanine 3.0 Connector
2	Proprietary PCIe Slot #2 (Gen 4/x16 slot/GENZ_2)
3	Server Management LAN Port
4	GbE LAN Ports
5	USB 3.0 Port x 2
6	Mini DP Port
7	NCSI Switch
8	BMC Readiness LED
9	M.2 Connector (PCIe x4, Supports NGFF-22110)
10	SlimLine SAS Connector (SATA0/SATA)
11	SlimLine SAS Connector (SL4_SATA0/SATA)
12	Power & PCIe/SATA Connector
13	SGPIO Connector #B
14	SGPIO Connector #A
15	Power & PCIe/SATA Connector
16	Power & PCIe/SATA Connector
17	Proprietary PCIe Slot #R (Gen 4/x16 slot/GENZ_R1)
18	Proprietary PCIe Slot #1 (Gen 4/x16 slot/GENZ_1)
19	System Battery Socket
20	TPM Connector
21	System Battery Socket

4-2 Jumper Setting

Clear CMOS
CLR_CMOS

Open: Default

Close: Enable



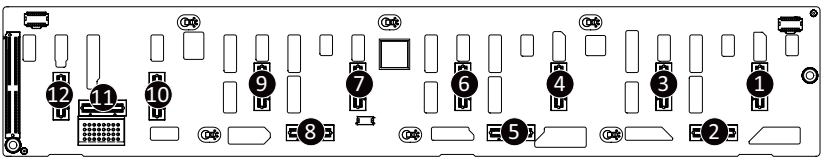
NCSI Switch

ON

OFF	Onboard LAN
ON	OCP 3.0 Mezzanine

4-3 Backplane Board Storage Connector

4-3-1 CBPH7O0



Item	Description
1	SlimLine SAS Connector (N1 U.2 A)
2	SlimLine SAS Connector (N1 SATA)
3	SlimLine SAS Connector (N1 U.2 B)
4	SlimLine SAS Connector (N2 U.2 A)
5	SlimLine SAS Connector (N2 SATA)
6	SlimLine SAS Connector (N2 U.2 B)
7	SlimLine SAS Connector (N3 U.2 A)
8	SlimLine SAS Connector (N3 U.2 B)
9	SlimLine SAS Connector (N3 SATA)
10	SlimLine SAS Connector (N4 U.2 A)
11	SlimLine SAS Connector (N4 SATA)
12	SlimLine SAS Connector (N4 U.2 B)

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Chapter 2 BIOS Setup

BIOS (Basic Input and Output System) records hardware parameters of the system in the EFI on the motherboard. Its major functions include conducting the Power-On Self-Test (POST) during system startup, saving system parameters, loading the operating system etc. The BIOS includes a BIOS Setup program that allows the user to modify basic system configuration settings or to activate certain system features. When the power is turned off, the battery on the motherboard supplies the necessary power to the CMOS to keep the configuration values in the CMOS.

To access the BIOS Setup program, press the <DEL> key during the POST when the power is turned on.

- BIOS flashing is potentially risky, if you do not encounter any problems when using the current BIOS version, it is recommended that you don't flash the BIOS. To flash the BIOS, do it with caution. Inadequate BIOS flashing may result in system malfunction.
- It is recommended that you not alter the default settings (unless you need to) to prevent system instability or other unexpected results. Inadequately altering the settings may result in system's failure to boot. If this occurs, try to clear the CMOS values and reset the board to default values. (Refer to the **Exit** section in this chapter or introductions of the battery/clearing CMOS jumper in Chapter 4 for how to clear the CMOS values.)

BIOS Setup Program Function Keys

<←><→>	Move the selection bar to select the screen
<↑><↓>	Move the selection bar to select an item
<+>	Increase the numeric value or make changes
<->	Decrease the numeric value or make changes
<Enter>	Execute command or enter the submenu
<Esc>	Main Menu: Exit the BIOS Setup program Submenus: Exit current submenu
<F1>	Show descriptions of general help
<F3>	Restore the previous BIOS settings for the current submenus
<F9>	Load the Optimized BIOS default settings for the current submenus
<F10>	Save all the changes and exit the BIOS Setup program

- **Main**
  This setup page includes all the items of the standard compatible BIOS.
- **Advanced**
  This setup page includes all the items of AMI BIOS special enhanced features.
  (ex: Auto detect fan and temperature status, automatically configure hard disk parameters.)
- **Chipset**
  This setup page includes all the submenu options for configuring the function of processor, network, North Bridge, South Bridge, and System event logs.
- **Server Management**
  Server additional features enabled/disabled setup menus.
- **Security**
  Change, set, or disable supervisor and user password. Configuration supervisor password allows you to restrict access to the system and BIOS Setup.
  A supervisor password allows you to make changes in BIOS Setup.
  A user password only allows you to view the BIOS settings but not to make changes.
- **Boot**
  This setup page provides items for configuration of the boot sequence.
- **Save & Exit**
  Save all the changes made in the BIOS Setup program to the CMOS and exit BIOS Setup. (Pressing <F10> can also carry out this task.)
  Abandon all changes and the previous settings remain in effect. Pressing <Y> to the confirmation message will exit BIOS Setup. (Pressing <Esc> can also carry out this task.)

2-1 The Main Menu

Once you enter the BIOS Setup program, the Main Menu (as shown below) appears on the screen. Use arrow keys to move among the items and press <Enter> to accept or enter other sub-menu.

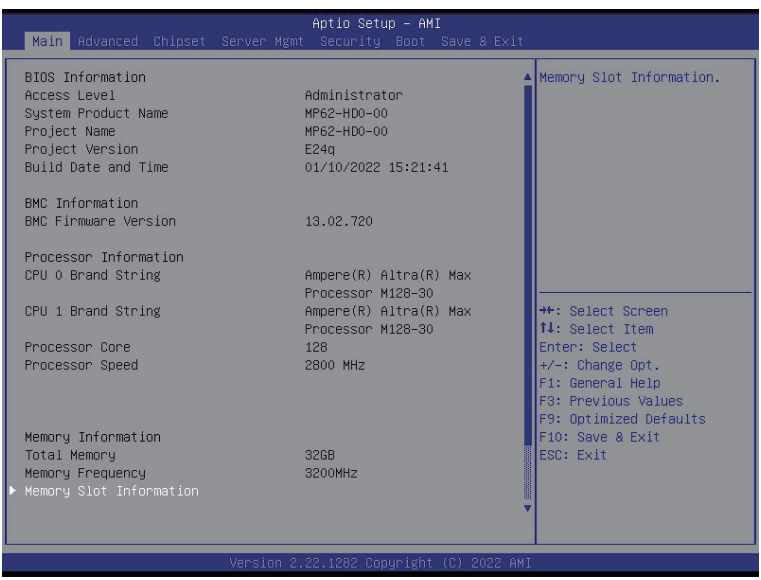
Main Menu Help

The on-screen description of a highlighted setup option is displayed on the bottom line of the Main Menu.

Submenu Help

While in a submenu, press <F1> to display a help screen (General Help) of function keys available for the menu. Press <Esc> to exit the help screen. Help for each item is in the Item Help block on the right side of the submenu.

- When the system is not stable as usual, select the **Restore Defaults** item to set your system to its defaults.
- The BIOS Setup menus described in this chapter are for reference only and may differ by BIOS version.



Parameter	Description
BIOS Information	
Access Level	Displays the privileges level information.
System Project Name	Displays the system project name information.
Project Name	Displays the motherboard project name information
Project Version	Displays version number of the BIOS setup utility.
Build Date and Time	Displays the date and time when the BIOS setup utility was created.
BMC Information(Note1)	
BMC Firmware Version(Note1)	Displays BMC firmware version information.
Processor Information	
CPU Brand String / Processor Core/ Processor Speed	Displays the technical specifications for the installed processor.
Memory Information	
Total Memory(Note2)	Displays the total memory size of the installed memory.
Memory Frequency(Note2)	Displays the frequency information of the installed memory.
Memory Slot Information	Press [Enter] to view installed memory slot information.

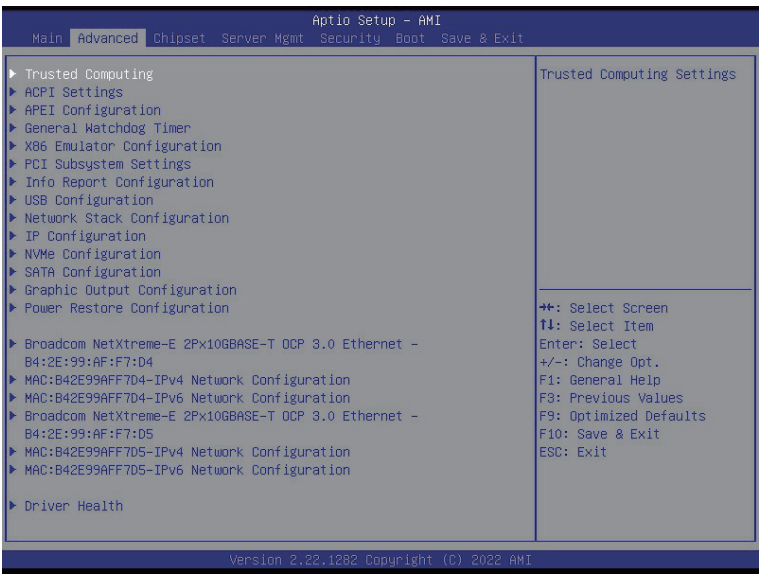
(Note1) Functions available on selected models.

(Note2) This section will display capacity and frequency information of the memory that the customer has installed.

Parameter	Description
System Language	Option: English.
System Date	Sets the date following the weekday-month-day-year format.
System Time	Sets the system time following the hour-minute-second format.

2-2 Advanced Menu

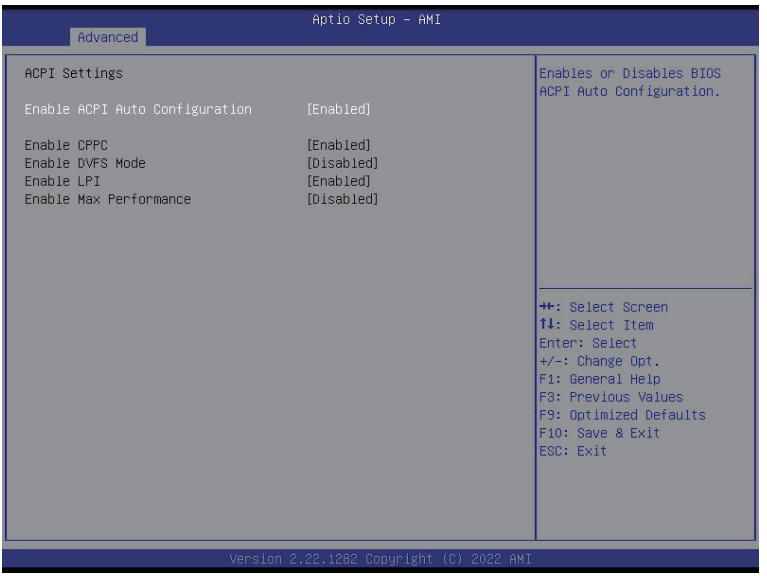
The Advanced Menu displays submenu options for configuring the function of various hardware components. Select a submenu item, then press <Enter> to access the related submenu screen.



