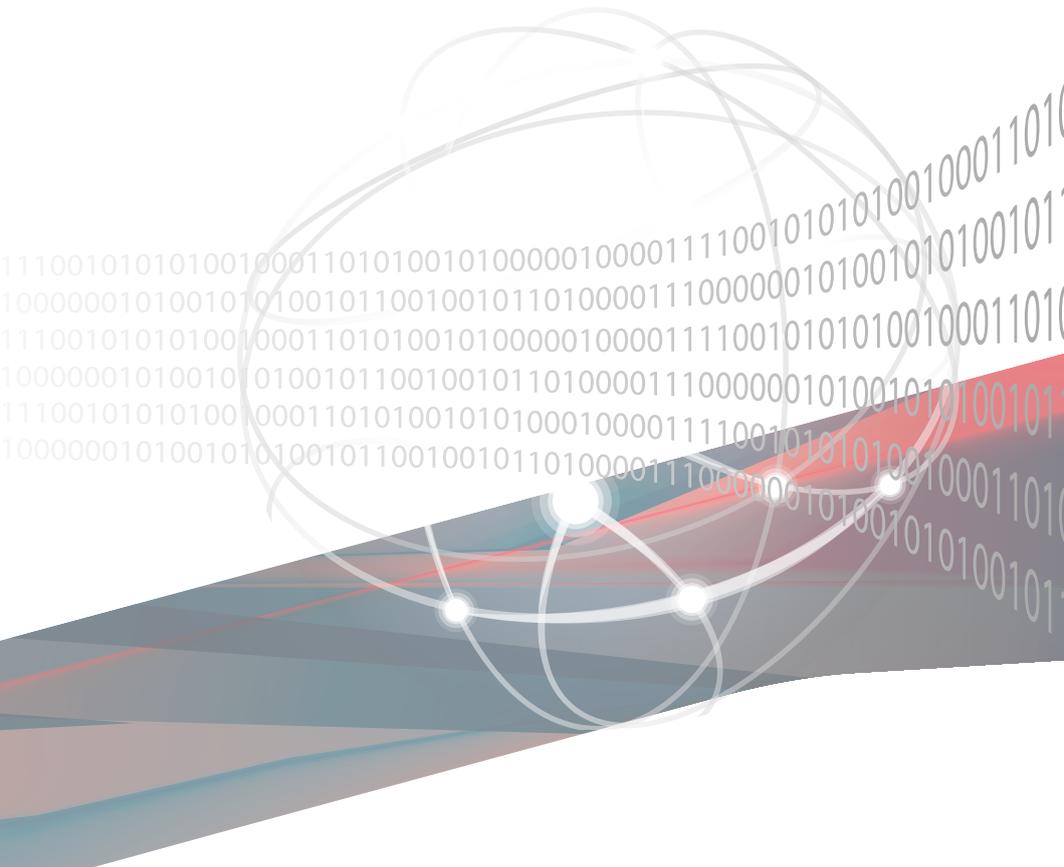




RS720QA-E12-RS8U

2U Rackmount Server

User Guide



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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.

Lithium-Ion Battery Warning

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

Avertissement sur les batteries Lithium-Ion

ATTENTION : Danger d'explosion si la batterie n'est pas correctement remplacée. Remplacer uniquement avec une batterie de type semblable ou équivalent, recommandée par le fabricant. Jeter les batteries usagées conformément aux instructions du fabricant.

CLASS 1 LASER PRODUCT

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: Motherboard Information

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

4. Chapter 4: BIOS Setup

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

5. Chapter 5: Driver Installation

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

Conventions

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



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



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



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



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

Typography

Bold text

Indicates a menu or an item to select.

Italics

Used to emphasize a word or a phrase.

<Key>

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

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

<Key1>+<Key2>+<Key3>

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

Example: <Ctrl>+<Alt>+

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.

Model Name	RS720QA-E12-RS8U
Chassis	ASUS 2U Rackmount Chassis
Motherboard	ASUS K14PH-D24 Server Board
	2 x 2600W Power Supply
	1 x Power Sharing Board (PSB-R2HF)
	1 x Backplane Board (BP8LE32G-25-R2H-D)
	2 x Midplane Board (MP4LE32G-D-R2HF)
Components	4 x Converter Board (CB8LX12G-R2H-B) (Optional)
	4 x PCIe Riser Card - Right (RF8R-R2HF)
	4 x PCIe Riser Card - Left (RF8L-R2HF)
	4 x M.2 PCIe Riser Card (RG4RG4L-M2X2-R2HF)
	8 x Tool-less Hot-swap 2.5" Storage Bays
	1 x Support DVD (includes User Guide)
	8 x CPU Standard Heatsinks
Accessories	8 x CPU EVAC Heatsinks (Optional)
	1 x Bag of Screws



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

1.2 Serial number label

Please take note of the product's serial number. The Serial number contains 12 characters such as xxSxxxxxxxx similar to the figure shown below.

You need to provide the correct serial number to the ASUS Technical Support team member if you need assistance or when requesting support.



1.3 System specifications

The ASUS RS720QA-E12-RS8U is a 2U server system featuring the ASUS K14PH-D24 Server Board. The server supports AMD EPYC™ 9004 series processors plus other latest technologies through the chipsets onboard.

Model Name		RS720QA-E12-RS8U
Processor Support		2 x Socket SP5 (LGA 6096) AMD EPYC™ 9004 series up to 400W
Core Logic		System on Chip (SoC)
Memory	Total Slots	24 (12 channels per CPU, 12 DIMMs per CPU)
	Capacity	Maximum up to 6TB per node
	Memory Type	DDR5 4800 RDIMM/RDIMM 3DS * Refer to www.asus.com for the latest memory AVL update
	Memory Size	16GB, 32GB, 64GB RDIMM 128GB, 256GB RDIMM 3DS * Refer to www.asus.com/support for the latest update
Expansion Slots	Total PCI/PCIe Slots	2 PCIe slots per node
	Slot Type	Per Node: 2 x PCIe x16 (Gen5 x16 link), LP
	M.2	Per Node: 2 x M.2 (Up to 2280 from CPU1)
Storage Controller	SATA/SAS Controller	Per Node: Optional ASUS CB8LX12G-R2H-B (supports RAID 0, 1) - 2 x SAS 12Gb/s ports or; - 2 x SATA 6Gb/s ports
Storage	Storage Bays	Per System: - 8 x 2.5" Hot-swap Storage Bays (8 x SATA*/SAS*/NVMe) Per Node: - 2 x 2.5" Hot-swap Storage Bays (2 x SATA*/SAS*/NVMe) * SATA/SAS support requires an optional ASUS Converter Board
	Backplane Connectors	8 x MCIO x4 (for NVMe) 4 x Slimline SAS x4 (for SATA/SAS)
	Motherboard Connectors	Per Converter Board: 1 x Slimline SAS (2 x SATA/SAS per 1 x CB8LX12G-R2H-B) Per Midplane: 2 x MCIO (4 x NVMe per 1 x MP4LE32G-D-R2HF) Per Node: 2 x M.2 connectors (M.2 PCIe Riser Card required)
	Default Cables	Per System: 4 x MCIO x8 to 8 x MCIO x4 (x2 cables per MP4LE32G-D-R2HF)

(continued on the next page)

Model Name		RS720QA-E12-RS8U
Networking		Per Node: 2 x LAN Port Intel® X710-AT2 10GbE LAN controller 1 x Management Port
VGA		Aspeed AST2600 64MB
Rear I/O		Per Node: 2 x USB 3.2 Gen 1 ports 1 x VGA port 1 x Mini DisplayPort 2 x RJ-45 10GbE LAN ports 1 x RJ-45 Management LAN port
Switch/LED		Per Node: Front: - 1 x Power Switch/LED - 1 x Location Switch/LED - 1 x Message LED - 2 x LAN LED Rear: - 1 x Power Switch/LED - 1 x Q-Code/Port 80 LED
Security Options		TPM-SPI / PFR
Management Solution	Software	ASUS Control Center (Classic)
	Out of Band Remote Management	On-Board ASMB11-iKVM for KVM-over-IP
OS support		Windows® Server, RHEL, SLES * Refer to www.asus.com/event/server/OS_support_list/OS.html for the latest update
Regulatory Compliance		BSMI, CE, CB, FCC (Class A)
Dimensions		847mm x 444mm x 87.3mm (2U) 33.35" x 17.48" x 3.43"
Gross Weight		29.25 kg (excluding CPU, DRAM, and HDD)
Net Weight		33.37 kg (including packaging, excluding CPU, DRAM, and HDD)
Power Supply / Power Rating		1+1 Redundant 2600W 80 PLUS Titanium Power Supply Rating: 220-240 Vac, 16A, 50/60Hz 240 Vac, 16A, 50/60Hz
Environment		Operating temperature: 10°C ~ 35°C Non-operating temperature: -40°C ~ 60°C Non-operating humidity: 20% ~ 90% (Non condensing)

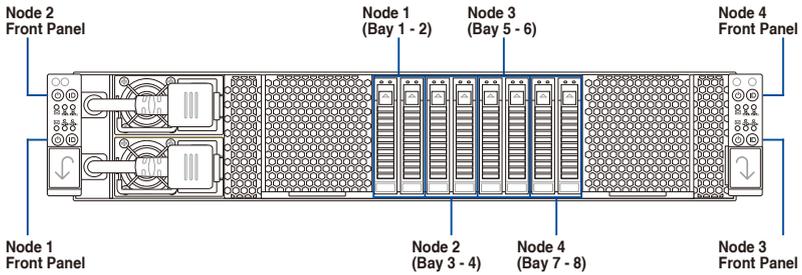


Specifications are subject to change without notice.

1.4 Front panel features



Refer to the **Front panel LEDs** section for the LED descriptions.



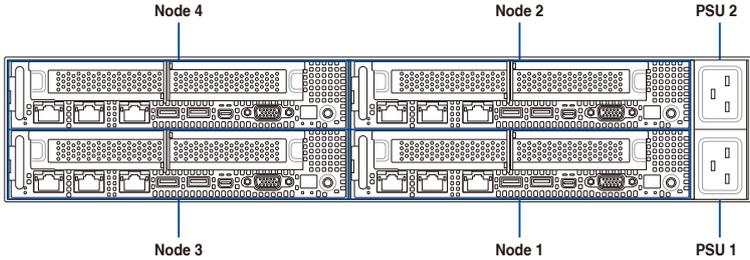
Turn off the system power and detach the power supply before removing or replacing any system component.

Asset tag

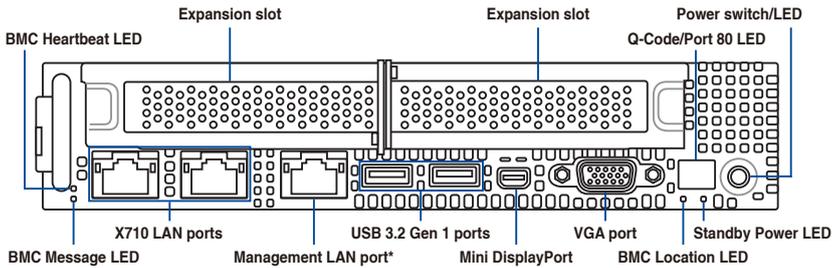
The Asset tag is a small polyester film located on the right side of the server's front panel. It provides information about the server such as asset barcode or serial number and is useful in asset tracking and inventory management.

1.5 Rear panel features

RS720QA-E12-RS8U (Air-cooled SKU)

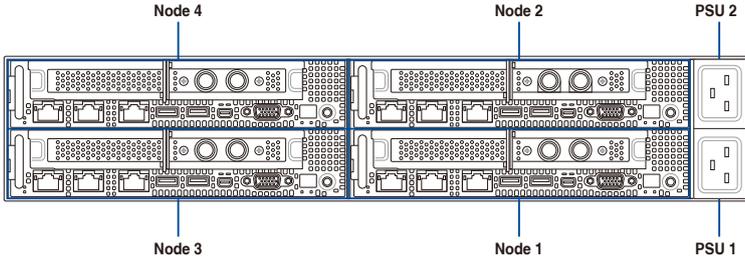


K14PH-D24 (Node, air-cooled SKU)

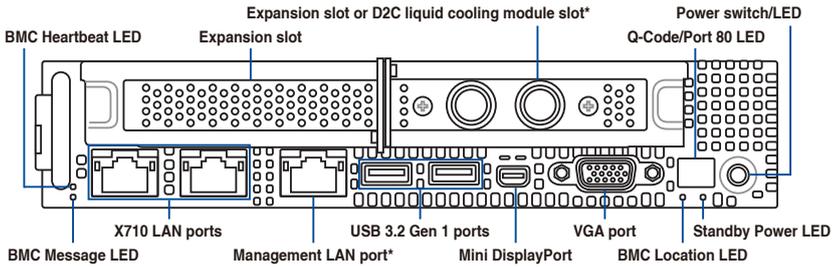


The Management LAN port is for ASUS ASMB11-iKVM only.

RS720QA-E12-RS8U (Liquid-cooled SKU)



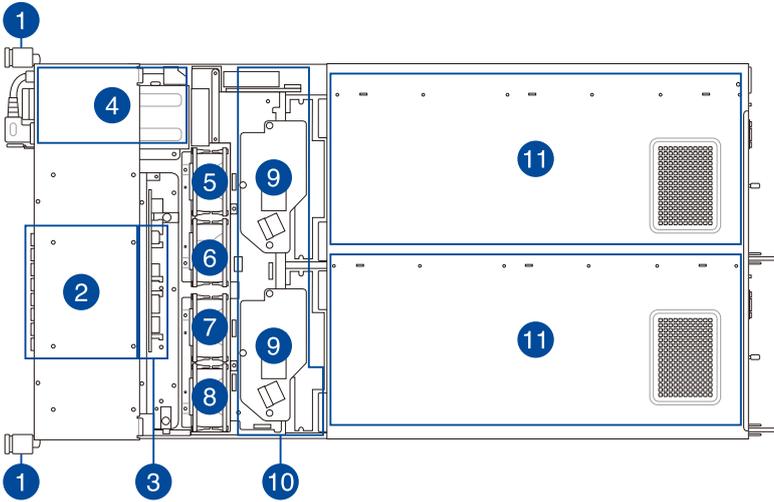
K14PH-D24 (Node, liquid-cooled SKU)



- The D2C liquid cooling module slots require a Liquid-to-Air Coolant Distribution Unit.
- The Management LAN port is for ASUS ASMB11-iKVM only.

1.6 Internal features

The barebone server includes the basic components as shown.



- | | |
|----------------------------------|---------------------------------|
| 1. Front panel boards | 7. System fan (SYS_FAN3) |
| 2. Hot-swap storage device trays | 8. System fan (SYS_FAN4) |
| 3. HDD backplane | 9. Converter board |
| 4. Power supply and power fan | 10. Midplane |
| 5. System fan (SYS_FAN1) | 11. ASUS K14PH-D24 server board |
| 6. System fan (SYS_FAN2) | |



Ensure that the air duct is positioned on the gaps between the memory slots.

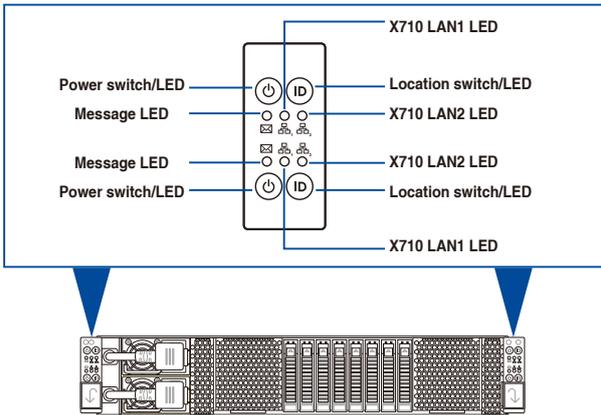


Turn off the system power and detach the power supply before removing or replacing any system component.

