ASUS
IN SEARCH OF INCREDIBLE

RS501A-E12 Series
RS501A-E12-RS4

1U Rackmount Server
User Guide

Contents

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.

Sécurité électrique

- Avant d'installer ou de retirer des câbles, assurez-vous que les câbles d'alimentation du système et de tous les périphériques sont débranchés.

- Pour éviter tout risque de choc électrique, débranchez le câble d'alimentation de la prise électrique avant de toucher au système.

- Lors de l'ajout ou du retrait de périphériques, vérifiez que les câbles d'alimentation sont débranchés avant de brancher d'autres câbles. Si possible, déconnectez tous les câbles d'alimentation du système avant d'y installer un périphérique.

- Si le bloc d'alimentation est endommagé, n'essayez pas de le réparer vous-même. Contactez un technicien électrique qualifié ou votre revendeur.

Operation Safety

- Any mechanical operation on this server must be conducted by certified or experienced engineers.

- Before operating the server, carefully read all the manuals included with the server package.

- Before using the server, ensure all cables are correctly connected and the power cables are not damaged. If any damage is detected, contact your dealer as soon as possible.

- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.

- Avoid dust, humidity, and temperature extremes. Place the server on a stable surface.

- If you encounter technical problems with the product, contact a qualified service technician or your retailer.

> 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.

Sécurité de fonctionnement

- Toute opération mécanique sur ce serveur doit être effectuée par des ingénieurs certifiés ou expérimentés.

- Avant d'utiliser le serveur, lisez attentivement tous les manuels fournis avec ce dernier.

- Avant d'utiliser le serveur, vérifiez que tous les câbles sont bien branchés et que les câbles d'alimentation ne sont pas endommagés. Si des dommages sont détectés, contactez votre revendeur dès que possible.

- Pour éviter les court-circuits, gardez les clips, les vis et les agrafes loin des connecteurs, des slots, des interfaces de connexion et de la circuiterie.

- Évitez la poussière, l'humidité et les températures extrêmes. Placez le serveur sur une surface stable.

- Si vous rencontrez des problèmes techniques avec votre produit, contactez un technicien qualifié ou votre revendeur.

> Ce produit est équipé d'un câble d'alimentation et d'une prise tripolaires pour la sécurité de l'utilisateur. Utilisez le câble d'alimentation sur une prise électrique correctement reliée à la terre pour éviter les chocs électriques.

Restricted Access Location

This equipment should only be installed in a Restricted Access Area where both these conditions apply:

- Access can only be gained by skilled or instructed persons who have been instructed about the reasons for the restrictions applied to the area and about any precautions that shall be taken; and

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

Emplacement d'accès restreint

Ce produit est destiné à être installé uniquement dans une salle informatique où :

- L'accès est uniquement accordé aux TECHNICIENS ou UTILISATEURS qui ont connaissance des raisons de cette restriction et des précautions qui devraient être prises.

- L'accès se fait par le biais d'un OUTIL ou tout dispositif de sécurité, et est contrôlé par l'autorité responsable de cet emplacement.

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 par une batterie de type identique ou équivalent, comme recommandé par le fabricant. Jetez les batteries usagées conformément aux instructions du fabricant.

Heavy System

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

Système lourd

ATTENTION ! Ce serveur est un système lourd. Demandez de l'aide pour déplacer ou transporter le système.

Optical Drive Safety Information

Laser Safety Information

CLASS 1 LASER PRODUCT
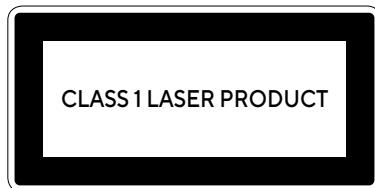
To prevent exposure to the optical drive's laser, do not attempt to disassemble or repair the optical drive by yourself. For your safety, contact a professional technician for assistance.

Informations de sécurité concernant le lecteur optique

Informations de sécurité relatives au laser

PRODUIT LASER DE CLASSE 1

Risque d'exposition dangereuse au laser. Ne tentez pas de démonter ou réparer le lecteur de disque optique. Pour votre sécurité, faites réparer le lecteur de disque optique uniquement par un prestataire de dépannage agréé.

About this guide

Audience

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

Contents

This guide contains the following parts:

1. **Chapter 1: Product Introduction**

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

2. **Chapter 2: Hardware Information**

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

3. **Chapter 3: Motherboard Information**

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

4. **Chapter 4: BIOS Setup**

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

Conventions

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

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

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

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

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

Typography

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

References

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

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

   This manual tells how to set up and use the proprietary ASUS server management utility. Visit asuscontrolcenter.asus.com for more information.

2. **ASUS websites**

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

Product Introduction

1

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

1.1   System package contents

Check your system package for the following items.

RS501A-E12-RS4	
Chassis	ASUS 1U Rackmount Chassis
Motherboard	ASUS K14PA-U24-T Server Board
Components	1 x Storage Device Backplane 4 x Hot-swap 3.5-inch or 2.5-inch Storage Device Trays 2 x Riser Cards 8 x System Fans
Accessories	1 x CPU Heatsink 2 x AC Power Cables
Optional Items	1 x Friction Rail Kit **or** 1 x Ball Bearing Rail Kit 2 x 800W Redundant Power Supply **or** 2 x 1200W Redundant Power Supply **or** 2 x 1600W Redundant Power Supply

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

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

1.2   Serial number label

Before requesting support from the ASUS Technical Support team, you must take note of the product's serial number containing 12 characters, such as xxSxxxxxxxxx, as shown in the figure below. With the correct serial number of the product, ASUS Technical Support team members can then offer a quicker and satisfying solution to your problems.
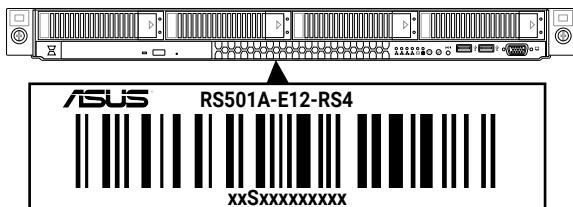
1.3 System specifications

The ASUS RS501A-E12 Series features the ASUS K14PA-U24-T server board. The server supports AMD EPYC™ 9004/9005 Series processors plus other latest technologies through the chipsets onboard.

Model Name		RS501A-E12-RS4
Motherboard		K14PA-U24-T
Processor Support		1 x Socket SP5 (LGA-6096) 4th/5th Generation AMD EPYC™ processors with AMD 3D V-Cache technology AMD EPYC™ 9005 series (up to 400W) AMD EPYC™ 9004 series (up to 400W) (Air cool with EVAC up to 400W)
Core Logic		System on Chip (SoC)
Memory	Total Slots	24 (12-channel per CPU, 24 DIMM per CPU)
	Capacity	Maximum 3072GB
	Memory Type	DDR5 5200/4800/4400/4000 RDIMM/3DS RDIMM 2DPC (1 of 2) up to 5200 2DPC (2 of 2, 1R+1R) up to 4400 2DPC (2 of 2, 2R+2R) up to 4000 * **Please refer to www.asus.com for latest memory AVL update**
	Memory Size	128GB, 64GB, 32GB RDIMM 128GB, 64GB, 32GB 3DS RDIMM * **Refer to www.asus.com for the latest memory AVL update.**
Expansion Slots	Total PCI/PCIe/ PIKE Slots	3+1
	Slot Type	1 x PCIe x16 slot (Gen5 x16 link, FH, HL) 1 x PCIe x16 slot (Gen5 x16 link, LP, HL) 1 x PCIe x16 slot (Gen5 x8 link, LP, HL) 1 x OCP3.0 socket (Gen5 x16 link)
	M.2	2 x M.2 (SATA signal or PCIe Gen5 x4 link) (Up to 22110)
Disk Controller	SATA Controller	CPU Integrated 2 x M.2 connectors (SATA3 6Gb/s & PCIe Gen5 x4 link) 1 x SATA controller (SATA3 6Gb/s)
	SAS Controller	Optional kit(s): ASUS PIKE II 3008 8-port SAS 12Gb/s HBA card
Storage	Storage Bay	4 x 3.5" Hot-swap Storage Bays (backplane supports 4 x SATA/SAS*) * **SAS support only from optional SAS HBA/RAID card.**
	Backplane connectors	1 x SlimSAS x4 (for SATA)
	MB onboard connectors	2 x M.2 connectors 8 x SlimSAS connectors

(continued on the next page)

Model Name	RS501A-E12-RS4
Networking	1 x Dual Port Intel® I350 Gigabit LAN Controller 1 x Management Port (BMC, AST2600)
VGA	BMC Integrated (Aspeed AST2600 256MB)
Graphic	Up to 2 single-wide GPU
Front I/O Ports	2 x USB 3.2 Gen 1 ports 1 x VGA port
Rear I/O Ports	2 x USB 3.2 Gen 1 ports 2 x Gigabit LAN ports (RJ45) 1 x Management port (RJ45) 1 x VGA port
Switch/LED	Rear: 1 x Power Button/LED 1 x Location Button/LED 1 x Message LED 1 x Q-Code (Port 80) LED Front: 1 x Power Button/LED 1 x Location Button/LED 1 x Message LED 1 x HDD LED 4 x LAN LED (1-2 for onboard LAN; 3-4 for OCP LAN)
Security Options	TPM-SPI Module (optional) PFR Module (optional)
OS Support	Please find the latest OS support from https://servers.asus.com/support/os.

Management Solution	Software	ASUS Control Center (Classic)
	Out of Band Remote Management	On-Board ASMB11-iKVM for KVM-over-IP

Regulatory Compliance	CE, FCC, BSMI, RCM
Dimension (HH x WW x DD)	842.5mm x 449mm x 43.85mm (1U) 33.17" x 17.68" x 1.73"
Net Weight Kg	13.15 Kg (CPU, DRAM & Storage device not included)
Gross Weight Kg	18.15 Kg (CPU, DRAM & Storage device not included, Packing included)

(continued on the next page)

Model Name	RS501A-E12-RS4
Power Supply (following different configuration by region)	1+1 Redundant 800W 80PLUS Platinum CRPS Power Supply Rating: 100-127/200-240Vac, 10A /5A (x2), 50/60Hz
	1+1 Redundant 800W 80PLUS Titanium CRPS Power Supply Rating: 100-127/200-240Vac, 10A /5A (x2), 50/60Hz
	1+1 Redundant 1200W 80PLUS Platinum CRPS Power Supply Rating: 100-127/200-240Vac, 10A/8A (x2), 50/60Hz
	1+1 Redundant 1600W 80 PLUS Titanium CRPS Power Supply Rating: 100-127/200-240Vac, 12A/10A (x2), 50/60Hz
Environment	Operating temperature: 10°C ~ 35°C
	Non-operating temperature: -40°C ~ 60°C
	Non-operating humidity: 20% ~ 90% (Non-condensing)

*Specifications are subject to change without notice.

1.4 Front panel features

The barebone server displays a simple yet stylish front panel with easily accessible features. The power and reset buttons, LED indicators, slim type optical drive, and other ports and buttons are located on the front panel, this may vary between models.

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

Rack screw   Bay 1   Bay 2   Bay 3   Bay 4   Rack screw

Asset tag

LAN 1-4 LED
Message LED
Storage device access LED
Power button (with LED)

VGA port
USB 3.2 Gen 1 port
Reset button
Location button (with LED)
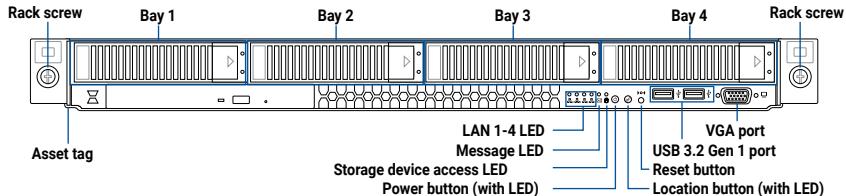
- Bays 1 to 4 support SATA/SAS. SAS support requires an optional HBA/RAID card.
- All bays support 3.5"/2.5" drives with trays.

1.5 Rear panel features

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

Expansion slot   Expansion slot   Expansion slot

Redundant Power supply
and Power cord connector

Q-Code LED
USB 3.2 Gen 1 ports   VGA port
Management LAN port

LAN port 1
LAN port 2

OCP 3.0 slot
Power button with LED
Location button with LED
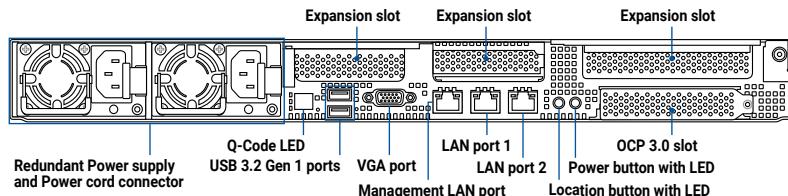
- Management LAN port is for ASUS ASMB11-iKVM only.
- The Q-Code LED provides the most probable cause of an error code as a starting point for troubleshooting. The actual cause may vary from case to case.
- Refer to the Q-Code table for details.

1.6 Internal features

The barebone server includes the basic components as shown.
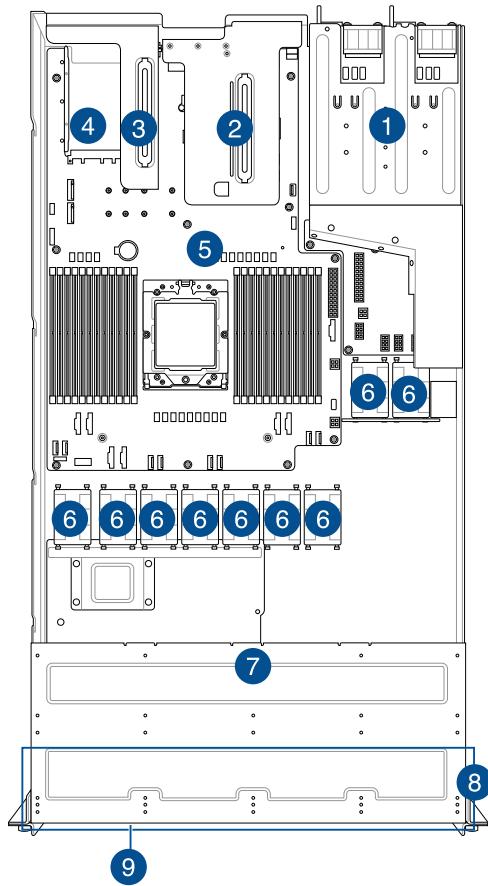
1. Redundant power supply

2. Butterfly riser card
   (Gen5 x16 link and x8 link)

3. Riser card (Gen5 x16 link)

4. OCP 3.0 module slot

5. ASUS K14PA-U24-T Server
   Board

6. System fans

7. SATA/SAS backplane
   (hidden)

8. 4 x 3.5" storage device bays

9. Asset tag (hidden)

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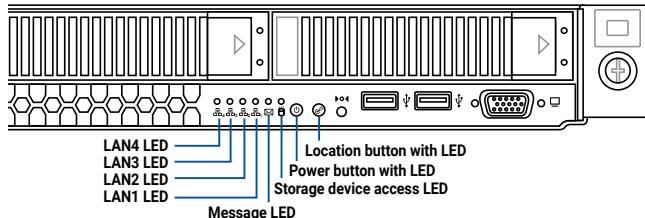
LED	Display status	Description
Power LED	ON	System power ON
Message LED	OFF	System is normal; no incoming event
	ON	A hardware monitor event is indicated
Location LED	OFF	Normal status
	ON	Location switch is pressed (Press the location switch again to turn off)
LAN LEDs	OFF	No LAN connection
	Blinking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

1.7.2   Storage device status LEDs

Red LED
Green LED
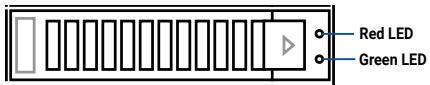
SATA/SAS Storage Device LED Description		
GREEN	ON	SATA/SAS storage device power ON
RED	ON	Storage device has failed and should be swapped immediately (For RAID card)
GREEN/ RED	Blinking	RAID rebuilding (For RAID card)
GREEN/ RED	Blinking	Locate (For RAID card)
GREEN/ RED	OFF	Storage device not found
GREEN	Blinking	SATA/SAS storage device reading or writing data

1.7.3   Rear panel LEDs

Q-Code LED   Location button w/LED   Power button w/LED
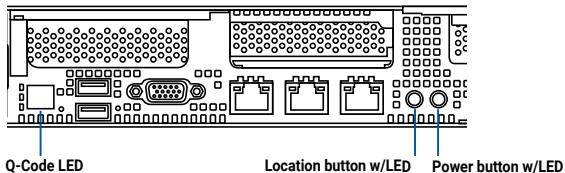
LED	Display status	Description
Power LED	ON	System power ON
Location LED	OFF	Normal status
	ON	Location switch is pressed (Press the location switch again to turn off)

1.7.4   LAN (RJ45) LEDs

LAN port LED indications

Intel® I350 Gigabit LAN port LEDs
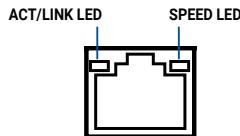
ACT/LINK LED   SPEED LED

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

Dedicated Management LAN port (for ASMB11 and DM_LAN1) LED indications
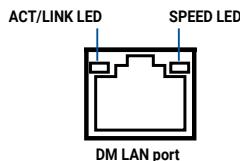
ACT/LINK LED   SPEED LED

DM LAN port

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

1.7.5   Q-Code table

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

(continued on the next page)

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

(continued on the next page)

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

(continued on the next page)

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

(continued on the next page)

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

Hardware Information

2

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

2.1 Chassis cover

2.1.1 Removing the rear cover

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

2. Loosen the thumbscrew on the rear panel to release the cover from the chassis.

3. Firmly hold the cover and slide it towards the rear panel for about half an inch until it is disengaged from the chassis.

4. Lift the cover from the chassis.
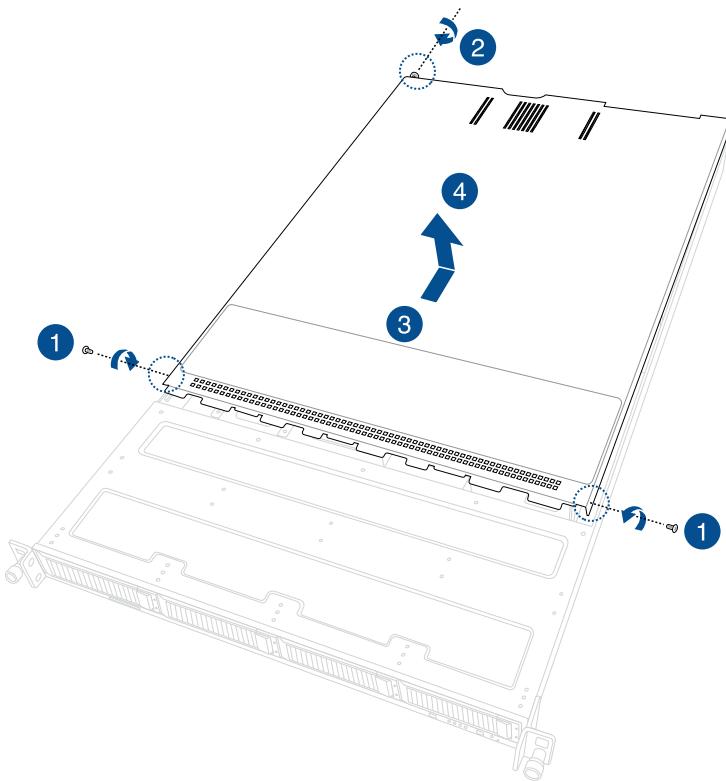
2.2   Air duct(s)

2.2.1   Removing the air duct(s)

Gently lift the air duct vertically out of the chassis.
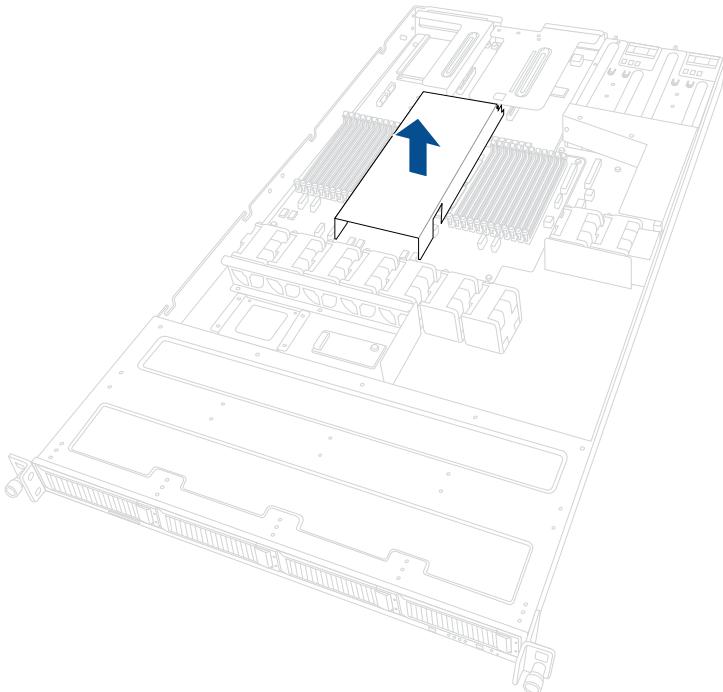
2.2.2   Installing the air duct(s)

Align the air duct along the edges of the DIMM slots, and then place the air duct in the chassis.
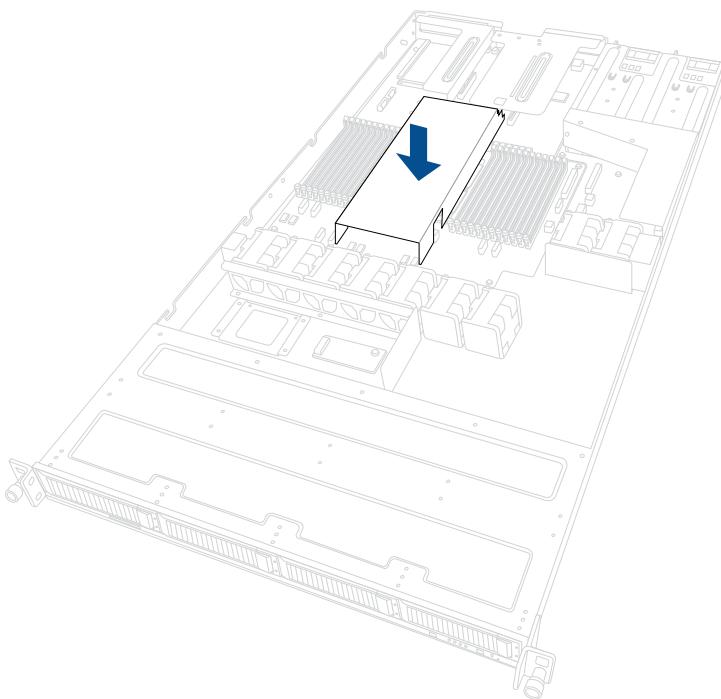
2.3 Central Processing Unit (CPU)

The motherboard comes with a surface mount Socket SP5 designed for Turin CPU or Genoa CPU processors.