2-2-1 Trusted Computing

Parameter	Description
Configuration	
Security Device Support	Enable/Disable BIOS support for security device. OS will not show security device. TCG EFI protocol and INT1A interface will not be available. Options available: Enable, Disable. Default setting is **Enable**.

2-2-2 ACPI Settings



Parameter	Description
ACPI Settings	
Enable ACPI Auto Configuration	Enable/Disable BIOS ACPI auto configuration. Options available: Disabled, Enabled. Default setting is **Enabled**.
Enable CPPC(Note)	Options available: Disabled, Enabled. Default setting is **Enabled**.
Enable DVFS Mode	Default setting is **Disabled**.
Enable LPI(Note)	Options available: Disabled, Enabled. Default setting is **Enabled**.
Enable Max Performance(Note)	Options available: Disabled, Enabled. Default setting is **Enabled**.

(Note) This item is available when **Enable ACPI Auto Configuration** is set to **Disabled**.

2-2-3 APEI Configuration

Parameter	Description
APEI Configuration	
APEI Enable	Enable/Disable ACPI platform Error Interface support. Options available: Disabled, Enabled. Default setting is **Disabled**.

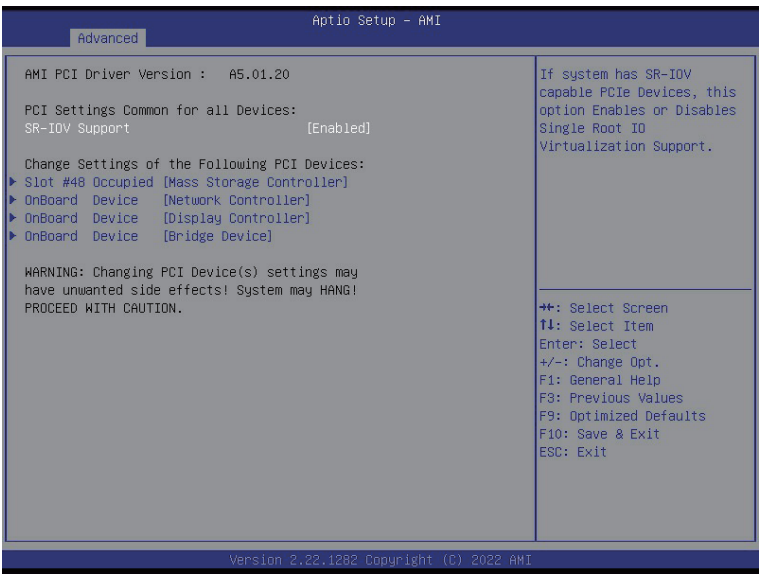
2-2-4 General Watchdog Timer

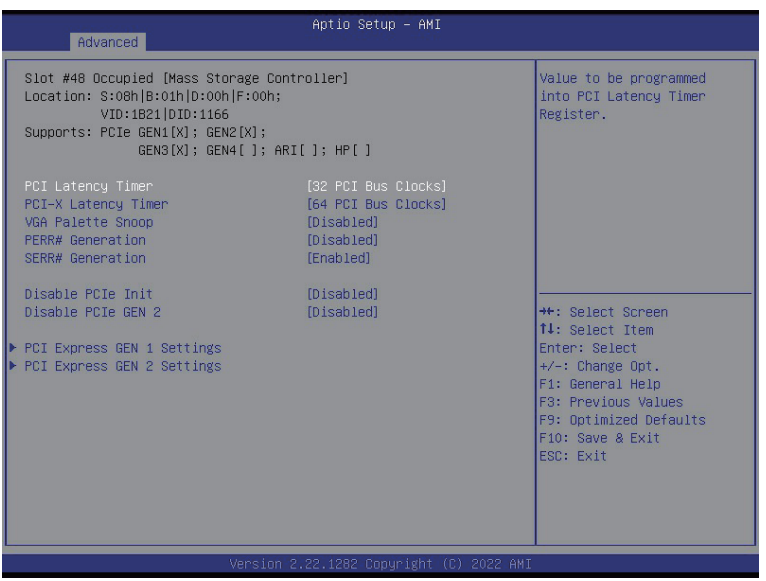
Parameter	Description
General Watchdog Timer	
Secure Watchdog Timeout	Timeout when SCP will reset system if it doesn't receive response from ARMv8. Options available: Disable, 5 minutes, 6 minutes, 10 minutes, 15 minutes, 20 minutes. Default setting is **Disable**.
BIOS Watchdog Timeout	Options available: Disable, 5 minutes, 6 minutes, 10 minutes, 15 minutes, 20 minutes. Default setting is **Disable**.
OS Watchdog Timeout	Options available: Disable, 3 minutes, 4 minutes, 5 minutes, 6 minutes, 10 minutes, 15 minutes, 20 minutes. Default setting is **Disable**.

2-2-5 X86 Emulation Configuration

Parameter	Description
X86 Emulator Configuration	
X86 Emulator Enable	Enable/Disable X86 Emulator support. Options available: Enabled, Disabled. Default setting is **Disabled**.

2-2-6 PCI Subsystem Settings





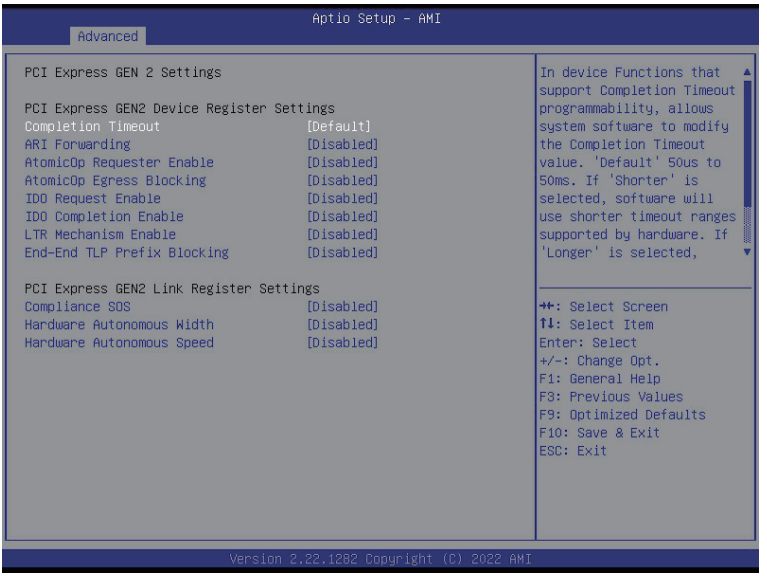
Parameter	Description
AMI PCI Driver Version	Displays the AMI PCI Bus Driver version information
PCI Settings Common for all Devices:	
SR-IOV Support	Enable/Disable Single Root IO virtualization support. Options available: Disabled, Enabled. Default setting is **Enabled**.
Change Settings of the following PCI Devices:	
Slot # Occupied OnBoard Device	Press [Enter] to configure advanced items. ◆ PCI Latency Timer – Value to be programmed into PCI latency timer register. – Options available: 32,64,96,128,160,192,224,248 PCI Bus Clocks. Default setting is **32 PCI Bus Clocks**. ◆ PCI-X Latency Timer – Value to be programmed into PCI latency timer register. – Options available: 32,64,96,128,160,192,224,248 PCI Bus Clocks. Default setting is **64 PCI Bus Clocks**. ◆ VGA Palette Snoop – Enable/Disable VGA Palette Registers Snooping. – Options available: Disabled, Enabled. Default setting is **Disabled**. ◆ PERR# Generation – Enable/Disable PCI Device to Generate PERR#. – Options available: Disabled, Enabled. Default setting is **Disabled**. ◆ SERR# Generation – Enable/Disable PCI Device to Generate SERR#. – Options available: Disabled, Enabled. Default setting is **Enabled**. ◆ Disable PCIe Init – Disable BIOS built-in PCI Express initialization for currently selected and down stream PCI device(s). – Options available: Disabled, Enabled. Default setting is **Disabled**. ◆ Disable PCIe GEN2 – Disable BIOS built-in PCI Express GEN2 initialization for currently selected and down stream PCI device(s). – Options available: Disabled, Enabled. Default setting is **Disabled**.
PCI Express GEN 1 Settings	Press [Enter] to configure advanced items.
PCI Express GEN 2 Settings	Press [Enter] to configure advanced items.

2-2-6-1 PCI Express GEN 1 Settings

Parameter	Description
PCI Express Device Register Settings	
Relaxd Ordering	Enable/disable PCI Express Device Relaxed Ordering. Options available: Enabled, Disabled. Default setting is **Enabled**.
Extended Tag	If enabled, allows device to use 8-bit tag field as a requester. Options available: Enabled, Disabled. Default setting is **Disabled**.
No Snoop	Enable/disable PCI Express Device No Snoop option. Options available: Enabled, Disabled. Default setting is **Disabled**.
Maximum Payload	Set maximum payload of PCI express device or allow system BIOS to select the value. Options available: Auto, 128 Bytes, 256 Bytes, 512 Bytes. Default setting is **Auto**.
Maximum Read Request	Set maximum Read Request size of PCI express device or allow system BIOS to select the value. Options available: Auto, 128 Bytes, 256 Bytes, 512 Bytes, 1024 Bytes, 2048 Bytes, 4096 Bytes. Default setting is **Auto**.
PCI Express Link Register Settings	
Extended Synch	If enabled, allows generation of extended synchronization patterns. Options available: Enabled, Disabled. Default setting is **Disabled**.

Parameter	Description
Clock Power Management	If supported by hardware and set to "Enabled", the device is permitted to use CLKREQ# signal for power management of Link clock in accordance to protocol defined in appropriate form factor specification. Options available: Enabled, Disabled. Default setting is **Disabled**.
Link Training Retry	Defines number of Retry attempts software will take to retrain the link if previous training attempt was unsuccessful. Options available: Disabled, 2, 3, 5. Default setting is **5**.
Link Training Timeout (uS)	Defines number of microseconds software will wait before polling 'Link Training' bit in link status register. Value range from 10 to 10000 uS.
Disable Empty Links	In order to save power, software will disable unpopulated PCI express links, if this option set to "Disable Link. Options available: Enabled, Disabled. Default setting is **Disabled**.

