ASUS

ESC N8-E11

7U Rackmount Server
User Guide

E22973
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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.

> ⚠ 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.

Restricted Access Location

This product is intended for installation only in a Computer Room where:

- Access can only be gained by SERVICE PERSONS or by USERS who have been instructed about the reasons for the restrictions applied to the location and about any precautions that shall be taken.

- Access is through the use of a TOOL, or other means of security, and is controlled by the authority responsible for the location.

Heavy System

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

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. It includes 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: BIOS Setup**

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

4. **Chapter 4: RAID Configuration**

    This chapter provides instructions for setting up, creating, and configuring RAID sets using the available utilities.

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 command 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.

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.

	ESC N8-E11
Chassis	ASUS 7U Rackmount Chassis
Motherboard	ASUS Z13PN-D32 Server Board
Accessory box	1 x Support DVD 1 x ACC instruction card 1 x ASMB11 instruction card 6 x AC power cables 2 x CPU heatsink 2 x CPU carrier
Optional items	1 x Rail kit 1 x RAID card cable kit 1 x ASUS PIKE cable kit

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

- Optional items come bundled if you selected them when purchasing the system and cannot be bought separately.

1.2   Serial number label

Before requesting support from the ASUS Technical Support team, you must take note of the product's serial number containing 12 characters, such as xxSxxxxxxxxx. See the figure below.

With the correct serial number of the product, ASUS Technical Support team members can then offer a quicker and satisfying solution to your problems.
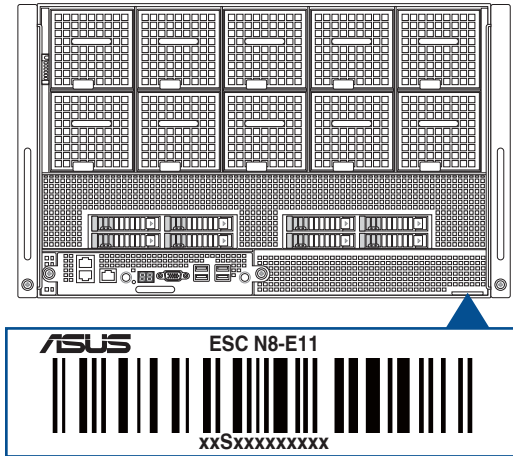
The serial number is printed on the Asset tag.

1.3   System specifications

The ASUS ESC N8-E11 server features the ASUS Z13PN-D32 server board. The server supports 4th and 5th Gen Intel® Xeon® Scalable Processors Family Series plus other latest technologies through the chipsets onboard.

Model Name		ESC N8-E11
Motherboard		Z13PN-D32
Processor Support		2 x Socket (LGA 4677)
		4th and 5th Gen Intel® Xeon® Scalable Processors Family (Up to 350W)
		UPI 16 GT/s
Core Logic		Intel® C741
Memory	Total Slots	32 (8-channel per CPU, 16 DIMM per CPU)
	Capacity	Maximum up to 4 + 8TB (DDR5 + Crow Pass)
	Memory Type	DDR5 4400 RDIMM / 3DS RDIMM (2 DIMM per channel)
		* Refer to ASUS server AVL for the latest update
	Memory Size	64GB, 32GB, 16GB (RDIMM)
		256GB, 128GB (3DS RDIMM)
		* Refer to ASUS server AVL for the latest update
Expansion Slots	Total PCI/PCIe Slots	SKU1: 10+1
		SKU2: 12
	PCIe Slot Type	**Rear:**
		SKU1:
		- 8 x PCIe (Gen5, LP, PCIe switch direct)
		- 1 x PCIe (Gen5 x16 link FH/HL, CPU1 direct)
		- 1 x PCIe (Gen5 x16 link FH/HL, CPU2 direct)
		- 1 x PCIe (Gen4 x8 HH/HL, CPU2 direct) for RAID cards
		SKU2:
		- 8 x PCIe (Gen5, LP, PCIe switch direct)
		- 1 x PCIe (Gen5 x16 link FH/HL, CPU1 direct)
		- 1 x PCIe (Gen5 x16 link FH/HL, CPU2 direct)
		- 1 x PCIe (Gen5 x8 link FH/HL, CPU1 direct)
		- 1 x PCIe (Gen5 x8 link FH/HL, CPU2 direct)
	M.2	2 x M.2 socket (Gen5 x4 link, CPU1, up to 2280)
		2 x M.2 socket (Gen3 x2 link, PCH, up to 2280)
	microSD Card Slot	1 x for BMC log
Storage	SATA Controller	Intel PCH Integrated
	SAS Controller	**Optional kit(s):**
		- Broadcom 9560-16i MegaRAID card
		- Broadcom 9540-8i RAID card
		- ASUS PIKE II 3008 8-port HBA card
		- ASUS PIKE II 3108 8-port HW RAID card

(continued on the next page)

Model Name		ESC N8-E11
Storage Bays	Storage Bays	8 x 2.5-inch Front Hot-swap Storage Bays - PCIe switch direct: 8 x NVMe 2 x 2.5-inch Rear Hot-swap Storage Bays - CPU2 direct: 2 x NVMe/SATA(PCH)/SAS* *** SAS support requires an optional HBA/RAID card**
	Backplane Connectors	4 x EXAMAX 1 x MCIO 1 x Mini SAS HD
	Motherboard Connectors	1 x MCIO 1 x Mini SAS HD
	Default Cables	1 x MCIO cable 1 x Mini SAS HD cable
Networking	LAN	2 x Dual Port Intel® X710-AT2 10GbE LAN controller 1 x Management Port
VGA		Aspeed AST2600 64MB
Graphic		HGX H100 8 GPUs with NVLink NVSwitch
Front I/O		4 x USB 3.2 Gen1 ports 1 x VGA port 2 x RJ-45 LAN ports 1 x RJ-45 management LAN port
Switch/LED		**Front:** 1 x Power switch/LED 1 x Location switch/LED 1 x Q-Code/Port 80 LED 2 x LAN LED 1 x Message LED ⸱ **Rear:** 1 x Location switch/LED
Security Options		TPM-SPI / PFR (optional)
OS Support		Windows Server, RedHat® Enterprise Linux, CentOS, Ubuntu, VMWare *** Refer to https://www.asus.com/event/Server/OS_support_list/ OS.html for the latest supported OS list**
Management Solution	Out of Band Remote Hardware	Onboard ASMB11-iKVM
	Software	ASUS Control Center

(continued on the next page)

Model Name	ESC N8-E11
Regulatory Compliance	BSMI, CB, CE, FCC, KCC (Class A)
Dimensions (HH x WW x DD)	885mm x 447 mm x 306.65 mm (7U)
Net Weight	99kg (excluding CPU, DRAM, and HDD)
Gross Weight	154kg (including packaging, excluding CPU, DRAM, and HDD)
Power Supply / Power Rating	4+2 or 3+3 3000W 80 PLUS Titanium power supply Rating: 200-220 Vac, 15.8A (x6), 50-60Hz
Environment	Operating temperature: 10°C ~ 35°C Non-operating temperature: -40°C ~ 70°C Non-operating humidity: 20% ~ 90% (Non-condensing)

Specifications are subject to change without notice.

1.4 Front panel features

Steel pull handle   **GPU fans**   **Steel pull handle**

LAN ports   **VGA port**   **Power switch/LED**   **2.5-inch storage bay 1-8**

DM port*   **Q-Code LED**   **USB 3.2 Gen 1 ports**

Location switch/LED
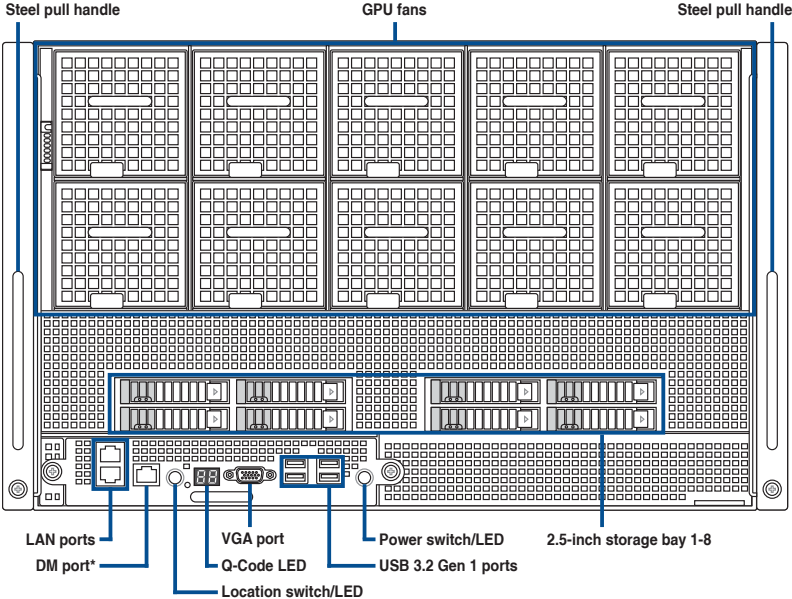
The DM (Dedicated Management) port is for ASUS ASMB11-iKVM only.

1.5   Rear panel features

2.5-inch storage bay 9-10   **Half-Height, Half-Length (HH/HL) expansion slots**

Location switch/LED   **Power switch/LED**   **Redundant power supply units**

Redundant power supply units   **Full-Height, Half-Length (FH/HL) expansion slots**
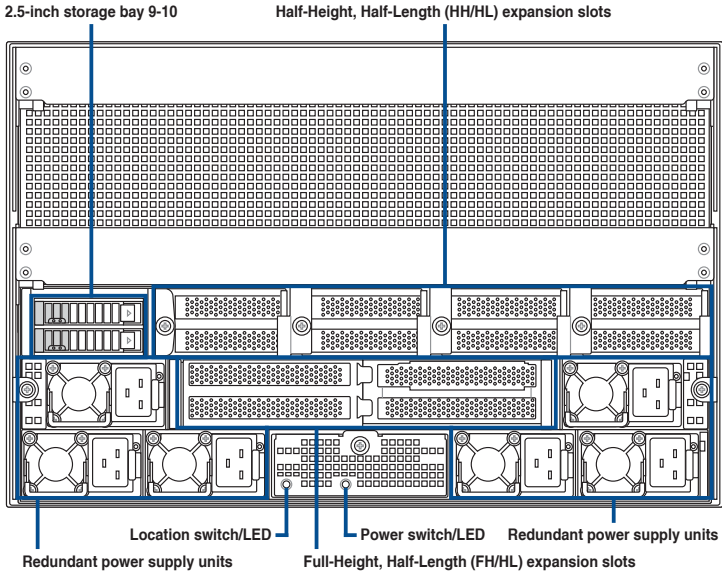
1.6 Internal features

The barebone server includes the basic components as shown.

Upper level (with PCIe switchboard and HH/HL PCIe expansion card brackets)
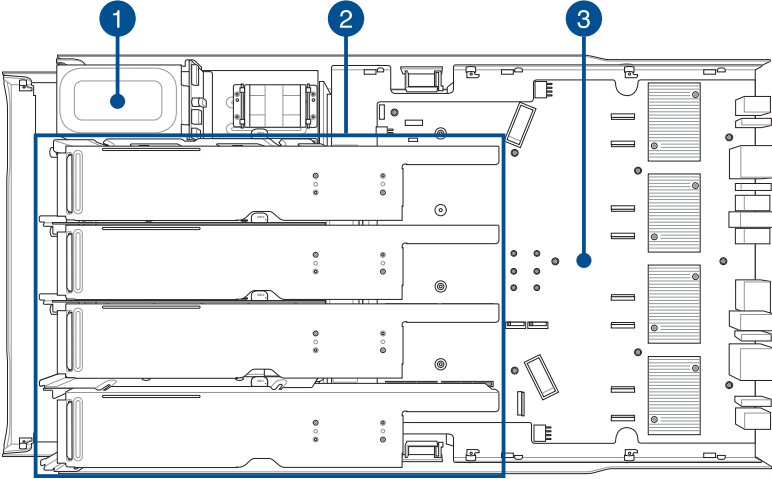
Lower level (without PCIe switchboard and HH/HL PCIe expansion card brackets)
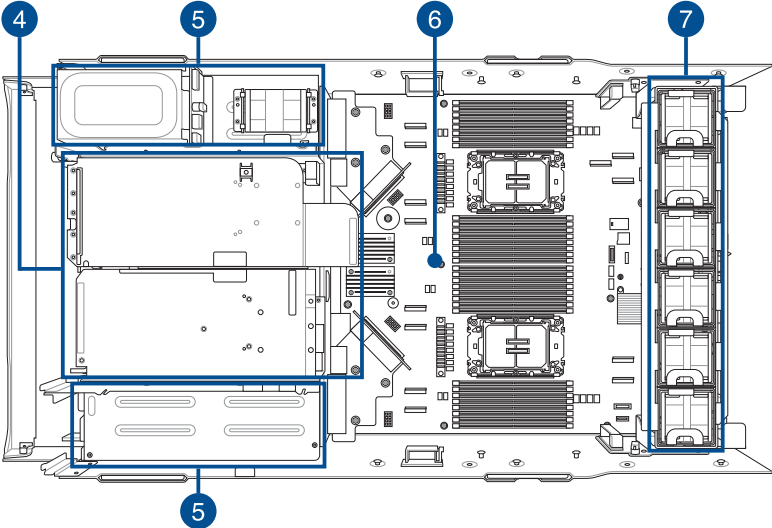
1. 2.5-inch storage bays

2. PCIe expansion card brackets with half-height, half-length expansion slots

3. PCIe switchboard

4. PCIe expansion card brackets with full-height, half-length expansion slots

5. Redundant power supply units

6. ASUS Z13PN-D32 server board

7. System fans

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

WARNING
HAZARDOUS MOVING PARTS
KEEP FINGERS AND OTHER BODY PARTS AWAY

1.7 LED information

1.7.1 Front panel LEDs
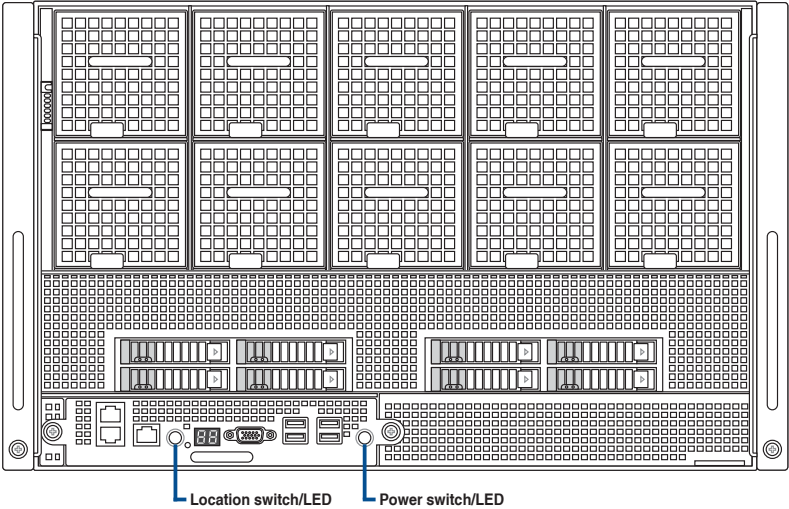
Location switch/LED   Power switch/LED

LED	Status	Description
Power LED	ON	System power is on
Location LED	OFF	System is normal; no incoming event
	ON	Received user command to locate the system

1.7.2   Rear panel LEDs
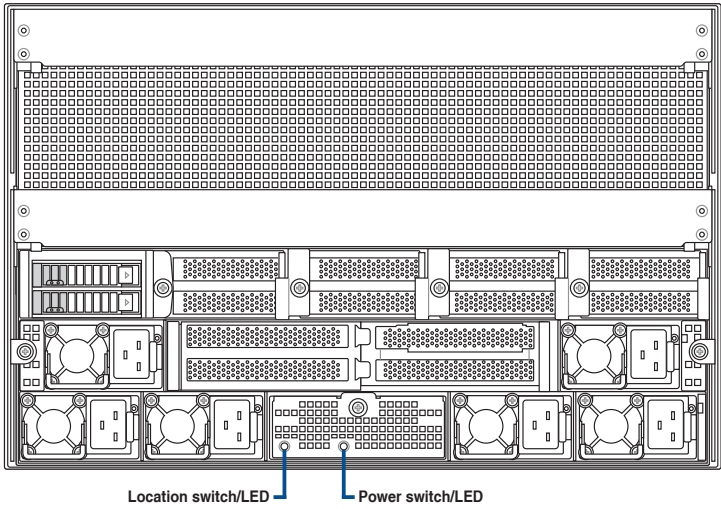
Location switch/LED ─┐   ┌─ **Power switch/LED**

LED	Status	Description
Power LED	ON	System power is on
Location LED	OFF	System is normal; no incoming event
	ON	Received user command to locate the system

1.7.3　LAN (RJ-45) LEDs
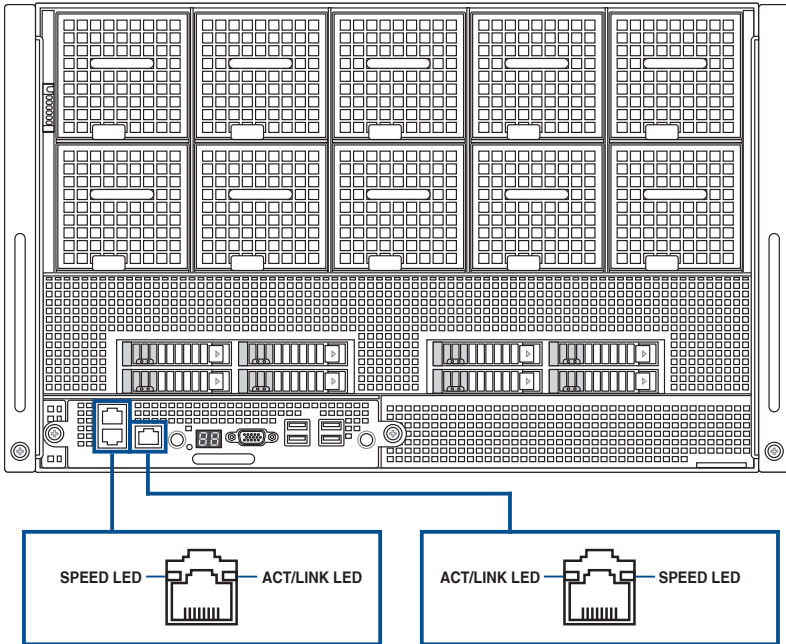
Intel® X710-AT2 10GbE LAN port LEDs

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

Dedicated Management LAN port (DM_LAN1) LED indications

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

1.7.4   Storage device status LEDs

Green LED ──┐   └── Red LED
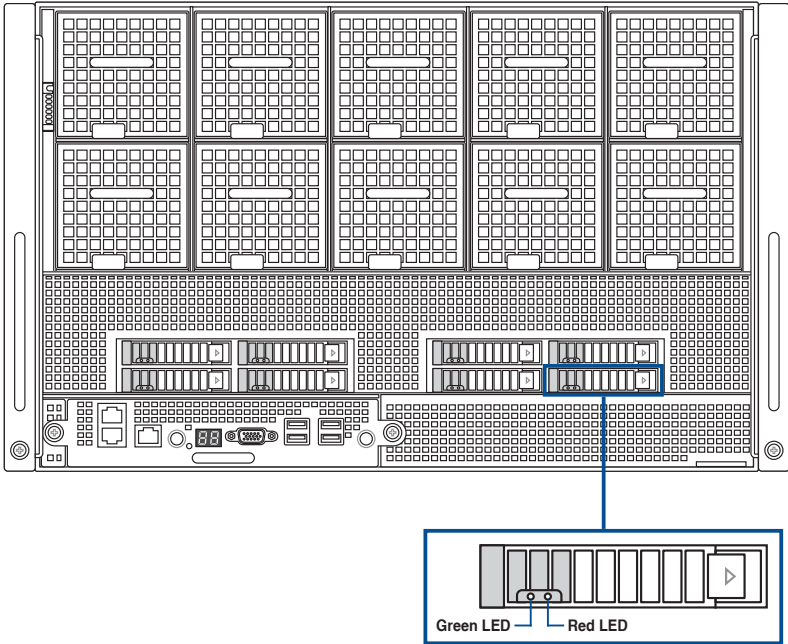
Storage Device LED Description		
Status (RED)	ON	Storage device has failed
	Blinking	RAID rebuilding or locating
Activity (GREEN)	ON	Storage device power ON
	Blinking	SATA/SAS/NVMe storage device reading or writing data
	OFF	Storage device not found

Hardware Setup

2

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

2.1 Server tray

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

2.1.1 Removing the server tray

1. Remove the two thumbscrews from the server tray handle.

Keep the thumbscrews in a safe place for later use.
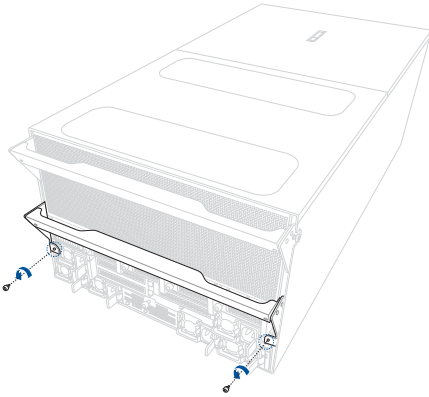
2. Pull the server tray handle downwards and slowly pull the server tray halfway out of the server chassis, then press both latches inwards and fully remove the server tray.

Slowly pull the server tray with both hands.
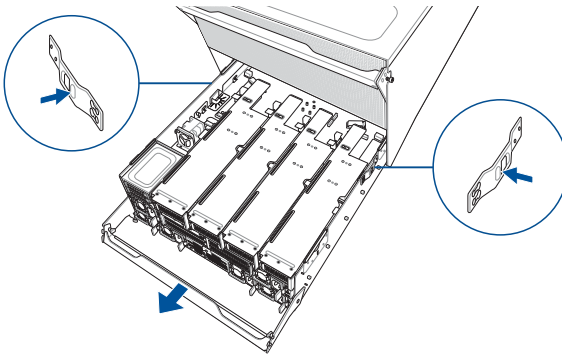
2.1.2   Installing the server tray

1. Align and push the server tray all the way into the server tray slot, then push the server tray handle upwards.
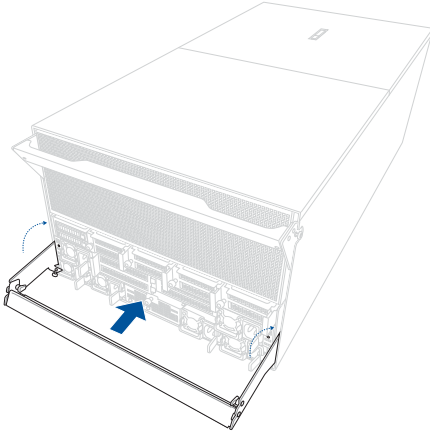
2. Secure the server tray handle using the thumbscrews, then tighten the thumbscrews by hand until the screw thread is no longer visible.
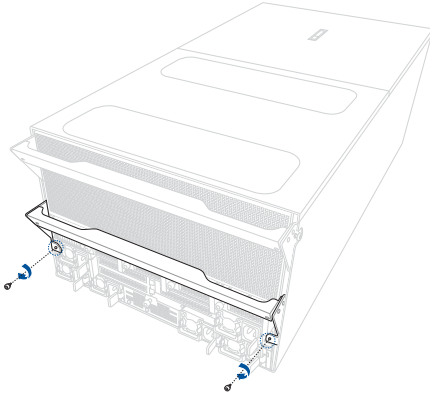
3. Use a tool to fully secure the thumbscrews with a torque value of 5 kgf-cm.

