GIGABYTE™

R283-SF0-AAL1

Rack Server - 4th/5th Gen Intel® Xeon® Scalable
2U DP 4 x PCIe Gen5 GPUs

User Manual

Rev. 1.0

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Documentation Classifications

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

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

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

For More Information

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

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

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

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

Conventions

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

	NOTE! Pieces of additional information related to the current topic.
	CAUTION! Precautionary measures to avoid possible hardware or software problems.
	WARNING! Alerts 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 the power cord from the power supply to disconnect power to the equipment.

• 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.

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 battery 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 touching any components or connectors. After removing a board from its protective ESD bag 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 ESD bag. Do not slide the board over any surface.

System power on/off: To service components within the server, please ensure the power has been disconnected.
e.g. Remove the node from the server chassis (to disconnect power) or disconnect the power from the server chassis.
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 chassis and disconnect the cables attached to the system before servicing the chassis. 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 us-ing 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

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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 service guide 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

System Dimension	◆ 2U ◆ 438 (W) x 87.5 (H) x 815(D) mm
CPU	◆ 5th Generation Intel® Xeon® Scalable Processors ◆ 4th Generation Intel® Xeon® Scalable Processors ◆ Intel® Xeon® CPU Max Series ◆ Dual processor, CPU TDP up to 350W NOTE: If only 1 CPU is installed, some PCIe or memory functions might be unavailable
Socket	◆ 2 x LGA 4677 ◆ Socket E
Chipset	◆ Intel® C741 Chipset
Security	◆ UEFI Secure Boot ◆ Silicon root of trust ◆ SNMP Support: V3
Memory	◆ 32 x DIMM slots ◆ DDR5 memory supported only ◆ 8-Channel memory architecture ◆ RDIMM modules up to 96GB supported ◆ 3DS RDIMM modules up to 256GB supported ◆ 5th Gen Intel® Xeon®: Up to *5600MHz (1DPC), 4400MHz (2DPC) ◆ 4th Gen Intel® Xeon®: Up to 4800MHz (1DPC), 4400MHz (2DPC) ◆ Intel® Xeon® Max Series: Up to 4800MHz (1DPC), 4400MHz (2DPC) *5600MHz support under 2DPC configuration requires verified memory and BIOS setup. Please refer to the QVL for more information.
LAN	**Rear side:** ◆ 1 x 10/100/1000 management LAN
Video	◆ 12 x 3.5"/2.5" Gen5 NVMe/SATA/SAS4 hot-swappable bays ◆ (6 x NVMe from CPU_0, 6 x NVMe from CPU_1)
Storage	**Front side:** ◆ 12 x 3.5"/2.5" Gen5 NVMe/SATA/SAS4 hot-swappable bays ◆ (6 x NVMe from CPU_0, 6 x NVMe from CPU_1) **SAS card is required for SAS devices support**

SAS	◆	Depends on SAS Add-on card
RAID	◆	Intel® SATA RAID 0/1/10/5
Expansion Slot	**Riser Card CRS202P:**	
		◆ 2 x PCIe x16 (Gen5 x16) FHFL slots, from CPU_0, for GPUs
	Riser Card CRS202Q:	
		◆ 1 x PCIe x16 (Gen5 x16) FHFL slot, from CPU_1, for GPUs
		◆ 1 x PCIe x16 (Gen5 x16) FHHL slot, from CPU_1
	Riser Card CRS201J:	
		◆ 1 x PCIe x16 (Gen5 x16) FHFL slot, from CPU_1, for GPUs
	1 x OCP 3.0 slot with PCIe Gen5 x16 bandwidth, from CPU_0	
	Supports NCSI function	
Internal I/O	◆	1 x TPM header
	◆	1 x VROC connector
	◆	1 x OCP 3.0 slot
Front I/O	◆	2 x USB 3.2 Gen1
	◆	1 x Power button with LED
	◆	1 x ID button with LED
	◆	1 x NMI button
	◆	1 x Reset button
	◆	2 x LAN activity LEDs (disabled)
	◆	1 x Bay status LED
	◆	1 x System status LED
Rear I/O	◆	2 x USB 3.2 Gen1
	◆	1 x Mini-DP
	◆	1 x MLAN
	◆	1 x ID LED
Backplane I/O	◆	Speed and bandwidth:
	◆	PCIe Gen5 x4 or SATA 6Gb/s or SAS4 24Gb/s
TPM	◆	1 x TPM header with SPI interface
	◆	Optional TPM2.0 kit: CTM010

	Power Supply	◆ Dual 2700W (240V) 80 PLUS Titanium redundant power supply AC Input: ◆ 100-127V~/ 12A, 50-60Hz ◆ 200-240V~/ 16A, 50-60Hz DC Input: ◆ 240Vdc/ 16A DC Output: ◆ Max 1008W/ 100-127V~ ◆ + 12V/ 84A ◆ + 12Vsb/ 3A ◆ Max 2700W/ 200-240V~ or 240Vdc Input ◆ + 12V/ 225A ◆ + 12Vsb/ 3A NOTE: ◆ The system power supply requires C19 power cord.
	System Management	◆ Aspeed® AST2600 management controller ◆ GIGABYTE Management Console (AMI MegaRAC SP-X) web interface ◆ Dashboard ◆ HTML5 KVM ◆ Sensor Monitor (Voltage, RPM, Temperature, CPU Status …etc.) ◆ Sensor Reading History Data ◆ FRU Information ◆ SEL Log in Linear Storage / Circular Storage Policy ◆ Hardware Inventory ◆ Fan Profile ◆ System Firewall ◆ Power Consumption ◆ Power Control ◆ 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%-80% (non-condensing)
	◆ Non-operating temperature: -40°C to 60°C
	◆ Non-operating humidity: 20%-95% (non-condensing)

1-3   System Block Diagram

SATA x12

12-bay 3.5"/2.5" Gen5 NVMe/SATA/SAS4

NVMe x6

NVMe x6

PCIe5.0 x16   PCIe5.0 x16   MCIO 8i x8   PCIe5.0 x16   PCIe5.0 x16

8-Channel DDR5, 16 x DIMMs
Speed up to 4800 MHz

8-Channel DDR5, 16 x DIMMs
Speed up to 4800 MHz

CPU0

intel XEON

4th Gen Intel® Xeon®
Scalable processors
(LGA4677 Socket)

4 x UPI 16 GT/s

CPU1

intel XEON

4th Gen Intel® Xeon®
Scalable processors
(LGA4677 Socket)

Riser Card CRS202P

(GPU)

(GPU)

2 x FHFL PCIe Gen5 x16 slots

PCIe6.0 x32

DMI3 x4

PCIe6.0 x16

OCP 3.0 slot

PCIe5.0 x32

NCSI

Riser Card CRS202Q

(GPU)

1 x FHFL PCIe Gen5 x16 slot

1 x FHHL PCIe Gen5 x16 slot

PCIe5.0 x16

Riser Card CRS201J

(GPU)

1 x FHFL PCIe Gen5 x16 slot

Slimline 4i x4

SATAIII x16

PCH
Intel C741
chipset

PCIe x1

eSPI

USB 2.0

BMC
ASPEED
AST2600

MAC

SPI

RTL8211FD

MLAN

Mini-DP

(front)
USB3.2 Gen1 x2

USB Hub

USB3.2 Gen1

(rear)
USB3.2 Gen1 x2

USB Hub

TPM

SPI 64MB

SPI 64MB

SPI 64MB

SPI 64MB

Chapter 2   System Appearance

2-1   Front View

No.	Description
1.	Front Panel LEDs and Buttons
2.	USB 3.2 Gen1 Port x 2
Note! Drives with green latches support NVMe.	

• Refer to section **2-3 Front Panel LEDs and Buttons** for a detailed description of the function of the LEDs.

2-2 Rear View
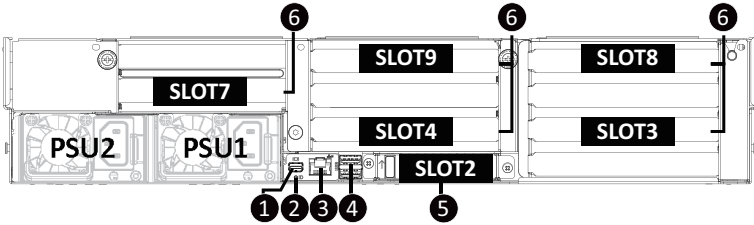
No.	Description	No.	Description
1.	Mini DP Port	**4.**	USB 3.2 Gen1 Port x 2
2.	ID LED	**5.**	OCP 3.0 Slot (Option/SFF)
3.	Server Management LAN Port	**6.**	PCIe Card Slot

• Refer to section **2-5 Rear System LAN LEDs** for a detailed description of the function of the LEDs.

2-3 Front Panel LEDs and Buttons
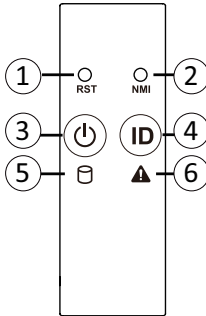
No.	Name	Color	Status	Description
1.	Reset Button	--	--	Press this button to reset the system.
2.	NMI button	--	--	Press this button for the server to generate a NMI to the processor. If multiple-bit ECC errors occur, the server will effectively be halted.
3.	Power button with LED	Green	On	Indicates the system is powered on.
		N/A	Off	System is not powered on or in ACPI S5 state (power off)
4.	ID Button with LED(Note)	Blue	On	System identification is active.
		N/A	Off	System identification is disabled.
5.	HDD Status LED	Green	On	Indicates locating the HDD.
			Blink	Indicates accessing the HDD.
		Amber	On	Indicates HDD error.
		Green/Amber	Blink	Indicates HDD rebuilding.
		N/A	Off	Indicates no HDD access or no HDD error.
6.	System Status LED(Note)	Green	Solid On	System is operating normally.
		Amber	Solid 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

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

2-4 RoT LEDs
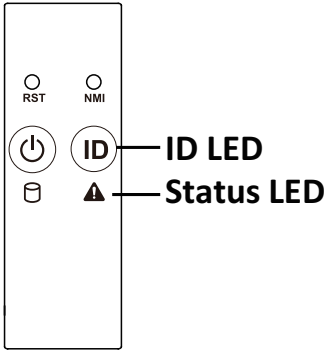
ID LED
Status LED

	LED on Front panel(Note5)	
	ID LED	Status LED
EC Firmware (FW) Authentication fail or not exit		
EC FW is broken or not exit (Note1)	OFF	OFF
Authenticating/Recovering BMC/BIOS Images		
Authenticating Images	OFF	OFF
Recovering BMC Active Flash	Blinks Blue 4 times per second	Blinks Green 4 times per second
Recovering BIOS Active Flash	Blinks Blue 4 times per second	Blinks Green 4 times per second
Authentication (AUTH) Pass		
Recovering BIOS Active Flash	OFF	OFF
BMC : AUTH pass after doing recovery BIOS : AUTH pass after doing recovery	OFF	OFF
BMC : AUTH pass after doing recovery BIOS : AUTH pass	OFF	OFF
BMC : AUTH pass BIOS : AUTH pass after doing recovery	OFF	OFF

Active Flash Authentication (AUTH) Fail		
BMC : AUTH Fail(Note2)	Blinks Blue 1 time per second	Blinks Green 1 time per second
BIOS : AUTH fail(Note2)	Blinks Blue 1 time per second	Blinks Amber 1 time per second
BMC : AUTH fail after doing recovery(Note3)	Blinks Blue 2 times per second [ON OFF OFF]	Blinks Green 2 times per second [ON OFF OFF]
BIOS : AUTH fail after doing recovery(Note3)	Blinks Blue 2 times per second [ON OFF OFF]	Blinks Amber 2 times per second [ON OFF OFF]
Backup Flash Authentication Fail(Note4)		
BMC : AUTH fail	Blinks Blue 2 times per second [ON OFF ON OFF]	Blinks Green 2 times per second [ON OFF ON OFF]
BIOS : AUTH fail	Blinks Blue 2 times per second [ON OFF ON OFF]	Blinks Amber 2 times per second [ON OFF ON OFF]

NOTE!
1. EC FW is broken or not exited result in Microchip CEC1702 cannot load EC FW for authentication.
2. CEC1702's bootloader load EC FW from BMC Flash1 when AC on. It must authenticate this FW firstly before run the FW. If the authenticate fail or not get the FW successfully, CEC1702 is not allowed to execute this FW and ECSTS_LED1 on the MB is OFF state.
3. if active flash is still authentication failed after recovery sequence, Microchip CEC1702 stop the process and showing LED behavior.
4. If backup flash authentication is failed cause by configuration table, public key or protected area is broken. Microchip CEC1702 stop the process and showing LED behavior.
5. Front panel LED is controlled by BMC or Microchip CEC1702. Once Microchip CEC1702 is working(Auth or recovery), the front panel LED is controlled by Microchip CEC1702 and vice versa.

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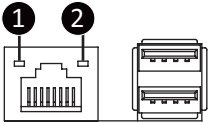
No.	Name	Color	Status	Description
1.	1GbE Speed LED	Yellow	On	1 Gbps data rate
		Green	On	100 Mbps data rate
		N/A	Off	10 Mbps data rate
2.	1GbE Link / Activity LED	Green	On	Link between system and network or no access
			Blink	Data transmission or reception is occurring.
		N/A	Off	No data transmission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

2-6 Power Supply Unit LED

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

PSU LED
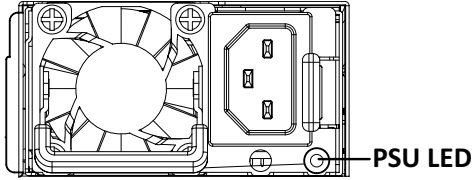
State	Description
OFF	No AC power to all power supplies
1Hz Green Blinking	AC present / only standby on / Cold redundant mode
2Hz Green Blinking	Power supply firmware updateing mode
Amber	AC cord unplugged or AC power lost; with a second power supply in parallel still with AC input power
	Power supply critical event causing shut down: failure, OCP, OVP, fan failure and UVP
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
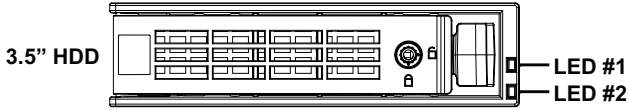
RAID SKU		LED #1	Locate	HDD Fault	Rebuilding	HDD Access	HDD Present (No Access)
No RAID configuration (via HBA)	Disk LED (LED on Back Panel)	Green	ON(*1)	OFF		BLINK (*2)	OFF
		Amber	OFF	OFF		OFF	OFF
	Removed HDD Slot (LED on Back Panel)	Green	ON(*1)	OFF		--	--
		Amber	OFF	OFF		--	--
RAID configuration (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 discharges of static electricity. 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 Cover

Before you remove or install the system cover
 • Make sure the system is not turned on or connected to AC power.

Follow these instructions to remove the chassis cover:

1. Remove the screw securing the chassis cover.
2. Unlock the plastic handle and pull the grip handle to open the panel cover.
3. Slide the cover cover to the rear of the system and then remove the cover in the direction indicated by the arrow.
4. To reinstall the chassis cover follow steps 1-4 in reverse order.
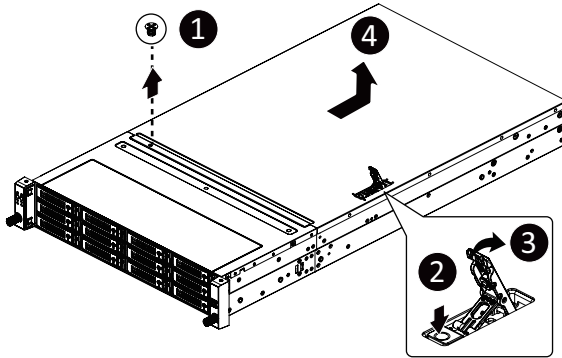
3-2   Removing and Installing the Hard Disk Drive

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

• Take note of the HDD tray orientation before sliding it out.

