an Acer Group Company

BrainSphere R880 F7

HPC/AI Server - Intel® Xeon® 6 Processors - 8U DP NVIDIA HGX™ B200

User Manual

Rev. 1.0

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Disclaimer

Documentation Classifications

In order to assist in the use of this product, Altos Computing 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 https://www.altoscomputing.com/en-US/products/subject/server/1#server

For further technical assistance, please contact your ALTOS COMPUTING representative or visit https://www.altoscomputing.com/en-US/contact

For any general sales or marketing enquiries, please contact your ALTOS COMPUTING representative or visit https://www.altoscomputing.com/en-US/contact

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.

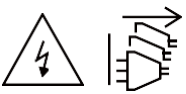
Server Warnings and Cautions

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.



- Shock Hazard! Disconnect all power supply cords before servicing.
- Do not route the power cord where it can be walked on or pinched by items placed against it. Pay particular attention to the plug, electrical outlet, and the point where the cord extends from the server.

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 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.

WARNING!

The equipment should only be repaired, maintained or replaced by skilled personnel.

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.

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.

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 discon-nect 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 sensi-tive 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 fin-gertips 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.

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

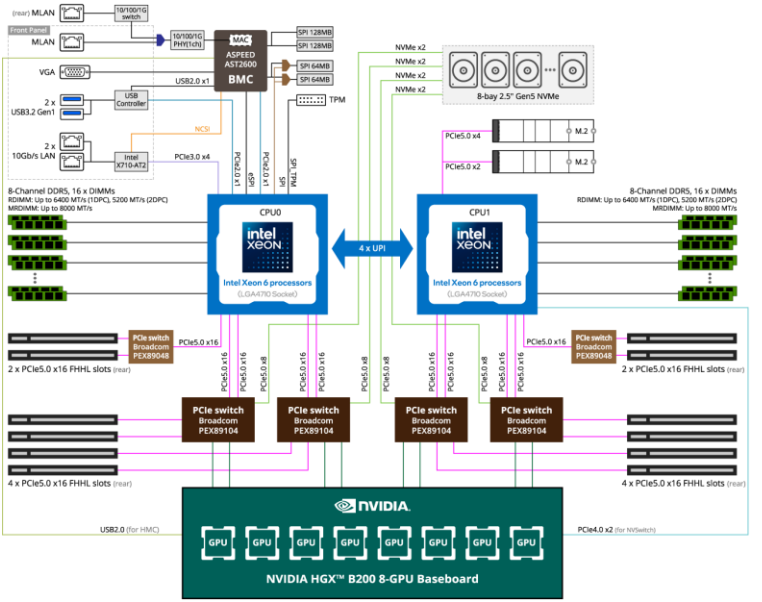
NOTE:
We reserve the right to make any changes to the product specifications and product-related information without prior notice.

System Dimension	◆ 8U ◆ 447 x 351 x 923 (W x H x D, mm)
CPU	◆ Intel® Xeon® 6 Processors - Intel® Xeon® 6700-Series Processors - Intel® Xeon® 6500-Series Processors ◆ Dual processor, TDP up to 350W [Note] If only 1 CPU is installed, some PCIe or memory functions might be unavailable.
Socket	◆ 2 x LGA 4710 ◆ Socket E2
Chipset	◆ System on Chip
Security	◆ UEFI Secure Boot ◆ Silicon root of trust (Option) ◆ SNMP Support: V3
Memory	◆ 32 x DIMM slots ◆ DDR5 memory supported ◆ 8-Channel memory per processor ◆ MRDIMM supported [1] ◆ RDIMM: Up to 6400 MT/s (1DPC), 5200 MT/s (2DPC) ◆ MRDIMM: Up to 8000 MT/s [1] MRDIMMs are only supported with Intel® Xeon® 6 Processors with P-cores and in a 1DPC configuration.
LAN	**Front (I/O board - CFPG440):** ◆ 2 x 10Gb/s LAN (1 x Intel® X710-AT2) - Support NCSI function ◆ 1 x 10/100/1000 Mbps Management LAN **Rear (MLAN board - CDB66):** ◆ 1 x 10/100/1000 Mbps Management LAN [Note] When both MLAN ports are connected with cables, the front MLAN port will be set as the default.
Video	◆ Integrated in Aspeed® AST2600 - 1 x VGA port

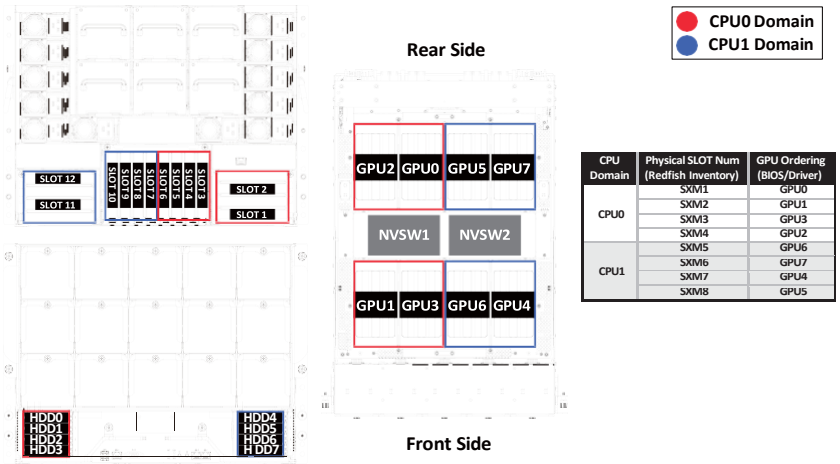
Storage	**Front hot-swap:** ◆ 8 x 2.5" Gen5 NVMe - (NVMe from PEX89104) **Internal M.2:** ◆ 1 x M.2 (2280/22110), PCIe Gen5 x4, from CPU_1 ◆ 1 x M.2 (2280/22110), PCIe Gen5 x2, from CPU_1
SAS	◆ N/A
RAID	◆ N/A
Modular GPU	◆ NVIDIA HGX™ B200 with 8 x SXM GPUs
Expansion Slot	◆ **PCIe Bridge Board - CBG76:** - 8 x FHHL x16 (Gen5 x16), from PEX89104 ◆ **PCIe Bridge Board - CPBG045 x 2:** - 4 x FHHL x16 (Gen5 x16), from PEX89048
Front I/O	**I/O board - CFPG440:** ◆ 2 x USB 3.2 Gen1 ports (Type-A) ◆ 1 x VGA port ◆ 2 x RJ45 ports ◆ 1 x MLAN port (default) ◆ 1 x Power button with LED ◆ 1 x ID button with LED ◆ 1 x NMI button ◆ 1 x Reset button ◆ 1 x Storage activity LED ◆ 1 x System status LED
Rear I/O	**MLAN board - CDB66:** ◆ 1 x MLAN port
Backplane Board	◆ Speed and bandwidth: PCIe Gen5 x4
Security Modules	◆ 1 x TPM header with SPI interface - **Optional** TPM2.0 kit: CTM012
Power Supply	◆ 6+6 3000W 80 PLUS Titanium redundant power supplies [1] [1] The system power supply requires C19 power cord. [Note] ALTOS COMPUTING offers PSUs with various efficiency ratings and power outputs. Full redundancy may depend on your server configuration, and alternative PSU options may be needed. Please contact our sales representatives for the best power solution. [Note] Please refer to ALTOS COMPUTING Website for detail power supply specification.

System Management	Aspeed® AST2600 Baseboard Management Controller ALTOS COMPUTING Management Console 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 ◆ Advanced power capping ◆ 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 30°C ◆ Operating humidity: 8% to 80% (non-condensing) ◆ Non-operating temperature: -40°C to 60°C ◆ Non-operating humidity: 20% to 95% (non-condensing)

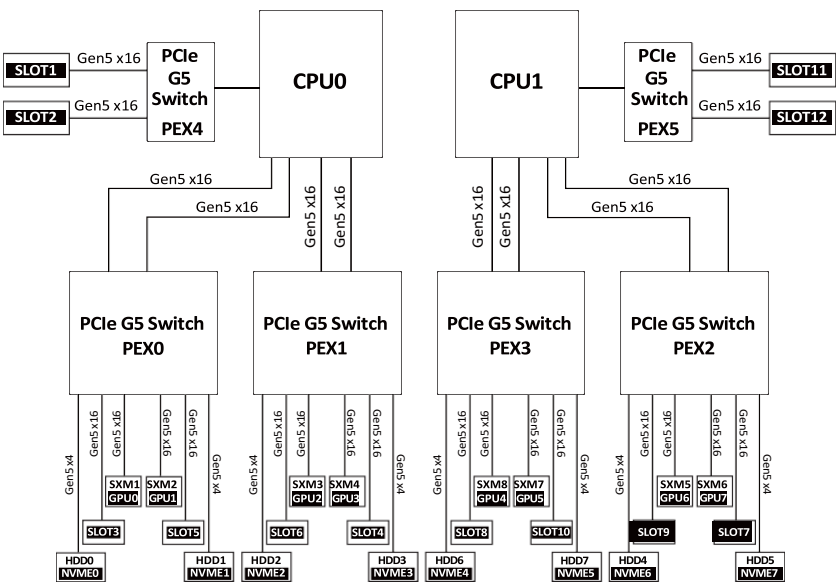
1-3 System Block Diagram



1-4 PCIe Block Diagram

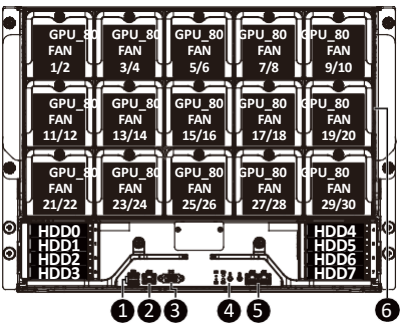


CPU Domain	Physical SLOT Num (Redfish Inventory)	GPU Ordering (BIOS/Driver)
CPU0	SXM1	GPU0
	SXM2	GPU1
	SXM3	GPU3
	SXM4	GPU2
CPU1	SXM5	GPU6
	SXM6	GPU7
	SXM7	GPU4
	SXM8	GPU5



Chapter 2 System Appearance

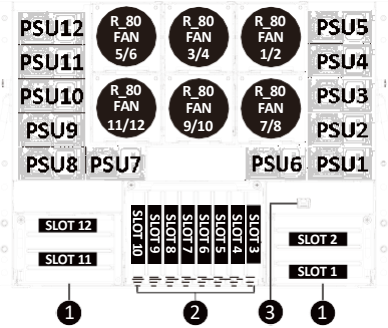
2-1 Front View



No.	Description
1.	USB 3.2 Gen1 Port x 2
2.	Management LAN Port
3.	VGA Port
4.	Front Panel LEDs and Buttons
5.	Data LAN Port x 2
6.	GPU Tray

- Go to the section **2-4 Front Panel Buttons and LEDs** for detail description of function LEDs.

2-2 Rear View

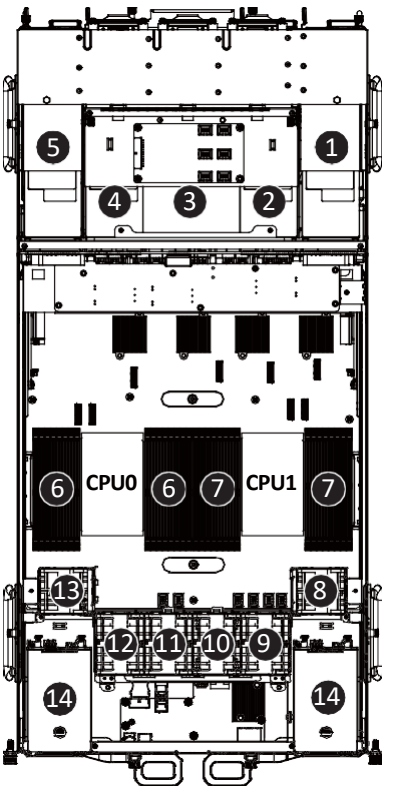


No.	Description
1.	PCIe Card Cage x 2
2.	PCIe Slot x 8
3.	Management LAN Port

NOTE!

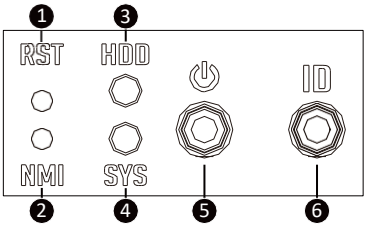
- Only one Management LAN (Front/Rear side) can be used at a time.
- Enabling the Rear-side Management LAN requires additional configuration commands. Please contact customer support for assistance.
- R_80 FAN 1/2 to R_80 FAN 11/12 may be installed depending on the system configuration.

2-3 Top View



No.	Description
1.	Power Supply Unit x 5 (Top)
	PCIe Slot x 2 (Bottom)
	Rear_BP_80_FAN_7/8 (Bottom)
2.	Power Supply Unit x 1
3.	PCIe Slot x 8
	Rear_BP_80_FAN_5/6
	Rear_BP_80_FAN_3/4
4.	Power Supply Unit x 1
5.	Power Supply Unit x 5 (Top)
	PCIe Slot x 2 (Bottom)
	Rear_BP_80_FAN_1/2 (Bottom)
6.	CPU0 DDR5 Memory
7.	CPU1 DDR5 Memory
8.	SYS_60_FAN_11/12
9.	SYS_60_FAN_9/10
10.	SYS_60_FAN_7/8
11.	SYS_60_FAN_5/6
12.	SYS_60_FAN_3/4
13.	SYS_60_FAN_1/2
14.	2.5” Storage Bays

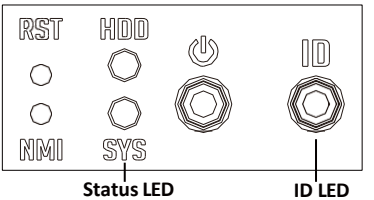
2-4 Front Panel LED and Buttons



No.	Name	Color	Status	Description
1.	Reset Button			Press the button to reset the system.
2.	NMI button			Press the button server generates a NMI to the processor if the multiple-bit ECC errors occur, which effectively halt the server.
3.	HDD Status LED	Green	On	HDD locate
			Blink	HDD access
		Amber	On	HDD fault
		Green/ Amber	Blink	HDD rebuilding
		N/A	Off	No HDD access or no HDD fault.
4.	System Status LED(Note)	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
5.	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)
6.	ID Button(Note)			Press the button to activate system identification

(Note) If your server features RoT function, please see the following section for detail LED behavior.

2-4-1 RoT LEDs



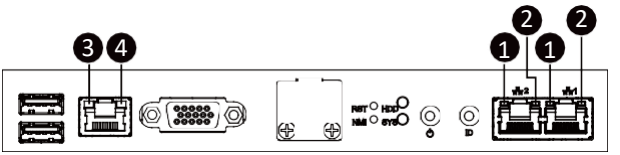
State	LED on Front Panel		LED on PRoT Module
	ID LED	Status LED	Live LED
AST1060 FW Active Authentication fail			
AST1060 : Recovering active region	4Hz	Green and Amber Blink alternately at 4Hz [Green, Amber, Green, Amber, and so on]	4Hz
AST1060 FW Active and Recovery Authentication fail			
Endless attempts to boot from active or recovery.	On	Off	Off
Authenticating BMC/BIOS Images			
Authenticating Images	Off	Off	2Hz
BMC/BIOS Images Authentication Pass			
BMC : Authentication pass **BIOS :** Authentication pass	Off	Off	0.5Hz
State	**LED on Front Panel**		**LED on PRoT Module**

	ID LED	Status LED	Live LED
Recovering BMC/BIOS Images			
BMC : Recovering active region	4Hz	Green Blink at 4Hz	4Hz
BIOS : Recovering active region	4Hz	Amber Blink at 4Hz	4Hz
BMC : Recovering recovery region (If the staging region exists)	4Hz	Green On	4Hz
BIOS : Recovering recovery region (If the staging region exists)	4Hz	Amber On	4Hz
BMC/BIOS Images Active and Recovery region Authentication Fail			
BMC : Active and Recovery authentication fail	On	Green On	2Hz
BIOS : Active and Recovery authentication fail	On	Amber On	2Hz

NOTE!

1. When the BMC/BIOS starts, the LEDs will be controlled by the BMC/BIOS.

2-5 Front Panel System LAN LEDs

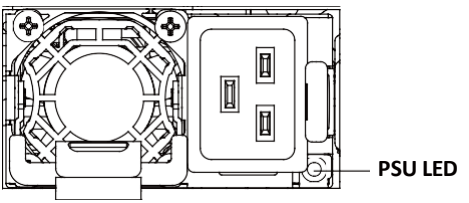


No.	Name	Color	Status	Description
1.	10GbE Speed LED	Green	On	10 Gbps data rate
		Yellow	On	5Gbps, 2.5Gbps, 1Gbps data rate
		N/A	Off	100 Mbps data rate
2.	10GbE Link / Activity LED	Green	On	Link between system and network or no access
			Blink	Data transmission or reception is occurring.
		N/A	Off	No data transmission or reception is occurring.
3.	1GbE Speed LED	Yellow	On	1 Gbps data rate
		Green	On	100 Mbps data rate
		N/A	Off	10 Mbps data rate
4.	1GbE Link / Activity LED	Green	On	Link between system and network or no access
			Blink	Data transmission or reception is occurring.
		N/A	Off	No data transmission or reception is occurring.

2-6 Power Supply Unit (PSU) LED

NOTE!

The power supply may be vary based on the system configuration.



State	Description
OFF	No AC power to all power supplies
1Hz Green Blinking	AC present / only standby on / Cold redundant mode
2Hz Green Blinking	Power supply firmware updating 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
1Hz Amber Blinking	Power supply warning events where the power supply continues to operate: high temp, high power, high current and slow fan

2-7 Hard Disk Drive LEDs

RAID SKU		LED1	Locate	HDD Fault	Rebuilding	HDD Access	HDD Present (No Access)
No RAID configuration (via ICH, 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 by 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.

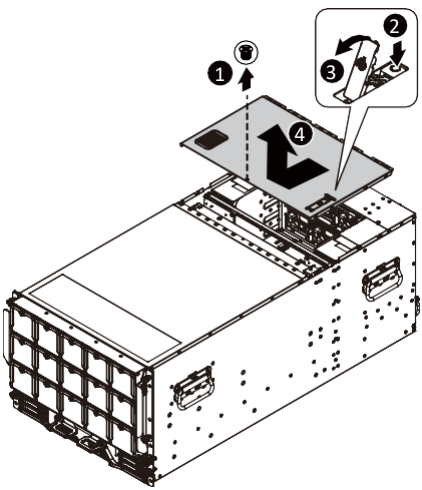
3-1 Removing and Installing the Chassis Top Cover

Before you remove or install the chassis top cover

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

Follow these instructions to remove/install the chassis top cover:

1. Remove the screw securing the chassis cover.
2. Push button to unlock the handle.
3. Pull the grip handle to open the panel cover.
4. Slide the cover towards the front of the system and then remove the cover in the direction indicated by the arrow.
5. Follow steps 1-4 in reverse order to re-install the chassis cover



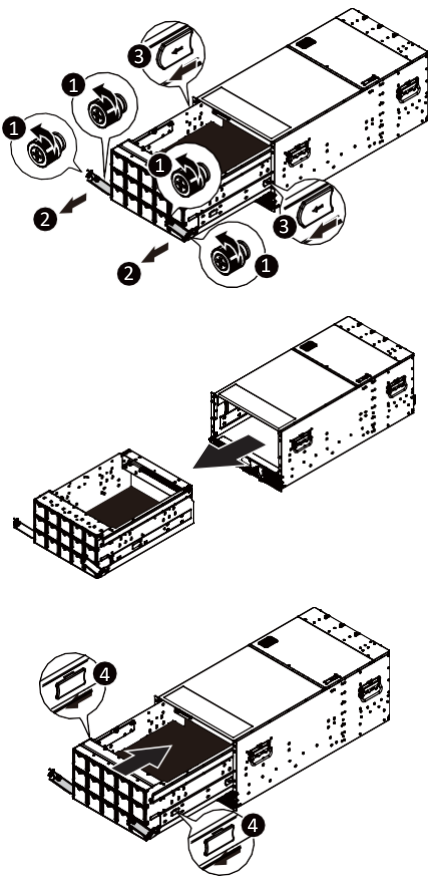
3-2 Removing and Installing the GPU Tray

Before you remove or install the GPU tray:

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

Follow these instructions to remove/install the GPU tray:

1. Loosen the thumbnail screw securing the handles on both sides of the system.
2. Pull the grip handles on both sides of the system slide the tray to the front of the system at the same time to pull out the tray.
3. Slide the white latch on both sides of the tray rail and carefully remove the GPU tray.
4. To reinstall the GPU tray, align it with the rails on both sides and push the blue latches on each side of the tray rail backward to slide it into the system. Then, reverse steps 1-2 to secure the GPU tray in position.