2.2 PCIe expansion card brackets

2.2.1 Removing the upper PCIe expansion card brackets

1. Remove the server tray from the server chassis. For more information, see the **Removing the server tray** section.

2. Loosen the thumbscrew on the PCIe expansion card bracket.
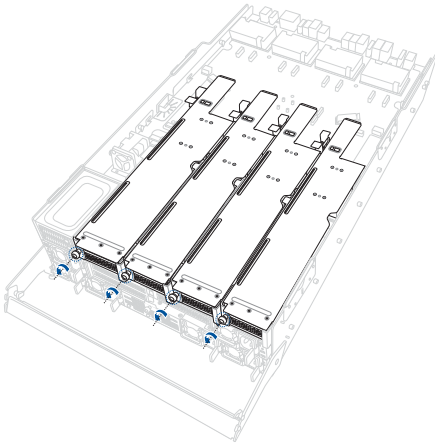
3. Press the latch on the PCIe expansion card bracket and lift the bracket upwards to remove it from the server tray.
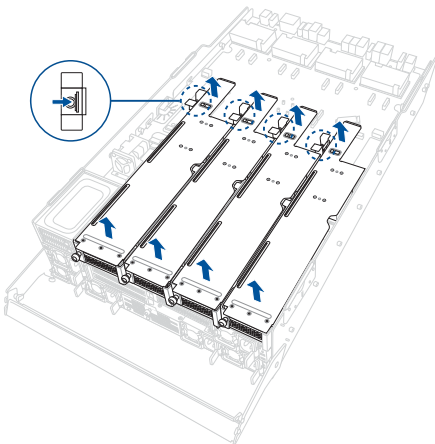
2.2.2   Installing the upper PCIe expansion card brackets

1.   Align and install the PCIe expansion card bracket into the server tray, then firmly press down on the indicated area of the PCIe expansion card bracket until a click is heard.
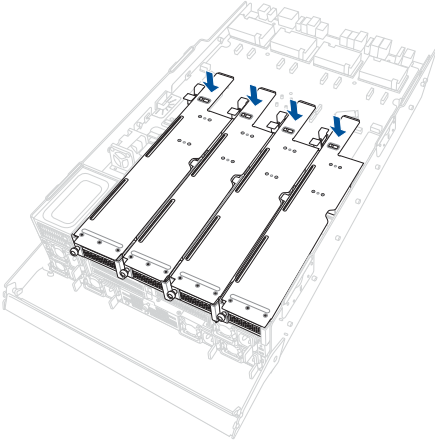
2.   Secure the bracket using the thumbscrew.
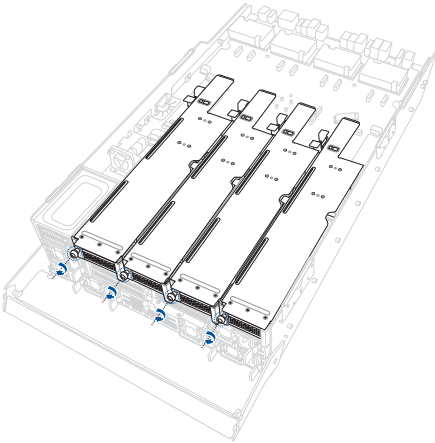
2.2.3 Removing the lower PCIe expansion card brackets

1. Remove the server tray from the server chassis. For more information, see the **Removing the server tray** section.

2. Remove the upper PCIe expansion card brackets from the server tray. For more information, see the **Removing the upper PCIe expansion card brackets** section.

3. Loosen the two thumbscrews and disengage the latch on the PCIe expansion card tray.
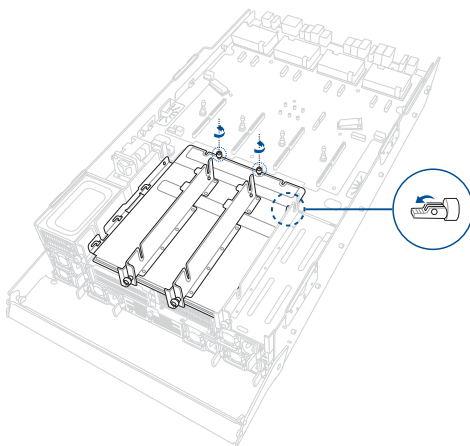
4. Slide the PCIe expansion card tray towards the rear of the server tray and pull upwards to remove it.
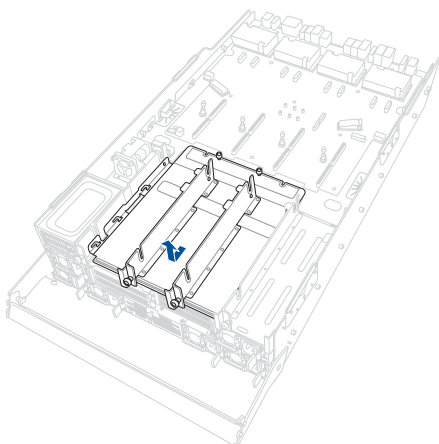
5. Pull the right PCIe expansion card bracket upwards to remove it from the server tray.

6. Pull the left PCIe expansion card bracket upwards to remove it from the server tray.
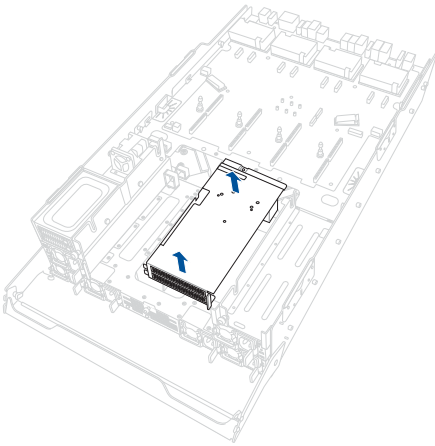
2.2.4   Installing the lower PCIe expansion card brackets

1.   Align and install the left PCIe expansion card bracket into the server tray.
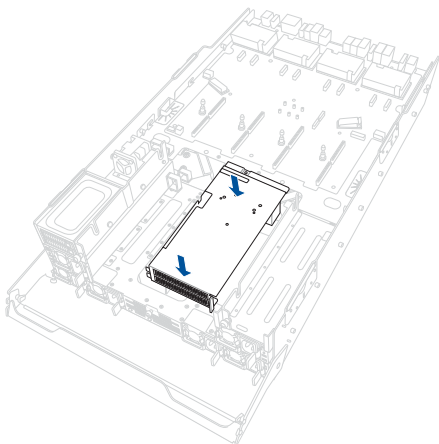
2.   Align and install the right PCIe expansion card bracket into the server tray.
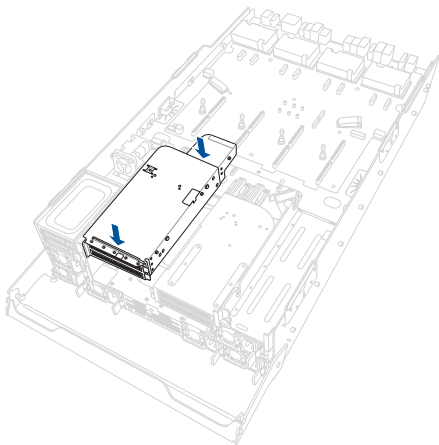
3.   Align and install the PCIe expansion card tray into the server tray.
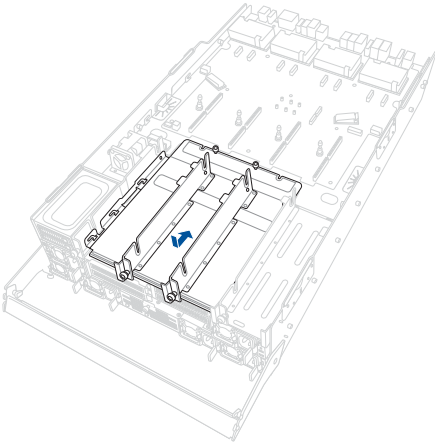
4.   Return the latch to the locked position, then use the two thumbscrews to secure the PCIe expansion card tray.
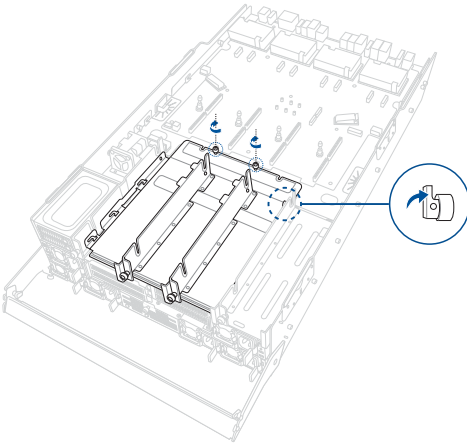
2.2.5 Removing the PCIe switchboard

1. Remove the server tray from the server chassis. For more information, see the **Removing the server tray** section.

2. Remove the upper PCIe expansion card brackets from the server tray. For more information, see the **Removing the upper PCIe expansion card brackets** section.

3. Remove the lower PCIe expansion card brackets from the server tray. For more information, see the **Removing the lower PCIe expansion card brackets** section.

4. Disconnect the cables from the PCIe switchboard.
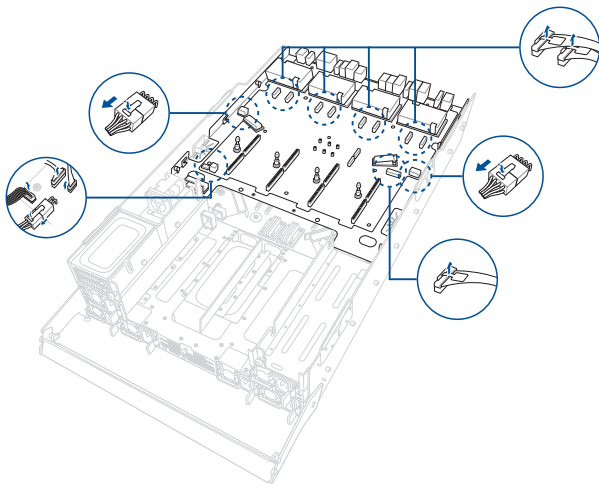
5. Disengage the latches on the PCIe switchboard, then slide the PCIe switchboard towards the front of the server tray and pull upwards to remove it.
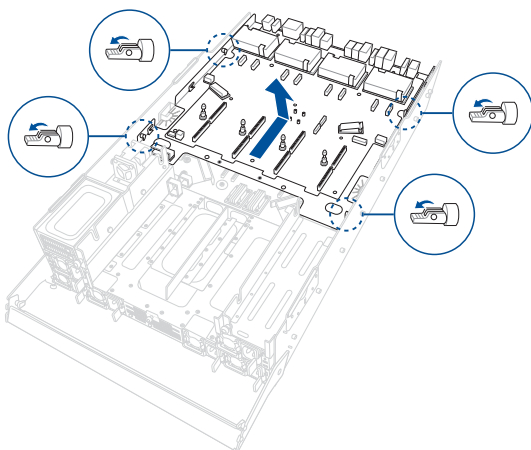
2.2.6 Installing the PCIe switchboard

1. Align and install the PCIe switchboard into the server tray, then return the latches to the locked position to secure it.
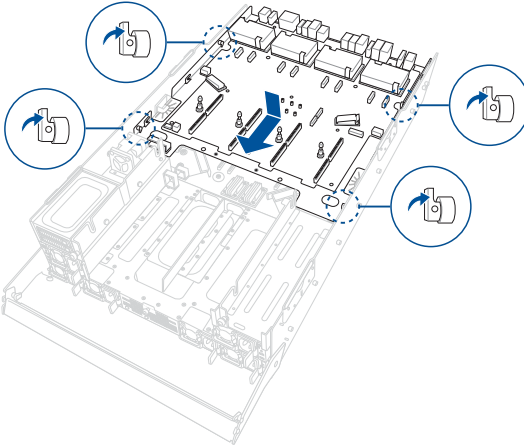
2. Reconnect the cables to the PCIe switchboard.
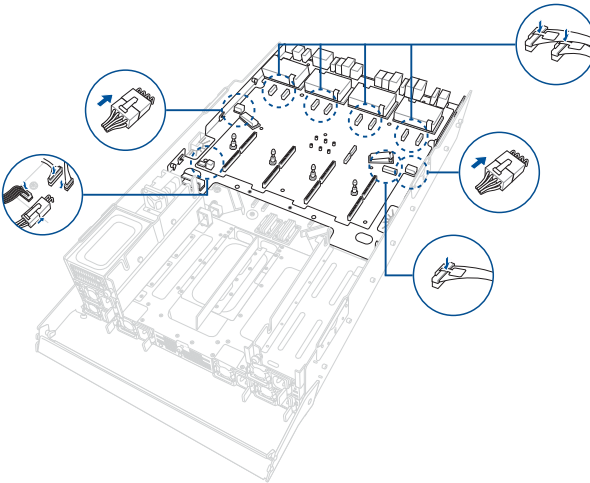
2.3 Central Processing Unit (CPU)

The motherboard comes with two (2) surface mount LGA 4677 sockets designed for 4th and 5th Gen Intel® Xeon® Scalable Processors Family CPUs.

⚠️ • 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.

1. Remove the server tray from the server chassis. For more information, see the **Removing the server tray** section.

2. Remove the upper PCIe expansion card brackets from the server tray. For more information, see the **Removing the upper PCIe expansion card brackets** section.

3. Remove the lower PCIe expansion card brackets from the server tray. For more information, see the **Removing the lower PCIe expansion card brackets** section.

4. Remove the PCIe switchboard from the server tray. For more information, see the **Removing the PCIe switchboard** section.

5. Lift the air duct to remove it from the server tray.
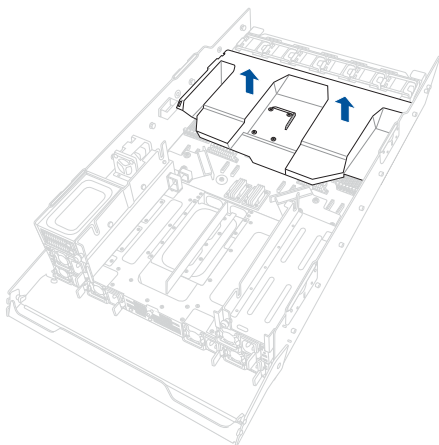
6. Locate the CPU socket on the motherboard.

Z13PN-D32 CPU LGA 4677 Socket
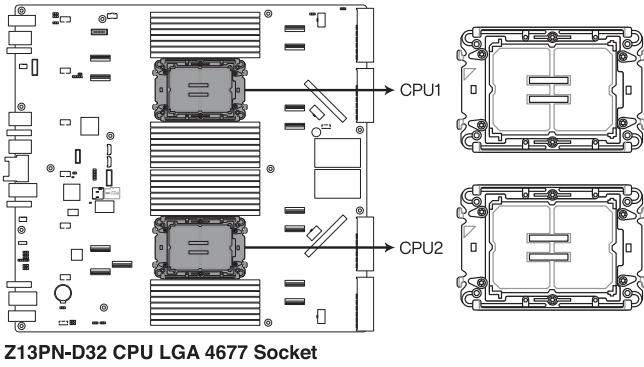
7. Remove the PnP caps from the CPU sockets.

Keep the PnP cap. ASUS will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the PnP cap on the socket.
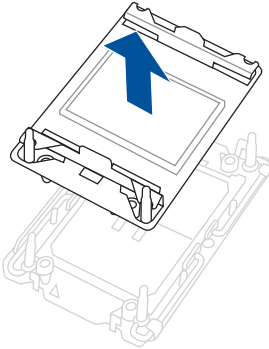
8. Attach the CPU to the carrier bracket, ensure the triangle mark is on the same side as the bracket lever, then attach the CPU and carrier bracket to the heatsink.

The CPU carrier differs depending on the type of CPU. Ensure that the CPU carrier corresponds to the CPU being installed.
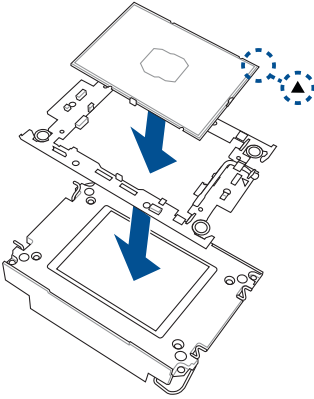
9. Align the CPU and heatsink assembly in the correct orientation so that the triangle marks on both the CPU and socket are aligned in the same direction, then place the heatsinks on top of the CPU sockets.

The CPU and CPU Carrier fits in only one correct orientation. DO NOT force the CPU and CPU Carrier into the socket to prevent damaging the CPU pins on the socket.

10. Once the heatsink is placed on top of the CPU socket (A), push the lock latches outwards on all four corners of the heatsink so that the heatsink and CPU assembly is secured to the CPU socket (B).

Ensure the triangle mark on the CPU is located in the same corner as the CPU socket.
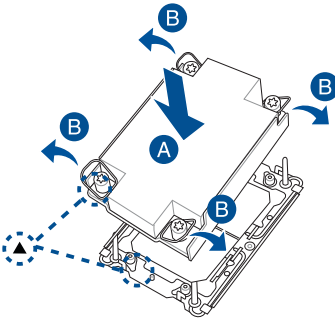
11. Do two (2) clockwise turns on each of the heatsink screws in the cross order pattern shown below until the heatsink screws are tightened and the heatsink is secured onto the motherboard.

Intel® recommends a using a torque driver with a T-30 bit and a torque value of 8 lbf-in to prolong the longevity of all PEEK nuts after the quality of the load post is corrected.
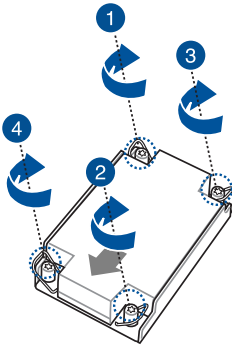
12. Align and insert the air duct into the server tray.
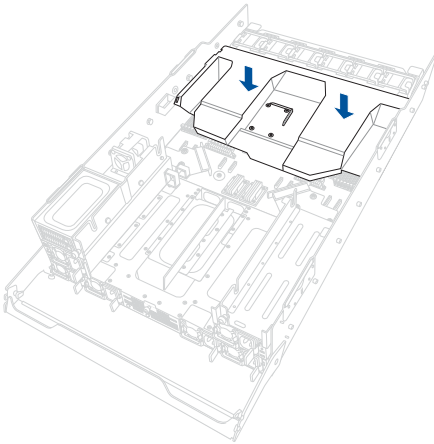
2.4 System memory

2.4.1 Overview

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

The figure illustrates the location of the DDR5 DIMM sockets:

Z13PN-D32 288-pin DDR5 DIMM sockets

CPU1_DIMM_D1
CPU1_DIMM_D2
CPU1_DIMM_C1
CPU1_DIMM_C2
CPU1_DIMM_B1
CPU1_DIMM_B2
CPU1_DIMM_A1
CPU1_DIMM_A2

CPU1_DIMM_E2
CPU1_DIMM_E1
CPU1_DIMM_F2
CPU1_DIMM_F1
CPU1_DIMM_G2
CPU1_DIMM_G1
CPU1_DIMM_H2
CPU1_DIMM_H1

CPU2_DIMM_D1
CPU2_DIMM_D2
CPU2_DIMM_C1
CPU2_DIMM_C2
CPU2_DIMM_B1
CPU2_DIMM_B2
CPU2_DIMM_A1
CPU2_DIMM_A2

CPU2_DIMM_E2
CPU2_DIMM_E1
CPU2_DIMM_F2
CPU2_DIMM_F1
CPU2_DIMM_G2
CPU2_DIMM_G1
CPU2_DIMM_H2
CPU2_DIMM_H1
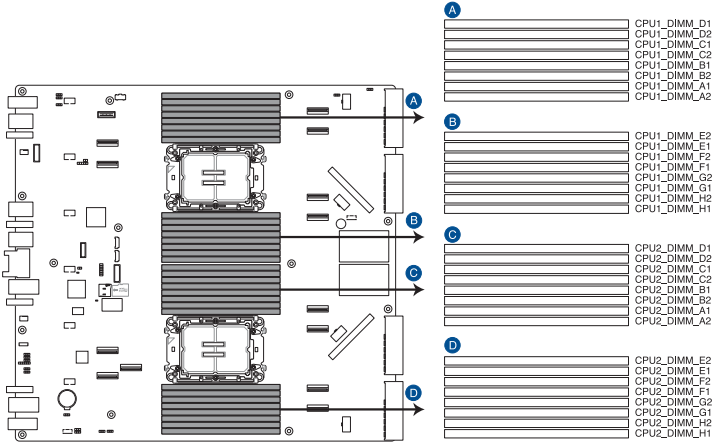
2.4.2 Memory configurations

You may install 16GB, 32GB, 64GB RDIMMs or 128GB, 256GB 3DS RDIMM into the DIMM sockets using the recommended memory configurations in this section.

> • Refer to ASUS Server AVL for the updated list of compatible DIMMs.
>
> • Always install DIMMs with the same CAS latency. For optimum compatibility, it is recommended that you obtain memory modules from the same vendor.

Recommended dual CPU configuration					
	2 DIMMs	**4 DIMMs**	**8 DIMMs**	**16 DIMMs**	**32 DIMMs**
CPU1_DIMM_A1	•	•	•	•	•
CPU1_DIMM_A2					•
CPU1_DIMM_B1				•	•
CPU1_DIMM_B2					•
CPU1_DIMM_C1			•	•	•
CPU1_DIMM_C2					•
CPU1_DIMM_D1				•	•
CPU1_DIMM_D2					•
CPU1_DIMM_E1			•	•	•
CPU1_DIMM_E2					•
CPU1_DIMM_F1				•	•
CPU1_DIMM_F2					•
CPU1_DIMM_G1		•	•	•	•
CPU1_DIMM_G2					•
CPU1_DIMM_H1				•	•
CPU1_DIMM_H2					•
CPU2_DIMM_A1	•	•	•	•	•
CPU2_DIMM_A2					•
CPU2_DIMM_B1				•	•
CPU2_DIMM_B2					•
CPU2_DIMM_C1			•	•	•
CPU2_DIMM_C2					•
CPU2_DIMM_D1				•	•
CPU2_DIMM_D2					•
CPU2_DIMM_E1			•	•	•
CPU2_DIMM_E2					•
CPU2_DIMM_F1				•	•
CPU2_DIMM_F2					•
CPU2_DIMM_G1		•	•	•	•
CPU2_DIMM_G2					•
CPU2_DIMM_H1				•	•
CPU2_DIMM_H2					•

Recommended single CPU configuration					
	1 DIMM	2 DIMMs	4 DIMMs	8 DIMMs	16 DIMMs
CPU1_DIMM_A1	•	•	•	•	•
CPU1_DIMM_A2					•
CPU1_DIMM_B1				•	•
CPU1_DIMM_B2					•
CPU1_DIMM_C1			•	•	•
CPU1_DIMM_C2					•
CPU1_DIMM_D1				•	•
CPU1_DIMM_D2					•
CPU1_DIMM_E1			•	•	•
CPU1_DIMM_E2					•
CPU1_DIMM_F1				•	•
CPU1_DIMM_F2					•
CPU1_DIMM_G1		•	•	•	•
CPU1_DIMM_G2					•
CPU1_DIMM_H1				•	•
CPU1_DIMM_H2					•

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.