⚠️
- Upon purchase of the motherboard, make sure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. ASUS will shoulder the cost of repair only if the damage is shipment/transit-related.
- Keep the cap after installing the motherboard. ASUS will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the Socket SP5.
- The product warranty does not cover damage to the socket contacts resulting from incorrect CPU installation/removal, or misplacement/loss/incorrect removal of the PnP cap.

2.3.1 Installing the CPU and heatsink

To install the CPU and heatsink:

1. Remove the rear cover. For more information, refer to **Chassis cover** section.

2. Remove the air duct. For more information, see the **Air duct(s)** section.

3. Locate the CPU sockets on the motherboard.
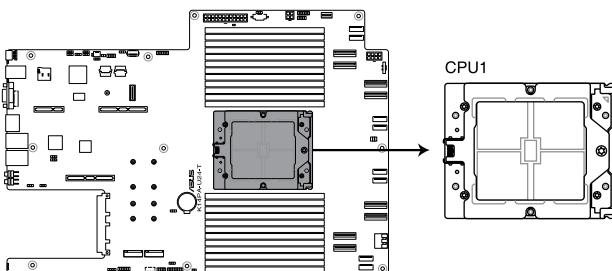
K14PA-U24-T CPU Socket SP5 LGA 6096

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

    The load plate screws are T20 models.
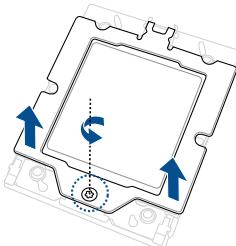
5. Lift open the rail frame.

    Load plate

    Rail frame   **External cap**
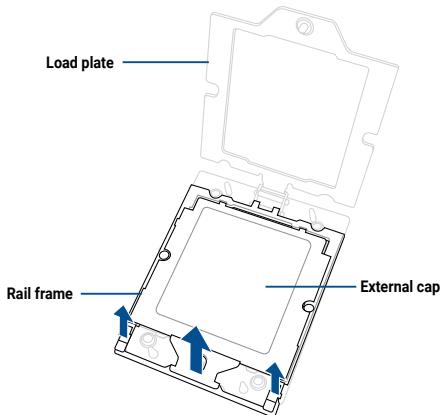
6. Slide the external cap out of the rail frame.

    External cap
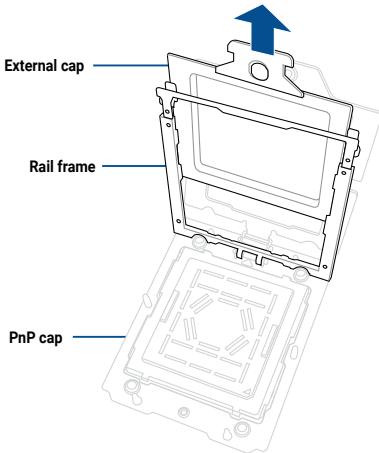
    Rail frame

    PnP cap

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

The carrier frame with CPU fits in only one correct orientation. DO NOT force the carrier frame with CPU into the rail frame.
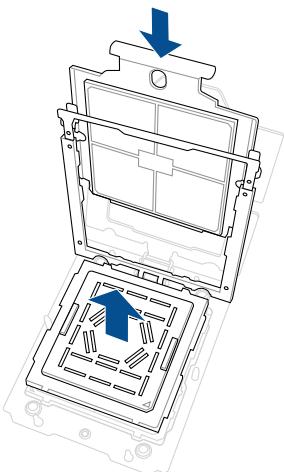
8. Gently close the rail frame just enough to let it sit on top of the CPU socket.

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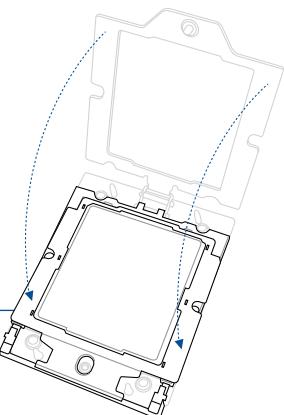
9. Close the load plate just enough to let it sit on top of the CPU, then secure the load plate using the screw on the socket.

The load plate screws are T20 models. A torque value of 13.5±1.0 kgf-cm (11.7±0.9 lbf-in) is recommended.
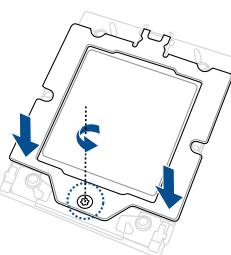
2.3.2 Installing the heatsink

1. Install the CPU. For more information, see the **Installing the CPU** section.

2. Place the heatsink on the CPU socket and make sure the heatsink screws are aligned with the CPU socket, and the screw holes on the evac is aligned with the screw holes on the chassis
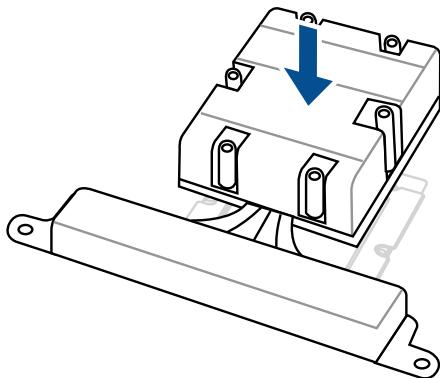
3. Partially tighten each of the six screws with a screwdriver in the order shown both in the illustration and on the heatsink just enough to attach the heatsink to the motherboard. When the six screws are attached, tighten them one by one in the same order to completely secure the heatsink.

> The heatsink screws are T20 models. A torque value of 13.5±1.0 kgf-cm (11.7±0.9 lbf-in) is recommended.
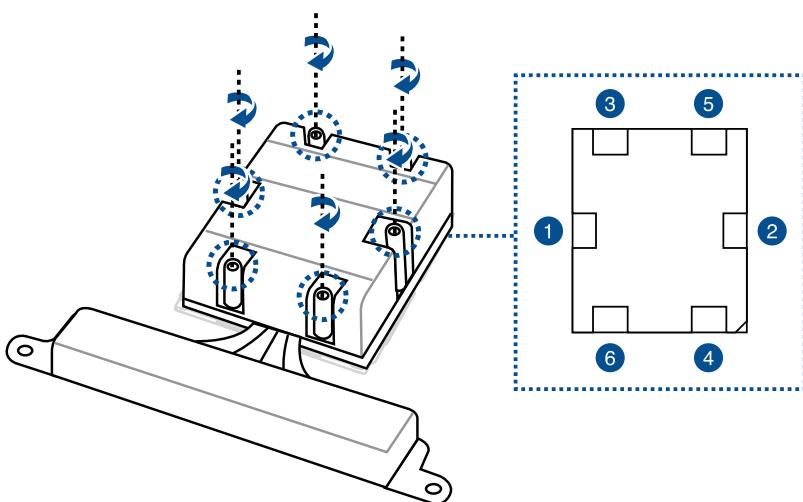
4.   Tighten the remaining heatsink screws to secure the heatsink to the motherboard.
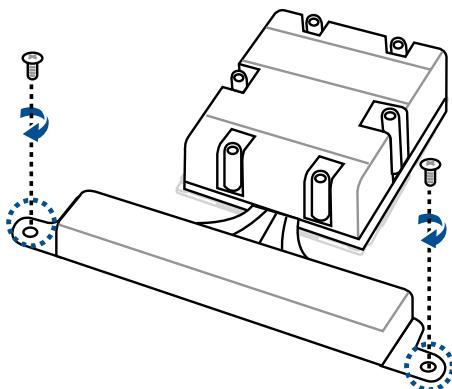
A torque value of 5.8±0.3 kgf-cm (5.0±0.3 lbf-in) is recommended.

2.4 System memory

2.4.1 Overview

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

The figure illustrates the location of the DDR5 DIMM sockets:

K14PA-U24-T 288-pin DDR5 DIMM sockets
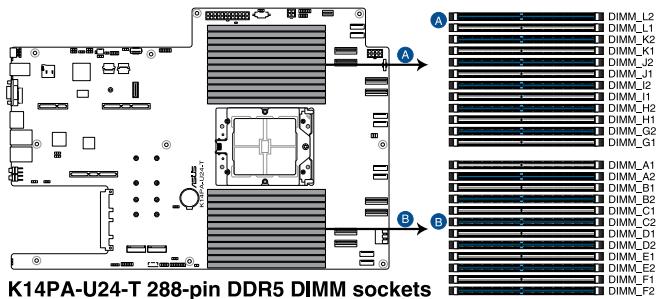
2.4.2   Memory Configurations

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

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

- When mixing 2DPC and 1DPC, make sure that each channel's total DIMM size should be equal. The DIMM size of 2DPC should equal to that of 1DPC; for example, if 2DPC is using a 32GB memory module (32GB * 2), then a 64GB memory module should be installed for 1DPC.

- All memory modules for 2DPC should be the same.

- Always install DIMMs with the same CAS latency. For optimum compatibility, it is recommended that you obtain memory modules from the same vendor.

2.4.3   Installing a DIMM

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

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

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

DIMM notch

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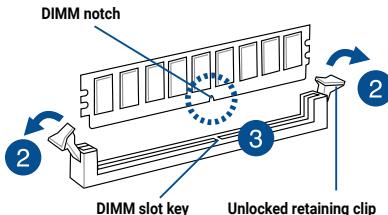
A DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a DIMM into a socket in the wrong direction to avoid damaging the DIMM.

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

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

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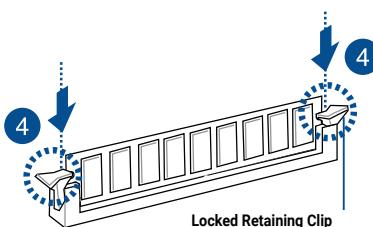
Always insert the DIMM into the socket VERTICALLY to prevent DIMM notch damage.

2.4.4   Removing a DIMM

1.   Remove the chassis cover. For more information, see the section **Chassis cover**.

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

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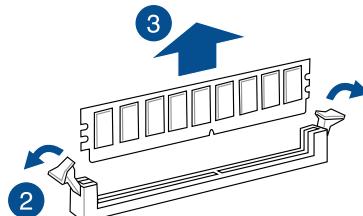
Support the DIMM lightly with your fingers when pressing the retaining clips. The DIMM might get damaged when it flips out with extra force.

2.5 (optional) Front bezel

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

If the system will be installed in a cabinet, make sure that you reserver a gap of at least 45 mm between the rack post and the cabinet door.

2.5.1 Removing the front bezel

1. Push the bezel release latch on the front bezel towards the right to unlock the bezel (A) and pull the left side of the bezel slightly away from the system (B).
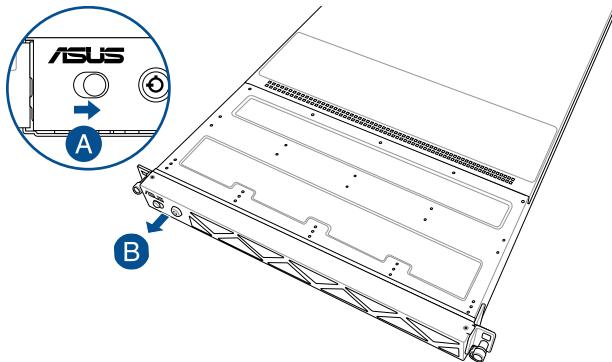
2. Slide the front bezel to the left to detach the front bezel, then remove it from the system.
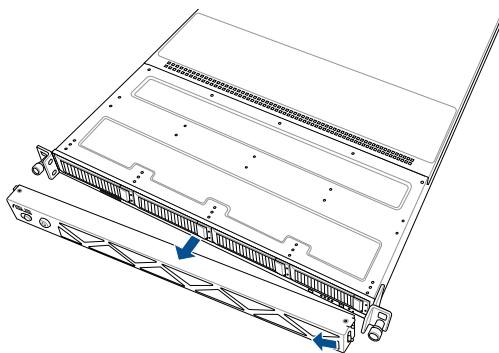
2.5.2 Installing the front bezel

1. Align the two (2) right notches on the front bezel to the notch holes on the right side of the front panel.
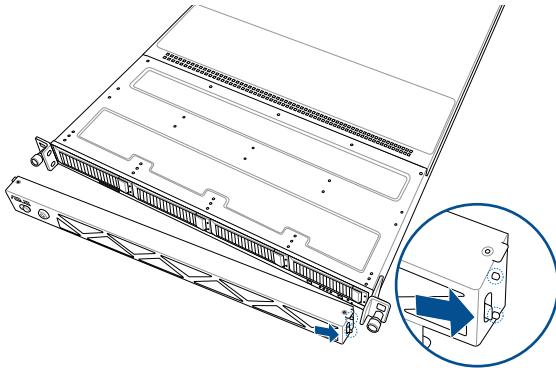
2. Push the bezel into the system until it clicks into place (A), and then slide the bezel release latch to the left to lock the bezel to the system (B).
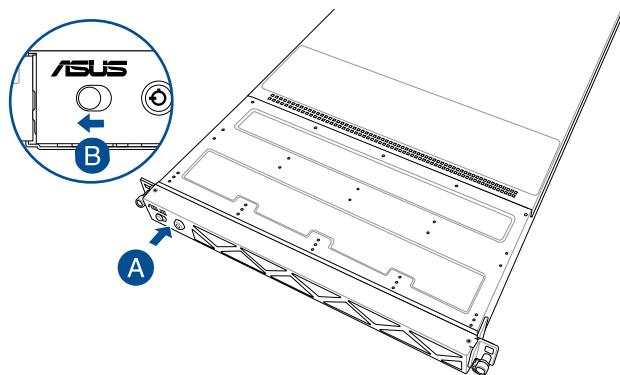
Make sure the bezel release latch is in the unlock state (pushed to the right) before attaching the bezel to the front panel.

2.6   Storage devices

The system supports four (4) 3.5" hot-swap SATA/SAS storage devices or four (4) 2.5" hot-swap NVMe. The storage device installed on the storage device tray connects to the motherboard SATA/SAS/NVMe ports via the SATA/SAS/NVMe backplane.

Bay 1   **Bay 2**   **Bay 3**   **Bay 4**
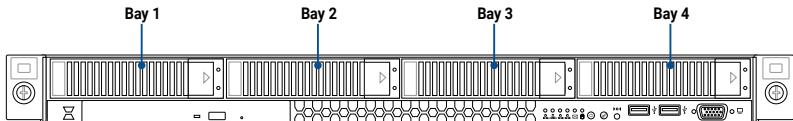
- Bays 1 to 4 support NVMe/SATA. SAS support requires an optional HBA/RAID card.
- All bays support 3.5"/2.5" drives with trays.

2.6.1   Installing a 3.5-in storage device

1.   Press the spring lock.
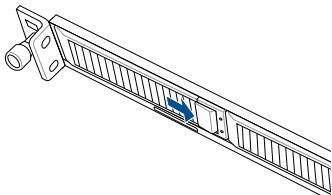
2.   Pull the tray lever outwards to remove the drive tray.
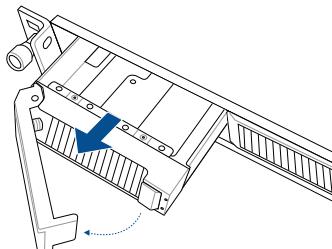
3.   Prepare the 3.5" storage device then place the 3.5" storage device into the tray until it clicks into place.
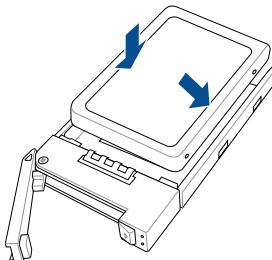
4.   Push the drive tray and HDD assembly all the way into the depth of the bay until the tray lever and spring lock clicks and secures the drive tray in place.
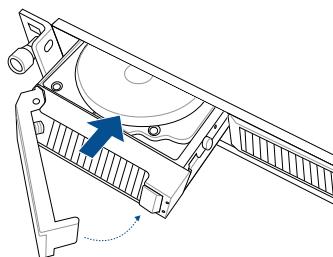
5.   Repeat steps 1 to 4 to install the other 3.5" storage devices.

2.6.2   Installing a 2.5-in storage device

1.   Follow steps 1 and 2 of the **Installing a 3.5-inch storage device** section to remove the drive tray from the chassis.

2.   Prepare the 2.5" storage device and align it to the screw holes on the two sides of the drive tray.

3.   Secure the 2.5" storage device to the drive tray using the bundled screws.
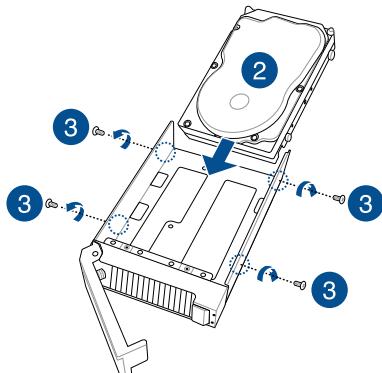
4.   Please follow step 4 of the **Installing a 3.5-inch storage device** section to replace the drive tray.

5.   Repeat steps 1 to 4 to install the other 2.5" storage devices.

2.7   Expansion slots

The barebone server comes with two PCIe slots (A) and (B). These slots are pre-installed with a riser card bracket and a butterfly riser card bracket for installing PCIe expansion cards. You need to remove these expansion card brackets if you want to install PCIe expansion cards.

Slot 3 x16   Slot 2 x8   Slot 1 x16

OCP 3.0 x16
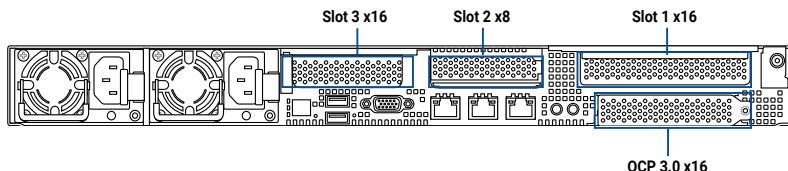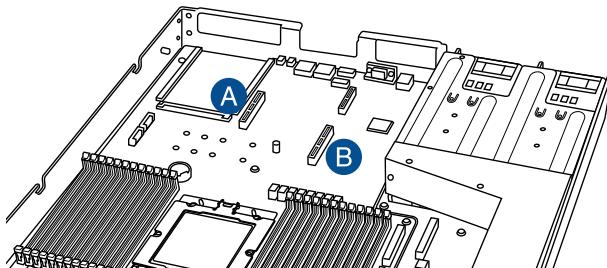
2.7.1 Installing an expansion card to the riser card bracket

1. Firmly hold the handle on the butterfly riser card bracket, then pull it up to detach it from the PCI Express slot on the motherboard.
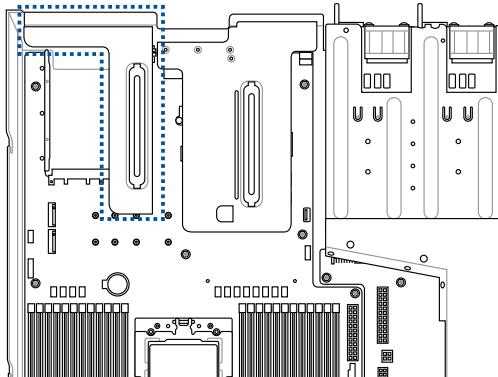
2. Place the riser card bracket on a flat and stable surface.

3. Push the metal bracket lock counter clockwise (A) until the metal bracket can be removed, then remove the metal bracket (B).
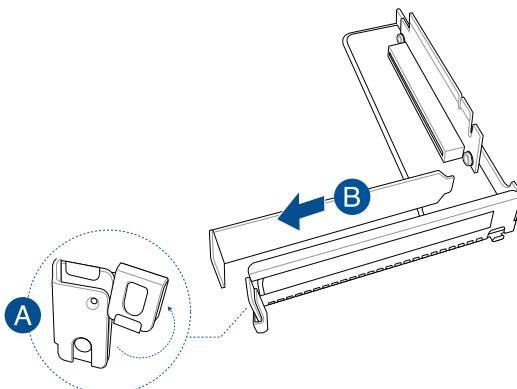
4. Insert the expansion card into the PCIe slot. Ensure that the golden fingers are totally inserted into the slot.
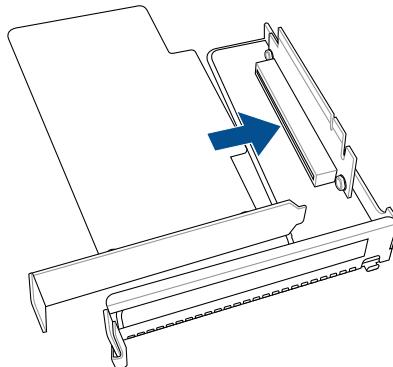
5. Push the metal bracket lock clockwise until it locks back and secures the expansion card to the riser card bracket.
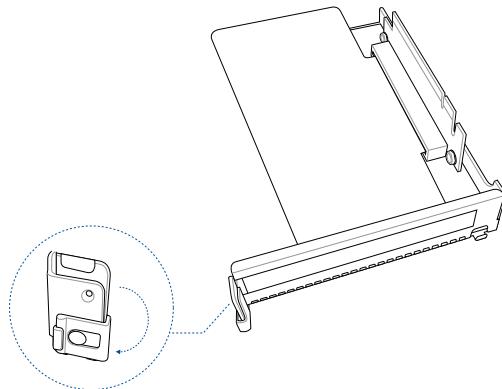
6. Install the riser card bracket and expansion card assembly back into the PCIe slot on the motherboard. Ensure that the golden connectors of the riser card bracket is firmly seated in place.

2.7.2 Installing an expansion card to the butterfly riser card bracket

The barebone server comes with a butterfly riser card bracket. You need to remove the bracket if you want to install PCIe x8 or x16 expansion cards.

1. Firmly hold the handle on the butterfly riser card bracket, then pull it up to detach it from the PCI Express slot on the motherboard.

