GIGABYTE™

R182-P91

Ampere® Altra® Max ARM Server - 1U 12-Bay Server

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

Server Warnings and Cautions

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

WARNING!

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

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

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

WARNING!

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

WARNING!

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

WARNING!

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

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

CAUTION!

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

Electrostatic Discharge (ESD)

CAUTION!

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

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

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

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

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

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

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

CAUTION!

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

Table of Contents

Chapter 1 Hardware Installation

1-1 Installation Precautions

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

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

1-2 Product Specifications

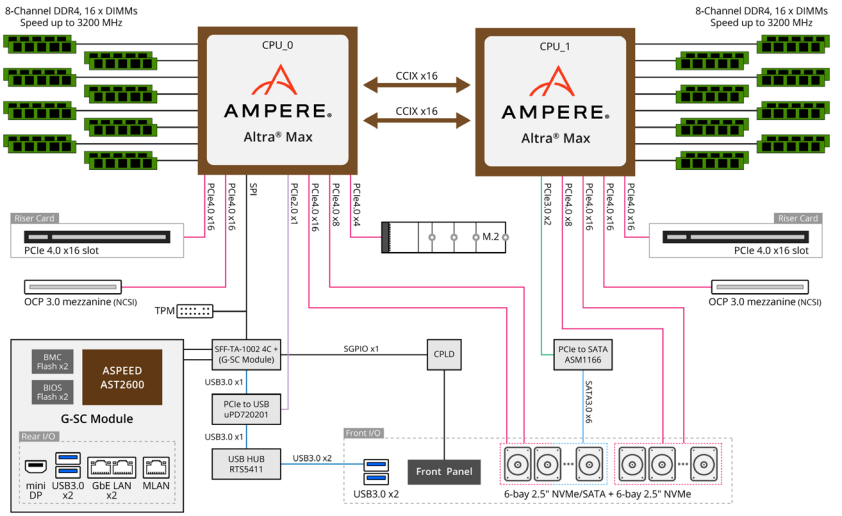
NOTE:
We reserve the right to make any changes to the product specifications and product-related information without prior notice.

System	◆ 1U
Dimension	◆ 438 x 43.5 x 730 (W x H x D, mm)
CPU	◆ Ampere® Altra® Max Processor ◆ Dual processors, 7nm technology ◆ LGA4926 ◆ Up to 128-core per processor Note: If only 1 CPU is installed, some PCIe or memory functions might be unavailable
Chipset	◆ System on Chip
Memory	◆ 32 x DIMM slots ◆ DDR4 memory supported only ◆ 8-Channel memory architecture ◆ RDIMM modules up to 256GB supported ◆ LRDIMM modules up to 256GB supported ◆ Up to 4TB of memory capacity supported per processor ◆ Memory speed: Up to 3200 MHz Note: Only supports configurations with 1, 2, 4, 6, 8, 12, or 16 DIMMs
LAN	◆ 2 x 1GbE LAN ports (1 x Intel® I350-AM2) ◆ NCSI function supported ◆ 1 x 10/100/1000 Mbps management LAN
Video	◆ Integrated in Aspeed® AST2600 ◆ 2D Video Graphic Adapter with PCIe bus interface ◆ 1920x1200@60Hz 32bpp, DDR4 SDRAM
Storage	◆ 12 x 2.5" Gen4 NVMe hot-swappable bays
Expansion Slot	◆ **Riser Card CRS101J:** - 1 x PCIe x16 slot (Gen4 x16), Full height half-length ◆ **Riser Card CRS101K:** - 1 x PCIe x16 slot (Gen4 x16), Full height half-length ◆ 2 x OCP 3.0 mezzanine slots ◆ 1 x M.2 slots: - M-key - PCIe Gen4 x4 - Supports NGFF-2242/2260/2280/22110 cards

Internal I/O	◆ 1 x M.2 slot ◆ 1 x TPM header ◆ 1 x Front panel header ◆ 1 x HDD/SSD backplane board header ◆ 1 x PMBus connector ◆ 1 x IPMB connector ◆ 1 x Clear CMOS jumper
Front I/O	◆ 1 x USB 3.0 ◆ 1 x Power button with LED ◆ 1 x ID button with LED ◆ 1 x Reset button ◆ 2 x LAN activity LEDs ◆ 1 x SSD activity LED ◆ 1 x System status LED
Rear I/O	◆ 2 x USB 3.0 ◆ 1 x mini-DP ◆ 2 x RJ45 ◆ 1 x MLAN
Backplane I/O	◆ Backplane P/N: 9CBP10C0NR-00 ◆ Speed and bandwidth: PCIe Gen4 x4 per port
TPM	◆ 1 x TPM header with SPI interface ◆ Optional TPM2.0 kit: CTM010
Power Supply	◆ 1+1 80 PLUS Platinum 1300W redundant PSU ◆ AC Input: - 100-240V~/ 12-7A, 50-60Hz - 200-240V~/ 8A, 50-60Hz ◆ DC Input: 240Vdc/ 6.5A ◆ DC Output: - Max 1000W/ 100-240V~ +12V/ 80.5A +12Vsb/ 3A - Max 1300W/ 200-240V~ or 240Vdc Input +12V/ 105.4A +12Vsb/ 3A

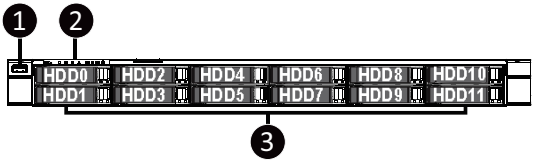
System Management	Aspeed® AST2600 management controller GIGABYTE Management Console (AMI MegaRAC SP-X) web interface ◆ Dashboard ◆ HTML5 KVM ◆ Sensor Monitor (Voltage, RPM, Temperature, CPU Status …etc.) ◆ Sensor Reading History Data ◆ FRU Information ◆ SEL Log in Linear Storage / Circular Storage Policy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

1-3 System Block Diagram



Chapter 2 System Appearance

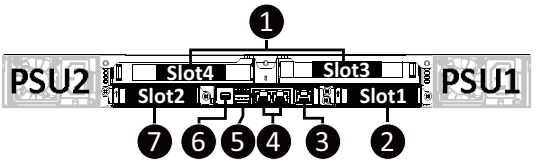
2-1 Front View



No.	Description
1.	Front USB 3.0 Port
2.	Front Panel LEDs and Buttons
3.	2.5" HDD Bays
	NOTE! Green HDD Latch Supports NVMe

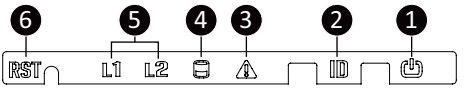
- Go to the section **2-3 Front Panel Buttons and LEDs** for detail description of function LEDs.

2-2 Rear View



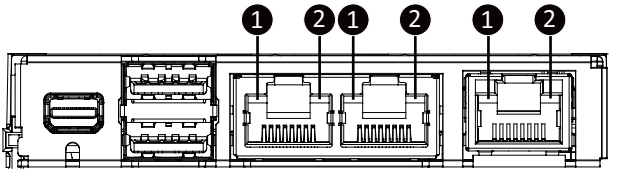
No.	Description
1.	PCIe Card Slot x 2
2.	Mezzanine Card Slot (Option/OCP 3.0/SFF)
3.	Server Management LAN Port
4.	GbE LAN Port x 2
5.	USB 3.0 Port x 2
6.	Mini DP Port
7.	Mezzanine Card Slot (Option/OCP 3.0/SFF)

2-3 Front Panel LED and Buttons



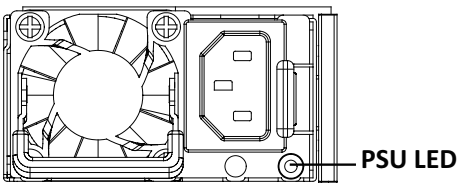
No.	Name	Color	Status	Description
1.	Power button with LED	Green	On	System is powered on
		Green	Blink	System is in ACPI S1 state (sleep mode)
		N/A	Off	• System is not powered on or in ACPI S5 state (power off) • System is in ACPI S4 state (hibernate mode)
2.	ID Button			Press the button to activate system identification
3.	System Status LED	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
4.	HDD Status LED	Green	On	HDD locate
			Blink	HDD access
		Amber	On	HDD fault
		Green/ Amber	Blink	HDD rebuilding
		N/A	Off	No HDD access or no HDD fault.
5.	LAN 1/2 Active/Link LEDs	Green	Solid On	Link between system and network or no access.
		Green	Blink	Data trasmission or receiving is occuring
		N/A	Off	No data transmission or receiving is occuring
6.	Reset Button			Press the button to reset the system.

2-4 Rear System LAN LEDs



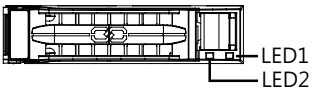
No.	Name	Color	Status	Description
1.	1GbE Speed LED	Yellow	On	1 Gbps data rate
		Green	On	100 Mbps data rate
		N/A	Off	10 Mbps data rate
2.	1GbE Link / Activity LED	Green	On	Link between system and network or no access
			Blink	Data transmission or reception is occurring.
		N/A	Off	No data transmission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

2-5 Power Supply Unit (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 updating mode
Amber	AC cord unplugged or AC power lost; with a second power supply in parallel still with AC input power
	Power supply critical event causing shut down: failure, OCP, OVP, fan failure and UVP
1Hz Amber Blinking	Power supply warning events where the power supply continues to operate: high temp, high power, high current and slow fan

2-6 Hard Disk Drive LEDs



RAID SKU		LED1	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 electrostatic discharge. Working on computers that are still connected to a power supply can be extremely dangerous. Follow the simple guidelines below to avoid damage to your computer or injury to yourself.

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

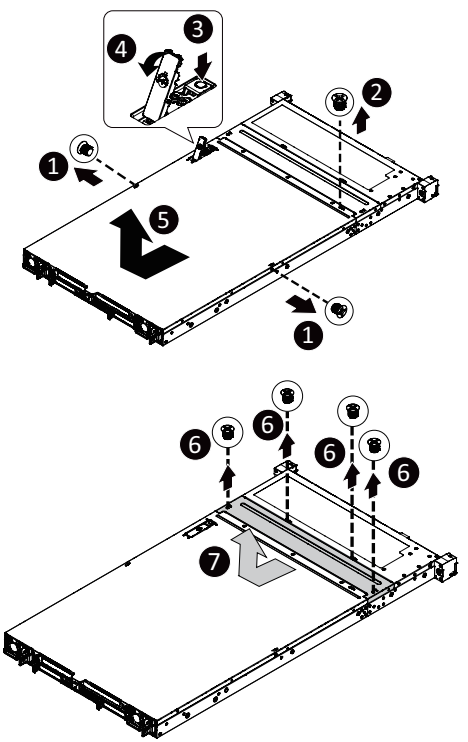
3-1 Removing and Installing the Chassis Cover

Before you remove or install the chassis top cover

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

Follow these instructions to remove/install the chassis cover:

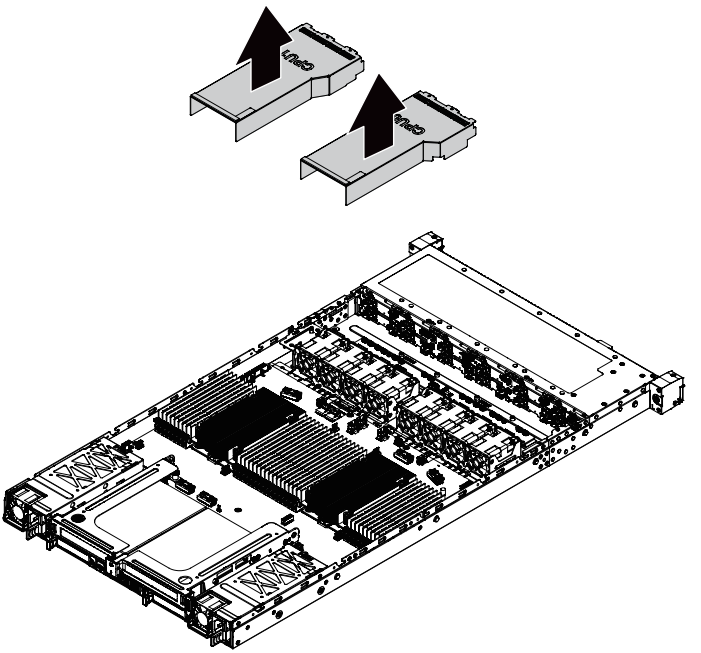
1. Remove the screws on both sides of the back chassis cover. (**Note: For safe shipping, installation screws are added and should be removed before deployment/putting it in the server cabinet.**)
2. Remove the screw securing the back chassis cover.
3. Push button to unlock the handle.
4. Pull the grip handle to open the panel cover.
5. Slide the back chassis cover towards the rear and remove the chassis cover in the direction indicated.
6. Remove the screw securing the middle chassis cover.
7. Slide the middle chassis cover towards the rear and remove the chassis cover in the direction indicated.
8. To reinstall the chassis cover reverse steps 2-7.



