

# SuperServer®

# SYS-222HA-TN

## USER'S MANUAL

Revision 1.0 MNL-2779

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# Preface

## About This Manual

This manual is written for professional system integrators and PC technicians. It provides information for the installation and use of the SYS-222HA-TN server. Installation and maintenance should be performed by certified service technicians only.

## Notes

For your system to work properly, follow the links below to download all necessary drivers/utilities and the user's manual for your server.

- Supermicro product manuals: https://www.supermicro.com/support/manuals
- Product drivers and utilities: https://www.supermicro.com/wdl
- Product safety info: https://www.supermicro.com/about/policies/safety_information.cfm
- A secure data deletion tool designed to fully erase all data from storage devices can be found on our website: https://www.supermicro.com/about/policies/disclaimer.cfm?url=/wdl/utility/Lot9_Secure_Data_Deletion_Utility
- Frequently Asked Questions: https://www.supermicro.com/FAQ/index.php
- If you still have questions after referring to our FAQs, contact our support team. Region-specific Technical Support email addresses can be found at: "Contacting Supermicro" on page 14
- If you have any feedback on Supermicro product manuals, contact our writing team at: Techwriterteam@supermicro.com

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## Conventions Used in the Manual

Special attention should be given to the following symbols for proper installation and to prevent damage done to the components or injury to yourself.



**Warning!** Indicates important information given to prevent equipment/property damage or personal injury.



**Warning!** Indicates high voltage may be encountered while performing a procedure.

**Important:** Important information given to ensure proper system installation or to relay safety precautions.

**Note:** Additional information given to differentiate various models or to provide information for proper system setup.

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# Contacting Supermicro

**Headquarters**

| | |
|---|---|
| Address: | Super Micro Computer, Inc.<br>980 Rock Ave.<br>San Jose, CA 95131 U.S.A. |
| Tel: | +1 (408) 503-8000 |
| Fax: | +1 (408) 503-8008 |
| Email: | Marketing@supermicro.com (General Information)<br>Sales-USA@supermicro.com (Sales Inquiries)<br>Government_Sales-USA@supermicro.com (Gov. Sales Inquiries)<br>Support@supermicro.com (Technical Support)<br>RMA@Supermicro.com (RMA Support)<br>Webmaster@supermicro.com (Webmaster) |
| Website: | https://www.supermicro.com |

**Europe**

| | |
|---|---|
| Address: | Super Micro Computer B.V.<br>Het Sterrenbeeld 28, 5215 ML<br>'s-Hertogenbosch, The Netherlands |
| Tel: | +31 (0) 73-6400390 |
| Fax: | +31 (0) 73-6416525 |
| Email: | Sales_Europe@supermicro.com (Sales Inquiries)<br>Support_Europe@supermicro.com (Technical Support)<br>RMA_Europe@supermicro.com (RMA Support) |
| Website: | https://www.supermicro.nl |

**Asia-Pacific**

| | |
|---|---|
| Address: | Super Micro Computer, Inc.<br>3F, No. 150, Jian 1st Rd.<br>Zhonghe Dist., New Taipei City 235 Taiwan (R.O.C) |
| Tel: | +886 (2) 8226-3990 |
| Fax: | +886 (2) 8226-3992 |
| Email: | Sales-Asia@supermicro.com.tw (Sales Inquiries)<br>Support@supermicro.com.tw (Technical Support)<br>RMA@supermicro.com.tw (RMA Support) |
| Website: | https://www.supermicro.com.tw |

# Chapter 1:

# Introduction

This chapter provides a brief outline of the functions and features of the SYS-222HA-TN system. It is based on the X14DBM-AP motherboard and the CSE-HS201-R000NFP chassis.

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## 1.1 Overview

This chapter provides a brief outline of the functions and features of the SuperServer SYS-222HA-TN. The following provides an overview of the specifications and capabilities.

| System Overview | |
|---|---|
| Motherboard | X14DBM-AP |
| Chassis | CSE-HS201-R000NFP |
| Processor | Intel® Xeon® 6900-series processors with P-cores that supports Dual Socket BR (LGA-7529)<br>CPU TDP supports up to 500 W TDP CPUs (air cooled or liquid cooled) |
| Memory | 24 DIMM slots that support up to 6 TB of RDIMM DDR5 ECC memory with speeds of up to 6400 MT/s, or up to 6 TB of MRDIMM DDR5 ECC memory with speeds of up to 8800 MT/s |
| Drive Support | Two M.2 PCIe 5.0 x2 NVMe slots (M-key 2280/22110)<br>Default: Eight front hot-swap 2.5" NVMe*/SAS*/SATA* drive bays<br>Option A: 16 front hot-swap 2.5" NVMe*/SAS*/SATA* drive bays<br>Option B: 24 front hot-swap 2.5" NVMe*/SAS*/SATA* drive bays<br>*NVMe/SAS/SATA support may require additional storage controller and/or cables, please see the optional parts list for details. |
| Expansion Slots | Up to four CXL 2.0 x16/x8 devices<br>PCIe configurations:<br>Option A*:<br>Four PCIe 5.0 x16 FH/10.5"L double-width slots<br>Two PCIe 5.0 x16 AIOM slots (OCP 3.0 compatible)<br>Option B*:<br>Eight PCIe 5.0 x8 (in x16) FH/10.5"L slots<br>Two PCIe 5.0 x16 AIOM slots (OCP 3.0 compatible)<br>*Requires additional parts, please see the optional parts list for details. For more details on PCIe slot configuration options, please refer to the "Expansion Slot Configurations" on page 85. |
| I/O Ports | One RJ45 1 GbE dedicated BMC LAN port<br>Two rear USB 3.0 ports<br>One VGA port |
| System Cooling | Six counter-rotating 60 x 60 x 56-mm fans<br>Direct-to-chip cold plate (optional) |

| System Overview | |
|---|---|
| Power | Two 2600 W redundant (1 + 1) Titanium Level (96%) power supplies or<br>Two 1600 W redundant (1 + 1) Titanium Level (96%) power supplies or<br>Two 2000 W redundant (1 + 1) Titanium Level (96%) power supplies |
| Form Factor | 2U rackmount; (WxHxD) 3.5" x 17.2" x 31.74" (88.9 x 437 x 806.2 mm) |

**Notes:**

- A Quick Reference Guide can be found on the following page of the Supermicro website:

  https://www.supermicro.com/en/products/system/hyper/2u/sys-222ha-tn

- The following safety models associated with the SYS-222HA-TN have been certified as compliant with UL or CSA: HS201-R16X14, HS201-R20X14, HS201-R26X14

## 1.2 System Features

The following views of the system display the main features. Refer to the System Specifications appendix of this manual for additional specifications.

### Front View

The illustration below shows the features included on the front of the SYS-222HA-TN server.

**Note:** The default drive bay configuration has 8 bays, and there are two additional drive bay configuration options. Option A has a total of 16 bays and option B has a total of 24 bays.

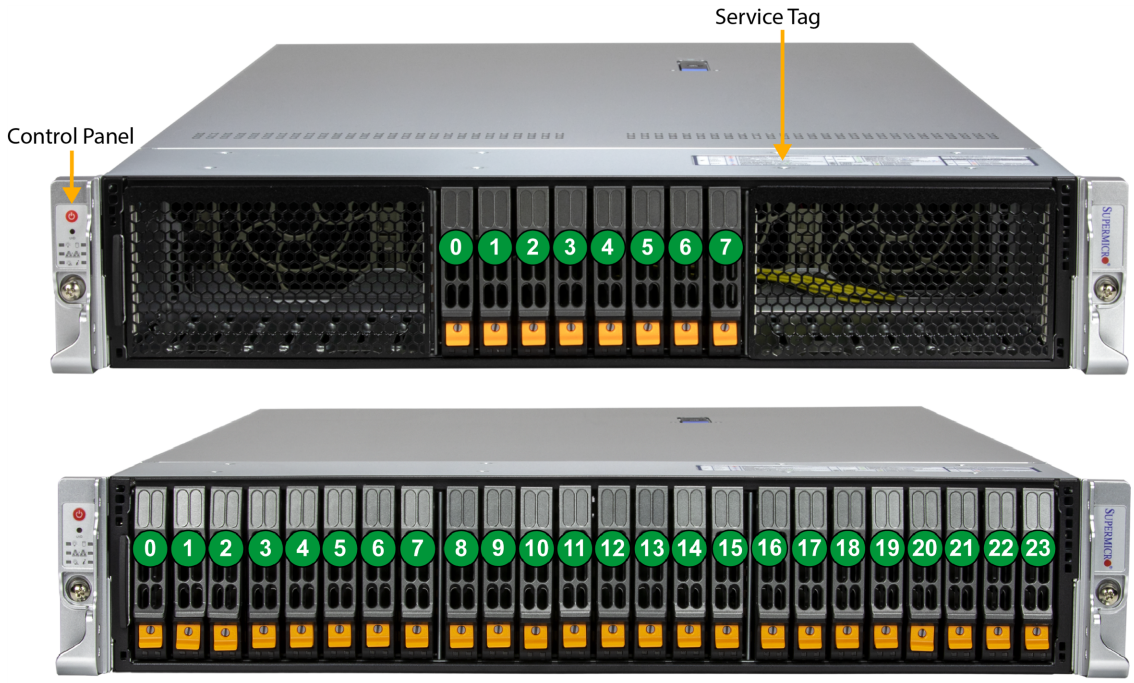



**Figure 1-1. SYS-222HA-TN Front Views**

| System Features: Front | |
|---|---|
| **Feature** | **Description** |
| Control Panel | One control panel (see "Control Panel" on page 20 for details) |
| Service Tag | One service tag with BMC password reset information |

| Logical Storage Drive Numbers | |
|---|---|
| **Item** | **Description** |
| 0 – 7 (Default) | Eight hot-swap 2.5" NVMe/SATA3/SAS3* drive bays |

| Logical Storage Drive Numbers | |
|---|---|
| **Item** | **Description** |
| 0 – 23 (Option A) | 24 hot-swap 2.5" NVMe/SATA3/SAS3* drive bays |
| ***NVMe, SATA3, or SAS3 support requires additional parts in Optional Components.** | |

### *Control Panel*

A power switch and status LEDs are located on the control panel on the front of the SYS-222HA-TN server.

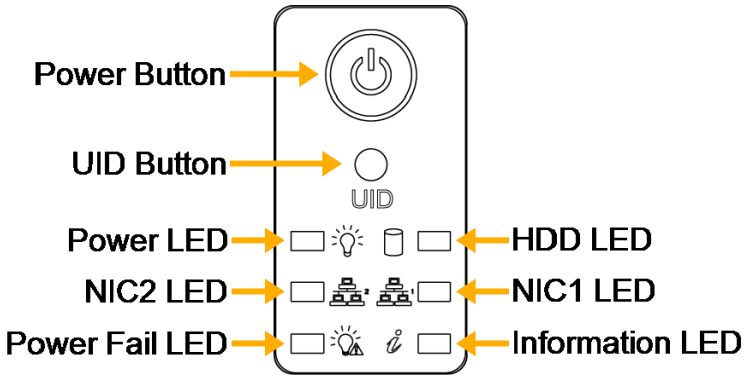



**Figure 1-2. Control Panel**

| Control Panel Features | |
|---|---|
| **Feature** | **Description** |
| Power Button | Applies or removes power from the power supply to the server.<br>Turning off system power with this button removes the main power but maintains standby power. To perform maintenance tasks, you must unplug the system before servicing. |
| UID Button | Powers the Information LED for unit identification.<br>Use a pin to press the UID button. |
| Power LED | Steady on: Power on<br>Blinking at 4 Hz: Checking BIOS/BMC integrity<br>Blinking at 4 Hz and "i" LED is blue: BIOS firmware updating<br>Two blinks at 4 Hz, one pause 2 Hz and "i" LED blue: BMC firmware updating |
| HDD LED | Indicates activity on a hard drive when flashing. |
| NIC2 LED | Indicates network activity on LAN port 2 when flashing. |
| NIC1 LED | Indicates network activity on LAN port 1 when flashing. |
| Power Fail LED | Indicates a power supply module has failed. |
| Information LED | See the Information LED table for details. |

| Information LED | |
|---|---|
| **Color, Status** | **Description** |
| Red, solid | An overheat condition has occurred. |
| Red, blinking at 1 Hz | Fan failure; check for an inoperative fan. |
| Red, blinking at 0.25 Hz | Power failure; check for an inoperative power supply. |
| Red, solid with Power LED blinking green | Fault detected. |
| Blue and red, blinking at 10 Hz | Recovery mode. |
| Blue, solid | UID has been activated locally to locate the server in a rack environment. |
| Blue, blinking at 1 Hz | UID has been activated via BMC to locate the server in a rack environment. |
| Blue, blinking at 2 Hz | BMC is resetting. |
| Blue, blinking at 4 Hz | BMC is setting factory defaults. |
| Blue, blinking at 10 Hz with Power LED blinking green | BMC/BIOS firmware is updating. |

## Rear View

The illustration below shows the features included on the rear of the SYS-222HA-TN server. Power supply modules display status lights.

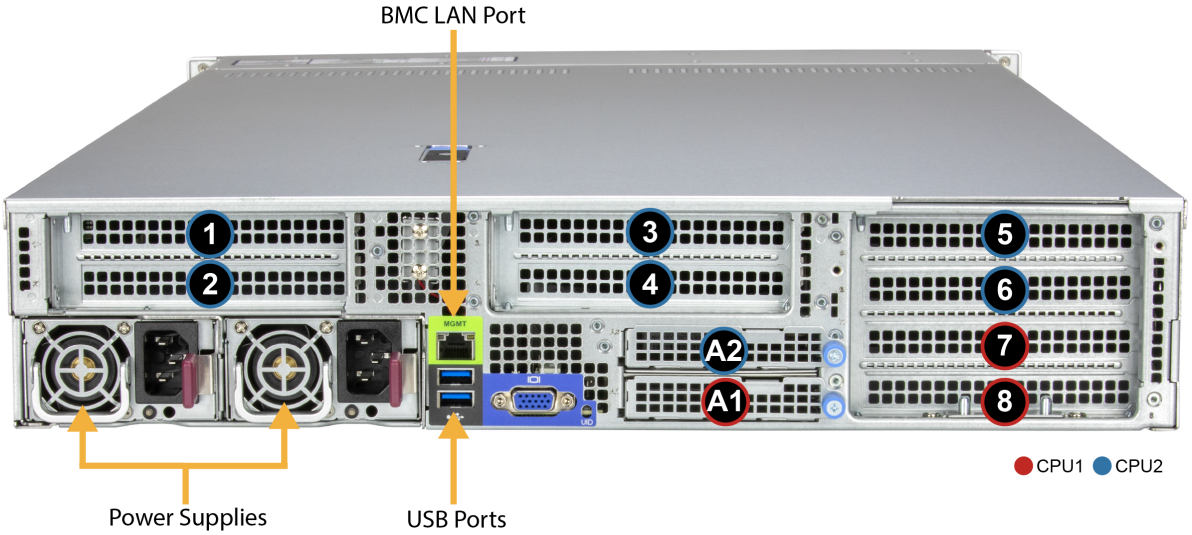



**Figure 1-3. SYS-222HA-TN Rear View**

| System Features: Rear | |
|---|---|
| **Feature** | **Description** |
| Power Supplies | Two redundant power supply modules<br>PWS1 is on the left, PWS2 is on the right |
| USB Ports | Two USB 3.0 ports |
| BMC LAN Port | One RJ45 dedicated BMC LAN port |
| VGA | One VGA port |

| Expansion Slot Locations | |
|---|---|
| **Location** | **Description** |
| 1 | PCIe 5.0 x8 (in x16) slot or PCIe 5.0 x16 slot (FH, 10.5” L) |
| 2 | PCIe 5.0 x8 (in x16) slot (FH, 10.5” L) |
| 3 | PCIe 5.0 x8 (in x16) slot or PCIe 5.0 x16 slot (FH, 10.5” L) |
| 4 | PCIe 5.0 x8 (in x16) slot (FH, 10.5” L) |
| 5 | PCIe 5.0 x8 (in x16) slot or PCIe 5.0 x16 slot (FH, 10.5” L) |
| 6 | PCIe 5.0 x8 (in x16) slot (FH, 10.5” L) |
| 7 | PCIe 5.0 x8 (in x16) slot or PCIe 5.0 x16 slot (FH, 10.5” L) |
| 8 | PCIe 5.0 x8 (in x16) slot (FH, 10.5” L) |

| AIOM Slot Locations | |
|---|---|
| **Location** | **Description** |
| A1 | AIOM/OCP NIC 3.0 Slot |
| A2 | Optional AIOM/OCP NIC 3.0 Slot |

| Power Supply Indicators | | |
|---|---|---|
| **Power Supply Condition** | **Green LED** | **Amber LED** |
| No AC power to power supply | Off | Off |
| Power supply critical events causing a shutdown/failure/OCP/OVP/Fan Fail/OTP/UVP | Off | On |
| Power supply warning events where the power supply continues to operate; high temperature; over voltage; under voltage, etc. | Off | 1 Hz Blinking |
| AC present only 12 VSB ON (PS OFF) | 1 Hz Blinking | Off |
| Output ON and OK | On | Off |
| AC cord unplugged and in redundant mode | Off | On |

## 1.3 System Architecture

This section covers the locations of the system's main components and provides a system block diagram.

### Main Components

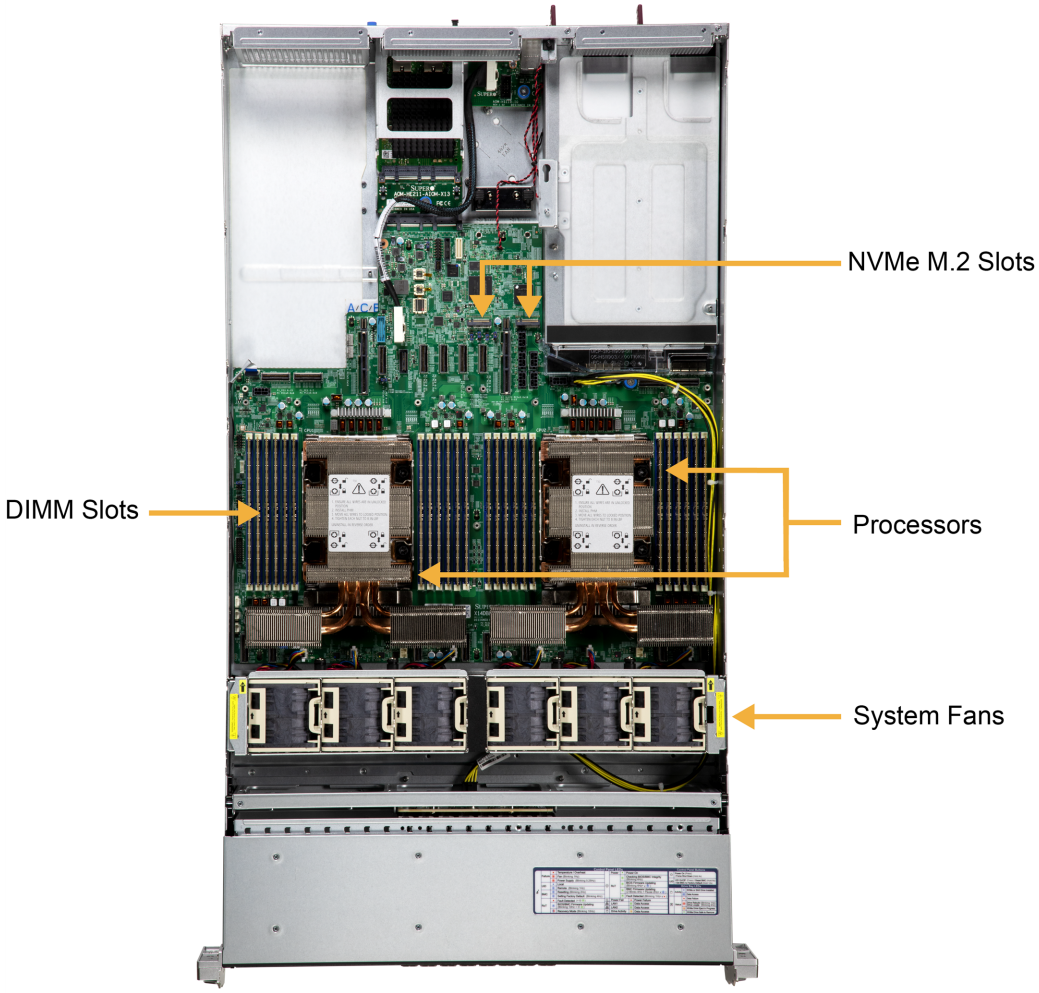



**Figure 1-4. SYS-222HA-TN Main Component Locations**

| System Features: Top | |
|---|---|
| **Feature** | **Description** |
| NVMe M.2 Slots | Two NVMe M.2 slots for internal boot drives |
| DIMM Slots | 24 DDR5 DIMM slots |
| Processors | Dual Intel® Xeon® 6900-series processors with P-cores |
| System Fans | Six internal fans |

## System Block Diagram

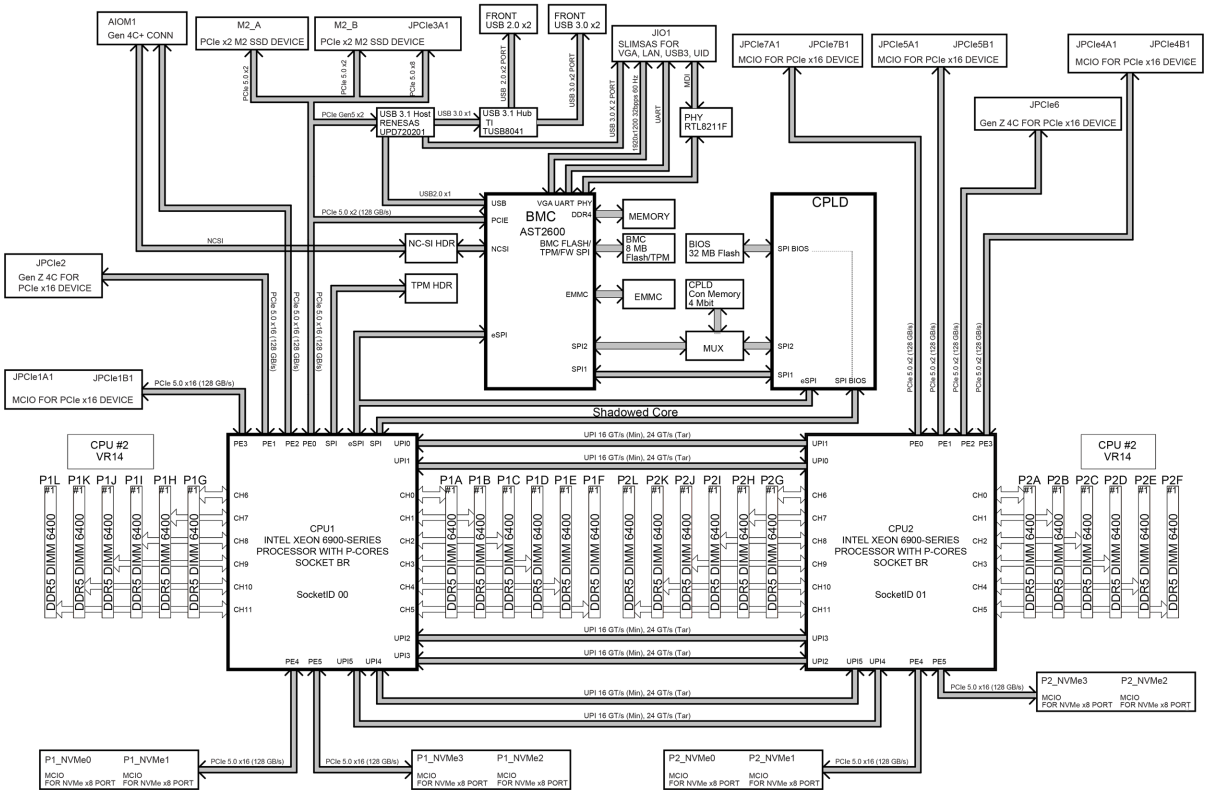



**Figure 1-5. System Block Diagram**

**Note:** This is a general block diagram and may not exactly represent the features on your motherboard. For the actual specifications of your motherboard, see "Motherboard Quick Reference" on page 27.

