



# **RS520A-E12 Series**

## **RS520A-E12-RS24U**

### **2U Rackmount Server User Guide**



E21653  
Revised Edition V2  
January 2023

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# Safety information

## Electrical Safety

- Before installing or removing signal cables, ensure that the power cables for the system unit and all attached devices are unplugged.
- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing any additional devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your dealer.

## Operation Safety

- Any mechanical operation on this server must be conducted by certified or experienced engineers.
- Before operating the server, carefully read all the manuals included with the server package.
- Before using the server, ensure all cables are correctly connected and the power cables are not damaged. If any damage is detected, contact your dealer as soon as possible.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Place the server on a stable surface.
- If you encounter technical problems with the product, contact a qualified service technician or your retailer.



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This product is equipped with a three-wire power cable and plug for the user's safety. Use the power cable with a properly grounded electrical outlet to avoid electrical shock.

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### **Lithium-Ion Battery Warning**

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

### **Heavy System**

CAUTION! This server system is heavy. Ask for assistance when moving or carrying the system.

## **Optical Drive Safety Information**

### **Laser Safety Information**



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To prevent exposure to the optical drive's laser, do not attempt to disassemble or repair the optical drive by yourself. For your safety, contact a professional technician for assistance.

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# About this guide

## Audience

This user guide is intended for system integrators, and experienced users with at least basic knowledge of configuring a server.

## Contents

This guide contains the following parts:

**1. Chapter 1: Product Introduction**

This chapter describes the general features of the server, including sections on front panel and rear panel specifications.

**2. Chapter 2: Hardware Information**

This chapter lists the hardware setup procedures that you have to perform when installing or removing system components.

**3. Chapter 3: Motherboard Information**

This chapter gives information about the motherboard that comes with the server. This chapter includes the motherboard layout, jumper settings, and connector locations.

**4. Chapter 4: BIOS Setup**

This chapter tells how to change system settings through the BIOS Setup menus and describes the BIOS parameters.

**5. Chapter 5: Driver Installation**

This chapter provides instructions for installing the necessary drivers for different system components.

## Conventions

To ensure that you perform certain tasks properly, take note of the following symbols used throughout this manual.



**DANGER/WARNING:** Information to prevent injury to yourself when trying to complete a task.



**CAUTION:** Information to prevent damage to the components when trying to complete a task.



**IMPORTANT:** Instructions that you **MUST** follow to complete a task.



**NOTE:** Tips and additional information to help you complete a task.

## Typography

### Bold text

Indicates a menu or an item to select.

### Italics

Used to emphasize a word or a phrase.

### <Key>

Keys enclosed in the less-than and greater-than sign means that you must press the enclosed key.

Example: <Enter> means that you must press the Enter or Return key.

### <Key1>+<Key2>+<Key3>

If you must press two or more keys simultaneously, the key names are linked with a plus sign (+).

Example: <Ctrl>+<Alt>+<Del>

### Command

Means that you must type the command exactly as shown, then supply the required item or value enclosed in brackets.

Example: At the DOS prompt, type the command line:  
**format A: /S**

## References

Refer to the following sources for additional information, and for product and software updates.

### 1. **ASUS Control Center (ACC) user guide**

This manual tells how to set up and use the proprietary ASUS server management utility. Visit [asuscontrolcenter.asus.com](http://asuscontrolcenter.asus.com) for more information.

### 2. **ASUS websites**

The ASUS websites provide updated information for all ASUS hardware and software products. Visit <https://www.asus.com> for more information.

# Product Introduction

# 1

This chapter describes the general features of the server. It includes sections on front panel and rear panel specifications.

## 1.1 System package contents

Check your system package for the following items.

|                |  |
|----------------|--|
| Model Name     | RS520A-E12-RS24U   |
| Chassis        | ASUS R2P-E 2U Rackmount Chassis  |
| Motherboard    | ASUS K14PA-U24 Server Board  |
| Component      | 24 x 2.5-inch Storage Device Trays or Dummy Trays  |
|                | 2 x 2.5-inch Storage Device Trays  |
|                | 4 x System Fans  |
| Accessories    | 1x AMD EPYC™ Support DVD   |
|                | 1 x CPU Heatsink   |
|                | 2 x AC Power Cable   |
| Optional Items | 1+1 Redundant 1200W/1600W 80PLUS Platinum Power Supply or<br>1+1 Redundant 1600W 80PLUS Titanium Power |
|                | 2 x Riser card (16 NVMe configuration & 12 NVMe configuration)   |
|                | 1 x System redundant fan kit   |
|                | 1 x Friction Rail Kit or Ball-bearing rail kit<br>ASUS PIKE II 3008 card                               |

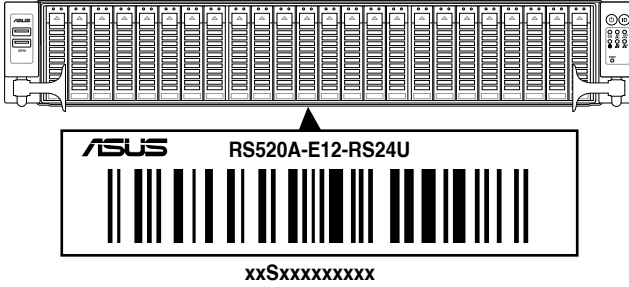


If any of the above items is damaged or missing, contact your retailer.

## 1.2 Serial number label

The product's serial number contains 12 characters such as xxSxxxxxxxx and printed on the sticker at the server's front cover.

The correct serial number of the product is required if you need to request for support from the ASUS Technical Support team.



### 1.3 System specifications

The ASUS RS520A-E12 Series features the ASUS K14PA-U24 server board. The server supports AMD EPYC™ 9004 Series processors plus other latest technologies through the chipsets onboard.

|                           |                                  |  |
|---------------------------|----------------------------------|--|
| <b>Model Name</b>         |                                  | <b>RS520A-E12-RS24U</b>  |
| <b>Motherboard</b>        |                                  | K14PA-U24  |
| <b>Processor Support</b>  |                                  | 1 x Socket SP5 (LGA 6096)<br>AMD EPYC™ 9004 series (up to 400W)  |
| <b>Core Logic</b>         |                                  | System on Chip (SoC)   |
| <b>Memory</b>             | <b>Total Slots</b>               | 24 (12-channel per CPU, 24 DIMM per CPU)<br>* May support to 2DPC, depends on AMD schedule   |
|                           | <b>Capacity</b>                  | Maximum up to 6TB  |
|                           | <b>Memory Type</b>               | DDR5 4800/4400 RDIMM / 3DS RDIMM<br>* Please refer to <a href="http://www.asus.com">www.asus.com</a> for latest memory AVL update  |
|                           | <b>Memory Size</b>               | 256GB, 128GB, 64GB, 32GB RDIMM<br>256GB, 128GB, 64GB, 32GB 3DS RDIMM<br>* Refer to <a href="http://www.asus.com/support">www.asus.com/support</a> for more information       |
| <b>Expansion Slots</b>    | <b>Total PCI/PCIe/PIKE Slots</b> | 5+1  |
|                           | <b>Slot Type</b>                 | <b>Up to 5 PCIe Gen5 slots + 1 OCP3.0</b><br>2 x PCIe Gen5 x16, FHFL or 4 x PCIe Gen5 x8<br>1 x PCIe Gen5 x16, LP<br>1 x OCP Mezz. 3.0 Slot (PCIe Gen5 x16)                  |
|                           |                                  | <u>24x NVMe</u><br>1 x PCIe Gen5 x8, LP + 1 x OCP3.0 (PCIe Gen5 x16)<br>(can't support GPU)  |
|                           |                                  | <u>16x NVMe or 12x NVMe</u><br>up to 5 PCIe Gen5 slots + 1 OCP3.0<br>2 x PCIe Gen5 x16, FHFL or 4 x PCIe Gen5 x8, FHFL<br>1 x PCIe Gen5 x8, LP<br>1 x OCP3.0 (PCIe Gen5 x16) |
|                           | <b>M.2</b>                       | 2 x M.2 (SATA signal or PCIe Gen5 x4 link) (Up to 22110)   |
|                           | <b>Micro SD Card slot</b>        | 1  |
|                           | <b>Proprietary Slot 1</b>        | 1 x PCIe x16 slot (Gen5 x8 link, for pike card only)   |
| <b>Proprietary Slot 2</b> | -                                |  |
| <b>Storage</b>            | <b>SATA Controller</b>           | CPU integrated<br>2 x M.2 connectors (support SATA3 6Gb/s or PCIe Gen5 x4 link)<br>1 x SATA controller (supports 2 x SATA3 6Gb/s)  |

(continued on the next page)

| Model Name      |                        | RS520A-E12-RS24U   |
|-----------------|------------------------|--|
| Storage         | SAS Controller         | <u>Optional kits:</u><br>ASUS PIKE II 3008 8-port SAS 12Gb/s HBA card<br>Broadcom MegaRAID 9560-16i  |
| Storage Bays    | Storage Bay            | <u>Front bays:</u><br>24 x 2.5" hot-swap drive bays<br>- 24 x NVMe or<br>- 16 x NVMe + 8x SAS/SATA (from HBA/RAID card) or<br>- 12 x NVMe + 12x SAS/SATA<br>- 8 x NVMe + 16x SAS/SATA<br><br><u>Rear bays:</u><br>2 x 2.5-inch Storage Device Trays (SATA III)<br>* SAS support only from optional SAS HBA/RAID card |
|                 | Backplane connectors   | 12 x MCIO x2 (for NVMe)<br>6 x SlimSAS x4 (for SATA)   |
|                 | MB on-board connectors | 2 x M.2 connectors<br>8 x MCIO connectors  |
|                 | Default Cable          | Optional, in CPQ under the option "others"   |
|                 | NVMe upgrade option    | Support 24 x NVMe: 12 x NVMe cable<br>Support 16 x NVMe: 8 x NVMe cable<br>Support 12 x NVMe: 6 x NVMe cable   |
| Networking      |                        | 1 x Dual Port Intel I350-AM2 Gigabit LAN controller<br>1 x Management Port<br><u>Optional OCP Adapter:</u><br>Up to 100Gb/s Ethernet / InfiniBand Adapter  |
| VGA             |                        | BMC Integrated (Aspeed AST2600 256MB)  |
| Graphic         |                        | 4 x Single-wide GPU (FHFL) or<br>2 x Double-wide GPU (FHFL)<br>(Not supported in 24 x NVMe model)  |
| Front I/O Ports |                        | 2 x USB 3.2 Gen 1 ports<br>1 x Power button  |
| Rear I/O Ports  |                        | 2 x USB 3.2 Gen 1 ports<br>1 x VGA port<br>1 x RJ-45 Mgmt LAN port<br>2 x RJ-45 1GbE LAN ports   |

(continued on the next page)

| Model Name  |                               | RS520A-E12-RS24U   |
|---|-------------------------------|--|
| Switch/LED  |                               | <p><u>Front Switch/LED:</u></p> <ul style="list-style-type: none"> <li>1 x Power Switch (w/LED)</li> <li>1 x Reset Switch</li> <li>1 x Location Switch (w/LED)</li> <li>1 x HDD Access LED</li> <li>1 x Message LED</li> <li>LAN 1-2 LED</li> </ul> <p><u>Rear Switch/LED:</u></p> <ul style="list-style-type: none"> <li>1 x Port80 LED (Q-Code)</li> <li>1 x Power Switch w/LED</li> <li>1 x Location Switch w/LED</li> <li>1 x Message LED</li> </ul> |
|   | Security Options              | TPM-SPI Module (optional)<br>PFR Module (optional)   |
| OS Support  |                               | Please find the latest OS support from <a href="https://www.asus.com/">https://www.asus.com/</a>   |
| Management Solution   | Software                      | ASUS Control Center (Classic)  |
|   | Out of Band Remote Management | On-Board ASMB11-iKVM for KVM-over-IP   |
| Regulatory Compliance   |                               | CE, RCM, FCC (Class A)   |
| Dimension   |                               | 840mm x 449mm x 88.1mm (2U)<br>33.07in x 17.68in x 3.47in  |
| Net Weight Kg (CPU, DRAM & HDD not included)                    |                               | 19.14Kg  |
| Gross Weight Kg (CPU, DRAM & HDD not included, Packing include) |                               | 26.63Kg  |
| Power Supply (different configuration by region)                |                               | 1+1 Redundant 1200W 80 PLUS Platinum Power Supply<br>Rating: 100-127/200-240Vac, 10A/8A (x2), 50/60Hz<br><br>1+1 Redundant 1600W 80 PLUS Platinum/Titanium Power Supply<br>Rating: 100-127/200-240Vac, 12A/9.5A (x2), 50/60Hz<br>(240Vdc Only for China)   |
| Environment   |                               | Operation temperature: 10°C ~ 35°C<br>Non operation temperature: -40°C ~ 60°C<br>Non operation humidity: 20% ~ 90% (Non condensing)  |

\*Specifications are subject to change without notice.

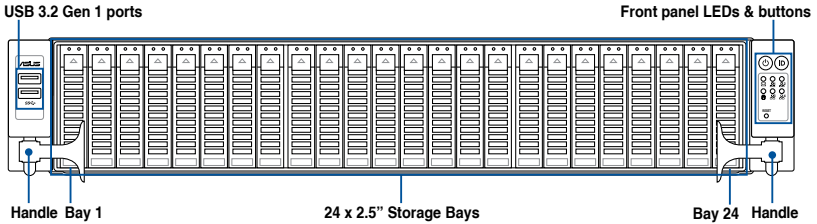


## 1.4 Front panel features

The barebone server displays a simple yet stylish front panel with easily accessible features. The power and reset buttons, LED indicators are located on the front panel.



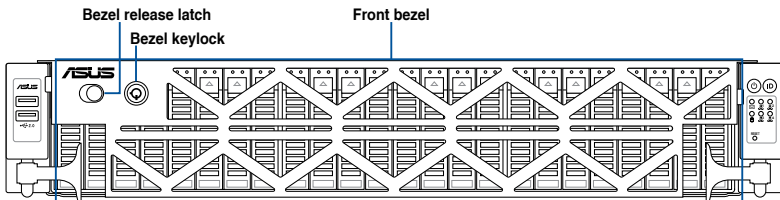
Refer to section 1.7 **LED information** for the LED descriptions.



- Bay 1 to bay 24 supports NVMe for 24 NVMe configuration.
- Bay 5 to bay 20 supports NVMe; others support SATA/SAS\* from HBA/RAID for 16 NVMe configuration.
- Bay 5 to bay 16 supports NVMe, others supports SATA/SAS\* for 12 NVMe configuration.

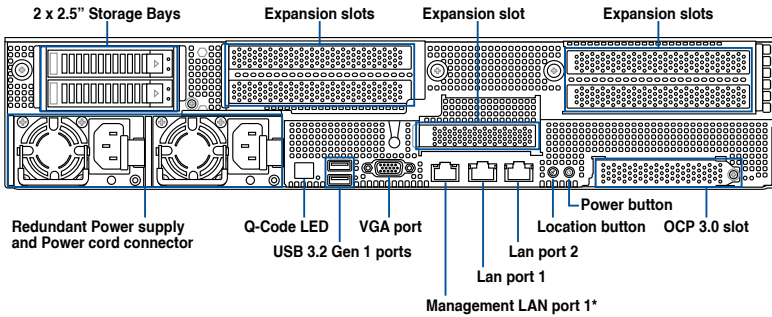
\* SAS support only from HBA/RAID card.

For extra security, a front bezel (purchased separately) can be installed to prevent unauthorized physical access to the hard drives and power button.



## 1.5 Rear panel features

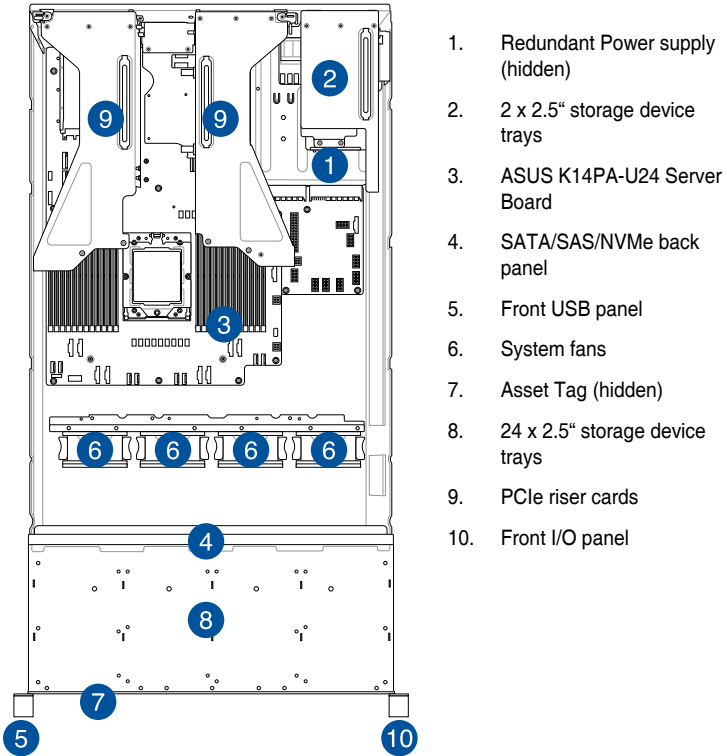
The rear panel includes the expansion slots, and system power sockets. The middle part includes the I/O shield with openings for the rear panel connectors on the motherboard.



- \* This port is for ASUS ASMB11-iKVM only.
- The Q-Code LED provides the most probable cause of an error code as a starting point for troubleshooting. The actual cause may vary from case to case.
- Refer to the Q-Code table for details.

## 1.6 Internal features

The barebone server includes the basic components as shown.

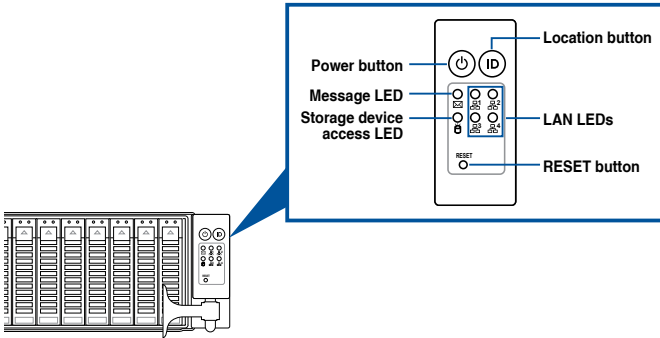


A protection film is pre-attached to the front cover before shipping. Please remove the protection film before turning on the system for proper heat dissipation.

**WARNING**  
**HAZARDOUS MOVING PARTS**  
**KEEP FINGERS AND OTHER BODY PARTS AWAY**

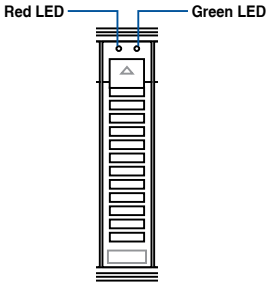
# 1.7 LED information

## 1.7.1 Front panel LEDs



| LED                       | Icon | Display status | Description   |
|---------------------------|------|----------------|---|
| Power LED                 | ⏻    | ON             | System power ON   |
| Storage device access LED | 🗄️   | OFF            | No activity   |
|                           |      | Blinking       | Read/write data into the storage device                             |
| Message LED               | ✉️   | OFF            | System is normal; no incoming event                                 |
|                           |      | ON             | With the onboard ASMB10-iKVM: a hardware monitor event is indicated |
| LAN LEDs                  | 📶    | OFF            | No LAN connection   |
|                           |      | Blinking       | LAN is transmitting or receiving data                               |
|                           |      | ON             | LAN connection is present   |
| Location LED              | ID   | ON             | Location switch is pressed  |
|                           |      | OFF            | Normal status (Press the location switch again to turn off)         |

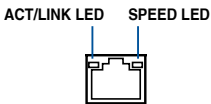
## 1.7.2 Storage device status LED



| Storage Device LED Description |          |   |
|--------------------------------|----------|---|
| Status (RED)                   | ON       | Storage device has failed                             |
|                                | Blinking | RAID rebuilding or locating                           |
| Activity (GREEN)               | ON       | Storage device power ON                               |
|                                | Blinking | Read/write data from/into the SATA/SAS storage device |
|                                | OFF      | Storage device not found                              |

## 1.7.3 LAN (RJ-45) LEDs

### Intel® I350-AM2 1G LAN port LEDs



| ACT/LINK LED |               | SPEED LED |                     |
|--------------|---------------|-----------|---------------------|
| Status       | Description   | Status    | Description         |
| OFF          | No link       | OFF       | 10 Mbps connection  |
| GREEN        | Linked        | ORANGE    | 100 Mbps connection |
| BLINKING     | Data activity | GREEN     | 1 Gbps connection   |

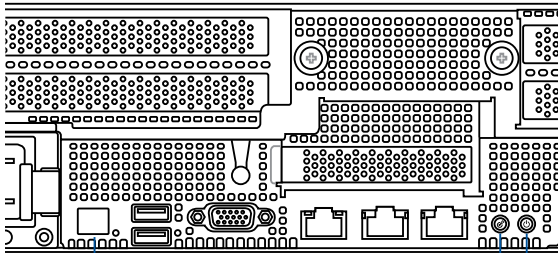
## Dedicated Management LAN port (DM\_LAN1) LED indications

ACT/LINK LED    SPEED LED



| ACT/LINK LED |               | SPEED LED |                     |
|--------------|---------------|-----------|---------------------|
| Status       | Description   | Status    | Description         |
| OFF          | No link       | OFF       | 10 Mbps connection  |
| GREEN        | Linked        | ORANGE    | 100 Mbps connection |
| BLINKING     | Data activity | GREEN     | 1 Gbps connection   |

### 1.7.4 Rear panel LEDs



Q-Code LED

Location button with LED    Power button with LED

| LED          | Icon | Display status | Description   |
|--------------|------|----------------|---|
| Power LED    | ⏻    | ON             | System power ON   |
| Location LED | 📍    | ON             | Location switch is pressed                                  |
|              |      | OFF            | Normal status (Press the location switch again to turn off) |

## 1.7.5 Q-Code table

| Action       | PHASE                                    | POST CODE   | TYPE     | DESCRIPTION  |
|--------------|--|---|----------|--|
| SEC Start up | Security Phase                           | 0x01  | Progress | First post code                                    |
|              |  | 0x02  | Progress | Load BSP microcode                                 |
|              |  | 0x03  | Progress | Perform early platform Initialization              |
|              |  | 0x04  | Progress | Set cache as ram for PEI phase                     |
|              |  | 0x05  | Progress | Establish Stack                                    |
|              |  | 0x06  | Progress | CPU Early Initialization                           |
| PSP Boot     | PSP Boot Loader phase (Error Post Codes) | 0x00  | error    | General - Success                                  |
|              |  | 0x01  | error    | Generic Error Code                                 |
|              |  | 0x02  | error    | Generic Memory Error                               |
|              |  | 0x03  | error    | Buffer Overflow                                    |
|              |  | 0x04  | error    | Invalid Parameter(s)                               |
|              |  | 0x05  | error    | Invalid Data Length                                |
|              |  | 0x06  | error    | Data Alignment Error                               |
|              |  | 0x07  | error    | Null Pointer Error                                 |
|              |  | 0x08  | error    | Unsupported Function                               |
|              |  | 0x09  | error    | Invalid Service ID                                 |
|              |  | 0x0A  | error    | Invalid Address                                    |
|              |  | 0x0B  | error    | Out of Resource Error                              |
|              |  | 0x0C  | error    | Timeout  |
|              |  | 0x0D  | error    | Data abort exception                               |
|              |  | 0x0E  | error    | Prefetch abort exception                           |
|              |  | 0x0F  | error    | Out of Boundary Condition Reached                  |
|              |  | 0x10  | error    | Data corruption                                    |
|              |  | 0x11  | error    | Invalid command                                    |
|              |  | 0x12  | error    | The package type provided by BR is incorrect       |
|              |  | 0x13  | error    | Failed to retrieve FW header during FW validation  |
|              |  | 0x14  | error    | Key size not supported                             |
|              |  | 0x15  | error    | Agesa0 verification error                          |
|              |  | 0x16  | error    | SMU FW verification error                          |
|              |  | 0x17  | error    | OEM SINGING KEY verification error                 |
|              |  | 0x18  | error    | Generic FW Validation error                        |
|              |  | 0x19  | error    | RSA operation fail - bootloader                    |
|              |  | 0x1A  | error    | CCP Passthrough operation failed - internal status |
|              |  | 0x1B  | error    | AES operation fail                                 |
|              |  | 0x1C  | error    | CCP state save failed                              |
|              |  | 0x1D  | error    | CCP state restore failed                           |
|              |  | 0x1E  | error    | SHA256/384 operation fail - internal status        |
|              |  | 0x1F  | error    | ZLib Decompression operation fail                  |
|              |  | 0x20  | error    | HMAC-SHA256/384 operation fail - internal status   |
|              |  | 0x21  | error    | Booted from boot source not recognized by PSP      |
|              |  | 0x22  | error    | PSP directory entry not found                      |
|              |  | 0x23  | error    | PSP failed to set the write enable latch           |
|              |  | 0x24  | error    | PSP timed out because spirom took too long         |
|              |  | 0x25  | error    | Cannot find BIOS directory                         |
|              |  | 0x26  | error    | SpiRom is not valid                                |
|              |  | 0x27  | error    | Slave die has different security state from master |
|              |  | 0x28  | error    | SMI interface init failure                         |
|              |  | 0x29  | error    | SMI interface generic error                        |
| 0x2A         | error                                    | Invalid die ID executes MCM related function                            |          |  |
| 0x2B         | error                                    | Invalid MCM configuration table read from bootrom                       |          |  |
| 0x2C         | error                                    | Valid boot mode wasn't detected   |          |  |
| 0x2D         | error                                    | NVStorage init failure  |          |  |
| 0x2E         | error                                    | NVStorage generic error   |          |  |
| 0x2F         | error                                    | MCM 'error' to indicate slave has more data to send                     |          |  |
| 0x30         | error                                    | MCM error if data size exceeds 32B                                      |          |  |
| 0x31         | error                                    | Invalid client id for SVC MCM call                                      |          |  |
| 0x32         | error                                    | MCM slave status register contains bad bits                             |          |  |
| 0x33         | error                                    | MCM call was made in a single die environment                           |          |  |
| 0x34         | error                                    | PSP secure mapped to invalid segment (should be 0x400_0000)             |          |  |
| 0x35         | error                                    | No physical x86 cores were found on die                                 |          |  |
| 0x36         | error                                    | Insufficient space for secure OS (range of free SRAM to SVC stack base) |          |  |
| 0x37         | error                                    | SYSHUB mapping memory target type is not supported                      |          |  |
| 0x38         | error                                    | Attempt to unmap permanently mapped TLB to PSP secure region            |          |  |
| 0x39         | error                                    | Unable to map an SMN address to AXI space                               |          |  |
| 0x3A         | error                                    | Unable to map a SYSHUB address to AXI space                             |          |  |

(continued on the next page)

| Action   | PHASE                                    | POST CODE  | TYPE  | DESCRIPTION   |
|----------|--|--|-------|---|
| PSP Boot | PSP Boot Loader phase (Error Post Codes) | 0x3B   | error | The count of CCXs or cores provided by bootrom is not consistent            |
|          |  | 0x3C   | error | Uncompressed image size doesn't match value in compressed header            |
|          |  | 0x3D   | error | Compressed option used in case where not supported                          |
|          |  | 0x3E   | error | Fuse info on all dies don't match   |
|          |  | 0x3F   | error | PSP sent message to SMU; SMU reported an error                              |
|          |  | 0x40   | error | Function RunPostX86ReleaseUnitTests failed in memcmp()                      |
|          |  | 0x41   | error | Interface between PSP to SMU not available.                                 |
|          |  | 0x42   | error | Timer wait parameter too large  |
|          |  | 0x43   | error | Test harness module reported an error                                       |
|          |  | 0x44   | error | x86 wrote C2PMSG_0 interrupting PSP, but the command has an invalid format  |
|          |  | 0x45   | error | Failed to read from SPI the Bios Directory or Bios Combo Directory          |
|          |  | 0x46   | error | Failed to find FW entry in SPL Table  |
|          |  | 0x47   | error | Failed to read the combo bios header  |
|          |  | 0x48   | error | SPL version mismatch  |
|          |  | 0x49   | error | Error in Validate and Loading AGESA APOB SVC call                           |
|          |  | 0x4A   | error | Correct fuse bits for DIAG_BL loading not set                               |
|          |  | 0x4B   | error | The UmcProgramKeys() function was not called by AGESA                       |
|          |  | 0x4C   | error | Unconditional Unlock based on serial numbers failure                        |
|          |  | 0x4D   | error | Syshub register programming mismatch during readback                        |
|          |  | 0x4E   | error | Family ID in MP0_SFUSE_SEC[7:3] not correct                                 |
|          |  | 0x4F   | error | An operation was invoked that can only be performed by the GM               |
|          |  | 0x50   | error | Failed to acquire host controller semaphore to claim ownership of SMB       |
|          |  | 0x51   | error | Timed out waiting for host to complete pending transactions                 |
|          |  | 0x52   | error | Timed out waiting for slave to complete pending transactions                |
|          |  | 0x53   | error | Unable to kill current transaction on host, to force idle                   |
|          |  | 0x54   | error | One of: Illegal command, Unclaimed cycle, or Host time out                  |
|          |  | 0x55   | error | An smbus transaction collision detected, operation restarted                |
|          |  | 0x56   | error | Transaction failed to be started or processed by host, or not completed     |
|          |  | 0x57   | error | An unsolicited smbus interrupt was received                                 |
|          |  | 0x58   | error | An attempt to send an unsupported PSP-SMU message was made                  |
|          |  | 0x59   | error | An error/data corruption detected on response from SMU for sent msg         |
|          |  | 0x5A   | error | MCM Steady-state unit test failed   |
|          |  | 0x5B   | error | S3 Enter failed   |
|          |  | 0x5C   | error | AGESA BL did not set PSP SMU reserved addresses via SVC call                |
|          |  | 0x5D   | error | Reserved PSP/SMU memory region is invalid                                   |
|          |  | 0x5E   | error | CcxSecBisiEn not set in fuse RAM  |
|          |  | 0x5F   | error | Received an unexpected result   |
|          |  | 0x60   | error | VMG Storage Init failed   |
|          |  | 0x61   | error | Failure in mbedTLS user app   |
|          |  | 0x62   | error | An error occurred whilst attempting to SMN map a fuse register              |
|          |  | 0x63   | error | Fuse burn sequence/operation failed due to internal SOC error               |
|          |  | 0x64   | error | Fuse sense operation timed out  |
|          |  | 0x65   | error | Fuse burn sequence/operation timed out waiting for burn done                |
|          |  | 0x66   | error | The PMU FW Public key certificate loading or authentication fails           |
|          |  | 0x67   | error | This PSP FW was revoked   |
|          |  | 0x68   | error | The platform model/vendor id fuse is not matching the BIOS public key token |
|          |  | 0x69   | error | The BIOS OEM public key of the BIOS was revoked for this platform           |
| 0x6A     | error                                    | PSP level 2 directory not match expected value.            |       |   |
| 0x6B     | error                                    | BIOS level 2 directory not match expected value.           |       |   |
| 0x6C     | error                                    | Reset image not found                                      |       |   |
| 0x6D     | error                                    | Generic error indicating the CCP HAL initialization failed |       |   |
| 0x6E     | error                                    | Failure to copy NVRAM to DRAM.                             |       |   |
| 0x6F     | error                                    | Invalid key usage flag                                     |       |   |
| 0x70     | error                                    | Unexpected fuse set  |       |   |
| 0x71     | error                                    | RSMU signaled a security violation                         |       |   |
| 0x72     | error                                    | Error programming the WAFL PCS registers                   |       |   |
| 0x73     | error                                    | Error setting wafl PCS threshold value                     |       |   |
| 0x74     | error                                    | Error loading OEM trustlets                                |       |   |
| 0x75     | error                                    | Recovery mode across all dies is not sync'd                |       |   |
| 0x76     | error                                    | Uncorrectable WAFL error detected                          |       |   |
| 0x77     | error                                    | Fatal MP1 error detected                                   |       |   |
| 0x78     | error                                    | Bootloader failed to find OEM signature                    |       |   |
| 0x79     | error                                    | Error copying BIOS to DRAM                                 |       |   |
| 0x7A     | error                                    | Error validating BIOS image signature                      |       |   |
| 0x7B     | error                                    | OEM Key validation failed                                  |       |   |
| 0x7C     | error                                    | Platform Vendor ID and/or Model ID binding violation       |       |   |

