RS720Q-E11-RS8U

2U Rackmount Server
User Guide

E21565
Revised Edition V2
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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.

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: Installation Options**

   This chapter describes how to install optional components into the barebone server.

4. **Chapter 4: 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.

5. **Chapter 5: BIOS Setup**

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

6. **Chapter 6: Driver Installation**

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

Conventions

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

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

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

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

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

Typography

Bold text	Indicates a menu or an item to select.
Italics	Used to emphasize a word or a phrase.
<Key>	Keys enclosed in the less-than and greater-than sign means that you must press the enclosed key. Example: <Enter> means that you must press the Enter or Return key.
<Key1>+<Key2>+<Key3>	If you must press two or more keys simultaneously, the key names are linked with a plus sign (+). Example: <Ctrl>+<Alt>+<Del>
`Command`	Means that you must type the command exactly as shown, then supply the required item or value enclosed in brackets. Example: At the DOS prompt, type the command line: **`format A:/S`**

References

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

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

   This manual tells how to set up and use the proprietary ASUS server management utility.

2. **ASUS websites**

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

1 Product Introduction

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	RS720Q-E11-RS8U
Chassis	ASUS 2U Rackmount Chassis
Motherboard	ASUS Z13PH-D16 Server Board
Component	2 x 3000W Power Supply
	2 x Front Panel Board (FPB-R2H-A)
	2 x Power Supply Distribution Board (PDB-R2H-B-3200)
	1 x Power Connection Board (PSB-R2H-A)
	1 x Backplane Board (BP8LE32G-25-R2H-D)
	2 x Midplane Board (MP4LE32G-D-R2H-D)
	4 x Converter Board (CB8LX12G-R2H-B)
	4 x PCIe Riser Card - Right (RF16R-R2H-D)
	4 x PCIe Riser Card - Left (RF16L-R2H-D)
	4 x M.2 PCIe Riser Card (RG4RG4L-M2X2-R2HE)
	2 x Backplane Fans (40mm x 28mm)
	4 x System Fans (80mm x 38mm)
	8 x Tool-less Hot-swap 2.5” Storage Bays
Accessories	1 x ASUS RS720Q-E11-RS8U Series Support DVD (includes User Guide)
	8 x CPU Standard Heatsinks (air cooling SKUs only)
	4 x CPU Cold Plate Loop (liquid cooling SKUs only)
	1 x Bag of Screws
	2 x AC Power Cables
	1 x Friction Rail Kit
	8 x LGA4677 XCC E1A CPU Carrier (barebone SKUs only)
	8 x LGA4677 MCC E1B CPU Carrier (barebone SKUs only)
	8 x LGA4677 HBM E1C CPU Carrier (barebone SKUs only)

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 xxSxxxxxxxxx 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 RS720Q-E11-RS8U is a 2U server system featuring the ASUS Z13PH-D16 Server Board. The server supports 4th Gen Intel® Xeon® Processor Scalable family plus other latest technologies through the chipsets onboard.

Model Name		RS720Q-E11-RS8U
Processor Support / System Bus		2 x Socket (LGA4677) per Node 4th Gen Intel® Xeon® Processor Scalable Family (air cooling up to 205W, liquid cooling up to 350W) UPI 16 GT/s
Core Logic		Intel® C741
Memory	Total Slots	16 (8-channel per CPU, 8 DIMM per CPU)
	Capacity	Maximum up to 2+4TB (Per Node, DDR5 + Crow Pass)
	Memory Type	DDR5 4800 RDIMM/RDIMM 3DS (1DIMM per Channel) Intel® Optane™ DC persistent memory 300 Series (Crow Pass) * **Refer to ASUS server AVL for the latest update**
	Memory Size	64GB, 32GB, 16GB RDIMM 256GB, 128GB RDIMM 3DS 512GB, 256GB, 128GB Intel® Optane™ DC persistent memory 300 Series (Crow Pass) * **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, HHHL (CPU1)
	M.2	Per Node: 2 x M.2 (Up to 22110, PCIe 4.0 from CPU1)
Storage Controller	SATA/SAS Controller	Per Node: Optional Broadcom SAS3008 (supports RAID 0, 1) - 2 x SAS 12Gb/s ports or; - 2 x SATA 6Gb/s ports
Storage	Storage Bay	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)
Networking		Per Node: 2 x LAN Port Intel® X710-AT2 10GbE LAN controller 1 x Management Port
VGA		Aspeed AST2600 64MB
Graphics		Per Node: Up to 1 single slot GPU, LP * **Advanced Cooling Upgrade kit required. Certain GPUs with high TDP may only be supported under specific conditions. For additional details about specialized system optimization, contact ASUS Technical Support.**

(continued on the next page)

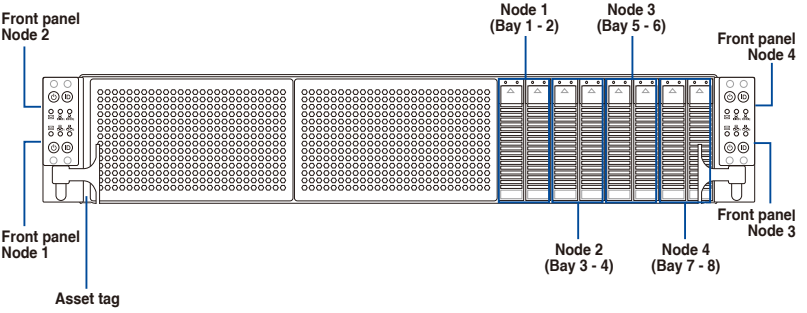
Model Name		RS720Q-E11-RS8U
Rear I/O Connectors		Per Node: 2 x USB 3.2 Gen 1 ports 1 x VGA port 2 x RJ-45 10GbE LAN ports 1 x RJ-45 Management LAN port
Switch/LED		Per Node: **Front:** - 1 x Power Switch/LED - 1 x Location Switch/LED - 1 x Message LED - 2 x LAN LED **Rear:** - 1 x Power Switch/LED - 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, CentOS, Ubuntu * **Refer to www.asus.com/event/server/OS_support_list/OS.html for the latest update**
Regulatory Compliance		BSMI, CE, CB, FCC (ClassA)
Dimensions		800mm x 444mm x 88mm (2U) 31.5" x 17.48" x 3.46"
Gross Weight Kg		41.5 kg
Net Weight Kg (CPU, DRAM, and HDD not included)		32.5 kg
Power Supply (following different configuration by region)		1+1 Redundant 3000W 80 PLUS Titanium Power Supply Rating: 220-240 Vac, 15.5A (x2), 50-60Hz, Class I
Environment		Operation temperature: 10°C ~ 35°C Non-operation temperature: -40°C ~ 60°C Non-operation humidity: 20% ~ 90% (Non condensing)

Specifications are subject to change without notice.

1.4 Front panel features

The barebone server displays easily accessible features such as the power and reset buttons, LED indicators, and optical drive.

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



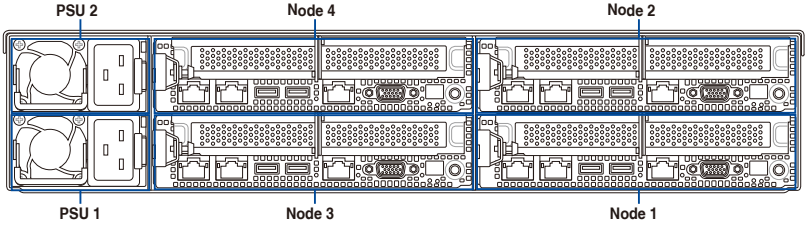
Turn off the system power and detach the power supply before removing or replacing any system component.

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.

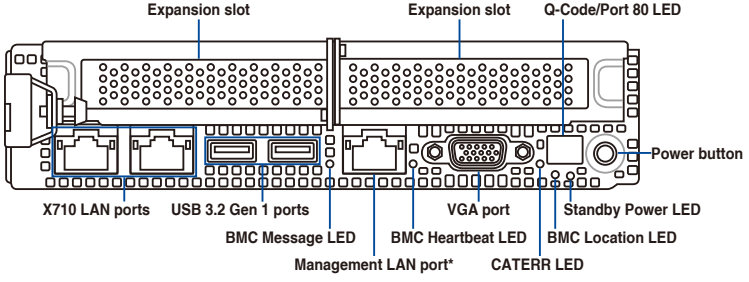
1.5 Rear panel features

RS720Q-E11-RS8U



When installing only two nodes, install the nodes to node slot number 1 and 2 or number 3 and 4.

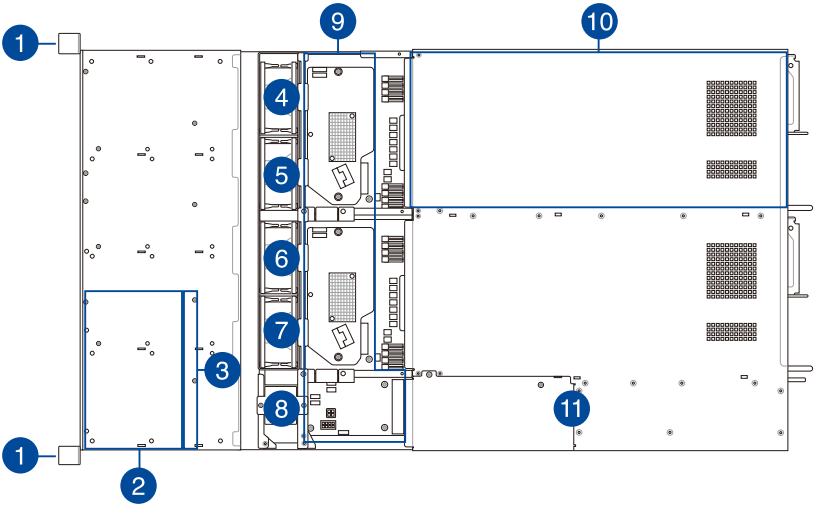
Z13PH-D16 (Node)



* This port is for ASUS ASMB11-iKVM controller and for technicians only.

1.6 Internal features

The barebone server includes the basic components as shown.



1. Front Panel Boards
2. Hot-swap storage device trays
3. HDD Backplane
4. System fan (SYS_FAN1)
5. System fan (SYS_FAN2)
6. System fan (SYS_FAN3)
7. System fan (SYS_FAN4)
8. BP_FAN1 (top) and BP_FAN2 (bottom)
9. Midplane
10. ASUS Z13PH-16 Server Board
11. Power supply and power fan

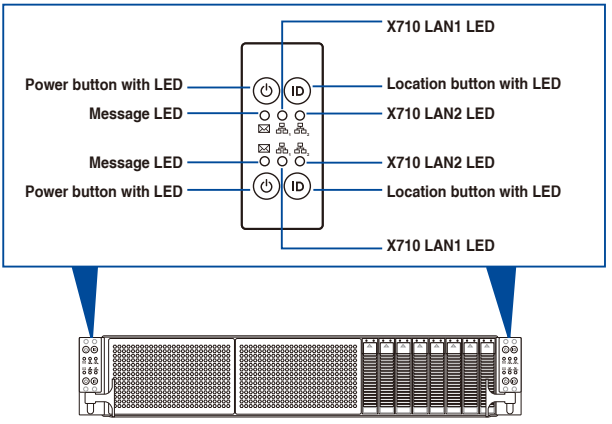
Ensure that the air duct is positioned on the gaps between the memory slots.

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

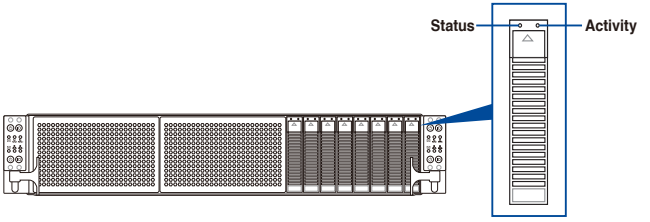
1.7 LED information

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		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.)

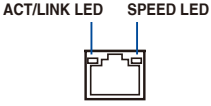
1.7.2 HDD status LEDs



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

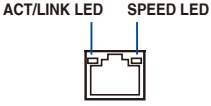
1.7.3 LAN (RJ-45) LEDs

Dedicated Management LAN port (DM_LAN1) LED indications



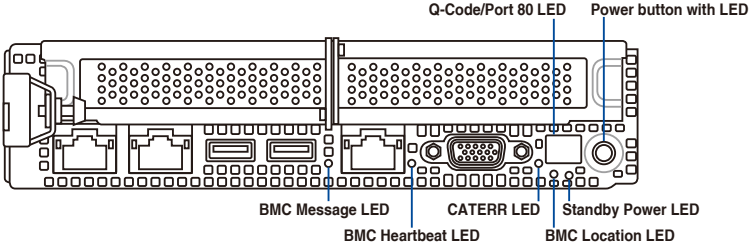
ACT/LINK LED		SPEED LED	
Status	Description	Status	Description
OFF	No link	OFF	10 Mbps connection
GREEN	Linked	ORANGE	100 Mbps connection
BLINKING	Data activity	GREEN	1 Gbps connection

Intel® X710-AT2 10GbE LAN port LEDs



ACT/LINK LED		SPEED LED	
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
CATERR LED	ON	System has experienced a catastrophic error
Standby Power LED	ON	System standby power is on

1.7.5 Q-Code table

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

(continued on the next page)

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

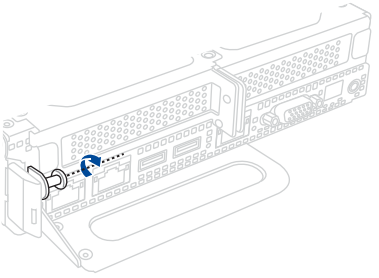
2 Hardware Information

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

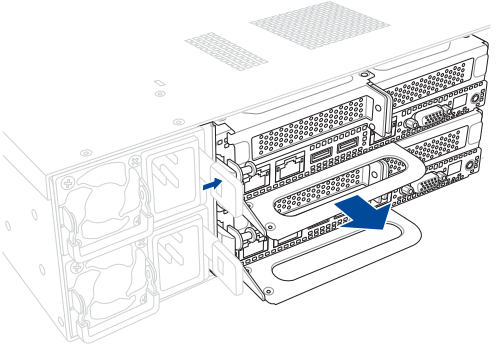
2.1 Server node

2.1.1 Removing a server node

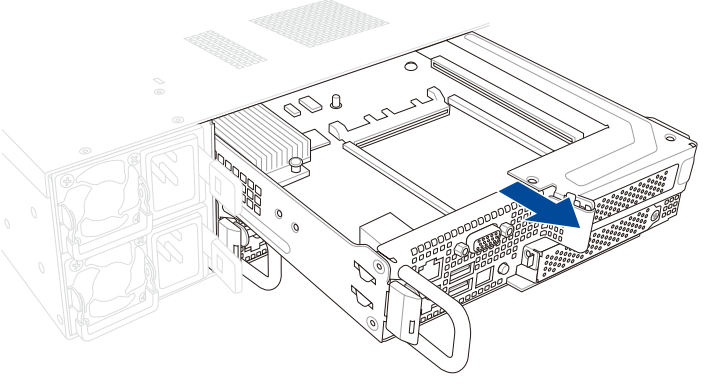
1. Remove the screw located on the node latch.



2. Hold the server node lever and press the green node latch.



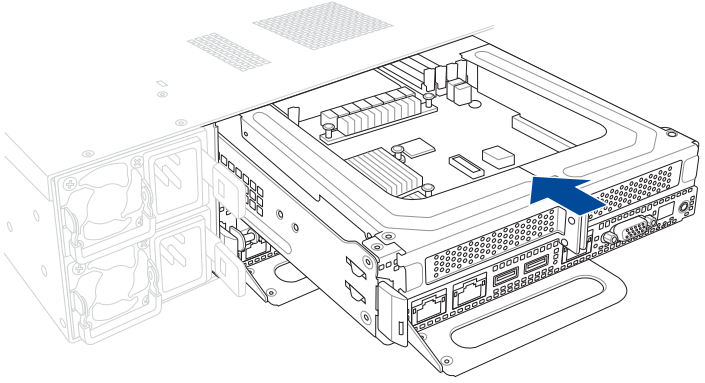
3. Firmly pull the server node out of the server chassis.



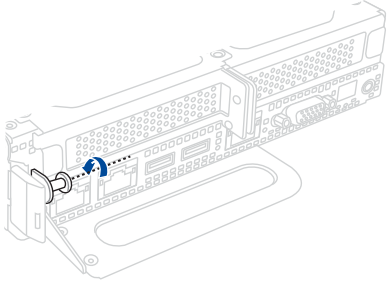
2.1.2 Installing a server node

When installing only two nodes, install the nodes to node slot number 1 and 3 or number 2 and 4. Refer to the **Rear panel features** section for details.

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



2. Secure the node latch using the screw previously removed.

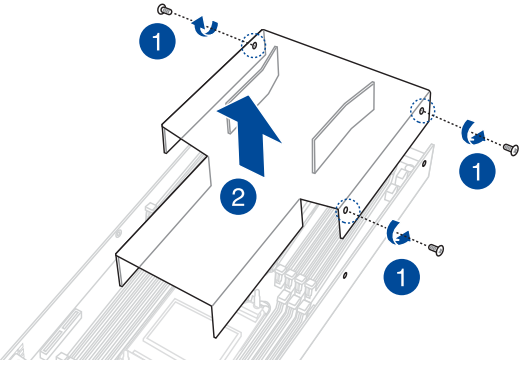


2.2 Air Duct

The RS720Q-E11-RS8U server system comes with a motherboard fan air duct to enable better air flow inside the motherboard while the system is running.

2.2.1 Removing the air duct

1. Remove the three (3) screws securing the air duct on both sides of the node chassis.
2. Carefully lift the air duct out of the chassis.



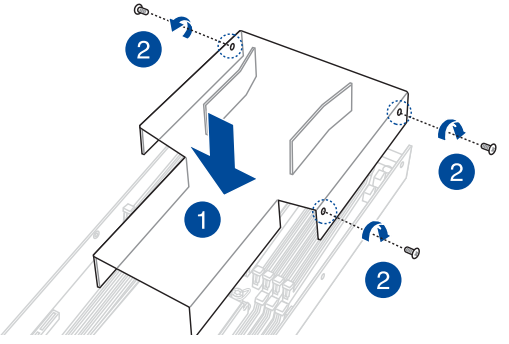
2.2.2 Installing the air duct

1. Position the air duct on top of the motherboard, then carefully fit it on top of the motherboard. Refer to the following illustration for the correct orientation of the air duct.

Insert the air duct on the gaps between the memory slots.

Ensure that the air duct is firmly fitted to the motherboard.

2. Secure the air duct using the three (3) screws removed previously.



2.3 Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA 4677 socket designed for the 4th Gen Intel® Xeon® Processor Scalable Family processors.

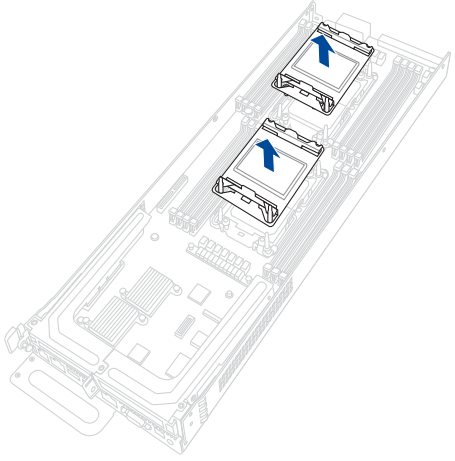
- Upon purchase of the motherboard, ensure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. ASUS will bear the cost of repair only if the 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 heatsink

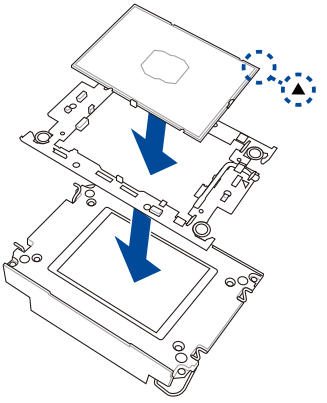
To install a CPU:

1. Remove the server node. For more information, see the **Removing a server node** section.
2. Remove the air duct. For more information, see the **Removing the air duct** section.
3. Remove the PnP caps from the CPU sockets.

Keep the PnP cap. ASUS will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the PnP cap on the socket.



4. Attach the CPU to the carrier bracket, ensure the triangle mark is on the same side as the bracket lever, then attach the CPU and carrier bracket to the heatsink.