WARNING
HAZARDOUS MOVING PARTS
KEEP FINGERS AND OTHER BODY PARTS AWAY

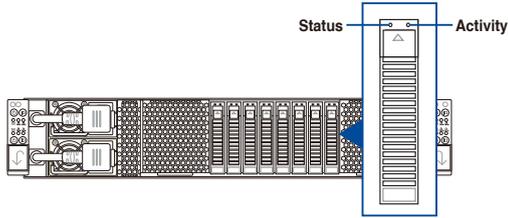
1.7 LED information

1.7.1 Front panel LEDs



LED	Icon	Display status	Description
Power LED	💡	ON	System power ON
Message LED	✉️	OFF	System is normal; no incoming event
		ON	A hardware monitor event is indicated
LAN LEDs	📶 ₁ 📶 ₂	OFF	No LAN connection
		Blinking	LAN is transmitting or receiving data
		ON	LAN connection is present
Location LED	ID	ON	Location switched is pressed
		OFF	Normal status (Press the location switch again to turn off.)

1.7.2 HDD status LEDs



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

1.7.3 LAN (RJ-45) LEDs

Dedicated Management LAN port (DM_LAN1) LED indications

ACT/LINK LED SPEED LED



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

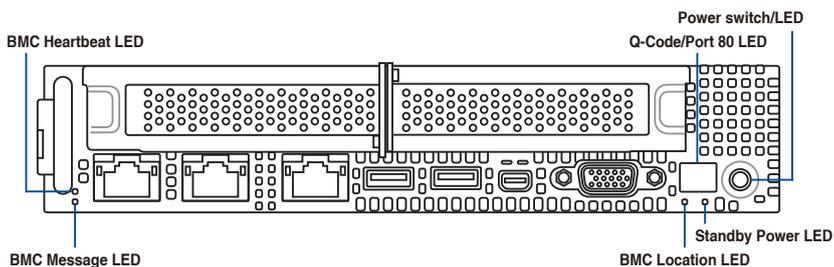
Intel® X710-AT2 10GbE LAN port LEDs

ACT/LINK LED SPEED LED



ACT/LINK LED		SPEED LED	
Status	Description	Status	Description
OFF	No link	OFF	100 Mbps connection
GREEN	Linked	ORANGE	1-5 Gbps connection
BLINKING	Data activity	GREEN	10 Gbps connection

1.7.4 Rear panel LEDs



LED	Display status	Description
Power LED	ON	System power is on
BMC Heartbeat LED	Blinking	BMC is operating normally
BMC Location LED	OFF	System is normal; no incoming event
	ON	Received user command to locate the system
BMC Message LED	OFF	System is normal; no incoming event
	ON	A hardware monitor event is indicated
Standby Power LED	ON	System standby power is on

Hardware Information

2

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

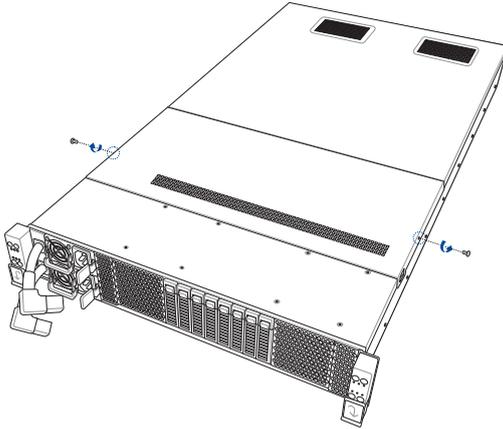
2.1 Chassis cover



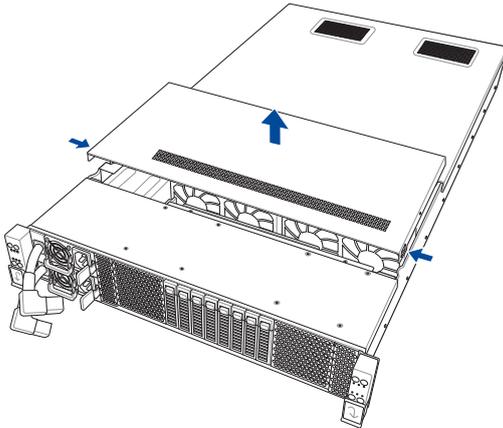
The diagrams in this section are for reference only. The system layout may vary with models, but the installation steps are the same for all models.

To remove the chassis cover:

1. Loosen the two screws on the sides of the chassis cover.

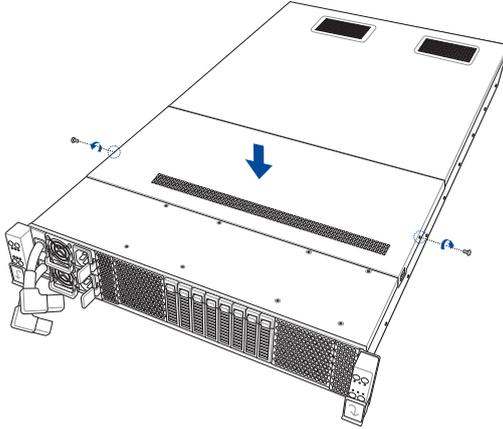


2. Press the two latches inwards to release the chassis cover, then lift the chassis cover to remove it from the chassis.



To install the chassis cover:

1. Place the chassis cover onto the chassis, then secure it using the two screws you removed earlier.



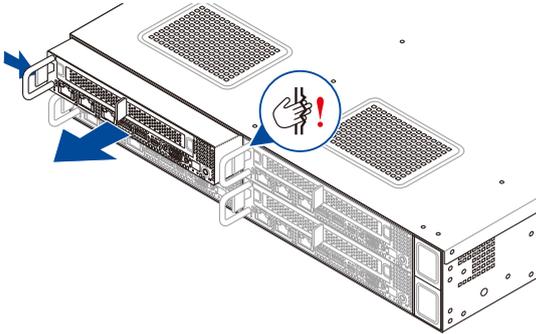
2.2 Server node

2.2.1 Removing a server node

Hold the server node lever and press the green node latch, then pull the server node out of the server chassis.



When removing a server node, do not hold onto the handles of other server nodes to reduce the risk of injury.

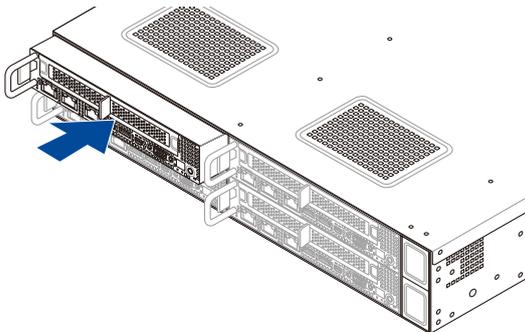


2.2.2 Installing a server node

Align the node with the node slot on the chassis, then push the node all the way into the node slot.



Visually confirm that the server node is fully inserted into the chassis after installing the server node. The edges of the server node should be aligned with the edges of the chassis.



2.3 Central Processing Unit (CPU)

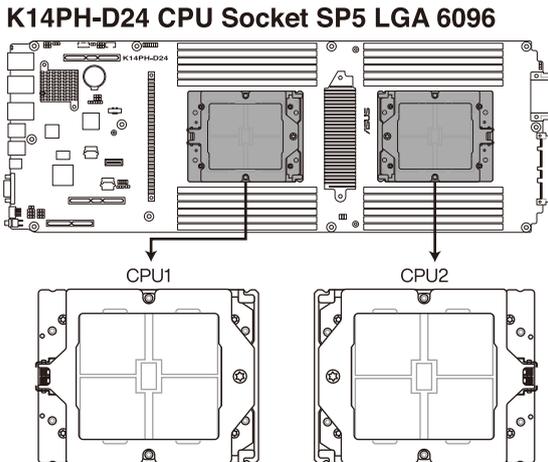
The motherboard comes with a surface mount SP5 socket designed for the AMD EPYC™ 9004 series processors.



- 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 bear 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 PnP cap on the socket.
- The product warranty does not cover damage to the socket contacts resulting from incorrect CPU installation/removal, or misplacement/loss/incorrect removal of the PnP cap.

2.3.1 Installing the CPU and air cooled heatsink

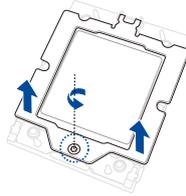
1. Remove the server node. For more information, see the **Removing a server node** section.
2. Locate the CPU socket on the motherboard.



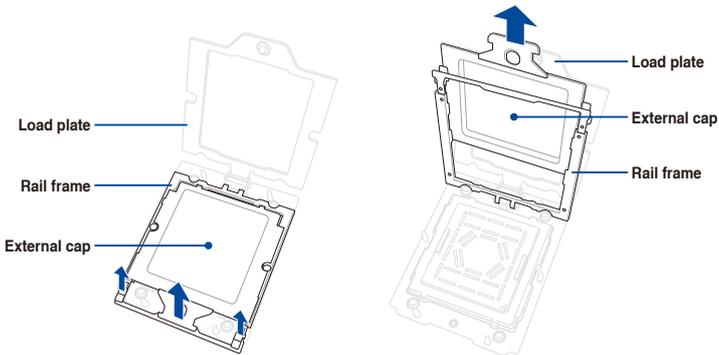
3. Loosen the screw on the socket to open the load plate.



A T20 screwdriver with a torque value of 13.5 ± 1.0 kgf-cm is recommended.



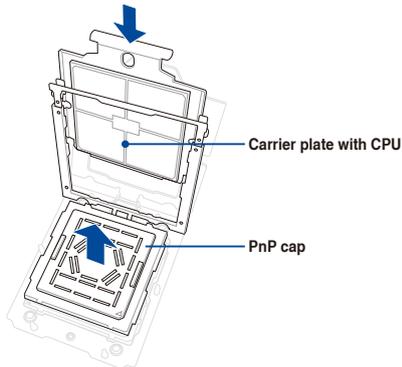
4. Lift open the rail frame, then slide the external cap out of the rail frame.



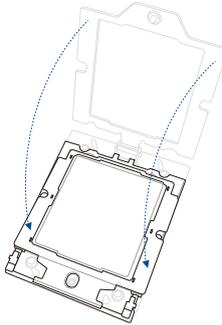
5. Slide the carrier frame with CPU into the rail frame, then remove the PnP cap.



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



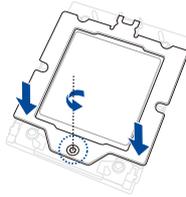
6. Gently close the rail frame just enough to let it sit on top of the CPU socket.



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

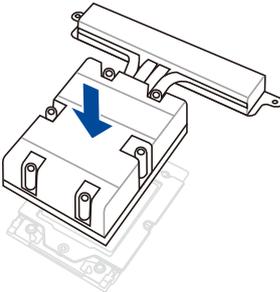


A T20 screwdriver with a torque value of 13.5 ± 1.0 kgf-cm is recommended.

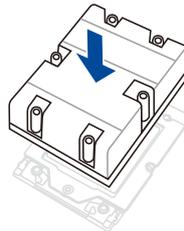


8. Place the heatsink on the CPU socket and make sure the heatsink screws are aligned with the CPU socket.

For CPU1



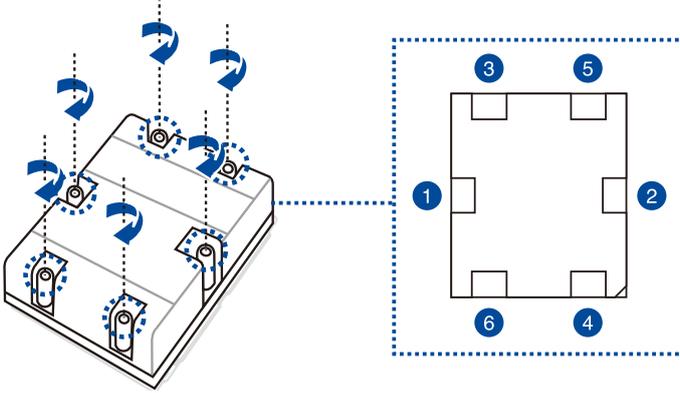
For CPU2



9. The below instructions must be followed when securing the heatsink to the motherboard. The order in which the screws should be tightened is shown both in the illustration below and on the heatsink.
- A. Tighten screw ① just enough to attach the heatsink to the motherboard.
 - B. Fully tighten screw ②, then fully tighten screw ①.
 - C. Fully tighten the remaining screws in order from ③ to ⑥



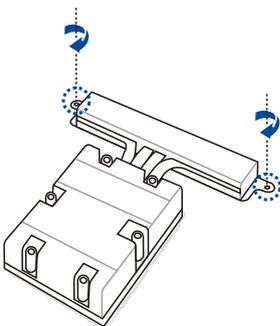
A T20 screwdriver with a torque value of 12.5 ± 2.5 kg-cm is recommended.



10. Fully tighten the remaining screws for CPU1.

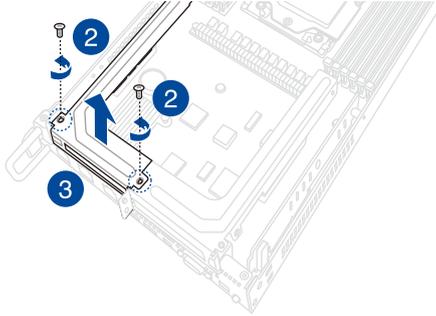


A #2 screwdriver with a torque value of 5.8 ± 0.3 kg-cm is recommended.

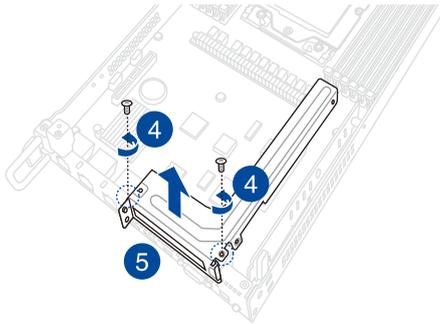


2.3.2 Installing the CPU and liquid cooling module

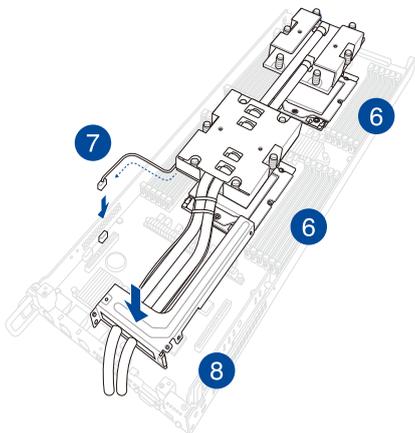
1. Refer to steps 1 to 7 in the previous section to install the CPU.
2. Remove the two (2) screws securing the left riser card to the chassis.
3. Firmly hold the left riser card, then pull it up to detach it from the PCIe x16 slot on the motherboard.



4. Remove the two (2) screws securing the right riser card to the chassis.
5. Firmly hold the right riser card, then pull it up to detach it from the PCIe x16 slot on the motherboard.



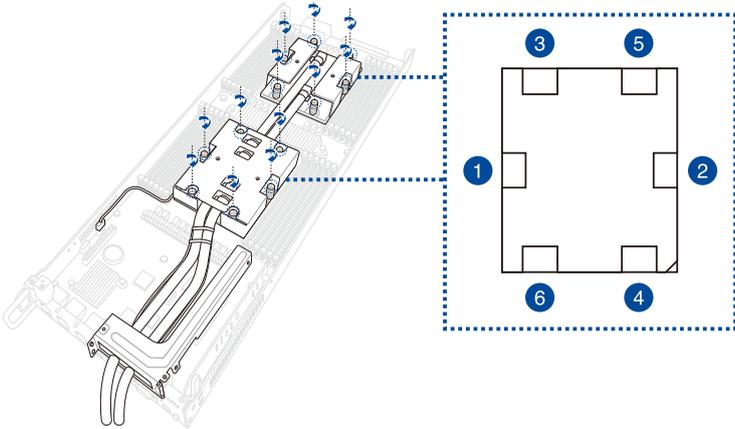
6. Align and place the liquid cooling module assembly in the correct orientation as shown in the illustration below.
7. Connect the cable to the leak detection sensor connector (WL_CON1).
8. Align and insert the right riser card into the PCIe slot on the motherboard.