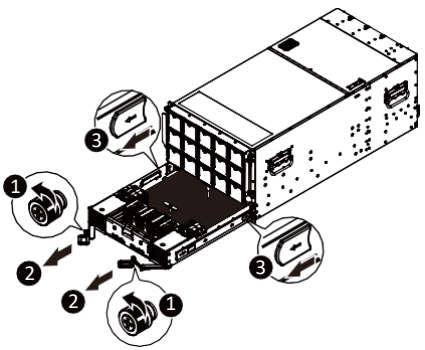
3-3 Removing and Installing the Motherboard Tray

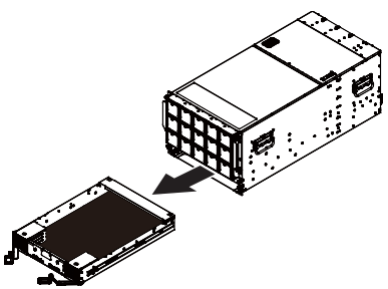
Before you remove or install the Motherboard tray:

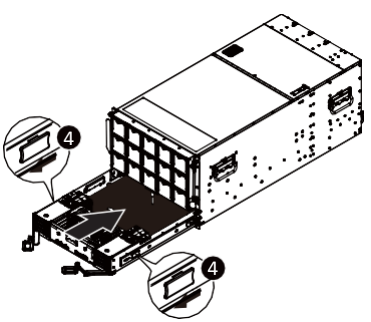
- Make sure the system is not turned on or connected to AC power.

Follow these instructions to remove/install the Motherboard tray:

1. Loosen the thumbnail screw securing the handles on both sides of the system.
2. Pull the grip handles on both sides of the system slide the tray to the front of the system at the same time to pull out the tray.
3. Slide the white latch on both sides of the tray rail and carefully remove the Motherboard tray.
4. To reinstall the Motherboard tray, align it with the rails on both sides and push the blue latches on each side of the tray rail backward to slide it into the system. Then, reverse steps 1-2 to secure the Motherboard tray in position.







3-4 Removing the Heat Sink

Read the following guidelines before you begin to remove/install the heat sink:

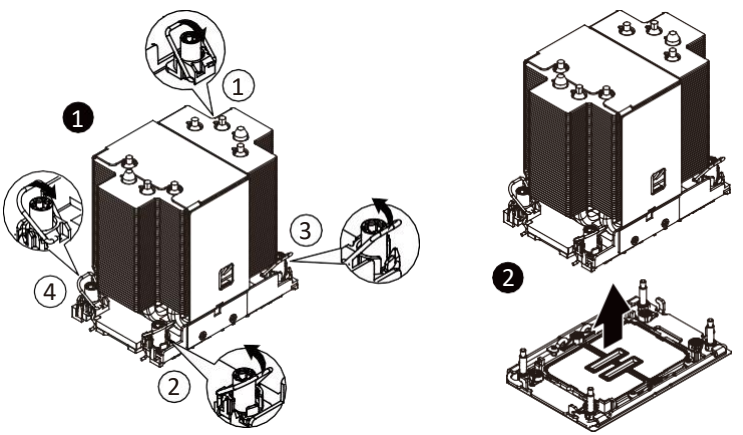
- Always turn off the computer and unplug the power cord from the power outlet before installing the heat sink to prevent hardware damage.
- Unplug all cables from the power outlets.
- Disconnect all telecommunication cables from their ports.
- Place the system unit on a flat and stable surface.
- Open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

WARNING!

Failure to 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/install the heat sink:

1. Loosen the captive screws securing the heat sink in place in reverse order (4→3→2→1). Move the rotating wires into the unlatch position.
2. Lift and remove the heat sink from the system.
3. To reinstall the heat sink reverse steps 1-2 while ensuring that you tighten the captive screws in sequential order (1→2→3→4).



- When installing the heat sink to CPU, use T30-Lobe driver to tighten 4 captive nuts in sequence as 1-4. Please refer to the Heat Sink Label for the screw tightening torque value.
- To ensure the system operates properly, make sure the heat sink is seated on the processor firmly.

3-5 Installing the CPU

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

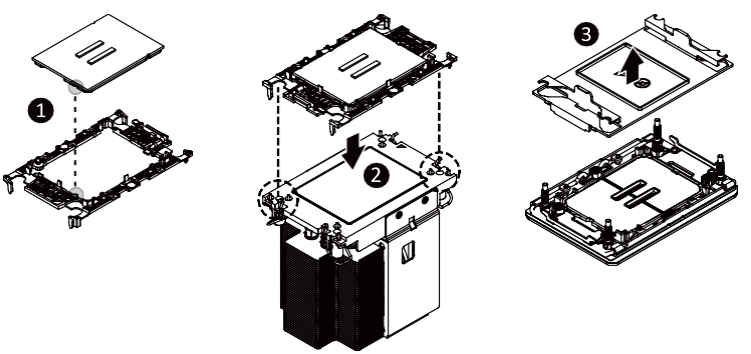
- Make sure that the motherboard supports the CPU.
- Always turn off the computer and unplug the power cord from the power outlet before installing the CPU to prevent hardware damage.
- Unplug all cables from the power outlets.
- Disconnect all telecommunication cables from their ports.
- Place the system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

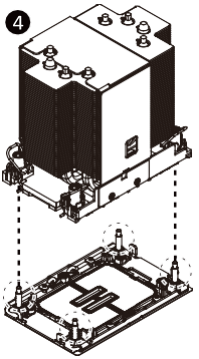
WARNING!

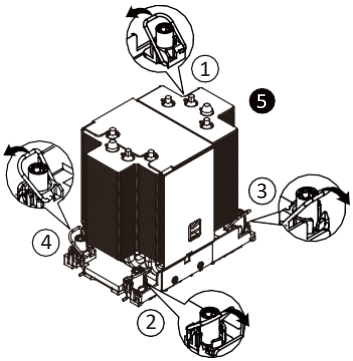
Failure to properly turn off the server before you start installing components may cause serious damage. Do not attempt the procedures described in the following sections unless you are a qualified service technician.

Follow these instructions to Install the CPU:

1. Align and install the processor on the carrier.
   NOTE: Apply thermal compound evenly on the top of the CPU. Remove the protective cover from the underside of the heat sink.
2. Carefully flip the heat sink cover. Then install the carrier assembly on the bottom of the heat sink and make sure the gold arrow is located in the correct direction.
3. Remove the CPU cover.
   NOTE: Save the CPU cover in the event that you need to remove the CPU from the socket.
4. Align the heat sink with the CPU socket by the guide pins and make sure the gold arrow is located in the correct direction. Then place the heat sink onto the top of the CPU socket.
5. Position the rotating wires into the latch position. Tighten the screws in sequential order (1→2→3→4).
   NOTE: When dissembling the heat sink, loosen the screws in reverse order (4→3→2→1) and then move the rotating wires into the unlatch position.







Carrier Types used for Package Types

Package Type	Granite Rapids-SP XCC	Granite Rapids-SP HCC Granite Rapids-SP LCC Sierra Forest-SP Clearwater Forest-SP
Carrier Code	E2A	E2B
Shim?	No	Yes
Integrated TIM Break Lever	Yes	Yes

NOTE!

- The carrier code is marked on each carrier and matches a code laser marked on to the IHS(Integrated Heat Spreader) to ensure the right parts are used together
- When installing the Heat Sink to CPU, use T30-Lobe driver to tighten 4 captive nuts in sequence as 1-4.
- Please refer to the Heat Sink Label for the screw tightening torque value.

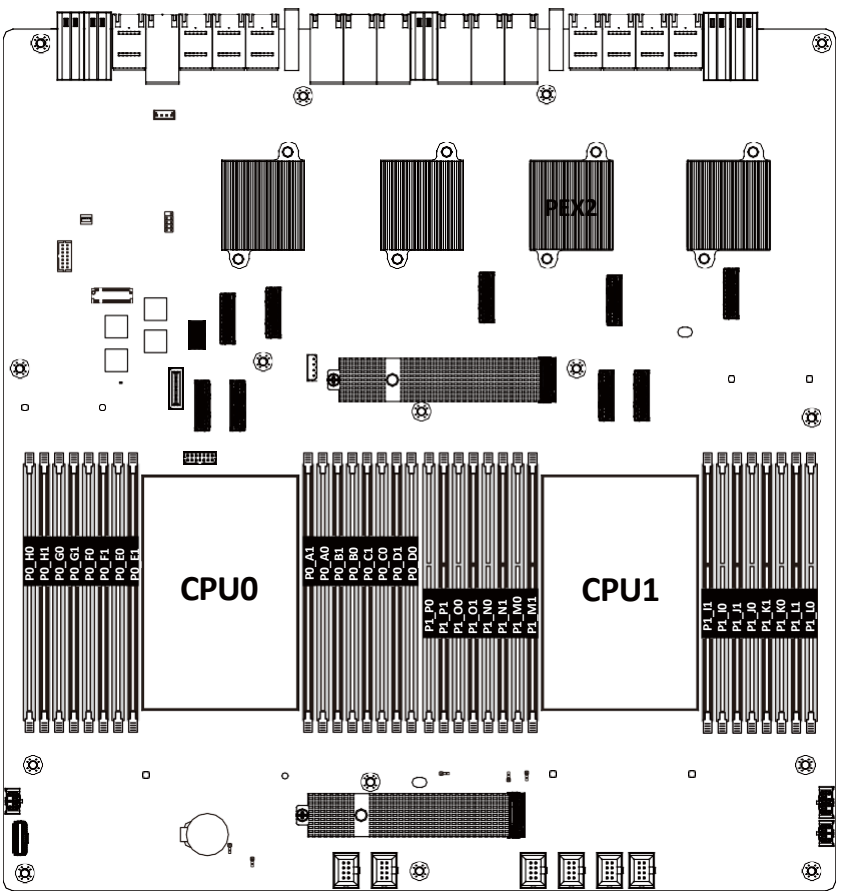
3-6 Installing the Memory

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.

3-6-1 Eight Channel Memory Configuration

This motherboard provides 32 DDR5 memory slots and supports 8-Channel Technology. After the memory is installed, the BIOS will automatically detect the specifications and capacity of the memory.

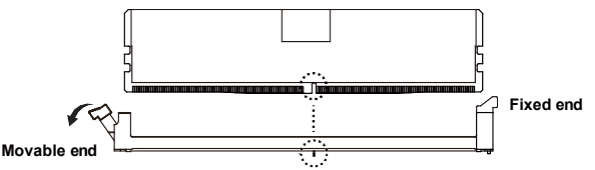


3-6-2 Installing the Memory

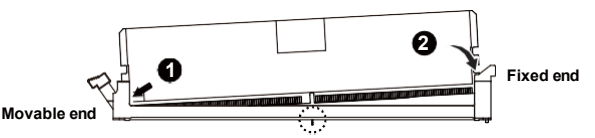
Before installing a memory module, make sure to turn off the computer and unplug the power cord from the power outlet to prevent damage to the memory module.
Be sure to install DDR5 DIMMs on this motherboard.
Make sure your DIMM slots have a single latch or a double latch.

Follow these instructions to install a DIMM module with Single Latch :

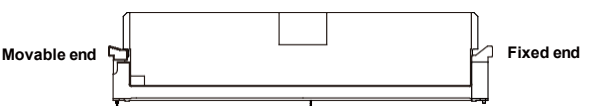
1. Open the plastic latch of the memory slot, then place the memory module as pre-inserted vertically position.



2. Hold it with both hands, insert the memory module into the movable end first, and then insert the memory module into the fixed end.



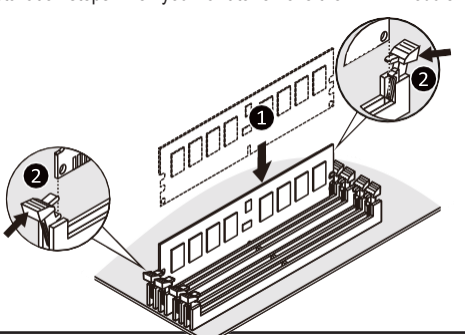
3. Then use both hands to insert the memory module vertically into the DIMM slot and push it down. Close the plastic latch at the edge of the DIMM slots to lock the memory module.



4. Reverse the installation steps when you want to remove the memory module.

Follow these instructions to install a DIMM module with Double Latch:

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.



3-6-3 DIMM Population Table

Intel Xeon 6700E-Series Memory Support

Type	Ranks Per DIMM and Data Width	DIMM Capacity (GB)						Channel Speed (MT/s); Voltage (V); Slots per Channel (SPC) & DIMMs per Channel (DPC)	
		DRAM Density							
		16Gb		24Gb		32Gb		1DPC/2SPC	2DPC/2SPC
		1DPC	2DPC	1DPC	2DPC	1DPC	2DPC	1.1V	
RDIMM	1Rx4	32GB						6400, 6000, 5600, 5200, 4800 (DDR5-6400 rated RDIMMS only)	NA
	2Rx8	32GB							NA
	2Rx4	64GB	64GB	96GB	96GB				5200, 4800 (DDR5-6400 rated RDIMMS only)
	2Rx4					128GB	128GB		NA

NOTE:

- Only DDR5-6400 Rated RDIMMs Supported.

Intel Xeon 6700E-Series CXL Memory Support

Native DDR5 Memory Per Socket				CXL Memory Per Socket				
Slot 0 DIMM Ranks	Slot 0 DIMM Capacity (GB)	DIMM Type	DRAM Density (Gb)	CXL Memory Channels	CXL Memory Type	CXL Capacity Per Device/ Module	CXL Interleave	CXL Mode
2Rx4	64	10x4	16	2+2	DDR5 x8	64 GB	1x4*, 2x2, 4x1	1LM+Vol
2Rx4	64	10x4	16	1+1	DDR5 x16	128 GB	1x2*, 2x1	1LM+Vol
1Rx4	32	10x4	16	2	DDR5 x8	128 GB	1x2*	Intel® Flat Memory Mode

NOTE:

- * Default setting in BIOS
- Intel Xeon 6700E-series (formerly codenamed Sierra Forest-SP) CXL memory configs are 1DPC ('Slot 0') only for native DDR5
- CXL Memory Channel notation: # of devices per root port, with root ports separated by "+". i.e. 2+2+2+2 = four root ports populated with two devices per root port
- CXL Interleave notation: sets x ways. i.e. 2x4 = One set of two modules, interleaved four-way
- CXL Modes:
  - 1LM+Vol = DDR5 ('1LM') and (Volatile) CXL memory visible to SW as separate tiers, separately interleaved
  - Flat Memory Mode = HW manages data movement between DDR5 and CXL memory, total capacity visible to SW

Intel Xeon 6500P/6700P-Series Memory Support

Type	Ranks Per DIMM and Data Width	DIMM Capacity (GB)						Channel Speed (MT/s); Voltage (V); Slots per Channel (SPC) & DIMMs per Channel Density (DPC)	
		DRAM Density							
		16Gb		24Gb		32Gb		1DPC/2SPC	2DPC/2SPC
		1DPC	2DPC	1DPC	2DPC	1DPC	2DPC	1.1V	
RDIMM	1Rx8	16GB		24GB				6400, 6000, 5600, 5200, 4800 (DDR5-6400 rated RDIMMS only)	5200, 4800 (DDR5-6400 rated RDIMMS only)
	1Rx4	32GB		48GB					
	2Rx8	32GB	32GB	48GB					
	2Rx4	64GB*	64GB*^	96GB*	96GB*^	128GB*	128GB*^		
RDIMM 3DS	8Rx4		256GB*						
MRDIMM	2Rx8	32GB						8000, 7200 (MRDIMM-8800 only)	N/A (no 2DPC configs for MRDIMM)
	2Rx4	64GB							

NOTE:

- *Supported in 1S/2S/4S systems
- ^Supported in 8S systems

Intel Xeon 6500P/6700P-Series CXL Memory Support

Native DDR5 Memory Per Socket				CXL Memory Per Socket					
Slot0 DIMM Ranks	Slot0 DIMM Capacity (GB)	DIMM Type	DRAM Density (Gb)	CXL Memory Channels	CXL Memory Type	CXL Capacity Per Device/ Module	CXL Interleave	CXL Mode	4S &8S Support
2Rx4	96	10x4	24	2+2	DDR5 x8	96 GB#	1x4*, 2x2, 4x1	1LM+Vol	Yes
2Rx4	128	10x4	32	2+2	DDR4x8# DDR5 x8	128 GB	1x4*, 2x2, 4x1	1LM+Vol	Yes
2Rx4	128	10x4	32	2+2	DDR5 x8	128 GB	hetero x12	Hetero	Yes
2Rx4	64	10x4	16	2+2+2	DDR5 x8	128 GB	1x6*, 2x3, 3x2	1LM+Vol	No
2Rx4	64	10x4	16	2	DDR5 x8	128 GB	1x2*	1LM+Vol	No
2Rx4	64	10x4	16	1+1	DDR5 x16	2ch 128 GB	1x2*	Intel® Flat Memory Mode	No

NOTE:

- Xeon 6500P/6700P-series processors CXL memory configs are 1DPC ('Slot 0') only for native DDR5
- CXL Memory Channel notation: # of devices per root port, with root ports separated by "+". i.e. 2+2+2+2 = four root ports populated with two devices per root port
- CXL Interleave notation: sets x ways. i.e. 2x4 = Set of two modules, interleaved four-way
- CXL Modes:
  - 1LM+Vol = Native DDR5 ('1LM') and (volatile) CXL memory visible to SW as separate tiers, separately interleaved
  - Hetero x12 = DDR5 and (volatile) CXL memory interleaved together in one 12-way set (See graphic in next slide)
  - Flat Memory Mode = HW manages data movement between DDR5 and CXL memory, total capacity visible to SW

3-6-4 Processor and Memory Module Matrix Table

Memory Q'ty for each CPU	CPU0																CPU1															
	H0	H1	G0	G1	F0	F1	E0	E1	A1	A0	B1	B0	C1	C0	D1	D0	P0	P1	O0	O1	N0	N1	M0	M1	I1	I0	J1	J0	K1	K0	L1	L0
1 DIMM										v																v						
4 DIMM			v				v			v				v					v				v			v			v			
	v				v							v				v	v		v								v					v
8 DIMM	v		v		v		v			v		v		v		v	v		v		v		v			v		v		v		v
			v	v				v	v	v	v				v					v	v			v	v	v	v			v	v		
	v	v			v	v					v	v			v	v	v	v			v	v					v	v			v	v
12 DIMM	v		v	v	v		v	v	v	v		v	v	v		v	v		v	v	v		v	v	v	v		v	v	v		v
16 DIMM	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v

NOTE:

- Xeon 6700E series do not support 12 DIMMs Configuration.

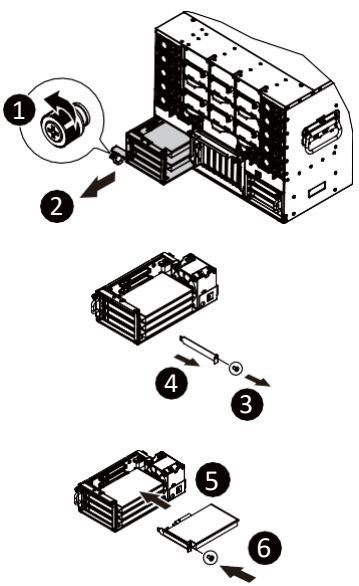
3-7 Installing the PCI Expansion Card

- 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 installing a PCIe card.
- Failure to observe these warnings could result in personal injury or damage to equipment.

Follow these instructions for a PCI Expansion card:

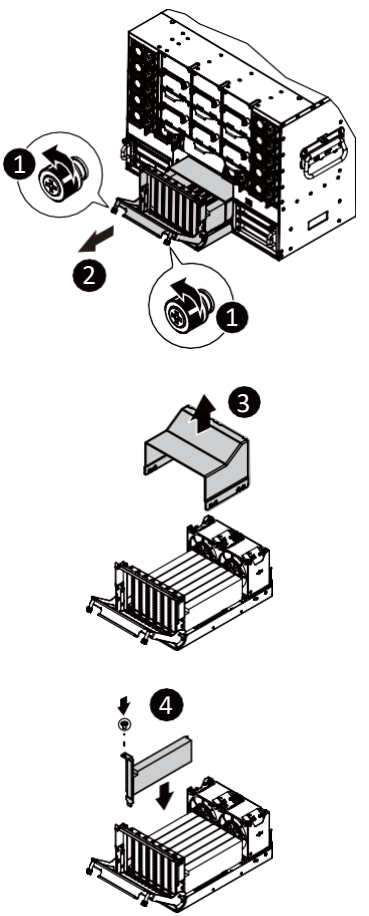
Left PCIe Card Cage

1. Loosen the thumbnail screw securing the handle of the PCIe card cage.
2. Pull the cage out of the system.
3. Remove the screw securing the slot cover to the riser bracket.
4. Remove the slot cover from the riser bracket.
5. Orient the PCIe card with the riser guide slot and push it towards the arrow until it is securely seated in the PCIe card connector.
   NOTE: Some riser brackets allow for single or multiple PCIe cards.
   Repeat steps 3-5 as necessary.
6. Secure the PCIe card with the screw.
7. Reverse steps 1-2 to reinstall the PCIe card cage in position.