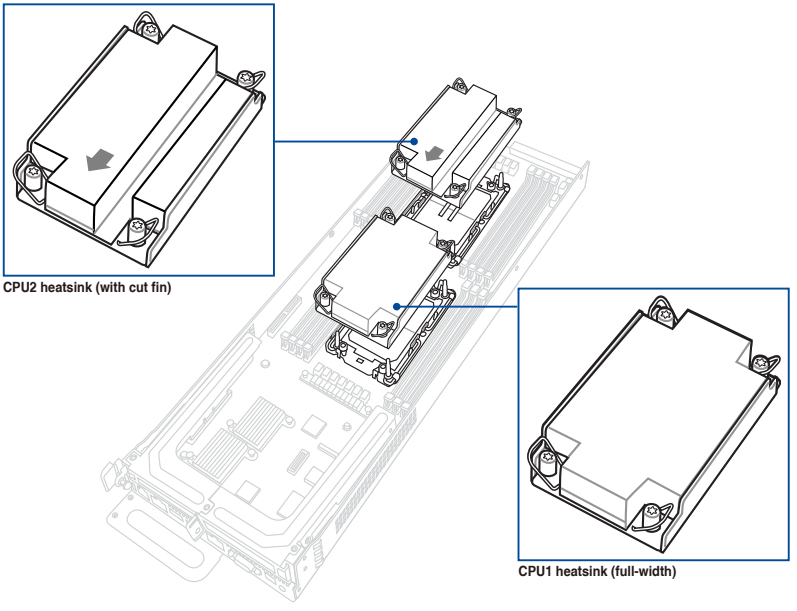


The CPU carrier differs depending on the type of CPU. Ensure that the CPU carrier corresponds to the CPU being installed.

5. Align the CPU and heatsink assembly in the correct orientation so that the triangle marks on both the CPU and socket are aligned in the same direction, then place the heatsinks on top of the CPU sockets.

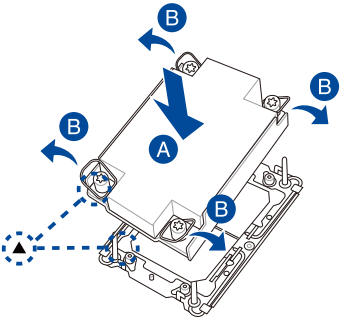
The CPU and CPU Carrier fits in only one correct orientation. DO NOT force the CPU and CPU Carrier into the socket to prevent damaging the CPU pins on the socket.

- The heatsink differs depending on the CPU socket, please refer to the illustration below for more information on the heatsink and the corresponding CPU socket.
- The heatsink should be oriented with the airflow direction indicator pointing towards the rear of the system.



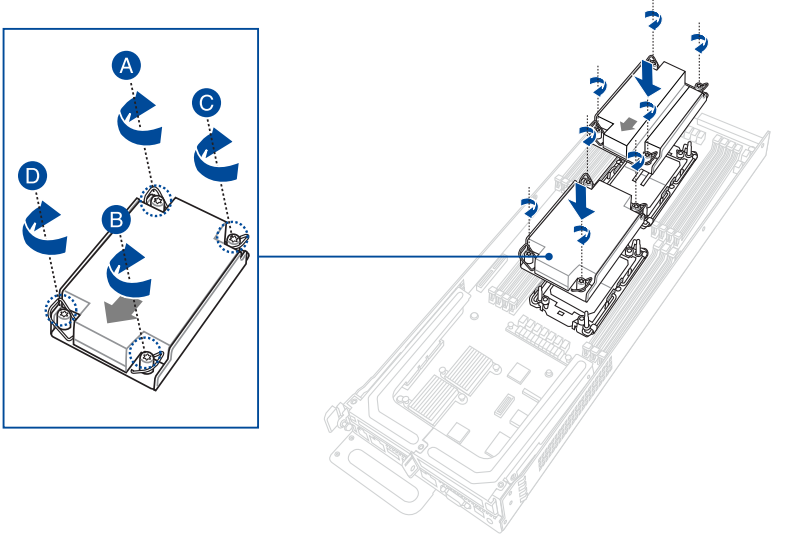
6. Once the heatsink is placed on top of the CPU socket (A), push the lock latches outwards on all four corners of the heatsink so that the heatsink and CPU assembly is secured to the CPU socket (B).

Ensure the triangle mark on the CPU is located in the same corner as the CPU socket.



7. Do two (2) clockwise turns on each of the heatsink screws in the cross order pattern shown on the illustration until the heatsink screws are tightened and the heatsink is secured onto the motherboard.

Intel® recommends a using a torque driver with a T-30 bit and a torque value of 8 lbf-in to prolong the longevity of all PEEK nuts after the quality of the load post is corrected.

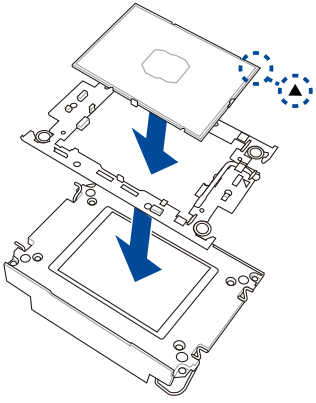


8. Reinstall the air duct. For more information, see the **Installing the air duct** section.
9. Reinstall the server node. For more information, see the **Installing a server node** section.

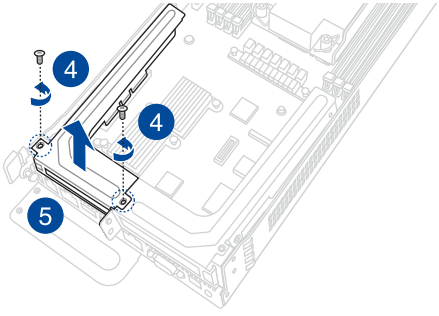
2.3.2 Installing the CPU and liquid cooling module

To install the CPUs and liquid cooling module:

1. Remove the server node. For more information, see the **Removing a server node** section.
2. Remove the air duct. For more information, see the **Removing the air duct** section.
3. Attach the CPU to the carrier bracket, ensure the triangle mark is on the same side as the bracket lever, then attach the CPU and carrier brackets to the liquid cooling modules.

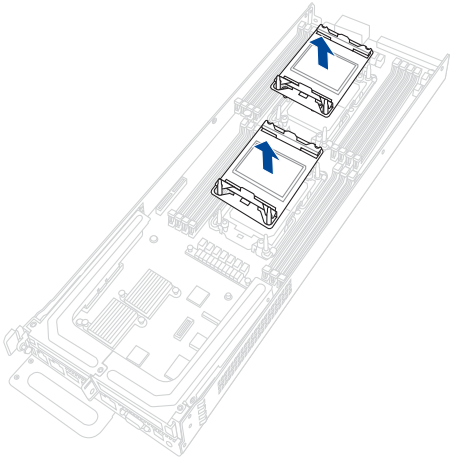


4. Remove the two (2) screws securing the riser card to the chassis.
5. Firmly hold the riser card, then pull it up to detach it from the PCIe x16 slot on the motherboard.



6. Remove the PnP caps from the CPU sockets.

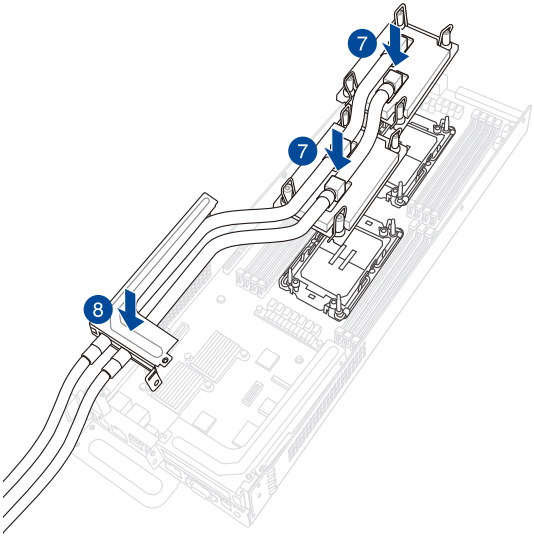
Keep the PnP cap. ASUS will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the PnP cap on the socket.



7. Align the CPU and liquid cooling module assembly in the correct orientation as shown in the illustration below, then place the liquid cooling modules on top of the CPU sockets.

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

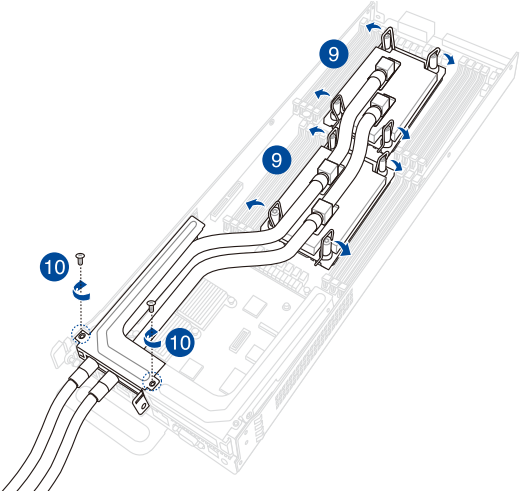
8. Align and insert the riser card into the PCIe slot on the motherboard.



9. Once the liquid cooling modules are placed on top of the CPU sockets, push the lock latches outwards on all four corners of the liquid cooling modules so that the CPU and liquid cooling module assembly is secured to the CPU socket.

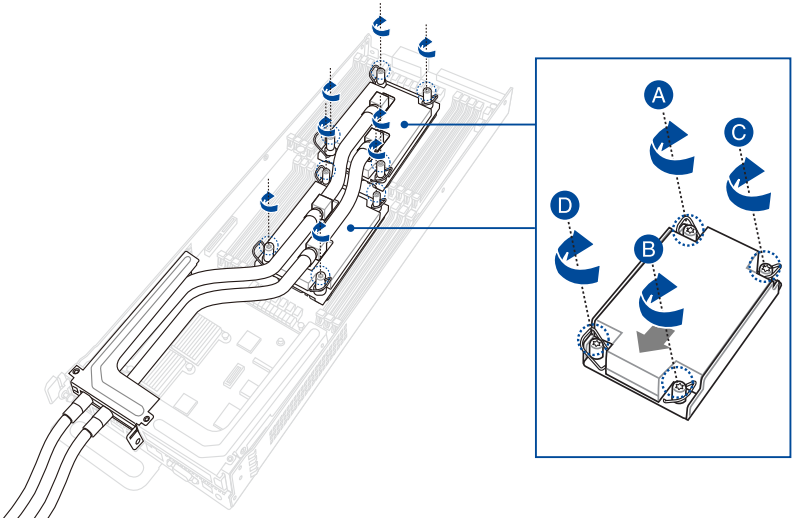
The CPU and CPU Carrier fits in only one correct orientation. DO NOT force the CPU and CPU Carrier into the socket to prevent damaging the CPU pins on the socket.

10. Secure the riser card with the screws that you removed earlier in step 4.



11. Do two (2) clockwise turns on each of the heatsink screws in the cross order pattern shown on the illustration until the heatsink screws are tightened and the heatsink is secured onto the motherboard.

Intel® recommends a using a torque driver with a T-30 bit and a torque value of 8 lbf-in to prolong the longevity of all PEEK nuts after the quality of the load post is corrected.



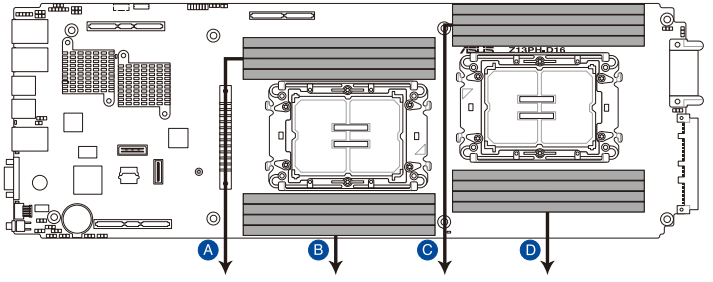
2.4 System memory

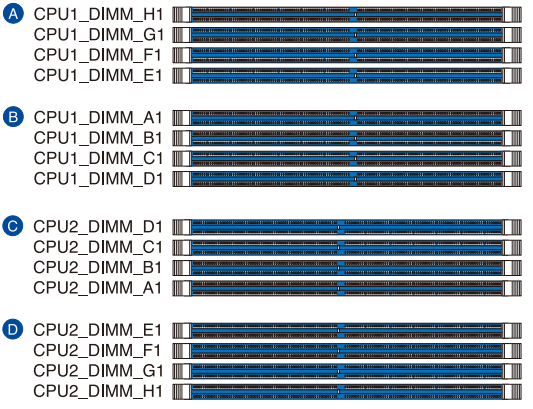
2.4.1 Overview

The motherboard comes with sixteen (16) Double Data Rate 5 (DDR5) Dual Inline Memory Modules (DIMM) sockets.

The figure illustrates the location of the DDR5 DIMM sockets:

Z13PH-D16 288-pin DDR5 DIMM sockets





2.4.2 Memory Configurations

You may install 16GB, 32GB, 64GB RDIMMs; 128GB, 256GB RDIMM 3DS; or 128GB, 256GB, 512GB Intel® Optane™ persistent memory 300 Series (Crow Pass) 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:

Dual CPU configuration																
CPU	CPU1								CPU2							
Slot	A1	B1	C1	D1	E1	F1	G1	H1	A1	B1	C1	D1	E1	F1	G1	H1
2 DIMMs	✓								✓							
4 DIMMs	✓						✓		✓						✓	
8 DIMMs	✓		✓		✓		✓		✓		✓		✓		✓	
12 DIMMs	✓		✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	
16 DIMMs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

If you wish to install PMem as well, please refer to the following table for configurations:

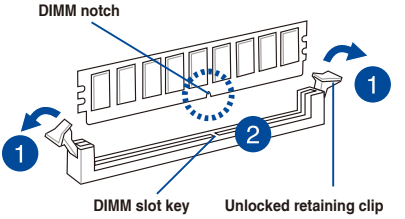
If two CPUs are installed, ensure that both CPUs share the same PMem configuration.

Channel	H	G	F	E	CPU	A	B	C	D
DDR5+CPS	DIMM_H1	DIMM_G1	DIMM_F1	DIMM_E1		DIMM_A1	DIMM_B1	DIMM_C1	DIMM_D1
4+4	DDR5	CPS	DDR5	CPS		CPS	DDR5	CPS	DDR5
6+1		DDR5	DDR5	DDR5		DDR5	CPS	DDR5	DDR5

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.

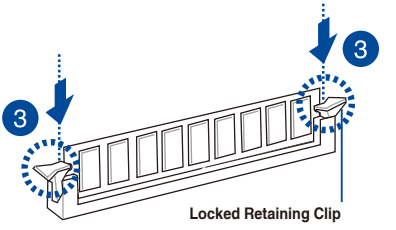
1. Unlock a DIMM socket by pressing the retaining clips outward.
2. Align a DIMM on the socket such that the notch on the DIMM matches the DIMM slot key on the socket.



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

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

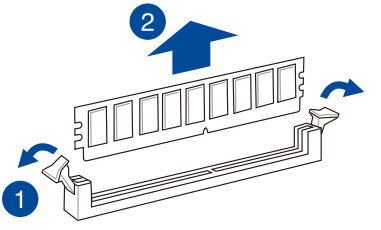
   Ensure that the DIMM is sitting firmly on the DIMM slot.



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

2.4.4 Removing a DIMM

1. Simultaneously press the retaining clips outward to unlock the DIMM.
2. Remove the DIMM from the socket.



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

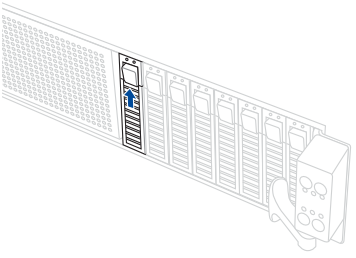
2.5 Storage devices

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.

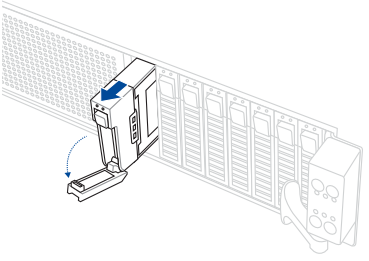
2.5.1 Installing a 2.5” hot-swap SATA/SAS/NVMe storage device

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.

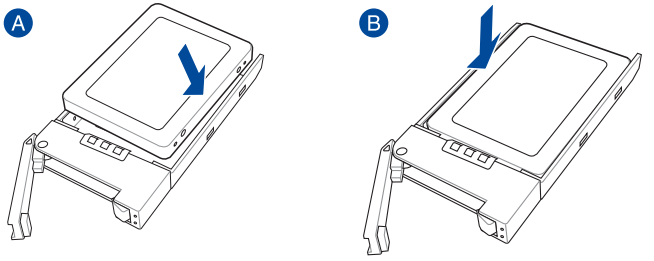
1. Press the spring lock to release the tray lever and to partially eject the tray from the bay.



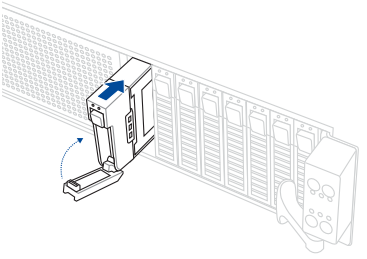
2. Firmly hold the tray lever and carefully pull the drive tray out of the bay.



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.

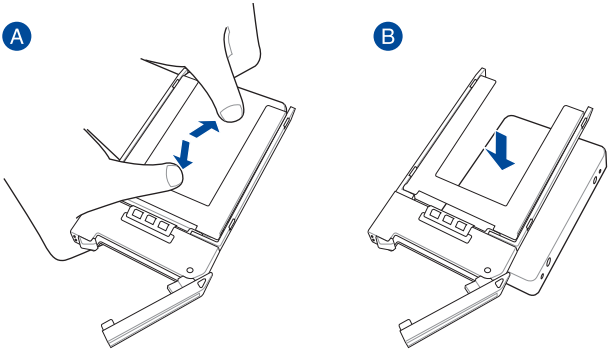


5. Repeat steps 1-4 to install any other 2.5-inch storage devices.

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.

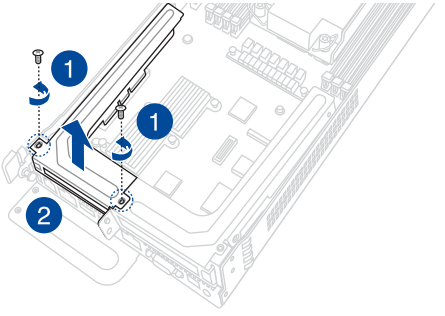
2.6.1 Installing a PCIe expansion card

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.

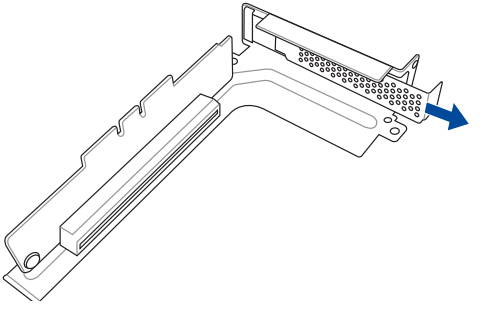
To install a PCIe expansion card to the left riser card:

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.

Make sure to remove the air duct before removing the riser card. Please refer to the **Removing the air duct** section for more information.



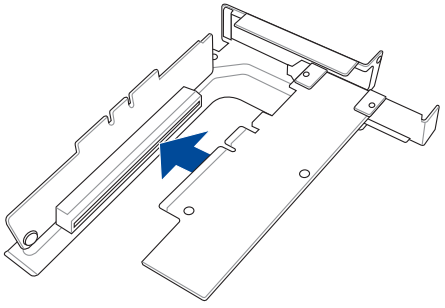
3. Remove the metal bracket from the riser card.



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.

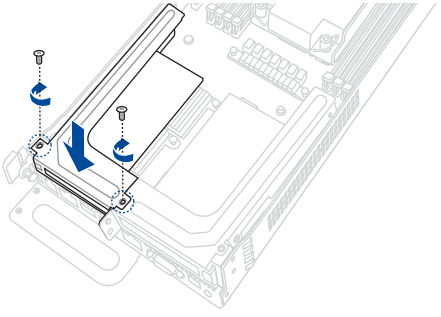
5. Align and insert the golden finger connectors of the expansion card to the PCIe slot connector on the riser card as shown.



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.

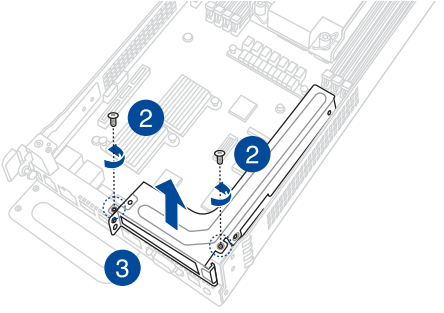
7. Secure the riser card with the screws that you removed earlier in step 1.