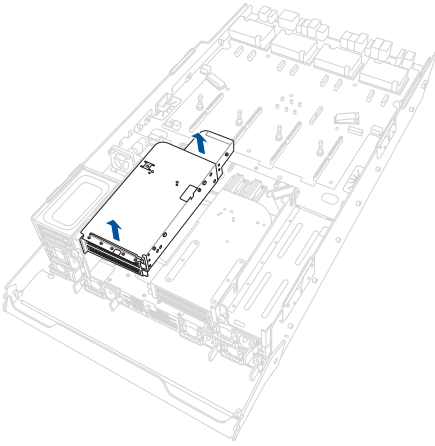1. Remove the server tray from the server chassis. For more information, see the **Removing the server tray** section.

2. Remove the upper PCIe expansion card brackets from the server tray. For more information, see the **Removing the upper PCIe expansion card brackets** section.

3. Remove the lower PCIe expansion card brackets from the server tray. For more information, see the **Removing the lower PCIe expansion card brackets** section.

4. Remove the PCIe switchboard from the server tray. For more information, see the **Removing the PCIe switchboard** section.

5. Lift the air duct to remove it from the server tray.

6. Unlock a DIMM socket by pressing the retaining clips outward.

7. Align a DIMM on the socket such that the notch on the DIMM matches the DIMM slot key on the socket.

DIMM notch

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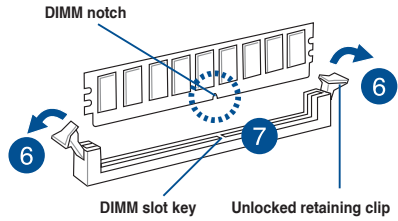
A DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a DIMM into a socket in the wrong direction to avoid damaging the DIMM.

8. 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 snap back into place.

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

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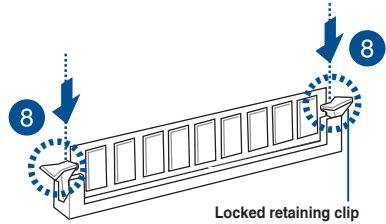
Always insert the DIMM into the socket VERTICALLY to prevent DIMM notch damage.

2.4.4   Removing a DIMM

1. Simultaneously press the retaining clips outward to unlock the DIMM.

2. Remove the DIMM from the socket.
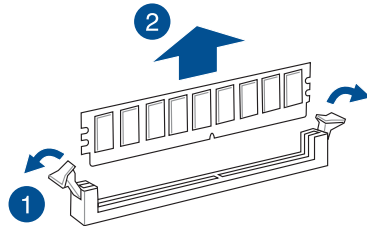
Support the DIMM lightly with your fingers when pressing the retaining clips. The DIMM might get damaged when it springs out with extra force.

2.5 Storage devices

The system supports up to ten (10) 2.5-inch NVMe storage devices and up to two (2) 2.5-inch hot-swap NVMe/SATA(PCH)/SAS storage devices. Storage devices installed on storage device trays connect to the motherboard via the NVMe/SATA/SAS backplane (SAS storage devices require an optional HBA/RAID card).

2.5-inch storage bay 1-8

2.5-inch storage bay 9-10
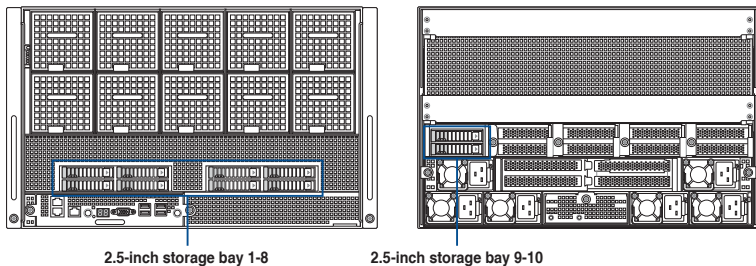
2.5.1 Installing a 2.5-inch storage device

To install a 2.5-inch storage device:

1. Press the spring lock to release the tray lever and partially eject the tray from the bay.
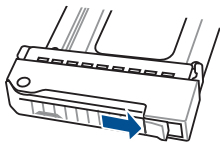
2. Firmly hold the tray lever and pull the storage device tray out of the bay.
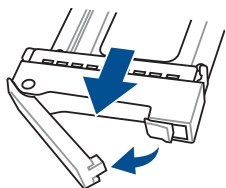
3. Prepare the 2.5-inch storage device and the bundled set of screws.

4. Place the 2.5-inch storage device onto the tray, then secure it with four screws.
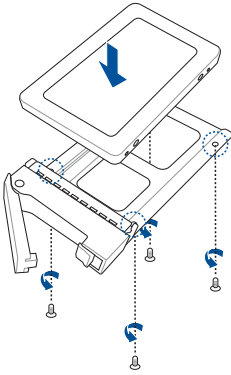
5. Carefully insert the tray and push it all the way into the bay.
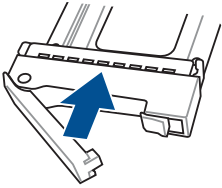
6. Lock the tray lever to secure the storage device tray in place.
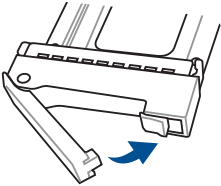
7. Repeat steps 1 to 6 to install additional 2.5-inch storage devices.

2.6 Expansion slots

⚠ Ensure to unplug the power cord before adding or removing expansion cards. Failure to do so may cause you physical injury and damage motherboard components.

2.6.1 Installing an expansion card to the upper PCIe expansion card brackets

The server system comes pre-installed with four upper PCIe expansion card brackets that each support two x16 slots (Gen5 x16 link) for installing half-height, half-length PCIe expansion cards.

To install a PCIe expansion card to the upper PCIe expansion card bracket:

1. Remove the server tray from the server chassis. For more information, see the **Removing the server tray** section.

2. Remove the upper PCIe expansion card brackets from the server tray. For more information, see the **Removing the upper PCIe expansion card brackets** section.

3. Place the upper PCIe expansion card bracket on a level surface.

Upper PCIe expansion card brackets
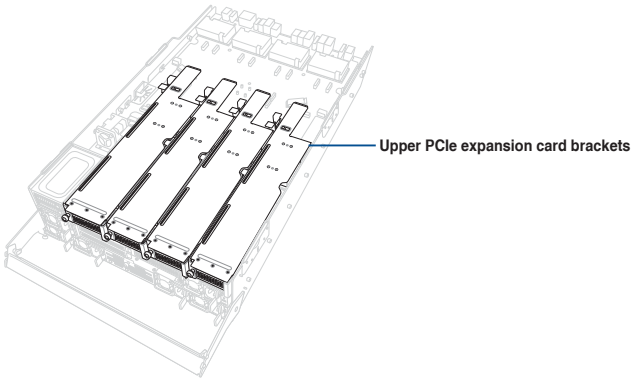
4. Push the slot cover lock outwards, then remove the PCIe slot cover.
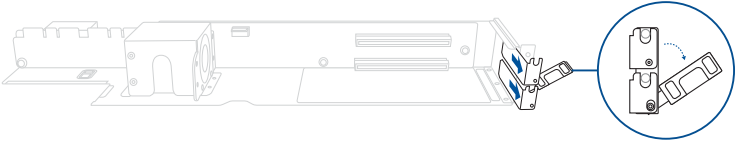
5. Insert the expansion card into the PCIe slot and ensure that it is securely seated, then push the slot cover lock inwards to secure the expansion card.

Before installing an expansion card, read the documentation that came with it and ensure that the proper hardware settings are configured.
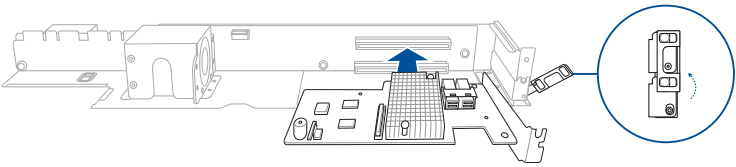
2.6.2 Installing an expansion card to the lower PCIe expansion card brackets

The server system comes pre-installed with two lower PCIe expansion card brackets that support two x16 slots (Gen5 x16 link) for installing half-height, half-length PCIe expansion cards and one x8 slot (Gen4 x8 link) for installing an ASUS PIKE II or RAID card.

The PCIe x8 slot may be unavailable on certain models.

To install a PCIe expansion card to the lower right PCIe expansion card bracket:

1. Remove the server tray from the server chassis. For more information, see the **Removing the server tray** section.

2. Remove the upper PCIe expansion card brackets from the server tray. For more information, see the **Removing the upper PCIe expansion card brackets** section.

3. Remove the lower PCIe expansion card brackets from the server tray. For more information, see the **Removing the lower PCIe expansion card brackets** section.

Lower right PCIe expansion card bracket
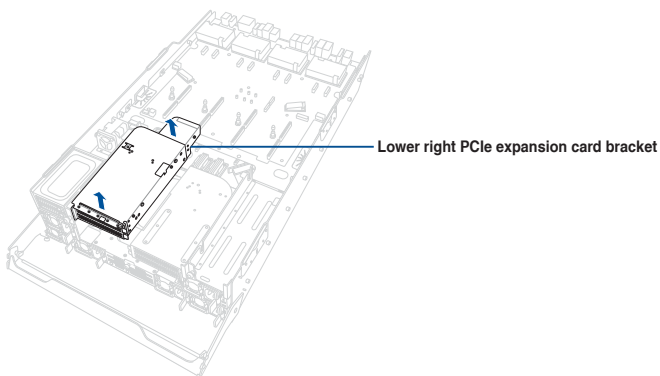
4. Place the lower right PCIe expansion card bracket on a level surface.

5. Push the slot cover lock outwards, then remove the PCIe slot cover.

6. Insert the expansion card into the PCIe slot and ensure that it is securely seated, then push the slot cover lock inwards to secure the expansion card.

Before installing an expansion card, read the documentation that came with it and ensure that the proper hardware settings are configured.

To install a PCIe expansion card to the lower left PCIe expansion card bracket:

1. Remove the server tray from the server chassis. For more information, see the **Removing the server tray** section.

2. Remove the upper PCIe expansion card brackets from the server tray. For more information, see the **Removing the upper PCIe expansion card brackets** section.

3. Remove the lower PCIe expansion card brackets from the server tray. For more information, see the **Removing the lower PCIe expansion card brackets** section.

Lower left PCIe expansion card bracket
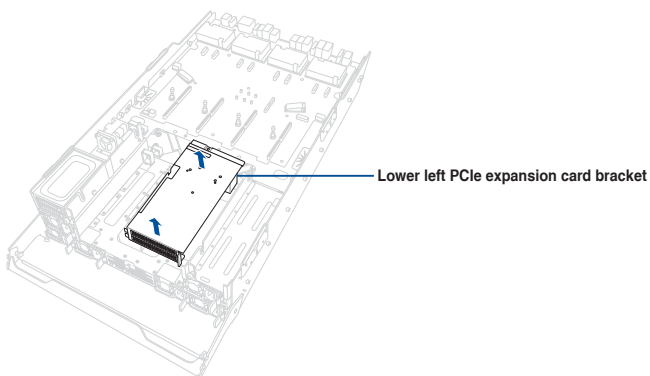
4. Place the lower left PCIe expansion card bracket on a level surface.

5. Push the slot cover lock outwards, then remove the PCIe slot cover.
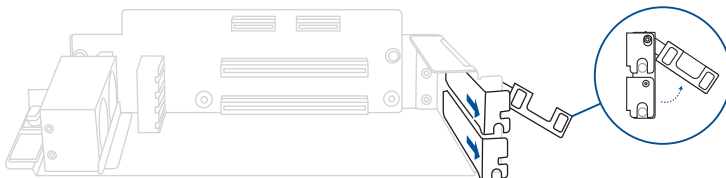
6. Insert the expansion card into the PCIe slot and ensure that it is securely seated, then push the slot cover lock inwards to secure the expansion card.

 Before installing an expansion card, read the documentation that came with it and ensure that the proper hardware settings are configured.
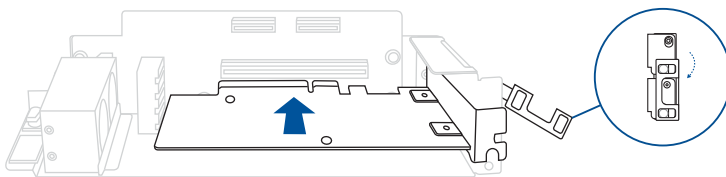
2.6.3   Installing an ASUS PIKE II or RAID card

A PIKE II or RAID card can be installed in the PCIe x8 slot on the lower right PCIe expansion card bracket.

The PCIe x8 slot may be unavailable on certain models.

1.   Prepare the ASUS PIKE II or RAID card.

2.   (Optional) To install an ASUS PIKE II 3108 card and cache vault, follow the below instructions to install the cache vault add-on card:

a.   Align the two spacers with the screw holes on the ASUS PIKE II card, then secure the two spacers with two screws from the bottom of the card.
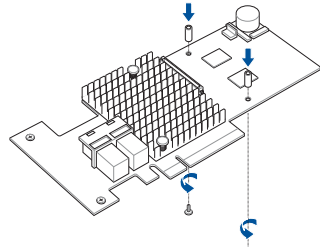
b.   Align and install the bundled cache vault add-on card onto the connector on the ASUS PIKE II card, then secure it to the two spacers with two screws.
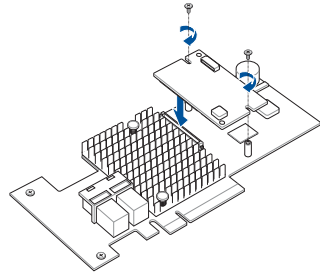
c.   Connect the bundled power cable to the cache vault add-on card.
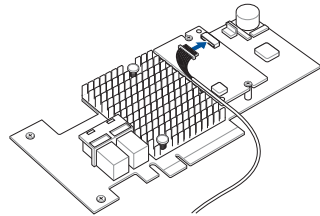
3. Remove the server tray from the server chassis. For more information, see the **Removing the server tray** section.

4. Remove the upper PCIe expansion card brackets from the server tray. For more information, see the **Removing the upper PCIe expansion card brackets** section.

5. Remove the lower PCIe expansion card brackets from the server tray. For more information, see the **Removing the lower PCIe expansion card brackets** section.

Lower right PCIe expansion card bracket
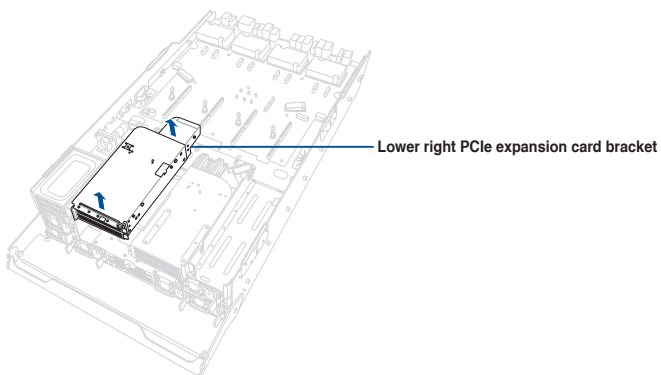
6. Place the lower right PCIe expansion card bracket on a level surface.

7. Insert the RAID card into the PCIe slot and ensure that it is securely seated.
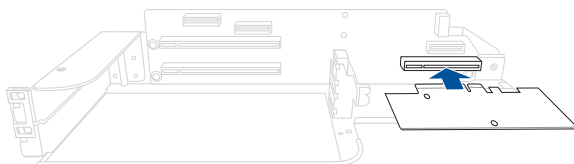
8. Connect the RAID card to the rear NMVe/SATA(PCH)/SAS backplane.

Rear NVMe/SATA(PCH)/SAS backplane
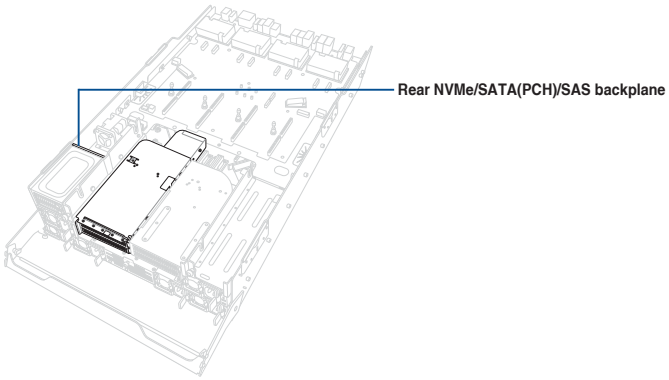
9. (Optional) Refer to the **Installing the Cache Vault Power Module** section to install and connect the Cache Vault Power Module.

2.6.4 Installing the Cache Vault Power Module

1. Remove the server tray from the server chassis. For more information, see the **Removing the server tray** section.

2. Remove the upper PCIe expansion card brackets from the server tray. For more information, see the **Removing the upper PCIe expansion card brackets** section.

3. Remove the lower PCIe expansion card brackets from the server tray. For more information, see the **Removing the lower PCIe expansion card brackets** section.

4. Remove the PCIe switchboard from the server tray. For more information, see the **Removing the PCIe switchboard** section.

5. Lift the air duct to remove it from the server tray.
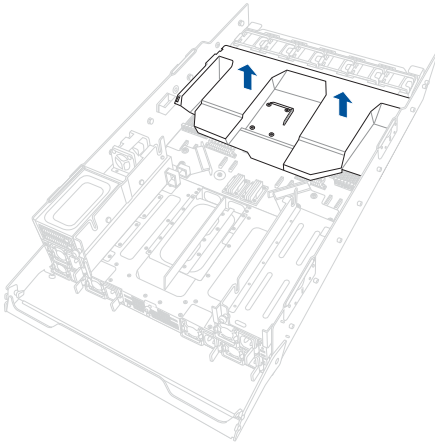
6. Align the screw holes on the cache vault power module clip with the screw holes on the air duct and secure the clip with three screws.
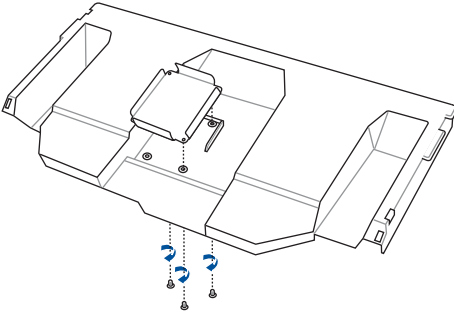
7. Install the cache vault power module into the clip
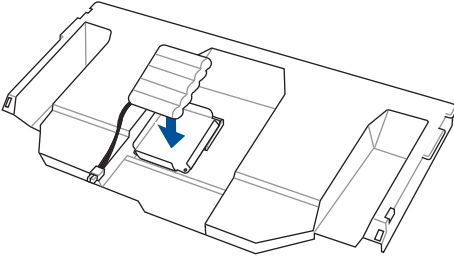
8. Connect the cache vault power module to the PIKE II card or RAID card.
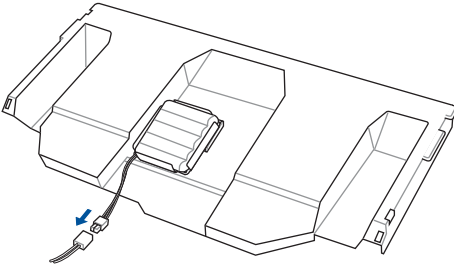
2.7 Removable/optional components

The following sections describe installation or removal instructions for the following removable/optional components:

1. GPU fans

2. System fans

3. Redundant power supply units

4. Front bezel

5. PFR module

6. Chassis intrusion sensor

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

2.7.1 GPU fans

To uninstall a GPU fan:

Press the latch inwards to release the fan, then remove the fan from the fan cage.
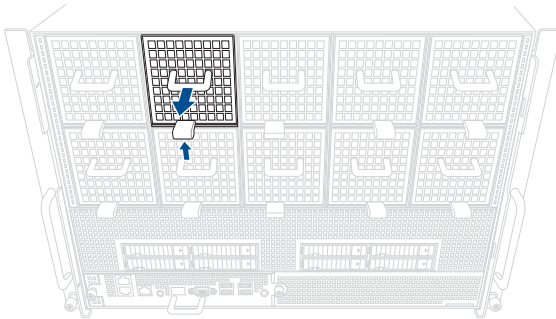
To install a GPU fan:

Insert the fan into the fan cage and ensure that it is securely seated.
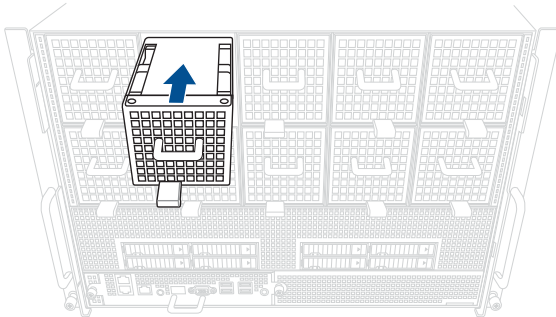
2.7.2 System fans

To uninstall a system fan:

1. Remove the server tray from the server chassis. For more information, see the **Removing the server tray** section.

2. Remove the upper PCIe expansion card brackets from the server tray. For more information, see the **Removing the upper PCIe expansion card brackets** section.

3. Remove the lower PCIe expansion card brackets from the server tray. For more information, see the **Removing the lower PCIe expansion card brackets** section.

4. Remove the PCIe switchboard. For more information, see the **Removing the PCIe switchboard** section.

5. Press the latch inwards to release the fan, then remove the fan from the fan cage.
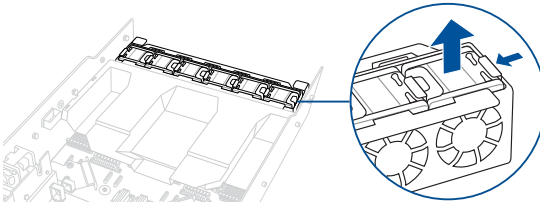
To install a system fan:

Insert the fan into the fan cage and ensure that it is securely seated.
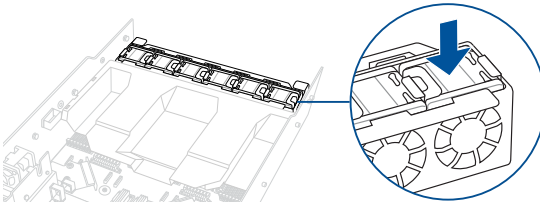
2.7.3 Redundant power supply units

To uninstall a power supply unit (PSU):

1. Lift up the PSU lever.
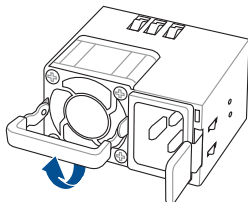
2. Hold the PSU lever and press the PSU latch inwards, then carefully pull the PSU out of the system chassis.
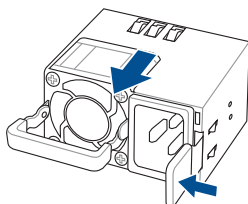
To install a power supply unit (PSU):

Align and install the PSU into the server chassis until it clicks into place.
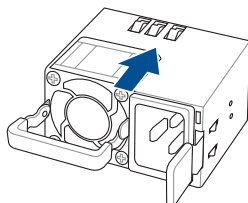
- The system automatically combines the six power supply modules as a single one.

- To enable the hot-swap feature (redundant mode), keep the total power consumption of the system under the maximum output power of an individual power supply module.

- Always use PSUs with the same wattage and power rating. Combining PSUs with different wattages may yield unstable results and potential damage to your system.

- At least three working power supply units are required in order for the system to boot normally.

