GIGABYTE™

# H274-S60-LAW1

High Density Server - Intel® Xeon® 6 Processors
2U 4-Node DP 24-Bay Gen5 NVMe/SATA/SAS-4 DLC

## User Manual

Rev. 1.0

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## Documentation Classifications

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

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

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

## For More Information

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

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## Conventions

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

| | |
|---|---|
| | **NOTE!**<br>Pieces of additional<br>information related to the current topic. |
| | **CAUTION!**<br>Precautionary measures to<br>avoid possible hardware or software problems. |
| | **WARNING!**<br>Alerts to any damage that might<br>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 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.

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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 user manual and follow these procedures:

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

## 1-2 Product Specifications

**NOTE:**

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

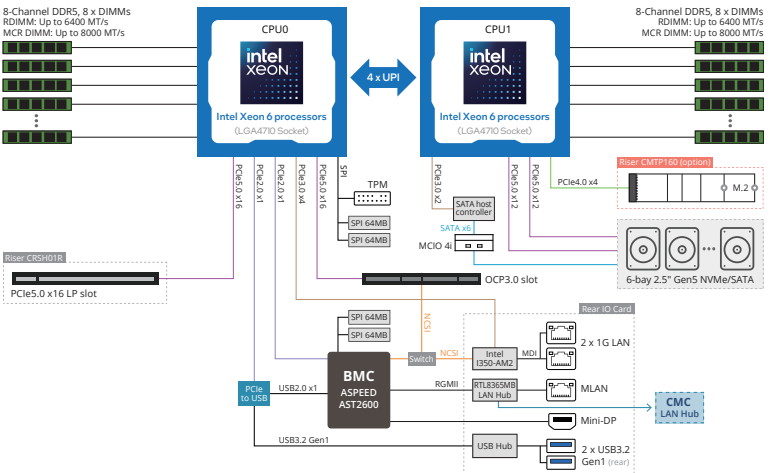
| | |
|---|---|
| System Dimension | ◆ 2U 4-Node - Rear access<br>◆ 440 (W) x 87.5 (H) x 877 (D) mm |
| CPU | Intel® Xeon® 6 Processors<br>◆ Intel® Xeon® 6700E-Series Processors<br>◆ Intel® Xeon® 6700P-Series Processors (available Q1'25)<br>◆ Intel® Xeon® 6500P-Series Processors (available Q1'25)<br><br>Dual processor per node, TDP up to 300W at 35°C ambient<br>◆ No OCP cards at 35°C ambient, TDP up to 350W<br>◆ With OCP cards at 30°C ambient, TDP up to 350W<br><br>NOTE: If only 1 CPU is installed, some PCIe or memory functions might be unavailable. |
| Socket | ◆ 8 x LGA 4710<br>◆ Socket E2 |
| Chipset | ◆ System on Chip |
| Memory | ◆ 64 x DIMM slots<br>◆ DDR5 memory supported<br>◆ 8-Channel memory architecture<br>◆ MRDIMM supported[1]<br>◆ RDIMM: Up to 6400 MT/s<br>◆ MRDIMM: Up to 8000 MT/s<br>◆<br>**[1] MRDIMMs are only supported with Intel® Xeon® 6 Processors with P-cores.** |
| LAN | **Rear (I/O board - CLBH160 x 4):**<br>◆ 8 x 1Gb/s LAN (4 x Intel® I350-AM2)<br>◆ Support NCSI function<br>◆ 4 x 10/100/1000 Mbps Management LAN[1]<br><br>**[1] Spanning Tree Protocol (STP) must be enabled on LAN switches when using a ring topology.** |
| Video | ◆ Integrated in Aspeed® AST2600 x 4<br>◆ 4 x Mini-DP |
| Storage | **Front hot-swap:**<br>◆ 24 x 2.5" Gen5 NVMe/SATA/SAS-4[1]<br>◆ (NVMe & SATA from CPU_1)<br><br>**Optional internal M.2 (CMTP160 x 4):**<br>◆ 4 x M.2 (2260/2280/22110), PCIe Gen4 x4, from CPU_1<br><br>[1] SAS card is required to support SAS drives. |

| | |
|---|---|
| SAS | ◆ Require SAS add-in cards |
| RAID | ◆ Require RAID add-in cards<br>◆ Onboard VROC key headers |
| Expansion Slots | **Riser Card CRSH01Q x 4:**<br>◆ 4 x LP x16 (Gen5 x16), from CPU_0<br>◆ 4 x OCP NIC 3.0 (Gen5 x16), from CPU_0<br>◆ Support NCSI function |
| Front I/O | ◆ 4 x Power buttons with LED<br>◆ 4 x ID buttons with LED<br>◆ 4 x Reset buttons<br>◆ 4 x System status LEDs<br>◆ 1 x CMC status LED<br>◆ 1 x CMC reset button |
| Rear I/O | ◆ 8 x USB 3.2 Gen1 ports (Type-A)<br>◆ 4 x Mini-DP<br>◆ 8 x RJ45 ports<br>◆ 4 x MLAN ports<br>◆ 4 x System status LEDs |

| | |
|---|---|
| Backplane Board | ◆ Speed and bandwidth:<br>◆ PCIe Gen5 x4 or SATA 6Gb/s or SAS-4 24Gb/s |
| Security Modules | ◆ 4 x TPM headers with SPI interface<br>◆ **Optional** TPM2.0 kit: CTM012<br>◆ 4 x PRoT connectors **(only enabled on RoT SKU)** |
| Power Supply | ◆ Dual 3000W 80 PLUS Titanium redundant power supply [1]<br><br>AC Input:<br>◆ 100-127V~/ 16A, 50/60Hz<br>◆ 200-207V~/ 16A, 50/60Hz<br>◆ 208-240V~/ 16A, 50/60Hz<br><br>DC Input: (Only for China)<br>◆ 240Vdc/ 16A<br><br>DC Output:<br>◆ Max 1200W/ 100-127V~<br>◆ +12.2V/ 98.36A<br>◆ +12.2Vsb/ 3A<br>◆ Max 2600W/ 200-207V~<br>◆ +12.2V/ 213A<br>◆ +12.2Vsb/ 3A<br>◆ Max 3000W/ 208-240V~ or 240Vdc Input<br>◆ +12.2V/ 245.9A<br>◆ +12.2Vsb/ 3A<br><br>[1] The system power supply requires C19 power cord. |

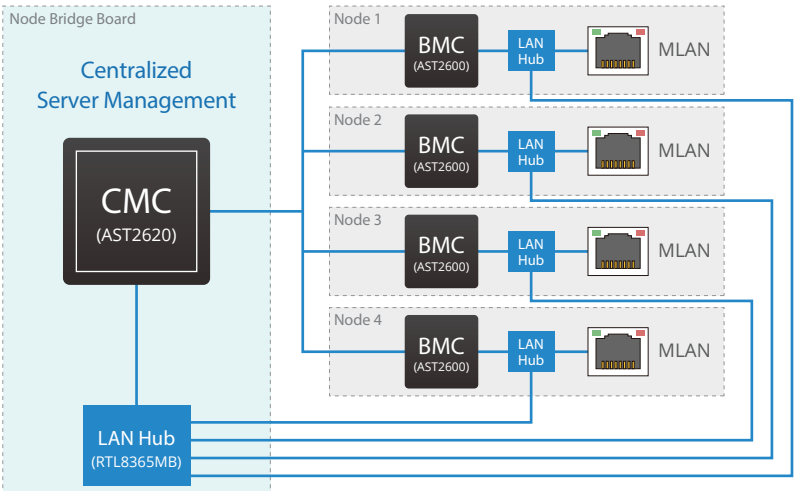
| | |
|---|---|
| System Management | ◆ Aspeed® AST2600 Baseboard Management Controller<br>◆ GIGABYTE Management Console web interface<br><br>◆ Dashboard<br>◆ HTML5 KVM<br>◆ Sensor Monitor (Voltage, RPM, Temperature, CPU Status …etc.)<br>◆ Sensor Reading History Data<br>◆ FRU Information<br>◆ SEL Log in Linear Storage / Circular Storage Policy<br>◆ Hardware Inventory<br>◆ Fan Profile<br>◆ System Firewall<br>◆ Power Consumption<br>◆ Power Control<br>◆ Advanced power capping<br>◆ LDAP / AD / RADIUS Support<br>◆ Backup & Restore Configuration<br>◆ Remote BIOS/BMC/CPLD Update<br>◆ Event Log Filter<br>◆ User Management<br>◆ Media Redirection Settings<br>◆ PAM Order Settings<br>◆ SSL Settings<br>◆ SMTP Settings |
| Operating Properties | ◆ Operating temperature: 10°C to 35°C<br>◆ Operating humidity: 8-80% (non-condensing)<br>◆ Non-operating temperature: -40°C to 60°C<br>◆ Non-operating humidity: 20%-95% (non-condensing)<br><br>Note:<br>◆ The ambient temperature and relative humidity of the environment depend on the inlet supply water temperature and the coolant flow rate.<br>◆ If the relative humidity surpasses 60%, maintain the inlet water temperature between 40°C and 45°C to prevent condensation and ensure optimal system performance. |

# 1-3 System Block Diagram



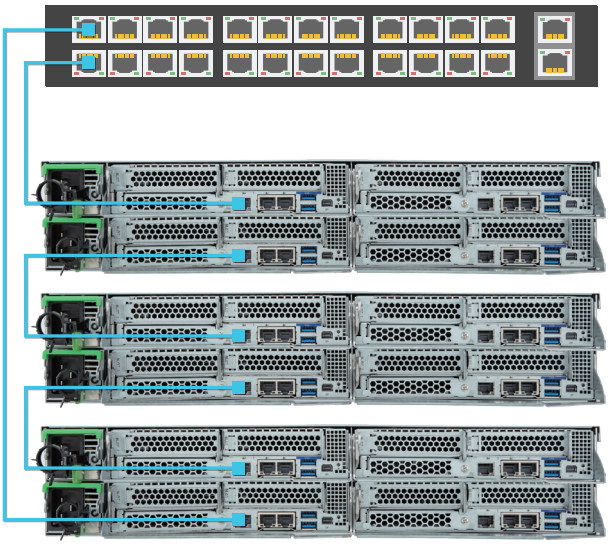

- **Please Go to Chapter 4 Motherboard Components for Riser Slot information.**

## 1-4 CMC Hub Integrated Architecture




**To access CMC, connect the management LAN port of each node.**

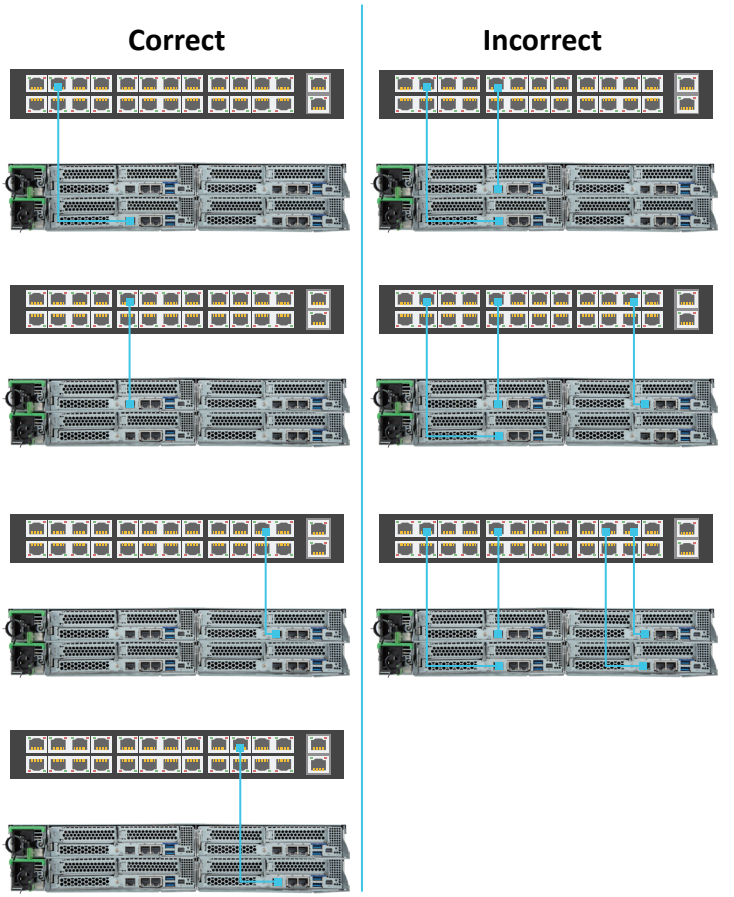
## 1-5 Multiplexing Management Topology



Multiplexing Management Example

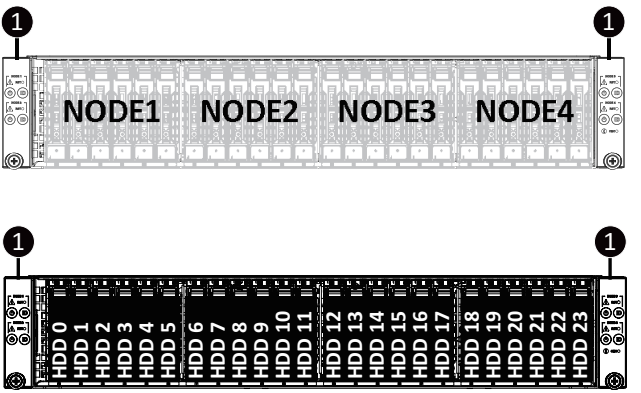
**Spanning Tree Protocol (STP) must be enabled in LAN switch function if using ring topology**.

## LAN Switch and Compute Node Connection Example



# Chapter 2 System Appearance

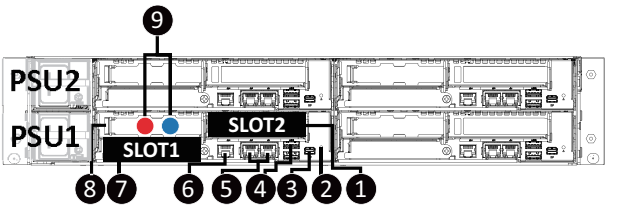
## 2-1 Front View




| No. | Description |
|---|---|
| 1. | Front Panel LEDs and buttons |

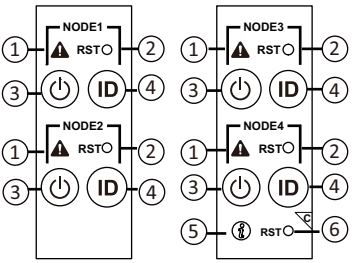
**• Please Go to Chapter 2-3 Front Panel LED and Buttons for detail description of function LEDs.**

## 2-2 Rear View




| No. | Description |
|---|---|
| 1. | PCIe Slot |
| 2. | Node System Status LED |
| 3. | Mini DisplayPort |
| 4. | USB 3.2 Gen1 x 2 |
| 5. | Data LAN Port x 2 |
| 6. | Server Management LAN Port |
| 7. | OCP 3.0 Slot (SFF Type) |
| 8. | PCIe Slot |
| 9. | Coolant Pipe Slot |

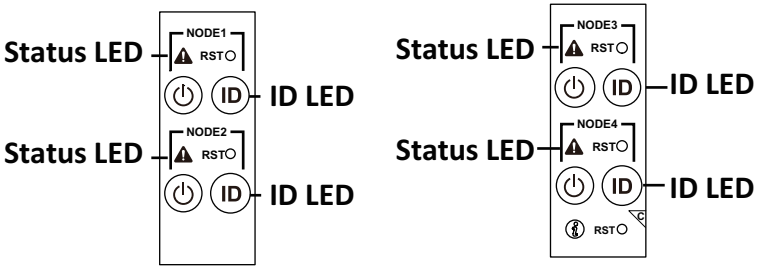
## 2-3 Front Panel LED and Buttons




| No. | Name | Color | Status | Description |
|---|---|---|---|---|
| 1. | System Status LED(Note) | | | This LED represents the RoT function LED behavior.<br>Please see the following section for detail LED behavior. |
| 2. | Reset Button | -- | -- | Press this button to reset the system. |
| 3. | 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)<br>• System is in ACPI S4 state (hibernate mode) |
| 4. | ID Button with LED(Note) | | | This LED represents the RoT function LED behavior.<br>Please see the following section for detail LED behavior. |
| 5. | Enclosure | Green | On | System is operating normally. |
| | | Amber | On | Critical condition, may indicates:<br>Power module failure<br>System fan failure<br>Power supply voltage issue<br>System temperature |
| | | | Blink | Non-critical condition, may indicates:<br>Redundant power module failure<br>Temperature and voltage issue |
| 6. | CMC Reset Button | -- | -- | Press this button to reset the CMC. |