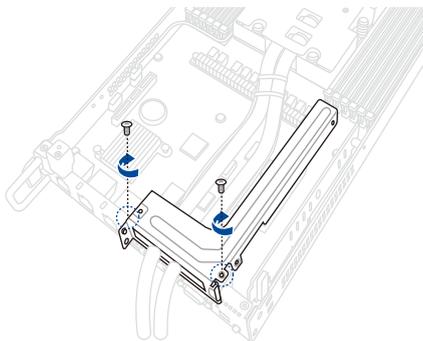
9. The below instructions must be followed when securing the heatsink to the motherboard. The order in which the screws should be tightened is shown both in the illustration below and on the heatsink.
- A. Tighten screw ① just enough to attach the heatsink to the motherboard.
 - B. Fully tighten screw ②, then fully tighten screw ①.
 - C. Fully tighten the remaining screws in order from ③ to ⑥



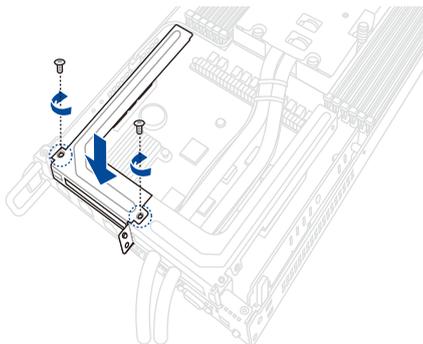
A T20 screwdriver with a torque value of 12.5 ± 2.5 kg-cm is recommended.



10. Secure the right riser card with the screws that you removed earlier.



11. Align and insert the left riser card into the PCIe slot on the motherboard, then secure it with the screws that you removed earlier.

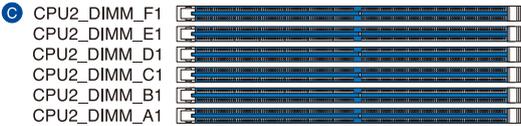
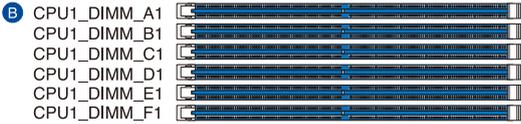
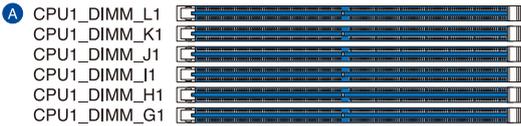
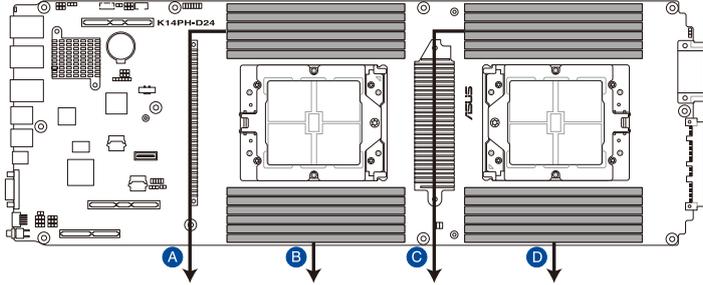


2.4 System memory

2.4.1 Overview

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

The figure illustrates the location of the DDR5 DIMM sockets:



2.4.2 Memory configurations

You may install 16GB, 32GB, 64GB RDIMMs; or 128GB, 256GB RDIMM 3DS into the DIMM sockets using the 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.

Dual CPU configuration

You can refer to the following recommended memory population for a dual CPU configuration:

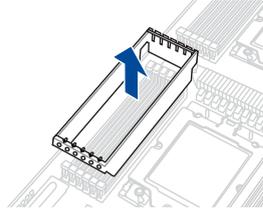
Recommended dual CPU configuration								
CPU	Slot	2 DIMMs	4 DIMMs	8 DIMMs	12 DIMMs	16 DIMMs	20 DIMMs	24 DIMMs
CPU1	A1	•	•	•	•	•	•	•
	B1				•	•	•	•
	C1			•	•	•	•	•
	D1						•	•
	E1					•	•	•
	F1							•
	G1		•	•	•	•	•	•
	H1				•	•	•	•
	I1			•	•	•	•	•
	J1						•	•
	K1					•	•	•
	L1							•
	CPU2	A1	•	•	•	•	•	•
B1					•	•	•	•
C1				•	•	•	•	•
D1							•	•
E1						•	•	•
F1								•
G1			•	•	•	•	•	•
H1					•	•	•	•
I1				•	•	•	•	•
J1							•	•
K1						•	•	•
L1								•

2.4.3 Installing a DIMM

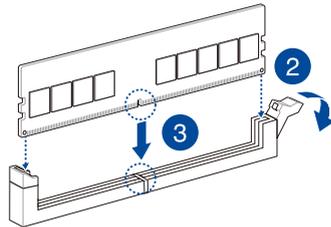


Make sure to unplug the power supply before adding or removing DIMMs or other system components. Failure to do so may cause severe damage to both the motherboard and the components.

1. Remove the DIMM air duct from the motherboard.



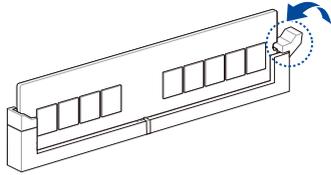
2. Unlock a DIMM socket by pressing the retaining clip outward.
3. Align a DIMM on the socket such that the notch on the DIMM matches the DIMM slot key on the socket.



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

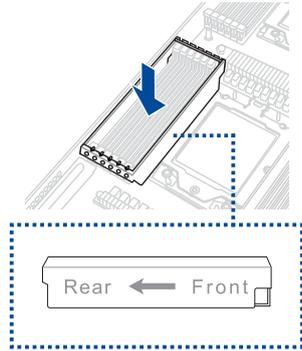
- 4. Hold the DIMM by both of its ends, then insert the DIMM vertically into the socket. Apply force to both ends of the DIMM simultaneously until the retaining clips snap back into place.

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



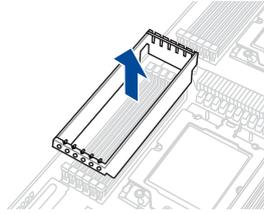
Always insert the DIMM into the socket VERTICALLY to prevent DIMM notch damage.

- 5. Align and install the DIMM air duct in the correct orientation.

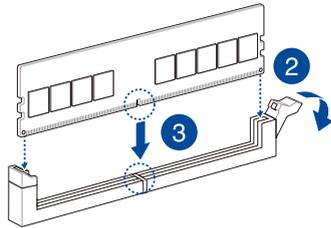


2.4.4 Removing a DIMM

1. Remove the DIMM air duct from the motherboard.

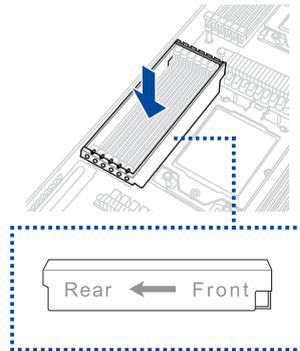


2. Press the retaining clip outward to unlock the DIMM.
3. Remove the DIMM from the socket.



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

4. Align and install the DIMM air duct in the correct orientation.



2.5 Storage devices

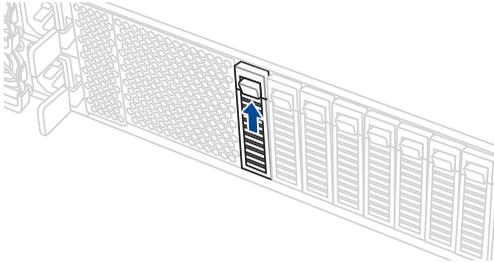
The system supports two (2) hot-swap storage devices per node. The storage device installed on the drive tray connects to the Midplane via the Backplane.

2.5.1 Installing a 2.5” hot-swap SATA/SAS/NVMe storage device

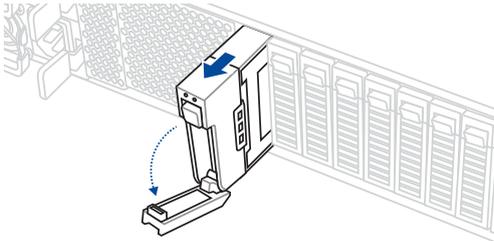


Ensure that the storage devices installed correspond to the correct node. For more information on the nodes and the storage bays, please refer to the **Front panel features** and **Rear panel features** sections.

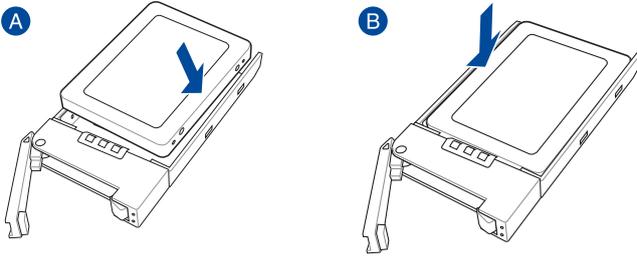
1. Press the spring lock to release the tray lever and to partially eject the tray from the bay.



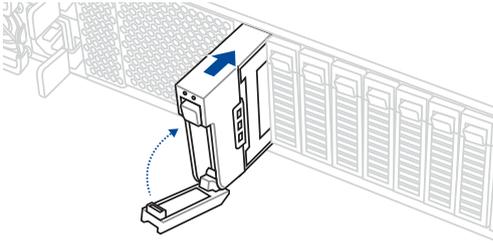
2. Firmly hold the tray lever and carefully pull the drive tray out of the bay.



3. Place the 2.5" storage device into the tray until it clicks into place.



4. Align and insert the 2.5-inch storage device and drive tray assembly into the drive bay.



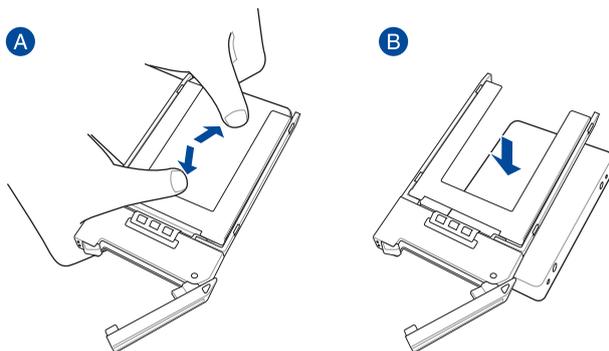
5. Repeat steps 1-4 to install any other 2.5-inch storage devices.

2.5.2 Removing a 2.5" hot-swap SATA/SAS/NVMe storage device

1. Follow steps 1 and 2 of the **Installing a 2.5" hot-swap SATA/SAS/NVMe storage device** section to remove the drive tray.
2. Push the 2.5" storage device through the openings on the bottom of the tray until the 2.5" storage device pops out of the tray.



DO NOT touch the circuit board on the 2.5" storage device. Ensure to push the 2.5" storage device through the opening on the bottom of the tray.



3. Follow step 4 of the **Installing a 2.5" hot-swap SATA/SAS/NVMe storage device** section to install the storage device and drive tray assembly into the drive bay.

2.6 Expansion slots

The following subsections describe the slots and expansion cards that they support.



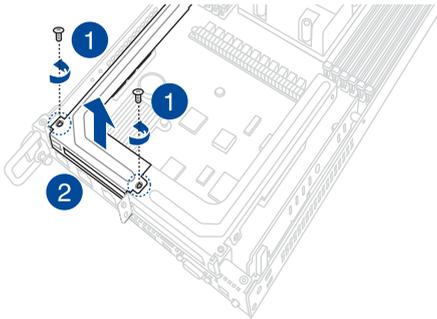
Make sure to unplug the power supply before adding or removing expansion cards. Failure to do so may cause you physical injury and damage motherboard components.

2.6.1 Installing a PCIe expansion card

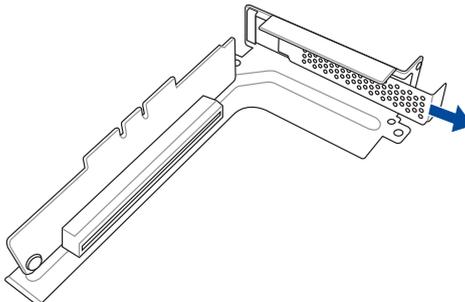
The onboard PCI Express slots on the motherboard comes pre-installed with two riser cards that each support one x16 slot (Gen5 x16 link) for installing low profile PCIe x16 cards.

To install a PCIe expansion card to the left riser card:

1. Remove the two (2) screws securing the left riser card to the chassis.
2. Firmly hold the left riser card, then pull it up to detach it from the PCIe x16 slot on the motherboard.



3. Remove the metal bracket from the riser card.

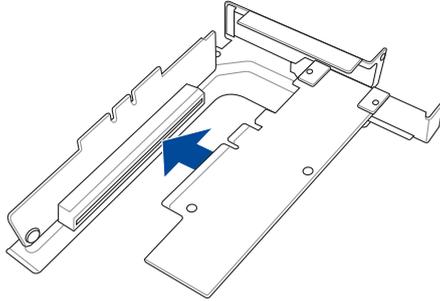


4. Prepare the expansion card.



Before installing an expansion card, read the documentation that came with it and make sure to make the necessary hardware settings.

5. Align and insert the golden finger connectors of the expansion card to the PCIe slot connector on the riser card as shown.

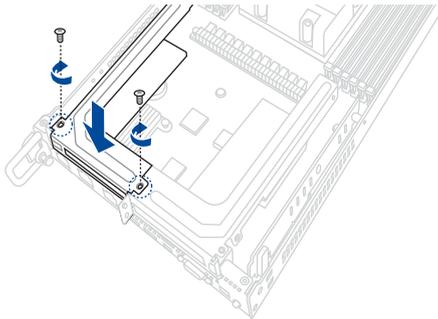


6. Align and insert the riser card and expansion card assembly into the PCIe slot on the motherboard.



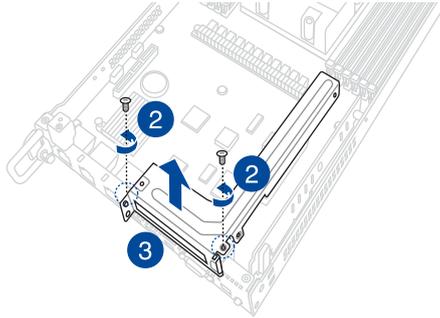
The expansion card fits in one orientation only. If it does not fit, try reversing it.

7. Secure the riser card with the screws that you removed earlier in step 1.

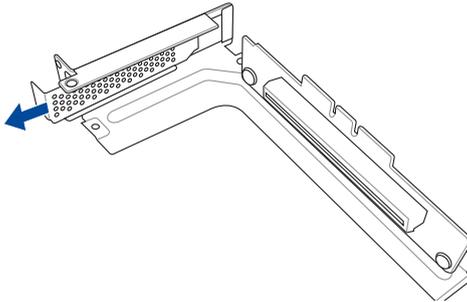


To install a PCIe expansion card to the right riser card:

1. Please refer to steps 1 to 2 in the previous section to remove the left riser card.
2. Remove the two (2) screws securing the right riser card to the chassis.
3. Firmly hold the right riser card, then pull it up to detach it from the PCIe x16 slot on the motherboard.



4. Remove the metal bracket from the riser card.



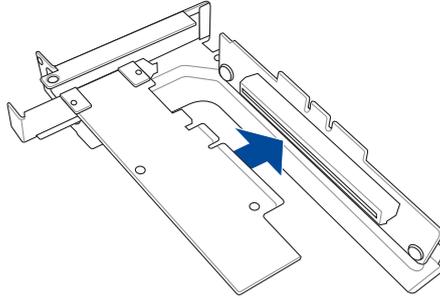
5. Prepare the expansion card.



Before installing an expansion card, read the documentation that came with it and ensure to make the necessary hardware settings.

6. Align and insert the golden finger connectors of the expansion card to the PCIe slot connector on the riser card as shown.

7. Align and insert the golden finger connectors of the expansion card to the PCIe slot connector on the riser card as shown.