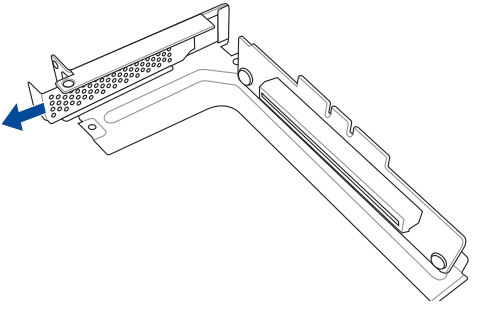
To install a PCIe expansion card to the right riser card:

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.

Make sure to remove the air duct before removing the riser card. Please refer to the **Removing the air duct** section for more information.



4. Remove the metal bracket from the riser card.

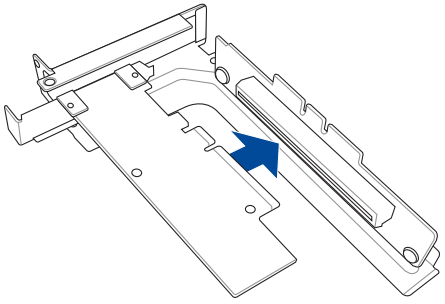


5. Prepare the expansion card.

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.

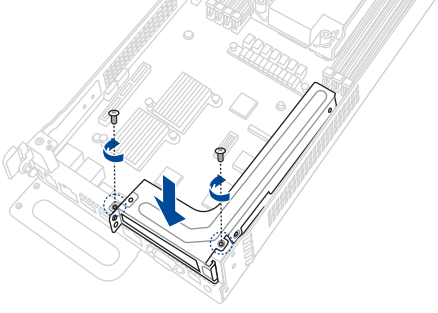
7. Align and insert the golden finger connectors of the expansion card to the PCIe slot connector on the riser card as shown.



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 Chapter 5 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

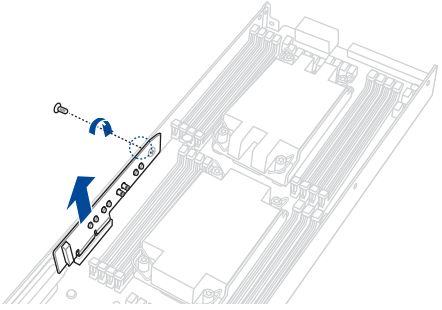
*** These IRQs are usually available for ISA or PCI devices.**

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.

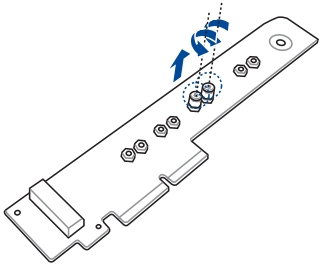
1. Remove the screw securing the M.2 baseboard from the motherboard, then lift and remove the M.2 baseboard.



2. The M.2 baseboard comes pre-installed with two (2) stands and screws. To install a M.2 card on the front or rear side of the baseboard, please refer to the below instructions:

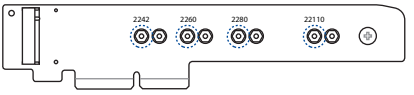
   To install a M.2 card to the front of the baseboard:

   a. Remove the two (2) indicated stands and screws from the front of the baseboard.

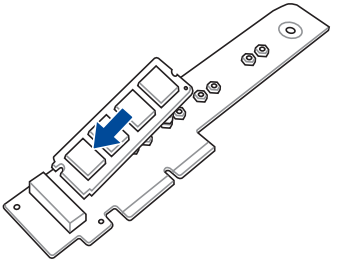


The additional stand and screw is used for the M.2 card slot on the rear of the baseboard. It is recommended to install the stand and screw in an unused screw hole when not in use.

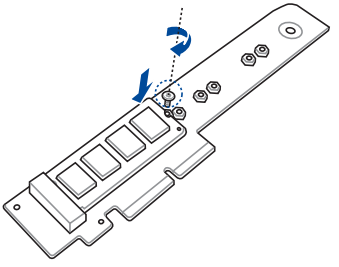
b. Install the stand in one of the indicated screw holes on the front side of the baseboard depending on the length of the M.2 card.



c. Insert your M.2 card into the M.2 slot on the M.2 baseboard.

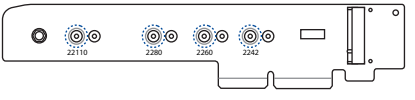


d. Push down on the M.2 card, then secure it to the M.2 baseboard using the screw removed previously.

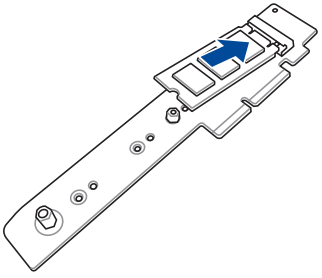


To install an M.2 card to the back of the baseboard:

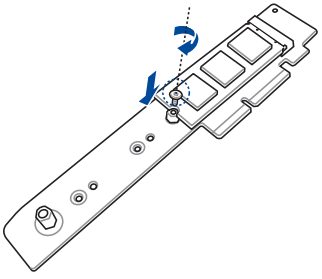
a. (Optional) Reinstall the stand in one of the indicated screw holes on the back side of the baseboard depending on the length of the M.2 card.



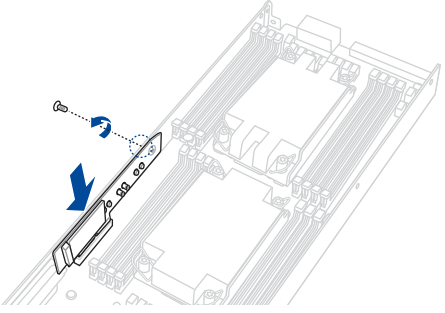
b. Insert your M.2 card into the M.2 slot on the M.2 baseboard.



c. Push down on the M.2 card, then secure it to the M.2 baseboard using the screw removed previously.

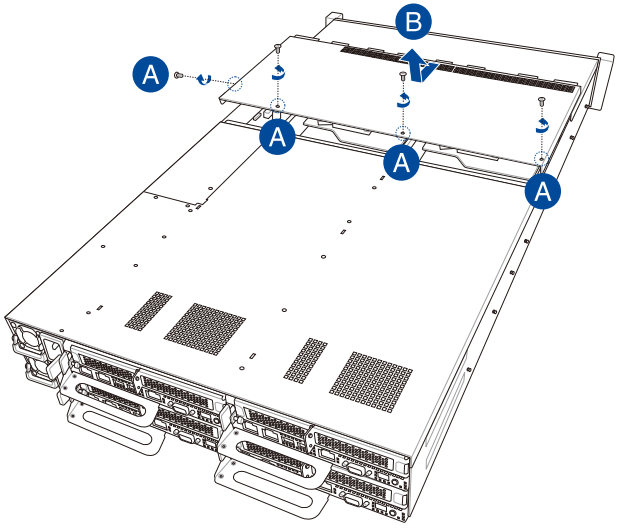


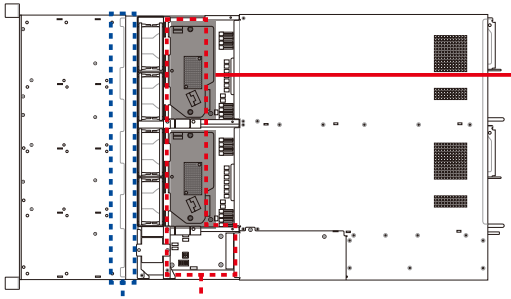
3. Align and insert the M.2 baseboard into the M.2_SLOT1 slot on the motherboard, then push down until the M.2 baseboard is securely seated in the slot.
4. Secure the M.2 baseboard to the system using the screw removed previously.



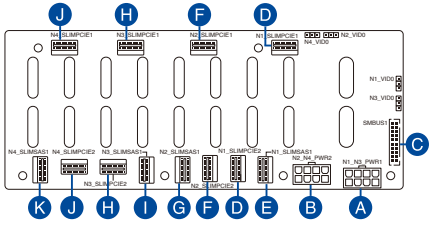
2.7 Backplane and Midplane cabling

Remove the top cover before configuring the backplane and midplane cabling by removing the four (4) screws securing the top cover (A), then push the top cover towards the rear of the system and remove the top cover (B).

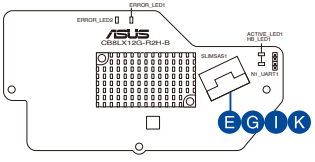




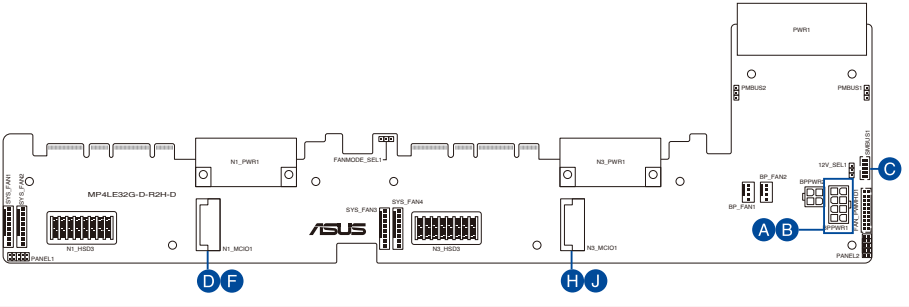
Backplane (BP8LE32G-25-R2H-D)



Converter Board for Node 1-4 (CB8LX12G-R2H-B)



Upper and Lower Midplane (MP4LE32G-D-R2H-D)



A	Connect **N1_N3_PWR1** on the Backplane to **BPPWR1** on the Lower Midplane
B	Connect **N2_N4_PWR1** on the Backplane to **BPPWR1** on the Upper Midplane
C	Connect **SMBUS1** on the Backplane to **SMBUS1** on the Upper and Lower Midplane
D	Connect **N1_SLIMPCIE1** and **N1_SLIMPCIE2** on the Backplane to **N1_MCIO1** on the Lower Midplane
E	Connect **N1_SLIMSAS1** on the Backplane to **SLIMSAS1** on the Converter Board for Node 1
F	Connect **N2_SLIMPCIE1** and **N2_SLIMPCIE2** on the Backplane to **N1_MCIO1** on the Upper Midplane
G	Connect **N2_SLIMSAS1** on the Backplane to **SLIMSAS1** on the Converter Board for Node 2
H	Connect **N3_SLIMPCIE1** and **N3_SLIMPCIE2** on the Backplane to **N3_MCIO1** on the Lower Midplane
I	Connect **N3_SLIMSAS1** on the Backplane to **SLIMSAS1** on the Converter Board for Node 3
J	Connect **N4_SLIMPCIE1** and **N4_SLIMPCIE2** on the Backplane to **N3_MCIO1** on the Upper Midplane
K	Connect **N4_SLIMSAS1** on the Backplane to **SLIMSAS1** on the Converter Board for Node 4

2.8 Removable/optional components

This section describes installation or removal instructions for the following components:

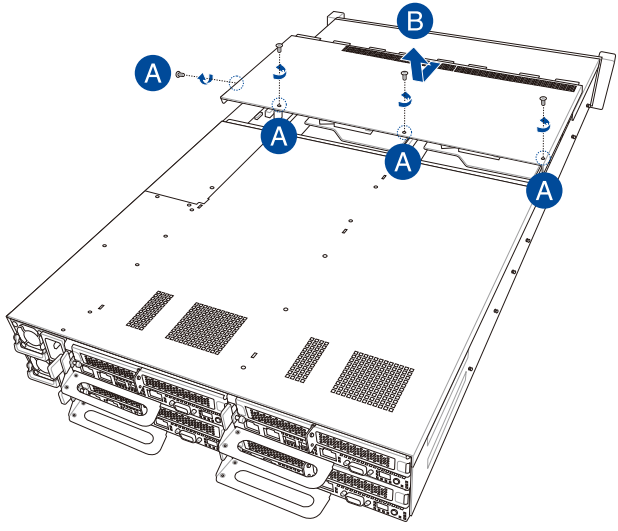
1. System fans
2. Power supply module

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

2.8.1 System fan

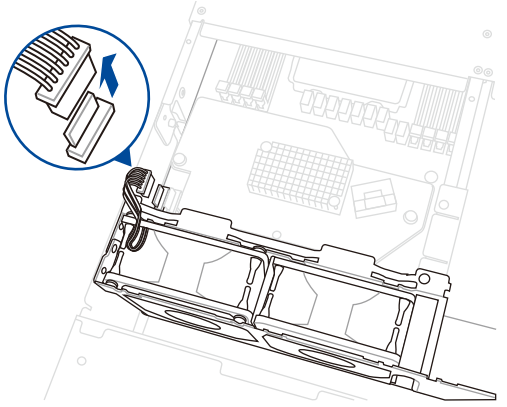
To replace a system fan:

1. Remove the four (4) screws securing the top cover (A), then push the top cover towards the rear of the system and remove the top cover (B).

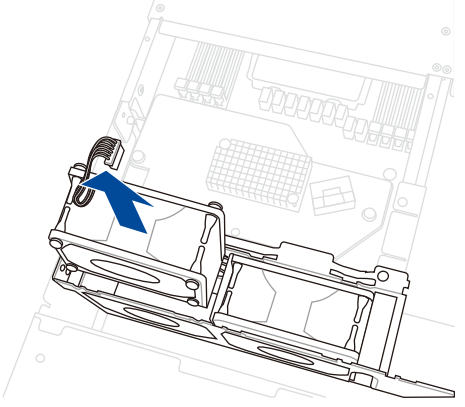


2. Prepare a replacement fan of the same type and size.

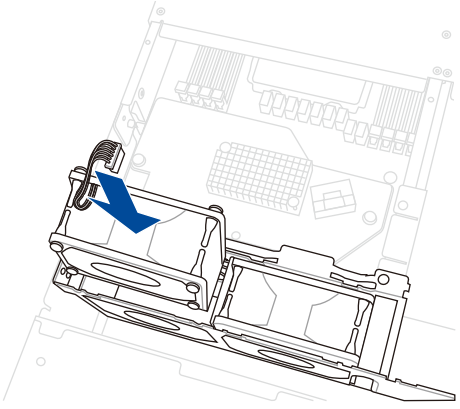
3. Disconnect the system fan cable from the fan connector on the Midplane.



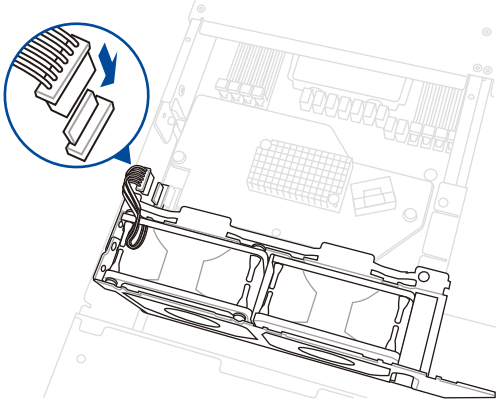
4. Lift the fan, then set it aside.



5. Insert the replacement fan into the fan compartment.



6. Connect the system fan cable to the fan connector on the midplane.

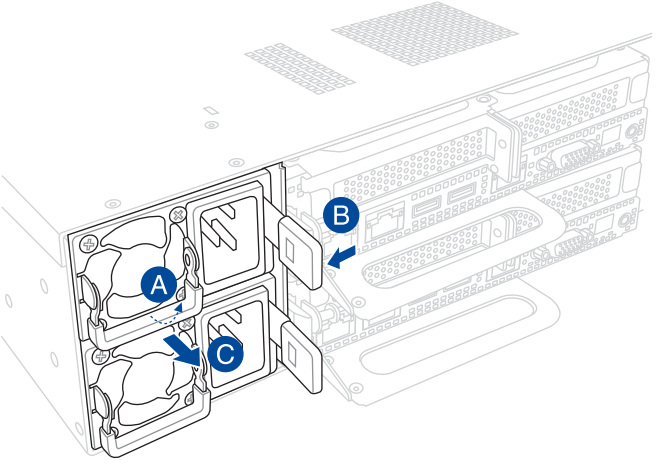


7. Repeat steps 3 to 6 to replace the other system fans.

2.8.2 Power supply module

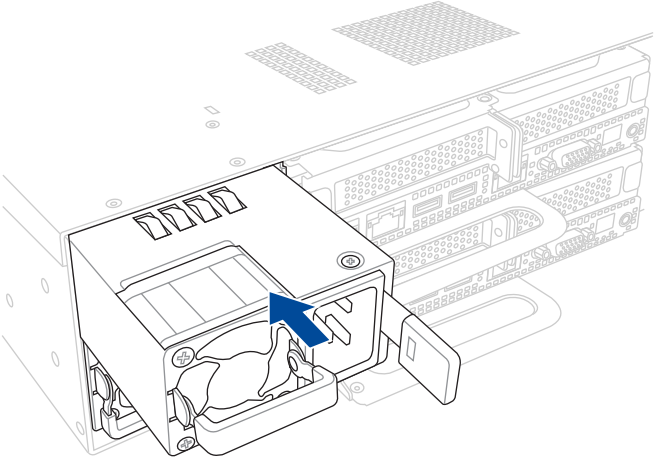
To replace a power supply unit (PSU):

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.

3000W

Input Voltage	Max. Output Power (Watt) per PSU
220V-240Vac, 15.5A (x2), 50-60Hz	3000W

- 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.

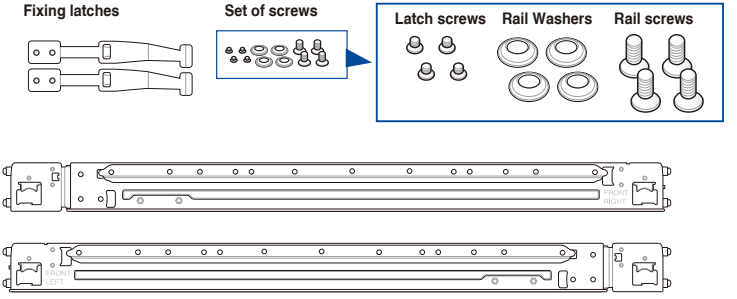
3 Installation Options

This chapter describes how to install the optional components and devices into the barebone server.

3.1 Tool-less Friction Rail Kit

The tool-less design of the rail kit allows you to easily install the rack rails into the server rack without the need for additional tools. The kit also comes with a metal stopping bracket that can be installed to provide additional support and stability to the server.

The tool-less rail kit package includes:

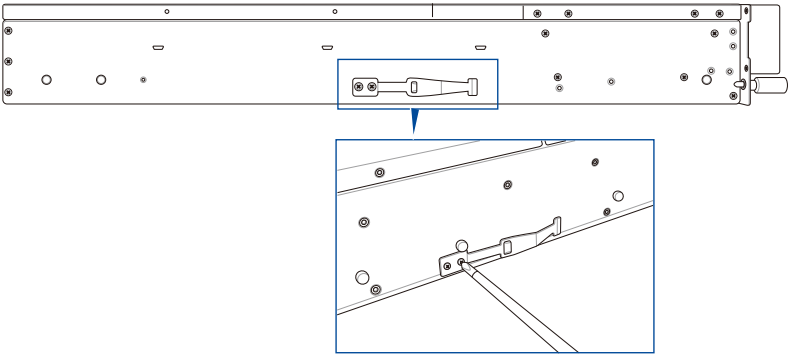


Installing the tool-less rack rail

To install the tool-less rack rails into the rack:

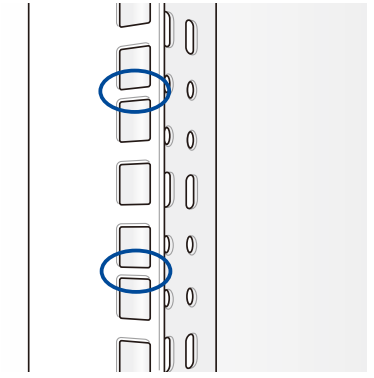
1. Secure the two fixing latches to the two sides of the server using the set of latch screws.

The locations of the screw holes vary with different server models. Refer to your server user manual for details.



2. Select a desired space and place the appropriate rack rail (left and right) on opposite positions on the rack.

A 1U space is consists of three square mounting holes with two thin lips on the top and the bottom.

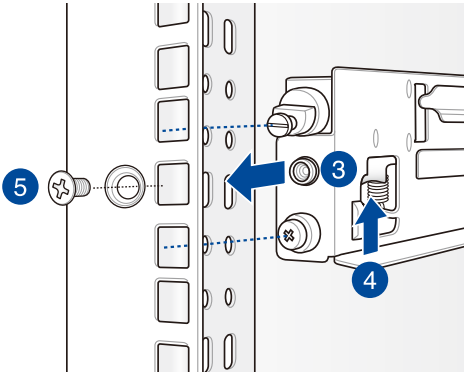


3. Press the spring lock, then insert the studs into the selected square mounting holes on the rack post.
4. Press the spring lock on the other end of rail, then insert the stud into the mounting hole on the rack post. Extend the rack rail, if necessary.
5. (Optional) Use the rail screw and rail washer that comes with the kit to secure the rack rail to the rack post.