• The tray will not fit back into the bay if it is inserted incorrectly.

• Make sure that the hard disk drive is connected to the connector on the backplane.

Follow these instructions to install a 3.5" 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 3.5" HDD tray.
4.   Pull the sides of the HDD tray in the direction indicated.
5.   Slide the hard disk drive into the HDD tray.
6.   Push the sides of the HDD tray back in the direction indicated to secure the hard disk drive in place.
7.   Reinsert the HDD tray into the slot and close the locking lever.
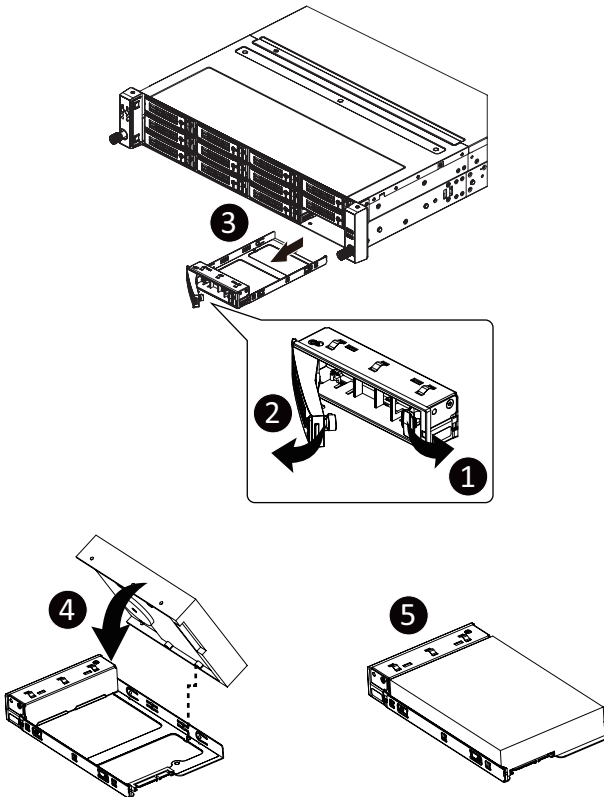
Follow these instructions to install a 2.5" hard disk drive into 3.5" HDD Tray:

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 screw on the HDD tray.
5. Secure the hard disk drive with five screws.
6. Reinsert the HDD tray into the slot and close the locking lever
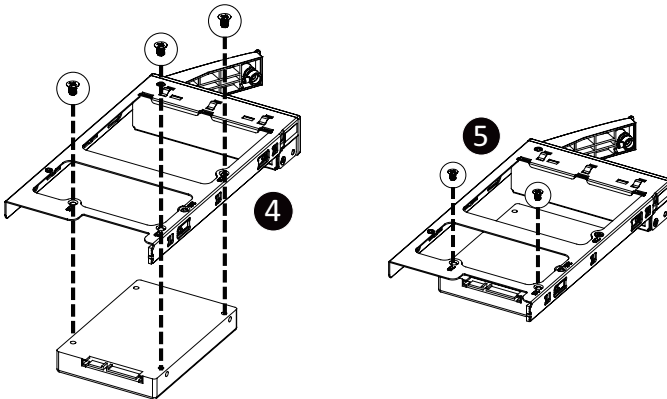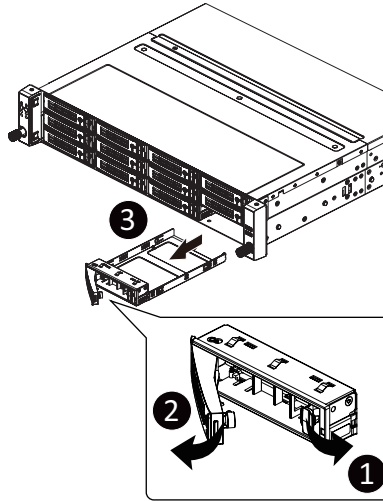
3-3　Removing and Installing the Fan Duct

Follow these instructions to remove the fan duct:

1. Lift up to remove the fan duct.
2. To reinstall the fan duct, align the fan duct with the guiding groove. Push down the fan duct until it is firmly seated on the system.
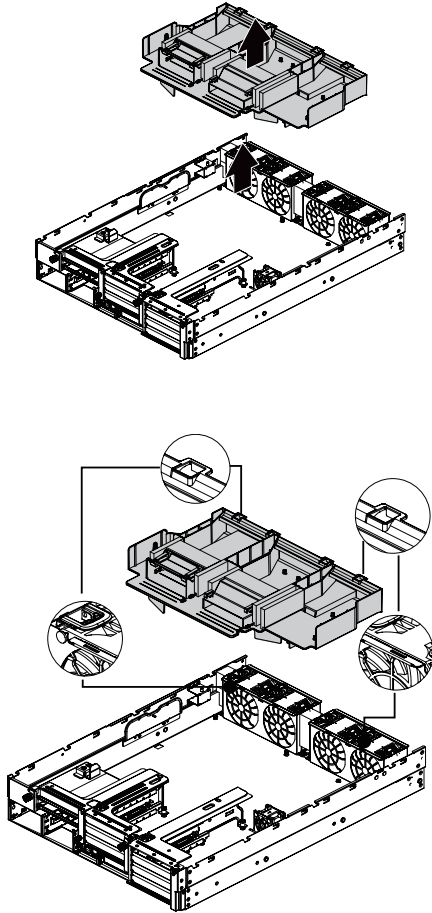
3-4   Removing and Installing the Heat Sink

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

1.   Loosen the screws securing the heat sink in place in reverse order (4→3→2→1).
2.   Lift and remove the heat sink from the system.
3.   To install the heat sink, reverse steps 1-2 while ensuring that you tighten the captive screws in sequential order (1→2→3→4) as seen in the image below.
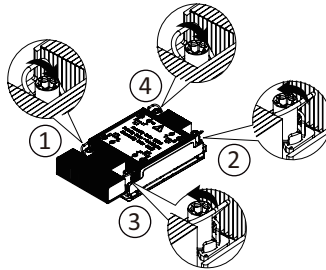
3-5　Installing the CPU and Heat Sink

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 the processor to the carrier so that the gold triangle on the processor aligns with the triangle
    on the carrier, and then install the processor into the carrier.
    NOTE: Apply thermal compound evenly on the top of the CPU.
2. Carefully flip the heatsink over. Align the carrier assembly so that the triangle on the carrier aligns
    with the triangle on the heatsink, and then install the carrier assembly onto the bottom of the
    heatsink.
3. Remove the CPU socket cover.
    NOTE: Save and replace the CPU socket cover if the processor is removed from its socket.
4. Align the heatsink to the CPU socket using the guide pins and make sure the gold triangle is in the
    correct orientation. Then place the heatsink onto the top of the CPU socket.
5. Secure the heatsink by tightening the screws in sequential order (1→2→3→4).
    NOTE: When removing the heatsink, loosen the screws in reverse order (4→3→2→1).
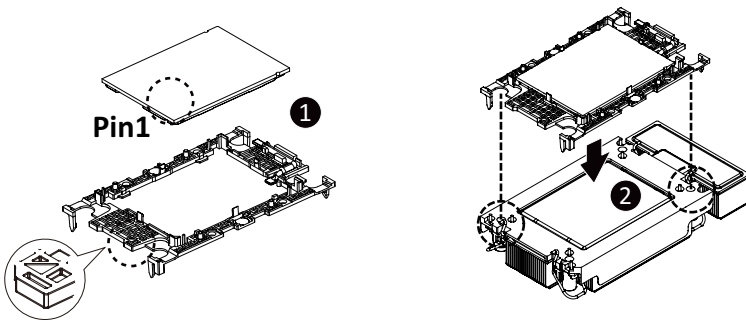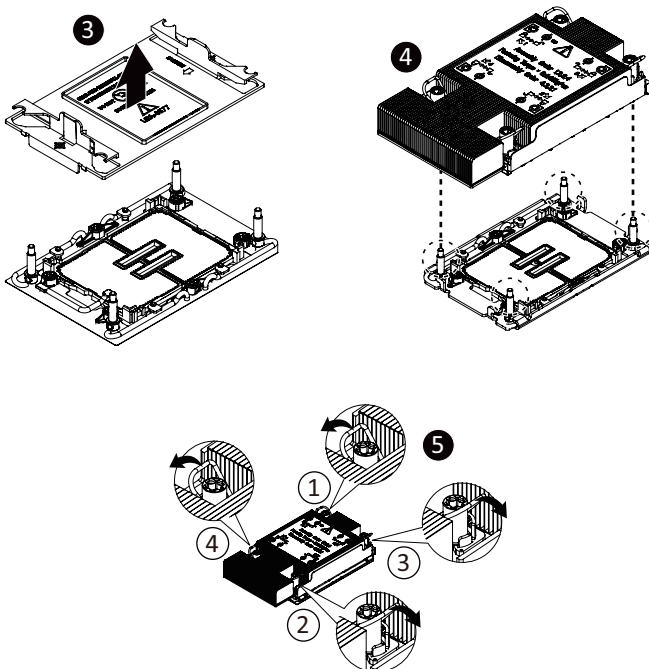
Carrier Types used for Package Types

Package Type	Xeon® SP XCC	Xeon® SP MCC	Xeon® SP+HBM
Carrier Code	E1A	E1B	E1C

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 heatsink to CPU,use T30-Lobe driver to tighten 4 captive nuts in sequence as 1-4.
- The screw tightening torque: 8 ± 0.5 kgf-cm.

3-6   Removing and Installing Memory

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

3-6-1   Eight Channel Memory Configuration

This motherboard provides 32 DDR5 memory sockets and supports Eight Channel Technology. After the memory is installed, the BIOS will automatically detect the specifications and capacity of the memory.
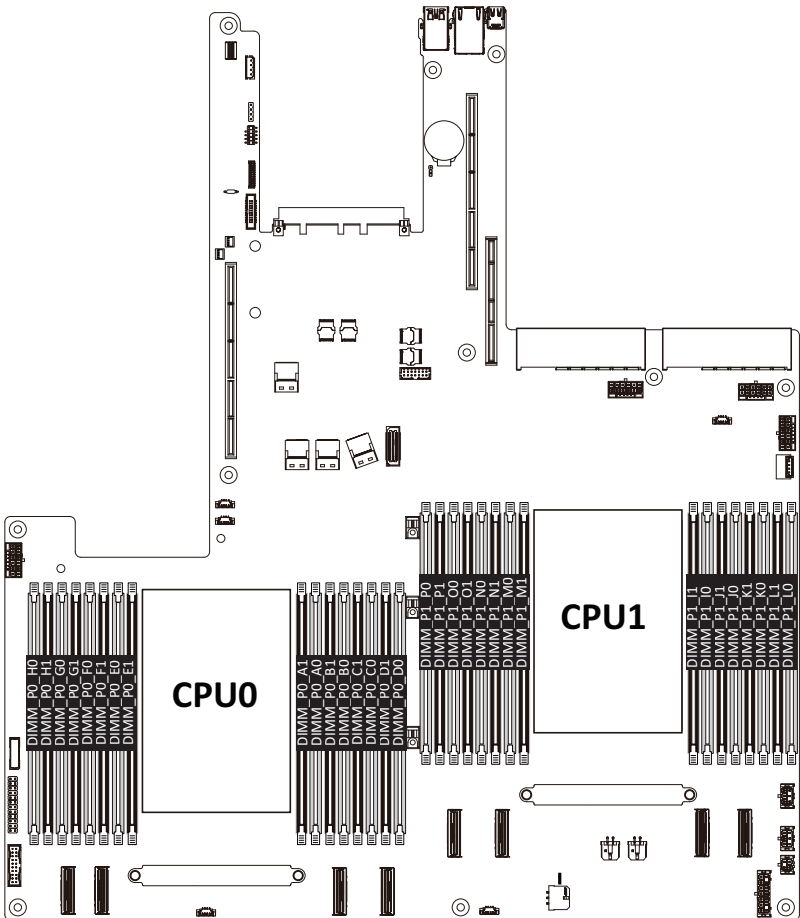
3-6-2 Removing and Installing a Memory Module

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 to this motherboard.

Follow these instructions to install a DIMM module:

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.
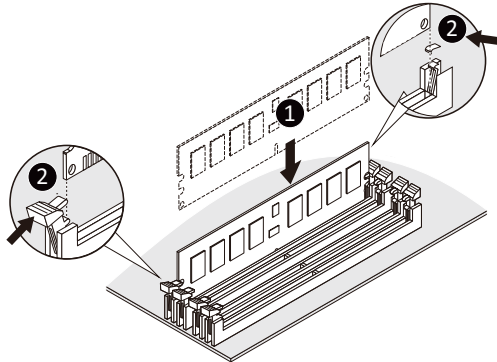
3-6-3 DIMM Population Table

4th Gen Intel Xeon Scalable Processors-SP Memory Support

Type	Ranks Per DIMM and Data Width	DIMM Capacity (GB)			Speed (MT/s); Voltage (V); DIMM per Channel (DPC)	
					1DPC[1]	2DPC
		16Gb	24Gb[2]	36Gb	1.1V	
RDIMM	SRx8 (RC D)	16GB	24GB	NA	4800	4400
	SRx4 (RC C)	32GB	48GB	NA		
	SRx4 (RC F) 9x4	32GB	NA	NA		
	DRx8 (RC E)	32GB	48GB	NA		
	DRx4 (RC A)	64GB	96GB	128GB		
	DRx4 (RC B) 9x4	64GB	NA	NA		
RDIMM 3DS	(4R/8R)x4 (RC A)	2H-128GB 4H-256GB	NA	NA		

NOTE:

1. 1DPC applies to 1SPC or 2SPC implementations (SPC - Sockets Per Channel)

2. 24Gb XCC only w/ limited configs: 1DPC all DIMM types, 2DPC 96GB only. Only 8 and 16 DIMM configs, no fallbacks.

5th Gen Intel Xeon Scalable Processors-SP Memory Support

Type	Ranks Per DIMM and Data Width	DIMM Capacity (GB)			Speed (MT/s); Voltage (V); DIMM per Channel (DPC)	
					1DPC[1]	2DPC
		16Gb	24Gb[2]	36Gb	1.1V	
RDIMM	SRx8 (RC D)	16GB	24GB	NA	5600[3]	4400[3]
	SRx4 (RC C)	32GB	48GB	NA		
	SRx4 (RC F) 9x4	NA	NA	NA		
	DRx8 (RC E)	32GB	48GB	NA		
	DRx4 (RC A)	64GB	96GB	128GB		
	DRx4 (RC B) 9x4	NA	NA	NA		
RDIMM 3DS	(4R/8R)x4 (RC A)	2H-128GB 4H-256GB	NA	NA	5600[4]	

NOTE:

1. 1DPC applies to 1SPC or 2SPC implementations (SPC - Sockets Per Channel)

2. 24Gb 2DPC not POR w/ 24GB and 48GB DIMMs.

3. DDR5-5600 RDIMMs will be limited to 5600 MT/s 1DPC and 4400 MT/s 2DPC. DDR5-4800 DIMMs will be limited to 4800 MT/s 1DPC and 4400 MT/s 2DPC.

4. DDR5-5600 DIMMS are required for 5600 and 5200 1DPC speeds.

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						
2 DIMM		v								v								v								v						
4 DIMM		v			v					v			v					v			v					v			v			
6 DIMM		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
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

3-7 Removing and Installing the PCIe 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 off 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.

📝 • The PCIe riser assembly does not include a riser card or any cabling as standard. To install a PCIe card, a riser card must be installed.