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

## 2-4 RoT LEDs



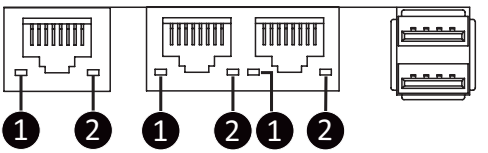

| | LED on Front panel(Note5) | |
|---|---|---|
| | ID LED | Status LED |
| **EC Firmware (FW) Authentication fail or not exit** | | |
| **EC FW is broken or not exit (Note1)** | OFF | OFF |
| **Authenticating/Recovering BMC/BIOS Images** | | |
| **Authenticating Images** | OFF | OFF |
| **Recovering BMC Active Flash** | Blinks Blue<br>4 times per second | Blinks Green<br>4 times per second |
| **Recovering BIOS Active Flash** | Blinks Blue<br>4 times per second | Blinks Amber<br>4 times per second |
| **Authentication (AUTH) Pass** | | |
| **Recovering BIOS Active Flash** | OFF | OFF |
| **BMC : AUTH pass after doing recovery**<br>**BIOS : AUTH pass after doing recovery** | OFF | OFF |
| **BMC : AUTH pass after doing recovery**<br>**BIOS : AUTH pass** | OFF | OFF |
| **BMC : AUTH pass**<br>**BIOS : AUTH pass after doing recovery** | OFF | OFF |
| **Active Flash Authentication (AUTH) Fail** | | |
| **BMC : AUTH Fail(Note2)** | Blinks Blue<br>1 time per second | Blinks Green<br>1 time per second |
| **BIOS : AUTH fail(Note2)** | Blinks Blue<br>1 time per second | Blinks Amber<br>1 time per second |

| | | |
|---|---|---|
| **BMC : AUTH fail after doing recovery(Note3)** | Blinks Blue<br>2 times per second<br>[ON OFF OFF] | Blinks Green<br>2 times per second<br>[ON OFF OFF] |
| **BIOS : AUTH fail after doing recovery(Note3)** | Blinks Blue<br>2 times per second<br>[ON OFF OFF] | Blinks Amber<br>2 times per second<br>[ON OFF OFF] |
| **Backup Flash Authentication Fail(Note4)** | | |
| **BMC : AUTH fail** | Blinks Blue<br>2 times per second<br>[ON OFF ON OFF] | Blinks Green<br>2 times per second<br>[ON OFF ON OFF] |
| **BIOS : AUTH fail** | Blinks Blue<br>2 times per second<br>[ON OFF ON OFF] | Blinks Amber<br>2 times per second<br>[ON OFF ON OFF] |

**NOTE!**

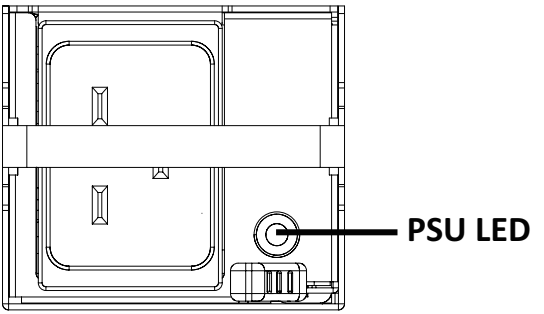
1. EC FW is broken or not exited result in Microchip CEC1702 cannot load EC FW for authentication.
2 CEC1702's bootloader load EC FW from BMC Flash1 when AC on. It must authenticate this FW firstly before run the FW. If the authenticate fail or not get the FW successfully, CEC1702 is not allowed to execute 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



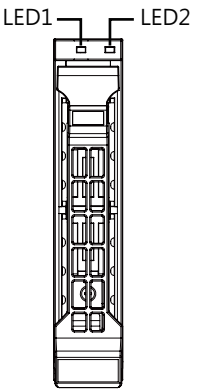

| No. | Name | Color | Status | Description |
|---|---|---|---|---|
| 1. | 1GbE Speed LED | Yellow | On | 1Gbps data rate |
| | | Green | On | 100 Mbps data rate |
| | | N/A | Off | 10 Mbps data rate |
| 2. | 1GbE Link/ Activity LED | Green | On | Link between system and network or no access |
| | |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

## 2-6 Power Supply Unit 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 | | 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 electrostatic discharge. Working on computers that are still connected to a power supply can be extremely dangerous. Follow the simple guidelines below to avoid damage to your computer or injury to yourself.

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

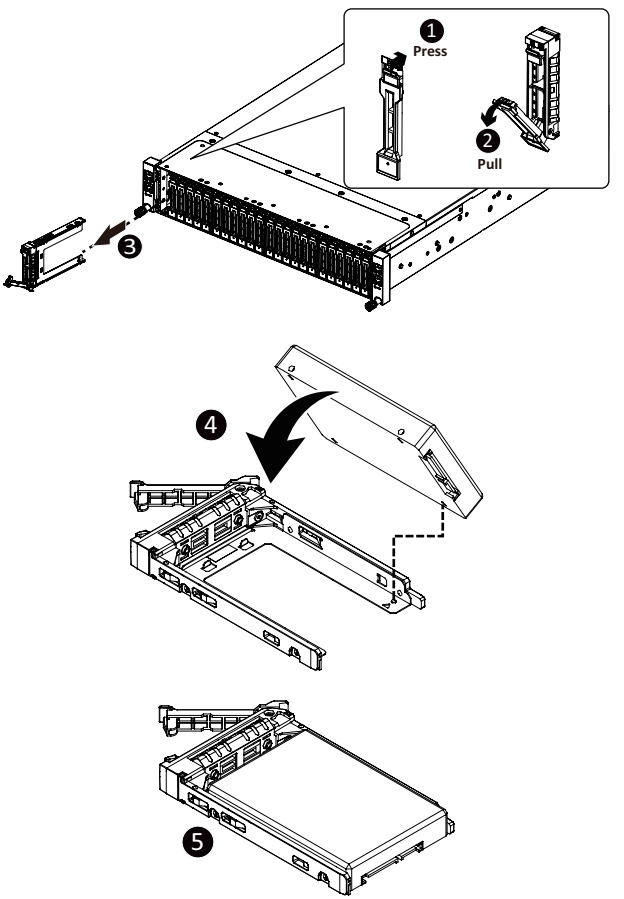
## 3-1 Installing the Hard Disk Drive

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

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

**Follow these instructions to install the Hard disk drive:**

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



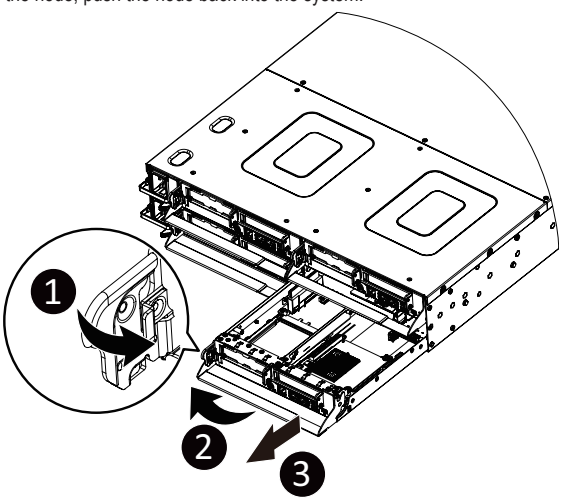
## 3-2 Removing the Node

**Read the following guidelines before you begin to replace a node:**

- **To make sure the system operates normally, please power off only the node that will be replaced or reconfigured.**

**Follow these instructions to remove a node:**

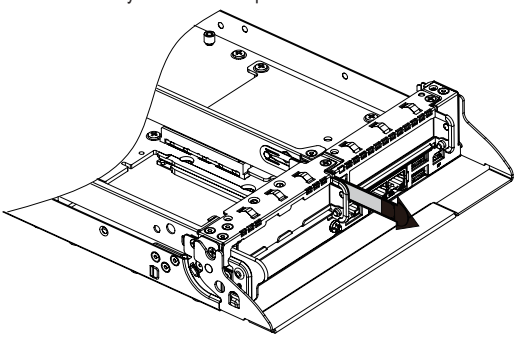
1. Press the release latch while simultaneously pushing down the tray handle for the node.
2. Pull the node out of the system.
3. To install the node, push the node back into the system.



## 3-3 How to Get the BMC Password

**Follow these instructions to get the BMC Password:**

1. Pull out the tab and then you can find the password information on the tab.



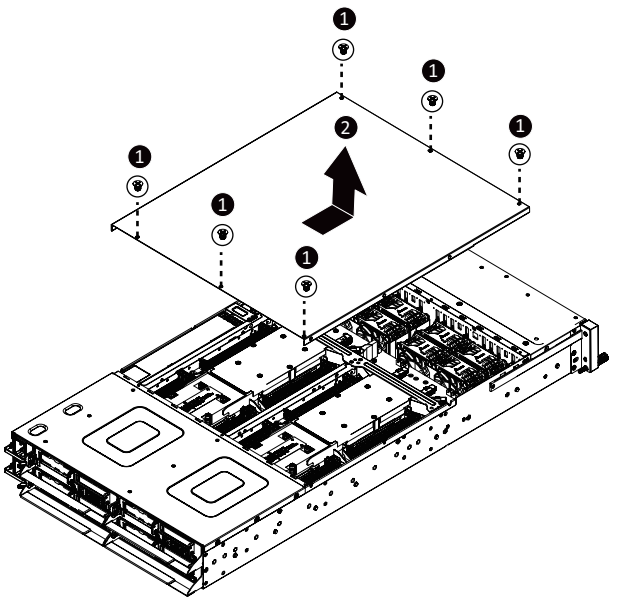
## 3-4 Removing Chassis Cover

Before you remove or install the system cover

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

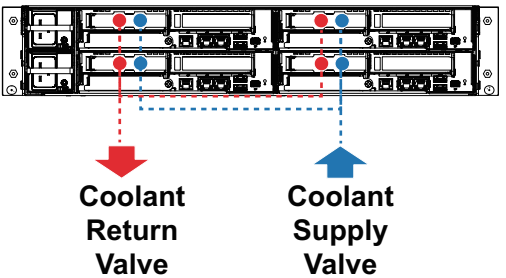
**Follow these instructions to remove the system cover:**

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

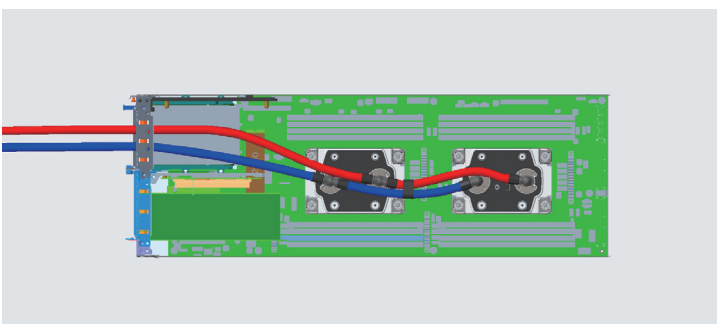


## 3-5 Liquid Cooling Assembly Information

The liquid cooling assembly is designed to capture heat from the processors in the node and cool the components. The coolant flow for the assembly is produced by the eight quick disconnects at the rear of the server chassis.




The flow of the coolant is shown below:



| Flow Order | Component |
|---|---|
| First | Coolant into CPU |
| Third | CPU coolant return |

### 3-5-1 Liquid Cooling Specifications

The cold plate assembly in the liquid cooling assembly mounts directly on top of the processors.

The retention mechanism for installation on top of the processors is integrated into the cold plate. The liquid coolant contained within the tubes, is a mixture of demineralized water and propylene glycol with the following beneficial features: Anti-Freeze, Anti-Corrosion and Anti Bacterial. The following table lists the features and specifications of the liquid cooling assembly.

| Specification | Value |
|---|---|
| **Cold plate material** | Copper CDA110 |
| **Thermal Interface Material** | Dowsil TC-5622 (CPU) |
| **Operating liquid temperature** | Minimum: 5°C<br>Maximum: 40°C |
| **Operating Air temperature** | 40°C |
| **Coolant Flow Rate** | 1.4 l/min (CPU) |
| **Operating Humidity** | 5 - 90% |
| **Storage Temperature** | -40°C to 70°C |
| **Dimensions** | |
| **Height** | 25.00 mm |
| **Weight** | CPU 1.87 lbs (850g) |

**NOTE:**

- **The ambient temperature and relative humidity of the environment depend on the inlet supply water temperature and the coolant flow rate.**
- **If the relative humidity surpasses 60%, maintain the inlet water temperature between 40°C and 45°C to prevent condensation and ensure optimal system performance.**

## 3-6 Installing the CPU and the Coolant Pipe Module

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

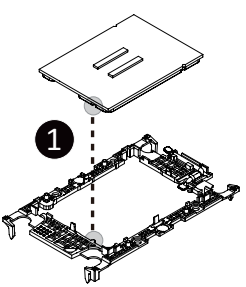
- **Make sure that the motherboard supports the CPU.**
- **Always turn off the computer and unplug the power cord from the power outlet before installing the CPU to prevent hardware damage.**
- **Unplug all cables from the power outlets.**
- **Disconnect all telecommunication cables from their ports.**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

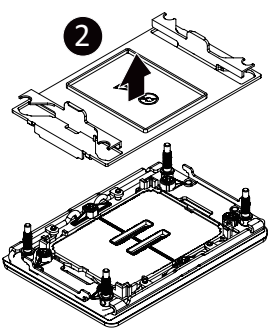
**WARNING!**

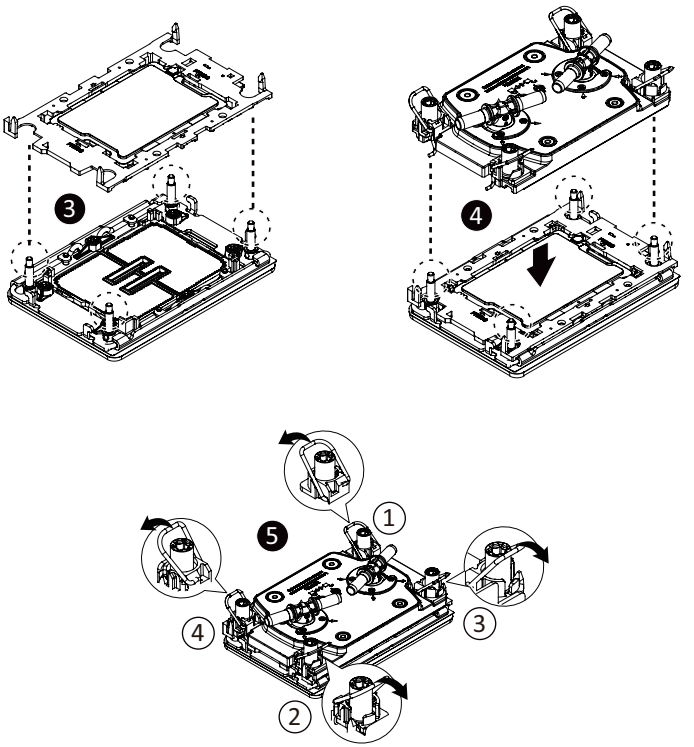
**Failure to properly turn off the server before you start installing components may cause serious damage. Do not attempt the procedures described in the following sections unless you are a qualified service technician.**

**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. Remove the CPU socket cover.
   NOTE: Save and replace the CPU socket cover if the processor is removed from its socket.
3. Loosen the four captive screws securing the carrier assembly to the system.
4. Put the Coolant pipe through the PCIe 1 bracket and put the PCIe bracket and coolant bracket together. Use the retained screw to lock the PCIe 1 bracket.
5. Align the carrier assembly to the CPU socket using the guide pins and make sure the gold triangle is in the correct orientation. Then place the carrier assembly onto the top of the CPU socket.
6. Secure the carrier assembly by tightening the screws in sequential order (1→2→3→4).






## Carrier Types used for Package Types

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

**NOTE!**

- The carrier code is marked on each carrier and matches a code laser marked on to the IHS(Integrated Heat Spreader) to ensure the right parts are used together.
- When installing the 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.

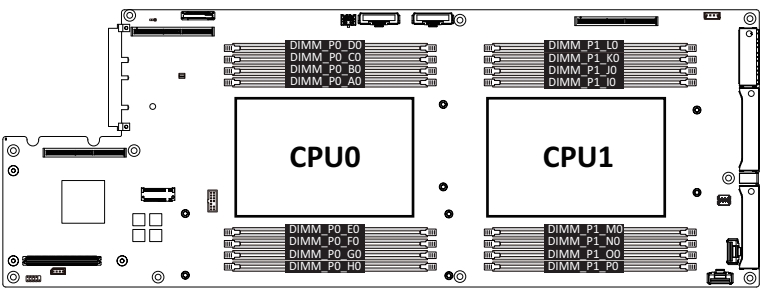
# 3-7 Installing Memory

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

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

## 3-7-1 Eight Channel Memory Configuration

This motherboard provides 16 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. Enabling eight Channel memory mode will be eight times of the original memory bandwidth.