- The server rack or external power supply system must supply 200-220V with at least 60A at 50-60Hz. If connected to a power outlet, each power outlet must individually supply at least 16A.

- For a steady power input, use only the power cables that come with the server system package.

2.7.4   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.

To install the front bezel:

1.   Align the two notches on the right side of the front bezel with the corresponding holes on the front panel.
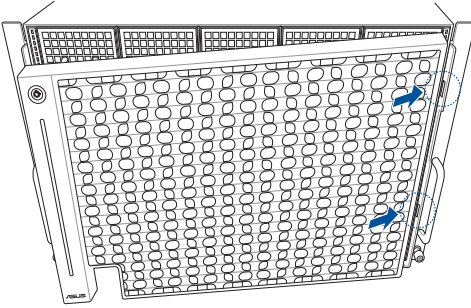
2.   Attach the left side of the front bezel to the front panel.
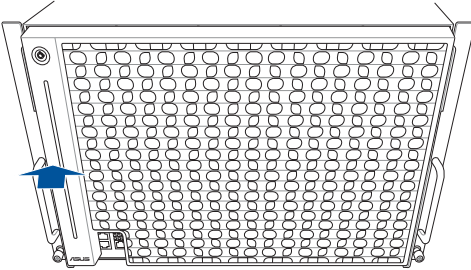
3.   (Optional) Lock the front bezel with the bundled key to prevent unauthorized access.
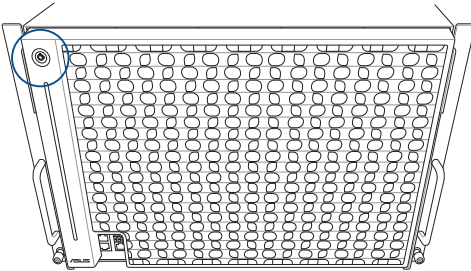
To uninstall the front bezel:

1.   Unlock the front bezel with the bundled key, if locked.
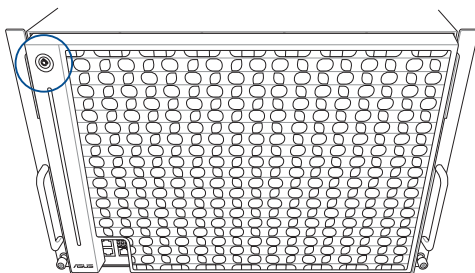
2.   Press the bezel release latch on the left side of the front bezel.
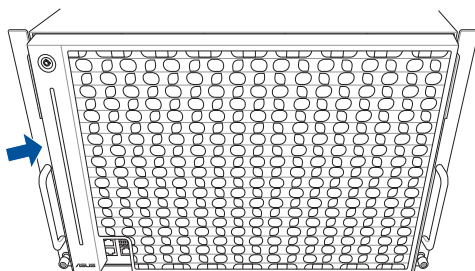
3.   Pull the left side of the front bezel to remove it from the front panel.
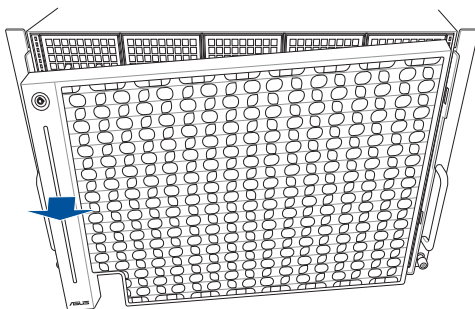
2.7.5   PFR module

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.

---

1. Locate the PFR module connector on your motherboard.
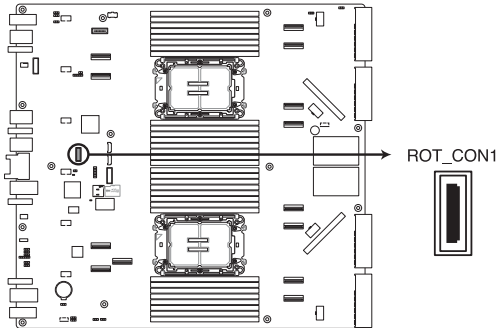
ROT_CON1

Z13PN-D32 ROT_CON1

2. Align and connect the PFR module to the PFR module connector.
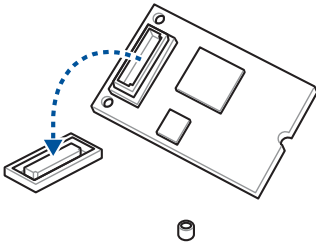
3. Push the PFR module down so that it is seated securely on the PFR module connector, then secure it using a screw.
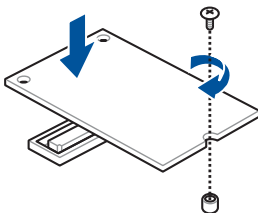
2.7.6   Chassis intrusion sensor

A chassis intrusion sensor will come pre-installed on your system and is connected to the Chassis Intrusion connector (2-pin INTRUSION1) on the midplane. To disable the chassis intrusion sensor, short the CHASSIS# and GND pins with a jumper cap.

2.8   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.

- 2U L-shelf rail kit

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.

3.1 Motherboard layout
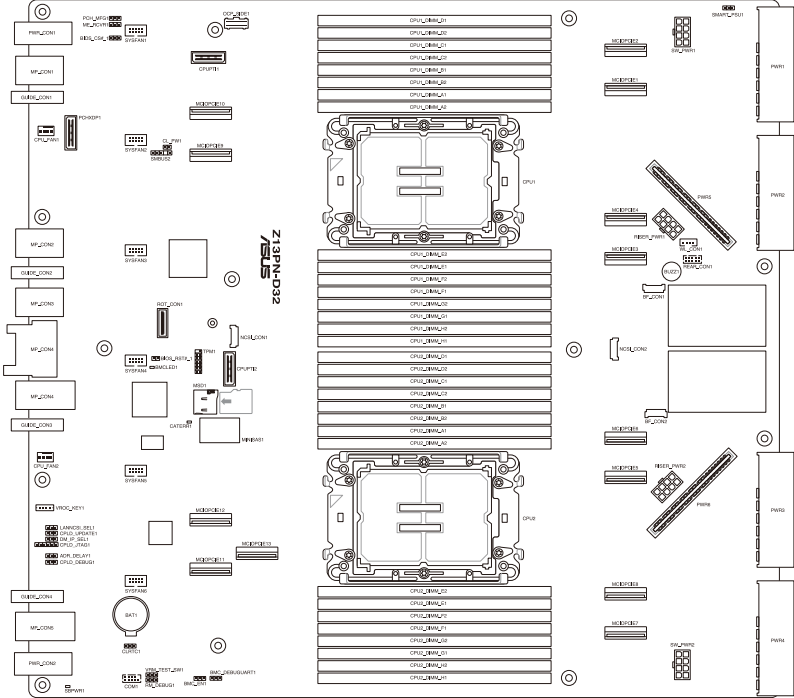
Layout contents

Central Processing Unit (CPU)	Page
1. CPU socket(s)	3-4

Dual Inline Memory Module (DIMM)	Page
1. DIMM sockets	3-5

3.2   Central Processing Unit (CPU)

The motherboard comes with two surface mount LGA 4677 sockets designed for the 4th and 5th Gen Intel® Xeon® Scalable Processors Family series.

Ⓐ CPU1
Ⓑ CPU2
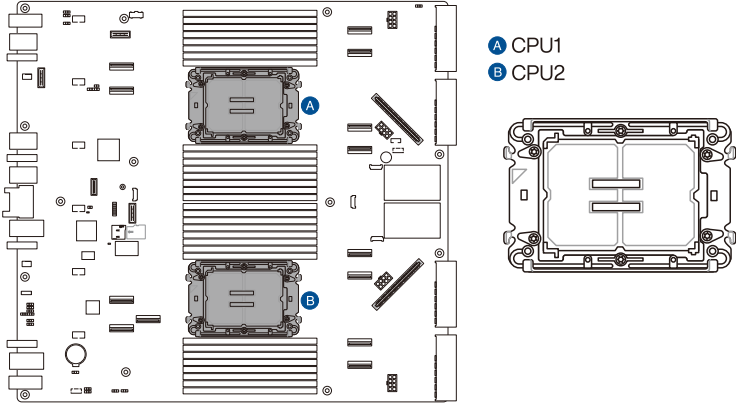
Z13PN-D32 CPU LGA 4677 Socket

3.3 Dual Inline Memory Module (DIMM)

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

Z13PN-D32 288-pin DDR5 DIMM sockets

A
CPU1_DIMM_D1
CPU1_DIMM_D2
CPU1_DIMM_C1
CPU1_DIMM_C2
CPU1_DIMM_B1
CPU1_DIMM_B2
CPU1_DIMM_A1
CPU1_DIMM_A2

B
CPU1_DIMM_E2
CPU1_DIMM_E1
CPU1_DIMM_F2
CPU1_DIMM_F1
CPU1_DIMM_G2
CPU1_DIMM_G1
CPU1_DIMM_H2
CPU1_DIMM_H1

C
CPU2_DIMM_D1
CPU2_DIMM_D2
CPU2_DIMM_C1
CPU2_DIMM_C2
CPU2_DIMM_B1
CPU2_DIMM_B2
CPU2_DIMM_A1
CPU2_DIMM_A2

D
CPU2_DIMM_E2
CPU2_DIMM_E1
CPU2_DIMM_F2
CPU2_DIMM_F1
CPU2_DIMM_G2
CPU2_DIMM_G1
CPU2_DIMM_H2
CPU2_DIMM_H1
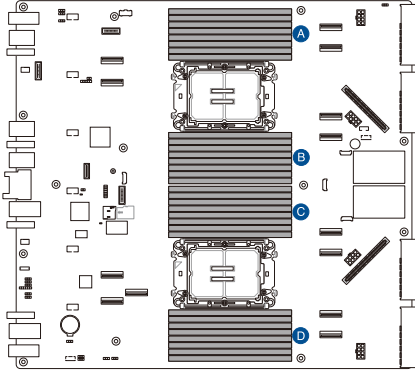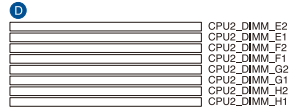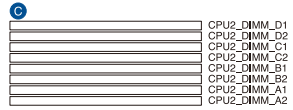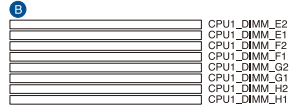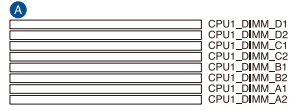
3.4 Jumpers

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

   This jumper allows you to clear the CMOS memory system setup parameters by erasing the CMOS Real Time Clock (RTC) RAM data. The onboard button cell battery powers the RAM data in CMOS, which includes 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 is cleared, reinstall the battery.

CLRTC1

2 1 — Normal (Default)

3 2 — Clear RTC
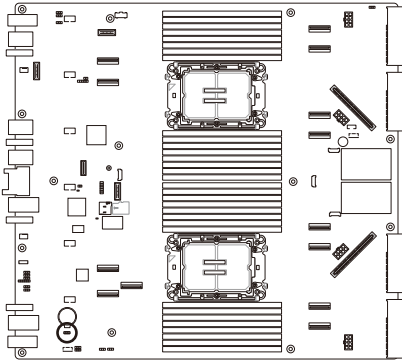
Z13PN-D32 CLRTC1

2. **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).

DM_IP_SEL1

2 1   3 2

Normal   Force to Static
(Default)
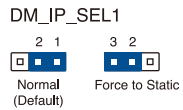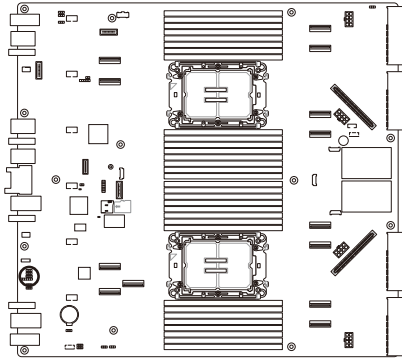
Z13PN-D32 DM_IP_SEL1

3. **Baseboard Management Controller setting (3-pin BMC_EN1)**

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

BMC_EN1

2 1   3 2

BMC Enable   BMC Disable
(Default)
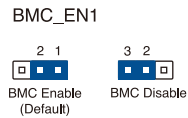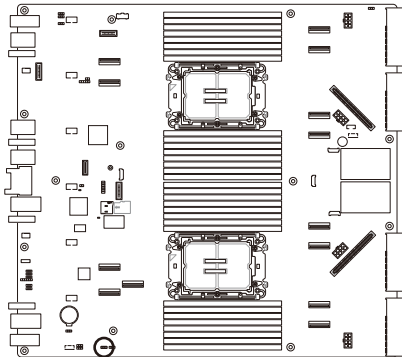
Z13PN-D32 BMC_EN1

4.   **LANNCSI setting (3-pin LANNCSI_SEL1)**

      This jumper allows you to select the NCSI device.
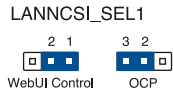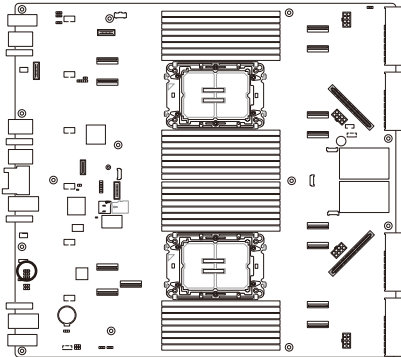
LANNCSI_SEL1

Z13PN-D32 LANNCSI_SEL1

5.   **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.
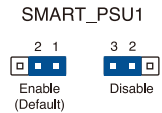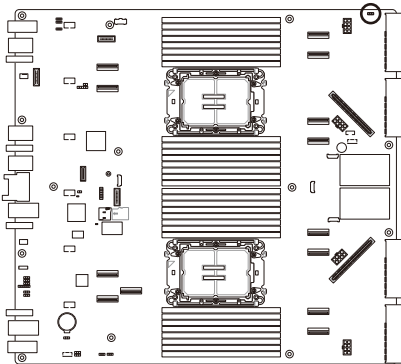
SMART_PSU1

Z13PN-D32 SMART_PSU1

6.   **ME Firmware Force Recovery setting (3-pin ME_RCVR1)**

Set to pins 2-3 to force Intel® Management Engine (ME) boot from recovery mode if the ME becomes corrupted.

Z13PN-D32 ME_RCVR1

ME_RCVR1

2 1   3 2

Normal   Force ME Recovery
(Default)
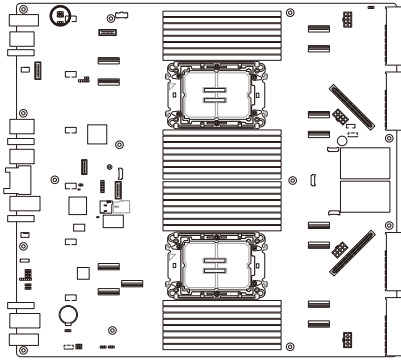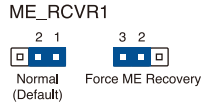
7.   **PCH_MFG1 setting (3-pin PCH_MFG1)**

The PCH_MFG1 jumper allows you to update the BIOS ME block.

Z13PN-D32 PCH_MFG1

PCH_MFG1

2 1   3 2

Normal   Security override
(Default)
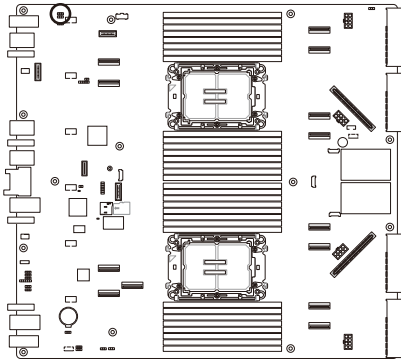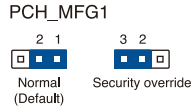
8.   **RM debug setting (3-pin RM_DEBUG1)**

This jumper allows you to enable or disable the BMC remote debug feature. Default is 1-2 (disabled).
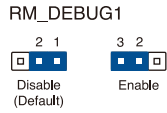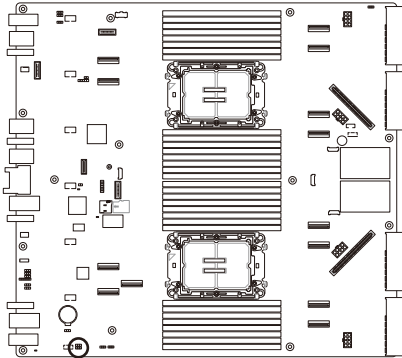
RM_DEBUG1

Z13PN-D32 RM_DEBUG1

3.5 Internal connectors

1. MCIOPCIE connectors (MCIOPCIE1-13)

Connects the PCIe signal to the backplane and riser.

Z13PN-D32 MCIOPCIE

A MCIOPCIE2
B MCIOPCIE1
C MCIOPCIE4
D MCIOPCIE3
I MCIOPCIE10
J MCIOPCIE9

E MCIOPCIE6
F MCIOPCIE5
G MCIOPCIE8
H MCIOPCIE7
K MCIOPCIE12
L MCIOPCIE11
M MCIOPCIE13
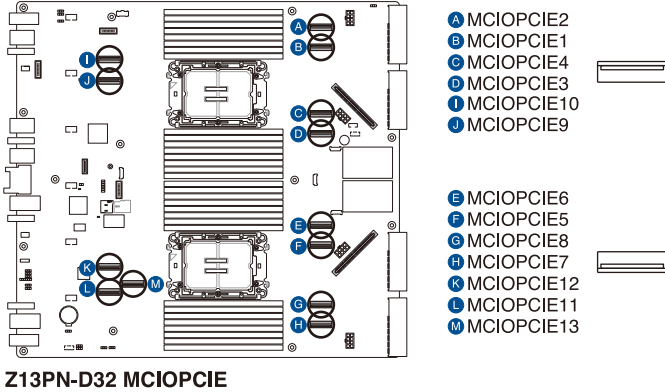
2. CPU fan connectors (4-pin CPU_FAN1-2)

These connectors supply power to CPU fans when installed for testing purposes.

Z13PN-D32 FAN connectors

A CPU_FAN1
B CPU_FAN2

PWM Control
Dummy
FAN Power
GND
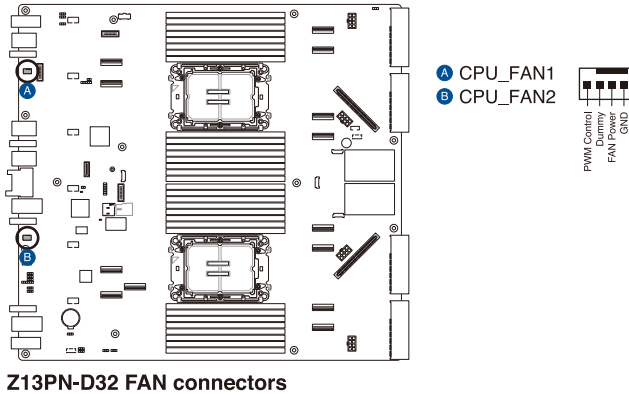
3. **System fan connectors (10-pin SYSFAN1-6)**

These connectors supply power to the system fans.
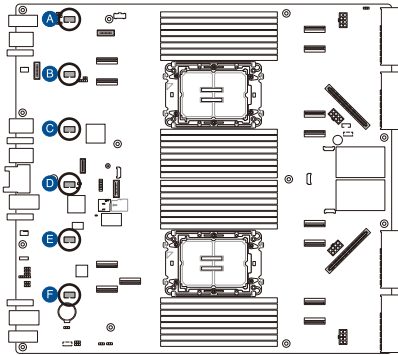
A SYSFAN1
B SYSFAN2
C SYSFAN3
D SYSFAN4
E SYSFAN5
F SYSFAN6
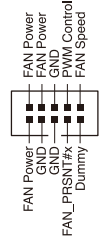
Z13PN-D32 SYSFAN connectors

4. **CPLD JTAG connector (6-pin CPLD_JTAG1)**

This connector is used to program the CPLD firmware.
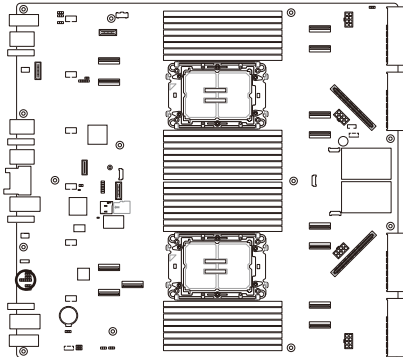
CPLD_JTAG1
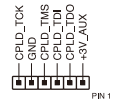
Z13PN-D32 CPLD_JTAG1

5.   **microSD card slot (MSD1)**

The microSD card slot allows you to install a microSD memory card v2.00 (SDHC) / v3.00 (SDXC) to log BMC events.