3-2 Removing and Installing the Fan Duct

Follow these instructions to remove/install the fan duct:

1. Lift up to remove the fan duct
2. To install the fan duct, align the fan duct with the guiding groove. Push down the fan duct into chassis until its firmly seat.



3-3 Removing and installing the Heat Sink

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

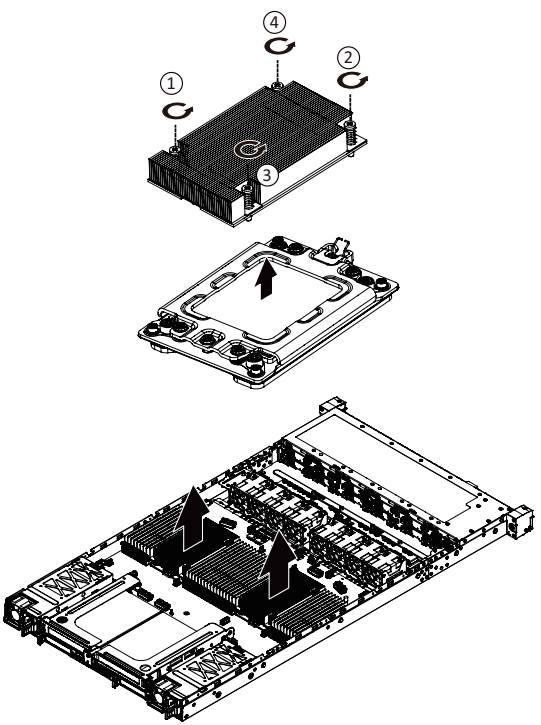
- Always turn off the computer and unplug the power cord from the power outlet before installing the heat sink to prevent hardware damage.
- Unplug all cables from the power outlets.
- Disconnect all telecommunication cables from their ports.
- Place the system unit on a flat and stable surface.
- Open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

WARNING!

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

Follow these instructions to remove/install the heat sink:

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



When installing the heat sink to CPU, use PHILLIPS #2-Lobe driver to tighten 4 captive nuts in sequence as 1-4. The screw tightening torque: 10 ± 0.5 kgf-cm.

3-4 Installing the CPU

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

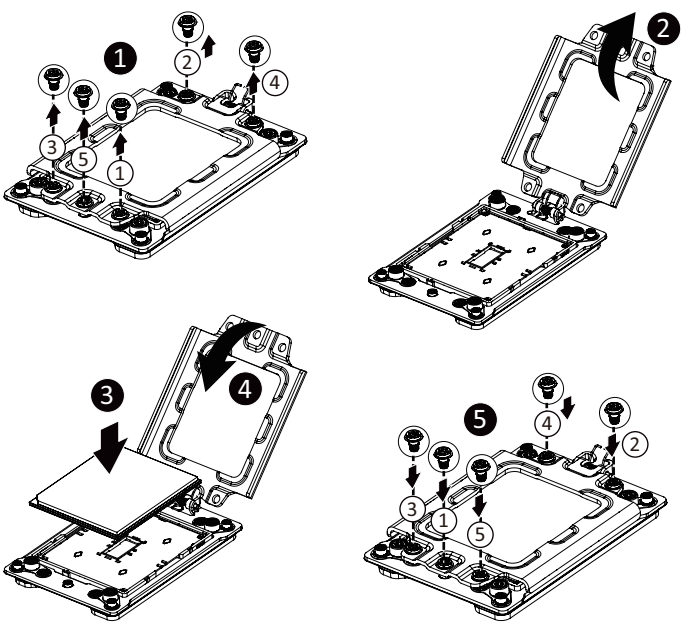
- Make sure that the motherboard supports the CPU.
- Always turn off the computer and unplug the power cord from the power outlet before installing the CPU to prevent hardware damage.
- Unplug all cables from the power outlets.
- Disconnect all telecommunication cables from their ports.
- Place the system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

WARNING!

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

Follow these instructions to install the CPU:

1. Loosen the three captive screws securing the CPU cover in sequential order (1 → 2 → 3 → 4 → 5).
2. Flip open the CPU cover.
3. Install the CPU into place in the CPU socket.
4. Flip the CPU cover into place over the CPU socket.
5. Tighten the CPU cover screws in sequential order (1 → 2 → 3 → 4 → 5) to secure the CPU cover in place.
6. To remove the CPUs, follow steps 1-5 in reverse order.



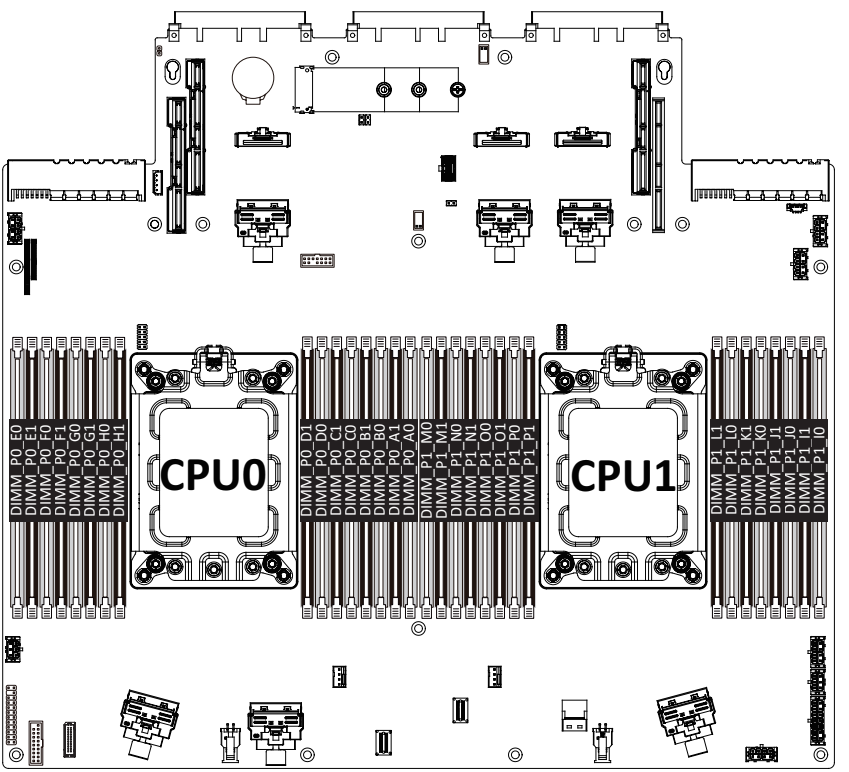
3-5 Installing the Memory

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

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

3-5-1 Eight Channel Memory Configuration

This motherboard provides 32 DDR4 memory slots and supports Eight Channel Technology. After the memory is installed, the BIOS will automatically detect the specifications and capacity of the memory.



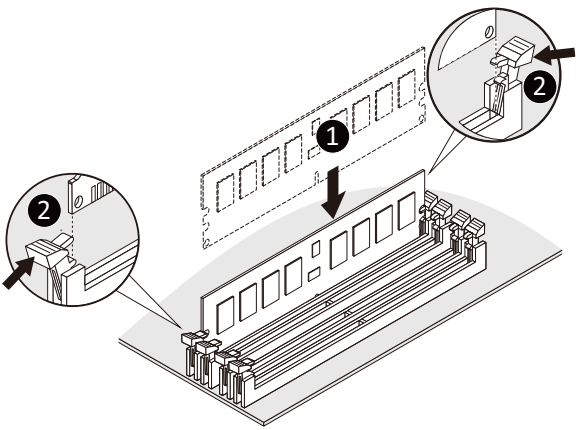
3-5-2 Installing the Memory

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

Be sure to install DDR4 DIMMs on this motherboard.

Follow these instructions to install the Memory:

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



3-5-3 DIMM Population Table

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

3-5-4 Altra Platform DDR4 Suggest Configuration Table

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

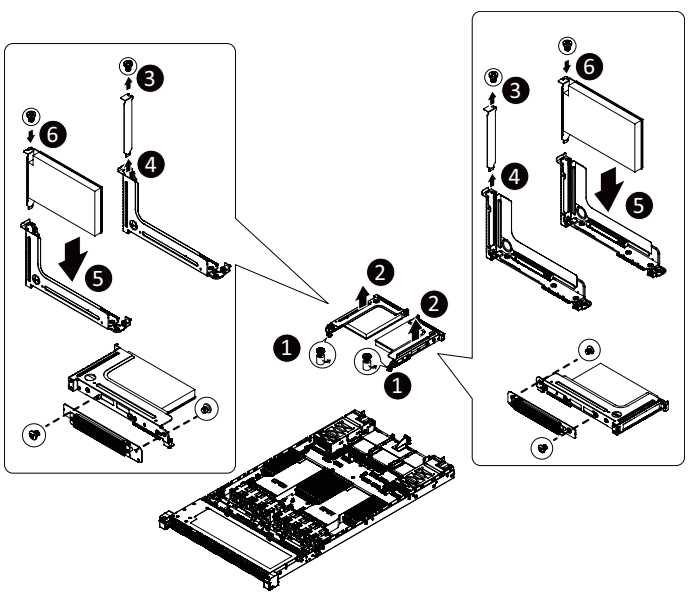
3-6 Installing the PCI Expansion Card

- Voltages can be present within the server whenever an AC power source is connected. This voltage is present even when the main power switch is in the off position. Ensure that the system is powered-down and all power sources have been disconnected from the server prior to installing a PCIe card.
- Failure to observe these warnings could result in personal injury or damage to equipment.

- 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 the PCI Expansion card:

1. Loosen the thumbscrew securing the riser bracket.
2. Lift up the riser bracket out of system.
3. Remove the screw securing the slot cover from the riser bracket.
4. Remove the slot covers from the riser bracket.
5. 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.
6. Secure the PCIe card with the screw.
7. Reverse the previous steps to install the riser bracket.



3-7 Installing the Mezzanine Card

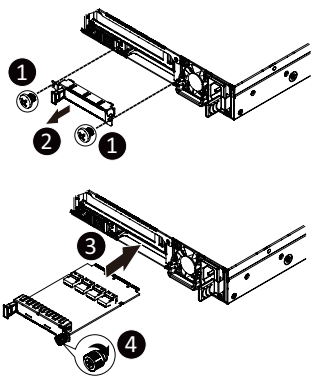
3-7-1 OCP 3.0

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 mezzanine card slot cover.
2. Remove the slot cover from the system.
3. Insert the OCP 3.0 mezzanine 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 mezzanine card in place.
5. Reverse the previous steps to replace the OCP 3.0 mezzanine card.



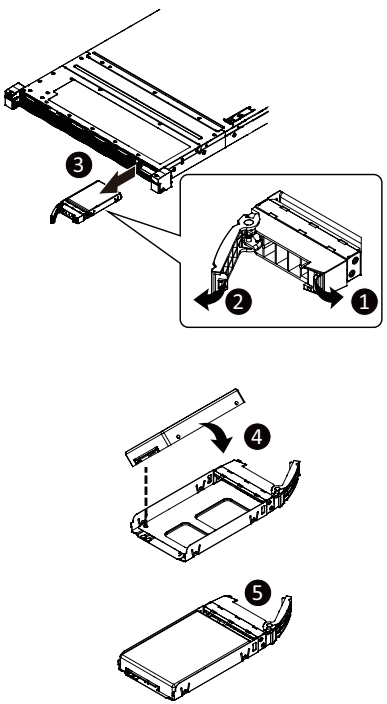
3-8 Installing the Hard Disk Drive

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

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

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

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



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

WARNING:

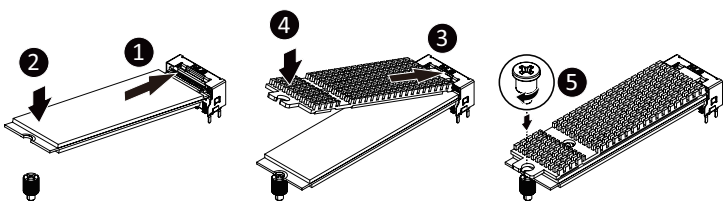
Installation of the thermal pad over the M.2 device is required when installing an M.2 device. Lack of the thermal pad may result in the system overheating and throttle the system performance.