Follow these instructions to install a PCIe card:
1. Loosen the seven thumbnail screws securing the riser bracket inside the system.
2. Lift up the riser bracket out of system.
3. Remove the screw securing the slot cover from riser bracket.
4. Orient the PCIe card with the riser guide slot and push in the direction of the arrow until the PCIe card sits in the PCIe card connector.
   NOTE: Some riser brackets allow for single or multiple PCIe cards.
   Repeat steps 3-4 as necessary.
5. Secure the PCIe card with the screw.
6. Repeat steps 1-2 to install the PCIe card into the system.
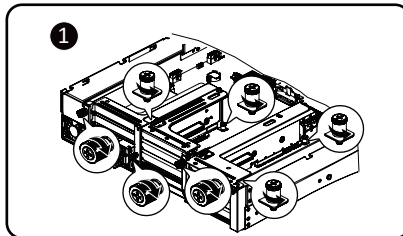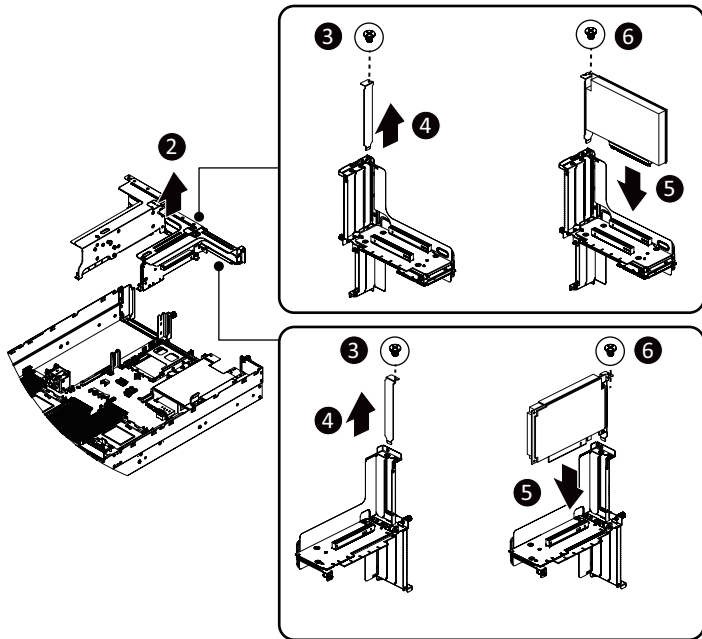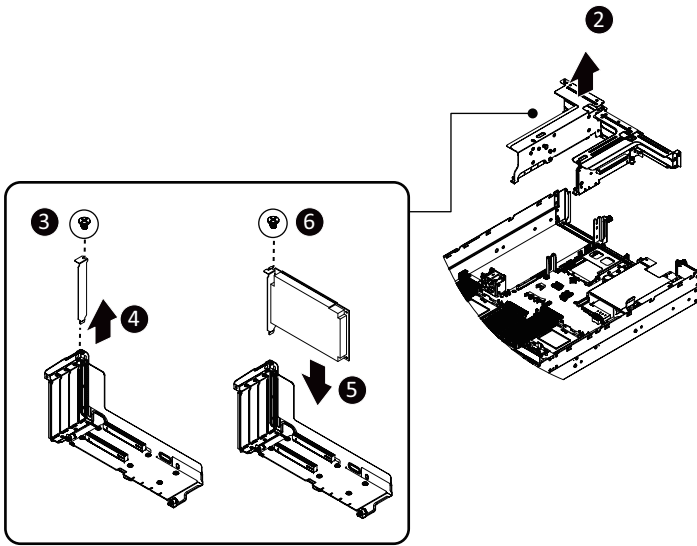
3-8 Installing the Mezzanine Card

3-8-1 Installing the OCP 3.0 Mezzanine Card

Use of the following type of OCP 3.0 NIC is recommended:
• OCP 3.0 SFF with pull tab
• OCP 3.0 SFF with ejector latch

Follow these instructions to install an OCP 3.0 Mezzanine card:
1. Remove the two screws securing the OCP 3.0 card slot cover.
2. Remove the slot cover from the system.
3. Insert the OCP 3.0 card into the card slot ensuring that the card is firmly connected to the connector on the motherboard.
4. Tighten the thumbnail screw to secure the OCP 3.0 card in place.
5. Reverse steps 3-4 to replace the OCP 3.0 card.
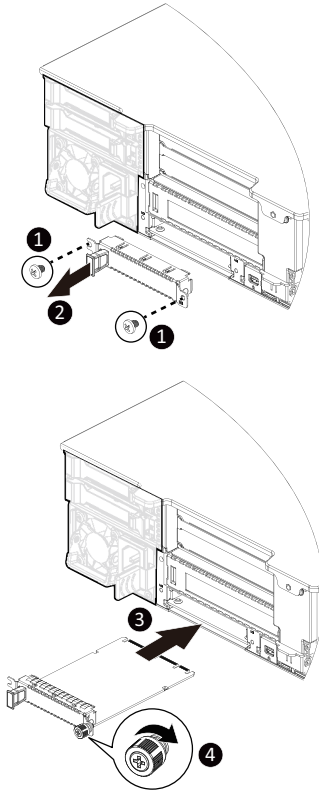
3-9   Replacing the Fan Assembly

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

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

Follow these instructions to replace a fan assembly:

1. Flip the latches on the top of the fan outwards.
2. Using the latches, lift up the fan assembly from the chassis.
3. Reverse the previous steps to install the replacement fan assembly.
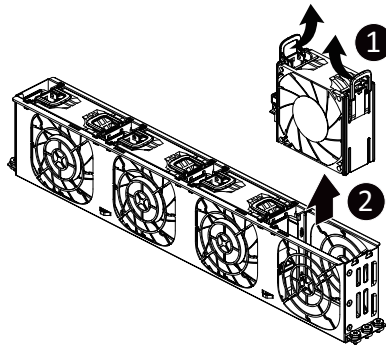
3-10 Removing and Installing the Power Supply

Follow these instructions to replace the power supply:

1. Flip up and then grasp the power supply handle.
2. Press the retaining clip on the right side of the power supply unit in the direction indicated.
3. Pull out the power supply unit using the handle.
4. Insert the replacement power supply unit firmly into the chassis. Connect the AC power cord to the replacement power supply.
5. Repeat steps 1-4 for replacement of the second power supply.
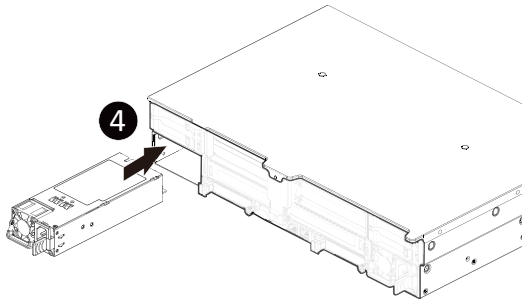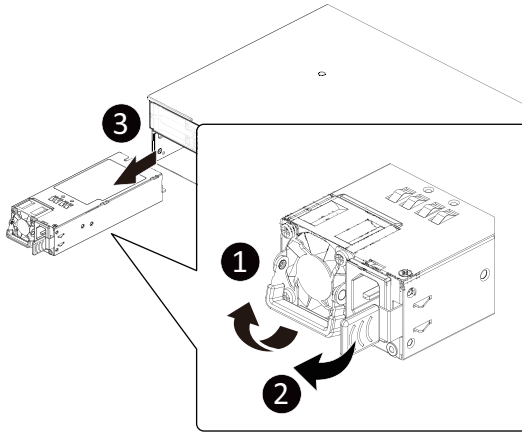
3-11 Cable Routing
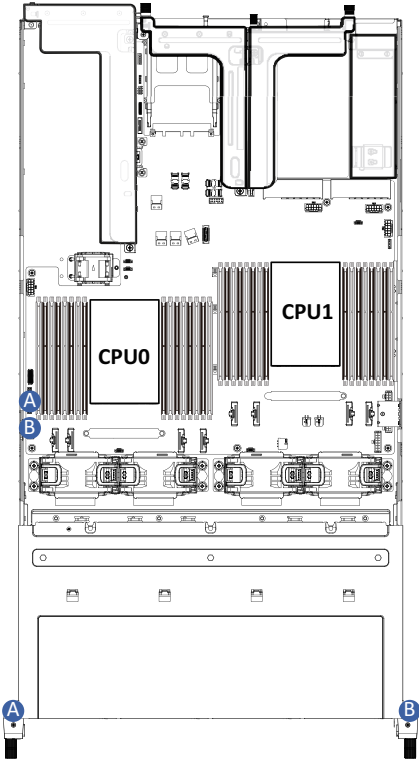
A	Front Panel LEDs and Buttons Cable	Motherboard: FP_1 Front IO Board: FP_1
		Front IO Board: FP_1
B	Front Panel USB 3 Ports Cable	Motherboard: FUSB_1
		--
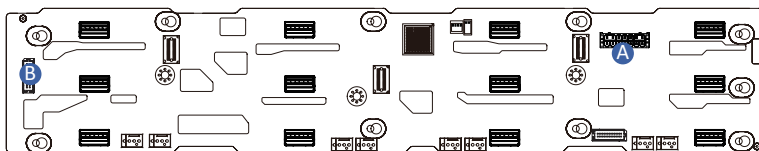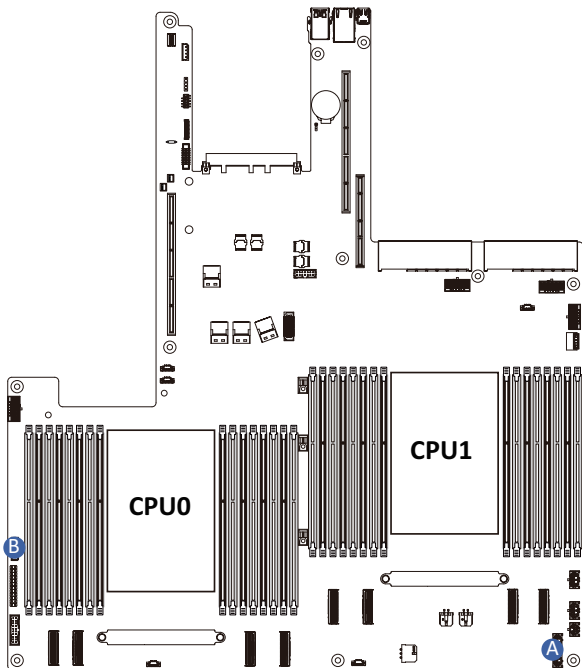
A	HDD Backplane Board Power Cable	Motherboard: BP_ATX1
		Front HDD Board: ATX
B	HDD Backplane Board Signal Cable	Motherboard: BP_1
		Front HDD Board: BP_1
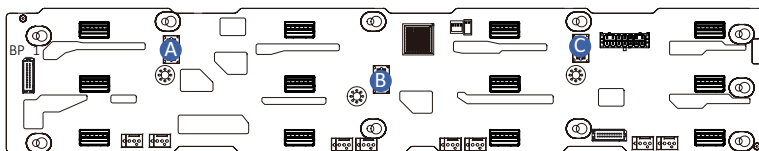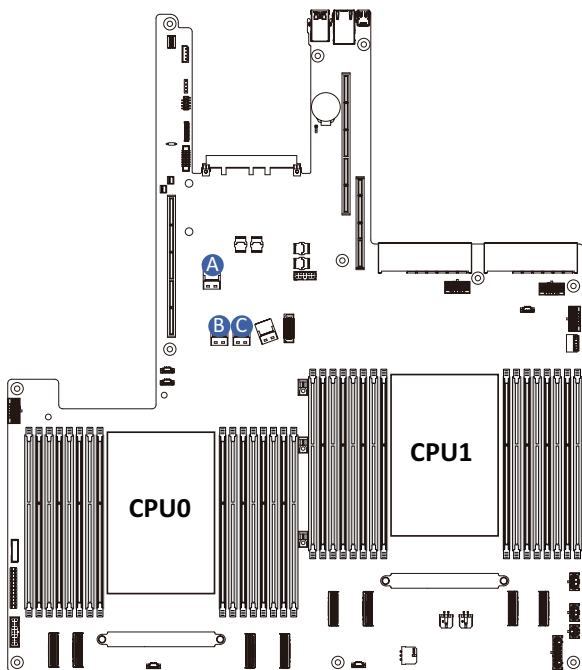
		Motherboard: SATA0
A	SATA Cable	
		Front HDD Board: SLSAS0
B	SATA Cable	Motherboard: SATA1
		Front HDD Board: SLSAS1
C	SATA Cable	Motherboard: SATA2
		Front HDD Board: SLSAS2
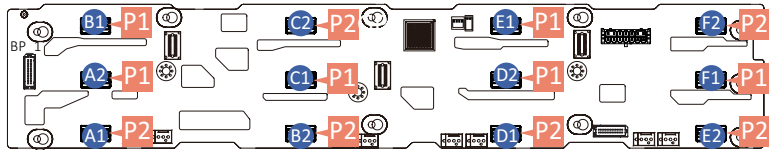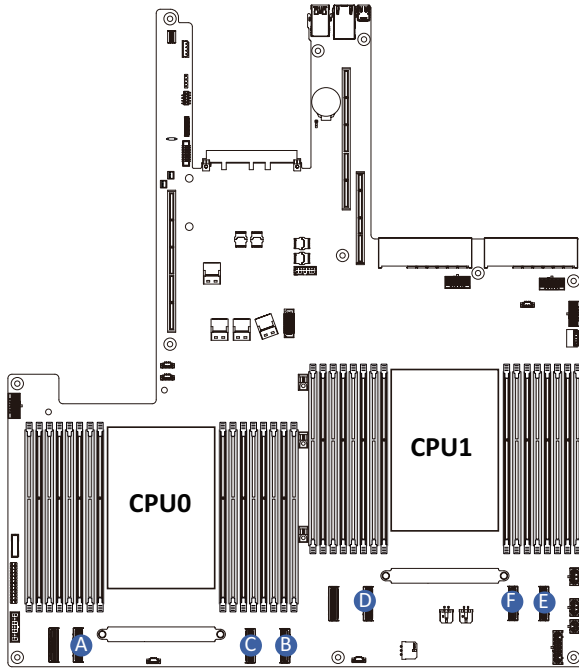
		Motherboard: U2_P0_3GE			Motherboard: U2_P1_3GE
A	NVMe 0-1 Cable	Front HDD Board: A1: U.2 0/ A2: U.2 1	**D**	NVMe 6-7 Cable	Front HDD Board: D1: U.2 6/ D2: U.2 7
B	NVMe 2-3 Cable	Motherboard: U2_P0_4AC	**E**	NVMe 8-9 Cable	Motherboard: U2_P1_4AC
		Front HDD Board: B1: U.2 2/ B2: U.2 3			Front HDD Board: E1: U.2 8/ E2: U.2 9
C	NVMe 4-5 Cable	Motherboard: U2_P0_4EG	**F**	NVMe 10-11 Cable	Motherboard: U2_P1_4EG
		Front HDD Board: C1: U.2 4/ C2: U.2 5			Front HDD Board: F1: U.2 10/ F2: U.2 11
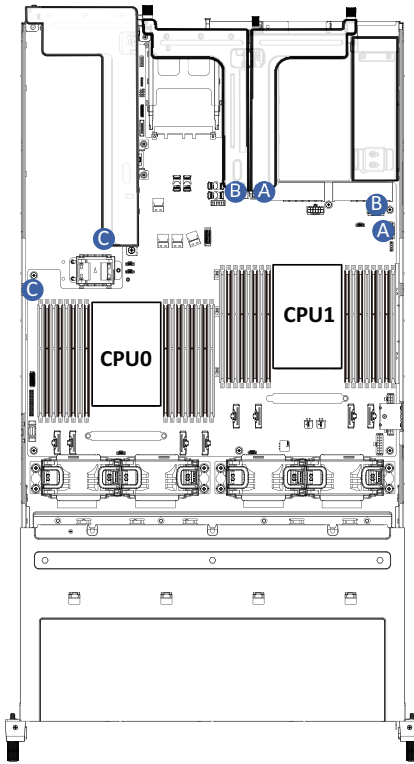
		Motherboard : GPU12V_S7
A		Riser Connector #3: --
B	GPU Card Power Cable (Reserved)	Motherboard : GPU12V_S9
		Riser Connector #2: --
C		Motherboard : GPU12V_S3
		Riser Connector #1: --