2. Place the butterfly riser card bracket on a flat and stable surface.

3. Push the metal bracket lock clockwise (A) until the metal bracket can be removed, then remove the metal bracket (B).
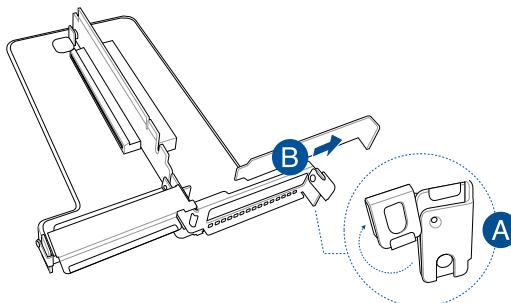
4. Insert the expansion card into the PCIe slot. Ensure that the golden fingers are totally inserted into the slot.

5. Push the metal bracket lock counter clockwise until it locks back and secures the expansion card to the butterfly riser card bracket.
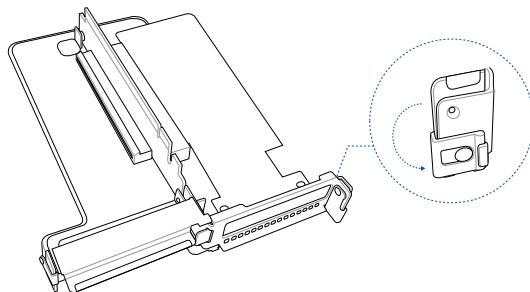
6. To install an expansion card to the other PCIe slot on this butterfly riser card bracket, please refer to the **Installing an HBA/RAID card** section.

7. Install the butterfly riser card bracket and expansion card assembly back into the PCIe slot on the motherboard. Ensure that the golden connectors of the butterfly riser card bracket is firmly seated in place.

2.7.3   Installing an HBA/RAID card

You can install an HBA/RAID card to any of the PCIe slots on both riser card brackets, but for this section we will be using the butterfly riser card bracket.

1.   Firmly hold the handle on the butterfly riser card bracket, then pull it up to detach it from the PCI Express slot on the motherboard.
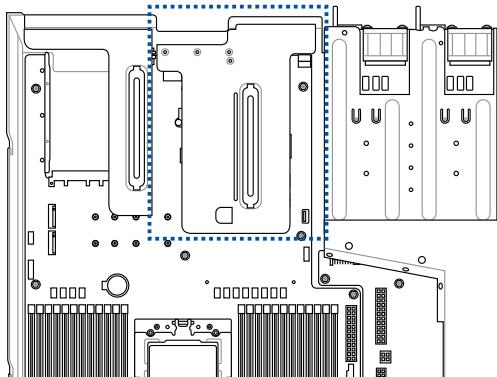
2.   Place the butterfly riser card bracket on a flat and stable surface.

3.   Push the metal bracket lock clockwise (A) until the metal bracket can be removed, then remove the metal bracket (B).
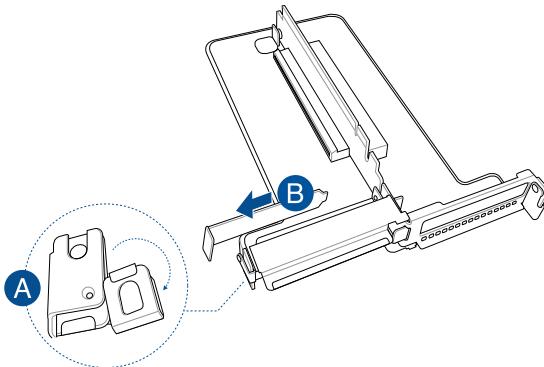
4.	Insert the HBA/RAID card into the PCIe slot. Make sure that the golden fingers are completely inserted into the slot.
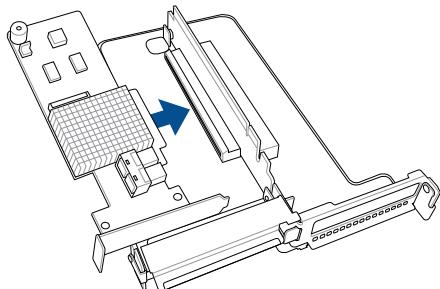
5.	Push the metal bracket lock counter clockwise until it locks back and secures the HBA/RAID card to the butterfly riser card bracket.
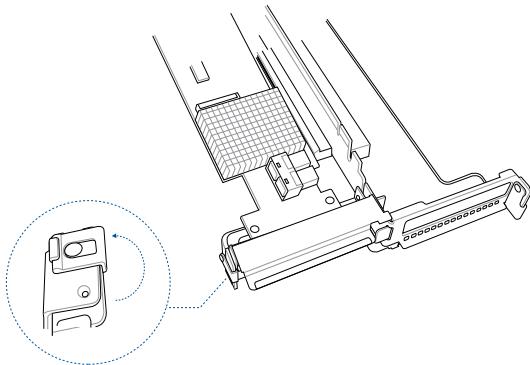
6.	Connect the SlimSAS cable to the connectors on the HBA/RAID card.
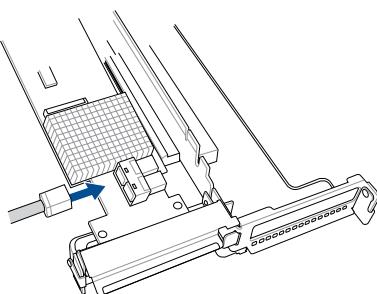
7.	Install the butterfly riser card bracket and HBA/RAID card assembly back into the PCIe slot on the motherboard. Make sure that the golden fingers on the butterfly riser card bracket are firmly seated in place.

2.7.4   Installing the Cache Vault Power Module

The cache vault power module is required for selected HBA/RAID card models. You may install the cache vault power module to the chassis by following the steps below.

1.   Unscrew the four (4) screws securing the Cache Vault bracket to the chassis, and remove the bracket.
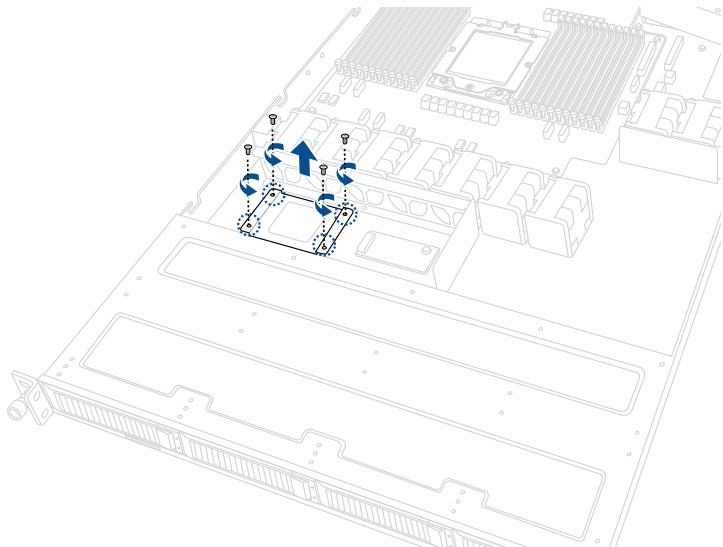
2.   Align the three screw holes on the Cache Vault Power Module clip to the three screw holes on the Cache Vault bracket, then secure the clip with the three (3) bundled screws.
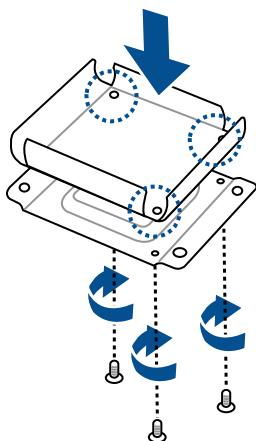
3.	Install the Cache Vault Power Module clip and bracket assembly to the chassis using the four (4) screws previously removed (A), and then align and install the Cache Vault Power Module into the Cache Vault Power Module clip (B).
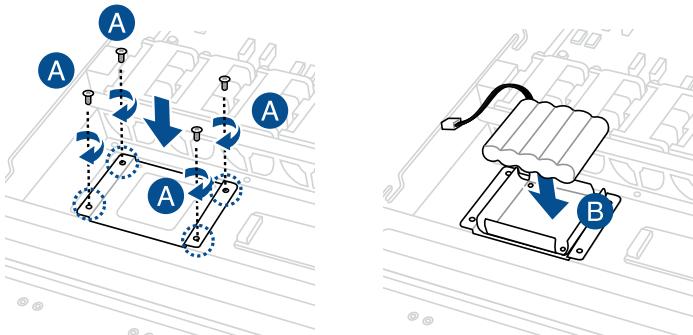
4.	Connect the Cache Vault Power Module to the **S-CAP** connector on the PIKE II card or HBA/RAID card.

2.7.5   Installing M.2 (NGFF) cards

1.   Firmly hold the handle on the butterfly riser card bracket, then pull it up to detach it from the PCI Express slot on the motherboard.
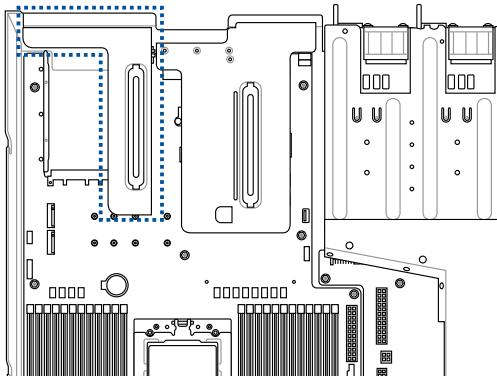
2.   Locate the M.2 (NGFF) connector on your motherboard.

K14PA-U24-T NGFF connectors
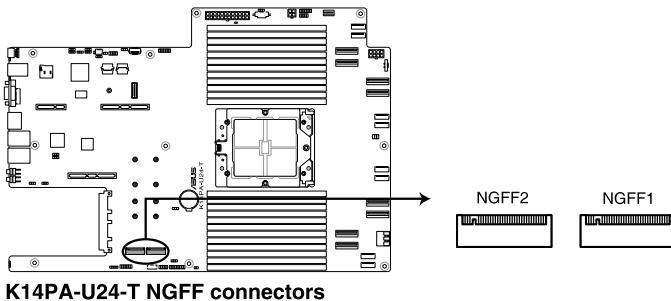
3.   Select an appropriate screw hole on the motherboard for your M.2 card, then secure the bundled stand to the motherboard.

4.   Insert the M.2 into the M.2 (NGFF) slot, and then secure it using the bundled screw.
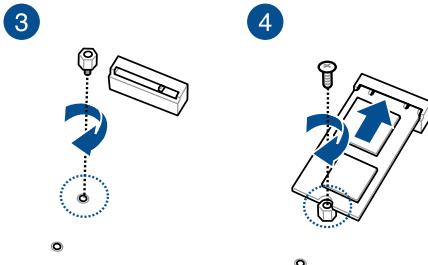
5.   Install the riser card bracket back into the PCIe slot on the motherboard. Ensure that the golden connectors of the riser card bracket is firmly seated in place.

2.7.6 Installing an OCP 3.0 card

1. Remove the screw securing the metal bracket for the OCP 3.0 slot (A), and then remove the metal bracket (B).
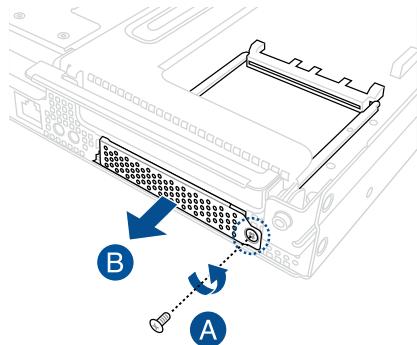
2. Insert and push the OCP 3.0 card all the way into the OCP 3.0 slot (A), and then secure the OCP 3.0 card using the thumbscrew (B).
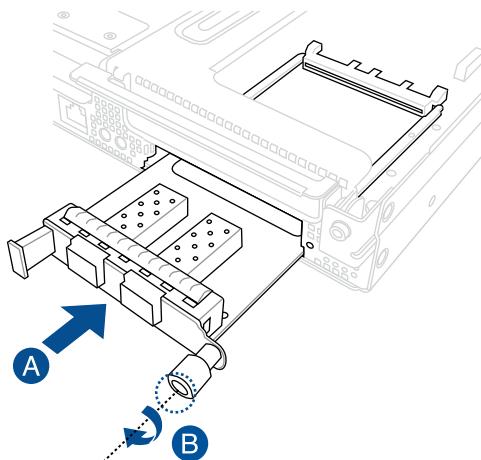
2.7.7 (optional) Installing the PFR module

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

> • The illustration below is for reference only.
>
> • For more information or assistance, please refer to www.asus.com.

1. Locate the PFR module connector on your motherboard.
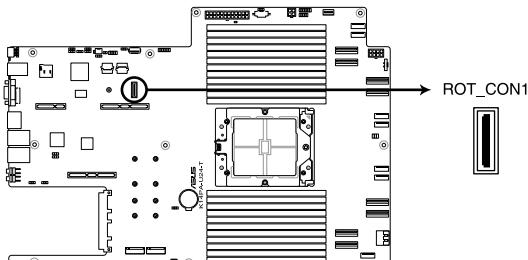
K14PA-U24-T ROT_CON1 connector

2. Align and connect the PFR module to the PFR module connector.
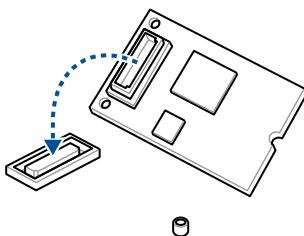
3. Push the PFR module down so that it is seated securely on the PFR module connector, then secure it using a screw.
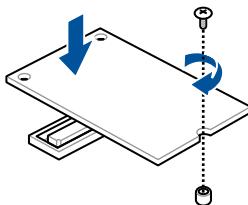
2.7.8 Configuring an expansion card

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

1. Turn on the system and change the necessary BIOS settings, if any. See the **BIOS Setup** chapter for more information.

2. Assign an IRQ to the card. Refer to the following tables.

3. Install the software drivers for the expansion card.

Standard Interrupt assignments

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

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

2.8   Cable connections

> • The bundled system cables are pre-connected before shipment. You do not need to disconnect these cables unless you will remove pre-installed components to install additional devices.
>
> • Refer to the **Motherboard Information** chapter for detailed information on the connectors.

RS501A-E12 Series
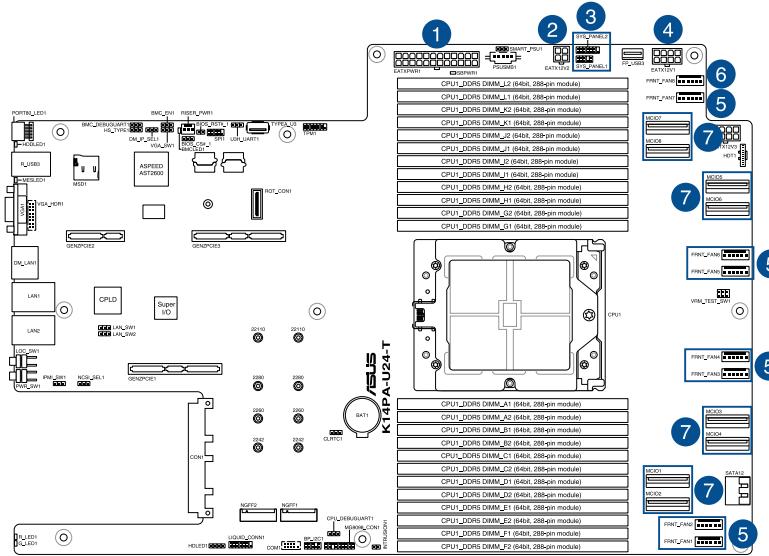
Pre-connected system cables

1. 24-pin EATXPWR1 power connector (connected to power board)

2. 4-pin EATX12V2 power connector (connected to power board)

3. Panel connector (connected to front I/O board)

4. 8-pin EATX12V1 power connector (connected to power board)

5. FRNT_FAN1-7 System fan connectors (from motherboard to system fans)

6. FRNT_FAN8 System fan connector (optional, from motherboard to system fans)

7. MCIO connectors (connected to backplane)

2.9   SATA/SAS backplane cabling

RS501A-E12-RS4U

Connects to MCIO2 connector on motherboard for NVMe support on Bay 3 and 4

Connects to MCIO1 connector on motherboard for NVMe support on Bay 1 and 2

Connects to HBA/RAID card for SAS support on Bay 1 to Bay 4 or to the MCIO7 connector on the motherboard for SATA support on Bay 1 to Bay 4

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

2.10 Storage device configuration and cabling

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

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

### RS501A-E12-RS4U

Bay 1 **Bay 2** **Bay 3** **Bay 4**
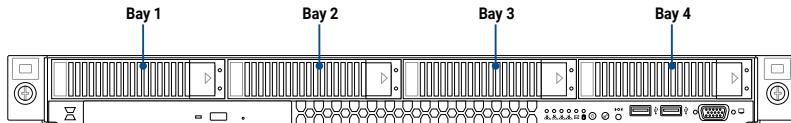
- Bay 1 to bay 4 supports NVMe/SATA/SAS. SAS support requires optional HBA/RAID card.
- All bays support 3.5"/2.5" drives with trays.

2.10.1 4 x SATA storage device configuration and cabling

- The illustrations in this section are for reference only and may vary between models.
- You may still support 4 NVMe bays with this configuration, for more information please refer to **4 x NVMe storage device configuration and cabling**

Backplane connector	Cable	Connect to
SLIMSAS1	MCIO to 2 x SlimSAS	MCIO7 on motherboard

1. Install the storage devices into the supported bays.

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

SATA **SATA** **SATA** **SATA**

2. Remove the rear cover. For more information, refer to **Removing the rear cover**.

3. Locate the backplane (A), and then cut the cable tie(s) (B).

Backplane

4. Connect the MCIO to 2 x SlimSAS cable to the motherboard and the backplane.

BP4LE32G-36-R1PD

SLIMSAS1: Connect MCIO to 2 x SlimSAS cable from the MCIO7 connector on the motherboard
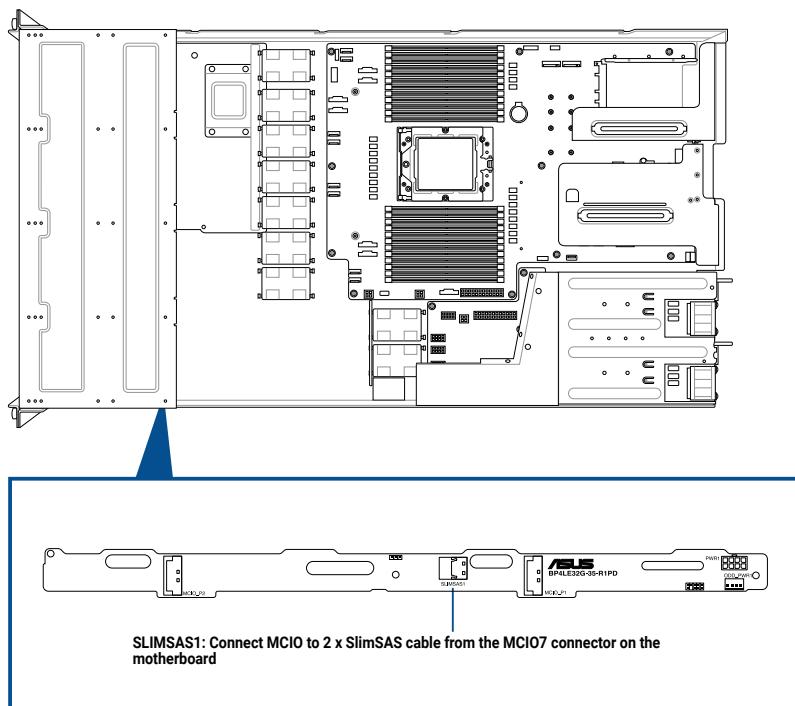
2.10.2 4 x NVMe storage device configuration and cabling

> • The illustrations in this section are for reference only and may vary between models.
>
> • You may still support either SATA or SAS for bays 1 to 4 with this configuration. For more information please refer to the following sections:
>
>   - SATA support: **4 x SATA storage device configuration and cabling**
>
>   - SAS support: **4 x SAS storage device configuration and cabling**

Backplane connector	Cable	Connect to
MCIO_P1	MCIO to MCIO	MCIO1 on motherboard
MCIO_P2	MCIO to MCIO	MCIO2 on motherboard

1. Install the storage devices into the supported bays.

> Refer to section **Storage Devices** for details on how to install storage devices.
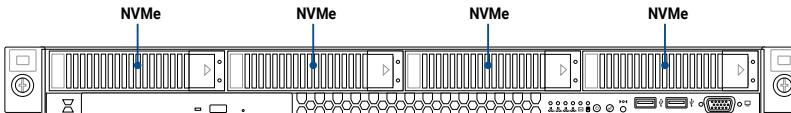
2. Remove the rear cover. For more information, refer to **Removing the rear cover**.

3. Locate the backplane (A), and then cut the cable tie(s) (B).
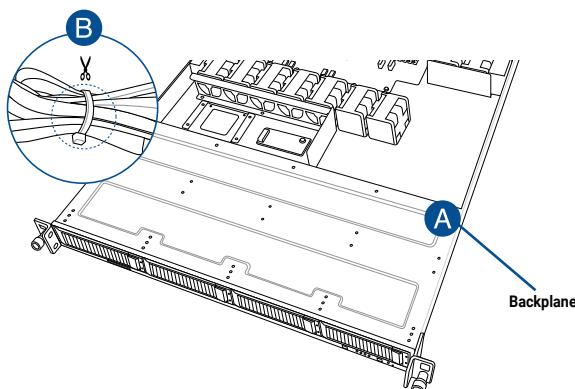
4. Connect the MCIO cables to the motherboard and the backplane.