A torque value of 14 kgf/cm is recommended for the rail screw.

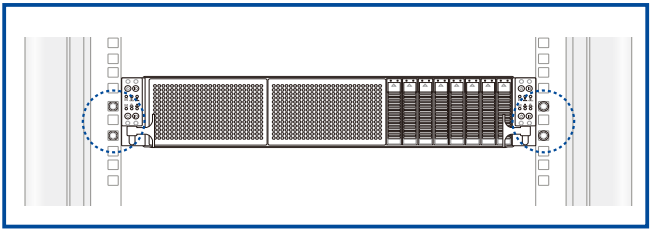
6. Perform steps 3 to 5 for the other rack rail.

Ensure that the installed rack rails (left and right) are aligned, secured, and stable in place.



7. Lift the server chassis and insert it into the rack rail.

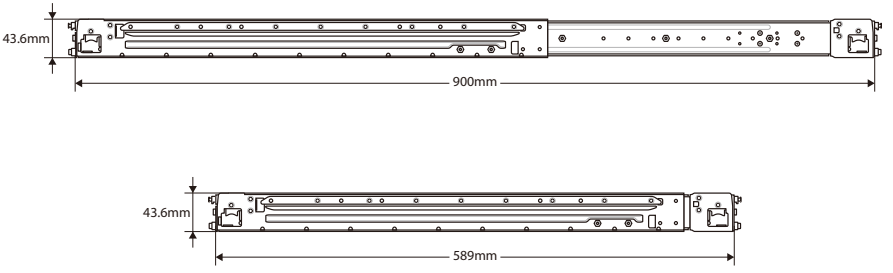
- Ensure that the rack rail cabinet and the rack posts are stable and standing firmly on a level surface.
- We strongly recommend that at least two able-bodied persons perform the steps described in this guide.
- We recommend the use of an appropriate lifting tool or device, if necessary.



Make sure to include the side knots on the two sides of the server in the rack rail holders.

The illustrations shown above are for reference only.

3.2 Rail kit dimensions

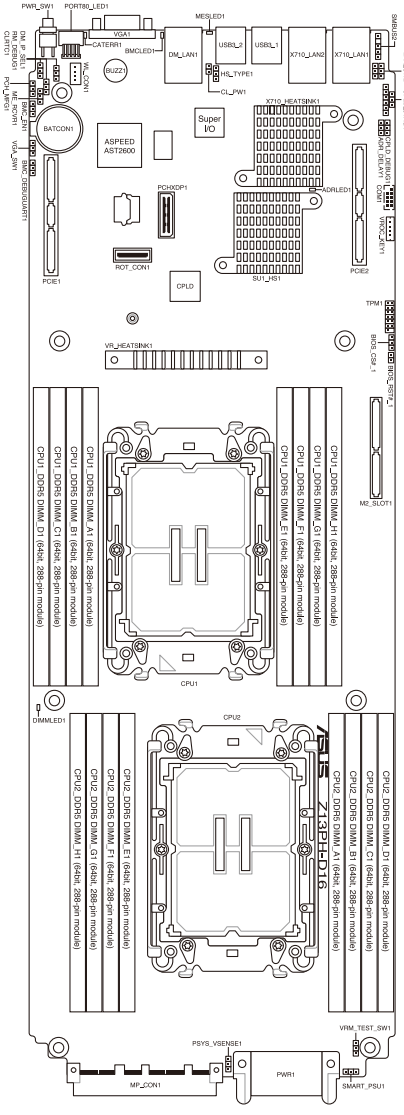


4 Motherboard Information

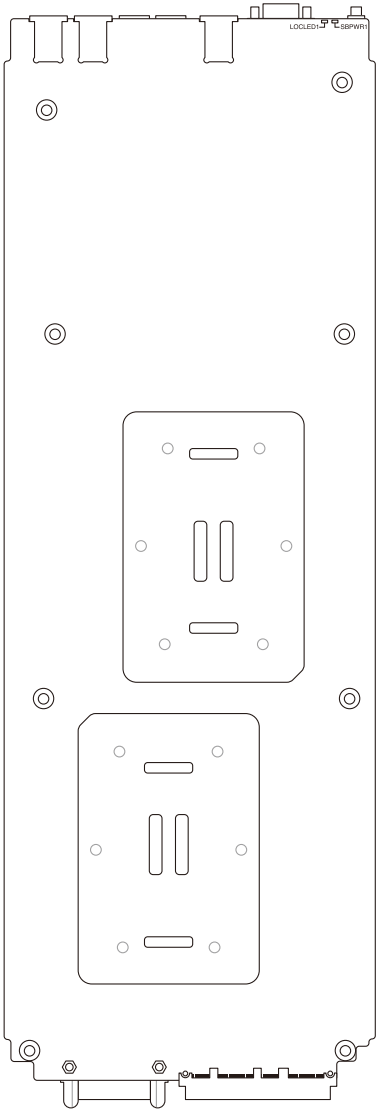
This chapter includes the motherboard layout and brief descriptions of the jumpers and internal connectors.

4.1 Motherboard layout

Top side



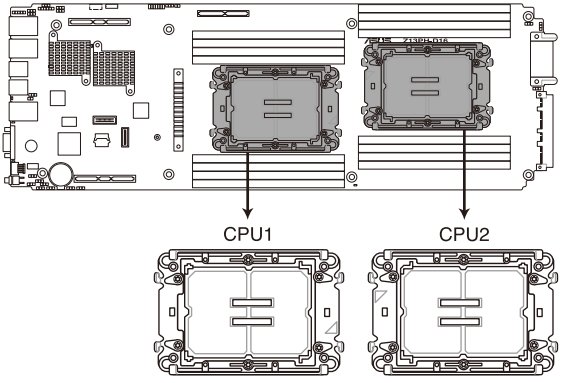
Bottom side



4.2 Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA 4677 socket designed for the 4th Gen Intel® Xeon® Processor Scalable Family processors.

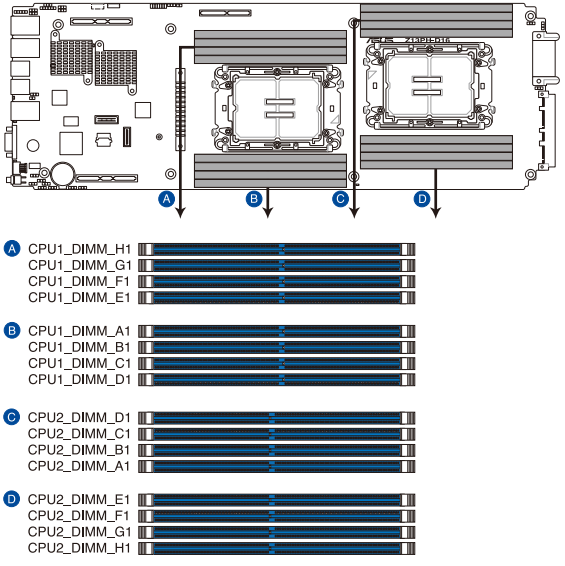
Z13PH-D16 CPU LGA 4677 Socket



4.3 Dual Inline Memory Module (DIMM)

The motherboard comes with sixteen (16) Double Data Rate 5 (DDR5) Dual Inline Memory Modules (DIMM) sockets.

Z13PH-D16 288-pin DDR5 DIMM sockets



4.4 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.

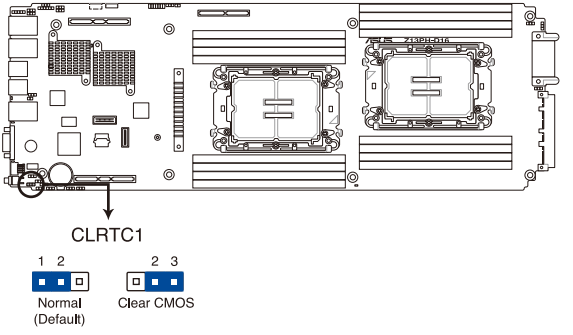
To erase the RTC RAM:

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 <Del> key during the boot process and enter BIOS setup to re-enter data.

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

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

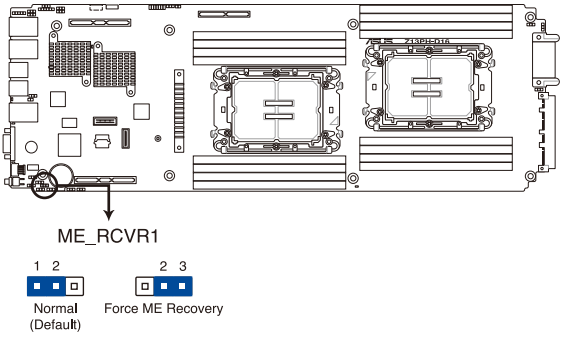
Z13PH-D16 Clear RTC RAM



2. ME firmware force recovery setting (3-pin ME_RCVR1)

This jumper allows you to force the Intel Management Engine (ME) firmware to enter recovery mode if needed.

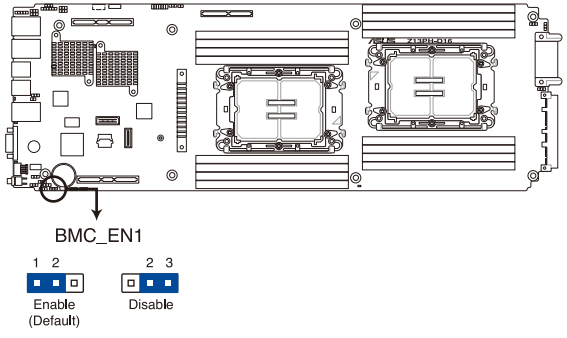
Z13PH-D16 ME recovery setting



3. BMC Setting (3-pin BMC_EN1)

This jumper allows you to enable or disable the ASMB11.

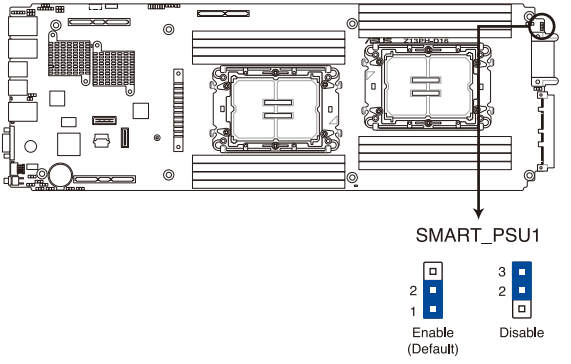
Z13PH-D16 BMC setting



4. 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.

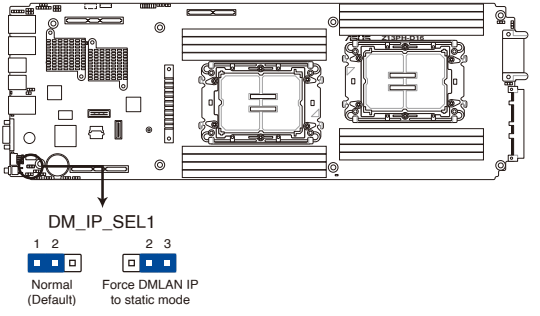
Z13PH-D16 Smart Ride Through setting



5. 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).

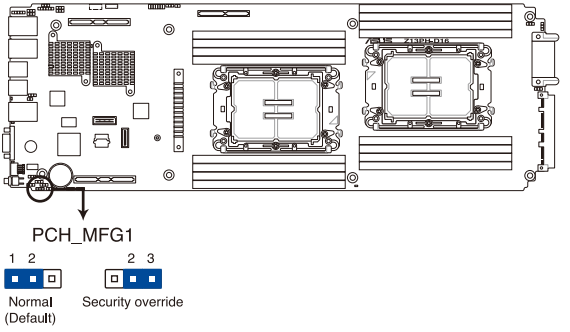
Z13PH-D16 DM_IP_SEL1 setting



6. **PCH_MFG setting (3-pin PCH_MFG1)**

This jumper allows you to update the BIOS ME block.

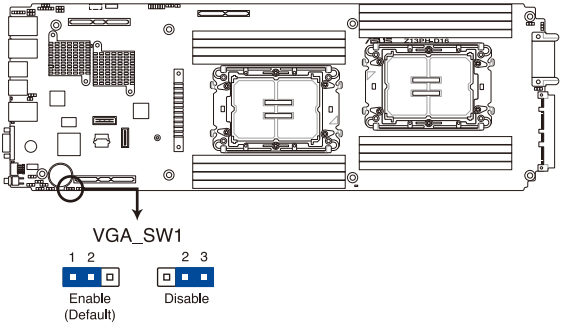
Z13PH-D16 PCH_MFG setting



7. **VGA setting (3-pin VGA_SW1)**

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

Z13PH-D16 VGA setting

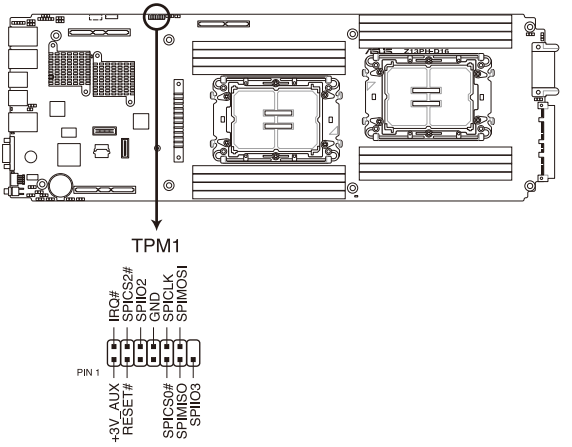


4.5 Internal connectors

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.

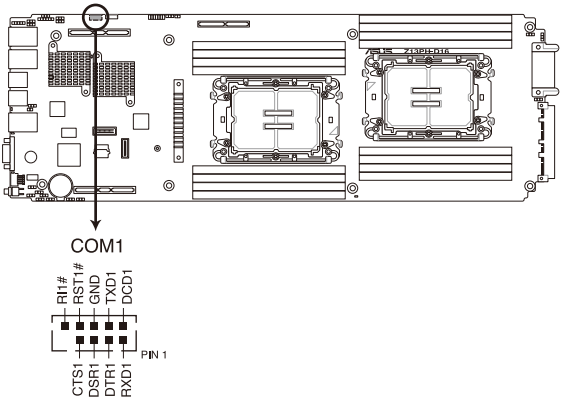
Z13PH-D16 TPM connector



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.

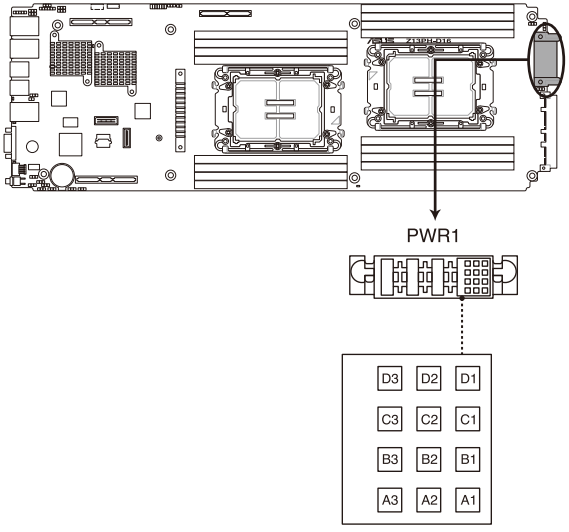
Z13PH-D16 Serial port connector



3. Power connector

This power connector connects to the Midplane.

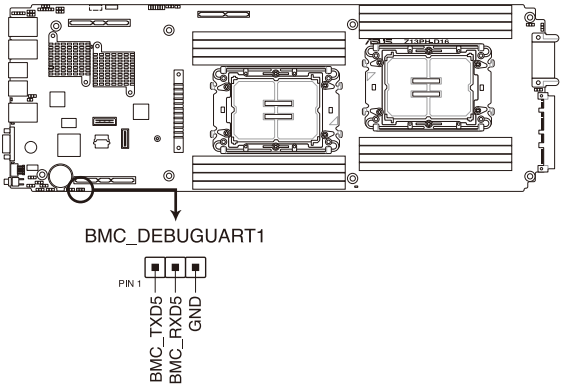
Z13PH-D16 ATX power connectors



4. BMC Debug UART connector (3-pin BMC_DEBUGUART1)

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

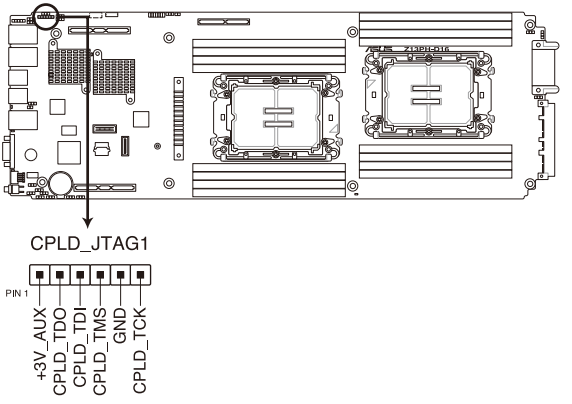
Z13PH-D16 BMC_DEBUGUART1 connector



5. CPLD JTAG connector (6-pin CPLD_JTAG1)

This connector is used for burning the CPLD JTAG.

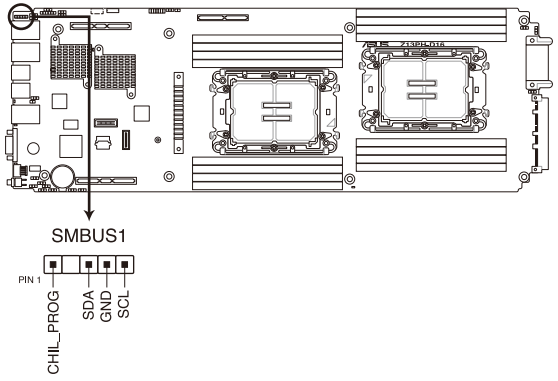
Z13PH-D16 CPLD_JTAG connector



6. System Management Bus (SMBUS) connector (5-1 pin SMBUS1)

This connector controls the system and power management-related tasks. This connector processes the messages to and from devices rather than tripping the individual control lines.

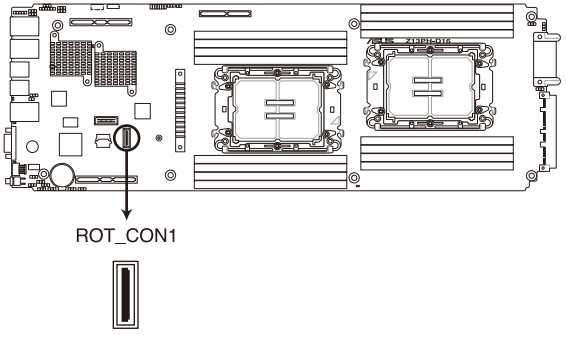
Z13PH-D16 SMBUS connector



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

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

Z13PH-D16 ROT_CON1 connector

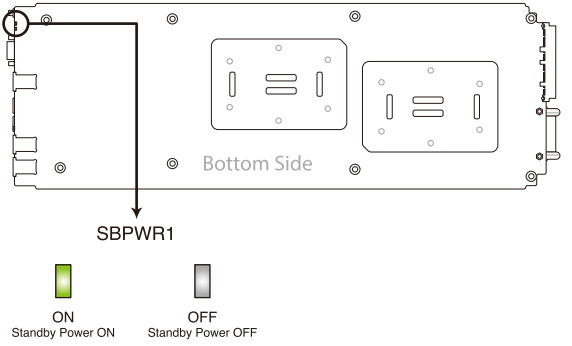


4.6 Internal LEDs

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.

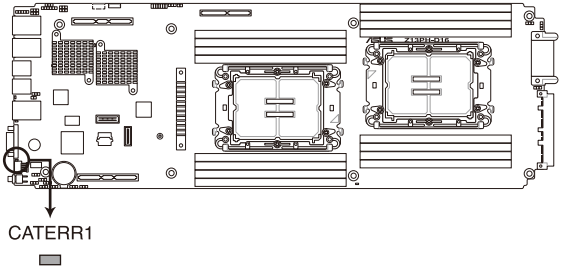
Z13PH-D16 Standby Power LED



2. CAT ERR LED (CATERR1)

The CAT ERR LED indicates that the system has experienced a fatal or catastrophic error and cannot continue to operate.