Chapter 4   Motherboard Components

4-1   Motherboard Components
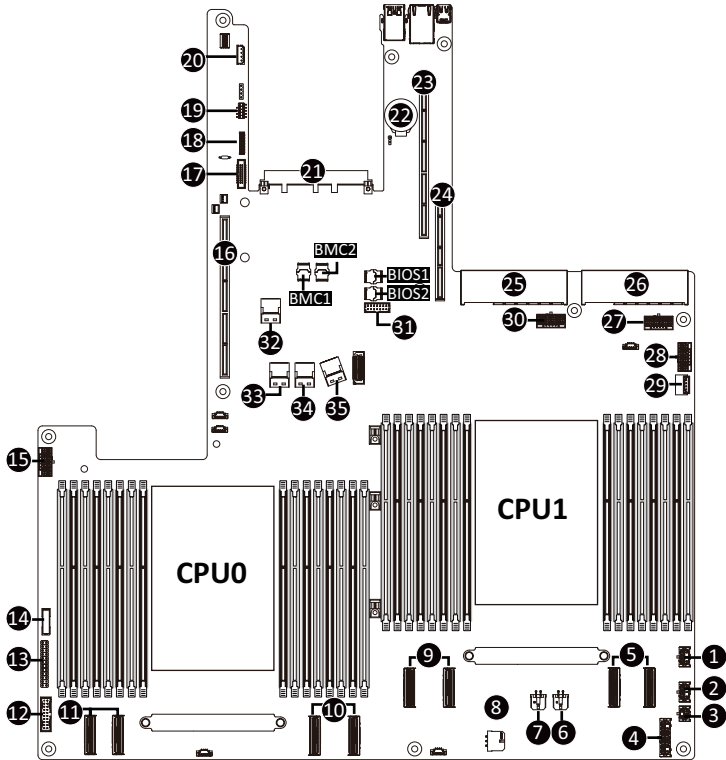
Item	Description
1	2 x 3 Pin ATX Power Connector
2	2 x 3 Pin ATX Power Connector
3	2 x 2 Pin P12V Backplane Power Connector
4	2 X 7 Pin ATX Power Connector
5	MCIO Connector (U2_P1_4EG/4AC)
6	2 x 2 Pin P12V Backplane Power Connector
7	2 x 2 Pin P12V Backplane Power Connector
8	2 x 3 Pin ATX Power Connector
9	MCIO Connector (U2_P1_3CA/3GE)
10	MCIO Connector (U2_P0_4EG/4AC)
11	MCIO Connector (U2_P0_3CA/3GE)
12	Front Panel USB 3.2 Gen1 Connector

Item	Description
13	Front Panel Connector
14	HDD Backplane Board Connector
15	P12V GPU Power Connector (GPUP12V_S3)
16	Riser Connector #1 (PCIe Gen5/x32 Slot)
17	NCSI Connector for add-on LAN Card (NSCI_CNN)
18	VGA Port Cable Connector
19	Serial Port Cable Connector
20	IPMB Connector
21	OCP 3.0 Connector (PCIe Gen5 x16)
22	System Battery
23	Riser Connector #2 (PCIe Gen5/x32 Slot)
24	Riser Connector #3 (PCIe Gen5/x16 Slot)
25	Power Supply Connector#1 (Primary)
26	Power Supply Connector#2 (Secondary)
27	P12V GPU Power Connector (GPUP12V_S9)
28	P12V GPU Power Connector (GPUP12V_S7)
29	VROC Upgrade Module Connector
30	P12V GPU Power Connector (GPUP12V_S8)
31	TPM Module Connector (SPI Interface)
32	SlimLine Connector (SATA0)
33	SlimLine Connector (SATA1)
34	SlimLine Connector (SATA2)
35	SlimLine Connector (SATA3)

4-2 Jumper Settings
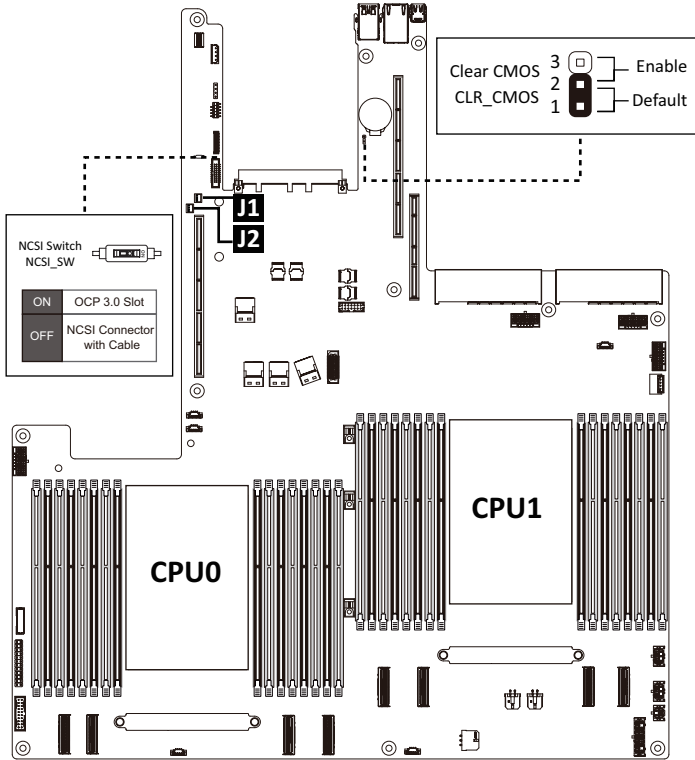
J1		ON	OFF
1	HSMB_SEL	BIOS defined	
2	PMBUS_SEL	BIOS defined	
3	S3_MASK	Stop initial power on when BMC is not ready	Normal [Default]
4	Force Power On	Force Power On	Normal [Default]

J2		ON	OFF
1	ME_UPDATE	Force ME update	Normal [Default]
2	BIOS_PWD	Clear supervisor password	Normal [Default]
3	BIOS_RCVR	BIOS recovery mode	Normal [Default]
4	ME_RCVR	ME recovery mode	Normal [Default]

4-3 Backplane Board Storage Connector

4-3-1 CBP20C7
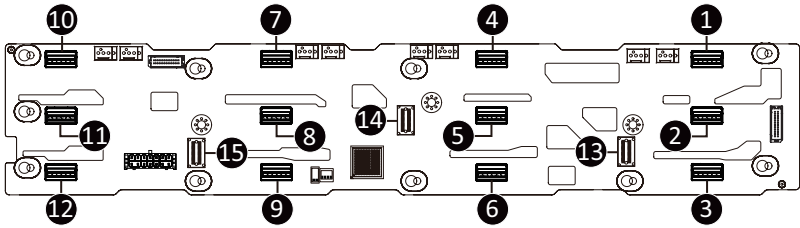
Item	Description
1.	MCIO Connector (MCIO 4i/U.2_0)
2.	MCIO Connector (MCIO 4i/U.2_1)
3.	MCIO Connector (MCIO 4i/U.2_2)
4.	MCIO Connector (MCIO 4i/U.2_3)
5.	MCIO Connector (MCIO 4i/U.2_4)
6	MCIO Connector (MCIO 4i/U.2_5)
7.	MCIO Connector (MCIO 4i/U.2_6)
8.	MCIO Connector (MCIO 4i/U.2_7)
9.	MCIO Connector (MCIO 4i/U.2_8)
10.	MCIO Connector (MCIO 4i/U.2_9)
11.	MCIO Connector (MCIO 4i/U.2_10)
12.	MCIO Connector (MCIO 4i/U.2_11)
13.	SlimLine Connector (SFF-8654 4i/SL_SAS0)
14.	SlimLine Connector (SFF-8654 4i/SL_SAS1)
15.	SlimLine Connector (SFF-8654 4i/SL_SAS2)

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 Platform Controller Hub.

■ **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.

```
                              Aptio Setup - AMI
     Main  Advanced  Chipset  Server Mgmt  Security  Boot  Save & Exit

     BIOS Information                                          ▲
     Project Name                   MSF3-GP0-000
     Project Version                F04
     Build Date and Time            07/04/2023 15:48:25

     BMC Information
     BMC Firmware Version           13.05.02

     Processor Information
     CPU 0 Brand String             Intel(R) Xeon(R) Platinum
                                    8450H
     CPU 1 Brand String             Intel(R) Xeon(R) Platinum
                                    8450H
     Max CPU Speed                  2000 MHz             →←: Select Screen
     CPU Signature                  806F8                ↑↓: Select Item
     Processor Core                 56                   K/M: Scroll Help Area
     Microcode Patch                2B000461             Up/Down.
                                                         Enter: Select
     Platform Information                                +/-: Change Opt.
     Processor                      SPR-SP E5            F1: General Help
     PCH                            EBG - B1             F3: Previous Values
     RC Revision                    100.D45              F9: Optimized Defaults
                                                         F10: Save & Exit
     Memory Information                                  ESC: Exit
     Total Memory                   262144 MB    ▼

                   Version 2.22.1289 Copyright (C) 2023 AMI              B4
```

```
                              Aptio Setup - AMI
     Main  Advanced  Chipset  Server Mgmt  Security  Boot  Save & Exit

     BMC Information                                                    Set the Time. Use Tab to
     BMC Firmware Version              13.05.02                         switch between Time
                                                                        elements.
     Processor Information
     CPU 0 Brand String               Intel(R) Xeon(R) Platinum
                                      8450H
     CPU 1 Brand String               Intel(R) Xeon(R) Platinum
                                      8450H
     Max CPU Speed                    2000 MHz
     CPU Signature                    806F8
     Processor Core                   56
     Microcode Patch                  2B000461

     Platform Information                                               ↔: Select Screen
     Processor                        SPR-SP E5                         ↑↓: Select Item
     PCH                              EBG - B1                          K/M: Scroll Help Area
     RC Revision                      100.D45                           Up/Down.
                                                                        Enter: Select
     Memory Information                                                 +/-: Change Opt.
     Total Memory                     262144 MB                         F1: General Help
     Usable Memory                    262144 MB                         F3: Previous Values
     Memory Frequency                 4800 MHz                          F9: Optimized Defaults
                                                                        F10: Save & Exit
     System Date                      [Wed 07/12/2023]                  ESC: Exit
     System Time                      [19:28:46]

                       Version 2.22.1289 Copyright (C) 2023 AMI                           B4
```

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/ PCH/ RC Revision	Displays the information of the installed processor(s) and PCH.
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.

```
                              Aptio Setup - AMI
         Main  Advanced  Chipset  Server Mgmt  Security  Boot  Save & Exit

    ▶ Trusted Computing                          Trusted Computing Settings
    ▶ Serial Port Console Redirection
    ▶ SIO Configuration
    ▶ PCI Subsystem Settings
    ▶ USB Configuration
    ▶ Network Stack Configuration
    ▶ Post Report Configuration
    ▶ NVMe Configuration
    ▶ Chipset Configuration

    ▶ Tls Auth Configuration
    ▶ iSCSI Configuration
                                                 ↔: Select Screen
                                                 ↑↓: Select Item
                                                 K/M: Scroll Help Area
                                                 Up/Down.
                                                 Enter: Select
                                                 +/-: Change Opt.
                                                 F1: General Help
                                                 F3: Previous Values
                                                 F9: Optimized Defaults
                                                 F10: Save & Exit
                                                 ESC: Exit

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```

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: Disable, Enable. Default setting is **Enable**.

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. Default setting is **VT100PLUS**. ◆ Bits per second – Selects the transfer rate for console redirection. – Options available: 9600, 19200, 38400, 57600, 115200. Default setting is **115200**. ◆ Data Bits – Selects the number of data bits used for console redirection. – Options available: 7, 8. Default setting is **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. Default setting is **None**.
	◆ 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. Default setting is **1**.
	◆ 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. Default setting is **None**.
	◆ VT-UTF8 Combo Key Support
	  – Enable/Disable the VT-UTF8 Combo Key Support.
	  – Options available: Enabled, Disabled. Default setting is **Enabled**.
	◆ Recorder Mode
	  – When this mode enabled, only texts will be send. This is to capture Terminal data.
	  – Options available: Enabled, Disabled. Default setting is **Disabled**.
	◆ Resolution 100x31
	  – Enable/Disable extended terminal resolution.
	  – Options available: Enabled, Disabled. Default setting is **Enabled**.
	◆ Putty KeyPad
	  – Selects Function Key and KeyPad on Putty.
	  – Options available: VT100, LINUX, XTERMR6, SC0, ESCN, VT400. Default setting is **VT100**.

Parameter	Description
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. Default setting is **Disabled**.

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. Default setting is **VT100PLUS**.
	◆ Bits per second EMS
	  – Selects the transfer rate for console redirection.
	  – Options available: 9600, 19200, 57600, 115200. Default setting is **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. Default setting is **None**.

5-2-3 SIO Configuration

```
                              Aptio Setup - AMI
    Advanced

 AMI SIO Driver Version :   A5.19.00                      View and Set Basic
                                                          properties of the SIO
 Super IO Chip Logical Device(s) Configuration            Logical device. Like IO
 ▶ [*Active*]  Serial Port                                Base, IRQ Range, DMA
                                                          Channel and Device Mode.
 WARNING: Logical Devices state on the left side of the control,
 reflects the current Logical Device state. Changes made during
 Setup Session will be shown after you restart the system.


                                                          ──────────────────────
                                                          ↔: Select Screen
                                                          ↑↓: Select Item
                                                          K/M: Scroll Help Area
                                                          Up/Down.
                                                          Enter: Select
                                                          +/-: Change Opt.
                                                          F1: General Help
                                                          F3: Previous Values
                                                          F9: Optimized Defaults
                                                          F10: Save & Exit
                                                          ESC: Exit

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```

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. Default setting is **Enabled**. ◆ 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. Use Automatic Settings IO=3F8h; IRQ=4; DMA; IO=3F8h; IRQ=4; DMA; IO=2F8h; IRQ=4; DMA; IO=3E8h; IRQ=4; DMA; IO=2E8h; IRQ=4; DMA; Default setting is **Use Automatic Settings**.

5-2-4 PCI Subsystem Settings
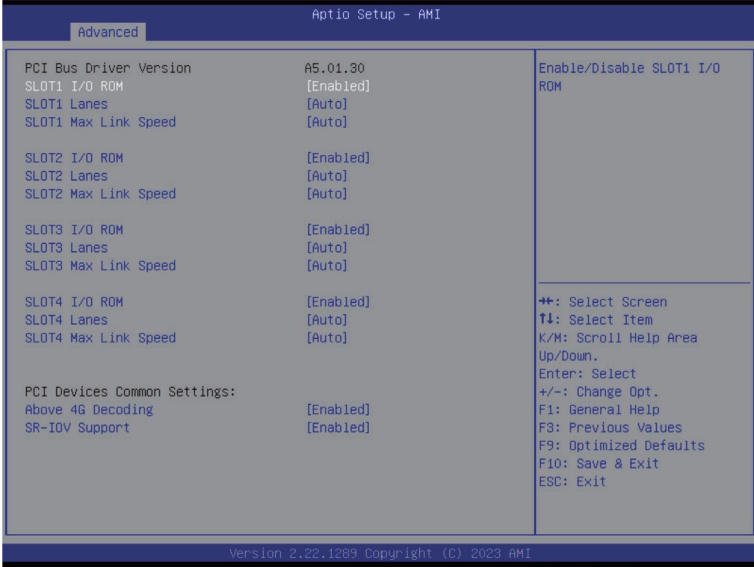
Parameter	Description
PCI Bus Driver Version	Displays the PCI Bus Driver version information.
SLOT# I/O ROM(Note)	When enabled, this setting will initialize the device expansion ROM for the related PCI-E slot. Options available: Enabled, Disabled. Default setting is **Enabled**.
SLOT# Lanes(Note)	Change the PCIe lanes. Default setting is **Auto**.
SLOT# Max Link Speed(Note)	Configure PCIe max link speed. Options available: Auto, Gen1, Gen2, Gen3, Gen4, Gen5. Default setting is **Auto**.
PCI Devices Common Settings	
Above 4G Decoding	Enable/Disable memory mapped I/O to 4GB or greater address space (Above 4G Decoding). Options available: Enabled, Disabled. Default setting is **Enabled**.
SR-IOV Support	If the system has SR-IOV capable PCIe devices, this item Enable/Disable Single Root IO Virtualization Support. Options available: Enabled, Disabled. Default setting is **Enabled**.