MCIO_P2: Connect MCIO cable from the MCIO2 connector on the motherboard

MCIO_P1: Connect MCIO cable from the MCIO1 connector on the motherboard
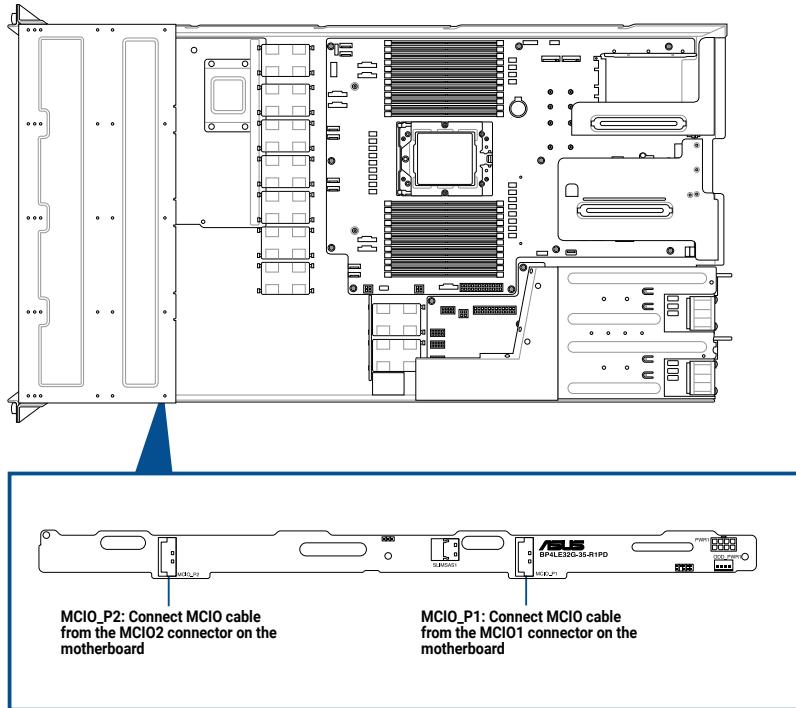
2.10.3   4 x SAS storage device configuration and cabling

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

• You may still support 4 NVMe bays with this configuration, for more information please refer to **4 x NVMe storage device configuration and cabling**

Backplane connector	Cable	Connect to
SLIMSAS1	MCIO (vertical) to MCIO (vertical)	HBA/RAID card

1.   Install the storage devices into the supported bays.

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

2.   Remove the rear cover. For more information, refer to **Removing the rear cover**.

3.   Locate the backplane (A), and then cut the cable tie(s) (B).
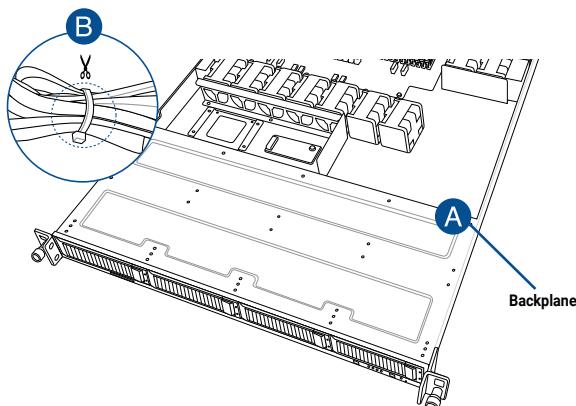
Backplane

4. Connect the MCIO cable to the HBA/RAID card and the backplane.

SLIMSAS1: Connect MCIO cable from the HBA/RAID card
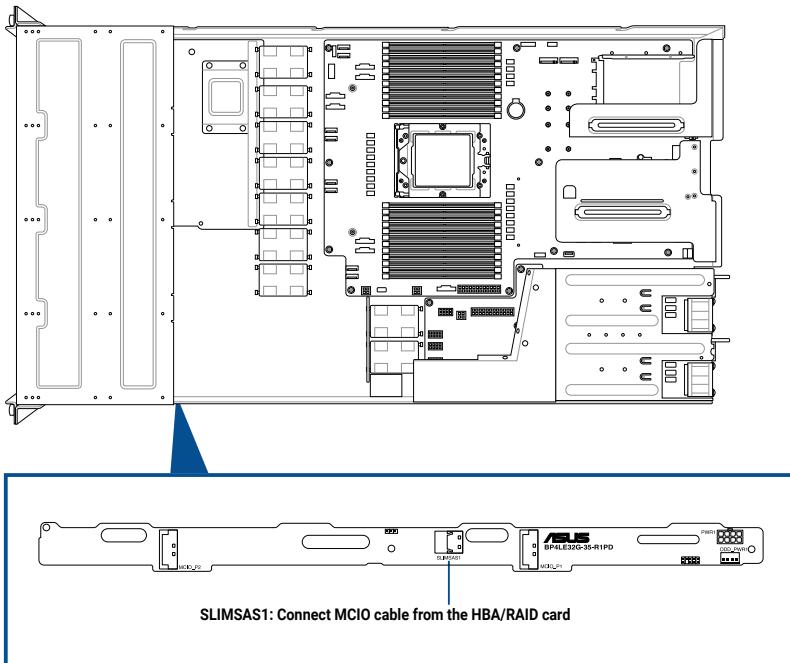
2.10.4 4 x NVMe and 4 x SATA storage device configuration and cabling

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

Backplane connector	Cable	Connect to
MCIO_P1	MCIO to MCIO	MCIO1 on motherboard
MCIO_P2	MCIO to MCIO	MCIO2 on motherboard
SLIMSAS1	MCIO to 2 x SlimSAS	MCIO7 on motherboard

1.   Install the storage devices into the supported bays.

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

SATA/NVMe   SATA/NVMe   SATA/NVMe   SATA/NVMe
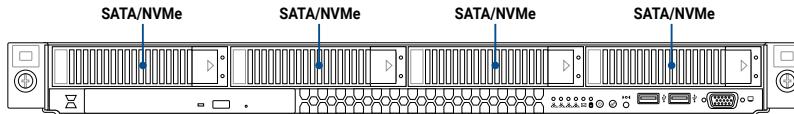
2.   Remove the rear cover. For more information, refer to **Removing the rear cover**.

3.   Locate the backplane (A), and then cut the cable tie(s) (B).
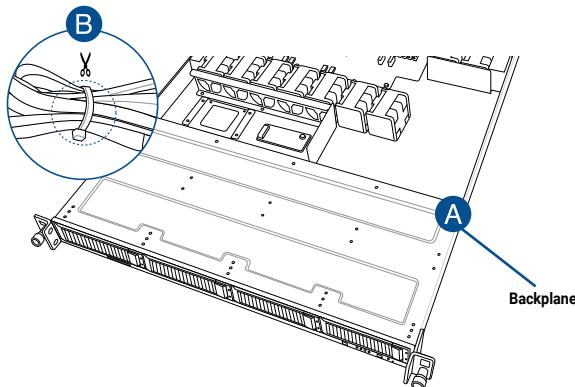
Backplane

4. Connect the MCIO and MCIO to 2 x SlimSAS cables to the motherboard and the backplane.

MCIO_P2: Connect MCIO cable from the MCIO2 connector on the motherboard

SLIMSAS1: Connect MCIO to 2 x SlimSAS cable from the MCIO7 connector on the motherboard

MCIO_P1: Connect MCIO cable from the MCIO1 connector on the motherboard
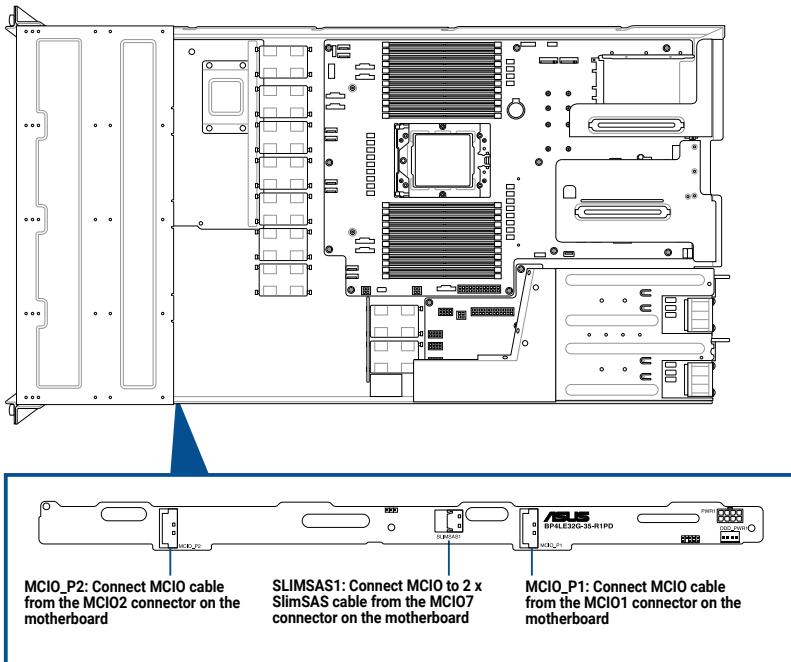
2.11   Motherboard

2.11.1   Removing the motherboard

To remove the system motherboard:

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

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

2.   Remove the screws, then remove the motherboard.
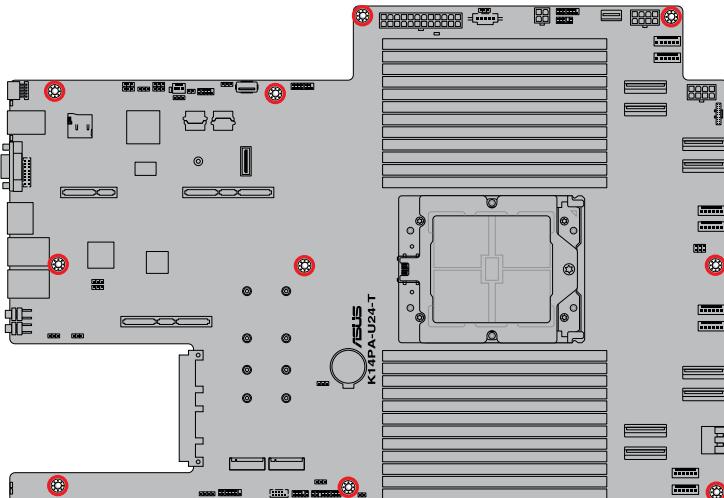
2.11.2   Installing the motherboard

To install the system motherboard:

1.   Place the motherboard into the chassis and ensure the screw holes on the motherboard are aligned to the screw holes in the chassis, then secure the motherboard to the chassis using the screws removed previously.
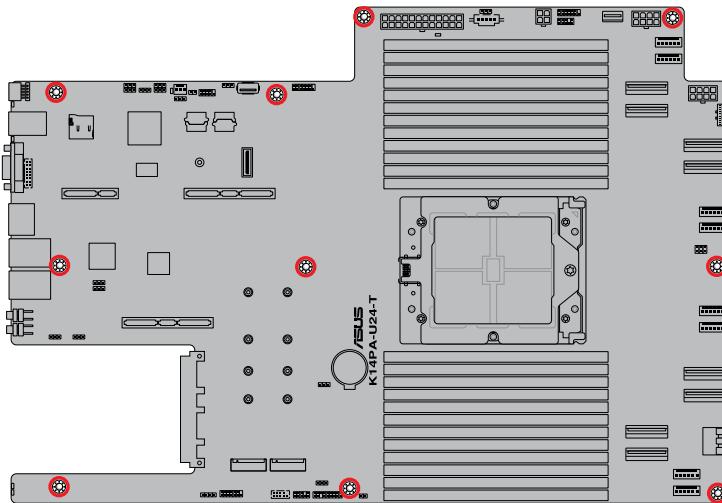
2.   Reinstall removed components and reconnect the cables to the motherboard.

2.12   Optional components

This section describes on how to replace previously installed system components or install optional components into the system.

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

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

2.12.1   Redundant power supply module

To replace a failed redundant power supply module:

1.   Lift up the power supply module lever (A), then hold the power supply module lever and press the PSU latch (B) to pull the power supply module out of the system chassis (C).
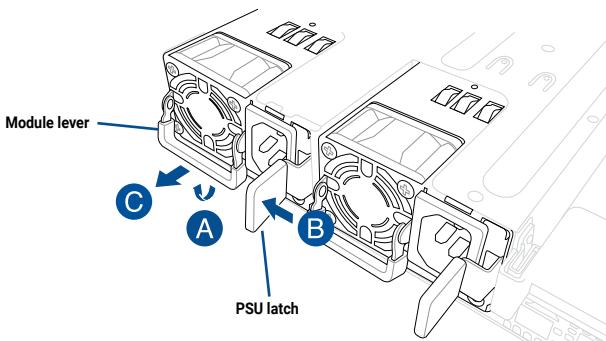
2.   Prepare the replacement power supply module.

3.   Insert the replacement power supply module into the chassis then push it inwards until the latch locks into place.
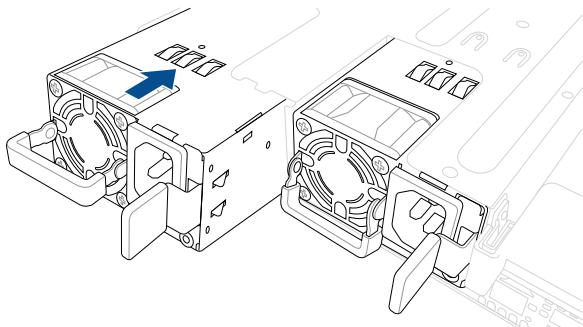
- The system automatically combines the two power supply modules as a single one. The combined output power varies with input voltages. Refer to the table below for details.

1200W

Input Voltage	Max. Output Power (Watt) per PSU
100-127 Vac, 10.0 A, 50-60 Hz	800 W
200-240 Vac, 8.0 A, 50-60 Hz	1200 W
240 Vac, 6.0 A, 50-60 Hz	1200 W

1600W

Input Voltage	Max. Output Power (Watt) per PSU
100-127 Vac, 9.4 A, 50-60 Hz	1000 W
200-240 Vac, 4.72 A, 50-60 Hz	1600 W
240 Vac, 4.6 A, 50-60 Hz	1600 W

- 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 wattages (e.g., 1 x 1200 W + 1 x 1600 W) may yield unstable results and potential damage to your system.

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

2.12.2 CMOS battery

To replace a CMOS battery:

1. Locate and remove the CMOS battery.
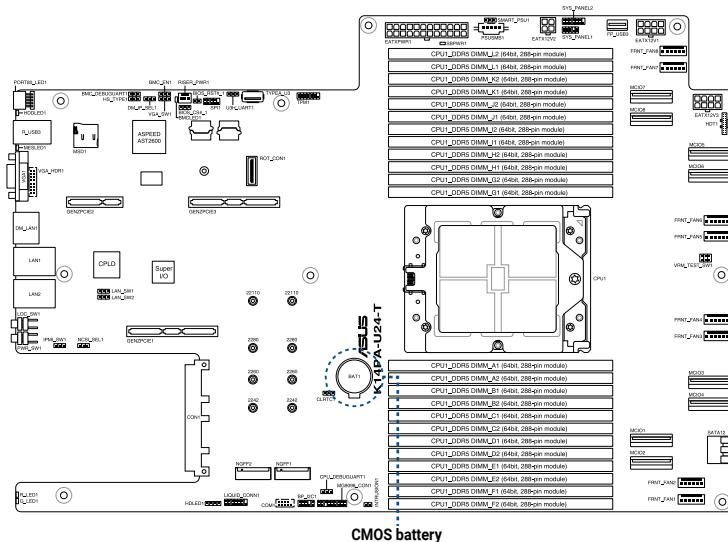
CMOS battery

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

2.13 Rail Kit Options

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

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

• Friction rail kit

• 1m half extension ball bearing rail kit

• 1.2m half extension ball bearing rail kit

• 1U full extension ball bearing rail kit

Motherboard Information

3

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

3.1 Motherboard layout
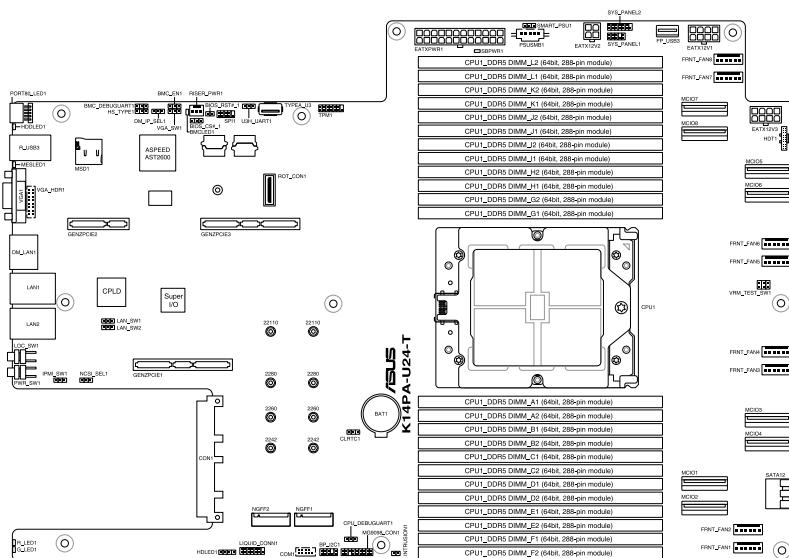
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3.2   Central Processing Unit (CPU)

The motherboard comes with a surface mount SP5 socket designed for the AMD EPYC™ 7004 Series Family processors.
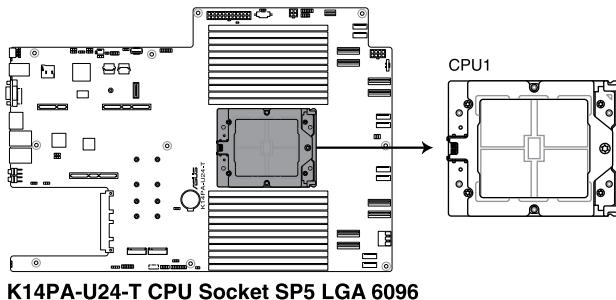
K14PA-U24-T CPU Socket SP5 LGA 6096

3.3   Dual Inline Memory Module (DIMM)

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

K14PA-U24-T 288-pin DDR5 DIMM sockets
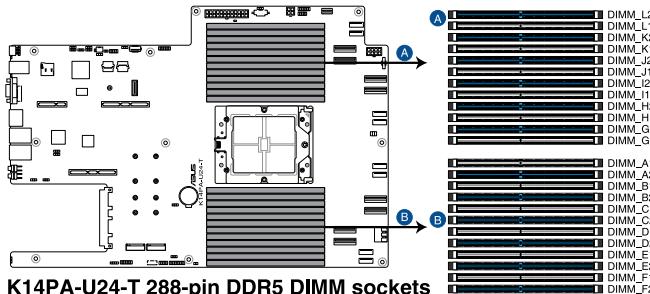
3.4 Jumpers

1. Clear RTC RAM (3-pin CLRTC1)

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

To erase the RTC RAM:

1. Turn OFF the computer and unplug the power cord.

2. Move the jumper cap from pins 1–2 (default) to pins 2–3. Keep the cap on pins 2–3 for about 5–10 seconds, then move the cap back to pins 1–2.

3. Plug the power cord and turn ON the computer.

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

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

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

K14PA-U24-T Clear RTC RAM
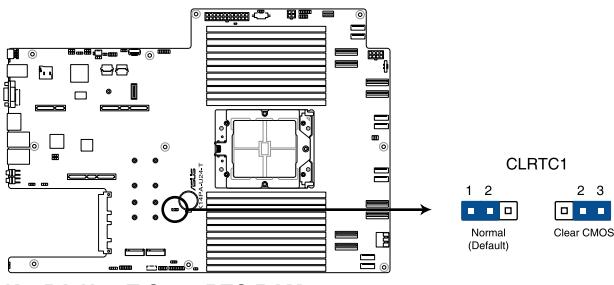
2. **VGA controller setting (3-pin VGA_SW1)**
   This jumper allows you to enable or disable the onboard VGA controller. Set to pins 1–2 to activate the VGA feature.

VGA_SW1

1 2   2 3

Enable   Disable
(Default)
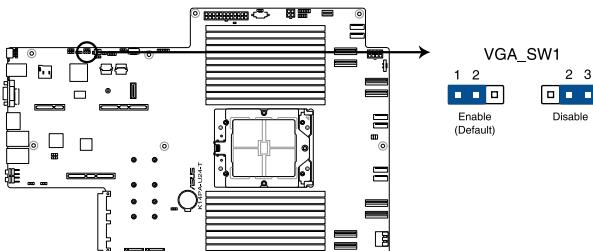
K14PA-U24-T VGA setting

3. **Baseboard Management Controller setting (3-pin BMC_EN1)**
   This jumper allows you to enable (default) or disable on-board BMC. Ensure to set this BMC jumper to enabled to avoid system fan control and hardware monitor error.

BMC_EN1

1 2   2 3

Enable   Disable
(Default)
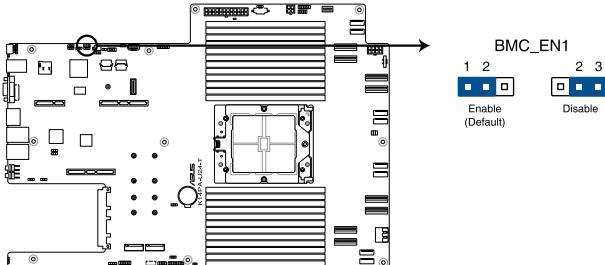
K14PA-U24-T BMC setting

4. **DMLAN setting (3-pin DM_IP_SEL1)**
   This jumper allows you to select the DMLAN setting. Set to pins 2-3 to force the DMLAN IP to static mode (IP=10.10.10.10, submask=255.255.255.0).

DM_IP_SEL1

1 2   2 3

Normal   Force DMLAN IP
(Default)   to static mode
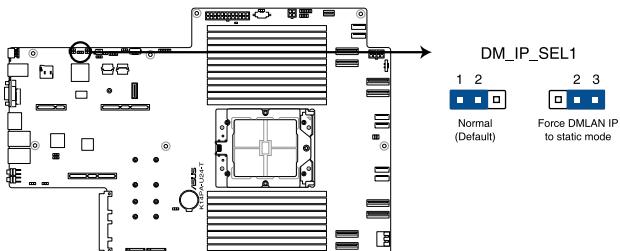
K14PA-U24-T DM_IP_SEL1 setting

5. **IPMI SW setting (3-pin IPMI_SW1)**
   This jumper allows you to select which protocol in the GPU sensor to function.