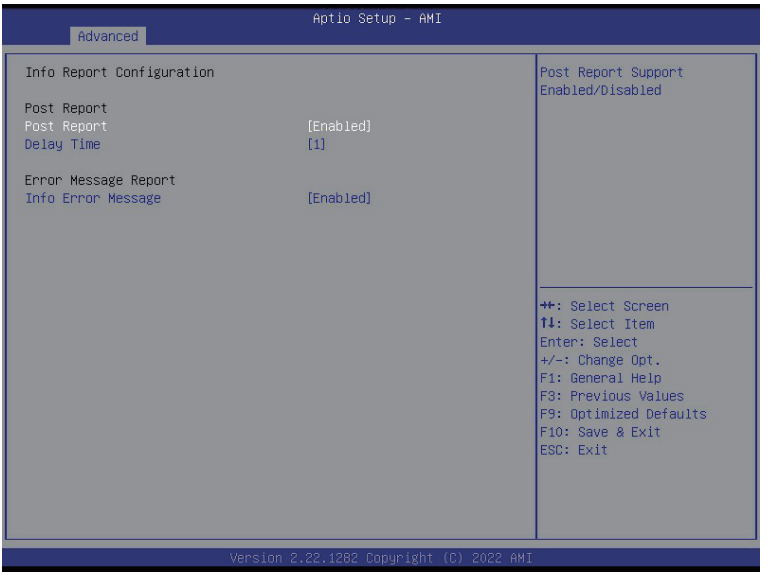
2-2-6-2 PCI Express GEN 2 Settings



Parameter	Description
PCI Express GEN2 Device Register Settings	
Completion Timeout	In device functions that support completion timeout programmability, allows system software to modify the completion timeout value. 'Default' 50us to 50ms. If 'Shorter' is selected, software will use shorter timeout ranges supported by hardware. If 'Longer' is selected, software will use longer timeout ranges. Options available: Default, Shorter, Longer, Disabled. Default setting is **Default**.
ARI Forwarding	If supported by hardware and set to 'Enabled', the Downstream Port disables its traditional Device Number field being 0 enforcement when turning a Type1 Configuration Request into a Type0 Configuration Request, permitting access to Extended Functions in an ARI Device immediately below the Port. Options available: Enabled, Disabled. Default setting is **Disabled**.
AtomicOp Requester Enable	If supported by hardware and set to 'Enabled', this function initiates AtomicOp Requests only if Bus Master Enable bit is in the Command Register Set.. Options available: Enabled, Disabled. Default setting is **Disabled**.

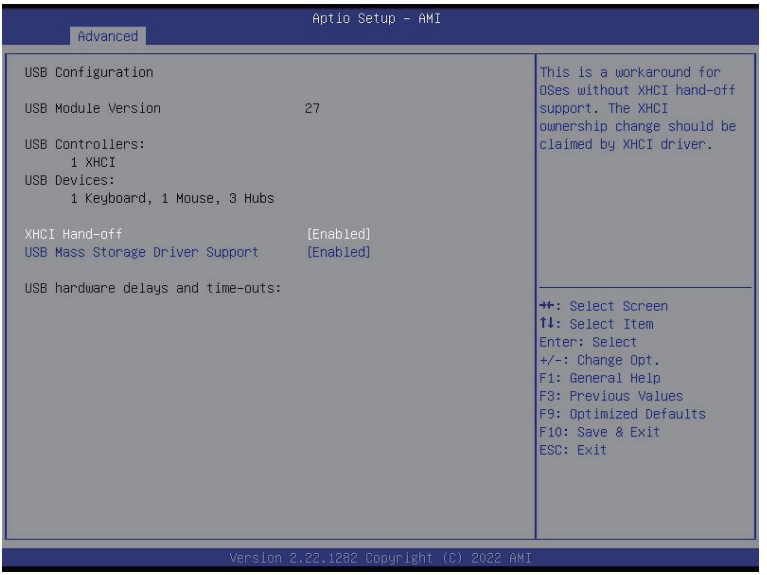
Parameter	Description
AtomicOp Egress Blocking	If supported by hardware and set to 'Enabled', outbound AtomicOp Requestsvia Egress Ports will be blocked. Options available: Enabled, Disabled. Default setting is **Disabled**.
IDO Request Enable	If supported by hardware and set to 'Enabled', this permits setting the number of ID-Based Ordering (IDO) bit (Attribute[2]) requests to be initiated. Options available: Enabled, Disabled. Default setting is **Disabled**.
IDO Completion Enable	If supported by hardware and set to 'Enabled', this permits setting the number of ID-Based Ordering (IDO) bit (Attribute[2]) requests to be initiated. Options available: Enabled, Disabled. Default setting is **Disabled**.
LTR Mechanism Enable	If supported by hardware and set to 'Enabled', this enables the Latency Tolerance Reporting (LTR) Mechanism. Options available: Enabled, Disabled. Default setting is **Disabled**.
End-End TLP Prefix Blocking	If supported by hardware and set to 'Enabled', this function will block forwarding of TLPs containing End-End TLP Prefixes. Options available: Enabled, Disabled. Default setting is **Disabled**.
PCI Express GEN2 Link Register Settings	
Compliance SOS	If supported by hardware and set to 'Enabled', this will force LTSSM to send SKP Ordered Sets between sequences when sending Compliance Pattern or Modified Compliance Pattern. Options available: Enabled, Disabled. Default setting is **Disabled**.
Hardware Autonomous Width	If supported by hardware and set to 'Disabled', this will disable the hardware's ability to change link width except width size reduction for the purpose of correcting unstable link operation. Options available: Enabled, Disabled. Default setting is **Disabled**.
Hardware Autonomous Speed	If supported by hardware and set to 'Disabled', this will disable the hardware's ability to change link speed except speed rate reduction for the purpose of correcting unstable link operation. Options available: Enabled, Disabled. Default setting is **Disabled**.

2-2-7 Info Report Configuration



Parameter	Description
Post Report	
Post Report	Enable/disable post report support. Options available: Enabled, Disabled. Default setting is **Enabled**.
Delay Time	Options available: 0,1,2,3,4,5,6,7,8,9,10, Until Press ESC. Default setting is **1**.
Error Message Report	
Info Error Message	Enable/disable Info error message support. Options available: Enabled, Disabled. Default setting is **Enabled**.

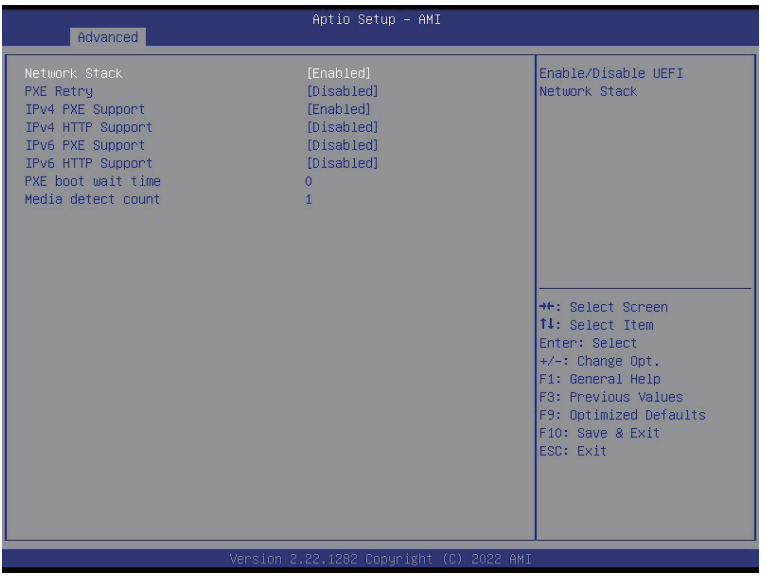
2-2-8 USB Configuration



Parameter	Description
USB Configuration	
USB Module Version	Displays the USB module version information.
USB Controllers	Displays the supported USB controllers.
USB Devices:	Displays the USB devices connected to the system.
XHCI Hand-off	Enable/Disable the XHCI (USB 3.0) Hand-off support. Options available: Enabled, Disabled. Default setting is **Enabled**.
USB Mass Storage Driver Support(Note)	Enable/Disable the USB Mass Storage Driver Support. Options available: Enabled, Disabled. Default setting is **Enabled**.

(Note) This item is present only if you attach USB devices.

2-2-9 Network Stack Configuration



Parameter	Description
Network Stack	Enable/Disable the UEFI network stack. Options available: Enabled, Disabled. Default setting is **Enabled**.
Ipv4 PXE Support(Note)	Enable/Disable the Ipv4 PXE feature. Options available: Enabled, Disabled. Default setting is **Enabled**.
Ipv4 HTTP Support(Note)	Enable/Disable the Ipv4 HTTP feature. Options available: Enabled, Disabled. Default setting is **Disabled**.
Ipv6 PXE Support(Note)	Enable/Disable the Ipv6 PXE feature. Options available: Enabled, Disabled. Default setting is **Enabled**.
Ipv6 HTTP Support(Note)	Enable/Disable the Ipv6 HTTP feature. Options available: Enabled, Disabled. Default setting is **Disabled**.
PXE boot wait time(Note)	Wait time in seconds to press ESC key to abort the PXE boot. Press the <+> / <-> keys to increase or decrease the desired values.
Media detect count(Note)	Number of times the presence of media will be checked. Press the <+> / <-> keys to increase or decrease the desired values.

(Note) This item appears when **Network Stack** is set to **Enabled**.

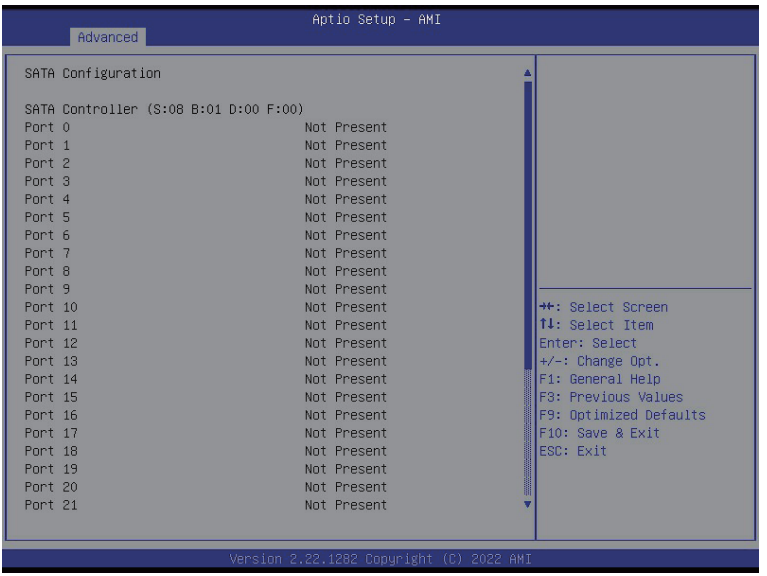
2-2-10 IP Configuration

Parameter	Description
IP Configuration Settings	
Provides the Options to Configure the IP Address	
Auto Configuration	Options available: Disabled, Every Boot, On Demand. Default setting is **Disabled**.

