# RS720A-E9-RS24-E

## 2U Rackmount Server
## User Guide

# Contents

# Contents

# Contents

# 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.

## Operation Safety

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

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

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

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

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

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

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

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#### Lithium-Ion Battery Warning

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

#### Heavy System

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

# 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: Installation Options**

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

4.  **Chapter 4: Motherboard Information**

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

5.  **Chapter 5: BIOS Setup**

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

6.  **Chapter 6: Driver Installation**

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

# Conventions

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

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

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

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

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

# Typography

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

# References

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

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

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

2.  **ASUS websites**

    The ASUS websites worldwide provide updated information for all ASUS hardware and software products. Refer to the ASUS contact information.

# Product Introduction

1

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

## 1.1    System package contents

Check your system package for the following items.

| | |
|---|---|
| Model Name | RS720A-E9-RS24-E |
| Chassis | ASUS R2P-A-R22475 2U Rackmount Chassis |
| Motherboard | ASUS KNPP-D32 Server Board |
| Component | 1 x 800W/1200W 80PLUS Platinum Power Supply<br>1 x SAS/SATA back panel<br>24 x Hot-swap 2.5-inch Storage Device Trays<br>1 x Front Panel Board<br>4 x System Fans |
| Accessories | 1 x RS720A-E9-RS24-E Support CD<br>1 x Bag of Screws<br>2 x CPU Heatsink<br>2 x AC Power Cable |
| Optional Items | 1 x Redundant 800W 80PLUS Platinum Power Supply (Second PSU)<br>1 x Friction Rail Kit |

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

## 1.2    Serial number label

The product's serial number contains 12 characters such as xxS0xxxxxxxx and printed on the sticker at the server's front cover.

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



**xxS0xxxxxxxx**
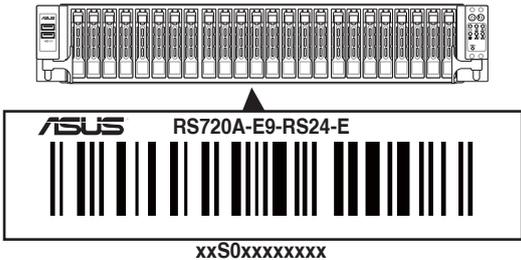
# 1.3    System specifications

The ASUS RS720A-E9-RS24-E features the ASUS KNPP-D32 server board. The server supports AMD EPYC™ 7000 Series processors plus other latest technologies through the chipsets onboard.

| Model Name | | RS720A-E9-RS24-E |
|---|---|---|
| Motherboard | | KNPP-D32 |
| Processor Support | | AMD EPYC™ 7000 Series<br>xGMI (External Global Memory Interface Link) |
| Core Logic | | System on Chip (SoC) |
| Memory | Total Slots | 32 (8-channel per CPU, 16 DIMM per CPU) |
| | Capacity | Maximum up to 4096GB |
| | Memory Type | DDR4 2666 / 2400 / 2133 RDIMM / LRDIMM<br>**\* Refer to ASUS server AVL for the latest update** |
| | Memory Size | 8GB, 16GB, 32GB (RDIMM)<br>32GB, 64GB, 128GB (LRDIMM)<br>**\* Refer to ASUS server AVL for the latest update** |
| Expansion Slots | Total PCI/PCI-E/PIKE Slots | 8+1 |
| | Slot Type | 6 x PCI-E x16 (Gen3 x8 link) or 3 PCI-E (Gen3 x16 link), FH, HL<br>1 x PCI-E x16 (Gen3 x16 link), LP, HL<br>1 x PCI-E x16 (Gen3 x8 link), FH, HL<br>1 x OCP Mezzanine 2.0 (Gen3 x16 link) |
| Disk Controller | SATA Controller | 10 x SATA 6Gb/s ports<br>2 x M.2 connectors (SATA 6Gb/s & PCI-E Gen3 x4 link) |
| | SAS Controller | **Optional:**<br>ASUS PIKE II 3008 8-port SAS HBA card<br>ASUS PIKE II 3108 8-port SAS HW RAID card<br>12G SAS Support |
| Storage Bays | I = internal<br>A or S will be hot-swappable | 24 x 2.5" Hot-swap Storage Bays |
| Networking | LAN | 1 x Dual Port Intel I350-AM2 Gigabit LAN controller<br>1 x Management Port |
| Graphic | VGA | Aspeed AST2500 64MB |

*(continued on the next page)*

| Model Name | RS720A-E9-RS24-E |
|---|---|
| Auxiliary Storage Device Bay (Floppy / Optical Drive) | N/A |
| I/O ports, Switches, and LEDs | **Front I/O Ports:**<br>2 x USB 2.0 ports<br>**Rear I/O Ports:**<br>2 x USB 3.0 ports<br>1 x VGA port<br>2 x RJ-45 GbE LAN ports<br>1 x RJ-45 Mgmt LAN port<br>**Rear Switch/LED:**<br>1 x Power switch<br>1 x Q-Code/Port 80 LED<br>**Front Switch/LED:**<br>1 x Power switch/LED<br>1 x Location switch/LED<br>1 x Reset switch<br>1 x Storage device access LED<br>1 x Message LED<br>LAN 1-4 LEDs<br>**\* LAN 3-4 for Mezzanine card use** |

| Management Solution | Out of Band Remote Hardware | On-Board ASMB9-iKVM for KVM-over-IP |
|---|---|---|
| | Software | ASUS Control Center (Classic) |

| OS Support | Windows® Server 2012 R2<br>Windows® Server 2016<br>RedHat® Enterprise Linux<br>SuSE® Linux Enterprise Server<br>CentOS<br>Ubuntu<br>VMware<br>Citrix XenServer<br>**\* Refer to http://www.asus.com for the latest OS support.** |
|---|---|

| Model Name | RS720A-E9-RS24-E |
| --- | --- |
| Regulatory Compliance | BSMI, CE, FCC (Class A) |
| Dimension (Depth x Width x Height) | 750 mm x 444 mm x 88 mm (2U)<br>29.52" x 17.48" x 3.46" |
| Net Weight Kg (CPU, DRAM & storage device not included) | 16.85 Kg |
| Gross Weight Kg (CPU, DRAM & storage device not included, packing included) | 22 Kg |
| Power Supply (different configuration by region) | 1+1 Redundant 800W/1200W 80 PLUS Platinum Power Supply<br>Rating: 100-120/200-240Vac, 9.4A/4.72A (x2), 50/60Hz Class I<br>       (240Vdc, 4.6A only for China) |
| Environment | Operating temperature: 10°C ~ 35°C<br>Non operating temperature: -40°C ~ 60°C<br>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, and two USB ports are located on the front panel.

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

USB 2.0 ports

Front panel LEDs & buttons

Asset tag

24 x 2.5" Drive Bays

handle

handle
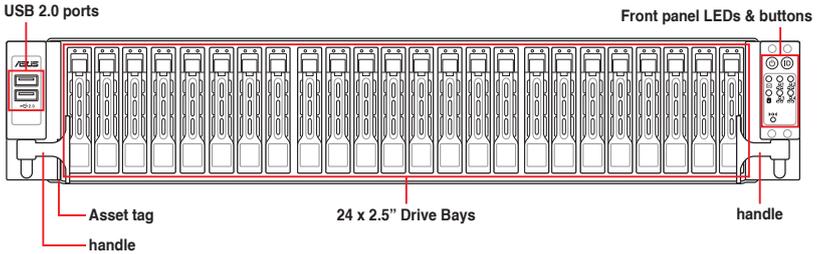
## 1.5 Rear panel features

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

Expansion card back plate

Redundant power supply

Power connector

USB 3.0 ports

Power button

Gigabit LAN port 2

Gigabit LAN port 1

Mgmt LAN port*

Q-Code LED

VGA port
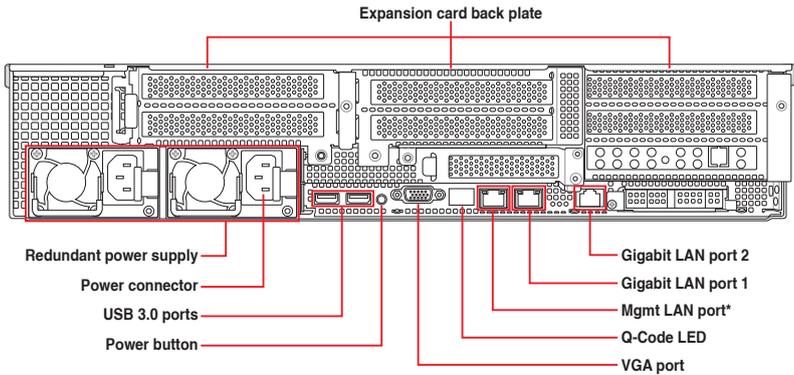
- *   * This port is for ASUS ASMB9-iKVM only.

- •   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.    ASUS KNPP-D32 Server Board

3.    System fans

4.    SATA/SAS back panel

5.    24 x 2.5" storage device trays

6.    Front panel (hidden)

7.    Asset tag (hidden)
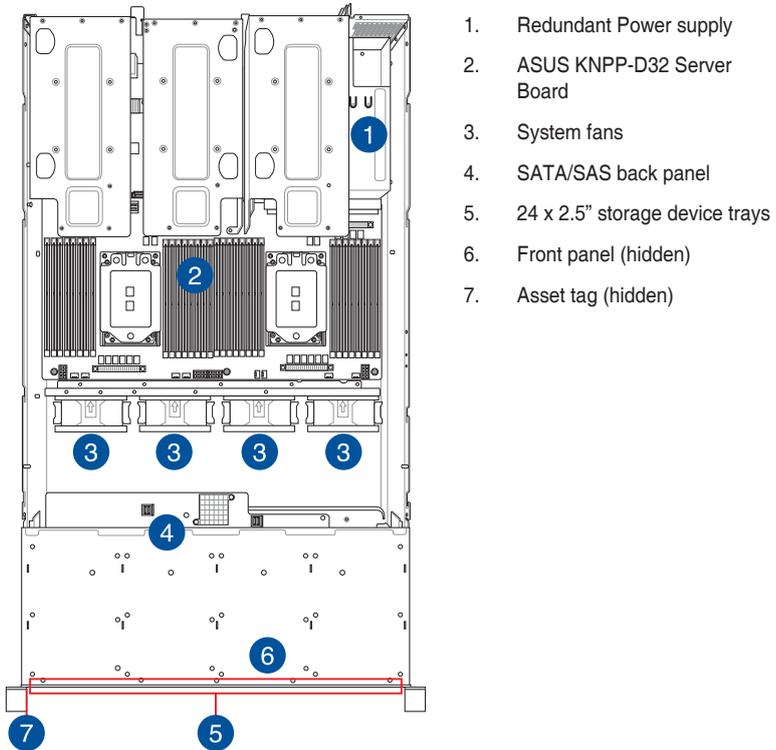
The barebone server does not include a floppy disk drive. Connect a USB floppy disk drive to any of the USB ports on the front or rear panel if you need to use a floppy disk.

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

WARNING
HAZARDOUS MOVING PARTS
KEEP FINGERS AND OTHER BODY PARTS AWAY

## 1.7 LED information

### 1.7.1 Front panel LEDs
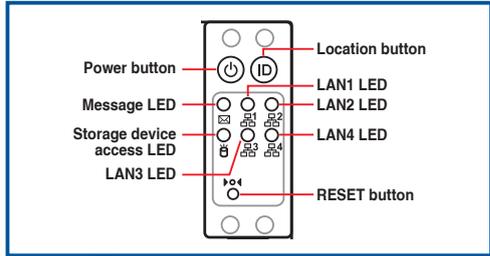


| LED | Icon | Display status | Description |
|---|---|---|---|
| Power LED | ⏻ | ON | System power ON |
| Storage device access LED | 🖰 | OFF | No activity |
| | | Blinking | Read/write data into the storage device |
| Message LED | ✉ | OFF | System is normal; no incoming event |
| | | ON | With the onboard ASMB8-iKVM: a hardware monitor event is indicated |
| LAN LEDs | 品 | OFF | No LAN connection |
| | | Blinking | LAN is transmitting or receiving data |
| | | ON | LAN connection is present |
| Location LED | ID | ON | Location switch is pressed |
| | | OFF | Normal status (Press the location switch again to turn off) |

## 1.7.2    Storage device status LED



**Red LED**
**Green LED**
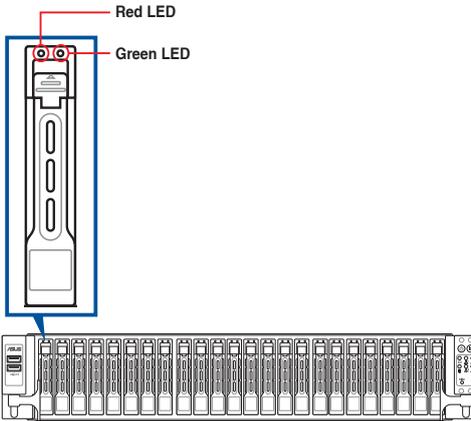
| SATA/SAS Storage Device LED Description | | |
|---|---|---|
| GREEN | ON | SATA/SAS storage device power ON |
| RED | ON | Storage device has failed and should be swapped immediately |
| GREEN/RED | Blinking | RAID rebuilding |
| GREEN/RED | Blinking | Locate |
| GREEN/RED | OFF | Storage device not found |
| GREEN | Blinking | Read/write data from/into the SATA/SAS storage device |

## 1.7.3    LAN (RJ-45) LEDs

ACT/LINK LED    SPEED LED



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

# 1.7.4    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 operation fail - internal status |
| | | 0x1F | Error | ZLib Decompression operation fail |
| | | 0x20 | Error | HMAC-SHA256 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 |

*(continued on the next page)*

| Action | PHASE | POST CODE | TYPE | DESCRIPTION |
|---|---|---|---|---|
| PSP Boot | PSP Boot Loader phase (Error Post Codes) | 0x39 | Error | Unable to map an SMN address to AXI space |
| | | 0x3A | Error | Unable to map a SYSHUB address to AXI space |
| | | 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 |
| | | 0x45 | Error | A write to an L3 register failed |
| | | 0x46 | Error | Mini-BL |
| | | 0x47 | Error | Mini-BL CCP HMAC Unit-test failed |
| | | 0x48 | Error | Potential stack corruption in jump to Mini BL |
| | | 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 | Secure unlock error |
| | | 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 |
| | | 0x54 | Error | One of: Illegal command |
| | | 0x55 | Error | An SMBus transaction collision detected |
| | | 0x56 | Error | Transaction failed to be started or processed by host |
| | | 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 |
| | | 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 | Failure status indicating that the given SecureOS has been |
| | | 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 | HVB validation failure for BIOS RTM volume (OEM public/signature failed to validate). |
| | | 0x6D | Error | Generic error indicating the CCP HAL initialization failed |
| | | 0x94 | Error | Knoll failed to idle correctly after being reset |
| | | 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 |

*(continued on the next page)*

| Action | PHASE | POST CODE | TYPE | DESCRIPTION |
|---|---|---|---|---|
| PSP Boot | PSP Boot Loader phase (Status Post Codes) | 0xA0 | Progress | Bootloader successfully entered C Main |
| | | 0xA1 | Progress | Master initialized C2P / slave waited for master to init C2P |
| | | 0xA2 | Progress | HMAC key successfully derived |
| | | 0xA3 | Progress | Master got Boot Mode and sent boot mode to all slaves |
| | | 0xA4 | Progress | SpiRom successfully initialized |
| | | 0xA5 | Progress | BIOS Directory successfully read from SPI to SRAM |
| | | 0xA6 | Progress | Early unlock check |
| | | 0xA7 | Progress | Inline Aes key successfully derived |
| | | 0xA8 | Progress | Inline-AES key programming is done |
| | | 0xA9 | Progress | Inline-AES key wrapper derivation is done |
| | | 0xAA | Progress | Bootloader successfully loaded HW IP configuration values |
| | | 0xAB | Progress | Bootloader successfully programmed MBAT table |
| | | 0xAC | Progress | Bootloader successfully loaded SMU FW |
| | | 0xAD | Progress | PSP and SMU configured WAFL |
| | | 0xAE | Progress | User mode test harness completed successfully |
| | | 0xAF | Progress | Bootloader loaded Agesa0 from SpiRom |
| | | 0xB0 | Progress | AGESA phase has completed |
| | | 0xB1 | Progress | RunPostDramTrainingTests() completed successfully |
| | | 0xB2 | Progress | SMU FW Successfully loaded to SMU Secure DRAM |
| | | 0xB3 | Progress | Sent all required boot time messages to SMU |
| | | 0xB4 | Progress | Validated and ran Security Gasket binary |
| | | 0xB5 | Progress | UMC Keys generated and programmed |
| | | 0xB6 | Progress | Inline AES key wrapper stored in DRAM |
| | | 0xB7 | Progress | Completed FW Validation step |
| | | 0xB8 | Progress | Completed FW Validation step |
| | | 0xB9 | Progress | BIOS copy from SPI to DRAM complete |
| | | 0xBA | Progress | Completed FW Validation step |
| | | 0xBB | Progress | BIOS load process fully complete |
| | | 0xBC | Progress | Bootloader successfully release x86 |
| | | 0xBD | Progress | Early Secure Debug completed |
| | | 0xBE | Progress | GetFWVersion command received from BIOS is completed |
| | | 0xBF | Progress | SMIInfo command received from BIOS is completed |
| | | 0xC0 | Progress | Successfully entered WarmBootResume() |
| | | 0xC1 | Progress | Successfully copied SecureOS image to SRAM |
| | | 0xC2 | Progress | Successfully copied trustlets to PSP Secure Memory |
| | | 0xC3 | Progress | About to jump to Secure OS (SBL about to copy and jump) |
| | | 0xC4 | Progress | Successfully restored CCP and UMC state on S3 resume |
| | | 0xC5 | Progress | PSP SRAM HMAC validated by Mini BL |
| | | 0xC6 | Progress | About to jump to <t-base in Mini BL |
| | | 0xC7 | Progress | VMG ECDH unit test started |
| | | 0xC8 | Progress | VMG ECDH unit test passed |
| | | 0xC9 | Progress | VMG ECC CDH primitive unit test started |
| | | 0xCA | Progress | VMG ECC CDH primitive unit test passed |
| | | 0xCB | Progress | VMG SP800-108 KDF-CTR HMAC unit test started |
| | | 0xCC | Progress | VMG SP800-108 KDF-CTR HMAC unit test passed |
| | | 0xCD | Progress | VMG LAUNCH_* test started |
| | | 0xCE | Progress | VMG LAUNCH_* test passed |
| | | 0xCF | Progress | MP1 has been taken out of reset |
| | | 0xD0 | Progress | PSP and SMU Reserved Addresses correct |
| | | 0xD1 | Progress | Reached Naples steady-state WFI loop |
| | | 0xD2 | Progress | Knoll device successfully initialized |
| | | 0xD3 | Progress | 32-byte RandOut successfully returned from Knoll |
| | | 0xD4 | Progress | 32-byte MAC successfully received from Knoll. |
| | | 0xD5 | Progress | Knoll device verified successfully |
| | | 0xD6 | Progress | Done enabling power for Knoll |
| | | 0xD7 | Progress | Enter recovery mode due to trustlet validation fail. |
| | | 0xD8 | Progress | Enter recovery mode due to OS validation fail. |
| | | 0xD9 | Progress | Enter recovery mode due to OEM public key not found. |

*(continued on the next page)*

| Action | PHASE | POST CODE | TYPE | DESCRIPTION |
|---|---|---|---|---|
| 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 |
| | 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 |
| | | 0x79 | Progress | CSM 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 outout 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 |
| | | 0xb2 | Progress | Legacy Option ROM 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 |
| | | 0xAE | Progress | Legacy boot event |
| | Operating system phase | 0xAA | Progress | APIC mode |
| | | 0xAC | Progress | PIC mode |

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# 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

**Removing the rear cover**

To remove the rear cover:

1.　Remove the six (6) screws on the rear cover with a Phillips screwdriver.
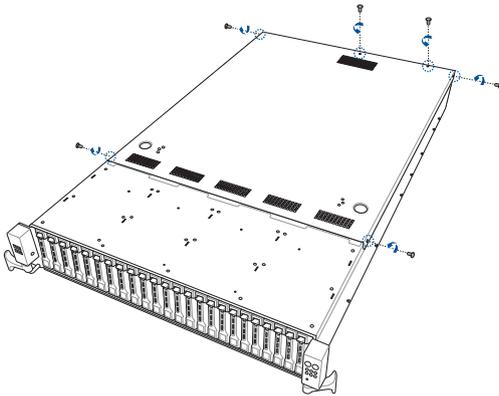
2.　Push and hold the cover buttons down, then slide the rear cover towards the rear to disengage it from the chassis.