(Note)   This section is dependent on the available PCIe 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. Default setting is **Enabled**.
USB Mass Storage Driver Support(Note)	Enable/Disable the USB Mass Storage Driver Support. Options available: Enabled, Disabled. Default setting is **Enabled**.
Port 60/64 Emulation	Enables the I/O port 60h/64h emulation support. This should be enabled for the complete USB Keyboard Legacy support for non-USB aware OSes. Options available: Enabled, Disabled. Default setting is **Enabled**.

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

5-2-6　Network Stack Configuration

```
                              Aptio Setup - AMI
    Advanced

 Network Stack                   [Enabled]              Enable/Disable UEFI
 IPv4 PXE Support                [Enabled]              Network Stack
 IPv4 HTTP Support               [Disabled]
 IPv6 PXE Support                [Disabled]
 IPv6 HTTP Support               [Disabled]
 PXE boot wait time              0
 Media detect count              1


                                                        ++: Select Screen
                                                        ↑↓: Select Item
                                                        K/M: Scroll Help Area
                                                        Up/Down.
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F3: Previous Values
                                                        F9: Optimized Defaults
                                                        F10: Save & Exit
                                                        ESC: Exit


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```

Parameter	Description
Network Stack	Enable/Disable the UEFI network stack. Options available: Enabled, Disabled. Default setting is **Enabled**.
Ipv4 PXE Support	Enable/Disable the Ipv4 PXE feature. Options available: Enabled, Disabled. Default setting is **Enabled**.
Ipv4 HTTP Support	Enable/Disable the Ipv4 HTTP feature. Options available: Enabled, Disabled. Default setting is **Disabled**.
Ipv6 PXE Support	Enable/Disable the Ipv6 PXE feature. Options available: Enabled, Disabled. Default setting is **Disabled**.
Ipv6 HTTP Support	Enable/Disable the Ipv6 HTTP feature. Options available: Enabled, Disabled. Default setting is **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

```
                            Aptio Setup - AMI
    Advanced

  Post Report Configuration                          Post Error Message Support
                                                     Enabled/Disabled
  Error Message Report
  Post Error Message              [Enabled]
  Halt On                        [No Error]




                                                     →←: Select Screen
                                                     ↑↓: Select Item
                                                     K/M: Scroll Help Area
                                                     Up/Down.
                                                     Enter: Select
                                                     +/-: Change Opt.
                                                     F1: General Help
                                                     F3: Previous Values
                                                     F9: Optimized Defaults
                                                     F10: Save & Exit
                                                     ESC: Exit


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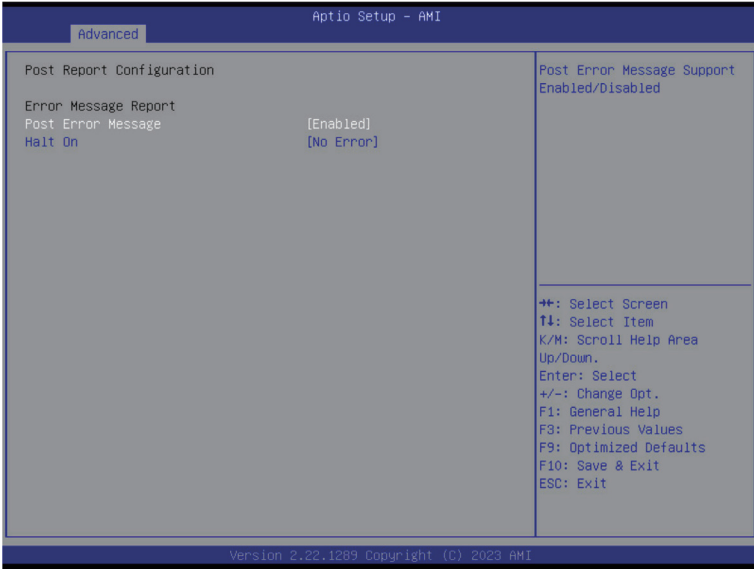
Parameter	Description
Post Report Configuration	
Error Message Report	
Post Error Message	Enable/Disable the POST Error Message support. Options available: Enabled, Disabled. Default setting is **Enabled**.
Halt On	Options available: No Error, All Error. Default setting is **No Error**.

5-2-8 NVMe Configuration

```
                              Aptio Setup - AMI
        Advanced

   NVMe Configuration

   No NVME Device Found

                                                        ↔: Select Screen
                                                        ↑↓: Select Item
                                                        K/M: Scroll Help Area
                                                        Up/Down.
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F3: Previous Values
                                                        F9: Optimized Defaults
                                                        F10: Save & Exit
                                                        ESC: Exit

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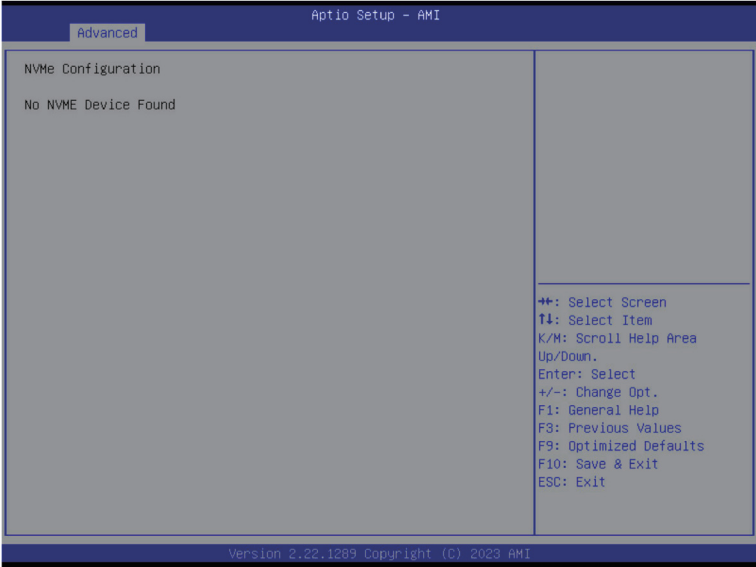
Parameter	Description
NVMe Configuration	Displays the NVMe devices connected to the system.

5-2-9 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. Default setting is **0x1000**.
SATA HDD Security Frozen	Enable/Disable this item to send freeze lock command to SATA HDD. Options available: Enabled, Disabled. Default setting is **Enabled**.
NVMe SSD Security Frozen	Attempt to send freeze lock command to NVMe SSDs during boot. Options available: Enabled, Disabled. Default setting is **Enabled**.
NVMe OPROM Select	Options available: BIOS Build-In, NVMe Device, Disabled. Default setting is **BIOS Build-In**.
NVMe LED Control	Enable/Disable allow user control NVMe LED. It only available the NVMe device direct connect to CPU. Options available: Disable, Enable. Default setting is **Disable**.

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

Parameter	Description
Chassis Opened Warning	Enable/Disable the chassis intrusion alert function. Options available: Enabled, Disabled, Clear. Default setting is **Disabled**.

5-2-10 Tls Auth Configuration

```
                              Aptio Setup - AMI
         Advanced
                                                    Press <Enter> to configure
                                                    Server CA.
  ▶ Server CA Configuration

  ▶ Client Cert Configuration




                                                    ↔: Select Screen
                                                    ↑↓: Select Item
                                                    K/M: Scroll Help Area
                                                    Up/Down.
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F3: Previous Values
                                                    F9: Optimized Defaults
                                                    F10: Save & Exit
                                                    ESC: Exit

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```

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.

5-2-11　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

5-3 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.

```
                            Aptio Setup - AMI
        Main   Advanced   Chipset   Server Mgmt   Security   Boot   Save & Exit

    ▶ Processor Configuration                      Displays and provides
    ▶ Common RefCode Configuration                 options to change the
    ▶ UPI Configuration                            Processor Settings
    ▶ Memory Configuration
    ▶ IIO Configuration
    ▶ Advanced Power Management Configuration
    ▶ PCH-IO Configuration
    ▶ Miscellaneous Configuration
    ▶ Server ME Configuration
    ▶ Runtime Error Logging
    ▶ Power Policy

                                                   ⮀: Select Screen
                                                   ↑↓: Select Item
                                                   K/M: Scroll Help Area
                                                   Up/Down.
                                                   Enter: Select
                                                   +/-: Change Opt.
                                                   F1: General Help
                                                   F3: Previous Values
                                                   F9: Optimized Defaults
                                                   F10: Save & Exit
                                                   ESC: Exit

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```

5-3-1 Processor Configuration

```
                              Aptio Setup - AMI
        Chipset

   Processor Configuration                                    ▲  Change Per-Socket Settings
   ---------------------------------------------------
 ▶ Per-Socket Configuration
   Processor Socket                Socket 0     Socket 1
   Processor ID                    000806F8* |  000806F8
   Processor Die Type                   XCC  |       XCC
   Processor Frequency             2.000GHz  |  2.000GHz
   Processor Max Ratio                  14H  |       14H
   Processor Min Ratio                  08H  |       08H
   Microcode Revision              2B000461  |  2B000461
   L1 Cache RAM(Per Core)              80KB  |      80KB
   L2 Cache RAM(Per Core)            2048KB  |    2048KB
   L3 Cache RAM(Per Package)        76800KB  |   76800KB
   Processor 0 Version             Intel(R) Xeon(R) Platin   ↔: Select Screen
                                   um 8450H                  ↑↓: Select Item
   Processor 1 Version             Intel(R) Xeon(R) Platin   K/M: Scroll Help Area
                                   um 8450H                  Up/Down.
                                                             Enter: Select
   Enable LP [Global]              [ALL LPs]                 +/-: Change Opt.
   Hardware Prefetcher             [Enable]                  F1: General Help
   L2 RFO Prefetch Disable         [Disable]                 F3: Previous Values
   Adjacent Cache Prefetch         [Enable]                  F9: Optimized Defaults
   DCU Streamer Prefetcher         [Enable]                  F10: Save & Exit
   DCU IP Prefetcher               [Enable]                  ESC: Exit
   Extended APIC                   [Enable]               ▼

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```

```
                              Aptio Setup - AMI
        Chipset

   Processor 0 Version             Intel(R) Xeon(R) Platin   ▲  Displays and provides
                                   um 8450H                     option to change the
   Processor 1 Version             Intel(R) Xeon(R) Platin      Processor CFR Settings
                                   um 8450H

   Enable LP [Global]              [ALL LPs]
   Hardware Prefetcher             [Enable]
   L2 RFO Prefetch Disable         [Disable]
   Adjacent Cache Prefetch         [Enable]
   DCU Streamer Prefetcher         [Enable]
   DCU IP Prefetcher               [Enable]
   Extended APIC                   [Enable]
   Enable Intel(R) TXT             [Disable]
   VMX                             [Enable]                  ↔: Select Screen
   Enable SMX                      [Disable]                 ↑↓: Select Item
   AES-NI                          [Enable]                  K/M: Scroll Help Area
   Debug Consent                   [Disable]                 Up/Down.
   ---------------------------------------------------       Enter: Select
   TME, TME-MT, TDX                                          +/-: Change Opt.
   ---------------------------------------------------       F1: General Help
   Memory Encryption (TME)         [Disabled]                F3: Previous Values
   SGX setup configuration preconditions for enabling were NOT  F9: Optimized Defaults
   met. Please check TME, MirrorMode or Extended APIC settings. F10: Save & Exit
   ---------------------------------------------------       ESC: Exit
 ▶ Processor CFR Configuration                            ▼

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```

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 Die Type / 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. Default setting is **ALL LPs**.
Hardware Prefetcher	Select whether to enable the speculative prefetch unit of the processor. Options available: Enable, Disable. Default setting is **Enable**.
L2 RF0 Prefetch Disable	Options available: Enable, Disable. Default setting is **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. Default setting is **Enable**.
DCU Streamer Prefetcher	Enable/Disable DCU streamer prefetcher. Options available: Enable, Disable. Default setting is **Enable**.
DCU IP Prefetcher	Enable/Disable DCU IP Prefetcher. Options available: Enable, Disable. Default setting is **Enable**.
Extended APIC	Enable/Disable extended APIC support. Note: The VT-d will be enabled automatically when x2APIC is enabled. Options available: Enable, Disable. Default setting is **Enable.**
Enable Intel(R) TXT	Enable/Disable the Intel Trusted Execution Technology support function. Options available: Enable, Disable. Default setting is **Disable.**
VMX	Enable/Disable the Vanderpool Technology. This will take effect after rebooting the system. Options available: Enable, Disable. Default setting is **Enable**.
Enable SMX	Enable/Disable the Safer Mode Extensions (SMX) support function. Options available: Enable, Disable. Default setting is **Disable**.
AES-NI	Enable/Disable the AES-NI support. Options available: Enable, Disable. Default setting is **Enable**.
Debug Consent	Options available: Enable, Disable. Default setting is **Disable**.

Parameter	Description
Memory Encryption (TME)[(Note)]	Enable/Disable memory encryption (TME). Options available: Enabled, Disabled. Default setting is **Disabled**.
Total Memory Encryption Multi-Tenant (TME-MT)	Options available: Enabled, Disabled. Default setting is **Disabled**.

Processor CFR Configuration	Press [Enter] to configure advanced items.
	 ◆ Provision S3M CFR
	   – Options available: Disable, Enable. Default setting is **Enable**.
	 ◆ Manual Commit S3M FW CFR
	   – Options available: Disable, Enable, Auto. Default setting is **Auto**.
	 ◆ Provision PUcode CFR
	   – Options available: Disable, Enable. Default setting is **Enable**.
	 ◆ Manual Commit PUcode CFR
	   – Options available: Enable, Disable, Auto. Default setting is **Auto**.
	 ◆ Socket0/1 CFR Revision Info
	   – Displays CFR Revision information of the socket.

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

5-3-2 Common RefCode Configuration

```
                              Aptio Setup - AMI
            Chipset

 Common RefCode Configuration                              Enable or Disable Non
 ------------------------------------------------          uniform Memory Access
 Numa                              [Enable]                (NUMA).
 Virtual Numa                      [Disable]



                                                          ↔↕: Select Screen
                                                          ↑↓: Select Item
                                                          K/M: Scroll Help Area
                                                          Up/Down.
                                                          Enter: Select
                                                          +/-: Change Opt.
                                                          F1: General Help
                                                          F3: Previous Values
                                                          F9: Optimized Defaults
                                                          F10: Save & Exit
                                                          ESC: Exit