2-2-11 NVMe Configuration

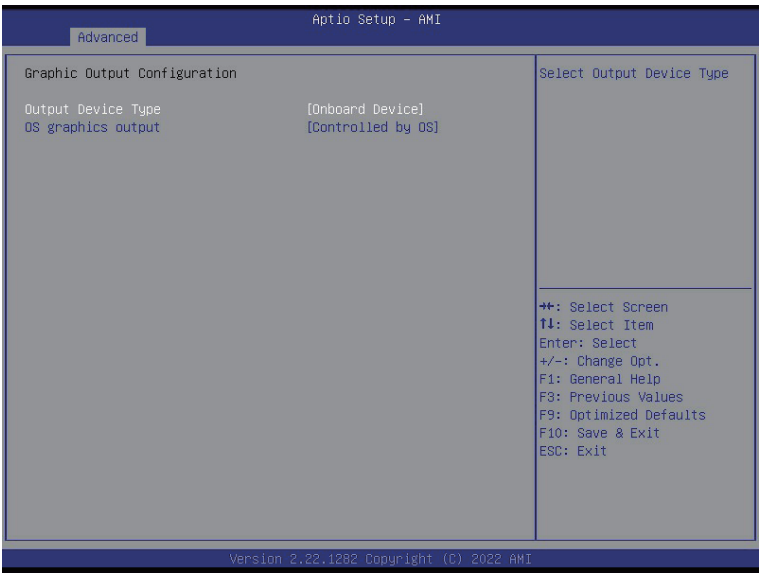
Parameter	Description
NVMe controller and Drive information	Displays the NVMe devices connected to the system

2-2-12 SATA Configuration



Parameter	Description
SATA Configuration	Displays the installed HDD devices information. System will automatically detect HDD type.

2-2-13 Graphic Output Configuration

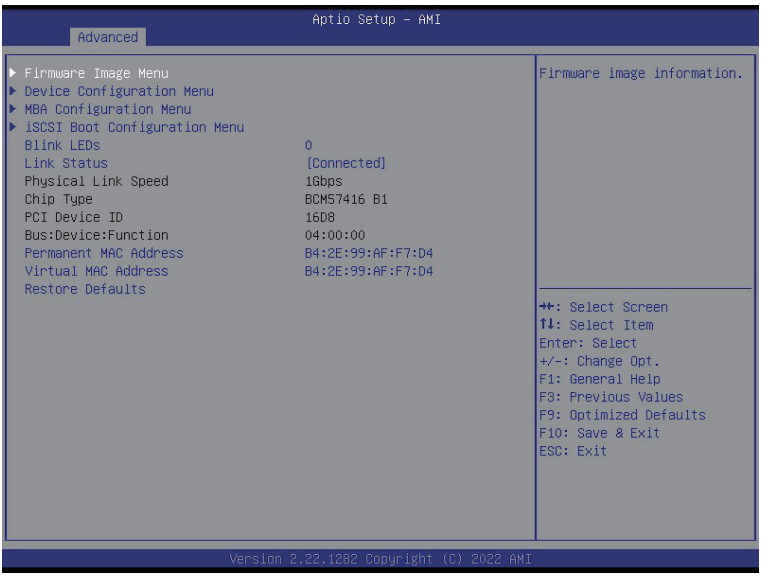


Parameter	Description
Graphic Output Configuration	
Output Device Type	Selects output device type. Options available: First loaded Device, Onboard Device, External Device, Specific Device. Default setting is **Onboard Device**.
OS graphics output	Use Onboard graphics output under OS (BMC KVM requires onboard graphics output). Options available: Controlled by OS, Onboard VGA. Default setting is **Controlled by OS**.

2-2-14 Power Restore Configuration

Parameter	Description
Power Restore	Specifies what state when power is re-applied after a power failure (G3 state). Options available: Power Off, Power On, Last State. Default setting is **Last State**.

2-2-15 Broadcom NetXtreme-E 2Px10GBASE-T OCP 3.0 Ethernet

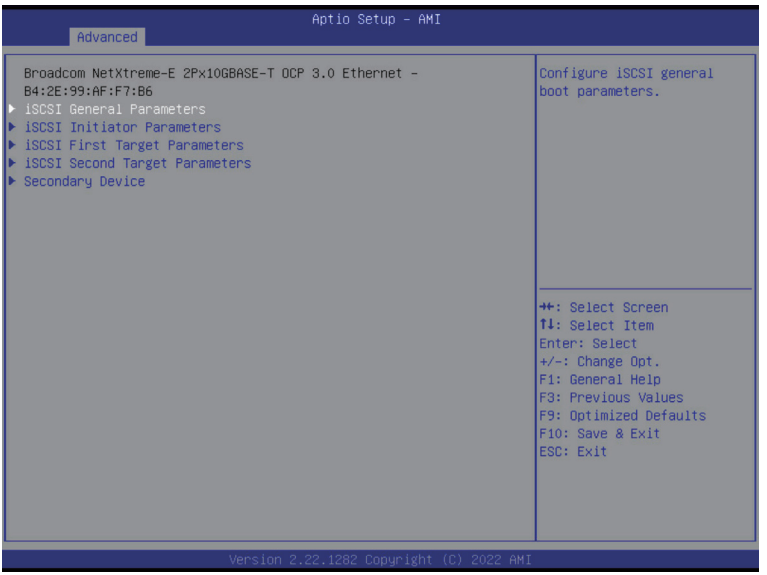


Parameter	Description
Firmware Image Menu	Press [Enter] to view firmware image information.
Device Configuration Menu	Press [Enter] to configure advanced items. ◆ Multi-Function Mode – Configures the NIC Hardware Mode. – Options available: SF, NPAR 1.0. Default setting is **SF**. ◆ Number of VFs Per PF – Configures the number of Virtual Functions Per Physical Function in multiples of 8 (1-128). This field is only applicable when SR-IOV is enabled. – Default setting is **8**. ◆ SR-IOV – Enable/Disable Single Root I/O Virtualization. – Options available: Enabled, Disabled. Default setting is **Disabled**. ◆ Number of MSI-X Vectors per VF – Configures the number of MSI-X Vectors per VF (0-128). – Default setting is **16**. ◆ Maximum Number of PF MSI-X Vectors – Configures the maximum number of PF MSI-X Vectors (0-512 per controller). – Default setting is **74**.

Parameter	Description
Device Configuration Menu (continued)	◆ Energy Efficient Ethernet – Enable/Disable Energy Efficient Ethernet operation. – Options available: Enabled, Disabled. Default setting is **Disabled**. ◆ Operational Link Speed – Configures the link speed setting to be used as the default link speed for the selected port. – Default setting is **AutoNeg**. ◆ Support RDMA – Enable/Disable RDMA support for this port. – Options available: Enabled, Disabled. Default setting is **Disabled**. ◆ DCB Protocol – Enable/Disable DCB protocol. – Options available: Disabled, Enabled (IEEE only), CEE (only), Both (IEEE preferred with fallback to CEE). Default setting is **Disabled**. ◆ LLDP nearest bridge – Enable/Disable LLDP nearest bridge state. – Options available: Enabled, Disabled. Default setting is **Enabled**. ◆ Default EVB Mode – Configures the default Edge Virtual Bridging mode. – Options available: VEB, VEPA, None. Default setting is **VEB**. ◆ Enable PME Capability – Enable/Disable PME Capability support. – Options available: Enabled, Disabled. Default setting is **Enabled**. ◆ Flow Offload – Options available: Enabled, Disabled. Default setting is **Disabled**. ◆ Live Firmware Upgrade – Options available: Enabled, Disabled. Default setting is **Disabled**. ◆ Adapter Error Recovery – Options available: Enabled, Disabled. Default setting is **Disabled**.
MBA Configuration Menu	Press [Enter] to configure advanced items. ◆ Option ROM – Enable/Disable Boot Option ROM. – Options available: Enabled, Disabled. Default setting is **Enabled**. ◆ Legacy Boot Protocol – Selects non-UEFI Boot Protocol: Preboot Execution Environment (PXE)/iSCSI. – Options available: PXE, iSCSI, NONE. Default setting is **PXE**. ◆ Boot Strap Type – Selects the boot strap type. Options available: Auto Detect, BBS, Int 18h, Int 19h. Default setting is **Auto Detect**. ◆ Hide Setup Prompt – Configures whether the Setup Prompt is displayed during ROM initialization. – Options available: Enabled, Disabled. Default setting is **Disabled**.

Parameter	Description
MBA Configuration Menu (continued)	◆ Setup Key Stroke – Configures key strokes to invoke the configuration menu. – Options available: Ctrl-S, Ctrl-B. Default setting is **Ctrl-S**. ◆ Banner Message Timeout – Selects the timeout value. (0 defaults to 4 seconds, 15 is no delay, 1-14 is timeout value in seconds) – Default setting is **5**. ◆ Pre-boot Wake On LAN – Configures Pre-boot Wake on LAN (WOL). – Options available: Enabled, Disabled. Default setting is **Enabled**. ◆ VLAN Mode – Configures the virtual LAN (VLAN) mode. – Options available: Enabled, Disabled. Default setting is **Disabled**. ◆ VLAN ID – Configures the VLAN ID (1…4094). – This item is available only when VLAN Mode is Enabled. ◆ Boot Retry Count – Selects the number of boot retries. – Options available: No Retry, 1 Retry, 2 Retries, 3 Retries, 4 Retries, 5 Retries, 6 Retries, Indefinite Retries. Default setting is **5 Retries**.
iSCSI Boot Configuration Menu	Press [Enter] to configure advanced items.
Blink LEDs	Identifies the physical network port by blinking the associated LED. Press the numeric keys to adjust desired values.
Link Status	Specifies the link status of the port.
Physical Link Speed	Displays the technical specifications for the Network Interface Controller.
Chip Type	Displays the technical specifications for the Network Interface Controller.
PCI Device ID	Displays the technical specifications for the Network Interface Controller.
Bus:Device:Function	Displays the technical specifications for the Network Interface Controller.
Permanent MAC Address	Displays the MAC address of the Ethernet controller.
Virtual MAC Address	Displays the virtual MAC address of the Ethernet controller.
Restore Defaults	Resets the adapter to factory defaults.