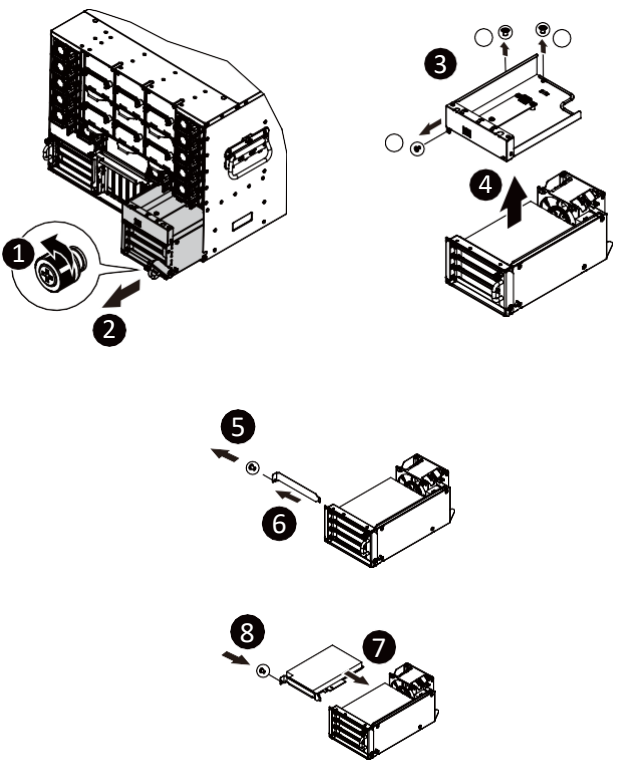
Middle PCIe Card Cage

1. Loosen the thumbnail screws securing the handle of the PCIe card cage.
2. Pull the cage out of the system.
3. Lift the fan duct and remove it.
4. Align the PCIe card with the slot and push it towards the arrow until it is securely seated in the PCIe card connector. Then, secure the PCIe card with the screw.
   NOTE: Some riser brackets allow for single or multiple PCIe cards.
   Repeat step 4 as necessary.
5. To install the PCIe card cage, push the cage back into the system. Reverse the previous steps to remove the PCIe card.



Right PCIe Card Cage

1. Loosen the thumbnail screw securing the handle of the PCIe card cage.
2. Pull the cage out of the system.
3. Remove the screws securing the MLAN tray, in the specified sequence.
4. Lift the MLAN tray and remove it.
5. Remove the screw securing the slot cover to the riser bracket.
6. Remove the slot cover from the riser bracket.
7. Orient the PCIe card with the riser guide slot and push it towards the arrow until it is securely seated in the PCIe card connector.
   NOTE: Some riser brackets allow for single or multiple PCIe cards.
   Repeat steps 5-7 as necessary.
8. Secure the PCIe card with the screw.
9. Reverse steps 1-4 to reinstall the PCIe card cage in position.



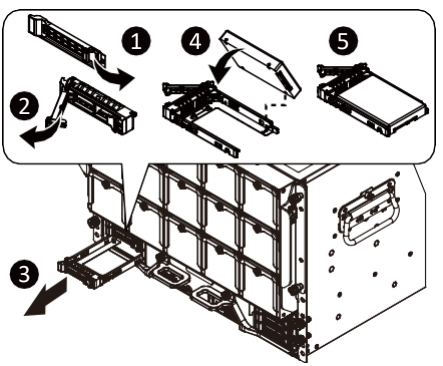
3-8 Installing the Hard Disk Drive

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 hard disk drive is connected to the hard disk drive connector on the backplane.

Follow these instructions to install a 2.5" hard disk drive:

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



3-9 Installing the M.2 Device and Heat Sink

CAUTION

The position of the stand-off screw will depend on the size of the M.2 device. The stand-off screw is pre-installed for 22110 cards as standard. Refer to the size of the M.2 device and change the position of the stand-off screw accordingly.

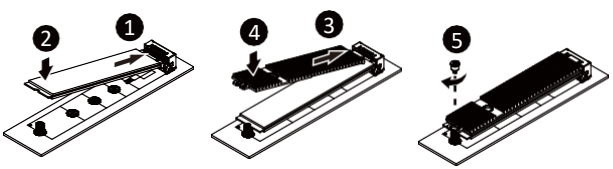
WARNING:

Please ensure a heat sink is attached to any M.2 device installed into the system. Installing an M.2 device without any heat sink may result in the system overheating or system performance being throttled.

- To install/remove the M.2 module and Heat sink use a No. 1 Phillips-head screwdriver with a screw torque of 1.5 ± 0.2 kgf*cm

Follow these instructions to install the M.2 device and heat sink:

1. Insert the M.2 device into the M.2 connector.
2. Press down on the M.2 device.
3. Install the thermal pad of the M.2 device to the M.2 device.
4. Press down on the thermal pad.
5. Secure the M.2 device and its thermal pad to the motherboard with a single screw.
6. Reverse steps 1-2 to remove the M.2 device.



3-10 Replacing the System Fan Module

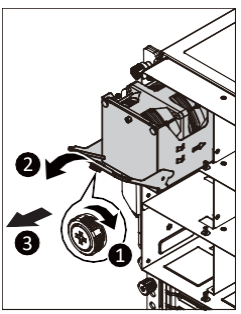
CAUTION!

Before you remove or install the system fans follow these steps:

- Disconnect all necessary cable connections. Failure to observe these warnings could result in personal injury or damage to the equipment

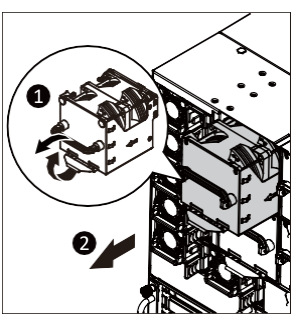
Follow these instructions to replace the GPU fan assembly:

1. Loosen the thumbnail screw securing the handle of the fan module.
2. Flip the handle and then grasp it firmly.
3. Pull out the fan module from the system.
4. Reverse the previous steps to install the replacement fan module.



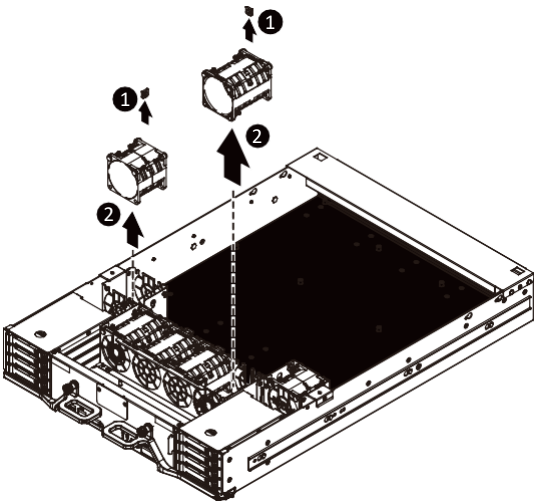
Follow these instructions to replace the fan assembly:

1. Flip and grasp the handle and simultaneously press the retaining clip on the bottom side of the fan module in the direction indicated.
2. Pull out the fan module from the system.
3. Reverse the previous steps to install the replacement fan module.



Internal System Fan

1. Remove the edge saddle by pulling it away from the fan assembly.
2. Lift the fan assembly from the chassis.
3. Reverse the previous steps to install the replacement fan assembly.



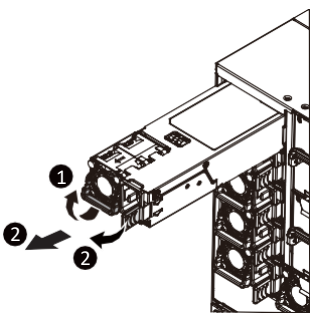
3-11 Removing and Installing the Power Supply

CAUTION!

Please see Section 2-2 "Rear View" for installation sequence.

Follow these instructions to replace the power supply:

1. Flip and then grasp the power supply handle.
2. Press the retaining clip on the right side of the power supply in the direction indicated.
3. Pull out the power supply using the handle.
4. Insert the replacement power supply firmly into the chassis. Connect the AC power cord to the replacement power supply.



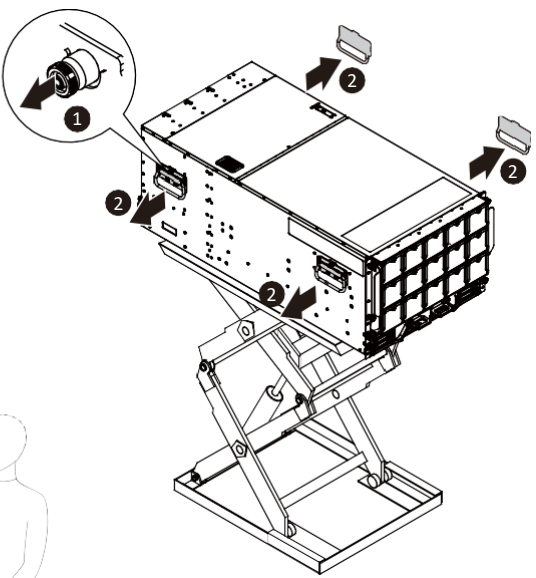
3-12 Installing the System into the Cabinet

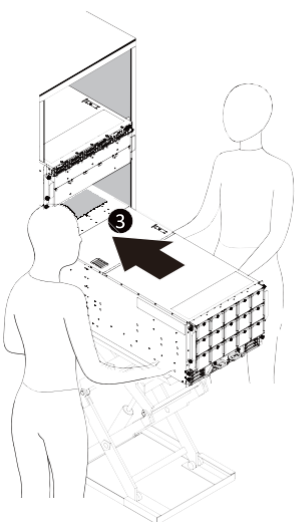
Read the following guidelines before you begin to install the system into the cabinet:

- Make sure the system is not turned on or connected to AC power.
- A Lift Table is required. Place the system unit on Lift Table. **Recommended load capacity for the lift table: 200 kilograms.**
- Four Person lift required. Firmly hold the bottom of the system when required to lift and carry the system.
- Failure to observe these warnings could result in personal injury or damage to the equipment.

Follow these instructions to install the system into the cabinet:

5. Pull out and release the thumbnail screw securing the chassis handle in place.
6. Remove the four handles on each side of the system.
7. Carefully slide the system into the cabinet.





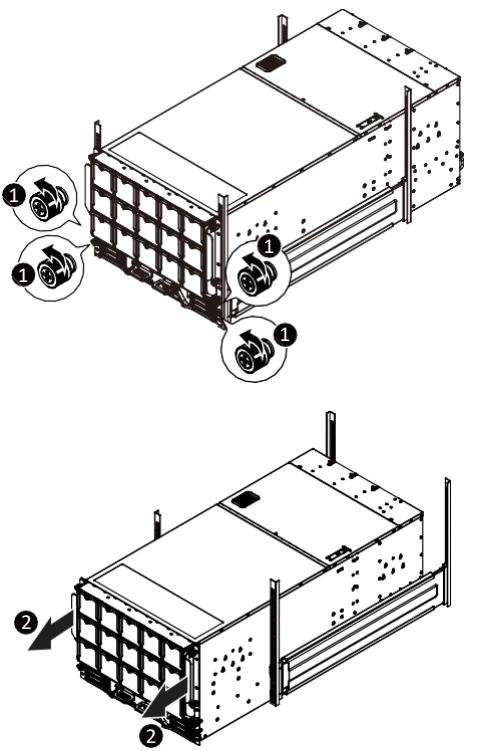
3-13 Removing the System from the Cabinet

Read the following guidelines before you begin to remove the system from the cabinet:

- Always turn off the computer and unplug the power cord from the power outlet before removing the system from the cabinet.
- Disconnect all necessary cable connections.
- A Lift Table is required. Place the system unit on Lift Table. **Recommended load capacity for the lift table: 200 kilograms.**
- Four Person lift required. Firmly hold the bottom of the system when required to lift and carry the system.
- Failure to observe these warnings could result in personal injury or damage to the equipment.

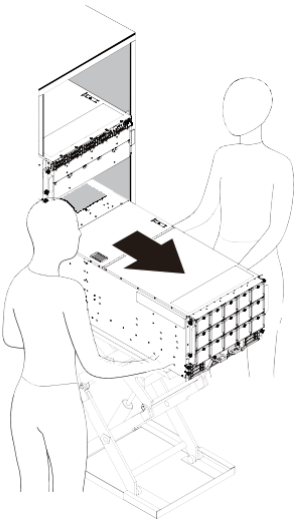
Follow these instructions to remove the system from the cabinet:

8. Loosen the thumbnail screws on each side that secure the system.
9. Gently pull out the system from the cabinet and place it on Lift table.



NOTE

- **The illustrations are for reference only.**
- **The actual slide rail may vary depending on your purchase.**

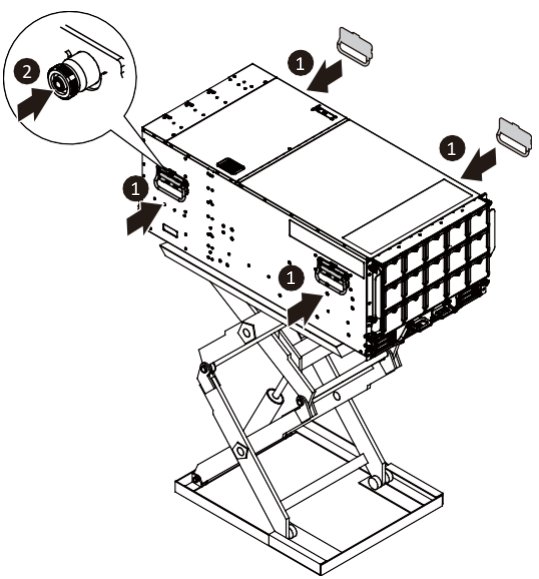


NOTE!

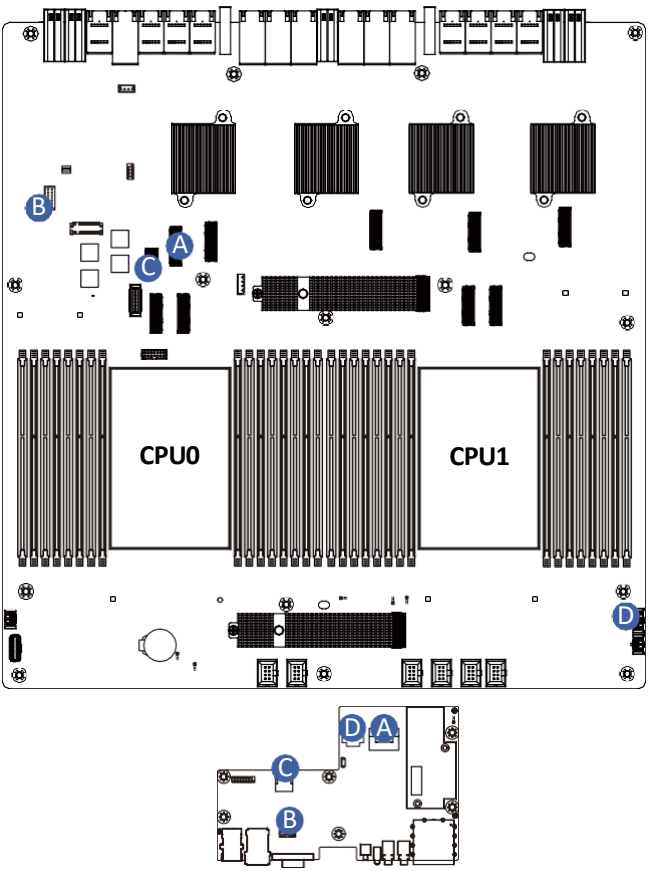
- Before lifting the system, installing the four chassis handles on the system is required.

Follow these instructions to install the chassis handles on the system:

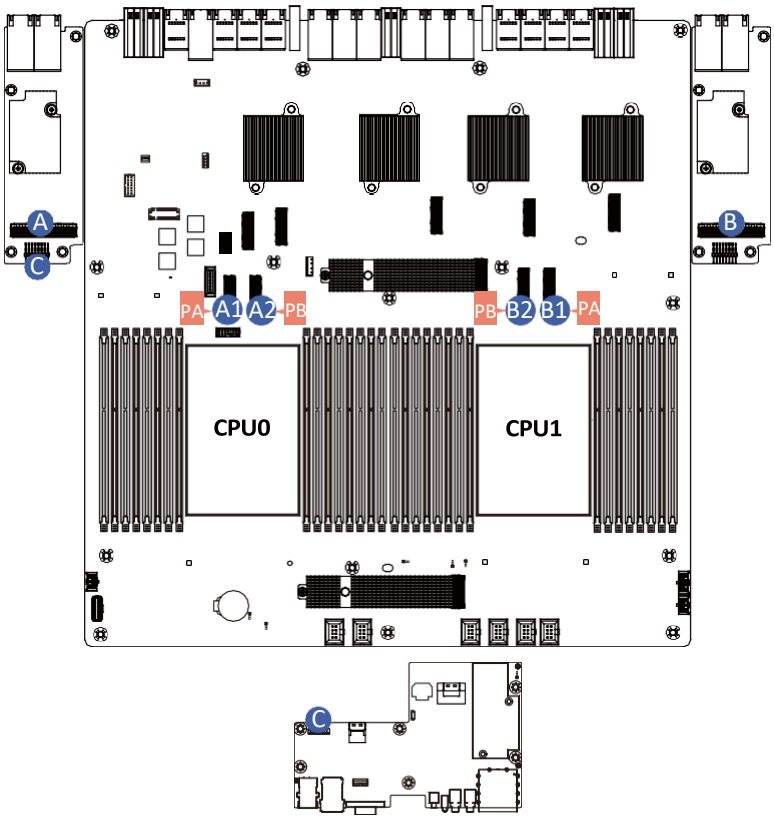
1. Attach the four chassis handles to the system.
2. Push and lock the thumbnail screw to secure the chassis handle in place.



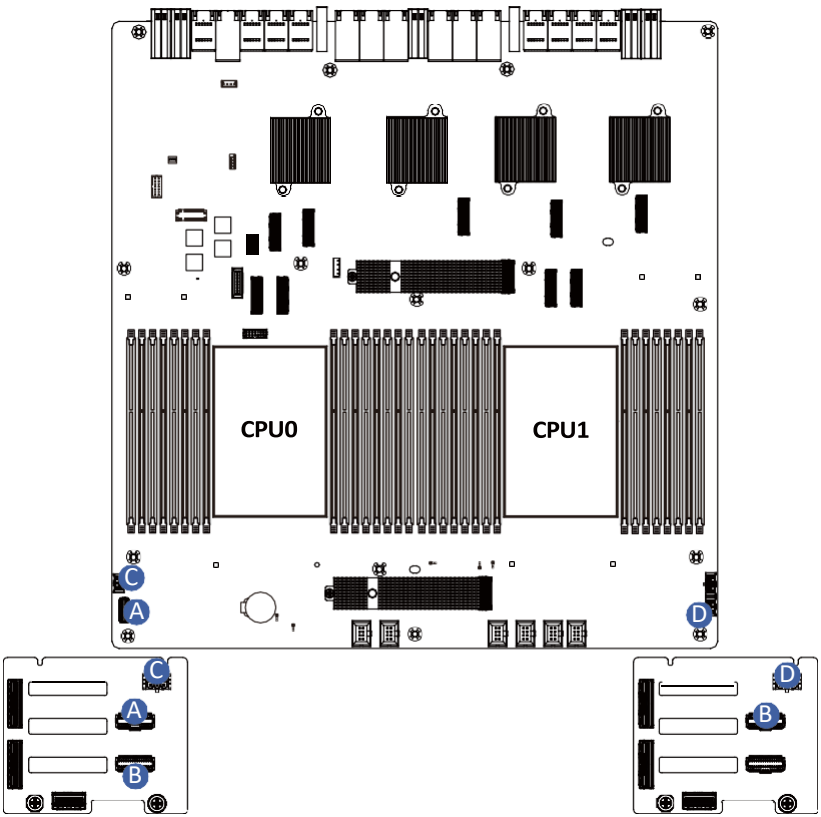
3-14 Cable Connection



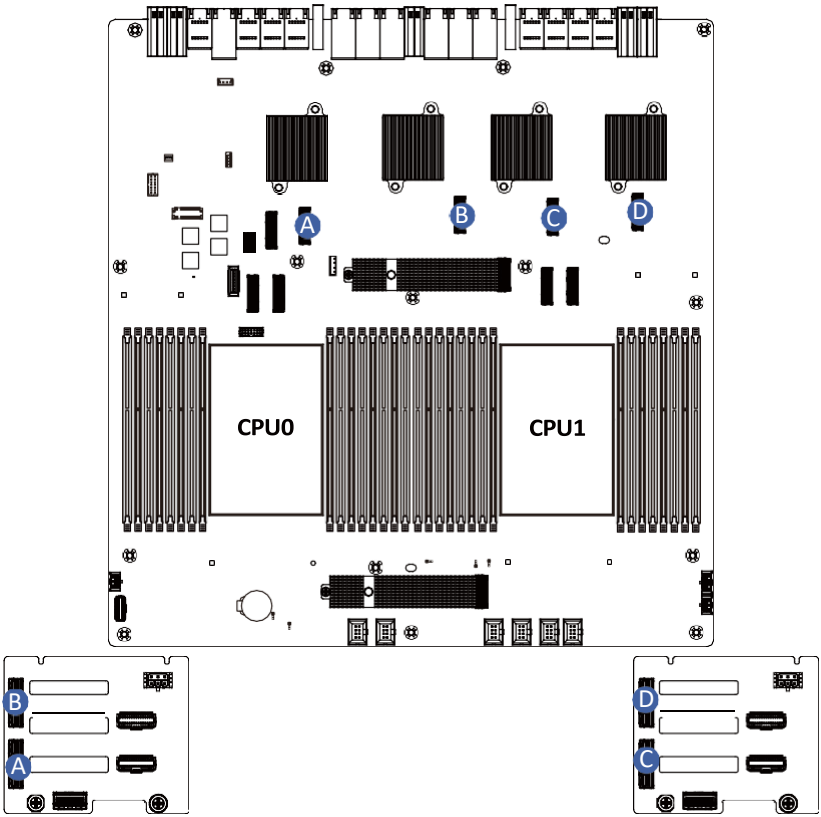
A	Front IO Board Signal Cable	Motherboard: FP_IO
		Front IO Board: FP_IO
B	Front IO VGA Cable	Motherboard: VGA_CON
		Front IO Board: VGA_CON
C	Front IO Board LAN Cable	Motherboard: FP_LAN
		Front IO Board: FP_LAN
D	Front IO Board Power Cable	Motherboard: FP_PWR
		Front IO Board: FP_PWR