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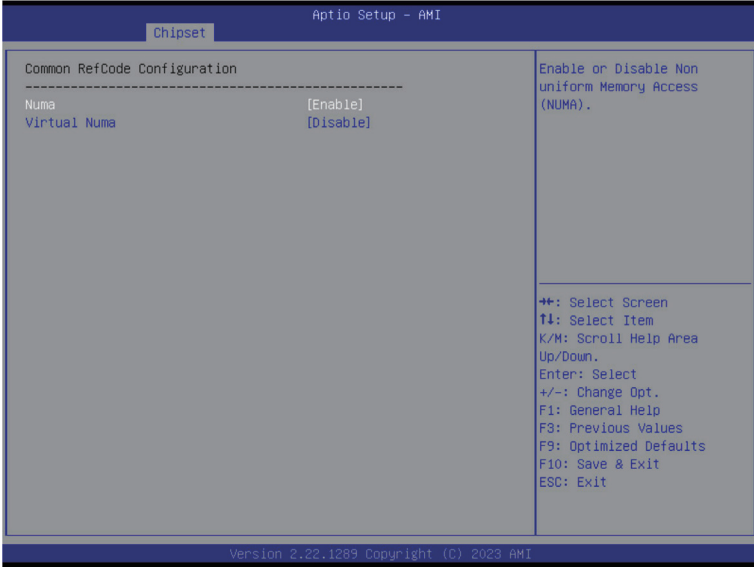
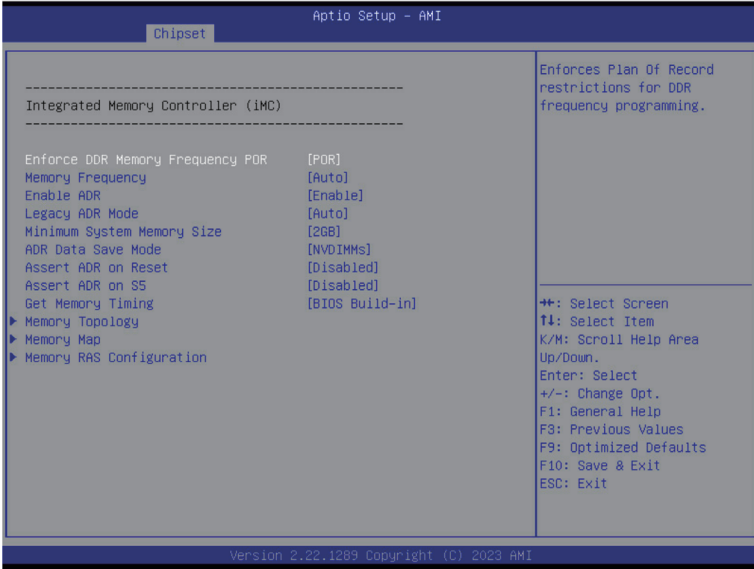| Parameter	Description
Common RefCode Configuration	
Numa	Enable/Disable Non uniform Memory Access (NUMA). Options available: Disable, Enable. Default setting is **Enable**.
Virtual Numa	Divide physical NUMA nodes into evenly sized virtual NUMA nodes in ACPI table. This may improve Windows performance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

5-3-3 UPI Configuration

Parameter	Description

UPI General Configuration	Press [Enter] to configure advanced items.
	◆ UPI Status
	  – Press [Enter] to view the Uncore status.
	◆ Link Frequency Select
	  – Selects the UPI link frequency.
	  – Options available: 12.8GT/s, 14.4GT/s, 16.0GT/s, Auto, Use Per Link Setting. Default setting is **Auto**.
	◆ SNC
	  – Enable/Disable Sub NUMA Cluster function.
	  – Options available: Auto, Disable, Enable SNC2 (2-clusters), Enable SNC4 (4-clusters). Default setting is **Auto**.
	◆ Stale AtoS
	  – Enable/Disable Stale A to S directory optimization.
	  – Options available: Disable, Enable, Auto. Default setting is **Auto**.
	◆ LLC dead line alloc
	  – Enable/Disable fill dead lines in LLC.
	  – Options available: Disable, Enable, Auto. Default setting is **Enable**.
	◆ MMCFG Size
	  – Options available: 64M, 128M, 256M, 512M, 1G, 2G, Auto. Default setting is **512M**.
	◆ MMIO High Base
	  – Options available: 56T, 40T, 32T, 24T, 16T, 4T, 2T, 1T, 512G, 3584T. Default setting is **4T**.

Parameter	Description

UPI General Configuration (continued)	◆ MMIO High Granularity Size
	  – Selects the allocation size used to assign mmioh resources.
	  – Options available: 1G, 4G, 16G, 64G, 256G, 1024G. Default setting is **1024G**.
	◆ Limit CPU PA to 46 bits
	  – Options available: Disable, Enable. Default setting is **Disable**.

5-3-4 Memory Configuration

```
                              Aptio Setup - AMI
            Chipset

                                                        Enforces Plan Of Record
                                                        restrictions for DDR
      -------------------------------------------       frequency programming.
      Integrated Memory Controller (iMC)
      -------------------------------------------

      Enforce DDR Memory Frequency POR    [POR]
      Memory Frequency                    [Auto]
      Enable ADR                          [Enable]
      Legacy ADR Mode                     [Auto]
      Minimum System Memory Size          [2GB]
      ADR Data Save Mode                  [NVDIMMs]
      Assert ADR on Reset                 [Disabled]
      Assert ADR on S5                    [Disabled]       ++: Select Screen
      Get Memory Timing                   [BIOS Build-in]  ↑↓: Select Item
    ▶ Memory Topology                                      K/M: Scroll Help Area
    ▶ Memory Map                                           Up/Down.
    ▶ Memory RAS Configuration                             Enter: Select
                                                           +/-: Change Opt.
                                                           F1: General Help
                                                           F3: Previous Values
                                                           F9: Optimized Defaults
                                                           F10: Save & Exit
                                                           ESC: Exit


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```

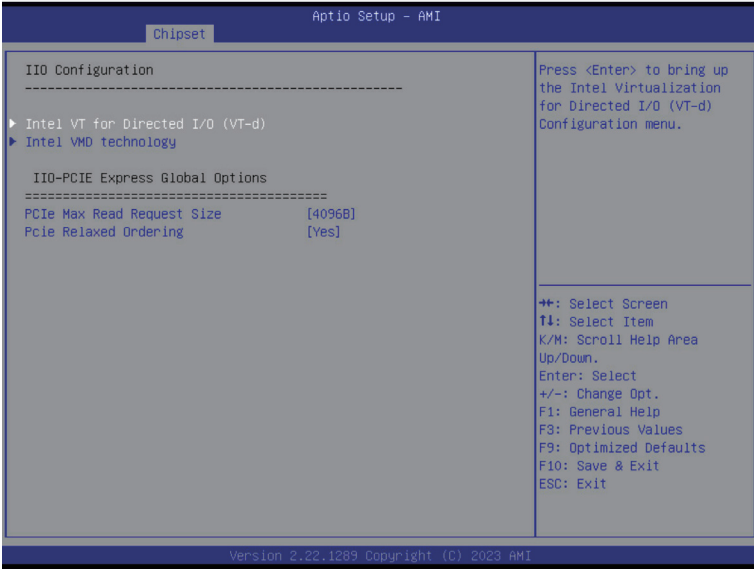| Parameter	Description
Integrated Memory Controller (iMC)	
Enforce DDR Memory Frequency POR	When set to Enable, the system enforces Plan Of Record restrictions for DDR frequency programming. Options available: POR, Disable. Default setting is **POR**.
Memory Frequency	Configures the maximum memory frequency. If Enforce POR is disabled, user will be able to run at higher frequencies than the memory support (limited by processor support). Default setting is **Auto**.
Enable ADR	Enables the detecting and enabling of ADR (Asynchronous DRAM Refresh) function. Options available: Enable, Disable. Default setting is **Enable**.
Legacy ADR Mode	Enable/Disable the Legacy ADR Mode. Options available: Enable, Disable, Auto. Default setting is **Auto**.
Minimum System Memory Size	Configures the minimum memory size. Options available: 2GB, 4GB, 6GB, 8GB. Default setting is **2GB**.
ADR Data Save Mode	Specifies the Data Save Mode for ADR. Batterybacked or Type 01 NVDIMM. Options available: Disable, Batterybacked DIMMs, NVDIMMs, Copy to Flash. Default setting is **NVDIMMs**.
Assert ADR on Reset	Enable/Disable Assert ADR on Reset. Options available: Enabled, Disabled. Default setting is **Disabled**.

Parameter	Description
Assert ADR on S5	Enable/Disable Assert ADR on S5. Options available: Enabled, Disabled. Default setting is **Disabled**.
Get Memory Timing	Auto is the detected SPD value and use it, otherwise use BIOS Build-in. Options available: Auto, BIOS Build-in. Default setting is **BIOS Build-in**.
Memory Topology	Press [Enter] to view memory topology with DIMM population information.

Memory Map	Press [Enter] to configure advanced items.
	◆ Volatile Memory Mode
	  – Selects 1LM or 2LM mode for volatile memory.
	  – Options available: 1LM, 2LM. Default setting is **2LM**.

Memory RAS Configuration	Press [Enter] to configure advanced items.
	◆ Mirror Mode(Note)
	  – 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, Partial Mirror Mode. Default setting is **Disabled**.
	◆ Partial Mirror 1 Size (GB)
	  – Selects multiplier of 1GB for the size of the SAD to be created.
	◆ Correctable Error Threshold
	  – Correctable Error Threshold (0x01-0x7fff) used for sparing, and leaky bucket.
	  – Press the <+> / <-> keys to increase or decrease the desired values.
	◆ Trigger SW Error Threshold(Note)
	  – Enable/Disable Sparing trigger SW Error Match Threshold.
	  – Options available: Disabled, Enabled. Default setting is **Disabled**.
	◆ SW Per Bank Threshold
	  – SW Per Bank Threshold (1-0x7FFF) used for DDR bank level error.
	  – Press the <+> / <-> keys to increase or decrease the desired values.
	◆ SW Correctable Error Time Window
	  – SW Correctable Error time window based interface in hour (0-24).
	  – 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. Default setting is **Disabled**.

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

Parameter	Description

Memory RAS Configuration (continued)	◆ 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. Default setting is **Disabled**.
	◆ Enable ADDDC Error Injection
	  – Options available: Disabled, Enabled. Default setting is **Enabled**.
	◆ Patrol Scrub
	  – Options available: Disabled, Enable at End of POST. Default setting is **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. Default setting is **Enabled**.

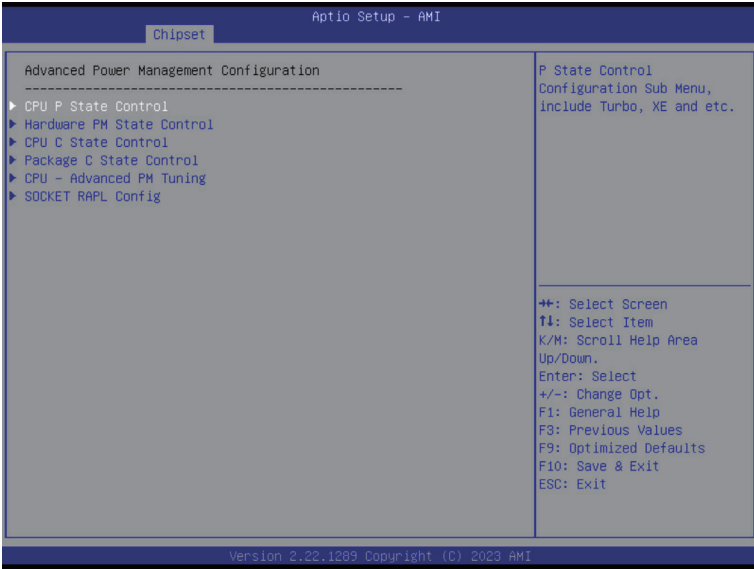(Note)   Advanced items prompt when this item is defined.

5-3-5 IIO Configuration

Parameter	Description
IIO Configuration	
Intel® VT for Directed I/O (VT-d)	Press [Enter] to configure advanced items. ◆ Intel® VT for Directed I/O – Enable/Disable the Intel VT for Directed I/O (VT-d) support function by reporting the I/O device assignment to VMM through DMAR ACPI Tables. – Options available: Enable, Disable. Default setting is **Enable**. ◆ Cache Allocation – Options available: Enable, Disable. Default setting is **Enable**. ◆ 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. Default setting is **Disable**. ◆ Interrupt Remapping – Enable/Disable the interrupt remapping support function. – Options available: Auto, Enable, Disable. Default setting is **Auto** ◆ x2APIC Opt Out – Options available: Enable, Disable. Default setting is **Disable**. ◆ Pre-boot DMA Protection – Options available: Enable, Disable. Default setting is **Disable**.

Parameter	Description

Intel® VT for Directed I/O (VT-d) (continued)	◆ PCIe ACSCTL
	  – Enable/Disable overwrite of PCI Access Control Services Control register in PCI root ports.
	  – Options available: Disable, Enable. Default setting is **Disable**.
	◆ Source Validation^(Note)
	  – Options available: Disabled, Enabled. Default setting is **Disabled**.
	◆ Translation Blocking^(Note)
	  – Options available: Disabled, Enabled. Default setting is **Disabled**.
	◆ P2P Request Redirect^(Note)
	  – Options available: Disabled, Enabled. Default setting is **Enabled**.
	◆ P2P Completion Redirect^(Note)
	  – Options available: Disabled, Enabled. Default setting is **Enabled**.
	◆ Upstream Forwarding Enable^(Note)
	  – Options available: Disabled, Enabled. Default setting is **Enabled**.

Intel® VMD technology	Press [Enter] to configure advanced items.
	◆ Intel® VMD Configuration
	  – Enable/Disable Intel® VMD technology.
	  – Options available: Enable, Disable. Default setting is **Disable**.
	◆ Intel® VMD for Non-Hotplug NVMe^(Note1)
	  – Enable/Disable Intel® VMD for Non-Hotplug NVMe.
	  – Options available: Enable, Disable. Default setting is **Disable**.

IIO-PCIE Express Global Options	
PCIe Max Read Request Size	Options available: Auto, 128B, 256B, 512B, 1024B, 2048B, 4096B. Default setting is **4096B.**
Pcie Relaxed Ordering	Options available: No, Yes. Default setting is **Yes.**

(Note)   This item is available when **PCIe ACSCTL** is set to **Enable**.
(Note1)   This item appears when **Intel® VMD Configuration** is set to **Enable**.

5-3-6　Advanced Power Management Configuration

Parameter	Description

CPU P State Control	Press [Enter] to configure advanced items.
	◆ 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: Enable, Disable. Default setting is **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: Enable, Disable. Default setting is **Enable**.

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. Default setting is **Native Mode**.

Parameter	Description

CPU C State Control	Press [Enter] to configure advanced items.
	◆ Enable Monitor MWAIT
	  – Allows Monitor and MWAIT instructions.
	  – Options available: Disable, Enable, Auto. Default setting is **Auto**.
	◆ CPU C6 Report
	  – Enable/Disable CPU C6(ACPI C3) report to OS.
	  – Options available: Disable, Enable, Auto. Default setting is **Auto**.
	◆ Enhanced Halt State (C1E)
	  – Core C1E auto promotion control. Takes effect after reboot.
	  – Options available: Enable, Disable. Default setting is **Enable**.

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, C6(Retention) state, No Limit, Auto. Default setting is **Auto**.

CPU - Advanced PM Tuning	Press [Enter] to configure advanced items.
	◆ Energy Perf BIAS
	  – Press [Enter] to configure advanced items.
	  » Power Performance Tuning
	    • Options available: OS Controls EPB, BIOS Controls EPB, PECI Controls EPB. Default setting is **OS Controls EPB**.
	  » Energy_PERF_BIAS_CFG mode(Note)
	    • Options available: Performance, Balanced Performance, Balanced Power, Power. Default setting is **Balanced Performance**.

SOCKET RAPL Config	Press [Enter] to configure advanced items.
	◆ PL1 Power Limit
	  – PL1 Power Limit in Watts. The value may vary from 0 to Fused Value. If the value is 0, the fused value will be programmed.
	  – Default setting is **0**.
	◆ PL1 Time Window
	  – PL1 value in seconds. The value may vary from 0 to 448.
	  – Default setting is **1**.
	◆ PL2 Power Limit
	  – PL2 Power Limit in Watts. The value may vary from 0 to Fused Value. If the value is 0, BIOS programs 120% * TDP.
	  – Default setting is **0**.
	◆ PL2 Time Window
	  – PL1 value in seconds. The value may vary from 0 to 0.438.
	  – Default setting is **0.012**.

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

5-3-7 PCH Configuration

Parameter	Description
PCH-IO Configuration	

SATA And RST Configuration/ SATA Controller And RST Configuration	Press [Enter] to configure advanced items.
	◆ SATA Configuration
	  – Enable/Disable SATA controller.
	  – Options available: Enabled, Disabled. Default setting is **Enabled**.
	◆ SATA Mode Selection
	  – Configures on chip SATA type.
	  – AHCI Mode: When set to AHCI, the SATA controller enables its AHCI functionality. Then the RAID function is disabled and cannot be access the RAID setup utility at boot time.
	  – RAID Mode: When set to RAID, the SATA controller enables both its RAID and AHCI functions. You will be allowed to access the RAID setup utility at boot time.
	  – Options available: AHCI, RAID. Default setting is **AHCI**.
	◆ RAID Device ID(Note)
	  – Choose RAID Device ID.
	  – Options available: Client, Alternate, Server. Default setting is **Server**.
	◆ SATA Port 0/1/2/3/4/5/6/7
	  – The category identifies SATA hard drives that are installed in the computer. System will automatically detect HDD type.

(Note)   Only appears when **SATA Mode Selection** sets to **RAID** Mode.

Parameter	Description

SATA And RST Configuration/ SATA Controller And RST Configuration (continued)	◆ SATA Port 0/1/2/3/4/5/6/7
	  – Enable/Disable Port 0/1/2/3/4/5/6/7 device.
	  – Options available: Enabled, Disabled. Default setting is **Enabled**.
	◆ Hot Plug (for Port 0/1/2/3/4/5/6/7)
	  – Enable/Disable HDD Hot-Plug function.
	  – Options available: Enabled, Disabled. Default setting is **Enabled**.
	◆ Spin Up Device (for Port 0/1/2/3/4/5/6/7)
	  – On an edge detect from 0 to 1, the PCH starts a COM reset initialization to the device.
	  – Options available: Enabled, Disabled. Default setting is **Disabled**.

SATA And RST Configuration/ sSATA Controller And RST Configuration	◆ SATA Configuration
	  – Enable/Disable SATA controller.
	  – Options available: Enabled, Disabled. Default setting is **Enabled**.
	◆ SATA Mode Selection
	  – Configures on chip SATA type.
	  – AHCI Mode: When set to AHCI, the SATA controller enables its AHCI functionality. Then the RAID function is disabled and cannot be access the RAID setup utility at boot time.
	  – RAID Mode: When set to RAID, the SATA controller enables both its RAID and AHCI functions. You will be allowed to access the RAID setup utility at boot time.
	  – Options available: AHCI, RAID. Default setting is **AHCI**.
	◆ RAID Device ID(Note)
	  – Choose RAID Device ID.
	  – Options available: Client, Alternate, Server. Default setting is **Server**.
	◆ SATA Port 4/5/6/7
	  – The category identifies sSATA hard drives that are installed in the computer. System will automatically detect HDD type.
	◆ SATA Port 4/5/6/7
	  – Enable/Disable Port 4/5/6/7 device.
	  – Options available: Enabled, Disabled. Default setting is **Enabled**.
	◆ Hot Plug (for Port 4/5/6/7)
	  – Enable/Disable HDD Hot-Plug function.
	  – Options available: Enabled, Disabled. Default setting is **Enabled**.
	◆ Spin Up Device (for Port 4/5/6/7)
	  – On an edge detect from 0 to 1, the PCH starts a COM reset initialization to the device.
	  – Options available: Enabled, Disabled. Default setting is **Disabled**.

(Note)   Only appears when **SATA Mode Selection** sets to **RAID** Mode.

Parameter	Description

SATA And RST Configuration/ tSATA Controller And RST Configuration	◆ SATA Configuration
	  – Enable/Disable SATA controller.
	  – Options available: Enabled, Disabled. Default setting is **Enabled**.
	◆ SATA Mode Selection
	  – Configures on chip SATA type.
	  – AHCI Mode: When set to AHCI, the SATA controller enables its AHCI functionality. Then the RAID function is disabled and cannot be access the RAID setup utility at boot time.
	  – RAID Mode: When set to RAID, the SATA controller enables both its RAID and AHCI functions. You will be allowed to access the RAID setup utility at boot time.
	  – Options available: AHCI, RAID. Default setting is **AHCI**.
	◆ RAID Device ID(Note)
	  – Choose RAID Device ID.
	  – Options available: Client, Alternate, Server. Default setting is **Server**.
	◆ SATA Port 0/1/2/3
	  – The category identifies sSATA hard drives that are installed in the computer. System will automatically detect HDD type.
	◆ SATA Port 0/1/2/3
	  – Enable/Disable Port 4/5/6/7 device.
	  – Options available: Enabled, Disabled. Default setting is **Enabled**.
	◆ Hot Plug (for Port 0/1/2/3)
	  – Enable/Disable HDD Hot-Plug function.
	  – Options available: Enabled, Disabled. Default setting is **Enabled**.
	◆ Spin Up Device (for Port 0/1/2/3)
	  – On an edge detect from 0 to 1, the PCH starts a COM reset initialization to the device.
	  – Options available: Enabled, Disabled. Default setting is **Disabled**.

(Note)   Only appears when **SATA Mode Selection** sets to **RAID** Mode.

5-3-8 Miscellaneous Configuration