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.
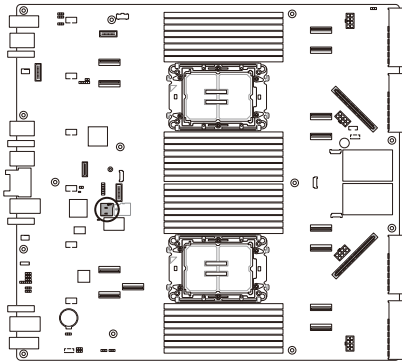
Z13PN-D32 MSD1

6.   **Serial port connector (10-1 pin COM1)**

This connector is for the serial COM port. Connect the serial port module cable to one of these connectors, then install the module to a slot opening at the back of the system chassis.
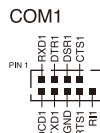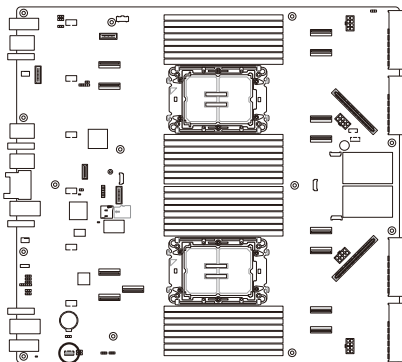
Z13PN-D32 COM1

7. **REAR_CON1 connector (10-pin REAR_CON1)**

This connector is for the power and location button on the rear I/O board.
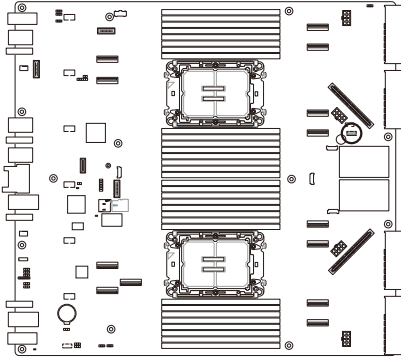
REAR_CON1
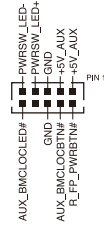
Z13PN-D32 REAR_CON1

8. **OCP3.0 sideband signal connector (12-pin OCP_SIDE1)**

This connector is for OCP3.0 sideband signal and allows you to connect an external OCP3.0 card to support additional features.
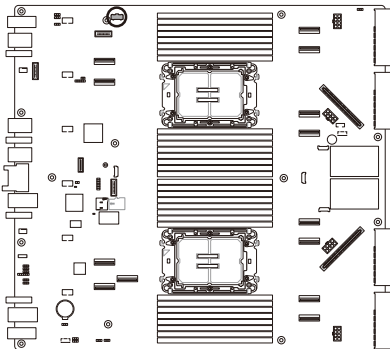
OCP_SIDE1

Z13PN-D32 OCP_SIDE1

9. **BF connector (BF_CON1-2)**

These connectors are for NCSI signals.
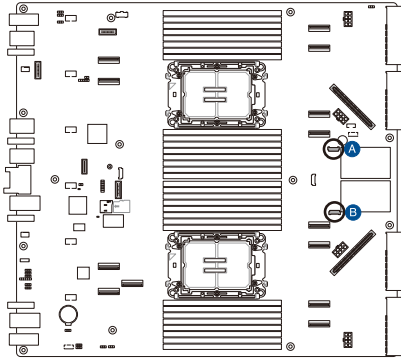
A BF_CON1

B BF_CON2

Z13PN-D32 BF_CON

10. **NCSI_CON connector (NCSI_CON1-2)**

These connectors are for NCSI signals.
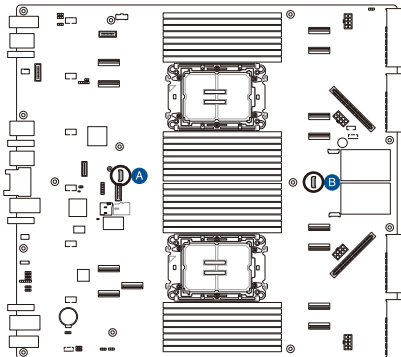
A NCSI_CON1

B NCSI_CON2

Z13PN-D32 NCSI_CON

11. **System management bus connector (5-1 pin SMBUS2)**

The System Management Bus (SMBus) connector allows you to connect SMBus devices. This connector is generally used for communication with the system and power management-related tasks.
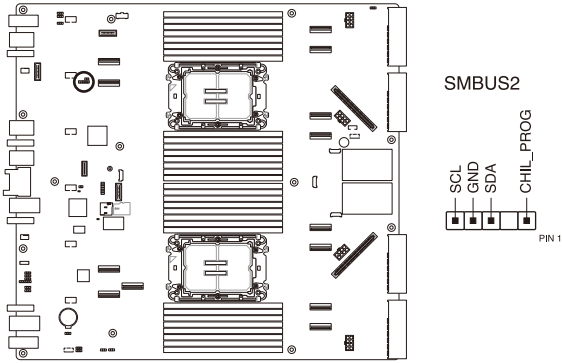
Z13PN-D32 SMBUS2

12. **Leak detection sensor connector (4-pin WL_CON1)**

This connector allows you to connect a compatible leak detection sensor.
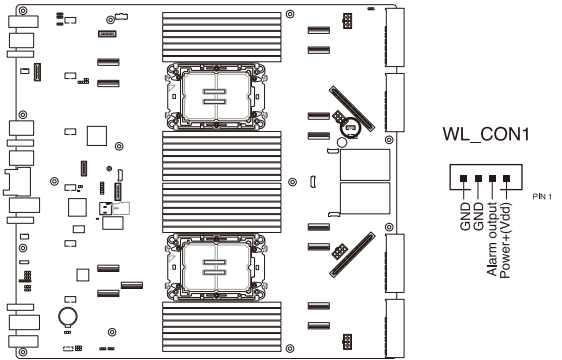
Z13PN-D32 WL_CON1

13. **BMC Debug UART connector (3-pin BMC_DEBUGUART1)**

    This connector is used for reading the BMC UART Debug log.
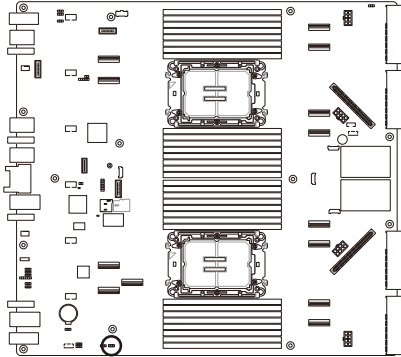
BMC_DEBUGUART1

Z13PN-D32 BMC_DEBUGUART1
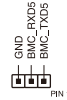
14. **Platform Firmware Resilience (PFR) Module connector (ROT_CON1)**

    This connector allows you to connect a PFR module to enable platform firmware resilience functions.
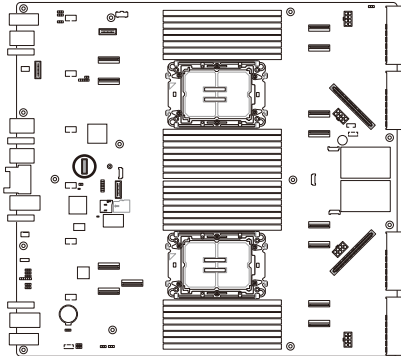
ROT_CON1

Z13PN-D32 ROT_CON1

15. **TPM connector (14-1 pin TPM1)**

This connector supports a Trusted Platform Module (TPM) system, which can securely store keys, digital certificates, passwords, and data.

TPM1

```
                                    BIOS_FLASH_SPIIO3_R
BIOS_FLASH_SPIMOSI_R                BIOS_FLASH_SPIMISO_R
   BIOS_FLASH_SPICLK_R              BIOS_FLASH_SPICS0#
                  GND               TPM1_PIN9
   BIOS_FLASH_SPIIO2_R              NC
         PCH_SPICS2#_R              TPM_RESET#
             TPM_IRQ#               +3V_AUX
                             PIN 1
```
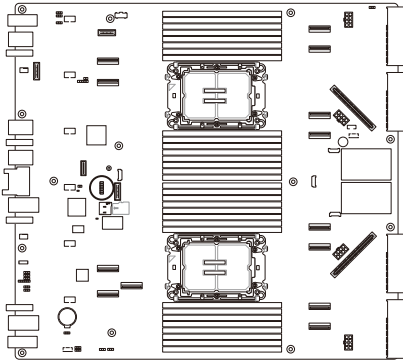
Z13PN-D32 TPM1
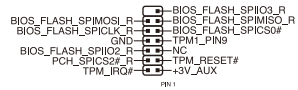
16. **VROC_KEY connector (4-pin VROC_KEY1)**

This connector allows you to connect a KEY module to enable CPU RAID functions with Intel® VROC.

VROC_KEY1

PIN 1

KEY2 GND KEY1 GND
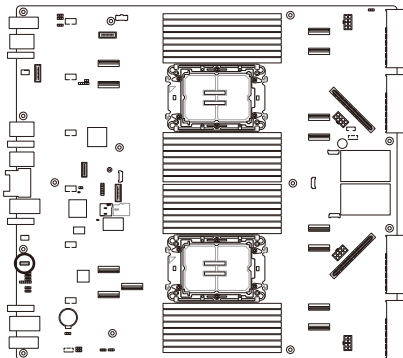
Z13PN-D32 VROC_KEY1

17. **System power connectors (PWR1-4)**

These connectors supply power from the power supply units to the motherboard and system components.

⚠️
- Use of a PSU with a higher power output is recommended when configuring a system with more power-consuming devices. The system may become unstable or may not boot up if the power is inadequate.

- Ensure that your power supply unit (PSU) can provide at least the minimum power required by your system.

Ⓐ PWR1
Ⓑ PWR2
Ⓒ PWR3
Ⓓ PWR4
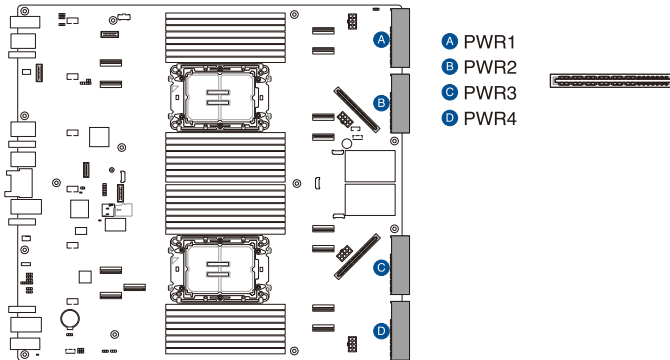
Z13PN-D32 Power connectors

18. **System power connectors (PWR5-6)**

These connectors supply power from the power supply units to the motherboard and system components via the power sharing boards.

Ⓐ PWR5   Ⓑ PWR6
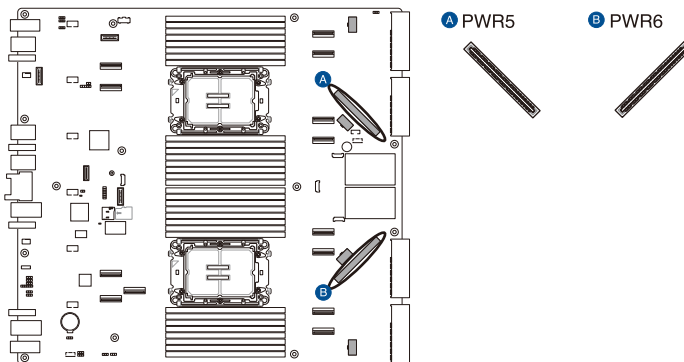
Z13PN-D32 Power connectors

19. **Switchboard and riser power connectors (SW_PWR1-2; RISER_PWR1-2)**

These connectors supply power to the switchboard and risers.

Ⓐ SW_PWR1
Ⓑ RISER_PWR1
Ⓒ RISER_PWR2
Ⓓ SW_PWR2

PIN 1

+12V — GND
+12V — GND
+12V — GND
+12V — +3V_AUX
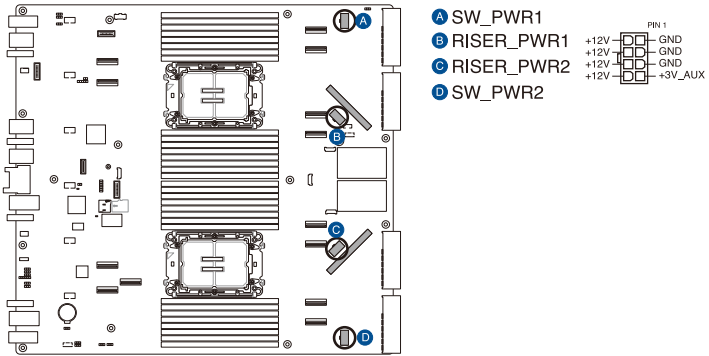
Z13PN-D32 Power connectors

3.6 Onboard LEDs

1.   **Baseboard Management Controller LED (BMCLED1)**

The BMC LED lights up to indicate that the on-board BMC is functional.
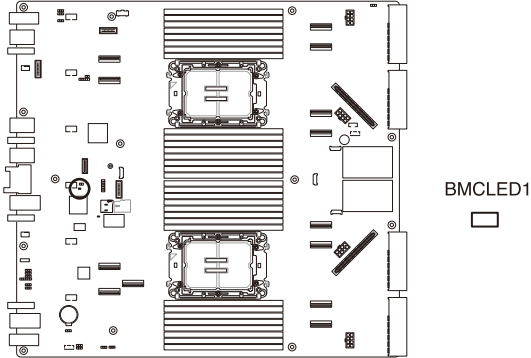
Z13PN-D32 BMCLED1

2.   **Catastrophic Error LED (CATERR1)**

The catastrophic error LED indicates that the system has experienced a fatal or catastrophic error and cannot continue to operate.
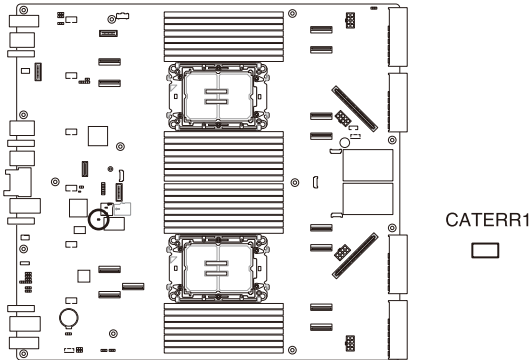
Z13PN-D32 CATERR1

3.   **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.

SBPWR1

ON
Standby Power

OFF
Powered Off

Z13PN-D32 SBPWR1

4
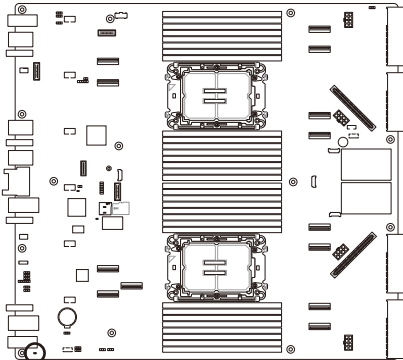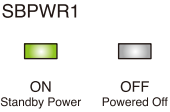
BIOS Setup

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 if the BIOS file fails or gets corrupted.

2. **ASUS EzFlash**

   Updates the BIOS using a USB flash disk.

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 if 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 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.

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 EZ Flash**. Press <Enter>.

```
                    ASUS Tek. EzFlash Utility

      Current Platform                    New Platform
Platform : Z13PN-D32              Platform : Z13PN-D32
Version :  1989                   Version : 2357
Build Date : 04/01/2023           Build Date : 04/15/2023

FS0              System Volume Information         <DIR>
                 Z13PN-D32 BIOS                    <DIR>
                 Windows                           <DIR>




[Up/Down/Left/Right]:Switch [Enter]:Choose [q]:Exit

```
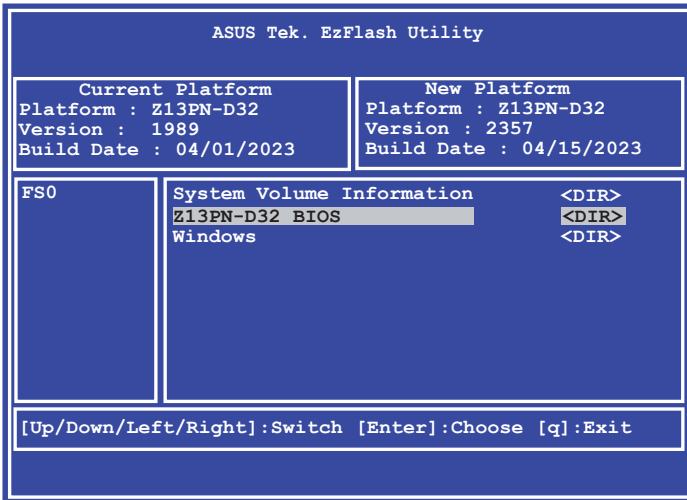
3.   Press the Left/Right arrow keys to switch to the **Drive** field.

4.   Press the Up/Down arrow keys to find the USB flash disk that contains the latest BIOS, then press <Enter>.

5.   Press Left/Right arrow keys to switch to the **Folder Info** field.

6.   Press the Up/Down arrow keys to find the BIOS file, 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.

4.2 BIOS setup program

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

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.

- Support for BIOS functions and options may vary based on AVL testing progress. Please contact your sales representative for more information.

- 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) to download the latest BIOS file for this motherboard.

4.2.1   BIOS menu screen

Menu bar

General help

```
                                Aptio Setup - AMI
      Main  Performance Tuning  Advanced  Platform Configuration  Socket Configuration  Security  ▶

      BIOS Information                                          Choose the system default
      BIOS Vendor              American Megatrends               language
      Core Version            5.29
      Compliancy              UEFI 2.8; PI 1.7
      BIOS Version            0202 x64
      Build Date              02/23/2023
      Access Level            Administrator

      Intel X710 LAN1 MAC     00:00:00:00:01:00
      Intel X710 LAN2 MAC     00:00:00:00:01:01

      BMC Firmware Revision   1.01.03
      RC Version              9409.P01
                                                          ▶+: Select Screen
      Processor Information                               ↑↓: Select Item
      Type                    Intel(R) Xeon(R) Platin     Enter: Select
                              um 8470                     +/-: Change Opt.
      Speed                   2000MHz                     F1: General Help
                                                          F2: Previous Values
      Memory Information                                  F5: Optimized Defaults
      Total Memory              16 GB                     F10: Save Changes & Reset
      Memory Frequency        4800 MHz                    F12: Print Screen
                                                          <k>: Scroll help area upwards
      System Language         [English]                   <m>: Scroll help area downwards
                                                        ▼ ESC: Exit

                          Version 2.22.1287 Copyright (C) 2023 AMI
```

Menu items   Configuration fields   Navigation keys

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

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.

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.

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>.

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.

General help

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

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.

Pop-up window

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

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.

```
                              Aptio Setup - AMI
    Main  Performance Tuning  Advanced  Platform Configuration  Socket Configuration  Security    ▶

    BIOS Information                                        ▲  Choose the system default
    BIOS Vendor                    American Megatrends         language
    Core Version                   5.29
    Compliancy                     UEFI 2.8; PI 1.7
    BIOS Version                   0202 x64
    Build Date                     02/23/2023
    Access Level                   Administrator

    Intel X710 LAN1 MAC            00:00:00:00:01:00
    Intel X710 LAN2 MAC            00:00:00:00:01:01

    BMC Firmware Revision          1.01.03
    RC Version                     9409.P01
                                                           ▶←: Select Screen
    Processor Information                                  ↑↓: Select Item
    Type                           Intel(R) Xeon(R) Platin  Enter: Select
                                   um 8470                 +/-: Change Opt.
    Speed                          2000MHz                 F1: General Help
                                                           F2: Previous Values
    Memory Information                                     F5: Optimized Defaults
    Total Memory                        16 GB              F10: Save Changes & Reset
    Memory Frequency               4800 MHz                F12: Print Screen
                                                           <k>: Scroll help area upwards
    System Language                [English]               <m>: Scroll help area downwards
                                                        ▼  ESC: Exit

                          Version 2.22.1287 Copyright (C) 2023 AMI
```

System Language

Allows you to set the system language.

System Date [MM/DD/YYYY]

Allows you to set the system date.

System Time [HH:MM:SS]

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.

```
                              Aptio Setup - AMI
    Main   Performance Tuning   Advanced   Platform Configuration   Socket Configuration   Security

    Optimized Performance Setting        [Default]          The following setting shows
    Core Optimizer                       [Disabled]         the recommended BIOS setting
    Engine Boost                         [Disabled]         to optimize for performance
    Power Balancer                       [Disabled]         includes those
                                                            performance-related BIOS
```
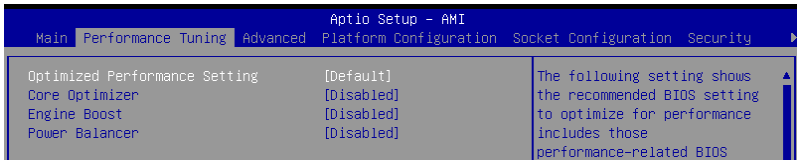
Optimized Performance Setting [Default]

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.

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 BIOS] [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 BIOS]** or **[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.

```
                              Aptio Setup - AMI
    Main  Performance Tuning  Advanced  Platform Configuration  Socket Configuration  Security  ▶

  AutoVMD                          [Enabled]              ▲  [Enabled] Intel VMD feature
  ▶ Trusted Computing                                        support , Intel VROC (NVMe
  ▶ ACPI Settings                                            RAID) function enabled.
  ▶ Redfish Host Interface Settings                          [Disabled] Intel VMD feature
  ▶ Onboard LAN Configuration                                does not support , Intel VROC
  ▶ UEFI Variables Protection                                (NVMe RAID) function disabled.
  ▶ Serial Port Console Redirection
  ▶ SIO Configuration
  ▶ PCI Subsystem Settings
  ▶ USB Configuration
  ▶ Network Stack Configuration
  ▶ NVMe Configuration
  ▶ APM Configuration
                                                            →←: Select Screen
  ▶ Tls Auth Configuration                                  ↑↓: Select Item
  ▶ Intel(R) Ethernet Controller X710 for 10GBASE-T -       Enter: Select
    00:00:00:00:01:00                                        +/-: Change Opt.
  ▶ VLAN Configuration (MAC:000000000100)                    F1: General Help
  ▶ MAC:000000000100-IPv6 Network Configuration              F2: Previous Values
  ▶ MAC:000000000100-IPv4 Network Configuration              F5: Optimized Defaults
  ▶ Intel(R) Ethernet Controller X710 for 10GBASE-T -       F10: Save Changes & Reset
    00:00:00:00:01:01                                        F12: Print Screen
  ▶ VLAN Configuration (MAC:000000000101)                    <k>: Scroll help area upwards
  ▶ MAC:000000000101-IPv6 Network Configuration              <m>: Scroll help area downwards
  ▶ MAC:000000000101-IPv4 Network Configuration           ▼  ESC: Exit

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```

AutoVMD [Enabled]

Configuration options: [Disabled] [Enabled]

4.5.1 Trusted Computing

```
                              Aptio Setup - AMI
                          Advanced

  Configuration                                       Enables or Disables BIOS
    Security Device Support        [Enable]           support for security device.
    NO Security Device Found                           O.S. will not show Security
                                                       Device. TCG EFI protocol and
```
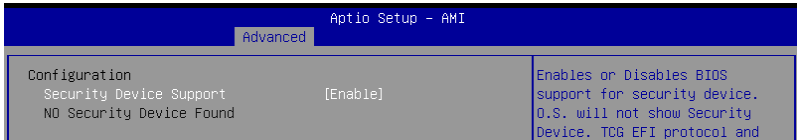
Configuration

Security Device Support [Enabled]

Configuration options: [Disabled] [Enabled]

4.5.2   ACPI Settings

```
                              Aptio Setup — AMI
                  Advanced

ACPI Settings                                        Enables or Disables BIOS ACPI
                                                     Auto Configuration.
Enable ACPI Auto Configuration      [Disabled]
```

Enable ACPI Auto Configuration [Disabled]

Configuration options: [Disabled] [Enabled]

4.5.3   Redfish Host Interface Settings

```
                              Aptio Setup — AMI
                  Advanced

Redfish Host Interface Settings                      Enable/Disable AMI Redfish

Redfish                             [Enabled]
```

Redfish [Disabled]

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]

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.

4.5.4   Onboard LAN Configuration

```
                              Aptio Setup – AMI
                    Advanced
 ▶ Onboard X710 LAN Configuration                    Onboard X710 LAN Configuration
```
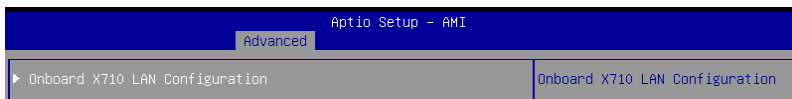
Onboard X710 LAN Configuration

> **LAN1/LAN2**

> **LAN Enable [LAN1, LAN2 Enabled]**

Configuration options: [Disabled] [LAN1 Enabled Only] [LAN1, LAN2 Enabled]

4.5.5   UEFI Variables Protection

```
                              Aptio Setup – AMI
                    Advanced
 Password protection of Runtime      [Disable]       Control the NVRAM Runtime
 Variables                                           Variable protection through
                                                     System Admin Password
```
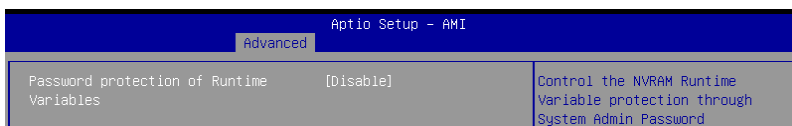
Password protection of Runtime Variables [Disabled]

Configuration options: [Disabled] [Enabled]

4.5.6 Serial Port Console Redirection

```
                            Aptio Setup - AMI
                  Advanced

      COM1                                              Console Redirection Enable or
      Console Redirection          [Disabled]           Disable.
   ▶  Console Redirection Settings

      COM2(SOL)
      Console Redirection          [Disabled]
   ▶  Console Redirection Settings