A	Rear LAN to Motherboard Signal Cable	Riser Switch Card (Left): U2_PE1
		Motherboard: A1: U2_P0_PE3A A2: U2_P0_PE3B
B	Rear LAN to Motherboard Signal Cable	Riser Switch Card (Right): U2_PE1
		Motherboard: B1: U2_P1_PE3A B2: U2_P1_PE3B
C	Rear LAN to Front IO LAN Signal Cable	Front IO Board: REAR_MLAN
		Riser Switch Card (Left): CN_LAN_F



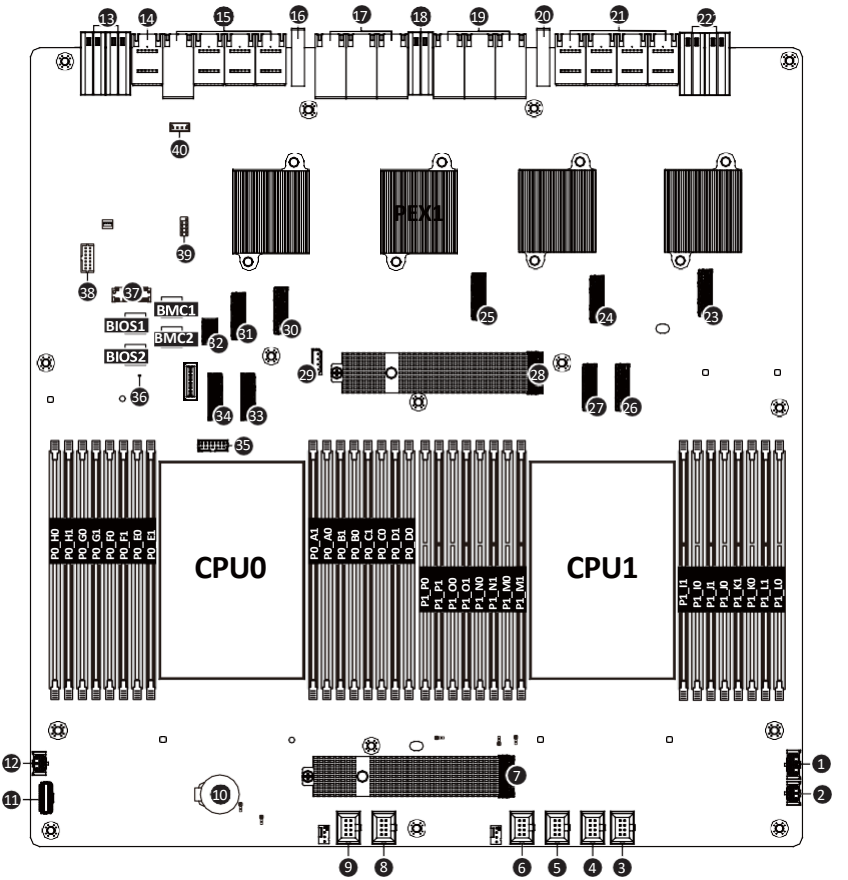
A	HDD Backplane Board Signal Cable	Motherboard: BP_1
		Front HDD Board: BP_1
B	HDD Backplane Board Signal Cable	Left Front HDD Board: BP_SERIES
		Right Front HDD Board: BP_1
C	HDD Backplane Board Signal Cable	Motherboard: BPB_PWR1
		Left Front HDD Board: BP_PWR
D	HDD Backplane Board Signal Cable	Motherboard: BPB_PWR2
		Right Front HDD Board: BP_PWR



A	NVMe 0-1 Cable	Motherboard: U2_PEX0 Left Front HDD Board:U2_0	**C**	NVMe 4-5 Cable	Motherboard: U2_PEX2 Right Front HDD Board:U2_0
B	NVMe 2-3 Cable	Motherboard: U2_PEX1 Left Front HDD Board:U2_1	**D**	NVMe 6-7 Cable	Motherboard: U2_PEX3 Right Front HDD Board:U2_1

Chapter 4 Motherboard Components

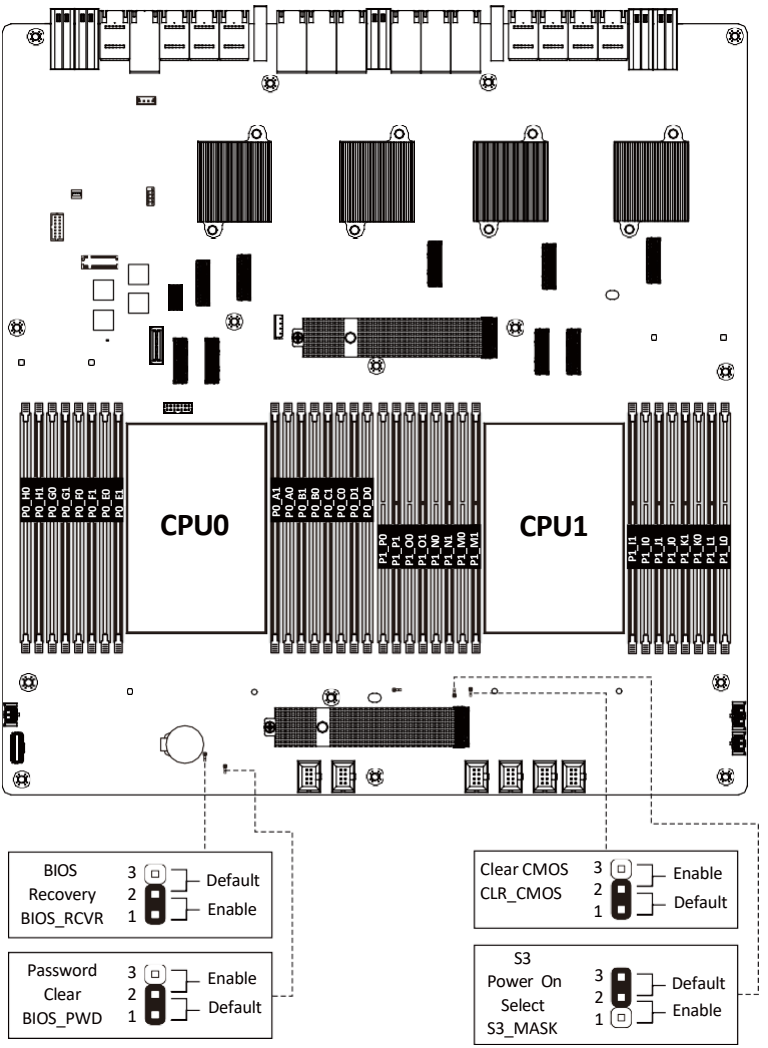
4-1 Motherboard Components



Item	Description
1	2 x 4 Pin Front Panel Power Connector (FP_PWR)
2	2 x 3 Backplane Power Connector (BPB_PWR2)
3	FAN_3/FAN_4 Connector
4	FAN_1/FAN_2 Connector
5	FAN_7/FAN_8 Connector
6	FAN_5/FAN_6 Connector
7	M.2 Slot (PCIe Gen5 x2, Support NGFF-22110)
8	FAN_11/FAN_12 Connector
9	FAN_9/FAN_10 Connector
10	Battery Socket
11	HDD Backplane Board Connector
12	2 x 3 Backplane Power Connector (BPB_PWR1)

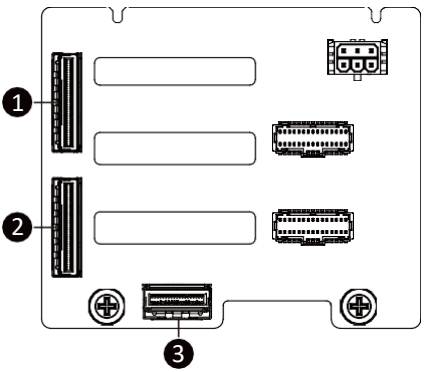
Item	Description
13	Motherboard Power Connector (MB_PWR1/MB_PWR2)
14	Power Distribution Board Connector (PDB_IO)
15	PCIe Signal Connector (EX_SXMJ3-6)
16	Guide Pin Connector (GP1)
17	PCIe Signal Connector (EX_SLT1_3/EX_SLT2_3/EX_SLT4)
18	PCIe Bridge Board Power Connector (PCIE_PWR1)
19	PCIe Signal Connector (EX_SLT5_6/EX_SLT6_7/EX_SLT8)
20	Guide Pin Connector (GP2)
21	PCIe Signal Connector (EX_SXMJ7-10)
22	Motherboard Power Connector (MB_PWR3/MB_PWR4)
23	MCIO Connector (U2_PEX3/PCIe Gen5)
24	MCIO Connector (U2_PEX2/PCIe Gen5)
25	MCIO Connector (U2_PEX1/PCIe Gen5)
26	MCIO Connector (U2_P1_PE3A/PCIe Gen5)
27	MCIO Connector (U2_P1_PE3B/PCIe Gen5)
28	M.2 Slot (PCIe Gen5 x4, Support NGFF-22110)
29	IPMB Connector
30	MCIO Connector (U2_PEX0/PCIe Gen5)
31	MCIO Connector (for System I/O/FP_IO)
32	SlimLine Connector (for MLAN/FP_LAN)
33	MCIO Connector (U2_P0_PE3B/PCIe Gen5)
34	MCIO Connector (U2_P0_PE3A/PCIe Gen5)
35	TPM Module Connector
36	BMC Firmware Readiness LED
37	PRoT Module Connector (M.2 M-Key/Optional SKU)
38	VGA Connector
39	Serial Port Header
40	VROC Module Connector

4-2 Jumper Setting



4-3 Backplane Board Storage Connector

4-3-1 CBPG641



Item	Description
1.	MCIO 8i (SFF-TA-1016 / U2_1
2.	MCIO 8i (SFF-TA-1016 / U2_0)
3.	MCIO 4i (SFF-TA-1016 / SL_CN1)

Chapter 5 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 functions of the chipset.
- **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.)

5-1 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.

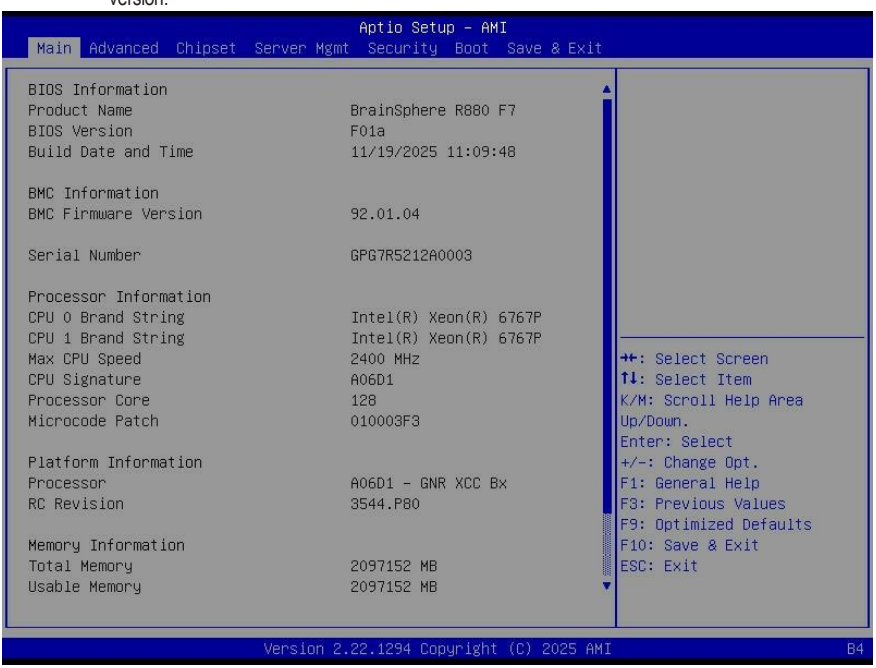
Main Menu Help

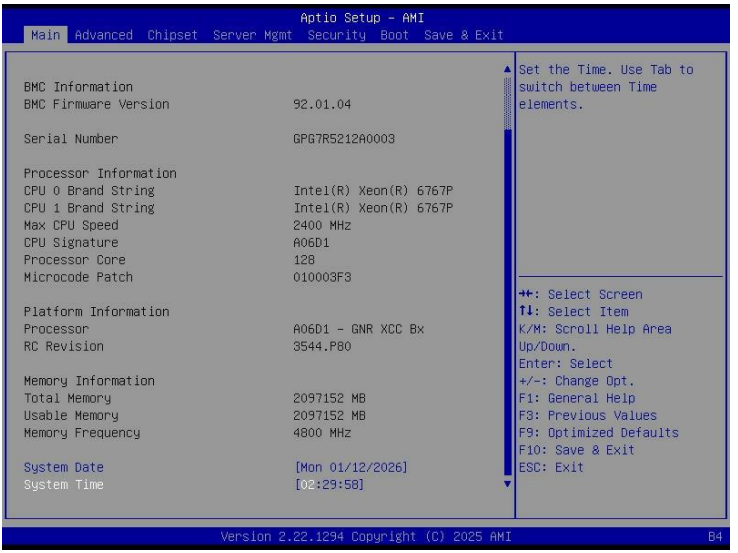
The on-screen description of a highlighted setup option is displayed on the bottom line of the Main Menu.

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	
Project Name	Displays the 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/ Max CPU Speed / CPU Signature / Processor Core / Microcode Patch	Displays the technical information for the installed processor(s).
Platform Information	
Processor/ RC Revision	Displays the information of the installed platform.
Memory Information(Note2)	
Total Memory	Displays the total memory size of the installed memory.
Usable Memory	Displays the usable memory size of the installed memory.

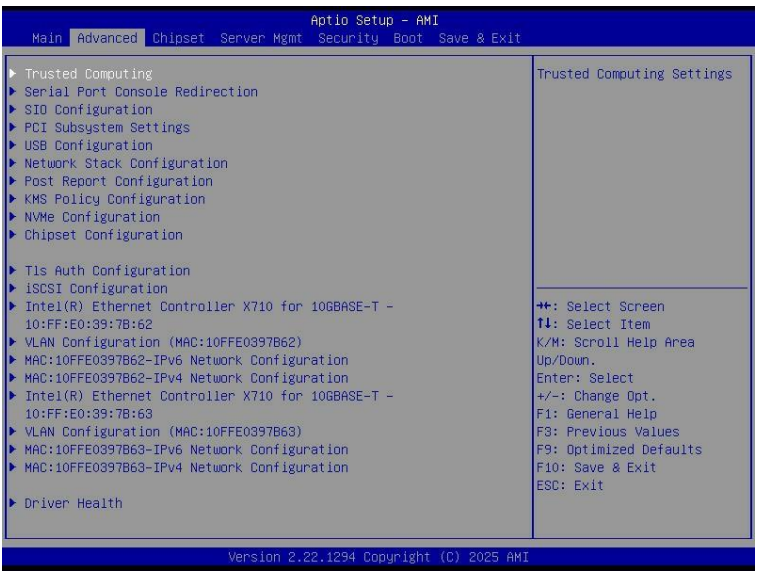
(Note1) Functions available on selected models.

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

Parameter	Description
Memory Frequency	Displays the frequency information of the installed memory.
System Date	Sets the date following the weekday-month-day-year format.
System Time	Sets the system time following the hour-minute-second format.

5-2 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.



5-2-1 Trusted Computing

Parameter	Description
Configuration	
TPM v1.2 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: Disabled, **Enabled**.

5-2-2 Serial Port Console Redirection

Parameter	Description
COM1 Console Redirection(Note)	Console redirection enables the users to manage the system from a remote location. Options available: Enabled, Disabled. Default setting is **Disabled**.
COM1 Console Redirection Settings	Press [Enter] to configure advanced items. **Please note that this item is configurable when COM1 Console Redirection is set to Enabled.** ◆ Terminal Type – Selects a terminal type to be used for console redirection. – Options available: VT100, **VT100PLUS**, VT-UTF8, ANSI. ◆ Bits per second – Selects the transfer rate for console redirection. – Options available: 9600, 19200, 38400, 57600, **115200**. ◆ Data Bits – Selects the number of data bits used for console redirection. – Options available: 7, **8**.

(Note) Advanced items prompt when this item is defined.

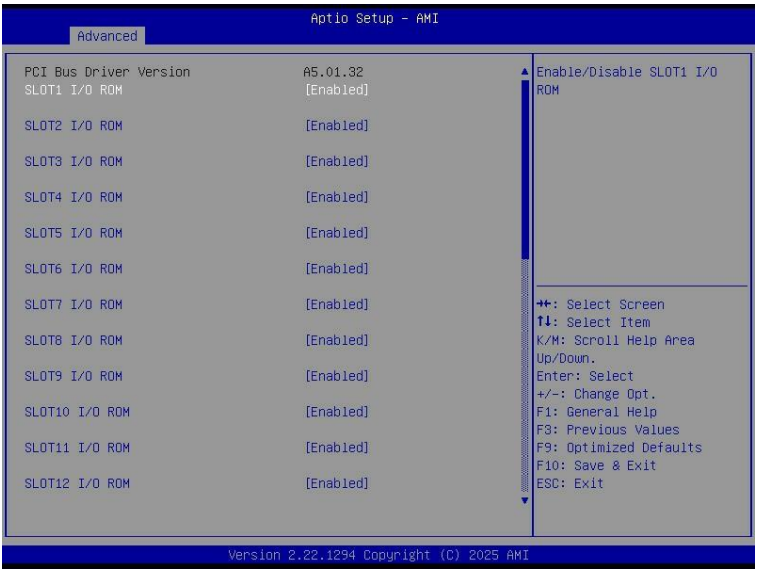
Parameter	Description
COM1 Console Redirection Settings (continued)	◆ Parity – A parity bit can be sent with the data bits to detect some transmission errors. – Even: parity bit is 0 if the num of 1's in the data bits is even. – Odd: parity bit is 0 if num of 1's in the data bits is odd. – Mark: parity bit is always 1. Space: Parity bit is always 0. – Mark and Space Parity do not allow for error detection. – Options available: **None**, Even, Odd, Mark, Space. ◆ Stop Bits – Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit. – Options available: **1**, 2. ◆ Flow Control – Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals. – Options available: **None**, Hardware RTS/CTS. ◆ VT-UTF8 Combo Key Support – Enable/Disable the VT-UTF8 Combo Key Support. – Options available: **Enabled**, Disabled. ◆ Recorder Mode – When this mode enabled, only texts will be send. This is to capture Terminal data. – Options available: Enabled, **Disabled**. ◆ Resolution 100x31 – Enable/Disable extended terminal resolution. – Options available: **Enabled**, Disabled. ◆ Putty KeyPad – Selects Function Key and KeyPad on Putty. – Options available: **VT100**, LINUX, XTERMR6, SC0, ESCN, VT400.
Serial Port for Out-of-Band Management / Windows Emergency Management Services (EMS) Console Redirection(Note)	EMS console redirection allows the user to configure Console Redirection Settings to support Out-of-Band Serial Port management. Options available: Enabled, **Disabled**.

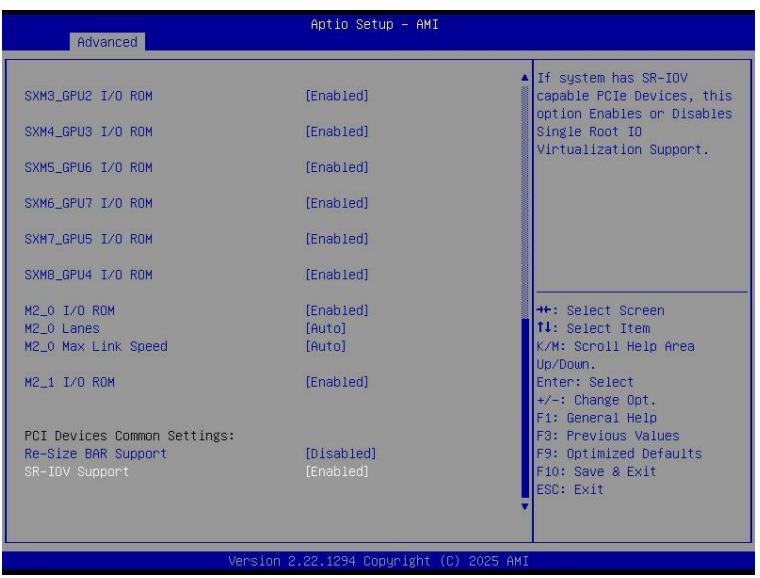
Parameter	Description
Serial Port for Out-of-Band EMS Console Redirection Settings	Press [Enter] to configure advanced items. **Please note that this item is configurable when Serial Port for Out-of-Band Management EMS Console Redirection is set to Enabled.** ◆ Out-of-Band Mgmt Port – Microsoft Windows Emergency Management Service (EMS) allows for remote management of a Windows Server OS through a serial port. – Default setting is **COM1**. ◆ Terminal Type EMS – Selects a terminal type to be used for console redirection. – Options available: VT100, **VT100PLUS**, VT-UTF8, ANSI. ◆ Bits per second EMS – Selects the transfer rate for console redirection. – Options available: 9600, 19200, 57600, **115200**. ◆ Flow Control EMS – Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals. – Options available: **None**, Hardware RTS/CTS, Software Xon/Xoff.