(continued on the next page)



| Action   | PHASE                                     | POST CODE   | TYPE  | DESCRIPTION   |
|----------|---|---|-------|---|
| PSP Boot | PSP Boot Loader phase (Status Post Codes) | 0x7D  | error | Bootloader detects BIOS request boot from SPI-ROM, which is unsupported for PSB.                    |
|          |   | 0x7E  | error | Requested fuse is already blown, reblow will cause ASIC malfunction                                 |
|          |   | 0x7F  | error | Error with actual fusing operation  |
|          |   | 0x80  | error | (Local Master PSP on P1 socket) Error reading fuse info   |
|          |   | 0x81  | error | (Local Master PSP on P1 socket) Platform Vendor ID and/or Model ID binding violation                |
|          |   | 0x82  | error | (Local Master PSP on P1 socket) Requested fuse is already blown, reblow will cause ASIC malfunction |
|          |   | 0x83  | error | (Local Master PSP on P1 socket) Error with actual fusing operation                                  |
|          |   | 0x84  | error | SEV FW Rollback attempt is detected   |
|          |   | 0x85  | error | SEV download FW command fail to broadcast and clear the IsInSRAM field on slave dies                |
|          |   | 0x86  | error | Agesa error injection failure   |
|          |   | 0x87  | error | Uncorrectable TWIX error detected   |
|          |   | 0x88  | error | Error programming the TWIX PCS registers  |
|          |   | 0x89  | error | Error setting TWIX PCS threshold value  |
|          |   | 0x8A  | error | SW CCP queue is full, cannot add more entries   |
|          |   | 0x8B  | error | CCP command description syntax error detected from input  |
|          |   | 0x8C  | error | Return value stating that the command has not yet be scheduled                                      |
|          |   | 0x8D  | error | The command is scheduled and being worked on  |
|          |   | 0x8E  | error | The DXIO PHY SRAM Public key certificate loading or authentication fails                            |
|          |   | 0x8F  | error | TPM binary size exceeds limit allocated in Private DRAM, need to increase the limit                 |
|          |   | 0x90  | error | The TWIX link for a particular CCD is not trained Fatal error                                       |
|          |   | 0x91  | error | Security check failed (not all dies are in same security state)                                     |
|          |   | 0x92  | error | FW type mismatch between the requested FW type and the FW type embedded in the FW binary header     |
|          |   | 0x93  | error | SVC call input parameter address violation  |
|          |   | 0x94  | error | Firmware Compatibility Level mismatch   |
|          |   | 0x95  | error | Bad status returned by I2CKnollCheck  |
|          |   | 0x96  | error | NACK to general call (no device on Knoll I2C bus)   |
|          |   | 0x97  | error | Null pointer passed to I2CKnollCheck  |
|          |   | 0x98  | error | Invalid device-ID found during Knoll authentication   |
|          |   | 0x99  | error | Error during Knoll/Prom key derivation  |
|          |   | 0x9A  | error | Null pointer passed to Crypto function  |
|          |   | 0x9B  | error | Error in checksum from wrapped Knoll/Prom keys  |
|          |   | 0x9C  | error | Knoll returned an invalid response to a command   |
|          |   | 0x9D  | error | Bootloader failed in Knoll Send Command function  |
|          |   | 0x9E  | error | No Knoll device found by verifying MAC  |
|          |   | 0x9F  | error | The maximum allowable error post code   |
|          |   | 0xA0  | error | Bootloader successfully entered C Main  |
|          |   | 0xA1  | error | Master initialized C2P / slave waited for master to init C2P  |
|          |   | 0xA2  | error | HMAC key successfully derived   |
|          |   | 0xA3  | error | Master got Boot Mode and sent boot mode to all slaves   |
|          |   | 0xA4  | error | SpiRom successfully initialized   |
|          |   | 0xA5  | error | BIOS Directory successfully read from SPI to SRAM   |
|          |   | 0xA6  | error | Early unlock check  |
|          |   | 0xA7  | error | Inline Aes key successfully derived   |
|          |   | 0xA8  | error | Inline-AES key programming is done  |
|          |   | 0xA9  | error | Inline-AES key wrapper derivation is done   |
|          |   | 0xAA  | error | Bootloader successfully loaded HW IP configuration values   |
|          |   | 0xAB  | error | Bootloader successfully programmed MBAT table   |
|          |   | 0xAC  | error | Bootloader successfully loaded SMU FW   |
|          |   | 0xAD  | error | Progress code is available  |
|          |   | 0xAE  | error | User mode test Uapp completed successfully  |
| 0xAF     | error                                     | Bootloader loaded Agesa0 from SpiRom              |       |   |
| 0xB0     | error                                     | AGESA phase has completed                         |       |   |
| 0xB1     | error                                     | RunPostDramTrainingTests() completed successfully |       |   |
| 0xB2     | error                                     | SMU FW Successfully loaded to SMU Secure DRAM     |       |   |
| 0xB3     | error                                     | Sent all required boot time messages to SMU       |       |   |
| 0xB4     | error                                     | Validated and ran Security Gasket binary          |       |   |
| 0xB5     | error                                     | UMC Keys generated and programmed                 |       |   |
| 0xB6     | error                                     | Inline AES key wrapper stored in DRAM             |       |   |
| 0xB7     | error                                     | Completed FW Validation step                      |       |   |
| 0xB8     | error                                     | Completed FW Validation step                      |       |   |
| 0xB9     | error                                     | BIOS copy from SPI to DRAM complete               |       |   |
| 0xBA     | error                                     | Completed FW Validation step                      |       |   |

(continued on the next page)

| Action    | PHASE                                     | POST CODE  | TYPE     | DESCRIPTION   |
|-----------|---|--|----------|---|
| PSP Boot  | PSP Boot Loader phase (Status Post Codes) | 0xBB   | error    | BIOS load process fully complete                        |
|           |   | 0xBC   | error    | Bootloader successfully release x86                     |
|           |   | 0xBD   | error    | Early Secure Debug completed                            |
|           |   | 0xBE   | error    | GetFWVersion command received from BIOS is completed    |
|           |   | 0xBF   | error    | SMInfo command received from BIOS is completed          |
|           |   | 0xC0   | error    | Successfully entered WarmBootResume()                   |
|           |   | 0xC1   | error    | Successfully copied SecureOS image to SRAM              |
|           |   | 0xC2   | error    | Successfully copied trustlets to PSP Secure Memory      |
|           |   | 0xC3   | error    | About to jump to Secure OS (SBL about to copy and jump) |
|           |   | 0xC4   | error    | Successfully restored CCP and UMC state on S3 resume    |
|           |   | 0xC5   | error    | PSP SRAM HMAC validated by Mini BL                      |
|           |   | 0xC6   | error    | About to jump to <t-base in Mini BL                     |
|           |   | 0xC7   | error    | VMG ECDH unit test started                              |
|           |   | 0xC8   | error    | VMG ECDH unit test passed                               |
|           |   | 0xC9   | error    | VMG ECC CDH primitive unit test started                 |
|           |   | 0xCA   | error    | VMG ECC CDH primitive unit test passed                  |
|           |   | 0xCB   | error    | VMG SP800-108 KDF-CTR HMAC unit test started            |
|           |   | 0xCC   | error    | VMG SP800-108 KDF-CTR HMAC unit test passed             |
|           |   | 0xCD   | error    | VMG LAUNCH_* test started                               |
|           |   | 0xCE   | error    | VMG LAUNCH_* test passed                                |
|           |   | 0xCF   | error    | MP1 has been taken out of reset, and executing SMUFW    |
|           |   | 0xD0   | error    | PSP and SMU Reserved Addresses correct                  |
|           |   | 0xD1   | error    | Reached Naples steady-state WFI loop                    |
|           |   | 0xD2   | error    | Knoll device successfully initialized                   |
|           |   | 0xD3   | error    | 32-byte RandOut successfully returned from Knoll        |
|           |   | 0xD4   | error    | 32-byte MAC successfully received from Knoll.           |
|           |   | 0xD5   | error    | Knoll device verified successfully                      |
|           |   | 0xD6   | error    | CNLI Keys generated and programmed                      |
|           |   | 0xD7   | error    | Enter recovery mode due to trustlet validation fail.    |
|           |   | 0xD8   | error    | Enter recovery mode due to OS validation fail.          |
|           |   | 0xD9   | error    | Enter recovery mode due to OEM public key not found.    |
|           |   | 0xDA   | error    | Enter recovery mode with header corruption              |
|           |   | 0xDB   | error    | We should not treat this error as blocking              |
|           |   | 0xDC   | error    | When same fw image type is already loaded in SRAM       |
|           |   | 0xDD   | error    | 0xE2 progress codes are available                       |
|           |   | 0xE0   | error    | Unlock return   |
|           |   | 0xE2   | error    | Token expiration reset triggered                        |
|           |   | 0xE3   | error    | Completed DXIO PHY SRAM FW key Validation step          |
|           |   | 0xE4   | error    | MP1 firmware load to SRAM success                       |
|           |   | 0xE5   | error    | Bootloader read the MP1 SRAM successfully               |
|           |   | 0xE6   | error    | Bootloader successfully reset MP1                       |
|           |   | 0xE7   | error    | DF init successfully done (in absence of AGESA)         |
|           |   | 0xE8   | error    | UMC init successfully done (in absence of AGESA)        |
|           |   | 0xE9   | error    | LX6 Boot ROM code ready                                 |
|           |   | 0xEA   | error    | Bootloader successfully asserted LX6 reset              |
|           |   | 0xEB   | error    | LX6 load to SRAM success                                |
|           |   | 0xEC   | error    | Bootloader successfully set LX6 reset vector to SRAM    |
| 0xED      | error                                     | Bootloader successfully de-asserted LX6 reset                  |          |   |
| 0xEE      | error                                     | LX6 firmware is running and ready                              |          |   |
| 0xEF      | error                                     | Loading of S3 image done successfully                          |          |   |
| 0xF0      | error                                     | Bootloader successfully verify signed image using 4K/2K key    |          |   |
| 0xF1      | error                                     | Bootloader identified as running on SP32P or multi-socket boot |          |   |
| 0xF2      | error                                     | Security Policy check successful (only in secure boot)         |          |   |
| 0xF3      | error                                     | Bootloader successfully loaded SS3                             |          |   |
| 0xF4      | error                                     | Bootloader successfully load ITPM Driver                       |          |   |
| 0xF5      | error                                     | Bootloader successfully loaded sys_drv                         |          |   |
| 0xF6      | error                                     | Bootloader successfully loaded secure OS                       |          |   |
| 0xF7      | error                                     | Bootloader about to transfer control to secureOS               |          |   |
| 0xFF      | error                                     | Bootloader sequence finished                                   |          |   |
| Quick VGA | PEI(Pre-EFI Initialization) phase         | 0x10   | Progress | PEI Core Entry  |
|           |   | 0x11   | Progress | PEI cache as ram CPU initial                            |
|           |   | 0x15   | Progress | NB Initialization before installed memory               |
|           |   | 0x19   | Progress | SB Initialization before installed memory               |

(continued on the next page)

| Action      | PHASE                                   | POST CODE                       | TYPE     | DESCRIPTION                                  |           |
|-------------|---|---------------------------------|----------|--|-----------|
| Quick VGA   | DXE(Driver Execution Environment) phase | 0x32                            | Progress | CPU POST-Memory Initialization               |           |
|             |   | 0x33                            | Progress | CPU Cache Initialization                     |           |
|             |   | 0x34                            | Progress | Application Processor(s) (AP) Initialization |           |
|             |   | 0x35                            | Progress | BSP Selection                                |           |
|             |   | 0x36                            | Progress | CPU Initialization                           |           |
|             |   | 0x37                            | Progress | Pre-memory NB Initialization                 |           |
|             |   | 0x3B                            | Progress | Pre-memory SB Initialization                 |           |
|             |   | 0x4F                            | Progress | DXE Initial Program Load(IPL)                |           |
|             |   | 0x60                            | Progress | DXE Core Started                             |           |
|             |   | 0x61                            | Progress | DXE NVRAM Initialization                     |           |
|             |   | 0x62                            | Progress | SB run-time Initialization                   |           |
|             |   | 0x63                            | Progress | CPU DXE Initialization                       |           |
|             |   | 0x68                            | Progress | PCI HB Initialization                        |           |
|             |   | 0x69                            | Progress | NB DXE Initialization                        |           |
|             |   | 0x6A                            | Progress | NB DXE SMM Initialization                    |           |
|             |   | 0x70                            | Progress | SB DXE Initialization                        |           |
|             |   | 0x71                            | Progress | SB DXE SMM Initialization                    |           |
| 0x72        | Progress                                | SB DEVICES Initialization       |          |  |           |
| 0x78        | Progress                                | ACPI Module Initialization      |          |  |           |
| 0xD0        | Progress                                | CPU PM Structure Initialization |          |  |           |
| Normal boot | BDS(Boot Device Selection) phase        | 0x90                            | Progress | BDS started                                  |           |
|             |   | 0x91                            | Progress | Connect device event                         |           |
|             |   | 0x92                            | Progress | PCI Bus Enumeration                          |           |
|             |   | 0x93                            | Progress | PCI Bus Enumeration                          |           |
|             |   | 0x94                            | Progress | PCI Bus Enumeration                          |           |
|             |   | 0x95                            | Progress | PCI Bus Enumeration                          |           |
|             |   | 0x96                            | Progress | PCI Bus Enumeration                          |           |
|             |   | 0x97                            | Progress | Console output connect event                 |           |
|             |   | 0x98                            | Progress | Console input connect event                  |           |
|             |   | 0x99                            | Progress | AMI Super IO start                           |           |
|             |   | 0x9A                            | Progress | AMI USB Driver Initialization                |           |
|             |   | 0x9B                            | Progress | AMI USB Driver Initialization                |           |
|             |   | 0x9C                            | Progress | AMI USB Driver Initialization                |           |
|             |   | 0x9D                            | Progress | AMI USB Driver Initialization                |           |
|             |   | 0xb3                            | Progress | Reset system                                 |           |
|             |   | 0xb4                            | Progress | USB hotplug                                  |           |
|             |   | 0xb6                            | Progress | NVRAM clean up                               |           |
|             |   | 0xb7                            | Progress | NVRAM configuration reset                    |           |
|             |   | 0xA0                            | Progress | IDE, AHCI Initialization                     |           |
|             |   | 0xA1                            | Progress | IDE, AHCI Initialization                     |           |
|             |   | 0xA2                            | Progress | IDE, AHCI Initialization                     |           |
|             |   | 0xA3                            | Progress | IDE, AHCI Initialization                     |           |
|             |   | 0x00-0xFF                       | Progress | Wait BMC ready                               |           |
|             |   | 0xA8                            | Progress | BIOS Setup Utility password verify           |           |
|             |   | 0xA9                            | Progress | BIOS Setup Utility start                     |           |
|             |   | 0xAB                            | Progress | BIOS Setup Utility input wait                |           |
|             |   | 0xAD                            | Progress | Ready to boot event                          |           |
|             |   | Operating system phase          | 0xAA     | Progress                                     | APIC mode |
|             |   |                                 | 0xAC     | Progress                                     | PIC mode  |



# Hardware Information

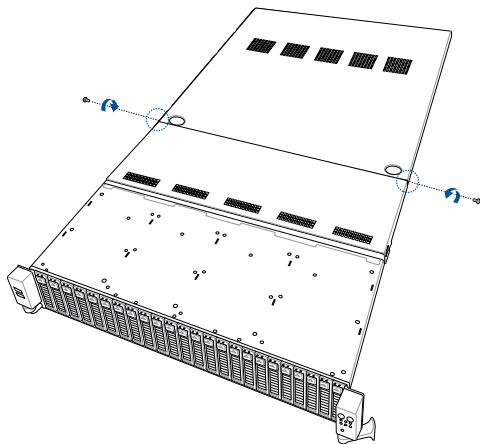
# 2

This chapter lists the hardware setup procedures that you have to perform when installing or removing system components.

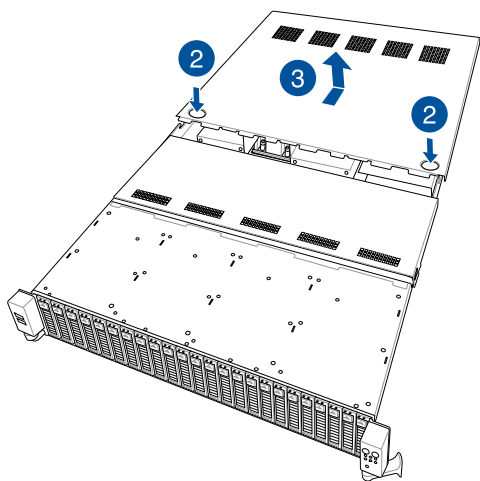
## 2.1 Chassis cover

### 2.1.1 Removing the rear cover

1. Remove the two (2) screws on both sides of the rear cover with a Phillips screwdriver.

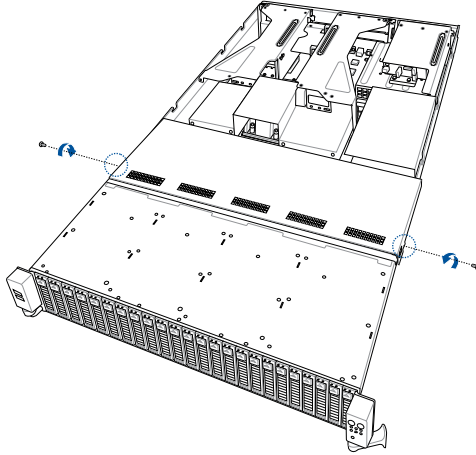


2. Push the buttons on both sides of the top cover to release the rear cover from the chassis.
3. Slide the rear cover towards the rear panel to disengage it from the chassis, then lift the rear cover from the chassis.

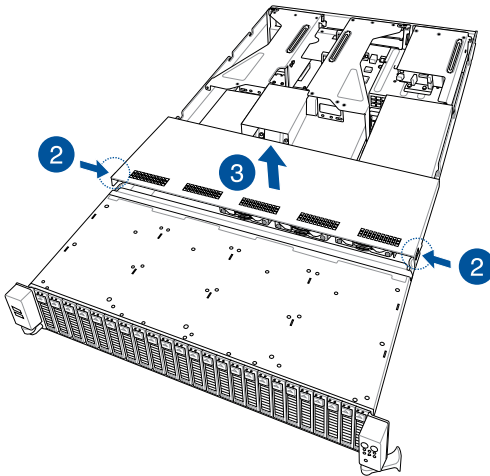


## 2.1.2 Removing the mid cover

1. Remove the two (2) screws on both sides of the mid cover with a Phillips screwdriver.



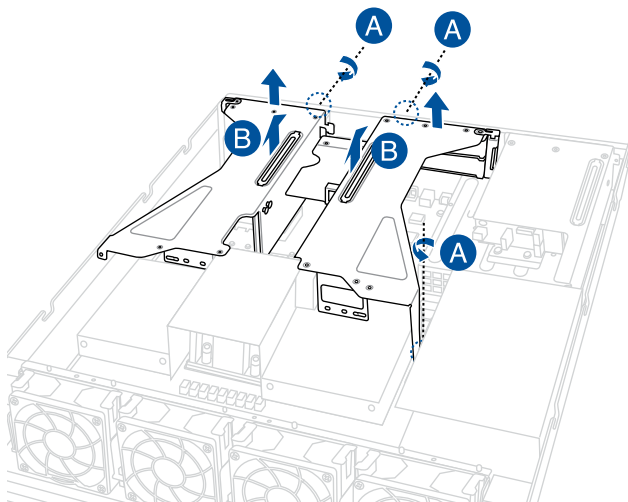
2. Push the buttons on both sides to release the mid cover from the chassis.
3. Lift the mid cover from the chassis.



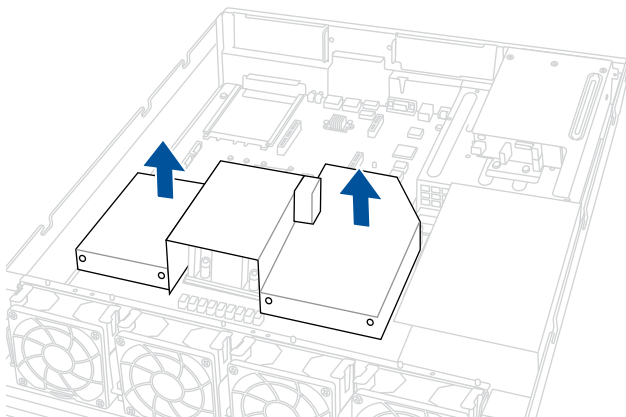
## 2.2 Air duct

### 2.2.1 Removing the air ducts

1. Loosen the screws of the left and right riser brackets (A), then lift and remove both riser brackets (B).

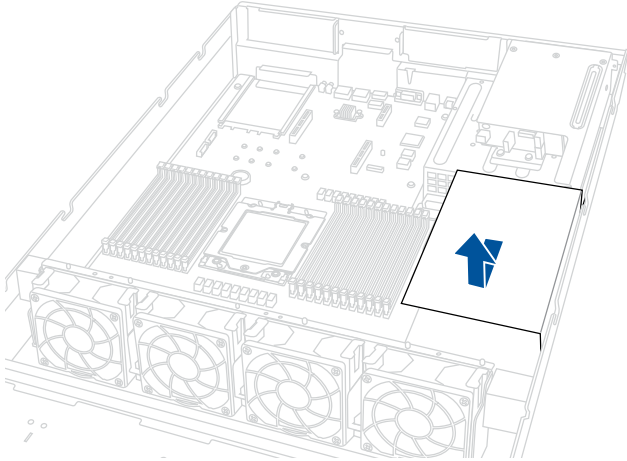


2. Lift and remove the CPU and DIMM air duct.



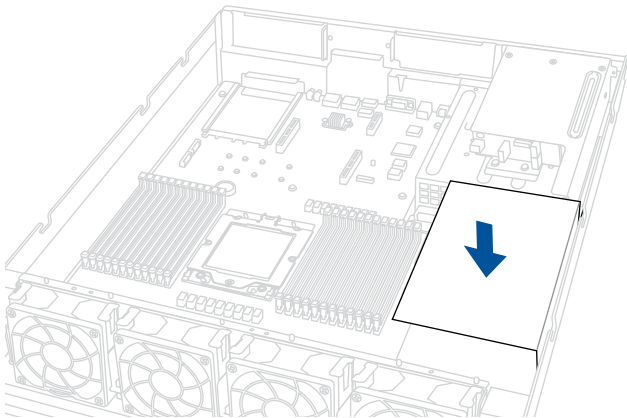


3. Lift and remove the PSU air duct.

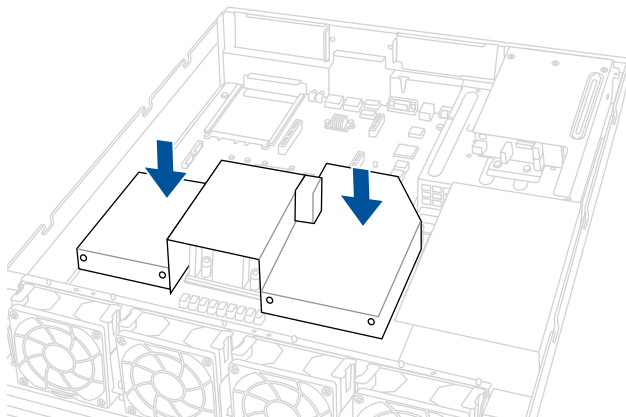


## 2.2.2 Installing the air ducts

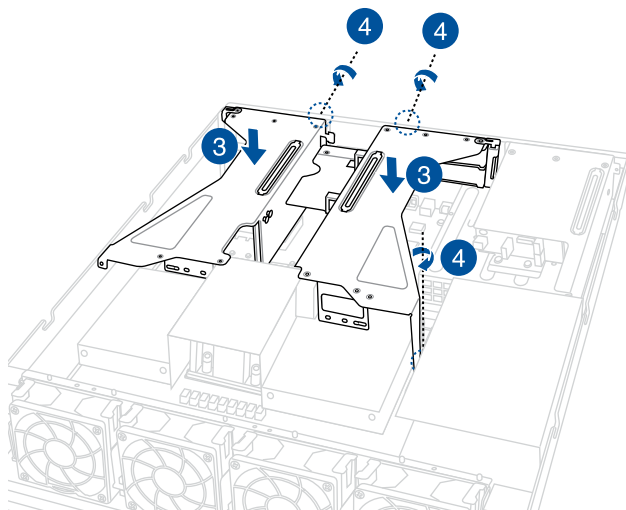
1. Replace the PSU air duct.



2. Replace the CPU and DIMM air duct.



3. Replace the left and right riser brackets, making sure both riser brackets are seated firmly in the chassis.
4. Secure both left and right riser brackets using the respective thumbscrews.



## 2.3 Central Processing Unit (CPU)

The motherboard comes with a surface mount Socket SP5 designed for the AMD EPYC™ 7004 Series.

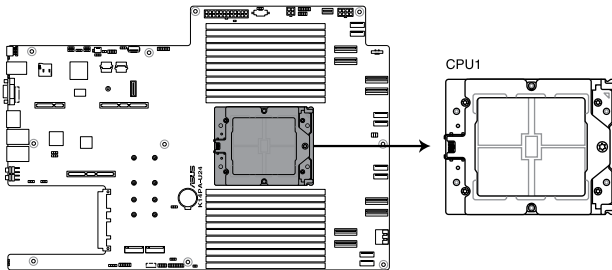


- Upon purchase of the motherboard, ensure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. ASUS will shoulder the cost of repair only if the damage is shipment/transit-related.
- Keep the cap after installing the motherboard. ASUS will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the Socket.
- The product warranty does not cover damage to the socket contacts resulting from incorrect CPU installation/removal, or misplacement/loss/incorrect removal of the PnP cap.

### 2.3.1 Installing the CPU and heatsink

To install the CPU and heatsink:

1. Remove the rear cover. For more information, refer to **Chassis cover**.
2. Remove the air ducts. For more information, refer to **Air ducts**.
3. Locate the CPU socket on your motherboard..

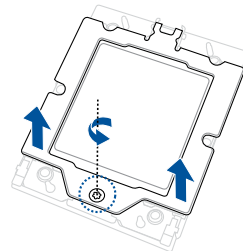


**K14PA-U24 CPU Socket SP5 LGA 6096**

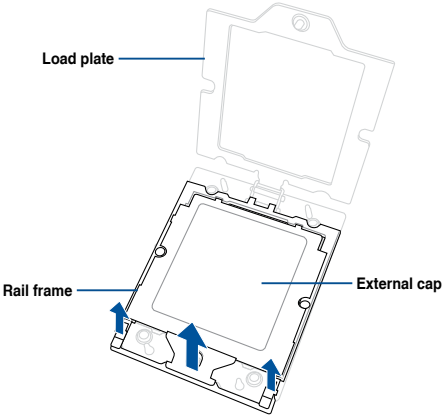
4. Loosen the screw on the socket to open the load plate.



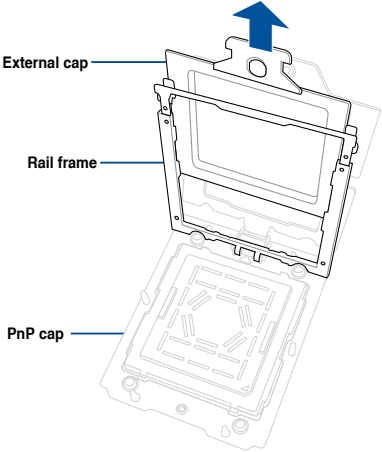
The load plate screws are T20 models. A torque value of  $13.5 \pm 1.0 \text{ kg-cm}$  ( $11.7 \pm 0.9 \text{ lbf-in}$ ) is recommended.



- 5. Lift open the rail frame.



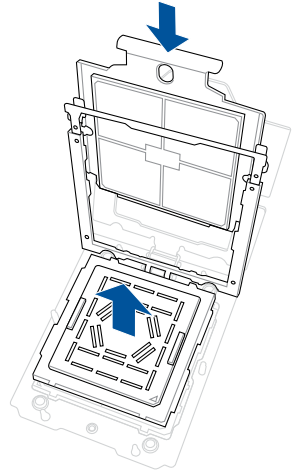
- 6. Slide the external cap out of the rail frame.



- Slide the carrier frame with CPU into the rail frame, then remove the PnP cap.

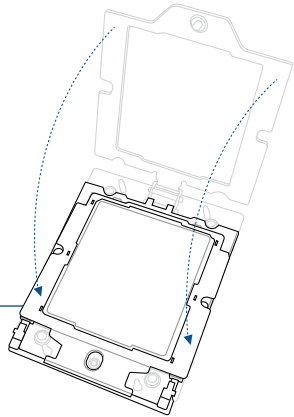


The carrier frame with CPU fits in only one correct orientation. DO NOT force the carrier frame with CPU into the rail frame.



- Gently close the rail frame just enough to let it sit on top of the CPU socket.

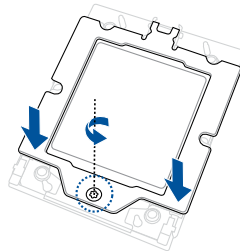
Carrier frame with CPU



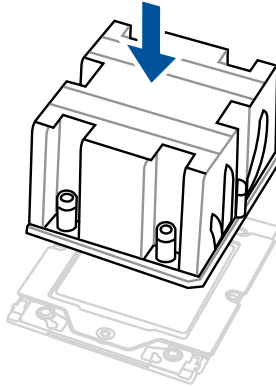
- Close the load plate just enough to let it sit on top of the CPU, then secure the load plate using the screw on the socket.



The load plate screws are T20 models. A torque value of  $13.5 \pm 1.0$  kg-cm ( $11.7 \pm 0.9$  lbf-in) is recommended.



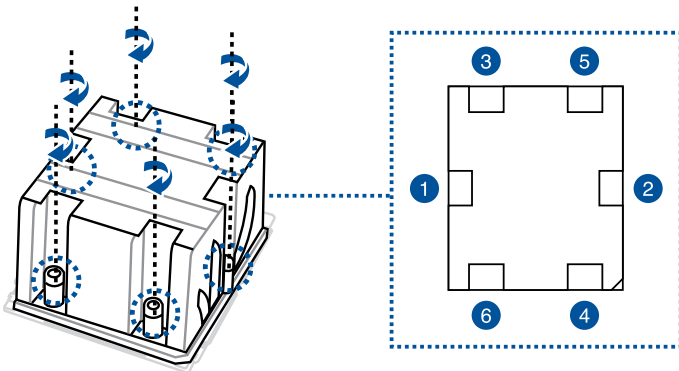
- Place the heatsink on the CPU socket and make sure the heatsink screws are aligned with the CPU socket.