## PCIe Lane Distribution

### *CPU 1 PCIe Lane Distribution*

| Port | PCIe | Motherboard Connector | PCIe Lane Assignment |
|---|---|---|---|
| PE0 | x8[1] | M.2-C1 (x2), M.2-C2 (x2) | Internal 2x NVMe M.2 Slots |
| | x8 | JPCIE3A1 | Not Used |
| PE1 | x16 | JPCIE2 | NVMe Drive Bays 0, 1, 2, 3[2] |
| PE2 | x16 | JAIOM1 | AIOM/OCP 3.0 NIC Slot A1 |
| PE3 | x8 | JPCIE1A1 | NVMe Drive Bays 4, 5 |
| | x8 | JPCIE1B1 | NVMe Drive Bays 6, 7 |
| PE4 | x8 | P1_NVME0 | NVMe Drive Bays 8, 9 |
| | x8 | P1_NVME1 | NVMe Drive Bays 10, 11 |
| PE5 | x8 | P1_NVME2 | NVMe Drive Bays 12, 13 |
| | x8 | P1_NVME3 | NVMe Drive Bays 14, 15 |

[1]Some PCIe lanes from this port are routed directly to onboard devices (USB controller & BMC).

[2] An alternate PCIe lane assignment is PCIe expansion slot 7, 8.

### *CPU2 PCIe Lane Distribution*

| Port | PCIe | Motherboard Connector | PCIe Lane Assignment |
|---|---|---|---|
| PE0 | x8 | JPCIE7A1 | PCIe Expansion Slot 1, 2 |
| | x8 | JPCIE7B1 | |
| PE1 | x8 | JPCIE5A1 | AIOM/OCP 3.0 NIC Slot A2 |
| | x8 | JPCIE5B1 | |
| PE2 | x16 | JPCIE6 | PCIe Expansion Slot 3, 4 |
| PE3 | x8 | JPCIE4A1 | PCIe Expansion Slot 5, 6 |
| | x8 | JPCIE4B1 | |
| PE4 | x8 | P2_NVME0 | NVMe Drive Bays 16, 17 |
| | x8 | P2_NVME1 | NVMe Drive Bays 18, 19 |
| PE5 | x8 | P2_NVME2 | NVMe Drive Bays 20, 21 |
| | x8 | P2_NVME3 | NVMe Drive Bays 22, 23 |

## 1.4 Motherboard Quick Reference

For details on the X14DBM-AP motherboard layout and other quick reference information, refer to the content below.

### Motherboard Layout

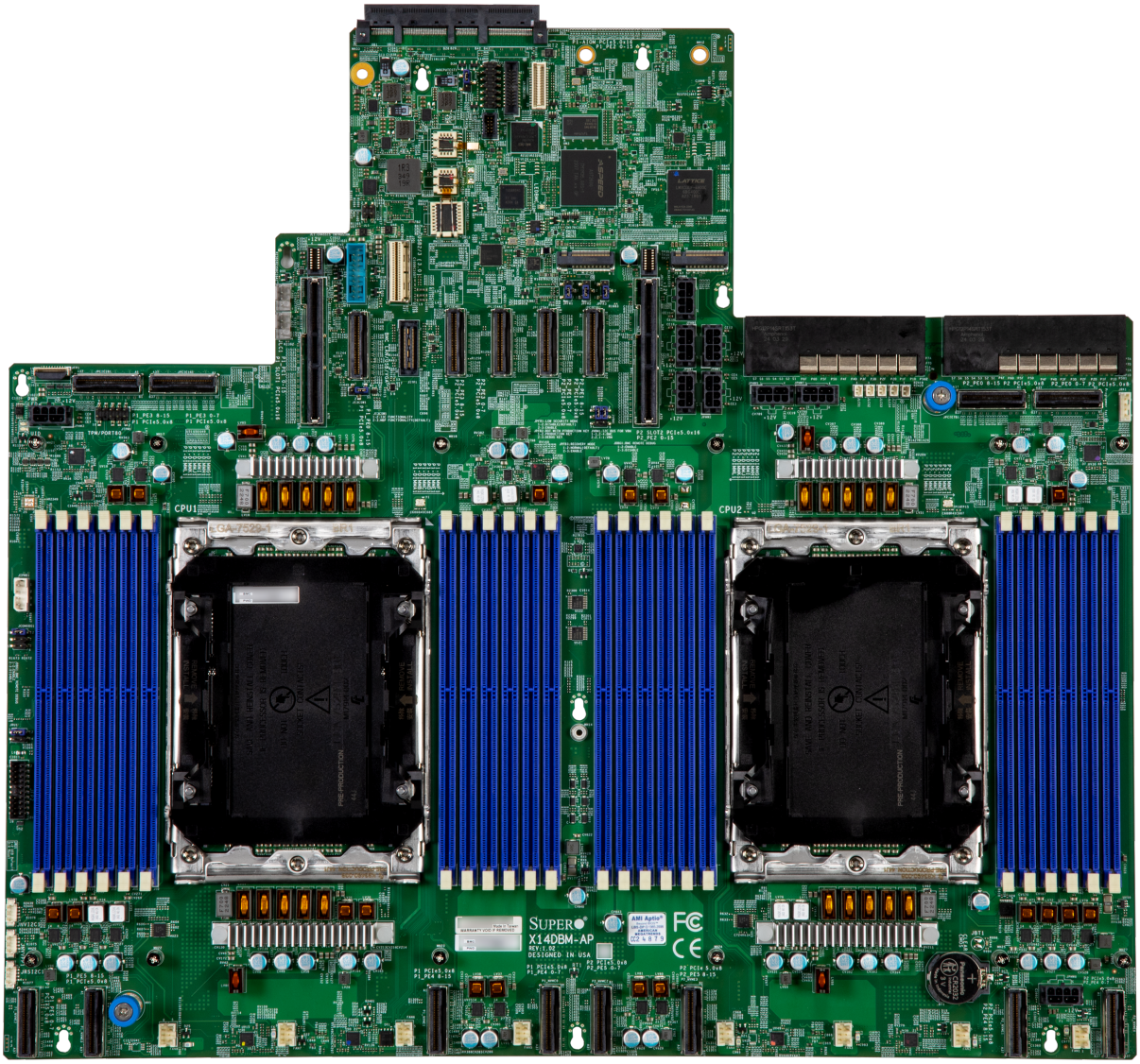



**Figure 1-6. X14DBM-AP Motherboard Image**

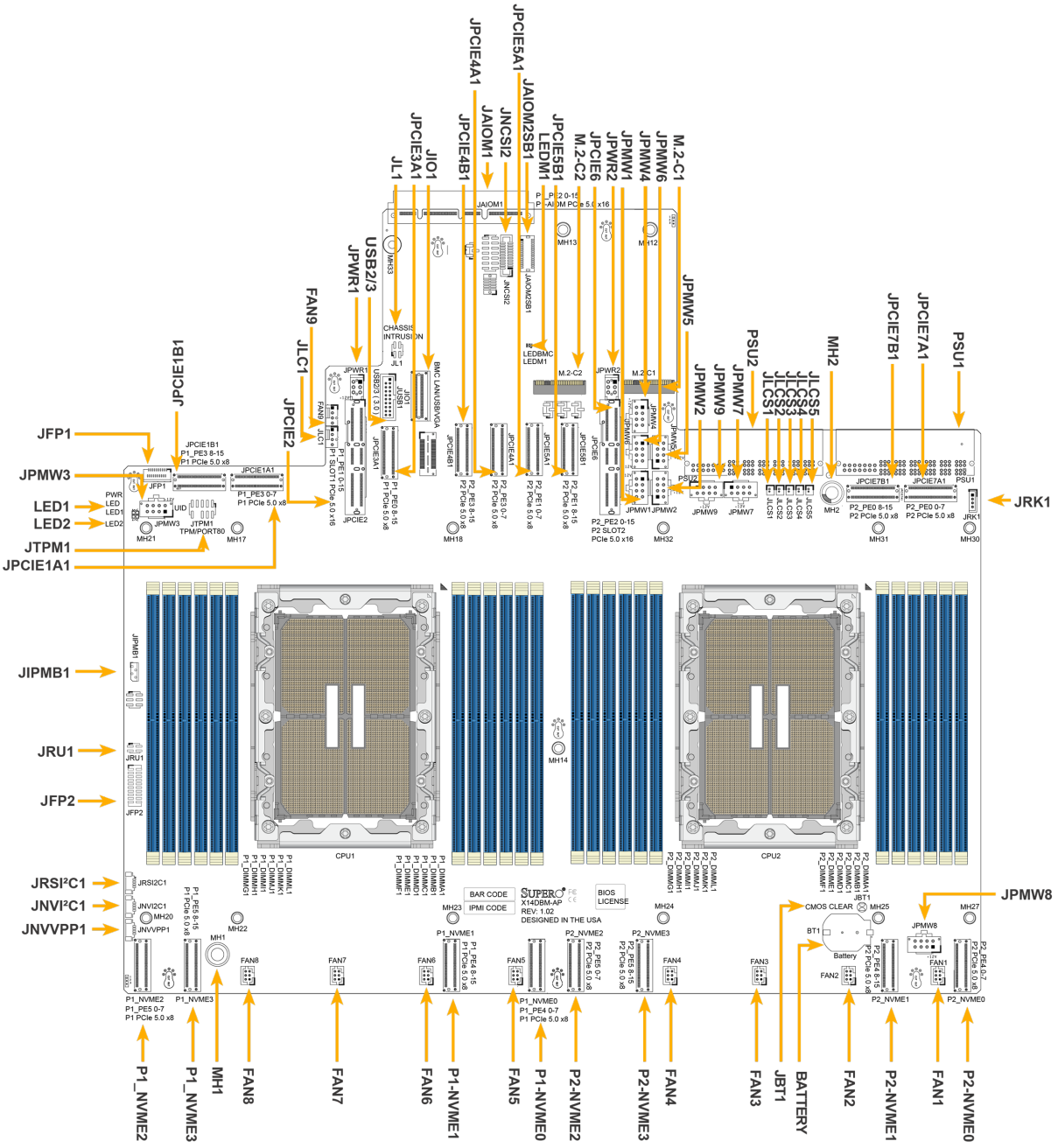



**Figure 1-7. X14DBM-AP Motherboard Layout**

**Notes:**

- For detailed information on jumpers, connectors, and LED indicators, see "Maintenance and Component Installation" on page 45.
- "■" indicates the location of pin 1.
- Components not documented are for internal testing purposes only.
- Use only the correct type of onboard CMOS battery as specified by the manufacturer. To avoid possible explosion, do not install the onboard battery upside down.

## Quick Reference Table

| Jumper | Description | Jumper Setting |
|---|---|---|
| JBT1 | CMOS Clear | Open (Normal) |

| LED | Description | Status |
|---|---|---|
| LED1 (PWRLED) | Onboard Power LED | LED On: Onboard Power On |
| LED2 (UID-LED) | Unit Identifier (UID) LED | Solid Blue: Unit Identified |
| LEDM1 (LEDBMC) | BMC Heartbeat LED | Blinking Green: BMC Normal (Active)<br>Solid Green: (During BMC Reset or during a Cold Reboot) |

| Connector | Description |
|---|---|
| Battery (BT1) | Onboard Battery |
| FAN1–FAN9 | Eight 6-pin Cooling Fan Headers (FAN1–FAN8) and one 4-pin Cooling Fan Header (FAN9) |
| JAIOM1 (P1_PE2 0–15) | Advanced Input/Output Module (AIOM) PCIe 5.0 x16 Connector for Rear I/O Support |
| JAIOM2SB1 | Advanced Input/Output Module (AIOM) Sideband Connector PCIe 5.0 x16 AIOM (OCP3.0-compliant) Slot |
| JFP1 | Front Control Panel Header |
| JFP2 | Front Control Panel Header 2 |
| JIO1 (BMCLAN/USB/VGA) | Low-profile (LP) Slim SAS I/O Connector |
| JIPMB1 | 4-pin BMC External I²C Header |
| JL1 | Chassis Intrusion Header |
| JLC1 | 4-pin Liquid Cooling Leakage Sensor Header |
| JLCS1–JLCS5 | 2-pin Liquid Cooling Leakage Sensor Header |
| JNCSI2 | Network Controller Sideband Interface (NC-SI) Connector |
| JNVI²C1 | NVMe SMBus I²C Header |
| JNVVPP1 | NVMe VPP System Management Bus (SMBus) |

| Connector | Description |
|---|---|
| JPCIE1A1 (P1_PE3 0–7) | MCIO (P1) PCIe 5.0 x8 Connector |
| JPCIE1B1 (P1_PE3 8–15) | MCIO (P1) PCIe 5.0 x8 Connector |
| JPCIE2 (P1_PE1 0–15) | (P1-SLOT1) PCIe 5.0 x16 Slot |
| JPCIE4A1 (P2_PE3 7–0) | MCIO (P2) PCIe 5.0 x8 Connector |
| JPCIE4B1 (P2_PE3 8–15) | MCIO (P2) PCIe 5.0 x8 Connector |
| JPCIE5A1 (P2_PE1 0–7) | MCIO (P2) PCIe 5.0 x8 Connector |
| JPCIE5B1 (P2_PE1 8–15) | MCIO (P2) PCIe 5.0 x8 Connector |
| JPCIE6 (P2_PE2 0–15) | (P2 SLOT2) PCIe 5.0 x16 Slot |
| JPCIE7A1 (P2_PE0 0–7) | MCIO (P2) PCIe 5.0 x8 Connector |
| JPCIE7B1 (P2_PE0 8–15) | MCIO (P2) PCIe 5.0 x8 Connector |
| JPMW1–JPMW9 | 8-pin +12 V Power Connectors |
| JPWR1–JPWR2 | 6-pin +12 V Power Connectors |
| JRSI2C1 | Auxiliary I²C Header |
| JRU1 | Unit identifier (UID) Switch/BMC Reset Button |
| JTPM1 | Trusted Platform Module/Port 80 Connector |
| M.2-C1/M.2-C2 | M.2 M-Key PCIe 5.0 x2 Slots (2280/22110) |
| P1_NVME0 (P1_PE4 0–7) | MCIO P1_PCIe 5.0 x8 Connectors with NVMe Connections 0–7 |
| P1_NVME1 (P1_PE4 8–15) | MCIO P1_PCIe 5.0 x8 Connectors with NVMe Connections 8–15 |

| Connector | Description |
|---|---|
| P1_NVME2 (P1_PE5 0–7) | MCIO P1_PCIe 5.0 x8 Connectorswith NVMe Connections 0–7 |
| P1_NVME3 (P1_PE5 8–15) | MCIO P1_PCIe 5.0 x8 Connectors with NVMe Connections 8–15 |
| P2_NVME0 (P2_PE4 0–7) | MCIO P2_PCIe 5.0 x8 Connectors with NVMe Connections 0–7 |
| P2_NVME1 (P2_PE4 8–15) | MCIO P2_PCIe 5.0 x8 Connectors with NVMe Connections 8–15 |
| P2_NVME2 (P2_PE5 0–7) | MCIO P2_PCIe 5.0 x8 Connectors with NVMe Connections 0–7 |
| P2_NVME3 (P2_PE5 8–15) | MCIO P2_PCIe 5.0 x8 Connectors with NVMe Connections 8–15 |
| PSU1/PSU2 | Power Supply Unit1/Unit2 |
| USB 2/3 (3.0) (JUSB1) | Rear USB Header |
| VROC RAID Key (JRK1) | Intel VROC RAID Key Header |

**Notes:**

- For details on how to configure Network Interface Card (NIC) settings, refer to the Network Interface Card Configuration User's Guide posted on our website under the link: https://www.supermicro.com/support/manuals.
- For detailed instructions on how to configure VROC RAID settings, refer to the VROC RAID Configuration User's Guide posted on the web page under the link: https://www.supermicro.com/support/manuals.

# Chapter 2:

# Server Installation

This chapter provides advice and instructions for mounting your server in a server rack. If your server is not already fully integrated with processors, system memory, etc., refer to "Maintenance and Component Installation" on page 45 for details on installing those specific components.

**Important:** Electrostatic Discharge (ESD) can damage electronic components. To prevent such damage to printed circuit boards (PCBs), it is important to use a grounded wrist strap, handle all PCBs by their edges, and keep PCBs in anti-static bags when not in use.

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## 2.1 Unpacking the System

Inspect the box the server was shipped in and note if it was damaged in any way. If any equipment appears damaged, file a damage claim with the carrier who delivered it.

Decide on a suitable location for the rack unit that will hold the server. It should be situated in a clean, dust-free area that is well ventilated. Avoid areas where heat, electrical noise and electromagnetic fields are generated. It will also require a grounded AC power outlet nearby. Be sure to read the precautions and considerations noted in "Standardized Warning Statements for AC Systems" on page 230.

## 2.2 Preparing for Setup

The box in which the SYS-222HA-TN server was shipped should include the rackmount hardware needed to install it into the rack. Read this section in its entirety before you begin the installation.

### Choosing a Setup Location

- The server should be situated in a clean, dust-free area that is well ventilated. Avoid areas where heat, electrical noise and electromagnetic fields are generated.
- Leave enough clearance in front of the rack so that you can open the front door completely (~25 inches) and approximately 30 inches of clearance in the back of the rack to allow sufficient space for airflow and access when servicing.
- This product should be installed only in a Restricted Access Location (dedicated equipment rooms, service closets, etc.).
- This product is not suitable for use with visual display workplace devices according to §2 of the German Ordinance for Work with Visual Display Units.

### Rack Precautions

- Ensure that the leveling jacks on the bottom of the rack are extended to the floor so that the full weight of the rack rests on them.
- In single rack installations, stabilizers should be attached to the rack. In multiple rack installations, the racks should be coupled together.
- Always make sure the rack is stable before extending a server or other component from the rack.
- You should extend only one server or component at a time. Extending two or more simultaneously may cause the rack to become unstable.

### System Precautions

- Review the electrical and general safety precautions in "Standardized Warning Statements for AC Systems" on page 230.
- Determine the placement of each component in the rack before you install the rails.
- Install the heaviest server components at the bottom of the rack first and then work your way up.

- Use a regulating uninterruptible power supply (UPS) to protect the server from power surges and voltage spikes and to keep your system operating in case of a power failure.
- Allow any drives and power supply modules to cool before touching them.
- When not servicing, always keep the front door of the rack and all covers/panels on the servers closed to maintain proper cooling.

## Rack Mounting Considerations



**Warning!** Stability hazard. The rack may tip over causing serious personal injury. Before extending the rack to the installation position, read the installation instructions. Do not put any load on the slide-rail mounted equipment in the installation position. Do not leave the slide-rail mounted equipment in the installation position.



**Avertissement!**
Danger d'instabilité. Le rack peut basculer et provoquer des blessures corporelles graves.
Avant d'étendre le rack en position d'installation, lire les instructions d'installation. Ne pas charger l'équipement monté sur rail de glissière en position d'installation. Ne pas laisser l'équipement monté sur rail de glissière en position d'installation.

**Important:** To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

- If this unit is the only unit in the rack, it should be mounted at the bottom of the rack.
- When mounting this unit in a partially filled rack, load the rack from the bottom to the top, placing the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.
- Slide rail mounted equipment is not to be used as a shelf or a workspace.
- Do not pick up the server with the front handles. They are designed to pull the system from a rack only.

### *Ambient Operating Temperature*

If installed in a closed or multi-unit rack assembly, the ambient operating temperature of the rack environment may be greater than the room's ambient temperature. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer's maximum rated ambient temperature (TMRA).

### *Airflow*

Equipment should be mounted into a rack so that the amount of airflow required for safe operation is not compromised.

### *Mechanical Loading*

Equipment should be mounted into a rack so that a hazardous condition does not arise due to uneven mechanical loading.

### *Circuit Overloading*

Consideration should be given to the connection of the equipment to the power supply circuitry and the effect that any possible overloading of circuits might have on overcurrent protection and power supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

### *Reliable Ground*

A reliable ground must be maintained at all times. To ensure this, the rack itself should be grounded. Particular attention should be given to power supply connections other than the direct connections to the branch circuit (i.e. the use of power strips, etc.).

## 2.3 Installing the Rails

This section provides information on installing the CSE-HS201-R000NFP chassis into a rack unit with the rails provided. There are a variety of rack units on the market, which may mean that the assembly procedure will differ slightly from the instructions provided. You should also refer to the installation instructions that came with the rack unit you are using.

The instructions in this section are specific to the rail set with part number MCP-290-11902-0N.

**Note:** This rail will fit a rack between 26.5" and 36.4" deep.

### Identifying the Rails

The CSE-HS201-R000NFP chassis package includes two rail assemblies. Each assembly consists of three sections: an inner rail that secures directly to the chassis, an outer rail that secures to the rack, and a middle rail which extends from the outer rail. These assemblies are specifically designed for the left and right side of the chassis and labeled.