CAUTION

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

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

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



3-10 Replacing the System Fan Module

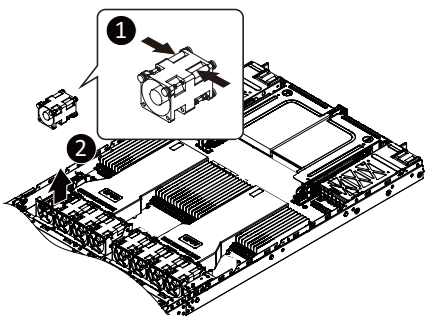
CAUTION!

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

- Make sure the system is not turned on or connected to AC power.
- Disconnect all necessary cable connections. Failure to observe these warnings could result in personal injury or damage to the equipment

Follow these instructions to replace the fan assembly:

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



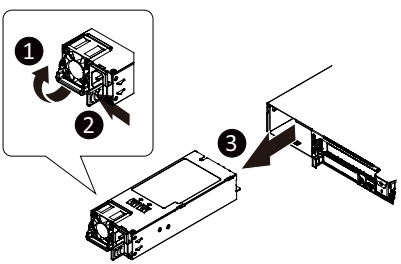
3-11 Removing and Installing the Power Supply

CAUTION!

- In order to reduce the risk of injury from electric shock, disconnect AC power from the power supply before removing the power supply from the system

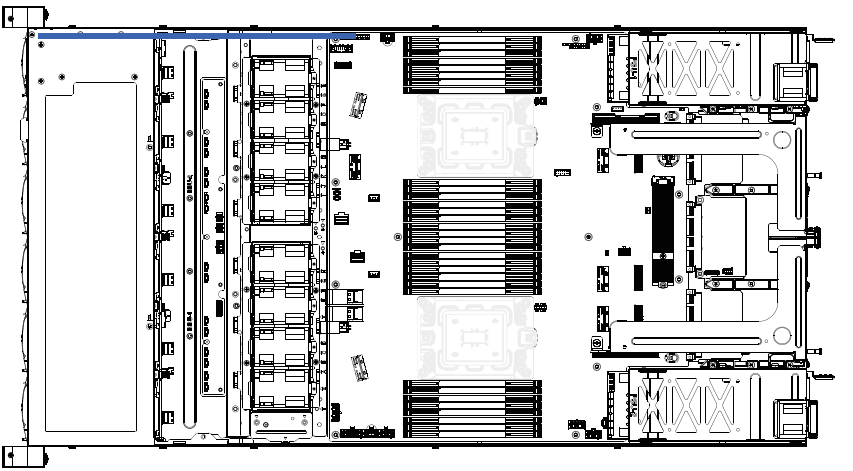
Follow these instructions to replace the power supply:

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

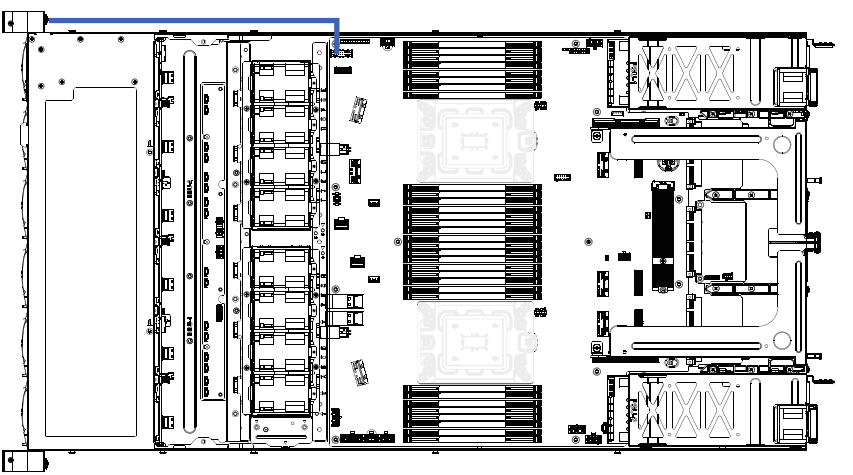


3-12 Cable Routing

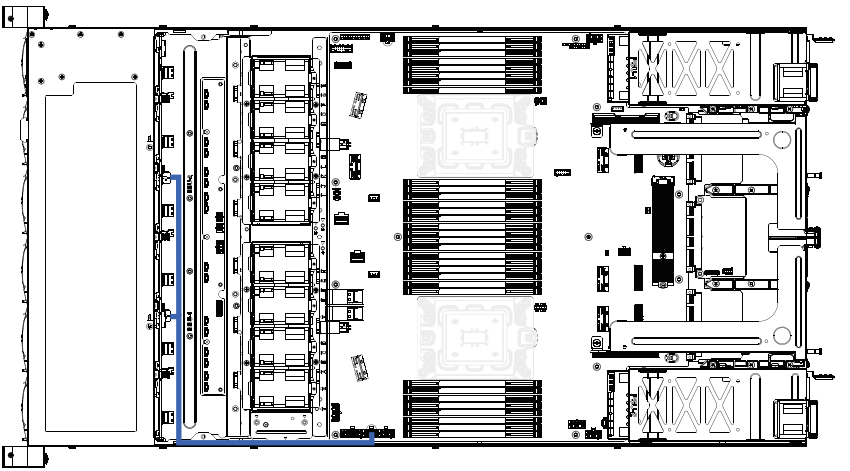
Front Switch Cable/Front LED Cable



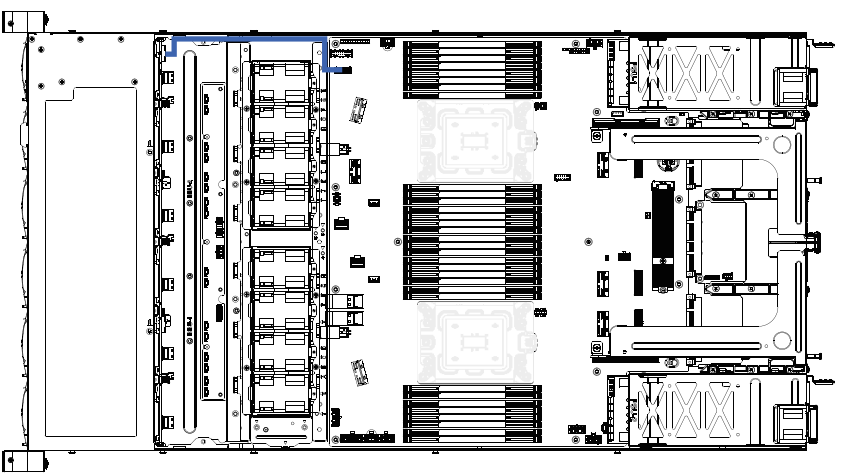
Front Panel USB 3.0 Cable



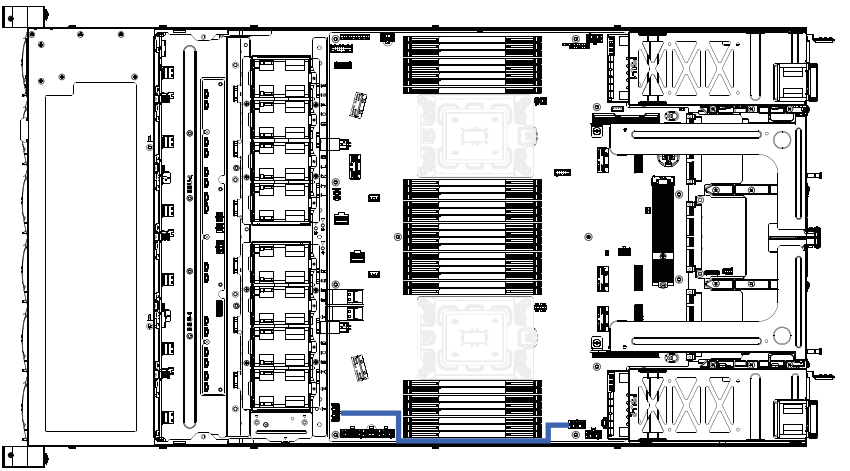
HDD Backplane Board Power Cable



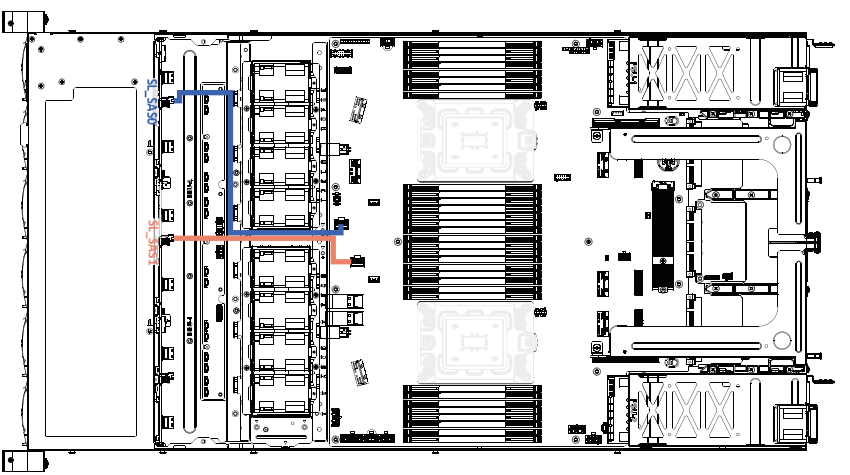
HDD Backplane Board Signal Cable



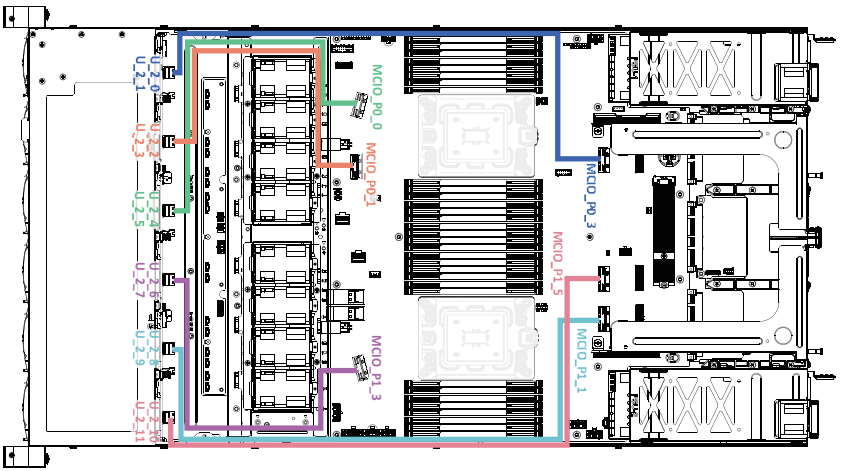
ATX Power Cable



SlimLine SAS to SATA Cable

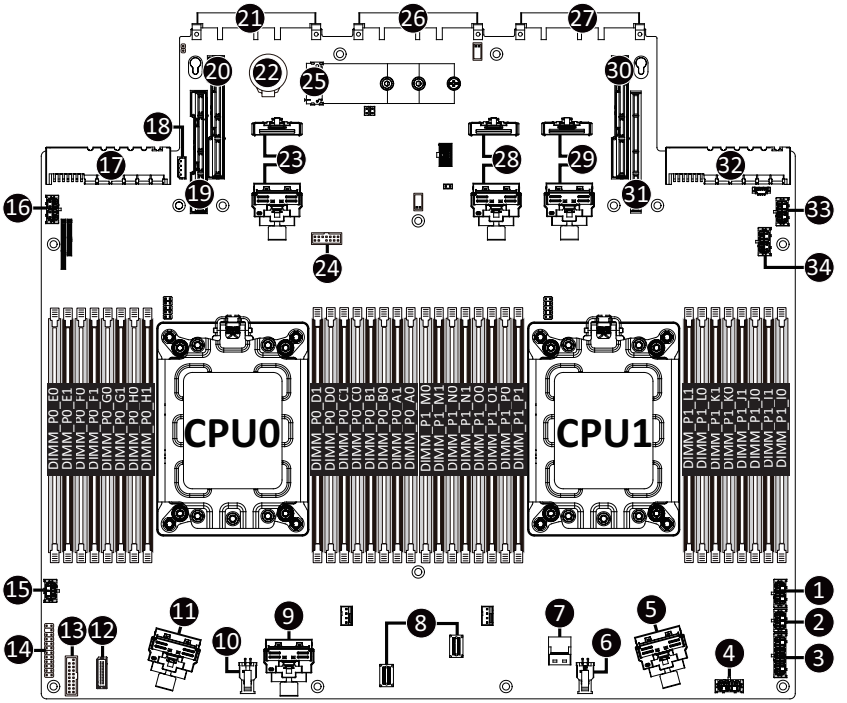


NVMe Cable


U_2_0
U_2_1
U_2_2
U_2_3
U_2_4
U_2_5
U_2_6
U_2_7
U_2_8
U_2_9
U_2_10
U_2_11
MCIO_P0_0
MCIO_P0_1
MCIO_P0_3
MCIO_P1_5
MCIO_P1_1
MCIO_P1_3