- Partially tighten each of the six screws with a screwdriver in the order shown both in the illustration and on the heatsink just enough to attach the heatsink to the motherboard. When the six screws are attached, tighten them one by one in the same order to completely secure the heatsink.



The heatsink screws are T20 models. A torque value of  $13.5 \pm 1.0 \text{ kg-cm}$  ( $11.7 \pm 0.9 \text{ lbf-in}$ ) is recommended.



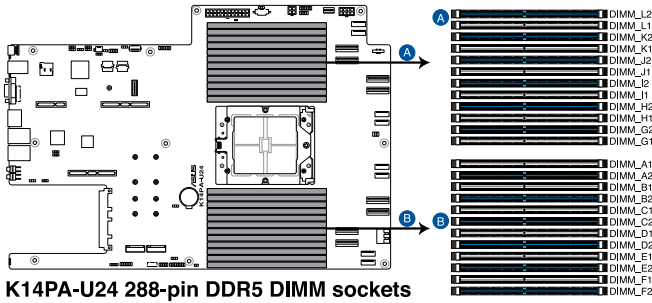
- Reinstall the air ducts. For more information, refer to **Air ducts**.

## 2.4 System memory

### 2.4.1 Overview

The motherboard comes with 24 Double Data Rate 5 (DDR5) Dual Inline Memory Modules (DIMM) sockets.

The figure illustrates the location of the DDR5 DIMM sockets:



### 2.4.2 Memory Configurations

You may install 32GB, 64GB, 128GB, 256GB RDIMM, and 32GB, 64GB, 128GB, 256GB 3DS RDIMM into the DIMM sockets. If you are not sure on which slots to install the DIMMS, you can use the recommended memory configuration in this section for reference.

| Memory configurations |  | DIMM |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |   |
|-----------------------|--|------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|---|
|                       |  | A1   | A2 | B1 | B2 | C1 | C2 | D1 | D2 | E1 | E2 | F1 | F2 | G1 | G2 | H1 | H2 | I1 | I2 | J1 | J2 | K1 | K2 | L1 | L2 |   |   |
| 1 DIMM                |  | ✓    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |   |
| 2 DIMMs               |  | ✓    |    |    |    |    |    |    |    |    |    |    |    |    | ✓  |    |    |    |    |    |    |    |    |    |    |   |   |
| 4 DIMMs               |  | ✓    |    |    |    | ✓  |    |    |    |    |    |    |    |    | ✓  |    |    |    |    | ✓  |    |    |    |    |    |   |   |
| 6 DIMMs               |  | ✓    |    | ✓  |    | ✓  |    |    |    |    |    |    |    |    | ✓  |    | ✓  |    |    | ✓  |    |    |    |    |    |   |   |
| 8 DIMMs               |  | ✓    |    | ✓  |    | ✓  |    |    |    | ✓  |    |    |    |    | ✓  |    | ✓  |    |    | ✓  |    |    |    | ✓  |    |   |   |
| 10 DIMMs              |  | ✓    |    | ✓  |    | ✓  |    | ✓  |    | ✓  |    |    |    |    | ✓  |    | ✓  |    |    | ✓  |    |    | ✓  |    | ✓  |   |   |
| 12 DIMMs              |  | ✓    |    | ✓  |    | ✓  |    | ✓  |    | ✓  |    |    |    | ✓  |    | ✓  |    |    | ✓  |    |    | ✓  |    | ✓  |    | ✓ |   |
| 14 DIMMs              |  | ✓    | ✓  |    | ✓  |    | ✓  |    | ✓  | ✓  |    |    |    | ✓  | ✓  |    | ✓  |    |    | ✓  |    |    | ✓  |    | ✓  |   | ✓ |
| 16 DIMMs              |  | ✓    | ✓  |    | ✓  | ✓  |    | ✓  |    | ✓  |    |    |    | ✓  | ✓  |    | ✓  |    |    | ✓  |    |    | ✓  |    | ✓  |   | ✓ |
| 18 DIMMs              |  | ✓    | ✓  | ✓  |    | ✓  |    | ✓  |    | ✓  |    |    |    | ✓  | ✓  |    | ✓  |    |    | ✓  |    |    | ✓  |    | ✓  |   | ✓ |
| 20 DIMMs              |  | ✓    | ✓  | ✓  | ✓  |    |    | ✓  |    | ✓  |    |    |    | ✓  | ✓  |    | ✓  |    |    | ✓  |    |    | ✓  |    | ✓  |   | ✓ |
| 22 DIMMs              |  | ✓    | ✓  | ✓  | ✓  | ✓  |    | ✓  |    | ✓  |    |    |    | ✓  | ✓  |    | ✓  |    |    | ✓  |    |    | ✓  |    | ✓  |   | ✓ |
| 24 DIMMs              |  | ✓    | ✓  | ✓  | ✓  | ✓  | ✓  |    |    | ✓  |    |    |    | ✓  | ✓  |    | ✓  |    |    | ✓  |    |    | ✓  |    | ✓  |   | ✓ |



- 
- When mixing 2DPC and 1DPC, ensure that each channel's total DIMM size should be equal. The DIMM size of 2DPC should equal to that of 1DPC, for example, if 2DPC is using a 32GB memory module (32GB \* 2), then a 64GB memory module should be installed for 1DPC.
  - All memory modules for 2DPC should be the same.
  - Always install DIMMs with the same CAS latency. For optimum compatibility, it is recommended that you obtain memory modules from the same vendor.
-

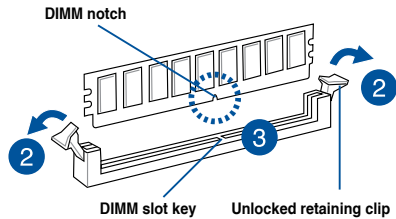


### 2.4.3 Installing a DIMM



Ensure to unplug the power supply before adding or removing DIMMs or other system components. Failure to do so may cause severe damage to both the motherboard and the components.

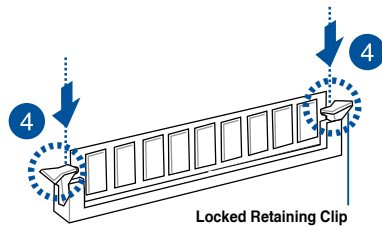
1. Unlock a DIMM socket by pressing the retaining clips outward.
2. Align a DIMM on the socket such that the notch on the DIMM matches the DIMM slot key on the socket.



A DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a DIMM into a socket in the wrong direction to avoid damaging the DIMM.

3. Hold the DIMM by both of its ends then insert the DIMM vertically into the socket. Apply force to both ends of the DIMM simultaneously until the retaining clips snaps back into place.

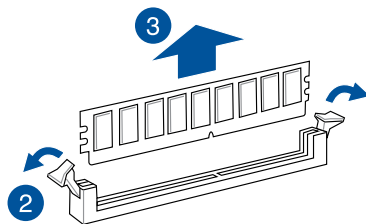
Ensure that the DIMM is sitting firmly on the DIMM slot.



Always insert the DIMM into the socket VERTICALLY to prevent DIMM notch damage.

### 2.4.4 Removing a DIMM

1. Remove the chassis cover. For more information, see the section **Chassis cover**.
2. Simultaneously press the retaining clips outward to unlock the DIMM.
3. Remove the DIMM from the socket.



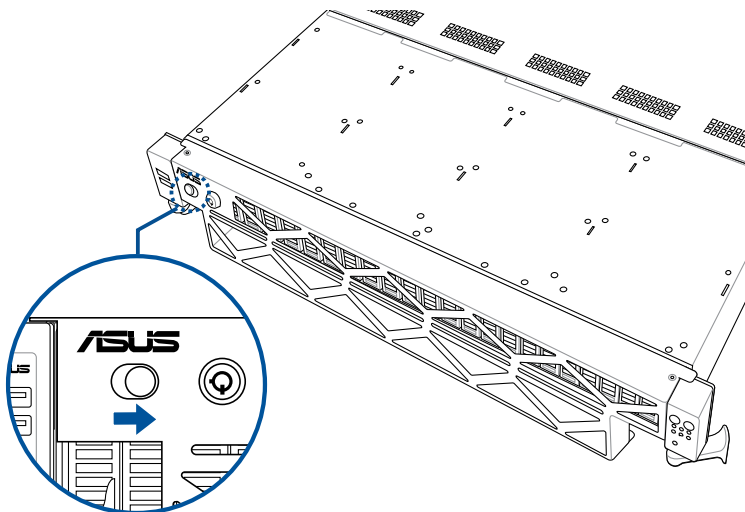
Support the DIMM lightly with your fingers when pressing the retaining clips. The DIMM might get damaged when it flips out with extra force.

## 2.5 (optional) Front bezel

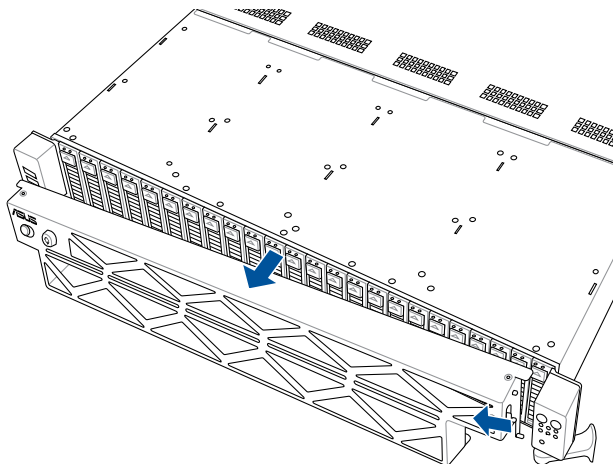
For extra security, a front bezel (purchased separately) can be installed to prevent unauthorized physical access to the hard drives and power button.

### 2.5.1 Removing the front bezel

1. Push the bezel release latch of the front bezel towards the right to unlock the bezel.

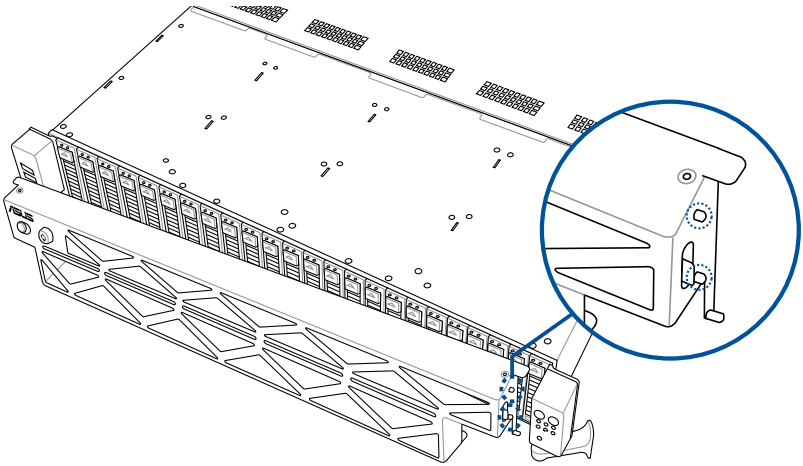


2. Slide the front bezel towards the left of the system to detach the front bezel, then remove it from the system.

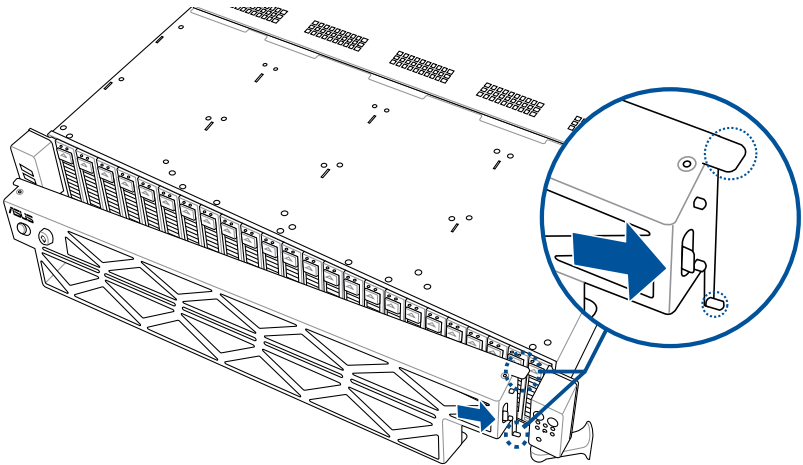


## 2.5.2 Installing the front bezel

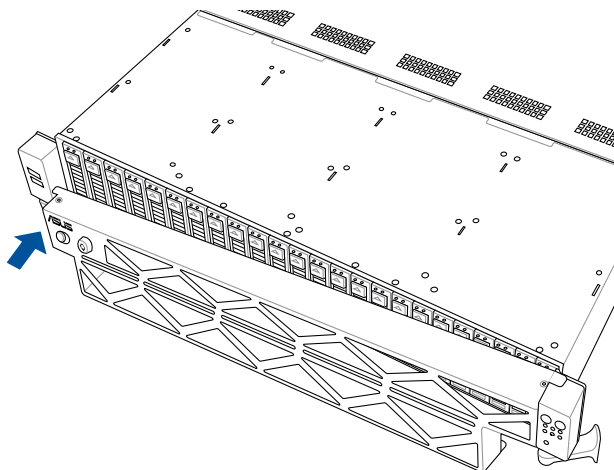
1. Align the two (2) right notches on the front bezel to the notch holes on the right front panel.



2. Attach the right side of the front bezel to the right front panel.



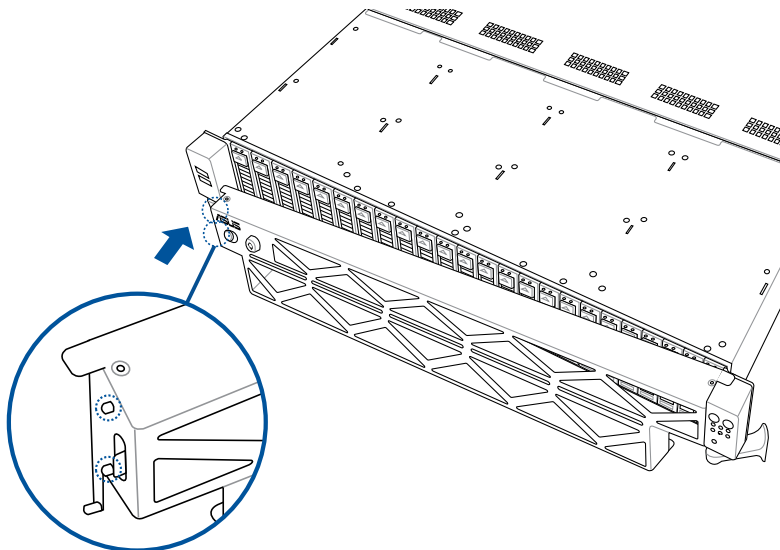
3. Push the left side of the front bezel towards the left USB panel.



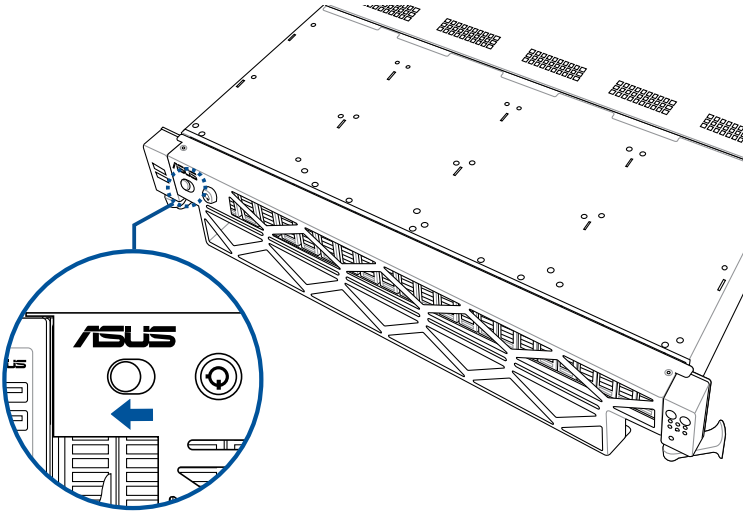
4. Make sure the two (2) left notches on the front bezel are aligned with the notch holes on the left USB panel, then push and attach the front bezel to the left USB panel.



Make sure the bezel release latch is in the unlock state (pushed to the right) before attaching the front bezel to the left USB panel.

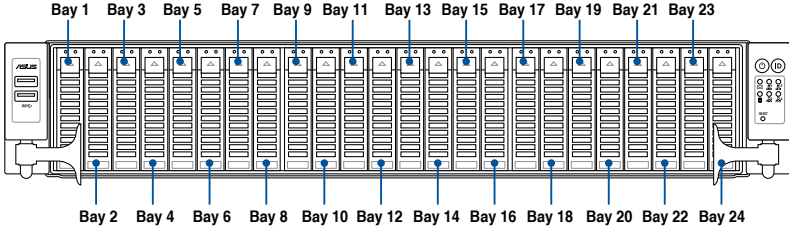


5. Push the bezel release latch of the front bezel towards the left to lock the bezel.



## 2.6 Storage devices

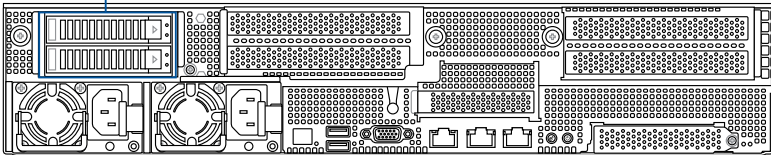
The system supports twenty-four (24) 2.5" hot-swap SATA/SAS/NVMe storage devices in the front (up to 8 x NVMe/SATA + 16 x NVMe/SATA/SAS) and two (2) optional 2.5" NVMe storage devices in the rear. The storage device installed on the storage device tray connects to the motherboard SATA/SAS/NVMe ports via the SATA/SAS/NVMe backplane.



- Bay 1 to bay 24 supports NVMe for 24 NVMe configuration.
- Bay 5 to bay 20 supports NVMe; others support SATA/SAS\* from HBA/RAID for 16 NVMe configuration.
- Bay 5 to bay 16 supports NVMe, others supports SATA/SAS\* for 12 NVMe configuration.

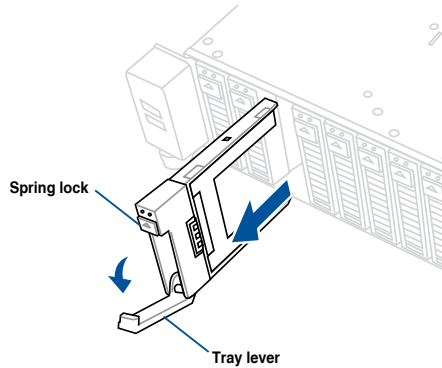
\* SAS support only from HBA/RAID card.

2 x 2.5" Storage Bays



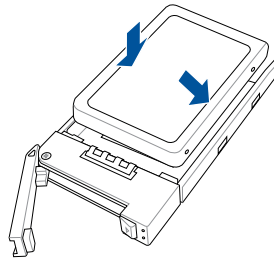
## 2.6.1 Installing a 2.5" hot-swap SATA/SAS/NVMe storage device

1. Press the spring lock then pull the tray lever outward to release the storage device tray. The storage device tray ejects slightly after you pull out the lever.

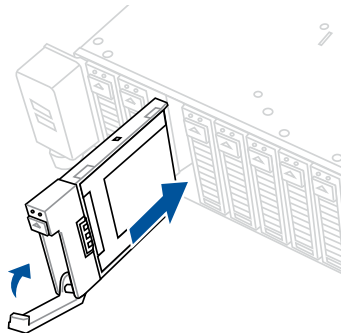


2. Firmly hold the tray lever and pull the storage device tray out of the bay.

3. Place the 2.5" storage device into the storage device tray until it clicks into place and is seated securely in the storage device tray.



4. Push the storage device tray and storage device assembly all the way into the depth of the bay until the tray lever and spring lock clicks and secures the storage device tray in place.

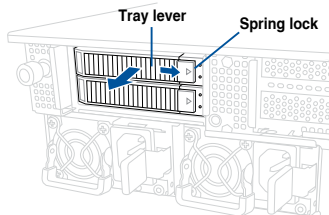


- When installed, the SATA/SAS/NVMe connector on the storage device connects to the SATA/SAS/NVMe interface on the backplane.
- The storage device tray is correctly placed when its front edge aligns with the bay edge.

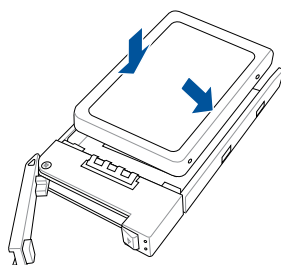
5. Repeat steps 1 to 4 to install the other SATA/SAS/NVMe storage devices.

## 2.6.2 Installing a 2.5" storage device to the rear bay

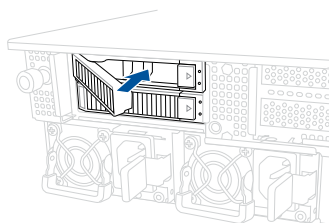
1. Press the spring lock then pull the tray lever outward to release the storage device tray. The storage device tray ejects slightly after you pull out the lever.
2. Firmly hold the tray lever and pull the storage device tray out of the bay.



3. Place the 2.5" storage device into the storage device tray and make sure it is seated firmly in the storage device tray.



4. Push the storage device tray and storage device assembly all the way into the depth of the rear storage bay until the tray lever and spring lock clicks and secures the storage device tray in place.



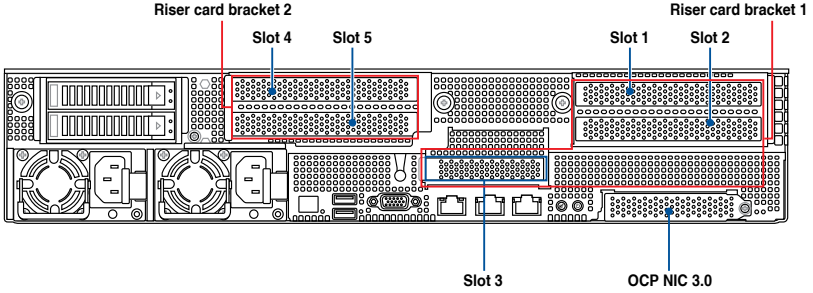
- When installed, the SATA/SAS/NVMe connector on the storage device connects to the SATA/SAS/NVMe interface on the backplane.
- The storage device tray is correctly placed when its front edge aligns with the bay edge.

5. Repeat steps 1 to 4 to install the other SATA/SAS/NVMe storage devices.



## 2.7 Expansion slot

The barebone server comes with a maximum of five (5) PCIe slots. These slots are pre-installed with two (2) riser card brackets for installing PCIe expansion cards. You need to remove these expansion card brackets if you want to install PCIe expansion cards.



### Riser card bracket 1

| PCIe slot         | Operation mode |        |
|-------------------|----------------|--------|
|                   | Mode 1         | Mode 2 |
| Slot 1            | x16            | x8     |
| Slot 2            | -              | x8     |
| Slot 3 (Internal) | x8             | x8     |

### Riser card bracket 2

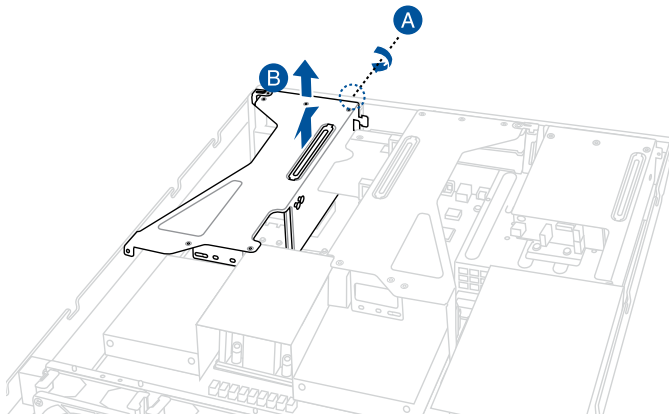
| PCIe slot | Operation mode |        |
|-----------|----------------|--------|
|           | Mode 1         | Mode 2 |
| Slot 5    | x16            | x8     |
| Slot 4    | -              | x8     |

## 2.7.1 Installing an expansion card to the left PCIe riser card bracket

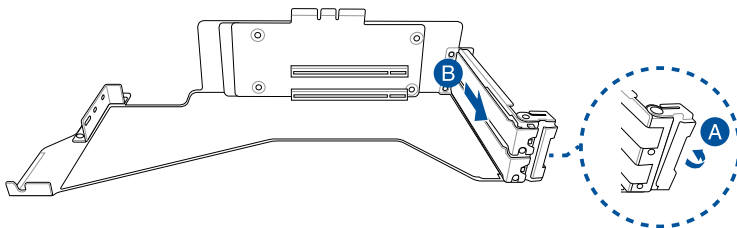
The pre-installed left PCIe riser card bracket on the GENZPCI1 slot has two PCIe x16 slots. The two PCIe x16 slots provides x16 Gen4 links, with the top PCIe slot's signal provided from CPU1 and the bottom PCIe slot's signal coming from CPU2.

To install PCIe x16 (Gen4 x16 link) proprietary cards, such as a graphics card to the left PCIe riser card bracket:

1. Loosen the thumbscrew (A) securing the left PCIe riser card bracket to the chassis, then lift the left PCIe riser card bracket upwards (B) out of the chassis to detach it from the PCIe x16 slot on the motherboard.



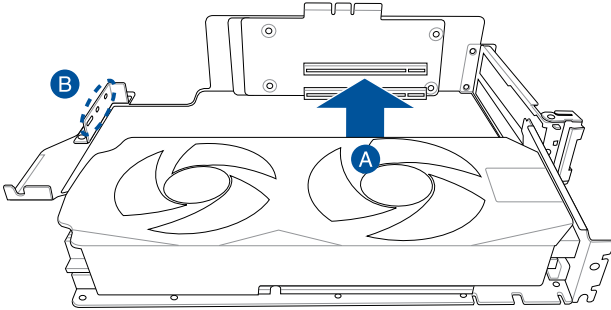
2. Prepare your expansion card and flip the left PCIe riser card bracket over.
3. Flip the metal bracket lock open (A) then slide the two metal brackets out of the left PCIe riser card bracket (B) and remove them.



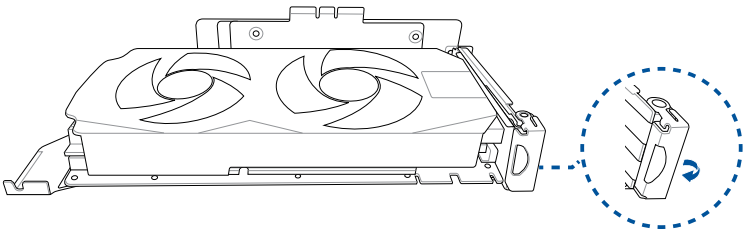
4. Install your expansion card to the PCIe x16 slot on the left PCIe riser card bracket (A), then secure your expansion card to the PCIe riser card bracket using the bundled screws (B). The illustration below is an example of a graphics card.



The amount of screws required may vary between expansion cards, only secure a bundled screw if a screw hole on the expansion card is aligned with the screw hole on the PCIe riser card.



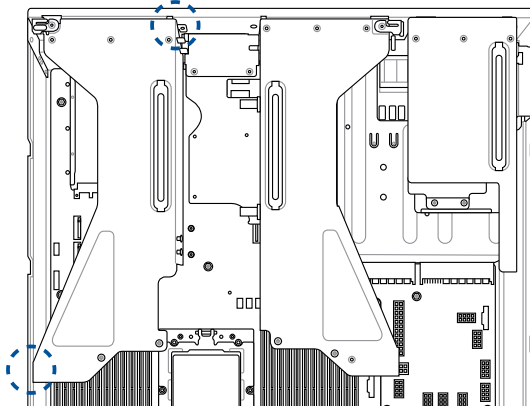
5. Once your expansion card is installed, flip the metal bracket lock back to secure the expansion card to the left PCIe riser card bracket.



- Align the left PCIe riser card bracket to the notch holes on the chassis and the **GENZPCIIE1** slot on the motherboard. Please refer to the illustration below for the locations of the notch holes on the chassis.



Ensure that no cables are below or in the way of the PCIe riser card bracket when installing it to the chassis.

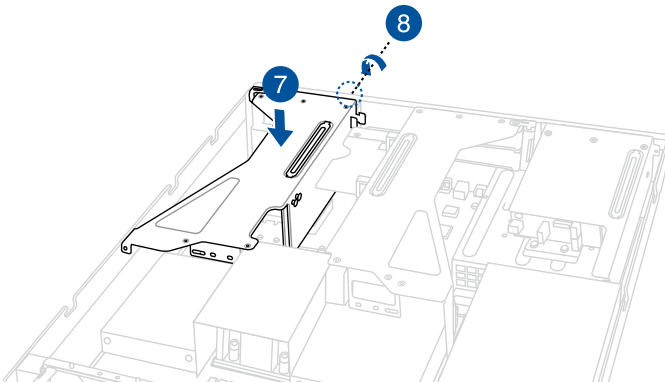


- Push the left PCIe riser card bracket down until it is seated firmly in the chassis.



Ensure that no cables are below or in the way of the PCIe riser card bracket when installing it to the chassis.

- Secure the left PCIe riser card bracket with the thumbscrew.

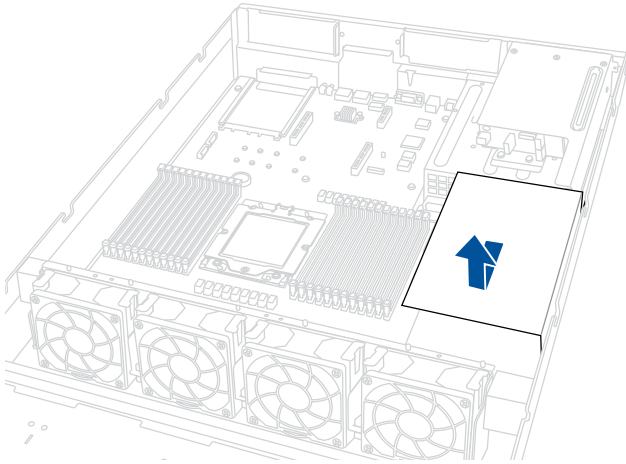


## 2.7.2 Installing an expansion card to the right PCIe riser card bracket

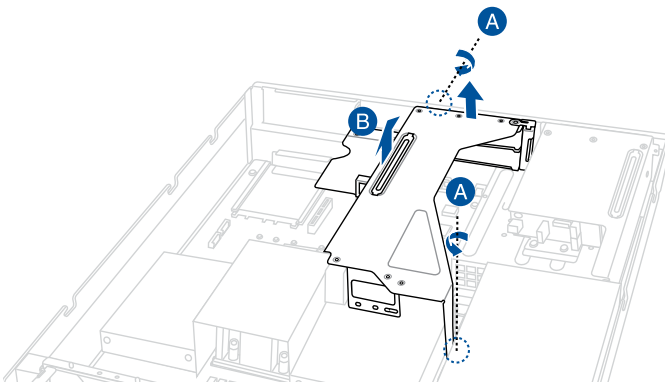
The pre-installed right PCIe riser card bracket on the GENZPCI2 slot has three PCIe x16 slots, two PCIe x16 slots and one PCIe x8 slot. The two PCIe x16 slots provides x16 Gen4 links, with the top PCIe slot's signal provided from CPU1 and the bottom PCIe slot's signal coming from CPU2. The PCIe x8 slot is reserved only for a PIKE II card.