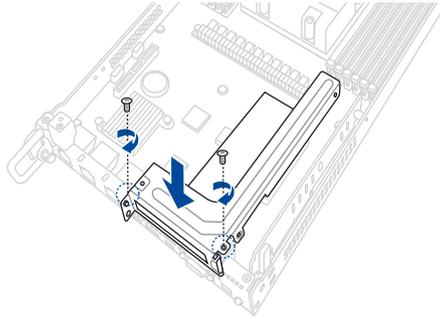


8. Align and insert the riser card and expansion card assembly into the PCIe slot on the motherboard.



The expansion card fits in one orientation only. If it does not fit, try reversing it.

9. Secure the riser card with the screws that you removed earlier in step 2.



10. Refer to steps 6 to 7 in the previous section to reinstall the left riser card.

2.6.2 Configuring an expansion card

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

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

Standard Interrupt assignments

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

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

2.6.3 Installing an M.2 card

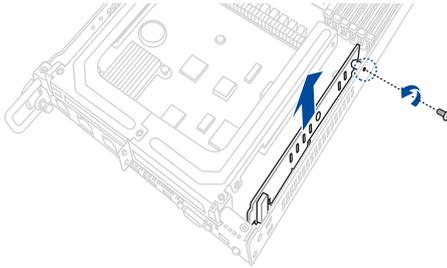


The illustrations in this section are for reference only. The M.2 card may differ depending on the M.2 card you purchased.

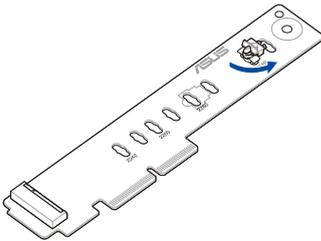


The **M.2_SLOT1** slot on the motherboard does not support hot-plug. If you wish to install or remove the M.2 baseboard and/or M.2 card, make sure to power off the system before installing or removing the M.2 baseboard and/or M.2 card.

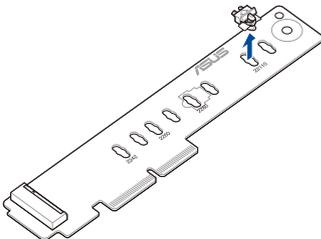
1. Remove the screw securing the M.2 baseboard from the motherboard, then lift and remove the M.2 baseboard.



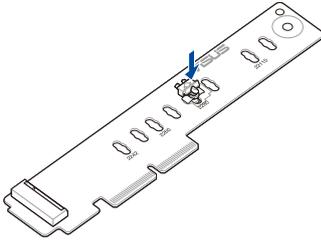
2. (optional) To change the position of the tool-less retaining clip for M.2 cards of different lengths, please refer to the below instructions:
 - a. Rotate the tool-less retaining clip 90 degrees to unlock it.



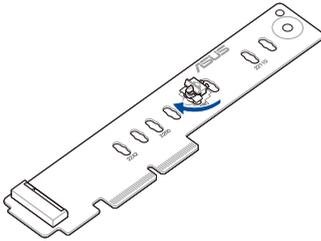
- b. Remove the tool-less retaining clip from the M.2 baseboard.



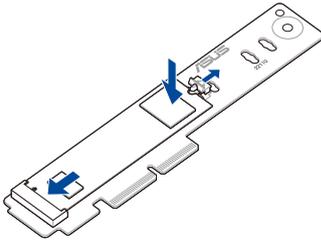
- c. Insert the tool-less retaining clip into one of the indicated holes depending on the length of the M.2 card.



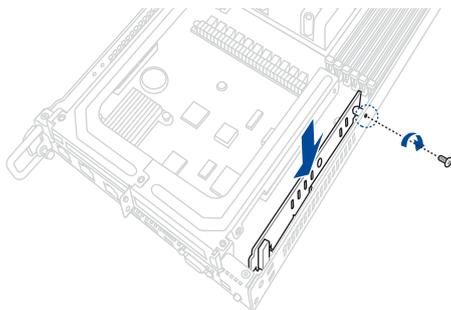
- d. Rotate the tool-less retaining clip so that the arrow on the clip is pointing away from the M.2 slot.



3. Push the latch on the tool-less retaining clip away from the M.2 slot, then insert the M.2 card into the M.2 slot.

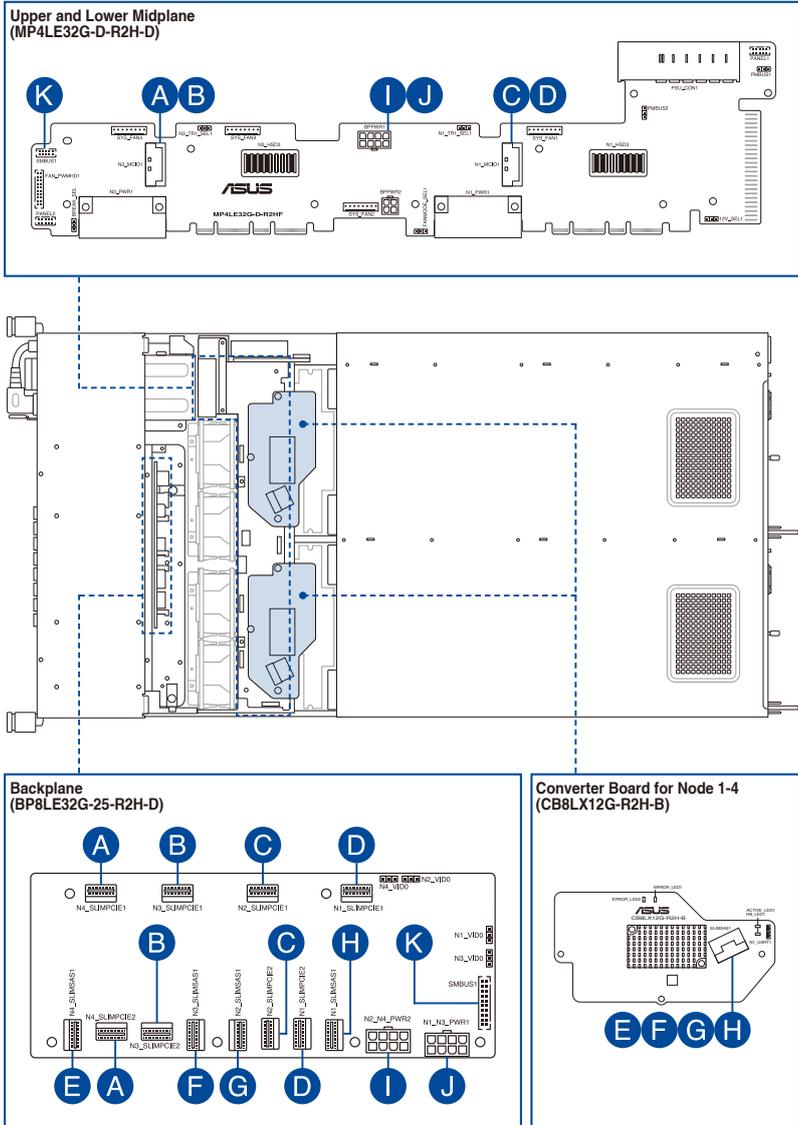


4. (optional) Repeat steps 2-3 to install an M.2 card to the rear of the M.2 baseboard.
5. Align and insert the M.2 baseboard into the M.2_SLOT1 slot on the motherboard, then push down until the M.2 baseboard is securely seated in the slot.
6. Secure the M.2 baseboard to the system using the screw removed previously.



2.7 Backplane and midplane cabling

Remove the top cover before configuring the backplane and midplane cabling. For more information, see the **Chassis cover** section.

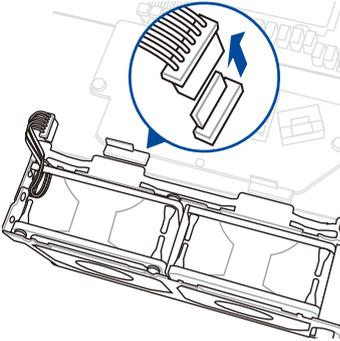


A	Connect N4_SLIMPCIE1 and N4_SLIMPCIE2 on the Backplane to N3_MCIO1 on the Upper Midplane
B	Connect N3_SLIMPCIE1 and N3_SLIMPCIE2 on the Backplane to N3_MCIO1 on the Lower Midplane
C	Connect N2_SLIMPCIE1 and N2_SLIMPCIE2 on the Backplane to N1_MCIO1 on the Upper Midplane
D	Connect N1_SLIMPCIE1 and N1_SLIMPCIE2 on the Backplane to N1_MCIO1 on the Lower Midplane
E	Connect N4_SLIMSAS1 on the Backplane to SLIMSAS1 on the Converter Board for Node 4
F	Connect N3_SLIMSAS1 on the Backplane to SLIMSAS1 on the Converter Board for Node 3
G	Connect N2_SLIMSAS1 on the Backplane to SLIMSAS1 on the Converter Board for Node 2
H	Connect N1_SLIMSAS1 on the Backplane to SLIMSAS1 on the Converter Board for Node 1
I	Connect N2_N4_PWR2 on the Backplane to BPPWR1 on the Upper Midplane
J	Connect N1_N3_PWR1 on the Backplane to BPPWR1 on the Lower Midplane
K	Connect SMBUS1 on the Backplane to SMBUS1 on the Upper and Lower Midplanes

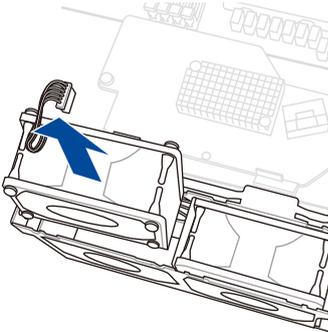
2.8 System fan

To replace a system fan:

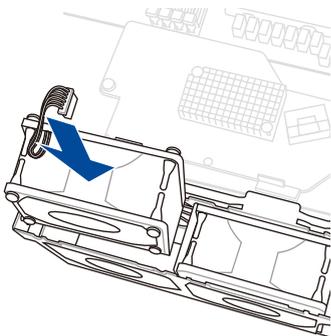
1. Remove the rear chassis cover. For more information, see the **Chassis cover** section.
2. Prepare a replacement fan of the same type and size.
3. Disconnect the system fan cable from the fan connector on the midplane. For more information on the fan connector locations, see the **Backplane and Midplane cabling** section.



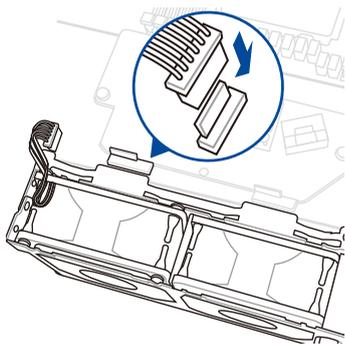
4. Lift the fan, then set it aside.



5. Insert the replacement fan into the fan compartment.



6. Connect the system fan cable to the fan connector on the midplane. For more information on the fan connector locations, see the **Backplane and Midplane cabling** section.

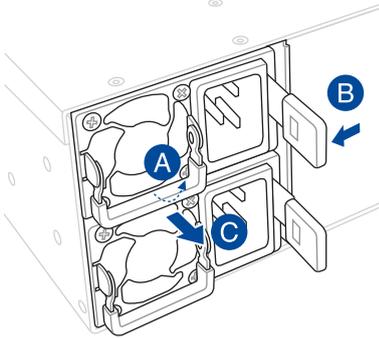


7. Repeat steps 3 to 6 to replace the other system fans.

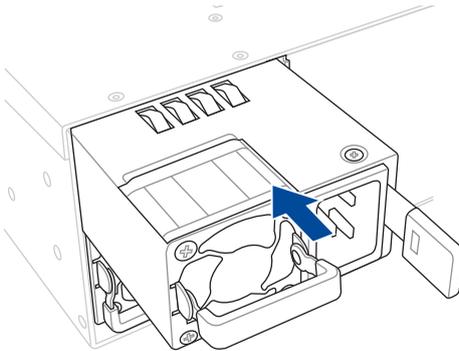
2.9 Power supply module

To replace a power supply unit (PSU):

1. Lift up the PSU lever (A), then press the PSU latch (B) and carefully pull the PSU out of the system chassis using the PSU lever (C) while the PSU latch is still pressed down.



2. Prepare the replacement PSU.
3. Align and insert the replacement PSU into the empty PSU bay until it clicks in place.





-
- The system automatically combines the two power supply modules as a single one. The combined output power varies with input voltages. Refer to the table below for details.

2600W

Input Voltage	Max. Output Power (Watt) per PSU
220-240Vac, 16A, 50/60Hz	2600W
240Vac, 16A, 50/60Hz	

- 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 watt and power rating. Combining PSUs with different wattage (e.g. 1 x 1600 W + 1 x 2200 W) may yield unstable results and potential damage to your system.
 - For steady power input, use only the power cables that come with the server system package.
-

2.10 Motherboard

2.10.1 Removing the motherboard

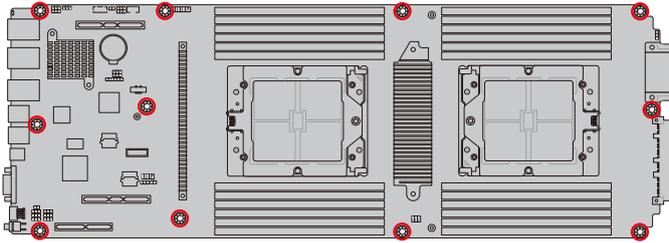
To remove the system motherboard:

1. Disconnect the cables from the motherboard and remove any installed components on the motherboard.



Take a photo or make a note of which components are removed, which cables are disconnected, and which connectors the cables were connected to.

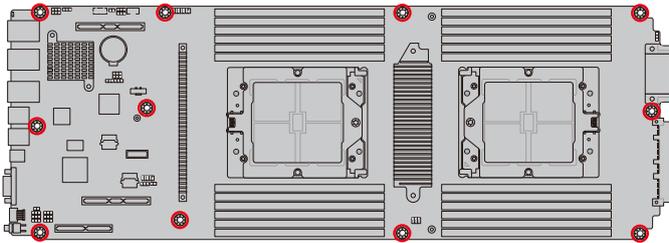
2. Remove the screws, then remove the motherboard.



2.10.2 Installing the motherboard

To install the system motherboard:

1. Place the motherboard into the chassis and ensure the screw holes on the motherboard are aligned with the screw holes in the chassis, then secure the motherboard to the chassis using the screws removed previously.