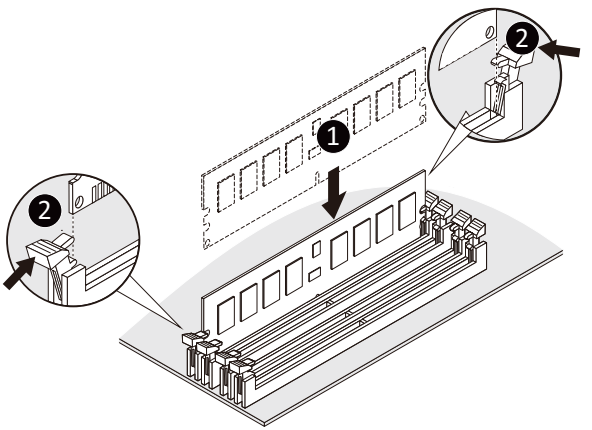
## 3-7-2 Installing the Memory

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

**Be sure to install DDR5 DIMMs on this motherboard.**

**Follow these instructions to install the Memory:**

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



## 3-7-3 DIMM Population Table

### Intel Xeon 6700E-Series Memory Support

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

### Intel Xeon 6700E-Series CXL Memory Support

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

**NOTE:**

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

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

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

**NOTE:**

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

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

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

**NOTE:**

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

### 3-7-4 Processor and Memory Module Matrix Table

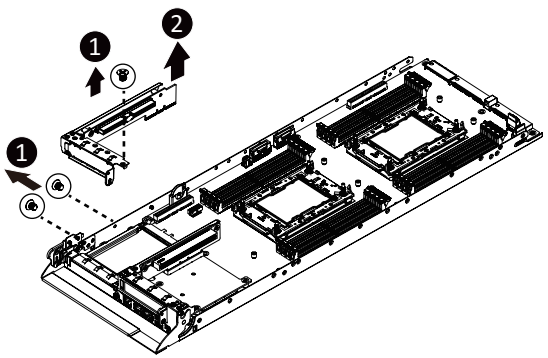
| Memory Q'ty for each CPU | CPU0 | | | | | | | | CPU1 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | H0 | G0 | F0 | E0 | A0 | B0 | C0 | D0 | P0 | O0 | N0 | M0 | I0 | J0 | K0 | L0 |
| 1 DIMM | | | | | v | | | | | | | | v | | | |
| 4 DIMM | | v | | v | v | | v | | | v | | v | v | | v | |
| | v | | v | | | v | | v | v | v | | | | v | | v |
| 8 DIMM | v | v | v | v | v | v | v | v | v | v | v | v | v | v | v | v |

## 3-8 Installing the PCI Expansion Card

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

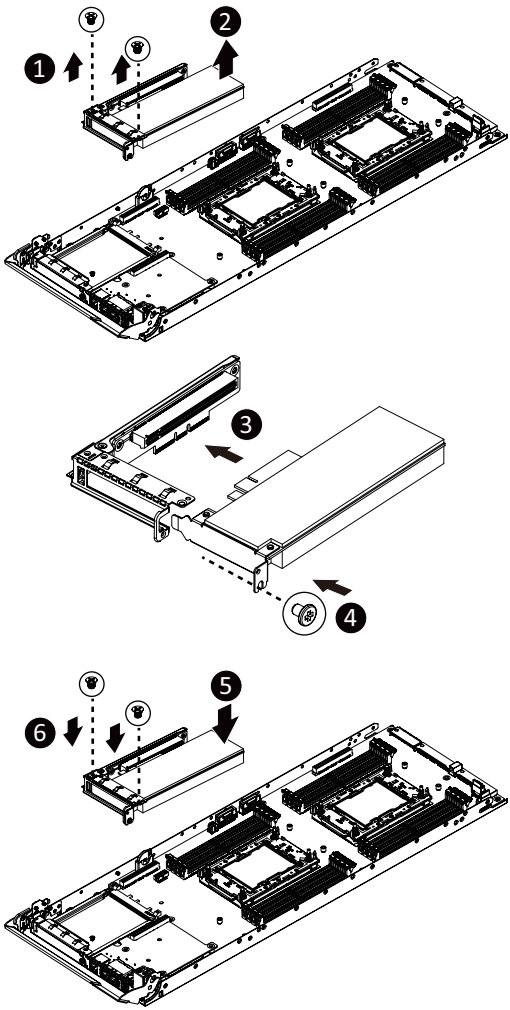
**Follow these instructions to install the left PCI bracket riser:**

1. Remove the three screws securing the riser bracket to the system.
2. Lift up the riser bracket out of system.
3. Reverse steps 1 - 2 to install the riser bracket back into the system.



**Follow these instructions to install the right PCI Expansion card:**

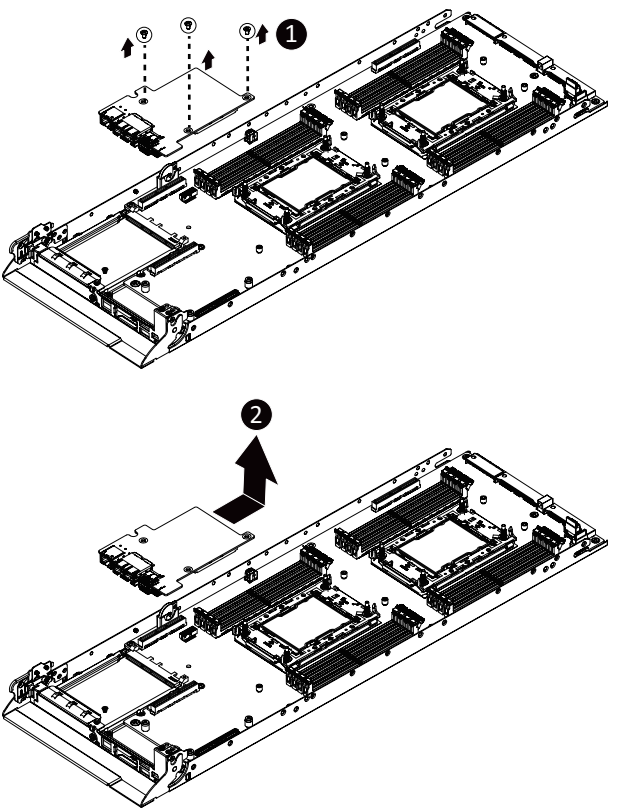
1. Remove the three screws on the riser bracket to the system.
2. Lift up the riser bracket out of system.
3. Remove the screw securing the side bracket to the riser bracket.
4. Remove the side bracket
5. Align the PCIe card to the riser guide slot and push in the direction of the arrow until the PCI-E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



## 3-9 Removing and Installing the Rear IO Card

**Follow these instructions to install the Rear IO card:**

1. Remove the three screws securing the Rear IO card to the system.
2. Lift up the Rear IO card out of system.
3. Reverse steps 1 - 2 to install the Rear IO card back into the system.



# 3-10 Installing the Mezzanine Card

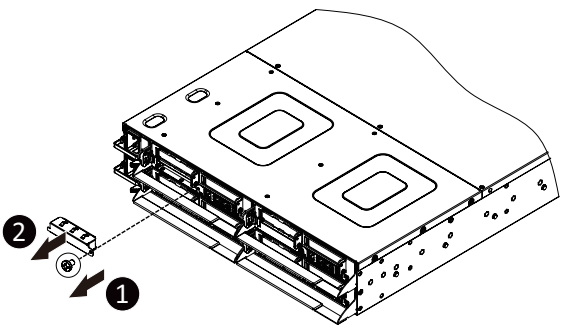
## 3-10-1 Installing the OCP 3.0 Mezzanine Card

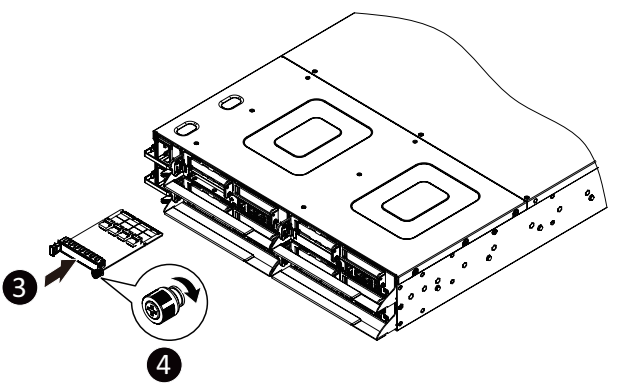
Use of the following type of OCP 3.0 NIC is recommended:

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

**Follow these instructions to install an OCP 3.0 Mezzanine card:**

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



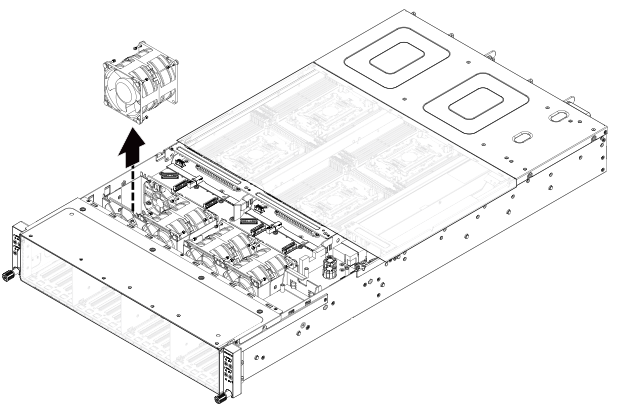
## 3-11 Replacing the Fan Assembly

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

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

**Follow these instructions to replace the fan assembly:**

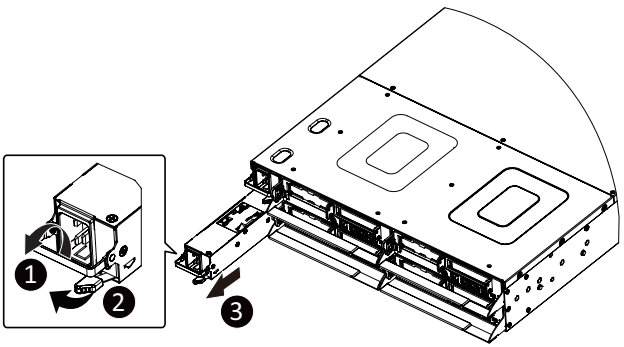
1. Lift up the fan assembly from the chassis.
2. Reverse the previous steps to install the replacement fan assembly.



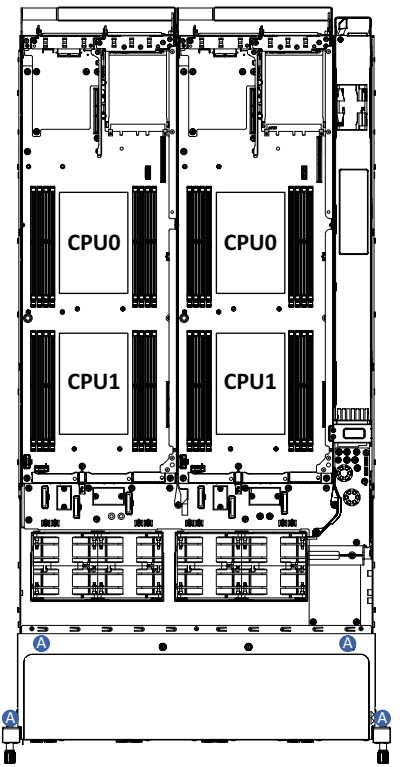
## 3-12 Replacing the Power Supply

**Follow these instructions to replace the power supply:**

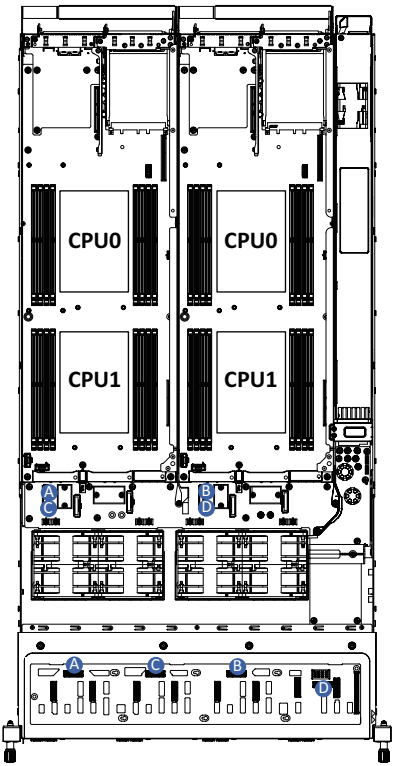
1. Pull up the power supply handle and press the retaining clip on the right side of the power supply along the direction of the arrow. At the same time, pull out the power supply by using its handle.
2. Insert the replacement power supply firmly into the chassis. Connect the AC power cord to the replacement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



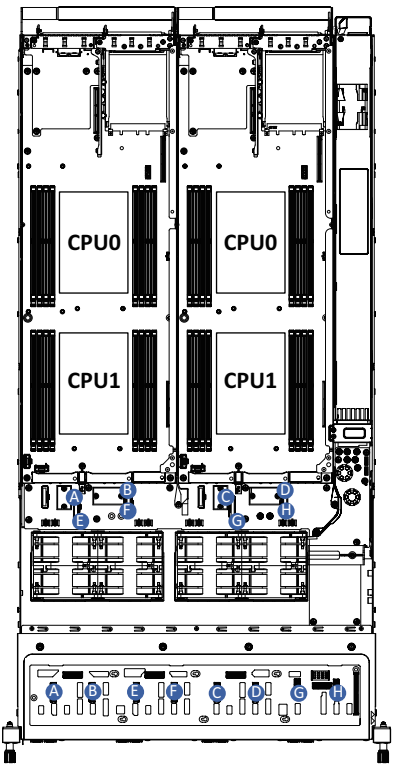
## 3-13 Cable Routing



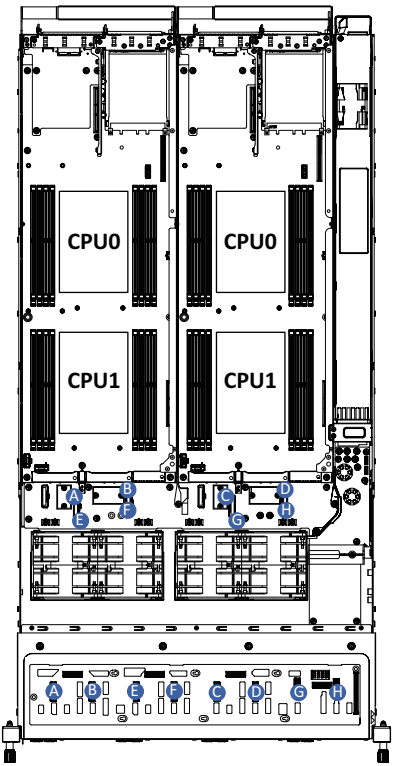

| | | | |
|---|---|---|---|
| A | Front Panel LEDs and Buttons Cable | Motherboard: FP_1<br>Front IO Board: FP_1 | |
| | | Front IO Board: FP_1 | |



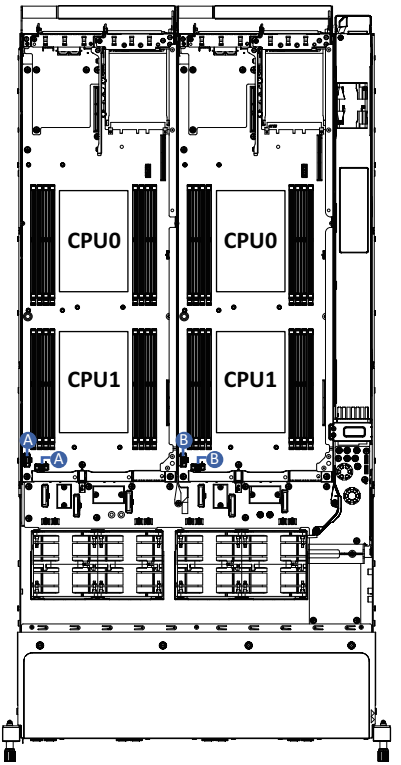

| | | |
|---|---|---|
| A | Top Middle Board to HDD Back Plane Board Cable (SATA1) | Middle Board: N1_SATA |
| | | F/ HDD Board: N1 SATA |
| B | Top Middle Board to HDD Back Plane Board Cable (SATA3) | Middle Board: N3_SATA |
| | | F/ HDD Board: N3 SATA |
| C | Bottom Middle Board to HDD Back Plane Board Cable (SATA2) | Middle Board: N2_SATA |
| | | F/ HDD Board: N2 SATA |
| D | Bottom Middle Board to HDD Back Plane Board Cable (SATA4) | Middle Board: N4_SATA |
| | | F/ HDD Board: N4 SATA |



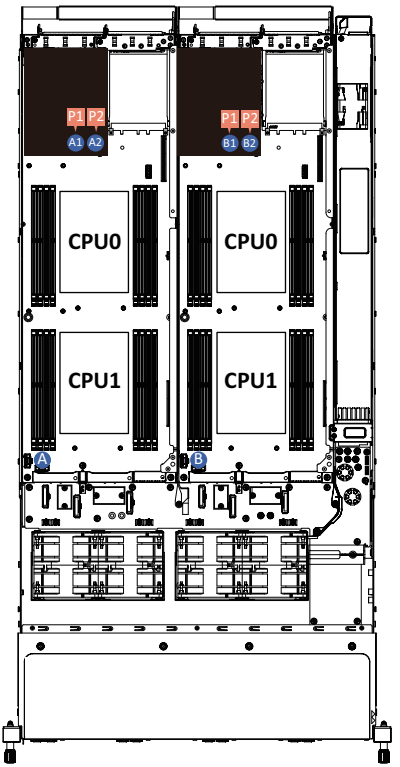

| | | |
|---|---|---|
| A | Top Middle Board to HDD Back Plane Board Cable (NVMe/Node1) | Middle Board: N1_U2_B |
| | | F/ HDD Board: N1 U.2 A |
| B | Top Middle Board to HDD Back Plane Board Cable (NVMe/Node1) | Middle Board: N1_U2_A |
| | | F/ HDD Board: N1 U.2 B |
| C | Top Middle Board to HDD Back Plane Board Cable (NVMe/Node3) | Middle Board: N3_U2_B |
| | | F/ HDD Board: N3 U.2 A |
| D | Top Middle Board to HDD Back Plane Board Cable (NVMe/Node3) | Middle Board: N3_U2_A |
| | | F/ HDD Board: N3 U.2 B |




| | | |
|---|---|---|
| E | Bottom Middle Board to HDD Back Plane Board Cable (NVMe/Node2) | Middle Board: N2_U2_B |
| | | F/ HDD Board: N2 U.2 A |
| F | Bottom Middle Board to HDD Back Plane Board Cable (NVMe/Node2) | Middle Board: N1_U2_A |
| | | F/ HDD Board: N2 U.2 B |
| G | Bottom Middle Board to HDD Back Plane Board Cable (NVMe/Node4) | Middle Board: N4_U2_B |
| | | F/ HDD Board: N4 U.2 A |
| H | Bottom Middle Board to HDD Back Plane Board Cable (NVMe/Node4) | Middle Board: N1_U2_A |
| | | F/ HDD Board: N4 U.2 B |