To install PCIe x16 (Gen4 x16 link) proprietary cards, such as a graphics card to the right PCIe riser card bracket:

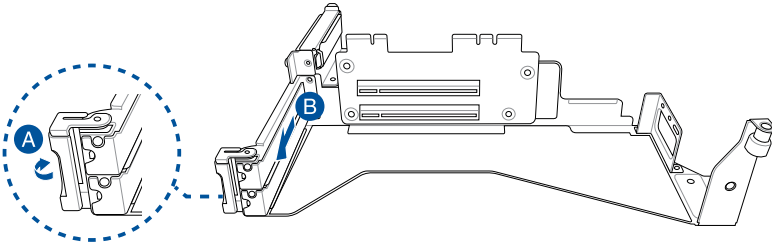
1. Lift and remove the PSU air duct.



2. Loosen the two (2) thumbscrews (A) securing the right PCIe riser card bracket to the chassis, then lift the right PCIe riser card bracket upwards (B) out of the chassis to detach it from the PCIe x16 slot on the motherboard.



3. Prepare your expansion card and flip the right PCIe riser card bracket over.
4. Flip the metal bracket lock open (A) then slide the two metal brackets out of the right PCIe riser card bracket (B) and remove them.



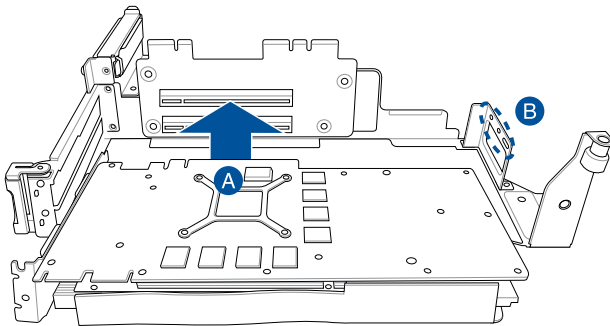
5. Install your expansion card to the PCIe x16 slot on the right PCIe riser card bracket (A), then secure your expansion card to the PCIe riser card bracket using the bundled screws (B). The illustration below is an example of a graphics card.



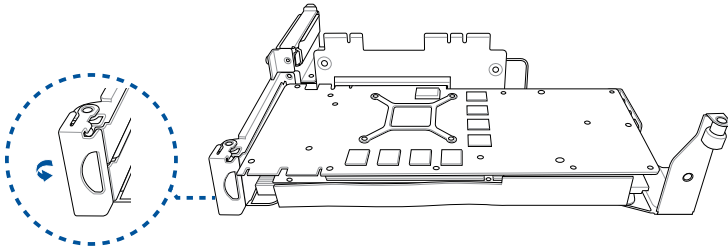
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The amount of screws required may vary between expansion cards, only secure a bundled screw if a screw hole on the expansion card is aligned with the screw hole on the PCIe riser card.

---



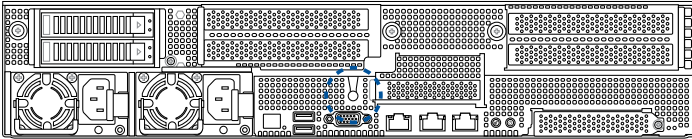
6. Once your expansion card is installed, flip the metal bracket lock back to secure the expansion card to the right PCIe riser card bracket.



7. Align the right PCIe riser card bracket to the notch hole on the rear of the chassis and the **GENZPCIe2** slot on the motherboard. Please refer to the illustration below for the location of the notch hole on the rear of the chassis.



Ensure that no cables are below or in the way of the PCIe riser card bracket when installing it to the chassis.

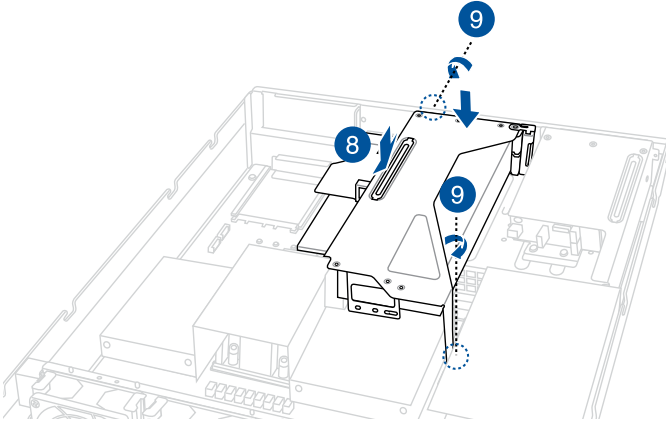


8. Push the right PCIe riser card bracket down until it is seated firmly in the chassis.

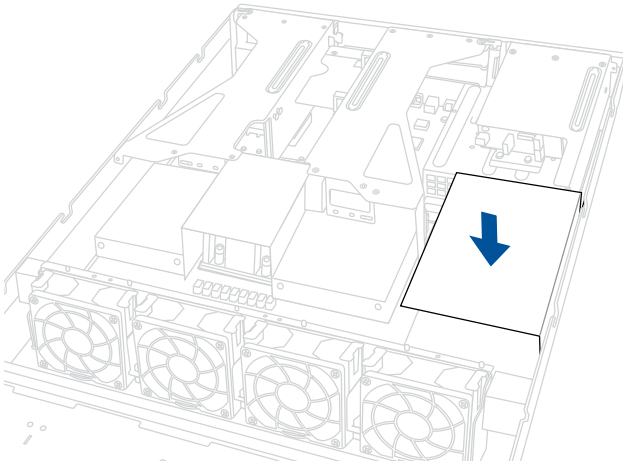


Ensure that no cables are below or in the way of the PCIe riser card bracket when installing it to the chassis.

9. Secure the right PCIe riser card bracket with the two (2) thumbscrews.



10. Replace the PSU airduct.

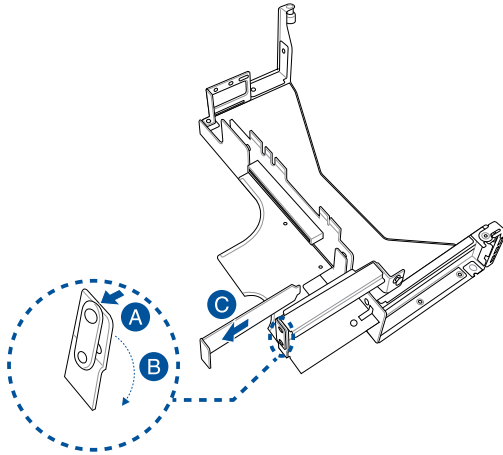




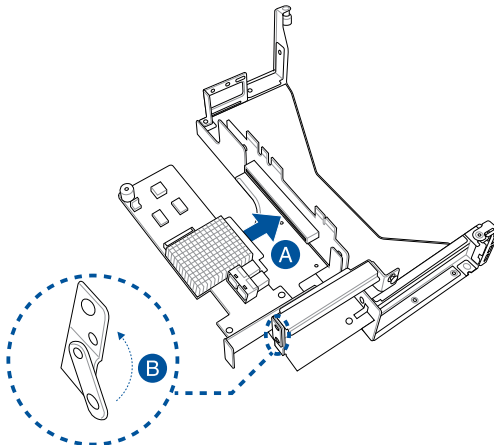
### 2.7.3 Installing an HBA/RAID card to the right PCIe riser card bracket

To install an HBA/RAID card to the right PCIe riser card:

1. Follow step 1 of the **Installing an expansion card to the right PCIe riser card bracket** section to remove the right PCIe riser card bracket.
2. Prepare your HBA/RAID card and flip the right PCIe riser card bracket over.
3. Slightly pull the lock latch outwards (A), then rotate the lock latch clockwise (B) and remove the metal bracket (C).



4. Insert the HBA/RAID card into the PCIe x8 slot on the right PCIe riser card (A), then rotate the lock latch counter-clockwise (B) until the lock latch secures the HBA/RAID card in place.

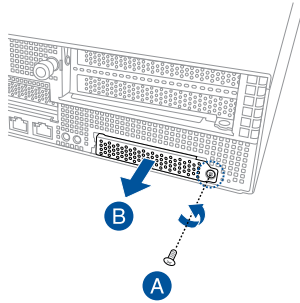


5. Connect the MiniSAS to Slimline SAS cables to the HBA/RAID card.
6. Follow steps 6 to 7 of the **Installing an expansion card to the right PCIe riser card bracket** section to reinstall the right PCIe riser card bracket to the system.

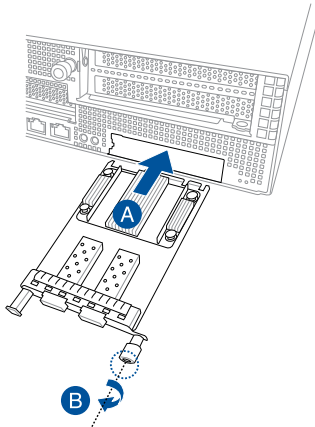
## 2.7.4 Installing an OCP 3.0 card to the OCP 3.0 slot

To install the OCP 3.0 card to the server system:

1. Remove the screw securing the metal bracket of the OCP 3.0 slot (A), then remove the metal bracket (B).



2. Insert and push the OCP 3.0 card all the way into the OCP 3.0 slot (A), then secure the OCP 3.0 card using the thumbscrew (B).



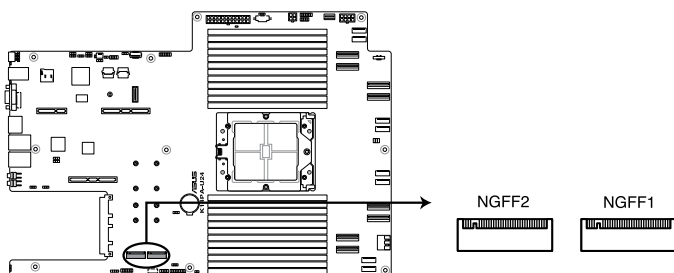
## 2.7.5 Installing an M.2 (NGFF) card

You may install an M.2 card (supports up to 22110) to the onboard M.2 (NGFF) slot on the motherboard.



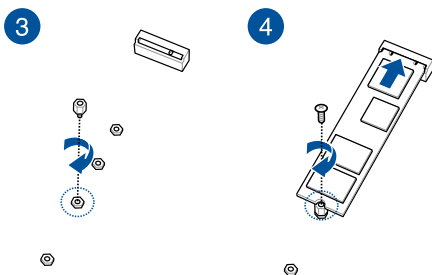
Both NGFF1 and NGFF2 slots support x4 PCIe link. If one of NGFF1 or NGFF2 slots are occupied, both slots will support SATA link.

1. Follow step 1 of the **Installing an expansion card to the left PCIe riser card bracket** section to remove the left PCIe riser card bracket.
2. Locate the M.2 connector (NGFF1 or NGFF2) on the motherboard.



**K14PA-U24 NGFF connectors**

3. Select an appropriate screw hole on the motherboard for your M.2 card, then secure the bundled stand to the motherboard.
4. Insert the M.2 into the M.2 (NGFF) slot, then secure it using the bundled screw.



5. Follow steps 6 to 8 in **Installing an expansion card to the left PCIe riser card bracket** section to replace the left PCIe riser card bracket.

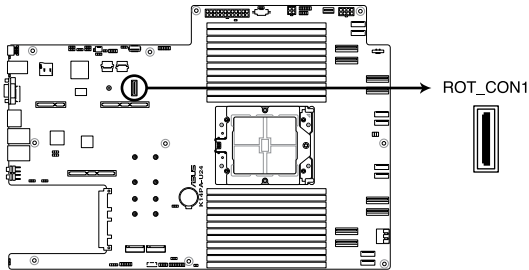
## 2.7.6 (optional) Installing the PFR module

The optional PFR module will come pre-installed on your system and is connected to the PFR module connector on your motherboard.



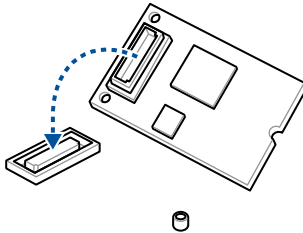
- The illustration below is for reference only.
- For more information or assistance, please refer to [www.asus.com](http://www.asus.com).

1. Locate the PFR module connector on your motherboard.

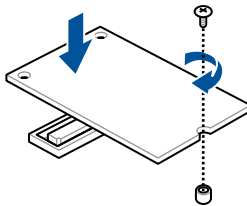


**K14PA-U24 ROT\_CON1 connector**

2. Align and connect the PFR module to the PFR module connector.



3. Push the PFR module down so that it is seated securely on the PFR module connector, then secure it using a screw.



## 2.7.7 Configuring an expansion card

After installing the expansion card, configure it by adjusting the software settings.

1. Turn on the system and change the necessary BIOS settings, if any. Refer to the **BIOS Setup** chapter for more information on BIOS setup.
2. Assign an IRQ to the card. Refer to the following tables.
3. Install the software drivers for the expansion card.

### Standard Interrupt assignments

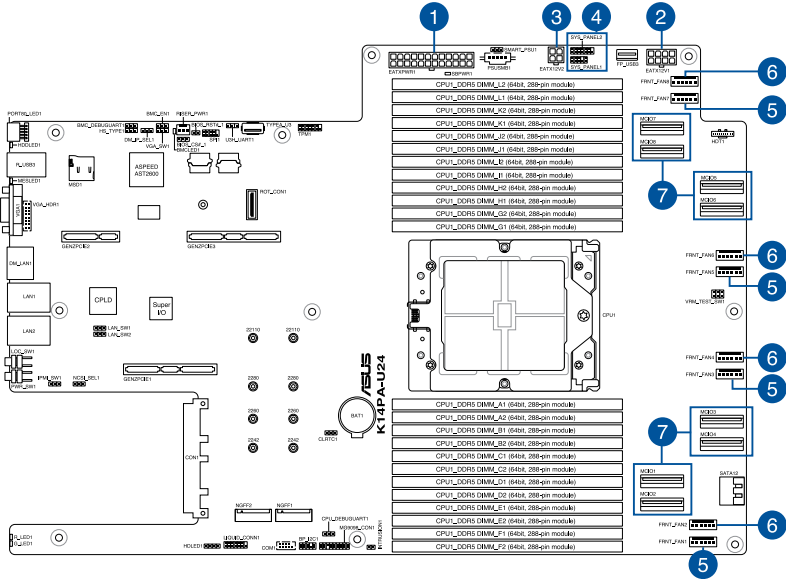
| IRQ | Priority | Standard function           |
|-----|----------|-----------------------------|
| 0   | 1        | System Timer                |
| 1   | 2        | Keyboard Controller         |
| 2   | -        | Programmable Interrupt      |
| 3*  | 11       | Communications Port (COM2)  |
| 4*  | 12       | Communications Port (COM1)  |
| 5*  | 13       | --                          |
| 6   | 14       | Floppy Disk Controller      |
| 7*  | 15       | --                          |
| 8   | 3        | System CMOS/Real Time Clock |
| 9*  | 4        | ACPI Mode when used         |
| 10* | 5        | IRQ Holder for PCI Steering |
| 11* | 6        | IRQ Holder for PCI Steering |
| 12* | 7        | PS/2 Compatible Mouse Port  |
| 13  | 8        | Numeric Data Processor      |
| 14* | 9        | Primary IDE Channel         |
| 15* | 10       | Secondary IDE Channel       |

\* These IRQs are usually available for ISA or PCI devices.

## 2.8 Cable connections



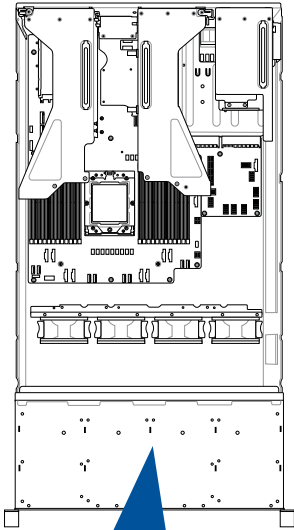
- The bundled system cables are pre-connected before shipment. You do not need to disconnect these cables unless you are going to remove pre-installed components to install additional devices.
- Refer to Chapter 4 for detailed information on the connectors.



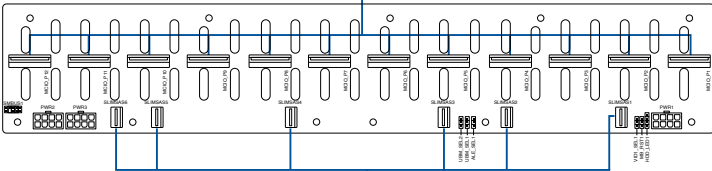
### Pre-connected system cables

1. 24-pin EATXPWR1 power connector (connected to power board)
2. 8-pin EATX12V1 power connector (connected to power board)
3. 4-pin EATX12V2 power connector (connected to power board)
4. Panel connector (connected to front I/O board)
5. FRNT\_FAN1, FRNT\_FAN3, FRNT\_FAN5, FRNT\_FAN7 System fan connectors (from motherboard to system fans)
6. FRNT\_FAN2, FRNT\_FAN4, FRNT\_FAN6, FRNT\_FAN8 System fan connectors (optional, from motherboard to system fans)
7. MCIO1, MCIO2, MCIO3, MCIO4, MCIO5, MCIO6, MCIO7, and MCIO8 Slim PCIe connectors (connected to front backplane)

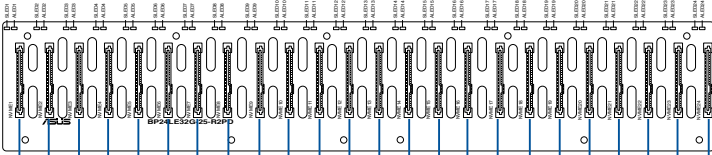
## 2.9 Backplane cabling



Connects to MCIO connectors on the motherboard for NVMe support on Bay 1 to Bay 24 depending on your storage device configuration. For more information on storage device configurations, please refer to Storage device configuration and cabling section.



Connects to HBA/RAID card or to the SLIMSAS connectors on the motherboard for SAS/SATA support on Bay 1 to Bay 24 depending on your storage device configuration. For more information on storage device configurations, please refer to Storage device configuration and cabling section.



Connects to NVMe/SAS/SATA storage devices (SAS support requires an optional HBA/RAID card)

Connects to NVMe storage devices

Connects to NVMe/SAS/SATA storage devices (SAS support requires an optional HBA/RAID card)

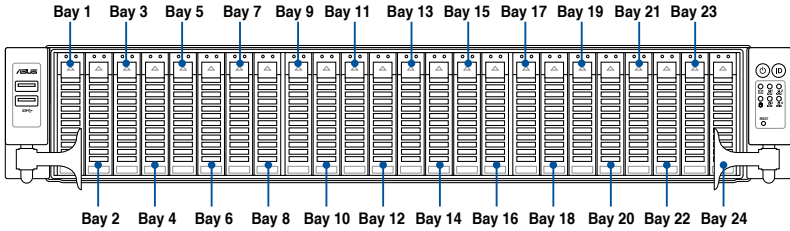


## 2.10 Storage device configuration and cabling

This section illustrates some storage configurations that is recommended with your server system. Before you start installing or removing the storage device cables, ensure that you have installed the correct storage devices into the supported bays.



Refer to section **Storage Devices** for details on how to install storage devices.



- Bay 1 to bay 24 supports NVMe for 24 NVMe configuration.
- Bay 5 to bay 20 supports NVMe; others support SATA/SAS\* from HBA/RAID for 16 NVMe configuration.
- Bay 5 to bay 16 supports NVMe, others supports SATA/SAS\* for 12 NVMe configuration.

\* SAS support only from HBA/RAID card.

## 2.10.1 24 x NVMe storage device configuration and cabling

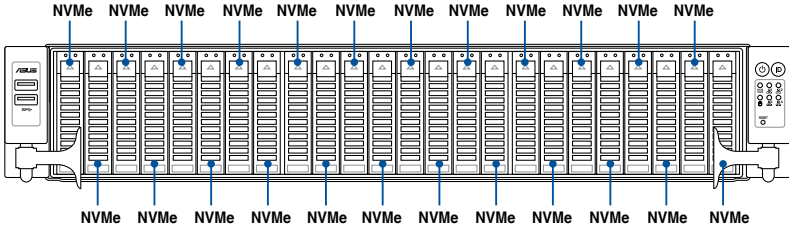


The illustrations in this section are for reference only and may vary between models.

1. Install the storage devices into the supported bays.



Refer to section **Storage Devices** for details on how to install storage devices.



2. Connect the GENZPCI to MCIO cables to the motherboard and the backplane.

| Backplane connector | Cable           | Connect to                  |
|---------------------|-----------------|-----------------------------|
| MCIO_P1             | GENZPCI to MCIO | GENZPCI1 on the motherboard |
| MCIO_P2             | GENZPCI to MCIO | GENZPCI1 on the motherboard |
| MCIO_P3             | GENZPCI to MCIO | MCIO1 on motherboard        |
| MCIO_P4             | GENZPCI to MCIO | MCIO2 on motherboard        |
| MCIO_P5             | GENZPCI to MCIO | MCIO3 on motherboard        |
| MCIO_P6             | GENZPCI to MCIO | MCIO4 on motherboard        |
| MCIO_P7             | GENZPCI to MCIO | MCIO5 on motherboard        |
| MCIO_P8             | GENZPCI to MCIO | MCIO6 on motherboard        |
| MCIO_P9             | GENZPCI to MCIO | MCIO7 on motherboard        |
| MCIO_P10            | GENZPCI to MCIO | MCIO8 on motherboard        |
| MCIO_P11            | GENZPCI to MCIO | GENZPCI3 on the motherboard |
| MCIO_P12            | GENZPCI to MCIO | GENZPCI3 on the motherboard |

## 2.10.2 16 x NVMe and 8 x SAS/SATA storage device configuration and cabling

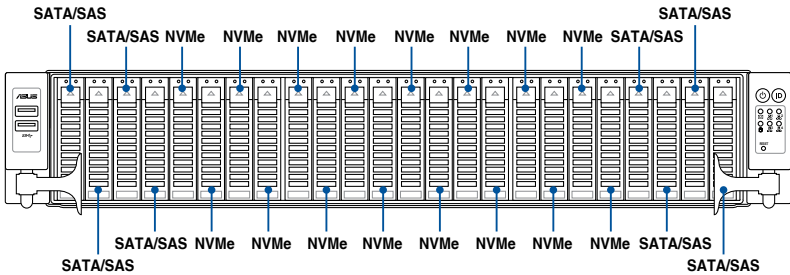


- The illustrations in this section are for reference only and may vary between models.
- This configuration requires an HBA/RAID card.

1. Install the storage devices into the supported bays.



Refer to section **Storage Devices** for details on how to install storage devices.



2. Connect the MCIO cables to the motherboard and the backplane.
3. Connect the SLIMSAS cables to the HBA/RAID card and the backplane.

| Backplane connector | Cable              | Connect to           |
|---------------------|--------------------|----------------------|
| MCIO_P3             | MCIO to MCIO       | MCIO1 on motherboard |
| MCIO_P4             | MCIO to MCIO       | MCIO2 on motherboard |
| MCIO_P5             | MCIO to MCIO       | MCIO3 on motherboard |
| MCIO_P6             | MCIO to MCIO       | MCIO4 on motherboard |
| MCIO_P7             | MCIO to MCIO       | MCIO5 on motherboard |
| MCIO_P8             | MCIO to MCIO       | MCIO6 on motherboard |
| MCIO_P9             | MCIO to MCIO       | MCIO7 on motherboard |
| MCIO_P10            | MCIO to MCIO       | MCIO8 on motherboard |
| SLIMSAS1            | SLIMSAS to SLIMSAS | HBA/RAID card        |
| SLIMSAS6            | SLIMSAS to SLIMSAS | HBA/RAID card        |

## 2.11 Removable/optional components

This section explains how to install optional components into the system and covers the following components:

1. System fans
2. Redundant power supply module



---

Ensure that the system is turned off before removing any components.

---



---

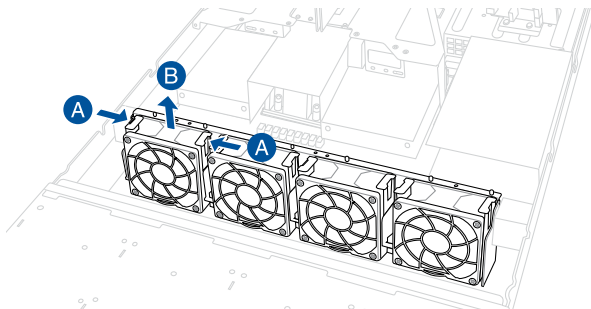
You may need to remove previously installed component or factory shipped components when installing optional components.

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### 2.11.1 System fans

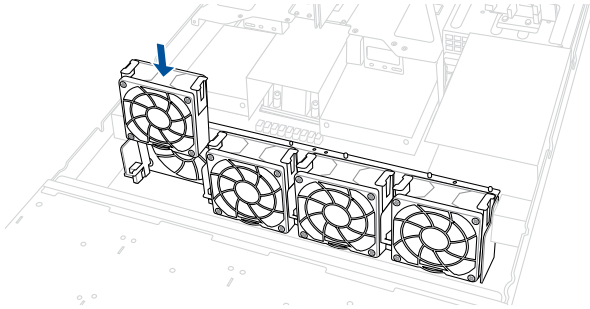
To remove the system fans:

1. Locate the fan you want to replace.
2. Press the retaining clips inwards (A) and lift upward (B) to remove the fan.



To reinstall the system fans:

1. Prepare the fan with the same model and size.
2. Install the fan to the fan cage.



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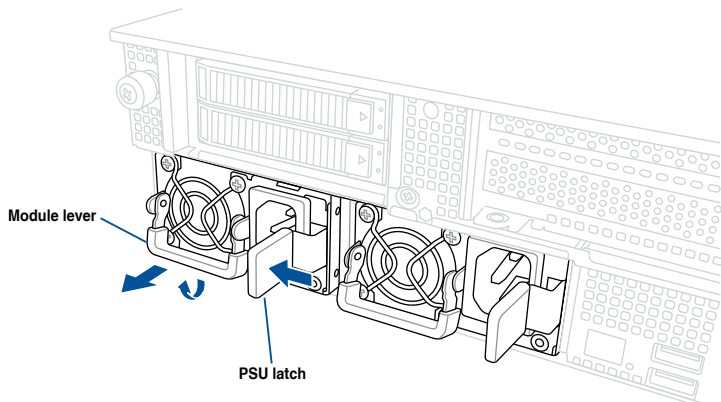
The fan can only be installed in one direction. If the fan cannot be installed, turn it around and try again.

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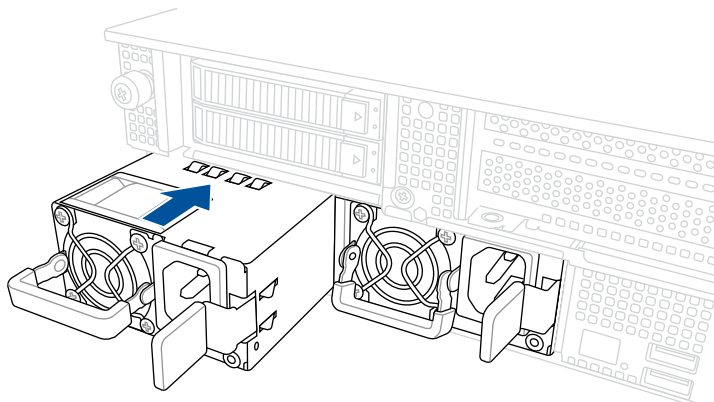
## 2.11.2 Redundant power supply module

To replace a failed redundant power supply module:

1. Lift up the power supply module lever.
2. Hold the power supply module lever and press the PSU latch, then pull the power supply module out of the system chassis.



3. Prepare the replacement power supply module.
4. Insert the replacement power supply module into the chassis then push it inwards until the latch locks into place.



## 2.12 Rail Kit Options

This server system supports the rail kit options listed below. For more information on rail kit installation, refer to corresponding documentation on the ASUS support site or on the official product site for this server system.



- 
- We strongly recommend that at least two able-bodied persons perform the installation of the rail kit.
  - We recommend the use of an appropriate lifting tool or device, if necessary.
- 
- Friction rail kit
  - 1.5U height full extension ball bearing rail kit



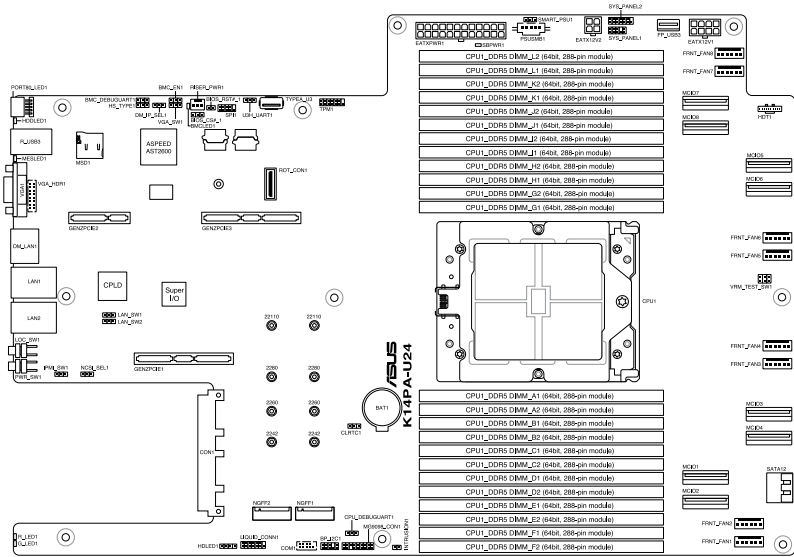


# Motherboard Information

# 3

This chapter includes the motherboard layout and brief descriptions of the jumpers and internal connectors.

# 3.1 Motherboard layout



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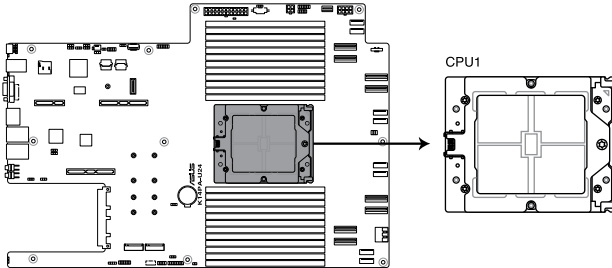
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| 11. Micro SD Card slot (MSD1)   | 4-19 |
| 12. Storage Device Activity LED connector (4-pin HDLED1)              | 4-19 |
| 13. System Panel connector (10-1 pin SYS_PANEL1; 14-1 pin SYS_PANEL2) | 4-20 |
| 14. BMC Debug UART connector (3-pin BMC_DEBUGUART1)                   | 4-21 |
| 15. Liquid connector (14-1 pin LIQUID_CONN1)                          | 4-21 |
| 16. Power Supply SMBus connector (5-pin PSUSMB1)                      | 4-22 |
| 17. Platform Firmware Resilience (PFR) module connector (ROT_CON)     | 4-22 |
| 18. Front BP SMBus Protocol connector (10-1 pin BP_I2C1)              | 4-23 |
| 19. Internal BP SMBus Protocol connector (18-1 MG9098_CON1)           | 4-23 |

### 3.2 Central Processing Unit (CPU)

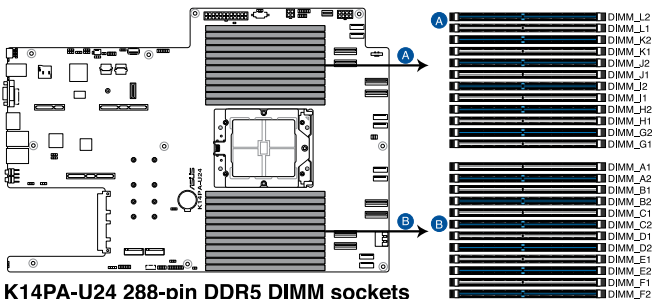
The motherboard comes with a surface mount SP5 socket designed for the AMD EPYC™ 7004 Series Family processors.