IPMI_SW1

1 2   2 3

IPMI   IPMB
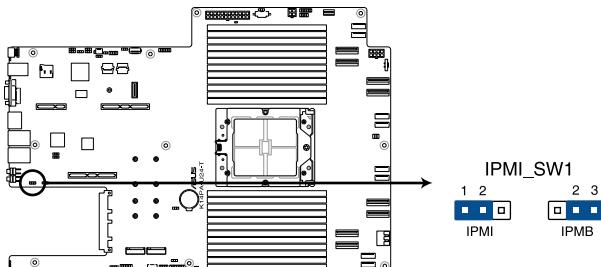
K14PA-U24-T IPMI_SW1 setting

6. **Smart Ride Through (SmaRT) setting (3-pin SMART_PSU1)**
    This jumper allows you to enable or disable the Smart Ride Through (SmaRT) function. This feature is enabled by default. Set to pins 2-3 to disable it. When enabled, SmaRT allows uninterrupted operation of the system during an AC loss event.
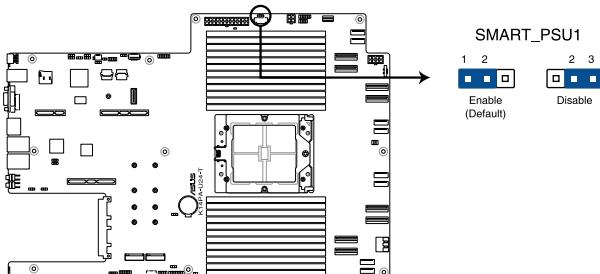
K14PA-U24-T Smart Ride Through setting

7. **LAN Controller settings (3-pin LAN_SW1-2)**
    These jumpers allow you to enable or disable the onboard LAN_SW1 or LAN_SW2. Set to pins 1-2 to activate the Gigabit LAN feature.
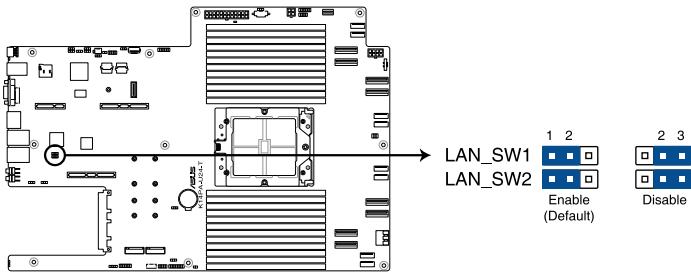
K14PA-U24-T LAN setting

8.   **Heatsink Type setting (3-pin HS_TYPE1)**
      This jumper should be set according to the type of heatsink installed.

K14PA-U24-T HS_TYPE1 setting
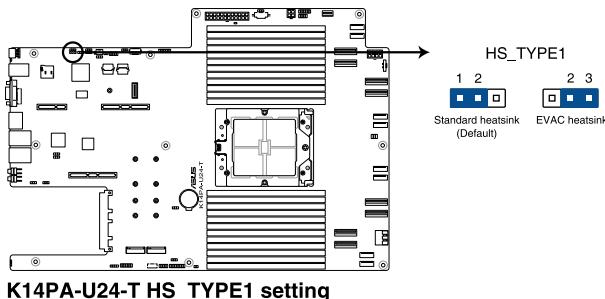
9.   **NCSI Device setting (3-pin NCSI_SEL1)**
      This jumper allows you to select the NCSI device.

K14PA-U24-T NCSI_SEL1 setting
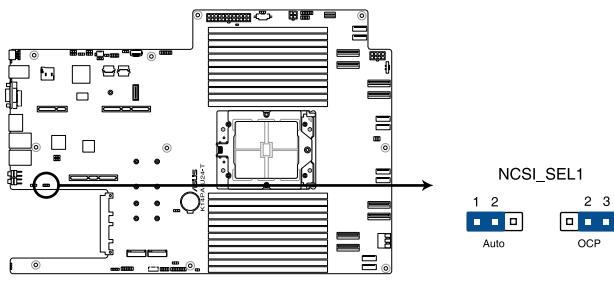
3.5   Internal LEDs

1.   **Standby Power LED (SBPWR1)**

    The motherboard comes with a standby power LED. The green LED lights up to indicate that the system is ON, in sleep mode, or in soft-off mode. This is a reminder that you should shut down the system and unplug the power cable before removing or plugging in any motherboard component. The illustration below shows the location of the onboard LED.
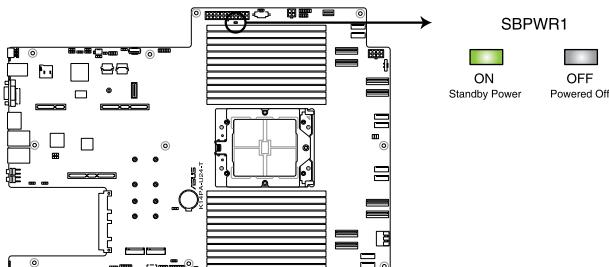
K14PA-U24-T Standby Power LED

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

    The BMC LED lights up to indicate that the on-board BMC is functional.
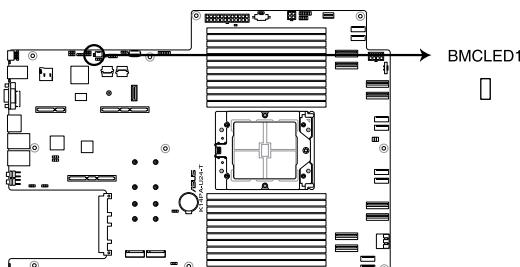
K14PA-U24-T BMCLED1

3. **Message LED (MESLED1)**
   This onboard LED lights up to red when there is a BMC event log is generated.
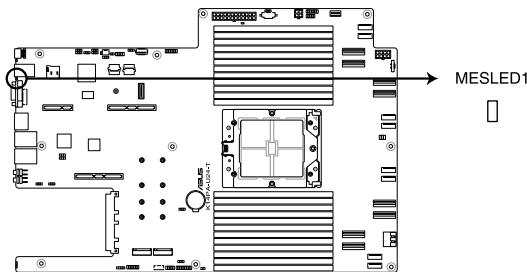
MESLED1

K14PA-U24-T MESLED1

4. **Storage Device Activity LED (HDDLED1)**
   This LED is for the storage devices connected to the onboard SATA, or SATA/SAS add-on card. The read or write activities of any device connected to the onboard SATA, or SATA/SAS add-on card causes the rear panel LED to light up.
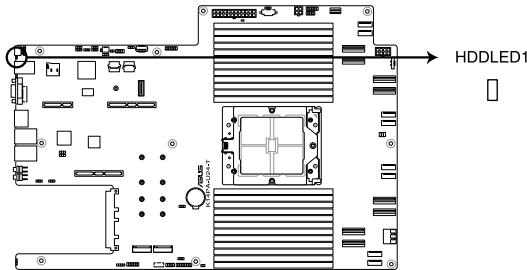
HDDLED1

K14PA-U24-T HDDLED1

5.   **OCP 3.0 Operation Normal LED (G_LED1)**
      The OCP 3.0 operation normal LED lights up to indicate that OCP 3.0 is functional.
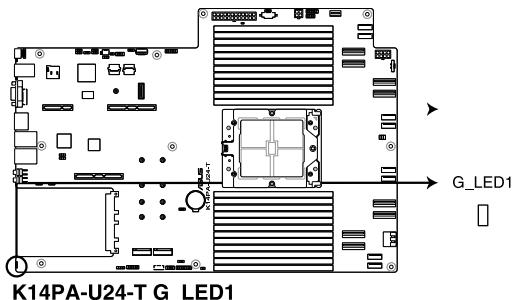
      G_LED1

      K14PA-U24-T G_LED1

6.   **OCP 3.0 Power Fail LED (R_LED1)**
      The OCP 3.0 power fail LED lights up to indicate that OCP 3.0 has encountered a power
      fail error.
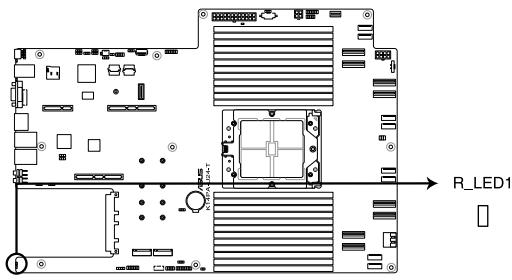
      R_LED1

      K14PA-U24-T R_LED1

3.6   Internal connectors

1.   **MCIOPCIE connectors (MCIO1-8)**
      Connects the PCIe or SATA signal to the riser card or the backplane.

K14PA-U24-T MCIOPCIE connectors
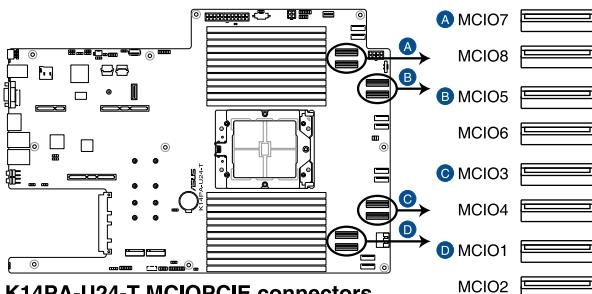
MCIO1~6 supports PCIe signals, and MCIO7~8 supports SATA signals only

2.   **SATA connector (SATA12)**
      Connects SATA signal to backplane to support SATA drives.

K14PA-U24-T SATA connectors
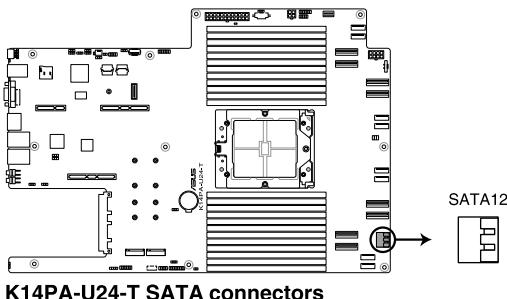
3. **USB 3.2 Gen 1 connector (FP_USB3; TYPEA_U3)**

    This connector allows you to connect a USB 3.2 Gen 1 module for additional USB 3.2 Gen 1 ports on the front panel. The USB 3.2 Gen 1 connector provides data transfer speeds of up to 10 Gb/s. The Type-A connector allows you to directly connect a USB flash drive.
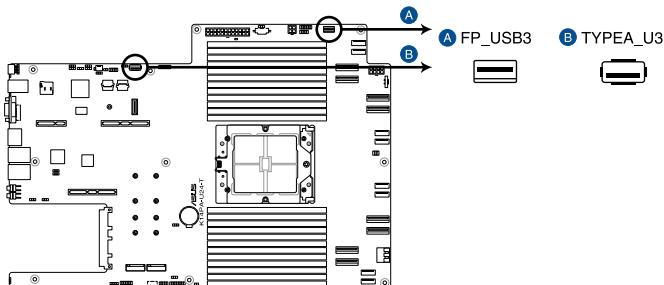
K14PA-U24-T USB 3.2 Gen 1 connectors

The USB port module is purchased separately.

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

    These leads are for the intrusion detection feature for chassis with intrusion sensor or microswitch. When you remove any chassis component, the sensor triggers and sends a high level signal to these leads to record a chassis intrusion event. The default setting is to short the CHASSIS# and the GND pin by a jumper cap to disable the function.
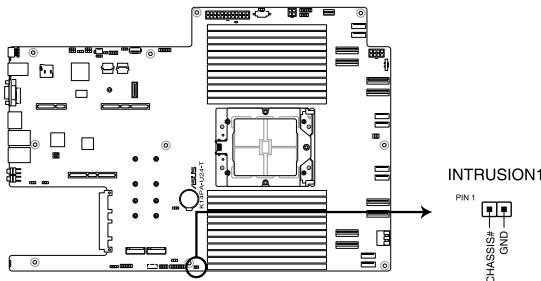
K14PA-U24-T Chassis Intrusion connector

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

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

COM1

PIN 1

RXD1 DTR1 DSR1 CTS1

DCD1 TXD1 GND RST1# PI1#
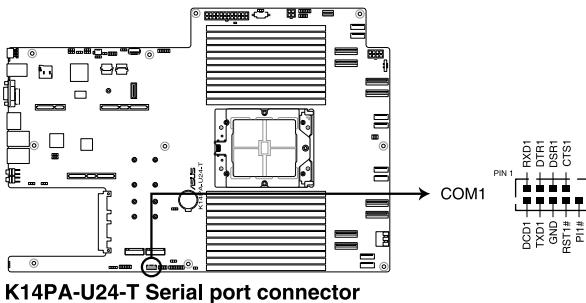
K14PA-U24-T Serial port connector

The COM module is purchased separately.

6. **System Fan connectors (6-pin FRNT_FAN1-8)**

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

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

A FRNT_FAN8

FRNT_FAN7

B FRNT_FAN6

FRNT_FAN5

C FRNT_FAN4

FRNT_FAN3

D FRNT_FAN2

FRNT_FAN1

+12V GND PWM rotate +12V GND
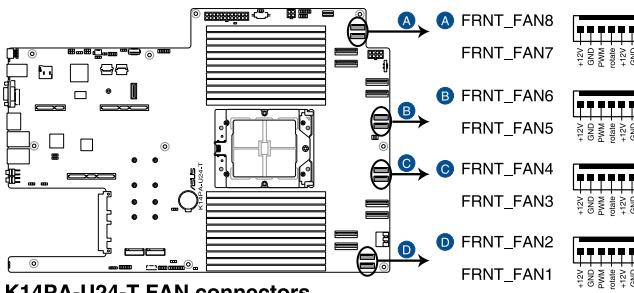
K14PA-U24-T FAN connectors

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

   This connector supports a Trusted Platform Module (TPM) system, which can securely store keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity.
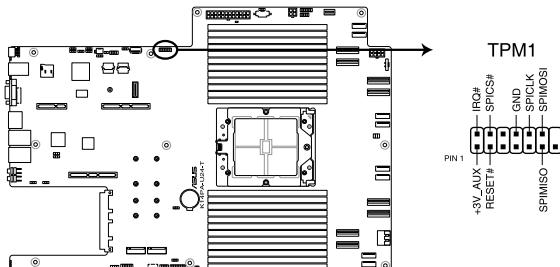
K14PA-U24-T TPM connectors

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

   These connectors allow you to install M.2 devices.
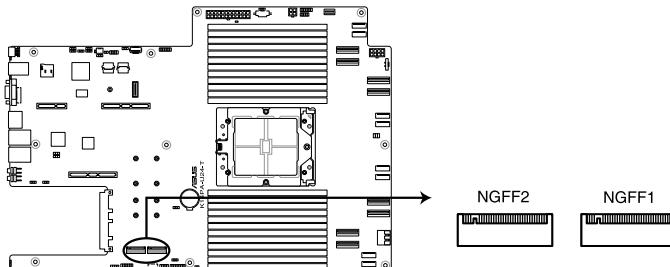
K14PA-U24-T NGFF connectors

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

The M.2 (NGFF) device is purchased separately

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

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

K14PA-U24-T ATX power connectors
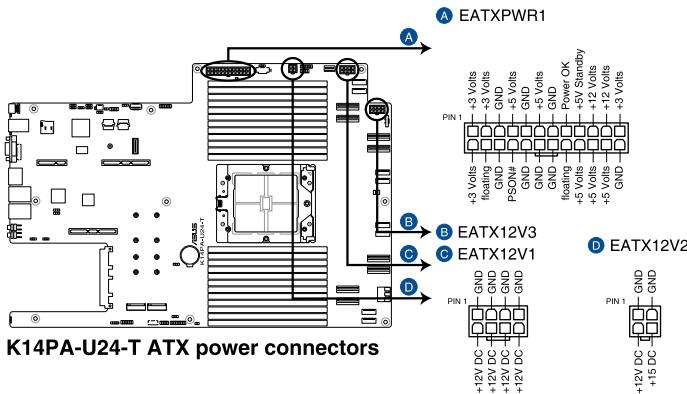
⚠ DO NOT connect VGA cards to these connectors. Doing so may cause system boot errors and permanent damage to your motherboard or device.

10. **VGA connector (16-pin VGA_HDR1)**

This connector outputs a VGA signal to a connected display device.

K14PA-U24-T Internal VGA connector
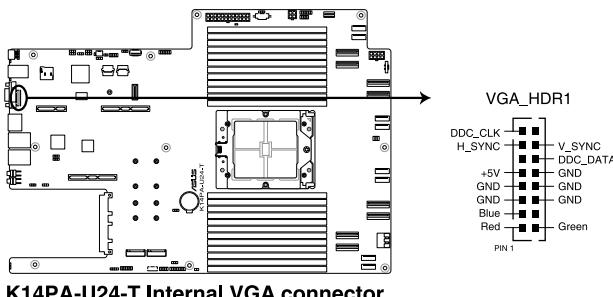
11. **microSD Card slot (MSD1)**
    Your motherboard supports SD Memory Card v2.00 (SDHC) / v3.00 (SDXC).

MSD1
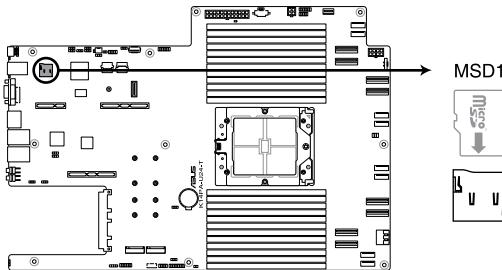
K14PA-U24-T MicroSD card slot

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

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

12. **Storage Device Activity LED connector (4-pin HDLED1)**
    This LED connector is for the storage add-on card cable connected to the SATA or SAS add-on card. The read or write activities of any device connected to the SATA or SAS add-on card causes the front panel LED to light up.

HDLED1

NC
ADD_IN_CARD-
ADD_IN_CARD-
NC

PIN 1
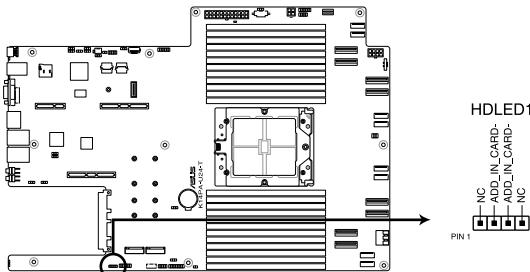
K14PA-U24-T Storage device activity LED connector

13. System Panel connector (10-1 pin SYS_PANEL1; 14-1 pin SYS_PANEL2)

This connector supports several chassis-mounted functions.
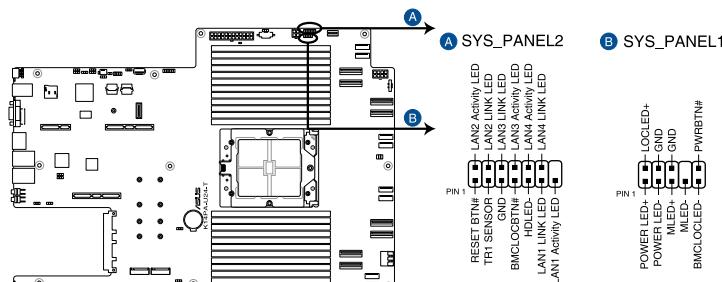
K14PA-U24-T System panel connectors

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

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

- **Locator LED connector (BMCLOCLED, LOCLED)**
  This connector allows you to connect the Locator LED. The Location LED helps visually locate and identify the server in error on a server rack.

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

- **LAN activity LED connector (LAN1_LED, LAN2_LED, LAN3_LED, LAN4_LED)**
  This 2-pin connector allows you to connect the Gigabit LAN Activity LED.

- **Reset button connector (RESET)**
  This connector allows you to connect the chassis-mounted reset button. Press the reset button to reboot the system.

- **TR1 Sensor connector (TR1 SENSOR)**
  This connector allows detection of the environmental temperature of the front panel.

- **Locator button connector (BMCLOCBTN#)**
  This connector allows you to connect the Locator button. Press the button to light up the Locator LED.

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

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

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

BMC_DEBUGUART1

PIN 1

BMC_TXD5
BMC_RXD5
GND
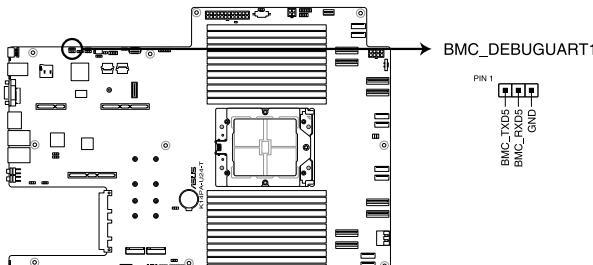
K14PA-U24-T BMC_DEBUGUART1 connector

15. Liquid connector (14-1 pin LIQUID_CONN1)

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

LIQUID_CONN1

+12V
+3V_AUX
GND
LC1_SCL
LC1_SDA
LC_PRSNT#

PIN 1

+12V
+5V
GND
LC_FAN_IN_1
NA
NA
NA
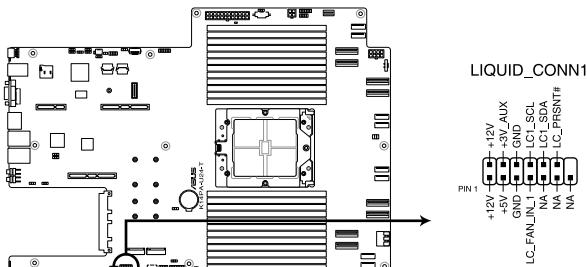
K14PA-U24-T LIQUID_CONN1 connector

16. **Power Supply SMBus connector (5-pin PSUSMB1)**
    This connector allows you to connect SMBus (System Management Bus) to the PSU (power supply unit) to read PSU information. Devices communicate with an SMBus host and/or other SMBus devices using the SMBus interface.
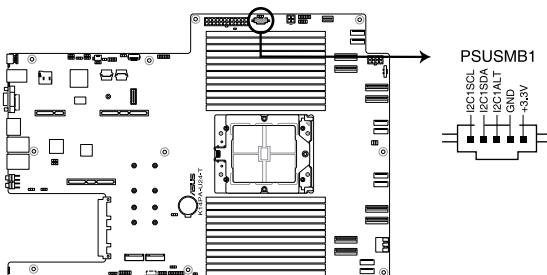
K14PA-U24-T Power supply SMBus connector

This connector functions only when you enable ASUS ASMB11.

17. **Platform Firmware Resilience (PFR) module connector (ROT_CON)**
    This connector allows you to connect a PFR module to enable platform firmware resilience functions.
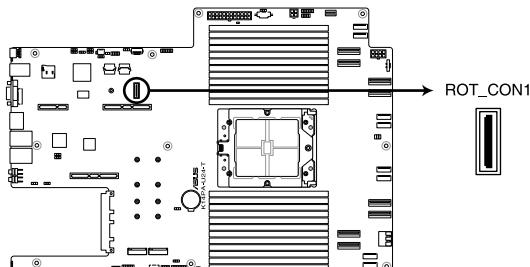
K14PA-U24-T ROT_CON1 connector

18. **Front BP SMBus Protocol connector (10-1 pin BP_I2C1)**

This connector is used for sensor readings.

K14PA-U24-T BP_I2C1 connector
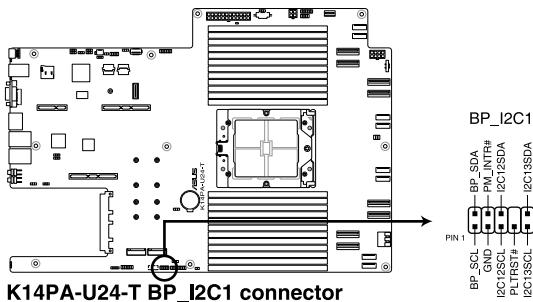
19. **Internal BP SMBus Protocol connector (18-1 MG9098_CON1)**

This connector is used for sensor readings.