**Important:** Do not pick up the server with the front handles. They are designed to pull the system from a rack only.

**Important:** Slide rail mounted equipment is not to be used as a shelf or a work space.

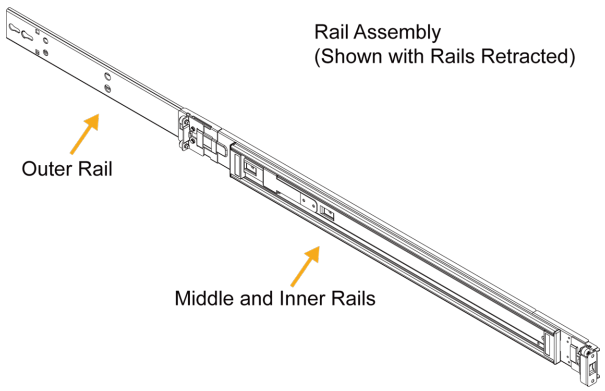



**Figure 2-1. Identifying the Middle and Outer Rails**

### Releasing the Inner Rail

Each inner rail has a locking latch. This latch prevents the chassis from coming completely out of the rack when the chassis is pulled out for servicing.

To mount the rail onto the CSE-HS201-R000NFP chassis, first release the inner rail from the outer rails.

### *Releasing the Inner Rail from the Middle and Outer Rails*

**Important:** Stability hazard. The rack stabilizing mechanism must be in place, or the rack must be bolted to the floor before you slide the unit out for servicing. Failure to stabilize the rack can cause the rack to tip over.

1. Pull the inner rail out of the outer rail until it is fully extended as illustrated below.
2. Press the locking tab down to release the inner rail.
3. Pull the inner rail all the way out.

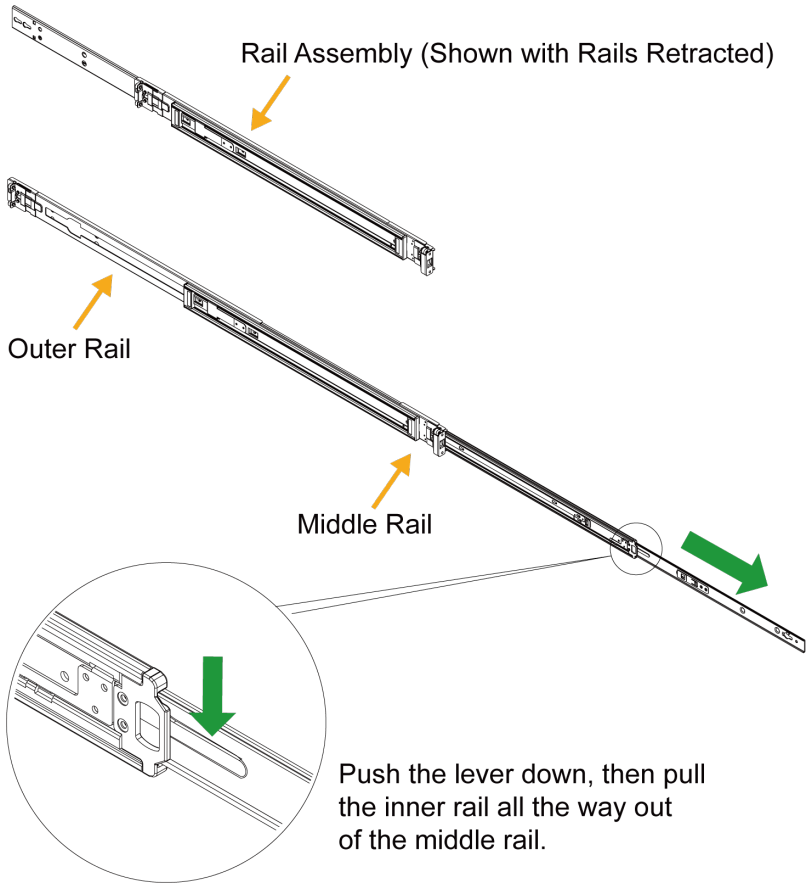



**Figure 2-2. Extending and Releasing the Inner Rail**

## Installing the Inner Rails onto the Chassis

Begin the rack mounting procedure by installing the inner rails to the CSE-HS201-R000NFP chassis.

1. Confirm that the left and right inner rails have been correctly identified.
2. Place the inner rail firmly against the side of the chassis, aligning the pins on the side of the chassis with the holes in the inner rail.
3. Slide the inner rail toward the rear of the chassis until the pins are at the end of the narrow slot, which secures the inner rail to the chassis.
4. Optionally, you can further secure the inner rail to the chassis with a screw.
5. Repeat for the other inner rail.

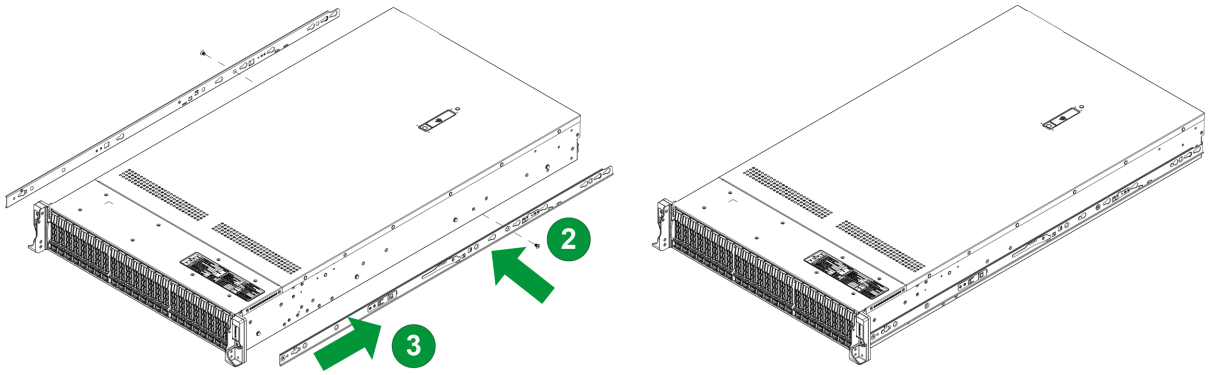



**Figure 2-3. Installing the Inner Rails**

## Installing the Outer Rails onto the Rack

After the inner rails are installed onto the CSE-HS201-R000NFP chassis, begin installing the outer rails onto the rack.

1. Confirm that the left and right outer rails have been correctly identified.
2. Press upward on the locking tab at the rear end of the middle rail.
3. Push the middle rail back into the outer rail.
4. Hang the hooks on the front of the outer rail onto the square holes on the front of the rack. If desired, use screws to secure the outer rails to the rack.
5. Pull out the rear of the outer rail, adjusting the length until it just fits within the posts of the rack.
6. Hang the hooks of the rear section of the outer rail onto the square holes on the rear of the rack. Take care that the proper holes are used so the rails are level. If desired, use screws to secure the rear of the outer rail to the rear of the rack.
7. Repeat for the other outer rail.

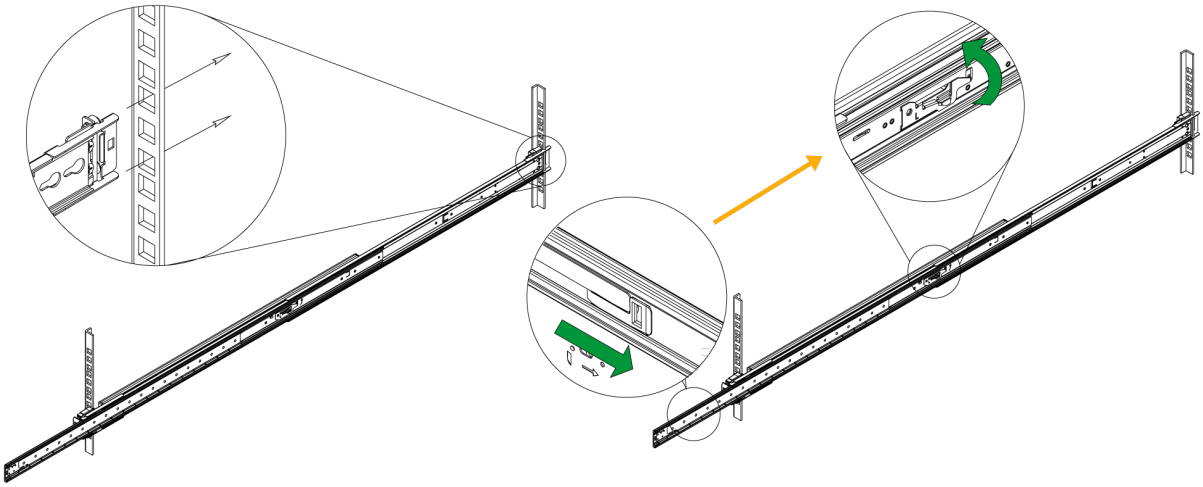


**Figure 2-4. Installing the Outer Rails**

## 2.4 Installing the Chassis into the Rack

After the rails are installed on the CSE-HS201-R000NFP chassis and on the rack, the server can be installed in the rack.

**Important:** Stability hazard. The rack stabilizing mechanism must be in place, or the rack must be bolted to the floor before you slide the unit out for servicing. Failure to stabilize the rack can cause the rack to tip over.

1. Pull both middle rails out the front of the outer rail until each clicks to a stop.
2. Align the inner rails on the chassis with the front of the middle rails.
3. Slide the inner rails on the chassis into the middle rails, keeping the pressure even on both sides. When partially in, the locking levers will stop further progress.
4. Press down the locking levers on the inside of the inner rails and push the chassis all the way into the rear of the rack. The front latches will click into place. The chassis is now mounted in the rack. It can be pulled partially out for service by lifting both front latches.

**Important:** This figure is for illustrative purposes only. Always install servers to the bottom of a rack first.

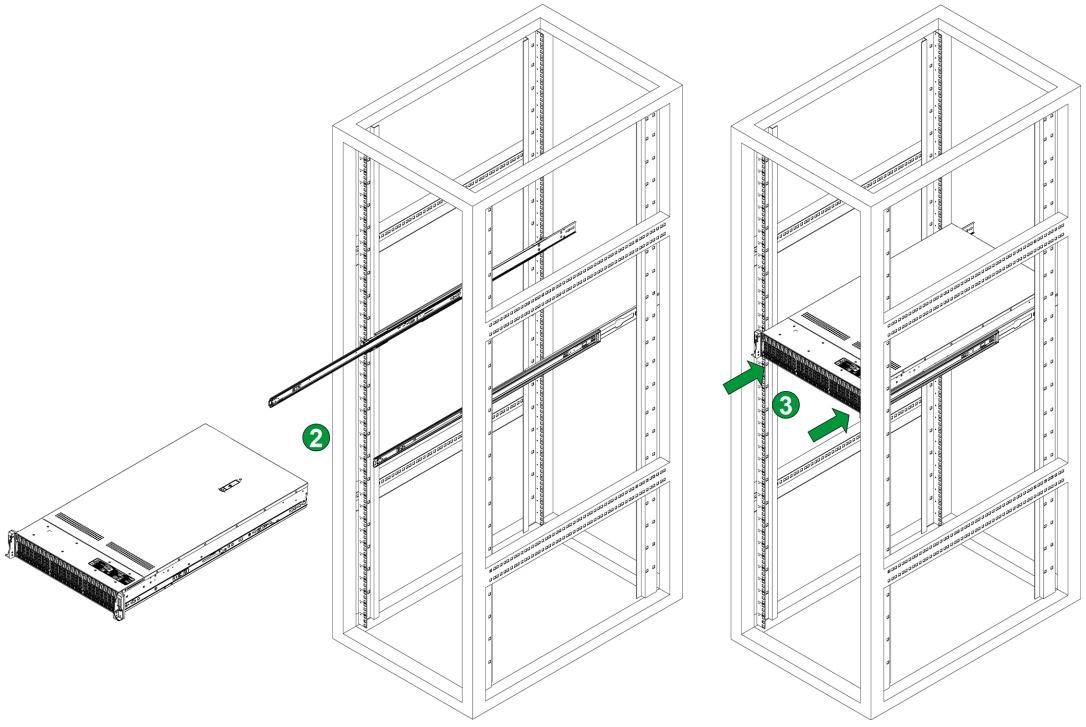



**Figure 2-5. Installing the Chassis into a Rack**

## Removing the Chassis from the Rack

**Important:** Use caution when mounting or removing the system from the rack. For large systems, at least one other person must assist during installation or removal. Follow the safety recommendations printed on the rails. Depending on the size of the system, you might need to use a lift.

1. Lift the right and left front latches, which are just below the LED control panels on the front edges of the chassis.
2. Pull the chassis forward until it clicks to a stop.

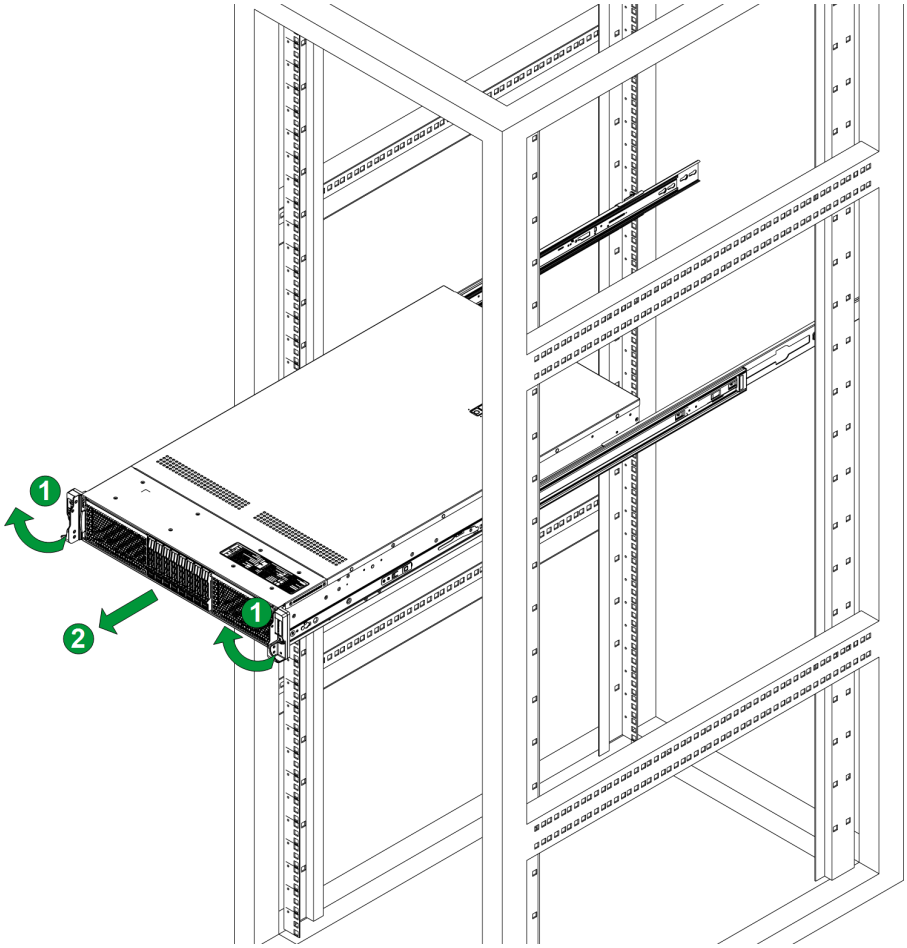



**Figure 2-6. Removing the Chassis from the Rack**

## Removing the Outer Rails from the Rack

In the uncommon event that it is necessary to remove the outer rails from the rack, follow these instructions. The SYS-222HA-TN chassis must first be out of the rack.

### *Releasing the Outer Rails*

1. On the front of the outer rail, slide the small plastic safety slider up and hold it while pushing the plastic release button just below it.
2. While holding the release button in, pull the outer rail forward to disengage the pins and the front of the rail from the rack.
3. Support the front of the outer and middle rail assembly while releasing the rear.
4. Remove the outer rail from the rear of the rack in the same way as the front. Slide the safety slider up and push and hold the release button, then pull the rear pins out of the rack and remove the rail.

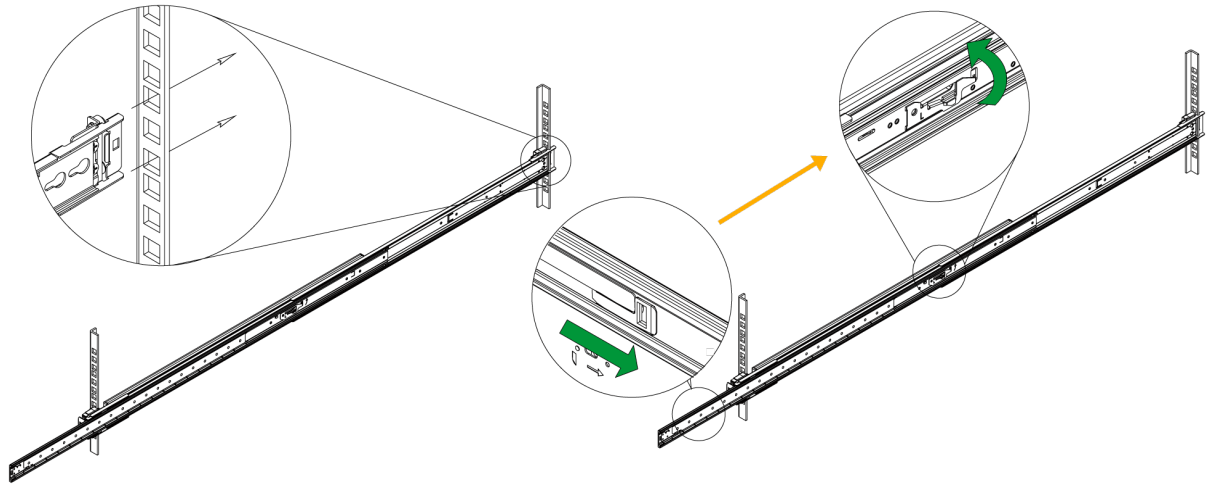


**Figure 2-7. Removing the Outer Rails**

# Chapter 3:

# Maintenance and Component Installation

This chapter provides instructions on installing and replacing main system components for the SYS-222HA-TN server. To prevent compatibility issues, only use components that match the specifications and/or part numbers given.

Installation or replacement of most components require that power first be removed from the system. Follow the procedures given in each section.

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## 3.1 Removing Power

Before performing some setup or maintenance tasks, use the following procedure to ensure that power has been removed from the SYS-222HA-TN server. This step is necessary when removing or installing non hot-swap components or when replacing a non-redundant power supply.

1. Use the operating system to power down the system.
2. After the system has completely shut-down, disconnect the AC power cord(s) from the power strip or outlet. (If your system has more than one power supply, remove the AC power cords from all power supply modules.)
3. Disconnect the power cord(s) from the power supply module(s).

## 3.2 Accessing the System

The SYS-222HA-TN server features a removable top cover for access to the internal components. When performing service on components inside the system, remove the system from the rack and place it on a work bench or desk. *Do not service with the system extended from the rack.*

### Removing the Chassis Cover

**Important:** Except for short periods of time, do not operate the server without the cover in place. The chassis cover must be in place to allow for proper airflow and to prevent overheating.

1. Remove the screws securing each side of the cover, if used.
2. Press the release button and slide the cover toward the rear.
3. Lift the top cover up.

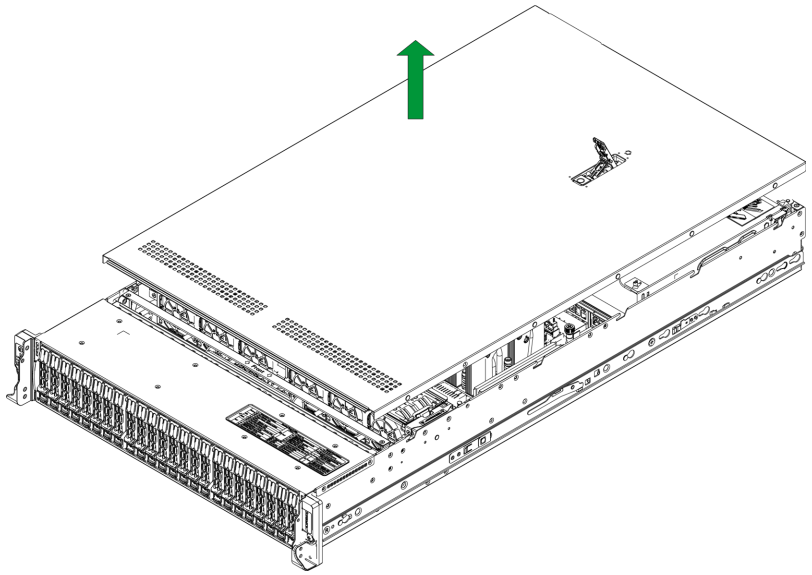


**Figure 3-1. Removing the Chassis Cover**

## 3.3 Static-Sensitive Devices

Electrostatic Discharge (ESD) can damage electronic components. To avoid damaging your motherboard, it is important to handle it very carefully. The following measures are generally sufficient to protect your equipment from ESD.

### Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing the board from the antistatic bag.
- Handle the motherboard only by its edges. Do not touch its components, peripheral chips, memory modules, or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the motherboard and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure that your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners, and the motherboard.
- Use only the correct type of onboard CMOS battery. To avoid possible explosion, do not install the onboard battery upside down.

## 3.4 Processor and Heatsink Installation

This section provides procedures to install the processor(s) and heatsink(s).

**Notes:**

- Take industry standard precautions to avoid ESD damage. For details, see "Static-Sensitive Devices" on the previous page.
- Before starting, make sure that the plastic socket cap is in place and none of the socket pins are bent. If any damage is noted, contact your retailer.
- Do not connect the system power cord before the processor and heatsink installation is complete.
- When handling the processor, avoid touching or placing direct pressure on the LGA lands (gold contacts). Improper installation or socket misalignment can cause serious damage to the processor or processor socket.
- When buying a processor separately, use only a Supermicro certified heatsink.
- Refer to the Supermicro website for the most recent processor support.
- When installing the heatsink, ensure a torque driver set to the correct force is used for each screw.
- Thermal grease is pre-applied on a new heatsink. No additional thermal grease is needed.

## BR (LGA-7529) Processors

### *Processor Top View*



**Figure 3-2. Processor**

## Overview of the Processor Socket

The processor socket is protected by a plastic protective cover.