**K14PA-U24 CPU Socket SP5 LGA 6096**

### 3.3 Dual Inline Memory Module (DIMM)

The motherboard comes with 24 Double Data Rate 5 (DDR5) Dual Inline Memory Modules (DIMM) sockets.



**K14PA-U24 288-pin DDR5 DIMM sockets**

# 3.4 Jumpers

## 1. Clear RTC RAM (3-pin CLRTC1)

This jumper allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of date, time, and system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which include system setup information such as system passwords.

To erase the RTC RAM:

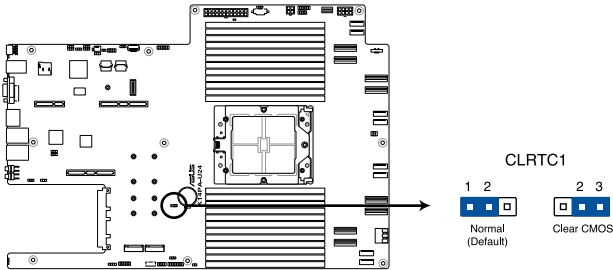
1. Turn OFF the computer and unplug the power cord.
2. Move the jumper cap from pins 1–2 (default) to pins 2–3. Keep the cap on pins 2–3 for about 5–10 seconds, then move the cap back to pins 1–2.
3. Plug the power cord and turn ON the computer.
4. Hold down the <Del> key during the boot process and enter BIOS setup to re-enter data.



Except when clearing the RTC RAM, never remove the cap on CLRTC jumper default position. Removing the cap will cause system boot failure!



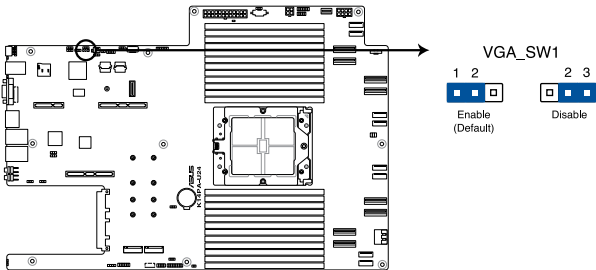
If the steps above do not help, remove the onboard battery and move the jumper again to clear the CMOS RTC RAM data. After the CMOS clearance, reinstall the battery.



**K14PA-U24 Clear RTC RAM**

## 2. VGA controller setting (3-pin VGA\_SW1)

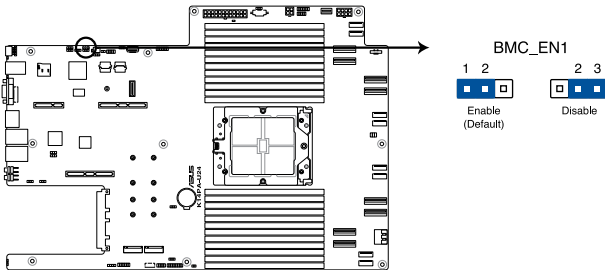
This jumper allows you to enable or disable the onboard VGA controller. Set to pins 1-2 to activate the VGA feature.



**K14PA-U24 VGA setting**

## 3. Baseboard Management Controller setting (3-pin BMC\_EN1)

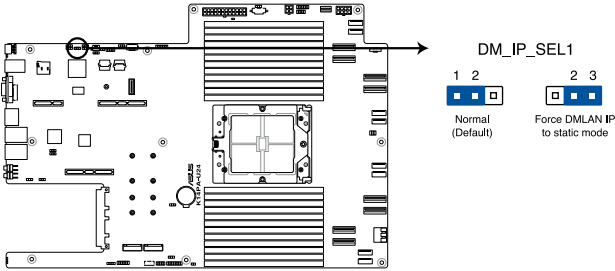
This jumper allows you to enable (default) or disable on-board BMC. Ensure to set this BMC jumper to enabled to avoid system fan control and hardware monitor error.



**K14PA-U24 BMC setting**

**4. DMLAN setting (3-pin DM\_IP\_SEL1)**

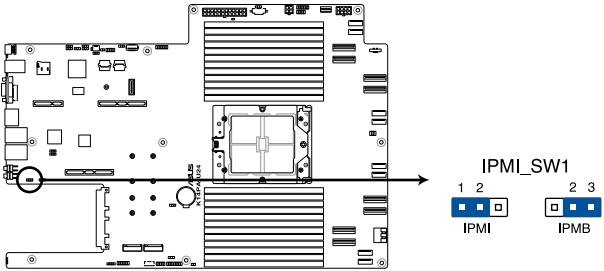
This jumper allows you to select the DMLAN setting. Set to pins 2-3 to force the DMLAN IP to static mode (IP=10.10.10.10, submask=255.255.255.0).



**K14PA-U24 DM\_IP\_SEL1 setting**

**5. IPMI SW setting (3-pin IPMI\_SW1)**

This jumper allows you to select which protocol in the GPU sensor to function.

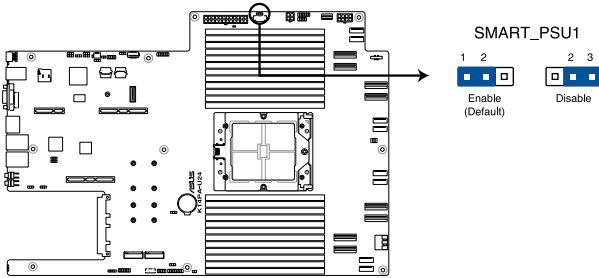


**K14PA-U24 IPMI\_SW1 setting**



## 6. Smart Ride Through (SmaRT) setting (3-pin SMART\_PSU1)

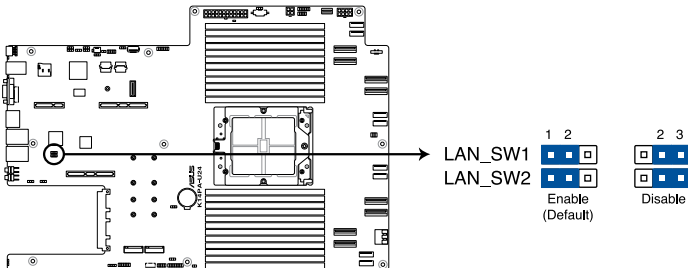
This jumper allows you to enable or disable the Smart Ride Through (SmaRT) function. This feature is enabled by default. Set to pins 2-3 to disable it. When enabled, SmaRT allows uninterrupted operation of the system during an AC loss event.



**K14PA-U24 Smart Ride Through setting**

## 7. LAN Controller settings (3-pin LAN\_SW1-2)

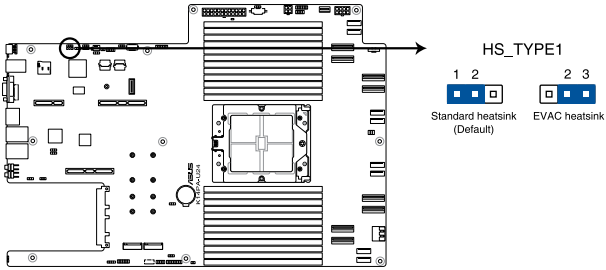
These jumpers allow you to enable or disable the onboard LAN\_SW1 or LAN\_SW2. Set to pins 1-2 to activate the Gigabit LAN feature.



**K14PA-U24 LAN setting**

**8. Heatsink Type setting (3-pin HS\_TYPE1)**

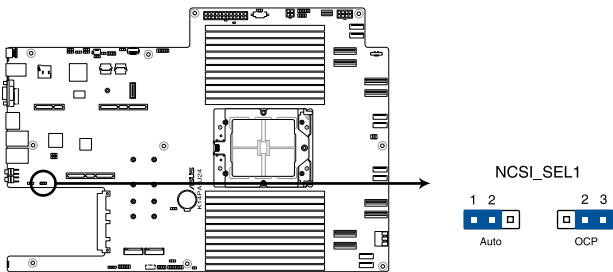
This jumper should be set according to the type of heatsink installed.



**K14PA-U24 HS\_TYPE1 setting**

**9. NCSI Device setting (3-pin NCSI\_SEL1)**

This jumper allows you to select which LAN NCSI to enable.

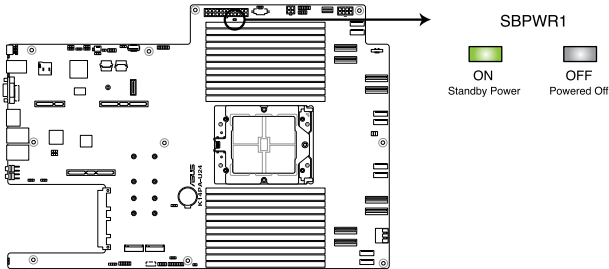


**K14PA-U24 NCSI\_SEL1 setting**

## 3.5 Internal LEDs

### 1. Standby Power LED (SBPWR1)

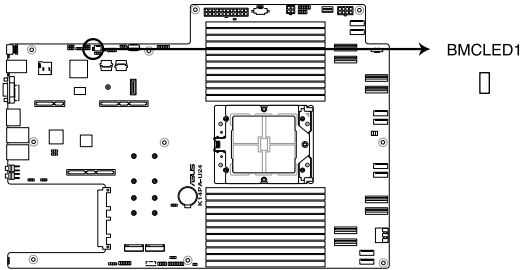
The motherboard comes with a standby power LED. The green LED lights up to indicate that the system is ON, in sleep mode, or in soft-off mode. This is a reminder that you should shut down the system and unplug the power cable before removing or plugging in any motherboard component. The illustration below shows the location of the onboard LED.



**K14PA-U24 Standby Power LED**

### 2. Baseboard Management Controller LED (BMCLED1)

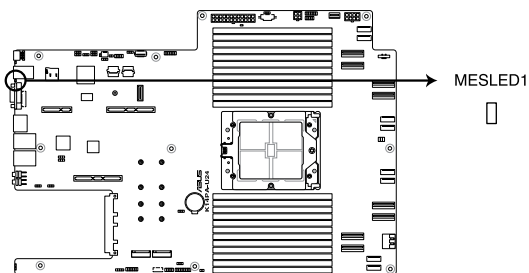
The BMC LED lights up to indicate that the on-board BMC is functional.



**K14PA-U24 BMCLED1**

### 3. Message LED (MESLED1)

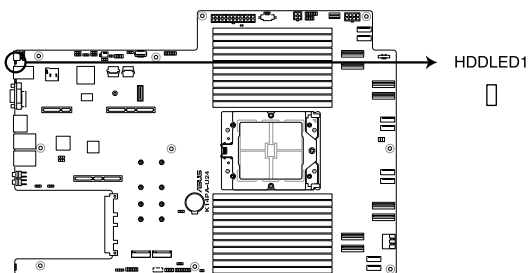
This onboard LED lights up to red when there is a BMC event log is generated.



**K14PA-U24 MESLED1**

### 4. Storage Device Activity LED (HDDLED1)

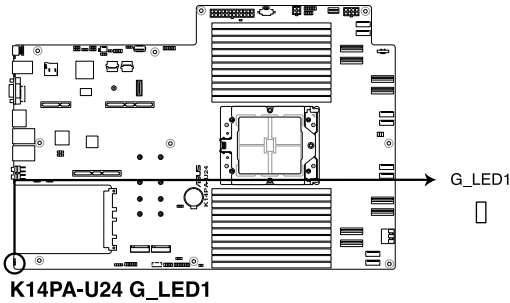
This LED is for the storage devices connected to the onboard SATA, or SATA/SAS add-on card. The read or write activities of any device connected to the onboard SATA, or SATA/SAS add-on card causes the rear panel LED to light up.



**K14PA-U24 HDDLED1**

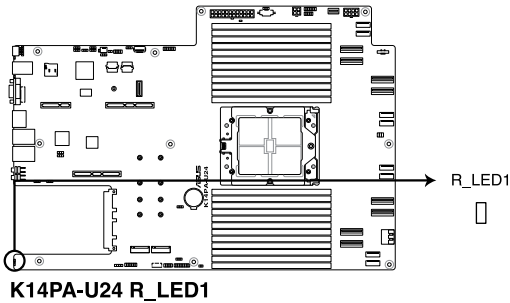
**5. OCP 3.0 Operation Normal LED (G\_LED1)**

The OCP 3.0 operation normal LED lights up to indicate that OCP 3.0 is functional.



**6. OCP 3.0 Power Fail LED (R\_LED1)**

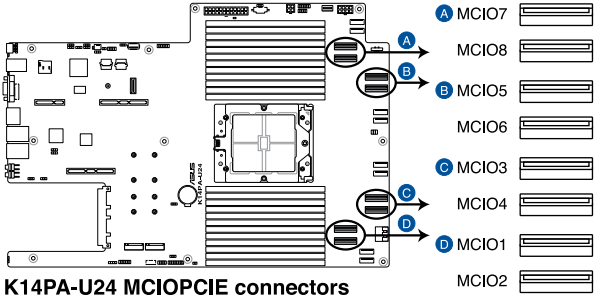
The OCP 3.0 power fail LED lights up to indicate that OCP 3.0 has encountered a power fail error.



### 3.6 Internal connectors

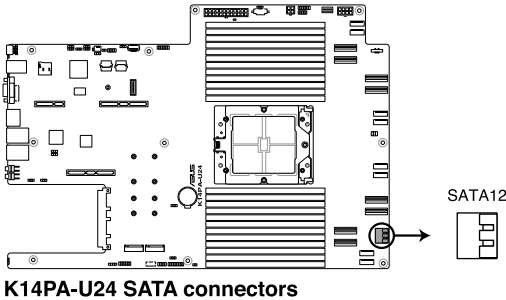
#### 1. MCIOPCIE connectors (MCIOPCIE1-3)

Connects the PCIe signal to the riser card or NVMe port on the backplane.



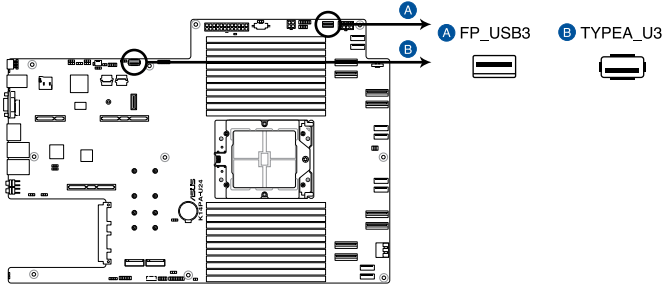
#### 2. SATA connector (SATA12)

Connects SATA signal to backplane to support SATA drives.



### 3. USB 3.2 Gen 1 connector (FP\_USB3; TYPEA\_U3)

This connector allows you to connect a USB 3.2 Gen 1 module for additional USB 3.2 Gen 1 ports on the front panel. The USB 3.2 Gen 1 connector provides data transfer speeds of up to 10 Gb/s. The Type-A connector allows you to directly connect a USB flash drive.



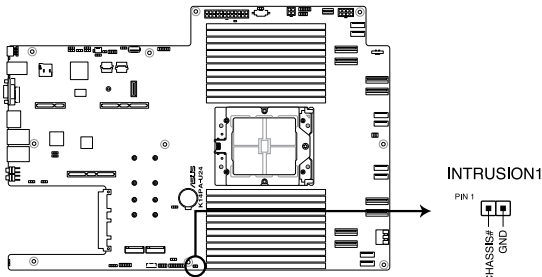
**K14PA-U24 USB 3.2 Gen 1 connectors**



The USB port module is purchased separately.

### 4. Chassis Intrusion (2-pin INTRUSION1)

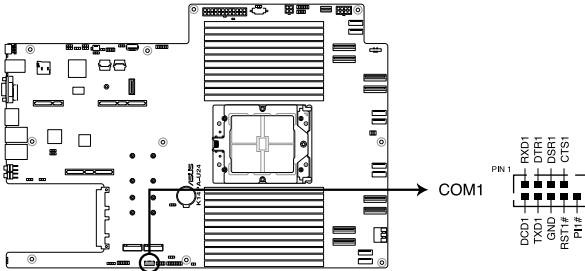
These leads are for the intrusion detection feature for chassis with intrusion sensor or microswitch. When you remove any chassis component, the sensor triggers and sends a high level signal to these leads to record a chassis intrusion event. The default setting is to short the CHASSIS# and the GND pin by a jumper cap to disable the function.



**K14PA-U24 Chassis Intrusion connector**

**5. Serial Port connector (10-1 pin COM1)**

This connector is for a serial (COM) port. Connect the serial port module cable to this connector, then install the module to a slot opening at the back of the system chassis.



**K14PA-U24 Serial port connector**



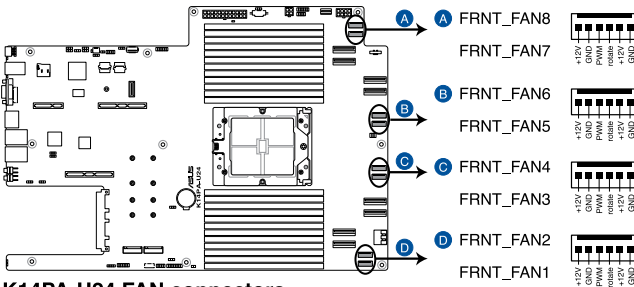
The COM module is purchased separately.

**6. System Fan connectors (6-pin FRNT\_FAN1-8)**

The fan connectors support cooling fans of 0.8A–1.0A (12 W max.) or a total of 6.4 A–8.0 A (96 W max.) at +12V. Connect the fan cables to the fan connectors on the motherboard, making sure that the black wire of each cable matches the ground pin of the connector.



DO NOT forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! DO NOT place jumper caps on the fan connectors!

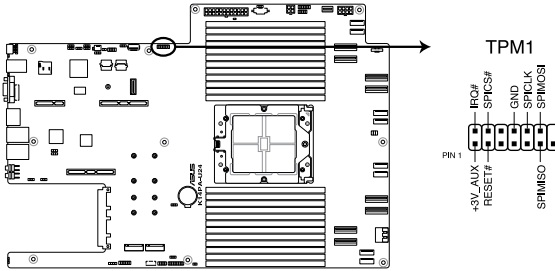


**K14PA-U24 FAN connectors**



**7. TPM connector (14-pin TPM1)**

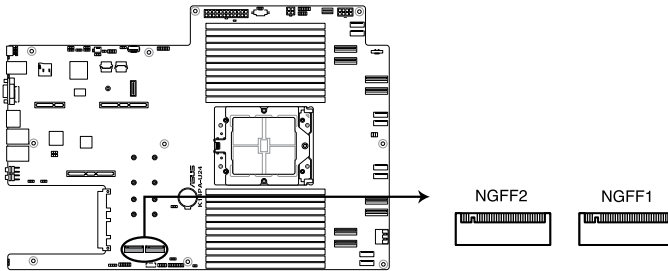
This connector supports a Trusted Platform Module (TPM) system, which can securely store keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity.



**K14PA-U24 TPM connectors**

**8. M.2 (NGFF) connector (NGFF1-2)**

These connectors allow you to install M.2 devices.



**K14PA-U24 NGFF connectors**



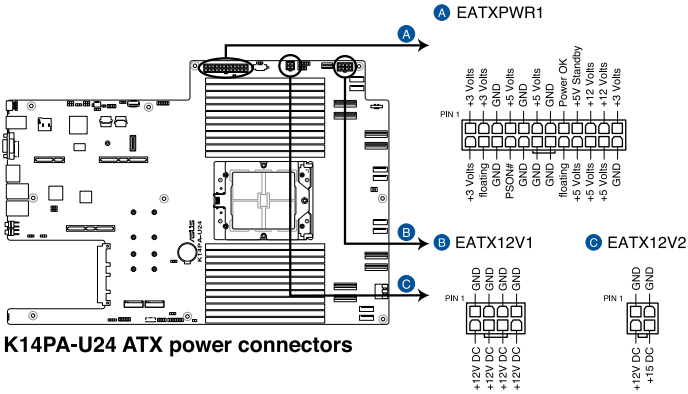
This connector supports type 2242 / 2260 / 2280 / 22110 devices on both PCIe and SATA interface.



The M.2 (NGFF) device is purchased separately

**9. Power connectors (24-pin EATXPWR; 8-pin EATX12V1; 4-pin EATX12V2)**

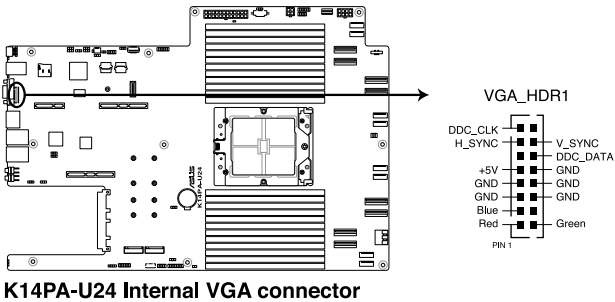
These connectors are for the power supply plugs that connects to the power board. The power supply plugs are designed to fit these connectors in only one orientation. Find the proper orientation and push down firmly until the connectors completely fit.



DO NOT connect VGA cards to these connectors. Doing so may cause system boot errors and permanent damage to your motherboard or device.

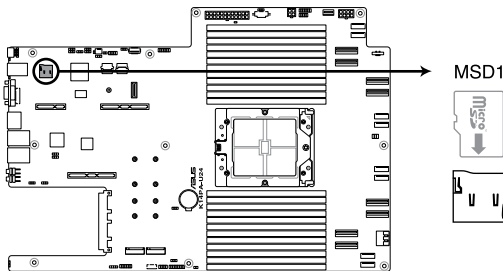
**10. VGA connector (16-pin VGA\_HDR1)**

This connector supports the VGA High Dynamic-Range interface.



## 11. Micro SD Card slot (MSD1)

Your motherboard supports SD Memory Card v2.00 (SDHC) / v3.00 (SDXC).



**K14PA-U24 MicroSD card slot**



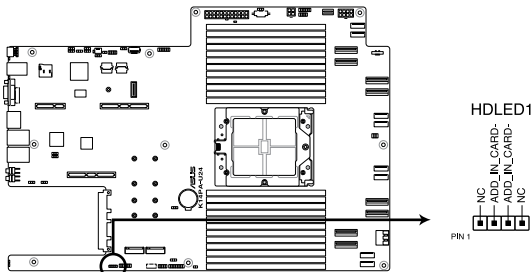
Disconnect all power (including redundant PSUs) from the existing system before you add or remove a Memory Card, then reboot the system to access the Memory Card.



Some memory cards may not be compatible with your motherboard. Ensure that you use only compatible memory cards to prevent loss of data, damage to your device, or memory card, or both.

## 12. Storage Device Activity LED connector (4-pin HDLED1)

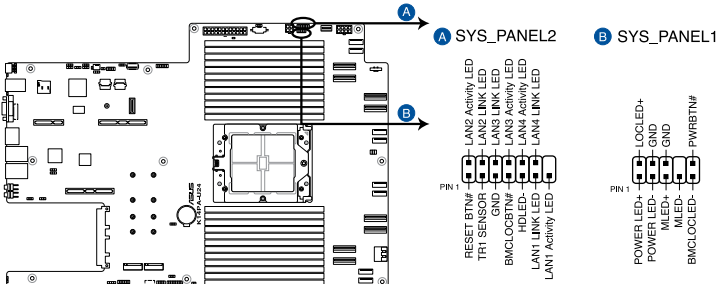
This LED connector is for the storage add-on card cable connected to the SATA or SAS add-on card. The read or write activities of any device connected to the SATA or SAS add-on card causes the front panel LED to light up.



**K14PA-U24 Storage device activity LED connector**

### 13. System Panel connector (10-1 pin SYS\_PANEL1; 14-1 pin SYS\_PANEL2)

This connector supports several chassis-mounted functions.



**K14PA-U24 System panel connectors**

- **System power LED (POWERLED)**

This 2-pin connector is for the system power LED. Connect the chassis power LED cable to this connector. The system power LED lights up when you turn on the system power, and blinks when the system is in sleep mode.

- **Message LED (2-pin MLED)**

This 2-pin connector is for the message LED cable that connects to the front message LED. The message LED is controlled by the BMC to indicate an abnormal event occurrence.

- **Locator LED connector (BMCLOCLED, LOCLED)**

This connector allows you to connect the Locator LED. The Location LED helps visually locate and identify the server in error on a server rack.

- **Power Button/Soft-off Button connector (PWRBTN)**

The 3-1 pin connector allows you to connect the system power button. Press the power button to power up the system, or put the system into sleep or soft-off mode (depending on the operating system settings).

- **LAN activity LED connector (LAN1\_LED, LAN2\_LED, LAN3\_LED, LAN4\_LED)**

This 2-pin connector allows you to connect the Gigabit LAN Activity LED.

- **Reset button connector (RESET)**

This connector allows you to connect the chassis-mounted reset button. Press the reset button to reboot the system.

- **TR1 Sensor connector (TR1 SENSOR)**

This connector allows detection of the environmental temperature of the front panel.

- **Locator button connector (BMCLOCBTN#)**

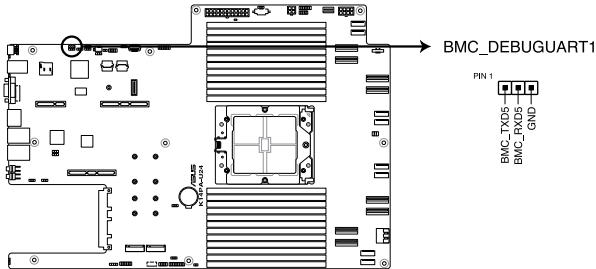
This connector allows you to connect the Locator button. Press the button to light up the Locator LED.

- **Storage Device Activity LED connector (HDLED)**

This connector allows you to connect the Storage Device Activity LED. The Storage Device Activity LED lights up or blinks when data is read from or written to the storage device or storage device add-on card.

**14. BMC Debug UART connector (3-pin BMC\_DEBUGUART1)**

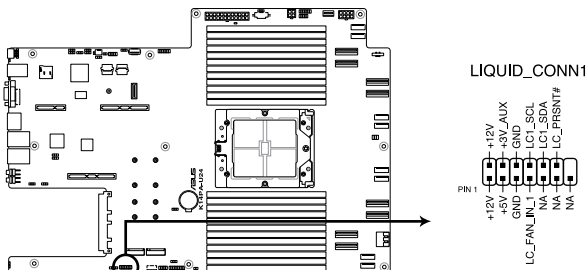
This connector is used for reading the BMC UART Debug log.



**K14PA-U24 BMC\_DEBUGUART1 connector**

**15. Liquid connector (14-1 pin LIQUID\_CONN1)**

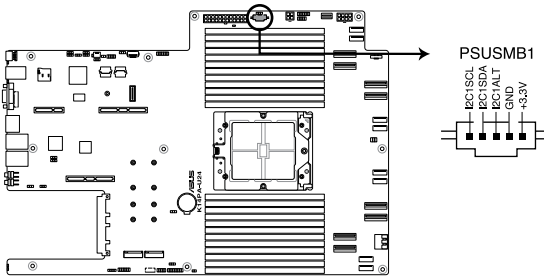
This connector is used for detecting the pump speed of the water cooling system.



**K14PA-U24 LIQUID\_CONN1 connector**

### 16. Power Supply SMBus connector (5-pin PSUSMB1)

This connector allows you to connect SMBus (System Management Bus) to the PSU (power supply unit) to read PSU information. Devices communicate with an SMBus host and/or other SMBus devices using the SMBus interface.



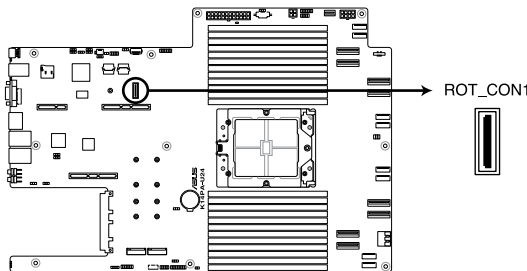
**K14PA-U24 Power supply SMBus connector**



This connector functions only when you enable ASUS ASMB11.

### 17. Platform Firmware Resilience (PFR) module connector (ROT\_CON)

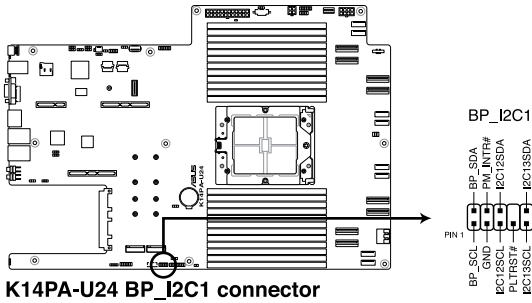
This connector allows you to connect a PFR module to enable platform firmware resilience functions.



**K14PA-U24 ROT\_CON1 connector**

### 18. Front BP SMBus Protocol connector (10-1 pin BP\_I2C1)

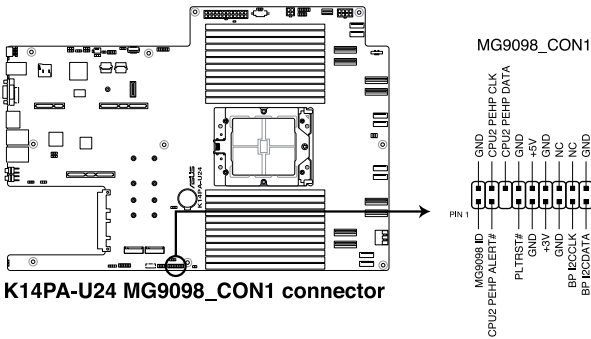
This connector is used for sensor readings.



**K14PA-U24 BP\_I2C1 connector**

### 19. Internal BP SMBus Protocol connector (18-1 MG9098\_CON1)

This connector is used for sensor readings.



**K14PA-U24 MG9098\_CON1 connector**





# **BIOS Setup**

# 4

This chapter tells how to change the system settings through the BIOS Setup menus. Detailed descriptions of the BIOS parameters are also provided.

## 4.1 Managing and updating your BIOS

The following utilities allow you to manage and update the motherboard Basic Input/Output System (BIOS) setup:

1. **ASUS CrashFree BIOS 3**

To recover the BIOS using a bootable USB flash disk drive when the BIOS file fails or gets corrupted.

2. **ASUS EzFlash**

Updates the BIOS using a USB flash disk.

3. **BUPDATER**

Updates the BIOS in DOS mode using a bootable USB flash disk drive.

Refer to the corresponding sections for details on these utilities.



---

Save a copy of the original motherboard BIOS file to a bootable USB flash disk drive in case you need to restore the BIOS in the future. Copy the original motherboard BIOS using the BUPDATER utility.

---

### 4.1.1 ASUS CrashFree BIOS 3 utility

The ASUS CrashFree BIOS 3 is an auto recovery tool that allows you to restore the BIOS file when it fails or gets corrupted during the updating process. You can update a corrupted BIOS file using a USB flash drive that contains the updated BIOS file.



---

Prepare a USB flash drive containing the updated motherboard BIOS before using this utility.

---

### Recovering the BIOS from a USB flash drive

To recover the BIOS from a USB flash drive:

1. Insert the USB flash drive with the original or updated BIOS file to one USB port on the system.
2. The utility will automatically recover the BIOS. It resets the system when the BIOS recovery finished.



---

**DO NOT** shut down or reset the system while recovering the BIOS! Doing so would cause system boot failure!

---



---

The recovered BIOS may not be the latest BIOS version for this motherboard. Visit the ASUS website at [www.asus.com](http://www.asus.com) to download the latest BIOS file.