K14PA-U24-T MG9098_CON1 connector

4
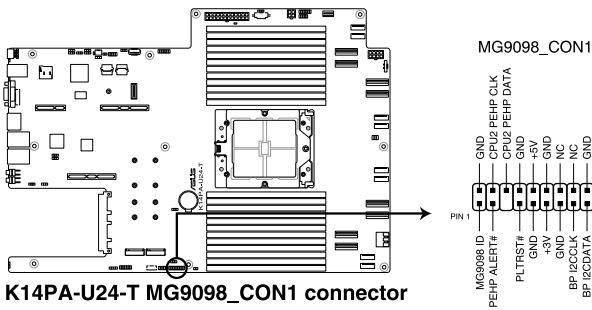
BIOS Setup

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

4.1 Managing and updating your BIOS

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

1. **ASUS CrashFree BIOS 3**

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

2. **ASUS EzFlash**

   Updates the BIOS using a USB flash disk.

4.1.1 ASUS CrashFree BIOS 3 utility

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

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

Recovering the BIOS from a USB flash drive

To recover the BIOS from a USB flash drive:

1. Insert the USB flash drive with the original or updated BIOS file to one USB port on the system.

2. The utility will automatically recover the BIOS. It resets the system when the BIOS recovery finished.

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

> The recovered BIOS may not be the latest BIOS version for this motherboard. Visit the ASUS website at www.asus.com to download the latest BIOS file.

4.1.2   ASUS EZ Flash Utility

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

> Before you start using this utility, download the latest BIOS from the ASUS website at www.asus.com.

To update the BIOS using EZ Flash Utility:

1.   Insert the USB flash disk that contains the latest BIOS file into the USB port.

2.   Enter the BIOS setup program. Go to the **Tool** menu then select **Start ASUS EzFlash**. Press <Enter>.

```
   ASUSTek. EzFlash Utility. (Will shutdown after update. Push Pwr Btn to turn on.)_

           ── Current Platform ──                         ── New Platform ──
  Platform  : K14PA-U24-T                       Platform  : K14PA-U24-T
  Version   : 0206                              Version   : 0302
  Build date: 06/03/2024                        Build date: 07/09/2024


  FS0
  FS1






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

3.   Press Left arrow key to switch to the **Drive** field.

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

5.   Press Right arrow key to switch to the **Folder Info** field.

6.   Press the Up/Down arrow keys to find the BIOS file, and then press <Enter> to perform the BIOS update process. Reboot the system when the update process is done.

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

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

4.2   BIOS setup program

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

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

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

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

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

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

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

- The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.

- Visit the ASUS website (www.asus.com) to download the latest BIOS file for this motherboard.

4.2.1   BIOS menu screen

Menu items   **Menu bar**   **Configuration fields**   **General help**

```
                              Aptio Setup - AMI
 Main  Advanced  Chipset  Security  Boot  Tool  Event Logs  Server Mgmt  Exit

 BIOS Information                                        Choose the system default
 BIOS Version              0302 x64                      language
 Build Date                09/07/2022
 Access Level              Administrator
 Agesa Version             v1.0.0.0
 System Serial Number      265226000308
 BMC Firmware Revision     1.01.15

 Intel I350 LAN1 MAC       00:E0:18:05:44:02
 Intel I350 LAN2 MAC       00:E0:18:05:44:03

 Memory Information                                     ++: Select Screen
 Total Memory              Total Memory: 32768 MB       ↑↓: Select Item
                           (DDR5)                       Enter: Select
 Memory Frequency          4800 MHz                     +/-: Change Opt.
                                                        F1: General Help
 System Language           [English]                    F2: Previous Values
                                                        F5: Optimized Defaults
 System Date               [Mon 09/26/2022]             F10: Save Changes & Reset
 System Time               [14:23:56]                   F12: Print Screen
                                                        ESC: Exit



                    Version 2.22.1285 Copyright (C) 2022 AMI
```

Navigation keys

4.2.2   Menu bar

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

Main   For changing the basic system configuration

Advanced   For changing the advanced system settings

Chipset   For changing the chipset settings

Security   For changing the security settings

Boot   For changing the system boot configuration

Tool   For configuring options for special functions

Event Logs For changing the event log settings

Server Mgmt   For changing the Server Mgmt settings

Save & Exit   For selecting the exit options

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

4.2.3   Menu items

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

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

4.2.4   Submenu items

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

4.2.5   Navigation keys

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

4.2.6   General help

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

4.2.7   Configuration fields

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

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

4.2.8   Pop-up window

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

4.2.9   Scroll bar

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

4.3   Main menu

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

```
                              Aptio Setup - AMI
    Main   Advanced   Chipset   Security   Boot   Tool   Event Logs   Server Mgmt   Save & Exit

    BIOS Information                                        Choose the system default
    BIOS Version                  0206 x64                  language
    Build Date                    06/03/2024
    Access Level                  Administrator
    AGESA Version                 0.0.8.1
    System Serial Number          111111111111
    BMC Firmware Revision         1.02.15

    Intel I350 LAN1 MAC           10:7C:61:53:9E:65
    Intel I350 LAN2 MAC           10:7C:61:53:9E:66

    Memory Information
    Total Memory                  Total Memory: 98304 MB
    Memory Frequency              5200 MHz                  →←: Select Screen
                                                           ↑↓: Select Item
    System Language               [English]                Enter: Select
                                                           +/-: Change Opt.
    System Date                   [Fri 07/05/2024]          F1: General Help
    System Time                   [11:26:59]                F2: Previous Values
                                                           F5: Optimized Defaults
                                                           F10: Save Changes & Reset
                                                           F12: Print Screen
                                                           <k>: Scroll help area upwards
                                                           <m>: Scroll help area downwards
                                                           ESC: Exit


                        Version 2.22.1293 Copyright (C) 2024 AMI
```

System Language [English]

Allows you to select the system default language.

System Date [Day xx/xx/xxxx]

Allows you to set the system date.

System Time [xx:xx:xx]

Allows you to set the system time.

4.4   Advanced menu

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

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

```
                                Aptio Setup – AMI
    Main  Advanced  Chipset  Security  Boot  Tool  Event Logs  Server Mgmt  Save & Exit
 ┌────────────────────────────────────────────────┬──────────────────────────────────┐
 │ ▶ Trusted Computing                            ▲│ Trusted Computing Settings        │
 │ ▶ Redfish Host Interface Settings               │                                   │
 │ ▶ AMD CBS                                       │                                   │
 │ ▶ Onboard LAN Configuration                     │                                   │
 │ ▶ UEFI Variables Protection                     │                                   │
 │ ▶ Serial Port Console Redirection               │                                   │
 │ ▶ CPU Configuration                             │                                   │
 │ ▶ PCI Subsystem Settings                        │                                   │
 │ ▶ USB Configuration                             │                                   │
 │ ▶ Network Stack Configuration                   │                                   │
 │ ▶ NVMe Configuration                            │                                   │
 │ ▶ SATA Configuration                            │                                   │
 │ ▶ Offboard SATA Controller Configuration        │                                   │
 │ ▶ APM Configuration                             │ ↔: Select Screen                  │
 │                                                 │ ↑↓: Select Item                   │
 │ ▶ AMD Mem Configuration Status                  │ Enter: Select                     │
 │ ▶ Tls Auth Configuration                        │ +/−: Change Opt.                  │
 │ ▶ Intel(R) I350 Gigabit Network Connection – 10:7C:61:53:9E:65 │ F1: General Help    │
 │ ▶ VLAN Configuration (MAC:107C61539E65)         │ F2: Previous Values               │
 │ ▶ MAC:107C61539E65-IPv4 Network Configuration   │ F5: Optimized Defaults            │
 │ ▶ MAC:107C61539E65-HTTP Boot Configuration      │ F10: Save Changes & Reset         │
 │ ▶ MAC:107C61539E65-IPv6 Network Configuration   │ F12: Print Screen                 │
 │ ▶ Intel(R) I350 Gigabit Network Connection – 10:7C:61:53:9E:66 │ <k>: Scroll help area upwards │
 │ ▶ VLAN Configuration (MAC:107C61539E66)         │ <m>: Scroll help area downwards   │
 │ ▶ MAC:107C61539E66-IPv4 Network Configuration  ▼│ ESC: Exit                         │
 └────────────────────────────────────────────────┴──────────────────────────────────┘
```

4.4.1   Trusted Computing

```
                                Aptio Setup – AMI
 ┌──────────┐
 │ Advanced │
 ┌────────────────────────────────────────────────┬──────────────────────────────────┐
 │ Configuration                                   │ Enables or Disables BIOS          │
 │   Security Device Support        [Disabled]     │ support for security device.      │
 │   NO Security Device Found                       │ O.S. will not show Security       │
 │                                                 │ Device. TCG EFI protocol and      │
 └────────────────────────────────────────────────┴──────────────────────────────────┘
```

Security Device Support [Disabled]

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

4.4.2   Redfish Host Interface Settings

```
                           Aptio Setup — AMI
     Advanced

 Redfish Host Interface Settings                     Enable/Disable AMI Redfish

 Redfish                          [Enabled]

 BMC Redfish Version              1.11.0
 BIOS Redfish Version             1.11.0

 Authentication mode             [Basic Authentication]

 Redfish Server Settings
 IP address
 IP Mask address
 IP Port                          65535
```

Redfish [Enabled]

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

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

Authentication mode [Basic Authentication]

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

Redfish BMC Settings

IP address

Allows you to enter the IP address.

IP Mask address

Allows you to enter the IP Mask address.

IP Port

Allows you to enter the IP Port.

4.4.3 AMD CBS

```
                                    Aptio Setup — AMI
        Advanced

   AMD CBS                                              CPU Common Options

   AMD CBS Revision Number           0x0

 ▶ CPU Common Options
 ▶ DF Common Options
 ▶ UMC Common Options
 ▶ NBIO Common Options
 ▶ FCH Common Options
 ▶ NTB Common Options
 ▶ Soc Miscellaneous Control
 ▶ CXL Common Options
```
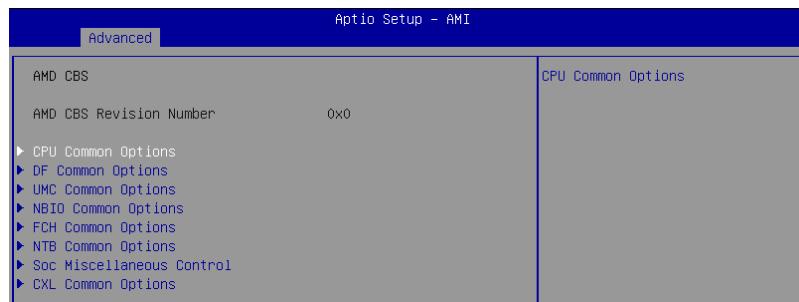
CPU Common Options

Performance

Allows you to configure performance options.

REP-MOV/STOS Streaming [Enabled]

Allows you to enable or disable the use of non-caching streaming stores for large sizes.
Configuration options: [Disabled] [Enabled]

Prefetcher Settings

Allows you to configure prefetcher options.

Core Watchdog

Allows you to configure core watchdog options.

RedirectForReturnDis [Auto]

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

Platform First Error Handling [Auto]

Allows you to enable or disable PFEH, cloak individual banks, and mask deferred error
interrupts from each bank.
Configuration options: [Disabled] [Enabled] [Auto]

Core Performance Boost [Auto]

Configuration options: [Disabled] [Auto]

Global C-state Control [Auto]

Allows you to control IO based C-state generation and DF C-states.
Configuration options: [Disabled] [Enabled] [Auto]

Power Supply Idle Control [Auto]

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

Streaming Stores Control [Auto]

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

Local APIC Mode [Auto]

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

ACPI _CST C1 Declaration [Auto]

Determines whether or not to declare the C1 state to the OS.
Configuration options: [Disabled] [Enabled] [Auto]

ACPI CST C2 Latency [100]

Enter in microseconds (decimal value). Larger C2 latency values will reduce the
number of C2 transitions and reduce C2 residency. Fewer transitions can help when
performance is sensitive to the latency of C2 entry and exit. Higher residency can
improve performance by allowing higher frequency boost and reduce idle core power.
With Linux kernel 6.0 or later, the C2 transition cost is significantly reduced. The best
value will be dependent on kernel version, use case, and workload.
Configuration options:[18] - [1000]

MCA error thresh enable [Auto]

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

MCA correctable error interrupt mask [Auto]

Configuration options: [Disable] [Enable] [Auto]

MCA FruText [True]

Configuration options: [False] [True]

SMU and PSP Debug Mode [Auto]

If this option is enabled, uncorrected errors detected by the PSP FW or SMU FW will
hang and not reset the system instead of causing a cold reset.
Configuration options: [Disabled] [Enabled] [Auto]

PPIN Opt-in [Auto]

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

SMEE [Auto]

Control secure memory encryption enable. Enabling both SMEE and SME-MK is not
supported. Results in #GP.
Configuration options: [Disable] [Enable] [Auto]

Action on BIST Failure [Auto]

Allows you to configure what action is taken when a CCD BIST failure is detected.
Configuration options: [Do nothing] [Down-CCD] [Auto]

Enhanced REP MOVSB/STOSB (ESRM) [Auto]

Default is 1, can be set to zero for analysis purposes as long as OS supports it.
Configuration options: [Disabled] [Enabled] [Auto]

Log Transparent Errors [Auto]

Log transparent errors in MCA in addition to debug registers.
Configuration options: [Disabled] [Enabled] [Auto]

AVX512 [Auto]

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

Enhanced Rep Movs Stos B [Auto]

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

MONITOR and MWAIT Disable [Auto]

When this option is enabled, MONITOR, MWAIT, MONITORX, and MWAITX opcodes become invalid.
Configuration options: [Disabled] [Enabled] [Auto]

CPU Speculative Store Modes [Auto]

[Balanced]   Store instructions may delay sending out their invalidations to remote cacheline copies when the cacheline is present but not in a writable state in the local cache.

[More Speculative] Store instructions will send out invalidations to remote cacheline copies as soon as possible.

[Less Speculative] Store instructions may delay sending out their invalidations to remote cacheline copies when the cacheline is not present in the local cache or not in a writable state in the local.

[Auto]   Uses default setting.

Fast Short REP MOVSB (FSRM) [Enabled]

Default set to 1, can be set to zero for analysis purposes as long as OS supports it.
Configuration options: [Disabled] [Enabled] [Auto]

PauseCntSel_1_0 [Auto]

Number of cycles dispatch is stalled for a thread after dispatching PAUSE instruction. POR is 64 cycles.
Configuration options: [Disabled] [Enabled]

Prefetch/Request Throttle [Auto]

Enables XI logic which calculates average latency, updates throttle level, and sends throttle level messages to L2.
Configuration options: [Disable] [Enable] [Auto]

Scan Dump Debug Enable [Disable]

This option operates like below settings (when enabled) to avoid the reset caused by Syncflood, etc.
Configuration options: [Disable] [Enable]

MCAX 64 bank support [Auto]

Enable 64 MCA banks per thread mapping.
Configuration options: [Disabled] [Enabled] [Auto]

Adaptive Allocation (AA) [Auto]

Disable to use fixed L2 replacement/allocation policy.
Configuration options: [Disabled] [Enabled] [Auto]

Latency Under Load (LUL) [Auto]

Enabling may improve latency in heavy BW scenarios. May slightly reduce peak CCD BW.
Configuration options: [Disabled] [Enabled] [Auto]

Core Trace Dump Enable [Disable]

Allows you to enable or disable Core Trace Dump Feature.
Configuration options: [Disable] [Enable]

DF Common Options

Memory Addressing

Allows you to configure memory addressing options.

ACPI

Allows you to configure ACPI options.

Link

Allows you to configure Link settings.

SDCI

Allows you to configure SDCI settings.

DF Watchdog Timer Interval [Auto]

Allows you to set the Data Fabric watchdog timer interval.
Configuration options: [Auto] [41 ms] [166 ms] [334 ms] [669 ms] [1.34 seconds] [2.68 seconds] [5.36 seconds]

Disable DF to external IP SyncFloodPropagation [Auto]

Allows you to enable or disable SyncFlood to UMC and downstream slaves.
Configuration options: [Sync flood disabled] [Sync flood enabled] [Auto]

Sync Flood Propagation to DF Components [Auto]

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

Freeze DF module queues on error [Auto]

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

CC6 Memory Region Encryption [Auto]

Control whether or not the CC6 save/restore memory is encrypted.
Configuration options: [Disabled] [Enabled] [Auto]

CCD B/W Balance Throttle Level [Auto]

Enabled throttling of memory traffic per CCD. Increased throttling can reduce imbalance across CCDs (expected to be rare).
Configuration options: [Auto] [Level 0] [Level 1] [Level 2] [Level 3] [Level 4]

Number of PCI Segments [Auto]

Configuration options: [1 Segment] [2 Segments] [4 Segments] [Auto]

CCM Throttler [Auto]

Limit peak CCM throughput.
Configuration options: [Disabled] [Enabled] [Auto]

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

MemReqBandwidthControl [FineThrotHeavy] [0]
If CCM Throttler enabled, limit level. Value 0 to 31 where 31+1 = 100% BW.
Configuration options: [0] - [19]

MemReqBandwidthControl [FineThrotLight] [0]
If CCM Throttler enabled, limit level. Value 0 to 31 where 31+1 = 100% BW.
Configuration options: [0] - [19]

Clean Victim FTI Cmd Balancing [Auto]

Control Clean Victim FTI Cmd Balancing feature.
Configuration options: [Disable] [Enable]

UMC Common Options

DDR Addressing Options

Allows you to configure DDR addressing options.

DDR Controller Configuration

Allows you to configure DDR controller options.

DDR MBIST Options

Allows you to configure DDR MBIST options.

DDR RAS

Allows you to configure DDR RAS options.

DDR Bus Configuration

Allows you to configure DDR Bus options.

DDR Timing Configuration

Allows you to configure DDR Timing options.

DDR Training Options

Allows you to configure DDR Training options.

DDR Security

Allows you to configure DDR Security options.

DDR PMIC Configuration

Allows you to configure DDR PMIC options.

DDR Miscellaneous

Allows you to configure DDR Miscellaneous options.

NBIO Common Options

SMU Common Options

Allows you to configure SMU Common options.

NBIO RAS Common Options

Allows you to configure NBIO RAS Common options.

PCIE

Allows you to configure PCIE options.

nBif Common Options

Allows you to configure nBif Common options.

IOMMU/Security

Allows you to configure IOMMU/Security options.

Enable Port Bifurcation

Allows you to configure Enable Port Bifurcation options.

Link EQ Preset Options

Allows you to configure Link EQ Preset Options options.

PCIe Loopback Mode [Auto]

Allows you to enable or disable PCIe Loopback Mode.
Configuration options: [Auto] [Disabled] [Enabled]

Enable 2 SPC (Gen 4)

Enable this setting to use 2 symbols per clock for devices at Gen 4 speed.
Configuration options: [Disable] [Enable] [Auto]

Enable 2 SPC (Gen 5)

Enable this setting to use 2 symbols per clock for devices at Gen 5 speed.
Configuration options: [Disable] [Enable] [Auto]

Safe recovery upon a BERExceeded Error [Auto]

Configuration options: [Disable] [Enable] [Auto]

Periodic Calibration [Auto]

Configuration options: [Disable] [Enable] [Auto]

FCH Common Options

I3C/I2C Configuration Options

Allows you to configure I3C/I2C options.

SATA Configuration Options

Allows you to configure SATA options.

USB Configuration Options

Allows you to configure USB options.

Ac Power Loss Options

Allows you to configure AC power loss options.

UART Configuration Options

Allows you to configure UART options.

FCH RAS Options

Allows you to configure FCH RAS options.

Miscellaneous Options

Allows you to configure miscellaneous FCH options.

NTB Common Options

Socket-0 P0 NTB Enable [Auto]

Enable NTB on Socket-0 P0 Link.
Configuration options: [Disable] [Enable] [Auto]

The following items appear only when **Socket-0 P0 NTB Enable** is set to **[Enable].**

Socket-0 P0 Start Lane [0]
NTB Start Lane on Socket-0 P0 Link.
Configuration options: [0] - [15]

Socket-0 P0 End Lane [15]
NTB Start Lane on Socket-0 P0 Link.
Configuration options: [0] - [15]

Socket-0 P0 Link Speed [Auto]
Link Speed for Socket-0 P0 Link.
Configuration options: [Auto] [Gen 1] [Gen 2] [Gen 3] [Gen 4] [Gen 5]

Socket-0 P0 NTB Mode [Auto]
NTB Mode for Socket-0 P0 Link.
Configuration options: [Auto] [NTB Disabled] [NTB Primary] [NTB Secondary]

Socket-0 P2 NTB Enable [Auto]

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

The following items appear only when **Socket-0 P2 NTB Enable** is set to **[Enable].**

Socket-0 P2 Start Lane [48]
NTB Start Lane on Socket-0 P2 Link.
Configuration options: [48] - [63]

Socket-0 P2 End Lane [63]
NTB Start Lane on Socket-0 P2 Link.
Configuration options: [48] - [63]

Socket-0 P2 Link Speed [Auto]
Link Speed for Socket-0 P2 Link.
Configuration options: [Auto] [Gen 1] [Gen 2] [Gen 3] [Gen 4] [Gen 5]

Socket-0 P2 NTB Mode [Auto]
NTB Mode for Socket-0 P2 Link.
Configuration options: [Auto] [NTB Disabled] [NTB Primary] [NTB Secondary]

Soc Miscellaneous Control

ABL Console Out Control [Auto]

[Disable]   Disable ConsoleOut Function for ABL.

[Enable]   Enable ConsoleOut Function for ABL.

[Auto]   Keep default behavior.

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

ABL Console Out Serial Port [Auto]
[eSPI UART]   Enable serial port through eSPI UART.

[SOC UART0] Enable serial port through SOC UART0.

[SOC UART1] Enable serial port through SOC UART1.

[Auto]   Keep default behavior.

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

ABL Console Out Serial Port IO [Auto]
Select Legacy Uart (SIO or eSPI) IO base.

[0x3F8]   Set IO base to 0x3F8.

[0x2F8]   Set IO base to 0x2F8.

[0x3E8]   Set IO base to 0x3E8.

[0x2E8]   Set IO base to 0x2E8.

[Auto]   Keep default behavior.

Please make sure the selected eSPI IO base and length has been filled in APCB_FCH_TYPE_ESPI_INIT or APCB_FCH_TYPE_ESPI1_INIT EspiInitConfiguration table. CRB only filles 0x3F8, 0x2F8 in it by default.

ABL Basic Console Out Control [Auto]
[Disabled]   Disable Basic ConsoleOut Function for ABL.

[Enabled]   Enable Basic ConsoleOut Function for ABL.

[Auto]   Keep default behavior.

ABL PMU message Control [Auto]
Allows you to control the total number of PMU debug messages.
Configuration options: [Detailed debug message] [Coarse debug message] [Stage completion] [Auto]

ABL Memory Population message Control [Warning message]

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

[Warning message]   Show warning messages if Memory channel configuration does NOT folow SP5 Memory Population Guidelines.

[Fatal error]   Show warning messages and halt system.

PSP error injection support [False]

Enable EINJ support.
Configuration options: [False] [True]

Firmware Anti-rollback (FAR)

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

CXL Common Options

For an AVL of components that support CXL, please contact your sales representative.

CXL Control [Auto]

Force enablement of CXL on all ports.

[Auto]   Uses default settings.

[Enabled]   Allow platforms to enable CXL by port.

[Disabled] Force enablement of CXL on all ports.

CXL Physical Addressing [Auto]

Control SDP request system address.

[Auto]   Uses default settings.

[Normalized address]   CS sends normalized address to SDP.

[System address]   CS sends system to SDP.

CXL Memory Attribute [Auto]

Set CXL memory as Special Purpose Memory.
Configuration options: [Disabled] [Enabled] [Auto]

CXL Encryption [Disabled]

Configuration options: [Disabled] [Enabled]

CXL DVSEC Lock [Auto]

Locks the CXL DVSEC.
Configuration options: [Auto] [Disabled] [Enabled]

CXL HDM Decoder Lock on Commit [Auto]

The CXL HDM Decoder will become read only when the decoder becomes active.
Configuration options: [Auto] [Disabled] [Enabled]

Temp Gen5 Advertisement [Auto]

Temp Gen5 Advertisementfor Alternate Protocol.
Configuration options: [Disable] [Enable] [Auto]

Sync Header Bypass [Auto]

Allows you to enable or disable Sync Header Bypass.
Configuration options: [Disabled] [Enabled] [Auto]

CXL RAS

Allows you to configure CXL RAS options.

CXL Memory Online/Offline [Disabled]

All 4 Plink slots support memory online/offline. Only slot4 of Amber supports hot plug. CXL memory interleaving automatically disabled globally when this CBS is enabled. Configuration options: [Disabled] [Enabled]

Override CXL Memory Size [Auto]

Configuration options: [32GB] [64GB] [128GB] [Auto]

4.4.4   Onboard LAN Configuration