```
                              Aptio Setup - AMI
         Chipset

 Miscellaneous Configuration                              Select active Video type
 ------------------------------------------------

 Active Video                    [Auto]
 External SSC - CK440            [SSC Off]




                                                          →←: Select Screen
                                                          ↑↓: Select Item
                                                          K/M: Scroll Help Area
                                                          Up/Down.
                                                          Enter: Select
                                                          +/-: Change Opt.
                                                          F1: General Help
                                                          F3: Previous Values
                                                          F9: Optimized Defaults
                                                          F10: Save & Exit
                                                          ESC: Exit

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```

Parameter	Description
Miscellaneous Configuration	
Active Video	Selects the active video type. Options available: Auto, Onboard Device, PCIE Device, Specific PCIE Device. Default setting is **Auto**.
External SSC - CK440	Enables Spread spectrum - only affects external clock generator. Options available: SSC Off, SSC = -0.3%, SSC = -0.5%, Hardware. Default setting is **SSC Off**.

5-3-9 Server ME Configuration

```
                                    Aptio Setup - AMI
            Chipset

   General ME Configuration
   Oper. Firmware Version          18:6.0.4.70
   ME Firmware Status #1           0x00300355
   ME Firmware Status #2           0x89508026
    Current State                  Operational
    Error Code                     No Error
    Recovery Cause                 N/A


                                                          ↔: Select Screen
                                                          ↑↓: Select Item
                                                          K/M: Scroll Help Area
                                                          Up/Down.
                                                          Enter: Select
                                                          +/-: Change Opt.
                                                          F1: General Help
                                                          F3: Previous Values
                                                          F9: Optimized Defaults
                                                          F10: Save & Exit
                                                          ESC: Exit


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```

Parameter	Description
General ME Configuration	
Oper. Firmware Version	Displays the operational firmware version.
ME Firmware Status #1/#2	Displays ME Firmware status information.
Current State	Displays ME Firmware current status information.
Error Code	Displays ME Firmware status error code.
Recovery Cause	Displays ME Firmware recovery cause.

5-3-10 Runtime Error Logging Settings

Parameter	Description
Runtime Error Logging	
System Errors	Enable/Disable system error logging function. Options available: Enable, Disable. Default setting is **Enable**.

Whea Settings	Press [Enter] to configure advanced items.
	◆ WHEA (Windows Hardware Error Architecture) Support
	  – Enable/Disable WHEA Support.
	  – Options available: Enable, Disable. Default setting is **Enable**.

Memory Error Enabling	Press [Enter] to configure advanced items.
	◆ Memory Corrected Error
	  – Enable/Disable Memory Corrected Error.
	  – Options available: Enable, Disable. Default setting is **Enable**.
	◆ Uncorrected Error disable Memory
	  – Enable/Disable the Memory that triggers Uncorrected Error.
	  – Options available: Enable, Disable. Default setting is **Disable**.

Parameter	Description

PCIe Error Enabling	Press [Enter] to configure advanced items.
	◆ PCIE Error
	   – Enable/Disable PCIE error.
	   – Options available: Enable, Disable. Default setting is **Disable**.
	◆ Uncorrected Error(Note)
	   – Enables and escalates Uncorrectable/Recoverable Errors to error pins.
	   – Options available: Enable, Disable. Default setting is **Enable**.
	◆ Fatal Error Enable(Note)
	   – Enables and escalates Fatal Errors to error pins.
	   – Options available: Enable, Disable. Default setting is **Enable**.
	◆ 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. Default setting is **Enabled**.
	◆ 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. Default setting is **Enabled**.

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

5-3-11 Power Policy

```
                              Aptio Setup - AMI
             Chipset

  Power Policy Quick Settings      [Standard]              Select a Power Policy
  SpeedStep (Pstates)              [Enable]                Quick Setting(The
  Turbo Mode                       [Enable]                following items will be
  CPU C6 report                    [Auto]                  set based on the selected
  Enhanced Halt State (C1E)        [Enable]                power policy)
  Package C State                  [Auto]
  Enable LP [Global]               [ALL LPs]
  Hardware Prefetcher              [Enable]
  Adjacent Cache Prefetch          [Enable]
  DCU Streamer Prefetcher          [Enable]
  Intel VT for Directed I/O        [Enable]

                                                           →←: Select Screen
                                                           ↑↓: Select Item
                                                           K/M: Scroll Help Area
                                                           Up/Down.
                                                           Enter: Select
                                                           +/-: Change Opt.
                                                           F1: General Help
                                                           F3: Previous Values
                                                           F9: Optimized Defaults
                                                           F10: Save & Exit
                                                           ESC: Exit

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```

Parameter	Description
Power Policy Quick Settings	Selects a Power Policy Quick Setting. Options available: Standard, Best Performance, Energy Efficient. Default setting is **Standard**.
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: Enable, Disable. Default setting is **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: Enable, Disable. Default setting is **Enable**.
CPU C6 report	Enable/Disable the BIOS to enable the report from the CPU C6 state (ACPI C3) to the OS. Options available: Disable, Enable, Auto. Default setting is **Auto**.
Enhanced Halt State (C1E)	Enable/Disable the C1E support for lower power consumption. Takes effect after reboot. Options available: Enable, Disable. Default setting is **Enable**.
Package C State	Configures the C-State package limit. Options available: C0/C1 state, C2 state, C6(non Retention) state, C6(Retention) state, No Limit, Auto. Default setting is **Auto**.

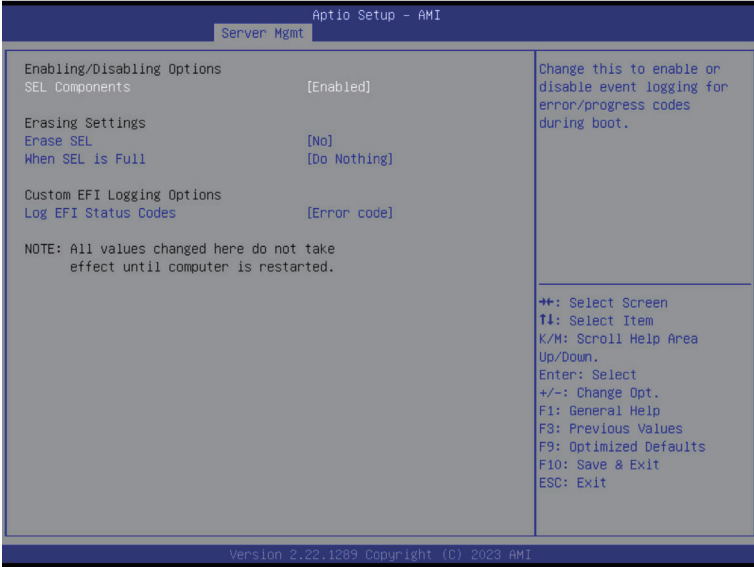| Parameter	Description
Enable LP [Global]	Enables Logical processor (Software Method to Enable/Disable Logical Processor threads). Options available: ALL LPs, Single LP. Default setting is **ALL LPs**.
Hardware Prefetcher	Options available: Enable, Disable. Default setting is **Enable**.
Adjacent Cache Prefetch	Options available: Enable, Disable. Default setting is **Enable**.
DCU Streamer Prefetcher	Options available: Enable, Disable. Default setting is **Enable**.
Intel® VT for Directed I/O	Enable/Disable the Intel VT for Directed I/O (VT-d) support function by reporting the I/O device assignment to VMM through DMAR ACPI Tables. Options available: Enable, Disable. Default setting is **Enable**.

5-4   Server Management Menu

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

(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
System Event Log	Press [Enter] to configure advanced items.
View FRU Information	Press [Enter] to view the FRU information.
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. Default setting is **Enabled**.
Erasing Settings	

Erase SEL	Choose options for erasing SEL.
	Options available: No,
	        Yes, On next reset,
	        Yes, On every reset.
	Default setting is **No**.

When SEL is Full	Choose options for reactions to a full SEL. Options available: Do Nothing, Erase Immediately, Delete Oldest Record. Default setting is **Do Nothing**.
Custom EFI Logging Options	
Log EFI Status Codes	Enable/Disable the logging of EFI Status Codes (if not already converted to legacy). Options available: Disabled, Both, Error code, Progress code. Default setting is **Error code**.