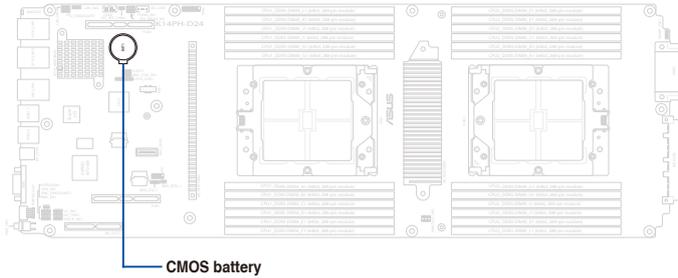


2. Reinstall any removed components and reconnect the cables to the motherboard.

2.11 CMOS battery

To replace a CMOS battery:

1. Locate and remove the CMOS battery.



2. Place the replacement CMOS battery into the battery compartment.

2.12 Rail kit

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



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

Motherboard Information

3

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

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

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

Jumpers		Page
1.	Clear RTC RAM (3-pin CLRTC1)	3-6
2.	BMC setting (3-pin BMC_EN1)	3-7
3.	PMBus 1.2 PSU select jumper (3-pin SMART_PSU1)	3-7
4.	DMLAN setting (3-pin DM_IP_SEL1)	3-8
5.	VGA setting (3-pin VGA_SW1)	3-8
6.	LAN controller settings (3-pin LAN_SW1-2)	3-9
7.	Heatsink type setting (3-pin HS_TYPE1)	3-10
8.	LC_SKU (3-pin LC_SKU)	3-10
9.	PSU_BREAK_EN1 (3-pin PSU_BREAK_EN1)	3-11

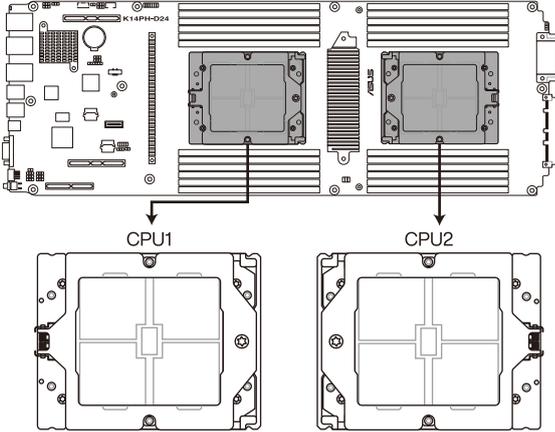
Internal connectors		Page
1.	Trusted Platform Module connector (14-1 pin TPM1)	3-12
2.	Serial port connector (10-1 pin COM1)	3-12
3.	Power connector (PWR1)	3-13
4.	Platform Firmware Resilience (PFR) module connector (ROT_CON)	3-13
5.	Chassis intrusion (2-pin INTRUSION1)	3-14
6.	Leak detection sensor connector (4-pin WL_CON1)	3-14

Internal LEDs		Page
1.	Standby Power LED (SBPWR1)	3-15
2.	BMC Heartbeat LED (BMCLED1)	3-15
3.	BMC Location LED (LOCLED1)	3-16
4.	BMC Message LED (MESLED1)	3-16

3.2 Central Processing Unit (CPU)

The motherboard comes with a surface mount SP5 socket designed for the AMD EPYC™ 9004 series processors.

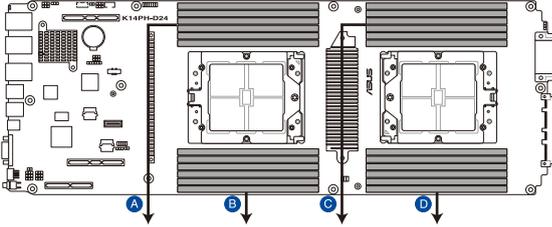
K14PH-D24 CPU Socket SP5 LGA 6096



3.3 Dual Inline Memory Module (DIMM)

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

K14PH-D24 288-pin DDR5 DIMM sockets



- A** CPU1_DIMM_L1
CPU1_DIMM_K1
CPU1_DIMM_J1
CPU1_DIMM_I1
CPU1_DIMM_H1
CPU1_DIMM_G1
- B** CPU1_DIMM_A1
CPU1_DIMM_B1
CPU1_DIMM_C1
CPU1_DIMM_D1
CPU1_DIMM_E1
CPU1_DIMM_F1
- C** CPU2_DIMM_F1
CPU2_DIMM_E1
CPU2_DIMM_D1
CPU2_DIMM_C1
CPU2_DIMM_B1
CPU2_DIMM_A1
- D** CPU2_DIMM_G1
CPU2_DIMM_H1
CPU2_DIMM_I1
CPU2_DIMM_J1
CPU2_DIMM_K1
CPU2_DIMM_L1

3.4 Jumpers

1. Clear RTC RAM (CLRTC1)

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

To erase the RTC RAM:

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

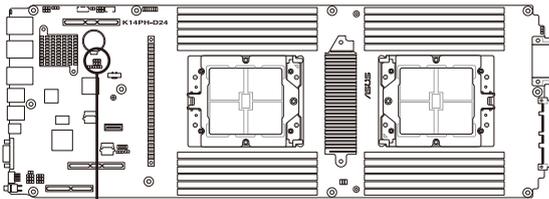


Except when clearing the RTC RAM, never remove the cap on CLRTC1 jumper default position. Removing the cap will cause system boot failure!

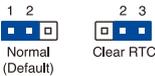


If the steps above do not help, remove the onboard battery and move the jumper again to clear the CMOS RTC RAM data. After the CMOS clearance, reinstall the battery.

K14PH-D24 CLRTC1



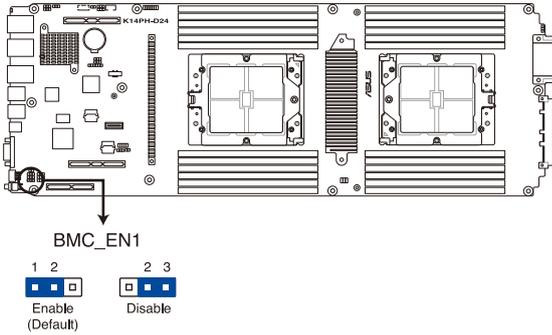
CLRTC1



2. BMC Setting (3-pin BMC_EN1)

This jumper allows you to enable or disable the ASMB11.

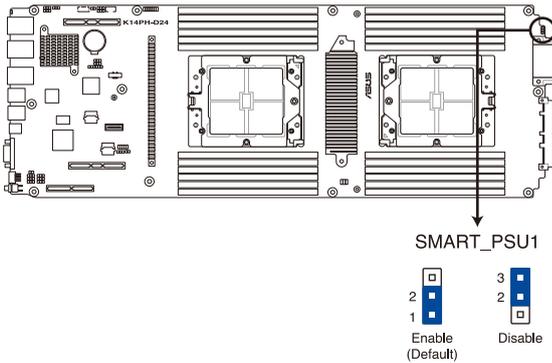
K14PH-D24 BMC_EN1



3. PMBus 1.2 PSU select jumper (3-pin SMART_PSU1)

This jumper allows you to set the motherboard (node) to immediately respond to PSU alert events.

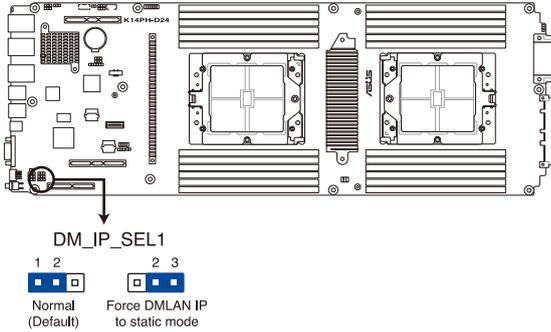
K14PH-D24 SMART_PSU1



4. DMLAN setting (3-pin DM_IP_SEL1)

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

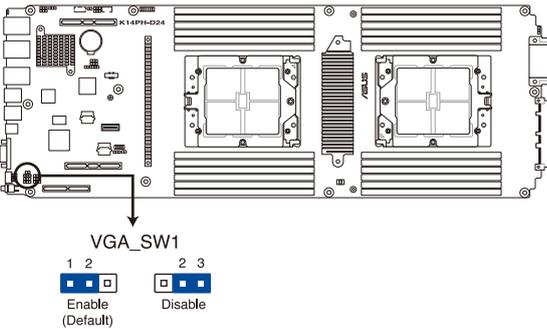
K14PH-D24 DM_IP_SEL1



5. VGA setting (3-pin VGA_SW1)

This jumper allows you to enable or disable the onboard VGA.

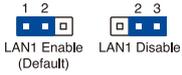
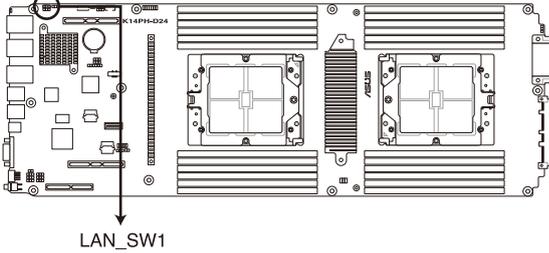
K14PH-D24 VGA_SW1



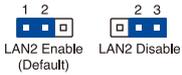
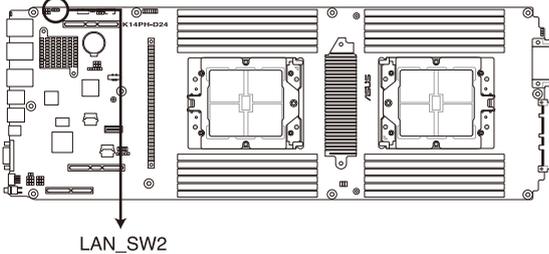
6. LAN Controller settings (3-pin LAN_SW1-2)

These jumpers allow you to enable or disable the onboard LAN1 or LAN2. Set to pins 1-2 to activate the Gigabit LAN feature.

K14PH-D24 LAN_SW1



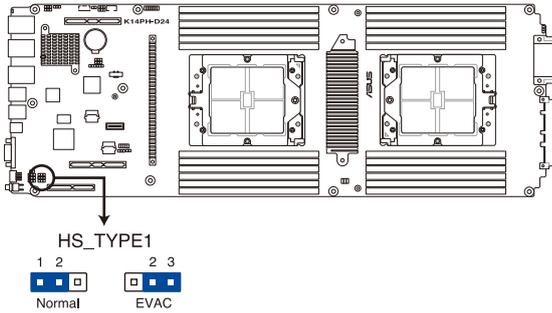
K14PH-D24 LAN_SW2



7. Heatsink Type setting (3-pin HS_TYPE1)

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

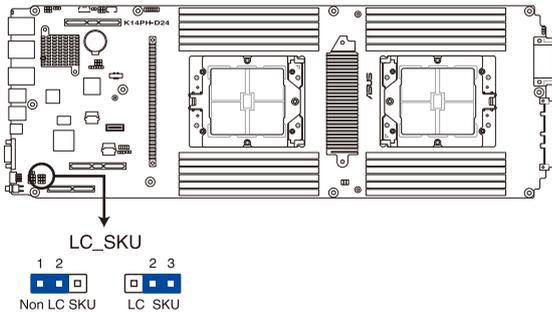
K14PH-D24 HS_TYPE1



8. LC_SKU setting (3-pin LC_SKU)

This jumper should be set according to the type of cooling solution (liquid cooled or air cooled SKU).

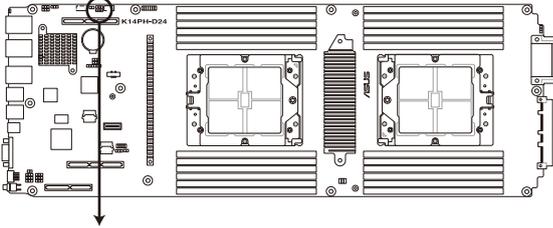
K14PH-D24 LC_SKU



9. **PSU_BREAK_EN1 setting (3-pin PSU_BREAK_EN1)**

This jumper allows you to enable or disable 2+0 plus mode for the installed PSUs.

K14PH-D24 PSU_BREAK_EN1



PSU_BREAK_EN1

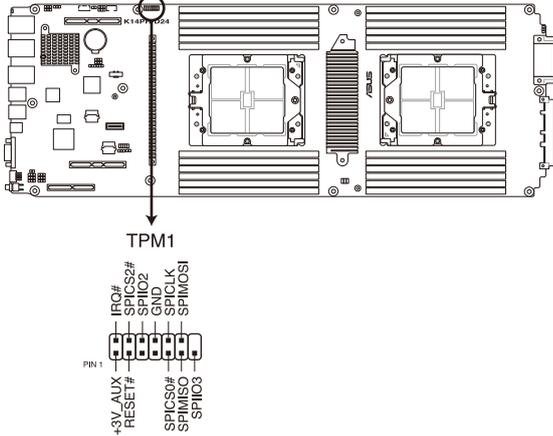
1	2	2	3
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Enable		Disable (Default)	

3.5 Internal connectors

1. Trusted Platform Module connector (14-1 pin TPM1)

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

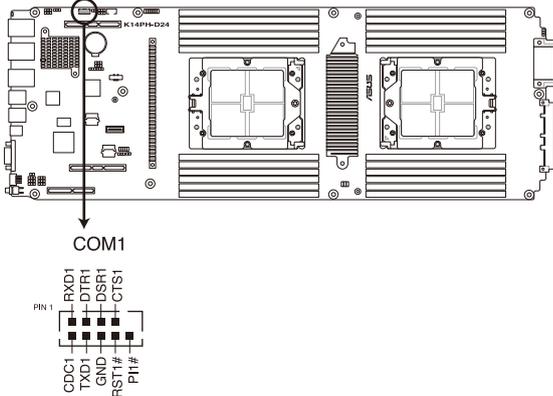
K14PH-D24 TPM1



2. Serial port connector (10-1 pin COM1)

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

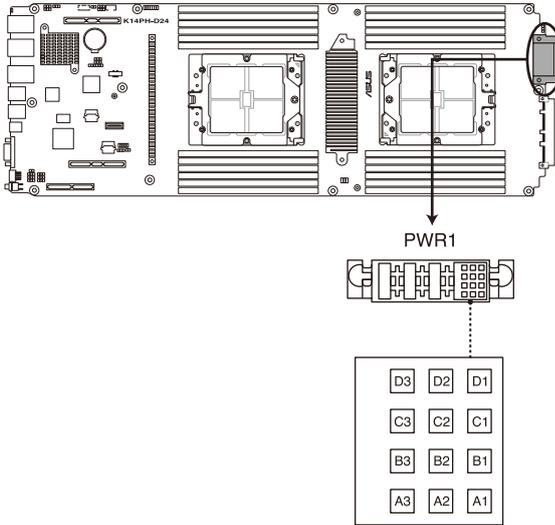
K14PH-D24 COM1



3. Power connector

This power connector connects to the Midplane.

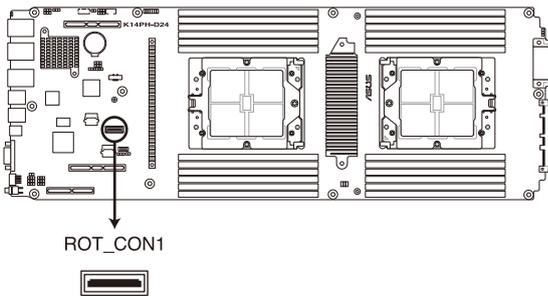
K14PH-D24 PWR1



4. Platform Firmware Resilience (PFR) module connector (ROT_CON)

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

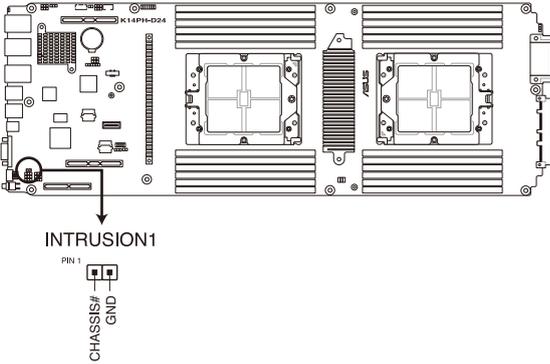
K14PH-D24 ROT_CON1



5. Chassis Intrusion (2-pin INTRUSION1)

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

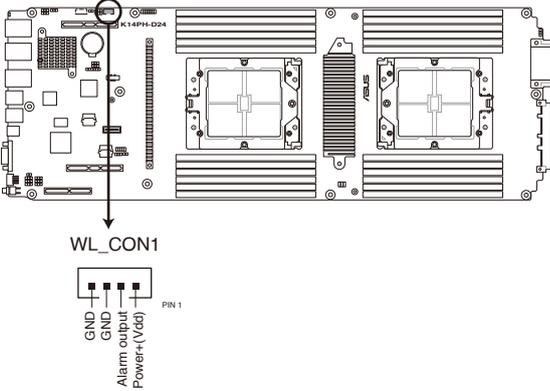
K14PH-D24 INTRUSION1



6. Leak detection sensor connector (4-pin WL_CON1)

This connector allows you to connect a compatible leak detection sensor.