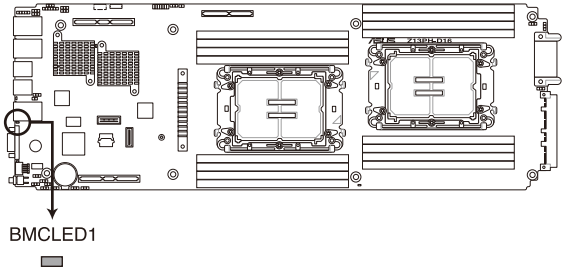
Z13PH-D16 CATERR1 LED



3. BMC Heartbeat LED (BMCLED1)

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

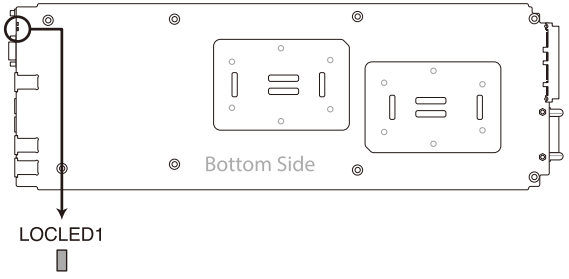
Z13PH-D16 BMCLED1



4. BMC Location LED (LOCLED1)

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

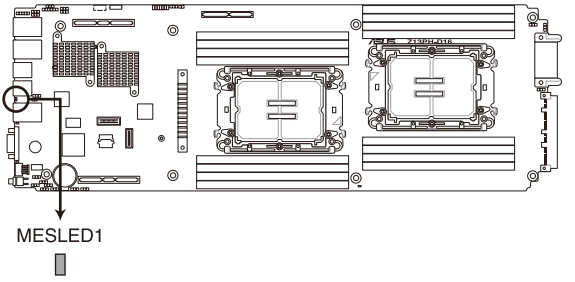
Z13PH-D16 Location LED



5. BMC Message LED (MESLED1)

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

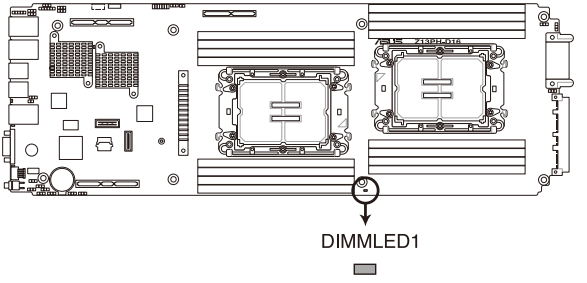
Z13PH-D16 MESLED1



6. DIMM LED (DIMMLED1)

The DIMM LED indicates that the 12V DIMM power is ready.

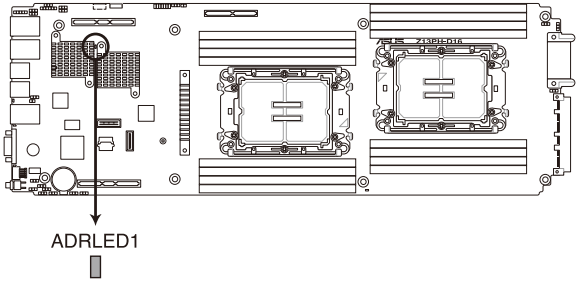
Z13PH-D16 DIMMLED1



7. Asynchronous DRAM Refresh (ADR) LED (ADR_LED)

The ADR LED indicates that the Asynchronous DRAM Refresh (ADR) has been completed.

Z13PH-D16 ADRLED1



5

BIOS Setup

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

5.1 Managing and updating your BIOS

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

1. **ASUS CrashFree BIOS 3**

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

2. **ASUS EzFlash**

   Updates the BIOS using a USB flash disk.

3. **BUPDATER**

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

Refer to the corresponding sections for details on these utilities.

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

5.1.1 ASUS CrashFree BIOS 3 utility

The ASUS CrashFree BIOS 3 is an automatic 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 into a USB port on the system.
2. The utility will automatically recover the BIOS and reset the system when the BIOS recovery is finished.

DO NOT shut down or reset the system while recovering the BIOS to prevent 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.

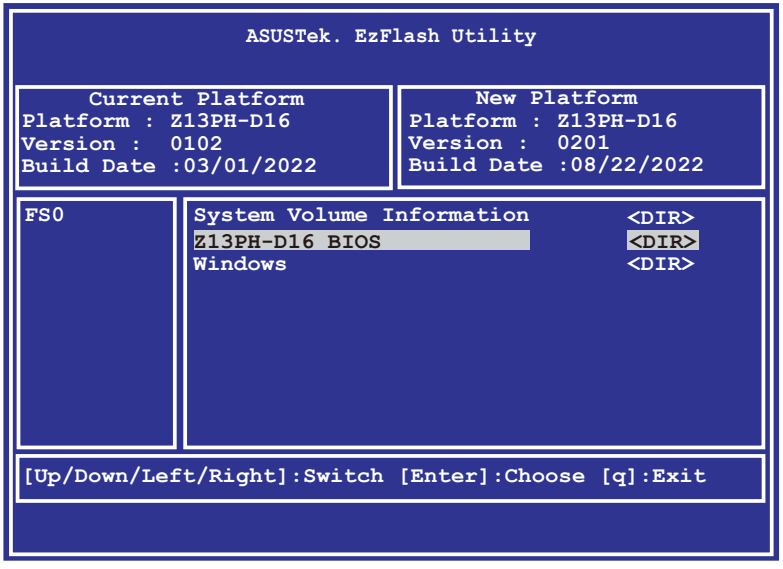
5.1.2 ASUS EZ Flash Utility

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 **ASUS EZ Flash Utility**. Press <Enter>.



3. Press <Tab> 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 <Tab> 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.

5.1.3 BUPDATER utility

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

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

Updating the BIOS file

To update the BIOS file using the BUPDATER utility:

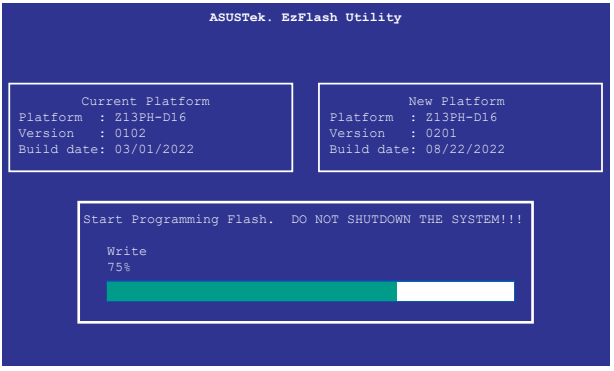
1. Visit the ASUS website at www.asus.com and download the latest BIOS file for the motherboard. Save the BIOS file to a bootable USB flash disk drive.
2. Copy the BUPDATER utility (BUPDATER.exe) from the ASUS support website at support.asus.com to the bootable USB flash disk drive you created earlier.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

   BUPDATER /i[filename].CAP

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

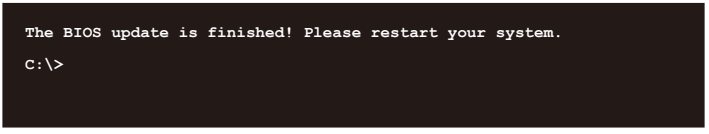
```
A:\>BUPDATER /i[file name].CAP
```

4. The utility verifies the file and starts updating the BIOS file.



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

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



5.2 BIOS setup program

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

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

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

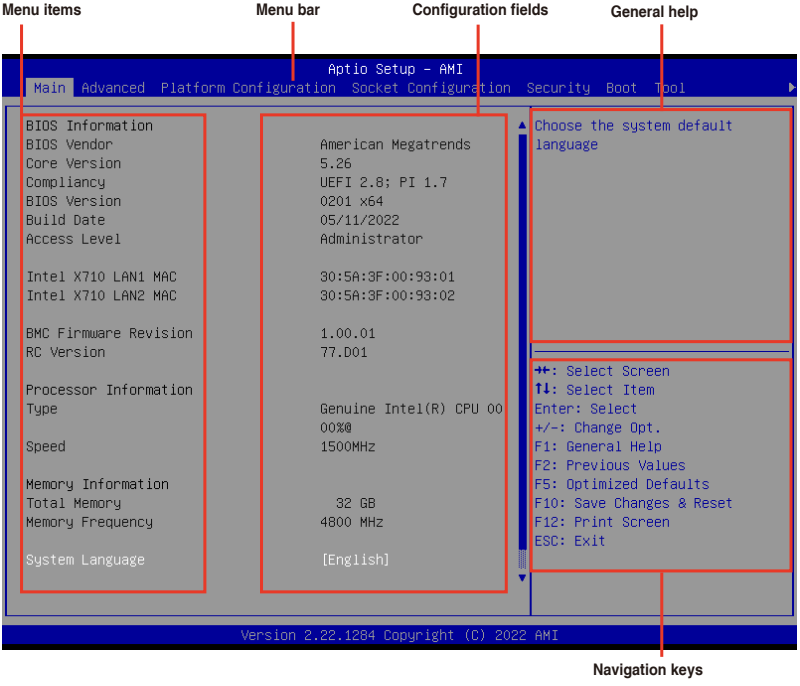
The firmware chip on the motherboard stores the Setup utility. When you start up the computer, the system provides you with the opportunity to run this program. Press <Del> during the Power-On Self-Test (POST) to enter the Setup utility; otherwise, POST continues with its test routines.

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

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

- The default BIOS settings for this motherboard apply for most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Press <F5> and select **Yes** to load the BIOS default settings.
- 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.

5.2.1 BIOS menu screen



5.2.2 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
Platform Configuration	For changing the platform settings
Socket Configuration	For changing the socket 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 (Advanced, Platform Configuration, Socket Configuration, Security, Boot, Tool, Event Logs, Server Mgmt, and Exit) 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

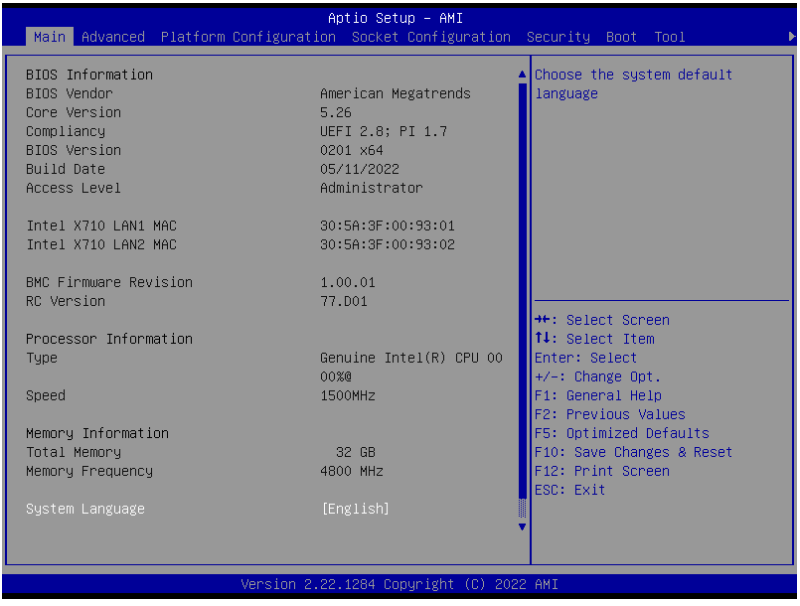
Select a menu item and press <Enter> to display a pop-up window with the configuration options for that item.

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.

5.3 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, language, and security settings.



System Language [English]

Allows you to select the system default language.

System Date [MM/DD/YYYY]

Allows you to set the system date.

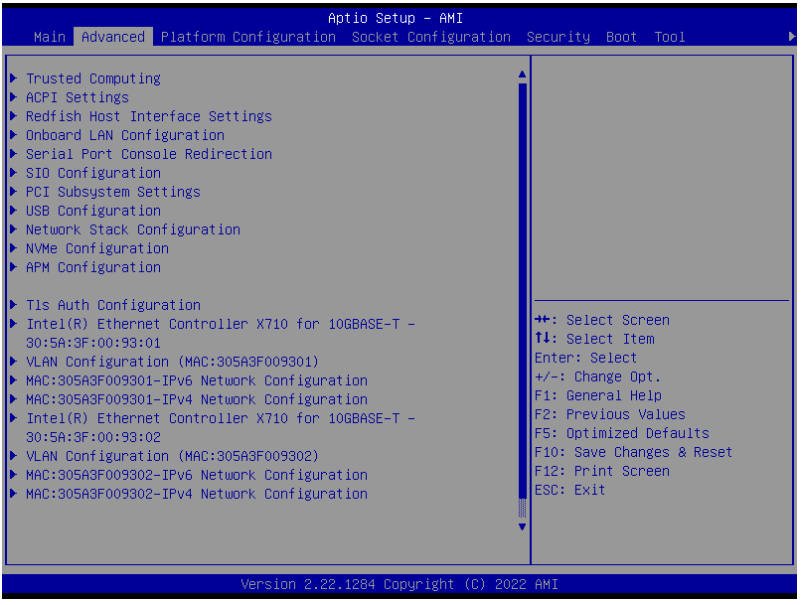
System Time [HH:MM:SS]

Allows you to set the system time.

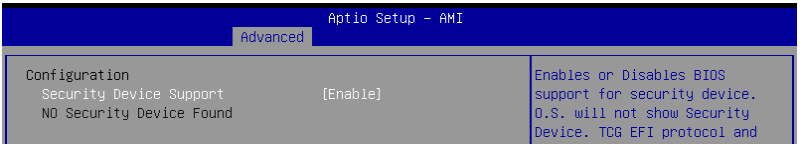
5.4 Advanced menu

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.



5.4.1 Trusted Computing

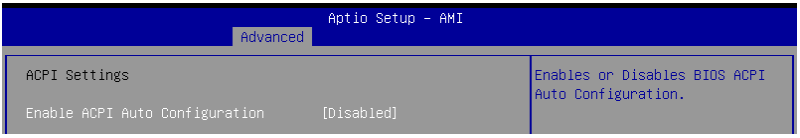


Configuration

Security Device Support [Enabled]

Allows you to enable or disable the BIOS support for security device.
Configuration options: [Disabled] [Enabled]

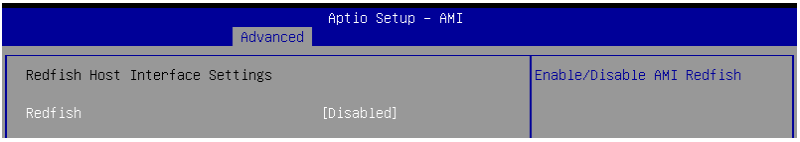
5.4.2 ACPI Settings



Enable ACPI Auto Configuration [Disabled]

Allows you to enable or disable the BIOS ACPI Auto Configuration.
Configuration options: [Disabled] [Enabled]

5.4.3 Redfish Host Interface Settings



Redfish [Disabled]

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

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

Authentication mode [Basic Authentication]

Allows you to select the authentication mode.
Configuration options: [Basic Authentication] [Session Authentication]

Redfish BMC Settings

IP address

Allows you to enter the IP address.

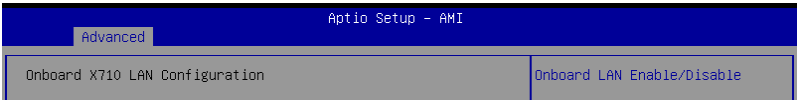
IP Mask address

Allows you to enter the IP Mask address.

IP Port

Allows you to enter the IP Port.

5.4.4 Onboard LAN Configuration



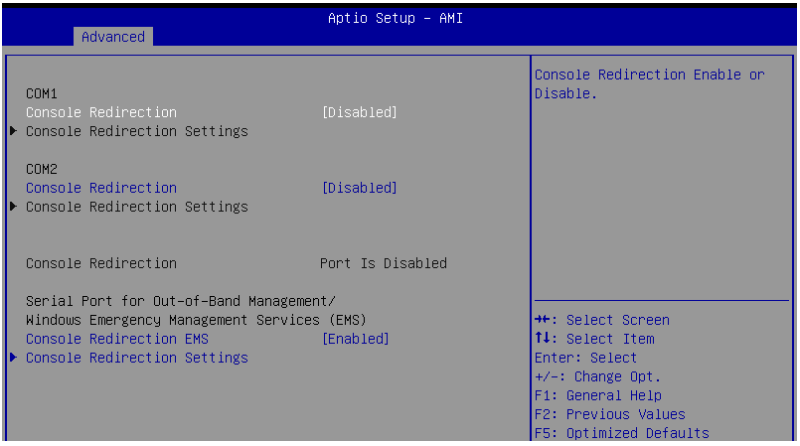
Onboard X710 LAN Configuration

Intel X710 LAN1

LAN Enable [LAN1, LAN2 Enabled]

Allows you to enable or disable the onboard LAN.
Configuration options: [Disabled] [LAN1 Enabled Only] [LAN1, LAN2 Enabled]

5.4.5 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 item is available only when **Console Redirection** for **COM1** or **COM2** is set to **[Enabled]**.

Console Redirection Settings

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

Terminal Type [ANSI]

Allows you to set the terminal type.

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

Bits per second [115200]

Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
Configuration options: [9600] [19200] [38400] [57600] [115200]

Data Bits [8]

Configuration options: [7] [8]

Parity [None]

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

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

Stop Bits [1]

Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning.) The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.
Configuration options: [1] [2]

Flow Control [None]

Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a "stop" signal can be sent to stop the data flow. Once the buffers are empty, a "start" signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.
Configuration options: [None] [Hardware RTS/CTS]

VT-UTF8 Combo Key Support [Enabled]

This allows you to enable the VT -UTF8 Combination Key Support for ANSI/VT100 terminals.
Configuration options: [Disabled] [Enabled]

Recorder Mode [Disabled]

With this mode enabled only text will be sent. This is to capture Terminal data.
Configuration options: [Disabled] [Enabled]

Resolution 100x31 [Enabled]

This allows you enable or disable extended terminal solution.
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 [Enabled]

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

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

Console Redirection Settings

Out-of-Band Mgmt Port [COM1]

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

Terminal Type EMS [VT-UTF8]

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

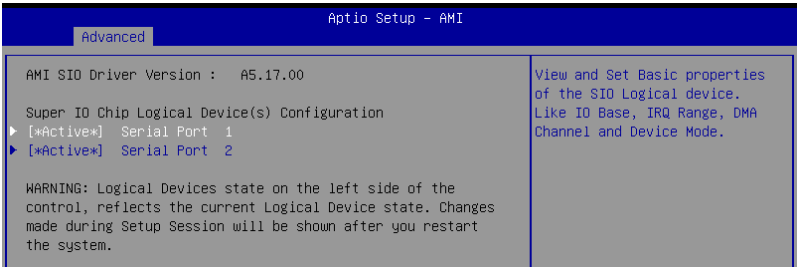
Bits per second EMS [115200]

Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
Configuration options: [9600] [19200] [57600] [115200]

Flow Control EMS [None]

Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a “stop” signal can be sent to stop the data flow. Once the buffers are empty, a “start” signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.
Configuration options: [None] [Hardware RTS/CTS] [Software Xon/Xoff]

5.4.6 SIO Configuration



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

[*Active*] Serial Port 1 / [*Active*] Serial Port 2

Allows you to view and set basic properties of the SIO Logical device. Like IO Base, IRQ Range, DMA Channel, and Device Mode.

Use This Device [Enabled]

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

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

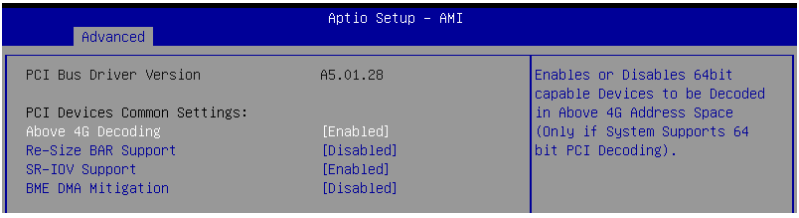
Disabling SIO Logical Devices may have unwanted side effects. PROCEED WITH CAUTION.