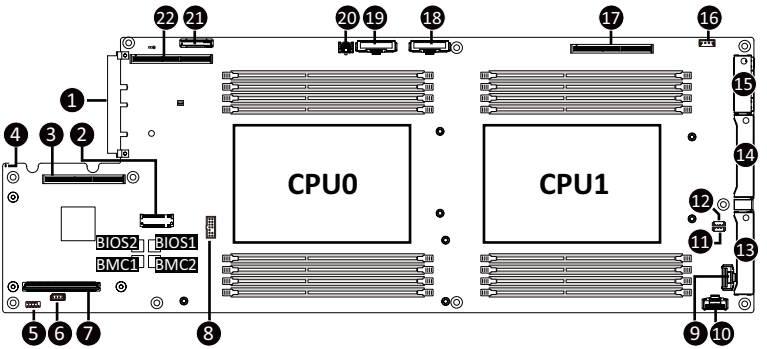

| | | |
|---|---|---|
| A | On board SATA Cable | Motherboard: MCIO_SATA |
| | | Motherboard: SATA0 |
| B | | Motherboard: MCIO_SATA |
| | | Motherboard: SATA0 |




| | | |
|---|---|---|
| **A** | SAS RAID Card Cable<br>(Optional) | Motherboard: MCIO_SATA |
| | | RAID Card:<br>A1: SAS 0-3<br>A2: SAS 4-7 |
| **B** | | Motherboard: MCIO_SATA |
| | | RAID Card:<br>A1: SAS 0-3<br>A2: SAS 4-7 |

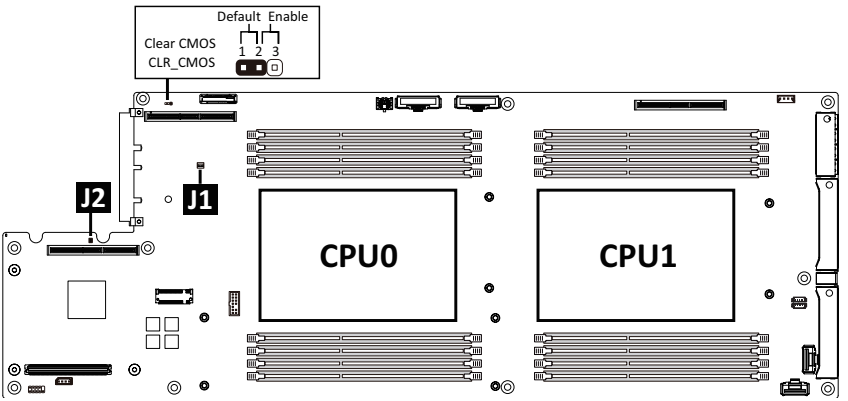
# Chapter 4 Motherboard Components

## 4-1 Motherboard Components




| Item | Description |
|---|---|
| 1 | OCP 3.0 Connector (PCIe Gen5 x16) |
| 2 | PRoT Module Connector (M.2 M-Key/only enabled on RoT SKU) |
| 3 | Proprietary PCIe Slot (Gen 5/ x16 slot/ GENZ_2) |
| 4 | BMC Readiness LED |
| 5 | Serial Port Cable Connector |
| 6 | IPMB Connector |
| 7 | IO Card Slot for IO Board |
| 8 | TPM Module Connector |
| 9 | MCIO Connector (SATA/SATA Signal to Backplane board) |
| 10 | MCIO Connector (SATA/SATA Signal from chip) |
| 11 | SGPIO Connector (SGPA1) |
| 12 | SGPIO Connector (SGPB1) |
| 13 | PCIe/SATA Connector |
| 14 | PCIe Connector |
| 15 | Powe Connector |
| 16 | VROC Module Connector |
| 17 | Proprietary PCIe Slot (Gen 5/ x16 slot/ GENZ_3) |
| 18 | MCIO Connector (U2_P1_PEA/PCIe Gen5) |
| 19 | MCIO Connector (U2_P1_PEB/PCIe Gen5) |
| 20 | PCIe Power Connector for GENZ_3 (SLOT3_PWR) |
| 21 | System Battery Cable Connector |
| 22 | Proprietary PCIe Slot (Gen 5/ x16 slot/ GENZ_1) |

## 4-2 Jumper Setting

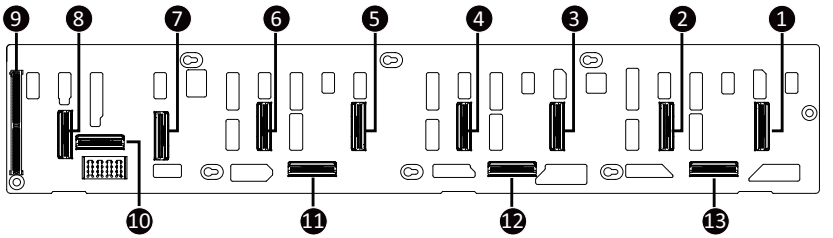



| J1 | | ON | OFF |
|---|---|---|---|
| 1 | S3_MASK | Stop initial power on when BMC is not ready | Normal [Default] |
| 2 | BIOS_RCVR | BIOS recovery mode | Normal [Default] |
| 3 | BIOS_PWD | Clear supervisor password | Normal [Default] |
| 4 | RST BMC_EN | ID button to enable BMC reset | Normal [Default] |

| J2 | NCSI Switch |
|---|---|
| SW.1 | |
| ON | OCP Slot |
| OFF | Onboard LAN |

## 4-3 Backplane Board Storage Connector

### 4-3-1 CBPH0O8




| Item | Description |
|---|---|
| 1 | MCIO 8i (SFF-TA1016/N1 U.2 A) |
| 2 | MCIO 8i (SFF-TA1016/N1 U.2 B) |
| 3 | MCIO 8i (SFF-TA1016/N2 U.2 A) |
| 4 | MCIO 8i (SFF-TA1016/N2 U.2 B) |
| 5 | MCIO 8i (SFF-TA1016/N3 U.2 A) |
| 6 | MCIO 8i (SFF-TA1016/N3 U.2 B) |
| 7 | MCIO 8i (SFF-TA1016/N4 U.2 A) |
| 8 | MCIO 8i (SFF-TA1016/N4 U.2 B) |
| 9 | Proprietary PCIe Slot (x8 slot/ GF_HDD) |
| 10 | MCIO 8i (SFF-TA1016/N4 SATA) |
| 11 | MCIO 8i (SFF-TA1016/N3 SATA) |
| 12 | MCIO 8i (SFF-TA1016/N2 SATA) |
| 13 | MCIO 8i (SFF-TA1016/N1 SATA) |

# 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<br>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.

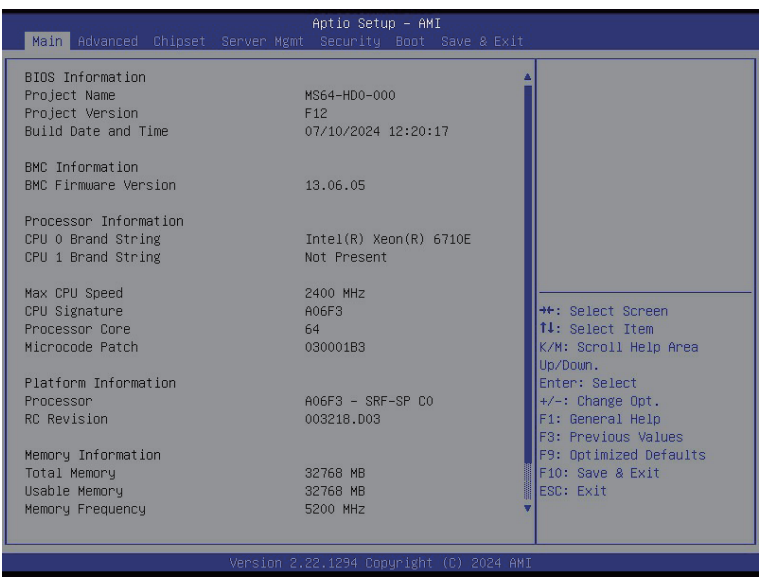
**Main Menu Help**

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.



| Parameter | Description |
|---|---|
| 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 | |
| BMC Firmware Version | Displays BMC firmware version information. |
| Processor Information | |
| CPU Brand String/ Max CPU Speed / CPU Signature / Processor Core / Microcode Patch | Displays the technical information for the installed processor(s). |
| Platform Information | |
| Processor/RC Revision | Displays the information of the installed processor(s). |
| 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. |
| Memory Frequency | Displays the installed memory frequency information. |

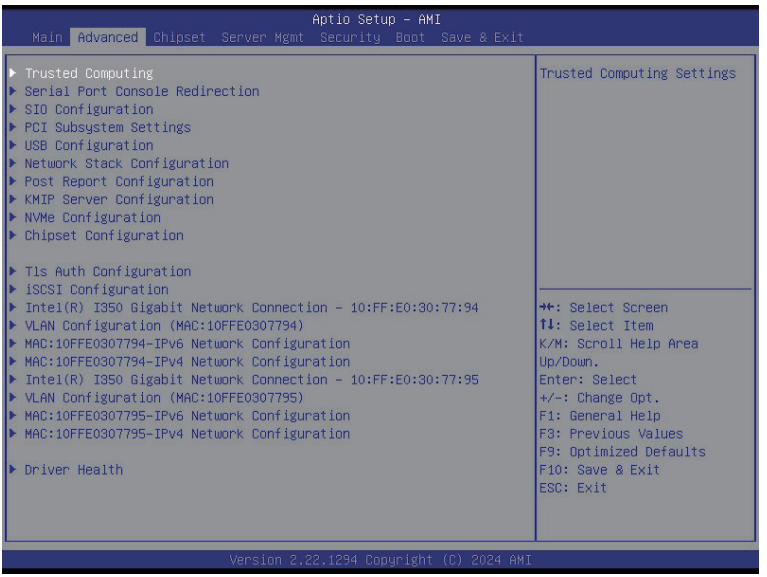
(Note1) Functions available on selected models.

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

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

## 5-2 Advanced Menu

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



## 5-2-1 Trusted Computing

| Parameter | Description |
|---|---|
| Configuration | |
| TPM v1.2 Support | Enable/Disable BIOS support for security device. OS will not show security device. TCG EFI protocol and INT1A interface will not be available.<br>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.<br>Options available: Enabled, Disabled. Default setting is **Disabled**. |
| COM1 Console Redirection Settings | Press [Enter] to configure advanced items.<br>**Please note that this item is configurable when COM1 Console Redirection is set to Enabled.**<br>◆ Terminal Type<br>– Selects a terminal type to be used for console redirection.<br>– Options available: VT100, VT100PLUS, VT-UTF8, ANSI. Default setting is **VT100PLUS**.<br>◆ Bits per second<br>– Selects the transfer rate for console redirection.<br>– Options available: 9600, 19200, 38400, 57600, 115200. Default setting is **115200**.<br>◆ Data Bits<br>– Selects the number of data bits used for console redirection.<br>– Options available: 7, 8. Default setting is **8**. |

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

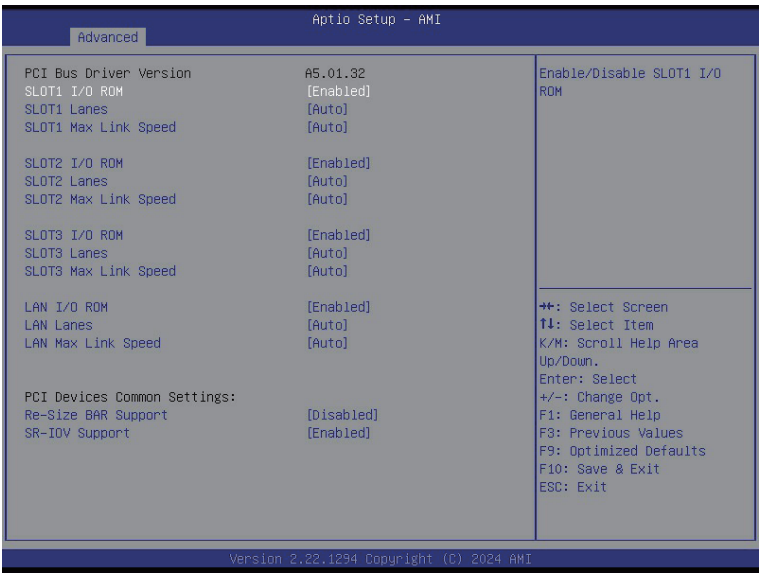
| Parameter | Description |
|---|---|
| COM1 Console Redirection Settings (continued) | ◆ Parity<br>– A parity bit can be sent with the data bits to detect some transmission errors.<br>– Even: parity bit is 0 if the num of 1's in the data bits is even.<br>– Odd: parity bit is 0 if num of 1's in the data bits is odd.<br>– Mark: parity bit is always 1. Space: Parity bit is always 0.<br>– Mark and Space Parity do not allow for error detection.<br>– Options available: None, Even, Odd, Mark, Space. Default setting is **None**.<br>◆ Stop Bits<br>– 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.<br>– Options available: 1, 2. Default setting is **1**.<br>◆ Flow Control<br>– 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.<br>– Options available: None, Hardware RTS/CTS. Default setting is **None**.<br>◆ VT-UTF8 Combo Key Support<br>– Enable/Disable the VT-UTF8 Combo Key Support.<br>– Options available: Enabled, Disabled. Default setting is **Enabled**.<br>◆ Recorder Mode<br>– When this mode enabled, only texts will be send. This is to capture Terminal data.<br>– Options available: Enabled, Disabled. Default setting is **Disabled**.<br>◆ Resolution 100x31<br>– Enable/Disable extended terminal resolution.<br>– Options available: Enabled, Disabled. Default setting is **Enabled**.<br>◆ Putty KeyPad<br>– Selects Function Key and KeyPad on Putty.<br>– 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.<br>Options available: Enabled, Disabled. Default setting is **Disabled**. |
| Serial Port for Out-of-Band EMS Console Redirection Settings | Press [Enter] to configure advanced items.<br>**Please note that this item is configurable when Serial Port for Out-of-Band Management EMS Console Redirection is set to Enabled.**<br>◆ Out-of-Band Mgmt Port<br>– Microsoft Windows Emergency Management Service (EMS) allows for remote management of a Windows Server OS through a serial port.<br>– Default setting is **COM1**.<br>◆ Terminal Type EMS<br>– Selects a terminal type to be used for console redirection.<br>– Options available: VT100, VT100PLUS, VT-UTF8, ANSI. Default setting is **VT100PLUS**.<br>◆ Bits per second EMS<br>– Selects the transfer rate for console redirection.<br>– Options available: 9600, 19200, 57600, 115200. Default setting is **115200**.<br>◆ Flow Control EMS<br>– 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.<br>– Options available: None, Hardware RTS/CTS, Software Xon/Xoff. Default setting is **None**. |