2-2-15-1 iSCSI Boot Configuration Menu

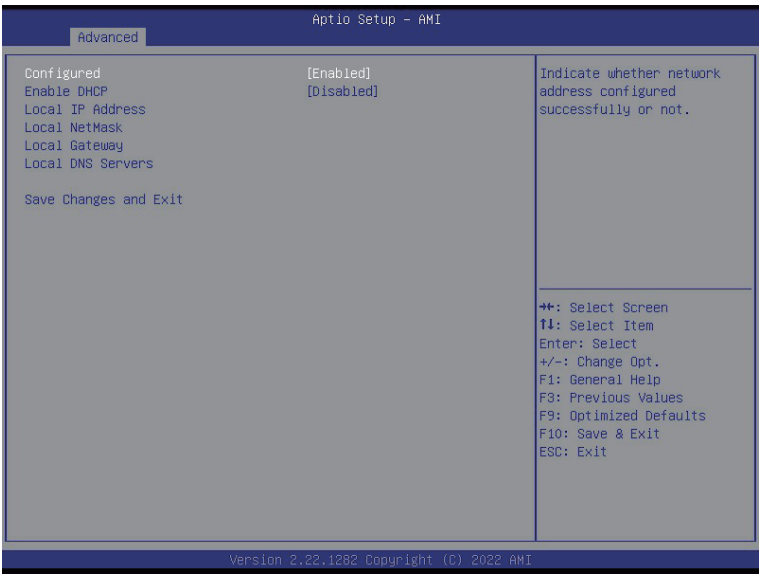


Parameter	Description
iSCSI General Parameters	Press [Enter] to configure advanced items. ◆ TCP/IP Parameters via DHCP – Acquires TCP/IP Parameters via DHCP. – Options available: Enabled, Disabled. Default setting is **Enabled**. ◆ IP Autoconfiguration – Auto-configures the IP configuration. – Options available: Enabled, Disabled. Default setting is **Enabled**. ◆ iSCSI Parameters via DHCP – Acquires iSCSI Parameters via DHCP. – Options available: Enabled, Disabled. Default setting is **Disabled**. ◆ CHAP Authentication – Enable/Disable the CHAP authentication. – Options available: Enabled, Disabled. Default setting is **Disabled**. ◆ Boot to iSCSI Target – Enable/Disable booting to iSCSI target after log-on. – Options available: Enabled, Disabled, One Time Disabled. Default setting is **Enabled**. ◆ DHCP Vendor ID – Configures the DHCP vendor ID (up to 32 characters long). ◆ Link Up Delay Time – Configures the link up delay time in seconds (0-225).

Parameter	Description
iSCSI General Parameters (continued)	◆ Use TCP Timestamp – Enable/Disable the TCP timestamp. – Options available: Enabled, Disabled. Default setting is **Disabled**. ◆ Target as First HDD – Enable/Disable target appears as first hard disk drive (HDD) in the system. – Options available: Enabled, Disabled. Default setting is **Disabled**. ◆ LUN Busy Retry Count – Configures the number of retries in 2 second intervals when LUN is busy (0-60). – Default setting is **0**. ◆ IP Version – Displays the IP version supported. Modifying this parameter will reset all IP-related fields. – Options available: IPv4, IPv6. Disabled. Default setting is **IPv4**.
iSCSI Initiator Parameters	Press [Enter] to configure advanced items. ◆ IP Address – Configures the initiator IP address. ◆ Subnet Mask – Configures the IP subnet mask. ◆ Default Gateway – Configures the default gateway IP address. ◆ Primary DNS – Configures the primary DNS IP address. ◆ Secondary DNS – Configures the secondary DNS IP address. ◆ iSCSI Name – Configures the iSCSI name. ◆ CHAP ID – Configures the Challenge-Handshake Authentication Protocol (CHAP) ID (up to 128 characters in length). ◆ CHAP Secret – Configure the Challenge-Handshake Authentication Protocol (CHAP) Secret (12 to 16 characters in length).
iSCSI First/Second Target Parameters	Press [Enter] to configure advanced items. ◆ Connect – Enable/Disable the target establishment. – Options available: Enabled, Disabled. Default setting is **Disabled**. ◆ IP Address – Configures the Target IP address. ◆ TCP Port – Configures the Target TCP port number (1-65535).

Parameter	Description
iSCSI First/Second Target Parameters (continued)	◆ Boot LUN – Configures the Target boot LUN number (0-255). ◆ iSCSI Name – Configures the iSCSI name. ◆ CHAP ID – Configures the Challenge-Handshake Authentication Protocol (CHAP) ID (up to 128 characters in length). ◆ CHAP Secret – Configure the Challenge-Handshake Authentication Protocol (CHAP) Secret (12 to 16 characters in length).
Secondary Device	Press [Enter] to configure advanced items. ◆ Secondary Device – Inputs the secondary device MAC address. ◆ Use Independent Target Portal – Use Independent target portal when multipath I/O is enabled. – Options available: Enabled, Disabled. Default setting is **Disabled**. ◆ Use Independent Target Name – Use Independent target name when multipath I/O is enabled. – Options available: Enabled, Disabled. Default setting is **Disabled**.

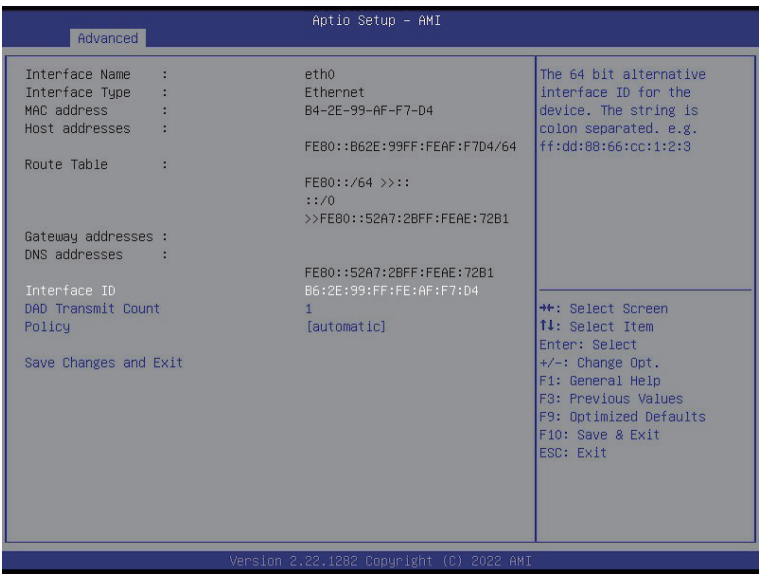
2-2-16 MAC IPv4 Network Configuration



Parameter	Description
Configured	Indicates whether network address is configured successfully or not. Options available: Enabled, Disabled. Default setting is **Disabled.**
Enable DHCP(Note)	Options available: Enabled, Disabled. Default setting is **Enabled.**
Local IP Address(Note)	Press [Enter] to configure local IP address.
Local NetMask(Note)	Press [Enter] to configure local NetMask.
Local Gateway(Note)	Press [Enter] to configure local Gateway
Local DNS Servers(Note)	Press [Enter] to configure local DNS servers
Save Changes and Exit	Press [Enter] to save all configurations.

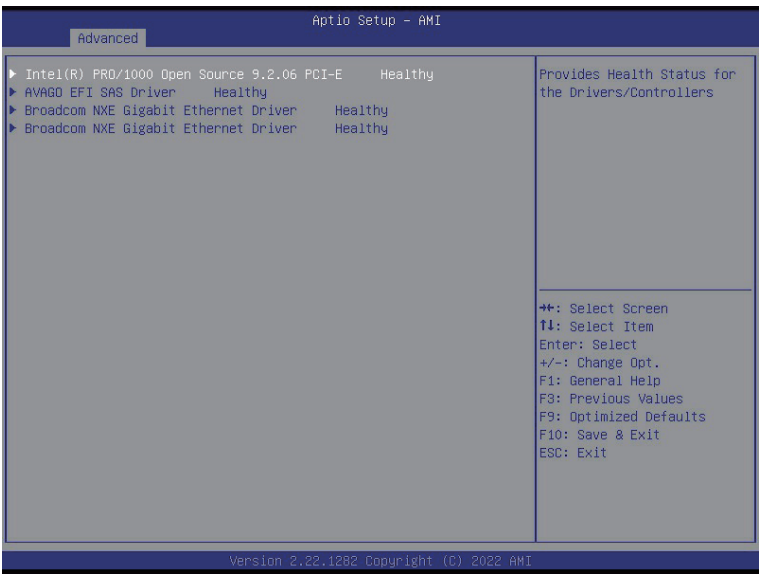
(Note) This item appears when **Configured** is set to **Enabled**.

2-2-17 MAC IPv6 Network Configuration



Parameter	Description
Enter Configuration Menu	Press [Enter] to configure advanced items. ◆ Displays the MAC Address information. ◆ Interface ID – The 64 bit alternative interface ID for the device. The string is colon separated. e.g. ff:dd:88:66:cc:1:2:3. ◆ DAD Transmit Count – The number of consecutive Neighbor solicitation messages sent while performing Duplicate Address Detection on a tentative address. A value of zero indicates that Duplicate Address Detection is not performed. ◆ Policy – Options available: automatic, manual. Default setting is **automatic**. ◆ Save Changes and Exit – Press [Enter] to save all configurations.

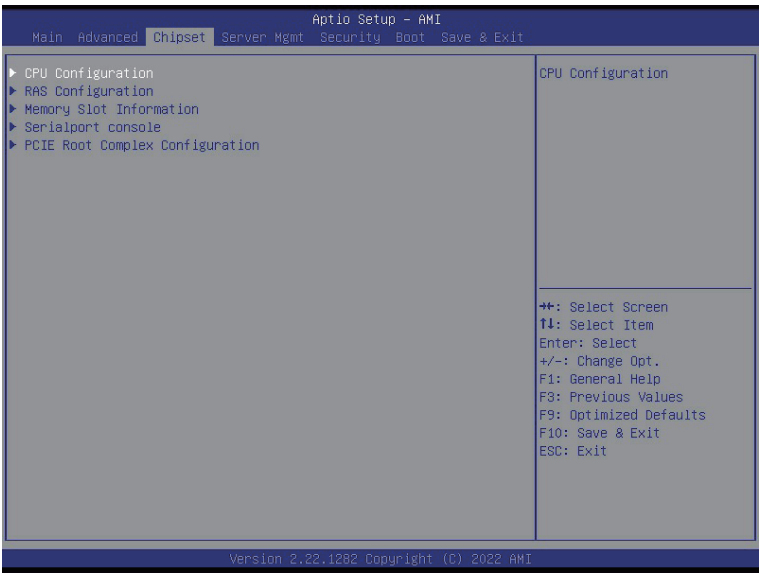
2-2-18 Driver Health



Parameter	Description
Driver Health	Displays health status of the drivers/controllers if installed.