Possible: [Use Automatic Settings]

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

5.4.7 PCI Subsystem Settings

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



Above 4G Decoding [Enabled]

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

Re-Size BAR Support [Disabled]

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

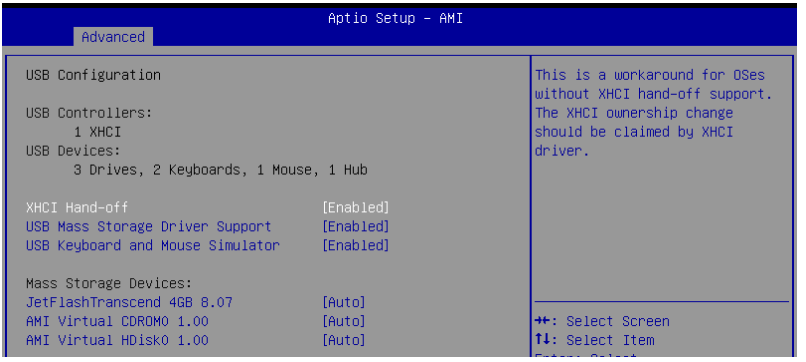
SR-IOV Support [Enabled]

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

BME DMA Mitigation [Disabled]

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

5.4.8 USB Configuration



XHCI Hand-off [Enabled]

Allows you to enable or disable workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
Configuration options: [Enabled] [Disabled]

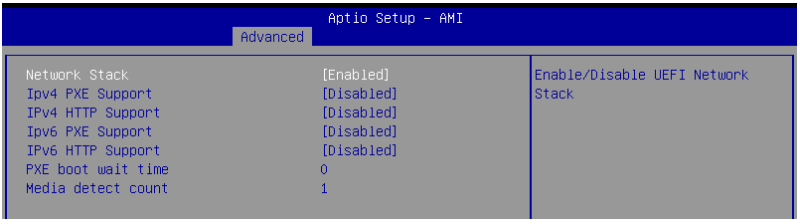
USB Mass Storage Driver Support [Enabled]

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

USB Keyboard and Mouse Simulator [Enabled]

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

5.4.9 Network Stack Configuration



Network Stack [Enabled]

Enables or disables the UEFI network stack.
Configuration options: [Disabled] [Enabled]

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

Ipv4 PXE Support [Disabled]

Enables or disables the Ipv4 PXE Boot Support. If disabled, Ipv4 PXE boot support will not be available.
Configuration options: [Disabled] [Enabled]

Ipv4 HTTP Support [Disabled]

Enables or disables the Ipv4 HTTP Boot Support. If disabled, Ipv4 HTTP boot support will not be available.
Configuration options: [Disabled] [Enabled]

Ipv6 PXE Support [Disabled]

Enables or disables the Ipv6 PXE Boot Support. If disabled, Ipv6 PXE boot support will not be available.
Configuration options: [Disabled] [Enabled]

Ipv6 HTTP Support [Disabled]

Enables or disables the Ipv6 HTTP Boot Support. If disabled, Ipv6 HTTP boot support will not be available.
Configuration options: [Disabled] [Enabled]

PXE boot wait time [0]

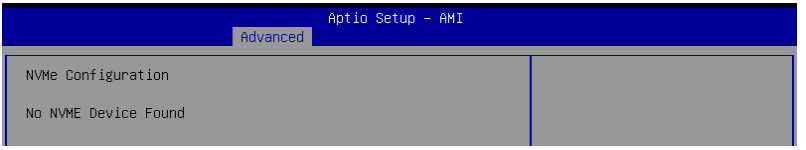
Set the wait time to press ESC key to abort the PXE boot. Use the <+> or <-> to adjust the value. The values range from 0 to 5.

Media detect count [1]

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

5.4.10 NVMe Configuration

This page will display the NVMe controller and drive information.



Device

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

Self Test Option [Short]

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

Self Test Action [Controller Only Test]

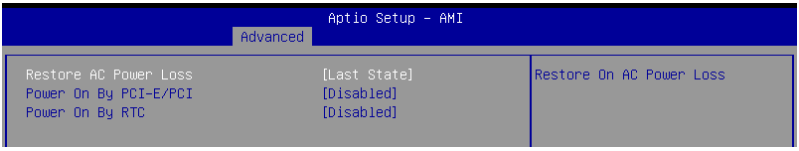
This item allows you to select either to test Controller alone or Controller and NameSpace. Selecting Controller and Namespace option will take a lot longer to complete the test.
Configuration options: [Controller Only Test] [Controller and NameSpace Test]

Run Device Self Test

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

5.4.11 APM Configuration

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



Restore AC Power Loss [Last State]

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

Power On By PCI-E [Disabled]

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

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

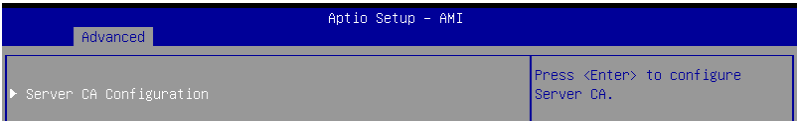
Power On By RTC [Disabled]

[Disabled] Disables RTC to generate a wake event.

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

5.4.12 T1s Auth Configuration

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



Enroll Cert

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

Enroll Cert Using File

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

Cert GUID

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

Commit Changes and Exit

Exit Server CA configuration after saving the changes.

Discard Changes and Exit

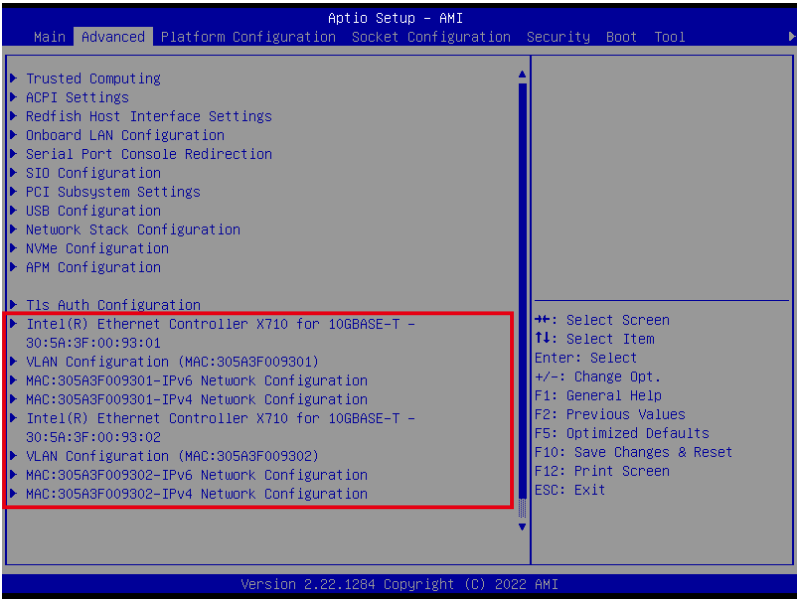
Exit Server CA configuration without saving any changes.

Delete Cert

Allows you to delete the certificate.

5.4.13 Third-party UEFI driver configurations

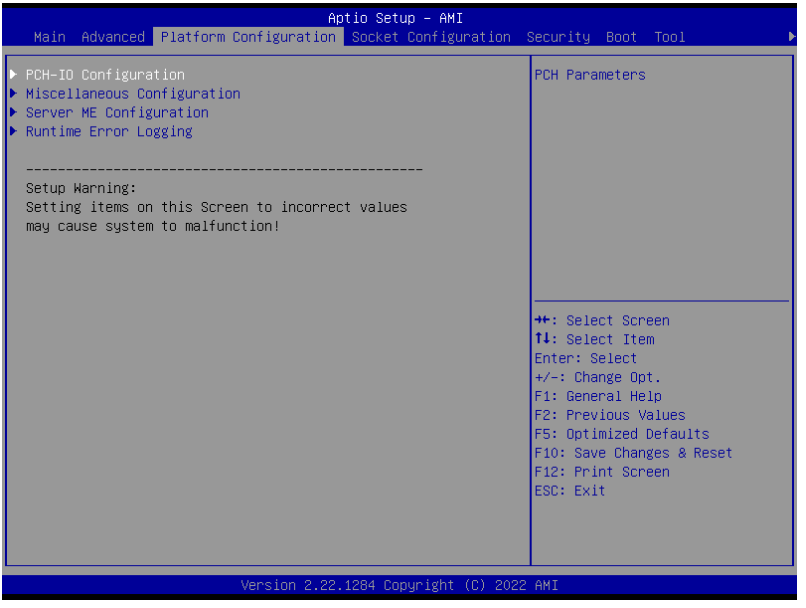
Additonal configuration options for third-party UEFI drivers installed to the system will appear in the section marked in red in the screenshot below.



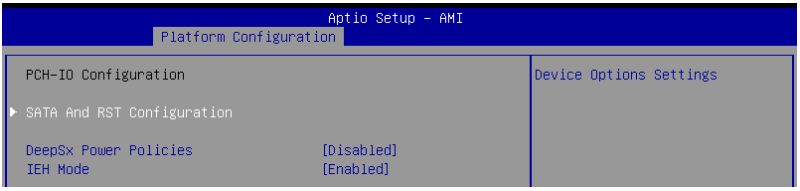
5.5 Platform Configuration menu

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

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



5.5.1 PCH-IO Configuration



SATA And RST Configuration

Allows you to configure SATA and RST settings.

Controller 1-3 SATA And RST Configuration

SATA Configuration [Enabled]

Allows you to enable or disable the SATA Controller
Configuration options: [Disable] [Enable]

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

SATA SGPIO Enable [Disabled]

Allows you to enable or disable Serial GPIO for the SATA Controller.
Configuration options: [Disabled] [Enabled]

SATA Port 0-7 [Enabled]

Allows you to enable or disable the selected SATA port.

Configuration options: [Disabled] [Enabled]

SATA Port 0-7 Hot Plug [Enabled]

Allows you to designate the selected SATA port as hot pluggable.

Configuration options: [Disabled] [Enabled]

SATA Port 0-7 Spin Up Device [Disabled]

Allows you to designate the selected SATA port as a spin up device. If this option is enabled for any port, staggered spin up will be performed and only the drives which have this option enabled will spin up at boot. If disabled for all ports, all drives will spin up at boot.

Configuration options: [Disabled] [Enabled]

DeepSx Power Policies [Disabled]

Allows you to configure the DeepSx power policy.

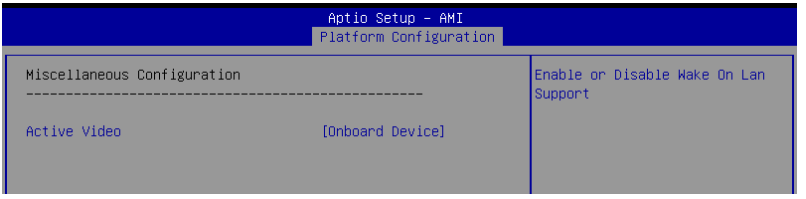
Configuration options: [Disabled] [Enabled in S5]

IEH Mode [Enabled]

Allows you to enable or bypass Interrupt Error Handling (IEH).

Configuration options: [Bypass Mode] [Enabled]

5.5.2 Miscellaneous Configuration

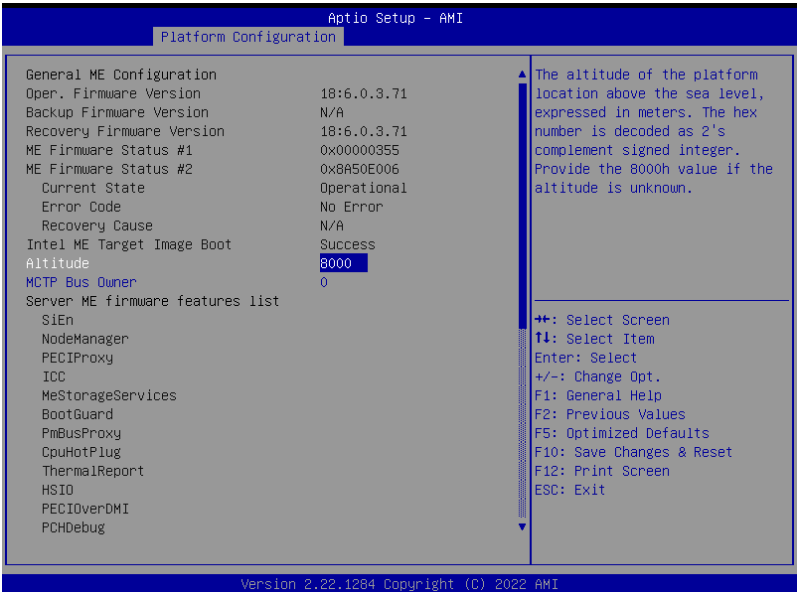


Active Video [Onboard Device]

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

5.5.3 Server ME Configuration

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



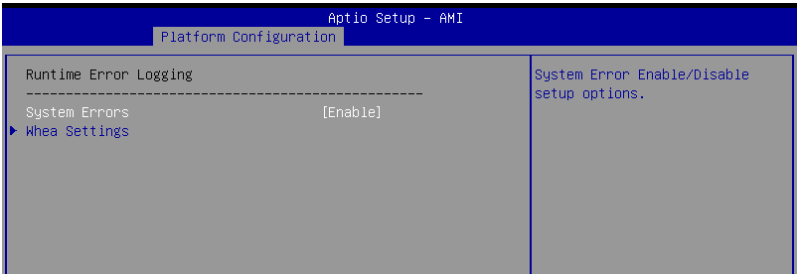
Altitude [8000]

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

MCTP Bus Owner [0]

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

5.5.4 Runtime Error Logging Support



System Errors [Enable]

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

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

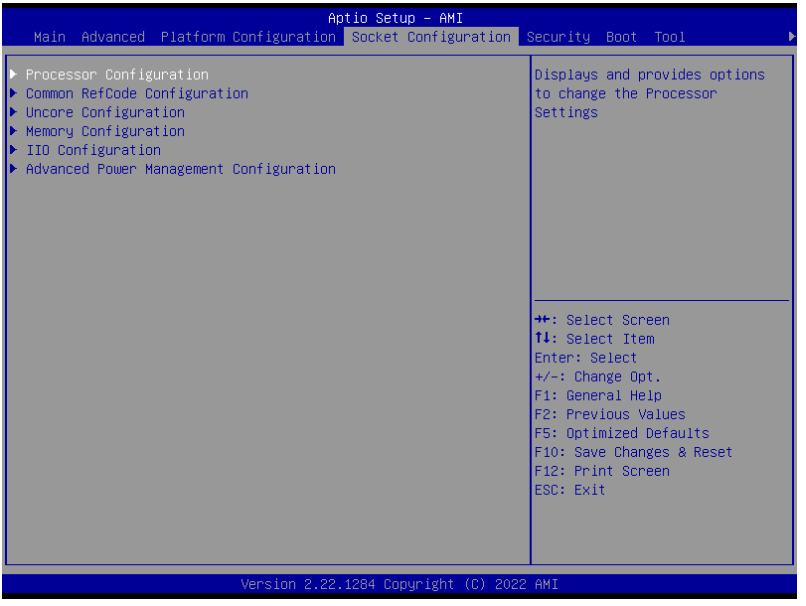
Whea Settings

Whea Support [Enable]

Allows you to enable or disable Whea support.
Configuration options: [Disable] [Enable]

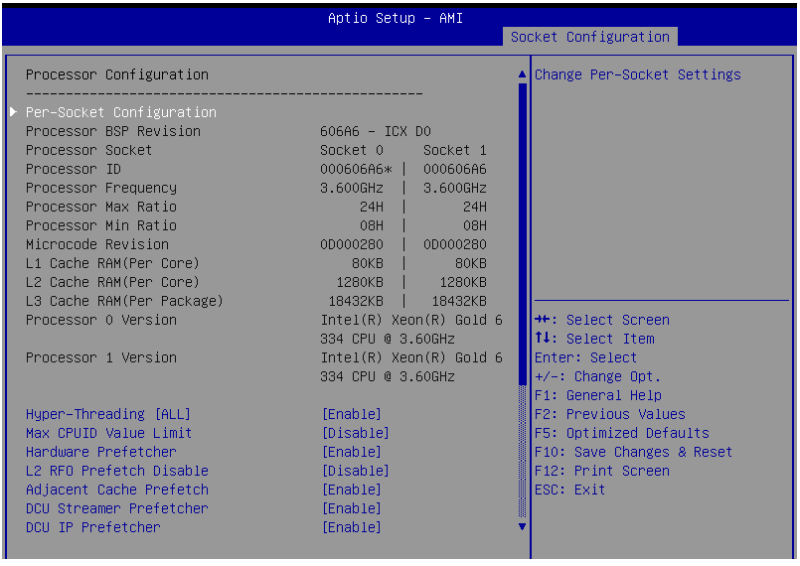
5.6 Socket Configuration menu

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



5.6.1 Processor Configuration

Scroll using the <Page Up> / <Page Down> keys to view more items.



Per-Socket Configuration

Allows you to change Per-Socket Settings.

CPU Socket 0/1 Configuration

Core Disable Bitmap(Hex) [0]

Allows you to set the Core Disable Bitmap. Set this item to [0] to enable all cores. Set this item to [FFFFFFFFFF] to disable all cores.

At least one core per CPU must be enabled. Disabling all cores is an invalid configuration.

Hyper Threading [Enabled]

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

IED Trace Memory [Disabled]

Allows you to allocate memory for PSMI trace.

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

Skip Flex Ratio Override [Disabled]

Allows you to skip flex ratio overrides to use power-on default flex ratio values. In multi-socket systems, this will allow mixed flex ratio limits.

Configuration options: [Disabled] [Enabled]

Check CPU BIST Result [Enabled]

Allows you to check or ignore BIST results. If enabled, cores with failed BIST results will be disabled.

Configuration options: [Disabled] [Enabled]

3StrikeTimer [Enabled]

Allows you to enable or disable the 3 strike counter.

Configuration options: [Disabled] [Enabled]

Fast String [Enabled]

Allows you to enable or disable fast strings for REP MOVS/STOS.

Configuration options: [Disabled] [Enabled]

Machine Check [Enabled]

Allows you to enable or disable the machine check.

Configuration options: [Disabled] [Enabled]

Hardware Prefetcher [Enabled]

Allows you to enable or disable the hardware prefetcher.

Configuration options: [Disabled] [Enabled]

L2 RFO Prefetch Disable [Disabled]

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

Adjacent Cache Prefetch [Enabled]

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

DCU Streamer Prefetcher [Enabled]

Allows you to enable or disable prefetcher of next L1 data line.
Configuration options: [Disabled] [Enabled]

DCU IP Prefetcher [Enabled]

Allows you to enable or disable prefetch of next L1 line based upon sequential load history.
Configuration options: [Disabled] [Enabled]

LLC Prefetch [Disabled]

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

DCU Mode [Normal]

[Normal] The whole DCU is used for caching.

[Mirror-Mode] DCU is organized as 2x16KB mirrored copies.

AMP Prefetch [Disabled]

Allows you to enable or disable AMP Prefetch.
Configuration options: [Disabled] [Enabled]

Extended APIC [Enabled]

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

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

APIC Physical Mode [Disabled]

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

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

Allows you to select the PECI trust mode

Configuration options: [All PECI Agents untrusted] [All PECI Agents trusted] [Use per-PECI agent trust mode]

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

Legacy Agent [Enabled]

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

SMBus Agent [Disabled]

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

IE Agent [Enabled]

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

Generic Agent [Disabled]

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

eSPI Agent [Disabled]

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

DfxRedManu Agent [Disabled]

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

DfxOrange Agent [Disabled]

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

DBP-F [Disabled]

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

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

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

SMM Blocked and Delayed [Disabled]

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

eSMM Save State [Disabled]

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

Smbus Error Recovery [Enabled]

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

Intel(R) TXT [Disabled]

Allows you to enable or disable Intel® TXT.

Configuration options: [Disabled] [Enabled]

VMX [Enabled]

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

Enable SMX [Disabled]

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

Lock Chipset [Enabled]

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

MSR Lock Control [Enabled]

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

PPIN Control [Unlock/Enabled]

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

AES-NI [Enabled]

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

TME, TME-MT, TDX

Total Memory Encryption (TME) [Disabled]

Allows you to enable or disable Total Memory Encryption (TME).
Configuration options: [Disabled] [Enabled]

The following item appears only when **Total Memory Encryption (TME)** is set to **[Enabled]**.

Total Memory Encryption (TME) Bypass [Auto]

Allows you to configure Total Memory Encryption (TME) Bypass.
Configuration options: [Auto] [Disabled] [Enabled]

Software Guard Extension (SGX)

The following items are available only when **Total Memory Encryption (TME)** is set to **[Enabled]**.

SGX Factory Reset [Disabled]

Allows you to factory reset SGX and reset all SGX BIOS knobs to default values.

SW Guard Extensions (SGX) [Disabled]

Allows you to enable or disable Software Guard Extensions (SGX)
Configuration options: [Disabled] [Enabled]

SGX Package Info In-Band Access [Disabled]

Allows you to enable or disable Software Guard Extensions (SGX) Package Info In-band Access.
Configuration options: [Disabled] [Enabled]

In Field Test (IFT)

The following items appear only when **Total Memory Encryption (TME)** is set to **[Enabled]**.

Enable SAF [Enabled]

Allows you to enable or disable Scan at Field (SAF).
Configuration options: [Disabled] [Enabled]

SAF Size [128M]

Allows you to set the SAF size region inside the PRM.

PSMI Configuration

Global PSMI Enable [Enabled]

Configuration options: [Disabled] [Enabled] [Force setup]

The following item appears only when **Global PSMI Enable** is set to **[Enabled]** or **[Force setup]**.

Socket 0/1 Configuration

PSMI Enable [Disabled]

Configuration options: [Disabled] [Enabled]

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

PSMI Handler Size [256K]

Configuration options: [256K] [512K] [1M]

PSMI Trace Region 0-4 [Disable]

Configuration options: [Disabled] [Enabled]

The following items appear only when **PSMI Trace Region** is set to **[Enabled]**.