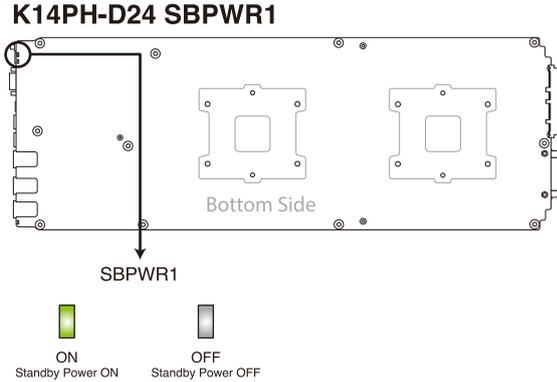
K14PH-D24 WL_CON1



3.6 Internal LEDs

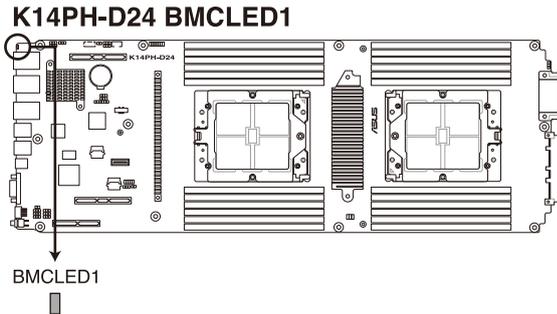
1. Standby Power LED (SBPWR1)

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



2. BMC Heartbeat LED (BMCLED1)

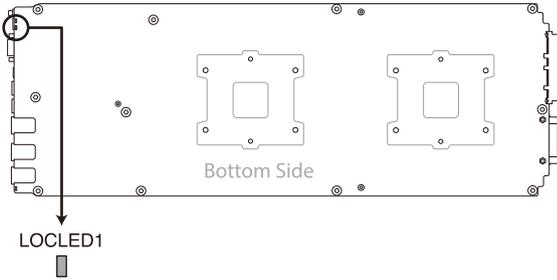
The BMC Heartbeat will blink continuously when BMC is operating normally.



3. BMC Location LED (LOCLED1)

When the locator button is pressed, both the front and rear Location LEDs of the system will light up.

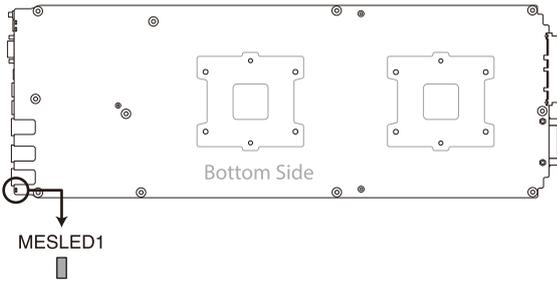
K14PH-D24 LOCLED1



4. BMC Message LED (MESLED1)

When an error occurs, both the front and rear Message LEDs of the system will light up.

K14PH-D24 MESLED1



BIOS Setup

4

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

4.1 Managing and updating your BIOS

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

1. **ASUS CrashFree BIOS 3**

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

2. **ASUS EzFlash**

Updates the BIOS using a USB flash disk.

Refer to the corresponding sections for details on these utilities.

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

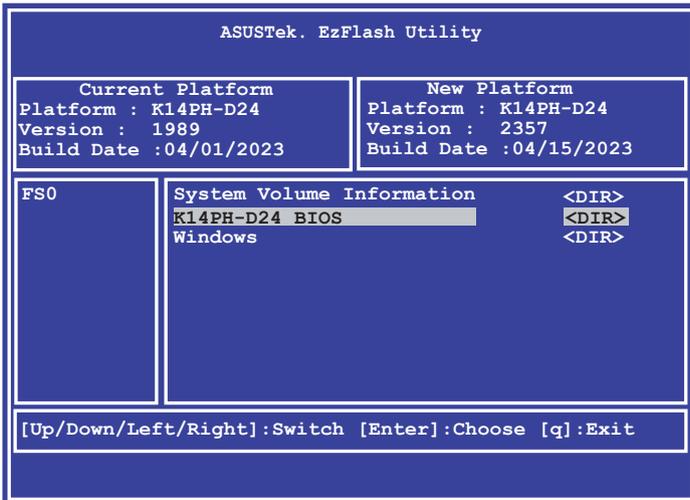
The ASUS EZ Flash Utility feature allows you to update the BIOS without having to use a DOS-based utility.



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>.



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 during the Power-On Self-Test (POST) to enter the Setup utility; otherwise, POST continues with its test routines.

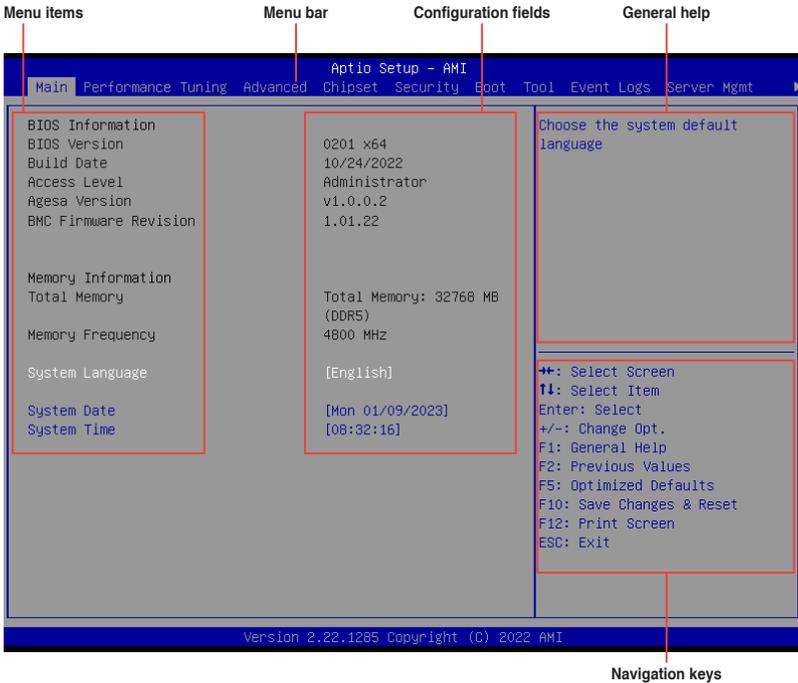
If you wish to enter Setup after POST, restart the system by pressing <Ctrl>+<Alt>+<Delete>, or by pressing the reset button on the system chassis. You can also restart by turning the system off and then back on. Do this last option only if the first two failed.

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



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

4.2.1 BIOS menu screen



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

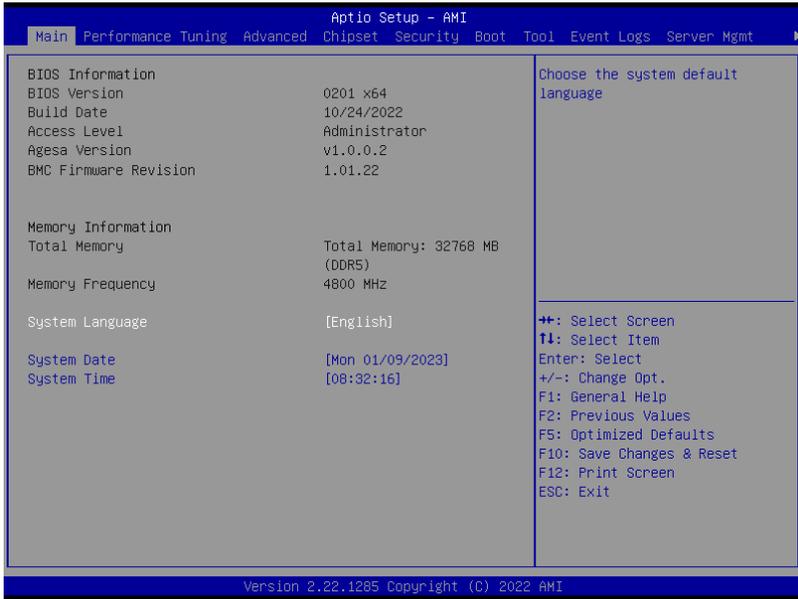
Select a menu item and press <Enter> to display a pop-up window with the configuration options for that item.

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.



System Language

Allows you to set the system language.

System Date [MM/DD/YYYY]

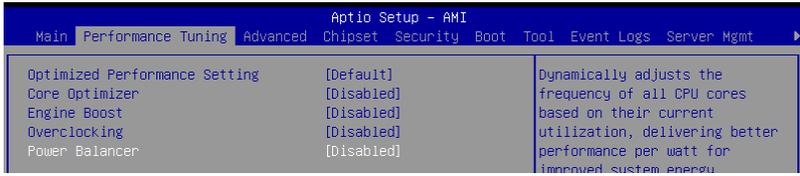
Allows you to set the system date.

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.



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 **Optimized Performance Setting** is set to **[Default]** or **[By Benchmark]**.

Engine Boost [Disabled]

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

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



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

Overclocking [Disabled]

Enable this item to increase the CPU's clock. Please use an external PCIe storage controller for your hard drives when enabling this feature.
Configuration options: [Disabled] [Enabled]



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



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

Power Balancer [Disabled]

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

Configuration options: [Disabled] [Enabled by ACC]



When setting **Power Balancer** to [Enabled by ACC], make sure that you have the latest ASUS Control Center software installed to support Power Balancer. Please see below for recommended software versions:
- **ACC**: 1.4.3.5 version or above.



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

Policy [Auto]

Configuration options: [Auto] [Manual]



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

CPU Max frequency [XXXX]

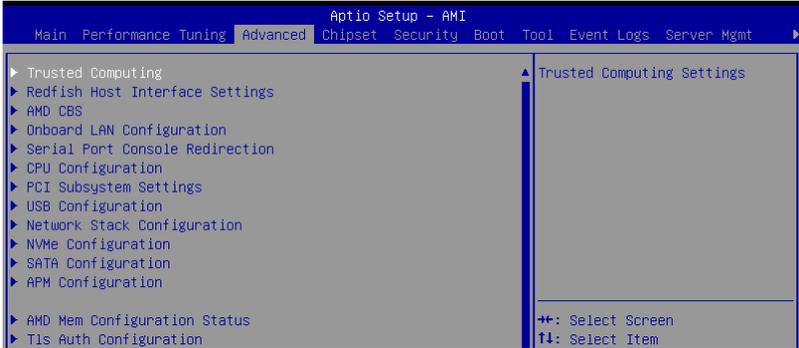
The default value for this option will be the maximum supported frequency of the CPU installed and may vary between different CPUs.

4.5 Advanced menu

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



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



4.5.1 Trusted Computing

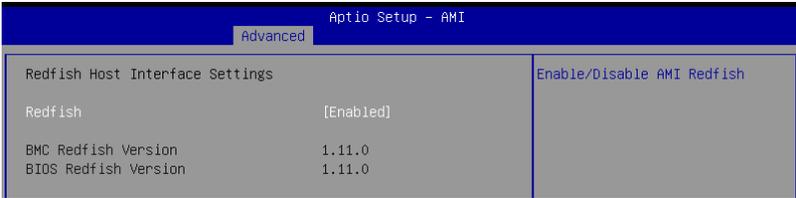


Security Device Support [Enabled]

Allows you to enable or disable the BIOS support for security device.

Configuration options: [Disabled] [Enabled]

4.5.2 Redfish Host Interface Settings



Redfish [Enabled]

Allows you to enable or disable AMI Redfish.
Configuration options: [Disabled] [Enabled]



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

Authentication Mode [Basic Authentication]

Configuration options: [Basic Authentication] [Session Authentication]

IP Address

Allows you to set the IP address

IP Mask Address

Allows you to set the IP mask address

IP Port

Allows you to set the IP port

4.5.3 AMD CBS



CPU Common Options

Performance

Allows you to configure performance options.

REP-MOV/STOS Streaming [Enabled]

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

Configuration options: [Disabled] [Enabled]

Prefetcher Settings

Allows you to configure prefetcher options.

Core Watchdog

Allows you to configure core watchdog options.

RedirectForReturnDis [Auto]

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

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

Platform First Error Handling [Auto]

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

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

Core Performance Boost [Auto]

Configuration options: [Disabled] [Auto]

Global C-State Control [Auto]

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

Power Supply Idle Control [Auto]

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

SEV-ES ASID Space Limit [1]

Allows you to set the SEV-ES ASID Space Limit.

SEV Control [Enabled]

Configuration options: [Disabled] [Enabled]

Streaming Stores Control [Auto]

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

Local APIC Mode [Auto]

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

ACPI _CST C1 Declaration [Auto]

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

ACPI CST C2 Latency [800]

Allows you to set the ACPI CST C2 Latency in microseconds.

MCA Error Threshold Enable [Auto]

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

MCA FruText [True]

Configuration options: [False] [True]

SMU and PSP Debug Mode [Auto]

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

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

PPIN Opt-in [Auto]

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

SNP Memory (RMP Table) Coverage [Auto]

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



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

Amount of Memory to Cover [10]

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

SMEE [Auto]

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

Action on BIST Failure [Auto]

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

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

Enhanced REP MOVSB/STOSB (ESRM) [Auto]

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

Log Transparent Errors [Auto]

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

AVX512 [Auto]

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

MONITOR and MWAIT Disable [Auto]

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

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

Small Hammer Configuration [Auto]

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

Corrector Branch Predictor [Disabled]

Configuration options: [Disabled] [Enabled]

PAUSE Delay [Auto]

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

CPU Speculative Store Modes [Auto]

Configuration options: [Balanced] [More Speculative] [Less Speculative] [Auto]

DF Common Options

Memory Addressing

Allows you to configure memory addressing options.

ACPI

Allows you to configure ACPI options.

Link

Allows you to configure Link options.

SDCI

Allows you to configure SDCI options.

Probe Filter

Allows you to configure Probe Filter options.

DF Watchdog Timer Interval [Auto]

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

Disable DF to external IP Sync Flood Propagation [Auto]

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

Sync Flood Propagation to DF Components [Auto]

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

Freeze DF Module Queues on Error [Auto]

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

CC6 Memory Region Encryption [Auto]

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

CC6 B/W Balance Throttle Level [Auto]

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

UMC Common Options

DDR Addressing Options

Allows you to configure DDR addressing options.

DDR Controller Configuration

Allows you to configure DDR controller options.

DDR MBIST Options

Allows you to configure DDR MBIST options.

DDR RAS

Allows you to configure DDR RAS options.

DDR Bus Configuration

Allows you to configure DDR Bus options.

DDR Timing Configuration

Allows you to configure DDR Timing options.

DDR Training Options

Allows you to configure DDR Training options.

DDR Security

Allows you to configure DDR Security options.

DDR PMIC Configuration

Allows you to configure DDR PMIC options.

DDR Miscellaneous

Allows you to configure DDR Miscellaneous options.

DDR PHY (CMN)

Allows you to configure DDR PHY (CMN) options.

NBIO Common Options

IOMMU [Auto]

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

DMAr Support [Auto]

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

DMA Protection [Auto]

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

DRTM Virtual Device Support [Auto]

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

DRTM Memory Reservation [Auto]

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

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

ACS Enable [Auto]

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

PCIe ARI Support [Auto]

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

PCIe ARI Enumeration [Auto]

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

PCIe Ten Bit Tag Support [Auto]

Allows you to enable PCIe ten bit tags for supported devices. Support is disabled if this option is enabled.

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

SMU Common Options

Allows you to configure SMU Common options.

NBIO RAS Common Options

Allows you to configure NBIO RAS Common options.

Enable AER Cap [Auto]

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

Early Link Speed [Auto]

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

Hot Plug Handling Mode [Auto]

Configuration options: [OS First] [Firmware First] [System Firmware Intermediary] [Auto]

Hot Plug Allow FF in Synchronous [Disabled]

Configuration options: [Disabled] [Enabled]

Presence Detect Select Mode [Auto]

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

Data Link Feature Cap [Auto]

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

CV Test [Auto]

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

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

SEV-SNP Support [Disabled]

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

Allow Compliance [Auto]

Allows you to enable or disable PCIe RP entering the polling compliance state.

SRIS [Auto]

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

Multi Upstream Auto Speed Change [Auto]

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

Multi Auto Speed Change on Last Rate [Auto]

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

PCIe Link Speed Capability [Gen5]

Configuration options: [Maximum speed] [Gen1] [Gen2] [Gen3] [Gen4] [Gen5] [Auto]

RTM Margining Support [Auto]

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

EQ Bypass to Highest Rate [Auto]

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

nBif Common Options

Allows you to configure nBif Common options.