---

## 4.1.2 ASUS EZ Flash Utility

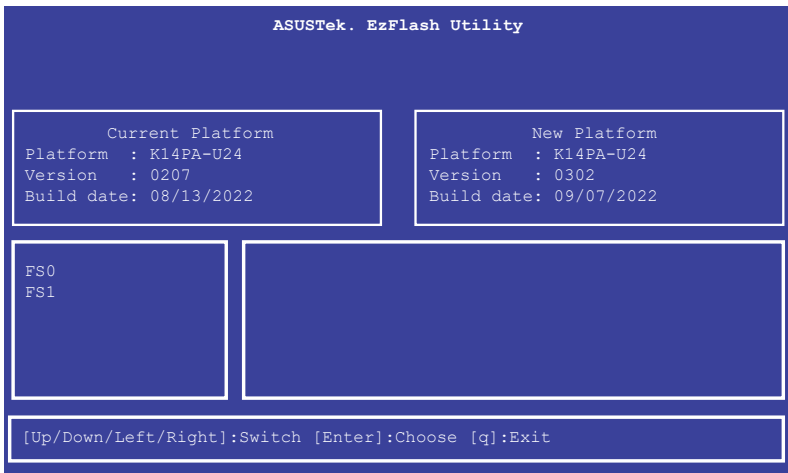
The ASUS EZ Flash Utility feature allows you to update the BIOS without having to use a DOS-based utility.



Before you start using this utility, download the latest BIOS from the ASUS website at [www.asus.com](http://www.asus.com).

To update the BIOS using EZ Flash Utility:

1. Insert the USB flash disk that contains the latest BIOS file into the USB port.
2. Enter the BIOS setup program. Go to the **Tool** menu then select **Start ASUS EzFlash**. Press <Enter>.



3. Press Left arrow key to switch to the **Drive** field.
4. Press the Up/Down arrow keys to find the USB flash disk that contains the latest BIOS, then press <Enter>.
5. Press Right arrow key to switch to the **Folder Info** field.
6. Press the Up/Down arrow keys to find the BIOS file, and then press <Enter> to perform the BIOS update process. Reboot the system when the update process is done.



- This function can support devices such as a USB flash disk with FAT 32/16 format and single partition only.
- DO NOT shut down or reset the system while updating the BIOS to prevent system boot failure!



Ensure to load the BIOS default settings to ensure system compatibility and stability. Press <F5> and select **Yes** to load the BIOS default settings.

### 4.1.3 BUPDATER utility



---

The succeeding BIOS screens are for reference only. The actual BIOS screen displays may not be the same as shown.

---

The BUPDATER utility allows you to update the BIOS file in the DOS environment using a bootable USB flash disk drive with the updated BIOS file.

#### Updating the BIOS file

To update the BIOS file using the BUPDATER utility:

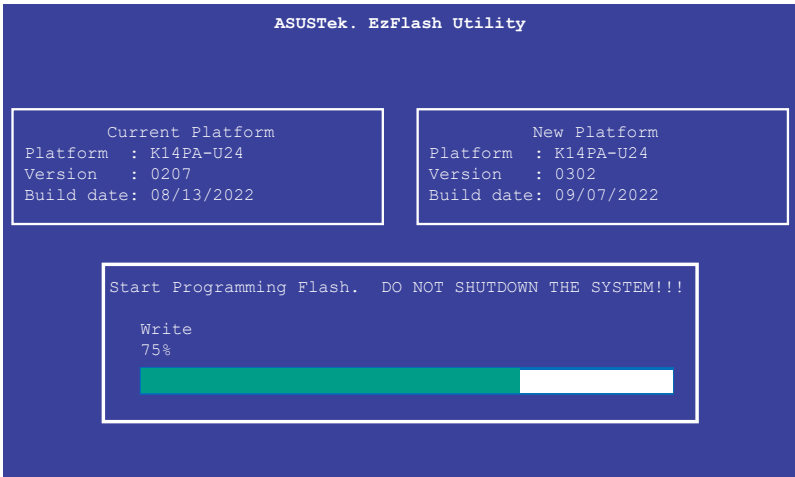
1. Visit the ASUS website at [www.asus.com](http://www.asus.com) and download the latest BIOS file for the motherboard. Save the BIOS file to a bootable USB flash disk drive.
2. Copy the BUPDATER utility (BUPDATER.exe) from the ASUS support website at [www.asus.com/support](http://www.asus.com/support) to the bootable USB flash disk drive you created earlier.
3. Boot the system in DOS mode, then at the prompt, type:

```
BUPDATER /i[filename].CAP
```

where [filename] is the latest or the original BIOS file on the bootable USB flash disk drive, then press <Enter>.

```
A:\>BUPDATER /i[file name].CAP
```

- The utility verifies the file, then starts updating the BIOS file.

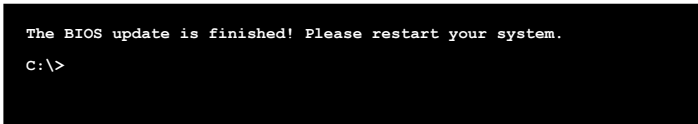


---

DO NOT shut down or reset the system while updating the BIOS to prevent system boot failure!

---

- The utility returns to the DOS prompt after the BIOS update process is completed. Reboot the system from the hard disk drive.



## 4.2 BIOS setup program

This motherboard supports a programmable firmware chip that you can update using the provided utility described in section 4.1 **Managing and updating your BIOS**.

Use the BIOS Setup program when you are installing a motherboard, reconfiguring your system, or prompted to “Run Setup.” This section explains how to configure your system using this utility.

Even if you are not prompted to use the Setup program, you can change the configuration of your computer in the future. For example, you can enable the security password feature or change the power management settings. This requires you to reconfigure your system using the BIOS Setup program so that the computer can recognize these changes and record them in the CMOS RAM of the firmware chip.

The firmware chip on the motherboard stores the Setup utility. When you start up the computer, the system provides you with the opportunity to run this program. Press <Del> during the Power-On Self-Test (POST) to enter the Setup utility; otherwise, POST continues with its test routines.

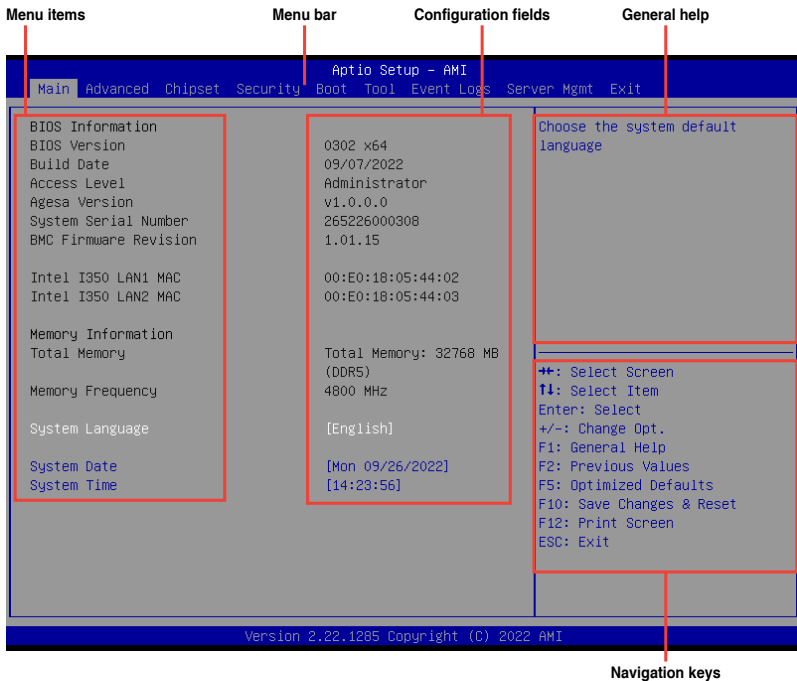
If you wish to enter Setup after POST, restart the system by pressing <Ctrl>+<Alt>+<Delete>, or by pressing the reset button on the system chassis. You can also restart by turning the system off and then back on. Do this last option only if the first two failed.

The Setup program is designed to make it as easy to use as possible. Being a menu-driven program, it lets you scroll through the various sub-menus and make your selections from the available options using the navigation keys.



- 
- The default BIOS settings for this motherboard apply for most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Press <F5> and select **Yes** to load the BIOS default settings.
  - The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.
  - Visit the ASUS website ([www.asus.com](http://www.asus.com)) to download the latest BIOS file for this motherboard.
-

## 4.2.1 BIOS menu screen



## 4.2.2 Menu bar

The menu bar on top of the screen has the following main items:

- Main** For changing the basic system configuration
- Performance Tuning** For changing the performance settings
- Advanced** For changing the advanced system settings
- Chipset** For changing the chipset settings
- Security** For changing the security settings
- Boot** For changing the system boot configuration
- Tool** For configuring options for special functions
- Event Logs** For changing the event log settings
- Server Mgmt** For changing the Server Mgmt settings
- Exit** For selecting the exit options

To select an item on the menu bar, press the right or left arrow key on the keyboard until the desired item is highlighted.

### **4.2.3 Menu items**

The highlighted item on the menu bar displays the specific items for that menu. For example, selecting **Main** shows the Main menu items.

The other items (such as **Advanced**) on the menu bar have their respective menu items.

### **4.2.4 Submenu items**

A solid triangle before each item on any menu screen means that the item has a submenu. To display the submenu, select the item then press <Enter>.

### **4.2.5 Navigation keys**

At the bottom right corner of a menu screen are the navigation keys for the BIOS setup program. Use the navigation keys to select items in the menu and change the settings.

### **4.2.6 General help**

At the top right corner of the menu screen is a brief description of the selected item.

### **4.2.7 Configuration fields**

These fields show the values for the menu items. If an item is user-configurable, you can change the value of the field opposite the item. You cannot select an item that is not user-configurable.

A configurable field is enclosed in brackets, and is highlighted when selected. To change the value of a field, select it and press <Enter> to display a list of options.

### **4.2.8 Pop-up window**

Select a menu item and press <Enter> to display a pop-up window with the configuration options for that item.

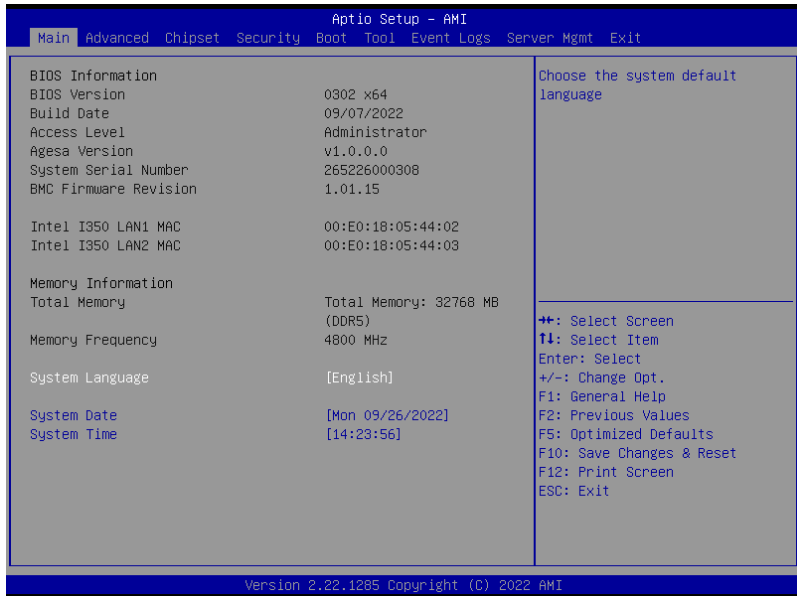
### **4.2.9 Scroll bar**

A scroll bar appears on the right side of a menu screen when there are items that do not fit on the screen. Press the Up / Down arrow keys or <Page Up> / <Page Down> keys to display the other items on the screen.



## 4.3 Main menu

When you enter the BIOS Setup program, the Main menu screen appears. The Main menu provides you an overview of the basic system information, and allows you to set the system date, time, and language settings.



### System Language [English]

Allows you to select the system default language.

### System Date [Day xx/xx/xxxx]

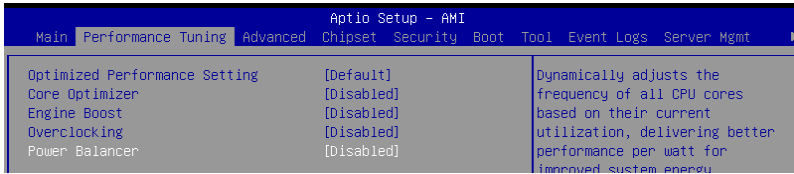
Allows you to set the system date.

### System Time [xx:xx:xx]

Allows you to set the system time.

## 4.4 Performance Tuning menu

The Performance Tuning menu items allow you to change performance related settings for different scenarios.



### Optimized Performance Setting [Default]

Allows you to select performance settings for different scenarios.

[Default] Default settings.

[By Benchmark] Optimize for different kinds of benchmarks. Select this option, then select a benchmark type from the >> list.

[By Workload] Optimize for different kinds of workloads. Select this option, then select a workload type from the >> list.



This function will reset some BIOS settings that you have changed back to their default values. Please check your BIOS settings again.



The following item appears only when **Power Balancer** is set to **[Disabled]**, or if **Optimized Performance Setting** is set to **[Default]** or **[By Benchmark]**.

### Core Optimizer [Disabled]

Allows you to keep the processor operating at the turbo highest frequency for the maximum performance.

Configuration options: [Disabled] [Auto] [Manual]



The following item appears only when you set **Core Optimizer** to **[Manual]**.

### CPU Max frequency [XXXX]

The default value for this option will be the maximum supported frequency of the CPU installed and may vary between different CPUs.



The following item appears only when you set **Optimized Performance Setting** to **[Default]** or **[By Benchmark]**.

### Engine Boost [Disabled]

Enable this item to boost the CPU's frequency. Recommended operation at an ambient temperature of 25°C or below for optimized performance.

Configuration options: [Disabled] [Normal] [Aggressive]



Operate with an ambient temperature of 25°C or lower for optimized performance.

## Overclocking [Disabled]

Enable this item to increase the CPU's clock. Please use an external PCIe storage controller for your hard drives when enabling this feature.

Configuration options: [Disabled] [Enabled]



---

Please note that overclocking might cause component damage or system crashes, which may reduce the lifespan of the system and the CPU. Use this tool at your own risk.

---



---

The following item appears only when you set **Core Optimizer** to [Disabled], or if Optimized Performance Setting is set to [Default] or [By Benchmark].

---

## Power Balancer [Disabled]

Allows you to dynamically adjust the frequency of all CPU cores based on their current utilization, delivering better performance per watt for improved system energy efficiency.

Configuration options: [Disabled] [Enabled by ACC]



---

When setting **Power Balancer** to [Enabled by ACC], make sure that you have the latest ASUS Control Center software installed to support Power Balancer. Please see below for recommended software versions:

- **ACC**: 1.4.3.5 version or above.

---



---

The following item appears only when you set **Power Balancer** to [Enabled by ACC].

---

## Policy [Auto]

Configuration options: [Auto] [Manual]



---

The following item appears only when you set **Policy** to [Manual].

---

## CPU Max frequency [XXXX]

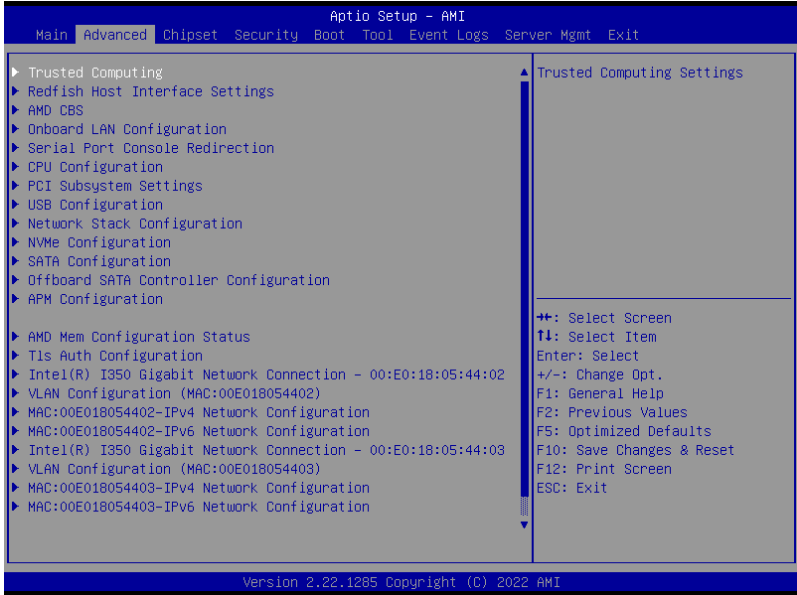
The default value for this option will be the maximum supported frequency of the CPU installed and may vary between different CPUs.

## 4.5 Advanced menu

The Advanced menu items allow you to change the settings for the CPU and other system devices.



Take caution when changing the settings of the Advanced menu items. Incorrect field values can cause the system to malfunction.



### 4.5.1 Trusted Computing

| Advanced                 |          | Aptio Setup - AMI  |
|--------------------------|----------|--|
| Configuration            |          |  |
| Security Device Support  | [Enable] | Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and |
| NO Security Device Found |          |  |

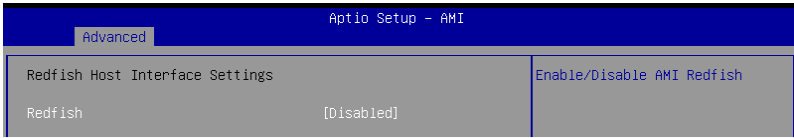
#### Configuration

#### Security Device Support [Enabled]

Allows you to enable or disable the BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

Configuration options: [Disabled] [Enabled]

## 4.5.2 Redfish Host Interface Settings



### Redfish [Disabled]

Allows you to enable or disable Redfish.

Configuration options: [Disabled] [Enabled]



The following items appear only when **Redfish** is set to **[Enabled]**.

### Authentication mode [Basic Authentication]

Allows you to select the authentication mode.

Configuration options: [Basic Authentication] [Session Authentication]

### Redfish BMC Settings

#### IP address

Allows you to enter the IP address.

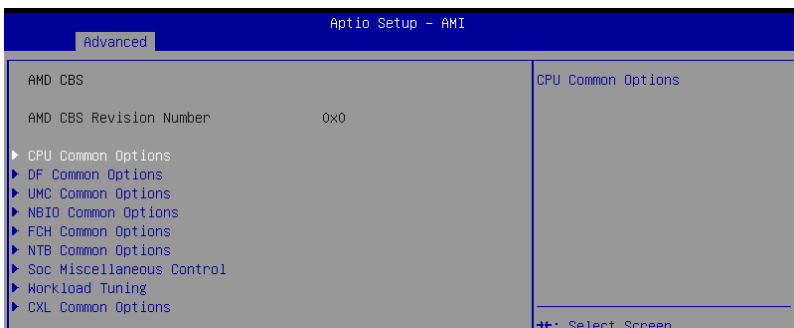
#### IP Mask address

Allows you to enter the IP Mask address.

#### IP Port

Allows you to enter the IP Port.

## 4.5.3 AMD CBS



### CPU Common Options

#### Performance

Allows you to configure performance options.

### **REP-MOV/STOS Streaming [Enabled]**

Allows you to enable or disable the use of non-caching streaming stores for large sizes.

Configuration options: [Disabled] [Enabled]

### **Prefetcher Settings**

Allows you to configure prefetcher options.

### **Core Watchdog**

Allows you to configure core watchdog options.

### **RedirectForReturnDis [Auto]**

Allows you to set RedirectForReturnDis to 0, 1, or Auto as a workaround for GCC/C000005 issue for XV Core on CZ A0.

Configuration options: [Auto] [1] [0]

### **Platform First Error Handling [Auto]**

Allows you to enable or disable PFEH, cloak individual banks, and mask deferred error interrupts from each bank.

Configuration options: [Disabled] [Enabled] [Auto]

### **Core Performance Boost [Auto]**

Configuration options: [Disabled] [Auto]

### **Global C-state Control [Auto]**

Allows you to control IO based C-state generation and DF C-states.

Configuration options: [Disabled] [Enabled] [Auto]

### **Power Supply Idle Control [Auto]**

Configuration options: [Low Current Idle] [Typical Current Idle] [Auto]

### **SEV-ES ASID Space Limit [1]**

SEV-ES and SNP guests must use ASIDs in the range 1 through (this value -1). SEV guests must use ASIDs in the range of this value through 1006. To have all ASIDs support SEV-ES or SNP guests, set this value to 1007. The default is 1: all SEV guests and no SEV-ES or SNP guests.

Configuration options: [1] - [1007]

### **SEV Control [Enabled]**

Can be used to disable SEV. To re-enable SEV, a power cycle is needed after selecting the [Enabled] option.

Configuration options: [Disabled] [Enabled]

### **Streaming Stores Control [Auto]**

Configuration options: [Disabled] [Enabled] [Auto]

### **Local APIC Mode [Auto]**

Configuration options: [Compatibility] [xAPIC] [x2APIC] [Auto]

### **ACPI \_CST C1 Declaration [Auto]**

Determines whether or not to declare the C1 state to the OS.

Configuration options: [Disabled] [Enabled] [Auto]

**MCA error threshold enable [Auto]**

Configuration options: [False] [True] [Auto]

**MCA FruText [Auto]**

Configuration options: [False] [True]

**SMU and PSP Debug Mode [Auto]**

If this option is enabled, uncorrected errors detected by the PSP FW or SMU FW will hang and not reset the system instead of causing a cold reset.

Configuration options: [Disabled] [Enabled] [Auto]

**PPIN Opt-in [Auto]**

Configuration options: [Disabled] [Enabled] [Auto]

**SNP Memory (RMP Table) Coverage [Auto]**

When [Enabled] is selected, the entire system memory is covered.

Configuration options: [Disabled] [Enabled] [Custom] [Auto]



---

The following item appears only when **SNP Memory (RMP Table) Coverage** is set to **[Custom]**.

---

***Amount of Memory to Cover [0]***

Allows you to set the amount of system memory (MB) to be covered in hex.

**SMEE [Auto]**

Configuration options: [Disabled] [Enabled] [Auto]

**Action on BIST Failure [Auto]**

Allows you to configure what action is taken when a CCD BIST failure is detected.

Configuration options: [Do nothing] [Down-CCD] [Auto]

**Enhanced REP MOVSB/STOSB (ESRM) [Auto]**

Configuration options: [Disabled] [Enabled] [Auto]

**Log Transparent Errors [Auto]**

Configuration options: [Disabled] [Enabled] [Auto]

**AVX512 [Auto]**

Configuration options: [Disabled] [Enabled] [Auto]

**MONITOR and MWAIT Disable [Auto]**

When this option is enabled, MONITOR, MWAIT, MONITORX, and MWAITX opcodes become invalid.

Configuration options: [Disabled] [Enabled] [Auto]

**Small Hammer Configuration [Auto]**

Configuration options: [Disabled] [Enabled] [Auto]

**Corrector Branch Predictor [Disabled]**

Enabling for branch heavy codes may reduce conditional branch mispredicts.

Configuration options: [Disabled] [Enabled]

### **PAUSE Delay [Auto]**

Number of cycles thread will be idle after a PAUSE instruction.

Configuration options: [Auto] [Disabled] [16 cycles] [32 cycles] [64 cycles] [128 cycles]

### **CPU Speculative Store Modes [Auto]**

|                    |   |
|--------------------|---|
| [Balanced]         | Store instructions may delay sending out their invalidations to remote cacheline copies when the cacheline is present but not in a writable state in the local cache.                       |
| [More Speculative] | Store instructions will send out invalidations to remote cacheline copies as soon as possible.  |
| [Less Speculative] | Store instructions may delay sending out their invalidations to remote cacheline copies when the cacheline is not present in the local cache or not in a writable state in the local cache. |
| [Auto]             | Default setting is applied.   |

## **DF Common Options**

### **Memory Addressing**

Allows you to configure memory addressing options.

### **ACPI**

Allows you to configure ACPI options.

### **Link**

Allows you to configure Link settings.

### **SDCI**

Allows you to configure SDCI settings.

### **DF Watchdog Timer Interval [Auto]**

Allows you to set the Data Fabric watchdog timer interval.

Configuration options: [Auto] [41ms] [166ms] [334ms] [669ms] [1.34 seconds] [2.68 seconds] [5.36 seconds]

### **Disable DF to external IP SyncFloodPropagation [Auto]**

Allows you to enable or disable SyncFlood to UMC and downstream slaves.

Configuration options: [Sync flood disabled] [Sync flood enabled] [Auto]

### **Sync Flood Propagation to DF Components [Auto]**

Configuration options: [Sync flood disabled] [Sync flood enabled] [Auto]

### **Freeze DF module queues on error [Auto]**

Configuration options: [Disabled] [Enabled] [Auto]

### **CC6 Memory Region Encryption [Auto]**

Configuration options: [Disabled] [Enabled] [Auto]

### **CCD B/W Balance Throttle Level [Auto]**

Configuration options: [Auto] [Level 0] [Level 1] [Level 2] [Level 3] [Level 4]



## UMC Common Options

### DDR Addressing Options

Allows you to configure DDR addressing options.

### DDR Controller Configuration

Allows you to configure DDR controller options.

### DDR MBIST Options

Allows you to configure DDR MBIST options.

### DDR RAS

Allows you to configure DDR RAS options.

### DDR Bus Configuration

Allows you to configure DDR Bus options.

### DDR Timing Configuration

Allows you to configure DDR Timing options.

### DDR Training Options

Allows you to configure DDR Training options.

### DDR Security

Allows you to configure DDR Security options.

### DDR PMIC Configuration

Allows you to configure DDR PMIC options.

### DDR Miscellaneous

Allows you to configure DDR Miscellaneous options.

## NBIO Common Options

### IOMMU [Auto]

Configuration options: [Disabled] [Enabled] [Auto]

### DMAR Support [Auto]

Allows you to enable or disable DMAR system protection during POST.

Configuration options: [Disabled] [Enabled] [Auto]

### DMA Protection [Auto]

Allows you to enable or disable DMA remap support in IVRS IVinfo Field.

Configuration options: [Auto] [Enabled] [Disabled]

### DRTM Virtual Device Support [Auto]

Configuration options: [Disabled] [Enabled] [Auto]

### DRTM Memory Reservation [Auto]

Allows you to enable or disable reservation of 128MB memory below Bottom IO for DRTM. This option is required for Secured-Core Server functionality.

Configuration options: [Disabled] [Enabled] [Auto]



---

The following item appears only when **Enable AER Cap** is set to **[Enabled]** or **[Auto]**.

---

**ACS Enable [Auto]**

Configuration options: [Disabled] [Enabled] [Auto]

**PCIe ARI Support [Auto]**

Configuration options: [Disabled] [Enabled] [Auto]

**PCIe ARI Enumeration [Auto]**

ARI Forwarding enabled for each downstream port.

Configuration options: [Disabled] [Enabled] [Auto]

**PCIe Ten Bit Tag Support [Auto]**

Allows you to enable PCIe ten bit tags for supported devices. Support is disabled if this option is set to **[Auto]**.

Configuration options: [Disabled] [Enabled] [Auto]

**SMU Common Options**

Allows you to configure SMU Common options.

**NBIO RAS Common Options**

Allows you to configure NBIO RAS Common options.

**Enable AER Cap [Auto]**

Configuration options: [Disabled] [Enabled] [Auto]

**Early Link Speed [Auto]**

Configuration options: [Auto] [Gen1] [Gen2]

**Hot Plug Handling Mode [Auto]**

Configuration options: [OS First] [Firmware First/EDR if OS supports]

[Firmware First but allow OS first] [System Firmware Intermediary] [Auto]

**Hot Plug Allow FF in Synchronous [Disabled]**

Allows firmware first hot plug handling mode to operate in mode A and mode B synchronous mappings.

Configuration options: [Disabled] [Enabled]

**Presence Detect Select Mode [Auto]**

Configuration options: [OR] [AND] [Auto]

**Data Link Feature Cap [Auto]**

Configuration options: [Disabled] [Enabled] [Auto]

**CV Test [Auto]**

Allows you to enable or disable support for PCIECV tool. Hardware defaults are preserved if this option is set to Auto.

Configuration options: [Disabled] [Enabled] [Auto]

**SEV-SNP Support [Disabled]**

Configuration options: [Disabled] [Enabled] [Auto]

**Allow Compliance [Auto]**

Allows you to enable or disable PCIe RP entering the polling compliance state.  
Configuration options: [Disabled] [Enabled] [Auto]

**SRIS [Auto]**

Configuration options: [Disabled] [Enabled] [Auto]

**Multi Upstream Auto Speed Change [Auto]**

Defines the setting of this feature for all PCIe devices. When this option is set to [Auto], the DXIO default setting of 0 for Gen1 and 1 for Gen2/3 is applied.

Configuration options: [Disabled] [Enabled] [Auto]

**Multi Auto Speed Change on Last Rate [Auto]**

Force PCIe link training speed to last advertised for all ports.

[Disabled]        Use highest data rate ever advertised.

[Enabled]        Use last data rate advertised.

[Auto]            Use default settings.

**PCIe Link Speed Capability [GEN5]**

Configuration options: [Maximum speed] [Gen1] [Gen2] [GEN3] [GEN4] [GEN5] [Auto]

**RTM Margining Support [Auto]**

Configuration options: [Disabled] [Enabled] [Auto]

**EQ Bypass to Highest Rate [Auto]**

Controls the ability to advertise Equalization Bypass to Highest Rate Support in TSxs sent prior to LinkUp=1.

Configuration options: [Disabled] [Enabled] [Auto]

**nBif Common Options**

Allows you to configure nBif Common options.

**FCH Common Options****I3C/I2C Configuration Options**

Allows you to configure I3C/I2C options.

**SATA Configuration Options**

Allows you to configure SATA options.

**USB Configuration Options**

Allows you to configure USB options.

**Ac Power Loss Options**

Allows you to configure AC power loss options.

**UART Configuration Options**

Allows you to configure UART options.

**ESPI Configuration Options**

Allows you to configure ESPI options.

## FCH RAS Options

Allows you to configure FCH RAS options.

## Miscellaneous Options

Allows you to configure miscellaneous FCH options.

## NTB Common Options

### Socket-0 P0 NTB Enable [Auto]

Configuration options: [Disabled] [Enabled] [Auto]

### Socket-0 P2 NTB Enable [Auto]

Configuration options: [Disabled] [Enabled] [Auto]

### Socket-0 G0 NTB Enable [Auto]

Configuration options: [Disabled] [Enabled] [Auto]

### Socket-0 G2 NTB Enable [Auto]

Configuration options: [Disabled] [Enabled] [Auto]

## Soc Miscellaneous Control

### ABL Console Out Control [Auto]

[Disabled]      Disable ConsoleOut Function for ABL.

[Enabled]        Enable ConsoleOut Function for ABL.

[Auto]            Keep default behavior.



---

The following items appear only when **ABL Console Out Control** is set to **[Enabled]**.

---

### **ABL Console Out Serial Port**

[eSPI UART]    Enable serial port through eSPI UART.

[SOC UART0]    Enable serial port through SOC UART0.

[SOC UART1]    Enable serial port through SOC UART1.

[Auto]            Keep default behavior.



---

The following item appears only when **ABL Console Out Serial Port** is set to **[eSPI UART]**.

---

### **ABL Console Out Serial Port IO**

Select Legacy Uart (SIO or eSPI) IO base.

Configuration options: [0x3F8] [0x2F8] [0x3E8] [0x2E8] [Auto]

### **ABL Basic Console Out Control**

[Disabled]      Disable Basic ConsoleOut Function for ABL.

[Enabled]        Enable Basic ConsoleOut Function for ABL.

[Auto]            Keep default behavior.

### **ABL PMU message Control**

Allows you to control the total number of PMU debug messages.