Chapter 4 Motherboard Components

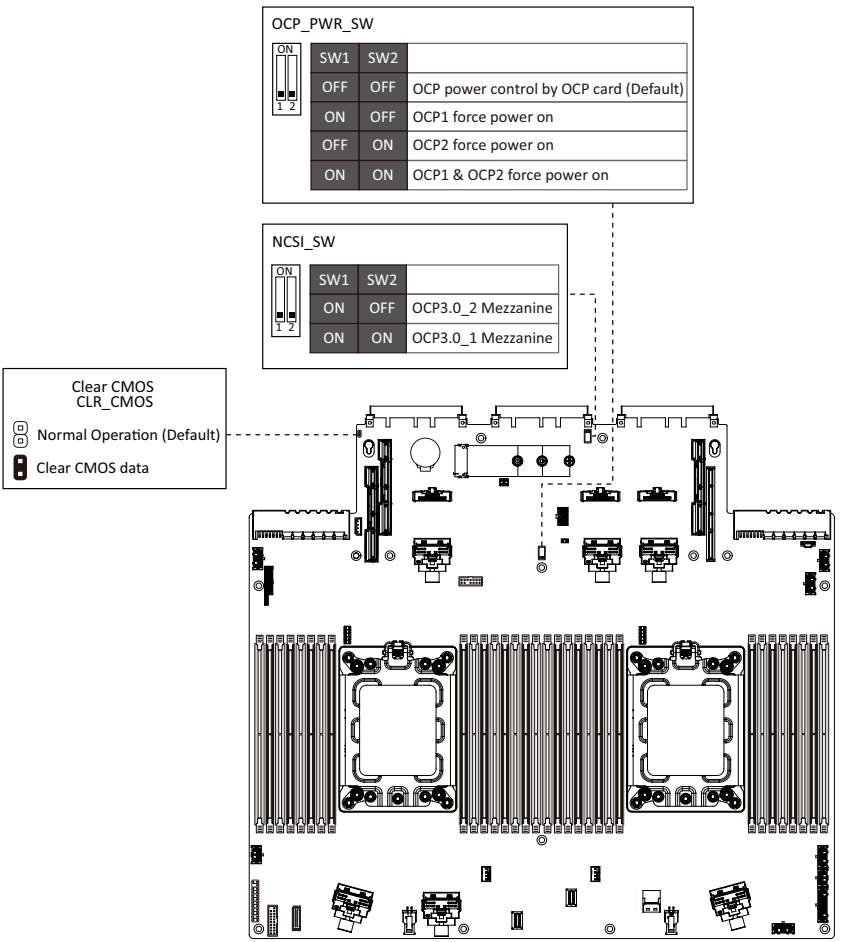
4-1 Motherboard Components



Item	Description
1	2 x 4 Pin P12V GPU Power Connector
2	2 x 3 Pin Power Connector
3	2 x 7 Pin Power Connector
4	2 x 4 Pin P12V Power Connector
5	MCIO Connector (MCIO_P1_3/PCIe Gen4)
6	2 x 2 Pin P12V Backplane Power Connector
7	SlimLine SAS Connector (MCIO_P1_22/PCIe Gen4)
8	SlimLine SAS Connectors
9	MCIO Connector (MCIO_P0_1/PCIe Gen4)
10	2 x 2 Pin P12V Backplane Power Connector
11	MCIO Connector (MCIO_P0_0/PCIe Gen4)
12	HDD Backplane Board Connector
13	Front Panel USB 3.0 Connector
14	Front Panel Header
15	2 x 3 Pin Power Connector
16	2 x 4 Pin P12V GPU Power Connector
17	Power Supply Connector#1 (Primary)

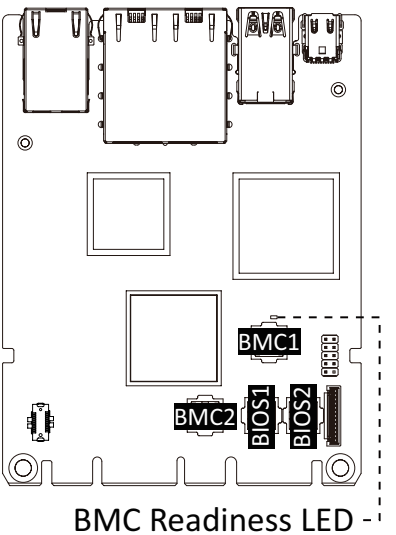
Item	Description
18	IPMB Connector
19	Riser Connector #1 (PCIe Gen4/x16 Slot)
20	Riser Connector #2 (PCIe Gen4/x16 Slot)
21	OCP Mezzanine Connector (OCP 3.0/SFF Type/Gen4 x16)
22	RTC Battery
23	MCIO Connectors (MCIO_P0_2/MCIO_P0_3/PCIe Gen4)
24	TPM Module Connector (SPI Interface)
25	M.2 Slot (PCIe Gen4 x4, Support NGFF-22110)
26	G-SC Module Connector
27	OCP Mezzanine Connector (OCP 3.0/SFF Type/Gen4 x16)
28	MCIO Connectors (MCIO_P1_4/MCIO_P1_5/PCIe Gen4)
29	MCIO Connectors (MCIO_P1_0/MCIO_P1_1/PCIe Gen4)
30	Riser Connector #3 (PCIe Gen4/x16 Slot)
31	Riser Connector #4 (PCIe Gen4/x16 Slot)
32	Power Supply Connector#2 (Secondary)
33	2 x 4 Pin P12V GPU Power Connector
34	2 x 4 Pin P12V Power Connector

4-2 Jumper Setting



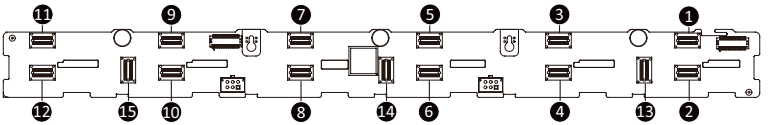
4-3 G-SC Module

4-3-1 DCR110



4-4 Backplane Board Storage Connector

4-4-1 CBP10C0



Item	Description
1	SlimLine Connector (U_2_0)
2	SlimLine Connector (U_2_1)
3	SlimLine Connector (U_2_2)
4	SlimLine Connector (U_2_3)
5	SlimLine Connector (U_2_4)
6	SlimLine Connector (U_2_5)
7	SlimLine Connector (U_2_6)
8	SlimLine Connector (U_2_7)
9	SlimLine Connector (U_2_8)
10	SlimLine Connector (U_2_9)
11	SlimLine Connector (U_2_10)
12	SlimLine Connector (U_2_11)
13	SlimLine Connector (SL_SAS0)
14	SlimLine Connector (SL_SAS1)
15	SlimLine Connector (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 function of processor, network, North Bridge, South Bridge, and System event logs.
- **Server Management**
  Server additional features enabled/disabled setup menus.
- **Security**
  Change, set, or disable supervisor and user password. Configuration supervisor password allows you to restrict access to the system and BIOS Setup.
  A supervisor password allows you to make changes in BIOS Setup.
  A user password only allows you to view the BIOS settings but not to make changes.
- **Boot**
  This setup page provides items for configuration of the boot sequence.
- **Save & Exit**
  Save all the changes made in the BIOS Setup program to the CMOS and exit BIOS Setup. (Pressing <F10> can also carry out this task.)
  Abandon all changes and the previous settings remain in effect. Pressing <Y> to the confirmation message will exit BIOS Setup. (Pressing <Esc> can also carry out this task.)

5-1 The Main Menu

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

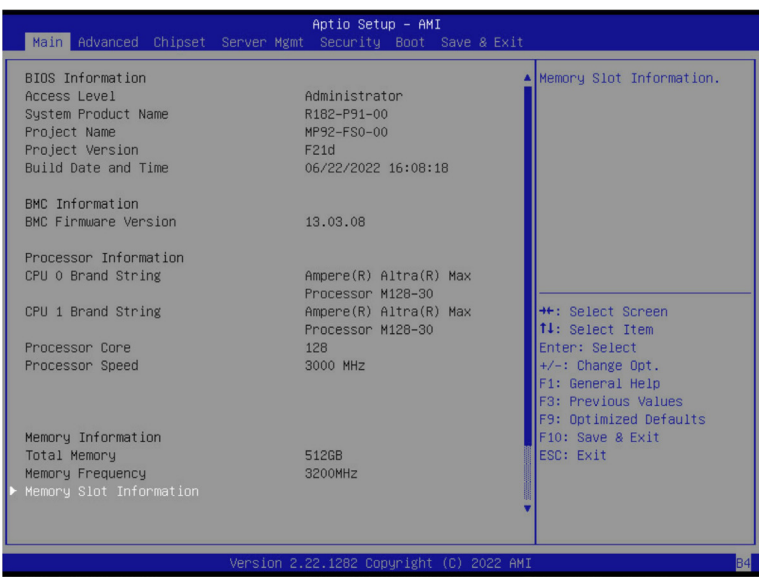
Main Menu Help

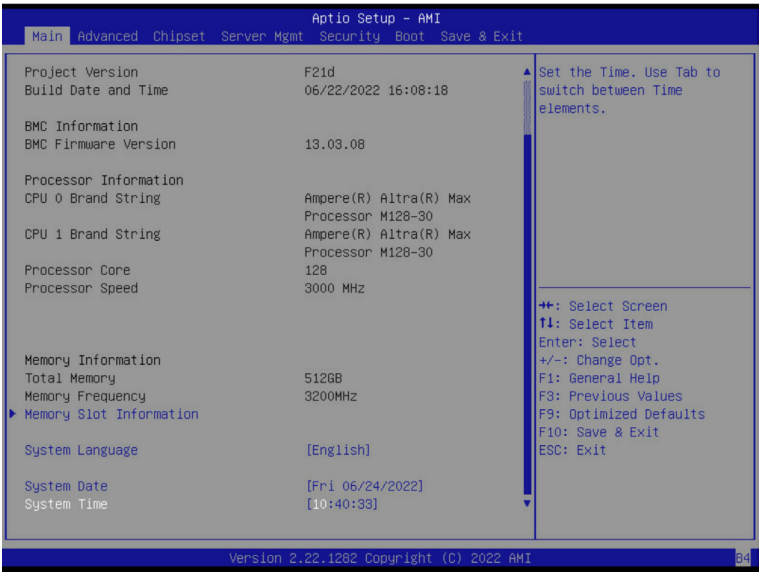
The on-screen description of a highlighted setup option is displayed on the bottom line of the Main Menu.

Submenu Help

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

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





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

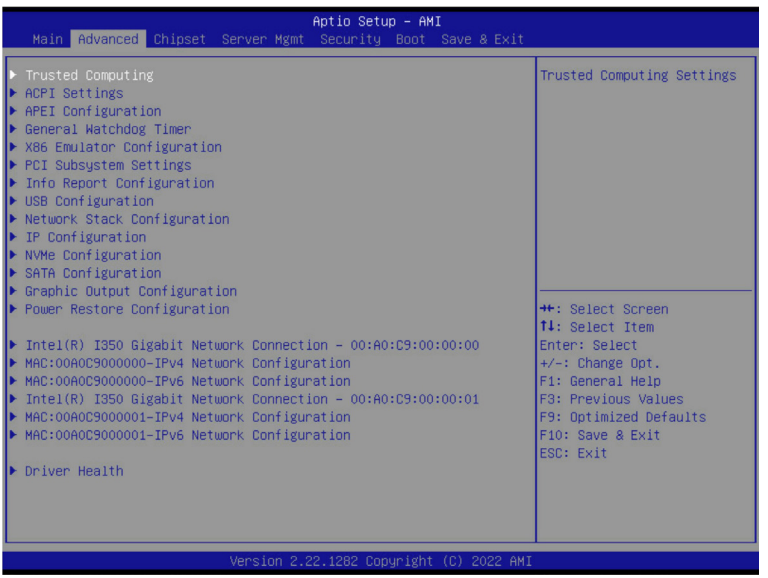
(Note1) Functions available on selected models.