      Console Redirection          Port Is Disabled

      Serial Port for Out-of-Band Management/
      Windows Emergency Management Services (EMS)        ↔: Select Screen
      Console Redirection EMS      [Disabled]            ↑↓: Select Item
   ▶  Console Redirection Settings                       Enter: Select
                                                         +/-: Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
                                                         F5: Optimized Defaults
```

COM1/COM2(SOL)

Console Redirection [Disabled]

Allows you to enable or disable the console redirection feature.
Configuration options: [Disabled] [Enabled]

> The following item is available only when **Console Redirection** for **COM1** or **COM2(SOL)** 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 [VT100Plus]

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 number of 1's in the data bits is even.

[Odd]   Parity bit is 0 if number 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 solution.
Configuration options: [Disabled] [Enabled]

Putty Keypad [VT100]

This allows you to select the Function Key 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 EMS [Enabled]

Allows you to enable or disable the console redirection feature.
Configuration options: [Disabled] [Enabled]

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

Console Redirection Settings

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(SOL)]

Terminal Type EMS [VT-UTF8]

VT-UTF8 is the preferred terminal type for out0of-band management. The next best
choice is VT100+, and then VT100. See above, in Console Redirection Settings page
for more help with Terminal Type/Emulation.
Configuration options: [VT100] [VT100+] [VT-UTF8] [ANSI]

Bits per second EMS [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] [57600] [115200]

Flow Control EMS [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] [Software Xon/Xoff]

4.5.7   SIO Configuration
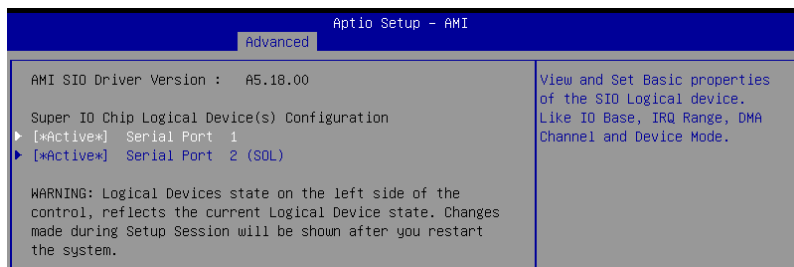
```
                           Aptio Setup - AMI
                 Advanced

  AMI SIO Driver Version :   A5.18.00                  View and Set Basic properties
                                                       of the SIO Logical device.
  Super IO Chip Logical Device(s) Configuration        Like IO Base, IRQ Range, DMA
▶ [*Active*]  Serial Port  1                            Channel and Device Mode.
▶ [*Active*]  Serial Port  2 (SOL)

  WARNING: Logical Devices state on the left side of the
  control, reflects the current Logical Device state. Changes
  made during Setup Session will be shown after you restart
  the system.
```

Logical Devices state on the left side of the control, reflects the current Logical Device state. Changes made during Setup Session will be shown after you restart the system.

[*Active*] Serial Port 1 / [*Active*] Serial Port 2 (SOL)

Allows you to view and set basic properties of the SIO Logical device.

Use This Device [Enabled]

Allows you to enable or disable this Logical Device.
Configuration options: [Disabled] [Enabled]

The following item appears only when **Use This Device** is set to **[Enabled]**.

Disabling SIO Logical Devices may have unwanted side effects. PROCEED WITH CAUTION.

Possible: [Use Automatic Settings]

Allows the user to change the device resource settings. New settings will be reflected no this setup page after system restarts.
Configuration options: [Use Automatic Settings] [IO=3F8h; IRQ=4; DMA;] [IO=3F8h; IRQ=3, 4, 5, 7, 9, 10, 11, 12; DMA;] [IO=2F8h; IRQ=3, 4, 5, 7, 9, 10, 11, 12; DMA;] [IO=3E8h; IRQ=3, 4, 5, 7, 9, 10, 11, 12; DMA;] [IO=2E8h; IRQ=3, 4, 5, 7, 9, 10, 11, 12; DMA;]

4.5.8 PCI Subsystem Settings

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

```
                              Aptio Setup - AMI
                      Advanced

 PCI Bus Driver Version         A5.01.29              Enables or Disables 64bit
                                                      capable Devices to be Decoded
 PCI Devices Common Settings:                         in Above 4G Address Space
 Above 4G Decoding              [Enabled]             (Only if System Supports 64
 Re-Size BAR Support            [Disabled]            bit PCI Decoding).
 SR-IOV Support                 [Enabled]
 BME DMA Mitigation             [Disabled]
```

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]

If system has Resizable BAR capable PCIe Devices, this option enables or disables Resizable BAR Support. (Only if system supports 64-bit PCI Decoding).
Configuration options: [Disabled] [Enabled]

SR-IOV Support [Enabled]

Allows you to enable or disable Single Root IO Virtualization Support if the system has SR-IOV capable PCIe devices.
Configuration options: [Disabled] [Enabled]

BME DMA Mitigation [Disabled]

Allows you to re-enable the Bus Master Attribute disabled during PCI enumeration for PCI bridges after SMM lock.
Configuration options: [Disabled] [Enabled]

4.5.9 USB Configuration

```
                            Aptio Setup - AMI
                 Advanced

USB Configuration                                    This is a workaround for OSes
                                                     without XHCI hand-off support.
USB Controllers:                                     The XHCI ownership change
     1 XHCI                                           should be claimed by XHCI
USB Devices:                                         driver.
     3 Drives, 2 Keyboards, 2 Mice, 4 Hubs

XHCI Hand-off                         [Enabled]
USB Mass Storage Driver Support       [Enabled]
USB Keyboard and Mouse Simulator      [Enabled]

Mass Storage Devices:
AMI Virtual CDROM0 1.00               [Auto]
AMI Virtual HDisk0 1.00               [Auto]         ++: Select Screen
JetFlashTranscend 4GB 8.07            [Auto]         ↑↓: Select Item
                                                     Enter: Select
```

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]

Allows you to enable or disable the USB Mass Storage driver support.
Configuration options: [Disabled] [Enabled]

USB Keyboard and Mouse Simulator [Enabled]

Allows you to enable or disable simulation of a USB keyboard and mouse for the PS/2 module in Windows 7. Ensure that the appropriate USB drivers are installed before this option is disabled.
Configuration options: [Disabled] [Enabled]

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]

4.5.10   Network Stack Configuration

```
                              Aptio Setup - AMI
                   Advanced

Network Stack                        [Enabled]          Enable/Disable UEFI Network
IPv4 PXE Support                     [Disabled]         Stack
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 UEFI network stack.
Configuration options: [Disabled] [Enabled]

> The following items appear 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 support will
not be available.
Configuration options: [Disabled] [Enabled]

IPv4 HTTP Support [Disabled]

Enables or disables the IPv4 HTTP Boot Support. If disabled, IPv4 HTTP boot support
will not be available.
Configuration options: [Disabled] [Enabled]

IPv6 PXE Support [Disabled]

Enables or disables the IPv6 PXE Boot Support. If disabled, IPv6 PXE boot support will
not be available.
Configuration options: [Disabled] [Enabled]

IPv6 HTTP Support [Disabled]

Enables or disables the IPv6 HTTP Boot Support. If disabled, IPv6 HTTP boot support
will not be available.
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.

4.5.11   NVMe Configuration

This page will display the NVMe controller and drive information.

```
                              Aptio Setup – AMI
                    Advanced

NVMe Configuration

No NVME Device Found
```
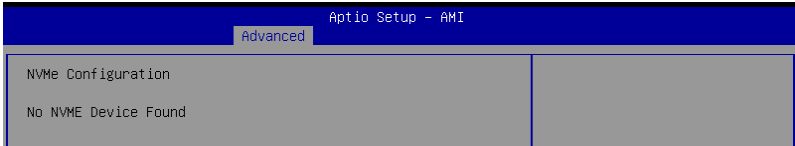
Device

> 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.

4.5.12   APM Configuration

This page will allow you to configure the Advanced Power Management (APM) settings.

```
                                    Aptio Setup – AMI
                          Advanced

    Restore AC Power Loss              [Last State]          Select AC power state when
    Power On By PCI-E                  [Disabled]            power is re-applied after a
    Power On By RTC                    [Disabled]            power failure.
```

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 Off] [Power On] [Last State]

Power On By PCI-E [Disabled]

[Disabled]   Disables wake events from PCI-E devices.

[Enabled]   Enables wake evens from PCI-E devices.

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.

4.5.13   T1s Auth Configuration

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

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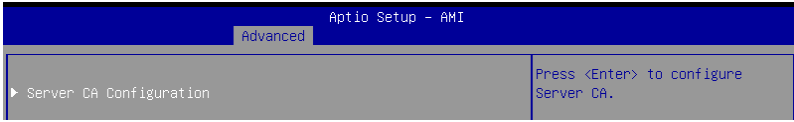
Enroll Cert

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.

4.5.14   Third-party UEFI driver configurations

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

```
                              Aptio Setup – AMI
        Main   Performance Tuning   Advanced   Platform Configuration   Socket Configuration   Security  ▶

▶ Trusted Computing                        ▲  Configure 10 Gigabit Ethernet
▶ ACPI Settings                               device parameters.
▶ Redfish Host Interface Settings
▶ Onboard LAN Configuration
▶ UEFI Variables Protection
▶ Serial Port Console Redirection
▶ SIO Configuration
▶ PCI Subsystem Settings
▶ USB Configuration
▶ Network Stack Configuration
▶ NVMe Configuration
▶ APM Configuration

▶ Tls Auth Configuration
▶ Intel(R) Ethernet Controller X710 for 10GBASE-T –   ++: Select Screen
  00:00:00:00:01:00                             ↑↓: Select Item
▶ VLAN Configuration (MAC:000000000100)         Enter: Select
▶ MAC:000000000100-IPv6 Network Configuration   +/-: Change Opt.
▶ MAC:000000000100-IPv4 Network Configuration   F1: General Help
▶ Intel(R) Ethernet Controller X710 for 10GBASE-T –   F2: Previous Values
  00:00:00:00:01:01                             F5: Optimized Defaults
▶ VLAN Configuration (MAC:000000000101)         F10: Save Changes & Reset
▶ MAC:000000000101-IPv6 Network Configuration   F12: Print Screen
▶ MAC:000000000101-IPv4 Network Configuration  ▼  <k>: Scroll help area upwards
                                                <m>: Scroll help area downwards
                                                ESC: Exit

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```

4.6 Platform Configuration menu

The Platform Configuration menu items allow you to change the platform settings.

Setting items in this menu to incorrect values may cause the system to malfunction!

```
                          Aptio Setup - AMI
    Main  Performance Tuning  Advanced  Platform Configuration  Socket Configuration  Security  ►

 ► PCH-IO Configuration                              PCH Parameters
 ► Miscellaneous Configuration
 ► Server ME Configuration
 ► Runtime Error Logging

   ------------------------------------------------
   Setup Warning:
   Setting items on this Screen to incorrect values
   may cause system to malfunction!

                                                     ►←: Select Screen
                                                     ↑↓: Select Item
                                                     Enter: Select
                                                     +/-: Change Opt.
                                                     F1: General Help
                                                     F2: Previous Values
                                                     F5: Optimized Defaults
                                                     F10: Save Changes & Reset
                                                     F12: Print Screen
                                                     <k>: Scroll help area upwards
                                                     <m>: Scroll help area downwards
                                                     ESC: Exit

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```

4.6.1 PCH-IO Configuration

```
                          Aptio Setup – AMI
                     Platform Configuration

  PCH-IO Configuration                              Device Options Settings

▶ SATA And RST Configuration

  DeepSx Power Policies            [Disabled]
  IEH Mode                        [Enabled]
```

SATA And RST Configuration

Allows you to configure SATA and RST settings.

DeepSx Power Policies [Disabled]

Allows you to configure the DeepSx power policy.
Configuration options: [Disabled] [Enabled in S5]

IEH Mode [Enabled]

Allows you to enable or bypass Interrupt Error Handling (IEH).
Configuration options: [Bypass Mode] [Enabled]

4.6.2 Miscellaneous Configuration

```
                          Aptio Setup – AMI
                     Platform Configuration

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

  Active Video                     [Auto]
```
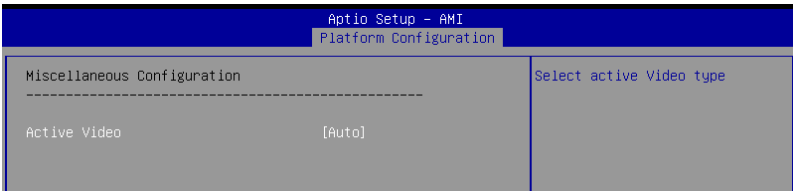
Active Video [Auto]

Allows you to select the active video type.
Configuration options: [Auto] [Onboard Device] [PCIE Device]

4.6.3   Server ME Configuration

Displays the Server ME Technology parameters on your system. Scroll using <Page Up> / <Page Down> keys to see more items.

```
                          Aptio Setup - AMI
                        Platform Configuration
┌─────────────────────────────────────────────┬──────────────────────────────┐
│  General ME Configuration                   ▲│ The altitude of the platform │
│  Oper. Firmware Version        18:6.0.4.25   │ location above the sea level,│
│  Backup Firmware Version       18:6.0.4.25   │ expressed in meters. The hex │
│  Recovery Firmware Version     18:6.0.4.25   │ number is decoded as 2's     │
│  ME Firmware Status #1         0x00000355    │ complement signed integer.   │
│  ME Firmware Status #2         0x8B504006    │ Provide the 8000h value if the│
│    Current State               Operational   │ altitude is unknown.         │
│    Error Code                  No Error      │                              │
│    Recovery Cause              N/A           │                              │
│  Intel ME Target Image Boot    Success       │                              │
│  Altitude                      8000          │                              │
│  MCTP Bus Owner                0             │                              │
│  Server ME firmware features list            │                              │
│    SiEn                                       │ ↔: Select Screen             │
│    NodeManager                                │ ↑↓: Select Item              │
│    PECIProxy                                  │ Enter: Select                │
│    ICC                                        │ +/-: Change Opt.             │
│    MeStorageServices                          │ F1: General Help             │
│    BootGuard                                  │ F2: Previous Values          │
│    PmBusProxy                                 │ F5: Optimized Defaults       │
│    CpuHotPlug                                 │ F10: Save Changes & Reset    │
│    HSIO                                       │ F12: Print Screen            │
│    PECIOverDMI                                │ <k>: Scroll help area upwards│
│    PCHDebug                                   │ <m>: Scroll help area downwards│
│    PowerThermalUtility                       ▼│ ESC: Exit                    │
└─────────────────────────────────────────────┴──────────────────────────────┘
              Version 2.22.1287 Copyright (C) 2023 AMI
```

Altitude [8000]

Allows you to set the altitude of the platform location above the sea level, expressed in meters. The hex number is decoded as 2's complement signed integer. Provide the 8000h value if the altitude is unknown.

MCTP Bus Owner [0]

Allows you to enter the MCTP bus owner location on PCIe: [15:8] bus, [7:3] device, [2:0] function. If all zeros, sending bus owner will be disabled.

PSU #1-4

Allows you to enter the PMBus address (7-bit) that will be used to retrieve the status of the PSU. Set to 0 to disable the query..

4.6.4   Runtime Error Logging Support

```
                            Aptio Setup – AMI
                           Platform Configuration
 ┌─────────────────────────────────────────────┬─────────────────────────────┐
 │                                               │                             │
 │  Runtime Error Logging                        │ System Error Enable/Disable │
 │  ---------------------------------------------│ setup options.              │
 │  System Errors                   [Enable]     │                             │
 │ ▶ Whea Settings                               │                             │
 │                                               │                             │
 │                                               │                             │
 │                                               │                             │
 │                                               │                             │
 │                                               │                             │
 │                                               │                             │
 └───────────────────────────────────────────────┴────────────────────────────┘
```

System Errors [Enable]

Allows you to enable or disable System Errors setup options.
Configuration options: [Disable] [Enable]

> The following item is available only when **System Errors** is set to **[Enabled]**.

Whea Settings

Allows you to configure Whea settings.

4.7   Socket Configuration menu

The Socket Configuration menu items allow you to change the socket settings.

```
                              Aptio Setup - AMI
        Main  Performance Tuning  Advanced  Platform Configuration  Socket Configuration  Security    ▶

     ▶ Processor Configuration                          Displays and provides options
       Common RefCode Configuration                     to change the Processor
     ▶ Uncore Configuration                             Settings
     ▶ Memory Configuration
     ▶ IIO Configuration
     ▶ Advanced Power Management Configuration




                                                        →←: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F5: Optimized Defaults
                                                        F10: Save Changes & Reset
                                                        F12: Print Screen
                                                        <k>: Scroll help area upwards
                                                        <m>: Scroll help area downwards
                                                        ESC: Exit

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```

4.7.1   Processor Configuration

```
                              Aptio Setup - AMI
                                                     Socket Configuration

    Processor Configuration                          ▲  Change Per-Socket Settings
    ------------------------------------------------
 ▶  Per-Socket Configuration
    Processor BSP Revision          806F8 - SPR-SP E5
    Processor Socket                Socket 0    Socket 1
    Processor ID                    000806F8* |   N/A
    Processor Frequency             2.000GHz  |   N/A
    Processor Max Ratio             14H       |   N/A
    Processor Min Ratio             08H       |   N/A
    Microcode Revision              2B000161  |   N/A
    L1 Cache RAM(Per Core)          80KB      |   N/A
    L2 Cache RAM(Per Core)          2048KB    |   N/A
    L3 Cache RAM(Per Package)       107520KB  |   N/A
    Processor 0 Version             Intel(R) Xeon(R) Platin    ↔: Select Screen
                                    um 8470                    ↑↓: Select Item
                                                               Enter: Select
    Hyper-Threading                 [Enabled]                  +/-: Change Opt.
    Skip Flex Ratio Override        [Disabled]                 F1: General Help
    Check CPU BIST Result           [Enabled]                  F2: Previous Values
    3StrikeTimer                    [Enable]                   F5: Optimized Defaults
    Fast String                     [Enable]                   F10: Save Changes & Reset
    Machine Check                   [Enable]                   F12: Print Screen
    Hardware Prefetcher             [Enable]                   <k>: Scroll help area upwards
    L2 RFO Prefetch Disable         [Disable]                  <m>: Scroll help area downwards
    Adjacent Cache Prefetch         [Enable]               ▼   ESC: Exit
```

Per-Socket Configuration

Allows you to configure per-socket settings.

Hyper Threading [Enabled]

Allows you to enable or disable the Hyper-Threading Technology function. When disabled, only one thread per activated core is enabled. This is the software method to enable or disable Logical Processor threads.
Configuration options: [Disabled] [Enabled]

Skip Flex Ratio Override [Disabled]

Allows you to skip flex ratio overrides to use power-on default flex ratio values. In multi-socket systems, this will allow mixed flex ratio limits.
Configuration options: [Disabled] [Enabled]

Check CPU BIST Result [Enabled]

Allows you to check or ignore BIST results. If enabled, cores with failed BIST results will be disabled.
Configuration options: [Disabled] [Enabled]

3StrikeTimer [Enabled]

Allows you to enable or disable the 3 strike counter.
Configuration options: [Disabled] [Enabled]

Fast String [Enabled]

Allows you to enable or disable fast strings for REP MOVS/STOS.
Configuration options: [Disabled] [Enabled]

Machine Check [Enabled]

Allows you to enable or disable the machine check.
Configuration options: [Disabled] [Enabled]

Hardware Prefetcher [Enabled]

Allows you to enable or disable the hardware prefetcher.
Configuration options: [Disabled] [Enabled]

L2 RFO Prefetch Disable [Disabled]

Allows you to turn enable or disable L2 RFO prefetcher.
Configuration options: [Disabled] [Enabled]

Adjacent Cache Prefetch [Enabled]

Allows you to enable or disable prefetching of adjacent cache lines.
Configuration options: [Disabled] [Enabled]

DCU Streamer Prefetcher [Enabled]

Allows you to enable or disable the L1 data cache prefetcher (MSR 1A4h [2]).
Configuration options: [Disabled] [Enabled]

DCU IP Prefetcher [Enabled]

Allows you to enable or disable the L1 data cache prefetcher (MSR 1A4h [3]).
Configuration options: [Disabled] [Enabled]

LLC Prefetch [Disabled]

Allows you to enable or disable LLC Prefetch on all threads.
Configuration options: [Disabled] [Enabled]

Homeless Prefetch [Auto]

Allows you to enable or disable Homeless Prefetch on all threads.
Configuration options: [Disabled] [Enabled] [Auto]

FB Thread Slicing [Disabled]

Allows you to enable or disable fill buffer thread slicing per thread.
Configuration options: [Disabled] [Enabled]

Bsp Selection [Auto]

Choose the method for BSP selection. Auto maps to hardware default BSP.
Configuration options: [Socket 0-7] [Auto]

Extended APIC [Enabled]

Allows you to enable or disable the extended APIC support.
Configuration options: [Disabled] [Enabled]

> Enabling Extended APIC will automatically enable VT-d and Interrupt Remapping.

APIC Physical Mode [Disabled]

Allows you to enable or disable the APIC physical destination mode.
Configuration options: [Disabled] [Enabled]

PECI Trust Mode [Use per-PECI agent trust mode]

Allows you to select the PECI trust mode
Configuration options: [All PECI Agents untrusted] [All PECI Agents trusted] [Use per-PECI agent trust mode]

> The following items are available only when **PECI Trust Mode** is set to **[Use per-PECI agent trust mode]**.

Legacy Agent [Enabled]

Allows you to enable or disable legacy agent trust.
Configuration options: [Disabled] [Enabled]

SMBus Agent [Disabled]

Allows you to enable or disable SMBus agent trust.
Configuration options: [Disabled] [Enabled]

Generic Agent [Disabled]

Allows you to enable or disable generic agent trust.
Configuration options: [Disabled] [Enabled]

eSPI Agent [Disabled]

Allows you to enable or disable eSPI agent trust.
Configuration options: [Disabled] [Enabled]

DfxRedManu Agent [Disabled]

Allows you to enable or disable DfxRedManu agent trust.
Configuration options: [Disabled] [Enabled]

DfxOrange Agent [Disabled]

Allows you to enable or disable DfxOrange agent trust.
Configuration options: [Disabled] [Enabled]

DBP-F [Disabled]

Allows you to enable or disable DBP-F.
Configuration options: [Disabled] [Enabled]

IIO LLC Ways [14:0] (Hex) [0]

Allows you to set the bitmask for IIO LLC Ways. All bits set in the mask must be contiguous.

SMM Blocked and Delayed [Disabled]

Allows you to enable or disable SMM Blocked and Delayed.
Configuration options: [Disabled] [Enabled]

eSMM Save State [Disabled]

Allows you to enable or disable the eSMM save state feature.
Configuration options: [Disabled] [Enabled]

Smbus Error Recovery [Enabled]

Allows you to enable or disable Smbus Error Recovery.
Configuration options: [Disabled] [Enabled]

Intel(R) TXT [Disabled]

Allows you to enable or disable Intel® TXT.
Configuration options: [Disabled] [Enabled]

> The following items are available only when **Intel(R) TXT** is set to **[Disabled]**.

VMX [Enabled]

Allows you to enable or disable Vanderpool Technology.
Configuration options: [Disabled] [Enabled]

Enable SMX [Disabled]

Allows you to enable or disable Safer Mode Extensions.
Configuration options: [Disabled] [Enabled]

Lock Chipset [Enabled]

Allows you to lock or unlock the chipset.
Configuration options: [Disabled] [Enabled]

MSR Lock Control [Enabled]

Allows you to lock or unlock MSR 3Ah and CSR 80h.
Configuration options: [Disabled] [Enabled]

PPIN Control [Unlock/Enabled]

Allows you to enable or disable PPIN Control.
Configuration options: [Lock/Disabled] [Unlock/Enabled]

AES-NI [Enabled]

Allows you to enable or disable the AES-NI support.
Configuration options: [Disabled] [Enabled]

PSMI Configuration

Allows you to configure PSMI settings.

Processor CFR Configuration

Allows you to configure Processor CFR settings.

4.7.2   Common RefCode Configuration