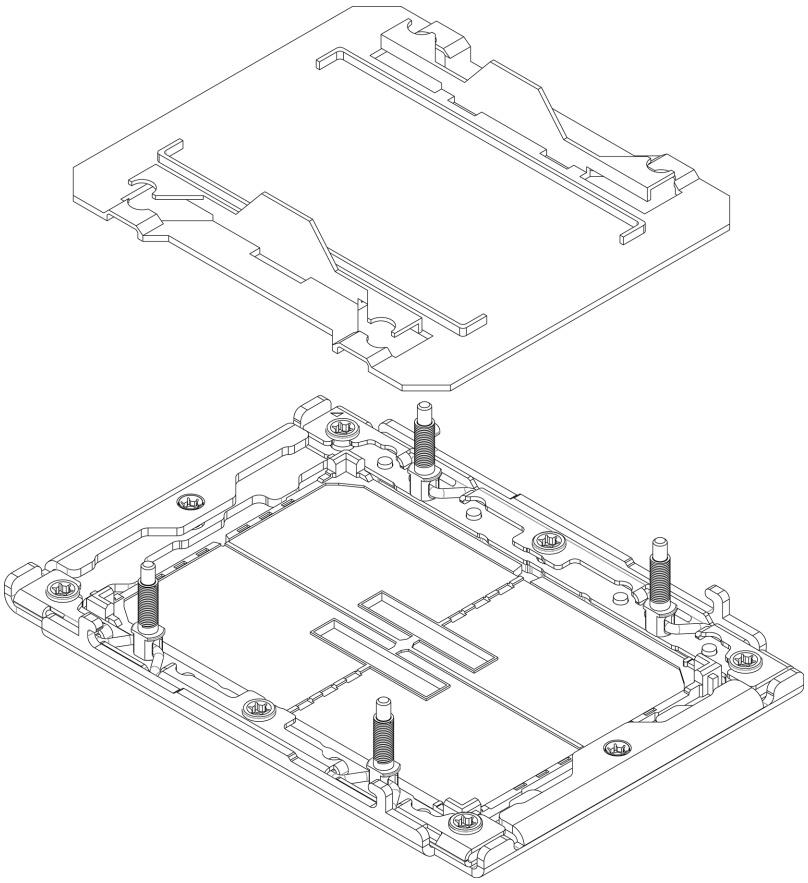


**Figure 3-3. Plastic Protective Cover and Processor Socket**

## Overview of the Processor Carrier

This section displays the X14DBM-AP motherboard processor carrier.

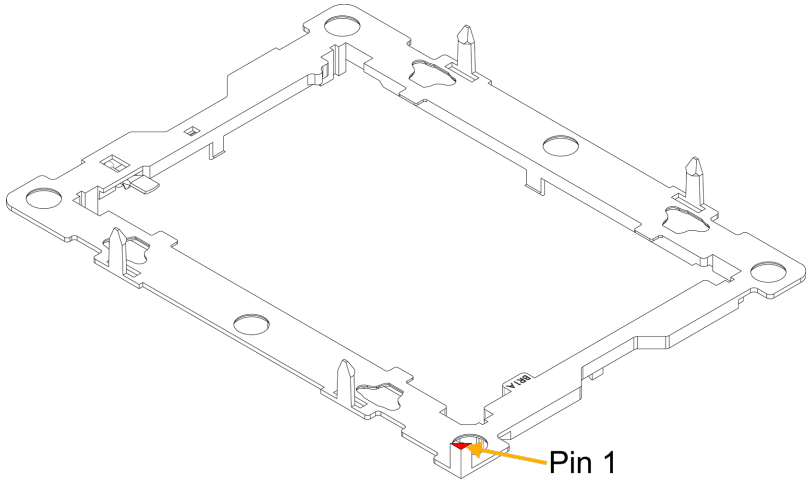



**Figure 3-4. Carrier BR1A**

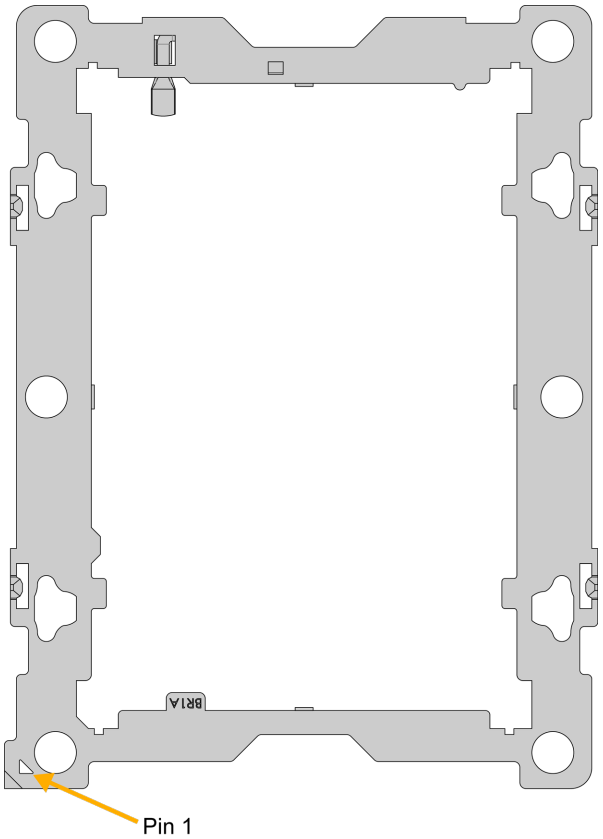



**Figure 3-5. Carrier Top View**

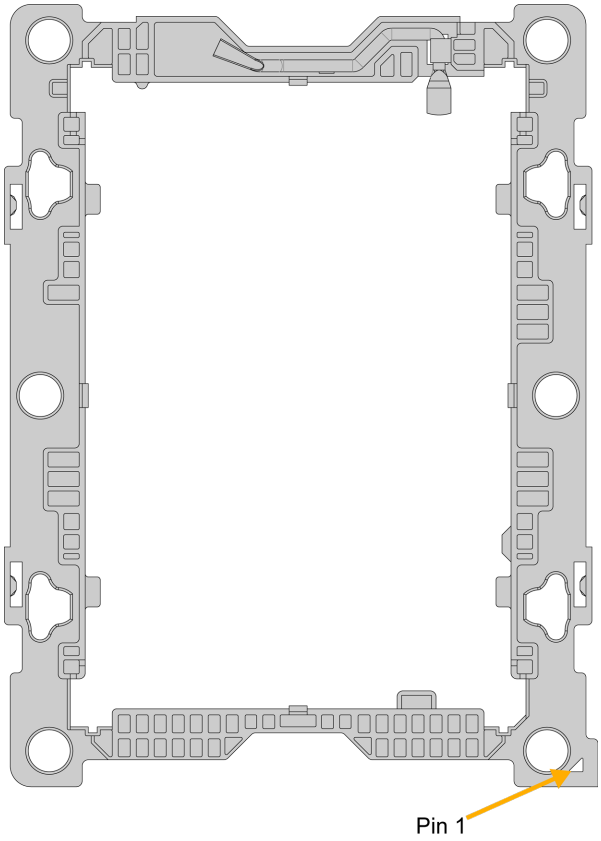



**Figure 3-6. Carrier Bottom View**

## Overview of the Processor Heatsink Module

The Processor Heatsink Module (PHM) contains a heatsink, a processor carrier, and the processor.

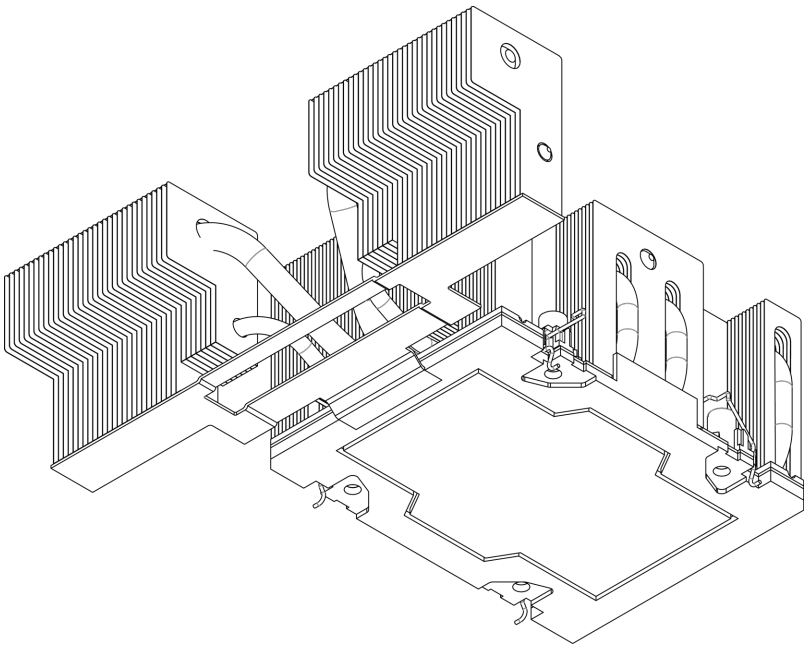


**Figure 3-7. 2U Heatsink**

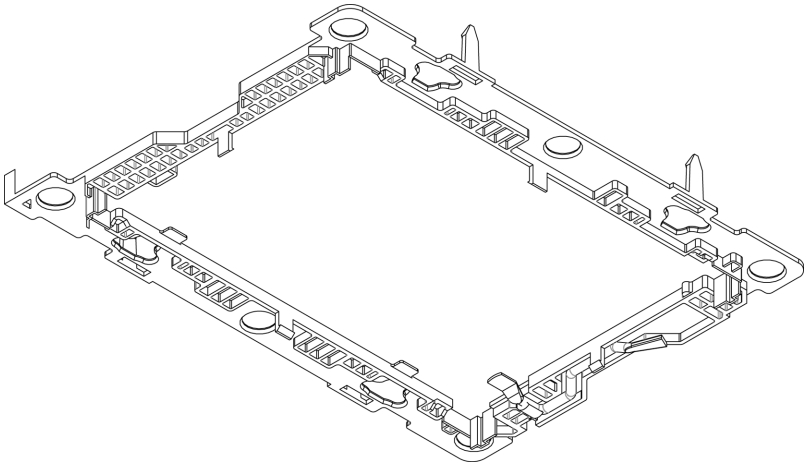


**Figure 3-8. Carrier**

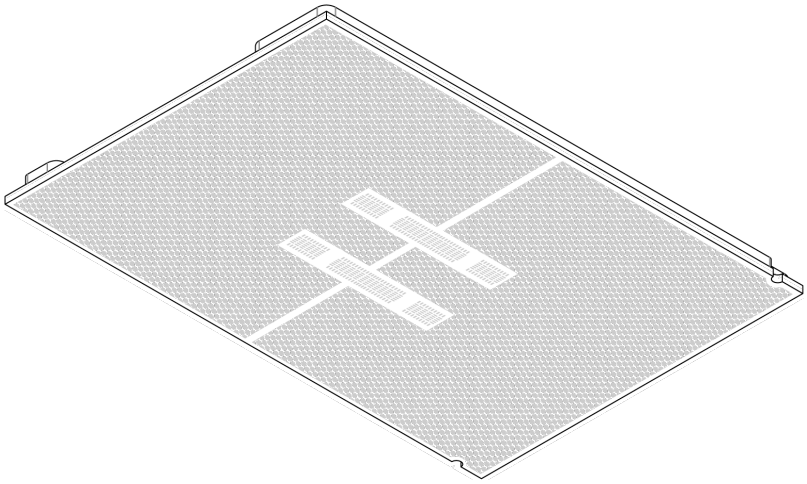


**Figure 3-9. Processor**

## Installing the Processor

To install a processor into the processor carrier, follow the steps below:

1. Ensure the lever on the processor carrier is pressed down and held by a latch on the processor carrier as shown below.

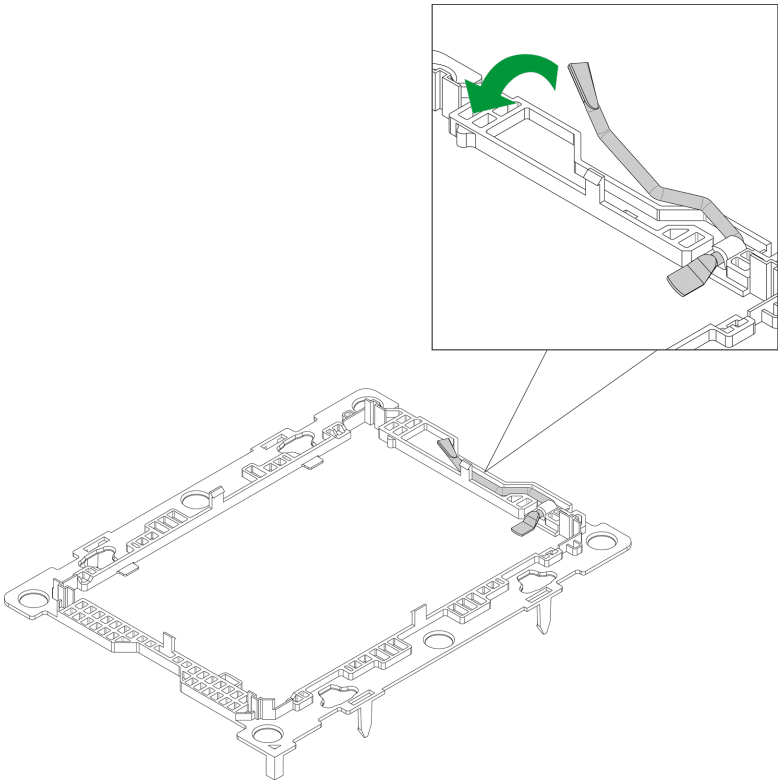


**Figure 3-10. Carrier Lever**

2. Hold the processor with the LGA lands (gold contacts) facing down. Locate the small, gold triangle in the corner of the processor and the corresponding hollowed triangle on the processor carrier. These triangles indicate pin 1.

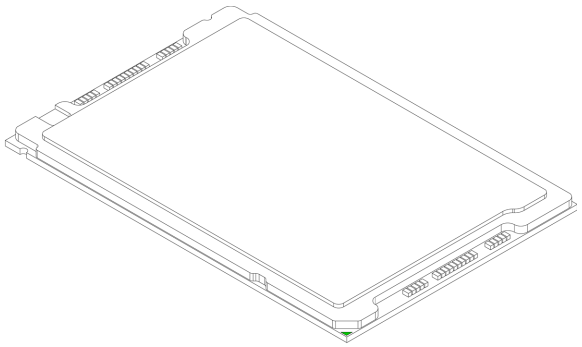


**Figure 3-11. Processor**

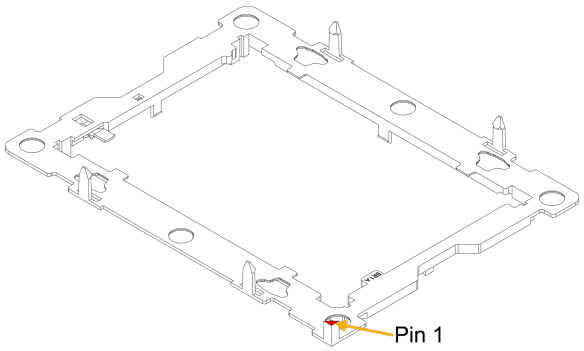



**Figure 3-12. Carrier**

3. While ensuring that the pin 1 triangles point towards the same direction, flip over the processor and processor carrier. Use the latches on the processor carrier to secure the processor onto the processor carrier. Processor keys on the processor and processor carrier will prevent securing the processor in an incorrect orientation.

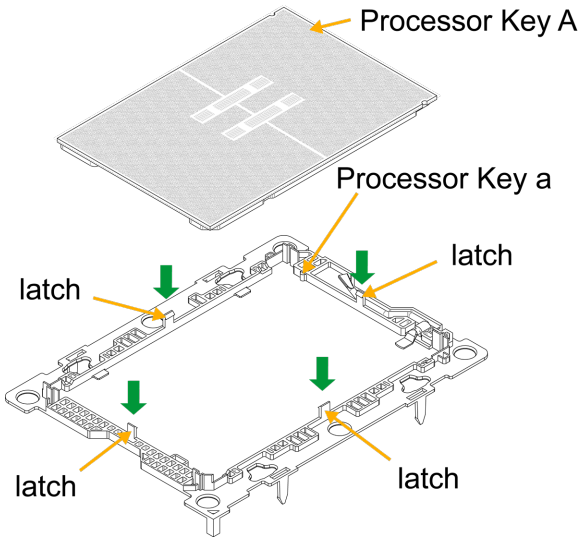



**Figure 3-13. Key and Latch Locations**

4. Examine all corners to verify that the processor is secured to the carrier. Two triangles indicating pin 1 on the processor and processor carrier should point towards the same direction.

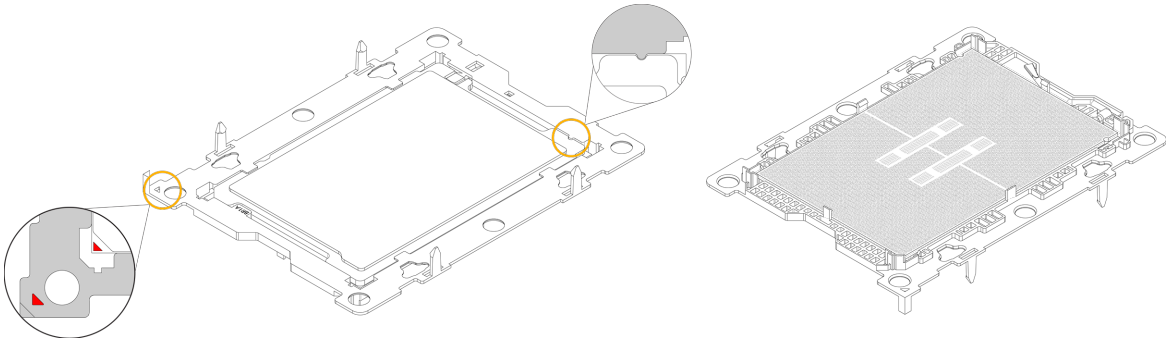


**Figure 3-14. Processor and BR1A Keys and Latches**

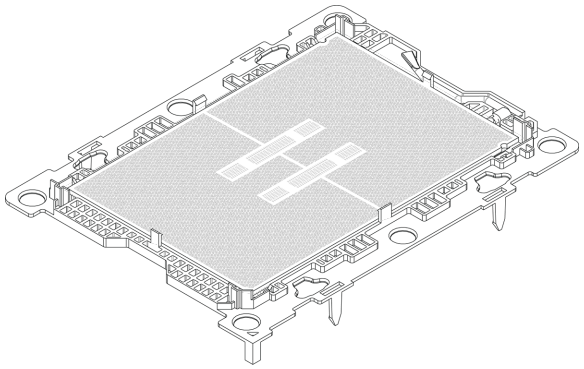


**Figure 3-15. Completed Processor Carrier Installation**

## Assembling the Processor Heatsink Module

After installing the processor into the carrier, mount it onto the heatsink to create the processor heatsink module (PHM):

1. Note the extensions of the heatsink if it is an EVAC heatsink. Ensure these extensions are oriented towards the chassis fans.
2. If this is a new heatsink, the thermal grease has been pre-applied. Otherwise, apply the proper amount of thermal grease.
3. Hold the processor carrier so the processor's gold contacts are facing up, then align the holes of the processor carrier with the holes on the heatsink. Press the processor carrier down until it snaps into place. The plastic clips of the processor carrier will lock at the four corners.

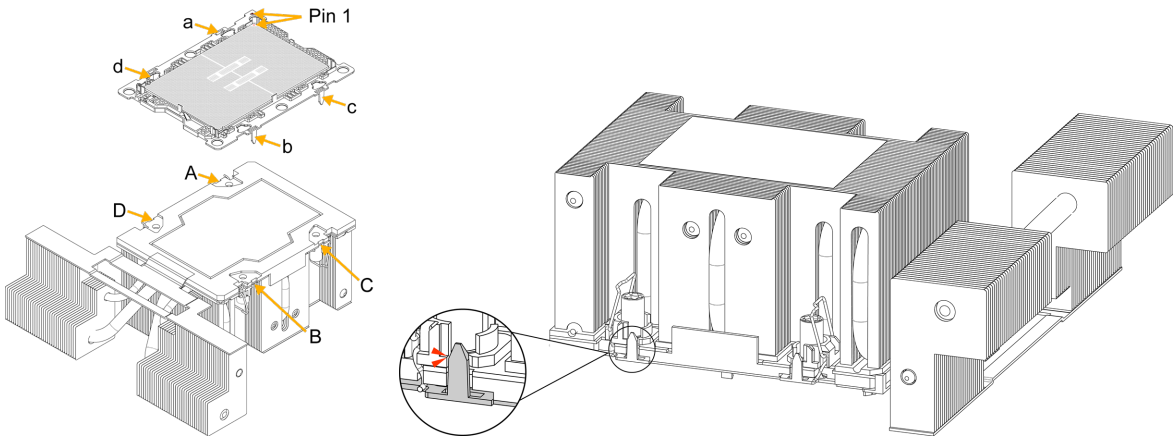



**Figure 3-16. Carrier with 2U Heatsink (Left), PHM Plastic Clips Locked (Right)**

4. Examine all corners to ensure that the plastic clips on the processor carrier are firmly attached to the heatsink.

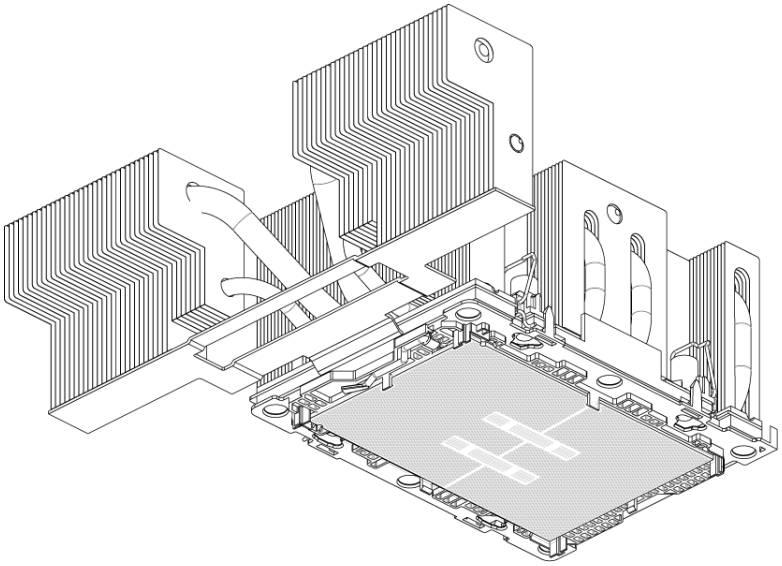


**Figure 3-17. PHM Completed**

## Preparing the Processor Socket for Installation

This motherboard comes with a plastic protective cover installed on the processor socket. Remove it from the socket to install the Processor Heatsink Module (PHM). Gently pull up one corner of the plastic protective cover to remove it.