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

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

5-2 Advanced Menu

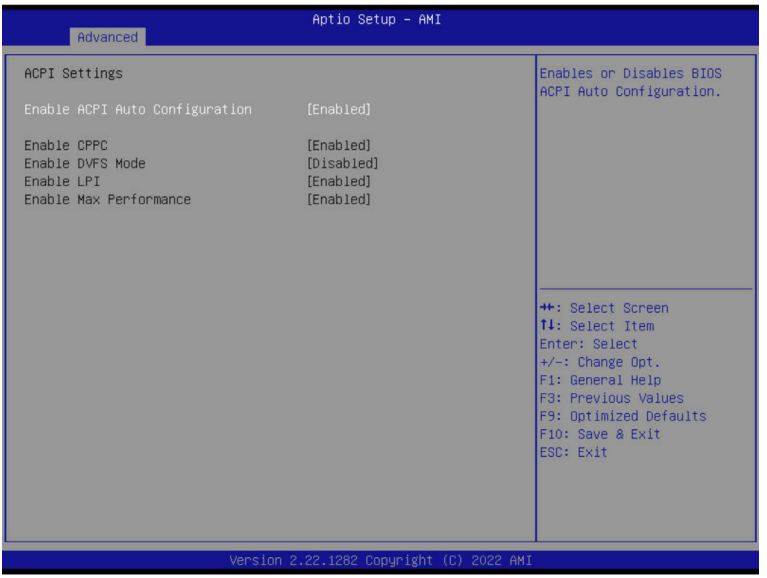
The Advanced Menu displays submenu options for configuring the function of various hardware components. Select a submenu item, then press <Enter> to access the related submenu screen.



5-2-1 Trusted Computing

Parameter	Description
Configuration	
Security Device Support	Enable/Disable BIOS support for security device. OS will not show security device. TCG EFI protocol and INT1A interface will not be available. Options available: Enable, Disable. Default setting is **Enable**.
Disable Block Sid	Override to allow SID authentication in TCG Storage device. Options available: Enabled, Disabled. Default setting is **Disabled**.

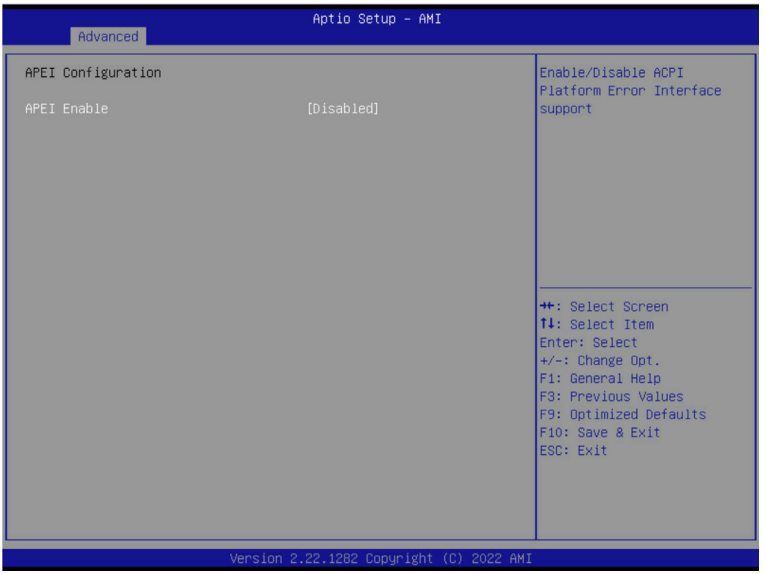
5-2-2 ACPI Settings



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

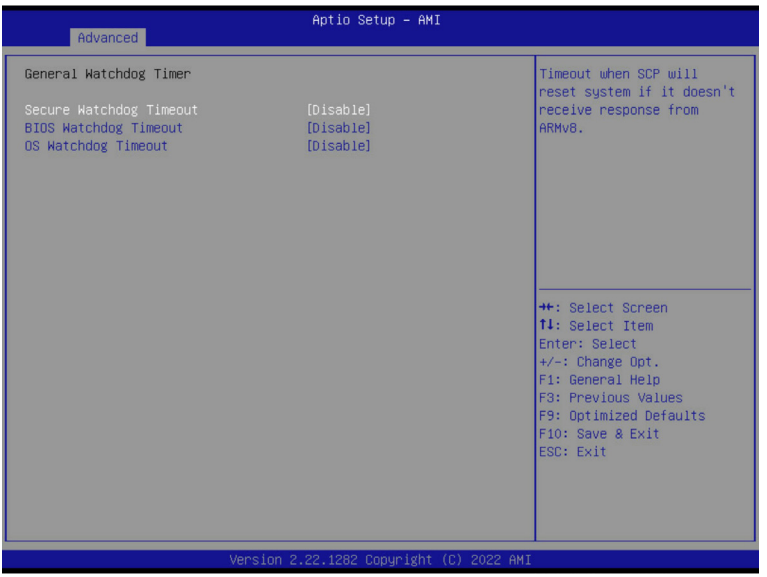
(Note) This item is available when **Enable ACPI Auto Configuration** is set to **Disabled**.

5-2-3 APEI Configuration



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

5-2-4 General Watchdog Timer

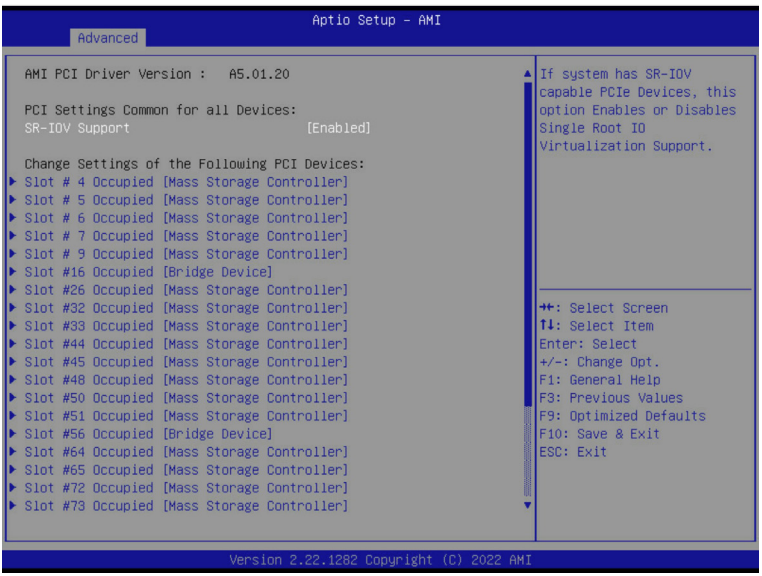


Parameter	Description
General Watchdog Timer	
Secure Watchdog Timeout	Timeout when SCP will reset system if it doesn't receive response from ARMv8. Options available: Disable, 5 minutes, 6 minutes, 10 minutes, 15 minutes, 20 minutes. Default setting is **Disable**.
BIOS Watchdog Timeout	Options available: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

5-2-5 X86 Emulation Configuration

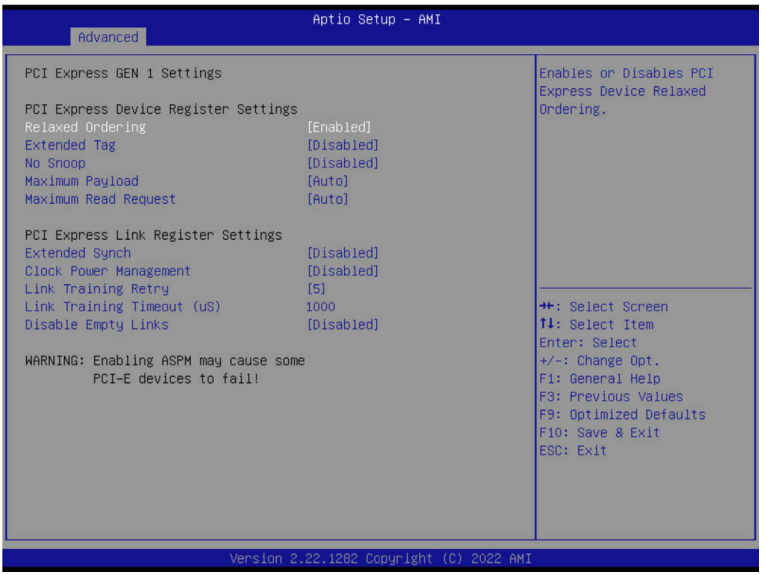
Parameter	Description
X86 Emulator Configuration	
X86 Emulator Enable	Enable/Disable X86 Emulator support. Options available: Enabled, Disabled. Default setting is **Disabled**.

5-2-6 PCI Subsystem Settings



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

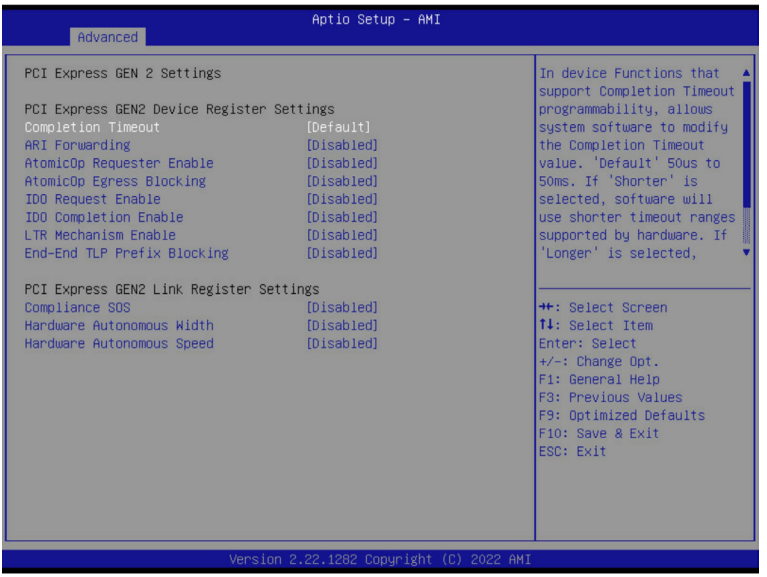
5-2-6-1 PCI Express GEN 1 Settings



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

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

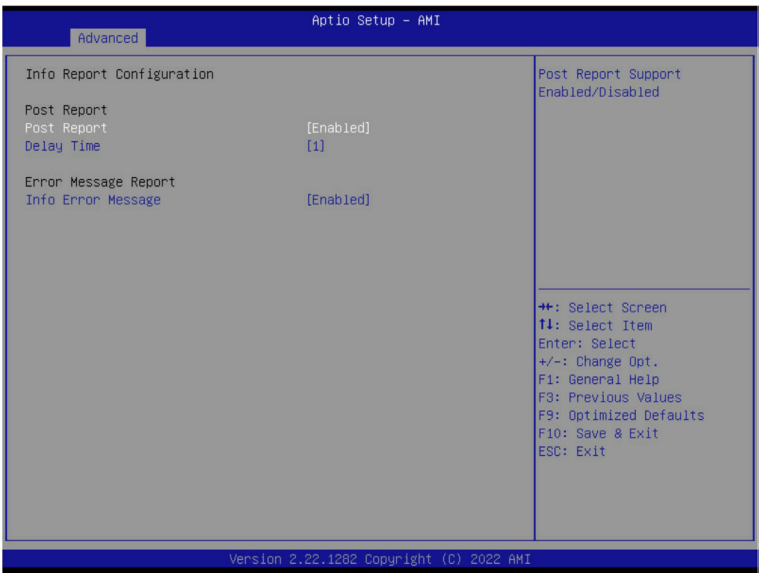
5-2-6-2 PCI Express GEN 2 Settings



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

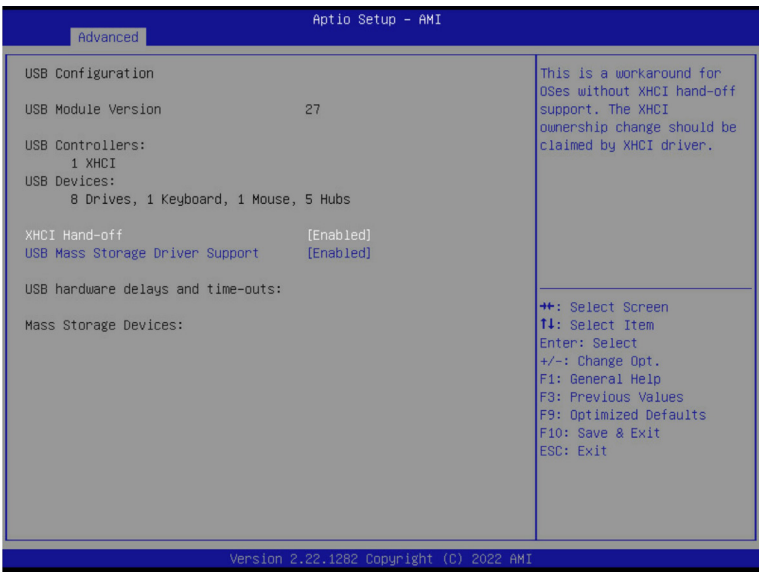
Parameter	Description
AtomicOp Egress Blocking	If supported by hardware and set to 'Enabled', outbound AtomicOp Requestsvia Egress Ports will be blocked. Options available: Enabled, Disabled. Default setting is **Disabled**.
IDO Request Enable	If supported by hardware and set to 'Enabled', this permits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