```
                        Aptio Setup - AMI
                                            Socket Configuration

  Common RefCode Configuration                Divide physical NUMA nodes
  -----------------------------------------   into evenly sized virtual NUMA
  Numa                         [Enable]       nodes in ACPI table. This may
  -----------------------------------------   improve Windows performance on
  Uniform Memory Access (UMA) cannot be enabled with the   CPUs with more than 64 logical
  current system configuration                processors.
  -----------------------------------------
  Virtual Numa                 [Disable]
```
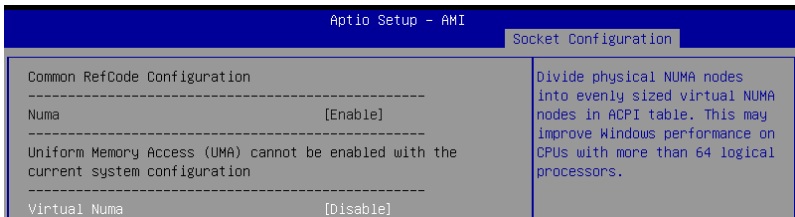
Virtual Numa [Disabled]

Allows you to enable or disable virtual non-uniform memory access (NUMA).
Configuration options: [Disabled] [Enabled]

4.7.3   Uncore Configuration

```
                        Aptio Setup - AMI
                                            Socket Configuration

  Uncore Configuration                        Displays and provides option
  -----------------------------------------   to change the Uncore General
▶ Uncore General Configuration                Settings
▶ Uncore Per Socket Configuration
```

Uncore General Configuration

Allows you to configure Uncore General settings.

Uncore Per Socket Configuration

Allows you to configure Uncore Per Socket settings.

4.7.4 Memory Configuration

```
                              Aptio Setup - AMI
                                                    Socket Configuration

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


    Enforce DDR Memory Frequency POR      [POR]
    Enforce Population POR                [Enable]
    Memory Frequency                      [Auto]
    Sockets in parallel                   [ALL]
    Attempt Fast Boot                     [Enable]
    Attempt Fast Cold Boot                [Enable]
    Data Scrambling for PMem              [Auto]
    Data Scrambling for DDR4/5            [Enable]
    Enable ADR                            [Enable]   ++: Select Screen
    Outlier Check Mapout                  [Enable]   ↑↓: Select Item
    Outlier Threshold Modifier            0          Enter: Select
    PMem Support                          [Enable]   +/-: Change Opt.
  ▶ Memory Topology                                  F1: General Help
```

Enforce DDR Memory Frequency POR [POR]

Allows you to enforce POR restrictions for DDR frequency and voltage programming. If this item is disabled, system memory can be run at frequencies higher than the memory supports, specified in the Memory Frequency field (limited by processor support).
Configuration options: [POR] [Disabled]

Enforce Population POR [Enabled]

Allows you to enforce POR restrictions for memory population.
Configuration options: [Disabled] [Enabled]

Memory Frequency [Auto]

Allows you to set the maximum memory frequency in MHz. If Enforce POR is disabled, system memory can be run at frequencies higher than the memory supports (limited by processor support).
Configuration options: [Auto] [3200] [3600] [4000] [4400] [4800] [5200] [5600] [6000] [6400]

Sockets in Parallel [All]

Allows you to set the number of sockets operating in parallel.
Configuration options: [All] [1] [2] [4]

Attempt Fast Boot [Enabled]

Allows you to enable or disable fast boot. Portions of memory reference code will be skipped when possible to increase boot speed on warm boots.
Configuration options: [Disabled] [Enabled]

Attempt Fast Cold Boot [Enabled]

Allows you to enable or disable fast cold boot. Portions of memory reference code will be skipped when possible to increase boot speed on cold boots.
Configuration options: [Disabled] [Enabled]

Data Scrambling for PMem [Auto]

Allows you to enable or disable data scrambling for PMem. If set to Auto, data scrambling will be enabled or disabled depending on stepping.
Configuration options: [Disabled] [Enabled] [Auto]

Data Scrambling for DDR4/5 [Enabled]

Allows you to enable or disable data scrambling for DDR4/5.
Configuration options: [Disabled] [Enabled]

Enable ADR [Enabled]

Allows you to enable or disable ADR. Automatically enabled if fADR is enabled.
Configuration options: [Disabled] [Enabled]

Outlier Check Mapout [Enabled]

Configuration options: [Disabled] [Enabled]

Outlier Threshold Modifier [0]

Allows you to modify the base outlier threshold.

Memory Topology

Displays memory topology with DIMM population information.

Memory Map

Allows you to configure memory mapping settings.

Memory RAS Configuration

Allows you to configure memory RAS settings.

PMem Configuration

Allows you to configure PMem settings.

4.7.5   IIO Configuration

```
                           Aptio Setup - AMI
                                              Socket Configuration

   IIO Configuration                             Press <Enter> to bring up the
   ----------------------------------------------  Intel Virtualization for
                                                 Directed I/O (VT-d)
 ▶ Intel VT for Directed I/O (VT-d)              Configuration menu.
```

Intel(R) VT for Directed I/O (VT-d)

Intel(R) VT for Directed I/O [Enabled]

Allows you to enable or disable the Intel Virtualization Technology for Directed I/O (VT-d) by reporting the I/O device assignment to VMM through DMAR ACPI Tables. Configuration options: [Disabled] [Enabled]

> The following items are available only when **Intel(R) VT for Directed I/O** is set to **[Enabled]**.

DMA Control Opt-in Flag [Disabled]
Configuration options: [Disabled] [Enabled]

Pre-boot DMA Protection [Disabled]
Configuration options: [Disabled] [Enabled]

4.7.6   Advanced Power Management Configuration

```
                           Aptio Setup - AMI
                                              Socket Configuration

   Advanced Power Management Configuration        P State Control Configuration
   ----------------------------------------------  Sub Menu, include Turbo, XE
 ▶ CPU P State Control                            and etc.
 ▶ Hardware PM State Control
 ▶ Frequency Prioritization
 ▶ CPU C State Control
 ▶ Package C State Control
```
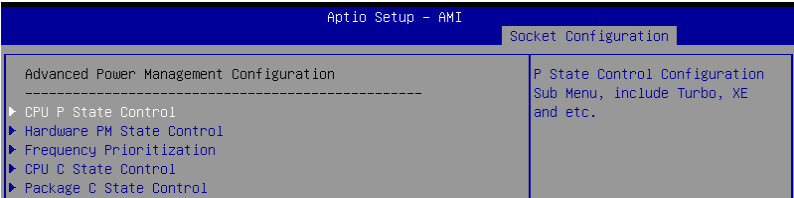
CPU P State Control

Allows you to configure CPU P State Control settings.

Hardware PM State Control

Allows you to configure Hardware PM State Control settings.

Frequency Prioritization

Allows you to configure Frequency Prioritization settings.

CPU C State Control

Allows you to configure CPU C State Control settings.

Package C State Control

Allows you to configure Package C State Control settings.

4.8 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.

```
                                  Aptio Setup - AMI
        Main   Performance Tuning   Advanced   Platform Configuration   Socket Configuration   Security    ▶

   Password Description                                  ▲    To clear the administrator
                                                              password, key in the current
   If ONLY the Administrator's password is set, then this only   password in the Enter Current
   limits access to Setup and is only asked for when entering    Password box, and then press
   Setup.                                                        <Enter> when prompted to
   If ONLY the User's password is set, then this is a power on   create/confirm the password.
   password and must be entered to boot or enter Setup.
   In Setup the User will have Administrator rights.
   The password length must be in the following range:
   is a power on password and must be entered to
   boot or enter Setup. In Setup the User will
   have Administrator rights.
   The password length must be
   in the following range:                                      ←→: Select Screen
   Minimum length                         3                     ↑↓: Select Item
   Maximum length                         20                    Enter: Select
                                                                +/-: Change Opt.
   Administrator Password                                        F1: General Help
   User Password                                                 F2: Previous Values
                                                                 F5: Optimized Defaults
                                                                F10: Save Changes & Reset
                                                                F12: Print Screen
                                                                <k>: Scroll help area upwards
                                                        ▼       <m>: Scroll help area downwards
                                                                ESC: Exit

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```

Administrator Password

To set an administrator password:

1. Select the Administrator Password item and press <Enter>.

2. From the Create New Password box, enter 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, enter the current password, then press <Enter>.

3. From the Create New Password box, enter 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, enter 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, enter the current password, then press <Enter>.

3.   From the Create New Password box, enter 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

Secure Boot [Disabled]

Secure Boot can be enabled if the system is running in User mode with enrolled platform Key (EPK) or if the CSM function is disabled.
Configuration options: [Disabled] [Enabled]

Secure Boot Mode [Custom]

Allows you to set the Secure Boot selector.
Configuration options: [Standard] [Custom]

Install Default Secure Boot Keys

Allows you to load the default secure boot keys.

Clear Secure Boot Keys

Allows you to delete all previously applied secure boot keys.

Key Management

Allows you to configure Key Management options.

4.9   Boot menu

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

```
                              Aptio Setup - AMI
  ◄ Boot  Tool  Event Logs  Server Mgmt  Exit

   Boot Configuration                              Number of seconds to wait for
   Setup Prompt Timeout           5                setup activation key.
   Bootup NumLock State           [On]             65535(0xFFFF) means indefinite
   Boot Logo Display              [Disabled]       waiting.

   Boot Option Priorities




                                                   ►◄: Select Screen
                                                   ↑↓: Select Item
                                                   Enter: Select
                                                   +/-: Change Opt.
                                                   F1: General Help
                                                   F2: Previous Values
                                                   F5: Optimized Defaults
                                                   F10: Save Changes & Reset
                                                   F12: Print Screen
                                                   <k>: Scroll help area upwards
                                                   <m>: Scroll help area downwards
                                                   ESC: Exit

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```

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]

Allows you to select the power-on state for the NumLock.
Configuration options: [Off] [On]

Boot Logo Display [Disabled]

[Disabled]   Hide the logo during POST.

[Enabled]   Display the 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 <F11> when logo appears.

- To access Windows OS in Safe Mode, please press <F8> after POST.

4.10   Tool menu

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

```
                              Aptio Setup - AMI
 ◄ Boot   Tool   Event Logs   Server Mgmt   Exit

   Start ASUS EzFlash                              Press ENTER to run the utility
   IPMI Hardware Monitor                           to select and update BIOS.
   ASUS SMBIOS Viewer
   ASUS Storage Viewer




                                                   ►◄: Select Screen
                                                   ↑↓: Select Item
                                                   Enter: Select
                                                   +/-: Change Opt.
                                                   F1: General Help
                                                   F2: Previous Values
                                                   F5: Optimized Defaults
                                                   F10: Save Changes & Reset
                                                   F12: Print Screen
                                                   <k>: Scroll help area upwards
                                                   <m>: Scroll help area downwards
                                                   ESC: Exit

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```

Start ASUS EzFlash

Allows you to start the ASUS EzFlash BIOS ROM Utility. Refer to the **ASUS EzFlash Utility** section for details.

IPMI Hardware Monitor

Allows you to start the IPMI hardware monitor.

ASUS SMBIOS Viewer

Allows you to start the ASUS SMBIOS Viewer.

ASUS Storage Viewer

Allows you to start the ASUS Storage Viewer.

4.11   Event Logs menu

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

```
                               Aptio Setup - AMI
    ◄ Boot  Tool  Event Logs  Server Mgmt  Exit

 ▶ Change Smbios Event Log Settings                    Press <Enter> to change the
 ▶ View Smbios Event Log                               Smbios Event Log configuration.
```
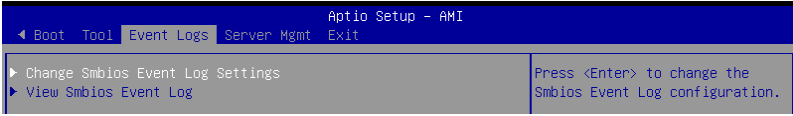
4.11.1   Change Smbios Event Log Settings

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

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

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]**.

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]

Log EFI Status Code [Enabled]

This option allows you to enable or disable logging of the EFI Status Codes.
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]
This option allows you to enable or disable converting of EFI Status Codes to Standard Smbios Type (Not all may be translated).
Configuration options: [Disabled] [Enabled]

4.11.2   View Smbios Event Log

Press <Enter> to view all Smbios event logs.

4.12 Server Mgmt menu

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

```
                              Aptio Setup - AMI
  ◀ Boot   Tool   Event Logs   Server Mgmt   Exit

    BMC Self Test Status        PASSED              If enabled, starts a BIOS
    BMC Device ID               32                  timer which can only be shut
    BMC Device Revision         81                  off by Management Software
    BMC Firmware Revision       1.01.03             after the OS loads.  Helps
    IPMI Version                2.0                 determine that the OS
                                                    successfully loaded or follows
    OS Watchdog Timer           [Disabled]          the OS Boot Watchdog Timer
    OS Wtd Timer Timeout        10                  policy.
    OS Wtd Timer Policy         [Reset]
    Serial Mux                  [Disabled]


  ▶ System Event Log
  ▶ View FRU information                            ↔: Select Screen
  ▶ BMC network configuration                       ↑↓: Select Item
  ▶ View System Event Log                           Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F5: Optimized Defaults
                                                    F10: Save Changes & Reset
                                                    F12: Print Screen
                                                    <k>: Scroll help area upwards
                                                    <m>: Scroll help area downwards
                                                    ESC: Exit


                   Version 2.22.1287 Copyright (C) 2023 AMI
```
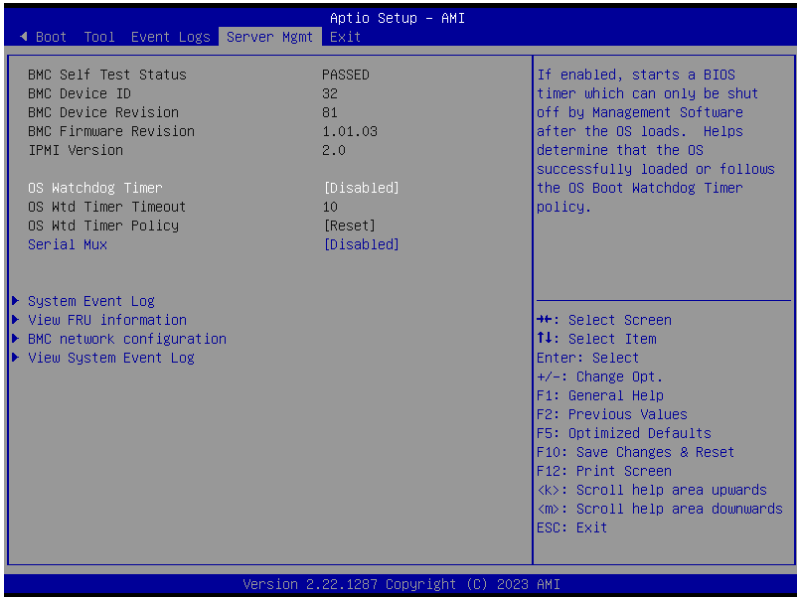
OS Watchdog Timer [Disabled]

This item allows you to start a BIOS timer which can only be shut off by Management Software after the OS loads.
Configuration options: [Enabled] [Disabled]

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

OS Wtd Timer Timeout [10]

Enter the value between 1 to 30 minutes to configure the length for the OS Boot Watchdog Timer.

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] [Power Cycle]

Serial Mux [Disabled]

Configuration options: [Enabled] [Disabled]

4.12.1   System Event Log

Allows you to change the SEL event log configuration.

SEL Components [Enabled]

Allows you to enable or disable event logging for error/progress codes during boot.
Configuration options: [Disabled] [Enabled]

The following item appears only when **SEL Components** is set to **[Enabled]**.

Erase SEL [No]

Allows you to choose options for erasing SEL.
Configuration options: [No] [Yes, On next reset] [Yes, On every reset]

4.12.2   View FRU Information

Allows you to view FRU information.

4.12.3   BMC network configuration

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

DM_LAN/Shared LAN

Configuration Address source [Unspecified]

Configuration options: [Unspecified] [Static] [DynamicBmcDhcp]

IPv6 Support [Enabled]

Configuration options: [Enabled] [Disabled]

The following items appear only when **IPv6 Support** is set to **[Enabled]**.

Configuration Address source [Unspecified]
Configuration options: [Unspecified] [Static] [DynamicBmcDhcp]

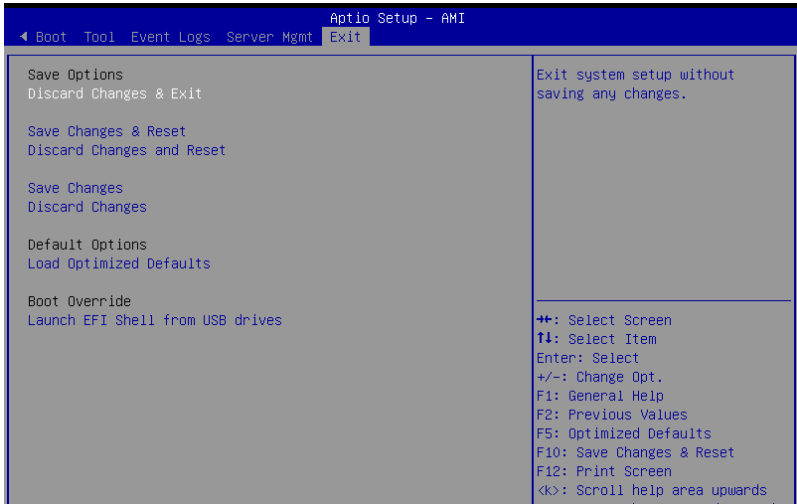*Configuration Router Lan1/Lan2 Address source [Unspecified]*
Configuration options: [Unspecified] [Static] [DynamicBmcDhcp]

4.12.4   View System Event Log

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

4.13 Save & Exit menu

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

```
                            Aptio Setup - AMI
◀ Boot  Tool  Event Logs  Server Mgmt  Exit

  Save Options                                   Exit system setup without
  Discard Changes & Exit                         saving any changes.

  Save Changes & Reset
  Discard Changes and Reset

  Save Changes
  Discard Changes

  Default Options
  Load Optimized Defaults

  Boot Override                                  →←: Select Screen
  Launch EFI Shell from USB drives               ↑↓: Select Item
                                                 Enter: Select
                                                 +/-: Change Opt.
                                                 F1: General Help
                                                 F2: Previous Values
                                                 F5: Optimized Defaults
                                                 F10: Save Changes & Reset
                                                 F12: Print Screen
                                                 <k>: Scroll help area upwards
```

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

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.

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.

RAID Configuration

This chapter provides instructions for setting up, creating, and configuring RAID sets using the available utilities.

5.1 Setting up RAID

The motherboard supports the **Intel® Rapid Storage Technology enterprise Option ROM Utility** with RAID 0, RAID 1, RAID 10, and RAID 5 support (for Windows OS and Linux).

5.1.1 RAID definitions

RAID 0 (Data striping) optimizes two identical hard disk drives to read and write data in parallel, interleaved stacks. Two hard disks perform the same work as a single drive but at a sustained data transfer rate, double that of a single disk alone, thus improving data access and storage. Use of two new identical hard disk drives is required for this setup.

RAID 1 (Data mirroring) copies and maintains an identical image of data from one drive to a second drive. If one drive fails, the disk array management software directs all applications to the surviving drive as it contains a complete copy of the data in the other drive. This RAID configuration provides data protection and increases fault tolerance to the entire system. Use two new drives or use an existing drive and a new drive for this setup. The new drive must be of the same size or larger than the existing drive.

RAID 10 is data striping and data mirroring combined without parity (redundancy data) having to be calculated and written. With the RAID 10 configuration you get all the benefits of both RAID 0 and RAID 1 configurations. Use four new hard disk drives or use an existing drive and three new drives for this setup.

RAID 5 stripes both data and parity information across three or more hard disk drives. Among the advantages of RAID 5 configuration include better HDD performance, fault tolerance, and higher storage capacity. The RAID 5 configuration is best suited for transaction processing, relational database applications, enterprise resource planning, and other business systems. Use a minimum of three identical hard disk drives for this setup.

> If you want to boot the system from a hard disk drive included in a created RAID set, copy first the RAID driver from the support DVD to a floppy disk before you install an operating system to the selected hard disk drive.

5.1.2 Installing hard disk drives

The motherboard supports Serial ATA and NVMe for RAID set configuration. For optimal performance, install identical drives of the same model and capacity when creating a disk array.

To install the SATA or NVMe hard disks for RAID configuration, please refer to the **Storage devices** section for more information.

5.1.3 RAID configuration utilities

Depending on the RAID connectors that you use, you can create a RAID set using the utilities embedded in each RAID controller. For example, use the **Intel® Rapid Storage Technology** if you installed Serial ATA hard disk drives on the Serial ATA connectors supported by the chipset.

Refer to the succeeding section for details on how to use the RAID configuration utility.

5.2   Intel® Virtual Raid on CPU in BIOS

This feature allows you to do CPU RAID functions with Intel® CPU RSTe.
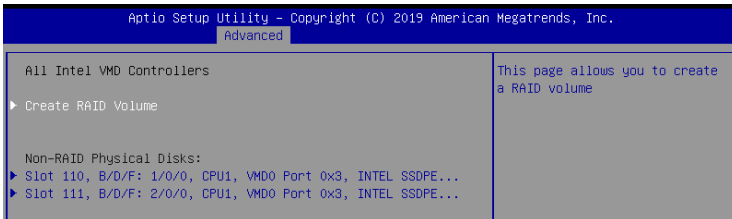
> • Due to chipset behavior, enabling the Intel® RSTe CPU RAID functions requires an Intel® VROC hardware key module.
>
> • Refer to the **Internal connectors** section for the location of the VROC_KEY1 connector.
>
> • The KEY module is purchased separately.