Configuration options: [Detailed debug message] [Coarse debug message] [Stage completion] [Assertion messages] [Firmware completion message only] [Auto]

### **ABL Memory Population message Control**

Non-recommended configurations may be functional but may not be validated by AMD.

|                   |   |
|-------------------|---|
| [Warning message] | Show warning messages if Memory channel configuration does NOT follow SP5 Memory Population Guidelines. |
| [Fatal error]     | Show warning messages and halt system.  |

### **PSP error injection support**

Configuration options: [False] [True]

### **Firmware Anti-rollback (FAR)**

Allows you to configure Firmware Anti-rollback (FAR) options.

## **Workload Tuning**

### **Workload Profile**

|                                 |  |
|---------------------------------|--|
| [Disabled]                      | Don't use any workload profiles.   |
| [CPU Intensive]                 | Tuned for CPU intensive workloads, providing optimal integer and floating point performance. |
| [Java Throughput]               | Tuned for the highest level of throughput with Java workloads.                               |
| [Java Latency]                  | Tuned for the latency sensitive Java workloads, to meet critical SLA's.                      |
| [Power Efficiency]              | Tuned for optimal power efficiency.  |
| [Memory Throughput Intensive]   | Tuned for the highest memory throughput available.   |
| [Storage IO Intensive]          | Tuned for the highest storage IO bandwidth.  |
| [NIC Throughput Intensive]      | Tuned for maximum TCP/IP and RDMA network throughput.  |
| [NIC Latency Sensitive]         | Tuned for network performance where the kernel performs L3 packet forwarding.                |
| [Accelerator Throughput]        | Tuned to maximum peer-to-peer PCIe throughput with accelerators such as GPUs.                |
| [VMware vSphere Optimized]      | Tuned for general virt+P3+Q4.  |
| [Linux KVM Optimized]           | Tuned for general virtualization performance when using Linux KVM.                           |
| [Container Optimized]           | Optimized for container performance.   |
| [RDBMS Optimized]               | Tuned for relational databases.  |
| [Big Data Analytics Optimized]  | Tuned for big data analytics.  |
| [IOT Gateway]                   | Tuned for throughput analytics as observed by IOT gateways.                                  |
| [HPC Optimized]                 | Tuned for general HPC performance.   |
| [OpenStack NFV]                 | Tuned for Openstack based NFV workloads.   |
| [OpenStack for RealTime Kernel] | Tuned for OpenStack with RealTime kernel enabled.  |
| [Auto]                          | Uses BIOS default workload profile.  |

### Performance Tracing

Configuration options: [Disabled] [Enabled] [Auto]

## CXL Common Options

### CXL Control

Configuration options: [Disabled] [Enabled] [Auto]

### CXL SPM

Set CXL memory as Special Purpose Memory.

Configuration options: [Disabled] [Enabled] [Auto]

### CXL ASPM

Configuration options: [Disabled] [Enabled] [Auto]

### CXL vLSM Power Management

Allows you to configure CXL vLSM Power Management options.

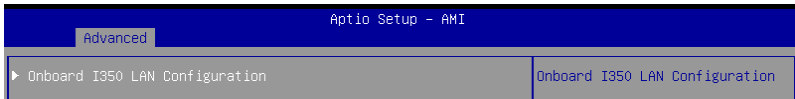
### CXL Encryption

Configuration options: [Disabled] [Enabled]

### Temp Gen5 Advertisement

Configuration options: [Disabled] [Enabled] [Auto]

## 4.5.4 Onboard LAN Configuration



### Onboard I350 LAN Configuration

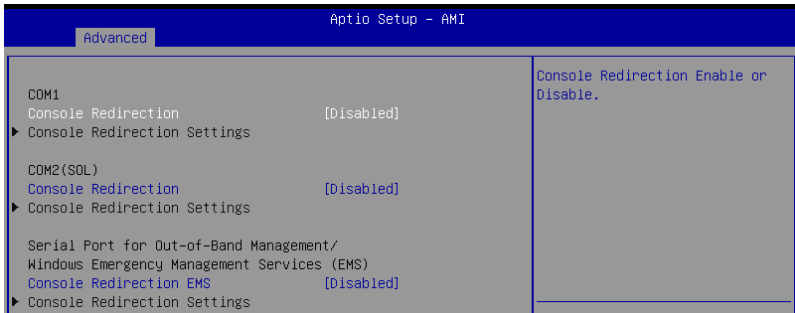
#### Intel I350 LAN1-2

#### LAN Enable [JumperState]

Allows you to enable or disable the Intel LAN.

Configuration options: [Disabled] [JumperState]

## 4.5.5 Serial Port Console Redirection



### COM1/COM2(SOL)

#### Console Redirection [Disabled]

Allows you to enable or disable the console redirection feature.

Configuration options: [Disabled] [Enabled]



The following item appears only when **Console Redirection** is set to **[Enabled]**.

#### Console Redirection Settings

These items become configurable only when you enable the **Console Redirection** item. The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

#### Terminal Type [ANSI]

Allows you to set the terminal type.

[VT100] ASCII char set.

[VT100PLUS] Extends VT100 to support color, function keys, etc.

[VT-UTF8] Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.

[ANSI] Extended ASCII char set.

#### Bits per second [115200]

Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.

Configuration options: [9600] [19200] [38400] [57600] [115200]

#### Data Bits [8]

Configuration options: [7] [8]

### **Parity [None]**

A parity bit can be sent with the data bits to detect some transmission errors. [Mark] and [Space] parity do not allow for error detection.

|         |  |
|---------|--|
| [None]  | None   |
| [Even]  | parity bit is 0 if the num of 1's in the data bits is even |
| [Odd]   | parity bit is 0 if num of 1's in the data bits is odd      |
| [Mark]  | parity bit is always 1                                     |
| [Space] | parity bit is always 0                                     |

### **Stop Bits [1]**

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.

Configuration options: [1] [2]

### **Flow Control [None]**

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.

Configuration options: [None] [Hardware RTS/CTS]

### **VT -UTF8 Combo Key Support [Enabled]**

This allows you to enable the VT -UTF8 Combination Key Support for ANSI/VT100 terminals.

Configuration options: [Disabled] [Enabled]

### **Recorder Mode [Disabled]**

With this mode enabled only text will be sent. This is to capture Terminal data.

Configuration options: [Disabled] [Enabled]

### **Resolution 100x31 [Enabled]**

This allows you enable or disable extended terminal resolution.

Configuration options: [Disabled] [Enabled]

### **Putty Keypad [VT100]**

This allows you to select the FunctionKey and Keypad on Putty.

Configuration options: [VT100] [LINUX] [XTERMR6] [SCO] [ESCN] [VT400]

## **Serial Port for Out-of-Band Management/ Windows Emergency Management Services (EMS)**

### **Console Redirection [Disabled]**

Allows you to enable or disable the console redirection feature.

Configuration options: [Disabled] [Enabled]





The following item appears only when **Console Redirection** is set to **[Enabled]**.

#### **Out-of-Band Mgmt Port [COM1]**

Microsoft Windows Emergency Management Services (EMS) allow for remote management of a Windows Server OS through a serial port.  
Configuration options: [COM1] [COM2]

#### **Terminal Type [VT-UTF8]**

Microsoft Windows Emergency Management Services (EMS) allow for remote management of a Windows Server OS through a serial port.  
Configuration options: [VT100] [VT100PLUS] [VT-UTF8] [ANSI]

#### **Bits per second [115200]**

Microsoft Windows Emergency Management Services (EMS) allow for remote management of a Windows Server OS through a serial port.  
Configuration options: [9600] [19200] [57600] [115200]

#### **Flow Control [None]**

Microsoft Windows Emergency Management Services (EMS) allow for remote management of a Windows Server OS through a serial port.  
Configuration options: [None] [Hardware RTS/CTS] [Software Xon/Xoff]

## **4.5.6 CPU Configuration**

This page displays the CPU node information.



#### **SVM Mode [Enabled]**

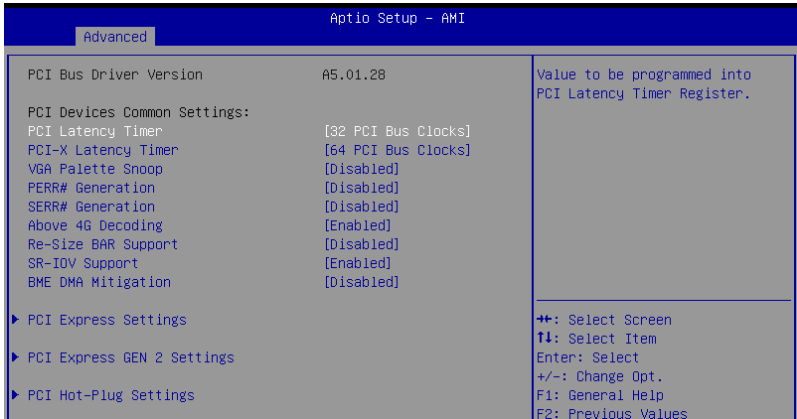
This item allows you enable or disable CPU Virtualization.  
Configuration options: [Disabled] [Enabled]

#### **Node 0 Information**

This item allows you to view memory information related to Node 0.

## 4.5.7 PCI Subsystem Settings

Allows you to configure PCI, PCI-X, and PCI Express Settings.



### PCI Latency Timer [32 PCI Bus Clocks]

Configuration options: [32 PCI Bus Clocks] [64 PCI Bus Clocks] [96 PCI Bus Clocks] [128 PCI Bus Clocks] [160 PCI Bus Clocks] [192 PCI Bus Clocks] [224 PCI Bus Clocks] [248 PCI Bus Clocks]

### PCI-X Latency Timer [64 PCI Bus Clocks]

Configuration options: [32 PCI Bus Clocks] [64 PCI Bus Clocks] [96 PCI Bus Clocks] [128 PCI Bus Clocks] [160 PCI Bus Clocks] [192 PCI Bus Clocks] [224 PCI Bus Clocks] [248 PCI Bus Clocks]

### VGA Palette Snoop [Disabled]

Configuration options: [Disabled] [Enabled]

### PERR# Generation [Disabled]

Configuration options: [Disabled] [Enabled]

### SERR# Generation [Disabled]

Configuration options: [Disabled] [Enabled]

### Above 4G Decoding [Enabled]

Allows you to enable or disable 64-bit capable devices to be decoded in above 4G address space. It only works if the system supports 64-bit PCI decoding.

Configuration options: [Disabled] [Enabled]

### Re-Size BAR Support [Disabled]

Configuration options: [Disabled] [Auto]



This option only comes into effect if the system has Resizable BAR capable PCIe devices.

## SR-IOV Support [Enabled]

This option enables or disables Single Root IO Virtualization Support if the system has SR-IOV capable PCIe devices.

Configuration options: [Disabled] [Enabled]

## BME DMA Mitigation [Disabled]

This allows you to enable or disable re-enabling Bus Master Attribute disabled during Pci enumeration for PCI Bridges after SMM locked.

Configuration options: [Disabled] [Enabled]

## PCI Express Settings

### PCI Express Device Register Settings

#### Relaxed Ordering [Enabled]

Configuration options: [Disabled] [Enabled]

#### Extended Tag [Disabled]

If this item is enabled, it will allow Device to use 8-bit Tag field as a requester.

Configuration options: [Disabled] [Enabled]

#### No Snoop [Enabled]

Configuration options: [Disabled] [Enabled]

#### Maximum Payload [Auto]

Allows you to set Maximum Payload of PCI Express Device or allow System BIOS to select the value.

Configuration options: [Auto] [128 Bytes] [256 Bytes] [512 Bytes] [1024 Bytes] [2048 Bytes] [4096 Bytes]

#### Maximum Read Request [Auto]

Allows you to set Maximum Read Request Size of PCI Express Device or allow System BIOS to select the value.

Configuration options: [Auto] [128 Bytes] [256 Bytes] [512 Bytes] [1024 Bytes] [2048 Bytes] [4096 Bytes]

### PCI Express Link Register Settings

#### ASPM Support [Disabled]

Allows you to set the ASPM level.

[Disabled] Disables ASPM.

[Auto] BIOS auto configure.

[Force L0s] Force all links to L0 State.



---

Enabling ASPM may cause some PCI-E devices to fail.

---

#### Extended Synch [Disabled]

If this item is enabled, it will allow generation of Extended Synchronization patterns.

Configuration options: [Disabled] [Enabled]

### **Link Training Retry [5]**

Allows you to define the number of Retry Attempts software will take to retrain the link if previous training attempt was unsuccessful.

Configuration options: [Disabled] [2] [3] [5]

### **Link Training Timeout (uS) [1000]**

Allows you to define the number of Microseconds software will wait before polling 'link Training' bit in Link Status register.

Configuration options: [10] - [10000]

### **Unpopulated Links [Keep Link ON]**

If this option is set to **[Disable]**, in order to save power, software will disable unpopulated PCI Express Links.

Configuration options: [Keep Link ON] [Disable]

## **PCI Express GEN 2 Settings**

The items in this submenu allow you change PCI Express GEN Devices Settings.

### **PCI Express GEN2 Device Register Settings**

#### **Completion Timeout [Default]**

In device Functions that support Completion Timeout programmability, allows system software to modify the Completion Timeout value.

[Default]            50us to 50ms.

[Shorter]           Software will use shorter timeout ranges supported by hardware.

[Longer]            Software will use longer timeout ranges.

[Disabled]          Disable completion timeout.

#### **ARI Forwarding [Disabled]**

If supported by hardware and set to **[Enabled]**, the Downstream Port disables its traditional Device Number field being 0 enforcement when turning a Type1 Configuration Request into a Type0 Configuration Request, permitting access to Extended Functions in an ARI Device immediately below the Port.

Configuration options: [Disabled] [Enabled]

#### **AtomicOp Requester Enable [Disabled]**

If supported by hardware and set to **[Enabled]**, this function initiates AtomicOp Requests only if Bus Master Enable bit is in the Command Register Set.

Configuration options: [Disabled] [Enabled]

#### **AtomicOp Egress Blocking [Disabled]**

If supported by hardware and set to **[Enabled]**, outbound AtomicOp Requests via Egress Ports will be blocked.

Configuration options: [Disabled] [Enabled]

#### **IDO Request Enable [Disabled]**

If supported by hardware and set to **[Enabled]**, this permits setting the number of ID-Based Ordering (IDO) bit (Attribute[2]) requests to be initiated.

Configuration options: [Disabled] [Enabled]

### **IDO Completion Enable [Disabled]**

If supported by hardware and set to **[Enabled]**, this permits setting the number of ID-Based Ordering (IDO) bit (Attribute[2]) requests to be initiated.

Configuration options: [Disabled] [Enabled]

### **LTR Mechanism Enable [Disabled]**

If supported by hardware and set to **[Enabled]**, this enables the Latency Tolerance Reporting (LTR) Mechanism.

Configuration options: [Disabled] [Enabled]

### **End-End TLP Prefix Blocking [Disabled]**

If supported by hardware and set to **[Enabled]**, this function will block forwarding of TLPs containing End-End TLP Prefixes.

Configuration options: [Disabled] [Enabled]

### **PCI Express GEN2 Link Register Settings**

#### **Target Link Speed [Auto]**

If supported by hardware and set to **[Force to X.X GT/s]**, for Downstream Ports, this sets an upper limit on Link operational speed by restricting the values advertised by the Upstream component in its training sequences. When **[Auto]** is selected HW initialized data will be used.

Configuration options: [Disabled] [Force to 2.5 GT/s] [Force to 5.0 GT/s] [Force to 8.0 GT/s] [Force to 16.0 GT/s] [Force to 32.0 GT/s]

#### **Clock Power Management [Disabled]**

If supported by hardware and set to **[Enabled]**, the device is permitted to use CLKREQ# signal for power management of Link clock in accordance to protocol defined in appropriate form factor specification.

Configuration options: [Disabled] [Enabled]

#### **Compliance SOS [Disabled]**

If supported by hardware and set to **[Enabled]**, this will force LTSSM to send SKP Ordered Sets between sequences when sending Compliance Pattern or Modified Compliance Pattern.

Configuration options: [Disabled] [Enabled]

#### **Hardware Autonomous Width [Enabled]**

If supported by hardware and set to **[Disabled]**, this will disable the hardware's ability to change link width except width size reduction for the purpose of correcting unstable link operation.

Configuration options: [Disabled] [Enabled]

#### **Hardware Autonomous Speed [Enabled]**

If supported by hardware and set to **[Disabled]**, this will disable the hardware's ability to change link speed except speed rate reduction for the purpose of correcting unstable link operation.

Configuration options: [Disabled] [Enabled]

## PCI Hot-Plug Settings

The items in this submenu allow you change PCI Express Hot-Plug and Standard HP Controller Settings.

### BIOS Hot-Plug Support [Enabled]

If this item is enabled, it allows the BIOS built-in Hot-Plug support to be used.. Use this feature if OS does not support PCI Express and SHPC hot-plug natively.

Configuration options: [Disabled] [Enabled]



---

The following items appear only when **BIOS Hot-Plug Support** is set to **[Enabled]**.

---

#### **PCI Buses Padding [1]**

Configuration options: [Disabled] [1] - [5]

#### **I/O Resources Padding [Disabled]**

Configuration options: [Disabled] [4 K] [8 K] [16 K] [32 K]

#### **MMIO 32 bit Resources Padding [Disabled]**

Configuration options: [Disabled] [1 M] [2 M] [4 M] [8 M] [16 M] [32 M] [64 M] [128 M]

#### **PFMMIO 32 bit Resources Padding [Disabled]**

Configuration options: [Disabled] [1 M] [2 M] [4 M] [8 M] [16 M] [32 M] [64 M] [128 M]

#### **PFMMIO 64 bit Resources Padding [64 M]**

Configuration options: [Disabled] [1 M] [2 M] [4 M] [8 M] [16 M] [32 M] [64 M] [128 M] [256 M] [512 M] [1 G] [2 G] [4 G] [8 G]

---



Due to the Bridge Architecture Specification Software, selected padding for 64 and 32 bit PFMMIO window cannot be applied at the same time. User must pick choose which PFMMIO they want to pad by setting the other resource to the disabled state. If both PFMMIO is set, the 32 bit resource will be used.

---

## 4.5.8 USB Configuration

| Advanced                              |           | Aptio Setup - AMI   |  |
|---------------------------------------|-----------|---|--|
| USB Configuration                     |           | [Enabled]: Enables the Legacy USB support.  |  |
| USB Module Version                    | 29        | [Auto]: Automatically disables the Legacy USB support if USB devices are not connected. |  |
| USB Controllers:                      |           | [Disabled]: USB devices are available only for EFI applications.                        |  |
| 2 XHCIs                               |           |   |  |
| USB Devices:                          |           |   |  |
| 3 Drives, 3 Keyboards, 2 Mice, 3 Hubs |           |   |  |
| Legacy USB Support                    | [Enabled] |   |  |
| XHCI Hand-off                         | [Enabled] |   |  |
| USB Mass Storage Driver Support       | [Enabled] |   |  |
| USB Keyboard and Mouse Simulator      | [Enabled] |   |  |
| USB hardware delays and time-outs:    |           | ++: Select Screen   |  |
| USB transfer time-out                 | [20 sec]  | F1: Select Item   |  |
| Device reset time-out                 | [20 sec]  | Enter: Select   |  |
| Device power-up delay                 | [Auto]    | +/-: Change Opt.  |  |
| Mass Storage Devices:                 |           | F1: General Help  |  |
| AMI Virtual CDROM 1.00                | [Auto]    | F2: Previous Values   |  |
| AMI Virtual HDisk0 1.00               | [Auto]    | F5: Optimized Defaults  |  |
| JetFlashTranscend 4GB 8.07            | [Auto]    | F10: Save Changes & Reset   |  |
|                                       |           | F12: Print Screen   |  |
|                                       |           | ESC: Exit   |  |

### Legacy USB Support [Enabled]

[Disabled]      USB devices are available only for EFI applications.

[Enabled]      Enables the support for USB devices on legacy operating systems (OS).

[Auto]      Automatically disables the Legacy USB support if USB devices are not connected.

### XHCI Hand-off [Enabled]

Allows you to enable or disable workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.

Configuration options: [Enabled] [Disabled]

### USB Mass Storage Driver Support [Enabled]

Configuration options: [Disabled] [Enabled]

### USB Keyboard and Mouse Simulator [Enabled]

Enable this item to simulate USB keyboard and mouse to PS/2 module in Windows 7. Ensure to install the USB drivers to your system before disabling this item.

Configuration options: [Disabled] [Enabled]

### USB hardware delays and time-outs

#### USB transfer time-out [20 sec]

Allows you to select time-out value for Control, Bulk, and Interrupt transfers.

Configuration options: [1 sec] [5 sec] [10 sec] [20 sec]

#### Device reset time-out [20 sec]

Configuration options: [10 sec] [20 sec] [30 sec] [40 sec]

### Device power-up delay [Auto]

Maximum time the device will take before it properly reports itself to the Host Controller.

[Auto] Uses default value; for a Root port it is 100 ms, for a Hub port the delay is taken from Hub descriptor.

[Manual] Manually set the device power-up delay.



The following item appears only when **Device power-up delay** is set to [Manual].

#### Device power-up delay in seconds [5]

Allows you to set the device power-up delay in seconds. Use the <+> or <-> to adjust the value. The values range from 1 to 40.

### Mass Storage Devices

Allows you to select the mass storage device emulation type for devices connected.

Configuration options: [Auto] [Floppy] [Forced FDD] [Hard Disk] [CD-ROM]

## 4.5.9 Network Stack Configuration

| Advanced           |            |  | Aptio Setup - AMI                 |  |  |
|--------------------|------------|--|-----------------------------------|--|--|
| Network Stack      | [Enabled]  |  | Enable/Disable UEFI Network Stack |  |  |
| IPv4 PXE Support   | [Disabled] |  |                                   |  |  |
| IPv4 HTTP Support  | [Disabled] |  |                                   |  |  |
| IPv6 PXE Support   | [Disabled] |  |                                   |  |  |
| IPv6 HTTP Support  | [Disabled] |  |                                   |  |  |
| PXE boot wait time | 0          |  |                                   |  |  |
| Media detect count | 1          |  |                                   |  |  |

### Network stack [Enabled]

Enables or disables the network stack feature.

Configuration options: [Disabled] [Enabled]



The following item appears only when **Network stack** is set to [Enabled].

#### IPv4 PXE Support [Disabled]

Enables or disables the IPv4 PXE Boot Support. If disabled, IPv4 PXE boot option will not be created.

Configuration options: [Disabled] [Enabled]

#### IPv4 HTTP Support [Disabled]

Enables or disables the IPv4 HTTP Boot Support. If disabled, IPv4 HTTP boot option will not be created.

Configuration options: [Disabled] [Enabled]

#### IPv6 PXE Support [Disabled]

Enables or disables the IPv6 PXE Boot Support. If disabled, IPv6 PXE boot option will not be created.

Configuration options: [Disabled] [Enabled]



### **Ipv6 HTTP Support [Disabled]**

Enables or disables the Ipv6 HTTP Boot Support. If disabled, Ipv6 HTTP boot option will not be created.

Configuration options: [Disabled] [Enabled]

### **PXE boot wait time [0]**

Set the wait time to press ESC key to abort the PXE boot. Use the <+> or <-> to adjust the value. The values range from 0 to 5.

### **Media detect count [1]**

Set the number of times presence of media will be checked. Use the <+> or <-> to adjust the value. The values range from 1 to 50.

## **4.5.10 NVMe Configuration**

This page will display the NVMe controller and drive information. You may press <Enter> on a connected NVMe device which appears in this menu to view more information on the NVMe device.



### **Device**



The devices and names shown in the NVMe configuration list depends on the connected devices. If no devices are connected, **No NVMe Device Found** will be displayed.

### **Self Test Option [Short]**

This option allows you to select either Short or Extended Self Test. Short option will take couple of minutes, and the extended option will take several minutes to complete.

Configuration options: [Short] [Extended]

### **Self Test Action [Controller Only Test]**

This item allows you to select either to test Controller alone or Controller and NameSpace. Selecting Controller and NameSpace option will take a lot longer to complete the test.

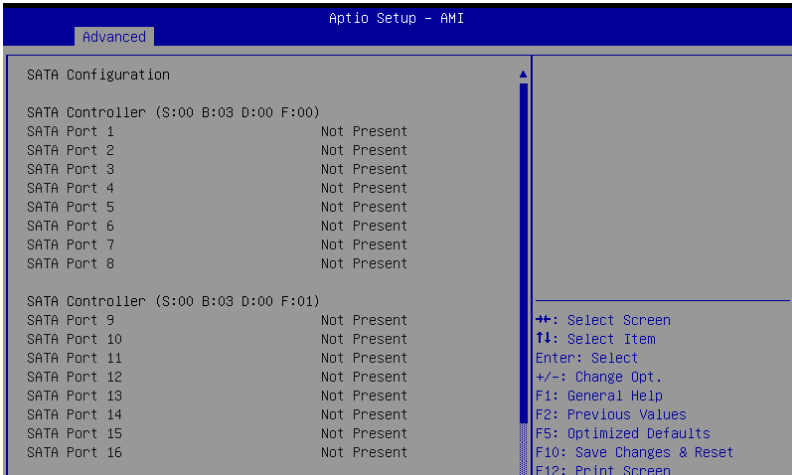
Configuration options: [Controller Only Test] [Controller and NameSpace Test]

### **Run Device Self Test**

Press <Enter> to perform device self test for the corresponding Option and Action selected by the user. Pressing the <ESC> key will abort the test. The results shown below is the most recent result logged in the device.

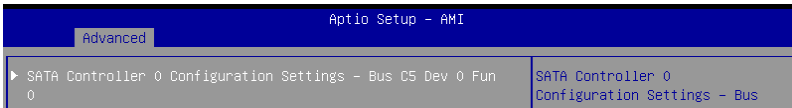
### 4.5.11 SATA Configuration

This page will display the SATA controller and drive information.



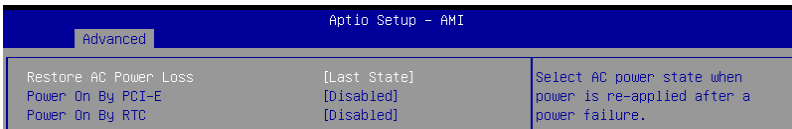
### 4.5.12 Offboard SATA Controller Configuration

Allows you to configure the Offboard SATA Controller.



### 4.5.13 APM Configuration

Allows you to configure the Advance Power Management (APM) settings.



#### Restore AC Power Loss [Last State]

When set to [Power Off], the system goes into off state after an AC power loss. When set to [Power On], the system will reboot after an AC power loss. When set to [Last State], the system goes into either off or on state, whatever the system state was before the AC power loss.

Configuration options: [Power On] [Power Off] [Last State]

### Power On By PCI-E [Disabled]

[Disabled] Disables the PCIe devices to generate a wake event.

[Enabled] Enables the PCIe devices to generate a wake event.

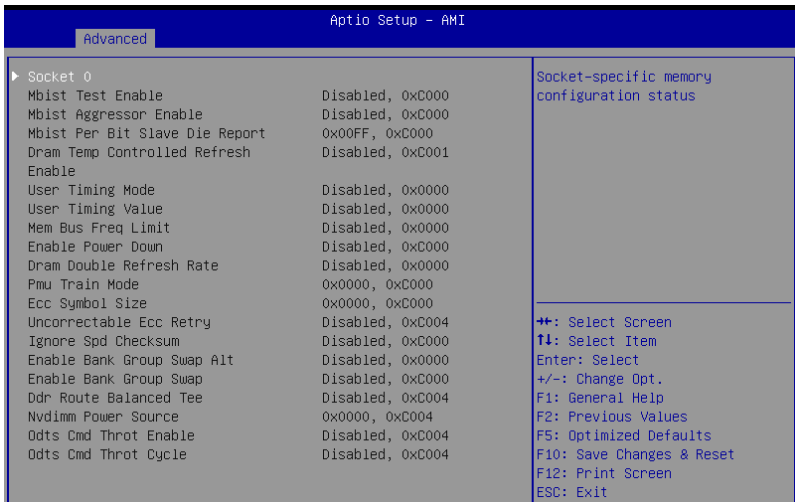
### Power On By RTC [Disabled]

[Disabled] Disables RTC to generate a wake event.

[Enabled] When set to [Enabled], the items **RTC Alarm Date (Days)** and **Hour/Minute/Second** will become user-configurable with set values.

## 4.5.14 AMD Mem Configuration Status

The items in this menu display the memory configuration (initialized by ABL) status.

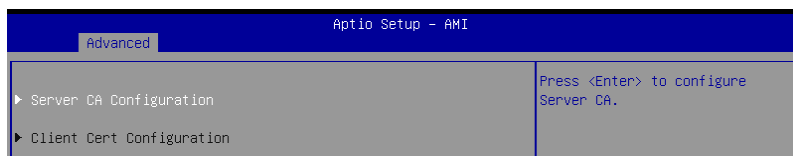


### Socket 0

Allows you to view and configure Socket-specific memory configuration status options.

## 4.5.15 T1s Auth

Allows you to configure the Server Certificate Authority (CA).



### Server CA Configuration / Client Cert Configuration

#### Enroll Cert

Allows you to enroll a certificate using a certificate file or manually input a certificate GUID.

#### *Enroll Cert Using File*

Allows you to enroll a certificate using a certificate file. You will be prompted to select a storage device and navigate to the location of the certificate file.

#### *Cert GUID*

Allows you to enroll a certificate by manually inputting the certificate GUID.

#### *Commit Changes and Exit*

Exit Server CA configuration after saving the changes.

#### *Discard Changes and Exit*

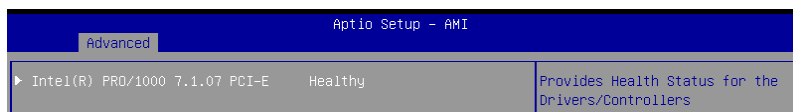
Exit Server CA configuration without saving any changes.

#### Delete Cert

Allows you to delete the certificate.

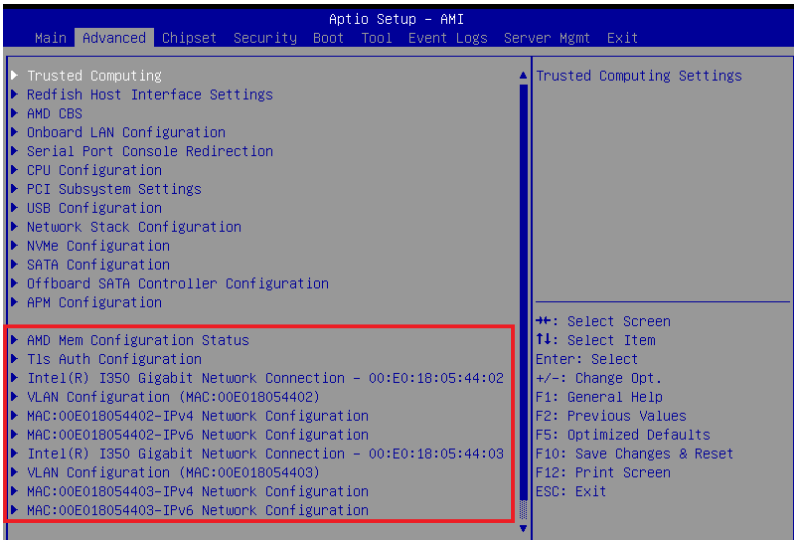
## 4.5.16 Driver Health

Provides Health Status for the Drivers/Controllers.