5-2-3 SIO Configuration

Parameter	Description
AMI SIO Driver Version	Displays the AMI SIO driver version information.
Super IO Chip Logical Device(s) Configuration	
[*Active*] Serial Port	Press [Enter] to configure advanced items. ◆ Use This Device – When set to Enabled allows you to configure the serial port settings. When set to Disabled, displays no configuration for the serial port. – Options available: **Enabled**, Disabled. ◆ Logical Device Settings/Current: – Displays the serial port base I/O address and IRQ. ◆ Possible: – Configures the serial port base I/O address and IRQ. – Options available: **Use Automatic Settings** IO=3F8h; IRQ=4; DMA; IO=3F8h; IRQ=3, 4, 5, 7, 9, 10, 11, 12; DMA; IO=2F8h; IRQ=3, 4, 5, 7, 9, 10, 11, 12; DMA; IO=3E8h; IRQ=3, 4, 5, 7, 9, 10, 11, 12; DMA; IO=2E8h; IRQ=3, 4, 5, 7, 9, 10, 11, 12; DMA;

5-2-4 PCI Subsystem Settings

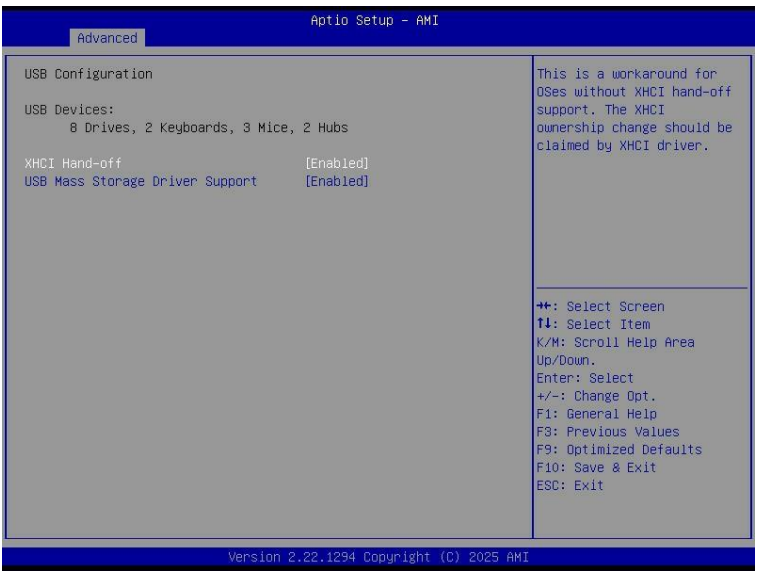




Parameter	Description
PCI Bus Driver Version	Displays the PCI Bus Driver version information.
SLOT_# I/O ROM(Note1)	When enabled, this setting will initialize the device expansion ROM for the related PCIe slot. Options available: **Enabled**, Disabled.
LAN I/O ROM	When enabled, this setting will initialize the device expansion ROM for the related LAN PCIe slot. Options available: **Enabled**, Disabled.
LAN Lanes	Change LAN PCIe lanes. Options available: **Auto**, x4, x2x2.
LAN Max Link Speed	Change LAN max link speed. Options available: **Auto**, Gen1, Gen2, Gen3, Gen4, Gen5.
SXM_#_GPU_# I/O ROM(Note2)	When enabled, this setting will initialize the device expansion ROM for the related GPU slot. Options available: **Enabled**, Disabled.
M2_# I/O ROM(Note3)	When enabled, this setting will initialize the device expansion ROM for the related M2 slot. Options available: **Enabled**, Disabled.
M2_0 Lanes	Change M2_0 PCIe lanes. Options available: **Auto**, x4, x2x2.
M2_0 Max Link Speed	Change M2_0 max link speed. Options available: **Auto**, Gen1, Gen2, Gen3, Gen4, Gen5.
PCI Devices Common Settings	
Re-Size BAR Support	If system has Resizable BAR capable PCIe Devices, this option Enables or Disables Resizable BAR Support. Options available: **Disabled**, Enabled.
SR-IOV Support	If the system has SR-IOV capable PCIe devices, this item Enable/Disable Single Root IO Virtualization Support. Options available: Disabled, **Enabled**.

(Note1) This section is dependent on the available PCIe Slot.
(Note2) This section is dependent on the available GPU Slot.
(Note3) This section is dependent on the available M2 Slot.

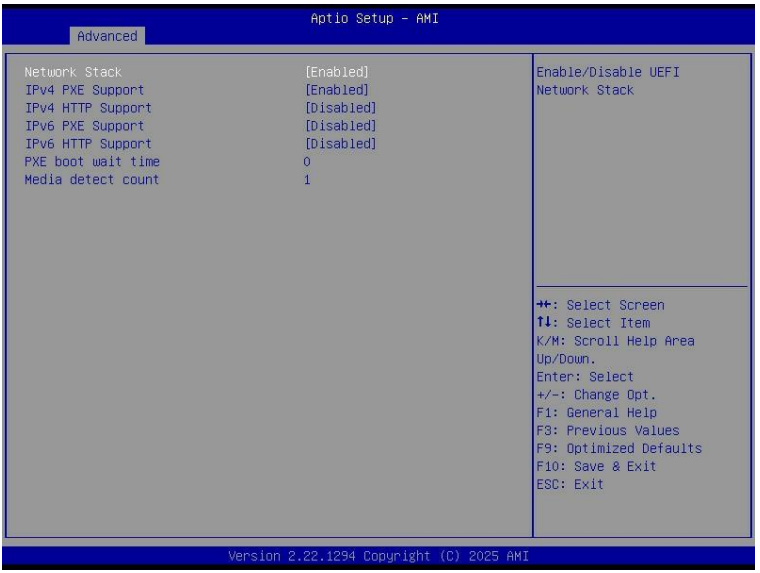
5-2-5 USB Configuration



Parameter	Description
USB Configuration	
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.
USB Mass Storage Driver Support(Note)	Enable/Disable the USB Mass Storage Driver Support. Options available: **Enabled**, Disabled.

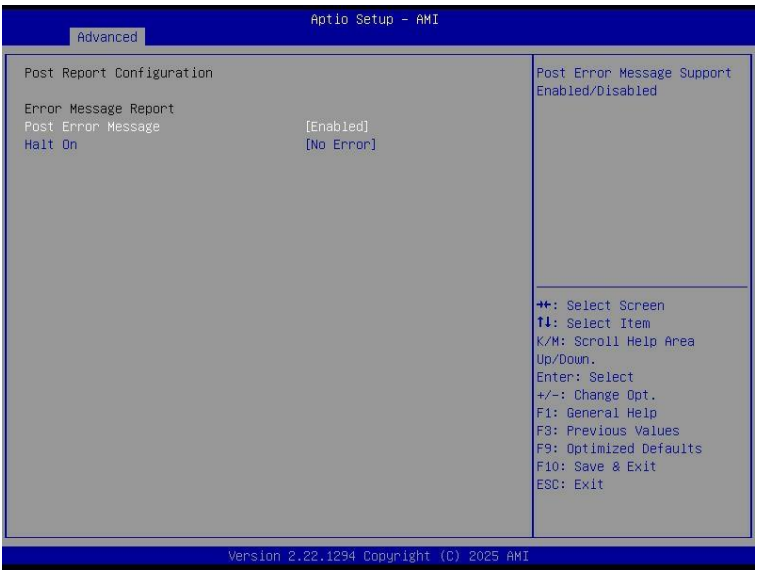
(Note) This item is present only if you attach USB devices.

5-2-6 Network Stack Configuration



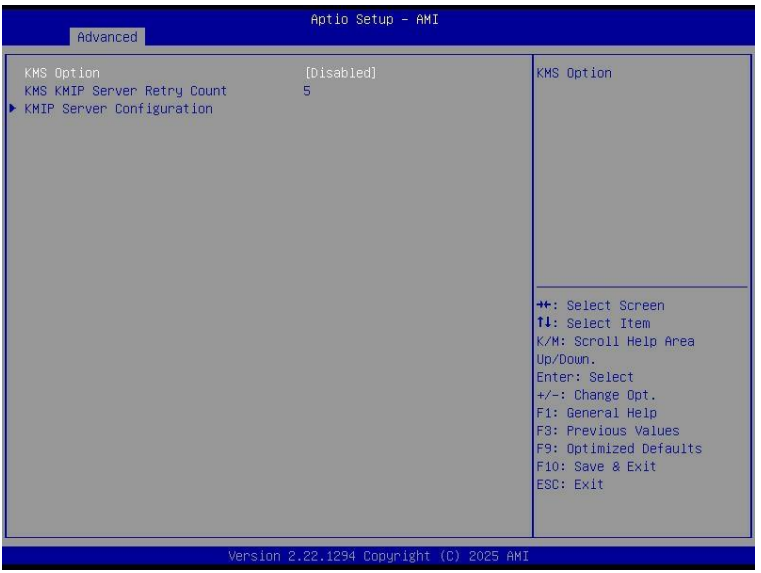
Parameter	Description
Network Stack	Enable/Disable the UEFI network stack. Options available: **Enabled**, Disabled.
Ipv4 PXE Support	Enable/Disable the Ipv4 PXE feature. Options available: **Enabled**, Disabled.
Ipv4 HTTP Support	Enable/Disable the Ipv4 HTTP feature. Options available: Enabled, **Disabled**.
Ipv6 PXE Support	Enable/Disable the Ipv6 PXE feature. Options available: Enabled, **Disabled**.
Ipv6 HTTP Support	Enable/Disable the Ipv6 HTTP feature. Options available: Enabled, **Disabled**.
PXE boot wait time	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	Number of times the presence of media will be checked. Press the <+> / <-> keys to increase or decrease the desired values.

5-2-7 Post Report Configuration



Parameter	Description
Post Report Configuration	
Error Message Report	
Post Error Message	Enable/Disable the POST Error Message support. Options available: Disabled, **Enabled**.
Halt On	Options available: **No Error**, All Error.

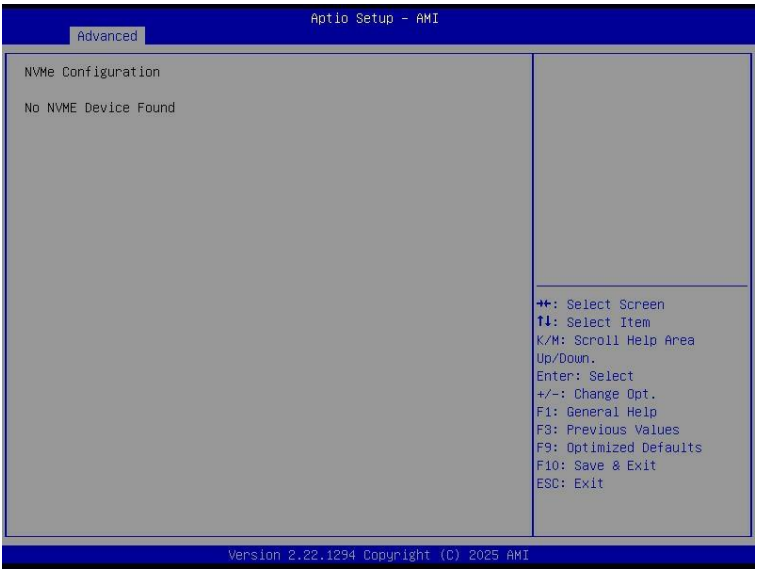
5-2-8 KMS Policy Configuration



Parameter	Description
KMS Option	Options available: **Disabled**, KMS with KMIP.
KMS KMIP Server Retry Count	Define KMS KMIP Server Retry Count.
KMIP Server Configuration	Press [Enter] to configure advanced items. ◆ KMIP Server IP address – Enter IP4 address in dotted-decimal notation. ◆ KMIP TCP Port number – Enter KMIP TCP Port number 100...9999. – Default setting is **5696**. ◆ Time Zone – Enter the correct time zone for this server. – Default setting is **GMT+8**. ◆ Client Credentials – Use User and password credentials to authenticate the client. – Options available: Disabled, **Enabled**. ◆ Client UserName – Enter Client identity: UserName. – Name Length: 0-63 characters. ◆ Client UserName – Enter Client identity: Password. – Password Length: 0-31 characters.

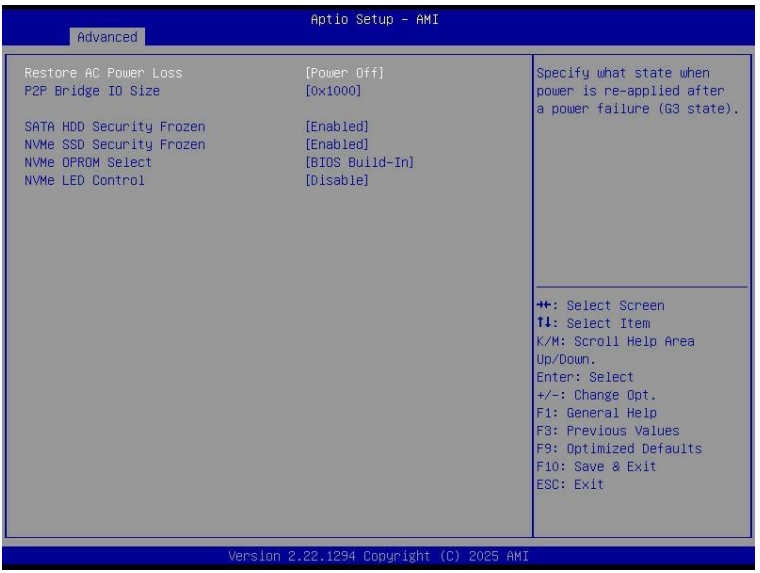
Parameter	Description
KMIP Server Configuration (continued)	◆ KMS TLS Certificate / Size – CA Certificate/ Client Private Key/ Client Certificate. ›› Enroll factory defaults or load the KMS TLS certificates from the file.

5-2-9 NVMe Configuration



Parameter	Description
NVMe Configuration	Displays the NVMe devices connected to the system.

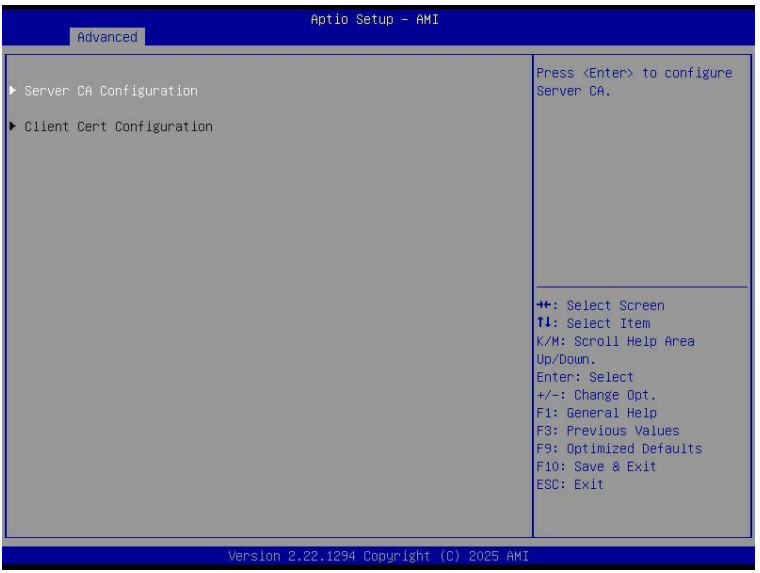
5-2-10 Chipset Configuration



Parameter	Description
Restore on AC Power Loss(Note)	Defines the power state to resume to after a system shutdown that is due to an interruption in AC power. When set to Last State, the system will return to the active power state prior to shutdown. When set to Power Off, the system remains off after power shutdown. Options available: Last State, Power Off, Power On, Unspecified. The default setting depends on the BMC setting.
P2P Bridge IO Size	Specifies P2P Bridge IO aligned to the size. Options available: 0x100, 0x150, **0x1000**.
SATA HDD Security Frozen	Enable/Disable this item to send freeze lock command to SATA HDD. Options available: Disabled, **Enabled**.
NVMe SSD Security Frozen	Attempt to send freeze lock command to NVMe SSDs during boot. Options available: Disabled, **Enabled**.
NVMe OPROM Select	Options available: **BIOS Build-In**, NVMe Device, Disabled.
NVMe LED Control	Enable/Disable allow user control NVMe LED. It only available the NVMe device direct connect to CPU. Options available: **Disable**, Enable.

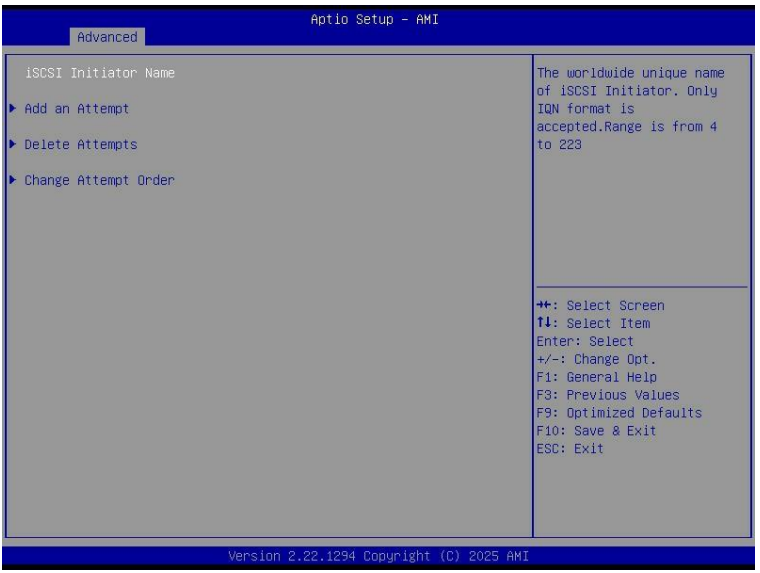
(Note) When the power policy is controlled by BMC, please wait for 15-20 seconds for BMC to save the last power state.

5-2-11 Tls Auth Configuration



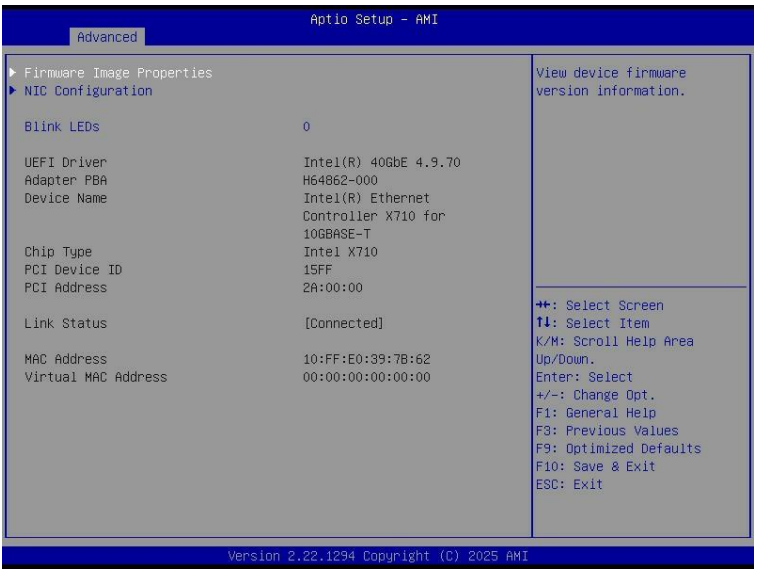
Parameter	Description
Server CA Configuration	Press [Enter] for configuration of advanced items. ◆ Enroll Cert – Press [Enter] to enroll a certificate • Enroll Cert Using File • Cert GUID Input digit character in 1111111-2222-3333-4444-1234567890ab format. – Commit Changes and Exit – Discard Changes and Exit ◆ Delete Cert
Client Cert Configuration	Press [Enter] for configuration of advanced items.