To enter the Intel® Virtual Raid on CPU in BIOS:

1.   Enter the BIOS Setup during POST.

2.   Go to the **Advanced** menu **> Intel(R) Virtual Raid on CPU** > **All Intel VMD Controllers**, then press <Enter> to display the Intel® Virtual Raid on CPU menu.
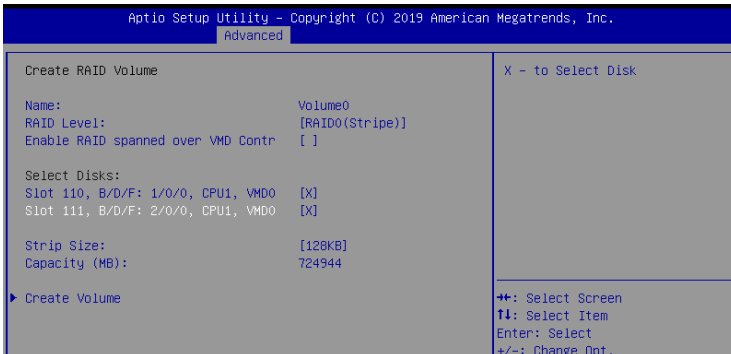
> Refer to the **BIOS Setup** chapter for details on entering and navigating through the BIOS Setup.

```
              Aptio Setup Utility – Copyright (C) 2019 American Megatrends, Inc.
                                   Advanced

    All Intel VMD Controllers                          This page allows you to create
                                                       a RAID volume
  ▶ Create RAID Volume


    Non-RAID Physical Disks:
  ▶ Slot 110, B/D/F: 1/0/0, CPU1, VMD0 Port 0x3, INTEL SSDPE...
  ▶ Slot 111, B/D/F: 2/0/0, CPU1, VMD0 Port 0x3, INTEL SSDPE...
```

5.2.1   Creating a RAID set

To create a RAID set:

1.   From the Intel® Virtual Raid on CPU menu, select **Create RAID Volume** and press <Enter>. The following screen appears:

```
            Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
                           Advanced

    Create RAID Volume                                          X - to Select Disk

    Name:                             Volume0
    RAID Level:                       [RAID0(Stripe)]
    Enable RAID spanned over VMD Contr  [ ]

    Select Disks:
    Slot 110, B/D/F: 1/0/0, CPU1, VMD0    [X]
    Slot 111, B/D/F: 2/0/0, CPU1, VMD0    [X]

    Strip Size:                       [128KB]
    Capacity (MB):                    724944
                                                                →←: Select Screen
  ▶ Create Volume                                               ↑↓: Select Item
                                                                Enter: Select
                                                                +/-: Change Opt.
```

2.   When the **Name** item is selected, enter a name for the RAID set and press <Enter>.

3.   When the **RAID Level** item is selected, press <Enter> to select the RAID level to create, and then press <Enter>.

4.   When the **Enable RAID spanned over VMD Controllers** item is selected, press <Enter> and select **X** to enable this function.

5.   Under Select Disks, press <Enter> and select **X** for the disks you want to include in the RAID set.

6.   When the **Strip Size** item is selected, press <Enter> to select strip size for the RAID array (for RAID 0, 10 and 5 only), and then press <Enter>. The available strip size values range from 4 KB to 128 KB. The following are typical values:

   -    RAID 0: 128 KB

   -    RAID 10: 64 KB

   -    RAID 5: 64 KB

> We recommend a lower strip size for server systems, and a higher strip size for multimedia computer systems used mainly for audio and video editing.

7.   When the **Capacity (MB)** item is selected, enter the RAID volume capacity that you want and press <Enter>. The default value indicates the maximum allowed capacity.

8.   When the **Create Volume** item is selected, press <Enter> to create the RAID volume and return to the Intel® Rapid Storage Technology menu.
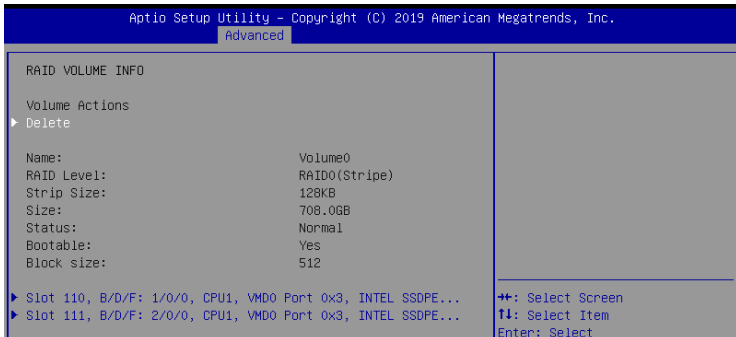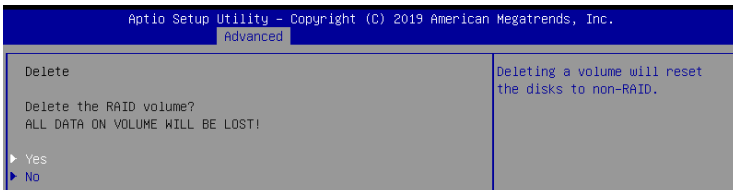
5.2.2 Deleting a RAID set

> Be cautious when deleting a RAID set. You will lose all data on the hard disk drives when you delete a RAID set.

To delete a RAID set:

1.   From the Intel® Virtual Raid on CPU menu, select the RAID volume you want to delete and press <Enter>. The following screen appears:

```
          Aptio Setup Utility – Copyright (C) 2019 American Megatrends, Inc.
                            Advanced

    RAID VOLUME INFO

    Volume Actions
  ▶ Delete

    Name:                           Volume0
    RAID Level:                     RAID0(Stripe)
    Strip Size:                     128KB
    Size:                           708.0GB
    Status:                         Normal
    Bootable:                       Yes
    Block size:                     512

  ▶ Slot 110, B/D/F: 1/0/0, CPU1, VMD0 Port 0x3, INTEL SSDPE...    →←: Select Screen
  ▶ Slot 111, B/D/F: 2/0/0, CPU1, VMD0 Port 0x3, INTEL SSDPE...    ↑↓: Select Item
                                                                   Enter: Select
```

2.   When the **Delete** item is selected, press <Enter>, then select **Yes** to delete the RAID volume and return to the Intel® Virtual Raid on CPU menu, or select **No** to cancel.

```
          Aptio Setup Utility – Copyright (C) 2019 American Megatrends, Inc.
                            Advanced

    Delete                                            Deleting a volume will reset
                                                      the disks to non-RAID.
    Delete the RAID volume?
    ALL DATA ON VOLUME WILL BE LOST!

  ▶ Yes
  ▶ No
```

5.3 Intel® Rapid Storage Technology enterprise (Windows)

The Intel® Rapid Storage Technology enterprise allows you to create RAID 0, RAID 1, RAID 10 (RAID 1+0), and RAID 5 set(s) from Serial ATA hard disk drives that are connected to the Serial ATA connectors supported by the Southbridge.

You need to manually install the Intel® Rapid Storage Technology enterprise utility on a Windows® operating system. Please refer to the **Driver Installation** chapter.

To enter the Intel® Rapid Storage Technology enterprise utility under Windows operating system:

1.   Turn on the system and go to the windows desktop.

2.   Click the **Intel® Rapid Storage Technology enterprise** icon to display the main menu.

Your storage system is configured for data protection, increased performance and optimal data storage capacity. You can create additional volumes to further optimize your storage system.
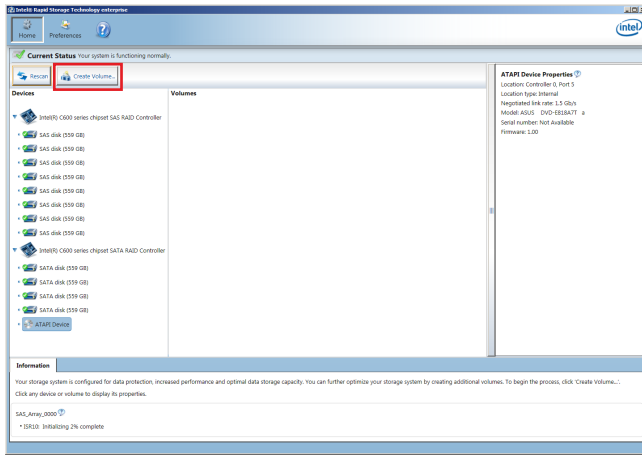
You can click **Rescan** to re-scan any attached hard disks.

5.3.1   Creating a RAID set

To create a RAID set:

1.   From the utility main menu, select **Create Volume** and select volume type.

2.   Click **Next**.
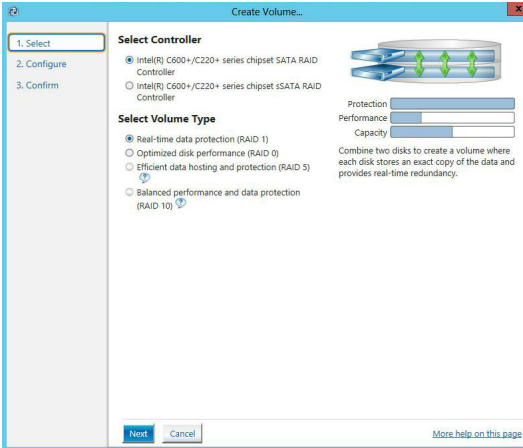
3.   Enter a name for the RAID set, then select the array disks.

4.   Select **Volume Size** tab, you can drag the bar to decide the volume size.

5.   Click **Next**.
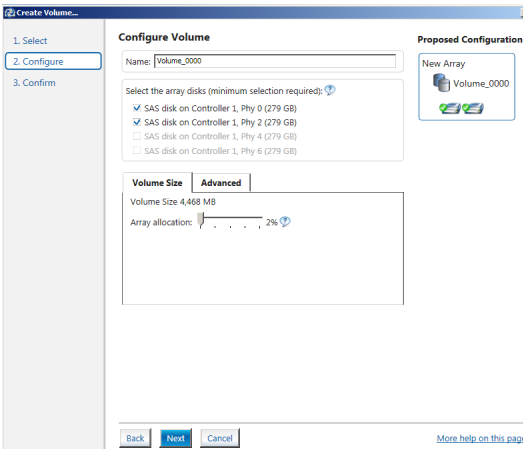
- If you do not want to keep the data on one of the selected disks, select **NO** when prompted.

- If you want to **Enable volume write-back cache** or **Initialize volume**, click **Advanced**.

6. Confirm the volume creation, than click **Create Volume** to continue.

This process could take a while depending on the number and size of the disks. You can continue using other applications during this time.
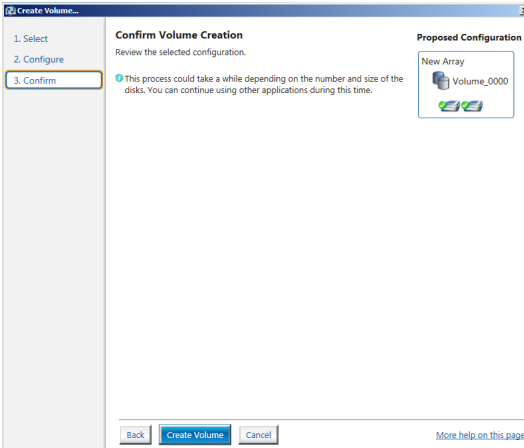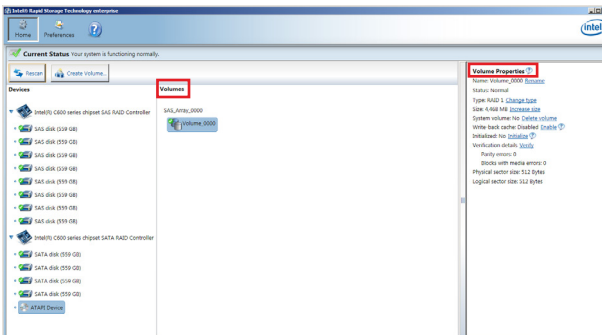

7. Wait until the process is completed, then click **OK** when prompted.
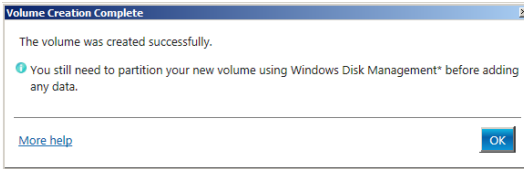
You still need to partition your new volume using Windows Disk Management before adding any data.
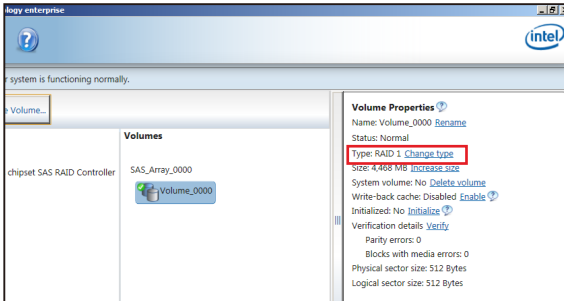
The RAID set is displayed in the **Volumes** list and you can change the settings in **Volume Properties**.

5.3.2   Changing a Volume Type

To change the volume type in **Volume Properties**:

1.   Click the SATA array items you want to change in **Volumes** field.

2.   From the **Volume Properties** field, select **Type: RAID 1 Change type**.

3.   You can change the **Name**, **Select the new volume type**, and **Select additional disks to include in the new volume** if needed.

4.   Select the **Data stripe size** for the RAID array (for RAID 0, 10 and 5 only), and click **OK**. The available stripe size values range from 4 KB to 128 KB. The following are typical values:
      RAID 0: 128KB
      RAID 10: 64KB
      RAID 5: 64KB
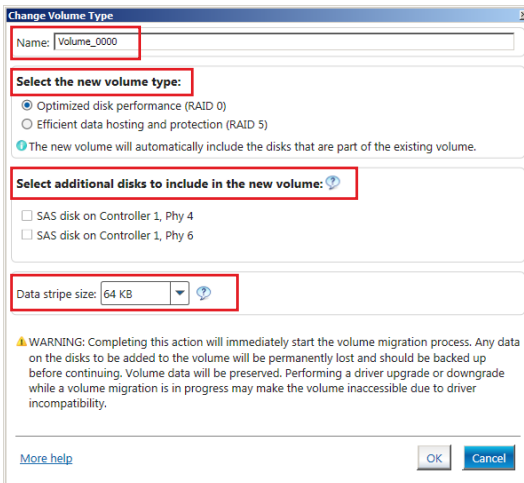
We recommend a lower stripe size for server systems, and a higher stripe size for multimedia computer systems used mainly for audio and video editing.
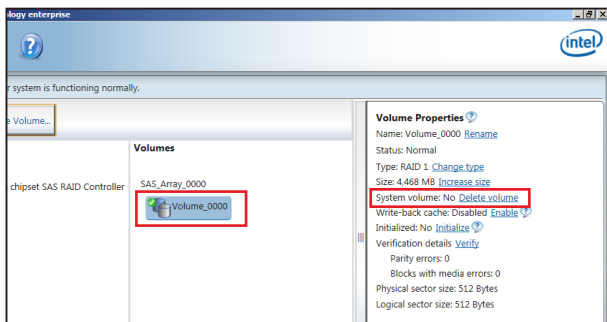
5.3.3   Deleting a volume

⚠️ Be cautious when deleting a volume. You will lose all data on the hard disk drives. Before you proceed, ensure that you back up all your important data from your hard drives.

To delete a volume:

1.   From the utility main menu, select the volume (ex. Volume_0000) in **Volumes** field you want to delete.

2.   Select **Delete volume** in **Volume Properties** field. The following screen appears.
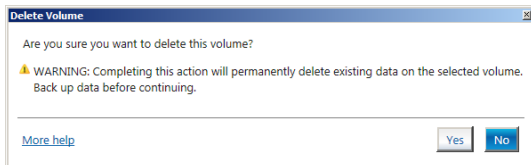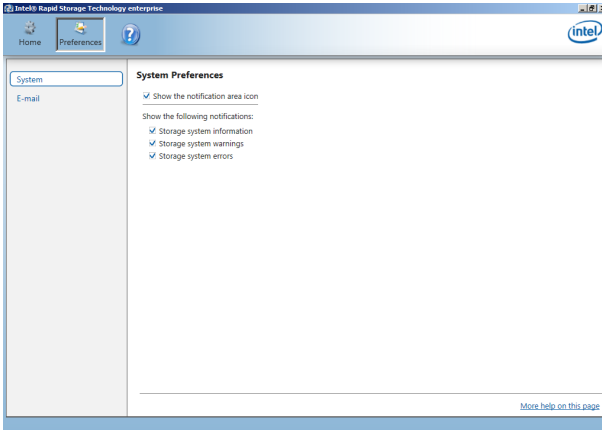

3.   Click **Yes** to delete the volume and return to the utility main menu, or click **No** to return to the main menu.

5.3.4   Preferences

System Preferences

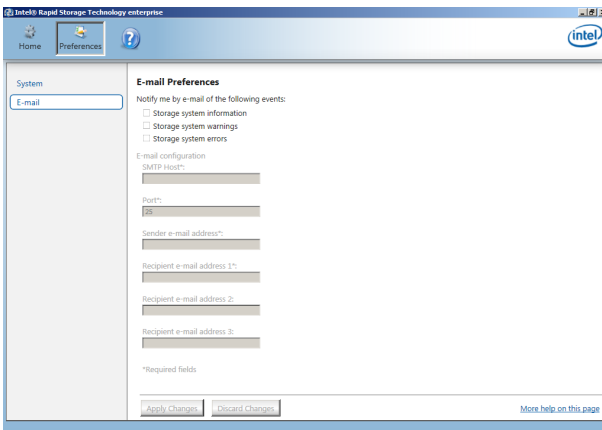Allow you to set to show the notification area icon and show system information, warning, or errors here.

E-Mail Preferences

Allow you to set to sent e-mail of the following events:

- Storage system information

- Storage system warnings

- Storage system errors

Driver Installation

6

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

6.1   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 www.asus.com for the latest updates on software and utilities.

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).

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

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.

Block diagram

Q-Code table

ACTION	PHASE	POST CODE	TYPE	DESCRIPTION
Normal boot	Security Phase	01	Progress	First post code(POWER_ON_POST_CODE)
		02	Progress	Load BSP microcode(MICROCODE_POST_CODE)
		03	Progress	Set cache as ram for PEI phase(CACHE_ENABLED_POST_CODE)
		06	Progress	CPU Early init.(CPU_EARLY_INIT_POST_CODE)
		04	Progress	initializes South bridge for PEI preparation
	PEI(Pre-EFI initialization) phase	10	Progress	PEI Core Entry
		15	Progress	NB initialize before installed memory
		19	Progress	SB initialize before installed memory
		78–00	Progress	Wait BMC ready(duration: 120 seconds).
		A1	MRC Progress	QPI initialization
		A3	MRC Progress	QPI initialization
		A7	MRC Progress	QPI initialization
		A8	MRC Progress	QPI initialization
		A9	MRC Progress	QPI initialization
		AA	MRC Progress	QPI initialization
		AB	MRC Progress	QPI initialization
		AC	MRC Progress	QPI initialization
		AD	MRC Progress	QPI initialization
		AE	MRC Progress	QPI initialization
		AF	MRC Progress	QPI initialization Complete
		2F	Progress	Memory Init.
		B0	MRC Progress	Memory Init.
		B1	MRC Progress	Memory Init.
		AF	MRC Progress	RC Reset if require
		B4	MRC Progress	Memory Init.
		B2	MRC Progress	Memory Init.
		B3	MRC Progress	Memory Init.
		B5	MRC Progress	Memory Init.
		B6	MRC Progress	Memory Init.
		B7	MRC Progress	Memory Init.
		B8	MRC Progress	Memory Init.
		B9	MRC Progress	Memory Init.
		BA	MRC Progress	Memory Init.

ACTION	PHASE	POST CODE	TYPE	DESCRIPTION
Normal boot	PEI(Pre-EFI initialization) phase	BB	MRC Progress	Memory Init.
		BC	MRC Progress	Memory Init.
		BF	MRC Progress	Memory Init. Done
		5A	MRC Progress	Other config. After RC end
		31	Progress	Memory already installed.
		32	Progress	CPU Init.
		34	Progress	CPU Init.
		36	Progress	CPU Init.
		4F	Progress	DXE Initial Program Load(IPL)
	DXE(Driver Execution Environment) phase	60	Progress	DXE Core Started
		61	Progress	DXE NVRAM Init.
		62	Progress	SB run-time init.
		63	Progress	DXE CPU Init
		68	Progress	NB Init.
		69	Progress	NB Init.
		6A	Progress	NB Init.
		70	Progress	SB Init.
		71	Progress	SB Init.
		72	Progress	SB Init.
		78	Progress	ACPI Init.
		79	Progress	CSM Init.
	BDS(Boot Device Selection) phase	90	Progress	BDS started
		91	Progress	Connect device event
		92	Progress	PCI Bus Enumeration.
		93	Progress	PCI Bus Enumeration.
		94	Progress	PCI Bus Enumeration.
		95	Progress	PCI Bus Enumeration.
		96	Progress	PCI Bus Enumeration.
		97	Progress	Console outout connect event
		98	Progress	Console input connect event
		99	Progress	AMI Super IO start
		9A	Progress	AMI USB Driver Init.
		9B	Progress	AMI USB Driver Init.
		9C	Progress	AMI USB Driver Init.
		9D	Progress	AMI USB Driver Init.
		b2	Progress	Legacy Option ROM Init.
		b3	Progress	Reset system
		b4	Progress	USB hotplug
		b6	Progress	NVRAM clean up
		b7	Progress	NVRAM configuration reset
		A0	Progress	IDE, AHCI Init.
		A1	Progress	IDE, AHCI Init.
		A2	Progress	IDE, AHCI Init.
		A3	Progress	IDE, AHCI Init.
		A8	Progress	BIOS Setup Utility password verify
		A9	Progress	BIOS Setup Utility start
		AB	Progress	BIOS Setup Utility input wait
		AD	Progress	Ready to boot event
		AE	Progress	Legacy boot event
	Operating system phase	AA	Progress	APIC mode
		AC	Progress	PIC mode

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.

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)

Le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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

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/.

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.

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.

Japan JATE

本製品は電気通信事業者（移動通信会社、固定通信会社、インターネットプロバイダ等）の通信回線（公衆無線LANを含む）に直接接続することができません。本製品をインターネットに接続する場合は、必ずルーター等を経由し接続してください。

Japan statement notice

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.

Declaration of compliance for product environmental regulation

ASUS follows the green design concept to design and manufacture our products, and makes sure that each stage of the product life cycle of ASUS product is in line with global environmental regulations. In addition, ASUS disclose the relevant information based on regulation requirements.

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

EU REACH and Article 33

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 https://csr.asus.com/english/REACH.htm.

EU RoHS

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

Japan JIS-C-0950 Material Declarations

Information on Japan RoHS (JIS-C-0950) chemical disclosures is available on
https://csr.asus.com/english/article.aspx?id=19

India RoHS

This product complies with the "India E-Waste (Management) Rules, 2016" and prohibits use of lead, mercury, hexavalent chromium, polybrominated biphenyls (PBBs) and polybrominated diphenyl ethers (PBDEs) in concentrations exceeding 0.1% by weight in homogenous materials and 0.01% by weight in homogenous materials for cadmium, except for the exemptions listed in Schedule II of the Rule.

Vietnam RoHS

ASUS products sold in Vietnam, on or after September 23, 2011,meet the requirements of the Vietnam Circular 30/2011/TT-BCT.

Các sản phẩm ASUS bán tại Việt Nam, vào ngày 23 tháng 9 năm2011 trở về sau, đều phải đáp ứng các yêu cầu của Thông tư 30/2011/TT-BCT của Việt Nam.

Türkiye RoHS

AEEE Yönetmeliğine Uygundur

ASUS Recycling/Takeback Services

ASUS recycling and takeback programs come from our commitment to the highest standards for protecting our environment. We believe in providing solutions for you to be able to responsibly recycle our products, batteries, other components as well as the packaging materials. Please go to https://csr.asus.com/english/Takeback.htm for detailed recycling information in different regions.

Ecodesign Directive

European Union announced a framework for the setting of ecodesign requirements for energy-related products (2009/125/EC). Specific Implementing Measures are aimed at improving environmental performance of specific products or across multiple product types. ASUS provides product information on the CSR website. The further information could be found at https://csr.asus.com/english/article.aspx?id=1555.

KC: Korea Warning Statement

이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다.

R-R-MSQ-ESC-N8-E11

Safety Precautions

Accessories that came with this product have been designed and verified for the use in connection with this product. Never use accessories for other products to prevent the risk of electric shock or fire.

安全上のご注意

付属品は当該専用品です。他の機器には使用しないでください。機器の破損もしくは、火災や感電の原因となることがあります。

Service and Support

Visit our multi-language website at https://www.asus.com/support.