Buffer Size [1M]

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

Cache Type [Any]

Configuration options: [Any] [Uncached] [Write Combine]

Processor CFR Configuration

Provision S3M CFR [Enabled]

Allows you to enable or disable S3M CFR provisioning.
Configuration options: [Disabled] [Enabled]

Manual Commit S3M FW CFR [Disabled]

Allows you to manually commit S3M FW CFR.
Configuration options: [Disabled] [Enabled]

Provision PUcode CFR [Enabled]

Allows you to enable or disable PUCode CFR provisioning.
Configuration options: [Disabled] [Enabled]

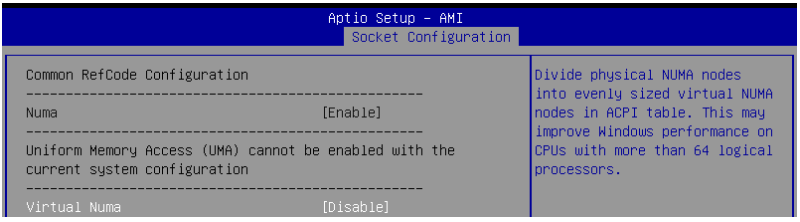
Manual Commit PUCode CFR [Disabled]

Allows you to manually commit PUCode CFR.
Configuration options: [Disabled] [Enabled]

Socket0-3 CFR Revision Info

Allows you to view the CFR revision information for the selected socket.

5.6.2 Common RefCode Configuration



Virtual Numa [Enabled]

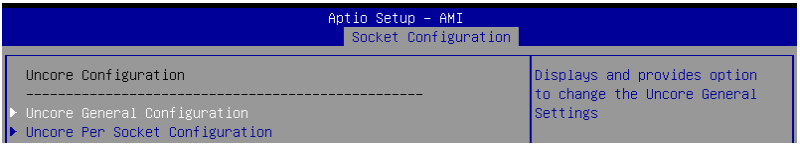
Allows you to enable or disable virtual non-uniform memory access (NUMA).
Configuration options: [Disabled] [Enabled]

UMA-Based Clustering [Quadrant (4-Clusters)]

Allows you to set the UMA-based clustering mode.

Configuration options: [Hemisphere (2-clusters)] [Quadrant (4-clusters)]

5.6.3 Uncore Configuration



Uncore General Configuration

Uncore Status

Allows you to view the Uncore status.

MMCFG Base [Auto]

Allows you to set the MMCFG Base.
Configuration options: [1G] [1.5G] [1.75G] [2G] [2.25G] [3G] [Auto]

MMCFG Size [Auto]

Allows you to set the MMCFG Size.
Configuration options: [64M] [128M] [256M] [512M] [1G] [2G] [Auto]

MMIO High Base [32T]

Allows you to set the MMIO High Base.
Configuration options: [56T] [40T] [32T] [24T] [16T] [4T] [2T] [1T] [512G] [3584T]

MMIO High Base [256G]

Allows you to set the MMIO High Granularity Size.
Configuration options: [1G] [4G] [16G] [64G] [256G] [1024G]

Limit CPU PA to 46 bits [Enabled]

Allows you to limit CPU physical address to 46 bits to support older Hyper-V. Automatically disables TME-MT if enabled.
Configuration options: [Disabled] [Enabled]

Uncore Per-Socket Configuration

CPU 1-8 UPI Port

Link Disable [No]

Allows you to enable or disable the selected UPI port.

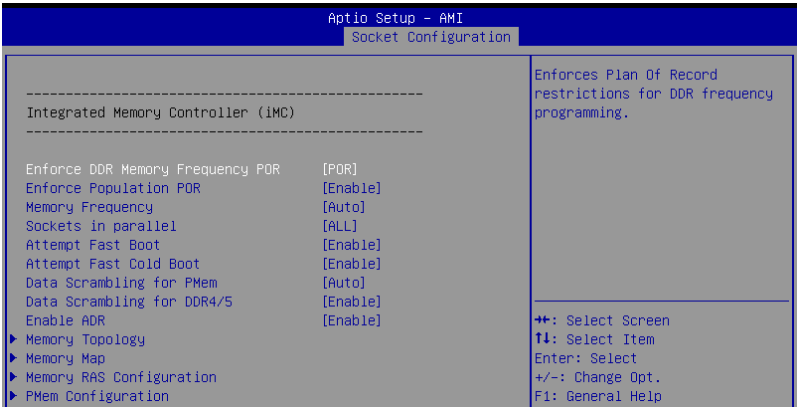
Configuration options: [No (Enable)] [Yes (Disable)]

Current UPI Link Speed [Auto]

Allows you to select the UPI link frequency. The Auto setting is based on Si Compatibility.

Configuration options: [12.8GT/s] [14.4GT/s] [16.0GT/s] [Auto]

5.6.4 Memory Configuration



Enforce DDR Memory Frequency POR [POR]

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

Enforce Population POR [Enabled]

Allows you to enforce POR restrictions for memory population.

Configuration options: [Disabled] [Enabled]

Memory Frequency [Auto]

Allows you to set the maximum memory frequency in MHz. If Enforce POR is disabled, system memory can be run at frequencies higher than the memory supports (limited by processor support).

Configuration options: [Auto] [3200] [3600] [4000] [4400] [4800]

Sockets in Parallel [All]

Allows you to set the number of sockets operating in parallel.

Configuration options: [All] [1] [2] [4]

Attempt Fast Boot [Enabled]

Allows you to enable or disable fast boot. Portions of memory reference code will be skipped when possible to increase boot speed on warm boots.

Configuration options: [Disabled] [Enabled]

Attempt Fast Cold Boot [Enabled]

Allows you to enable or disable fast cold boot. Portions of memory reference code will be skipped when possible to increase boot speed on cold boots.

Configuration options: [Disabled] [Enabled]

Data Scrambling for PMem [Auto]

Allows you to enable or disable data scrambling for PMem. If set to Auto, data scrambling will be enabled or disabled depending on stepping.

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

Data Scrambling for DDR4/5 [Enabled]

Allows you to enable or disable data scrambling for DDR4/5.

Configuration options: [Disabled] [Enabled]

Enable ADR [Enabled]

Allows you to enable or disable ADR. Automatically enabled if fADR is enabled.

Configuration options: [Disabled] [Enabled]

Memory Topology

Displays memory topology with DIMM population information.

Memory Map

Allows you to set memory mapping settings.

Volatile Memory Mode [2LM]

Selects 1LM or 2LM mode for volatile memory. For 2LM memory mode, BIOS will try to configure 2LM, but if BIOS is unable to configure 2LM, volatile memory mode will fall beck to 1LM.

Configuration options: [1LM] [2LM]

Memory RAS Configuration

Displays and provides options to change the memory RAS Settings.

Dynamic ECC Mode Selection [Enabled]

Allows you to enable or disable Dynamic ECC Mode Selection.

Configuration options: [Disabled] [Enabled] [Enabled + Allow 128b ECC]

Enable PCode WA for SAI PG [Disabled]

Allows you to enable or disable the PCode workaround for SAI Policy Group for A Step.

Configuration options: [Disabled] [Enabled]

Mirror Mode [Disabled]

Allows you to set the mirror mode. Full mirror mode will set the entire 1LM memory in system to be mirrored, consequently reducing the memory capacity by half. Partial mirror mode will set the mirror size according to the Partial Mirror Size field. If rank sparing is enabled, partial mirroring will not take effect.
Configuration options: [Disabled] [Full Mirror Mode] [Partial Mirror Mode]

The following items appear only when **Mirror Mode** is set to **[Partial Mirror Mode]**.

Partial Mirror 1 Size (GB) [0]
Allows you to set the size of the created SAD in GB.

Mirror TAD0 [Disabled]

Allows you to enable or disable mirror of the entire memory for TAD0.
Configuration options: [Disabled] [Enabled]

UEFI ARM Mirror [Disabled]

Allows you to enable or disable imitation of UEFI based address range mirror.
Configuration options: [Disabled] [Enabled]

The following items appear only when **UEFI ARM Mirror** is set to **[Enabled]**.

ARM Mirror Percentage [0]
Allows you to set the percantage to be mirrored in basis points. 12.75% is represented as 1275.

Memory Correctable Error Flood Policy [Frequency]

Allows you to set the Memory Correctable Error Flood Policy.

[Disabled]	Ignore Memory CE Flood.
[Once]	Only first Memory CE will trigger SMI.
[Frequency]	Disable SMI when Memory CE reaches threshold within time limit.

Correctable Error Threshold [7FFF]

Allows you to set the Correctable Error Threshold (0x01 - 0x7fff) used for sparing and leaky bucket.

Trigger SW Error Threshold [Disabled]

Allows you to enable or disable the Trigger SW Error Threshold.
Configuration options: [Disabled] [Enabled]

The following items appear only when **Trigger SW Error Threshold** is set to **[Enabled]**.

SW Per Bank Threshold [3]
Allows you to set the SW Per Bank Correctable Error Threshold (1 - 0x7FFF) used for bank level errors.

SW Correctable Error Time Window [24]
Allows you to set the SW Correctable Error time window in hours (0 - 24)

Leaky Bucket Time Window Based Interface [Disabled]

Allows you to enable or disable the Leaky Bucket Time Window Based Interface.
Configuration options: [Disabled] [Enabled]

The following items appear only when **Leaky Bucket Time Window Based Interface** is set to **[Enabled]**.

Leaky Bucket Time Window Based Interface Hour [24]
Allows you to set the time window hour.

Leaky Bucket Time Window Based Interface Minute [0]
Allows you to set the time window minute.

The following items appear only when **Leaky Bucket Time Window Based Interface** is set to **[Disabled]**.

Leaky Bucket Low Bit [28]
Allows you to set the Leaky Bucket low bit.

Leaky Bucket High Bit [29]
Allows you to set the Leaky Bucket high bit.

ADDDC Sparing [Disabled]

Allows you to enable or disable ADDDC Sparing.
Configuration options: [Disabled] [Enabled]

Patrol Scrub [Enabled at End of POST]

Allows you to enable or disable Patrol Scrub.
Configuration options: [Disabled] [Enabled at End of POST]

The following items appear only when **Patrol Scrub** is set to **[Enabled at End of POST]**.

Patrol Scrub Interval [24]
Allows you to set the number of hours (1-24) required to complete a full scrub.

DDR5 ECS [Disabled]

Allows you to enable or disable DDR5 Error Check and Scrub (ECS)
Configuration options: [Disabled] [Enabled]

PMem Configuration

Displays and provides options to change the PMem settings.

PMem Secure Erase Unit

Allows you to securely erase the persistent memory region of the selected DIMMs.

PMem Factory Reset/Clear [Disabled]

Allows you to factory reset or clear PMem. PMem Power Policy settings will also be set to default values.
Configuration options: [Disabled] [Enabled]

PMem Average Power Limit (in mW) [15000]

Allows you to set the power limit in mW used for average power. Valid range starts from 10,000mW and must be a multiple of 250mW.

PMem Turbo/Memory Bandwidth Boost (MBB) [Disabled]

Allows you to enable or disable the Turbo/Memory Bandwidth Boost (MBB) feature.
Configuration options: [Disabled] [Enabled]

The following items appear only when **Trigger SW Error Threshold** is set to **[Enabled]**.

PMem MBB Average Power Time Constant [15000]
Allows you to set the base time window for power usage requirements in msec. Valid range is between 1,000msec and 120,000msec and must be a multiple of 1,000msec.

PMem MBB Power Limit [18000]
Allows you to set the power limit for the Memory Bandwidth Boost power consumption. Valid range starts from 15,000mW.

Publish ARS Capability [Enabled]

Allows you to enable or disable publishing of the Address Range Scrub capability to the OS.
Configuration options: [Disabled] [Enabled]

PMem ECC Read Check [Enabled]

Allows you to enable or disable PMem ECC Read Check.
Configuration options: [Disabled] [Enabled]

PMem Latch System Shutdown State [Enabled]

Allows you to set the Latch System Shutdown State.
Configuration options: [Disabled] [Enabled]

Power Cycle on PMem Surprise Clock Stop [Enabled]

Allows you to enable or disable the power policy when PMem receives a surprise clock stop.
Configuration options: [Disabled] [Enabled]

Snoopy Mode for AD [Disabled]

Allows you to enable or disable AD-specific features to avoid directory updates to PMem memory from non-NUMA optimized workloads.
Configuration options: [Disabled] [Enabled]

LSx Implementation [ASL]

Allows you to select the LSx implementation method.
Configuration options: [SWSMI] [ASL]

Extended Type 17 Structure [Enabled]

Allows you to enable or disable extended Type 17 SMBIOS structures.
Configuration options: [Disabled] [Enabled]

SMBus Max Access Time [350]

Allows you to set the maximum amount of time in milliseconds the UEFI management driver is allowed to use the SMBus.

SMBus Release Delay [150]

Allows you to set the delay in milliseconds before releasing after the UEFI management driver requests a SMbus release.

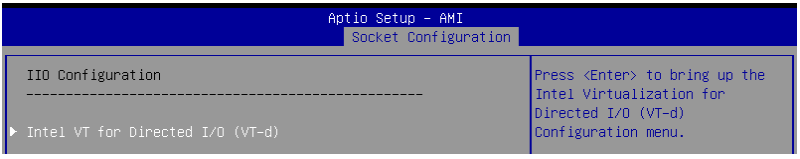
NVDimm Mailbox in NFIT [Disabled]

Allows you to enable or disable publishing NVDIMM registers in NFIT structures.
Configuration options: [Disabled] [Enabled]

Seamless: Opt-in DIMMs [Keep]

Allows you to keep, enable, or disable opt-in DIMMs if supported by FW. FW activation does not update the FW digest CSR.
Configuration options: [Keep] [Disabled] [Enabled]

5.6.5 IIO Configuration

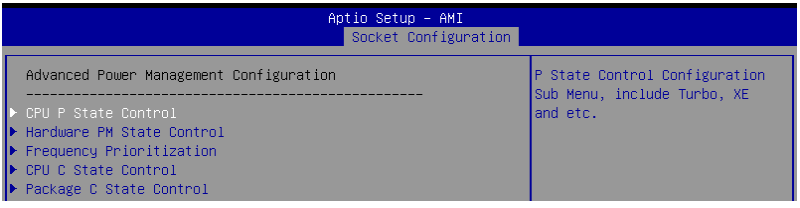


Intel(R) VT for Directed I/O (VT-d)

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

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

5.6.6 Advanced Power Management Configuration



CPU P State Control

Displays and provides options to change the CPU P State settings.

AVX Licence Pre-Grant Override [Disabled]

Enabled AVX ICCP pre-grant level override.
Configuration options: [Disabled] [Enabled]

The following item appears only when **AVX Licence Pre-Grant Override** is set to **[Enable]**.

AVX ICCP pre-grant level [128 Heavy]

Pre-grants an AVX level to the core. Base frequency is not updated.
Configuration options: [128 Heavy] [256 Light] [256 Heavy] [512 Light] [512 Heavy]

SpeedStep (Pstates) [Enabled]

Allows you to enable or disable EIST (P-States).
Configuration options: [Disabled] [Enabled]

The following items appear only when **SpeedStep (Pstates)** is set to **[Enable]**.

AVX P1 [Nominal]
AVX P1 level selection.
Configuration options: [Nominal] [Level 1] [Level 2]

Turbo Mode [Enabled]
Allows you to enable or disable processor turbo mode. Requires EMTTM to be enabled.

Configuration options: [Disabled] [Enabled]

Dynamic SST-PP [Disabled]
Allows you to enable or disable dynamic SST-PP selection.
Configuration options: [Disabled] [Enabled]

The following item appears only when **Dynamic SST-PP** is set to **[Disabled]**.

Intel SST-PP [Auto]
Intel SST-PP level selection.
Configuration options: [Auto] [Level 0] [Level 3] [Level 4]

Activate SST-BF [Disabled]

Allows you to enable or disable SST-BF.
Configuration options: [Disabled] [Enabled]

Configure SST-BF [Enabled]

Allows BIOS to configure SST-BF High Priority Cores so that SW does not have to configure.
Configuration options: [Disabled] [Enabled]

Boot performance mode [Max Performance]

Allows you to select the performance state that the BIOS will set before OS hand off.
Configuration options: [Max Performance] [Max Efficient] [Set by Intel Node Manager]

Energy Efficient Turbo [Enable]

Allows you to enable or disable Energy Efficient Turbo.
Configuration options: [Disable] [Enable]

Hardware PM State Control

Hardware P-States [Native Mode]

Allows you to select a hardware P-state.
Configuration options: [Disabled] [Native Mode] [Out of Band Mode] [Native Mode with No Legacy Support]

Frequency Prioritization

SST-CP [Disabled]

Allows you to enable or disable per-core power budgeting.
Configuration options: [Disabled] [Enabled]

CPU C State Control

Enable Monitor MWAIT [Auto]

Allows you to enable or disable Monitor and MWAIT instructions.
Configuration options: [Disable] [Enable] [Auto]

CPU C1 auto demotion [Enabled]

Allows CPU to automatically demote to C1. Takes effect after reboot.
Configuration options: [Disabled] [Enabled]

CPU C1 auto undemotion [Enabled]

Allows CPU to automatically undemote from C1. Takes effect after reboot.
Configuration options: [Disabled] [Enabled]

CPU C6 Report [Auto]

Allows you to enable or disable CPU C6 (ACPI C3) report to OS.
Configuration options: [Disabled] [Enabled] [Auto]

Enhanced Halt State (C1E) [Enabled]

Core C1E auto promotion Control. Takes effect after reboot.
Configuration options: [Disabled] [Enabled]

OS ACPI Cx [ACPI C2]

Allows you to select whether CC3/CC6 is reported to OS ACPI C2 or ACPI C3.
Configuration options: [ACPI C2] [ACPI C3]

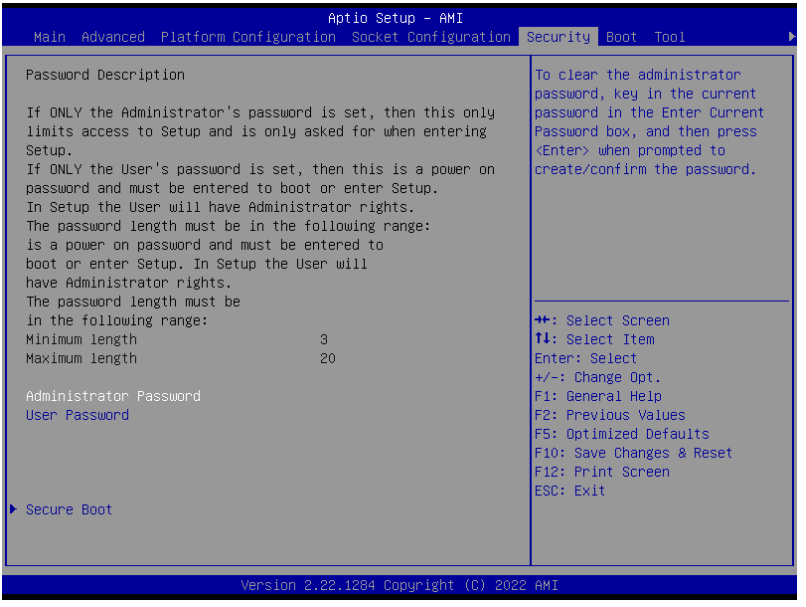
Package C State Control

Package C State [Auto]

Allows you to select Package C State limit.
Configuration options: [C0/C1 state] [C2 state] [C6 (non-retention state] [C6 (retention state] [No limit] [Auto]

5.7 Security menu

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



Administrator Password

To set an administrator password:

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

To change an administrator password:

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

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

User Password

To set a user password:

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

To change a user password:

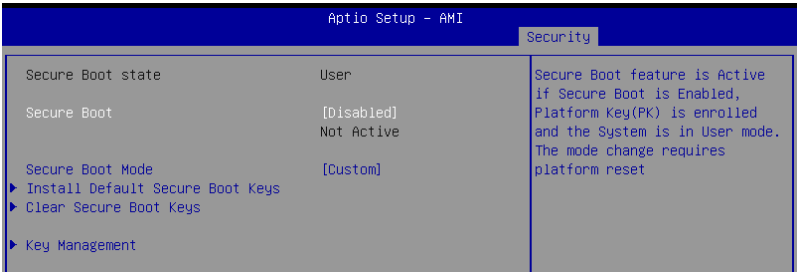
1. Select the User Password item and press <Enter>.
2. From the Enter Current Password box, key in the current password, then press <Enter>.
3. From the Create New Password box, key in a new password, then press <Enter>.
4. Confirm the password when prompted.

To clear a user password:

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

5.7.1 Secure Boot

This item allows you to customize the Secure Boot settings.