```
                              Aptio Setup – AMI
        Advanced
▶ Onboard I350 LAN Configuration                 Onboard I350 LAN Configuration
```
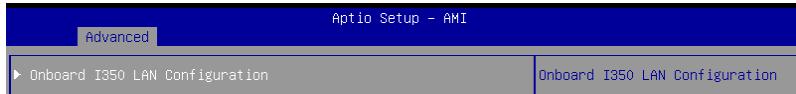
Onboard I350 LAN Configuration

Intel I350 LAN1-2

LAN Enable [Enabled]

Allows you to enable or disable the Intel LAN.
Configuration options: [Disabled] [Enabled]

4.4.5   UEFI Variables Protection

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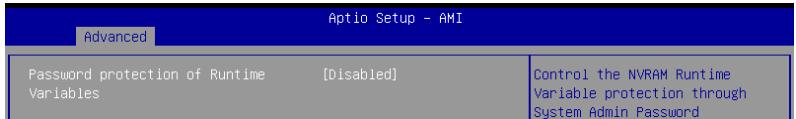
Password protection of Runtime Variables [Disabled]

Control the NVRAM Runtime Variable protection through System Admin Password.
Configuration options: [Enabled] [Disabled]

4.4.6   Serial Port Console Redirection

```
                              Aptio Setup - AMI
        Advanced

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

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

     Serial Port for Out-of-Band Management/
     Windows Emergency Management Services (EMS)
     Console Redirection EMS          [Disabled]
  ▶ Console Redirection Settings
                                                    ↑↓: Select Screen
```

COM1/COM2(SOL)

Console Redirection [Disabled]

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

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

Console Redirection Settings

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

Terminal Type [VT100Plus]

Allows you to set the terminal type.

[VT100]   ASCII char set.

[VT100Plus]   Extends VT100 to support color, function keys, etc.

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

[ANSI]   Extended ASCII char set.

Bits per second [115200]

Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
Configuration options: [9600] [19200] [57600] [115200] [230400] [460800] [921600]

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 [Hardware RTS/CTS]

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

VT -UTF8 Combo Key Support [Enabled]

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

Recorder Mode [Disabled]

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

Resolution 100x31 [Enabled]

This allows you enable or disable extended terminal resolution.
Configuration options: [Disabled] [Enabled]

Putty Keypad [VT100]

This allows you to select the FunctionKey and Keypad on Putty.
Configuration options: [VT100] [LINUX] [XTERMR6] [SCO] [ESCN] [VT400]

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

Console Redirection [Disabled]

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

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.

Out-of-Band Mgmt Port [COM1]

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

Terminal Type [VT-UTF8]

VT-UTF8 is the preferred terminal type for out-of-band management. The next best choice is VT100+ and then VT100. See above, in Console Redirection Settings page, for more help with Termnial Type/Emulation.
Configuration options: [VT100] [VT100Plus] [VT-UTF8] [ANSI]

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] [57600] [115200] [230400] [460800] [921600]

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] [Software Xon/Xoff]

4.4.7   CPU Configuration

This page displays the CPU node information.

```
                              Aptio Setup — AMI
            Advanced

  CPU Configuration                                   Enable/disable CPU
                                                      Virtualization

  SVM Mode                          [Enable]
▶ Node 0 Information
```

SVM Mode [Enable]

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

Node 0 Information

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

4.4.8   PCI Subsystem Settings

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

```
                              Aptio Setup - AMI
        Advanced

    PCI Devices Common Settings:                      Value to be programmed into
    PCI Latency Timer            [32 PCI Bus Clocks]  PCI Latency Timer Register.
    PCI-X Latency Timer          [64 PCI Bus Clocks]
    VGA Palette Snoop            [Disabled]
    PERR# Generation             [Disabled]
    SERR# Generation             [Disabled]
    Resize BAR Support           [Disabled]
    SR-IOV Support               [Enabled]

  ▶ PCI Express Settings

  ▶ PCI Express GEN 2 Settings

  ▶ PCI Hot-Plug Settings                             ↔↔: Select Screen
                                                      ↑↓: Select Item
```

PCI Latency Timer [32 PCI Bus Clocks]

Value to be programmed into PCI Latency Timer Register.
Configuration options: [32 PCI Bus Clocks] [64 PCI Bus Clocks] [96 PCI Bus Clocks] [128 PCI Bus Clocks] [160 PCI Bus Clocks] [192 PCI Bus Clocks] [224 PCI Bus Clocks] [248 PCI Bus Clocks]

PCI-X Latency Timer [64 PCI Bus Clocks]

Value to be programmed into PCI Latency Timer Register.
Configuration options: [32 PCI Bus Clocks] [64 PCI Bus Clocks] [96 PCI Bus Clocks] [128 PCI Bus Clocks] [160 PCI Bus Clocks] [192 PCI Bus Clocks] [224 PCI Bus Clocks] [248 PCI Bus Clocks]

VGA Palette Snoop [Disabled]

Allows you to enable or disable VGA Palette Registers Snooping.
Configuration options: [Disabled] [Enabled]

PERR# Generation [Disabled]

Allows you to enable or disable PCI device to generate PERR#.
Configuration options: [Disabled] [Enabled]

SERR# Generation [Disabled]

Allows you to enable or disable PCI device to generate SERR#.
Configuration options: [Disabled] [Enabled]

Re-Size BAR Support [Disabled]

If the system has Resize BAR capable PCIe Devices, this option enables or disable Resize BAR Support (only if system supports 64 bit PCI Decoding).
Configuration options: [Disabled] [Enabled]

To enable Resize BAR Support to fully harness GPU memory, pleas navigate to Boot section and disable CSM (Compatibility Support Module).

SR-IOV Support [Enabled]

This option enables or disables Single Root IO Virtualization Support if the system has SR-IOV capable PCIe devices.
Configuration options: [Disabled] [Enabled]

PCI Express Settings

PCI Express Device Register Settings

Relaxed Ordering [Enabled]

Allows you to enable or disable PCI Express Device Relaxed Ordering.
Configuration options: [Disabled] [Enabled]

Extended Tag [Disabled]

If this item is enabled, it will allow Device to use 8-bit Tag field as a requester.
Configuration options: [Disabled] [Enabled]

No Snoop [Enabled]

Allows you to enable or disable PCI Express Device No Snoop option.
Configuration options: [Disabled] [Enabled]

Maximum Payload [Auto]

Allows you to set Maximum Payload of PCI Express Device or allow System BIOS to select the value.
Configuration options: [Auto] [128 Bytes] [256 Bytes] [512 Bytes] [1024 Bytes] [2048 Bytes] [4096 Bytes]

Maximum Read Request [Auto]

Allows you to set Maximum Read Request Size of PCI Express Device or allow System BIOS to select the value.
Configuration options: [Auto] [128 Bytes] [256 Bytes] [512 Bytes] [1024 Bytes] [2048 Bytes] [4096 Bytes]

PCI Express Link Register Settings

ASPM Support [Disabled]

Allows you to set the ASPM level.

[Disabled]   Disables ASPM.

[Auto]   BIOS auto configure.

[Force L0s]   Force all links to L0s State.

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

Extended Synch [Disabled]

If this item is enabled, it will allow generation of Extended Synchronization patterns.
Configuration options: [Disabled] [Enabled]

Link Training Retry [5]

Allows you to define the number of Retry Attempts software will take to retrain the link if previous training attempt was unsuccessful.
Configuration options: [Disabled] [2] [3] [5]

Link Training Timeout (uS) [1000]

Allows you to define the number of Microseconds software will wait before polling 'link Training' bit in Link Status register.
Configuration options: [10] - [10000]

Unpopulated Links [Keep Link ON]

If this option is set to **[Disable]**, in order to save power, software will disable unpopulated PCI Express Links.
Configuration options: [Keep Link ON] [Disable]

PCI Express GEN 2 Settings

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

PCI Express GEN2 Device Register Settings

Completion Timeout [Default]

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

[Default]	50us to 50ms.
[Shorter]	Software will use shorter timeout ranges supported by hardware.
[Longer]	Software will use longer timeout ranges.
[Disabled]	Disable completion timeout.

ARI Forwarding [Disabled]

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

AtomicOp Requester Enable [Disabled]

If supported by hardware and set to **[Enabled]**, this function initiates Atomic0p Requests only if Bus Master Enable bit is in the Command Register Set.
Configuration options: [Disabled] [Enabled]

AtomicOp Egress Blocking [Disabled]

If supported by hardware and set to **[Enabled]**, outbound Atomic0p Requests via Egress Ports will be blocked.
Configuration options: [Disabled] [Enabled]

IDO Request Enable [Disabled]

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

IDO Completion Enable [Disabled]

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

LTR Mechanism Enable [Disabled]

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

End-End TLP Prefix Blocking [Disabled]

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

PCI Express GEN2 Link Register Settings

Target Link Speed [Auto]

If supported by hardware and set to **[Force to X.X GT/s]**, for Downstream Ports, this sets an upper limit on Link operational speed by restricting the values advertised by the Upstream component in its training sequences. When **[Auto]** is selected HW initialized data will be used.
Configuration options: [Disabled] [Force to 2.5 GT/s] [Force to 5.0 GT/s] [Force to 8.0 GT/s] [Force to 16.0 GT/s] [Force to 32.0 GT/s]

Clock Power Management [Disabled]

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

Compliance SOS [Disabled]

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

Hardware Autonomous Width [Enabled]

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

Hardware Autonomous Speed [Enabled]

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

PCI Hot-Plug Settings

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

BIOS Hot-Plug Support [Enabled]

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

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

PCI Buses Padding [1]
Pad PCI Buses behind the bridge for Hot-Plug.
Configuration options: [Disabled] [1] - [5]

I/O Resources Padding [Disabled]
Pad PCI I/O Resources behind the bridge for Hot-Plug.
Configuration options: [Disabled] [4 K] [8 K] [16 K] [32 K]

MMIO 32 bit Resources Padding [16 M]
Pad PCI MMIO 32-bit Resources behind the bridge for Hot-Plug.
Configuration options: [Disabled] [1 M] [2 M] [4 M] [8 M] [16 M] [32 M] [64 M] [128 M]

PFMMIO 32 bit Resources Padding [16 M]
Pad PCI MMIO 32-bit Prefetchable Resources behind the bridge for Hot-Plug.
Configuration options: [Disabled] [1 M] [2 M] [4 M] [8 M] [16 M] [32 M] [64 M] [128 M]

PFMMIO 64 bit Resources Padding [64 M]
Pad PCI MMIO 64-bit Prefetchable Resources behind the bridge for Hot-Plug.
Configuration options: [Disabled] [1 M] [2 M] [4 M] [8 M] [16 M] [32 M] [64 M] [128 M] [256 M] [512 M] [1 G] [2 G] [4 G] [8 G]

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

4.4.9   USB Configuration

```
                              Aptio Setup - AMI
        Advanced

  USB Configuration                              [Enabled]: Enables the Legacy
                                                 USB support.
  USB Controllers:                               [Auto]: Automatically disables
      2 XHCIs                                     the Legacy USB support if USB
  USB Devices:                                   devices are not connected.
      3 Drives, 2 Keyboards, 1 Mouse, 3 Hubs     [Disabled]: USB devices are
                                                 available only for EFI
  Legacy USB Support              [Enabled]      applications.
  XHCI Hand-off                   [Enabled]
  USB Mass Storage Driver Support [Enabled]
```

Legacy USB Support [Enabled]

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

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

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

XHCI Hand-off [Enabled]

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

USB Mass Storage Driver Support [Enabled]

Configuration options: [Disabled] [Enabled]

4.4.10   Network Stack Configuration

```
                              Aptio Setup - AMI
        Advanced

  Network Stack                   [Enabled]      Enable/Disable UEFI Network
  IPv4 PXE Support                [Enabled]      Stack
  IPv4 HTTP Support               [Enabled]
  IPv6 PXE Support                [Disabled]
  IPv6 HTTP Support               [Disabled]
  PXE boot wait time              0
  Media detect count              1
```

Network stack [Enabled]

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

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

Ipv4 PXE Support [Disabled]

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

Ipv4 HTTP Support [Disabled]

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

Ipv6 PXE Support [Disabled]

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

Ipv6 HTTP Support [Disabled]

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

PXE boot wait time [0]

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

Media detect count [1]

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

4.4.11   NVMe Configuration

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

```
                              Aptio Setup — AMI
       Advanced

  NVMe Configuration

  No NVME Device Found
```
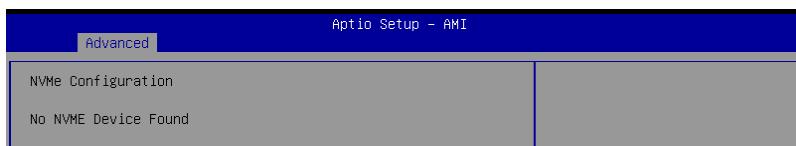
Device

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

Self Test Option [Short]

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

Self Test Action [Controller Only Test]

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

Run Device Self Test

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

4.4.12   SATA Configuration

This page will display the SATA controller and drive information.

```
                            Aptio Setup - AMI
    Advanced

  SATA Configuration                                ▲

  SATA Controller (S:00 B:43 D:00 F:00)
  Port 0                            Not Present
  Port 1                            Not Present
  Port 2                            Not Present
  Port 3                            Not Present
  Port 4                            Not Present
  Port 5                            Not Present
  Port 6                            Not Present
  Port 7                            Not Present

  SATA Controller (S:00 B:43 D:00 F:01)
  Port 0                            Not Present    ++: Select Screen
  Port 1                            Not Present    ↑↓: Select Item
  Port 2                            Not Present    Enter: Select
  Port 3                            Not Present    +/-: Change Opt.
  Port 4                            Not Present    F1: General Help
  Port 5                            Not Present    F2: Previous Values
  Port 6                            Not Present    F5: Optimized Defaults
  Port 7                            Not Present    F10: Save Changes & Reset
                                                   F12: Print Screen
```

4.4.13   Offboard SATA Controller Configuration

Allows you to configure the Offboard SATA Controller.

```
                            Aptio Setup - AMI
    Advanced

 ▶ SATA Controller 0 Configuration Settings - Bus 43 Dev 0 Fun    SATA Controller 0
   0                                                               Configuration Settings - Bus
 ▶ SATA Controller 1 Configuration Settings - Bus 43 Dev 0 Fun    43 Dev 0 Fun 0
   1
 ▶ SATA Controller 2 Configuration Settings - Bus A2 Dev 0 Fun
   0
```
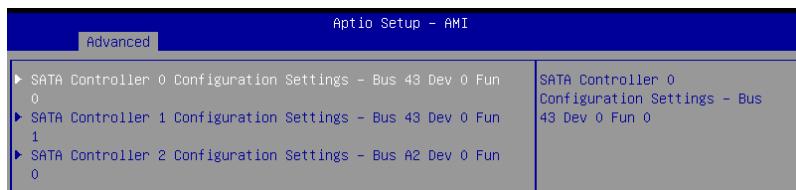
4.4.14 APM Configuration

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

```
                              Aptio Setup – AMI
        Advanced

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

Restore AC Power Loss [Last State]

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

Power On By PCI-E [Disabled]

Allows you to enable or disable the wake-on-LAN function of the onboard LAN controller or other installed PCI-E LAN cards.
Configuration options: [Disabled] [Enabled]

Power On By RTC [Disabled]

[Disabled]   Disables RTC to generate a wake event.

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

4.4.15 AMD Mem Configuration Status

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

```
                              Aptio Setup – AMI
        Advanced

▶ Socket 0                                              Socket-specific memory
  Mbist Test Enable              Disabled, 0xC000       configuration status
  Mbist Aggressor Enable         Disabled, 0xC000
  Mbist Per Bit Slave Die Report 0x00FF, 0xC000
  Dram Temp Controlled Refresh   Disabled, 0xC001
  Enable
  User Timing Mode               Disabled, 0x0000
  User Timing Value              Disabled, 0x0000
  Mem Bus Freq Limit             Disabled, 0x0000
  Enable Power Down              Disabled, 0xC000
  Dram Double Refresh Rate       Disabled, 0x0000
  Pmu Train Mode                 0x0000, 0xC000
  Ecc Symbol Size                0x0000, 0xC000
  Uncorrectable Ecc Retry        Disabled, 0xC004      →←: Select Screen
  Ignore Spd Checksum            Disabled, 0xC000      ↑↓: Select Item
  Enable Bank Group Swap Alt     Disabled, 0x0000      Enter: Select
  Enable Bank Group Swap         Disabled, 0xC000      +/-: Change Opt.
  Ddr Route Balanced Tee         Disabled, 0xC004      F1: General Help
  Nvdimm Power Source            0x0000, 0xC004        F2: Previous Values
  Odts Cmd Throt Enable          Disabled, 0xC004      F5: Optimized Defaults
  Odts Cmd Throt Cycle           Disabled, 0xC004      F10: Save Changes & Reset
                                                       F12: Print Screen
```

Socket 0

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

4.4.16   T1s Auth

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

```
                              Aptio Setup - AMI
        Advanced

                                               Press <Enter> to configure
 ▶ Server CA Configuration                     Server CA.

 ▶ Client Cert Configuration
```

Server CA Configuration / Client Cert Configuration

Enroll Cert

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

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

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

Commit Changes and Exit
Exit Server CA configuration after saving the changes.

Discard Changes and Exit
Exit Server CA configuration without saving any changes.

Delete Cert

Allows you to delete the certificate.