3.　Lift the rear cover to completely remove it from the chassis.
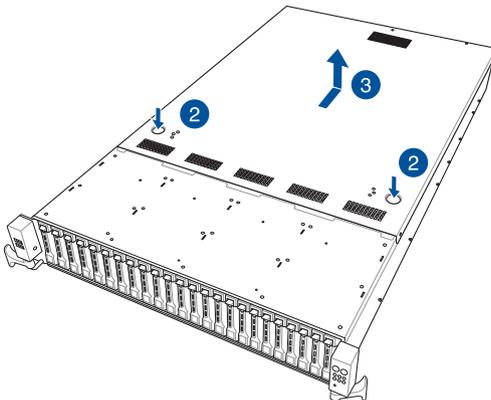
## 2.2 Central Processing Unit (CPU)

The motherboard comes with a surface mount Socket SP3 designed for the AMD EPYC™ 7000 Series.

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

- Keep the cap after installing the motherboard. ASUS will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the Socket SP3.

- 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.

### 2.2.1 Installing the CPU and heatsink

To install a CPU:

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

2. Remove the screws then remove the air ducts.
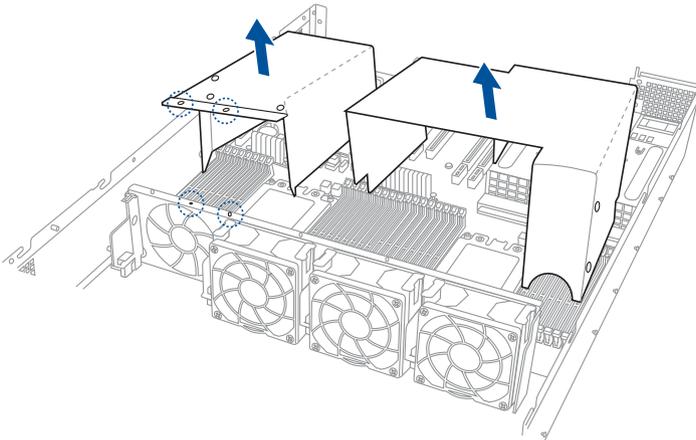
3.  Loosen each screw one by one in the sequence shown on the socket to open the load plate.
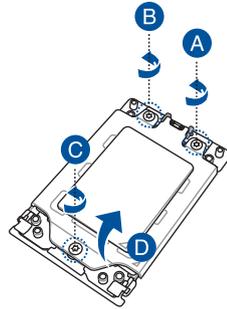
4.  Slightly lift open the rail frame.

**Load plate**

**Rail frame**
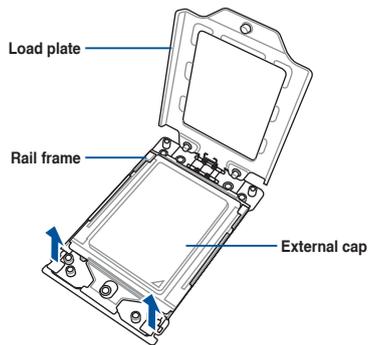
**External cap**

5.  Slide the external cap out of the rail frame.

**External cap**
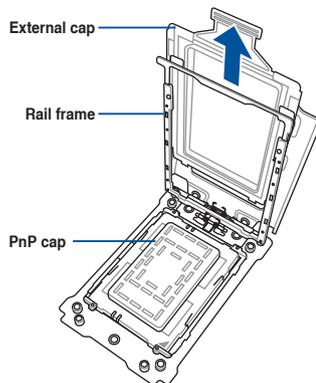
**Rail frame**

**PnP cap**

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

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

**Carrier frame with CPU**

**Rail frame**

**PnP cap**

A

B
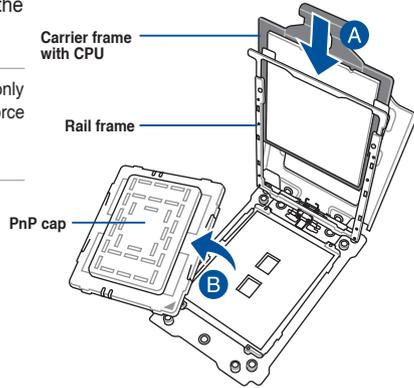
7.  Gently push the rail frame just enough to let it sit on top of the CPU socket.

**Carrier frame with CPU**
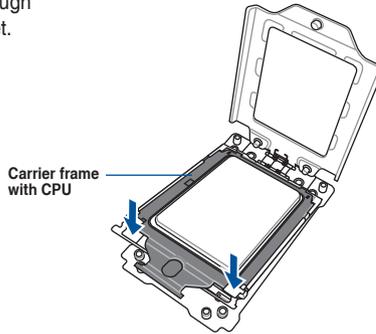
8.  Close the load plate just enough to let it sit on top of the CPU, then secure each screw one by one in the sequence shown on the socket to completely secure the load plate.

The load plate screws are T20 models. A torque value of 12 inch-lbf is recommended.

B

C

A
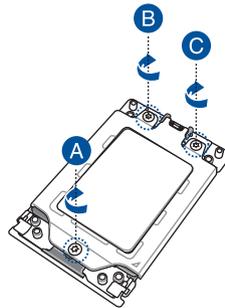
9. Twist each of the four screws with a Phillips screwdriver just enough to attach the heatsink to the motherboard. When the four screws are attached, tighten them one by one in a diagonal sequence to completely secure the heatsink.
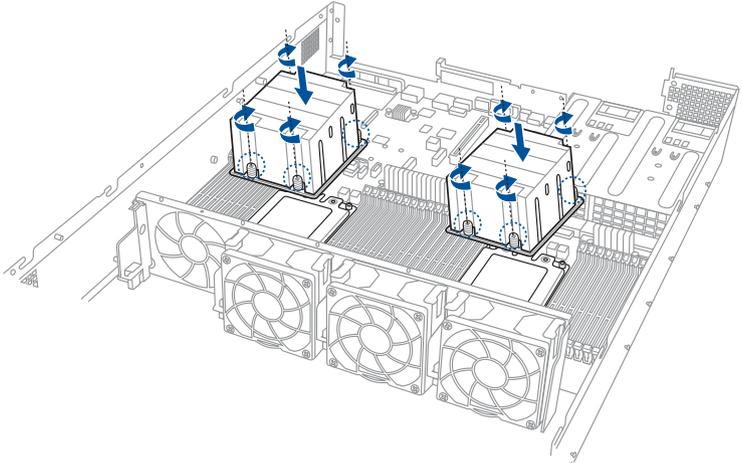
10. Reinstall the air ducts then secure the air ducts with the screws removed in step 2.
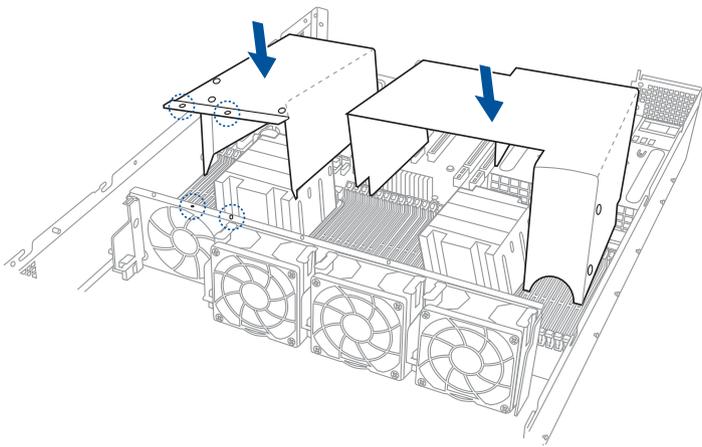
## 2.3    System memory

### 2.3.1    Overview

The motherboard comes with 32 Double Data Rate 4 (DDR4) Dual Inline Memory Modules (DIMM) sockets.

The figure illustrates the location of the DDR4 DIMM sockets:



**KNPP-D32**
**288-pin DDR4 DIMM sockets**
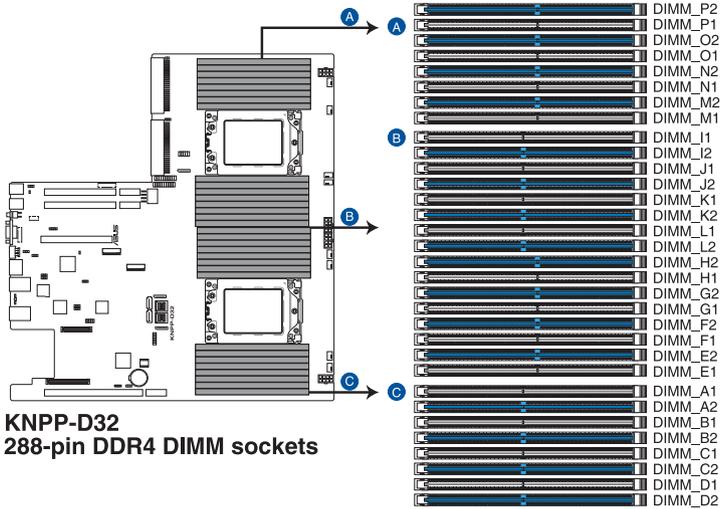
## 2.3.2    Memory Configurations

You may install 8GB, 16GB, and 32GB RDIMMs; 32GB, 64GB, and 128GB LRDIMMs 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.

- Refer to ASUS Server AVL for the updated list of compatible DIMMs.
- Always install DIMMs with the same CAS latency. For optimum compatibility, it is recommended that you obtain memory modules from the same vendor.
- Start installing the DIMMs into the second slots (such as DIMM_A2 , DIMM_B2, etc.)

| Recommended dual CPU configuration | | | | | | |
|---|---|---|---|---|---|---|
| **DIMMs** | | | | | | |
| | **2** | **4** | **8** | **12** | **16** | **32** |
| **DIMM_P2** | | | | | ● | ● |
| **DIMM_P1** | | | | | | ● |
| **DIMM_O2** | | | | ● | ● | ● |
| **DIMM_O1** | | | | | | ● |
| **DIMM_N2** | | | ● | ● | ● | ● |
| **DIMM_N1** | | | | | | ● |
| **DIMM_M2** | | ● | ● | ● | ● | ● |
| **DIMM_M1** | | | | | | ● |
| **DIMM_I1** | | | | | | ● |
| **DIMM_I2** | ● | ● | ● | ● | ● | ● |
| **DIMM_J1** | | | | | | ● |
| **DIMM_J2** | | | ● | ● | ● | ● |
| **DIMM_K1** | | | | | | ● |
| **DIMM_K2** | | | | ● | ● | ● |
| **DIMM_L1** | | | | | | ● |
| **DIMM_L2** | | | | | ● | ● |
| **DIMM_H2** | | | | | ● | ● |
| **DIMM_H1** | | | | | | ● |
| **DIMM_G2** | | | | ● | ● | ● |
| **DIMM_G1** | | | | | | ● |
| **DIMM_F2** | | | ● | ● | ● | ● |
| **DIMM_F1** | | | | | | ● |
| **DIMM_E2** | | ● | ● | ● | ● | ● |
| **DIMM_E1** | | | | | | ● |
| **DIMM_A1** | | | | | | ● |
| **DIMM_A2** | ● | ● | ● | ● | ● | ● |
| **DIMM_B1** | | | | | | ● |
| **DIMM_B2** | | | ● | ● | ● | ● |
| **DIMM_C1** | | | | | | ● |
| **DIMM_C2** | | | | ● | ● | ● |
| **DIMM_D1** | | | | | | ● |
| **DIMM_D2** | | | | | ● | ● |

### 2.3.3    Installing a DIMM on a single clip DIMM socket

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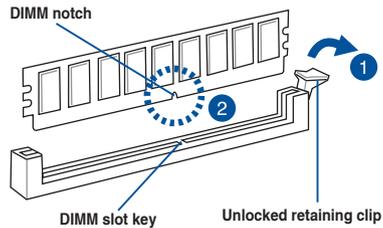
> ✎ A DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a DIMM into a socket in the wrong direction to avoid damaging the DIMM.

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 clip snaps back into place and the DIMM cannot be pushed in any further to ensure proper sitting of the DIMM.

**Locked Retaining Clip**
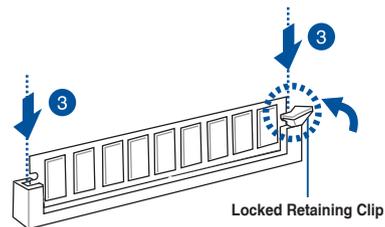
> ⚠️ Always insert the DIMM into the socket vertically to prevent DIMM notch damage.

### 2.3.4    Removing a DIMM from a single clip DIMM socket

1.    Press the retaining clip outward to unlock the DIMM.

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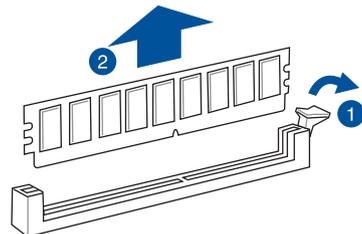
> ✎ Support the DIMM lightly with your fingers when pressing the retaining clips. The DIMM might get damaged when it flips out with extra force.

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## 2.4 Storage devices

The system supports twenty-four (24) 2.5" hot-swap SATA/SAS storage devices. The storage device installed on the storage device tray connects to the motherboard SATA/SAS ports via the SATA/SAS backplane (SAS storage devices require an optional ASUS PIKE II card).

To install a 2.5" hot-swap SATA/SAS storage device:

1.  Switch the secure lock upward then pull the tray lever outward. The storage device tray ejects slightly after you pull out the lever.

**Secure lock**
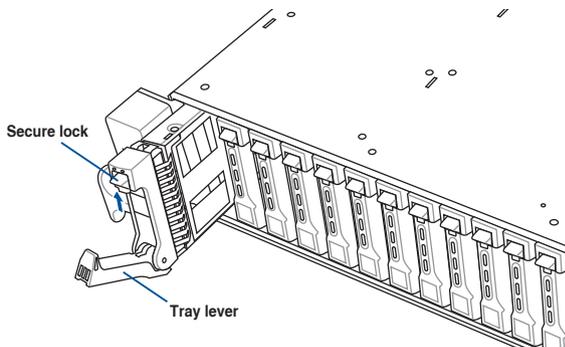
**Tray lever**

2.  Firmly hold the tray lever and pull the storage device tray out of the bay.
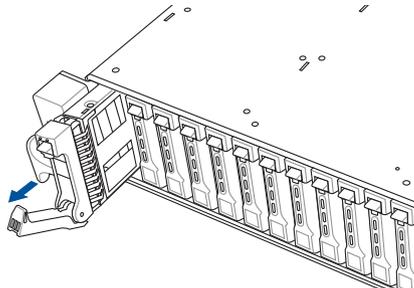
3.  Place the storage device tray on a flat and stable surface.

**Metal beam**

4.  Release the screws on each side of the storage device tray to release the metal beam.
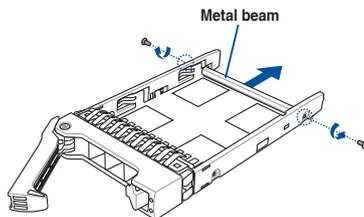
> The metal beam supports the storage device tray horizontally to prevent the storage device tray from benting or deforming.

5.    Place the SATA/SAS storage
      device into the storage device tray
      then secure it with four screws.
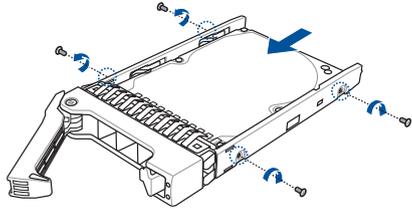
6.    Insert the storage device tray and
      storage device assembly all the
      way into the depth of the bay until
      just a small fraction of the tray
      edge protrudes.

7.    Push the tray lever until it clicks
      and secures the storage device
      tray in place.

8.    Repeat steps 1 to 7 to install the
      other SATA/SAS storage devices.
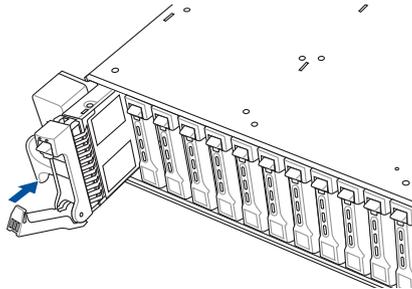
## 2.5    Expansion slot

The barebone server comes with four pre-installed riser cards to support eight PCIe slots and one OCP Mezzanine slot on board.
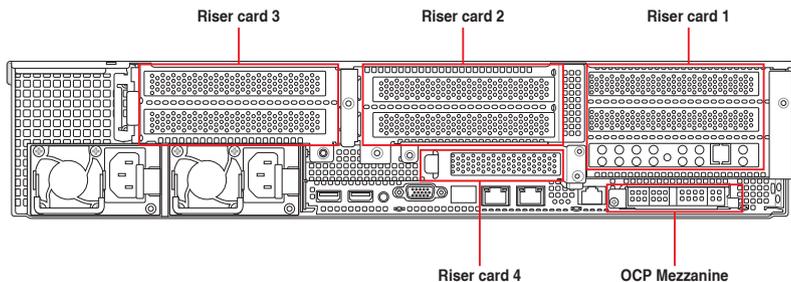


**Riser card bracket 1**

Riser card bracket 1 supports PCIe Gen3 slots 1-3 top to bottom. Slot 2 can be auto-switch to x16 mode when x16 card is populated whereas slot 1 will be disabled.

| PCIe slot | Operation mode | |
|---|---|---|
| Slot 1 | x8 | N/A |
| Slot 2 | x8 | x16 |
| Slot 3 | x8 (ASUS PIKE II card by default) | x8 (ASUS PIKE II card by default) |

**Riser card bracket 2**

Riser card bracket 2 supports PCIe Gen3 slots 4-5 top to bottom. Slot 4 can be auto-switch to x16 mode when x16 card is populated whereas slot 5 will be disabled.

| PCIe slot | Operation mode | |
|---|---|---|
| Slot 4 | x8 | x16 |
| Slot 5 | x8 | N/A |

## Riser card bracket 3

Riser card bracket 3 supports PCIe Gen3 slots 6-7 top to bottom. Slot 7 can be auto-switch to x16 mode when x16 card is populated whereas slot 6 will be disabled.

| PCIe slot | Operation mode | |
|---|---|---|
| Slot 6 | x8 | N/A |
| Slot 7 | x8 | x16 |

## Riser card bracket 4

Riser card bracket 4 supports PCIe Gen3 slot 8.

| PCIe slot | Operation mode |
|---|---|
| Slot 8 | x16 |

## OCP Mezzanine slot

OCP Mezzanine slot supports PCIe Gen3 x16.

| PCIe slot | Operation mode |
|---|---|
| OCP Mezzanine | x16 |

## 2.5.1    Installing an expansion card to riser card bracket 1

The pre-installed riser card bracket 1 on the PCIE1 slot supports Full-Height (FH) and Half-Length (HL) PCIE x16 expansion cards.