1. Press the tabs inward.

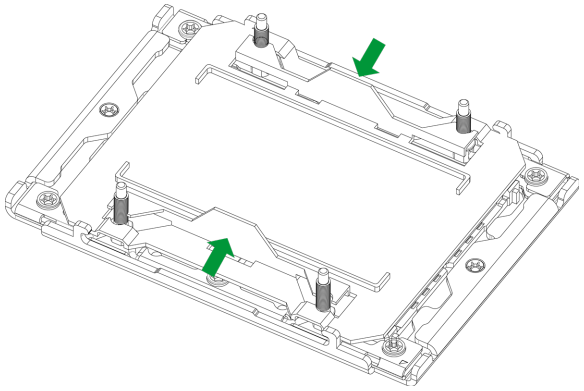


**Figure 3-18. Processor Socket with Plastic Protective Cover**

2. Pull up the protective cover from the socket.

**Note:** Do not touch or bend the socket pins.

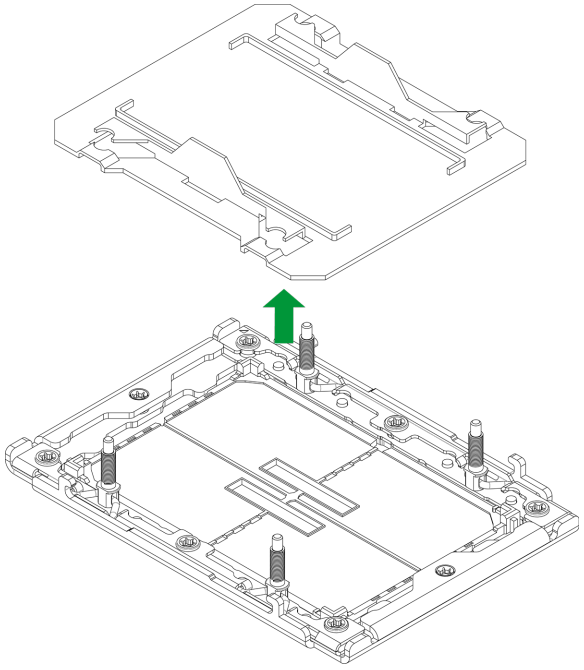


**Figure 3-19. Plastic Protective Cover Removed**

## Preparing to Install the PHM into the Processor Socket

After assembling the Processor Heatsink Module (PHM), you are ready to install it into the processor socket. To ensure the proper installation, follow the procedures below:

1. Locate the four threaded fasteners (marked a, b, c, and d) on the processor socket.

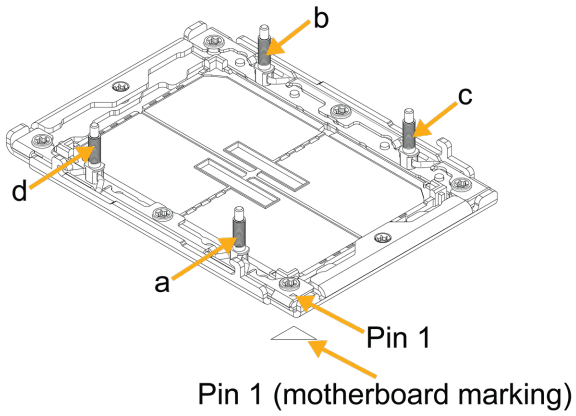



**Figure 3-20. Threaded Fasteners**

2. Locate the four PEEK nuts (marked A, B, C, and D) and four rotating wires (marked 1, 2, 3, and 4) on the heatsink. Align the PEEK nuts with the threads on the BR (LGA-7529) (marked a, b, c, d).

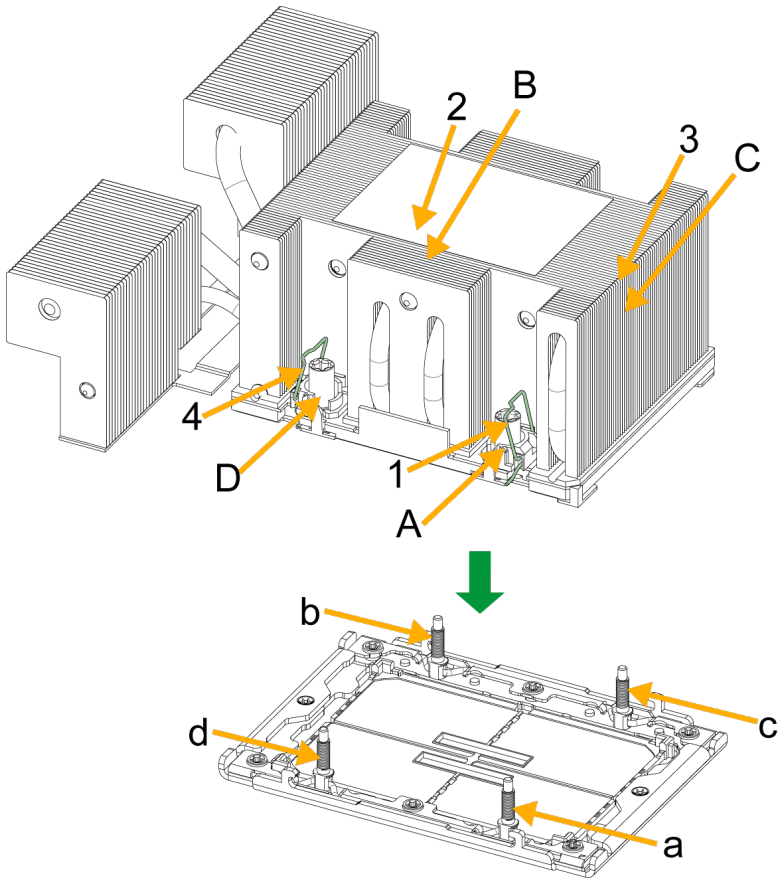



**Figure 3-21. PEEK Nuts and Rotating Wires**

3. Check the rotating wires (marked 1, 2, 3, and 4) to make sure that they are at unlatched positions before installing the PHM into the processor socket.

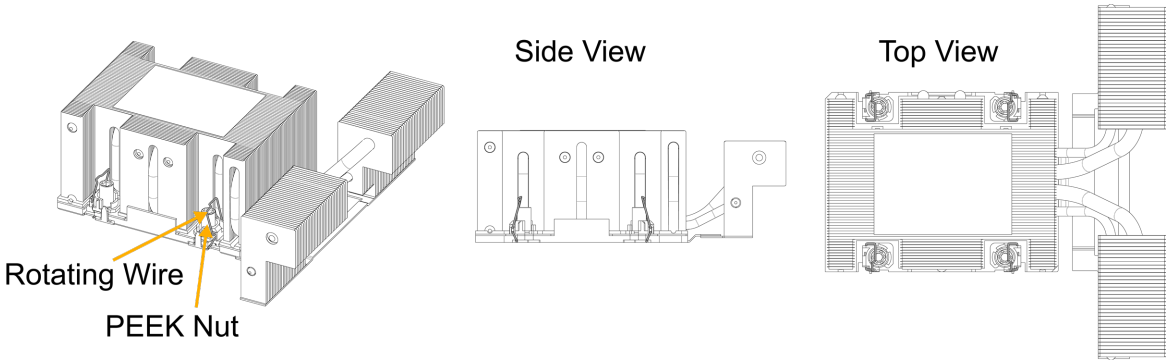



**Figure 3-22. Unlatched Positions**

## Installing the Processor Heatsink Module

1. Align pin 1 of the PHM with the printed triangle on the processor socket.
2. Make sure all four PEEK nuts of the heatsink (marked A, B, C, and D) are aligned with the threaded fasteners (marked a, b, c, and d), then gently place the heatsink on top of the processor socket.

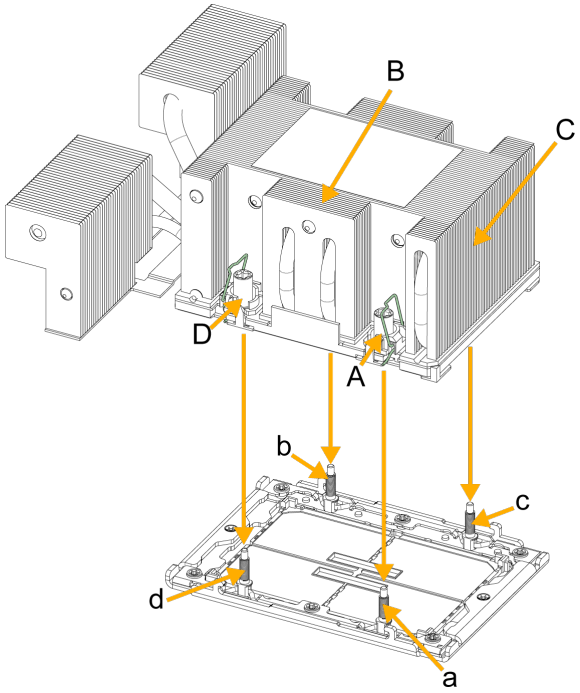



**Figure 3-23. Aligning the 2U Heatsink with the Socket**

3. Press all four rotating wires inwards and make sure that the heatsink is securely latched into the processor socket.

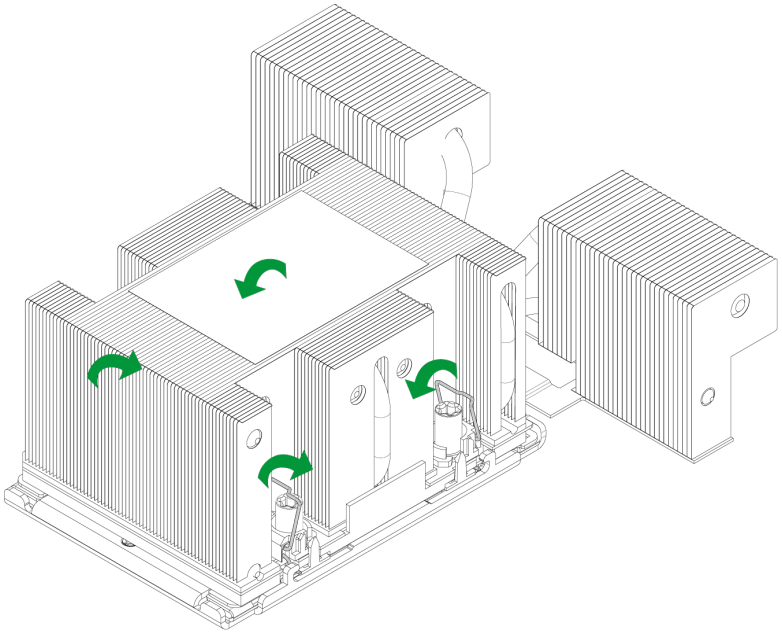


**Figure 3-24. Latching the PHM**

4. With a T30 bit torque driver set to a force of 8.0 in-lbf (0.904 N-m), gradually tighten the four screws to ensure even pressure. You can start with any screw, but make sure to tighten the screws in a diagonal pattern.

**Important:** Do not use a force greater than 8.0 in-lbf (0.904 N-m). Exceeding this force may over-torque the screw, causing damage to the processor, heatsink, and screw.

5. Examine all corners to ensure that the PHM is firmly attached to the socket.

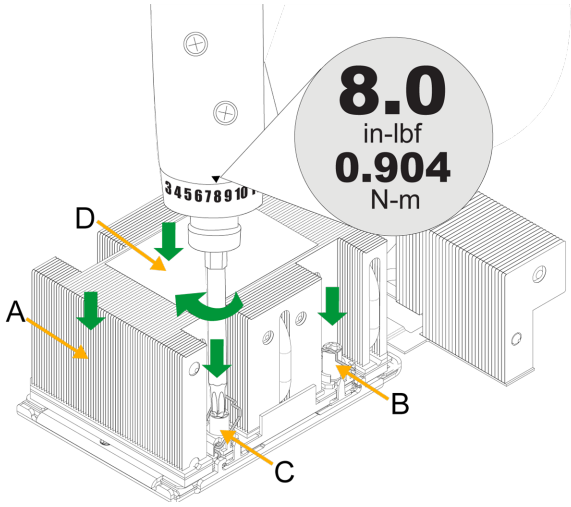



**Figure 3-25. Installing the PHM with a Torque Driver**

## Removing the Processor Heatsink Module

Before removing the processor heatsink module (PHM) from the motherboard, shut down the system and then unplug the AC power cord from all power supplies.

Then follow the steps below:

1. Use a screwdriver to loosen the four screws. You can start with any screw, but make sure to loosen the screws in a diagonal pattern.

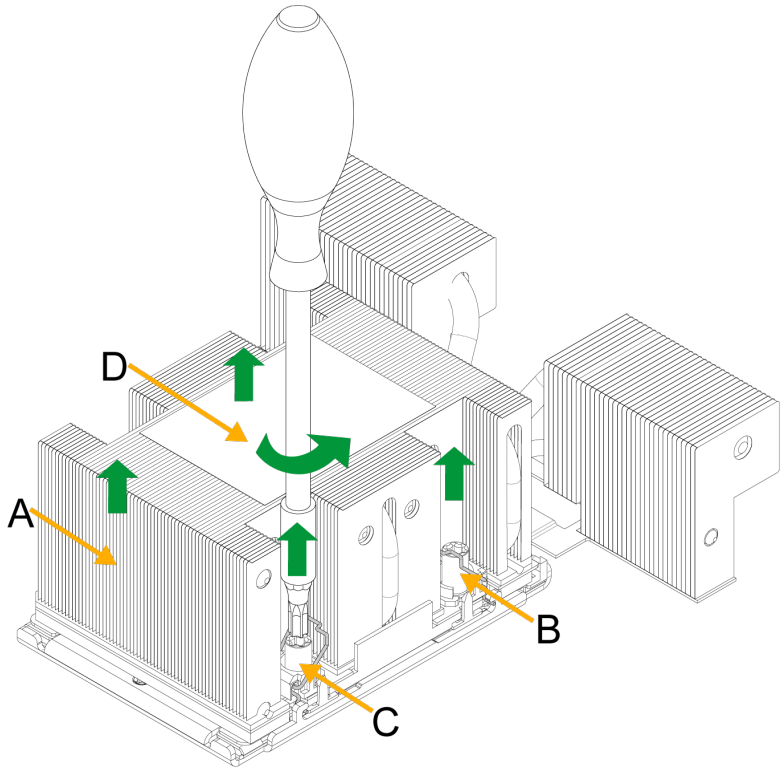



**Figure 3-26. Loosening the Screws**

2. Press the four rotating wires outwards to unlatch the PHM from the socket.

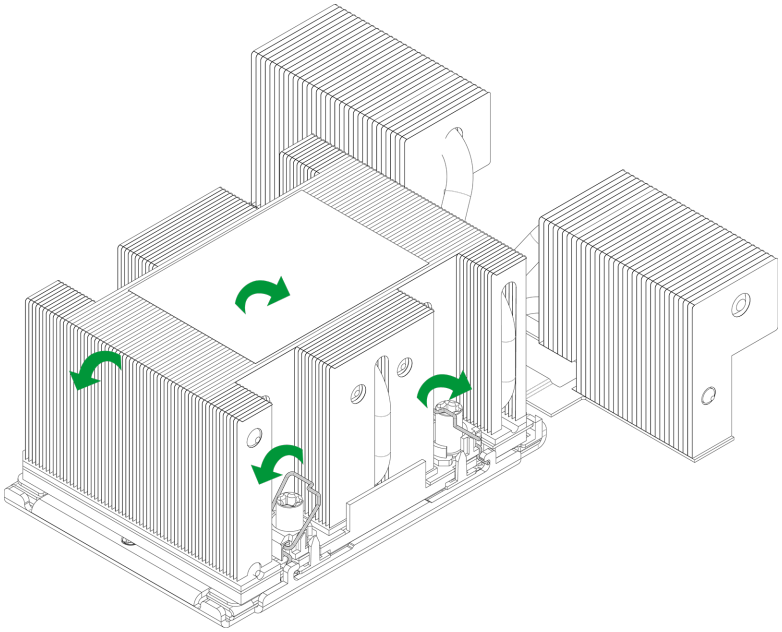


**Figure 3-27. Unlatching the PHM**

3. Gently lift the PHM upwards to remove it from the socket.

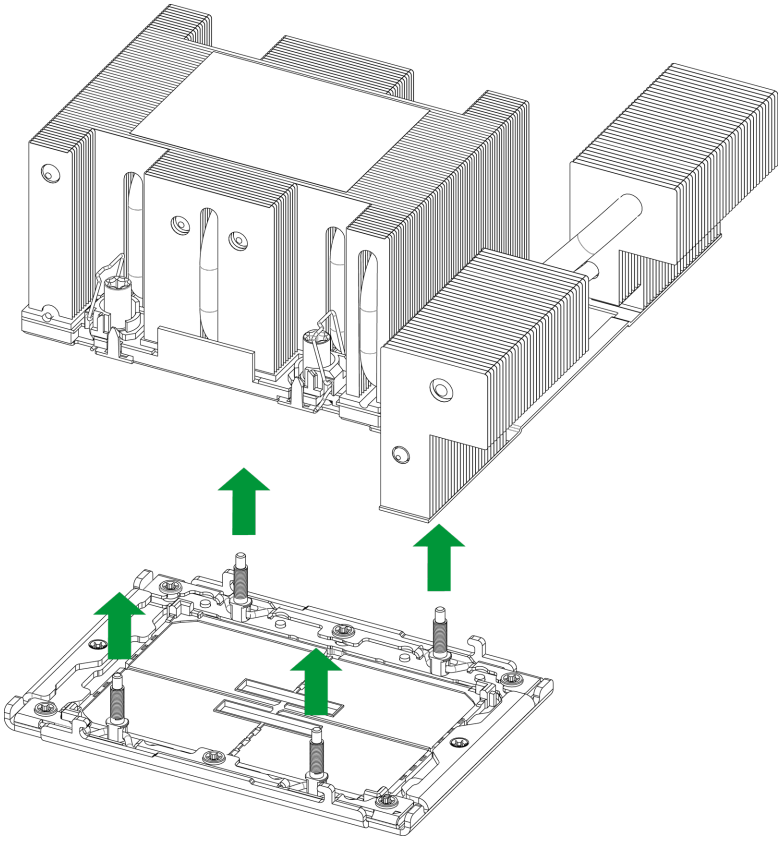


**Figure 3-28. Removing the PHM from the Socket**

4. To remove the processor from the heatsink, gently lift the lever from the processor carrier.

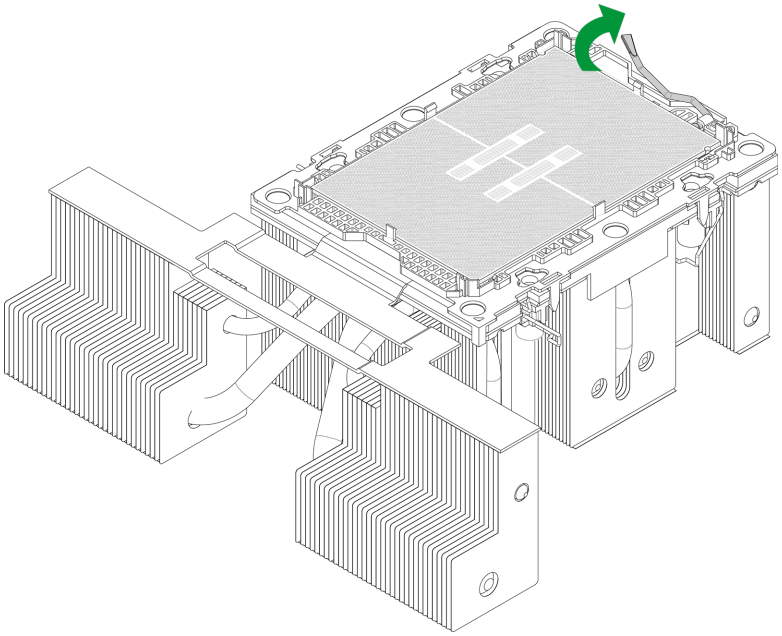


**Figure 3-29. Carrier with 2U Heatsink**

5. To remove the processor, move the lever to its unlocked position and gently remove the processor.

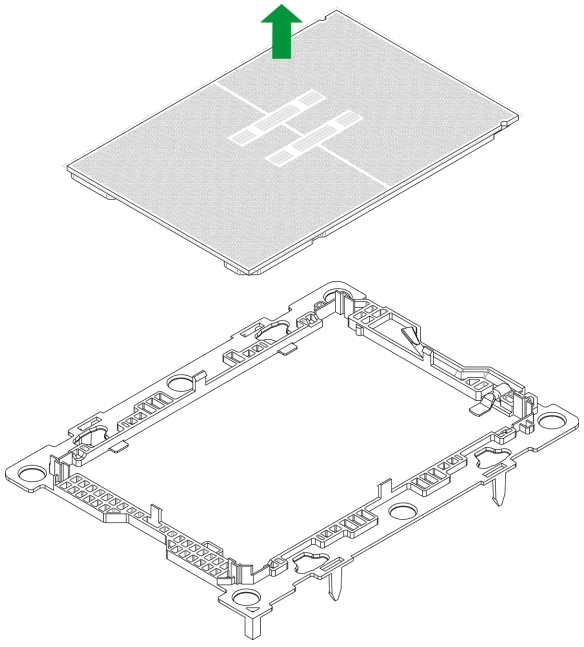


**Figure 3-30. Removing the Processor**

# 3.5 Memory Support and Installation

## Memory Support

**Note:** Check the Supermicro website for recommended memory modules.

**Important:** Exercise extreme care when installing or removing memory modules to prevent any possible damage.

The X14DBM-AP motherboard supports up to 6 TB of DDR5 (288-pin) memory with speeds up to 6400 MT/s (1DPC).

To enhance memory performance and ensure system stability, do not mix memory modules of different speeds, different sizes, and different types in your server.