4.4.17   Driver Health

Provides Health Status for the Drivers/Controllers.

```
                              Aptio Setup - AMI
        Advanced

 ▶ Intel(R) PRO/1000 7.1.07 PCI-E     Healthy     Provides Health Status for the
                                                  Drivers/Controllers
```
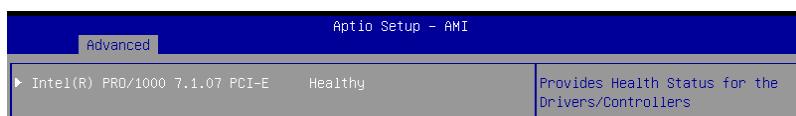
4.4.18   Third-party UEFI driver configurations

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

```
                              Aptio Setup - AMI
      Main  Advanced  Chipset  Security  Boot  Tool  Event Logs  Server Mgmt  Save & Exit
   ┌────────────────────────────────────────────┬─────────────────────────────────────────┐
   │ ▶ UEFI Variables Protection              ▲  │ Configure Gigabit Ethernet              │
   │ ▶ Serial Port Console Redirection           │ device parameters                       │
   │ ▶ CPU Configuration                         │                                         │
   │ ▶ PCI Subsystem Settings                    │                                         │
   │ ▶ USB Configuration                         │                                         │
   │ ▶ Network Stack Configuration               │                                         │
   │ ▶ NVMe Configuration                        │                                         │
   │ ▶ SATA Configuration                        │                                         │
   │ ▶ Offboard SATA Controller Configuration    │                                         │
   │ ▶ APM Configuration                         │                                         │
   │                                             │                                         │
   │ ▶ AMD Mem Configuration Status              │                                         │
   │ ▶ Tls Auth Configuration                    │                                         │
   │ ▶ Intel(R) I350 Gigabit Network Connection  │ →←: Select Screen                       │
   │   - 10:7C:61:53:9E:65                       │ ↑↓: Select Item                         │
   │ ▶ VLAN Configuration (MAC:107C61539E65)     │ Enter: Select                           │
   │ ▶ MAC:107C61539E65-IPv4 Network Configuration │ +/-: Change Opt.                      │
   │ ▶ MAC:107C61539E65-HTTP Boot Configuration  │ F1: General Help                        │
   │ ▶ MAC:107C61539E65-IPv6 Network Configuration │ F2: Previous Values                   │
   │ ▶ Intel(R) I350 Gigabit Network Connection  │ F5: Optimized Defaults                  │
   │   - 10:7C:61:53:9E:66                       │ F10: Save Changes & Reset               │
   │ ▶ VLAN Configuration (MAC:107C61539E66)     │ F12: Print Screen                       │
   │ ▶ MAC:107C61539E66-IPv4 Network Configuration │ <k>: Scroll help area upwards         │
   │ ▶ MAC:107C61539E66-HTTP Boot Configuration  │ <m>: Scroll help area downwards         │
   │ ▶ MAC:107C61539E66-IPv6 Network Configuration │ ESC: Exit                             │
   │ ▶ Driver Health                          ▼  │                                         │
   └────────────────────────────────────────────┴─────────────────────────────────────────┘
```

4.5 Chipset menu

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

```
                               Aptio Setup - AMI
      Main  Advanced  Chipset  Security  Boot  Tool  Event Logs  Server Mgmt  Save & Exit
    ┌─────────────────────────────────────────────┬──────────────────────────────────────┐
    │  PCIe Compliance Mode              [Off]     │ PCIe Link Compliance Mode.           │
    │▶ PCH Configuration                            │                                      │
    │▶ System Agent (SA) Configuration             │                                      │
    │                                               │                                      │
    │                                               │                                      │
    │                                               │                                      │
    │                                               │                                      │
    │                                               │                                      │
    │                                               │                                      │
    │                                               │ ↔: Select Screen                     │
    │                                               │ ↑↓: Select Item                      │
    │                                               │ Enter: Select                        │
    │                                               │ +/-: Change Opt.                     │
    │                                               │ F1: General Help                     │
    │                                               │ F2: Previous Values                  │
    │                                               │ F5: Optimized Defaults               │
    │                                               │ F10: Save Changes & Reset            │
    │                                               │ F12: Print Screen                    │
    │                                               │ <k>: Scroll help area upwards        │
    │                                               │ <m>: Scroll help area downwards      │
    │                                               │ ESC: Exit                            │
    └─────────────────────────────────────────────┴──────────────────────────────────────┘
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```

PCIe Compliance Mode [Off]

Configuration options: [Off] [On]

PCH Configuration

SB Debug Configuration

This item displays options for SB Debug Features.

System Agent (SA) Configuration

Socket 1 Information

This item displays the memory information on Socket 1.

4.6　Security menu

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

```
                          Aptio Setup - AMI
    Main  Advanced  Chipset  Security  Boot  Tool  Event Logs  Server Mgmt  Save & Exit

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

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```

Administrator Password

To set an administrator password:

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

2.　From the Create New Password box, 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 confirm the password.

User Password

To set a user password:

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

2.   From the Create New Password box, key in a password, then press <Enter>.

3.   Confirm the password when prompted.

To change a user password:

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

2.   From the Enter Current Password box, key in the current password, then press <Enter>.

3.   From the Create New Password box, key in a new password, then press <Enter>.

4.   Confirm the password when prompted.

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

Secure Boot

This item allows you to customize the Secure Boot settings.

```
                        Aptio Setup - AMI
                Security

  System Mode              User                 Secure Boot feature is Active
                                                if Secure Boot is Enabled,
  Secure Boot              [Disabled]           Platform Key(PK) is enrolled
                           Not Active           and the System is in User mode.
                                                The mode change requires
  Secure Boot Mode         [Custom]             platform reset
▶ Restore Factory Keys
▶ Reset To Setup Mode
```

Secure Boot [Disabled]

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

Secure Boot Mode [Custom]

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

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

Restore Factory Keys

Force System to User Mode. Install factory default Secure Boot Keys databases.

Reset to Setup Mode

Delete all Secure Boot key databases from NVRAM.

Expert Key Management

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

```
                        Aptio Setup - AMI
                  | Security |

  Vendor Keys                    Modified          Force System to User Mode.
                                                   Install factory default Secure
  Factory Key Provision          [Enabled]         Boot key databases
▶ Restore Factory Keys
▶ Reset To Setup Mode
▶ Enroll Efi Image
▶ Export Secure Boot variables

  Secure Boot variable  | Size| Keys| Key Source
▶ Platform Key      (PK)| 1304|    1| Factory
▶ Key Exchange Keys (KEK)| 5079|    4| Factory
▶ Authorized Signatures (db)| 9312|   12| Factory
▶ Forbidden  Signatures(dbx)|17836|  371| Factory
▶ Authorized TimeStamps(dbt)|    0|    0| No Keys    →←: Select Screen
▶ OsRecovery Signatures(dbr)|    0|    0| No Keys    ↑↓: Select Item
                                                    Enter: Select
```

Factory Key Provision [Enabled]

Allows you to provision factory default Secure Boot keys after the platform resets and while the system is in Setup Mode.
Configuration options: [Disabled] [Enabled]

Restore Factory Keys

Force System to User Mode. Install factory default Secure Boot Keys databases.

Reset to Setup Mode

Delete all Secure Boot key databases from NVRAM.

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).

Export Secure Boot variables

Save NVRAM content of Secure Boot variable to a file.

Platform Key (PK)

Configuration options: [Details] [Export] [Update] [Delete]

Key Exchange Keys (KEK) / Authorized Signatures (db) / Forbidden Signatures (dbx)

Configuration options: [Details] [Export] [Update] [Append] [Delete]

Authorized TimeStamps (dbt) / OsRecovery Signatures (dbr)

Configuration options: [Update] [Append]

4.7 Boot menu

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

```
                              Aptio Setup - AMI
        Main  Advanced  Chipset  Security  Boot  Tool  Event Logs  Server Mgmt  Save & Exit

     Boot Configuration                                          Number of seconds to wait for
     Setup Prompt Timeout             1                          setup activation key.
     Bootup NumLock State             [On]                       65535(0xFFFF) means indefinite
     Boot Logo Display                [Disabled]                 waiting.

     Boot Option Priorities
     Boot Option #1                   [UEFI: A1:00:00 HTTP
                                      IPv4 Intel(R) I350
                                      Gigabit Network
                                      Connection]
     Boot Option #2                   [UEFI: A1:00:00 PXE
                                      IPv4 Intel(R) I350
                                      Gigabit Network
                                      Connection]                ++: Select Screen
     Boot Option #3                   [UEFI: A1:00:01 HTTP       ↑↓: Select Item
                                      IPv4 Intel(R) I350         Enter: Select
                                      Gigabit Network            +/-: Change Opt.
                                      Connection]                F1: General Help
     Boot Option #4                   [UEFI: A1:00:01 PXE        F2: Previous Values
                                      IPv4 Intel(R) I350         F5: Optimized Defaults
                                      Gigabit Network            F10: Save Changes & Reset
                                      Connection]                F12: Print Screen
                                                                 <k>: Scroll help area upwards
                                                                 <m>: Scroll help area downwards
                                                                 ESC: Exit

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```

Setup Prompt Timeout [1]

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

Bootup NumLock State [On]

Configuration options: [Off] [On]

Boot Logo Display [Disabled]

[Disabled]   Hide the logo during POST.

[Enabled]   Display the boot logo during POST.

Boot Option Priorities

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

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

4.8   Tool menu

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

```
                              Aptio Setup - AMI
     Main  Advanced  Chipset  Security  Boot  Tool  Event Logs  Server Mgmt  Save & Exit

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









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

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```

IPMI Hardware Monitor

Allows you to run the IPMI hardware monitor.

Start ASUS EzFlash

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

ASUS Storage Viewer

Allows you to run ASUS Storage Viewer.

ASUS SMBIOS Viewer

Allows you to run ASUS SMBIOS Viewer.

4.9   Event Logs menu

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

```
                              Aptio Setup - AMI
        Main  Advanced  Chipset  Security  Boot  Tool  Event Logs  Server Mgmt  Exit

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







                                                  ↔: Select Screen
                                                  ↑↓: Select Item
                                                  Enter: Select
                                                  +/-: Change Opt.
                                                  F1: General Help
                                                  F2: Previous Values
                                                  F5: Optimized Defaults
                                                  F10: Save Changes & Reset
                                                  F12: Print Screen
                                                  ESC: Exit



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```

4.9.1 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.

```
                          Aptio Setup – AMI
                              Event Logs

 Enabling/Disabling Options                        Change this to enable or
 Smbios Event Log              [Enabled]            disable all features of Smbios
                                                    Event Logging during boot.
 Erasing Settings
 Erase Event Log              [No]
 When Log is Full             [Do Nothing]

 Custom Options
 Log EFI Status Code          [Enabled]
 Convert EFI Status Codes to  [Disabled]
 Standard Smbios Type

 NOTE: All values changed here do not take
       effect until computer is restarted.      ↔: Select Screen
```
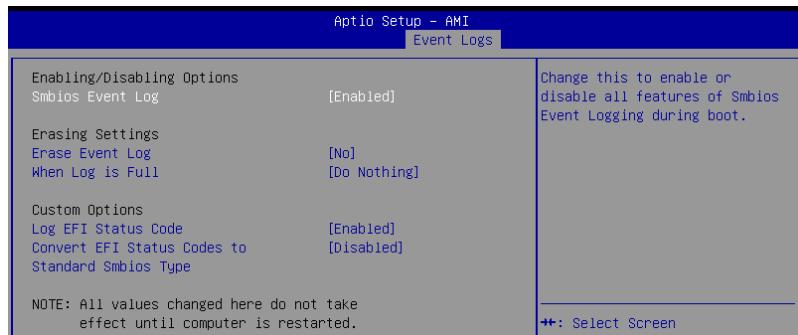
Enabling/Disabling Options

Smbios Event Log [Enabled]

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

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

Erasing Settings

Erase Event Log [No]

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

When Log is Full [Do Nothing]

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

Custom Options

Log EFI Status Code [Enabled]

Configuration options: [Disabled] [Enabled]

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

Convert EFI Status Codes to Standard Smbios Type [Disabled]
Configuration options: [Disabled] [Enabled]

4.9.2 View Smbios Event Log

Press <Enter> to view all smbios event logs.

```
                          Aptio Setup – AMI
                                    Event Logs

   DATE      TIME      ERROR CODE  SEVERITY   COUNT

   No records found in the Smbios Event Log.
```

4.10   Server Mgmt menu

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

```
                              Aptio Setup - AMI
     Main  Advanced  Chipset  Security  Boot  Tool  Event Logs  Server Mgmt  Save & Exit
 ┌──────────────────────────────────────────────────┬──────────────────────────────────┐
 │ BMC Self Test Status            PASSED            │ If enabled, starts a BIOS        │
 │ BMC Device ID                   32                │ timer which can only be shut     │
 │ BMC Device Revision             81                │ off by Management Software       │
 │ BMC Firmware Revision           1.02.15           │ after the OS loads.  Helps       │
 │ IPMI Version                    2.0               │ determine that the OS            │
 │                                                   │ successfully loaded or follows   │
 │ OS Watchdog Timer               [Disabled]        │ the OS Boot Watchdog Timer       │
 │ OS Wtd Timer Timeout            10                │ policy.                          │
 │ OS Wtd Timer Policy             [Reset]           │                                  │
 │                                                   │                                  │
 │▶ System Event Log                                 │                                  │
 │▶ View FRU information                             │                                  │
 │▶ BMC network configuration                        │                                  │
 │▶ View System Event Log                            ├──────────────────────────────────┤
 │                                                   │ ++: Select Screen                │
 │                                                   │ ↑↓: Select Item                  │
 │                                                   │ Enter: Select                    │
 │                                                   │ +/-: Change Opt.                 │
 │                                                   │ F1: General Help                 │
 │                                                   │ F2: Previous Values              │
 │                                                   │ F5: Optimized Defaults           │
 │                                                   │ F10: Save Changes & Reset        │
 │                                                   │ F12: Print Screen                │
 │                                                   │ <k>: Scroll help area upwards    │
 │                                                   │ <m>: Scroll help area downwards  │
 │                                                   │ ESC: Exit                        │
 └──────────────────────────────────────────────────┴──────────────────────────────────┘
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```

OS Watchdog Timer [Disabled]

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

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

OS Wtd Timer Timeout [10]

Allows you to enter a value between 1 to 30 minutes for OS Boot Watchdog Timer Expiration.
Configuration options: [1] - [30]

OS Wtd Timer Policy [Reset]

This item allows you to configure the how the system should respond if the OS Boot Watch Timer expires.
Configuration options: [Do Nothing] [Reset] [Power Down]

4.10.1 System Event Log

Allows you to change the SEL event log configuration.

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

```
                              Aptio Setup - AMI
                                                       Server Mgmt

 Erasing Settings                               Choose options for erasing SEL.
 Erase SEL                        [No]

 NOTE: All values changed here do not take
       effect until computer is restarted.
```
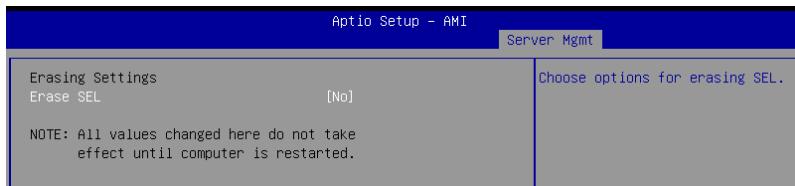
Erase SEL [No]

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

4.10.2 View FRU information

Allows you to view the FRU information.

```
                              Aptio Setup - AMI
                                                       Server Mgmt

 FRU Information

 System Manufacturer           ASUSTeK COMPUTER INC.
 System Product Name           RS501A-E12-RS4
 System Version                00
 System Serial Number          111111111111
 Board Manufacturer            ASUSTeK COMPUTER INC.
 Board Product Name            K14PA-U24-T Series
 Board Part Number             60SB0B60-SB0C01
 Board Serial Number           L9S2CG016505111
 Chassis Manufacturer          ASUSTeK COMPUTER INC.
 Chassis Part Number           70SF03Y1-SA0010
 Chassis Serial Number         1111111111
 System UUID                   To be filled by O.E.M.    →←: Select Screen
                                                         ↑↓: Select Item
```

4.10.3 BMC network configuration

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

```
                            Aptio Setup – AMI
                                                  Server Mgmt

--BMC network configuration--                        Select to configure LAN
***************************                           channel parameters statically
Configure IPv4 support                               or dynamically(by BIOS or
***************************                           BMC). Unspecified option will
                                                     not modify any BMC network
DM_LAN                                                parameters during BIOS phase
Configuration Address source        [Unspecified]
Current Configuration Address       DynamicAddressBmcDhcp
source
Station IP address                  0.0.0.0
Subnet mask                         0.0.0.0
Station MAC address                 10-7C-61-53-9E-67
Router IP address                   0.0.0.0
Router MAC address                  00-00-00-00-00-00
                                                     ++: Select Screen
Shared LAN                                           ↑↓: Select Item
Configuration Address source        [Unspecified]    Enter: Select
Current Configuration Address       DynamicAddressBmcDhcp  +/-: Change Opt.
source                                               F1: General Help
Station IP address                  0.0.0.0          F2: Previous Values
Subnet mask                         0.0.0.0          F5: Optimized Defaults
Station MAC address                 10-7C-61-53-9E-68  F10: Save Changes & Reset
Router IP address                   0.0.0.0          F12: Print Screen
Router MAC address                  00-00-00-00-00-00  <k>: Scroll help area upwards
                                                     <m>: Scroll help area downwards
                                                     ESC: Exit
```

Configure IPV4 support

DM_LAN/Shared LAN

Configuration Address source [Unspecified]

This item allows you to configure LAN channel parameters statistically or dynamically (by BIOS or 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
Allows you to set the prefix length (maximum of Prefix Length is 128).

Configuration Router Lan1-2 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: [Previous State] [Static] [DynamicBmcDhcp]

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

IPV6 Router1 IP address
Allows you to set the IPV6 Router1 IP address.

IPV6 Router1 Prefix Length Lan1-2
Allows you to set the IPV6 Router1 prefix length (maximum of Prefix Length is 128).

IPV6 Router1 Prefix Value Lan1-2
Allows you to set the IPV6 Router1 prefix value.

4.10.4   View System Event Log

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

```
                              Aptio Setup - AMI
                                                      Server Mgmt

 No. of log entries in SEL : 17                  HEX:
                                                 01  00  02  1D  D3  1E
 DATE      TIME      SENSOR TYPE                  66  21  00  04  0C  00
                                                 6F  A4  51  00
 04/16/24  19:35:57  Memory                      Generator ID: SMI Handler
 04/16/24  19:47:26  Memory                      (Channel #0)
 04/16/24  19:48:07  Version Change              Sensor Number: 0x00
 12/31/79  19:00:51  Power Unit                  Unspecified
 12/31/79  19:01:28  Physical Security           Event Description: Record
 01/01/11  23:36:21  Power Unit                  Type-0x02. Assertion Event.
 01/01/11  23:41:13  Version Change
 01/01/11  23:41:13  Version Change
 01/01/11  23:41:13  Version Change
 01/01/11  23:42:00  Power Unit                  ++: Select Screen
 01/08/11  16:02:46  Power Unit                  ↑↓: Select Item
 01/08/11  23:41:26  Power Unit                  Enter: Select
 01/12/11  21:02:34  Power Unit                  +/-: Change Opt.
 07/09/24  15:05:11  Version Change              F1: General Help
 07/09/24  18:54:04  Power Unit                  F2: Previous Values
 07/09/24  18:58:59  Power Unit                  F5: Optimized Defaults
 07/10/24  13:57:56  Power Unit                  F10: Save Changes & Reset
                                                 F12: Print Screen
```

4.11   Save & Exit menu

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

```
                        Aptio Setup - AMI
    Main  Advanced  Chipset  Security  Boot  Tool  Event Logs  Server Mgmt  Save & Exit

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

    Save Changes and Reset
    Discard Changes and Reset

    Save Changes
    Discard Changes

    Default Options
    Restore Defaults

    Boot Override
    UEFI: A1:00:00 HTTP IPv4 Intel(R) I350 Gigabit Network
    Connection                                        →←: Select Screen
    UEFI: A1:00:00 PXE IPv4 Intel(R) I350 Gigabit Network    ↑↓: Select Item
    Connection                                        Enter: Select
    UEFI: A1:00:01 HTTP IPv4 Intel(R) I350 Gigabit Network    +/-: Change Opt.
    Connection                                        F1: General Help
    UEFI: A1:00:01 PXE IPv4 Intel(R) I350 Gigabit Network    F2: Previous Values
    Connection                                        F5: Optimized Defaults
    UEFI: JetFlashTranscend 4GB 8.07, Partition 1 (4.0GB)   F10: Save Changes & Reset
    Launch EFI Shell from filesystem device           F12: Print Screen
                                                      <k>: Scroll help area upwards
                                                      <m>: Scroll help area downwards
                                                      ESC: Exit

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```

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

Save Options

Discard Changes and Exit

Exit system setup without saving any changes.

Save Changes and Reset

Reset system after saving the changes.

Discard Changes and Reset

Reset system setup without saving any changes.

Save Changes

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

Discard Changes

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

Default Options

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.

Launch EFI Shell from filesystem device

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

Appendix

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

K14PA-U24-T block diagram
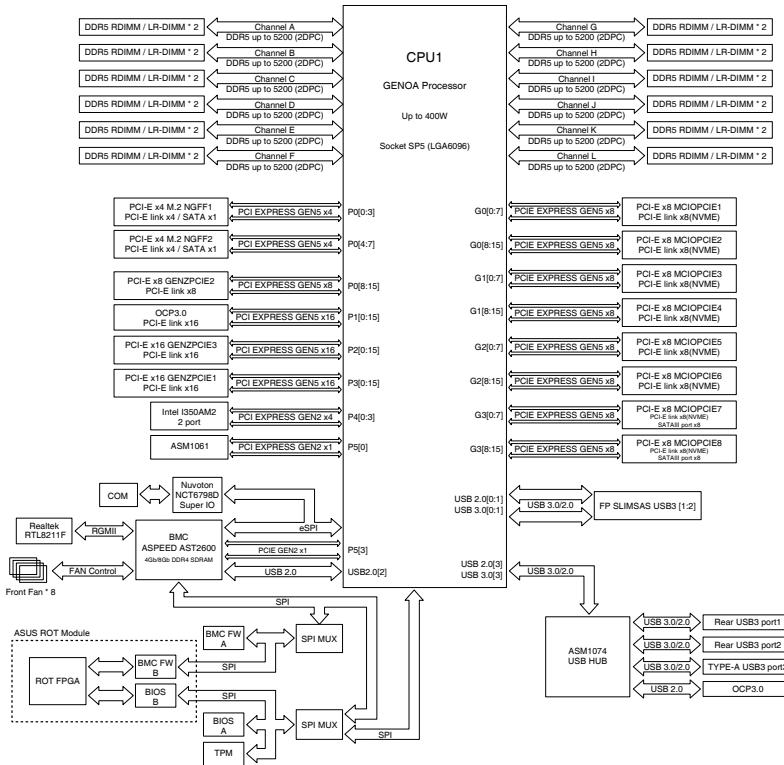
Notices

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 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、必ずルータ等を経由し接続してください。

Japan statement notice

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

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

EU REACH and Article 33

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

EU RoHS

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

Japan JIS-C-0950 Material Declarations

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

India RoHS

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

Vietnam RoHS

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

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

Türkiye RoHS

AEEE Yönetmeliğine Uygundur

ASUS Recycling/Takeback Services

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

Ecodesign Directive

The European Union announced a framework for the setting of ecodesign requirements for energy-related products (2009/125/EC). Specific implementing measures are aimed at improving environmental performance of specific products or across multiple product types. ASUS provides product information at https://esg.asus.com/Compliance.htm.

ENERGY STAR® Qualified Product

ENERGY STAR® is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy helping us all save money and protect the environment through energy efficient products and practices.

All ASUS products with the ENERGY STAR® logo comply with the ENERGY STAR® standard, and the power management feature is enabled by default. The monitor is automatically set to sleep within 10 minutes of user inactivity; the computer is automatically set to sleep within 30 minutes of user inactivity. To wake your computer, click the mouse, press any key on the keyboard, or press the power button.

Please visit https://www.energystar.gov for detailed information on the ENERGY STAR® joint program, power management, and the benefits to the environment.

> ENERGY STAR® is NOT supported on FreeDOS and Linux-based products without power management.

Access Advance Patent Notice

Covered by patents at patentlist.accessadvance.com

FCC COMPLIANCE INFORMATION
Per FCC Part 2 Section 2.1077

Responsible Party: **Asus Computer International**

Address: **48720 Kato Rd, Fremont, CA 94538.**

Phone/Fax No: **(510)739-3777/(510)608-4555**

hereby declares that the product

Product Name : **Server**

Model Number : **RS521A-E12-RS12U**

RS521A-E12-RS24U

compliance statement:

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

Ver. 180620

UK: The Radio Equipment Regulations 2017 (S.I. 2017/1206)

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

EU: Radio Equipment Directive (Directive 2014/53/EU)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Română ASUSTeK Computer Inc. declară că acest dispozitiv se conformează cerinţelor esenţiale şi altor prevederi relevante ale directivelor conexe. Textul complet al declaraţiei de conformitate a Uniunii Europene se găseşte la: www.asus.com/support

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

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

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

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

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

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

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

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

Service and Support

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