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.
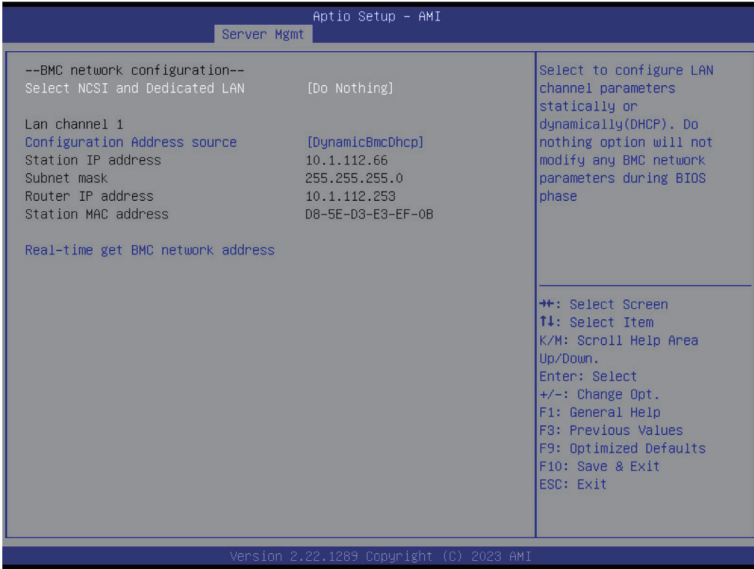
```
                            Aptio Setup - AMI
              Server Mgmt

   FRU Information

   System Manufacturer              Giga Computing
   System Product Name              R283-SF0-AAL1-000
   System Version                   0100
   System Serial Number             01234567890123456789AB
   Board Manufacturer               Giga Computing
   Board Product Name               MSF3-GP0-000
   Board Part Number                123456789AB
   Board Serial Number              01234567890123456789AB
   Chassis Manufacturer             Giga Computing
   Chassis Part Number              01234567
   Chassis Serial Number            01234567890123456789AB

                                                    →←: Select Screen
                                                    ↑↓: Select Item
                                                    K/M: Scroll Help Area
                                                    Up/Down.
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F3: Previous Values
                                                    F9: Optimized Defaults
                                                    F10: Save & Exit
                                                    ESC: Exit

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```

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

5-4-3 BMC VLAN Configuration
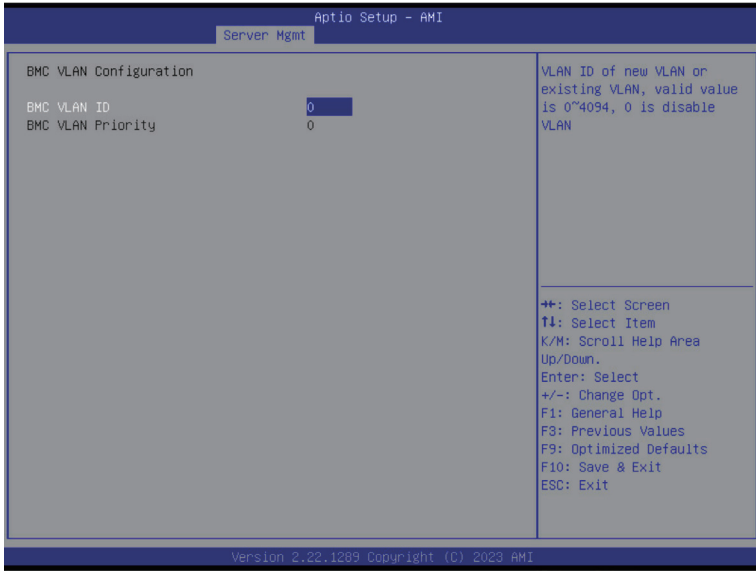
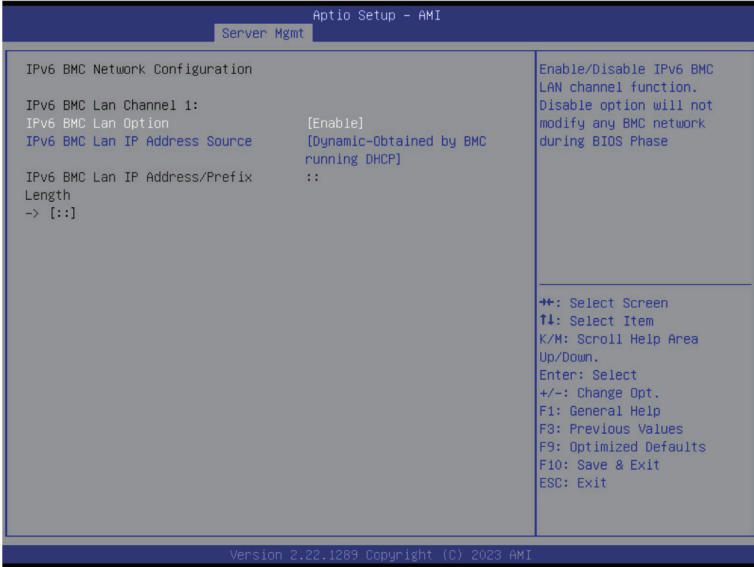| Parameter	Description
BMC VLAN Configuration	
BMC VLAN ID	Select to configure BMC VLAN ID. The valid range is from 0 to 4094. When set to 0, BMC VLAN ID will be disabled.
BMC VLAN Priority	Select to configure BMC VLAN Priority. The valid range is from 0 to 7. When BMC VLAN ID is set to 0, BMC VLAN Priority will not be selected.

5-4-4 BMC Network Configuration

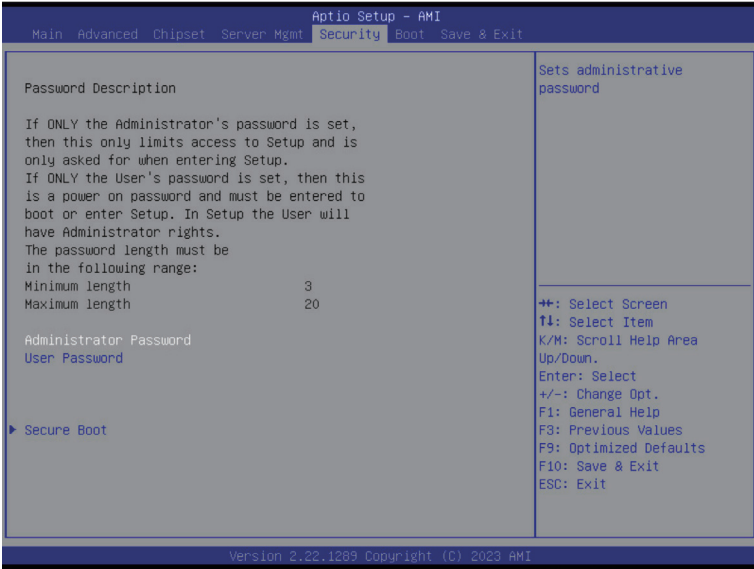| Parameter	Description
BMC network configuration	
Select NCSI and Dedicated LAN	Options available: Do Nothing, Model1(Dedicated), Model2(NCSI), Mode3(Failover). Default setting is **Do Nothing**.
Lan Channel 1	
Configuration Address source	Selects to configure LAN channel parameters statically or dynamically (DHCP). Options available: Unspecified, Static, DynamicBmcDhcp. Default setting is **DynamicBmcDhcp**.
Station IP address	Displays IP Address information.
Subnet mask	Displays Subnet Mask information. Please note that the IP address must be in three digitals, for example, 192.168.000.001.
Router IP address	Displays the Router IP Address information.
Station MAC address	Displays the MAC Address information.
Real-time 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. Default setting is **Enable**.
IPv6 BMC Lan IP Address Source	Selects to configure LAN channel parameters statically or dynamically (by BIOS or BMC). Options available: Unspecified, Static, Dynamic-Obtained by BMC running DHCP. Default setting is **Dynamic-Obtained by BMC running DHCP**.
IPv6 BMC Lan IP Address/ Prefix Length	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.

```
                              Aptio Setup - AMI
        Main  Advanced  Chipset  Server Mgmt  Security  Boot  Save & Exit

                                                    Sets administrative
     Password Description                           password

     If ONLY the Administrator's password is set,
     then this only limits access to Setup and is
     only asked for when entering Setup.
     If ONLY the User's password is set, then this
     is a power on password and must be entered to
     boot or enter Setup. In Setup the User will
     have Administrator rights.
     The password length must be
     in the following range:
     Minimum length                3
     Maximum length                20                →←: Select Screen
                                                     ↑↓: Select Item
     Administrator Password                          K/M: Scroll Help Area
     User Password                                   Up/Down.
                                                     Enter: Select
                                                     +/-: Change Opt.
   ▶ Secure Boot                                     F1: General Help
                                                     F3: Previous Values
                                                     F9: Optimized Defaults
                                                     F10: Save & Exit
                                                     ESC: Exit


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```

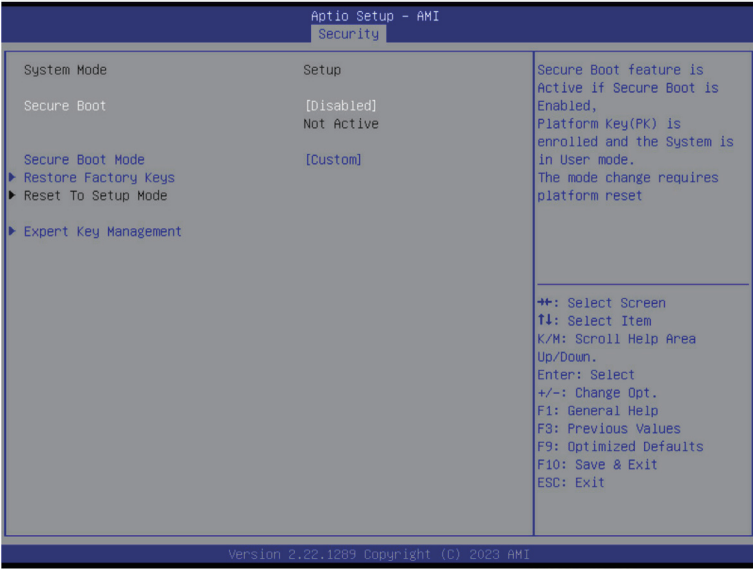There are two types of passwords that you can set:
  • Administrator Password
      Entering this password will allow the user to access and change all settings in the Setup Utility.
  • User Password
      Entering this password will restrict a user's access to the Setup menus. To enable or disable 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.

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.

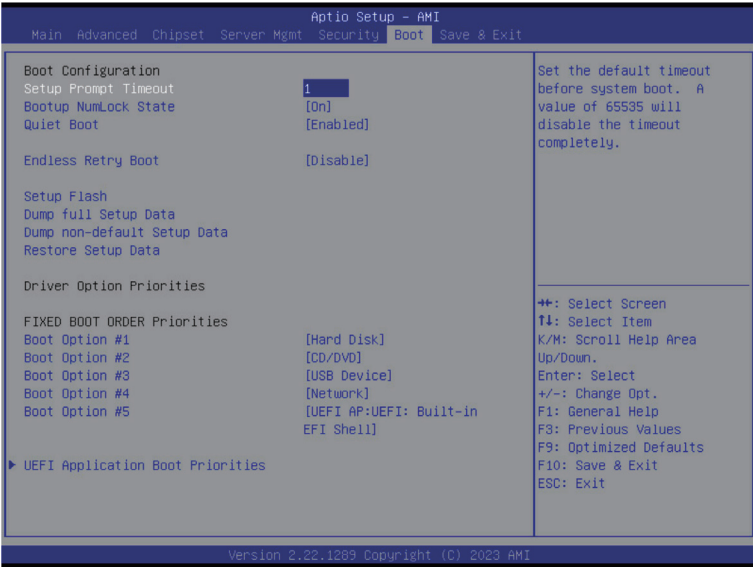| Parameter	Description
System Mode	Displays if the system is in User mode or Setup mode.
Secure Boot	Enable/ Disable the Secure Boot function. Options available: Enabled, Disabled. Default setting is **Disabled**.
Secure Boot Mode(Note)	Secure Boot requires all the applications that are running during the booting process to be pre-signed with valid digital certificates. This way, the system knows all files being loaded before 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. Default setting is **Standard**.
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
Key Management	Press [Enter] to configure advanced items. **Please note that this item is configurable when Secure Boot Mode is set to Custom.** ◆ Factory Key Provision – Allows to provision factory default Secure Boot keys when system is in Setup Mode. – Options available: Enabled, Disabled. Default setting is **Disabled**. ◆ Restore Factory Keys – Installs all factory default keys. It will force the system in User Mode. – Options available: Yes, No. ◆ Reset To Setup Mode – Reset the system 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.

```
                          Aptio Setup - AMI
        Main  Advanced  Chipset  Server Mgmt  Security  Boot  Save & Exit

    Boot Configuration                                      Set the default timeout
    Setup Prompt Timeout            1                       before system boot.  A
    Bootup NumLock State            [On]                    value of 65535 will
    Quiet Boot                      [Enabled]               disable the timeout
                                                            completely.
    Endless Retry Boot              [Disable]

    Setup Flash
    Dump full Setup Data
    Dump non-default Setup Data
    Restore Setup Data

    Driver Option Priorities
                                                            →←: Select Screen
    FIXED BOOT ORDER Priorities                             ↑↓: Select Item
    Boot Option #1                  [Hard Disk]             K/M: Scroll Help Area
    Boot Option #2                  [CD/DVD]                Up/Down.
    Boot Option #3                  [USB Device]            Enter: Select
    Boot Option #4                  [Network]               +/-: Change Opt.
    Boot Option #5                  [UEFI AP:UEFI: Built-in F1: General Help
                                    EFI Shell]              F3: Previous Values
                                                            F9: Optimized Defaults
  ▶ UEFI Application Boot Priorities                        F10: Save & Exit
                                                            ESC: Exit


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```

Parameter	Description
Boot Configuration	
Setup Prompt Timeout	Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting. Press the numeric keys to input the desired values.
Bootup NumLock State	Enable/Disable the Bootup NumLock function. Options available: On, Off. Default setting is **On**.
Quiet Boot	Enable/Disable showing the logo during POST. Options available: Enabled, Disabled. Default setting is **Enabled**.
Endless Retry Boot	Options available: Disable, Enable. Default setting is **Disable**.
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.

Parameter	Description
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 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>**.**
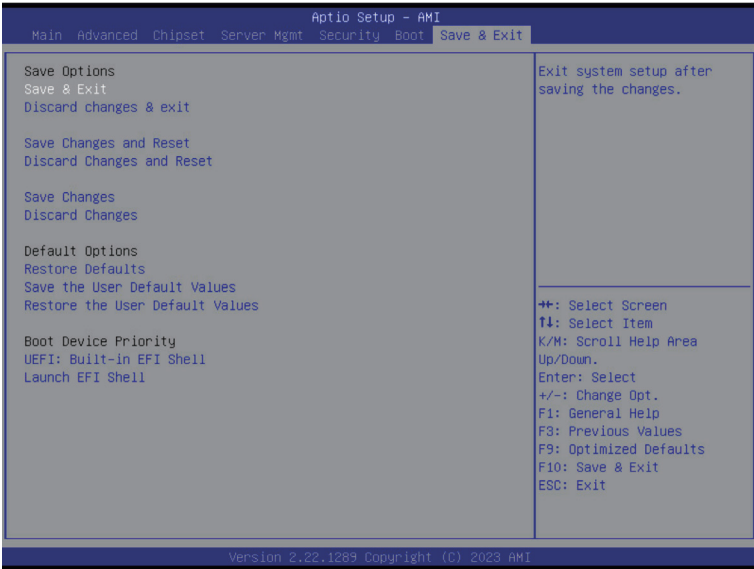
| Parameter	Description
Save Options	
Save and Exit	Saves changes made and closes the BIOS setup. Options available: Yes, No.
Discard changes and exit	Discards changes made and exits the BIOS setup. Options available: Yes, No.
Save Changes and Reset	Restarts the system after saving the changes made. 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 diskette.
2. Setting BIOS Recovery jump to enabled status.
3. Boot into BIOS recovery.
4. Run Proceed with flash update.
5. BIOS updated.
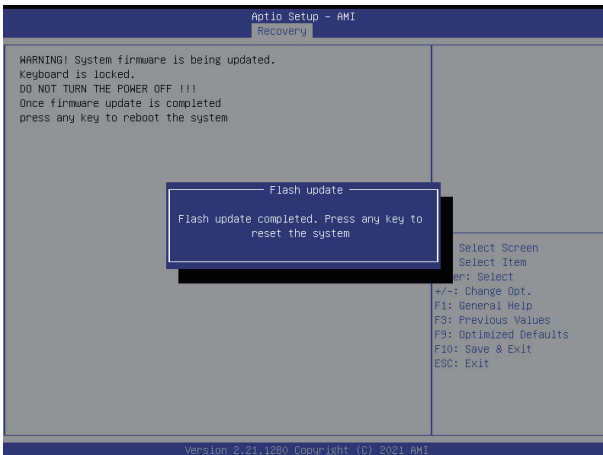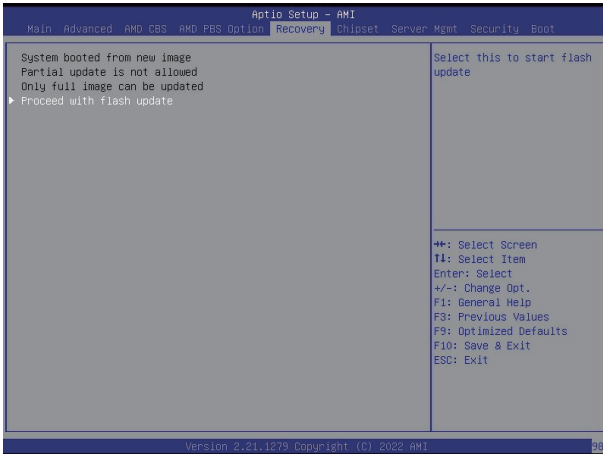
5-9   BIOS POST Beep code (AMI standard)

5-9-1   PEI Beep Codes

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

5-9-2   DXE Beep Codes

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