**Note:** Memory speed/capacity support depends on the processors used in the system.

### *The Intel® Xeon® 6900-Series Processors with P-cores*

| DDR5 Memory Support for Intel® Xeon® 6900 Series Processors with P-Cores | | | | | |
|---|---|---|---|---|---|
| **Type** | **Ranks Per DIMM, Data Width (Stack)** | **DIMM Capacity (GB)** | | | **Speed (MT/s); Voltage (V); Slots per Channel (SPC) and DIMMs per Channel (DPC)** |
| | | **DRAM Density** | | | **1DPC/1SPC** |
| | | **16 Gb** | **24 Gb** | **32 Gb** | **+1.1 V** |
| **RDIMM** | 1Rx4 | 32 GB | 48 GB | - | 6400, 6000, 5600, 5200, 4800 (DDR5-6400 rated RDIMMs only) |
| | 2Rx8 | 32 GB | 48 GB | - | |
| | 2Rx4 | 64 GB | 96 GB | 128 GB | |
| **3DS RDIMM** | 8Rx4 | 256 GB | - | - | |
| | 4Rx4 | - | - | 256 GB | |
| **MRDIMM** | 2Rx8 | 32 GB | 48 GB | - | 8800, 8000, 7200 (MRDIMM-8800 only) |
| | 2Rx4 | 64 GB | 96 GB | 128 GB | |
| | 4Rx8 | 64 GB | 96 GB | - | |
| | 4Rx4 (2U) | 128 GB | - | - | |
| | 4Rx4 (2U) | - | - | 256 GB | |

| Intel® Xeon® 6900-Series Processors with P-Cores<br>DDR5 Memory Population Table<br>(1 Processor and 12 DIMMs Installed, 1DPC) | |
|---|---|
| ***DIMM Counts*** | ***Memory Population Sequence (1DPC)*** |
| **1 Processor and 1 DIMM (Recommend Optimized Configuration)** | DIMMA1 |
| **1 Processor and 8 DIMMs (Recommend Optimized Configuration)** | DIMMC1/DIMMD1/DIMME1/DIMMF1/DIMMI1/DIMMJ1/DIMMK1/DIMML1 |
| **1 Processor and 8 DIMMs** | DIMMA1/DIMMB1/DIMMD1/DIMME1/DIMMG1/DIMMH1/DIMMJ1/DIMMK1 |
| **1 Processor and 8 DIMMs** | DIMMA1/DIMMB1/DIMMC1/DIMMF1/DIMMG1/DIMMH1/DIMMI1/DIMML1 |
| **1 Processor and 12 DIMMs (Recommend Optimized Configuration)** | DIMMA1/DIMMB1/DIMMC1/DIMMD1/DIMME1/DIMMF1/<br>DIMMG1/DIMMH1/DIMMI1/DIMMJ1/DIMMK1/-DIMML1 |

**Note:** DIMM rank mixing is not allowed.

## General Guidelines for Optimizing Memory Performance

- It is recommended to use DDR5 memory of the same type, size, and speed.
- Mixed DIMM speeds can be installed. However, all DIMMs will run at the speed of the slowest DIMM.
- The motherboard will support an odd number amount of memory modules. However, to achieve the best memory performance, a balanced memory population is recommended.

## DIMM Installation

**Important:** To avoid causing any damage to the memory module or the DIMM socket, do not use excessive force when pressing the release tabs on the ends of the DIMM socket. Handle memory modules with care. To avoid ESD-related damage to your memory modules or components, carefully follow all the instructions given in "Static-Sensitive Devices" on page 49.

1. Insert the desired number of DIMMs into the memory slots based on the recommended DIMM population table earlier in this section.
2. Push the release tabs outwards on both ends of the DIMM slot to unlock it.

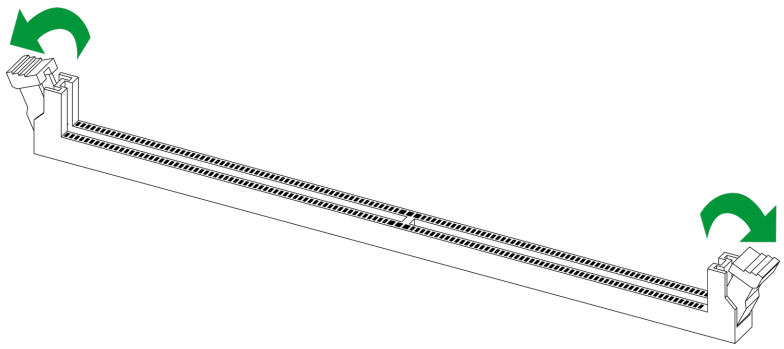


**Figure 3-31. Unlocking the DIMM Slot**

3. Align the key of the DIMM with the receptive point on the memory slot.

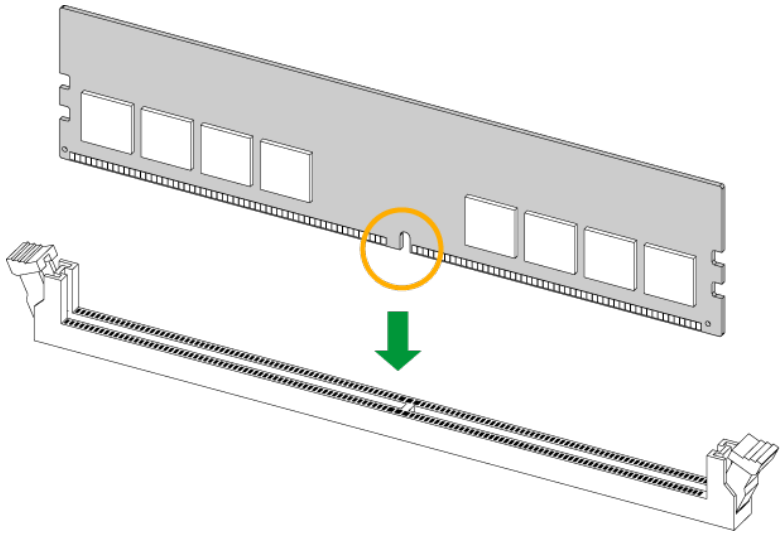


**Figure 3-32. Aligning the DIMM Slot with the Receptive Point**

4. Align the notches on both ends of the module against the receptive points on the ends of the slot.

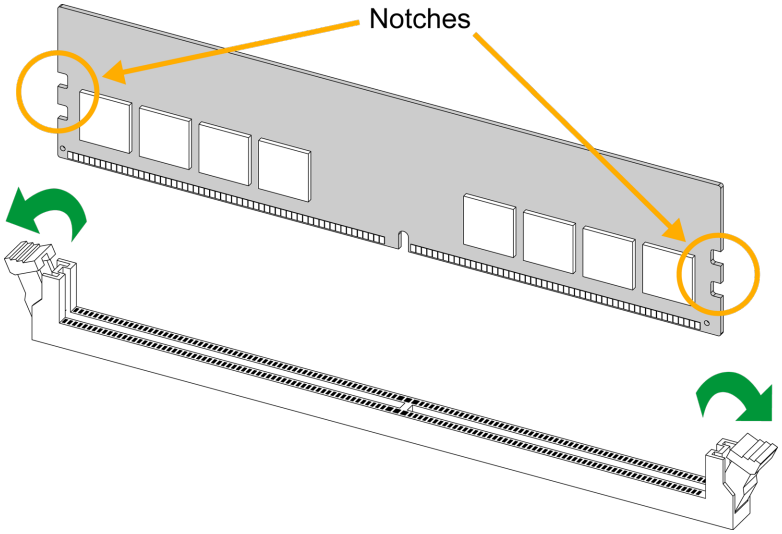



**Figure 3-33. Aligning the Notches**

5. Press both ends of the module straight down into the slot until the module snaps into place.
6. Press the release tabs to the lock positions to secure the DIMM into the slot.

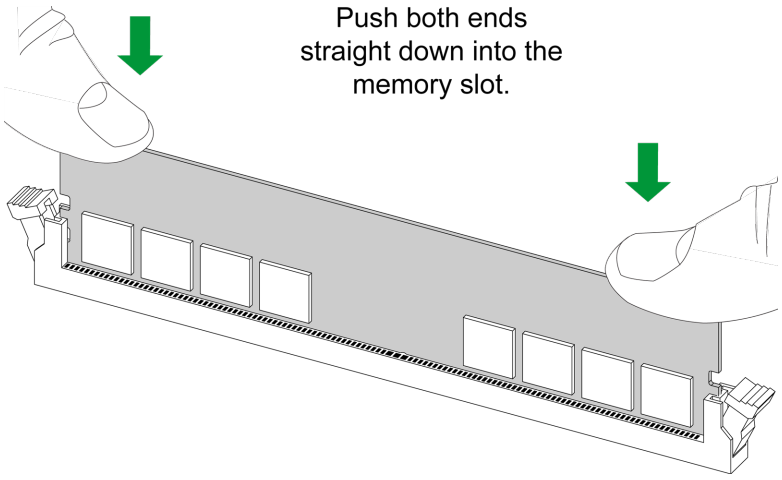



**Figure 3-34. Securing the DIMM**

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

## DIMM Removal

**Important:** To avoid causing any damage to the memory module or the DIMM socket, do not use excessive force when pressing the release tabs on the ends of the DIMM socket. Handle memory modules with care. To avoid ESD-related damage to your memory modules or components, carefully follow all the instructions given in "Static-Sensitive Devices" on page 49.

Press both release tabs on the ends of the DIMM socket to unlock it. Once the DIMM is loosened, remove it from the memory slot.

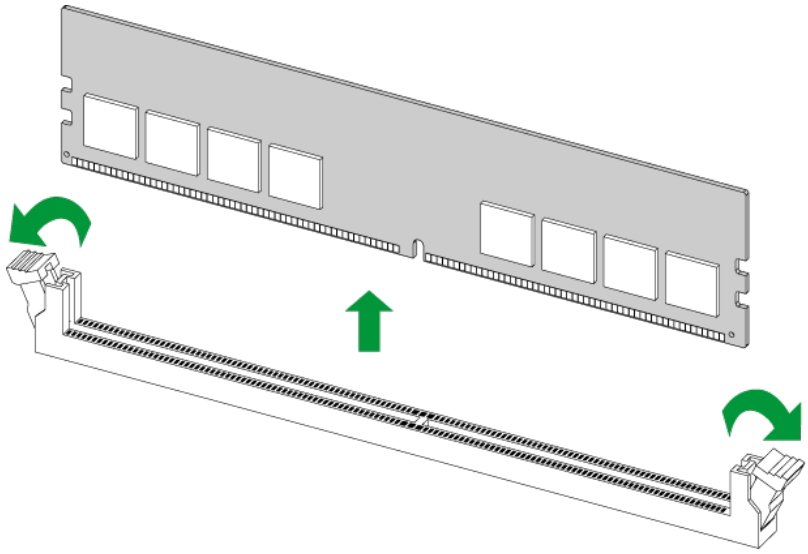


**Figure 3-35. Unlocking the DIMM Slot**

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

# 3.6 Motherboard Battery Removal and Installation

## Battery Removal

To remove the onboard battery, follow the steps below:

1. Power off your system and unplug your power cable.
2. Locate the onboard battery as shown below.
3. Using a tool such as a pen or a small screwdriver, push the battery lock outwards to unlock it. Once unlocked, the battery will pop out from the holder.
4. Remove the battery.

## Proper Battery Disposal

**Important:** Handle used batteries carefully. Do not damage the battery in any way; a damaged battery may release hazardous materials into the environment. Do not discard a used battery in the garbage or a public landfill. Comply with the regulations set up by your local hazardous waste management agency to dispose of your used battery properly.

## Battery Installation

To install an onboard battery, follow steps 1 and 2 above and continue below:

**Important:** When replacing a battery, be sure to only replace it with the same type.

1. Identify the battery's polarity. The positive (+) side should be facing up.
2. Insert the battery into the battery holder and push it down until you hear a click to ensure that the battery is securely locked.

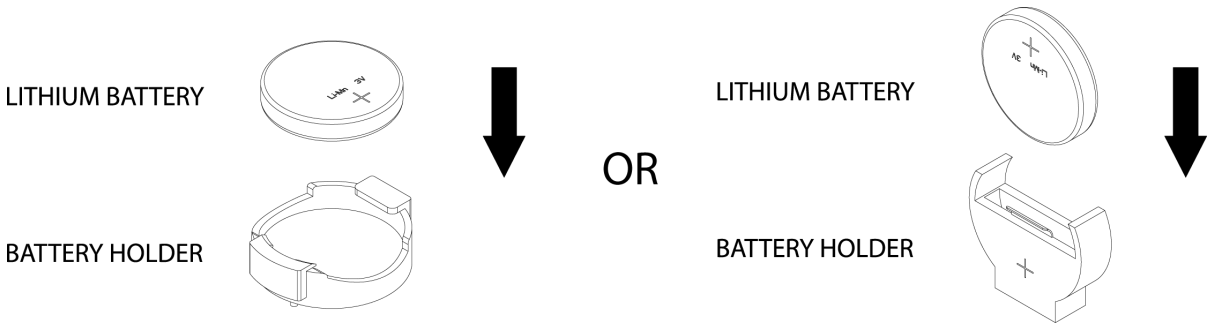



**Figure 3-36. Installing a Battery**

## 3.7 Storage Drives

The storage drives are mounted in tool-less drive carriers that simplify their removal from the chassis. These carriers also help promote proper airflow. For compatible storage drives, see the SYS-222HA-TN product page.

### Installing Drives




**Figure 3-37. Logical Drive Numbers**

#### *Removing a Hot-Swap Drive Carrier from the Chassis*

1. Press the release button on the drive carrier, which will extend the drive carrier handle.
2. Use the drive carrier handle to pull the drive out of the chassis.

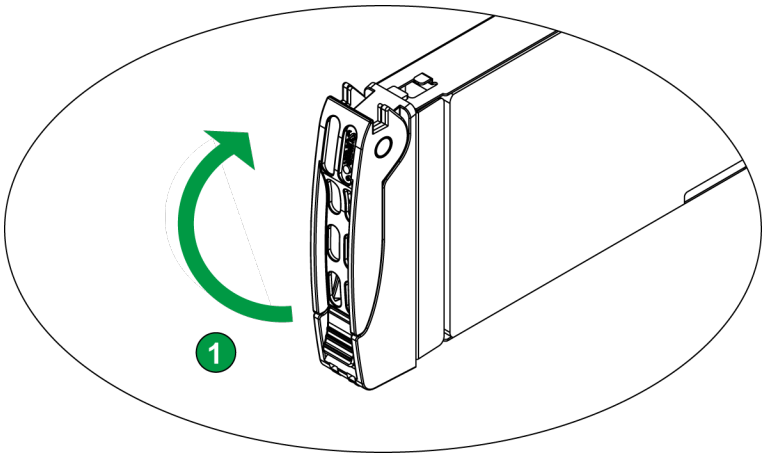



**Figure 3-38. Removing a Drive Carrier**

## Hot-Swap for NVMe Drives

Supermicro servers support NVMe surprise hot-swap. For even better data security, NVMe orderly hot-swap is recommended. NVMe drives can be ejected and replaced remotely using BMC.

**Note:** If you are using VROC, see "Intel Virtual RAID on CPU (VROC)" on page 1 in this manual instead.

### *Ejecting a Drive*

1. **BMC > Server Health > NVMe SSD**
2. Select Device, Group, and Slot, and click **Eject**. After ejecting, the drive Status LED indicator turns green.
3. Remove the drive.

Note that Device and Group are categorized by the CPLD design architecture.

A Slot is the slot number on which the NVMe drives are mounted.

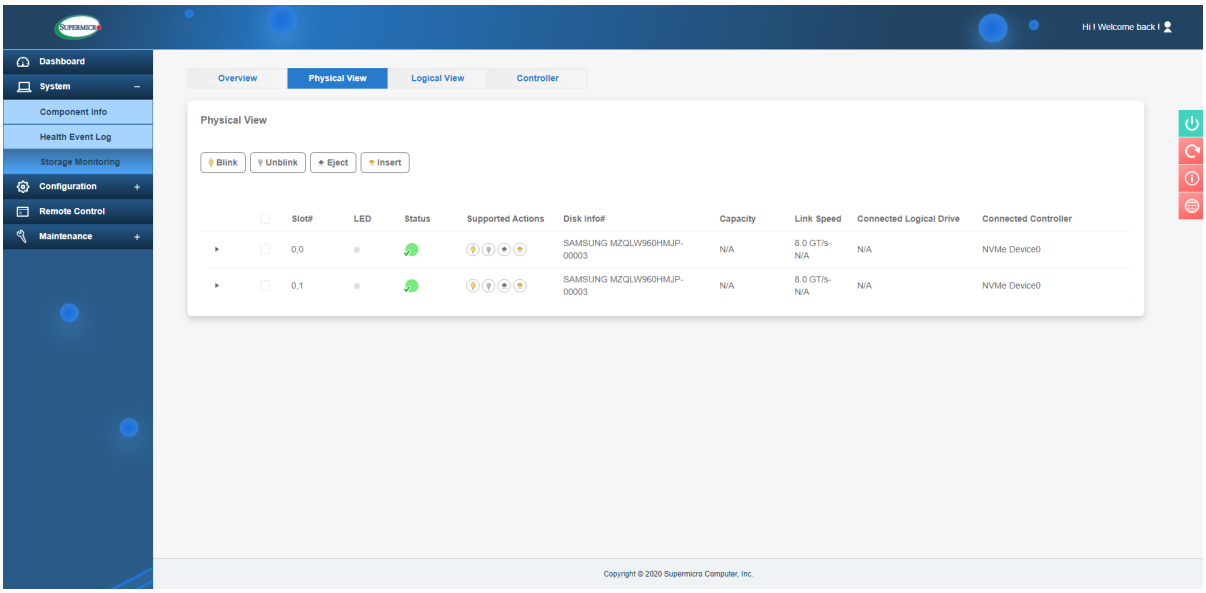



**Figure 3-39. BMC Screenshot**

### *Replacing a Drive*

1. Insert the replacement drive.
2. **BMC > System > Storage Monitor > Physical View**

3. Select Device, Group, and slot and click **Insert**. The drive Status LED indicator flashes red, then turns off. The Activity LED turns blue.

## 3.8 Boot Drives

Before following the procedure below to install M.2 solid state drives, first turn off and remove power from the system as described in "Removing Power" on page 47 then remove the top cover.

### Installing M.2 Solid State Drives on Motherboard

The X14DBM-AP motherboard has two PCIe 5.0 M.2 slots (M.2-C1, M.2-C2). M.2 allows for a variety of card sizes, increased functionality, and spatial efficiency.

The M.2 slot on the motherboard supports PCIe 5.0 x2 devices in the 2280 and 22110 form factors.

**Important:** M.2 slots are intended to be used for boot devices only. Any write intensive workloads may result in thermal issues and the M.2s overheating.

1. Remove power from the system and then remove the top cover as described in "Removing Power" on page 47 and "Accessing the System" on page 1.
2. Locate the plastic clips that will lock the M.2 SSD in place. Determine whether your M.2 SSD is 80-mm or 110-mm.

#### *Installing 80-mm M.2 SSDs*

1. Open the green plastic pin. Push the pin into the holes in the motherboard.

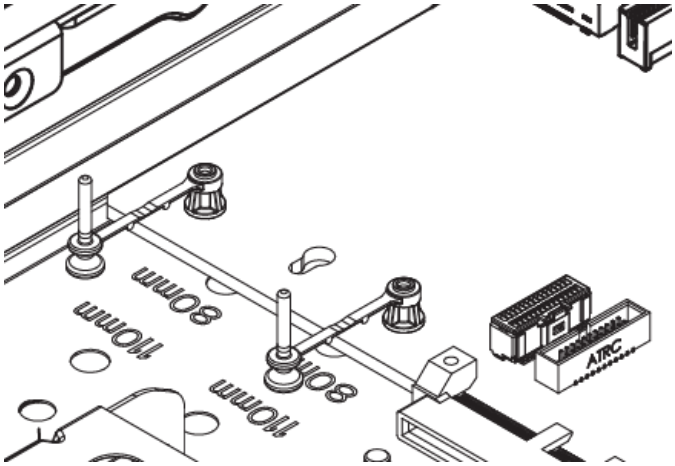



**Figure 3-40. Pushing the Pin onto the Motherboard**

2. Insert the M.2 at an angle, then push the M.2 down so it lays flat.

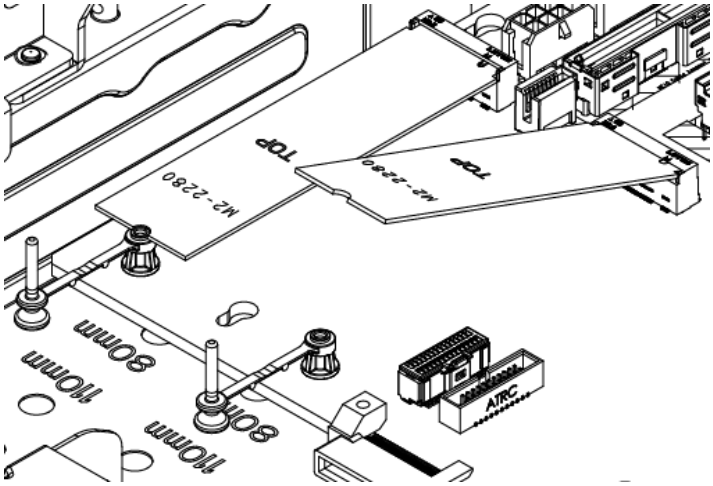



**Figure 3-41. Inserting the M.2**

3. Close the pin to secure the M.2. The M.2 will rest on the lip of the pins.

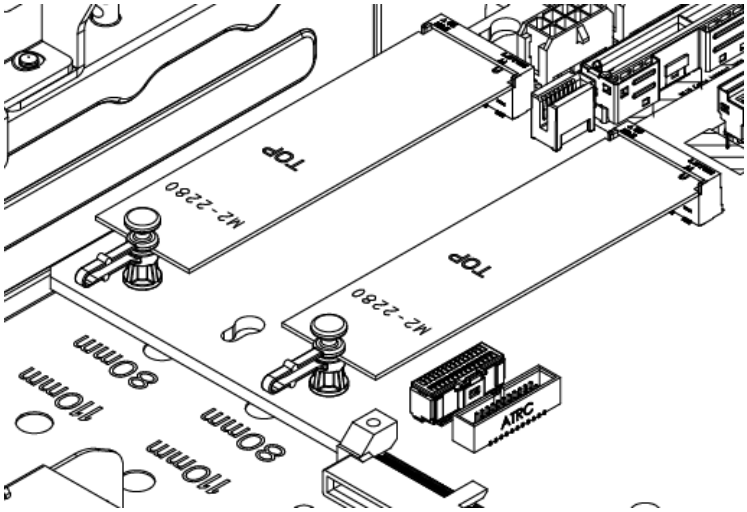



**Figure 3-42. Securing the M.2 Drive**

### *Installing 110-mm M.2 SSDs*

1. If the plastic clip is not in the correct hole, move it. To remove the plastic clip, twist it 90° degrees and pull up.
2. Insert the M.2 sideways into the connector so that it lays flat, then secure it to the motherboard with the plastic clip.