## 5-2-3 SIO Configuration

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

## 5-2-4 PCI Subsystem Settings

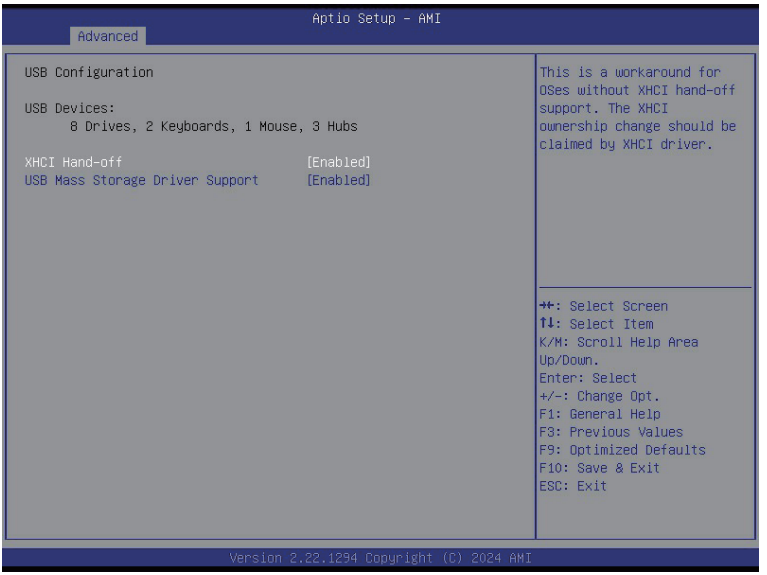



| Parameter | Description |
|---|---|
| PCI Bus Driver Version | Displays the PCI Bus Driver version information. |
| SLOT_# I/O ROM(Note1) | When enabled, this setting will initialize the device expansion ROM for the related PCI-E slot.<br>Options available: Enabled, Disabled. Default setting is **Enabled**. |
| SLOT_# Lanes(Note1) | Change the PCIe lanes. Default setting is **Auto**. |
| SLOT_#_Max Link Speed(Note1) | Configure PCIe max link speed.<br>Options available: Auto, Gen1, Gen2, Gen3, Gen4, Gen5.<br>Default setting is **Auto**. |
| LAN I/O ROM(Note2) | Enable/Disable the LAN devices, and initializes device expansion ROM.<br>Options available: Enabled, Disabled. Default setting is **Enabled**. |
| Onboard LAN I/O ROM(Note2) | Enable/Disable the onboard LAN devices, and initializes device expansion ROM.<br>Options available: Enabled, Disabled. Default setting is **Enabled**. |

(Note1) This section is dependent on the available PCIe Slot.
(Note2) This section is dependent on the available LAN controller.

| Parameter | Description |
|---|---|
| PCI Devices Common Settings | |
| Re-Size BAR Support | If system has Resizable BAR capable PCIe Devices, this option Enables or Disables Resizable BAR Support.<br>Options available: Enabled, Disabled. Default setting is **Disabled**. |
| SR-IOV Support | If the system has SR-IOV capable PCIe devices, this item Enable/Disable Single Root IO Virtualization Support.<br>Options available: Enabled, Disabled. Default setting is **Enabled**. |

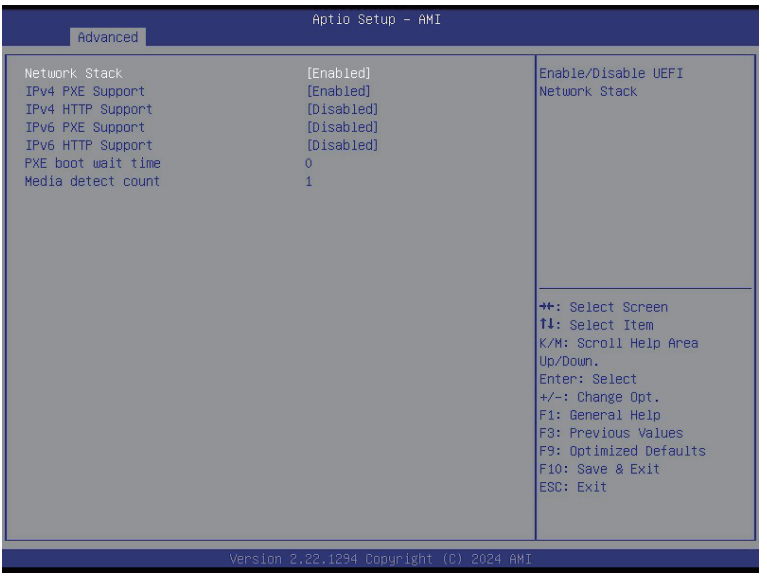
## 5-2-5 USB Configuration




| 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.<br>Options available: Enabled, Disabled. Default setting is **Enabled**. |
| USB Mass Storage Driver Support(Note) | Enable/Disable the USB Mass Storage Driver Support.<br>Options available: Enabled, Disabled. Default setting is **Enabled**. |

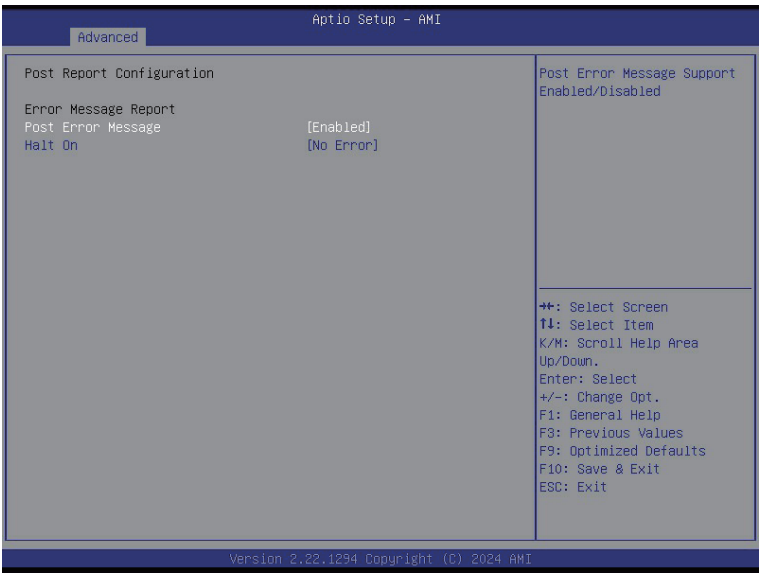
(Note) This item is present only if you attach USB devices.

## 5-2-6 Network Stack Configuration



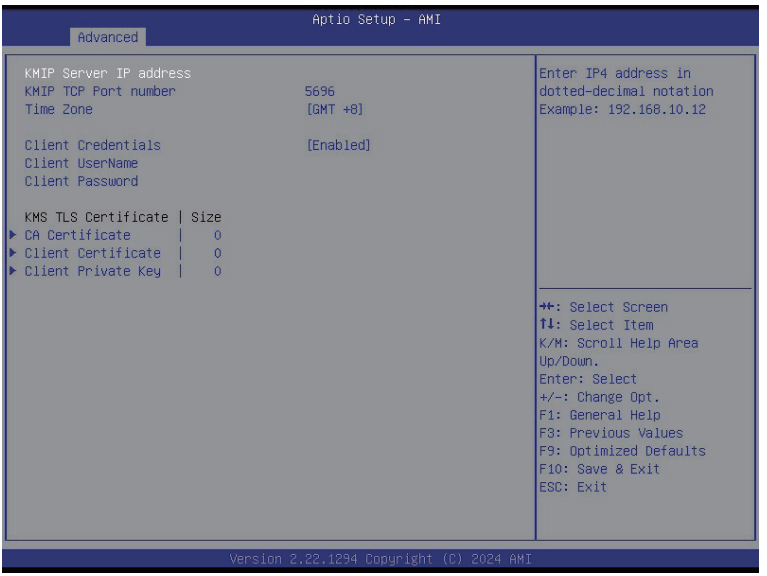

| Parameter | Description |
|---|---|
| Network Stack | Enable/Disable the UEFI network stack.<br>Options available: Enabled, Disabled. Default setting is **Enabled**. |
| Ipv4 PXE Support | Enable/Disable the Ipv4 PXE feature.<br>Options available: Enabled, Disabled. Default setting is **Enabled**.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

## 5-2-7 Post Report Configuration



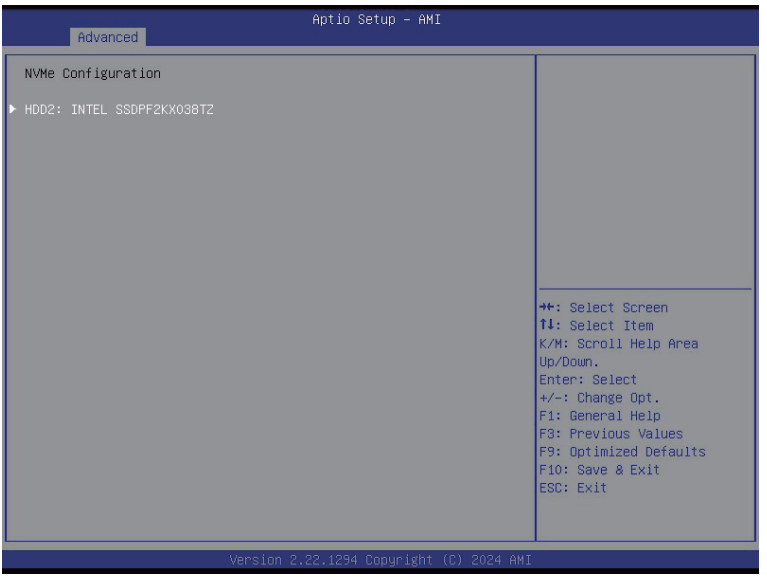

| Parameter | Description |
|---|---|
| Post Report Configuration | |
| Error Message Report | |
| Post Error Message | Enable/Disable the POST Error Message support.<br>Options available: Enabled, Disabled. Default setting is **Enabled**. |
| Halt On | Options available: No Error, All Error. Default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

## 5-2-8 KMIP Server Configuration



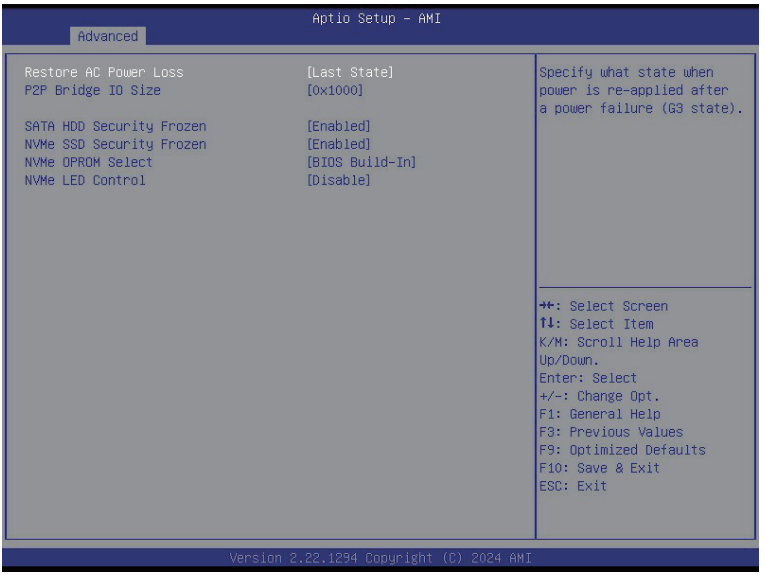

| Parameter | Description |
|---|---|
| KMIP Server IP address | |
| KMIP TCP Port Number | |
| Time Zone | Enter the correct timem zone for this server.<br>Default setting is **GMT+8**. |
| Client Credentials | Use User and password credentials to authenticate the Client.<br>Options available: Enabled, Disabled, Clear. Default setting is **Enabled**. |
| Client UserName | Enter Client identify: UserName.<br>Name Length: 0-63 characters. |
| Client Password | Enter Client identify: Password.<br>Password Length: 0-31 characters. |
| KMS TLS Certificate / Size | |
| CA Certificate | Enroll factory defaults or load the KMS TLS certificates from the file. |
| Client Certificate | Enroll factory defaults or load the KMS TLS certificates from the file. |
| Client Private Key | Enroll factory defaults or load the KMS TLS certificates from the file. |

## 5-2-9 NVMe Configuration




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

## 5-2-10 Chipset Configuration



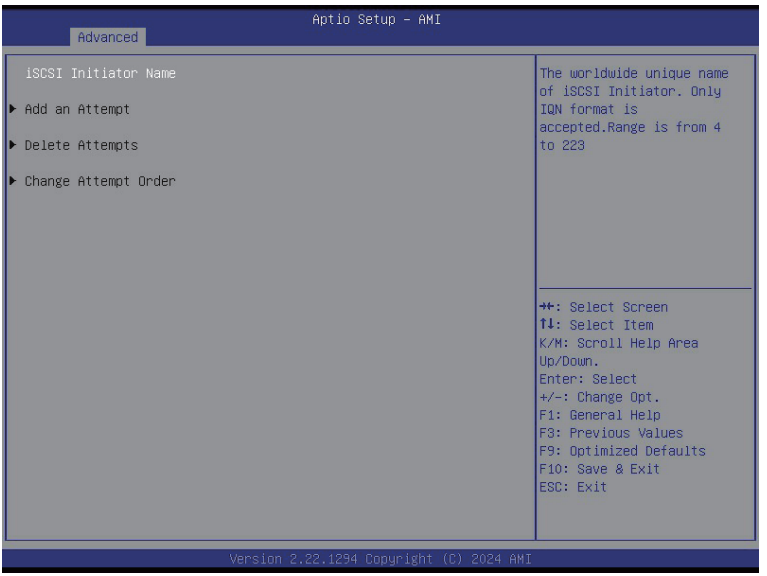

| Parameter | Description |
|---|---|
| Restore on AC Power Loss(Note) | Defines the power state to resume to after a system shutdown that is due to an interruption in AC power. When set to Last State, the system will return to the active power state prior to shutdown. When set to Power Off, the system remains off after power shutdown.<br>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.<br>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.<br>Options available: Enabled, Disabled. Default setting is **Enabled**. |
| NVMe SSD Security Frozen | Attempt to send freeze lock command to NVMe SSDs during boot.<br>Options available: Enabled, Disabled. Default setting is **Enabled**. |
| NVMe OPROM Select | BIOS Build-In is default setting. Select Device Itself, then this NVMe page will not display any device. Unless the device doesn't have OPROM.<br>Options available: BIOS Build-In, NVMe Device, Disables.<br>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. 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.

## 5-2-11 Tls Auth Configuration

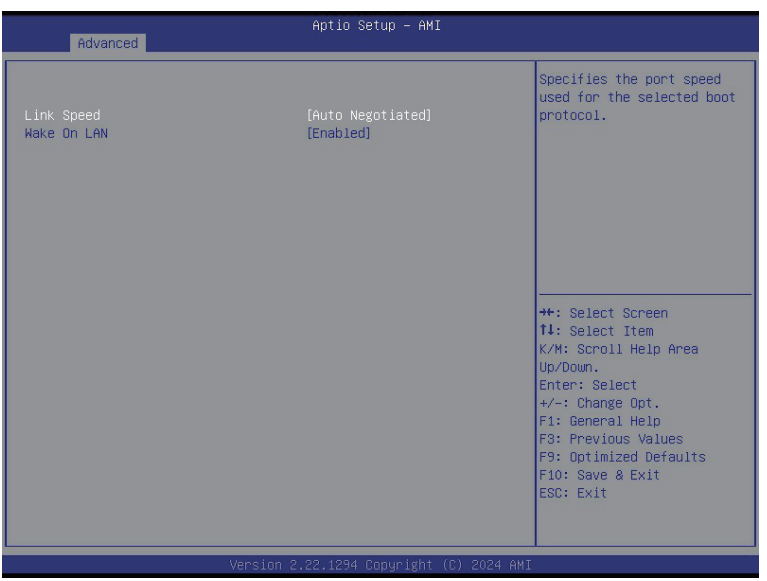
| Parameter | Description |
|---|---|
| Server CA Configuration | Press [Enter] for configuration of advanced items.<br>◆ Enroll Cert<br>– Press [Enter] to enroll a certificate<br>• Enroll Cert Using File<br>• Cert GUID<br>Input digit character in 1111111-2222-3333-4444-1234567890ab format.<br>– Commit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

## 5-2-12 iSCSI Configuration




| Parameter | Description |
|---|---|
| Host iSCSI Configuration | Press [Enter] to configure advanced items.<br>◆ iSCSI Initiator Name<br>– Only IQN format is accepted. Range: from 4 to 223<br>◆ Add an Attempt<br>◆ Delete Attempts<br>◆ Change Attempt Order |

## 5-2-13 Intel(R) i350 Gigabit Network Connection

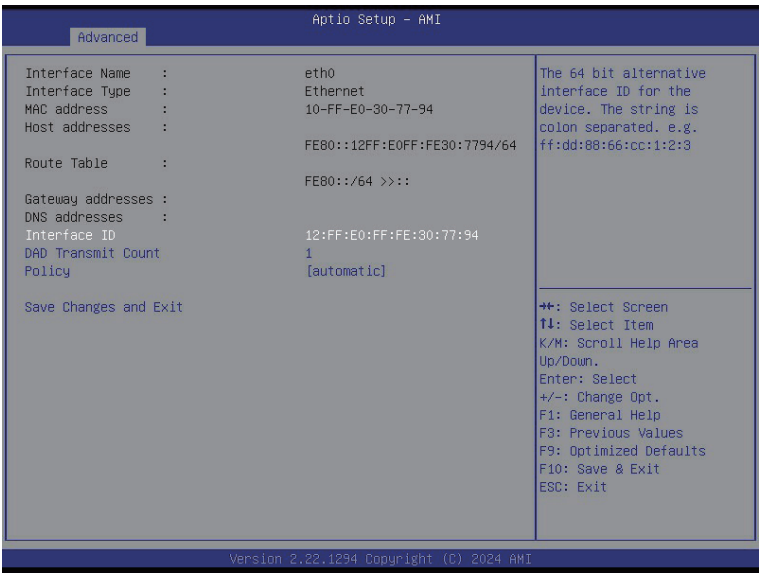


| Parameter | Description |
|---|---|
| NIC Configuration | Press [Enter] to configure advanced items.<br>◆ Link Speed<br>– Allows for automatic link speed adjustment.<br>– Options available: Auto Negotiated, 10 Mbps Half, 10 Mbps Full, 100 Mbps Half, 100 Mbps Full. Default setting is **Auto Negotiated**.<br>◆ Wake On LAN<br>– 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.<br>– Options available: Enabled, Disabled. Default setting is **Enabled**. |
| Blink LEDs | Identifies the physical network port by blinking the associated LED.<br>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. |