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

Allows you to configure I3C/I2C options.

SATA Configuration Options

Allows you to configure SATA options.

USB Configuration Options

Allows you to configure USB options.

AC Power Loss Options

Allows you to configure AC power loss options.

UART Configuration Options

Allows you to configure UART options.

ESPI Configuration Options

Allows you to configure ESPI options.

FCH RAS Options

Allows you to configure FCH RAS options.

Miscellaneous Options

Allows you to configure miscellaneous FCH options.

NTB Common Options

Socket-0 P0/Socket-0 P2/Socket-0 G0/Socket-0 G2

NTB Enable [Auto]

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



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

Start Lane

Allows you to set the NTB start lane.

End Lane

Allows you to set the NTB end lane.

Link Speed [Auto]

Allows you to set the NTB Link Speed

Configuration options: [Gen1] [Gen2] [Gen3] [Gen4] [Gen5] [Auto]

SOC Miscellaneous Control

ABL Console Out Control [Auto]

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



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

ABL Console Out Serial Port [Auto]

Configuration options: [eSPI UART] [SOC UART0] [SOC UART1] [Auto]

ABL Console Out Serial Port IO [Auto]

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

ABL Basic Console Out Control [Auto]

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

ABL PMU Message Control [Auto]

Allows you to control the number of PMU debug messages.

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

ABL Memory Population Message Control [Warning Message]

Configuration options: [Warning Message] [Fatal Error]

PSP Error Injection Support [False]

Configuration options: [False] [True]

Firmware Anti-rollback (FAR)

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

Workload Tuning

Workload Profile [Auto]

Allows you to set the workload profile.

Configuration options: [Disabled] [CPU Intensive] [Java Throughput] [Java Latency] [Power Efficiency] [Memory Throughput Intensive] [Storage IO Intensive] [NIC Throughput Intensive] [NIC Latency Sensitive] [Accelerator Throughput] [VMware vSphere Optimized] [Linux KVM Optimized] [Container Optimized] [RDBMS Optimized] [Big Data Analytics Optimized] [IOT Gateway] [HPC Optimized] [OpenStack NFV] [OpenStack for RealTime Kernel] [Auto]

Performance Tracing [Auto]

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

CXL Common Options

CXL Control [Auto]

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

CXL SPM [Auto]

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

CXL Encryption [Disabled]

Configuration options: [Disabled] [Enabled]

Temp Gen5 Advertisement [Auto]

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

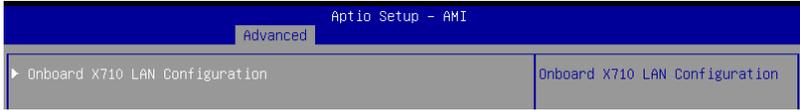
Sync Header Bypass [Auto]

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

CXL RAS

Allows you configure CXL RAS options.

4.5.4 Onboard LAN Configuration

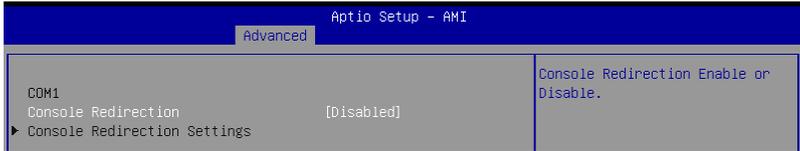


Onboard X710 LAN Configuration

LAN Enable [LAN1, LAN2 Enabled]

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

4.5.5 Serial Port Console Redirection



COM1/COM2

Console Redirection [Disabled]

Allows you to enable or disable the console redirection feature.

Configuration options: [Disabled] [Enabled]



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

Terminal Type [ANSI]

Allows you to set the terminal type.

- | | |
|-------------|---|
| [VT100] | ASCII char set. |
| [VT100Plus] | Extends VT100 to support color, function keys, etc. |
| [VT-UTF8] | Uses UTF8 encoding to map Unicode chars onto 1 or more bytes. |
| [ANSI] | Extended ASCII char set. |

Bits per second [115200]

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

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

Data Bits [8]

Configuration options: [7] [8]

Parity [None]

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

[None] None

[Even] parity bit is 0 if the num of 1's in the data bits is even

[Odd] parity bit is 0 if num of 1's in the data bits is odd

[Mark] parity bit is always 1

[Space] parity bit is always 0

Stop Bits [1]

Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning.) The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.

Configuration options: [1] [2]

Flow Control [None]

Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a "stop" signal can be sent to stop the data flow. Once the buffers are empty, a "start" signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.

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

VT-UTF8 Combo Key Support [Enabled]

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

Configuration options: [Disabled] [Enabled]

Recorder Mode [Disabled]

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

Configuration options: [Disabled] [Enabled]

Resolution 100x31 [Enabled]

This allows you to set the number of rows and columns supported on the Legacy OS.

Configuration options: [Disabled] [Enabled]

Putty Keypad [VT100]

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

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

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

Console Redirection EMS [Disabled]

Allows you to enable or disable the console redirection feature.

Configuration options: [Disabled] [Enabled]



The following items appear 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]

Terminal Type EMS [VT-UTF8]

Microsoft Windows Emergency Management Services (EMS) allow for remote management of a Windows Server OS through a serial port.

Configuration options: [VT100] [VT100Plus] [VT-UTF8] [ANSI]

Bits per second EMS [115200]

Microsoft Windows Emergency Management Services (EMS) allow for remote management of a Windows Server OS through a serial port.

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

Flow Control EMS [None]

Microsoft Windows Emergency Management Services (EMS) allow for remote management of a Windows Server OS through a serial port.

Configuration options: [None] [Hardware RTS/CTS] [Software Xon/Xoff]

4.5.6 CPU Configuration



SVM Mode [Enable]

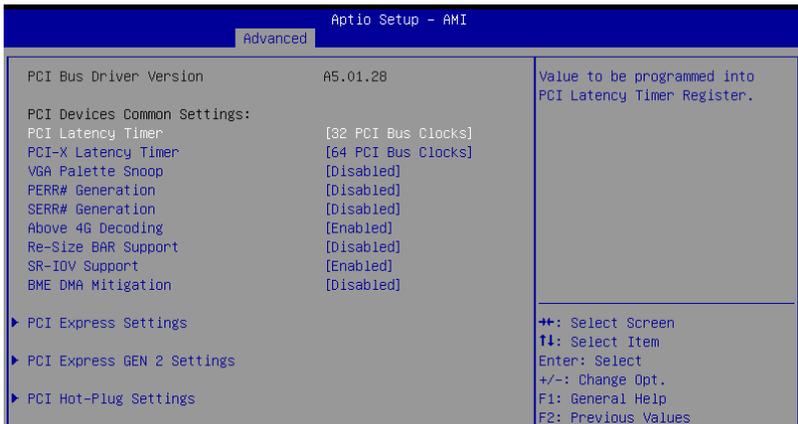
This item allows you enable or disable CPU Virtualization.

Configuration options: [Disabled] [Enable]

Node Information

This item allows you to view memory information related to the selected node.

4.5.7 PCI Subsystem Settings



PCI Latency Timer [32 PCI Bus Clocks]

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

PCI-X Latency Timer [64 PCI Bus Clocks]

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

VGA Palette Snoop [Disabled]

Configuration options: [Disabled] [Enabled]

PERR# Generation [Disabled]

Configuration options: [Disabled] [Enabled]

SERR# Generation [Disabled]

Configuration options: [Disabled] [Enabled]

Above 4G Decoding [Enabled]

Configuration options: [Disabled] [Enabled]

Re-Size BAR Support [Disabled]

Configuration options: [Disabled] [Auto]

SR-IOV Support [Enabled]

Configuration options: [Disabled] [Enabled]

BME DMA Mitigation [Disabled]

Configuration options: [Disabled] [Enabled]

PCI Express Settings

Allows you to configure PCI Express options.

PCI Express GEN 2 Settings

Allows you to configure PCI Express GEN 2 options.

PCI Hot-Plug Settings

Allows you to configure PCI Hot-Plug options.

4.5.8 USB Configuration

Advanced		Aptio Setup - AMI	
USB Configuration		[Enabled]: Enables the Legacy USB support.	
USB Module Version	29	[Auto]: Automatically disables the Legacy USB support if USB devices are not connected.	
USB Controllers: 2 XHCIs		[Disabled]: USB devices are available only for EFI applications.	
USB Devices: 3 Drives, 2 Keyboards, 2 Mice, 1 Hub			
Legacy USB Support	[Enabled]		
XHCI Hand-off	[Enabled]		
USB Mass Storage Driver Support	[Enabled]		
USB Keyboard and Mouse Simulator	[Enabled]		
USB hardware delays and time-outs:			
USB transfer time-out	[20 sec]	++: Select Screen	
Device reset time-out	[20 sec]	↑↓: Select Item	
Device power-up delay	[Auto]	Enter: Select	
Mass Storage Devices:		+/-: Change Opt.	
JetFlashTranscend 4GB 8.07	[Auto]	F1: General Help	
AMI Virtual CDROM 1.00	[Auto]	F2: Previous Values	
AMI Virtual HDisk0 1.00	[Auto]	F5: Optimized Defaults	
		F10: Save Changes & Reset	
		F12: Print Screen	
		ESC: Exit	

Legacy USB Support [Enabled]

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

XHCI Hand-off [Enabled]

Configuration options: [Enabled] [Disabled]

USB Mass Storage Driver Support [Enabled]

Configuration options: [Disabled] [Enabled]

USB Keyboard and Mouse Simulator [Enabled]

Configuration options: [Disabled] [Enabled]

USB Transfer Time-out [20 sec]

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

Device Reset Time-out [20 sec]

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

Device Power-up Delay [Auto]

Configuration options: [Auto] [Manual]

Mass Storage Devices

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

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

4.5.9 Network Stack Configuration

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

Network Stack [Enabled]

Configuration options: [Disabled] [Enabled]



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

IPv4 PXE Support [Disabled]

Configuration options: [Disabled] [Enabled]

IPv4 HTTP Support [Disabled]

Configuration options: [Disabled] [Enabled]

IPv6 PXE Support [Disabled]

Configuration options: [Disabled] [Enabled]

IPv6 HTTP Support [Disabled]

Configuration options: [Disabled] [Enabled]

PXE boot wait time [0]

Wait time to press ESC key to abort the PXE boot.

Media detect count [1]

Wait time (in seconds) to detect media.

4.5.10 NVMe Configuration

This page will display the NVMe controller and drive information.

Aptio Setup - AMI	
Advanced	
NVMe Configuration	
No NVMe Device Found	

4.5.11 APM Configuration

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

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

Restore AC Power Loss [Last State]

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

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

Power On By PCI-E [Disabled]

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

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

Power On By RTC [Disabled]

[Disabled] Disables RTC to generate a wake event.

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

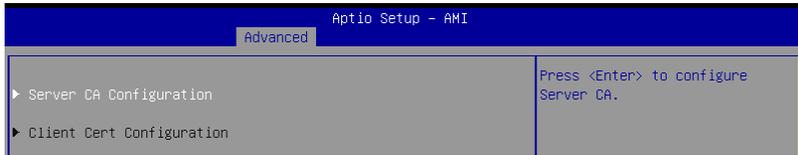
4.5.12 AMD Mem Configuration Status

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

Aptio Setup - AMI		
Advanced		
▶ Socket 0		
▶ Socket 1		Socket-specific memory configuration status
Mbist Test Enable	Disabled, 0xC000	
Mbist Aggressor Enable	Disabled, 0xC000	
Mbist Per Bit Slave Die Report	0x00FF, 0xC000	
Dram Temp Controlled Refresh Enable	Disabled, 0xC001	
User Timing Mode	Disabled, 0x0000	
User Timing Value	Disabled, 0x0000	
Mem Bus Freq Limit	Disabled, 0x0000	
Enable Power Down	Disabled, 0xC000	
Dram Double Refresh Rate	Disabled, 0x0000	

4.5.13 T1s Auth

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



Server / Client CA Configuration

Enroll Cert

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

Enroll Cert Using File

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

Cert GUID

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

Commit Changes and Exit

Exit Server CA configuration after saving the changes.

Discard Changes and Exit

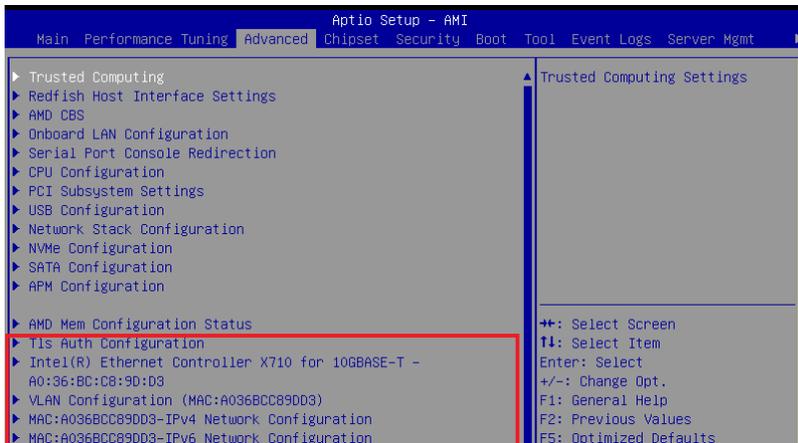
Exit Server CA configuration without saving any changes.

Delete Cert

Allows you to delete the certificate.

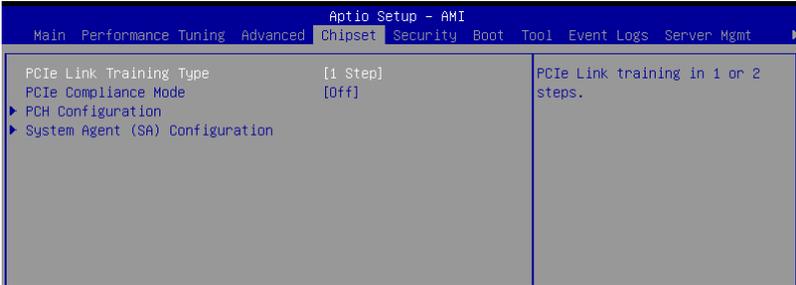
4.5.14 Third-party UEFI driver configurations

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



4.6 Chipset menu

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



PCIe Link Training Type [1 Step]

This item allows you to select PCIe Link Training in 1 or 2 steps.

Configuration options: [1 Step] [2 Step]

PCIe Compliance Mode [Off]

This item allows you to turn the PCIe Compliance Mode on or off.

Configuration options: [Off] [On]

PCH Configuration

SB Debug Configuration

Allows you to configure SB Debug options.

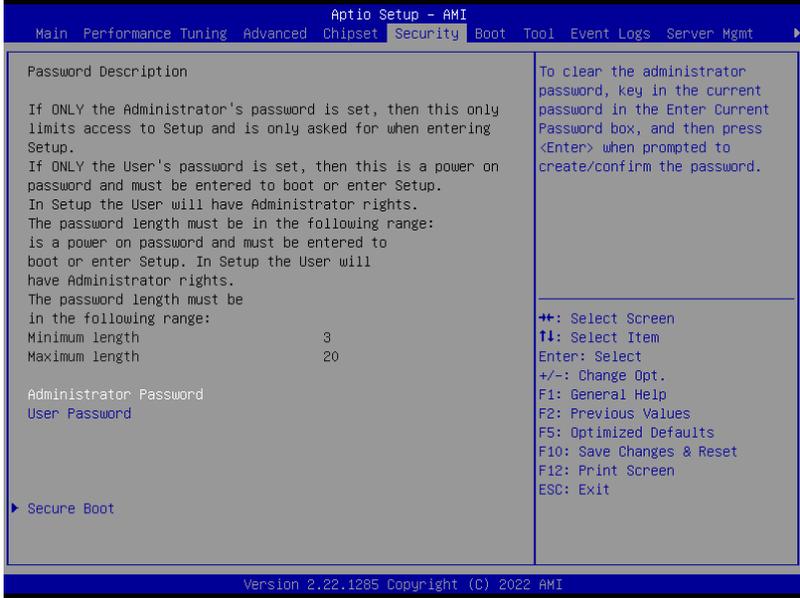
System Agent (SA) Configuration

Socket Information

This item displays the memory information for the selected socket.