Secure Boot [Disabled]

Secure Boot feature is active if Secure Boot is Enabled, Platform Key (PK) is enrolled and the system is in User mode. The mode change requires platform reset.
Configuration options: [Disabled] [Enabled]

Secure Boot Mode [Custom]

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

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

Install Default Secure Boot Keys

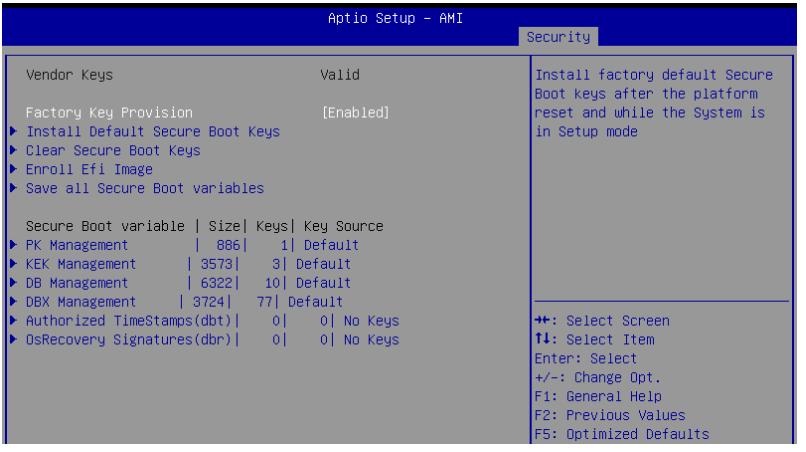
This option will load the default secure boot keys, including the PK (Platform key), KEK (key-exchange key), db (signature database), and dbx (revoked signature database). All the secure boot keys states will change from unloaded to loaded. Save changes and reset the system for the changes to take effect.

Clear Secure Boot Keys

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

Key Management

This item only appears when the item **Secure Boot Mode** is set to **[Custom]**. The Key Management item allows you to modify Secure Boot variables and set Key Management page.



Factory Key Provision [Enabled]

Allows you to provision factory default Secure Boot keys when the system is in Setup Mode.
Configuration options: [Disabled] [Enabled]

Install Default Secure Boot Keys

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

Clear Secure Boot Keys

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

Enroll Efi Image

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

Save all Secure Boot Variables

This option will save NVRAM content of Secure Boot policy variables to the file (EFI_ SIGNATURE_LIST data format) in root foler on a target file system device.

PK Management

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

KEK Management / DB Management / DBX Management

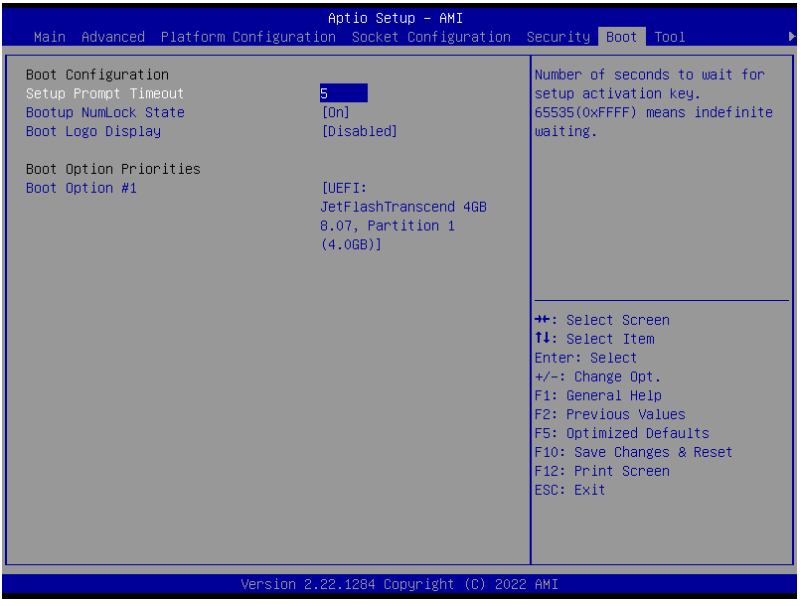
Configuration options: [Details] [Save To File] [Set New Key] [Append Key] [Delete key]

Authorized TimeStamps / OsRecovery Signatures

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

5.8 Boot menu

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



Setup Prompt Timeout [1]

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

Bootup NumLock State [On]

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

Boot Logo Display [Disabled]

[Disabled] Hide the logo during POST.

[Enabled] Display the logo during POST.

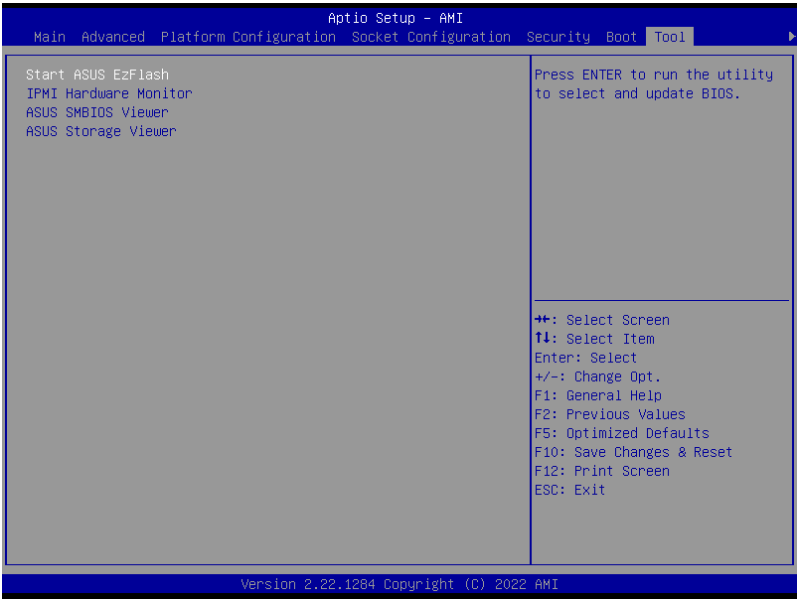
Boot Option Priorities

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

- To select the boot device during system startup, press <F11> when logo appears.
- To access Windows OS in Safe Mode, please press <F8> after POST.

5.9 Tool menu

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



Start ASUS EzFlash

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

IPMI Hardware Monitor

Allows you to start the IPMI hardware monitor.

ASUS SMBIOS Viewer

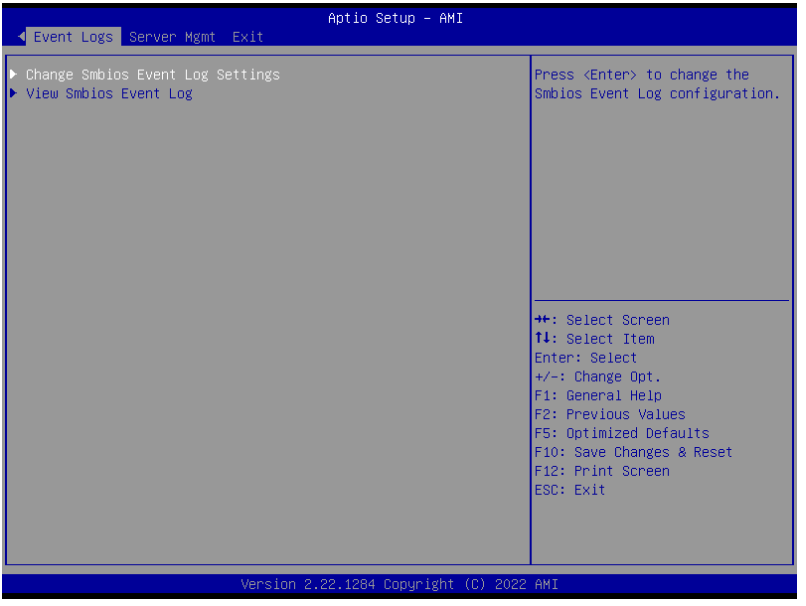
Allows you to start the ASUS SMBIOS Viewer.

ASUS Storage Viewer

Allows you to start the ASUS Storage Viewer.

5.10 Event Logs menu

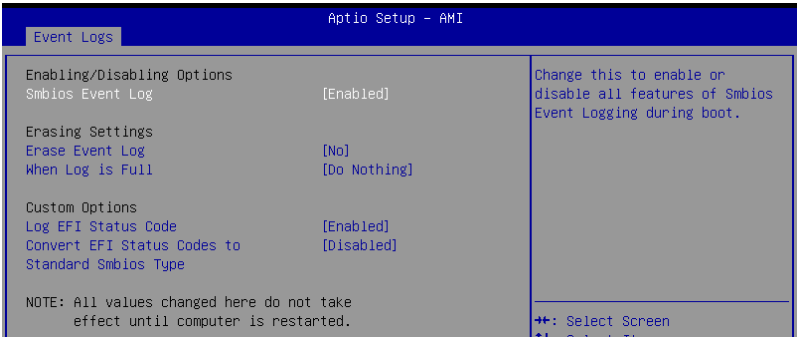
The Event Logs menu items allow you to change the event log settings and view the system event logs.



5.10.1 Change Smbios Event Log Settings

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

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



Enabling/Disabling Options

Smbios Event Log [Enabled]

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

The following items only appear when **Smbios Event Log** is set to **[Enabled]**.

Erasing Settings

Erase Event Log [No]

Choose options for erasing Smbios Event Log. Erasing is done prior to any logging activation during reset.
Configuration options: [No] [Yes, Next reset] [Yes, Every reset]

When Log is Full [Do Nothing]

Choose options for reactions to a full Smbios Event Log.
Configuration options: [Do Nothing] [Erase Immediately]

Custom Options

Log EFI Status Code [Enabled]

Allows you to enable or disable the logging of EFI Status Codes as OEM reserved type E0 (if not already converted to legacy).
Configuration options: [Disabled] [Enabled]

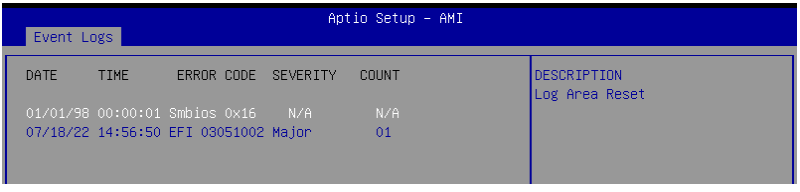
The following item only appears when **Log EFI Status Code** is set to **[Enabled]**.

Convert EFI Status Codes to Standard Smbios Type [Disabled]

Allows you to enable or disable the converting of EFI Status Codes to Standard Smbios Types (not all may be translated).
Configuration options: [Disabled] [Enabled]

5.10.2 View Smbios Event Log

Press <Enter> to view all smbios event logs.



5.11 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. Helps determine if the OS successfully loaded or follows the OS Boot Watchdog Timer policy.
Configuration options: [Disabled] [Enabled]

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

OS Wtd Timer Timeout [10]

Allows you to enter a value between 1 to 30 minutes for OS Boot Watchdog Timer Expiration. Not available if OS Boot Watchdog Timer is disabled.
Configuration options: [1] - [30]

OS Wtd Timer Policy [Reset]

This item allows you to configure the how the system should respond if the OS Boot Watch Timer expires. Not available if OS Boot Watchdog Timer is disabled.
Configuration options: [Do Nothing] [Reset] [Power Down] [Power Cycle]

Serial Mux [Disabled]

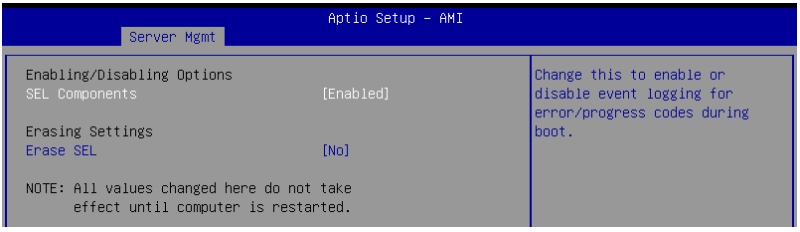
Allows you to enable or disable Serial Mux configuration.

Configuration options: [Disabled] [Enabled]

5.11.1 System Event Log

Allows you to change the SEL event log configuration.

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



SEL Components [Enabled]

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

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

Erase SEL [No]

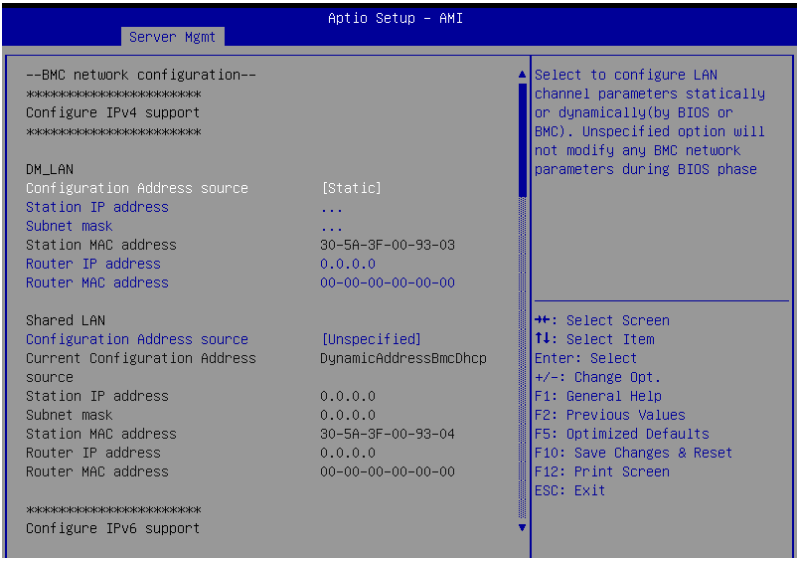
Allows you to choose options for erasing SEL.
Configuration options: [No] [Yes, On next reset] [Yes, On every reset]

5.11.2 View FRU Information

Allows you to view the FRU information.

5.11.3 BMC network configuration

The sub-items in this configuration allow you to configure the BMC network parameters. Scroll using <Page Up> / <Page Down> keys to see more items.



Configure IPV4 support

DM_LAN / Shared LAN

Configuration Address source [Unspecified]

Allows you to set the LAN channel parameters statically or dynamically (by BIOS or by BMC). **[Unspecified]** option will not modify any BMC network parameters during BIOS phase.
Configuration options: [Unspecified] [Static] [DynamicBmcDhcp]

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

Station IP address
Allows you to set the station IP address.

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

Router IP Address
Allows you to set the router IP address.

Router MAC Address
Allows you to set the router MAC address.

Configure IPV6 support

DM_LAN / Shared LAN

IPV6 support [Enabled]

Allows you to enable or disable IPV6 support.
Configuration options: [Enabled] [Disabled]

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

Configuration Address source [Unspecified]
Allows you to set the LAN channel parameters statically or dynamically (by BIOS or by BMC). [Unspecified] option will not modify any BMC network parameters during BIOS phase.
Configuration options: [Unspecified] [Static] [DynamicBmcDhcp]

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

Station IPV6 address
Allows you to set the station IPV6 address.

Prefix Length [0]
Allows you to set the prefix length (maximum Prefix Length is 128).

Configuration Router Address source [Unspecified]
Allows you to set the LAN channel parameters statically or dynamically (by BIOS or by BMC). [Unspecified] option will not modify any BMC network parameters during BIOS phase.
Configuration options: [Unspecified] [Static] [DynamicBmcDhcp]

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

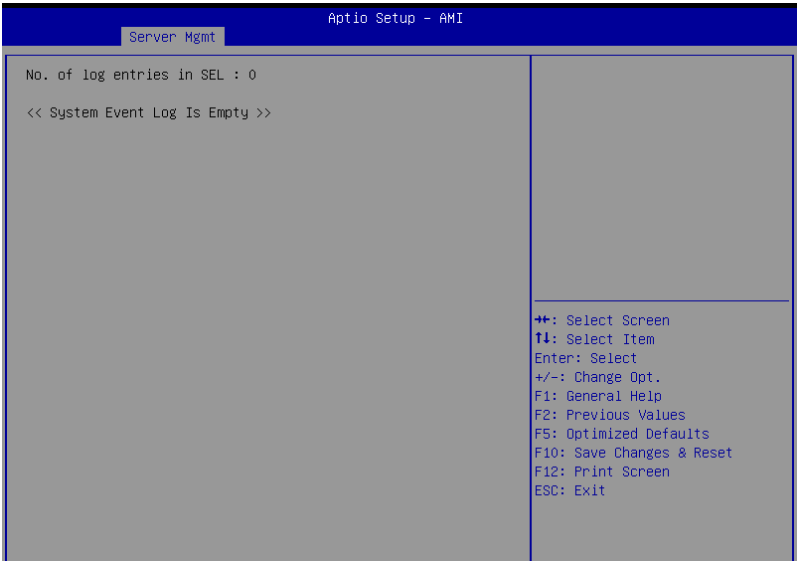
IPV6 Router IP Address
Allows you to set the IPV6 router address.

Prefix Length [0]
Allows you to set the prefix length (maximum Prefix Length is 128).

Prefix Value
Allows you to set the prefix value.

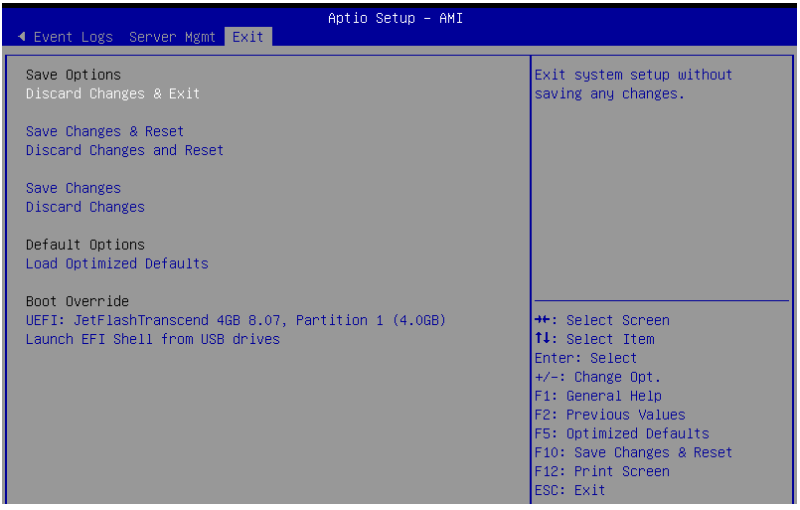
5.11.4 View System Event Log

This item allows you to view the system event log records. Scroll using <Page Up> / <Page Down> keys to see more items.



5.12 Save & Exit menu

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



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

Discard Changes and Exit

Exit system setup without saving any changes.

Save Changes and Reset

Reset system after saving the changes.

Discard Changes and Reset

Reset system setup without saving any changes.

Save Changes

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

Discard Changes

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

Restore 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.

6 Driver Installation

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

6.1 Running the Support DVD

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

The contents of the support DVD are subject to change at any time without notice. Visit 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:

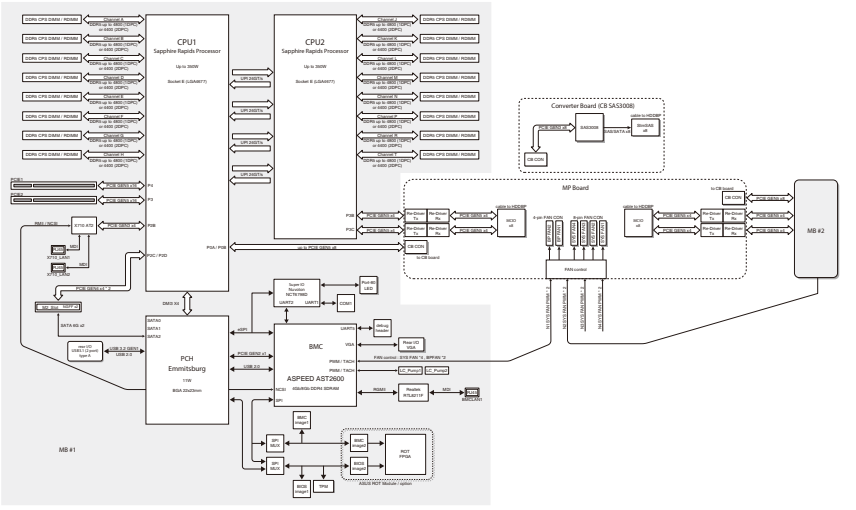
1. Drivers - Shows the available device drivers that the system detects.
2. Utilities - Displays the software applications and utilities that the motherboard supports.
3. Manual - Provides the link to the user guide(s).

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

Z13PH-D16 block diagram



Notices

Federal Communications Commission Statement

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

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

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

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)

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.

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。

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.

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

EU REACH and Article 33

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

EU RoHS

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

Japan JIS-C-0950 Material Declarations

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

India RoHS

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

Vietnam RoHS

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

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

Türkiye RoHS

AEEE Yönetmeliğine Uygundur

ASUS Recycling/Takeback Services

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

Ecodesign Directive

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

Safety Precautions

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

安全上のご注意

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

Service and Support

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