## 5-2-14 VLAN Configuration

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

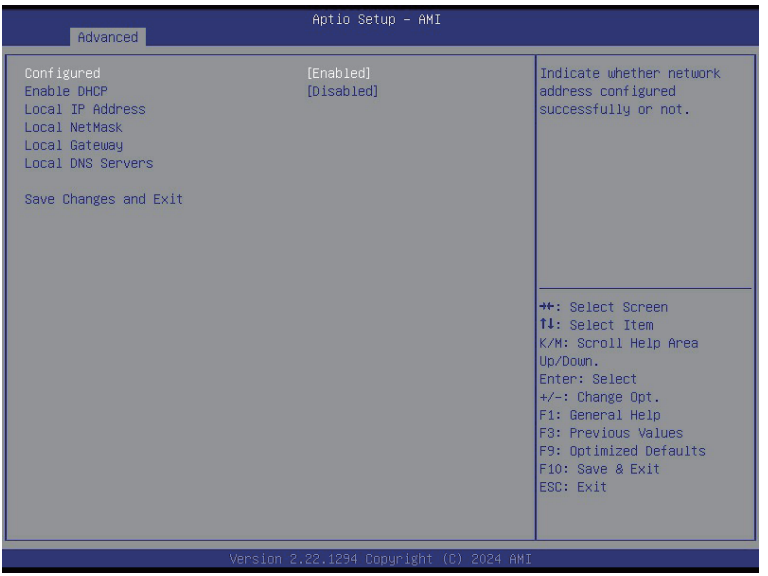
## 5-2-15 MAC IPv6 Network Configuration




| Parameter | Description |
|---|---|
| Enter Configuration Menu | Press [Enter] to configure advanced items.<br>◆ Displays the MAC Address information.<br>◆ Interface ID<br>– The 64 bit alternative interface ID for the device. The string is colon separated. e.g. ff:dd:88:66:cc:1:2:3.<br>◆ DAD Transmit Count<br>– 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.<br>◆ Policy<br>– Options available: automatic, manual. Default setting is **automatic**.<br>◆ Save Changes and Exit<br>– Press [Enter] to save all configurations. |

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

## 5-2-16 MAC IPv4 Network Configuration



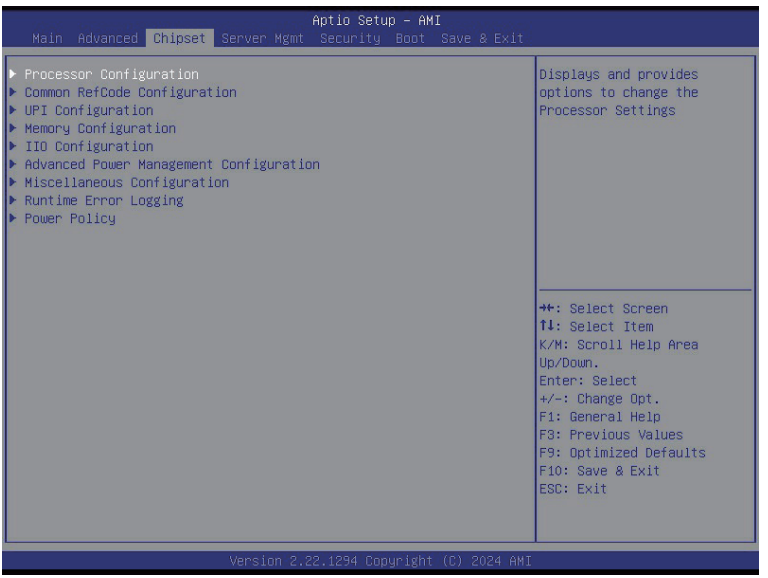

| Parameter | Description |
|---|---|
| Configured | Indicates whether network address is configured successfully or not.<br>Options available: Enabled, Disabled. Default setting is **Disabled.** |
| Enable DHCP | Options available: Enabled, Disabled. Default setting is **Disabled.** |
| Local IP Address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

## 5-2-17 Driver Health

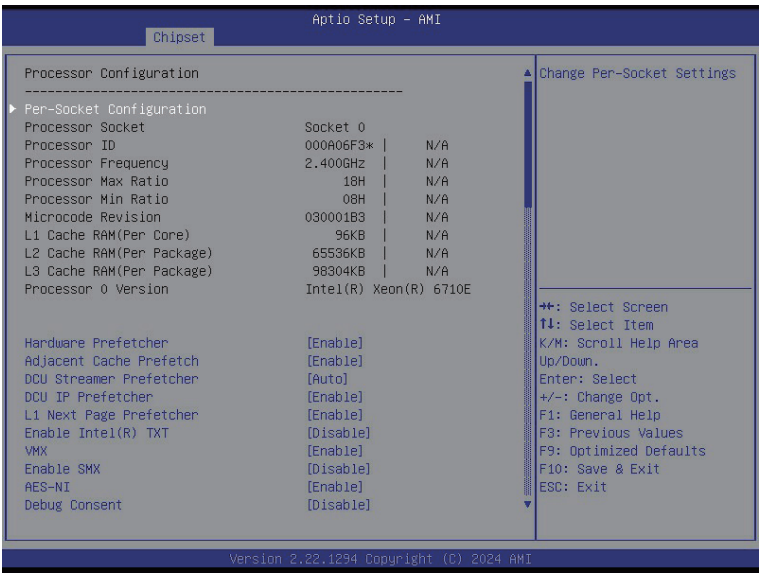
| Parameter | Description |
|---|---|
| Driver Health | Displays driver health status of the devices/controllers if installed |

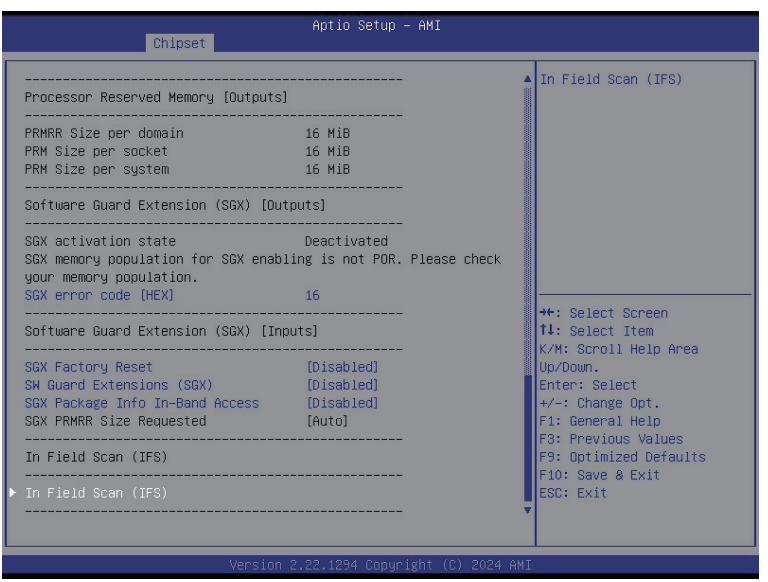
# 5-3 Chipset Menu

The Chipset Setup menu displays submenu options for configuring the chipset functions. Select a submenu item, then press <Enter> to access the related submenu screen.



## 5-3-1 Processor Configuration



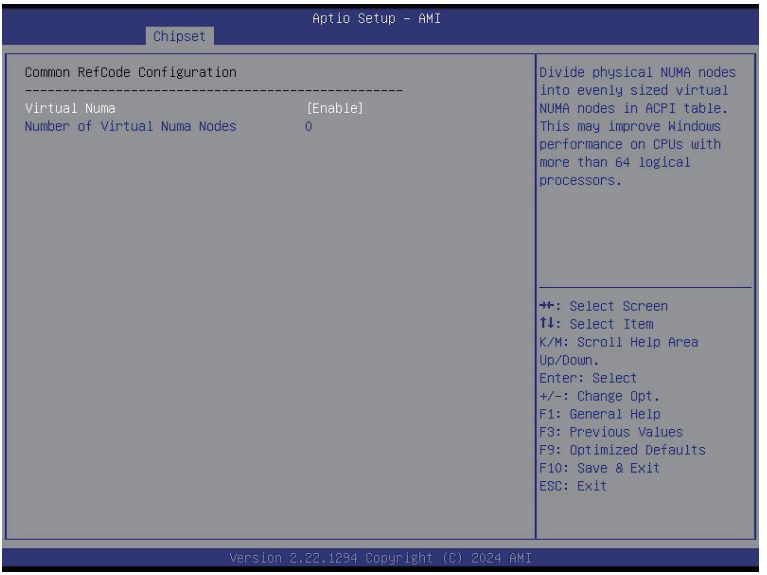



| Parameter | Description |
|---|---|
| Processor Configuration | |
| Pre-Socket Configuration | Press [Enter] to configure advanced items.<br>◆ CPU Socket 0/1 Configuration<br>– Core Disable Bitmap(Hex)<br>• Number of Cores to enable. 0 means all cores. FFFFFFF means to disable all cores. The maximum value depends on the number of CPUs available. Press the numeric keys to adjust desired values. |
| Processor Socket / Processor ID / Processor Frequency / Processor Max Ratio / Processor Min Ratio / Microcode Revision / L1 Cache RAM(Per Core) / L2 Cache RAM(Package) / L3 Cache RAM(Per Package) / Processor # Version | Displays the technical specifications for the installed processor(s). |
| Hardware Prefetcher | Select whether to enable the speculative prefetch unit of the processor.<br>Options available: Enable, Disable. Default setting is **Enable**. |
| Adjacent Cache Prefetch | When enabled, cache lines are fetched in pairs. When disabled, only the required cache line is fetched.<br>Options available: Enable, Disable. Default setting is **Enable**. |
| DCU Streamer Prefetcher | Enable/Disable DCU streamer prefetcher.<br>Options available: Enable, Disable. Default setting is **Enable**. |
| DCU IP Prefetcher | Enable/Disable DCU IP Prefetcher.<br>Options available: Enable, Disable. Default setting is **Enable**. |
| L1 Next Page Prefetcher | Next Page Prefetcher is an L1 data cache page prefetche .<br>Options available: Enable, Disable. Default setting is **Enable**. |
| Enable Intel(R) TXT | Enable/Disable the Intel Trusted Execution Technology support function.<br>Options available: Enable, Disable. Default setting is **Disable.** |
| VMX | Enable/Disable the Vanderpool Technology. This will take effect after rebooting the system.<br>Options available: Enable, Disable. Default setting is **Enable**. |
| Enable SMX | Enable/Disable the Safer Mode Extensions (SMX) support function.<br>Options available: Enable, Disable. Default setting is **Disable**. |
| AES-NI | Enable/Disable the AES-NI support.<br>Options available: Enable, Disable. Default setting is **Enable**. |
| Debug Consent | Options available: Enable, Disable. Default setting is **Disable**. |

| Parameter | Description |
|---|---|
| Memory Encryption (TME) [Output] (Note) | Enable/Disable memory encryption (TME).<br>Options available: Enabled, Disabled. Default setting is **Disabled**. |
| Total Memory Encryption Multi-Tenant (TME-MT) | Options available: Enabled, Disabled. Default setting is **Disabled**. |
| Memory integrity | Options available: Enabled, Disabled. Default setting is **Disabled**. |
| Trust Domain Extension (TDX) | Options available: Enabled, Disabled. Default setting is **Disabled**. |
| SGX error code [HEX] | Shows hexadecimal SGX internal error code. |
| SGXx Factory Reset | Perform SGX Factory Reset, on subsequent boot: delete all registration data, if SGX enabled will force Initial Platform Establishment flow.<br>Options available: Enabled, Disabled. Default setting is **Disabled**. |
| SW Guard Extension (SGX) | Options available: Enabled, Disabled. Default setting is **Disabled**. |
| SGX Package Inf In-Band Access | Options available: Enabled, Disabled. Default setting is **Disabled**. |
| SGX PRMRR Sizze Requested | Options available: Enabled, Disabled. Default setting is **Auto**. |
| In-Field Scan (IFS) | Press [Enter] to configure advanced items.<br>◆ Enable SAF<br>– Options available: Disabled, Enabled.<br>– Default setting is **Disabled**.<br>◆ SAF PRMRR Size Requested<br>– Default setting is **8M**. |

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

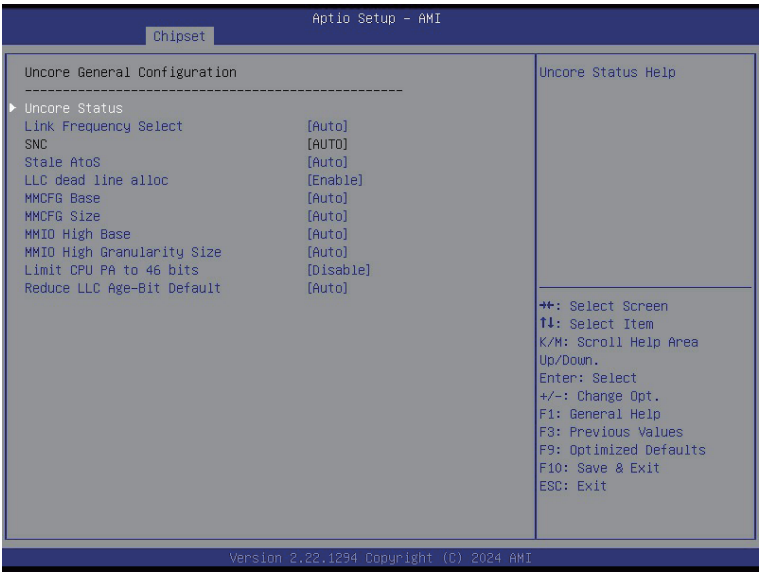
## 5-3-2 Common RefCode Configuration




| Parameter | Description |
|---|---|
| Common RefCode Configuration | |
| Virtual Numa(note) | 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.<br>Options available: Enable, Disable. Default setting is **Disable**. |
| Number of Virtual Numa Nodes | The numbber of virtual NUMA nodes per physical NUMA nodes. 0 means automatically set the number of virtual NUMA nodes baes on system configuration. 1 equals disabling virtual NUMA. |

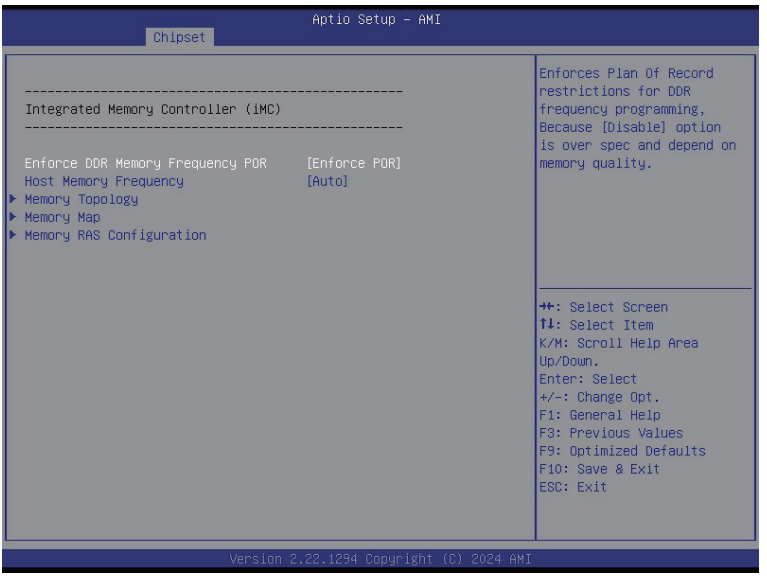
(Note) Advanced items prompt when this item is defined.