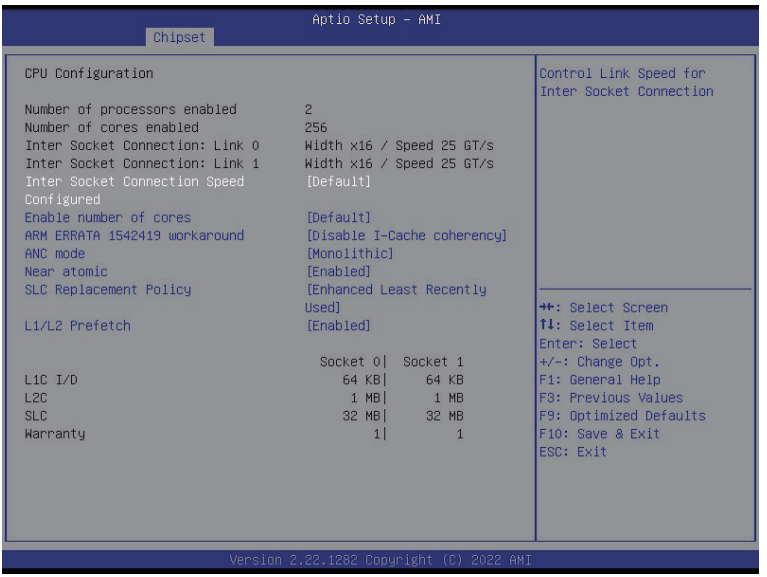
2-3 Chipset Setup Menu

Chipset Setup menu displays submenu options for configuring the function of North Bridge. Select a submenu item, then press <Enter> to access the related submenu screen.



Parameter	Description
CPU Configuration	Press [Enter] for configuration of advanced items.
RAS Configuration	Press [Enter] for configuration of advanced items.
Memory Slot Information	Press [Enter] for configuration of advanced items.
Serialport console	Press [Enter] for configuration of advanced items.
PCIE Root Complex Configuration	Press [Enter] for configuration of advanced items.

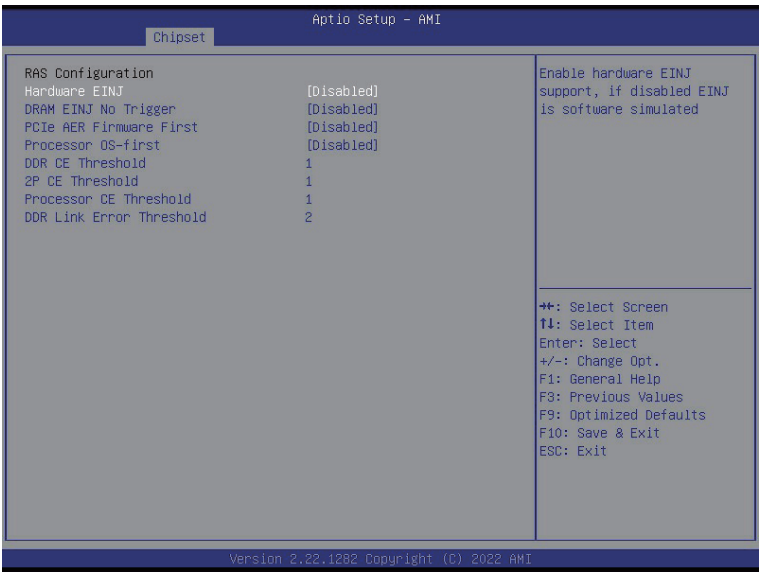
2-3-1 CPU Configuration



Parameter	Description
CPU Configuration	
Number of processors/cores enabled	Displays the number of installed processor information.
Inter Socket Connection: Link0/1	Displays the Inter socket connection information.
Inter Socket Connection Speed Configured	Controls Link speed for Inter socket connection. Options available: Default, 16GT/s, 20GT/s, 25GT/s. Default setting is **Default.**
Enable number of cores	Enable number of cores for the system. Default setting is **Default**.
ARM ERRATA 1542419 workaround	Options available: Disable I-Cache coherency, Software solution, Disable. Default setting is **Disable I-Cache coherency.**
ANC mode	Options available: Monolithic, Hemisphere, Quadrant. Default setting is **Monolithic.**
Near atomic	Enable/Disable cacheable atomic instruction executed near in CPU. Options available: Enabled, Disabled. Default setting is **Enabled.**
SLC Replacement Policy	Options available: Enhanced Least Recently Used, Linear-Feedback Shift Register. Default setting is **Enhanced Least Recently Used.**

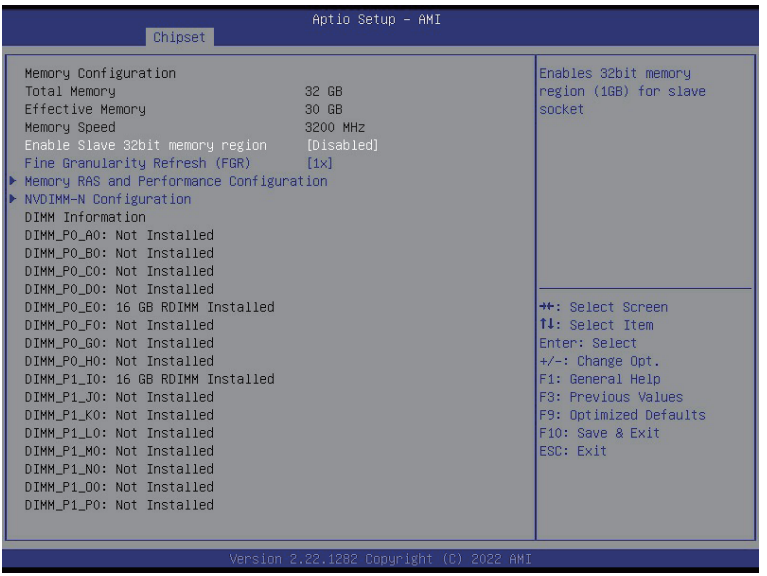
Parameter	Description
L1/L2 Prefetch	Enable/Disable L1/L2 Prefetch for each core. Options available: Enabled, Disabled. Default setting is **Enabled.**
L1C I/D L2C SLC Warrenty	Displays the technical specifications for the installed processor

2-3-2 RAS Configuration



Parameter	Description
RAS Configuration	
Hardware EINJ	Options available: Disabled, Enabled. Default setting is **Disabled.**
DRAM EINJ No Trigger	Options available: Disabled, Enabled. Default setting is **Disabled.**
PCIe AER Firmware First	Options available: Disabled, Enabled. Default setting is **Disabled.**
Processor OS-first	Options available: Disabled, Enabled. Default setting is **Disabled.**
DDR CE Threshold	Press '+" or "-" to configure the threshold.
2P CE Threshold	Press '+" or "-" to configure the threshold.
Processor CE Threshold	Press '+" or "-" to configure the threshold.
DDR Link Error Threshold	Press '+" or "-" to configure the threshold.

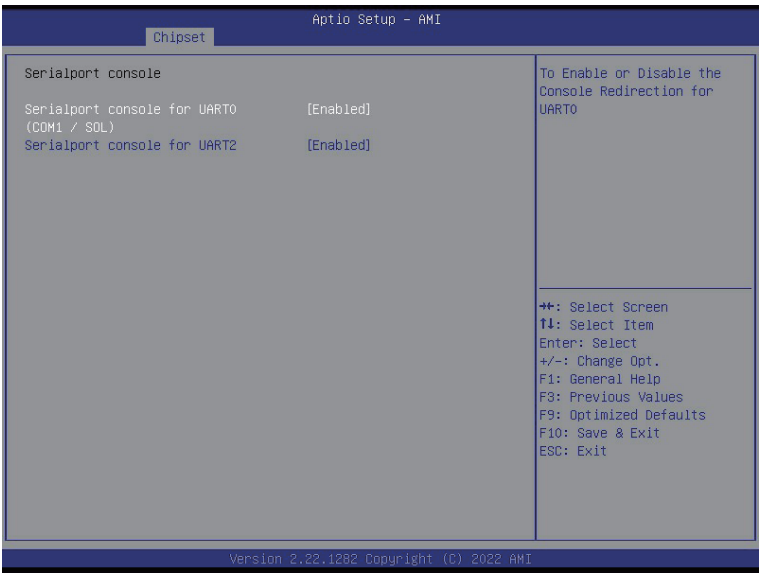
2-3-3 Memory Slot Information



Parameter	Description
Memory Configuration	
Total Memory/ Effective Memory/ Memory Speed	Displays the technical specifications for the installed memory module.
Enable Slave 32bit memory region	Options available: Disabled, Enabled. Default setting is **Disabled.**
Fine Granularity Refresh (FGR)	Options available: 1x, 2x, 4x. Default setting is **1x.**
Memory RAS and Performance Configuration	Press [Enter] to configure advanced items. ◆ ECC mode – Options available: Auto, Disabled, SECDED, Symbol. Default setting is **Auto**. ◆ Defer uncorrectable read errors – Options available: Disabled, Enabled. Default setting is **Enabled**. ◆ Fault handling interrupt – Options available: Disabled, Enabled. Default setting is **Enabled**. ◆ Scrub Patrol duration (hour) – Options available: Disabled, 1,.., 24. Default setting is **24**. ◆ Demand scrub – Options available: Disabled, Enabled. Default setting is **Enabled**.

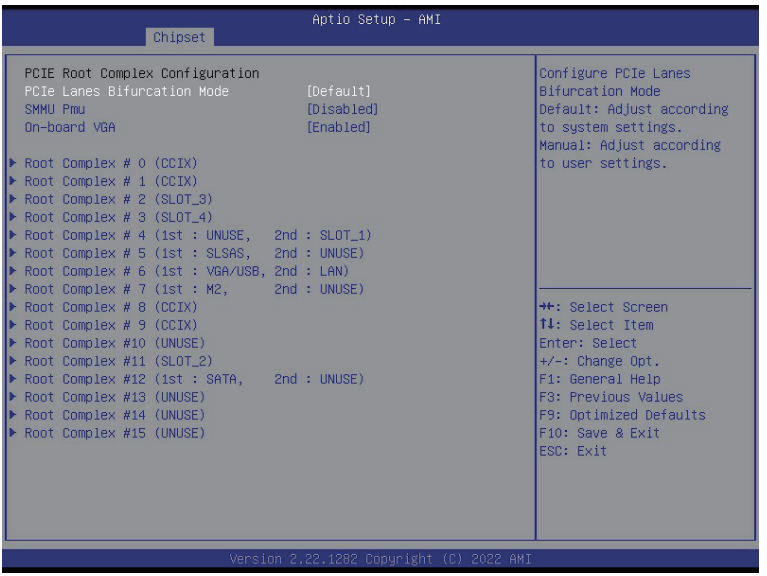
Parameter	Description
Memory RAS and Performance Configuration (continued)	◆ Write CRC – Options available: Disabled, Enabled. Default setting is **Disabled**. ◆ CVE-2020-10255 mitigation – Options available: Disabled, Enabled. Default setting is **Disabled**.
NVDIMM-N Configuration	Press [Enter] to configure advanced items. ◆ Socket0/1 Configured Mode ◆ Mode Selection – Options available: Non-NVDIMM, Non-Hashed, Hashed, Auto. Default setting is **Auto**.