5-2-7 Info Report Configuration



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

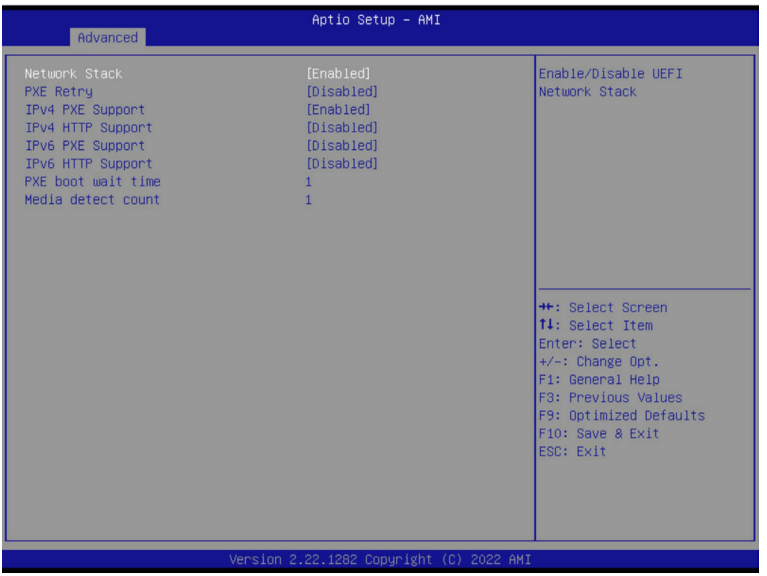
5-2-8 USB Configuration



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

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

5-2-9 Network Stack Configuration



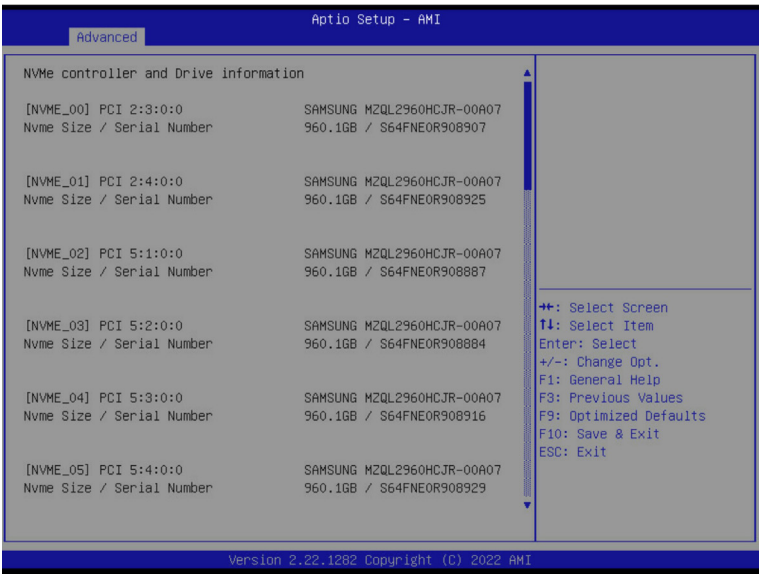
Parameter	Description
Network Stack	Enable/Disable the UEFI network stack. Options available: Enabled, Disabled. Default setting is **Enabled**.
PXE Retry(Note)	Options available: Enabled, Disabled. Default setting is **Disabled**.
Ipv4 PXE Support(Note)	Enable/Disable the Ipv4 PXE feature. Options available: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

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

5-2-10 IP Configuration

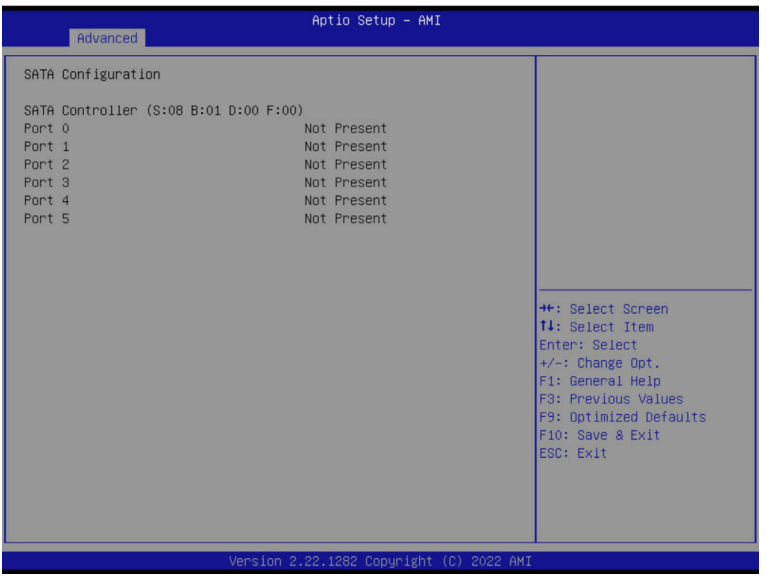
Parameter	Description
IP Configuration Settings	
Provides the Options to Configure the IP Address	
Auto Configuration	Options available: Disabled, Every Boot, On Demand. Default setting is **Disabled**.

5-2-11 NVMe Configuration



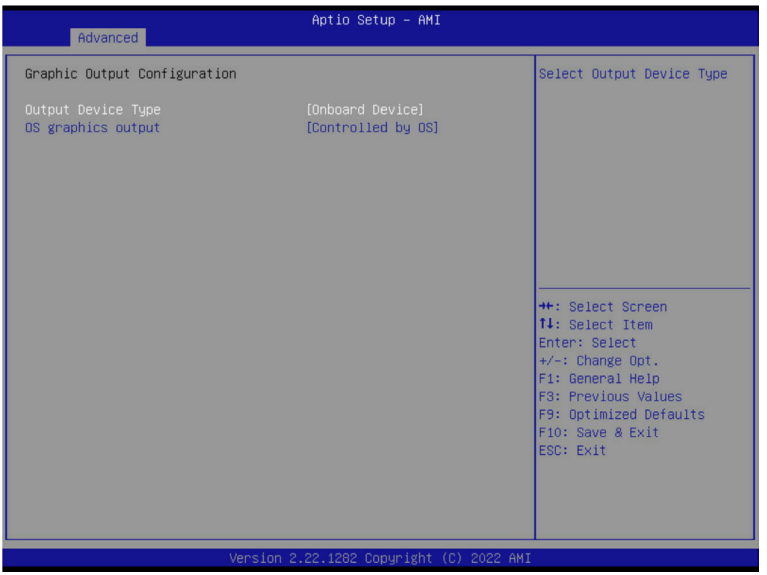
Parameter	Description
NVMe controller and Drive information	Displays the NVMe devices connected to the system

5-2-12 SATA Configuration



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

5-2-13 Graphic Output Configuration

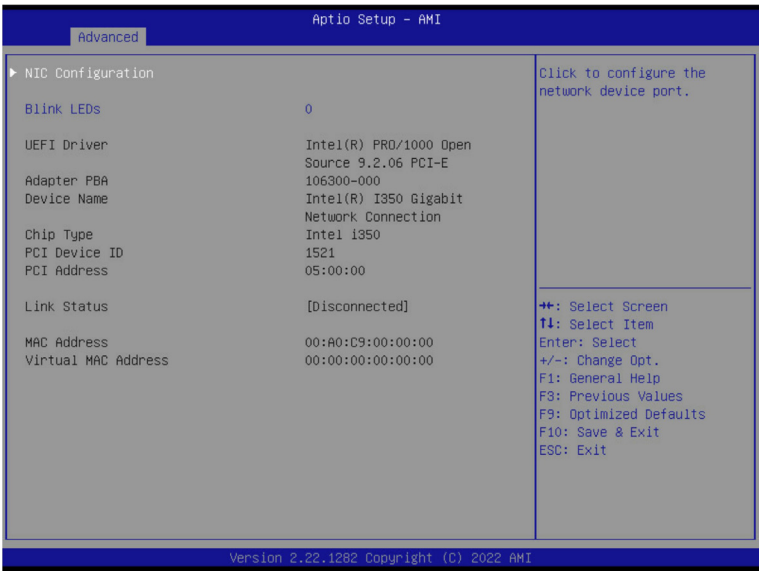


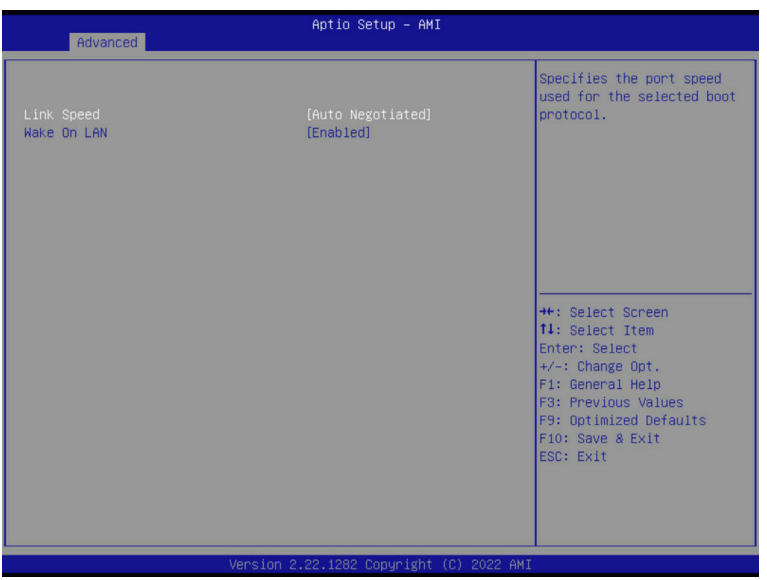
Parameter	Description
Graphic Output Configuration	
Output Device Type	Selects output device type. Options available: First loaded Device, Onboard Device, External Device, Specific Device. Default setting is **Onboard Device**.
OS graphics output	Use Onboard graphics output under OS (BMC KVM requires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

5-2-14 Power Restore Configuration

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

5-2-15 Intel(R) I350 Gigabit Network Connection





Parameter	Description
NIC Configuration	Press [Enter] to configure advanced items. ◆ Link Speed – Allows for automatic link speed adjustment. – Options available: Auto Negotiated, 10 Mbps Half, 10 Mbps Full, 100 Mbps Half, 100 Mbps Full. Default setting is **Auto Negotiated**. ◆ Wake On LAN – Enables power on of the system via LAN. Note that configuring Wake on LAN in the operating system does not change the value of this setting, but does override the behavior of Wake on LAN in OS controlled power states. – Options available: Enabled, Disabled. Default setting is **Enabled**.
Blink LEDs	Identifies the physical network port by blinking the associated LED. Press the numeric keys to adjust desired values (up to 15 seconds).
UEFI Driver	Displays the technical specifications for the Network Interface Controller.
Adapter PBA	Displays the technical specifications for the Network Interface Controller.
Device Name	Displays the technical specifications for the Network Interface Controller.
Chip Type	Displays the technical specifications for the Network Interface Controller.
PCI Device ID	Displays the technical specifications for the Network Interface Controller.
PCI Address	Displays the technical specifications for the Network Interface Controller.
Link Status	Displays the technical specifications for the Network Interface Controller.
MAC Address	Displays the technical specifications for the Network Interface Controller.
Virtual MAC Address	Displays the technical specifications for the Network Interface Controller.