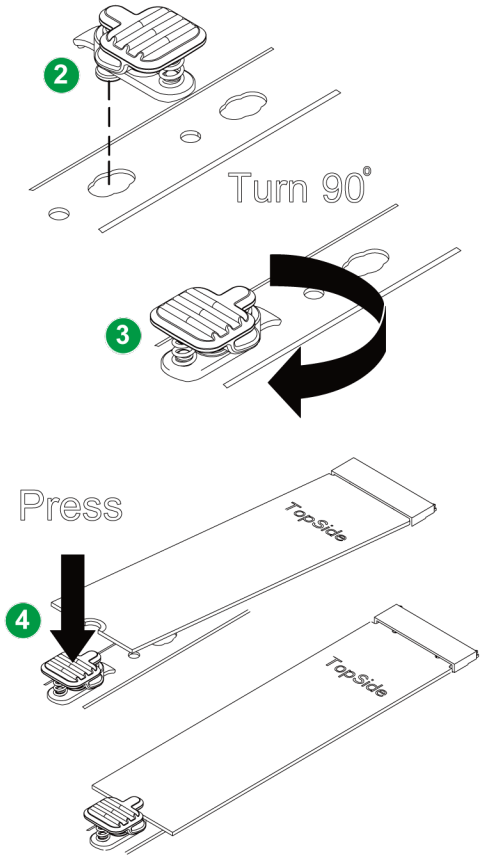



**Figure 3-43. Installing a Plastic Locking Clip and M.2 SSD**

3. Replace the cover and restore the power to the system.

# 3.9 System Cooling

Refer to the following sections for information about the cooling capabilities of the SYS-222HA-TN server.

## Fans

There are six 6-cm heavy-duty fans that provide cooling for the SYS-222HA-TN server.

Fans are hot-swappable and can be replaced without powering down the system. The electrical connections are automatically made when a fan is inserted into its slot. Make sure the chassis cover is only off for a short time and makes a good seal when replaced for the cooling air to circulate properly through the system.

Fan speed is controlled by a system temperature setting in the BMC. If a fan fails, the remaining fans will ramp up to full speed. The system can continue to run with a failed fan. Replace any failed fan at your earliest convenience with the same type and model. Failed fans can be identified through the BMC.

### *Changing a System Fan*

1. Determine which fan is failing. If possible, use BMC. If not, remove the chassis cover while the power is on and examine the fans to determine which one has failed.
2. Squeeze the fan tabs of the failed fan and lift the fan housing up and out of the chassis.
3. Replace the failed fan with an identical fan, available from Supermicro. Push the new fan into the housing, making sure the air flow direction is the same.
4. Finish by fully closing the cover and pushing the system back into the rack.

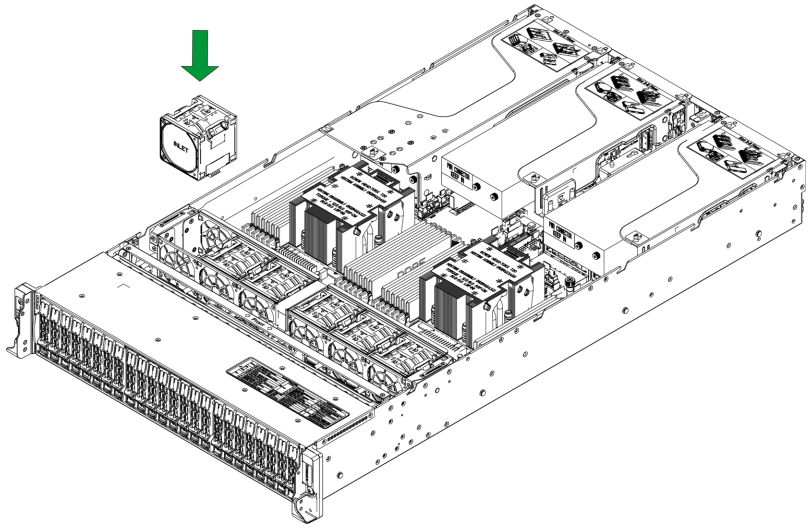


**Figure 3-44. Placing a System Fan**

## Air Shrouds

Air shrouds concentrate airflow to maximize fan efficiency in the SYS-222HA-TN server. They do not require screws for installation.

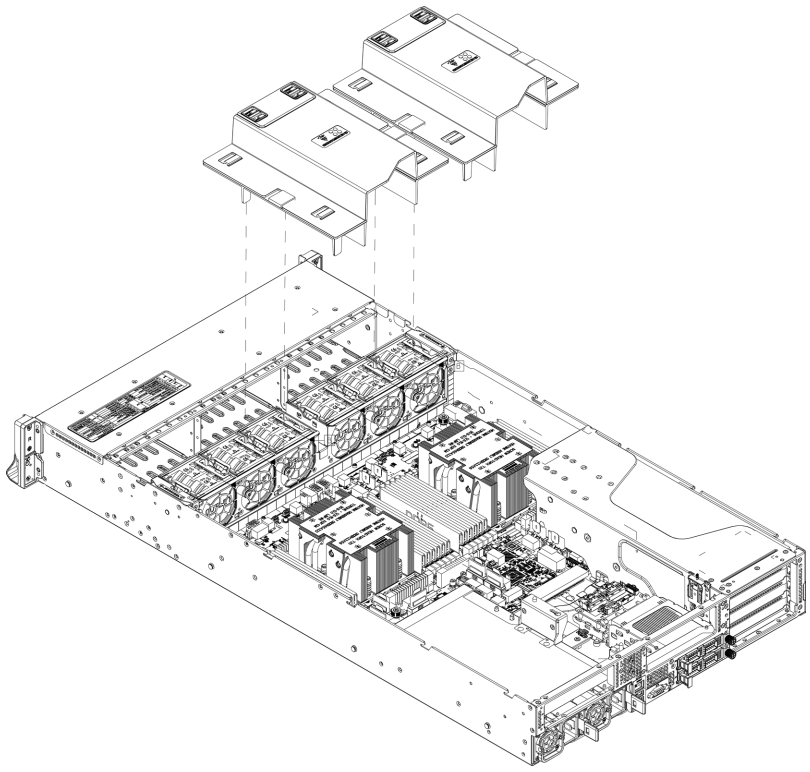


**Figure 3-45. Air Shroud Locations**

### *Installing the Air Shrouds for Memory (CPU1/2)*

Two air shrouds cool the DIMM slots controlled by CPUs 1 and 2.

1. Turn off and remove power from the system as described in "Removing Power" on page 47.
2. Remove the system from the rack and remove the cover as described in "Accessing the System" on page 48.
3. Each air shroud has CPU1 or CPU2 printed on it. Install the corresponding air shroud onto the heatsink and DIMM slots. Place each air shroud over 24 DIMM slots at a time for both CPU1 and CPU2-controlled DIMM slots.
4. Ensure that the air shroud is secured and hooked onto the rubber grommet on the fan cage. Adjust the hooks on the air shroud as needed.

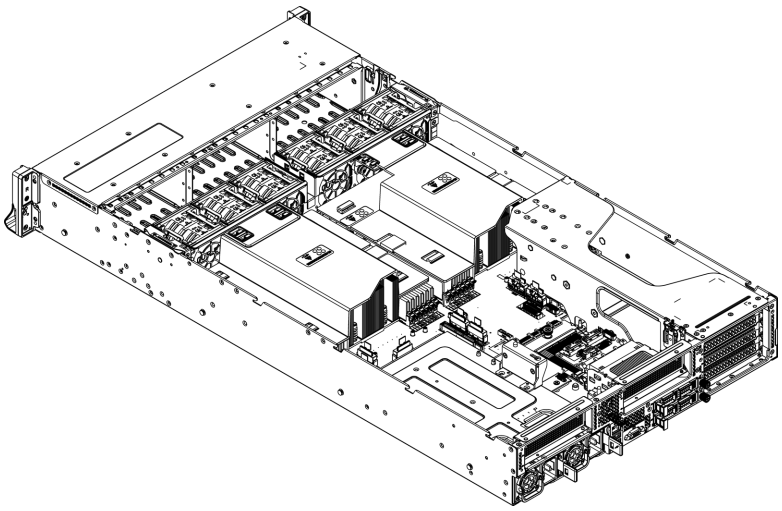


**Figure 3-46. Air Shrouds Installed**

5. Replace the chassis cover, push the system back into the rack, and power up the system.

# 3.10 Expansion Cards

Refer to the following sections for information on the expansion cards supported by the SYS-222HA-TN server.

## Expansion Slot Configurations

The system accepts up to eight PCIe 5.0 x8 or up to four PCIe 5.0 x16 full-height 10.5"L expansion cards mounted on riser cards and brackets.

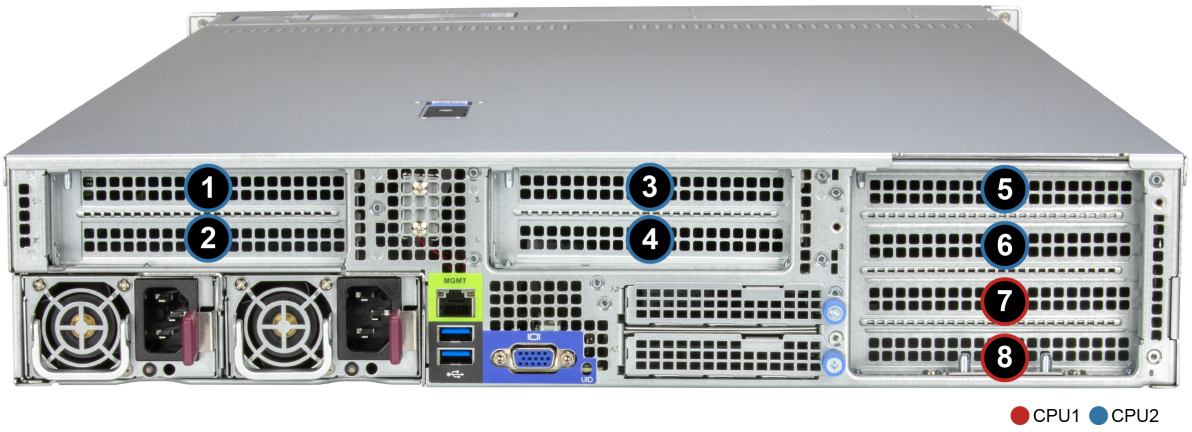



**Figure 3-47. Expansion Card Slots**

| Expansion Slot Configuration | | | |
|---|---|---|---|
| **Slot** | **Option 1[1]** | **Option 2[1]** | **Option 3[1]** |
| 1, 3 | PCIe x8 (in x16) | PCIe 5.0 x16 | — |
| 2, 4 | PCIe 5.0 x8 (in x16) | — | — |
| 5 | PCIe 5.0 x8 (in x16) | PCIe 5.0 x16 | PCIe 5.0 x16 |
| 6 | PCIe 5.0 x8 (in x16) | — | — |
| 7 | PCIe 5.0 x8 (in x16)[2] | PCIe 5.0 x8 (in x16)[2] | PCIe 5.0 x16[2] |
| 8 | PCIe 5.0 x8 (in x16)[2] | PCIe 5.0 x8 (in x16)[2] | — |

**[1]Requires additional parts from the optional parts list.**

**[2]Not available in 16 and 24 NVMe drive bay configurations.**

To enable any of the eight expansion card slots in this system, you must order from the list of optional parts that are sold separately. For details, see ordering information under the Optional Components chapter of this manual.

Each expansion card slot is assigned to specific motherboard PCIe x8 MCIO connectors or PCIe x16 slots. The following table shows the possible expansion card slot configuration options and the corresponding motherboard PCIe connector assignment.

| Expansion Card Slot Configurations | | |
|---|---|---|
| **Slot Configurations** | **Slot Width** | **Motherboard Connection** |
| Up to eight PCIe x8 slots | Slot 1: PCIe 5.0 x8 | Cable connection from JPCIE7A1 (CPU2) |
| | Slot 2: PCIe 5.0 x8 | Cable connection from JPCIE7B1 (CPU2) |
| | Slot 3: PCIe 5.0 x8 | Cable connection from JPCIE6 (CPU2) |
| | Slot 4: PCIe 5.0 x8 | |
| | Slot 5: PCIe 5.0 x8 | Cable connection from JPCIE4A1 (CPU2) |
| | Slot 6: PCIe 5.0 x8 | Cable connection from JPCIE4B1 (CPU2) |
| | Slot 7: PCIe 5.0 x8 | Edge connection from JPCIE2 (CPU1) |
| | Slot 8: PCIe 5.0 x8 | |
| Up to four PCIe x16 slots | Slot 1: PCIe 5.0 x16 | Cable connection from JPCIE7A1+JPCIE7B1 (CPU2) |
| | Slot 2: No Connection | No connection |
| | Slot 3: PCIe 5.0 x16 | Cable connection from JPCIE6 (CPU2) |
| | Slot 4: No Connection | No connection |
| | Slot 5: PCIe 5.0 x16 | Cable connection from JPCIE4A1+JPCIE4B1 (CPU2) |
| | Slot 6: No Connection | No connection |
| | Slot 7: PCIe 5.0 x16 | Edge connection from JPCIE2 (CPU1) |
| | Slot 8: No Connection | No connection |

### *Installing Expansion Cards*

1. Turn off and remove power from the system as described in "Removing Power" on page 47.
2. Remove the top cover as described in Accessing the System.
3. Remove any slimline SAS cables connected to the riser card and pull up the riser card brackets.
4. Looking from the node rear, open the clip of each slot on the right.
5. Remove the blank PCI shield from the chassis.
6. Slide the expansion card shield into the open shield slot while plugging the expansion card into the riser card.

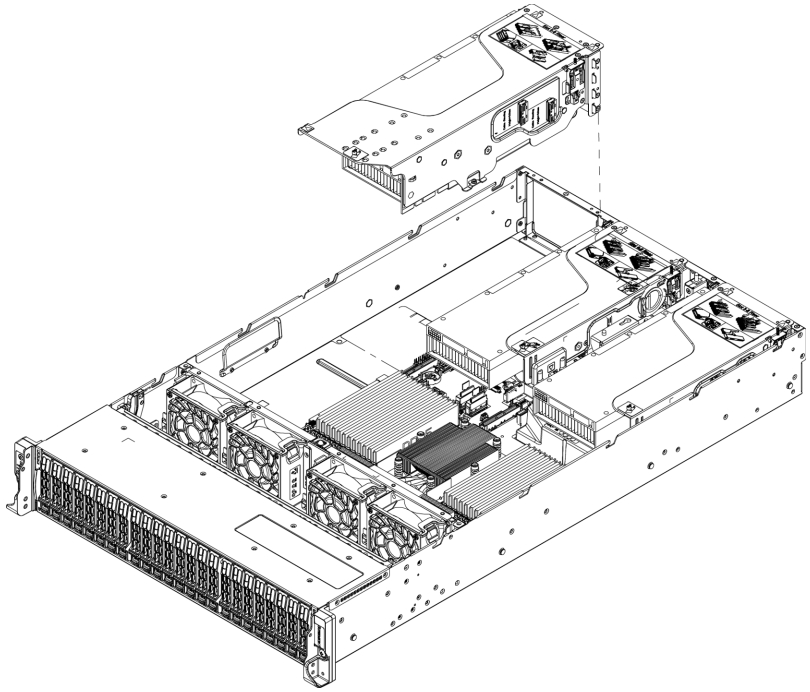


**Figure 3-48. Installing Expansion Cards**

## AIOM Cards

The SYS-222HA-TN server supports up to two AIOM/OCP NIC 3.0 network port cards. The second AIOM slot A2 is optional.




**Figure 3-49. AIOM Slot Locations**

| AIOM Configuration | | | |
|---|---|---|---|
| **Slot** | **Mechanical** | **Electrical** | **Slot Class** |
| A1 | Small Form Factor, OCP 3.0 | x16 (CPU1) | Up to 50 W* |
| A2 (Optional) | Small Form Factor, OCP 3.0 | x16 (CPU2) | Up to 35 W* |

*AIOM cards exceeding the 15 W slot class may require restricted conditions to meet the thermal specifications of the AIOM card. Contact your Supermicro account representative for more information.

### *Installing AIOM Cards*

1. Remove power as described in "Removing Power" on page 47.
2. Remove the blank cover plate (A1 or A2), unscrewing the thumbscrew.
3. Slide the AIOM card in the opening until it seats in the AIOM board slot.
4. Secure with the thumbscrew.

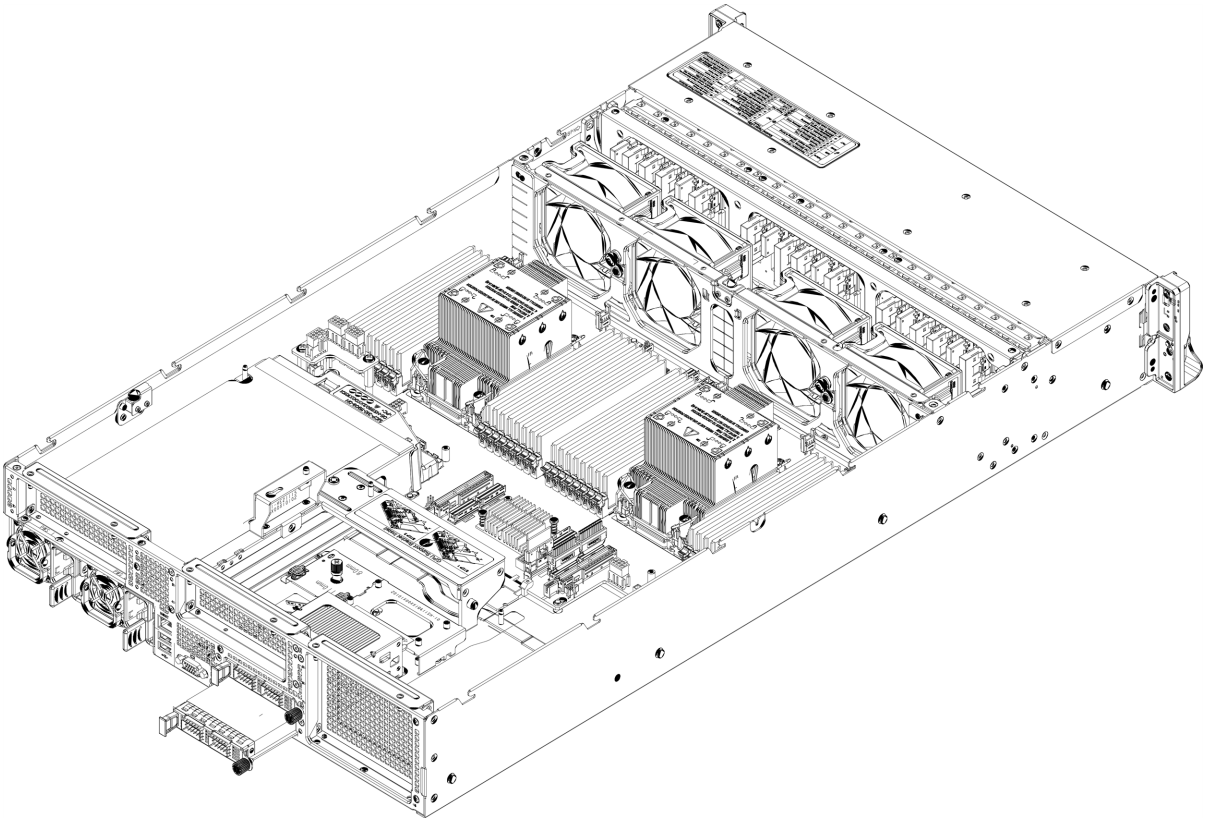


**Figure 3-50. Installing AIOMs**

## 3.11 Cable Routing Diagrams

The below diagrams indicate the cable routing for the storage, PCIe, I/O, and power cables. When disconnecting cables to add or replace components, refer to the diagrams so you can reroute them in the same manner. If cables are not connected or routed properly it may lead to device detection or performance issues.