2-3-4 Serialport console



Parameter	Description
Serialport console	
Serialport console for UART0 (COM1/SOL)	Options available: Disabled, Enabled. Default setting is **Enabled.**
Serialport console for UART2	Options available: Disabled, Enabled. Default setting is **Enabled.**

2-3-5 PCIE Root Complex Configuration



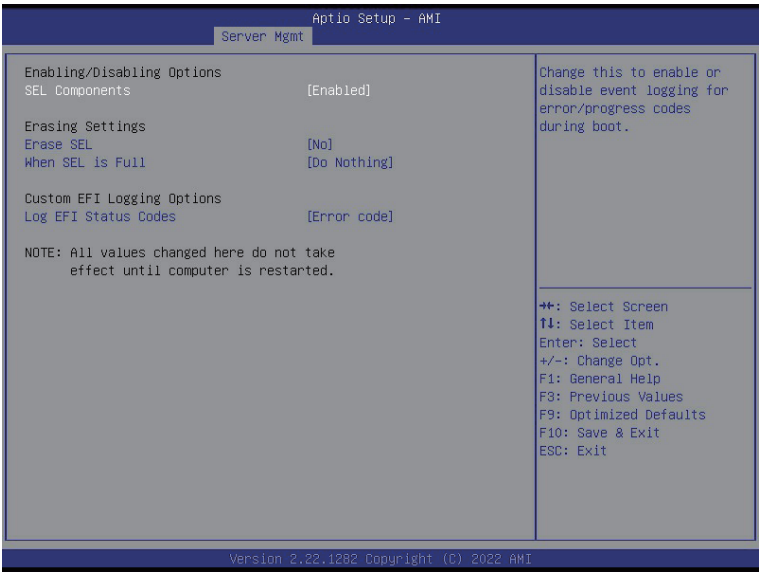
Parameter	Description
PCIE Root Complex Configuration	
PCIe Lanes Bifurcation Mode	Options available: Manual, Default. Default setting is **Default.**
SMMU Pmu	Options available: Disabled, Enabled. Default setting is **Disabled.**
On-board VGA	Options available: Disabled, Enabled. Default setting is **Enabled.**
Root Complex #(Note)	Press [Enter] to view advanced items.

(Note) This item is configurable when **PCIe Lanes Bifurcation Mode** is set to **Manual**.

2-4 Server Management Menu

Parameter	Description
BMC Self Test Status/ BMC Device ID/ BMC Device Revision/ BMC Firmware Revision/ IPMI Version/ BMC Interface(s)	Displays the technical specification of the BMC controller.
BMC Support	Options available: Enabled, Disabled. Default setting is **Enabled**.
System Event Log	Press [Enter] to configure advanced items.
Bmc self test log	Press [Enter] to configure advanced items.
View FRU Information	Press [Enter] to view the FRU information.
BMC network configuration	Press [Enter] to configure advanced items.

2-4-1 System Event Log



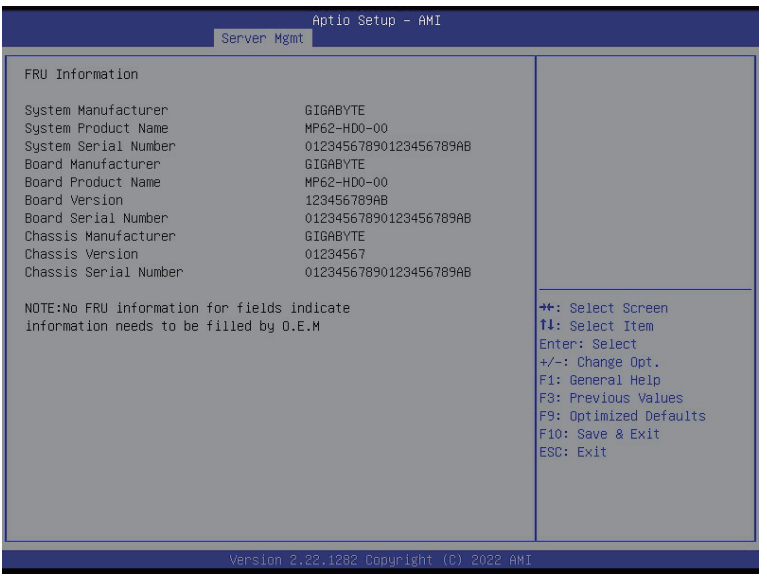
Parameter	Description
Enabling / Disabling Options	
SEL Components	Change this item to enable or disable all features of System Event Logging during boot. Options available: Enabled, Disabled. Default setting is **Enabled**.
Erasing Settings	
Erase SEL	Choose options for erasing SEL. Options available: No/Yes, On next reset/Yes, On every reset. Default setting is **No**.
When SEL is Full	Choose options for reactions to a full SEL. Options available: Do Nothing, Erase Immediately, Delete Oldest Record. Default setting is **Do Nothing**.
Custom EFI Logging Options	
Log EFI Status Codes	Enable/Disable the logging of EFI Status Codes (if not already converted to legacy). Options available: Disabled, Both, Error code, Progress code. Default setting is **Error code**.

2-4-2 Bmc self test log

Parameter	Description
Log area usage = 00 out of 20 logs	
Erase Log	Options available: Yes, On every reset/ No. Default setting is **No**.
When log is full	Options available: Clear Log, Do not log any more. Default setting is **Do not log any more**.

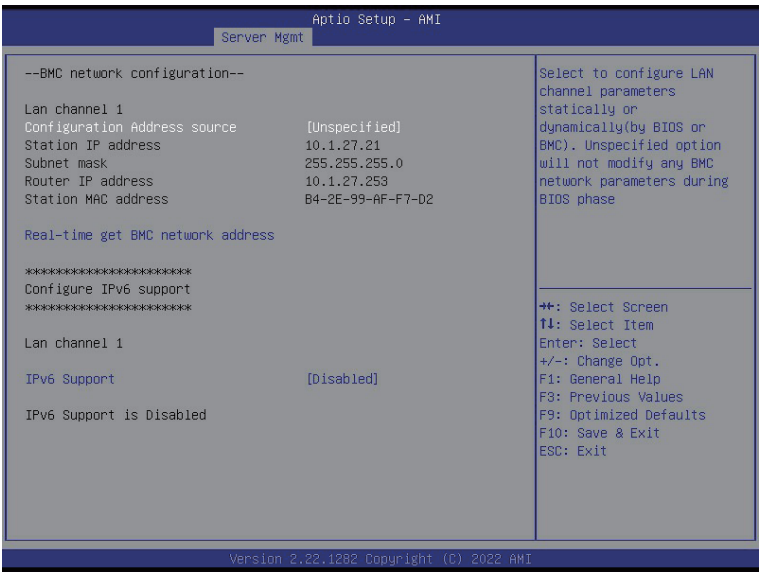
2-4-3 View FRU Information

The FRU page is a simple display page for basic system ID information, as well as System product information. Items on this window are non-configurable.



(Note) The model name will vary depends on the product you purchased

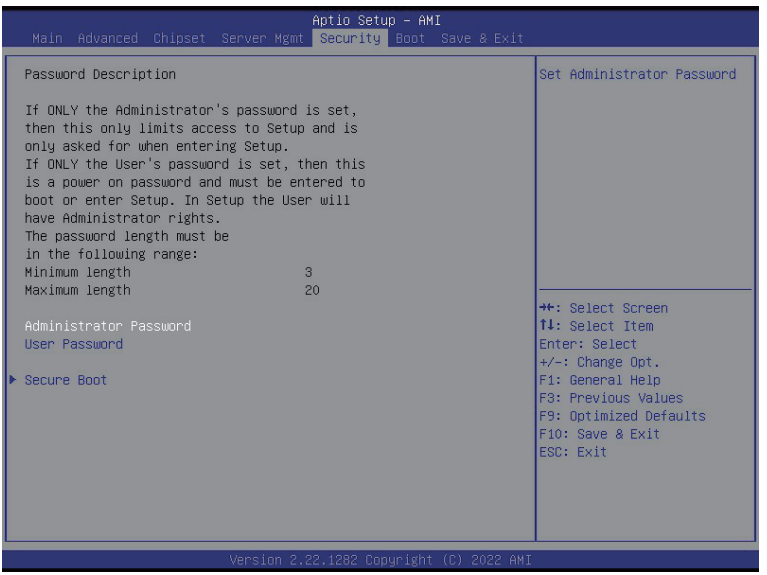
2-4-4 BMC Network Configuration



Parameter	Description
BMC network configuration	
Lan Channel 1	
Configuration Address source	Selects to configure LAN channel parameters statically or dynamically (DHCP). Do nothing option will not modify any BMC network parameters during BIOS phase. Options available: Unspecified, Static, DynamicBmcDhcp. Default setting is **DynamicBmcDhcp**.
Station IP address	Displays IP Address information.
Subnet mask	Displays Subnet Mask information. Please note that the IP address must be in three digitals, for example, 192.168.000.001.
Router IP address	Displays the Router IP Address information.
Station MAC address	Displays the MAC Address information.
Real-time synchronize BMC network parameter values	Press [Enter] will set Address source(Static/DHCP) to BMC and then get Station IP address, Subnet mask and Router IP address from BMC.
IPv6 Support	Options available: Enabled, Disabled. Default setting is **Disabled**.

2-5 Security Menu

The Security menu allows you to safeguard and protect the system from unauthorized use by setting up access passwords.



There are two types of passwords that you can set:

- Administrator Password

  Entering this password will allow the user to access and change all settings in the Setup Utility.