4.7 Security menu

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



Administrator Password

To set an administrator password:

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

To change an administrator password:

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



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

User Password

To set a user password:

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

To change a user password:

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



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

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

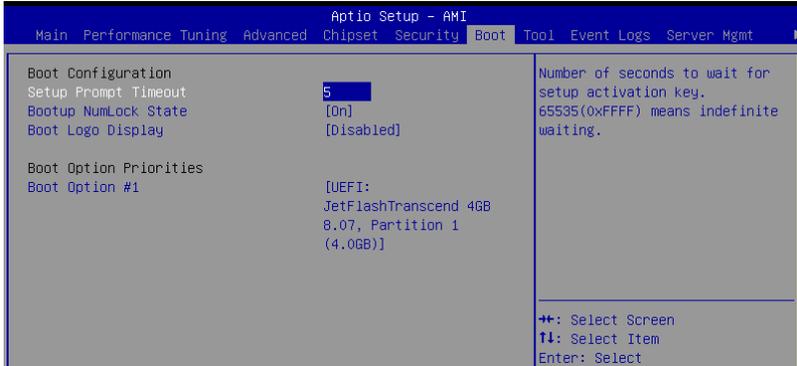
Allows you to delete all previously applied secure boot keys.

Key Management

Allows you to configure Key Management options.

4.8 Boot menu

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



Setup Prompt Timeout [5]

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

Bootup NumLock State [On]

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

Boot Logo Display [Disabled]

Allows you to enable or disable Quiet Boot option.
Configuration options: [Disabled] [Enabled]

Boot Option Priorities

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



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

POST Report [5 sec]

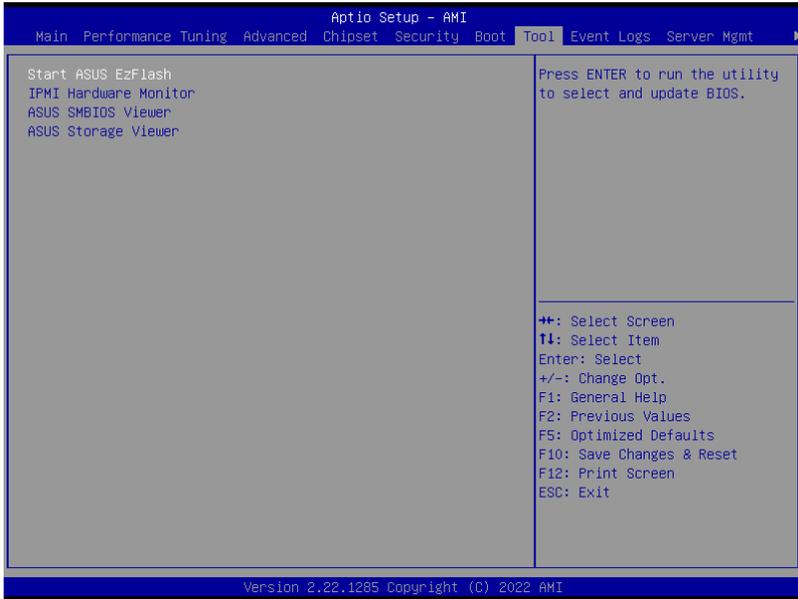
Allows you to set the desired POST Report waiting time from 1 to 10 seconds.
Configuration options: [1 sec] - [10 sec] [Until Press ESC]

Hard Drive BBS Priorities

These items appear only when you connect a network cable or SATA ODD to the SATA port, and allows you to set the booting order of the Network / SATA devices.

4.9 Tool menu

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



Start ASUS EzFlash

Allows you to run ASUS EZ Flash BIOS ROM Utility. Refer to the ASUS EZ Flash Utility section for details.

IPMI Hardware Monitor

Allows you to run the IPMI hardware monitor.

ASUS SMBIOS Viewer

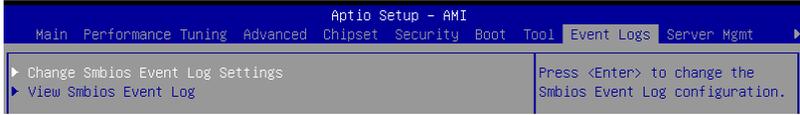
Allows you to run ASUS SMBIOS Viewer.

ASUS Storage Viewer

Allows you to run ASUS Storage Viewer.

4.10 Event Logs menu

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



4.10.1 Change Smbios Event Log Settings

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



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

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]

4.10.2 View Smbios Event Log

Press <Enter> to view all smbios event logs.

4.11 Server Mgmt menu

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



OS Watchdog Timer [Disabled]

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 how the system should respond if the OS Boot Watchdog Timer expires.

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

4.11.1 System Event Log

Allows you to change the SEL event log configuration.

Erase SEL [No]

Allows you to choose options for erasing SEL.

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

4.11.2 BMC network configuration

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

DM_LAN/Shared LAN

Configuration Address source [Previous State]

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

IPv6 Support [Enabled]

Configuration options: [Enabled] [Disabled]



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

Configuration Address source [Previous State]

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

Configuration Router Lan1/Lan2 Address source [Previous State]

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

VLAN Support [Previous State]

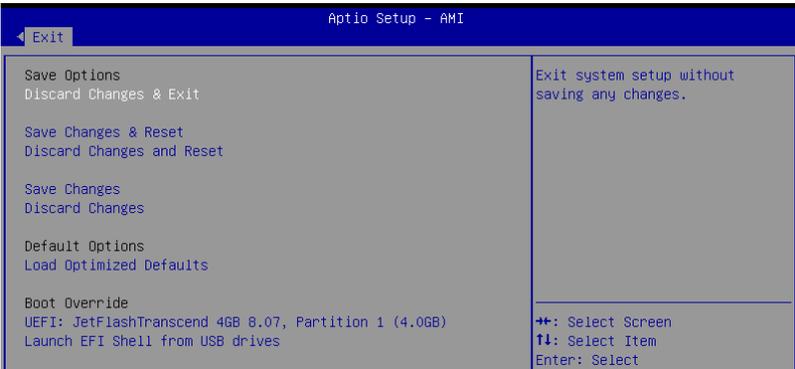
Configuration options: [Previous State] [Enabled] [Disabled]

4.11.3 View System Event Log

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

4.12 Exit menu

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



Discard Changes and Exit

Exit system setup without saving any changes.

Save Changes and Reset

Reset the 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.

Launch EFI Shell from filesystem device

This item allows you to attempt to launch the EFI Shell application (shellx64.efi) from one of the available filesystem devices.

Driver Installation

5

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

5.1 Running the Support DVD

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



The contents of the support DVD are subject to change at any time without notice. Visit the ASUS website (www.asus.com) 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

Q-Code table

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

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

(continued on the next page)

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

(continued on the next page)

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

(continued on the next page)

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

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://esg.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://esg.asus.com/Compliance.htm>.

EU RoHS

This product complies with the EU RoHS Directive. For more details, see <https://esg.asus.com/Compliance.htm>

Japan JIS-C-0950 Material Declarations

Information on Japan RoHS (JIS-C-0950) chemical disclosures is available on <https://esg.asus.com/Compliance.htm>

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 năm 2011 trở về sau, đều phải đáp ứng các yêu cầu của Thông tư 30/2011/TT-BCT của Việt Nam.

Türkiye RoHS

AEEEE 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://esg.asus.com/en/Takeback.htm> for detailed recycling information in different regions.

Ecodesign Directive

The 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 at <https://esg.asus.com/Compliance.htm>.

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。

Simplified EU Declaration of Conformity

English ASUSTeK Computer Inc. hereby declares that this device is in compliance with the essential requirements and other relevant provisions of related Directives. Full text of EU declaration of conformity is available at: www.asus.com/support

Français AsusTek Computer Inc. déclare par la présente que cet appareil est conforme aux critères essentiels et autres clauses pertinentes des directives concernées. La déclaration de conformité de l'UE peut être téléchargée à partir du site Internet suivant : www.asus.com/support

Deutsch ASUSTeK Computer Inc. erklärt hiermit, dass dieses Gerät mit den wesentlichen Anforderungen und anderen relevanten Bestimmungen der zugehörigen Richtlinien übereinstimmt. Der gesamte Text der EU-Konformitätserklärung ist verfügbar unter: www.asus.com/support

Italiano ASUSTeK Computer Inc. con la presente dichiara che questo dispositivo è conforme ai requisiti essenziali e alle altre disposizioni pertinenti con le direttive correlate. Il testo completo della dichiarazione di conformità UE è disponibile all'indirizzo: www.asus.com/support

Русский Компания ASUS заявляет, что это устройство соответствует основным требованиям и другим соответствующим условиям соответствующих директив. Подробную информацию, пожалуйста, смотрите на www.asus.com/support

Български С настоящото ASUSTeK Computer Inc. декларира, че това устройство е в съответствие със съществените изисквания и другите приложими постановления на свързаните директиви. Пълният текст на декларацията за съответствие на ЕС е достъпна на адрес: www.asus.com/support

Hrvatski ASUSTeK Computer Inc. ovim izjavljuje da je ovaj uređaj sukladan s bitnim zahtjevima i ostalim odgovarajućim odredbama vezanih direktiva. Cijeli tekst EU izjave o sukladnosti dostupan je na: www.asus.com/support

Čestina Společnost ASUSTEK Computer Inc. tímto prohlašuje, že toto zařízení splňuje základní požadavky a další příslušná ustanovení souvisejících směrnic. Plné znění prohlášení o shodě EU je k dispozici na adrese: www.asus.com/support

Dansk ASUSTeK Computer Inc. erklærer hermed, at denne enhed er i overensstemmelse med hovedkravene og andre relevante bestemmelser i de relaterede direktiver. Hele EU-overensstemmelseserklæringen kan findes på: www.asus.com/support

Nederlands ASUSTeK Computer Inc. verklaart hierbij dat dit apparaat voldoet aan de essentiële vereisten en andere relevante bepalingen van de verwante richtlijnen. De volledige tekst van de EU-verklaring van conformiteit is beschikbaar op: www.asus.com/support

Eesti Käesolevaga kinnitab ASUSTeK Computer Inc, et see seade vastab asjakohaste direktiivide olulistele nõuetele ja teistele asjassepuutuvatele sätetele. EL vastavusdeklaratsiooni täielik tekst on saadaval järgmisel aadressil: www.asus.com/support

Suomi ASUSTeK Computer Inc. ilmoittaa täten, että tämä laite on asiaankuuluvien direktiivien olennaisten vaatimusten ja muiden tätä koskevien säädösten mukainen. EU-yhdenmukaisuusilmoituksen koko teksti on luettavissa osoitteessa: www.asus.com/support

Ελληνικά Με το παρόν, η AsusTek Computer Inc. δηλώνει ότι αυτή η συσκευή συμμορφώνεται με τις θεμελιώδεις απαιτήσεις και άλλες σχετικές διατάξεις των Οδηγιών της ΕΕ. Το πλήρες κείμενο της δήλωσης συμβατότητας είναι διαθέσιμο στη διεύθυνση: www.asus.com/support

Magyar Az ASUSTeK Computer Inc. ezennel kijelenti, hogy ez az eszköz megfelel a kapcsolódó Irányelvek lényeges követelményeinek és egyéb vonatkozó rendelkezéseinek. Az EU megfeleléségi nyilatkozat teljes szövege innen letölthető: www.asus.com/support

Latviski ASUSTeK Computer Inc. ar šo paziņo, ka šī ierīce atbilst saistīto Direktīvu būtiskajām prasībām un citiem citiem saistošajiem nosacījumiem. Pilns ES atbilstības paziņojuma teksts pieejams šeit: www.asus.com/support

Lietuvių „ASUSTeK Computer Inc.“ šiuo tvirtina, kad šis įrenginys atitinka pagrindinius reikalavimus ir kitas svarbias susijusių direktyvų nuostatas. Visą ES atitikties deklaracijos tekstą galima rasti: www.asus.com/support

Norsk ASUSTeK Computer Inc. erklærer herved at denne enheten er i samsvar med hovedsaklige krav og andre relevante forskrifter i relaterte direktiver. Fullstendig tekst for EU-samsvarserklæringen finnes på: www.asus.com/support

Polski Firma ASUSTeK Computer Inc. niniejszym oświadcza, że urządzenie to jest zgodne z zasadniczymi wymogami i innymi właściwymi postanowieniami powiązanych dyrektyw. Pełny tekst deklaracji zgodności UE jest dostępny pod adresem: www.asus.com/support

Português A ASUSTeK Computer Inc. declara que este dispositivo está em conformidade com os requisitos essenciais e outras disposições relevantes das Diretivas relacionadas. Texto integral da declaração da UE disponível em: www.asus.com/support

Română ASUSTeK Computer Inc. declară că acest dispozitiv se conformează cerințelor esențiale și altor prevederi relevante ale directivelor conexe. Textul complet al declarației de conformitate a Uniunii Europene se găsește la: www.asus.com/support

Srpski ASUSTeK Computer Inc. ovim izjavljuje da je ovaj uređaj u saglasnosti sa osnovnim zahtevima i drugim relevantnim odredbama povezanih Direktiva. Pun tekst EU deklaracije o usaglašenosti je dostupan da adresi: www.asus.com/support

Slovensky Spoločnosť ASUSTeK Computer Inc. týmto vyhlasuje, že toto zariadenie vyhovuje základným požiadavkám a ostatým príslušným ustanoveniam príslušných smerníc. Celý text vyhlásenia o zhode pre štáty EÚ je dostupný na adrese: www.asus.com/support

Slovenščina ASUSTeK Computer Inc. izjavlja, da je ta naprava skladna z bistvenimi zahtevami in drugimi ustreznimi določbami povezanih direktiv. Celotno besedilo EU-izjave o skladnosti je na voljo na spletnem mestu: www.asus.com/support

Español Por la presente, ASUSTeK Computer Inc. declara que este dispositivo cumple los requisitos básicos y otras disposiciones pertinentes de las directivas relacionadas. El texto completo de la declaración de la UE de conformidad está disponible en: www.asus.com/support

Svenska ASUSTeK Computer Inc. förklarar härmed att denna enhet överensstämmer med de grundläggande kraven och andra relevanta föreskrifter i relaterade direktiv. Fulltext av EU-försäkran om överensstämmelse finns på: www.asus.com/support

Українська ASUSTeK Computer Inc. заявляє, що цей пристрій відповідає основним вимогам та іншим відповідним положенням відповідних Директив. Повний текст декларації відповідності стандартам ЄС доступний на: www.asus.com/support

Türkçe AsusTek Computer Inc., bu aygıtın temel gereksinimlerle ve ilişkili Yönergelerin diğer ilgili koşullarıyla uyumlu olduğunu beyan eder. AB uygunluk bildiriminin tam metni şu adreste bulunabilir: www.asus.com/support

Bosanski ASUSTeK Computer Inc. ovim izjavljuje da je ovaj uređaj usklađen sa bitnim zahtjevima i ostalim odgovarajućim odredbama vezanih direktiva. Cijeli tekst EU izjave o usklađenosti dostupan je na: www.asus.com/support

Simplified UKCA Declaration of Conformity

ASUSTeK Computer Inc. hereby declares that this device is in compliance with the essential requirements and other relevant provisions of related Regulations. Full text of UKCA declaration of conformity is available at: www.asus.com/support

FCC COMPLIANCE INFORMATION

Per FCC Part 2 Section 2.1077



Responsible Party: Asus Computer International
Address: 48720 Kato Rd., Fremont, CA 94538
Phone/Fax No: (510)739-3777/(510)608-4555

hereby declares that the product

Product Name : Server
Model Number : RS720QA-E12-RS8U

compliance statement:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Ver. 180125

Service and Support

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