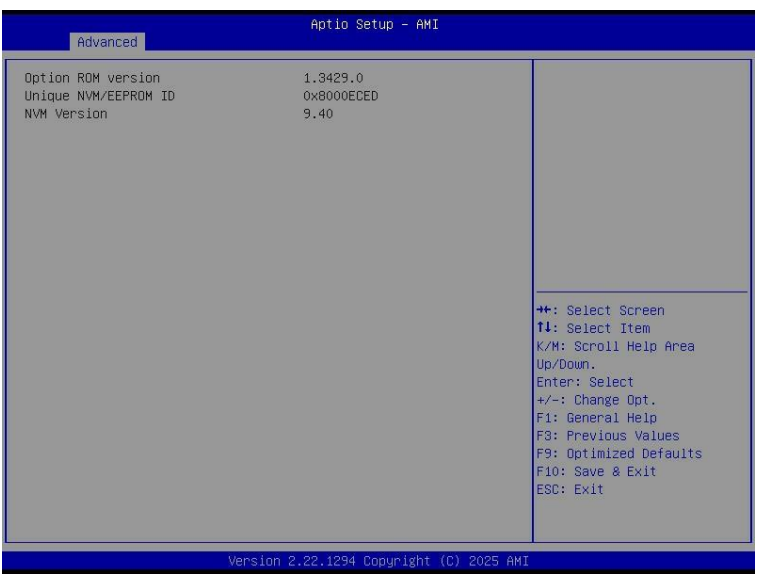
5-2-12 iSCSI Configuration

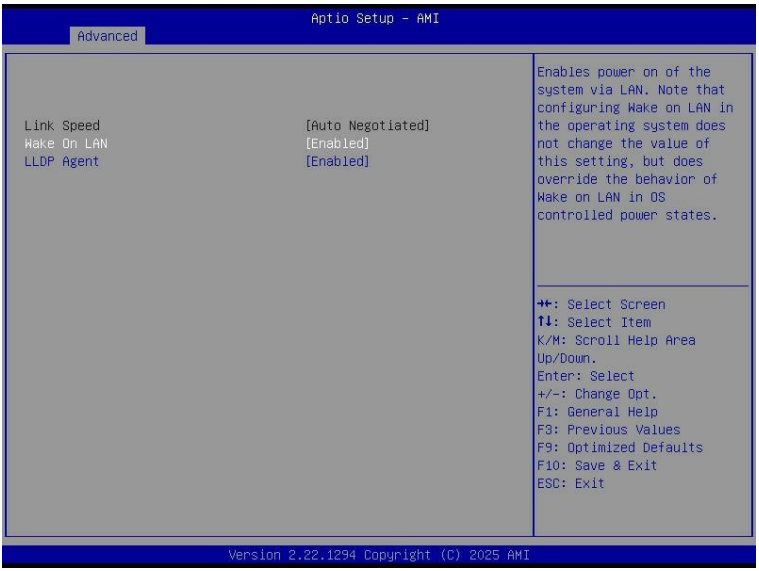


Parameter	Description
Attempt Priority	Press [Enter] configure advanced items. ◆ Attempt Priority – Use arrow keys to select the attempt, then press +/- keys to move the attempt up/down in the attempt order list. ◆ Commit Changes and Exit
Host iSCSI Configuration	Press [Enter] to configure advanced items. ◆ iSCSI Initiator Name – Only IQN format is accepted. Range: from 4 to 223 ◆ Add an Attempt ◆ Delete Attempts ◆ Change Attempt Order

5-2-13 Intel(R) Ethernet Controller X710 for 10GBASE-T



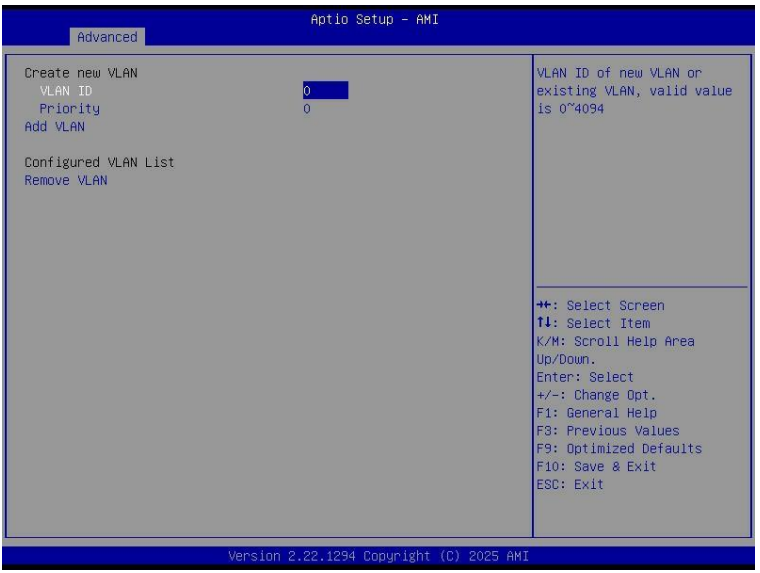




Parameter	Description
Firmware Image Properties	Press [Enter] to view device firmware version information
NIC Configuration	Press [Enter] to configure advanced items. ◆ Link Speed – Allows for automatic link speed adjustment. – Default setting is **Auto Negotiated**. ◆ Wake On LAN – Enables power on of the system via LAN. Note that configuring Wake on LAN in the operating system does not change the value of this setting, but does override the behavior of Wake on LAN in OS controlled power states. – Options available: Disabled, **Enabled**. ◆ LLDP Agent – Options available: Disabled, **Enabled**.
Blink LEDs	Identifies the physical network port by blinking the associated LED. Press the numeric keys to adjust desired values (up to 15 seconds).
UEFI Driver	Displays the technical specifications for the Network Interface Controller.
Adapter PBA	Displays the technical specifications for the Network Interface Controller.
Device Name	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.
PCI Address	Displays the technical specifications for the Network Interface Controller.
Link Status	Displays the technical specifications for the Network Interface Controller.

Parameter	Description
MAC Address	Displays the technical specifications for the Network Interface Controller.
Virtual MAC Address	Displays the technical specifications for the Network Interface Controller.

5-2-14 VLAN Configuration

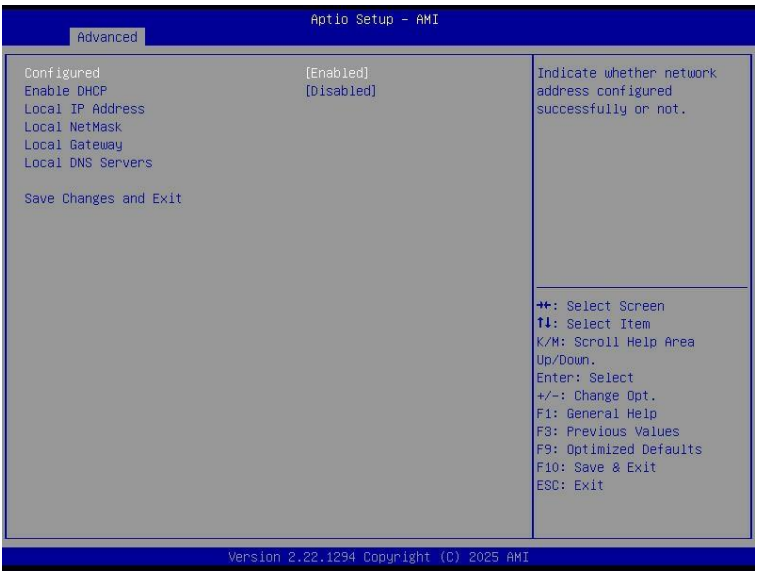


Parameter	Description
Enter Configuration Menu	Press [Enter] to configure advanced items. ◆ Create new VLAN ◆ VLAN ID – Sets VLAN ID for a new VLAN or an existing VLAN. – Press the <+> / <-> keys to increase or decrease the desired values. – The valid range is from 0 to 4094. ◆ Priority – Sets 802.1Q Priority for a new VLAN or an existing VLAN. – Press the <+> / <-> keys to increase or decrease the desired values. – The valid range is from 0 to 7. ◆ Add VLAN – Press [Enter] to create a new VLAN or update an existing VLAN. ◆ Configured VLAN List ◆ Remove VLAN – Press [Enter] to remove an existing VLAN.

5-2-15 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. ◆ Save Changes and Exit – Press [Enter] to save all configurations.

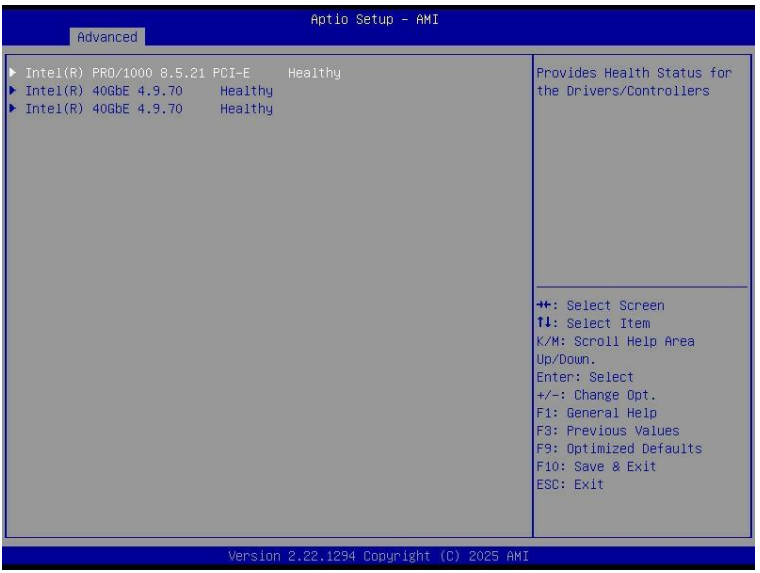
5-2-16 MAC IPv4 Network Configuration



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 **Disabled.**
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**.

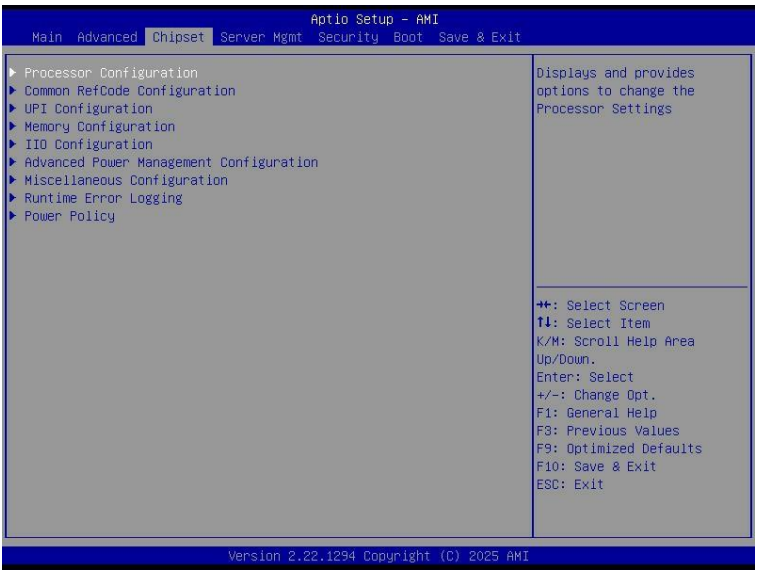
5-2-17 Driver Health



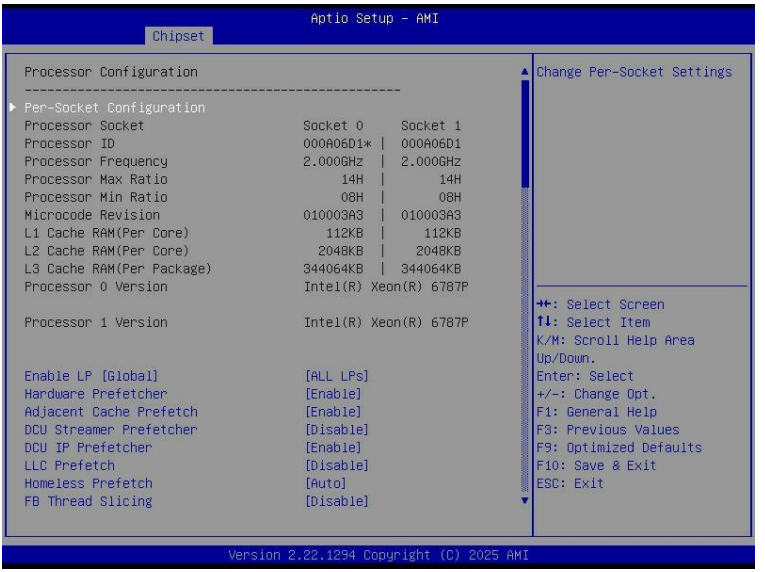
Parameter	Description
Driver Health	Displays driver health status of the devices/controllers if installed.

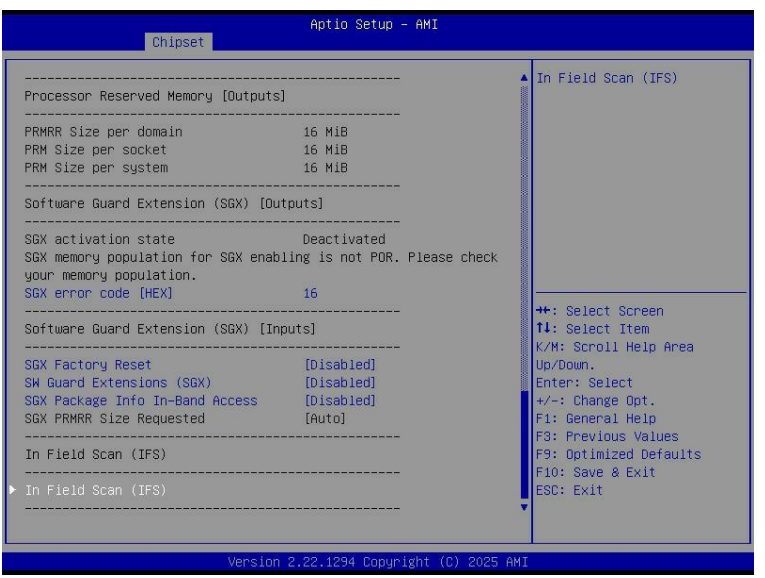
5-3 Chipset Menu

Chipset Setup menu displays submenu options for configuring the function of Platform Controller Hub(PCH). Select a submenu item, then press <Enter> to access the related submenu screen.



5-3-1 Processor Configuration



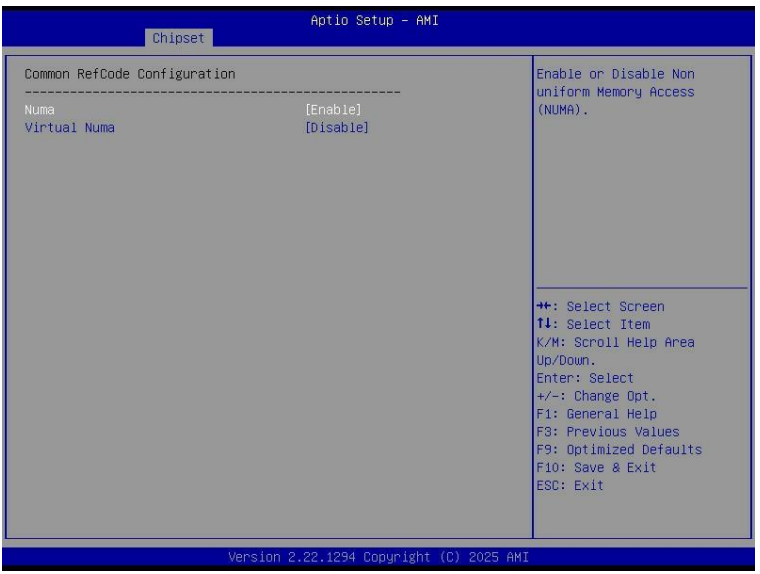


Parameter	Description
Processor Configuration	
Pre-Socket Configuration	Press [Enter] to configure advanced items. ◆ CPU Socket 0/1 Configuration – Core Disable Bitmap(Hex) • Number of Cores to enable. 0 means all cores. FFFFFFF means to disable all cores. The maximum value depends on the number of CPUs available. Press the numeric keys to adjust desired values.
Processor Socket / Processor ID / Processor Frequency / Processor Max Ratio / Processor Min Ratio / Microcode Revision / L1 Cache RAM(Per Core) / L2 Cache RAM(Per Core) / L3 Cache RAM(Per Package) / Processor # Version	Displays the technical specifications for the installed processor(s).
Enable LP [Global]	Enables Logical processor (Software Method to Enable/Disable Logical Processor threads). Options available: **ALL LPs**, Single LP.
Hardware Prefetcher	Select whether to enable the speculative prefetch unit of the processor. Options available: **Enable**, Disable.
Adjacent Cache Prefetch	When enabled, cache lines are fetched in pairs. When disabled, only the required cache line is fetched. Options available: **Enable**, Disable.
DCU Streamer Prefetcher	Enable/Disable DCU streamer prefetcher. Options available: Enable, **Disable**, Auto.
DCU IP Prefetcher	Enable/Disable DCU IP Prefetcher. Options available: **Enable**, Disable.
LLC Prefetch	Enable/Disable LLC Prefetch on all threads. Options available: **Disable**, Enable.
Homeless Prefetch	Enable/Disable Homeless Prefetch on all threads, Auto will skip the register programming and keep the hardware default setting. Options available: Disable, Enable, **Auto**.
FB Thread Slicing	Enable/Disable FB (Full Buffer) Thread Slicing per thread. Options available: **Disable**, Enable.
AMP Prefetch	Options available: **Enable**, Disable.
Enable Intel(R) TXT	Enable/Disable the Intel Trusted Execution Technology support function. Options available: Enable, **Disable**.
VMX	Enable/Disable the Vanderpool Technology. This will take effect after rebooting the system. Options available: Disable, **Enable**.
Enable SMX	Enable/Disable Safer Mode Extensions. Options available: **Disable**, Enable.
AES-NI	Enable/Disable the AES-NI support. Options available: Disable, **Enable**.

Parameter	Description
Debug Consent	Options available: **Disable**, Enable.
Memory Encryption (TME)	Options available: **Disabled**, Enabled.
Total Memory Encryption Multi-Tenant (TME-MT)	Options available: **Disabled**, Enabled.
Memory Integrity	Options available: **Disabled**, Enabled.
Trust Domain Extensions (TDX)(Note)	Options available: **Disabled**, Enabled.
Trust Domain Extensions - Connect (TDX Connect)	Options available: **Disabled**, Enabled.
TDX Secure Arbitration Mode Loader (SEAM Loader)	Options available: **Disabled**, Enabled.
TME-MT/TDX key split	Designate number of bits for TDX usage. The rest will be used by TME-MT.
SGX error code [HEX]	Displays hexadecimal SGX internal error code.
SGX Factory Reset	Options available: **Disabled**, Enabled.
SW Guard Extensions (SGX)	Options available: **Disabled**, Enabled.
SGX Package Info In-Band Access	Options available: **Disabled**, Enabled.
In-Field Scan (IFS)	Press [Enter] to configure advanced items. ◆ Enable SAF(Note) – Options available: **Disabled**, Enabled. ◆ SAF PRMRR Size Requested – Configures SAF size region inside of PRM - just a constituent that may not be equal to the total PRM size. ◆ Enable SBFT(Note) – Options available: **Disabled**, Enable SBFT and SGX, Enabled. ◆ SBFT PRMRR Size Requested – Configures SBFT size region inside of PRM - just a constituent that may not be equal to the total PRM size.

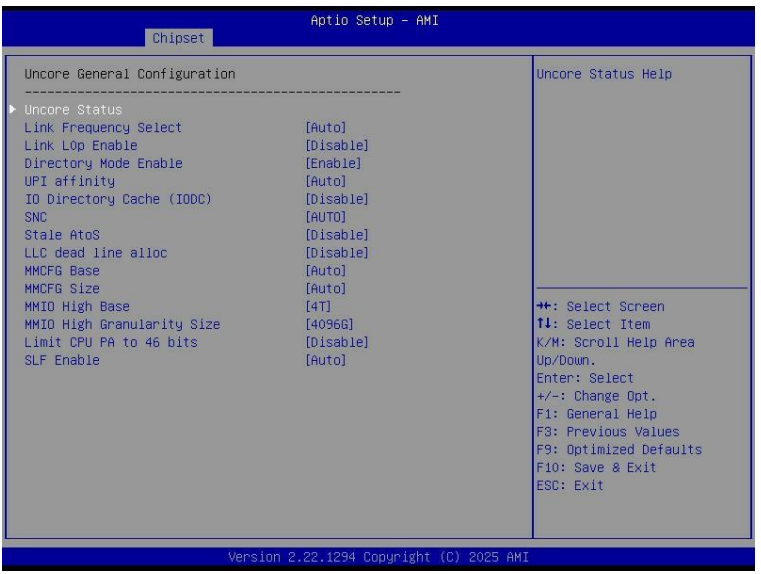
(Note) Advanced items prompt when this item is defined.

5-3-2 Common RefCode Configuration



Parameter	Description
Common RefCode Configuration	
Numa	Enable or disable Non uniform Memory Address (NUMA). Options available: **Enable**, Disable.
Virtual Numa	Divide physical NUMA nodes into evenly sized virtual NUMA nodes in ACPI table. This may improve Windows performance on CPUs with more than 64 logical processors. Options available: Enable, **Disable**.