5-2-16 MAC IPv4 Network Configuration

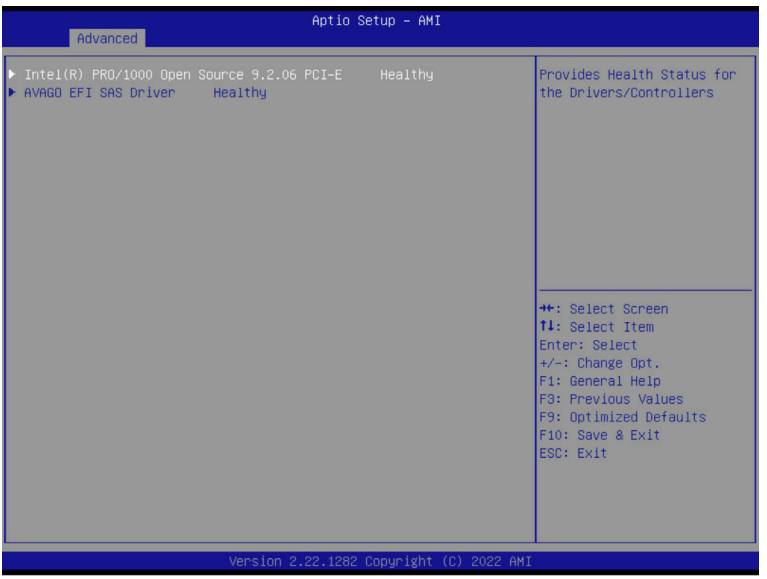
Parameter	Description
Configured	Indicates whether network address is configured successfully or not. Options available: Enabled, Disabled. Default setting is **Disabled.**
Enable DHCP(Note)	Options available: Enabled, Disabled. Default setting is **Enabled.**
Local IP Address(Note)	Press [Enter] to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

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

5-2-17 MAC IPv6 Network Configuration

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

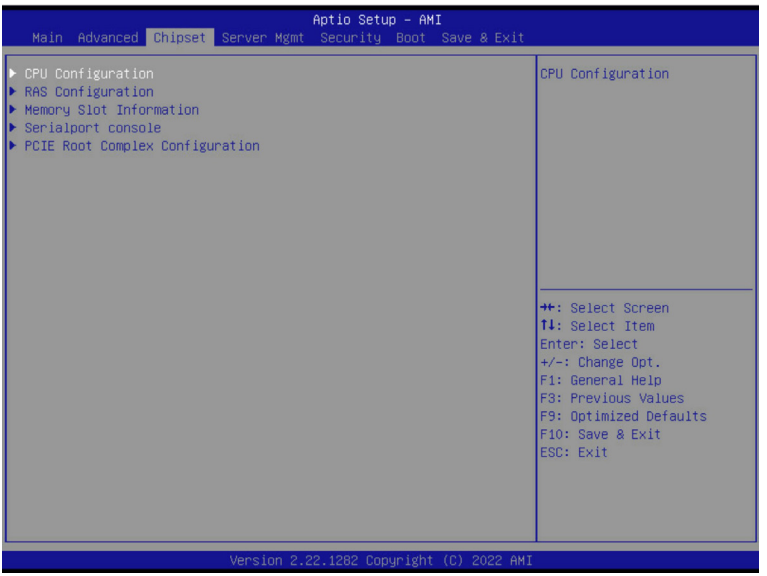
5-2-18 Driver Health



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

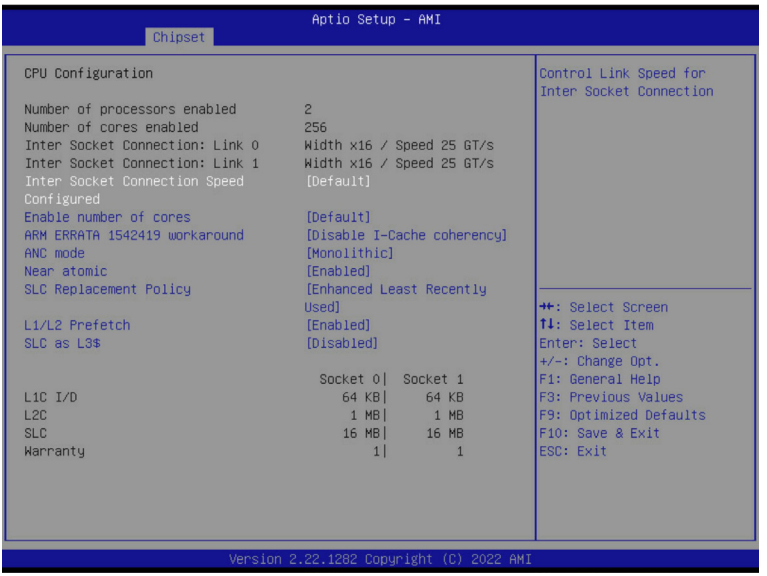
5-3 Chipset Setup Menu

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



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

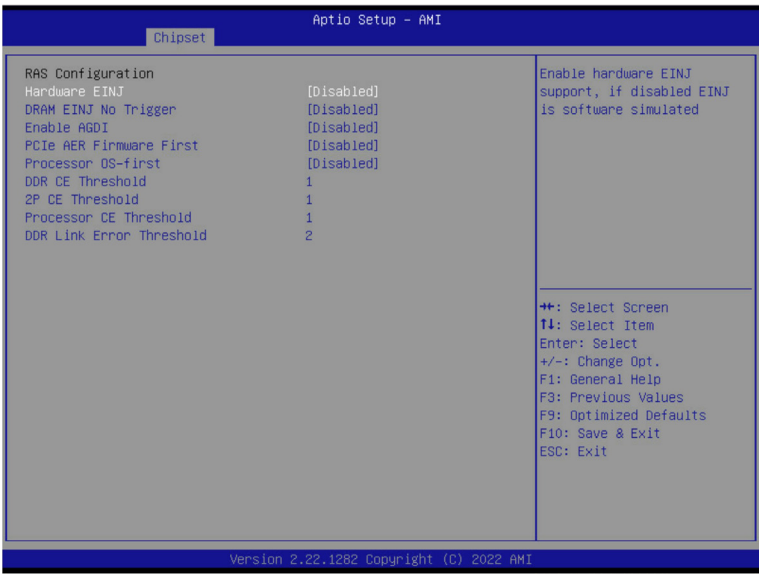
5-3-1 CPU Configuration



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

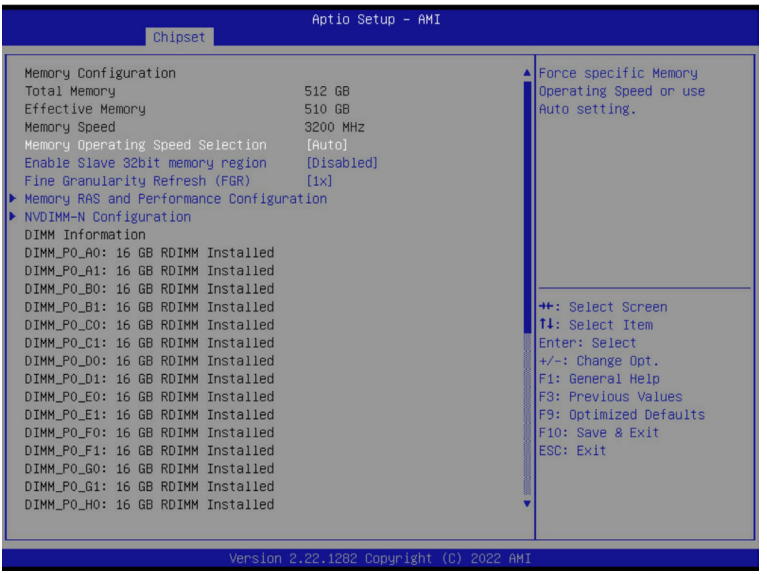
Parameter	Description
L1/L2 Prefetch	Enable/Disable L1/L2 Prefetch for each core. Options available: Enabled, Disabled. Default setting is **Enabled.**
SLC as L3$	Enable/Disable PPTT to indicate SLC as L3$. This is limited to only 1P Monolithic mode. Options available: Enabled, Disabled. Default setting is **Disabled.**
L1C I/D L2C SLC Warrenty	Displays the technical specifications for the installed processor

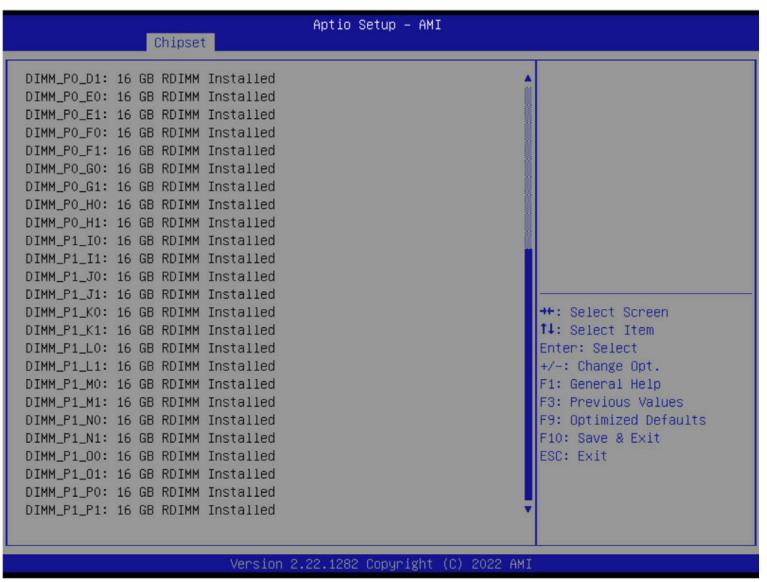
5-3-2 RAS Configuration



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

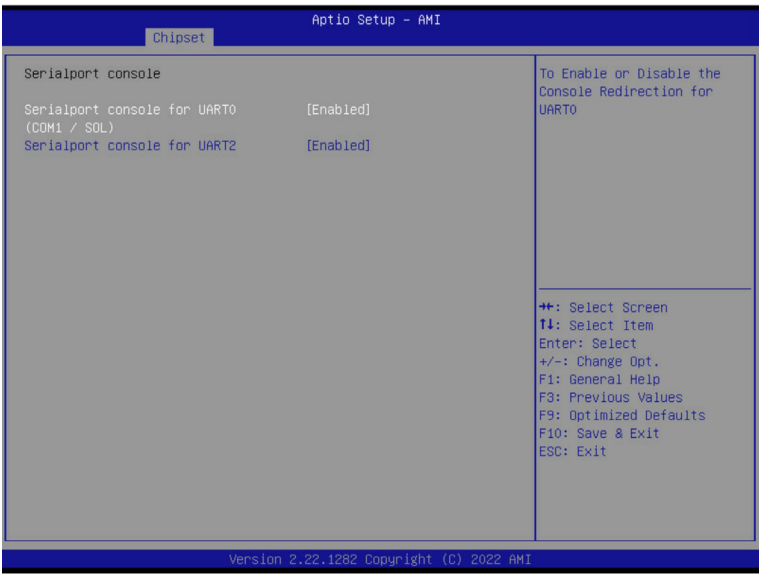
5-3-3 Memory Slot Information





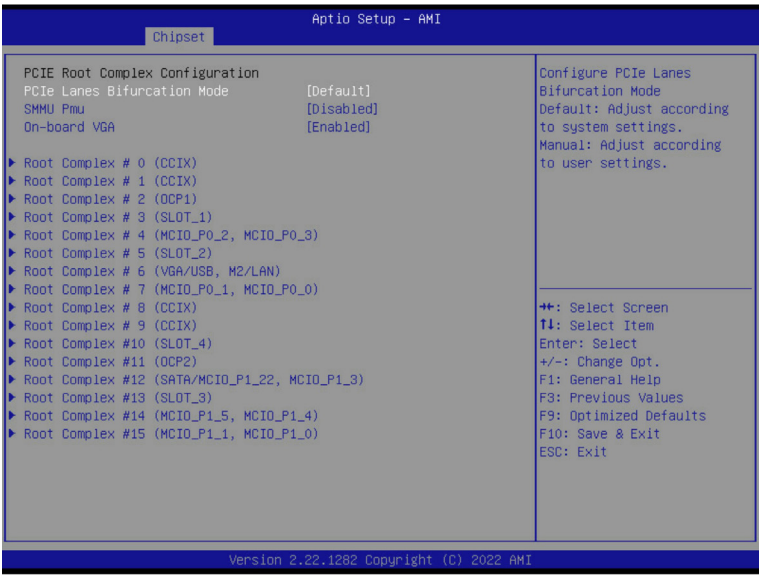
Parameter	Description
Memory Configuration	
Total Memory/ Effective Memory/ Memory Speed	Displays the technical specifications for the installed memory module.
Memory Operating Speed Selection	Options available: Auto, 2133, 2400, 2666, 2933, 3200. Default setting is **Auto.**
Enable Slave 32bit memory region	Options available: Disabled, Enabled. Default setting is **Disabled.**
Fine Granularity Refresh (FGR)	Options available: 1x, 2x, 4x. Default setting is **1x.**
Memory RAS and Performance Configuration	Press [Enter] to configure advanced items. ◆ ECC mode – Options available: Auto, Disabled, SECDED, Symbol. Default setting is **Auto**. ◆ Defer uncorrectable read errors – Options available: Disabled, Enabled. Default setting is **Enabled**. ◆ Fault handling interrupt – Options available: Disabled, Enabled. Default setting is **Enabled**. ◆ Scrub Patrol duration (hour) – Options available: Disabled, 1,.., 24. Default setting is **24**. ◆ Demand scrub – Options available: Disabled, Enabled. Default setting is **Enabled**. ◆ Write CRC – Options available: Disabled, Enabled. Default setting is **Disabled**. ◆ CVE-2020-10255 mitigation – Options available: Disabled, Enabled. Default setting is **Disabled**.
NVDIMM-N Configuration	Press [Enter] to configure advanced items. ◆ Socket0/1 Configured Mode ◆ Mode Selection – Options available: Non-NVDIMM, Non-Hashed, Hashed, Auto. Default setting is **Auto**.
DIMM Information	Displays installed DIMM information.