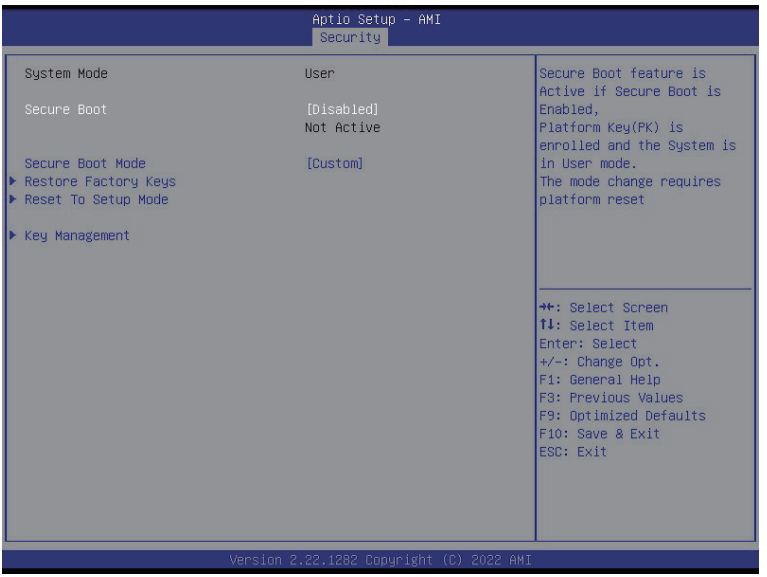
- User Password

  Entering this password will restrict a user's access to the Setup menus. To enable or disable this field, a Administrator Password must first be set. A user can only access and modify the System Time, System Date, and Set User Password fields.

Parameter	Description
Administrator Password	Press [Enter] to configure the administrator password.
User Password	Press [Enter] to configure the user password.
Secure Boot	Press [Enter] to configure advanced items.

2-5-1 Secure Boot

The Secure Boot submenu is applicable when your device is installed the Windows® 8 (or above) operating system.



Parameter	Description
System Mode	Displays if the system is in User mode or Setup mode.
Secure Boot	Enable/ Disable the Secure Boot function. Options available: Enabled, Disabled. Default setting is **Disabled**.
Secure Boot Mode(Note)	Secure Boot requires all the applications that are running during the booting process to be pre-signed with valid digital certificates. This way, the system knows all files being loaded before Windows loads to the login screen have not been tampered with. When set to Standard, it will automatically load the Secure Boot keys form the BIOS databases. When set to Custom, you can customize the Secure Boot settings and manually load its keys from the BIOS database. Options available: Standard, Custom. Default setting is **Custom**.
Restore Factory Keys	Forces the system to user mode and installs factory default Secure Boot key database.
Reset To Setup Mode	Press [Enter] to reset the system mode to Setup mode.

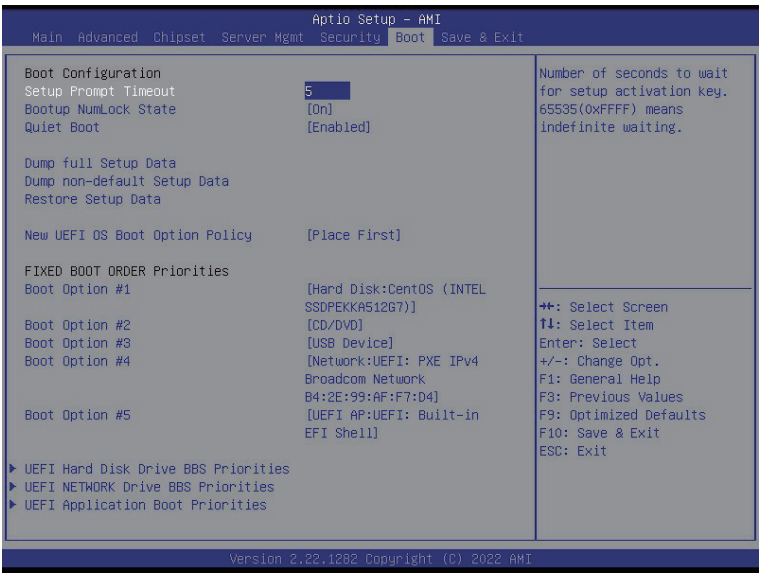
(Note) Advanced items prompt when this item is set to **Custom**.

Parameter	Description
Key Management	Press [Enter] to configure advanced items. **Please note that this item is configurable when Secure Boot Mode is set to Custom.** ◆ Factory Key Provision – Allows to provision factory default Secure Boot keys when system is in Setup Mode. – Options available: Enabled, Disabled. Default setting is Disabled. ◆ Restore Factory Keys – Installs all factory default keys. It will force the system in User Mode. – Options available: Yes, No. ◆ Reset to Setup Mode – Reset the system mode to Setup mode. ◆ Export Secure Boot variables – Export all Secure Boot Keys and key variables. ◆ Enroll Efi Image – Press [Enter] to enroll SHA256 hash of the binary into Authorized Signature Database (db). ◆ Restore DB defaults – Restore DB variable to factory defaults. ◆ Secure Boot variable – Displays the current status of the variables used for secure boot. ◆ Platform Key (PK) – Displays the current status of the Platform Key (PK). – Press [Enter] to configure a new PK. – Options available: Update. ◆ Key Exchange Keys (KEK) – Displays the current status of the Key Exchange Key Database (KEK). – Press [Enter] to configure a new KEK or load additional KEK from storage devices. – Options available: Update, Append. ◆ Authorized Signatures (DB) – Displays the current status of the Authorized Signature Database. – Press [Enter] to configure a new DB or load additional DB from storage devices. – Options available: Update, Append. ◆ Forbidden Signatures (DBX) – Displays the current status of the Forbidden Signature Database. – Press [Enter] to configure a new dbx or load additional dbx from storage devices. – Options available: Update, Append. ◆ Authorized TimeStamps (DBT) – Displays the current status of the Authorized TimeStamps Database. – Press [Enter] to configure a new DBT or load additional DBT from storage devices. – Options available: Update, Append.

Parameter	Description
Key Management (continued)	◆ OsRecovery Signatures – Displays the current status of the OsRecovery Signature Database. – Press [Enter] to configure a new OsRecovery Signature or load additional OsRecovery Signature from storage devices. – Options available: Update, Append.

2-6 Boot Menu

The Boot menu allows you to set the drive priority during system boot-up. BIOS setup will display an error message if the legacy drive(s) specified is not bootable.

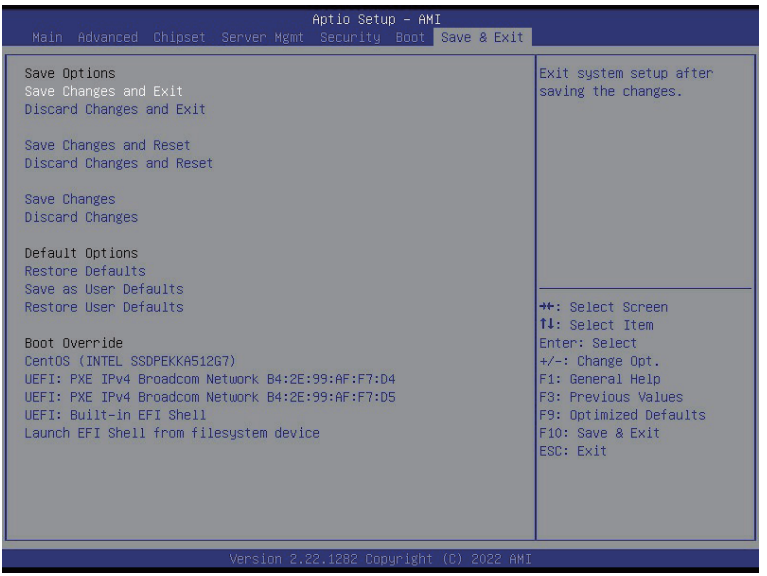


Parameter	Description
Boot Configuration	
Setup Prompt Timeout	Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting. Press the numeric keys to input the desired values.
Bootup NumLock State	Enable/Disable the Bootup NumLock function. Options available: On, Off. Default setting is **On**.
Quiet Boot	Enable/Disable showing the logo during POST. Options available: Enabled, Disabled. Default setting is **Enabled**.
Dump full Setup Data	Press [Enter] to dump full setup data to file.
Dump non-default Setup Data	Press [Enter] to dump non-default setup data to file.
Restore Setup Data	Press [Enter] to restore setup data from file (cJson format).
New UEFI OS Boot Option Policy	Controls the placement of newly detected UEFI boot options. Options available: Default, Place First, Place Last. Default setting is **Place First**.

Parameter	Description
FIXED BOOT ORDER Priorities	
Boot Option #1 / #2 / #3 / #4 / #5	Press [Enter] to configure the boot priority. By default, the server searches for boot devices in the following sequence: 1. Hard drive. 2. CD-COM/DVD drive. 3. USB device. 4. Network. 5. UEFI.
UEFI Network Drive BBS Priorities	Press [Enter] to configure the boot priority.
UEFI Application Boot Priorities	Press [Enter] to configure the boot priority.

2-7 Save & Exit Menu

The Save & Exit menu displays the various options to quit from the BIOS setup. Highlight any of the exit options then press <Enter>.



Parameter	Description
Save Options	
Save Changes and Exit	Saves changes made and closes the BIOS setup. Options available: Yes, No.
Discard Changes and Exit	Discards changes made and exits the BIOS setup. Options available: Yes, No.
Save Changes and Reset	Restarts the system after saving the changes made. Options available: Yes, No.
Discard Changes and Reset	Restarts the system without saving the changes made. Options available: Yes, No.
Save Changes	Saves changes done so far to any of the setup options. Options available: Yes, No.
Default Options	
Restore Defaults	Loads the default settings for all BIOS setup parameters. Setup Defaults are quite demanding in terms of resources consumption. If you are using low-speed memory chips or other kinds of low-performance components and you choose to load these settings, the system might not function properly. Options available: Yes, No.

Parameter	Description
Save as User Defaults	Press [Enter] to save changes as the user defaults without exit BIOS setup.
Restore User Defaults	Press [Enter] to restore the user defaults .
Boot Override	Press [Enter] to configure the device as the boot-up drive.
Launch EFI Shell from filesystem device	Attempts to Launch EFI Shell application (Shell.efi) from one of the available file system devices.

2-8 BIOS POST Beep code (AMI standard)

2-8-1 PEI Beep Codes

# of Beeps	Description
1	Memory not Installed.
1	Memory was installed twice (InstallPeiMemory routine in PEI Core called twice)
2	Recovery started
3	DXEIPL was not found
3	DXE Core Firmware Volume was not found
4	Recovery failed
4	S3 Resume failed
7	Reset PPI is not available

2-8-2 DXE Beep Codes

# of Beeps	Description
1	Invalid password
4	Some of the Architectural Protocols are not available
5	No Console Output Devices are found
5	No Console Input Devices are found
6	Flash update is failed
7	Reset protocol is not available
8	Platform PCI resource requirements cannot be met