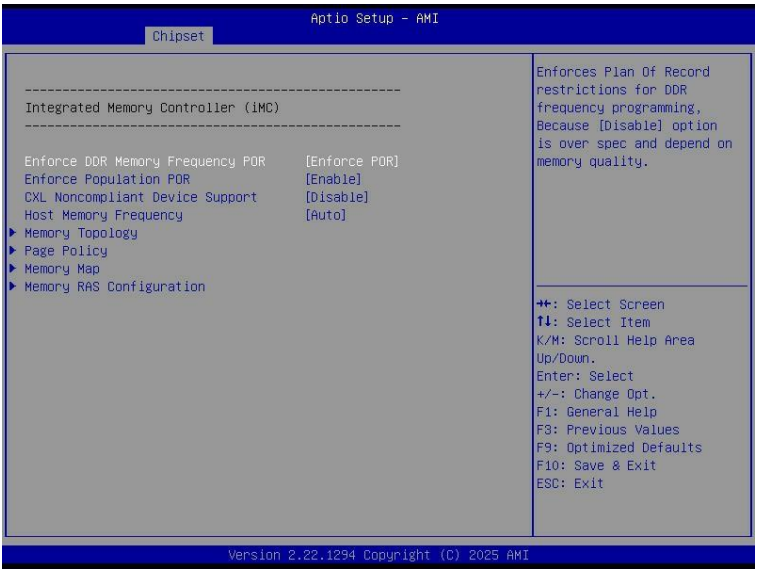
5-3-3 UPI Configuration



Parameter	Description
UPI General Configuration	Press [Enter] to configure advanced items. ◆ Uncore Status – Press [Enter] to view the Uncore status. ◆ Link Frequency Select – Selects the UPI link frequency. – Options available: 16.0GT/s, 20.0GT/s, 24.0GT/s, **Auto**, Use Per Link Setting. ◆ Link L0p Enable – Options available: **Disable**, Enable, Auto. ◆ Directory Mode Enable – Options available: Disable, **Enable**, Auto. ◆ UPI affinity – Options available: Disable, Enable, **Auto**. ◆ IO Directirt Cache (IODC) – Options available: **Disable**, Auto, Enable for Remote InvItoM Hybrid Push, Enable for Remote InItoM AllocFlow, Enable for Remote InvItoM Hybrid AllocNonAlloc, Enable for Remote InvItoM and Remote WCiLF. ◆ SNC – Options available: Disable, Enable, **Auto**.

Parameter	Description
UPI General Configuration (continued)	◆ Stale AtoS – Enable/Disable Stale A to S directory optimization. – Options available: **Disable**, Enable, Auto. ◆ LLC dead line alloc – Enable/Disable fill dead lines in LLC. – Options available: **Disable**, Enable, Auto. ◆ MMCFG Base – Options available: 1G, 1.5G, 1.75G, 2G, 2.25G, 3G, **Auto**. ◆ MMCFG Size – Options available: 64M, 128M, 256M, 512M, 1G, 2G, **Auto**. ◆ MMIO High Base – Options available: 248T, 120T, 88T, 60T, 30T, 56T, 40T, 32T, 24T, 16T, **4T**, 2T, 1T, 512G, 3584T, Auto. ◆ MMIO High Granularity Size – Selects the allocation size used to assign mmioh resources. – Options available: 1G, 4G, 16G, 32G, 64G, 256G, 1024G, **4096G**, Auto. ◆ Limit CPU PA to 46 bit – Options available: **Disable**, Enable. ◆ SLF Enable – Options available: Disable, Enable, **Auto**.

5-3-4 Memory Configuration



Parameter	Description
Integrated Memory Controller (iMC)	
Enforce DDR Memory Frequency POR	When set to Enable, the system enforces Plan Of Record restrictions for DDR frequency programming. Options available: **Enforce POR**, Enforce Stretch Goals, Disable.
Enforce Population POR	Options available: Disable, **Enable**.
CXL Noncompliant Device Support	Options available: Enable, **Disable**.
Host Memory Frequency	Options available: **Auto**, 4800, 5200, 5600, 6000, 6400.
Memory Topology	Press [Enter] to view memory topology with DIMM population information.
Page Policy	Press [Enter] to configure advanced items. ◆ Page Policy – Selects DRAM page policy. – Options available: Auto, Closed, **Adaptive**.
Memory Map(Note)	Press [Enter] to configure advanced items. ◆ Intel(R) Flat Memory Mode Support – Options available: **Disabled**, Enabled. ◆ DDR CXL Heterogeneous Interleave Support – Options available: Enabled, **Disabled**. ◆ In Memory Directory (Dir Backed RSF) with IODC mode – Options available: Enabled, **Disabled**.

(Note) Advanced items prompt when HBM CPU is installed.

Parameter	Description
Memory RAS Configuration	Press [Enter] to configure advanced items. ◆ Mirror Mode – Mirror Mode will set entire 1LM memory in system to be mirrored, consequently reducing the memory capacity by half. Enables the Mirror Mode will disable the XPT Prefetch. – Options available: **Disabled**, Full Mirror Mode. ◆ UEFI ARM Mirror – Imitate behavior of UEFI based Address Rang Mirror with setup option. – Options available: **Disabled**, Enabled. ◆ Mirror TAD0 – Enable Mirror om entire memory for TAD0. – Options available: Enabled, **Disabled**. ◆ Correctable Error Threshold – Correctable Error Threshold (0x01-0x7fff) used for sparing, and leaky bucket. – Press the <+> / <-> keys to increase or decrease the desired values. ◆ Leaky bucket time window based interface(Note) – Enable/Disable leaky bucket time window based interface. – Options available: **Disabled**, Enabled. ◆ Leaky bucket time window based interface Hour – Leaky bucket time window based interface hour used for DDR (0-24). – Press the <+> / <-> keys to increase or decrease the desired values. ◆ Leaky bucket time window based interface Minute – Leaky bucket time window based interface minute used for DDR (0-60). – Press the <+> / <-> keys to increase or decrease the desired values. ◆ Leaky bucket low bit – Configures leaky bucket low bit (0x1 - 0x29). – Press the <+> / <-> keys to increase or decrease the desired values. ◆ Leaky bucket high bit – Configures leaky bucket high bit (0x1 - 0x29). – Press the <+> / <-> keys to increase or decrease the desired values. ◆ ADDDC Sparing(Note) – Enable/Disable ADDDC Sparing. – Options available: **Disabled**, Enabled.

(Note) Advanced items prompt when this item is defined.

Parameter	Description
Memory RAS Configuration (continued)	◆ Enable ADDDC Error Injection – Options available: Disabled, **Enabled**. ◆ Patrol Scrub – Options available: **Disabled**, Enable at End of POST. ◆ Patrol Scrub Interval – Selects the number of hours (1-24) required to complete full scrub. A value of zero means auto. ◆ DDR5 ECS – Options available: Disabled, **Enabled**, Enable ECS with Result Collection.

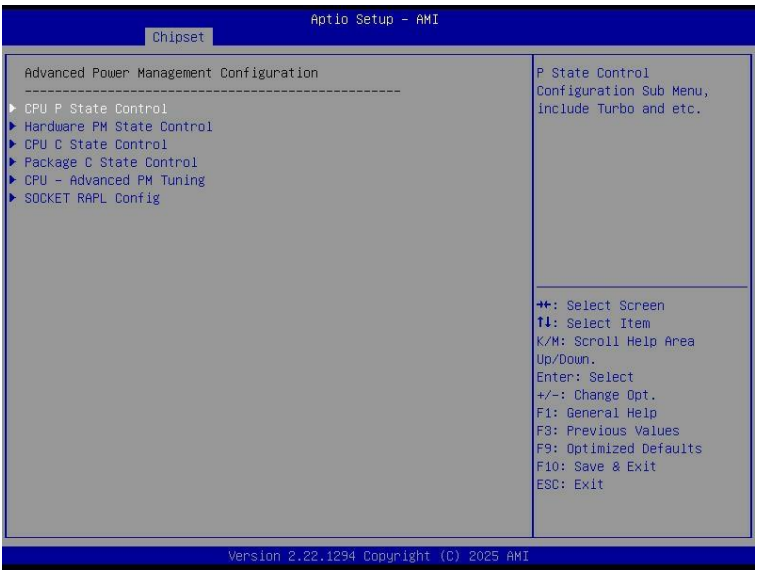
5-3-5 IIO Configuration

Parameter	Description
IIO Configuration	
Intel® VMD Configuration(Note)	Enable/Disable Intel® VMD technology. Options available: **Disable**, Enable.
Intel® VMD for Non-Hotplug NVMe	Enable/Disable Intel® VMD for Non-Hotplug NVMe. Options available: **Disable**, Enable.
Intel® VT for Directed I/O (VT-d)	Press [Enter] to configure advanced items. ◆ DMA Control Opt-In Flag – Enable/Disable DMA_CTRL_PLATFORM_OPT_IN_FLAG in DMAR table in ACPI. Not compatible with Direct Device Assignment (DDA). – Options available: **Enable**, Disable. ◆ Pre-boot DMA Protection – Options available: Disable, **Enable**. ◆ PCIe ACSCTL(Note) – Enable/Disable overwrite of PCI Access Control Services Control register in PCI root ports. – Options available: **Disable**, Enable. ◆ Source Validation – Options available: **Disabled**, Enabled. ◆ Translation Blocking – Options available: **Disabled**, Enabled.

(Note) Advanced items prompt when this item is defined.

Parameter	Description
Intel® VT for Directed I/O (VT-d) (continued)	◆ P2P Request Redirect – Options available: Disabled, **Enabled**. ◆ P2P Completion Redirect – Options available: Disabled, **Enabled**. ◆ Upstream Forwarding Enable – Options available: Disabled, **Enabled**. ◆ Cache Allocation – Options available: **Enable**, Disable.
Global Configuration	Press [Enter] to configure advanced items. ◆ Max Read Request Size – Options available: Auto, 128B, 256B, 512B, 1024B, 2048B, **4096B**. ◆ Relaxed Ordering – Options available: Disable, **Enable**.

5-3-6 Advanced Power Management Configuration



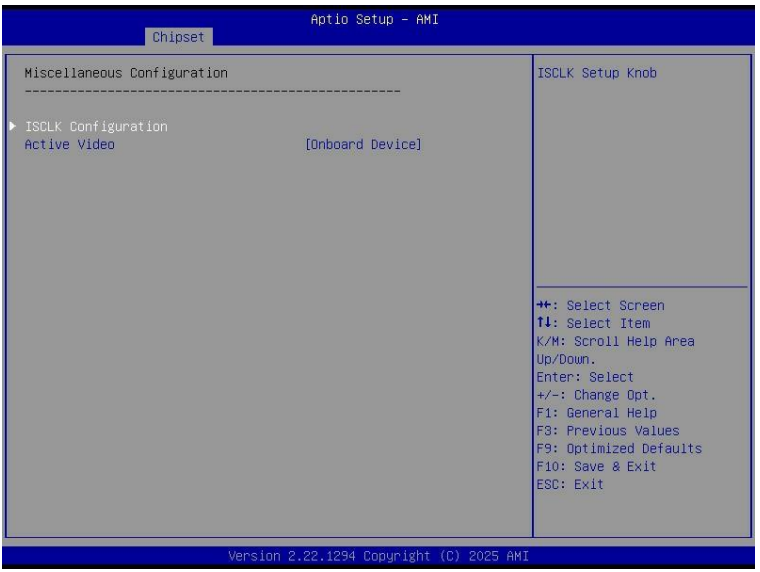
Parameter	Description
CPU P State Control	Press [Enter] to configure advanced items. ◆ AVX License Pre-Grant Override – Options available: **Disable**, Enable. ◆ AVX P1 – Options available: **Nominal**, Level 1, Level 2. ◆ SpeedStep (Pstates) – Options available: Disable, **Enable**. ◆ EIST PSD Function – Options available: **HW_ALL**, SW_ALL. ◆ Boot performance mode – Options available: **Max Performance**, Max Efficiency. ◆ Turbo Mode – When this item is enabled, the processor will automatically ramp up the clock speed of 1-2 of its processing cores to improve its performance. When this item is disabled, the processor will not overclock any of its core. – Options available: Disable, **Enable**.

Parameter	Description
Hardware PM State Control	Press [Enter] to configure advanced items. ◆ Hardware P-States – When this item is disabled, the processor hardware chooses a P-state based on OS Request (Legacy P-States). – In Native mode, the processor hardware chooses a P-state based on OS guidance. – In Out of Band mode, the processor hardware autonomously chooses a P-state (with no OS guidance). – Options available: Disable, **Native Mode**, Out of Band Mode, Native Mode with No Legacy Support. ◆ HardwarePM Interrupt – Options available: **Disable**, Enable. ◆ Native ASPM – Options available: Auto, Enabled, **Disabled**.
CPU C State Control	Press [Enter] to configure advanced items. ◆ Monitor MWAIT – Allows Monitor and MWAIT instructions. – Options available: Disable, **Enable**. ◆ C1 to C1e Promotion – CPU will promote C1 request to C1e state. – Options available: Disable, **Enable**. ◆ ACPI C6x Enumeration – Options available: Disable, C6 as ACPI C2, **C6 as ACPI C3**, C6-P as ACPI C2, C6-P as ACPI C3, Auto.
Package C State Control	Press [Enter] to configure advanced items. ◆ Package C State – Configures the state for the C-State package limit. – Options available: **C0/C1 state**, C2 state, C6(non Retention) state, No Limit, Auto.
CPU - Advanced PM Tuning	Press [Enter] to configure advanced items. ◆ Uncore Freq Ratio (COMPUTE/IO) – 0: Set dynamic Uncore frequency range from max and min fused values. Otherwise Uncore will run at a constant frequency ratio, the UFS algorithm will be disabled, but physical limits may still reduce frequency. ◆ Uncore Freq Control – Options available: Mode 0, **Mode 1**. ◆ Energy Perf BIAS – Press [Enter] to configure advanced items. » Power Performance Tuning • Options available: OS Controls EPB, **BIOS Controls EPB**, PECI Controls EPB.

Parameter	Description
CPU - Advanced PM Tuning (continued)	» Energy_PERF_BIAS_CFG mode(Note) • Options available: **Performance**, Balanced Performance, Balanced Power, Power. ◆ Latency Optimized Mode – Options available: **Disable**, Enabled.
SOCKET RAPL Config	Press [Enter] to configure advanced items. ◆ PL1 Power Limit – Press the <+> / <-> keys to increase or decrease the desired values. ◆ PL1 Timer Window – Options available: **1**, 1.25, 1.5, 1.75, 2, 2.5, 3, 3.5, 4, 5. ◆ PL2 Power Limit – Press the <+> / <-> keys to increase or decrease the desired values. ◆ PL2 Timer Window – Options available: **0.012**, 0.014, 0.016, 0.02, 0.023, 0.027, 0.031, 0.039.

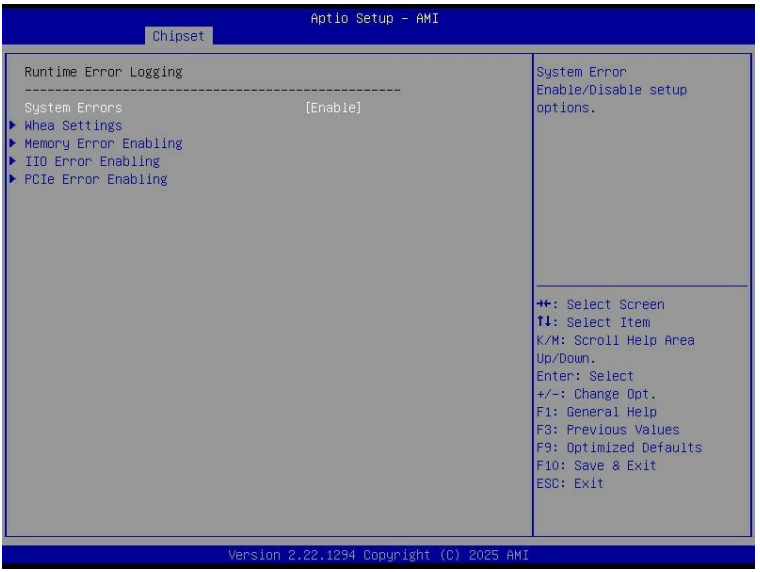
(Note) This item is configurable when **Power Performance Tuning** is set to **BIOS Controls EPB**.

5-3-7 Miscellaneous Configuration



Parameter	Description
Miscellaneous Configuration	
ISCLK Configuration	Press [Enter] to configure advanced items. ◆ SSC1/SSC2 Enable – Options available: Disable, **Enable**.
Active Video	Selects the active video type. Options available: Auto, **Onboard Device**, PCIE Device, Specific PCIE Device.

5-3-8 Runtime Error Logging

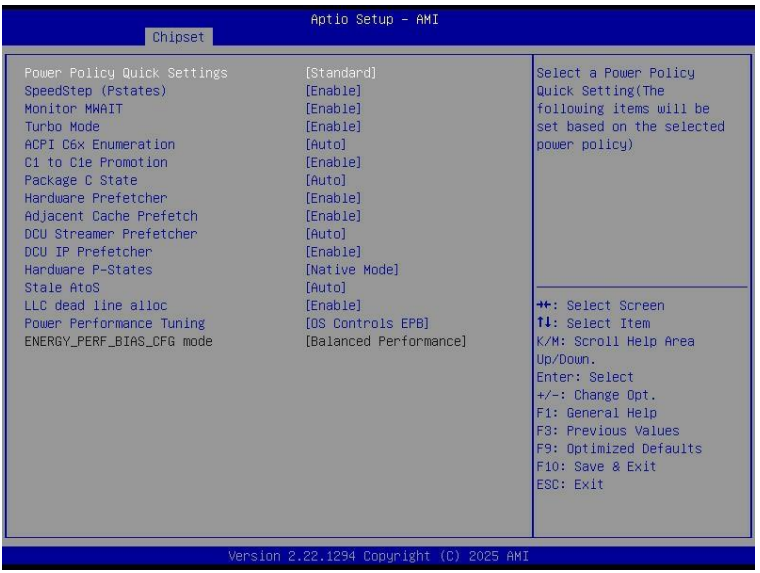


Parameter	Description
Runtime Error Logging	
System Errors	Enable/Disable system error logging function. Options available: **Enable**, Disable.
Whea Settings	Press [Enter] to configure advanced items. ◆ WHEA (Windows Hardware Error Architecture) Support – Enable/Disable WHEA Support. – Options available: **Enable**, Disable.
Memory Error Enabling	Press [Enter] to configure advanced items. ◆ Memory Corrected Error – Enable/Disable Memory Corrected Error. – Options available: **Enable**, Disable. ◆ Uncorrected Error disable Memory – Enable/Disable the Memory that triggers Uncorrected Error. – Options available: Enable, **Disable**.
IIO Error Enabling	Press [Enter] to configure advanced items. ◆ Os Native AER Support – Select FFM or OS native for AER error handling. If select OS native, BIOS also initialize FFM first until handshake, which depends on OS capability. – Options available: Enable, **Disable**.

Parameter	Description
PCIe Error Enabling	Press [Enter] to configure advanced items. ◆ PCIE Error – Enable/Disable PCIE error. – Options available: **Enable**, Disable. ◆ Uncorrected Error(Note) – Enables and escalates Uncorrectable/Recoverable Errors to error pins. – Options available: **Enable**, Disable. ◆ Fatal Error Enable(Note) – Enables and escalates Fatal Errors to error pins. – Options available: **Enable**, Disable. ◆ Assert NMI on SERR(Note) – Enable/Disable BIOS generates a non-maskable interrupt (NMI) and logs an error when a system error (SERR) occurs. – Options available: **Enabled**, Disabled. ◆ Assert NMI on PERR(Note) – Enable/Disable BIOS generates a non-maskable interrupt (NMI) and logs an error when a processor bus parity error (PERR) occurs. – Options available: **Enabled**, Disabled.

(Note) This item appears when **PCIE Error** is set to **Enable**.

5-3-9 Power Policy

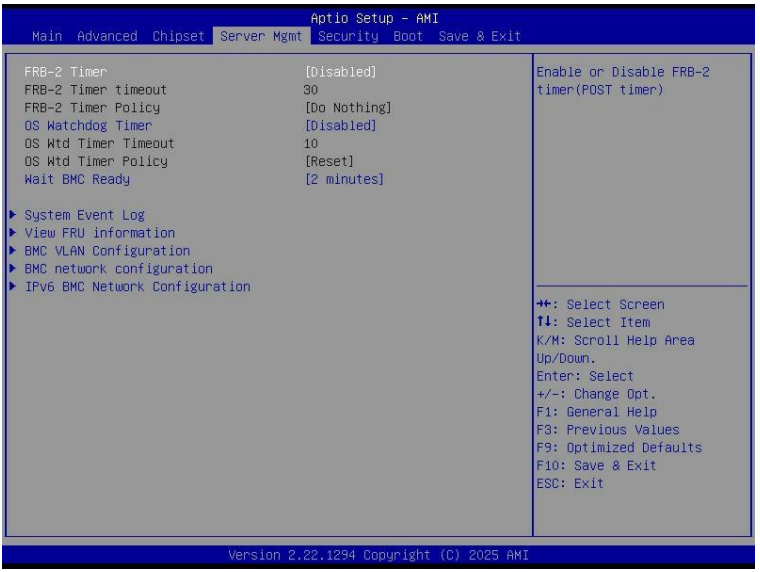


Parameter	Description
Power Policy Quick Settings(Note)	Selects a Power Policy Quick Setting. Options available: **Standard**, Best Performance, Energy Efficient.
SpeedStep (Pstates)	Conventional Intel SpeedStep Technology switches both voltage and frequency in tandem between high and low levels in response to processor load. Options available: Disable, **Enable**.
Monitor MWAIT	Options available: Disable, **Enable**.
Turbo Mode	When this item is enabled, the processor will automatically ramp up the clock speed of 1-2 of its processing cores to improve its performance. When this item is disabled, the processor will not overclock any of its core. Options available: Disable, **Enable**.
ACPI C6x Enumeration	Options available: Disable, C6 as ACPI C2, **C6 as ACPI C3**, C6-P as ACPI C2, C6-P as ACPI C3, Auto.
C1 to C1e Promotion	Options available: Disable, **Enable**.
Package C State	Configures the C-State package limit. Options available: **C0/C1 state**, C2 state, C6(non Retention) state, No Limit, Auto.
Hardware Prefetcher	Options available: **Enable**, Disable.
Adjacent Cache Prefetch	Options available: **Enable**, Disable.