5-3-4 Serialport console



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

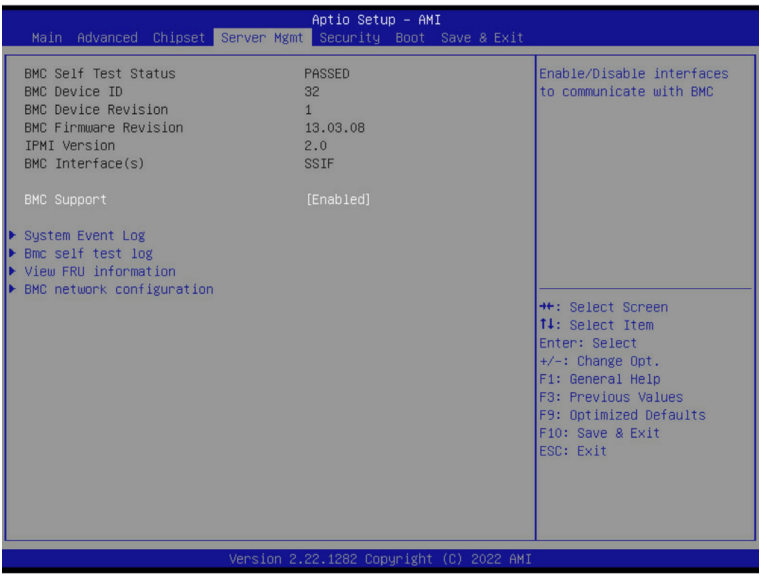
5-3-5 PCIE Root Complex Configuration



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

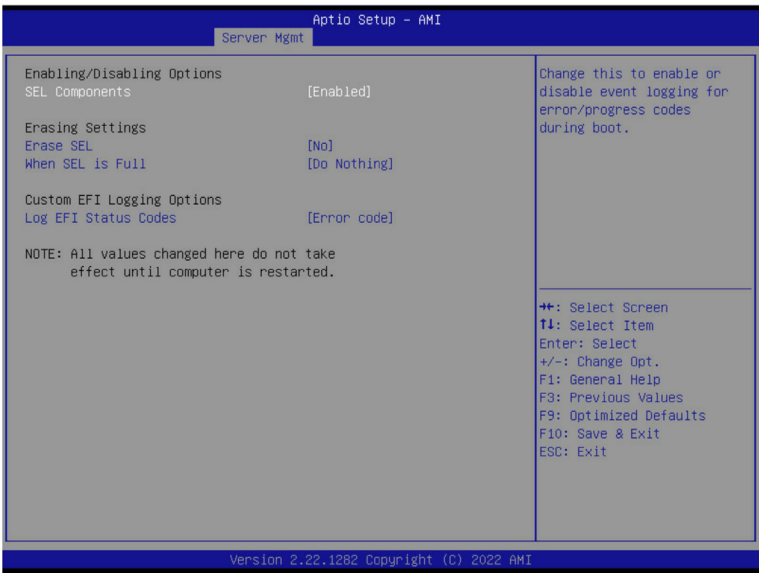
(Note) This item is configurable when **PCIe Lanes Bifurcation Mode** is set to **Manual**.

5-4 Server Management Menu



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

5-4-1 System Event Log



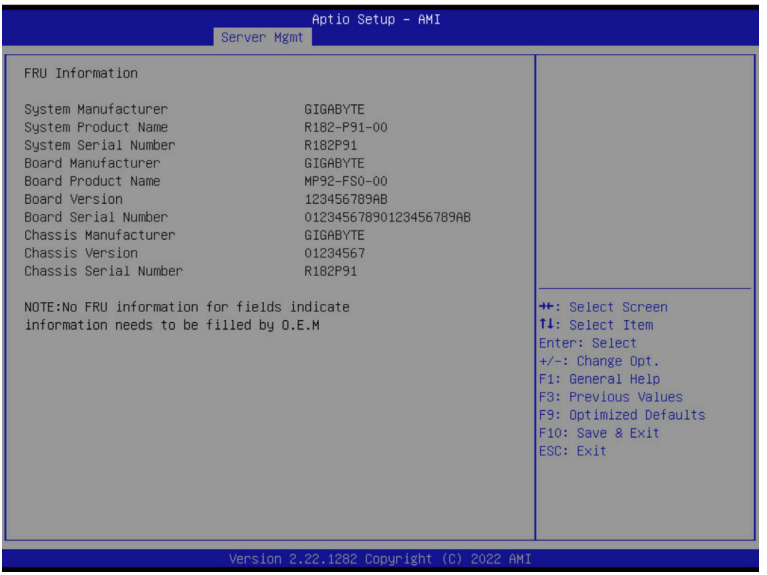
Parameter	Description
Enabling / Disabling Options	
SEL Components	Change this item to enable or disable all features of System Event Logging during boot. Options available: Enabled, Disabled. Default setting is **Enabled**.
Erasing Settings	
Erase SEL	Choose options for erasing SEL. Options available: 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 Bmc self test log

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

5-4-3 View FRU Information

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



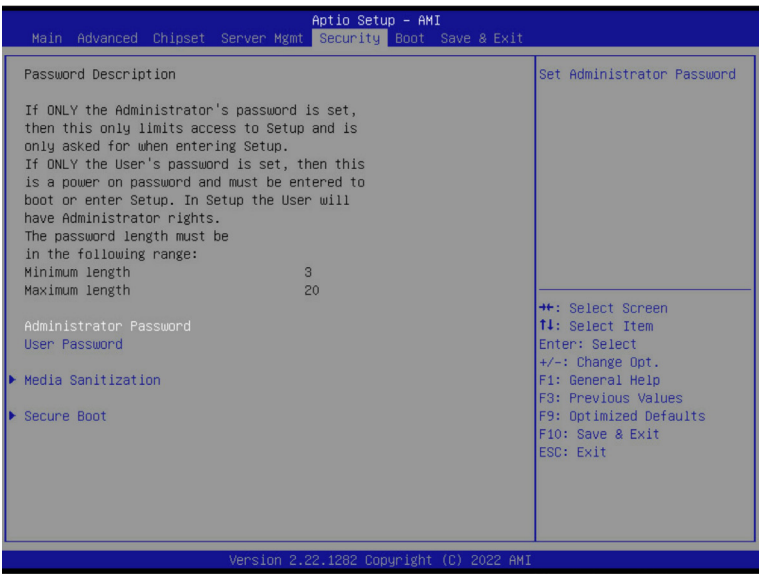
(Note) The model name will vary depends on the product you purchased

5-4-4 BMC Network Configuration

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

5-5 Security Menu

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



There are two types of passwords that you can set:

- Administrator Password

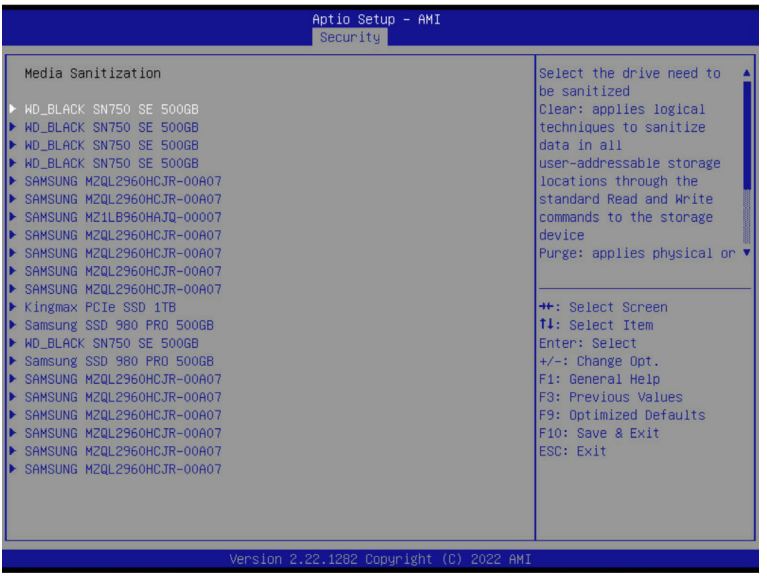
  Entering this password will allow the user to access and change all settings in the Setup Utility.

- User Password

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

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

5-5-1 Media Sanitization



Parameter	Description
Media Santitization	Select the drive need to be sanitized. ◆ Device Name ◆ Method Type – Options available: Clear, Purge. Default setting is **Clear**. ◆ Start This Device Sanitization – Start sanitizating this device with setup configsuraiton.

5-5-2 Secure Boot

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

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

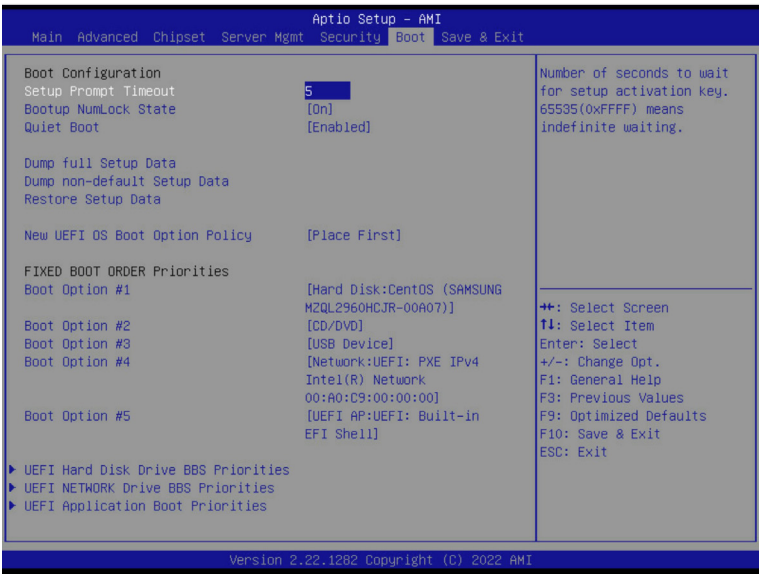
(Note) Advanced items prompt when this item is set to **Custom**.

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

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

5-6 Boot Menu

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

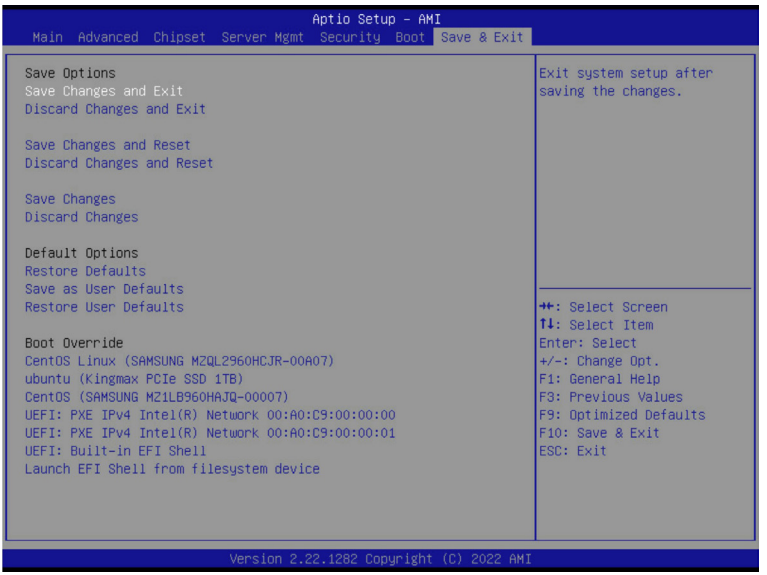


Parameter	Description
Boot Configuration	
Setup Prompt Timeout	Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting. Press the numeric keys to input the desired values.
Bootup NumLock State	Enable/Disable the Bootup NumLock function. Options available: On, Off.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

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

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 Changes and Exit	Saves changes made and closes the BIOS setup. Options available: Yes, No.
Discard Changes and Exit	Discards changes made and exits the BIOS setup. Options available: Yes, No.
Save Changes and Reset	Restarts the system after saving the changes made. Options available: Yes, No.
Discard Changes and Reset	Restarts the system without saving the changes made. Options available: Yes, No.
Save Changes	Saves changes done so far to any of the setup options. Options available: Yes, No.
Discard Changes	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 as User Defaults	Press [Enter] to save changes as the user defaults without exit BIOS setup.
Restore User Defaults	Press [Enter] to restore the user defaults .
Boot Override	Press [Enter] to configure the device as the boot-up drive.
Launch EFI Shell from filesystem device	Attempts to Launch EFI Shell application (Shell.efi) from one of the available file system devices.

5-8 BIOS POST Beep code (AMI standard)

5-8-1 PEI Beep Codes

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

5-8-2 DXE Beep Codes

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