To install an expansion card to the riser card bracket 1:

1.    Remove the screw that secures the riser card bracket 1 to the chassis.

2.    Firmly hold the riser card bracket 1, then pull it up to detach it from the PCIE1 slot on the motherboard.
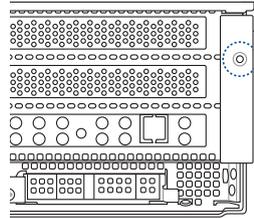
**Riser card bracket 1**
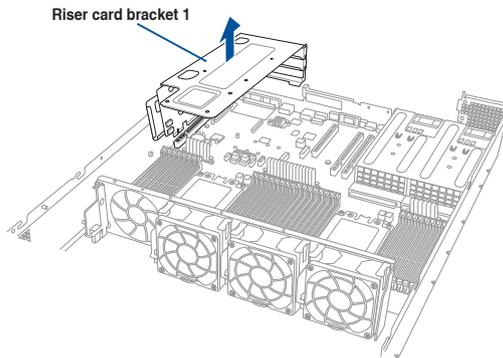
3. Remove the screw from the metal cover (A), then remove the metal cover (B) from the riser card bracket 1.

**Metal cover**
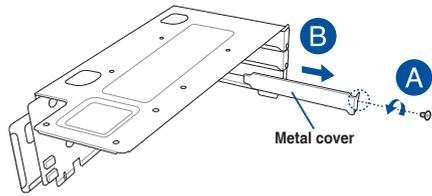
4. Install the PCIE expansion card into the riser card bracket 1 (A), then secure the expansion card with the screw (B).
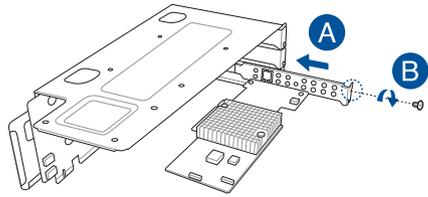
5. Install the riser card bracket 1 and the PCIE expansion card assembly into the PCIE1 slot on the motherboard. Ensure that the golden connectors of the riser card bracket 1 is firmly seated in place.
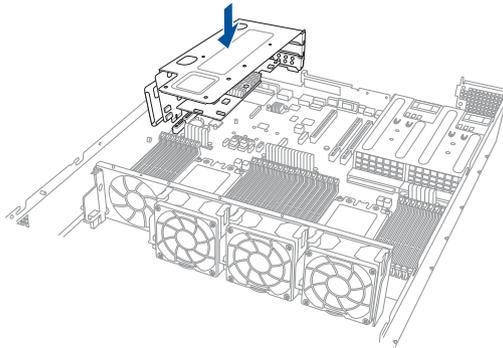
6. Secure the riser card bracket 1 to the chassis with the screw removed in step 1.

## 2.5.2    Installing an expansion card to riser card bracket 2

To install an expansion card on the riser card bracket 2:

1.    Remove the two screws that secure the riser card bracket 2 to the chassis.
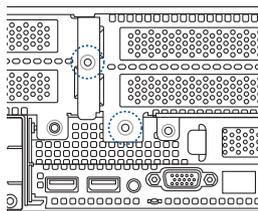


2.    Remove the screw that secures the riser card bracket 2 to the motherboard.

3.    Firmly hold the riser card bracket 2, then pull it up to detach it from the PCIE3 slot on the motherboard.



Riser card bracket 2
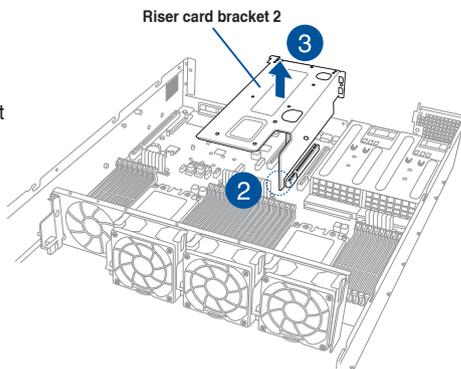
4.    Remove the screw from the metal cover (A), then remove the metal cover (B) from the riser card bracket 2.



Metal cover
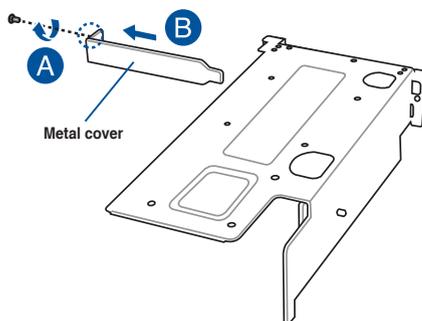
5. Install the PCIE expansion card into the riser card bracket 2 (A), then secure the expansion card with the screw (B).
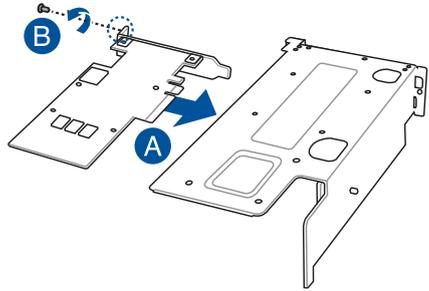


6. Install the riser card bracket 2 and the PCIE expansion card assembly into the PCIE3 slot on the motherboard. Ensure that the golden connectors of the riser card bracket 2 is firmly seated in place.

7. Secure the riser card bracket 2 to the motherboard with the screw removed in step 2.
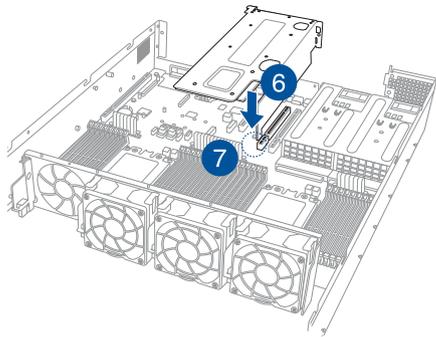


8. Secure the riser card bracket 2 to the chassis with the screws removed in step 1.

### 2.5.3    Installing an expansion card to riser card bracket 3

To install an expansion card on the riser card bracket 3:

1.  Remove the two screws that
    secure the riser card bracket 3 to
    the chassis.
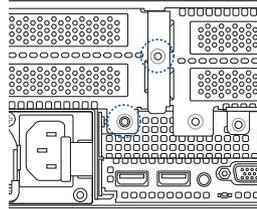


2.  Firmly hold the riser card bracket 3, then pull it up to detach it from the PCIE4 slot on
    the motherboard.
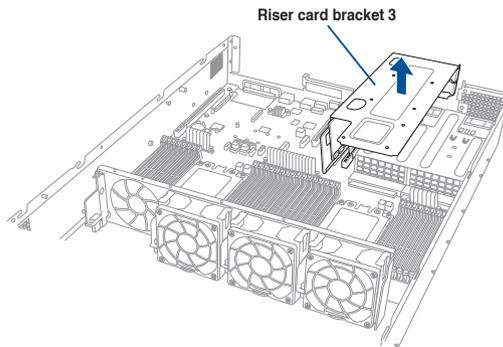
**Riser card bracket 3**



3.  Remove the screw from the
    metal cover (A), then remove the
    metal cover (B) from the riser
    card bracket 3.

**Metal cover**
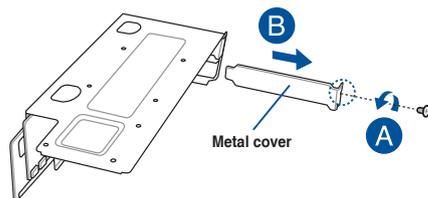
4.  Install the PCIE expansion card into the riser card bracket 3 (A), then secure the expansion card with the screw (B).
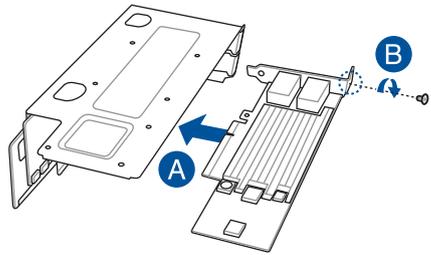


5.  Install the riser card bracket 3 and the PCIE expansion card assembly into the PCIE4 slot on the motherboard. Ensure that the golden connectors of the riser card bracket 3 is firmly seated in place.
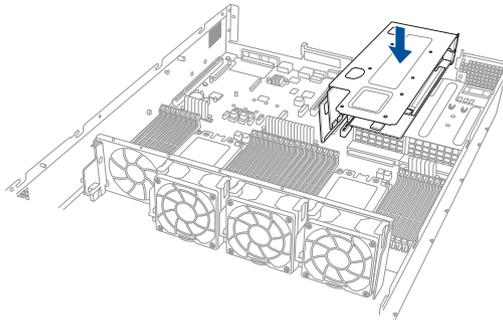


6.  Secure the riser card bracket 3 to the chassis with the screws removed in step 1.

## 2.5.4     Installing an expansion card to riser card bracket 4

To install an expansion card to the riser card bracket 4:

1.    Remove the riser card bracket 1 and riser card bracket 2.

For more information, refer to section **2.5.1 Installing an expansion card to riser card bracket 1** and **2.5.2 Installing an expansion card to riser card bracket 2**.

2.    Remove the screw that secures the metal lock to the chassis.
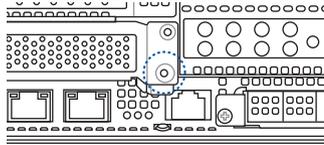
3.    Lift the metal lock upward.
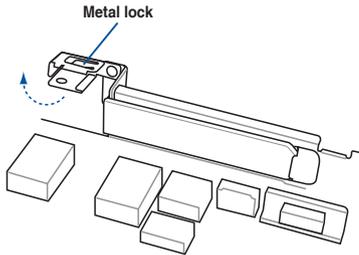
**Metal lock**

4.    Remove the metal cover from the chassis.

**Metal cover**

5. Install the PCIE expansion card into the riser card bracket 4.
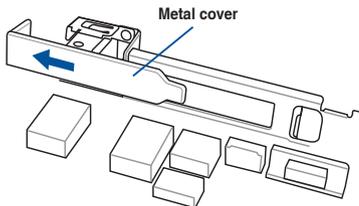
**Riser card bracket 4**
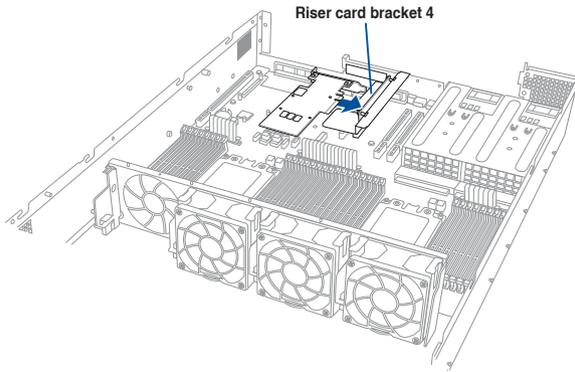
6. Move the metal lock downward to secure the riser card bracket 4 and the PCIE expansion card assembly to the chassis.
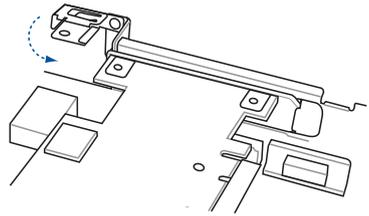
7. Secure the metal lock to the chassis with the screw removed in step 2.

## 2.5.5    Replacing the ASUS PIKE II card

To replace the pre-installed ASUS PIKE II card on the riser card bracket 1:

1.    Remove the screw that secures the riser card bracket 1 to the chassis.

2.    Firmly hold the riser card bracket 1, then pull it up to detach it from the PCIE1 slot on the motherboard.
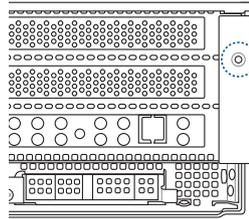
**Riser card bracket 1**
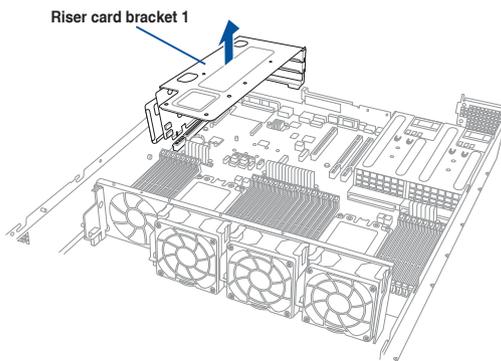
3.    Remove the screw from the metal cover (A), then remove the ASUS PIKE II card (B) from the riser card bracket 1.

**Metal cover**
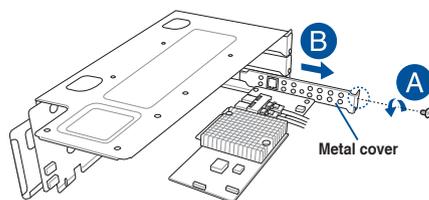
4. Remove the default cable from the ASUS PIKE II card.
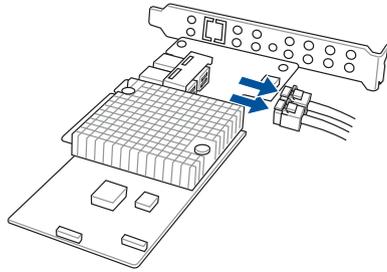


5. Prepare the replacement ASUS PIKE II card.

6. Reconnect the default cable to the replacement ASUS PIKE II card.
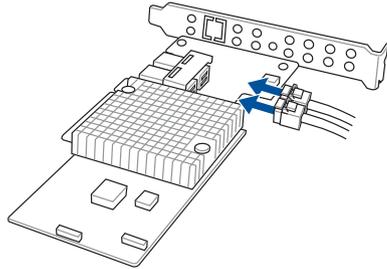


7. Install the replacement ASUS PIKE II card into the riser card bracket 1 (A), then secure it with the screw (B).
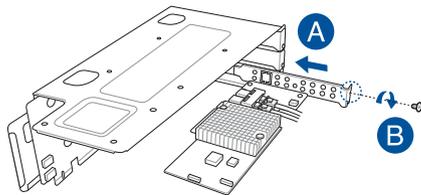
8.    Install the riser card bracket 1 and the ASUS PIKE II card assembly into the PCIE1 slot on the motherboard. Ensure that the golden connectors of the riser card bracket 1 is firmly seated in place.
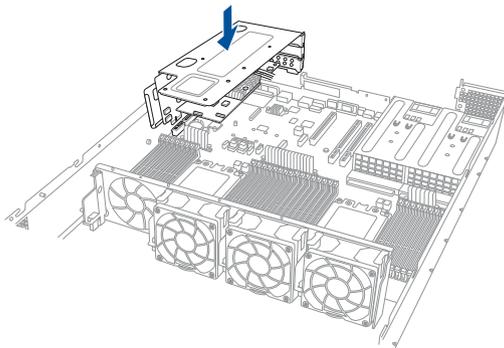


9.    Secure the riser card bracket 1 to the chassis with the screw removed in step 1.

## 2.5.6    Configuring an expansion card

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

1.    Turn on the system and change the necessary BIOS settings, if any. See Chapter 5 for information on BIOS setup.

2.    Assign an IRQ to the card. Refer to the 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.**

## 2.5.7 Installing Mezzanine cards

To install a Mezzanine card:

1. Locate the Mezzanine card connector on your motherboard.



**KNPP-D32 MEZZPCIE connectors**
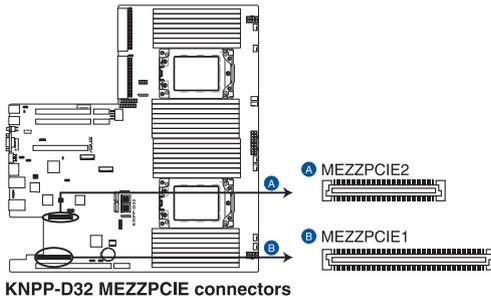
2. Remove the riser card bracket 1. For more information, refer to section **2.5.1 Installing an expansion card to riser card bracket 1**.

3. Remove the screw from the metal cover (A), then remove the metal cover (B) from chassis.
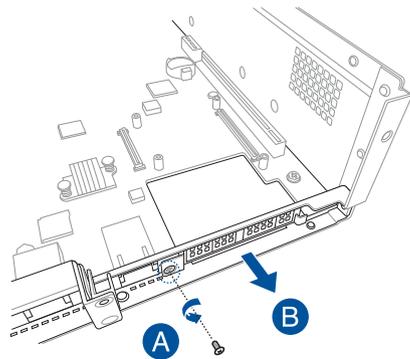


4. Select the slots that are going to be used for your Mezzanine card, then use a screwdriver and pry the corresponding slots until it pops off.
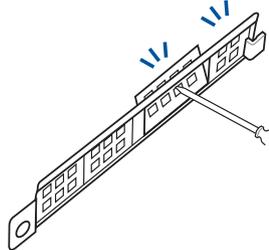
5.  Prepare the Mezzanine card.

6.  Insert the ports of the Mezzanine card into the mounting hole on the chassis, then insert the golden connector of the Mezzanine card into the OCP connector on the motherboard.

    Ensure that the stand screws on the motherboard is aligned and matched to the screw holes of the Mezzanine card.
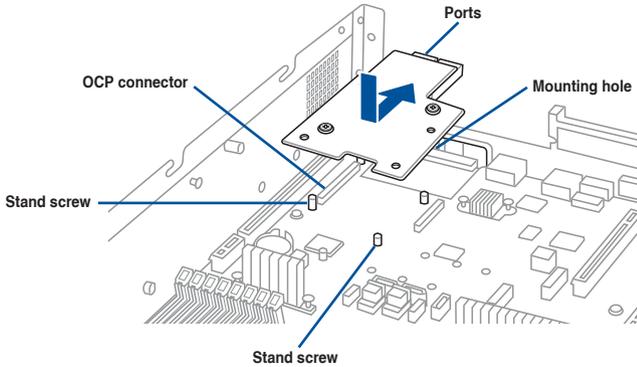


7.  Secure the Mezzanine card with four bundled screws.
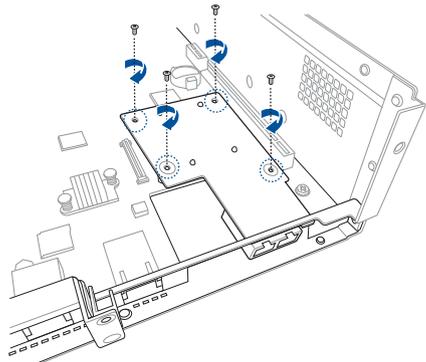
8. Reinstall the metal cover (A) and secure it with the screw (B).
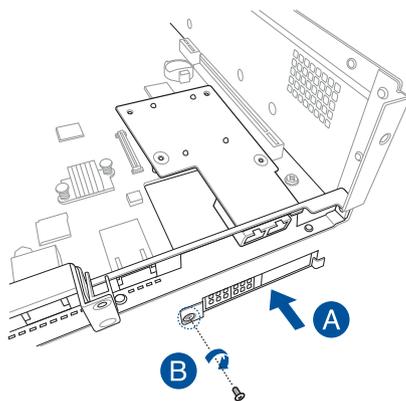
9. Install the riser card bracket 1 into the PCIE connector on the motherboard. For more information, refer to section **2.5.1 Installing an expansion card to riser card bracket 1**.