## 5-3-3 UPI Configuration



| Parameter | Description |
|---|---|
| UPI General Configuration | Press [Enter] to configure advanced items.<br>◆ Uncore Status<br>– Press [Enter] to view the Uncore status.<br>◆ Link Frequency Select<br>– Selects the UPI link frequency.<br>– Options available: 12.8GT/s, 14.4GT/s, 16.0GT/s, Auto, Use Per Link Setting. Default setting is **Auto**.<br>◆ SNC<br>– Enable/Disable Sub NUMA Cluster function.<br>– Options available: Auto, Disable, Enable SNC2 (2-clusters), Enable SNC4 (4-clusters). Default setting is **Auto**.<br>◆ Stale AtoS<br>– Enable/Disable Stale A to S directory optimization.<br>– Options available: Disable, Enable, Auto. Default setting is **Auto**.<br>◆ LLC dead line alloc<br>– Enable/Disable fill dead lines in LLC.<br>– Options available: Disable, Enable, Auto. Default setting is **Enable**.<br>◆ MMCFG Base<br>– Options available: 1G, 1.5G, 1.75G, 2G, 2.25G, 3G, Auto.<br>– Default setting is **Auto**.<br>◆ MMCFG Size<br>– Options available: 64M, 128M, 256M, 512M, 1G, 2G, Auto .<br>– Default setting is **Auto**.<br>◆ MMIO High Base<br>– Options available: 56T, 40T, 32T, 24T, 16T, 4T, 2T, 1T, 512G, 3584T. Default setting is **Auto**.<br>◆ MMIO High Granularity Size<br>– Selects the allocation size used to assign mmioh resources.<br>– Options available: 1G, 4G, 16G, 64G, 256G, 1024G. Default setting is **64G**.<br>◆ Limit CPU PA to 46 bits<br>– Options available: Disable, Enable, Auto. Default setting is **Disable**.<br>◆ Reduce LLC Age-Bit Default<br>– Options available: Disable, Enable, Auto.<br>– Enable, Auto. Default setting is **Auto**. |

## 5-3-4 Memory Configuration




| Parameter | Description |
|---|---|
| Integrated Memory Controller (iMC) | |
| Enforce DDR Memory Frequency POR | When set to Enable, the system enforces Plan Of Record restrictions for DDR frequency programming.<br>Options available: POR, Disable. Default setting is **POR**. |
| Host Memory Frequency | Maximum Host DDR Memory Frequency Selecttions in MT/s.<br>If the AUTO option has been selected, a frequency is chosen automatically based on the minimum tCK given by the SPD.<br>Options available: Auto, 4800, 5200, 5600, 6000, 6400. Default setting is **Auto**. |

| Parameter | Description |
|---|---|
| Memory Topology | Press [Enter] to view memory topology with DIMM population information. |
| Memory Map | Press [Enter] to configure advanced items.<br>◆ Intel(R) Flat Memory Mode Support.<br>– Options available: Enabled, Disabled. Default setting is **Disabled**.<br>◆ DDR CXL Heterogeneous Interleave support.<br>– Options available: Enabled, Disabled. Default setting is **Disabled**. |
| Memory RAS Configuration | Press [Enter] to configure advanced items.<br>◆ Mirror Mode(Note)<br>– 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.<br>– Options available: Disabled, Full Mirror Mode, Partial Mirror Mode. Default setting is **Disabled**.<br>◆ Correctable Error Threshold<br>– Correctable Error Threshold (0x01-0x7fff) used for sparing, and leaky bucket.<br>– Press the <+> / <-> keys to increase or decrease the desired values.<br>◆ Leaky bucket time window based interface<br>– Enable/Disable leaky bucket time window based interface.<br>– Options available: Disabled, Enabled. Default setting is **Disabled**.<br>◆ Leaky bucket low bit<br>– Configures leaky bucket low bit (0x1 - 0x29).<br>– Press the <+> / <-> keys to increase or decrease the desired values.<br>◆ Leaky bucket high bit<br>– Configures leaky bucket high bit (0x1 - 0x29).<br>– Press the <+> / <-> keys to increase or decrease the desired values. |

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

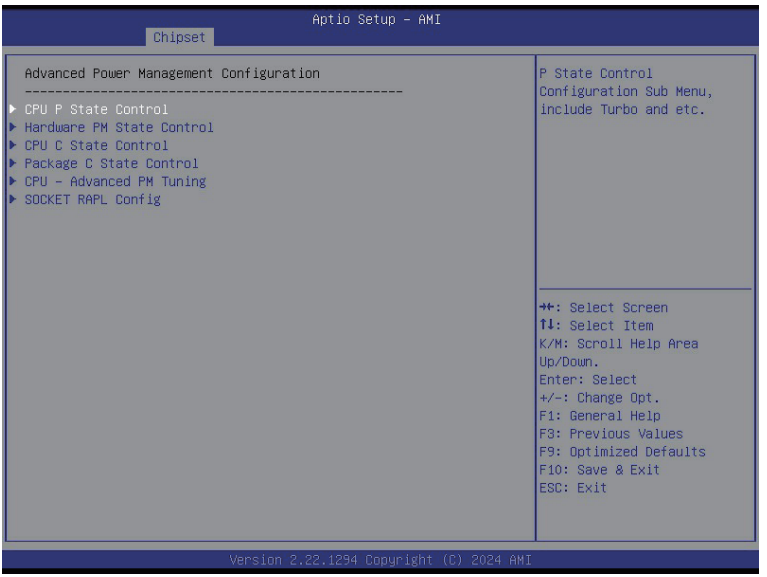
| Parameter | Description |
|---|---|
| Memory RAS Configuration (continued) | ◆ ADDDC Sparing(Note)<br>– Enable/Disable ADDDC Sparing.<br>– Options available: Disabled, Enabled. Default setting is **Disabled**.<br>◆ Enable ADDDC Error Injection<br>– Options available: Disabled, Enabled. Default setting is **Enabled**.<br>◆ Patrol Scrub<br>– Options available: Disabled, Enable at End of POST. Default setting is **Enable at End of POST**.<br>◆ Patrol Scrub Interval<br>– Selects the number of hours (1-24) required to complete full scrub. A value of zero means auto.<br>◆ DDR5 ECS<br>– 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 VMD Configuration | Enable/Disable Intel VMD technology.<br>Options available: Enable, Disable. Default setting is **Disable**. |
| Intel VT for Directed I/O (VT-d) | Press [Enter] to configure advanced items.<br>◆ DMA Control Opt-In Flag<br>– Enable/Disable DMA_CTRL_PLATFORM_OPT_IN_FLAG in DMAR table in ACPI. Not compatible with Direct Device Assignment (DDA).<br>◆ Pre-boot DMA Protection<br>– Options available: Enable, Disable. Default setting is **Disable**.<br>◆ PCIe ACSCTL<br>– Options available: Enable, Disable. Default setting is **Disable**.<br>◆ Cache Allocation<br>– Options available: Enable, Disable. Default setting is **Enable**. |
| Global Configuration | Press [Enter] to configure advanced items.<br>◆ Max Read Request Size<br>– Options available: Auto, 128B, 256B, 512B, 1024B, 2048B, 4096B. Default setting is **Auto**.<br>◆ Relaxed Ordering<br>– Options available: Enable, Disable. Default setting is **Enable**. |

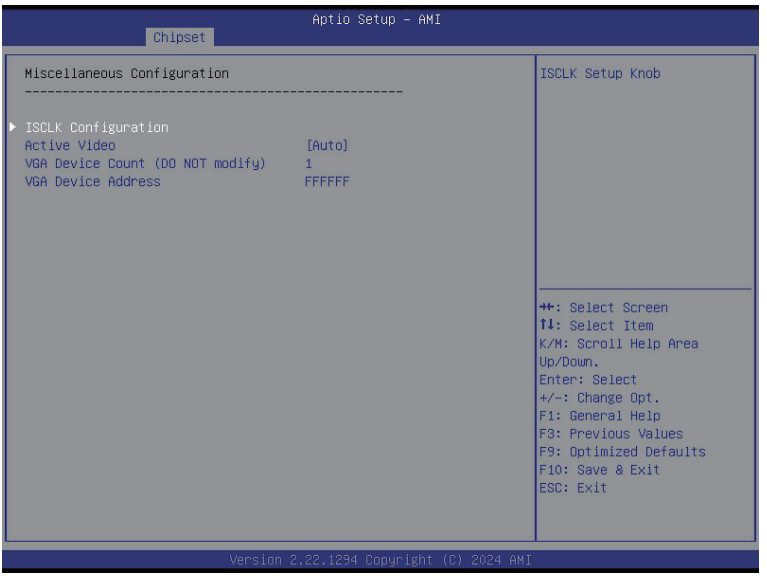
## 5-3-6 Advanced Power Management Configuration




| Parameter | Description |
|---|---|
| CPU P State Control | Press [Enter] to configure advanced items.<br>◆ Intel SST-PP<br>– Intel SST-PP Select allows user to choose level.<br>– Options available: Auto, Level 0, Level 1. Default setting is **Auto**.<br>◆ SpeedStep (Pstates)<br>– Conventional Intel SpeedStep Technology switches both voltage and frequency in tandem between high and low levels in response to processor load.<br>– Options available: Enable, Disable. Default setting is **Enable**.<br>◆ Turbo Mode<br>– 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.<br>– Options available: Enable, Disable. Default setting is **Enable**. |

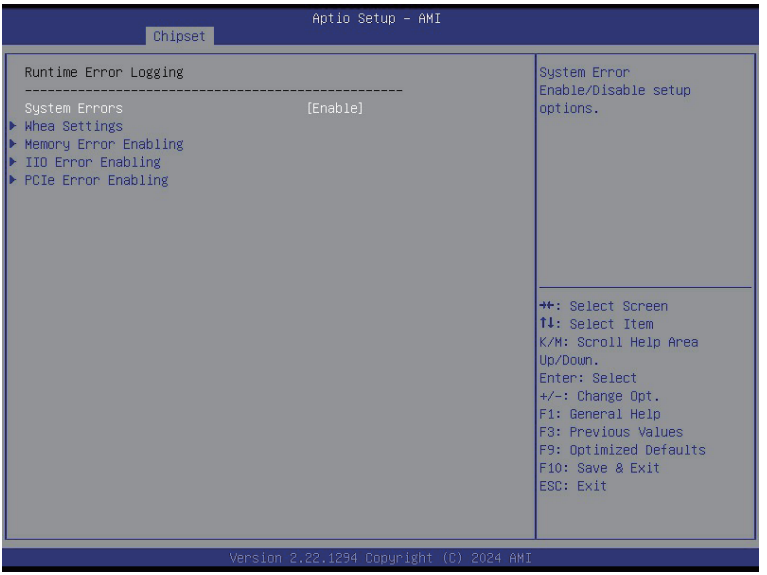
| Parameter | Description |
|---|---|
| Hardware PM State Control | Press [Enter] to configure advanced items.<br>◆ Hardware P-States<br>– When this item is disabled, the processor hardware chooses a P-state based on OS Request (Legacy P-States).<br>– In Native mode, the processor hardware chooses a P-state based on OS guidance.<br>– In Out of Band mode, the processor hardware autonomously chooses a P-state (with no OS guidance).<br>– Options available: Disable, Native Mode, Out of Band Mode, Native Mode with No Legacy Support. Default setting is **Native Mode**. |
| CPU C State Control | Press [Enter] to configure advanced items.<br>◆ Monitor MWAIT<br>– Options available: Disable, Enable. Default setting is **Enable**.<br>◆ ACPI C1 Enumeration<br>– Options available: C1, C1e . Default setting is **C1e**.<br>◆ ACPI C6x Enumeration<br>– Options available: Dsiable, C6S as ACPI C2, C6S as ACPI C3, C6S-P as ACPI C2, C6S-P as ACPI C3, Auto .<br>– Default setting is **Auto**. |
| Package C State Control | Press [Enter] to configure advanced items.<br>◆ Package C State<br>– Configures the state for the C-State package limit.<br>– 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.<br>◆ Energy Perf BIAS<br>– Press [Enter] to configure advanced items.<br>» Power Performance Tuning<br>• Options available: OS Controls EPB, BIOS Controls EPB, PECI Controls EPB. Default setting is **OS Controls EPB**.<br>» Energy_PERF_BIAS_CFG mode(Note)<br>• Options available: Performance, Balanced Performance, Balanced Power, Power. Default setting is **Balanced Performance**. |
| SOCKET RAPL Config | Press [Enter] to configure advanced items.<br>◆ PL1 Power Limit<br>– Press the <+> / <-> keys to increase or decrease the desired values.<br>◆ PL1 Time Window<br>• Default setting is **1**.<br>◆ PL2 Power Limit<br>– Press the <+> / <-> keys to increase or decrease the desired values.<br>◆ PL2 Time Window<br>• Default setting is **1**. |

## 5-3-7 Miscellaneous Configuration




| Parameter | Description |
|---|---|
| Miscellaneous Configuration | |
| ISCLK Configuration | Press [Enter] to configure advanced items.<br>– SSC1 Enable<br>– Options available: Enable, Disable. Default setting is **Enable**.<br>– SSC2 Enable<br>– Options available: Enable, Disable. Default setting is **Enable**. |
| Active Video | Selects the active video type.<br>Options available: Auto, Onboard Device, PCIE Device, Specific PCIE Device. Default setting is **Auto**. |
| VGA Device Count (NOT modify) | |
| VGA Device Address | VGA Device Address |

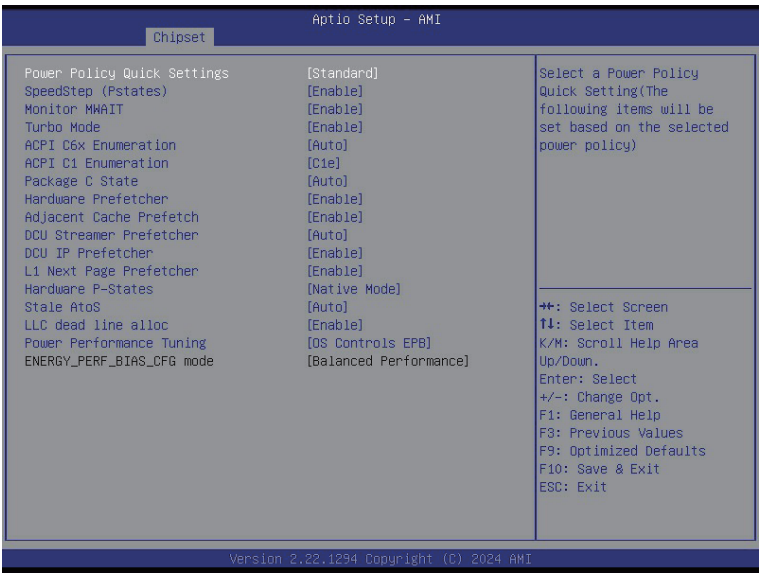
## 5-3-8 Runtime Error Logging Settings




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

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

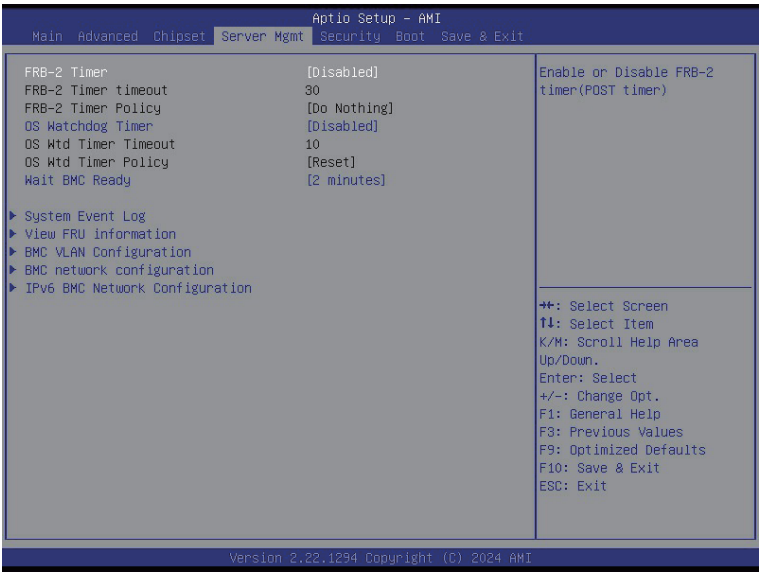
## 5-3-9 Power Policy




| Parameter | Description |
|---|---|
| Power Policy Quick Settings | Selects a Power Policy Quick Setting.<br>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.<br>Options available: Enable, Disable. Default setting is **Enable**. |
| Monitor MWAIT | Allows Monitor and MWAIT instructions.<br>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.<br>Options available: Enable, Disable. Default setting is **Enable**. |
| ACPI C6x Enumeration | Options available: Disable,C6S as ACPI C2, C6S as ACPI C3, C6S-P as ACPI C2, C6S-P as ACPI C3, Auto.<br>Default setting is **Auto**. |
| ACPI C1 Enumeration | Options available: C1, C1e.<br>Default setting is **C1e**. |
| Package C State | Configures the C-State package limit.<br>Options available: C0/C1 state, C2 state, C6(non Retention) state, C6(Retention) state, No Limit, Auto. Default setting is **Auto**. |

| Parameter | Description |
|---|---|
| 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**. |
| L1 Next page Prefetcher | Options available: Enable, Disable. Default setting is **Enable**. |
| Hardware P-States | Options available: Disable, Native mode, Out of Band mode, Native Mode with No Legacy Support. Default setting is **Native Mode**. |
| Stale AtoS | Options available: Auto, Enable, Disable. Default setting is **Auto**. |
| LLC dead line alloc | Options available: Auto, Enable, Disable. Default setting is **Enable**. |
| Power Performance Tuning | Options available: OS Controls EPB, BIOS Controls EPB, PECI Controls EPB. Default setting is **BIOS Controls EPB**. |
| ENERGY_PERF_BIAS_CFG mode | Performance, Balanced Performance, Balanced Power, Power. Default setting is **Balanced Performance**. |