(Note) Advanced items prompt when this item is defined.

Parameter	Description
DCU Streamer Prefetcher	Options available: Enable, **Disable**, Auto.
DCU IP Prefetcher	Options available: **Enable**, Disable.
Hardware P-States	Options available: Disable, **Native Mode**, Out of Band Mode, Native Mode with No Legacy Support.
Stale Atos	Options available: **Disable**, Enable, Auto.
LLC dead line alloc	Options available: **Disable**, Enable, Auto.
Power Performance Tuning	Options available: OS Controls EPB, **BIOS Controls EPB,** PECI Controls EPB.
ENERGY_PERF_BIAS_CFG mode	Options available: Performance, **Balanced Performance**, Balanced Power, Power.
Hyper-Performance	Options available: Disable, Level 1, Level 2, Level 3, **Maximum**.
Turbo Frequency Lock	Options available: **Disable**, Enable.

5-4 Server Management Menu



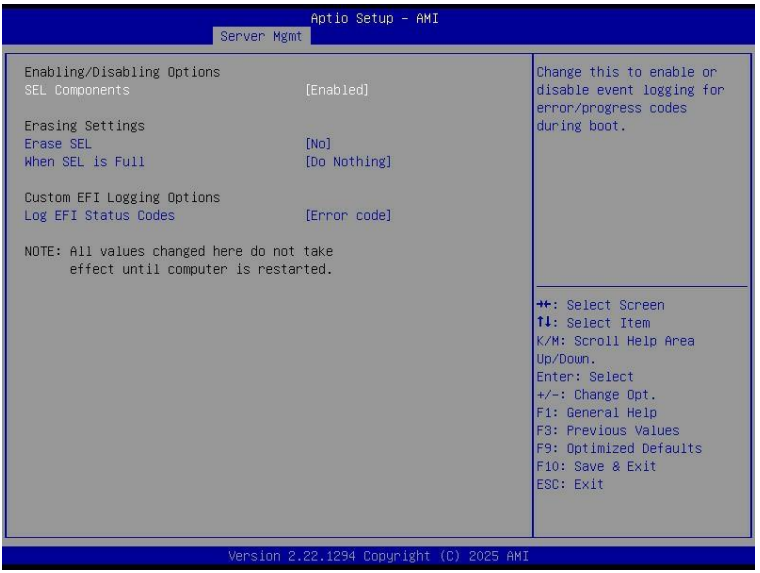
Parameter	Description
FRB-2 Timer	Enable/Disable FRB-2 timer (POST timer). Options available: Enabled, **Disabled**.
FRB-2 Timer(Note1) timeout	Configures the FRB2 Timer timeout. The value is between 1 to 30 minutes. Default setting is **30**.
FRB-2 Timer Policy(Note1)	Configures the FRB2 Timer policy. Options available: **Do Nothing**, Reset, Power Down, Power Cycle.
OS Watchdog Timer	Enable/Disable OS Watchdog Timer function. Options available: Enabled, **Disabled**.
OS Wtd Timer Timeout(Note2)	Configures OS Watchdog Timer. The value is between 1 to 30 minutes. Default setting is **10**.
OS Wtd Timer Policy(Note2)	Configure OS Watchdog Timer Policy. Options available: **Reset**, Do Nothing, Power Down, Power Cycle.
Wait BMC Ready	POST wait BMC ready and reboot system. Options available: Disabled, **2 minutes**, 4 minutes, 6 minutes.
System Event Log	Press [Enter] to configure advanced items.
View FRU Information	Press [Enter] to view the FRU information.

(Note1) This item is configurable when **FRB-2 Timer** is set to **Enabled**.

(Note2) This item is configurable when **OS Watchdog Timer** is set to **Enabled**.

Parameter	Description
BMC VLAN Configuration	Press [Enter] to configure advanced items.
BMC network Configuration	Press [Enter] to configure advanced items.
IPv6 BMC Network Configuration	Press [Enter] to configure advanced items.

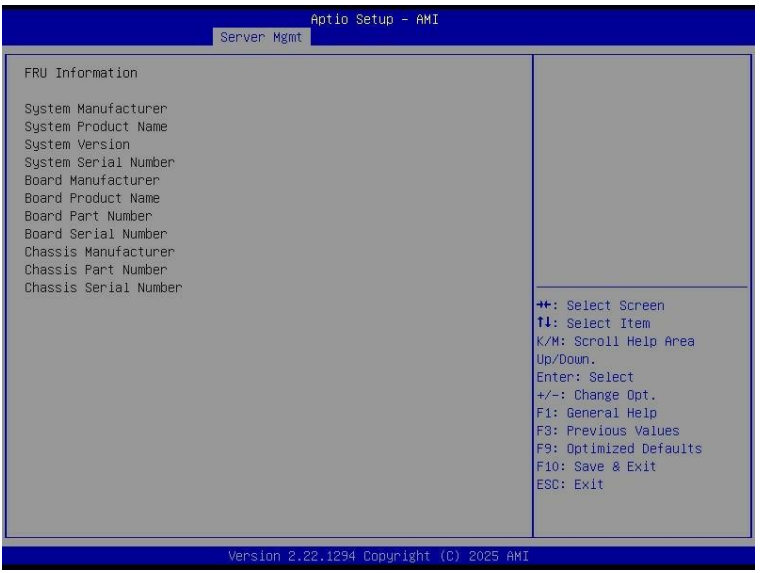
5-4-1 System Event Log



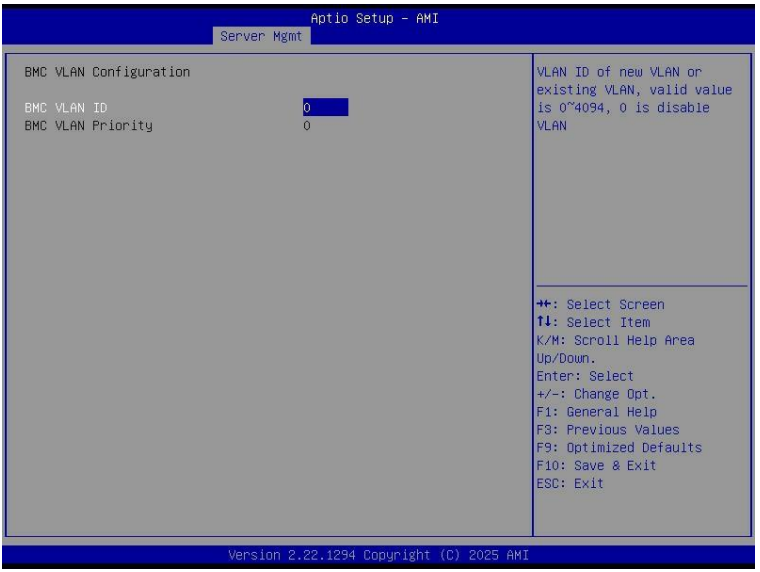
Parameter	Description
Enabling / Disabling Options	
SEL Components	Change this item to enable or disable all features of System Event Logging during boot. Options available: **Enabled**, Disabled.
Erasing Settings	
Erase SEL	Choose options for erasing SEL. Options available: **No**, Yes, On next reset, Yes, On every reset.
When SEL is Full	Choose options for reactions to a full SEL. Options available: **Do Nothing**, Erase Immediately, Delete Oldest Record.
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.

5-4-2 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.



5-4-3 BMC VLAN Configuration

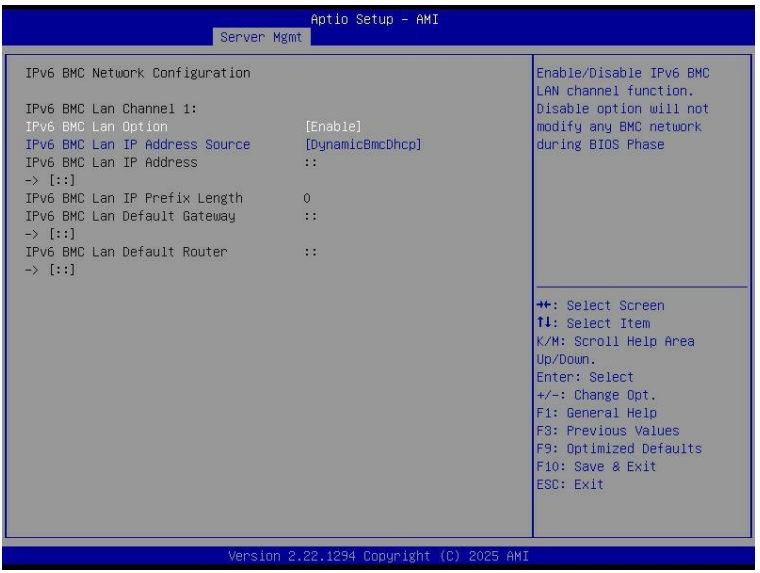


Parameter	Description
BMC VLAN Configuration	
BMC VLAN ID	Select to configure BMC VLAN ID. The valid range is from 0 to 4094. When set to 0, BMC VLAN ID will be disabled.
BMC VLAN Priority	Select to configure BMC VLAN Priority. The valid range is from 0 to 7. When BMC VLAN ID is set to 0, BMC VLAN Priority will not be selected.

5-4-4 BMC Network Configuration

Parameter	Description
BMC network configuration	
Select NCSI and Dedicated LAN	Options available: **Do Nothing**, Model1(Dedicated), Model2(NCSI), Mode3(Failover).
Lan Channel 1	
Configuration Address source	Selects to configure LAN channel parameters statically or dynamically (DHCP). Options available: Unspecified, Static, **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 get BMC network address	Press [Enter] will set LAN mode and Address source and then get IP, Subnet, Gateway and MAC address.

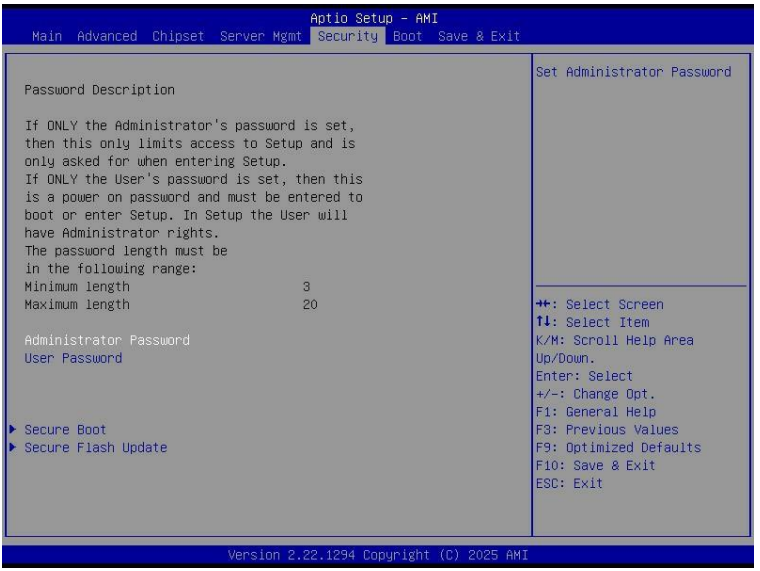
5-4-5 IPv6 BMC Network Configuration



Parameter	Description
IPv6 BMC network configuration	
IPv6 BMC Lan Channel 1	
IPv6 BMC Lan Option	Enable/Disable IPv6 BMC LAN channel function. When this item is disabled, the system will not modify any BMC network during BIOS phase. Options available: Unspecified, Disable, **Enable**.
IPv6 BMC Lan IP Address Source	Selects to configure LAN channel parameters statically or dynamically (by BIOS or BMC). Options available: Unspecified, Static, **DynamicBmcDhcp**.
IPv6 BMC Lan IP Address/ Prefix Length/ Default Gateway/ Default Router	Check if the IPv6 BMC LAN IP address matches those displayed on the screen.

5-5 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.

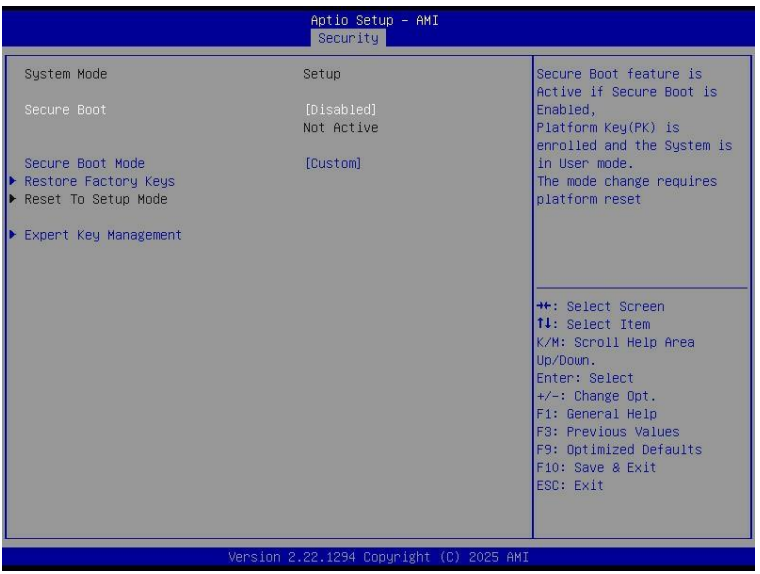
- User Password

  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.
Secure Flash Update	Press [Enter] to view information of secure Flash update support.

5-5-1 Secure Boot

The Secure Boot feature is applicable if supported by your Operating System.
If your Operating System is not supporting Secure Boot, the system will hang when starting the 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**.
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 the Operating System 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.
Restore Factory Keys	Forces the system to user mode and installs factory default Secure Boot key database.
Reset To Setup Mode	Reset the system to Setup Mode.

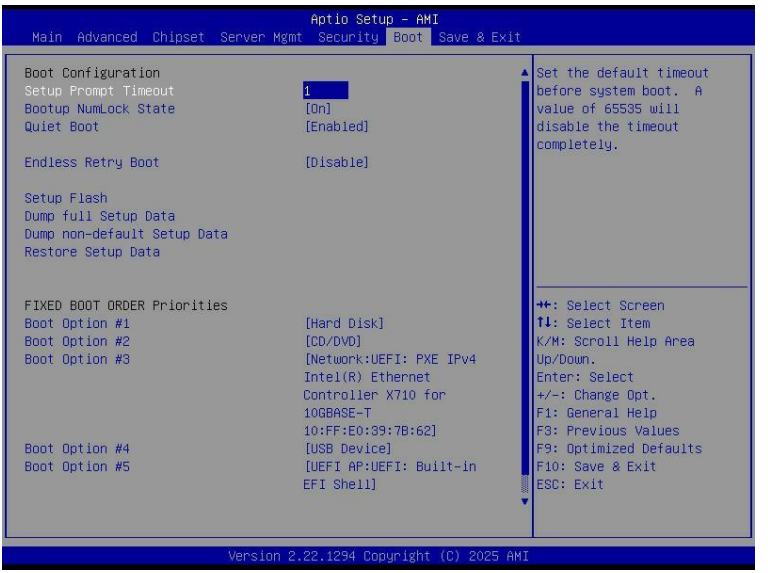
(Note) Advanced items prompt when this item is set to **Custom**.

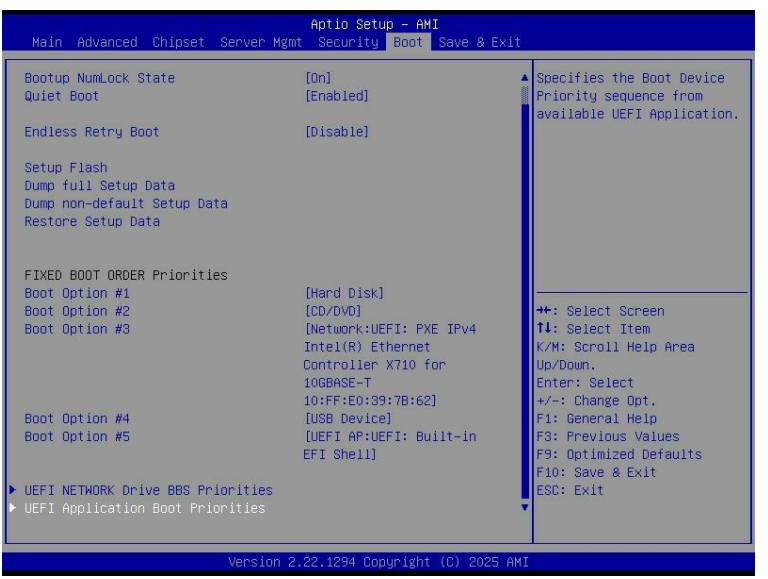
Parameter	Description
Expert Key Management	Press [Enter] to configure advanced items. **Please note that this item is configurable when Secure Boot Mode is set to Custom.** ◆ Factory Key Provision – Allows to provision factory default Secure Boot keys when system is in Setup Mode. – Options available: Enabled, **Disabled**. ◆ 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 to Setup Mode. – Options available: Yes, No. ◆ Enroll Efi Image – Press [Enter] to enroll SHA256 hash of the binary into Authorized Signature Database (db). ◆ Export Secure Boot variables – Copy NVRAM content of Secure Boot variables to files in a root folder on a file system device. ◆ 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.

Parameter	Description
Key Management (continued)	◆ 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. ◆ 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.

5-6 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.

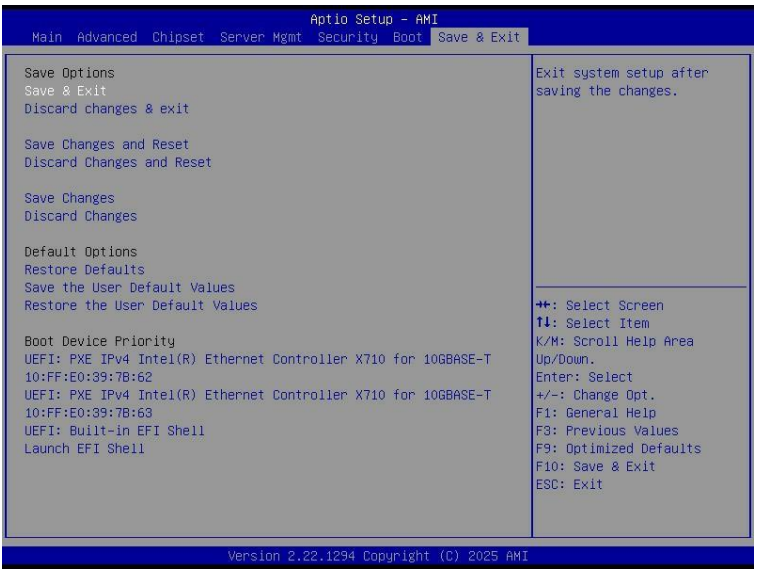




Parameter	Description
Boot Configuration	
Setup Prompt Timeout	Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting. Press the numeric keys to input the desired values.
Bootup NumLock State	Enable/Disable the Bootup NumLock function. Options available: **On**, Off.
Quiet Boot	Enable/Disable showing the logo during POST. Options available: **Enabled**, Disabled.
Endless Retry Boot	Options available: **Disable**, Enable.
Setup Flash	Press [Enter] to run setup flash.
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.
FIXED BOOT ORDER Priorities	
Boot Option #1 / #2 / #3 / #4 / #5	Press [Enter] to configure the boot order 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.

5-7 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 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 any changes. Options available: Yes, No.
Save Changes	Saves changes done so far to any of the setup options. Options available: Yes, No.
Discard Changes	Discards changes made and closes the BIOS setup. Options available: Yes, No.
Default Options	

Parameter	Description
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.
Save the User Default Values	Saves the changes made as the user default settings. Options available: Yes, No.
Restore the User Default Values	Loads the user default settings for all BIOS setup parameters. Options available: Yes, No.
Boot Device Priority	Press [Enter] to configure the device as the boot-up drive.
Launch EFI Shell	Attempts to Launch EFI Shell application (Shell.efi) from one of the available file system devices.

5-8 BIOS Recovery

The system has an embedded recovery technique. In the event that the BIOS becomes corrupt the boot block can be used to restore the BIOS to a working state. To restore your BIOS, please follow the instructions listed below:

Recovery Instruction:

1. Copy the XXX.rom to USB drive.
2. Setting BIOS Recovery jump to enabled status.
3. Boot into BIOS recovery.
4. Run Proceed with flash update.
5. BIOS updated.