## 2.5.8    Installing M.2 (NGFF) cards

To install an M.2 (NGFF) card:

1.    Locate the M.2 (NGFF) connectors on your motherboard.



**KNPP-D32 NGFF connectors**
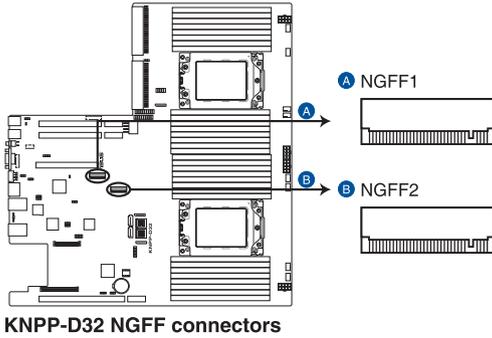
2.    Remove the top screw and the stand from the motherboard.
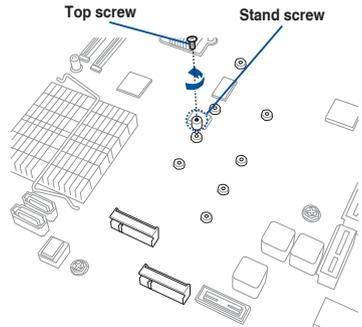


3.    Select an appropriate screw hole on the motherboard for your M.2 card, then secure the stand to the motherboard.
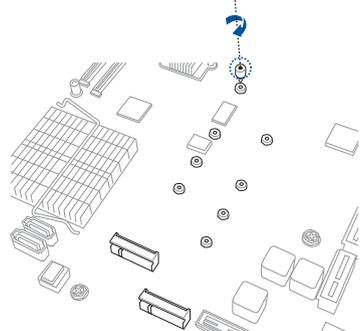
4. Prepare the M.2 card.

5. Align and insert the M.2 card into the M.2 connector on the motherboard.

   Ensure that the golden connector of the M.2 card is inserted firmly in place and that the screw hole on the M.2 card matches the stand screw on the motherboard.
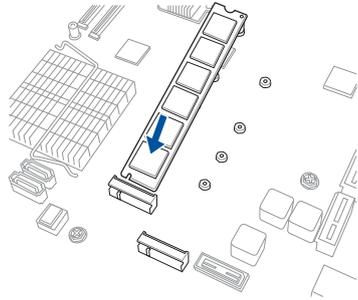
6. Secure the M.2 card with the top screw.

   Ensure that the M.2 card is positioned between the top screw and the stand screw before securing it.
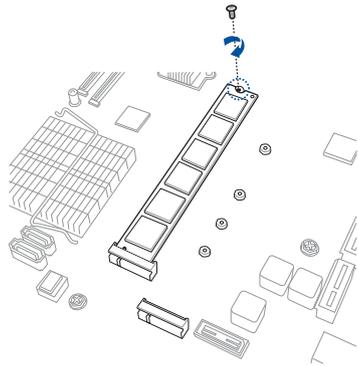
# 2.6    Cable connections

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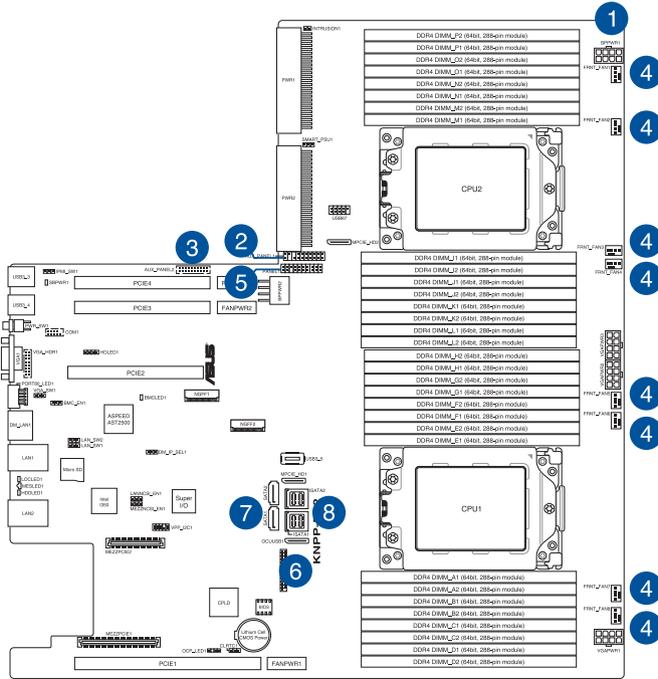
**Pre-connected system cables**

1.    8-pin BPPWR1 power connector (from power supply to backplane)

2.    Auxiliary panel 1 connector (from motherboard to front I/O board)

3.    Auxiliary panel 2 connector (from motherboard to front I/O board)

4.    System fan connectors (from motherboard FAN1-8 to system fans)

5.    Panel connector (from motherboard to front I/O board)

6.    OCU-USB to USB connector (from motherboard to front I/O board)

7.    SATA connectors (from motherboard to SATA/SAS backplane board)

8.    ISATA connectors (from motherboard to SATA/SAS backplane board)

# 2.7 SATA/SAS backplane cabling



## Backplane



**Connects a 8-pin plug from motherboard**

**Connects to expander board**

**Connects to SATA/SAS storage devices**



## Expander board

**Connects to backplane**



**Connects the data cable from the ASUS PIKE II card**
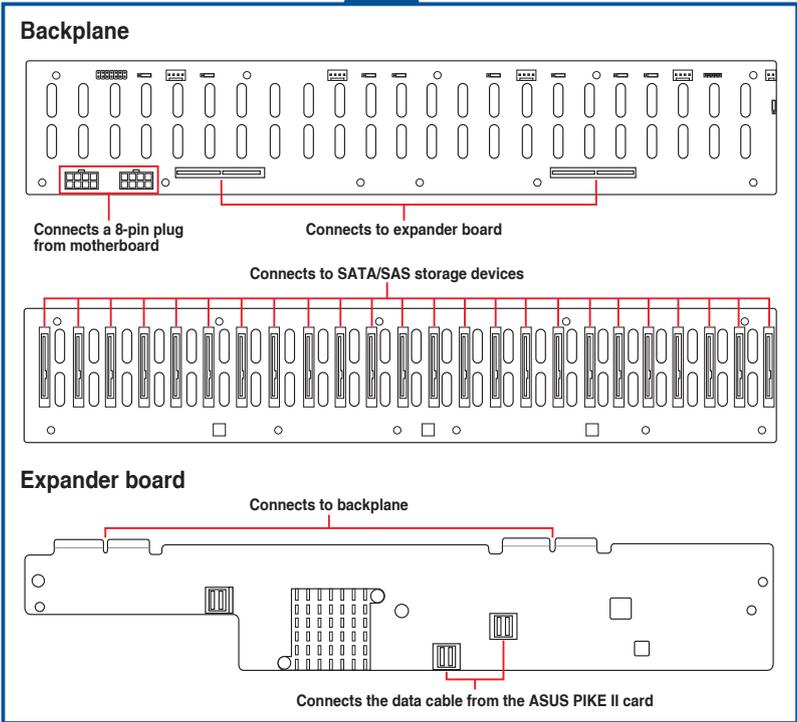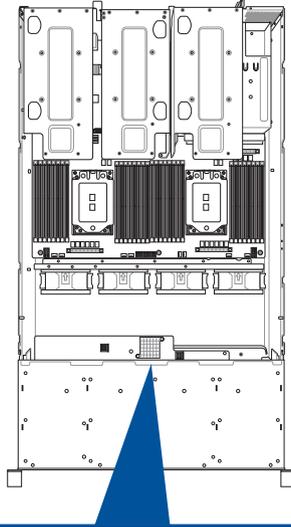
## 2.8 Removable/optional components

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

1. System fans

2. Redundant power supply module

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

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

## 2.8.1 System fans

To remove the system fans:

1. Locate the fans you want to replace.

2. Press the retaining clip (A) and lift upward (B) to remove the fan.
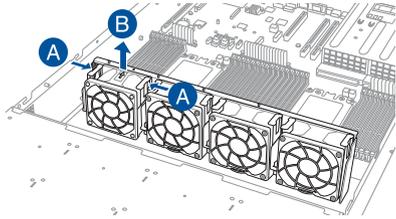
3. Replace the fan with the same model and size.

4. Align and position the fan with the arrow on the fan pointing to the back of the chassis (C).

5. Install the fan to the fan cage.
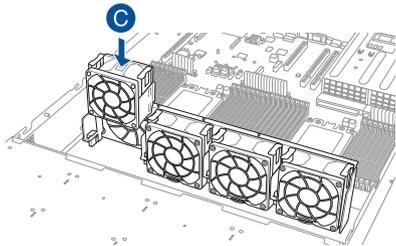
> 📝 The fan can only be installed in one direction. If the fan cannot be installed, turn it around and try again.

## 2.8.2 Redundant power supply module

To replace a failed redundant power supply module:

1. Lift up the power supply module lever.

2. Hold the power supply module lever and press the PSU latch.

3. Pull the power supply module out of the system chassis.
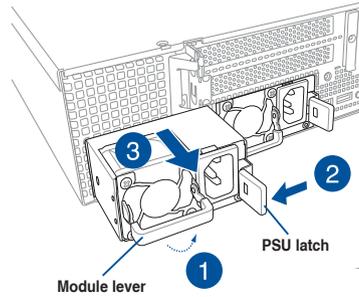
4. Insert the replacement power supply module into the chassis then push it inwards until the latch locks into place.
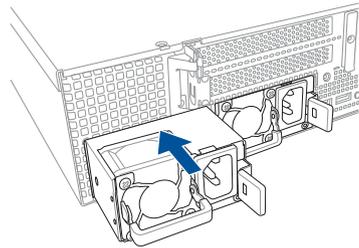
# Installation Options

3

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

# 3.1 Tool-less Friction Rail Kit

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

The tool-less rail kit package includes:

Set of screws

Fixing latches    Rail components (screws included)

Latch screws    Rail Washers    Rail screws

Tool-less rack rail

FRONT RIGHT

FRONT LEFT
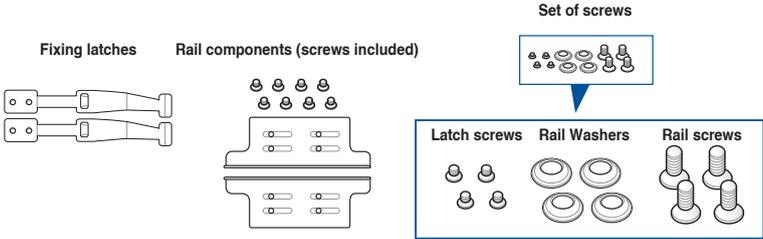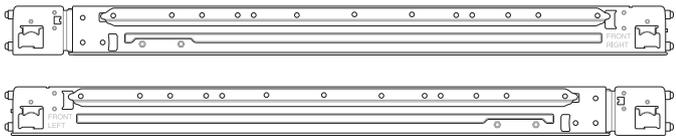
## 3.2    Installing the tool-less rack rail

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

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

> The locations of the screw holes vary with different server models. Refer to your server user manual for details.
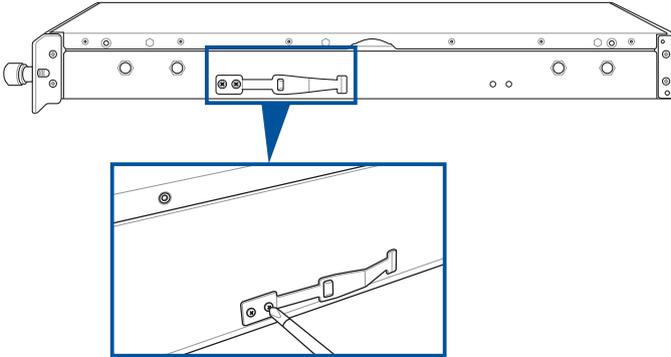
2.    Select a desired space and place the appropriate rack rail (left and right) on opposite positions on the rack.

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

1U
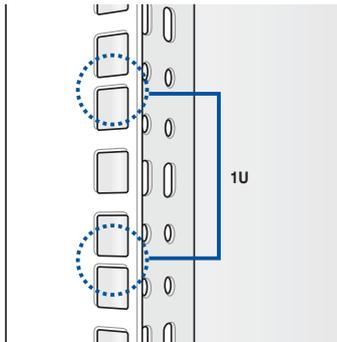
3. Secure the rail components to the rail using the bundled screws.

4. Press the spring lock (A) then insert the studs into the selected square mounting holes on the rack post.

5. Press the spring lock on the other end of rail then insert the stud into the mounting hole on the rack post. Extend the rack rail, if necessary.

6. (Optional) Use the rail screw and rail washer (B) that comes with the kit to secure the rack rail to the rack post.

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

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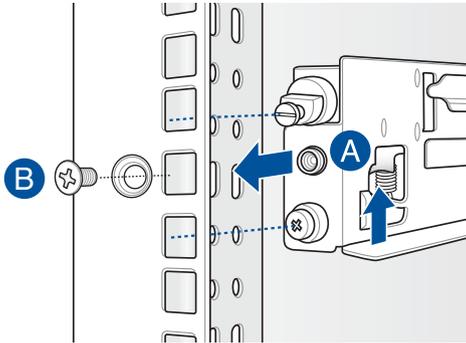


8. Lift the server chassis and insert it into the rack rail.

Ensure that the rack rail cabinet and the rack posts are stable and standing firmly on a level surface.

## 3.3    Rail kit dimensions



43.6mm

900mm



43.6mm

589mm
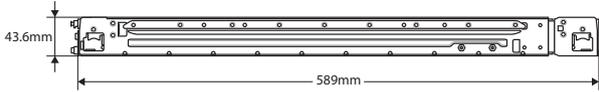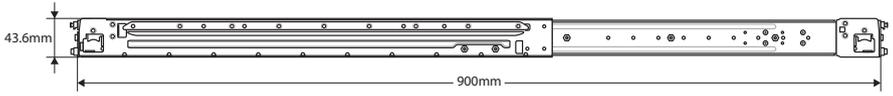
# Motherboard Information

4

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

# 4.1 Motherboard layout
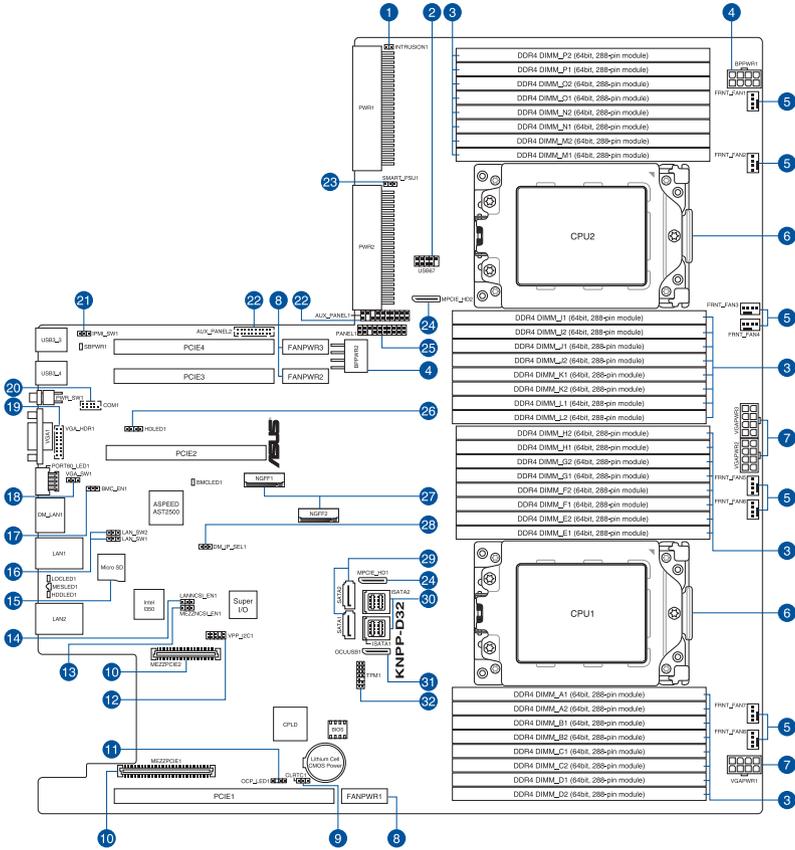
## Layout contents

| Internal connectors / Sockets / Jumpers / LEDs | Page |
|---|---|
| 1. Chassis Intrusion (2-pin INTRUSION1) | 4-19 |
| 2. USB 2.0 connector (10-1 pin USB67) | 4-14 |
| 3. DDR4 DIMM sockets | 2-7 |
| 4. Back panel power connectors (8-pin BPPWR1-2) | 4-18 |
| 5. System fan connectors (4-pin FRNT_FAN1-8) | 4-15 |
| 6. CPU socket | 2-3 |
| 7. VGA power connectors (8-pin VGAPWR1-3) | 4-18 |
| 8. Fan power connectors (FANPWR1-3) | 4-14 |
| 9. Clear RTC RAM (3-pin CLRTC1) | 4-4 |
| 10. Mezzanine PCIE card connectors (MEZZPCIE1-2) | 4-20 |
| 11. OCP LAN Activity LED connector (4-1 pin OCP_LED1) | 4-22 |
| 12. VPP_I2C1 connector (10-1 pin VPP_I2C1) | 4-22 |
| 13. MEZZNCSI setting (3-pin MEZZNCSI_SEL1) | 4-8 |
| 14. LANNCSI setting (3-pin LANNCSI_SEL1) | 4-7 |
| 15. Micro SD card slot (MSD1) | 4-21 |
| 16. LAN controller setting (3-pin LAN_SW1-2) | 4-5 |
| 17. Baseboard Management Controller setting (3-pin BMC_EN1) | 4-6 |
| 18. VGA controller setting (3-pin VGA_SW1) | 4-5 |
| 19. VGA connector (16-pin VGA_HDR1) | 4-19 |
| 20. Serial port connector (10-1 pin COM1) | 4-21 |
| 21. IPMI SW setting (3-pin IPMI_SW1) | 4-8 |
| 22. Auxiliary panel connector (20-2 pin AUX_PANEL1, 20-pin AUX_PANEL2) | 4-17 |
| 23. Smart Ride Through (SmaRT) setting (3-pin SMART_PSU1) | 4-6 |
| 24. MPCIE_HD connectors (MPCIE_HD1-2) | 4-13 |
| 25. System panel connector (20-1 pin PANEL1) | 4-16 |
| 26. Hard disk activity LED connector (4-pin HDLED1) | 4-13 |
| 27. M.2 (NGFF) card connectors (NGFF1-2) | 4-20 |
| 28. DMLAN setting (3-pin DM_IP_SEL1) | 4-7 |
| 29. Serial ATA connectors (7-pin SATA1-2) | 4-12 |
| 30. Mini-SAS HD connector (ISATA1-2) | 4-12 |
| 31. USB 3.0 connectors (OCUUSB1) | 4-23 |
| 32. TPM connector (14-1 pin TPM1) | 4-15 |

## 4.2    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.



**KNPP-D32 Clear RTC RAM**
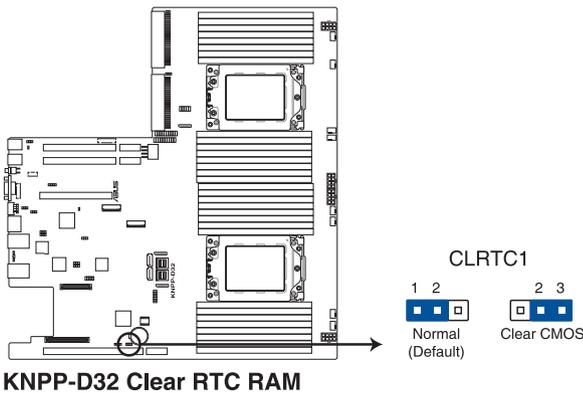
2. **VGA controller setting (3-pin VGA_SW1)**

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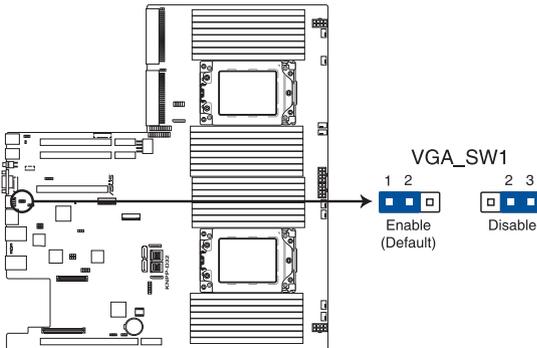