## 5-4 Server Management Menu

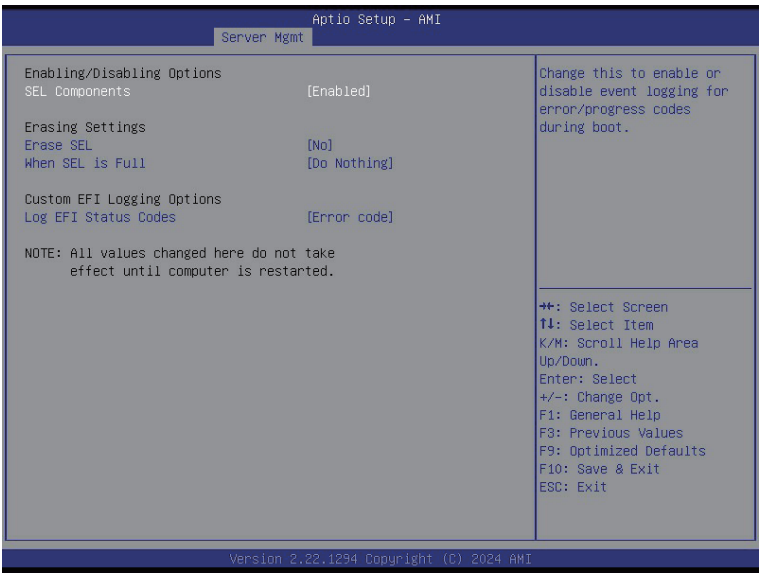



| Parameter | Description |
|---|---|
| FRB-2 Timer | Enable/Disable FRB-2 timer (POST timer).<br>Options available: Enabled, Disabled. Default setting is **Enabled**. |
| FRB-2 Timer[Note1] timeout | Configures the FRB2 Timer timeout. The value is between 1 to 30 minutes.<br>Default setting is **6 minutes**.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

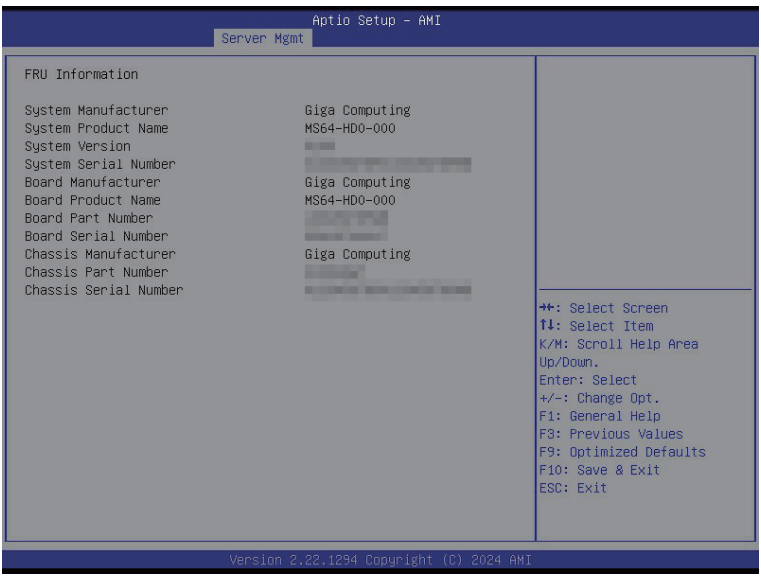
## 5-4-1 System Event Log




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

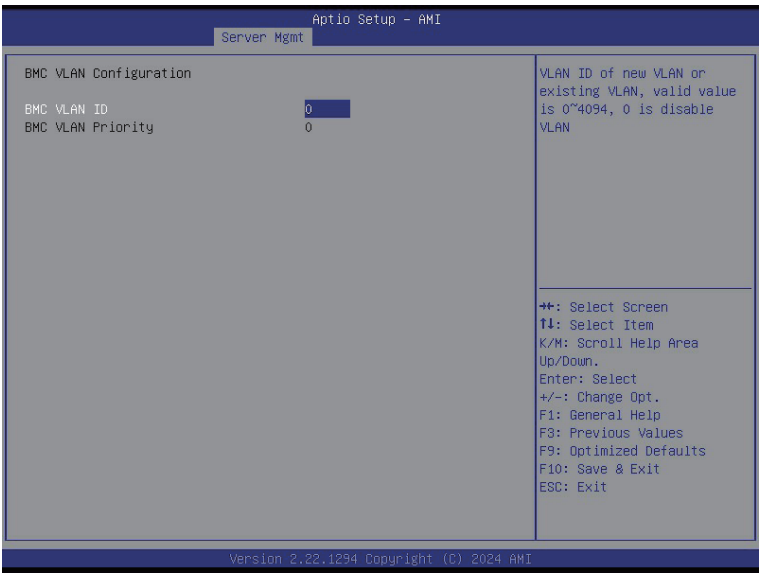
## 5-4-2 View FRU Information

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.




(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

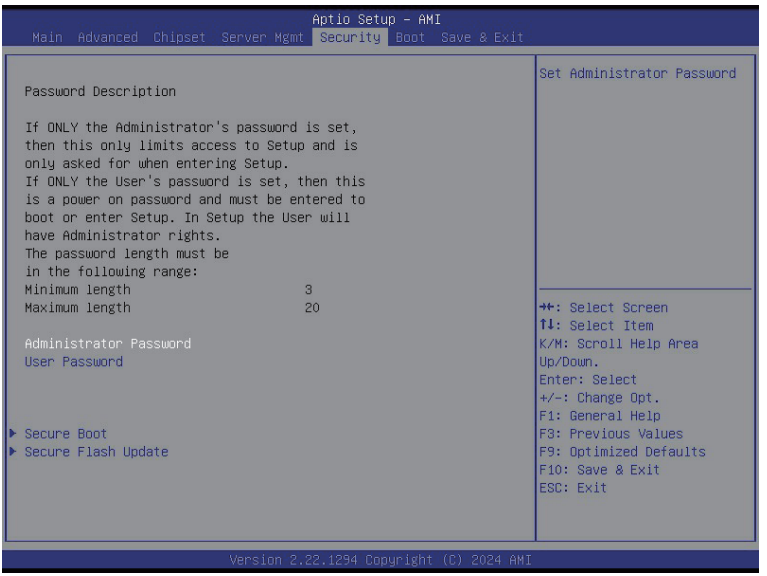
| Parameter | Description |
|---|---|
| BMC network configuration | |
| Select NCSI and Dedicated LAN | Options available: Do Nothing, Model1(Dedicated), Model2(NCSI), Mode3(Failover). Default setting is **Do Nothing**. |
| Lan Channel 1 | |
| Configuration Address source | Selects to configure LAN channel parameters statically or dynamically (DHCP).<br>Options available: Unspecified, Static, DynamicBmcDhcp. Default setting is **DynamicBmcDhcp**. |
| Station IP address | Displays IP Address information. |
| Subnet mask | Displays Subnet Mask information.<br>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.<br>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).<br>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.




There are two types of passwords that you can set:

- Administrator Password

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

- User Password

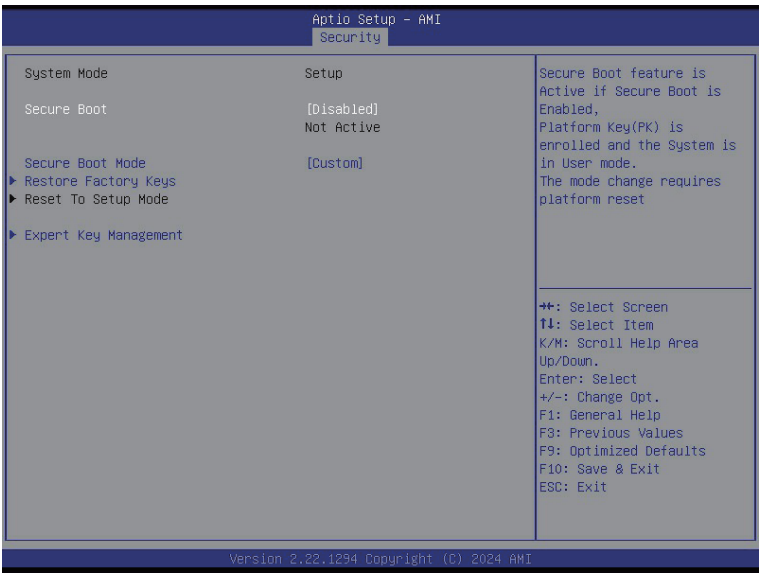
  Entering this password will restrict a user's access to the Setup menus. To enable or disable this field, a Administrator Password must first be set. A user can only access and modify the System Time, System Date, and Set User Password fields.

| Parameter | Description |
|---|---|
| Administrator Password | Press [Enter] to configure the administrator password. |
| User Password | Press [Enter] to configure the user password. |
| Secure Boot | Press [Enter] to configure advanced items. |
| Secure Flash Update | Press [Enter] to 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.<br>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.<br>When set to Standard, it will automatically load the Secure Boot keys form the BIOS databases.<br>When set to Custom, you can customize the Secure Boot settings and manually load its keys from the BIOS database.<br>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. |

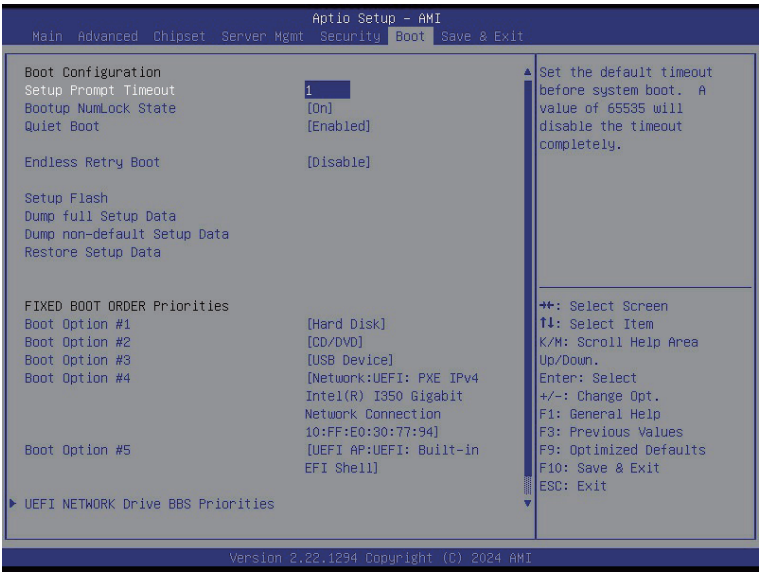
(Note) Advanced items prompt when this item is set to **Custom**.

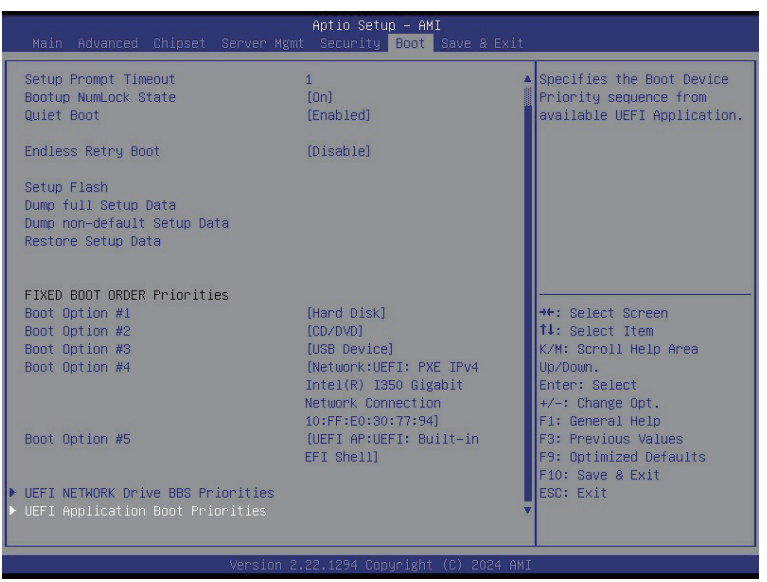
| Parameter | Description |
|---|---|
| Key Management | Press [Enter] to configure advanced items.<br>**Please note that this item is configurable when Secure Boot Mode is set to Custom.**<br>◆ Factory Key Provision<br>– Allows to provision factory default Secure Boot keys when system is in Setup Mode.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

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

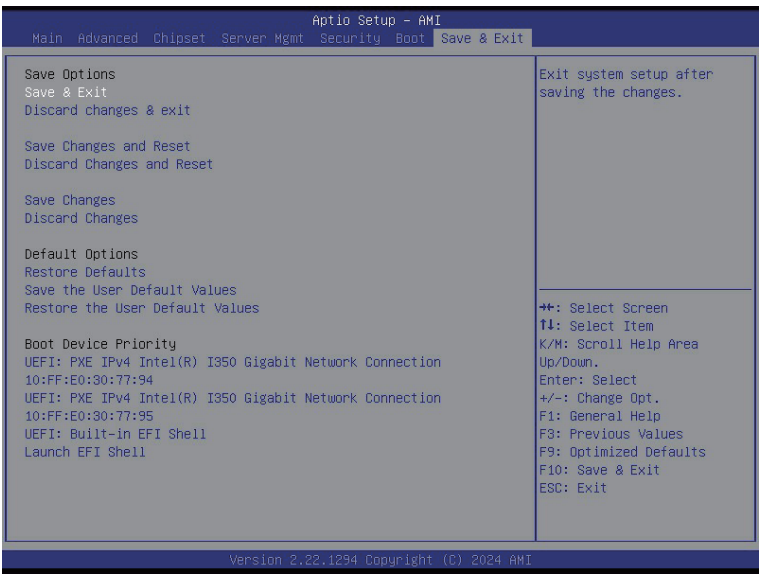


| Parameter | Description |
|---|---|
| Boot Configuration | |
| Setup Prompt Timeout | Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting.<br>Press the numeric keys to input the desired values. |
| Bootup NumLock State | Enable/Disable the Bootup NumLock function.<br>Options available: On, Off. Default setting is **On**. |
| Quiet Boot | Enable/Disable showing the logo during POST.<br>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. |
| FIXED BOOT ORDER Priorities | |
| Boot Option #1 / #2 / #3 / #4 / #5 | Press [Enter] to configure the boot order priority.<br>By default, the server searches for boot devices in the following sequence:<br>1. Hard drive.<br>2. CD-COM/DVD drive.<br>3. USB device.<br>4. Network.<br>5. UEFI. |
| UEFI Network Drive BBS Priorities | Press [Enter] to configure the boot priority. |
| UEFI Application Boot Priorities | Press [Enter] to configure the boot priority. |

## 5-7 Save & Exit Menu

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




| Parameter | Description |
|---|---|
| Save Options | |
| Save and Exit | Saves changes made and closes the BIOS setup.<br>Options available: Yes, No. |
| Discard changes and exit | Discards changes made and exits the BIOS setup.<br>Options available: Yes, No. |
| Save Changes and Reset | Restarts the system after saving the changes made.<br>Options available: Yes, No. |
| Discard Changes and Reset | Restarts the system without saving any changes.<br>Options available: Yes, No. |
| Save Changes | Saves changes done so far to any of the setup options.<br>Options available: Yes, No. |
| Discard Changes | Discards changes made and closes the BIOS setup.<br>Options available: Yes, No. |
| Default Options | |

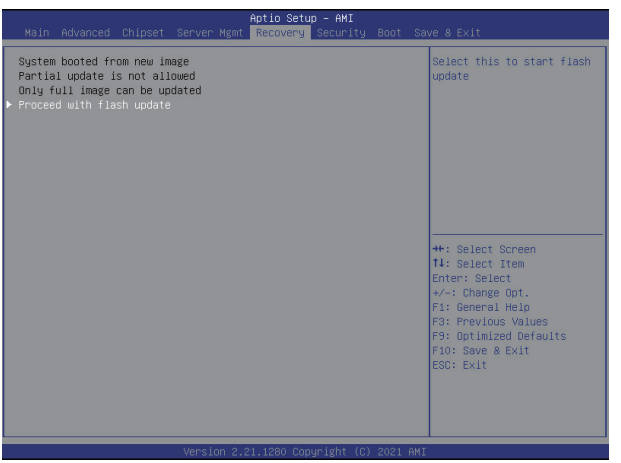
| Parameter | Description |
|---|---|
| Restore Defaults | Loads the default settings for all BIOS setup parameters. Setup Defaults are quite demanding in terms of resources consumption. If you are using low-speed memory chips or other kinds of low-performance components and you choose to load these settings, the system might not function properly.<br>Options available: Yes, No. |
| Save the User Default Values | Saves the changes made as the user default settings.<br>Options available: Yes, No. |
| Restore the User Default Values | Loads the user default settings for all BIOS setup parameters.<br>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. |

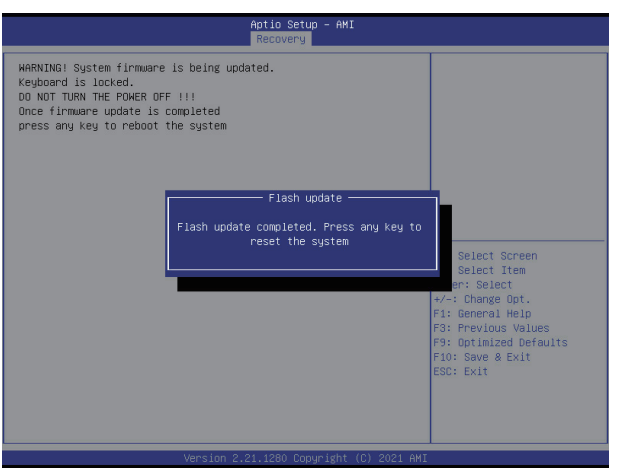
# 5-8 BIOS Recovery

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 |