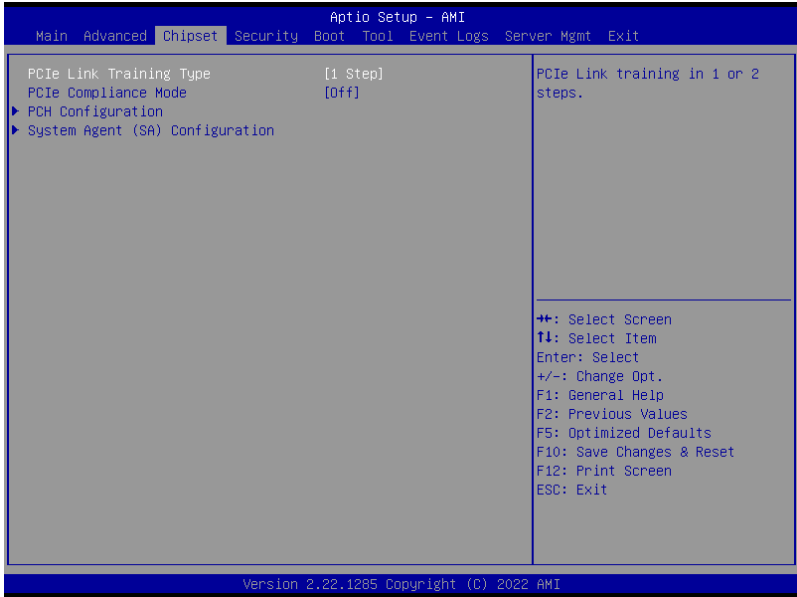
## 4.5.17 Third-party UEFI driver configurations

Additional configuration options for third-party UEFI drivers installed to the system will appear in the bottom of the Advanced menu, in the section marked red in the screenshot below.



## 4.6 Chipset menu

The Chipset menu items allow you to change the Chipset settings.



### PCIe Link Training Type [1 Step]

This item allows you to select PCIe Link Training in 1 or 2 steps.  
Configuration options: [1 Step] [2 Step]

### PCIe Compliance Mode [Off]

Configuration options: [Off] [On]

### PCH Configuration

#### SB Debug Configuration

This item displays options for SB Debug Features.

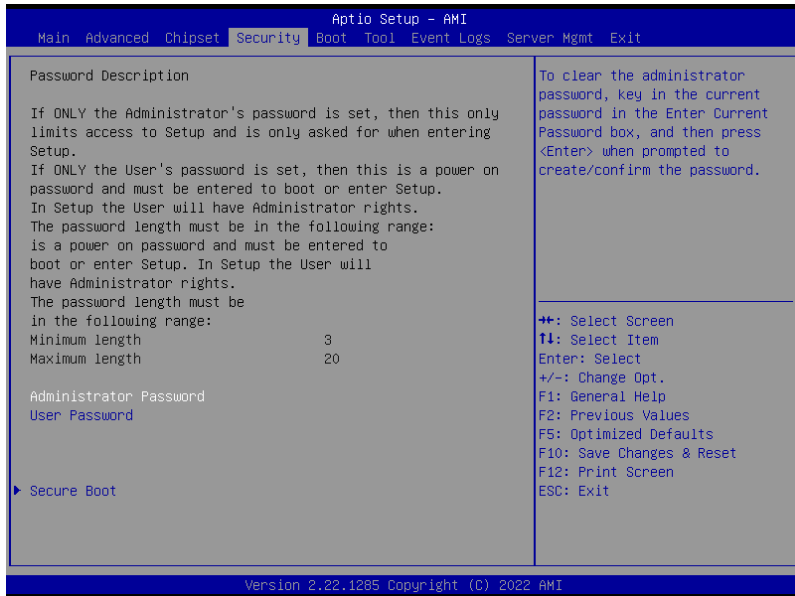
### System Agent (SA) Configuration

#### Socket 1 Information

This item displays the memory information on Socket 1.

## 4.7 Security menu

This menu allows a new password to be created or a current password to be changed. The menu also enables or disables the Secure Boot state and lets the user configure the System Mode state.



### Administrator Password

To set an administrator password:

1. Select the Administrator Password item and press <Enter>.
2. From the Create New Password box, key in a password, then press <Enter>.
3. Confirm the password when prompted.

To change an administrator password:

1. Select the Administrator Password item and press <Enter>.
2. From the Enter Current Password box, key in the current password, then press <Enter>.
3. From the Create New Password box, key in a new password, then press <Enter>.
4. Confirm the password when prompted.



---

To clear the administrator password, follow the same steps as in changing an administrator password, but press <Enter> when prompted to create/confirm the password.

---

## User Password

To set a user password:

1. Select the User Password item and press <Enter>.
2. From the Create New Password box, key in a password, then press <Enter>.
3. Confirm the password when prompted.

To change a user password:

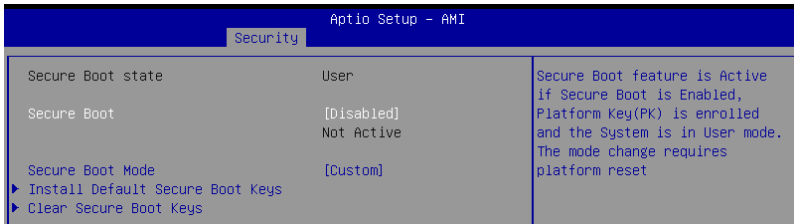
1. Select the User Password item and press <Enter>.
2. From the Enter Current Password box, key in the current password, then press <Enter>.
3. From the Create New Password box, key in a new password, then press <Enter>.
4. Confirm the password when prompted.

To clear a user password:

1. Select the Clear User Password item and press <Enter>.
2. Select **Yes** from the Warning message window then press <Enter>.

## Secure Boot

This item allows you to customize the Secure Boot settings.



### Secure Boot [Disabled]

Secure Boot feature is Active if Secure Boot is Enabled, Platform Key (PK) is enrolled, and the System is in User mode. A mode change requires a platform reset.

Configuration options: [Disabled] [Enabled]

### Secure Boot Mode [Custom]

Allows you to set the Secure Boot selector. In Custom mode, Secure Boot Policy variables can be configured physically by the present user without full authentication.

Configuration options: [Custom] [Standard]





The following items are only available when **Secure Boot Mode** is set to **[Custom]**.

### Install Default Secure Boot Keys

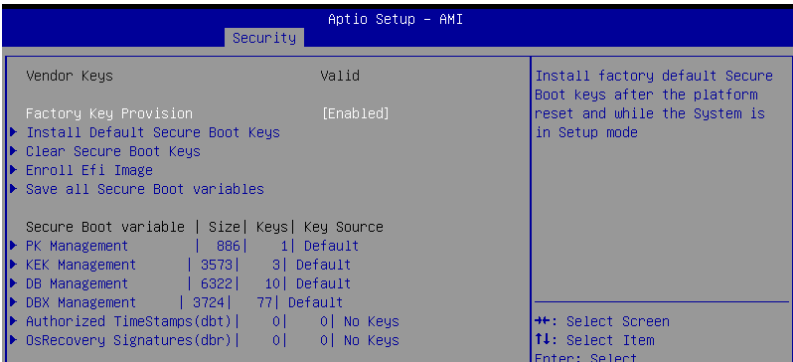
This option will load the default secure boot keys, including the PK (Platform key), KEK (key-exchange key), db (signature database), and dbx (revoked signature database). All the secure boot keys states will change from unloaded to loaded. Save changes and reset the system for the changes to take effect.

### Clear Secure Boot Keys

This option will delete all previously applied secure boot keys, including the PK (Platform key), KEK (key-exchange key), db (signature database), and dbx (revoked signature database). All the secure boot keys states will change from unloaded to loaded. Save changes and reset the system for the changes to take effect.

### Key Management

The Key Management item allows you to modify Secure Boot variables and set Key Management page.



### Factory Key Provision [Enabled]

Allows you to provision factory default Secure Boot keys after the platform resets and while the system is in Setup Mode.

Configuration options: [Disabled] [Enabled]

### Install Default Secure Boot Keys

This option will load the default secure boot keys, including the PK (Platform key), KEK (key-exchange key), db (signature database), and dbx (revoked signature database). All the secure boot keys states will change from unloaded to loaded. Save changes and reset the system for the changes to take effect.

### Clear Secure Boot Keys

This option will delete all previously applied secure boot keys, including the PK (Platform key), KEK (key-exchange key), db (signature database), and dbx (revoked signature database). All the secure boot keys states will change from unloaded to loaded. Save changes and reset the system for the changes to take effect.

**Enroll Efi Image**

This item will allow the image to run in Secure Boot mode. Enroll SHA256 Hash certificate of a PE image into Authorized Signature Database (db).

**Save all Secure Boot Variables**

This option will save NVRAM content of Secure Boot policy variables to the file (EFI\_SIGNATURE\_LIST data format) in root folder on a target file system device.

**PK Management**

Configuration options: [Details] [Save To File] [Set New Key] [Delete key]

**KEK Management / DB Management / DBX Management**

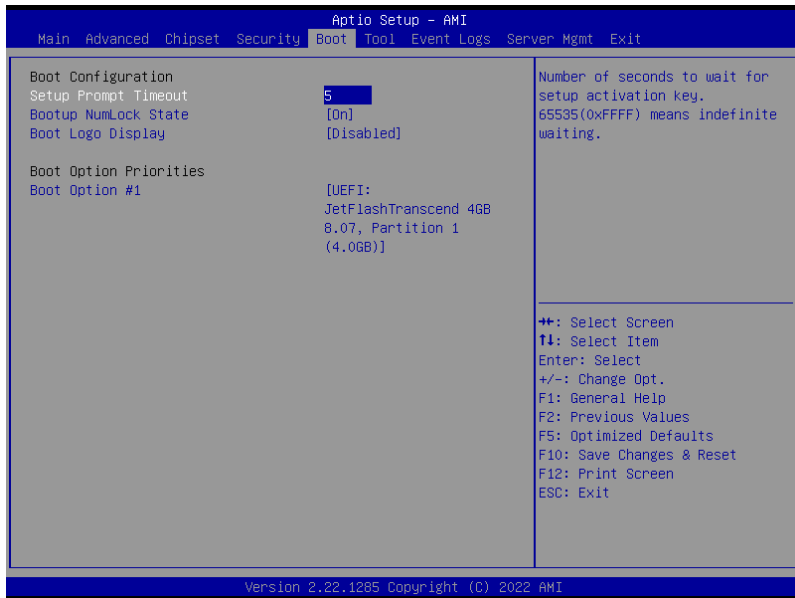
Configuration options: [Details] [Save To File] [Set New Key] [Append Key] [Delete key]

**Authorized TimeStamps (dbt) / OsRecovery Signatures (dbr)**

Configuration options: [Set New Key] [Append Key]

## 4.8 Boot menu

The Boot menu items allow you to change the system boot options.



### Setup Prompt Timeout [5]

Allows you to set the number of seconds that the firmware waits before initiating the original default boot selection. 65535(0xFFFF) means indefinite waiting. Use the <+> or <-> to adjust the value.

### Bootup NumLock State [On]

Configuration options: [Off] [On]

### Boot Logo Display [Disabled]

[Disabled] Hide the logo during POST.

[Enabled] Display the boot logo during POST.

### Boot Option Priorities

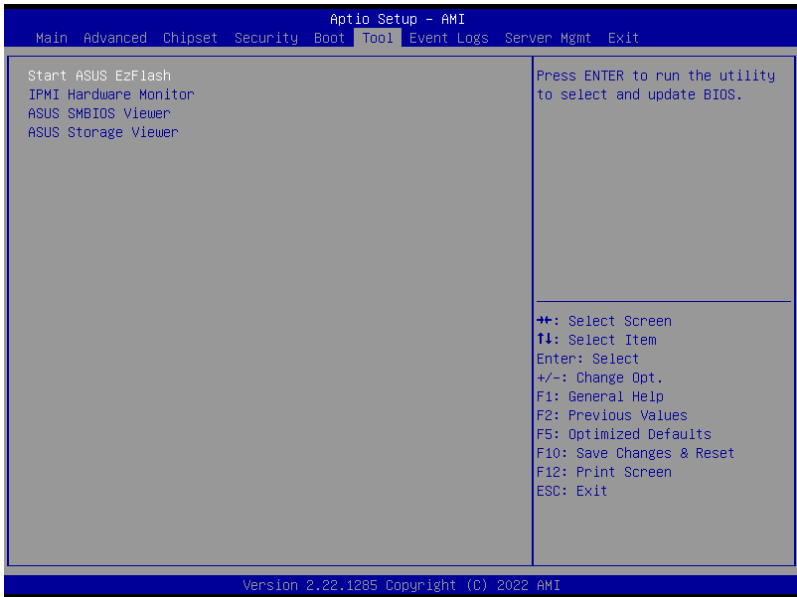
These items specify the boot device priority sequence from the available devices. The number of device items that appears on the screen depends on the number of devices installed in the system.



- To select the boot device during system startup, press <F8> when ASUS Logo appears.
- To access Windows OS in Safe Mode, please press <F8> after POST.

## 4.9 Tool menu

The Tool menu items allow you to configure options for special functions. Select an item then press <Enter> to display the submenu.



### Start ASUS EzFlash

Allows you to run ASUS EzFlash BIOS ROM Utility when you press <Enter>. Refer to the **ASUS EzFlash Utility** section for details.

### IPMI Hardware Monitor

Allows you to run the IPMI hardware monitor.

### ASUS SMBIOS Viewer

Allows you to run ASUS SMBIOS Viewer.

### ASUS Storage Viewer

Allows you to run ASUS Storage Viewer.

## 4.10 Event Logs menu

The Event Logs menu items allow you to change the event log settings and view the system event logs.

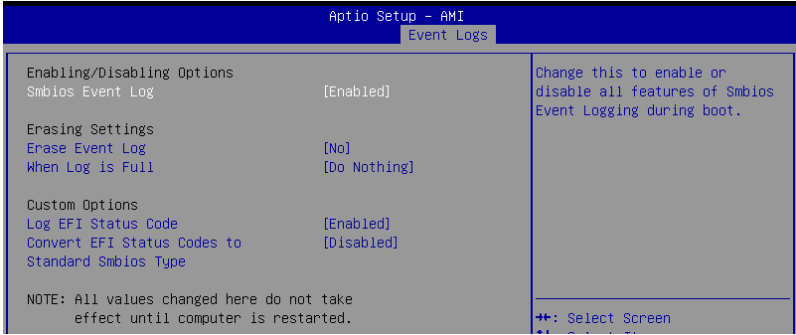


## 4.10.1 Change Smbios Event Log Settings

Press <Enter> to change the Smbios Event Log configuration.



All values changed here do not take effect until computer is restarted.



### Enabling/Disabling Options

#### Smbios Event Log [Enabled]

Change this to enable or disable all features of Smbios Event Logging during boot.  
Configuration options: [Disabled] [Enabled]



The following item appears only when **Smbios Event Log** is set to **[Enabled]**.

### Erasing Settings

#### Erase Event Log [No]

Choose options for erasing Smbios Event Log. Erasing is done prior to any logging activation during reset.

Configuration options: [No] [Yes, Next reset] [Yes, Every reset]

#### When Log is Full [Do Nothing]

Choose options for reactions to a full Smbios Event Log.

Configuration options: [Do Nothing] [Erase Immediately]

### Custom Options

#### Log EFI Status Code [Enabled]

Configuration options: [Disabled] [Enabled]



The following item appears only when **Log EFI Status Code** is set to **[Enabled]**.

#### **Convert EFI Status Codes to Standard Smbios Type [Disabled]**

Configuration options: [Disabled] [Enabled]

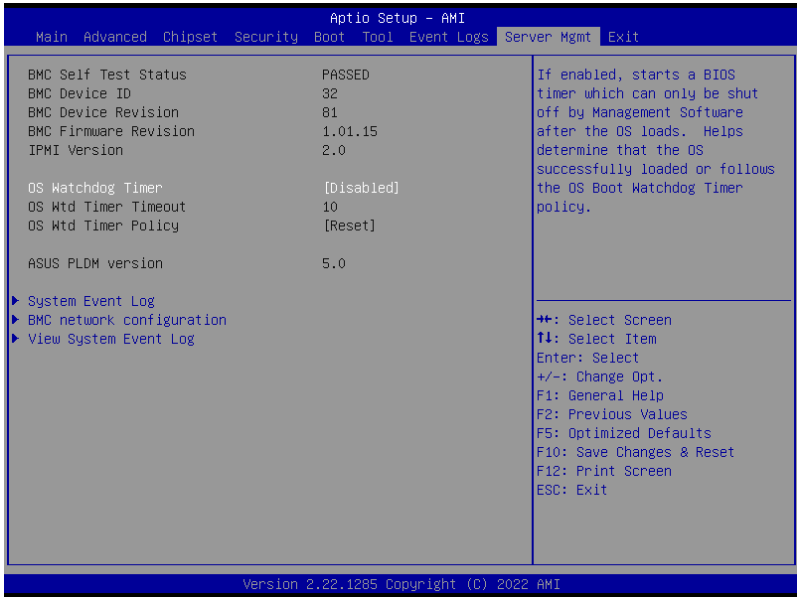
## 4.10.2 View Smbios Event Log

Press <Enter> to view all smbios event logs.

| Aptio Setup - AMI |          |             |          |       |                |
|-------------------|----------|-------------|----------|-------|----------------|
| Event Logs        |          |             |          |       |                |
| DATE              | TIME     | ERROR CODE  | SEVERITY | COUNT | DESCRIPTION    |
| 01/01/11          | 00:00:01 | Smbios 0x16 | N/A      | N/A   | Log Area Reset |

## 4.11 Server Mgmt menu

The Server Management menu displays the server management status and allows you to change the settings.



### OS Watchdog Timer [Disabled]

Allows you to start a BIOS timer which can only be shut off by Management Software after the OS loads. Helps determine if the OS successfully loaded or follows the OS Boot Watchdog Timer policy.

Configuration options: [Disabled] [Enabled]



The following items appear only when the **OS Watchdog Timer** is set to **[Enabled]**.

#### OS Wtd Timer Timeout [10]

Allows you to enter a value between 1 to 30 minutes for OS Boot Watchdog Timer Expiration.

Configuration options: [1] - [30]

#### OS Wtd Timer Policy [Reset]

This item allows you to configure the how the system should respond if the OS Boot Watch Timer expires.

Configuration options: [Do Nothing] [Reset] [Power Down]



## 4.11.1 System Event Log

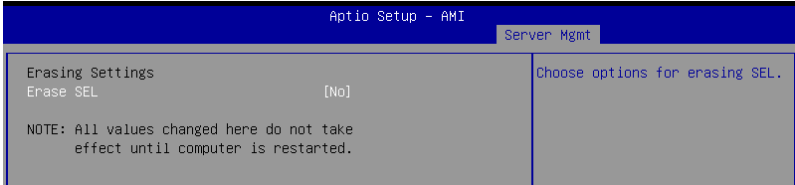
Allows you to change the SEL event log configuration.



---

All values changed here do not take effect until computer is restarted.

---



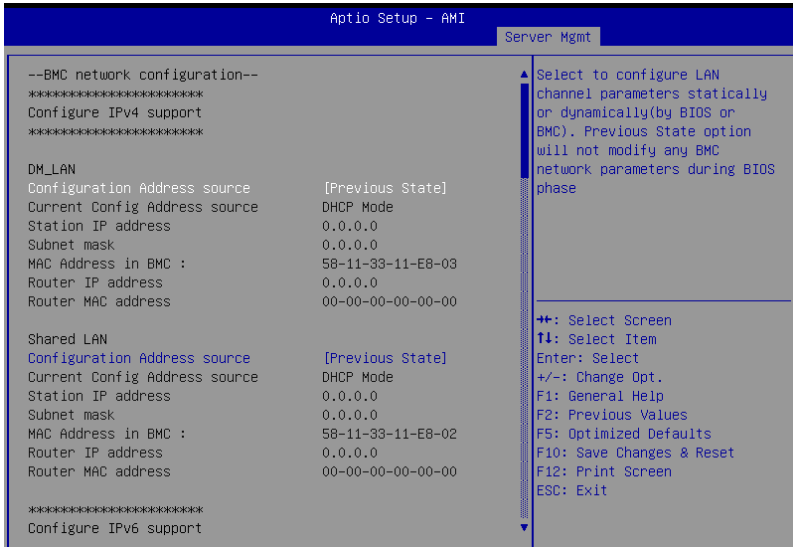
### Erase SEL [No]

Allows you to choose options for erasing SEL.

Configuration options: [No] [Yes, On next reset] [Yes, On every reset]

## 4.11.2 BMC network configuration

The sub-items in this configuration allow you to configure the BMC network parameters.



### Configure IPV4 support

#### DM\_LAN/Shared LAN

#### Configuration Address source [Previous State]

This item allows you to configure LAN channel parameters statistically or dynamically (by BIOS or BMC). [Previous State] option will not modify any BMC network parameters during BIOS phase.

Configuration options: [Previous State] [Static] [DynamicBmcDhcp] [DynamicBmcNonDhcp]



The following items are available only when **Configuration Address source** is set to **[Static]**.

#### **Station IP address**

Allows you to set the station IP address.

#### **Subnet mask**

Allows you to set the subnet mask. We recommend that you use the same Subnet Mask you have specified on the operating system network for the used network card.

#### **Router IP Address**

Allows you to set the router IP address.

#### **Router MAC Address**

Allows you to set the router MAC address.

## Configure IPV6 support

### DM\_LAN/Shared LAN

#### IPV6 support [Enabled]

Allows you to enable or disable IPV6 support.

Configuration options: [Enabled] [Disabled]



---

The following items appear only when **IPV6 support** is set to **[Enabled]**.

---

#### Configuration Address source [Previous State]

Allows you to set the LAN channel parameters statically or dynamically (by BIOS or by BMC). **[Previous State]** option will not modify any BMC network parameters during BIOS phase.

Configuration options: [Previous State] [Static] [DynamicBmcDhcp]



---

The following items are available only when **Configuration Address source** is set to **[Static]**.

---

#### Station IPV6 address

Allows you to set the station IPV6 address.

#### Prefix Length

Allows you to set the prefix length (maximum of Prefix Length is 128).

#### Configuration Router Lan1-2 Address source [Previous State]

Allows you to set the LAN channel parameters statically or dynamically (by BIOS or by BMC). **[Previous State]** option will not modify any BMC network parameters during BIOS phase.

Configuration options: [Previous State] [Static] [DynamicBmcDhcp]



---

The following items are available only when **Configuration Router Lan1-2 Address source** is set to **[Static]**.

---

#### IPV6 Router1 IP address

Allows you to set the IPV6 Router1 IP address.

#### IPV6 Router1 Prefix Length Lan1-2

Allows you to set the IPV6 Router1 prefix length (maximum of Prefix Length is 128).

#### IPV6 Router1 Prefix Value Lan1-2

Allows you to set the IPV6 Router1 prefix value.

## Configure VLAN support

### DM\_LAN/Shared LAN

#### VLAN support [Previous State]

Allows you to enable or disable IPV6 support.

Configuration options: [Enabled] [Disabled] [Previous State]



---

The following items appear only when **VLAN support** is set to **[Enabled]**.

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#### VLAN ID [0]

VLAN ID Range is from 1-4094. VLAN ID 0 and 4095 are reserved VLAN ID's.

Configuration options: [1] - [4094]

#### VLAN Priority [0]

Value ranges from 0 to 7. 7 is the highest priority for VLAN.

Configuration options: [0] - [7]

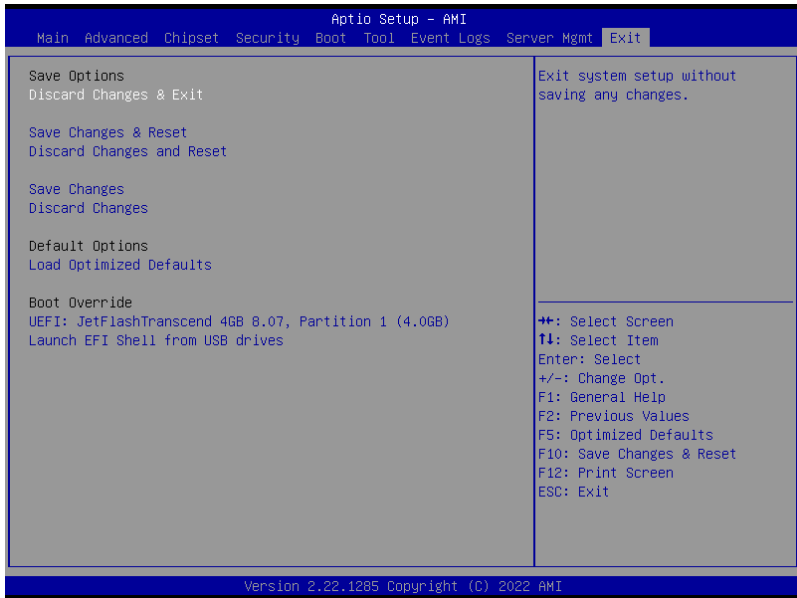
## 4.11.3 View System Event Log

This item allows you to view the system event log records.

| Aptio Setup - AMI             |          |             | Server Mgmt                  |
|-------------------------------|----------|-------------|------------------------------|
| No. of log entries in SEL : 6 |          |             | HEX:                         |
| DATE                          | TIME     | SENSOR TYPE | 01 00 02 83 6E 1E            |
|                               |          |             | 4D 20 00 04 09 F5            |
|                               |          |             | 6F 00 00 00                  |
| 01/01/11                      | 00:00:03 | Power Unit  | Generator ID: BMC - LUN #0   |
| 01/01/11                      | 00:00:08 | Power Unit  | (Channel #0)                 |
| 01/01/11                      | 00:01:39 | Power Unit  | Sensor Number: 0xF5 PowerUni |
| 01/01/11                      | 00:03:26 | Power Unit  | Event Description: Power     |
| 01/01/11                      | 00:09:11 | Power Unit  | Off/Power Down. Record       |
| 01/01/11                      | 02:29:16 | Power Unit  | Type-0x02. Assertion Event.  |

## 4.12 Exit menu

The Exit menu items allow you to save or discard your changes to the BIOS items.



Pressing <Esc> does not immediately exit this menu. Select one of the options from this menu or <F10> from the legend bar to exit.

### Save Options

#### Discard Changes and Exit

Exit system setup without saving any changes.

#### Save Changes and Reset

Reset system after saving the changes.

#### Discard Changes and Reset

Reset system setup without saving any changes.

#### Save Changes

Save changes done so far to any of the setup options.

#### Discard Changes

Discard changes done so far to any of the setup options.

## **Default Options**

### **Load Optimized Defaults**

Restore/Load Default values for all the setup options.

### **Boot Override**

These items displays the available devices. The device items that appears on the screen depends on the number of devices installed in the system. Click an item to start booting from the selected device.

### **Launch EFI Shell from USB drives**

Attempt to Launch EFI Shell application (Shell.efi) from one of the available filesystem devices.

# Driver Installation

# 5

This chapter provides instructions for installing the necessary drivers for different system components.

## 5.1 Running the Support DVD

The support DVD that is bundled with your motherboard contains drivers, management applications, and utilities that you can install to maximize the features of your motherboard.



- The contents of the support DVD are subject to change at any time without notice. Visit the ASUS website ([www.asus.com](http://www.asus.com)) for the latest updates on software and utilities.
- The support DVD is supported on Windows® Server 2016 and Windows® Server 2019.

The main screen of the Support DVD contains the following tabs:

1. **Drivers** - Shows the available device drivers that the system detects.
2. **Utilities** - Displays the software applications and utilities that the motherboard supports.
3. **Manual** - Provides the link to the user guide(s).



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You need an internet browser installed in your OS to view the User Guide.

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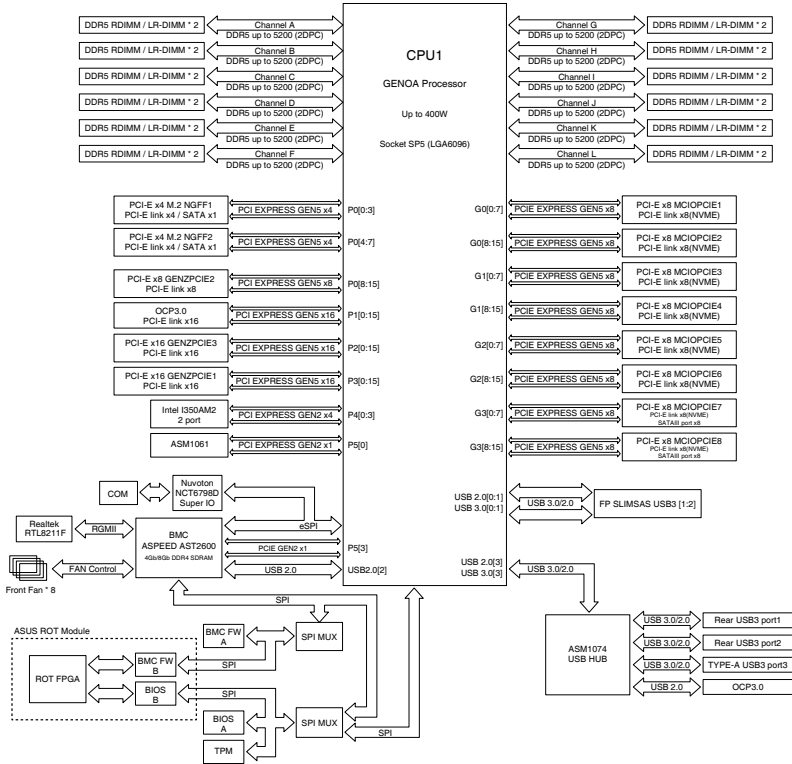
4. **Contact** - Displays the ASUS contact information, e-mail addresses, and useful links if you need more information or technical support for your motherboard.



# Appendix

This appendix includes additional information that you may refer to when configuring the motherboard.

# K14PA-U24 block diagram



## Notices

### Federal Communications Commission Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



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The use of shielded cables for connection of the monitor to the graphics card is required to assure compliance with FCC regulations. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

---

### Compliance Statement of Innovation, Science and Economic Development Canada (ISED)

This device complies with Innovation, Science and Economic Development Canada licence exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

CAN ICES-003(A)/NMB-003(A)

### Déclaration de conformité de Innovation, Sciences et Développement économique Canada (ISED)

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CAN ICES-003(A)/NMB-003(A)

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This product cannot be directly connected to the Internet (including public wireless LAN) of a telecom carrier (mobile network companies, landline network companies, Internet providers, etc.). When connecting this product to the Internet, be sure to connect it through a router or switch.

## Australia statement notice

From 1 January 2012 updated warranties apply to all ASUS products, consistent with the Australian Consumer Law. For the latest product warranty details please visit <https://www.asus.com/support/>. Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

If you require assistance please call ASUS Customer Service 1300 2787 88 or visit us at <https://www.asus.com/support/>.



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DO NOT throw the motherboard in municipal waste. This product has been designed to enable proper reuse of parts and recycling. This symbol of the crossed out wheeled bin indicates that the product (electrical and electronic equipment) should not be placed in municipal waste. Check local regulations for disposal of electronic products.

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DO NOT throw the mercury-containing button cell battery in municipal waste. This symbol of the crossed out wheeled bin indicates that the battery should not be placed in municipal waste.

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Please refer to <http://csr.asus.com/Compliance.htm> for information disclosure based on regulation requirements ASUS is complied with:

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Complying with the REACH (Registration, Evaluation, Authorization, and Restriction of Chemicals) regulatory framework, we publish the chemical substances in our products at ASUS REACH website at <http://csr.asus.com/english/REACH.htm>.

### EU RoHS

This product complies with the EU RoHS Directive. For more details, see <http://csr.asus.com/english/article.aspx?id=35>

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Các sản phẩm ASUS bán tại Việt Nam, vào ngày 23 tháng 9 năm 2011 trở về sau, đều phải đáp ứng các yêu cầu của Thông tư 30/2011/TT-BCT của Việt Nam.

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AEEE Yönetmeliğine Uygundur

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