**KNPP-D32 VGA setting**

3. **LAN controller setting (3-pin LAN_SW1-2)**

   These jumpers allow you to enable or disable the onboard Intel® I350-AM2 Gigabit LAN1/2 controller. Set to pins 1–2 to activate the Gigabit LAN feature.
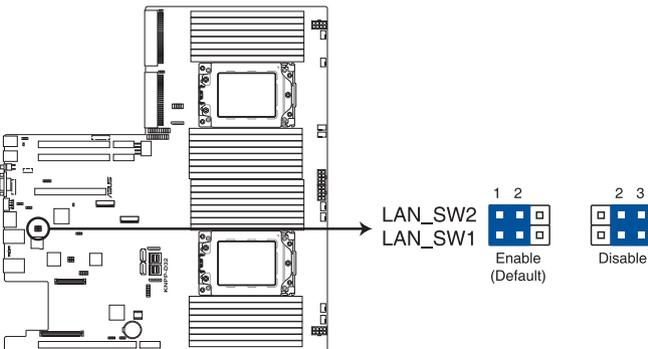


**KNPP-D32 LAN setting**

4. **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.
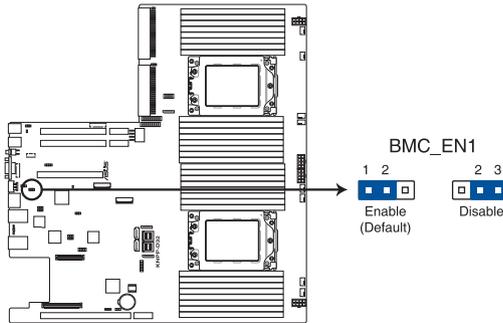


**KNPP-D32 BMC setting**

5. **Smart Ride Through (SmaRT) setting (3-pin SMART_PSU1)**

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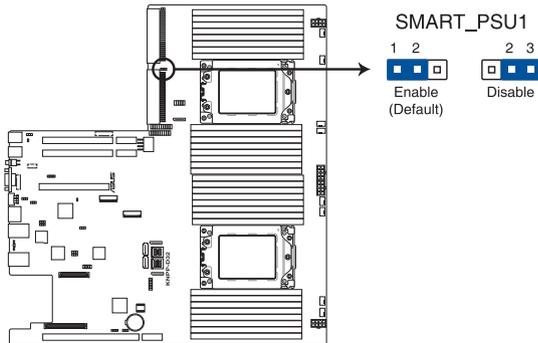


**KNPP-D32 Smart Ride Through setting**

6. **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

Normal
(Default)

2 3

Force DMLAN IP
to static mode
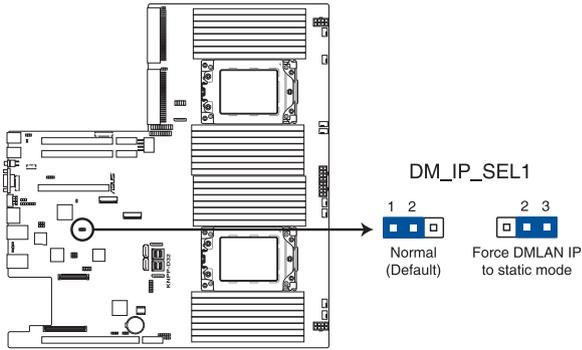
**KNPP-D32 DM_IP_SEL1 setting**

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

This jumper allows you to enable or disable the LAN NCSI.

LANNCSI_SEL1

1 2

Disable

2 3
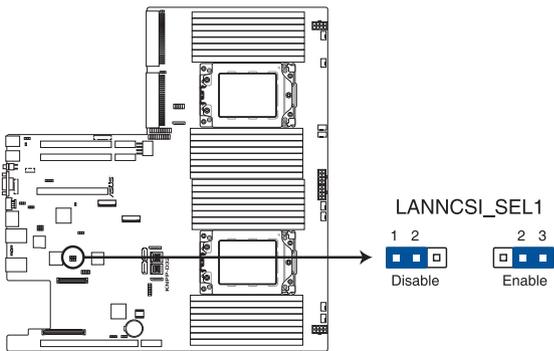
Enable

**KNPP-D32 LANNCSI_SEL1 setting**

8. **MEZZNCSI setting (3-pin MEZZNCSI_SEL1)**

This jumper allows you to enable or disable the MEZZ NCSI.

MEZZNCSI_EN1

1  2          2  3

Disable        Enable
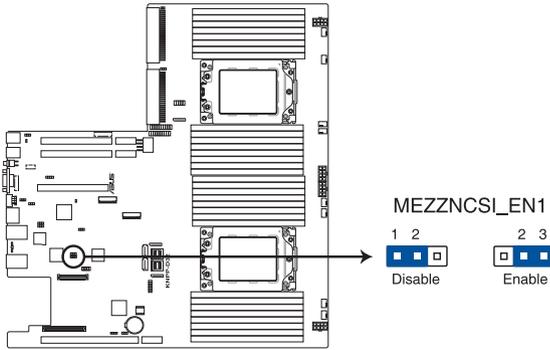
**KNPP-D32 MEZZNCSI_EN1 setting**

9. **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
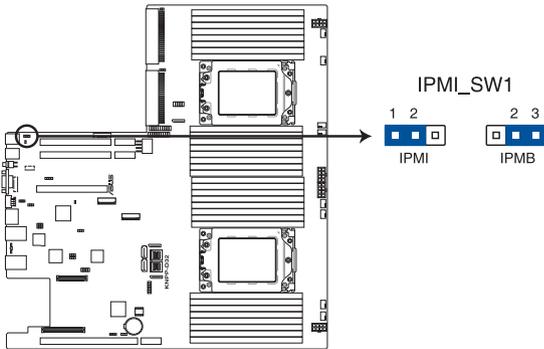
**KNPP-D32 IPMI_SW1 setting**

## 4.3    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.

**KNPP-D32 Standby Power LED**
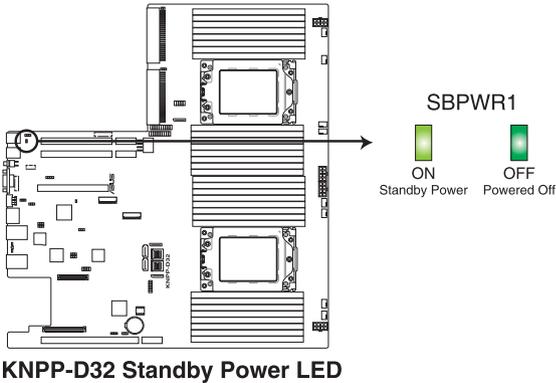
2.    **Location LED (LOCLED1)**

This onboard LED lights up when the Location button on the server is pressed or when triggered by a system management software. The Location LED helps visually locate and quickly identify the server in error on a server rack.

**KNPP-D32 Location LED**
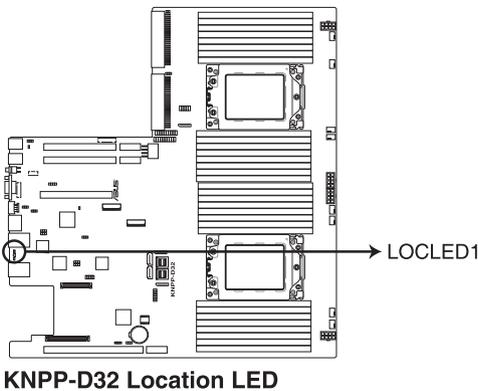
3. **Storage device activity LED (HDDLED1)**

   This LED is reserved for the storage devices connected to the onboard M.2, or SATA/SAS add-on card. The read or write activities of any device connected to the onboard M.2, or SATA/SAS add-on card causes the rear panel LED to light up.
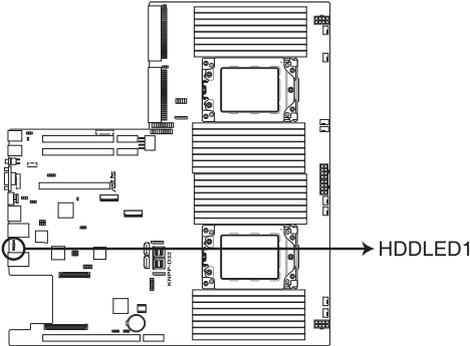


**KNPP-D32 Storage device activity LED**

4. **Message LED (MESLED1)**

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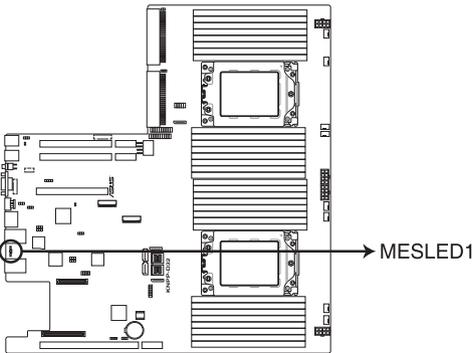


**KNPP-D32 MESLED**

**5. BMC LED (BMCLED1)**

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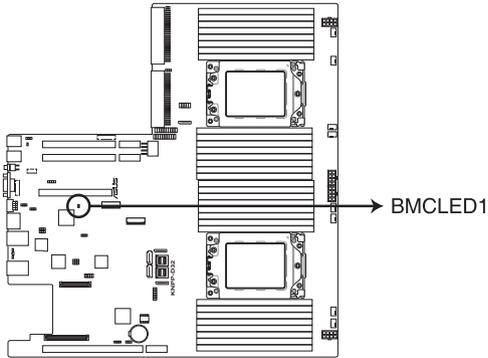


**KNPP-D32 BMC LED**

# 4.4 Internal connectors

1. **Serial ATA connectors (7-pin SATA1-2)**

   These connectors, controlled by AMD integrated SATA controller, are for the Serial ATA signal cables for Serial ATA drives (SATA 1 connector is used for the optical drive by default).

   > If the SATA M.2 (NGFF1) slot is occupied, the SSATA2 slot will be disabled.



   SATA2
   GND
   RSATA_TXP2
   RSATA_TXN2
   GND
   RSATA_RXN2
   RSATA_RXP2
   GND

   SATA1
   GND
   RSATA_TXP1
   RSATA_TXN1
   GND
   RSATA_RXN1
   RSATA_RXP1
   GND
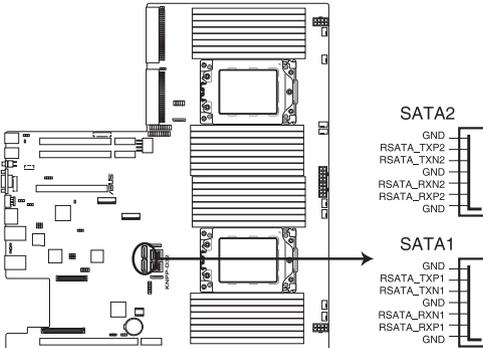
   **KNPP-D32 SATA connectors**

2. **Mini-SAS HD connector (ISATA1-2)**

   This motherboard comes with mini Serial Attached SCSI (SAS) HD connectors, the storage technology that supports Serial ATA. Each connector supports up to four devices.
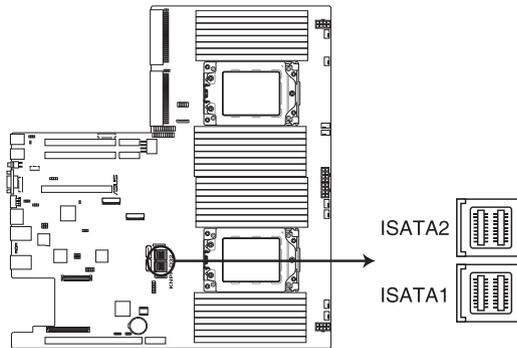


   ISATA2

   ISATA1

   **KNPP-D32 ISATA connectors**

3. **MPCIE_HD connectors (MPCIE_HD1-2)**

   The MPCIE_HD connectors allows you to connect NVME storage device.
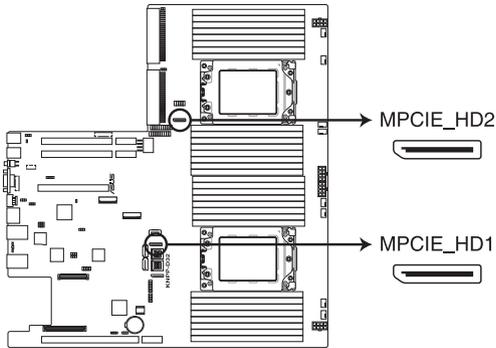


**KNPP-D32 MPCIE_HD1 & MPCIE_HD2**

4. **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.
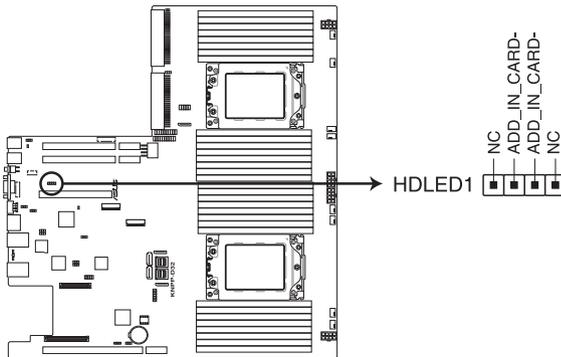


**KNPP-D32 Storage device activity LED connector**

**5. USB 2.0 connector (10-1 pin USB67)**

This connector is for USB 2.0 ports. Connect the USB module cable to the connector, and then install the module to a slot opening at the back of the system chassis. The USB connectors comply with USB 2.0 specification that supports up to 480 Mbps connection speed.
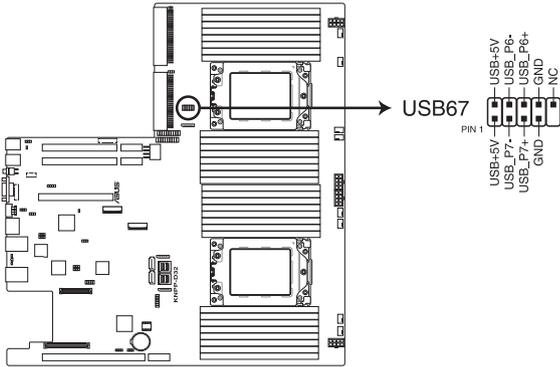


**KNPP-D32 USB 2.0 connector**

The USB port module is purchased separately.

**6. Fan power connectors (FANPWR1-3)**

These connectors are for the power supply plugs that connects to additional fans. 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.
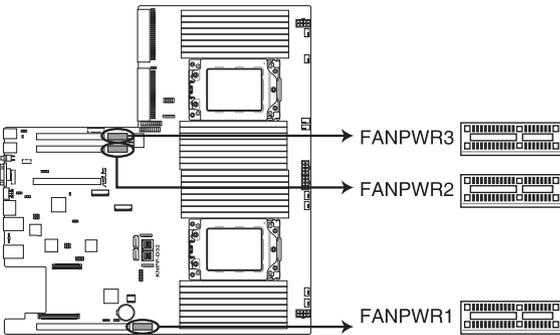


**KNPP-D32 FANPWR**

7.    **System fan connectors (4-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!

**KNPP-D32 FAN connectors**
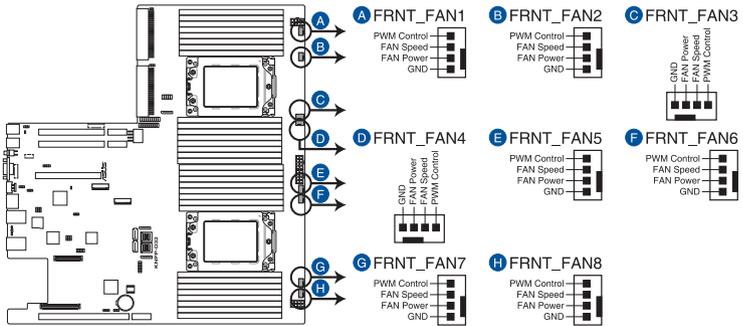
8.    **TPM connector (14-1 pin TPM1)**

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.

**KNPP-D32 TPM connector**
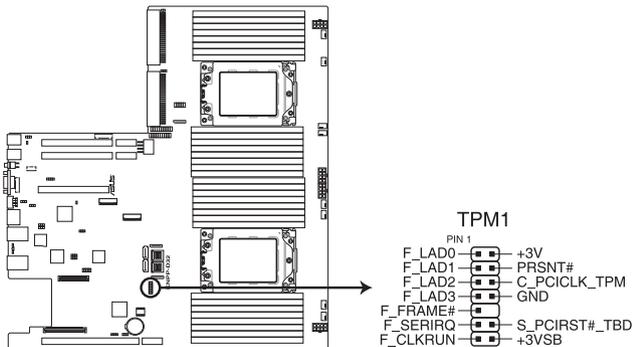
**9.    System panel connector (20-1 pin PANEL1)**

This connector supports several chassis-mounted functions.
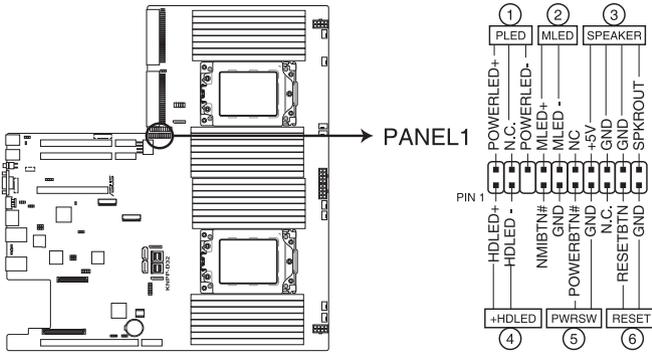


**KNPP-D32 System panel connector**

**1.    System power LED (3-pin PLED)**

This 3-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.

**2.    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.

**3.    System warning speaker (4-pin SPEAKER)**

This 4-pin connector is for the chassis-mounted system warning speaker. The speaker allows you to hear system beeps and warnings.

**4.    Storage device activity LED (2-pin HDLED)**

This 2-pin connector is for the storage device activity LED. Connect the storage device activity LED cable to this connector. The LED lights up or flashes when data is read from or written to the storage device.

**5.    ATX power button/soft-off button (2-pin PWRSW)**

This connector is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the BIOS settings. Pressing the power switch for more than four seconds while the system is ON turns the system OFF.

**6.    Reset button (2-pin RESET)**

This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.

10. **Auxiliary panel connector (20-2 pin AUX_PANEL1, 20-pin AUX_PANEL2)**

This connector is for additional front panel features including front panel SMB, locator LED and switch, chassis intrusion, and LAN LEDs.
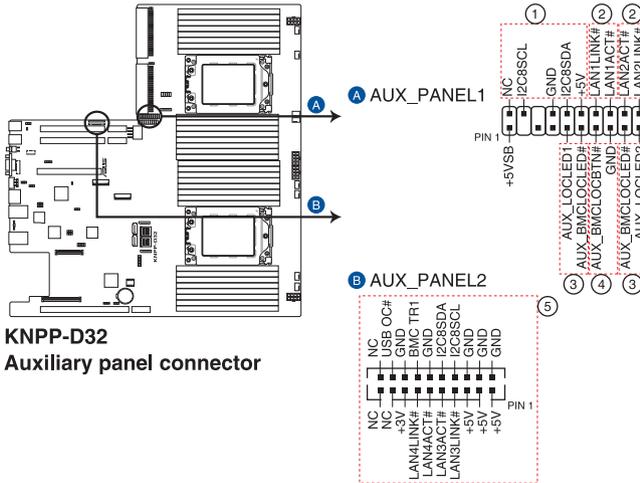


**KNPP-D32**
**Auxiliary panel connector**

1. **Front panel SMB (6-1 pin FPSMB)**

   This 6-1 pin connector is for the front panel SMBus cable.

2. **LAN activity LED (2-pin LAN1_LED, LAN2_LED)**

   This 2-pin connector is for the Gigabit LAN activity LEDs on the front panel.

3. **Locator LED (2-pin LOCATORLED1, 2-pin LOCATORLED2)**

   This 2-pin connector is for the locator LED1 and LED2 on the front panel. Connect the Locator LED cables to these 2-pin connector. The LEDs will light up when the Locator button is pressed.

4. **Locator Button/Switch (2-pin LOCATORBTN)**

   This 2-pin connector is for the locator button on the front panel. This button queries the state of the system locator.

5. **LAN activity LED and USB port (2-pin LAN3_LED, LAN4_LED, USB ports)**

   These 2-pin connectors are for the Gigabit LAN activity LEDs and USB ports on the front panel.

## 11. Back panel power connectors (8-pin BPPWR1-2)

These connectors are for the power supply plugs that connects to the back panel. 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.
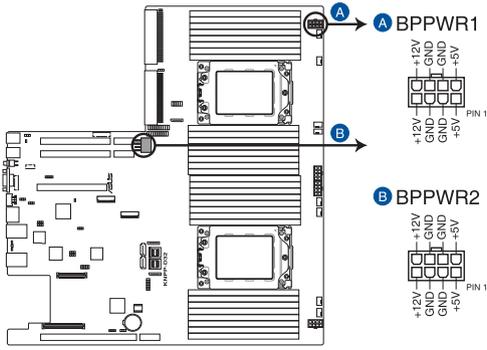


**KNPP-D32 BP power connectors**

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

## 12. VGA power connectors (8-pin VGAPWR1-3)

These connectors are for the power supply plugs that connects to the VGA card. 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.
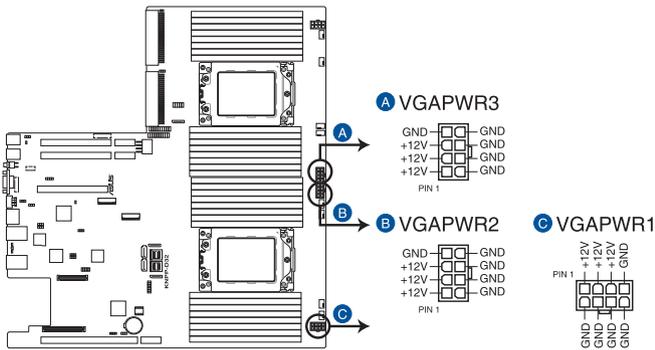


**KNPP-D32 VGA power connectors**

⚠ DO NOT connect the back panel to these connectors. Doing so may cause system boot errors and permanent damage to your motherboard or device.

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

This connector supports the VGA High Dynamic-Range interface.

VGA_HDR1

DDC_CLK
H_SYNC — V_SYNC
— DDC_DATA
+5V — GND
GND — GND
GND — GND
Blue
Red — Green

PIN 1
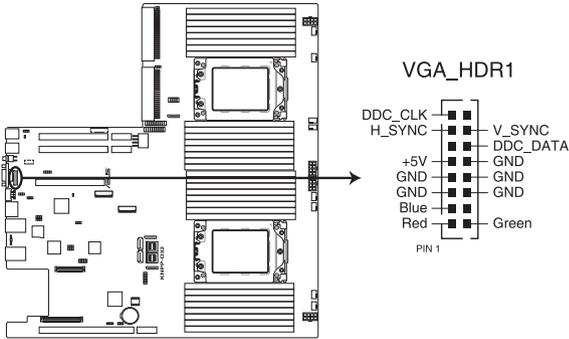
KNPP-D32 Internal VGA connector

14. **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.

INTRUSION1

CHASSIS#
GND

PIN 1
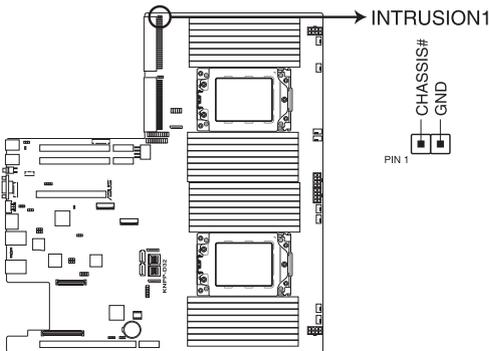
KNPP-D32 Chassis Intrusion connector

**15. Mezzanine PCIE card connectors (MEZZPCIE1-2)**

The MEZZPCIE1-2 connector supports Open Compute Project (OCP) cards.



**A** MEZZPCIE2
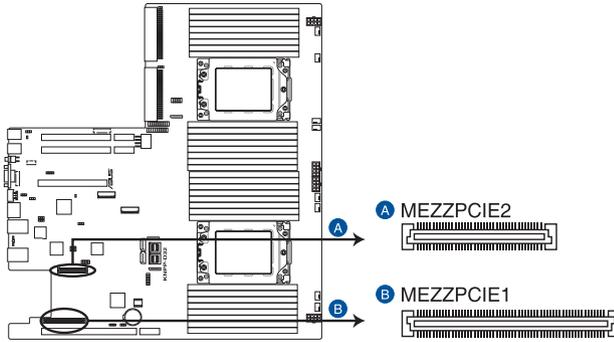
**B** MEZZPCIE1

**KNPP-D32 MEZZPCIE connectors**

**16. M.2 (NGFF) card connectors (NGFF1-2)**

These connectors allow you to install M.2 devices.



**A** NGFF1

**B** NGFF2
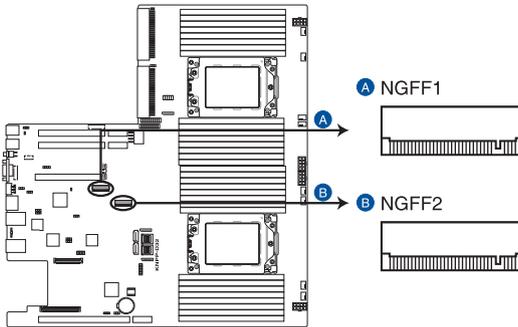
**KNPP-D32 NGFF connectors**

- This connector supports type 2242 / 2260 / 2280 / 22110 devices on both PCI-E and SATA interface.
- If the SATA M.2 (NGFF1) slot is occupied, the SSATA2 slot will be disabled.

The M.2 (NGFF) device is purchased separately.

17. **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.
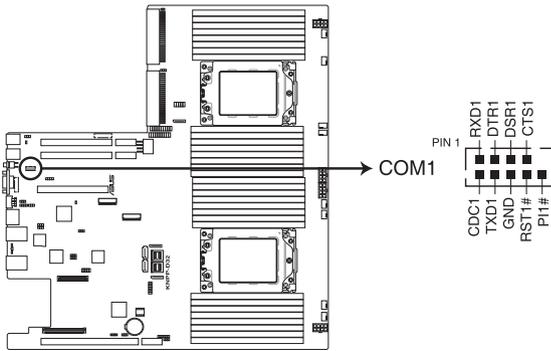


**KNPP-D32 Serial port connector**

> The COM module is purchased separately.

18. **Micro SD card slot (MSD1)**

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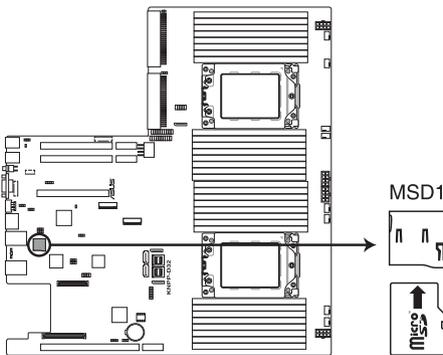


**KNPP-D32 MSD1**

> 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.

**19.    OCP LAN Activity LED connector (4-1 pin OCP_LED1)**

OCP LAN LED connector supports OCP LAN card Active LED.



**KNPP-D32 OCP_LED1 connector**
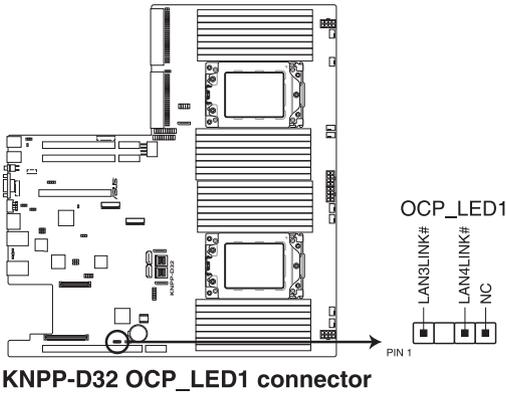
**20.    VPP_I2C1 connector (10-1 pin VPP_I2C1)**

This connector is used for the Intel VMD function and sensor readings.



**KNPP-D32 VPP_I2C1 connector**
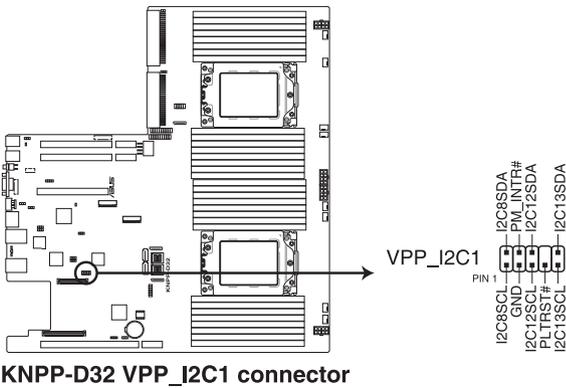
**21. USB 3.0 connectors (OCUUSB1)**

Connect a compatible USB module cable to the OCUUSB1 connector, and then install the module to a slot opening at the back or front of the system chassis. You can enjoy all the benefits of USB 3.0 including faster data transfer speeds of up to 5 Gbps, faster charging time for USB-chargeable devices, optimized power efficiency, and backward compatibility with USB 2.0. (OCUUSB1 connector is used for the front USB panel by default).
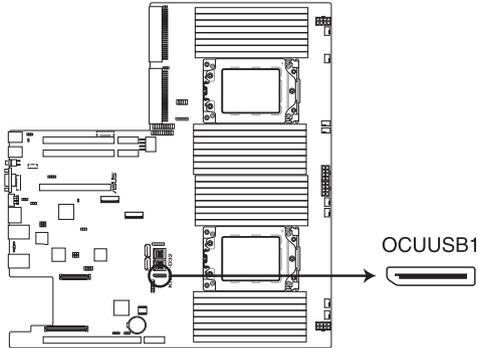
OCUUSB1

**KNPP-D32 OCUUSB1**

The USB port module is purchased separately.

# BIOS Setup

5

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

# 5.1 Managing and updating your BIOS

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

1. **ASUS CrashFree BIOS 3**

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

2. **ASUS EzFlash**

    Updates the BIOS using a USB flash disk.

3. **BUPDATER**

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

Refer to the corresponding sections for details on these utilities.

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

## 5.1.1 ASUS CrashFree BIOS 3 utility

The ASUS CrashFree BIOS 3 is an 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.

## 5.1.2    ASUS EZ Flash Utility

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

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

To update the BIOS using EZ Flash Utility:

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

2.    Enter the BIOS setup program. Go to the **Tool** menu then select **ASUS EZ Flash Utility**. Press <Enter>.

```
                         ASUS Tek. EzFlash Utility




         Current Platform                              New Platform
Platform   : KNPP-D32                      Platform   : KNPP-D32
Version    : 0215                          Version    : 0217
Build date: 01/13/2017                     Build date: 02/20/2017


FS0
FS1



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

3.    Press <Tab> to switch to the **Drive** field.

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

5.    Press <Tab> to switch to the **Folder Info** field.

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

### 5.1.3 BUPDATER utility

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

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

**Updating the BIOS file**

To update the BIOS file using the BUPDATER utility:

1. Visit the ASUS website at www.asus.com and download the latest BIOS file for the motherboard. Save the BIOS file to a bootable USB flash disk drive.

2. Copy the BUPDATER utility (BUPDATER.exe) from the ASUS support website at www.asus.com/support to the bootable USB flash disk drive you created earlier.

3. Boot the system in DOS mode, then at the prompt, type:

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

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

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

4.    The utility verifies the file, then starts updating the BIOS file.
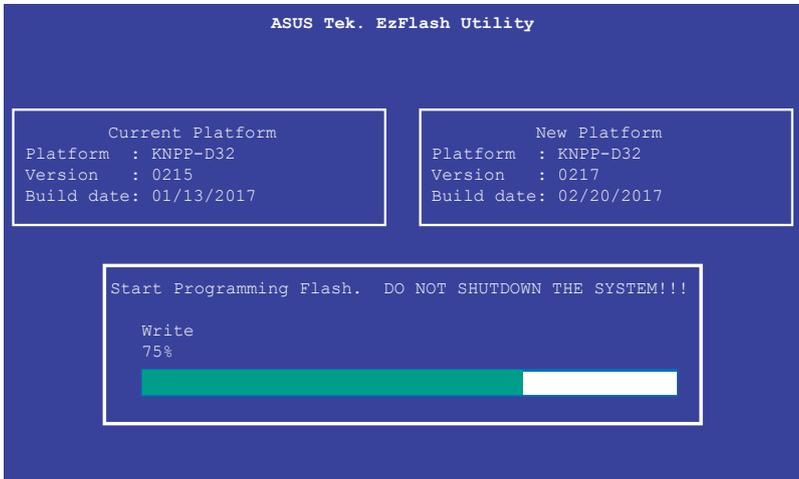
```
                        ASUS Tek. EzFlash Utility



         Current Platform                           New Platform
 Platform  : KNPP-D32                    Platform  : KNPP-D32
 Version   : 0215                        Version   : 0217
 Build date: 01/13/2017                  Build date: 02/20/2017



       Start Programming Flash.   DO NOT  SHUTDOWN  THE SYSTEM!!!

          Write
          75%

```

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

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

```
   The BIOS update is finished! Please restart your system.

   C:\>
```
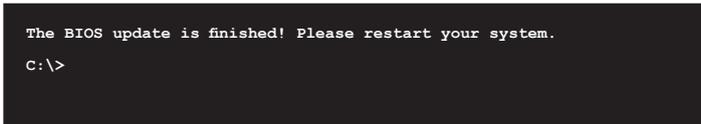
## 5.2 BIOS setup program

This motherboard supports a programmable firmware chip that you can update using the provided utility described in section **5.1 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.

## 5.2.1 BIOS menu screen

Menu items       Menu bar       Configuration fields       General help

```
                Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
   Main   Advanced  Chipset  Security  Boot  Tool  Save & Exit  AMD CBS  Event Logs  Server Mgmt

   BIOS Information                                            Set the Date. Use Tab to
   BIOS Vendor                         American Megatrends     switch between Date elements.
   Core Version                        5.13                    Default Ranges:
   Compliancy                          UEFI 2.6; PI 1.4        Year: 2005-2099
   Project Version                     0204 x64                Months: 1-12
   Build Date                          06/30/2017              Days: dependent on month

   Memory Information
   Total Memory                        16384 MB
   Memory Frequency                    1067 MT/s

   System Date                         [Sun 10/09/2016]
   System Time                         [23:26:51]
                                                              →←: Select Screen
   Access Level                        Administrator          ↑↓: Select Item
                                                              Enter: Select
                                                              +/-: Change Opt.
   INTEL LAN1 MAC:                     08:62:66:A0:64:D2       F1: General Help
   INTEL LAN2 MAC:                     08:62:66:A0:64:D3       F2: Previous Values
                                                              F5: Optimized Defaults
                                                              F10: Save Changes & Reset
                                                              F12: Print Screen
                                                              ESC: Exit


                Version 2.18.1264. Copyright (C) 2017 American Megatrends, Inc.
```

Navigation keys

## 5.2.2 Menu bar

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

| | |
|---|---|
| **Main** | For changing the basic system configuration |
| **Advanced** | For changing the advanced system settings |
| **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 |
| **Save & Exit** | For selecting the exit options |
| **AMD CBS** | For configuring AMD CBS settings |
| **Event Logs** | For changing the event log settings |
| **Server Mgmt** | For changing the Server Mgmt settings |

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

### 5.2.3    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.

### 5.2.4    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>.

### 5.2.5    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.

### 5.2.6    General help

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

### 5.2.7    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.

### 5.2.8    Pop-up window

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

### 5.2.9    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.

## 5.3    Main menu

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

```
            Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
    Main  Advanced  Chipset  Security  Boot  Tool  Save & Exit  AMD CBS  Event Logs  Server Mgmt

    BIOS Information                                         Set the Date. Use Tab to
    BIOS Vendor              American Megatrends             switch between Date elements.
    Core Version             5.13                            Default Ranges:
    Compliancy               UEFI 2.6; PI 1.4                Year: 2005-2099
    Project Version          0204 x64                        Months: 1-12
    Build Date               06/30/2017                      Days: dependent on month

    Memory Information
    Total Memory             16384 MB
    Memory Frequency         1067 MT/s

    System Date              [Sun 10/09/2016]
    System Time              [23:26:51]
                                                            →←: Select Screen
    Access Level             Administrator                  ↑↓: Select Item
                                                            Enter: Select
                                                            +/-: Change Opt.
    INTEL LAN1 MAC:          08:62:66:A0:64:D2              F1: General Help
    INTEL LAN2 MAC:          08:62:66:A0:64:D3              F2: Previous Values
                                                            F5: Optimized Defaults
                                                            F10: Save Changes & Reset
                                                            F12: Print Screen
                                                            ESC: Exit


            Version 2.18.1264. Copyright (C) 2017 American Megatrends, Inc.
```

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

Allows you to set the system date.

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

Allows you to set the system time.

## 5.4    Advanced menu

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

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

```
              Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
   Main   Advanced  Chipset  Security  Boot  Tool  Save & Exit  AMD CBS  Event Logs  Server Mgmt

▶ Trusted Computing                                         Trusted Computing Settings
▶ PSP Firmware Versions
▶ APM
▶ SMART Settings
▶ NCT6793D Super IO Configuration
▶ Onboard LAN Configuration
▶ Serial Port Console Redirection
▶ CPU Configuration
▶ PCI Subsystem Settings
▶ Network Stack Configuration
▶ CSM Configuration
▶ NVMe Configuration
▶ SATA Configuration
▶ USB Configuration                                         ➜←: Select Screen
                                                            ↑↓: Select Item
▶ iSCSI Configuration                                       Enter: Select
                                                            +/-: Change Opt.
                                                            F1: General Help
                                                            F2: Previous Values
                                                            F5: Optimized Defaults
                                                            F10: Save Changes & Reset
                                                            F12: Print Screen
                                                            ESC: Exit


              Version 2.18.1264. Copyright (C) 2017 American Megatrends, Inc.
```

## 5.4.1　Trusted Computing

```
             Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
    Advanced

 Configuration                                        Enables or Disables BIOS
   Security Device Support          [Disable]         support for security device.
   NO Security Device Found                           O.S. will not show Security
                                                      Device. TCG EFI protocol and
                                                      INT1A interface will not be
                                                      available.
```

### Configuration

### Security Device Support [Disabled]

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

## 5.4.2　PSP Firmware Versions

This page displays the PSP firmware versions.

```
             Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
    Advanced

  PSP Firmware Versions

  PSP Directory Level 1 (Fixed)
  PSP Recovery BL Ver              FF.7.0.41
  SMU FW Version                   4.25.84.0
  ABL Version                      17052214
  APCB Version                     0028
  APOB Version                     000E
  APPB Version                     0001

  PSP Directory Level 2 (Updateable)
  PSP BootLoader Version           0.7.0.43
  SMU FW Version                   4.25.84.0
  ABL Version                      17052214           →←: Select Screen
  APCB Version                     0028               ↑↓: Select Item
  APOB Version                     000E               Enter: Select
  APPB Version                     0001               +/-: Change Opt.
                                                      F1: General Help
                                                      F2: Previous Values
                                                      F5: Optimized Defaults
                                                      F10: Save Changes & Reset
                                                      F12: Print Screen
                                                      ESC: Exit


             Version 2.18.1264. Copyright (C) 2017 American Megatrends, Inc.
```

## 5.4.3 APM

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

```
                 Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
        Advanced

 Restore AC Power Loss              [Last State]          Specify what state to go to
 Power On By PCIE                   [Disabled]            when power is re-applied after
 Power On By RTC                    [Disabled]            a power failure (G3 state).
```
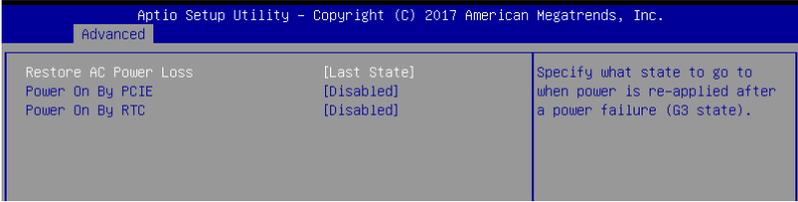
### Restore AC Power Loss [Last State]

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

### Power On By PCIE [Disabled]

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

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

### Power On By RTC [Disabled]

[Disabled]        Disables RTC to generate a wake event.

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

## 5.4.4    Smart Settings

Advanced

SMART Settings

SMART Self Test                    [Disabled]

Run SMART Self Test on all
HDDs during POST.

**SMART Self Test [Disabled]**

Allows you to run SMART Self Test on all HDDs during POST.
Configuration options: [Disabled] [Enabled]

## 5.4.5    NCT6793D Super IO Configuration

Advanced

NCT6793D Super IO Configuration

Super IO Chip                      NCT6793D
▶ Serial Port 1 Configuration

Set Parameters of Serial Port
1 (COMA)
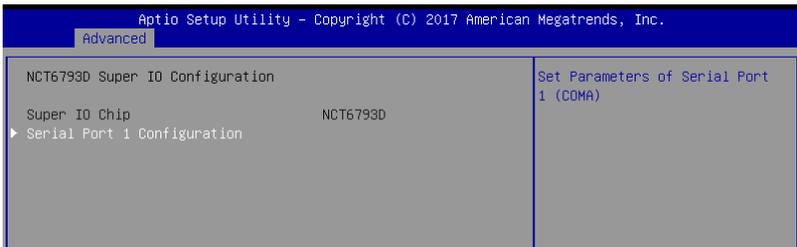
**Serial Port 1 Configuration**

Allows you to set the parameters of Serial Port 1.

**Serial Port [Enabled]**

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

## 5.4.6    Onboard LAN Configuration

```
                    Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
            Advanced

  Onboard LAN Configuration                                          Intel LAN Enable/Disable

  INTEL LAN1 MAC:                   08:62:66:A0:64:D2
  INTEL LAN2 MAC:                   08:62:66:A0:64:D3
  Intel LAN1 Enable                 [Enabled]
  Intel LAN1 ROM Type               [PXE]
  Intel LAN2 Enable                 [Enabled]
  Intel LAN2 ROM Type               [Disabled]
```

### Intel LAN1 Enable [Enabled]

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

> The following items appear only when **Intel LAN1 Enable** is set to **[Enabled]**.

#### Intel LAN 1 ROM Type [PXE]

Allows you to select the Intel LAN ROM type.
Configuration options: [PXE] [iSCSI] [Disabled]

### Intel LAN2 Enable [Enabled]

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

> The following items appear only when **Intel LAN2 Enable** is set to **[Enabled]**.

#### Intel LAN 2 ROM Type [Disabled]

Allows you to select the Intel LAN ROM type.
Configuration options: [PXE] [iSCSI] [Disabled]

## 5.4.7 Serial Port Console Redirection

```
                Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
        Advanced

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

   COM2
   Console Redirection            [Disabled]
 ▶ Console Redirection Settings

   Legacy Console Redirection
 ▶ Legacy Console Redirection Settings

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

**COM1/COM2**

**Console Redirection [Disabled]**

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

> The following item appears only when you set **Console Redirection** 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 [VT-UTF8]**

> Allows you to set the terminal type.
> [VT100]          ASCII char set.
> [VT100+]         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 [57600]**

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

**Data Bits [8]**

> Configuration options: [7] [8]

**Parity [None]**

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

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

**Stop Bits [1]**

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

**Flow Control [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]

**Legacy OS Redirection Resolution [80x24]**

This allows you to set the number of rows and columns supported on the Legacy OS.
Configuration options: [80x24] [80x25]

**Putty Keypad [VT100]**

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

**Redirection After BIOS POST [Always Enable]**

This setting allows you to specify if Bootloader is selected than Legacy console
redirection.
Configuration options: [Always Enable] [Bootloader]

**Legacy Console Redirection Settings**

**Legacy Console Redirection Port [COM1]**

Allows you to select a COM port to display redirection of Legacy OS and Legacy OPROM
Messages.
Configuration options: [COM1] [COM2]

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

### Console Redirection [Disabled]

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

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

**Console Redirection Settings**

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

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

### Terminal Type [VT-UTF8]

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

### Bits per second [115200]

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

### Flow Control [None]

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

## 5.4.8    CPU Configuration

This page displays the CPU node information.

```
              Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
        Advanced

    CPU Configuration                                View Memory Information
                                                     related to Node 0

  ▶ Node 0 Information
  ▶ Node 1 Information
```

### 5.4.9 PCI Subsystem Settings

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

```
                    Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
          Advanced

     PCI Bus Driver Version              A5.01.12                    Enables or Disables VGA
                                                                     Palette Registers Snooping.
     PCI Devices Common Settings:
     VGA Palette Snoop                   [Disabled]
     VGA Priority                        [Offboard Device]
     Load RT32 Image                     [Disabled]
     Above 4G Decoding                   [Disabled]
     SR-IOV Support                      [Disabled]
```
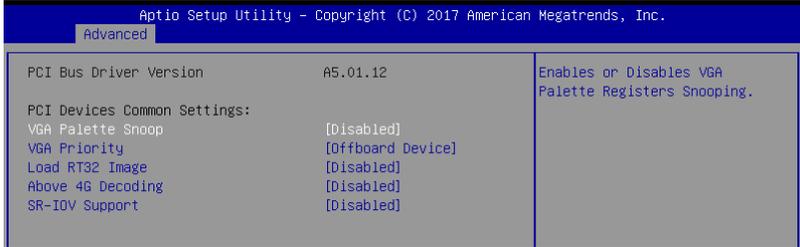
#### VGA Palette Snoop [Disabled]

This option enables or disables VGA Palette Registers Snooping.
Configuration options: [Disabled] [Enabled]

#### VGA Priority [Offboard Device]

This option allows you to select the priority of the VGA.
Configuration options: [Offboard Device] [Onboard Device]

#### Load RT32 Image [Disabled]

This option enables or disables RT32 Image Loading.
Configuration options: [Disabled] [Enabled]

#### Above 4G Decoding [Disabled]

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

#### SR-IOV Support [Disabled]

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

## 5.4.10    Network Stack Configuration

```
                    Aptio Setup Utility — Copyright (C) 2017 American Megatrends, Inc.
        Advanced

  Network Stack                        [Disabled]                Enable/Disable UEFI Network
                                                                 Stack
```

**Network stack [Disabled]**

Enables or disables the network stack feature.
Configuration options: [Disable] [Enable]

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]**

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

**Media detect time [1]**

Wait time (in seconds) to detect media.

## 5.4.11 CSM Configuration

```
                 Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
        Advanced

  Compatibility Support Module Configuration                  Enable/Disable CSM Support.

  CSM Support                         [Enabled]

  CSM16 Module Version                07.80

  GateA20 Active                      [Upon Request]
  Option ROM Messages                 [Force BIOS]
  INT19 Trap Response                 [Immediate]

  Boot option filter                  [Legacy only]

  Option ROM execution
                                                             ↔: Select Screen
  Network                             [Legacy]              ↑↓: Select Item
  Storage                             [Legacy]              Enter: Select
  Video                               [Legacy]              +/-: Change Opt.
  Other PCI devices                   [Legacy]              F1: General Help
                                                             F2: Previous Values
```

### CSM Support [Enabled]

This option allows you to enable or disable CSM Support.
Configuration options: [Disabled] [Enabled]

> ✎ The following item appears only when **CSM Support** is set to **[Enabled]**.

### GateA20 Active [Upon Request]

This allows you to set the GA20 option.
Configuration options: [Upon Request] [Always]

### Option ROM Messages [Force BIOS]

This allows you to set the display mode for option ROM.
Configuration options: [Force BIOS] [Keep Current]

### INT19 Trap Response [Immediate]

[Immediate]          Execute the trap right away.
[Postponed]          Execute the trap during legacy boot.

### Boot Option filter [Legacy only]

This option allows you to control the Legacy/UEFI ROMs priority.
Configuration options: [UEFI and Legacy] [Legacy only] [UEFI only]

### Network / Storage / Video [Legacy]

This option allows you to control the execution of UEFI and Legacy PXE / Storage /
Video OpROM.
Configuration options: [UEFI] [Legacy]

### Other PCI devices [Legacy]

This item determines the OpROM execution policy for devices other than Network,
Storage, or Video.
Configuration options: [UEFI] [Legacy]

## 5.4.12    NVMe Configuration

This page will display the NVMe controller and drive information.

```
                    Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
       Advanced

 NVMe controller and Drive information

 No NVME Device Found
```

## 5.4.13    SATA Configuration

This page will display the SATA controller and drive information.

```
                    Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
       Advanced

 SATA Configuration                                              ▲

 SATA Controller (S:00 B:03 D:00 F:02)
 ISATA1 Port1                         Not Present

 ISATA1 Port2                         Not Present

 ISATA1 Port3                         Not Present

 ISATA1 Port4                         Not Present

 ISATA2 Port1                         Not Present

 ISATA2 Port2                         Not Present        ↔: Select Screen
                                                         ↑↓: Select Item
 ISATA2 Port3                         Not Present        Enter: Select
                                                         +/-: Change Opt.
 ISATA2 Port4                         Not Present        F1: General Help
                                                         F2: Previous Values
 SATA Controller (S:00 B:14 D:00 F:02)                   F5: Optimized Defaults
 SATA1                       HL-DT-ST DVDRAM GUE1N...     F10: Save Changes & Reset
                                                         F12: Print Screen
 SATA2                                Not Present   ▼     ESC: Exit


                    Version 2.18.1264. Copyright (C) 2017 American Megatrends, Inc.
```

## 5.4.14    USB Configuration

```
           Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
     Advanced

 USB Configuration                                    ▲  Enables Legacy USB support.
                                                         AUTO option disables legacy
 USB Module Version                 19                   support if no USB devices are
                                                         connected. DISABLE option will
 USB Controllers:                                        keep USB devices available
     4 XHCIs                                             only for EFI applications.
 USB Devices:
     5 Drives, 2 Keyboards, 1 Mouse, 1 Hub

 Legacy USB Support                 [Enabled]
 XHCI Hand-off                      [Enabled]
 USB Mass Storage Driver Support    [Enabled]
 Port 60/64 Emulation               [Enabled]
                                                      →←: Select Screen
 USB hardware delays and time-outs:                   ↑↓: Select Item
 USB transfer time-out              [20 sec]          Enter: Select
 Device reset time-out              [20 sec]          +/-: Change Opt.
 Device power-up delay              [Auto]            F1: General Help
                                                      F2: Previous Values
 Mass Storage Devices:                                F5: Optimized Defaults
 JetFlashTranscend 4GB 8.07         [Auto]            F10: Save Changes & Reset
 AMI Virtual CDROM0 1.00            [Auto]            F12: Print Screen
 AMI Virtual Floppy0 1.00           [Auto]            ESC: Exit
 AMI Virtual HDisk0 1.00            [Auto]
 AMI Virtual HDisk1 1.00            [Auto]         ▼

           Version 2.18.1264. Copyright (C) 2017 American Megatrends, Inc.
```

### Legacy USB Support [Enabled]

Allows you to enable or disable Legacy USB device support.
Configuration options: [Enabled] [Disabled] [Auto]

### XHCI Hand-off [Enabled]

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

### USB Mass Storage Driver Support [Enabled]

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

### Port 60/64 Emulation [Enabled]

Allows you to enable or disable I/O port 60h/64h emulation support. This should be enabled
for the complete keyboard legacy support for non-USB aware OSes.
Configuration options: [Disabled] [Enabled]

**USB hardware delays and time-outs**

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

Allows you to select time-out value for Control, Bulk, and Interrupt transfers.
Configuration options: [1 sec] [5 sec] [10 sec] [20 sec]

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

Allows you to select time-out value for USB mass storage device Start Unit command.
Configuration options: [10 sec] [20 sec] [30 sec] [40 sec]

**Device power-up delay [Auto]**

Allows you to select maximum time the device will take before it properly reports itself to the Host Controller.
Configuration options: [Auto] [Manual]

**Mass Storage Devices**

**AMI Virtual CDROM0-2 / Floppy / HDisk0 1.00 [Auto]**

Allows you to select the mass storage device emulation type.
Configuration options: [Auto] [Floppy] [Forced FDD] [Hard Disk] [CD-ROM]

## 5.4.15    iSCSI Configuration

Allows you to configure the iSCSi parameters.

```
              Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
       Advanced

   iSCSI Initiator Name                              The worldwide unique name of
                                                     iSCSI Initiator. Only IQN
 ▶ Add an Attempt                                    format is accepted. Range is
                                                     from 4 to 223
 ▶ Delete Attempts

 ▶ Change Attempt Order
```
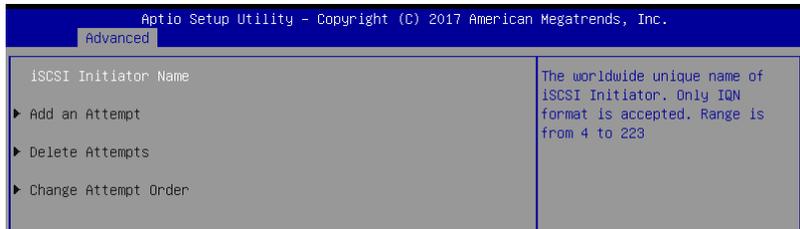
## 5.5    Chipset menu

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

```
              Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
      Main  Advanced  Chipset  Security  Boot  Tool  Save & Exit  AMD CBS  Event Logs  Server Mgmt

    SMT Mode                              [Auto]                    Simultaneous multithreading.
  ▶ North Bridge                                                    OFF=1T single-thread Auto=2T
                                                                    two-thread if capable.
```
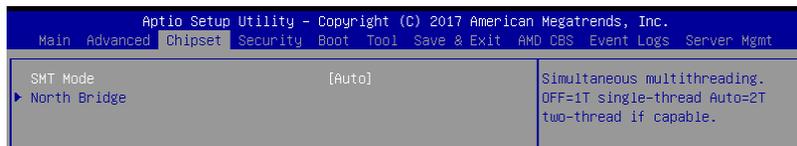
### SMT Mode [Auto]

Allows you to select the simultaneous multithreading mode.
Configuration options: [Auto] [Off]


### North Bridge

### Memory Configuration

**Memory Clock [Auto]**

> This option allows you to select different memory clock values.
> Configuration options: [Auto] [1333MHz] [1600MHz] [1866MHz] [2133MHz] [2400MHz]

**Socket 0 Information**

> This item displays the memory information on Socket 0.

**Socket 1 Information**

> This item displays the memory information on Socket 1.

## 5.6 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 Utility - Copyright (C) 2017 American Megatrends, Inc.
    Main  Advanced  Chipset  Security  Boot  Tool  Save & Exit  AMD CBS  Event Logs  Server Mgmt

    Password Description                                    Set Administrator Password

    If ONLY the Administrator's password is set,
    then this only limits access to Setup and is
    only asked for when entering Setup.
    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:
    Minimum length                      3
    Maximum length                      20                ⟷: Select Screen
                                                          ↑↓: Select Item
                                                          Enter: Select
    Administrator Password                                +/-: Change Opt.
    User Password                                         F1: General Help
                                                          F2: Previous Values
  ▶ Secure Boot                                           F5: Optimized Defaults
                                                          F10: Save Changes & Reset
                                                          F12: Print Screen
                                                          ESC: Exit
```

**Administrator Password**

To set an administrator password:

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

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

3.    Confirm the password when prompted.

To change an administrator password:

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

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

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

4.    Confirm the password when prompted.

---

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

---

## User Password

To set a user password:

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

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

3. Confirm the password when prompted.

To change a user password:

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

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

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

4. Confirm the password when prompted.

To clear a user password:

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

2. Select **Yes** from the Warning message window then press <Enter>.

## Secure Boot

This item allows you to customize the Secure Boot settings.
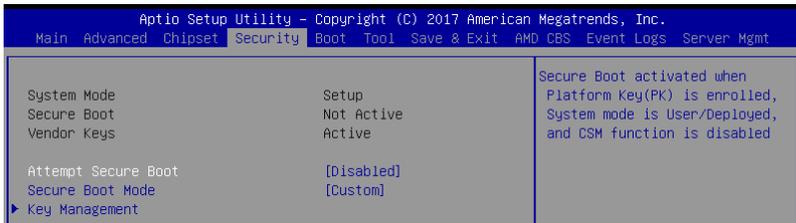


**Attempt Secure Boot [Disabled]**

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

**Secure Boot Mode [Custom]**

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

**Key Management**

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

```
            Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
    Main  Advanced  Chipset  Security  Boot  Tool  Save & Exit  AMD CBS  Event Logs  Server Mgmt

   Provision Factory Defaults        [Disabled]            Allow to provision factory
                                                           default Secure Boot keys when
 ▶ Install Factory Default keys                            System is in Setup Mode
 ▶ Enroll Efi Image
 ▶ Save all Secure Boot variables

   Secure Boot variable |  Size| Keys#| Key Source
 ▶ Platform Key(PK)     |    0|     0| No Key
 ▶ Key Exchange Keys    |    0|     0| No Key
 ▶ Authorized Signatures|    0|     0| No Key
 ▶ Forbidden  Signatures|    0|     0| No Key
 ▶ Authorized TimeStamps|    0|     0| No Key
 ▶ OsRecovery Signatures|    0|     0| No Key
                                                           ↔: 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

            Version 2.19.1266. Copyright (C) 2017 American Megatrends, Inc.
```

**Provision Factory Defaults [Disabled]**

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

**Install Factory Default keys**

This item will install all Factory Default keys.

**Enroll Efi Image**

This item will allow the image to run in Secure Boot mode.

**Save All Secure Boot Variables**

This item will ask you if you want to save all secure boot variables. Select Yes if you want to save all secure boot variables, otherwise select No.

**Platform Key (PK) / Key Exchange Key (KEK) / Authorized Signatures (DB) / Forbidden Signatures (DBX) / Authorized TimeStamps (DBT) / OsRecovery Signatures**

Configuration options: [Erase] [Set New] [Save to File]

# 5.7    Boot menu

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

```
                Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
        Main   Advanced   Chipset   Security   Boot   Tool   Save & Exit   AMD CBS   Event Logs   Server Mgmt

      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.
        POST Report                      [5 sec]

      Chassis Intrusion Message          [Warning]

      Boot Option Priorities
      Boot Option #1                     [P0: HL-DT-ST DVDRAM...]
      Boot Option #2                     [JetFlashTranscend 4...]
      Boot Option #3                     [IBA GE Slot 0100 v1578]

      Network Device BBS Priorities                                   →←: Select Screen
      CD/DVD ROM Drive BBS Priorities                                 ↑↓: Select Item
      Hard Drive BBS Priorities                                       Enter: Select
                                                                      +/-: Change Opt.
```

## Setup Prompt Timeout [1]

Allows you to set the number of seconds to wait for setup activation key.

## Bootup NumLock State [On]

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

## Boot Logo Display [Auto]

Allows you to enable or disable the full screen logo display feature.
Configuration options: [Auto] [Full Screen] [Disabled]

### POST Report [5 sec]

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

## Chassis Intrusion Message [Warning]

Allows you to select the action to perform when chassis intrusion has occurred.
Configuration options: [Warning] [Halt]

## 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.

**Floppy Drive BBS Priorities / Hard Drive BBS Priorities / CD/DVD ROM Drive BBS Priorities**

These items appear only when you connect Floppy / SATA ODD or HDD to the SATA ports and allow you to set the booting order of the SATA devices.

# 5.8    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 Utility – Copyright (C) 2017 American Megatrends, Inc.
    Main  Advanced  Chipset  Security  Boot  Tool  Save & Exit  AMD CBS  Event Logs  Server Mgmt

                                                                IPMI HWM
       IPMI HWM
       Start EzFlash
```

**IPMI HWM**

Allows you to run the IPMI hardware monitor.

**Start EZ Flash**

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

# 5.9    Save & Exit menu

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

```
              Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
    Main  Advanced  Chipset  Security  Boot  Tool  Save & Exit  AMD CBS  Event Logs  Server Mgmt

    Save Changes and Exit                                       Exit system setup after saving
    Discard Changes and Exit                                    the changes.
    Save Changes and Reset
    Discard Changes and Reset

    Save Options
    Save Changes
    Discard Changes

    Restore Defaults
    Save as User Defaults
    Restore User Defaults

    Boot Override                                               ↔: Select Screen
    IBA GE Slot 0100 v1578                                      ↑↓: Select Item
    P0: HL-DT-ST DVDRAM GUE1N                                   Enter: Select
    AMI Virtual CDROM0 1.00                                     +/-: Change Opt.
    JetFlashTranscend 4GB 8.07                                  F1: General Help
    AMI Virtual HDisk0 1.00                                     F2: Previous Values
    AMI Virtual HDisk1 1.00                                     F5: Optimized Defaults
    AMI Virtual Floppy0 1.00                                    F10: Save Changes & Reset
                                                                F12: Print Screen
                                                                ESC: Exit
    Launch EFI Shell from filesystem device
```

**Save Changes and Exit**

Exit system setup after saving the changes.

**Discard Changes and Exit**

Exit system setup without saving any changes.

**Save Changes and Reset**

Rest system setup after saving the changes.

**Discard Changes and Rest**

Rest system setup without saving any changes.

**Restore Defaults**

Restore/load default values for all the setup options.

**Save as User Defaults**

Save all the current setup options as user default values.

**Restore as User Defaults**

Restore/load user 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.

# 5.10 AMD CBS menu

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

```
                Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
    Main  Advanced  Chipset  Security  Boot  Tool  Save & Exit  AMD CBS  Event Logs  Server Mgmt

    AMD CBS                                                       Zen Common Options

  ▶ Zen Common Options
  ▶ DF Common Options
  ▶ UMC Common Options
  ▶ NBIO Common Options
```

## 5.10.1 Zen Common Options

```
                Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
                                                                  AMD CBS

    Zen Common Options                                            Disable CPB

    Core Performance Boost            [Auto]
    Global C-state Control            [Auto]
```
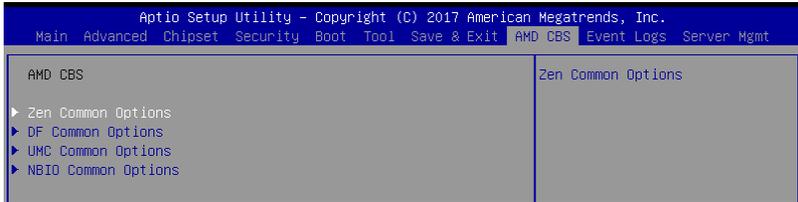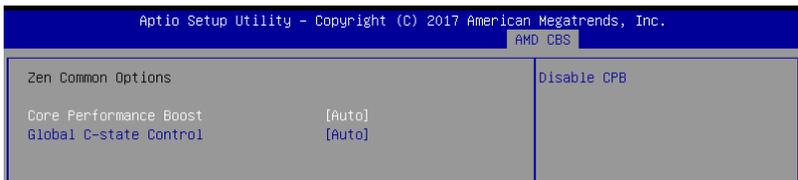
### Core Performance Boost [Auto]

This option allows you to enable or disable CPB.
Configuration options: [Disabled] [Auto]

### Global C-state Control [Auto]

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

## 5.10.2 DF Common Options

```
                Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
                                                                  AMD CBS

    DF Common Options                                             Controls fabric level memory
                                                                  interleaving (AUTO, none,
    Memory interleaving               [Auto]                      channel, die, socket). Note
    Memory interleaving size          [Auto]                      that channel, die, and socket
                                                                  has requirements on memory
                                                                  populations and it will be
```
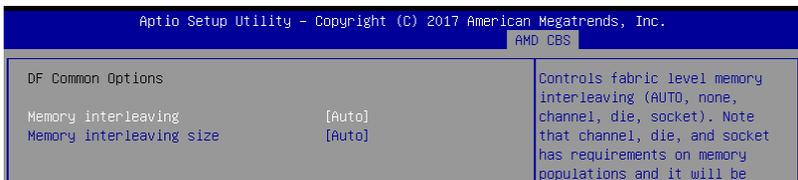
### Memory interleaving [Auto]

This option allows you to control fabric level memory interleaving.
Configuration options: [None] [Channel] [Die] [Socket] [Auto]

### Memory interleaving size [Auto]

This option allows you to control the memory interleaving size.
Configuration options: [256 Bytes] [512 Bytes] [1 KB] [2 KB] [Auto]

## 5.10.3    UMC Common Option

```
                Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
                                                                    AMD CBS

  UMC Common Options                                        DRAM Memory Mapping

▶ DRAM Memory Mapping
```

**DRAM Memory Mapping**

**Chipselect Interleaving [Auto]**

This option allows you to interleave memory blocks accross DRAM chip selects for node 0.
Configuration options: [Disabled] [Auto]

**BankGroupSwap [Auto]**

This option allows you enable or disable BankGroupSwap.
Configuration options: [Disabled] [Enabled] [Auto]

## 5.10.4    NBIO Common Options

```
                Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
                                                                    AMD CBS

  NBIO Common Options                                       NB Configuration

▶ NB Configuration
```

**NB Configuration**

**IOMMU [Auto]**

This option allows you enable or disable IOMMU.
Configuration options: [Disabled] [Enabled] [Auto]

## 5.11 Event Logs menu

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

```
              Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
    Main  Advanced  Platform Configuration  Socket Configuration  Event Logs  Server Mgmt          ▶

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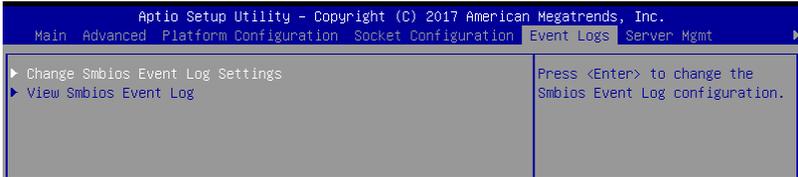
### 5.11.1 Change Smbios Event Log Settings

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

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

**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]

**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 reacting to a full Smbios Event Log.
Configuration options: [Do Nothing] [Erase Immediately]

**Smbios Event Log Standard Settings**

**Log System Boot Event [Disabled]**

This option allows you to enable or disable logging System boot event.
Configuration options: [Disabled] [Enabled]

### 5.11.2 View Smbios Event Log

Press <Enter> to view all smbios event logs.

## 5.12 Server Mgmt menu

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

```
                 Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
    Main  Advanced  Chipset  Security  Boot  Tool  Save & Exit  AMD CBS  Event Logs  Server Mgmt

  BMC Self Test Status              PASSED                      If enabled, starts a BIOS
  BMC Device ID                     32                          timer which can only be shut
  BMC Device Revision               1                           off by Management Software
  BMC Firmware Revision             1.05                        after the OS loads.  Helps
  IPMI Version                      2.0                         determine that the OS
                                                                successfully loaded or follows
  Current Time Zone                 -05:00 GMT                  the OS Boot Watchdog Timer
  OS Watchdog Timer                 [Disabled]                  policy.
  OS Wtd Timer Timeout              [10 minutes]
  OS Wtd Timer Policy               [Reset]
▶ System Event Log
▶ BMC network configuration
▶ View System Event Log
                                                                ↔: Select Screen
```

### OS Watchdog Timer [Disabled]

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

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

#### OS Wtd Timer Timeout [10 minutes]

Allows you to configure the length fo the OS Boot Watchdog Timer.
Configuration options: [5 minutes] [10 minutes] [15 minutes] [20 minutes]

#### 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]

### System Event Log

Allows you to change the SEL event log configuration.

#### Erase SEL [No]

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

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

Allows you to choose options for reactions to a full SEL.
Configuration options: [Do Nothing] [Erase Immediately]

### BMC network configuration

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

### View System Event Log

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

# Driver Installation

6

This chapter provides the instructions for installing the necessary drivers for different system components in the Windows® Operating System.

# 6.1 Management applications and utilities installation

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

1. The contents of the support DVD are subject to change at any time without notice. Visit the ASUS website (www.asus.com) for the latest updates on software and utilities.

2. The support DVD is supported on Windows® Server 2012 R2 and Windows® Server 2016.

# 6.2 Running the Support DVD

When you place the support DVD into the optical drive, the DVD automatically displays the main screen if Autorun is enabled in your computer. By default, the Drivers tab is displayed.

If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file **ASSETUP.EXE** from the **BIN** folder. Double-click the **ASSETUP.EXE** to run the support DVD.

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

1. Drivers

2. Utilities

3. Manual

4. Contact

The main screen of the Support DVD looks exactly the same on the Windows® Server 2012 R2 and on the Windows® Server 2016 Operating System (OS).

## 6.2.1    Drivers menu tab

The Drivers Menu shows the available device drivers if the system detects installed devices. Install the necessary drivers to activate the devices.



## 6.2.2    Utilities menu tab

The Utilities menu displays the software applications and utilities that the motherboard supports.

## 6.2.3    Manual menu

The Manual menu provides the link to the Broadcom NetXtreme II Network Adapter user guide.

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



## 6.2.4    Contact information menu

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

## 6.3 AMD chipset device software installation

This section provides the instructions on how to install the AMD chipset device software on the system.

You need to manually install the AMD chipset device software on a Windows operating system.

To install the AMD chipset device software:

1.   Restart the computer, and then log on with **Administrator** privileges.

2.   Insert the motherboard/system support DVD into the optical drive. The support DVD automatically displays the **Drivers** menu if Autorun is enabled in your computer.

> If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file **ASSETUP.EXE** from the **BIN** folder. Double-click the **ASSETUP.EXE** to run the support DVD.

3.   Click the item **AMD Software** from the menu.



4.   The **AMD Software** window appears. Click **Accept and Install** to start the installation, and follow the onscreen instructions to complete the setup process.
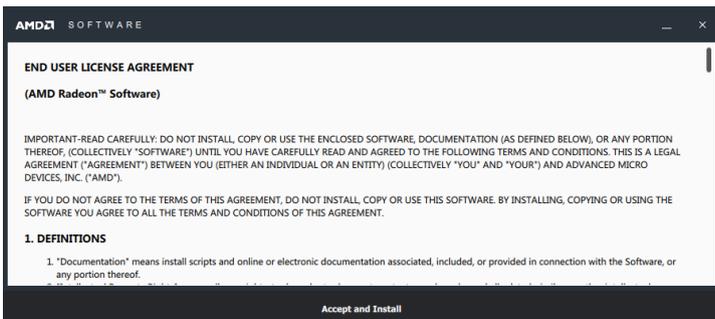
## 6.4 Installing the Intel® I350-AM2 Gigabit Adapters driver

This section provides the instructions on how to install the **Intel® I350-AM2 Gigabits Adapter Driver** on the system.

To install the **Intel® I350-AM2 Gigabit Adapters Driver** on the Windows® operating system:

1. Restart the computer.

2. Log on with **Administrator** privileges.

3. Insert the motherboard/system support DVD to the optical drive.

> If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file **ASSETUP.EXE** from the **BIN** folder. Double-click the **ASSETUP.EXE** to run the support DVD.

4. Click **Intel® I350-AM2 Gigabit Adapters Drivers** in the **Drivers** menu of the main screen to start the installation.



5. Click **Install Drivers and Software** option to begin installation.
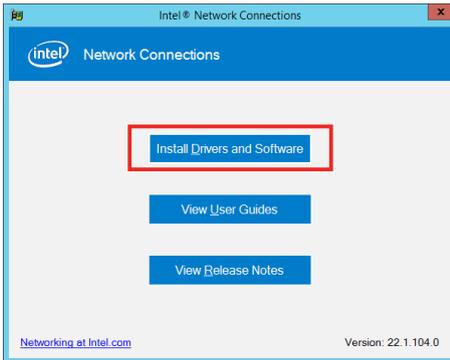
6. Click **Install** to start the installation.



7. When the installation is done, press **Finish** to complete the installation.
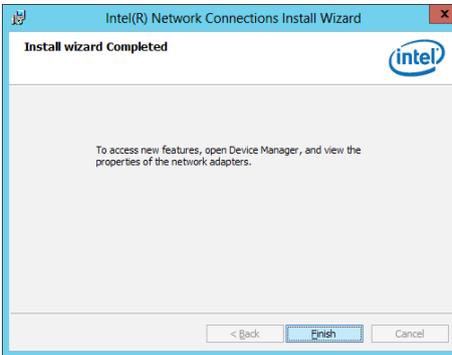
## 6.5 VGA driver installation

This section provides the instructions on how to install the ASPEED Video Graphics Adapter (VGA) driver.

You need to manually install the ASPEED VGA driver on a Windows® operating system.

To install the ASPEED VGA driver:

1. Restart the computer, and then log on with **Administrator** privileges.

2. Insert the motherboard/system support DVD into the optical drive. The support DVD automatically displays the **Drivers** menu if Autorun is enabled in your computer.

> If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file **ASSETUP.EXE** from the **BIN** folder. Double-click the **ASSETUP.EXE** to run the support DVD.

3. Click the **ASPEED AST2500 Display Driver** to begin installation.



4. From the installation window, click **Next** to start the installation.

5. Click **Install** to start the installation process.
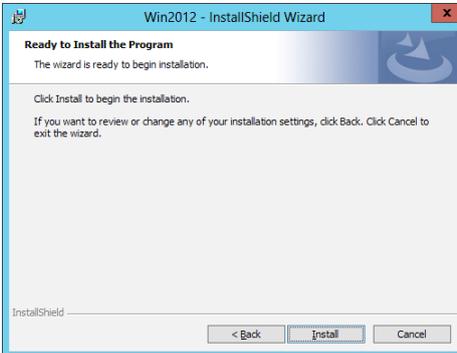


6. Click **Finish** to complete the installation.
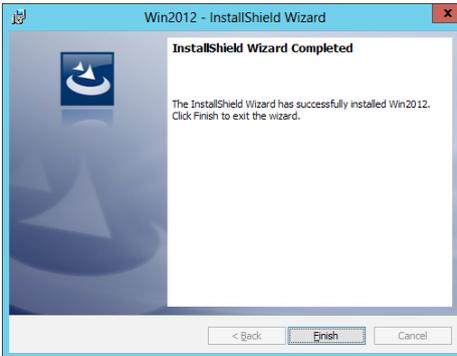
# Appendix

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

# KNPP-D32 block diagram



Block diagram showing CPU1 and CPU2 Zeppelin Processors with their connections.

**Left side (CPU1):**
- DDR4 *16 — Channel A~H
- ISATA1~2 — SATA3 x8
- SATA1~2 — SATA3 x2
- Intel I350 — x4 GEN2
- PCIE1 — x8 GEN3 / x16 GEN3
- MEZZPCIE1 OCP 2.0 Type A — x8 GEN3
- MEZZPCIE1 OCP 2.0 Type B — x8 GEN3
- USB3_5 1 ports — USB 3.0 / 2.0 x2
- USB3_2 2 ports — USB 3.0 / 2.0 x2
- MPCIE_HD1 — x4 GEN3
- SPI Flash 128 Mbit — x8 GEN3

**CPU1 Zeppelin Processor** — Up to 180W Socket SP3 (LGA4094)

**Center connections (xGMI x16):** CPU1 ↔ CPU2

**CPU2 Zeppelin Processor** — Up to 180W Socket SP3 (LGA4094)

**Right side (CPU2):**
- DDR4 *16 — Channel I~P
- PCIE2 — x16 GEN3
- PCIE3 — x16 GEN3
- PCIE4 — x16 GEN3
- USB3_3 — USB 3.0 / 2.0 x1
- USB3_4 — USB 3.0 / 2.0 x1
- USB67 — 2.0 x2
- MPCIE_HD2 — x4 GEN4
- NGFF1 — x4 GEN3 / SATA3 x1
- NGFF2 — x4 GEN3 / SATA3 x1

**Bottom section:**
- x1 GEN3 → ASPEED AST2500 256Mbyte DDR4 SDRAM
- ASPEED AST2500 — RGMII → Realtek RTL8211E
- FRNT_FAN *8
- GPU_FAN *6
- TPM
- LPC USB → NCT6793D Super I/O
- COM1
- PORT80

# 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, and

• 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.

## Canadian Department of Communications Statement

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

## REACH

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

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.

## ASUS Recycling/Takeback Services

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

## 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/.

# ASUS contact information

## ASUSTeK COMPUTER INC.

| | |
|---|---|
| Address | 4F, No. 150, Li-Te Rd., Peitou, Taipei 112, Taiwan |
| Telephone | +886-2-2894-3447 |
| Fax | +886-2-2890-7798 |
| Web site | http://www.asus.com |

### *Technical Support*

| | |
|---|---|
| Telephone | +86-21-38429911 |
| Fax | +86-21-58668722 ext: 9101 |
| Online Support | http://support.asus.com/techserv/techserv.aspx |

## ASUSTeK COMPUTER INC. (Taiwan)

| | |
|---|---|
| Address | 4F, No. 150, Li-Te Rd., Peitou, Taipei 112, Taiwan |
| Telephone | +886-2-2894-3447 |
| Fax | +886-2-2890-7798 |
| Web site | http://www.asus.com |

### *Technical Support*

| | |
|---|---|
| Telephone | +886-2-2894-3447 (0800-093-456) |
| Online Support | http://support.asus.com/techserv/techserv.aspx |

## ASUSTeK COMPUTER INC. (China)

| | |
|---|---|
| Address | No. 5077, Jindu Road, Minhang District, Shanghai, China |
| Telephone | +86-21-5442-1616 |
| Fax | +86-21-5442-0099 |
| Web site | http://www.asus.com.cn |

### *Technical Support*

| | |
|---|---|
| Telephone | +86-20-2804-7506 (400-620-6655) |
| Online Support | http://support.asus.com/techserv/techserv.aspx |

# ASUS contact information

## ASUS COMPUTER INTERNATIONAL (America)

Address            800 Corporate Way, Fremont, CA 94539, USA
Fax                +1-510-608-4555
Web site           http://usa.asus.com

### *Technical Support*

Support fax        +1-812-284-0883
General support    +1-812-282-2787
Online support     http://support.asus.com/techserv/techserv.aspx

## ASUS COMPUTER GmbH (Germany and Austria)

Address            Harkort Str. 21-23, 40880 Ratingen, Germany
Fax                +49-2102-959911
Web site           http://www.asus.de
Online contact     http://www.asus.de/sales

### *Technical Support*

Telephone          +49-1805-010923
Support Fax        +49-2102-959911
Online support     http://support.asus.com/techserv/techserv.aspx

## ASUS Czech Service s.r.o. (Europe)

Address            Na Rovince 887, 720 00 Ostrava – Hrabová,
                   Czech Republic
Telephone          +420-596766888
Web site           http://www.asus.cz

### *Technical Support*

Telephone          +420-596-766-891
Fax                +420-596-766-329
E-mail             advance.rma.eu@asus.com
Online Support     http://support.asus.com/techserv/techserv.aspx

# ASUS contact information

## ASUS Holland BV (The Netherlands)

Address            Marconistraat 2, 7825GD EMMEN, The Netherlands
Web site           http://www.asus.com

### *Technical Support*

Telephone          +31-(0)591-5-70292
Fax                +31-(0)591-666853
E-mail             advance.rma.eu@asus.com
Online Support     http://support.asus.com/techserv/techserv.aspx

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## ASK-Service (Russia and CIS)

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Web site           http://ru.asus.com

### *Technical Support*

Telephone          008-800-100-ASUS (008-800-100-2787)
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