### NVMe Storage Cables

| Cable | Cable Part Number | Connection From | Connection To | Reference |
|---|---|---|---|---|
| 1 | CBL-GNZ4-1255CM5Y | Motherboard, JPCIE2 | Left Backplane, NVME1 & NVME2 | Drives 0 – 3 |
| 2 | CBL-MCIO-1249M5LF-M | Motherboard, JPCIE1A1 | Left Backplane, NVME3 | Drives 4 – 5 |
| 3 | CBL-MCIO-1250M5L-M | Motherboard, JPCIE1B1 | Left Backplane, NVME4 | Drives 6 – 7 |
| 4* | CBL-MCIO-1221M5 | Motherboard, P1_NVME0 | Mid Backplane, NVME1 | Drives 8 – 9 |
| 5 | CBL-MCIO-1220M5R | Motherboard, P1_NVME1 | Mid Backplane, NVME2 | Drives 10 – 11 |
| 6 | CBL-MCIO-1234M5L | Motherboard, P1_NVME2 | Mid Backplane, NVME3 | Drives 12 – 13 |
| 7 | CBL-MCIO-1442M5FAP1-M | Motherboard, P1_NVME3 | Mid Backplane, NVME4 | Drives 14 – 15 |
| 8* | CBL-MCIO-1225M5L | Motherboard, P2_NVME0 | Right Backplane, NVME1 | Drives 16 – 17 |
| 9 | CBL-MCIO-1424RM5FAP4-M | Motherboard, P2_NVME1 | Right Backplane, NVME2 | Drives 18 – 19 |
| 10 | CBL-MCIO-1230M5 | Motherboard, P2_NVME2 | Right Backplane, NVME3 | Drives 20 – 21 |

| Cable | Cable Part Number | Connection From | Connection To | Reference |
|---|---|---|---|---|
| 11 | CBL-MCIO-1431M5FAP3-M | Motherboard, P2_NVME3 | Right Backplane, NVME4 | Drives 22 – 23 |
| 12* | CBL-CDAT-1062 | Motherboard, JNVI2C1 | Left Backplane, JIPMB1 | NVMe SMBus for Drives 0 – 7 |
| 13* | CBL-CDAT-1062 | Motherboard, JNVVPP1 | Left Backplane, JIPMB2 | NVMe VPP for Drives 0 – 7 |
| ***This cable connection provides a NVMe SMBus and/or NVMe VPP bus communication links between the system and the storage backplane. NVMe devices attached to the storage backplane may have detection or hot-swap issues if this cable not connected properly.** | | | | |

### *Eight NVMe Configuration*

This configuration of the SYS-222HA-TN server supports:

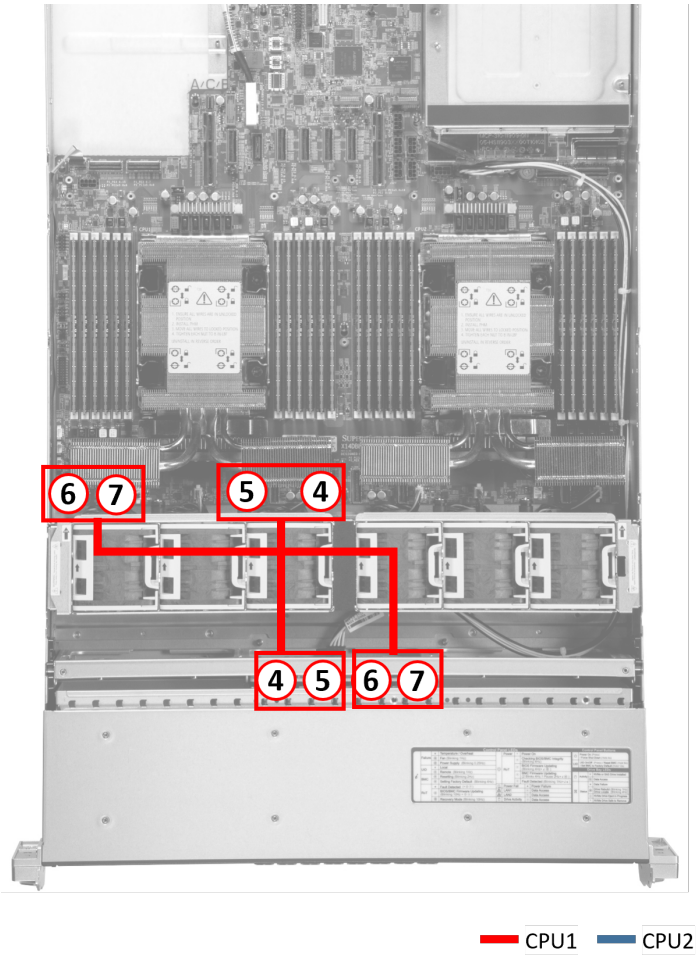



**Figure 3-51. Eight NVMe Cable Routing Diagram**

## *16 NVMe Configuration*

This configuration of the SYS-222HA-TN server supports:

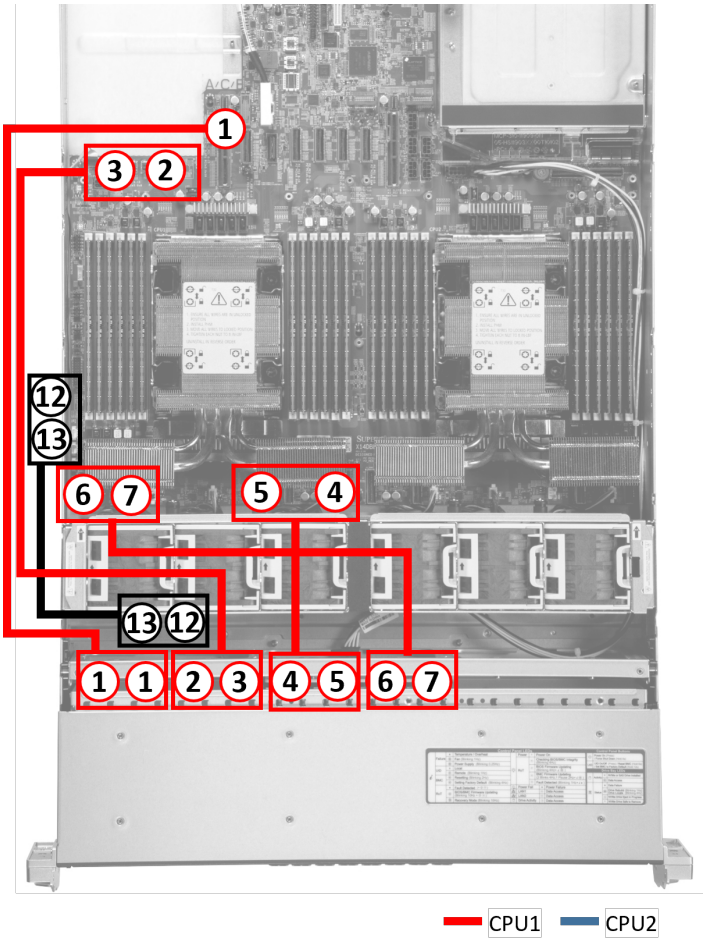



**Figure 3-52. 16 NVMe Cable Routing Diagram**

### *24 NVMe Configuration*

This configuration of the SYS-222HA-TN server supports:

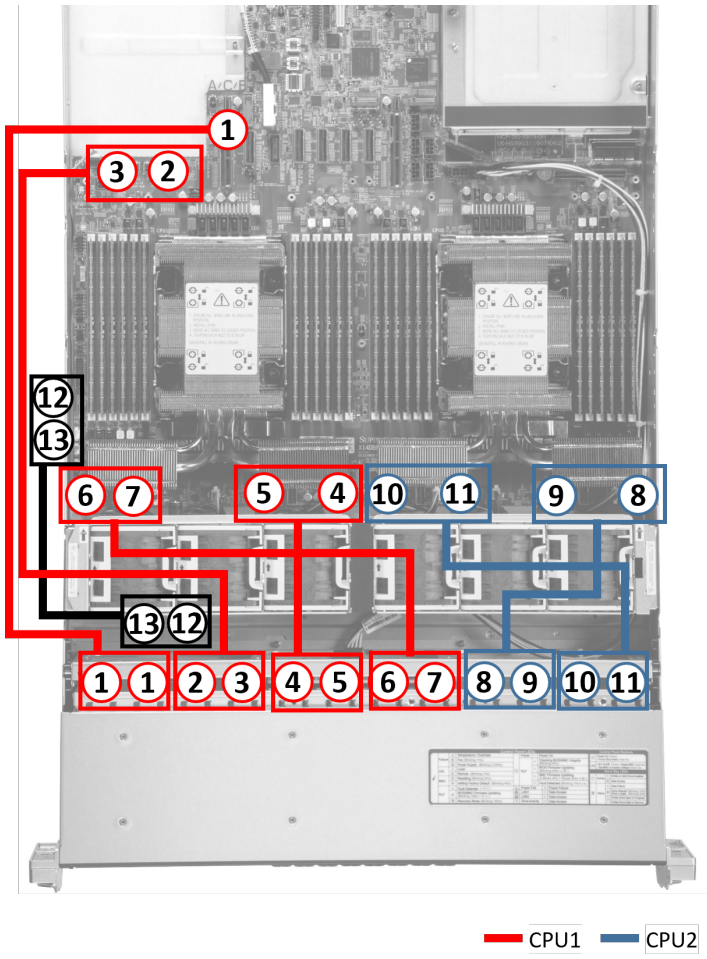



**Figure 3-53. 24 NVMe Cable Routing Diagram**

## SAS/SATA Storage Cables

| Cable | Cable Part Number | Connection From | Connection To | Reference |
|---|---|---|---|---|
| 1 | CBL-GNZ4-1255CM5Y | Motherboard, JPCIE2 | Left Backplane, NVME1 & NVME2 | Drives 0 – 3 |
| 2 | CBL-MCIO-1249M5LF-M | Motherboard, JPCIE1A1 | Left Backplane, NVME3 | Drives 4 – 5 |
| 3 | CBL-MCIO-1250M5L-M | Motherboard, JPCIE1B1 | Left Backplane, NVME4 | Drives 6 – 7 |
| 4* | CBL-MCIO-1221M5 | Motherboard, P1_NVME0 | Mid Backplane, NVME1 | Drives 8 – 9 |
| 5 | CBL-MCIO-1220M5R | Motherboard, P1_NVME1 | Mid Backplane, NVME2 | Drives 10 – 11 |
| 6 | CBL-MCIO-1234M5L | Motherboard, P1_NVME2 | Mid Backplane, NVME3 | Drives 12 – 13 |

### *Eight SAS/SATA Configuration*

This configuration of the SYS-222HA-TN server supports:

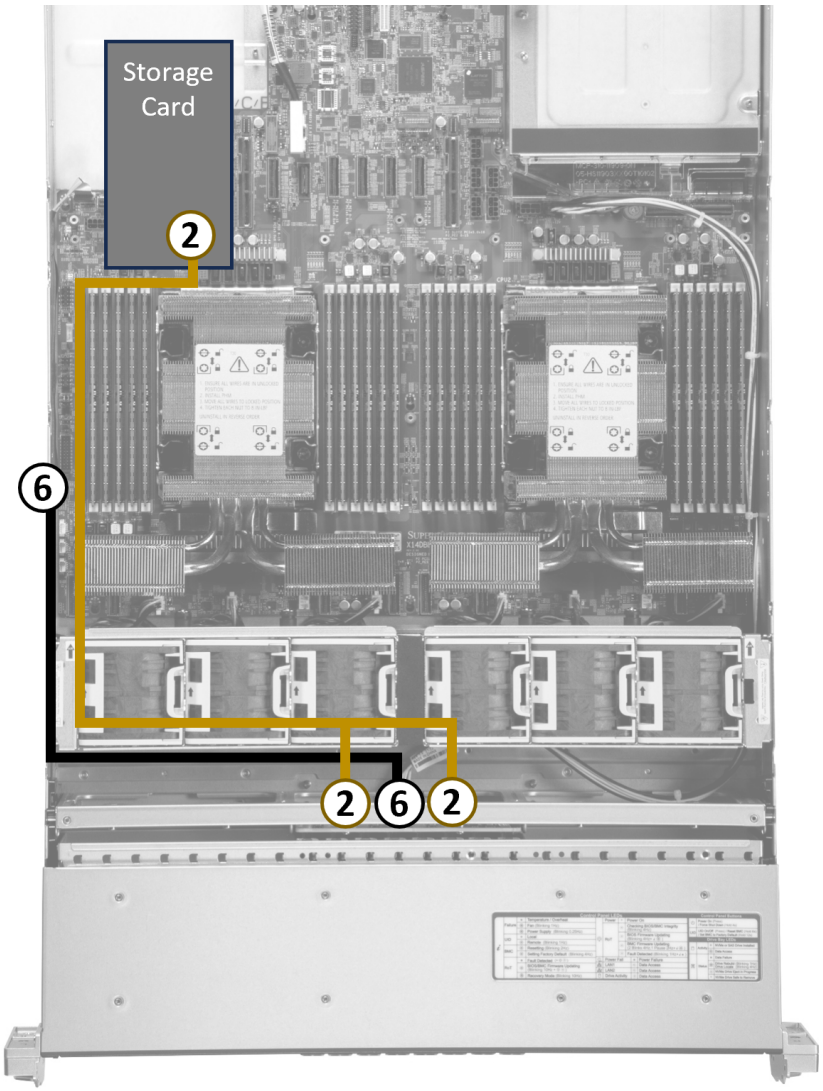



**Figure 3-54. Eight SAS/SATA Cable Routing Diagram**

## *16 SAS/SATA Configuration*

This configuration of the SYS-222HA-TN server supports:

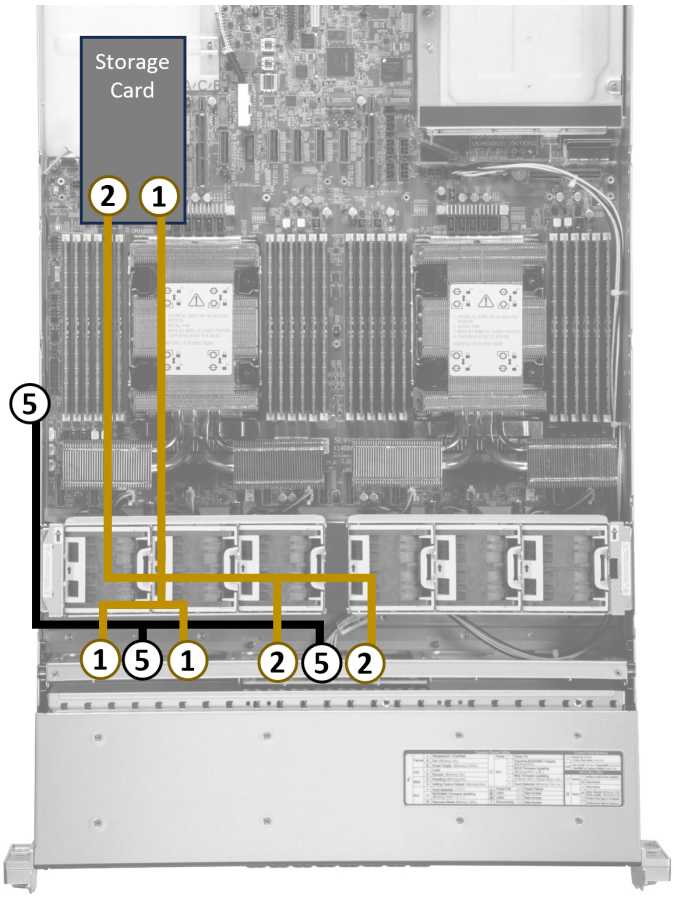



**Figure 3-55. 16 SAS/SATA Cable Routing Diagram**

## *24 SAS/SATA Configuration*

This configuration of the SYS-222HA-TN server supports:

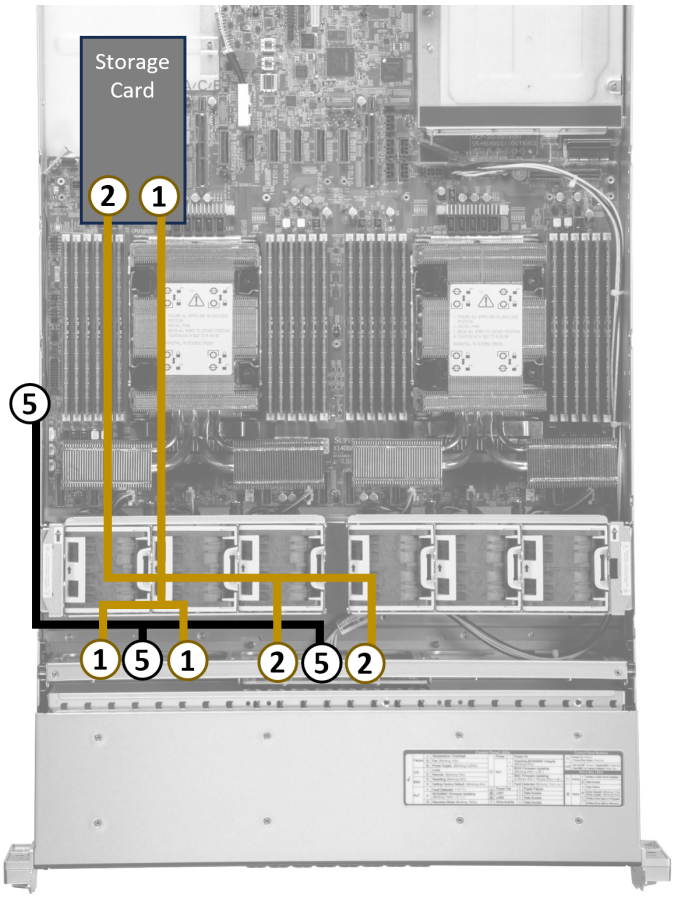



**Figure 3-56. 24 SAS/SATA Cable Routing Diagram**

## PCIe Cables

### *Slot A2: AIOM OCP 3.0 NIC*

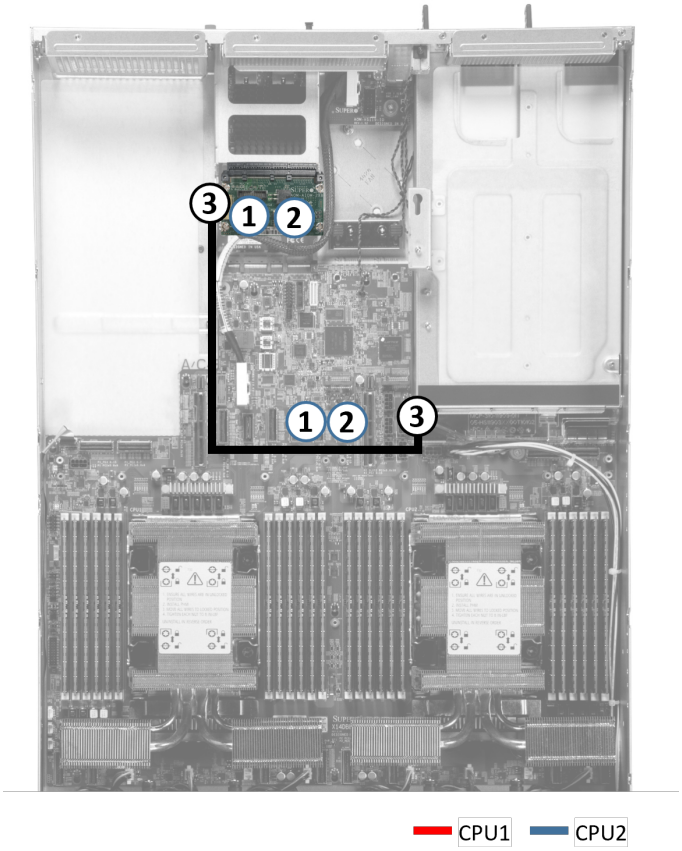



**Figure 3-57. Slot A2 AIOM/OCP 3.0 NIC Cable Routing Diagram**

| Cable | Cable Part Number | Connection From | Connection To | Reference |
|---|---|---|---|---|
| 1 | CBL-MCIO-1221M5 | Motherboard, JPCIE5A1 | AIOM Board, JPCIE1A1 | AIOM/OCP 3.0 NIC Slot A2 |
| 2 | CBL-MCIO-1218M5-1 | Motherboard, JPCIE5B1 | AIOM Board, JPCIE1B1 | |
| 3 | CBL-CDAT-1060-30 | Motherboard, JAIOM2SB1 | AIOM Board, JAIOM2SB1 | AIOM Board Sideband & Power |

### *Expansion Card Slots (x8, x8)*

| Cable | Cable Part Number | Connection From | Connection To | Reference |
|---|---|---|---|---|
| 1 | CBL-MCIO-1230M5R | Motherboard, JPCIE7A1 | Riser Card, JPCIE1A1 | Expansion Card Slot 1 (x8) |
| 2 | CBL-MCIO-1224M5 | Motherboard, JPCIE7B1 | Riser Card, JPCIE2A1 | Expansion Card Slot 2 (x8) |
| 3 | CBL-GNZ4-1222M5YR27 | Motherboard, JPCIE6 | Riser Card, JPCIE1A1 & JPCIE2A1 | Expansion Card Slot 3,4 (x8,x8) |
| 4 | CBL-MCIO-1221M5 | Motherboard, JPCIE4A1 | Riser Card, JPCIE1A1 | Expansion Card Slot 5 (x8) |
| 5 | CBL-MCIO-1224M5 | Motherboard, JPCIE4B1 | Riser Card, JPCIE2A1 | Expansion Card Slot 6 (x8) |

*Slots 1, 2: PCIe Cables x8, x8*

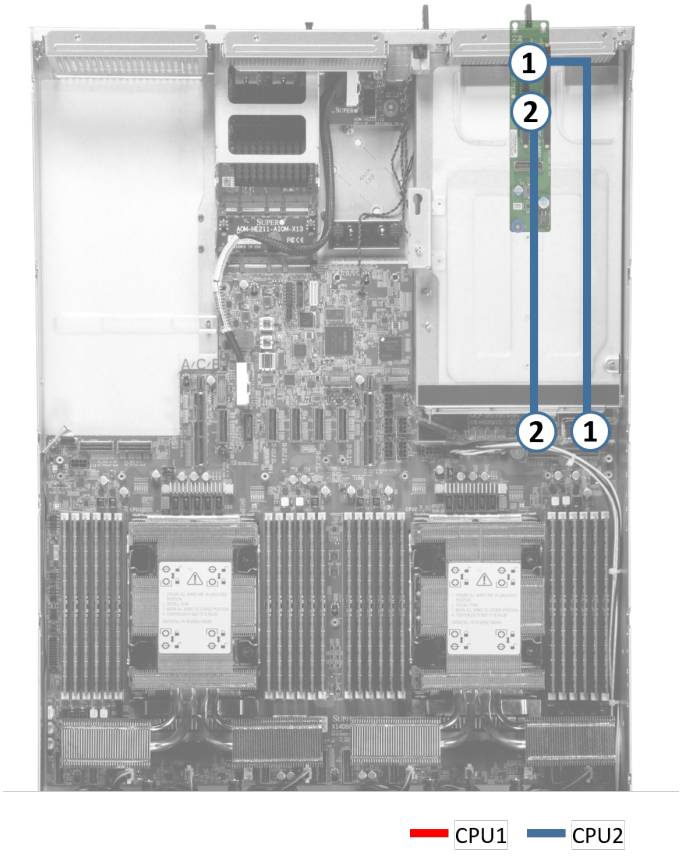



**Figure 3-58. Slots 1, 2 PCIe Cables x8, x8 Cable Routing Diagrams**

### *Slots 3, 4: PCIe Cables x8, x8*

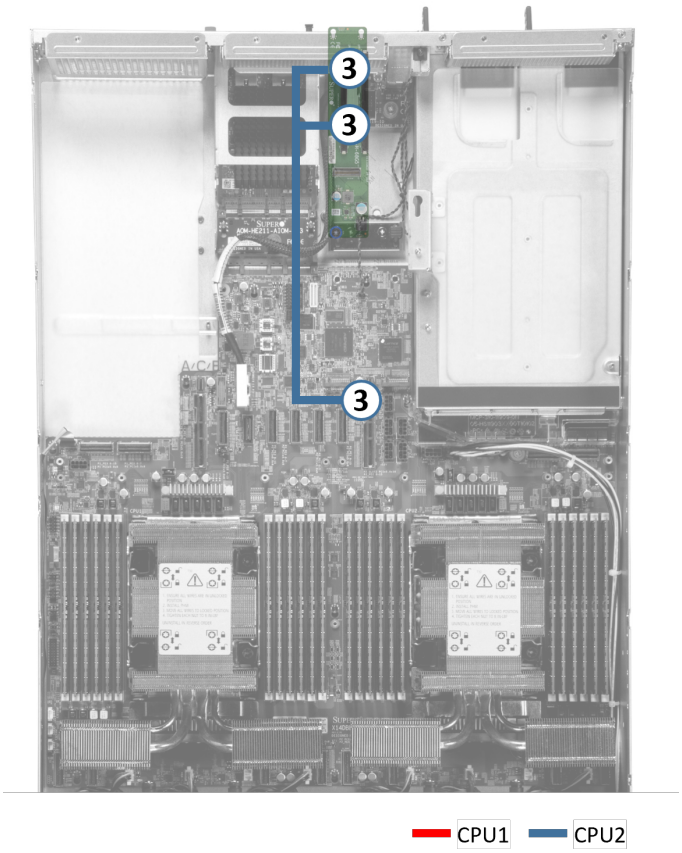



**Figure 3-59. Slots 3, 4 PCIe Cables x8, x8 Cable Routing Diagram**

### *Slot 5, 6: PCIe Cables x8, x8*

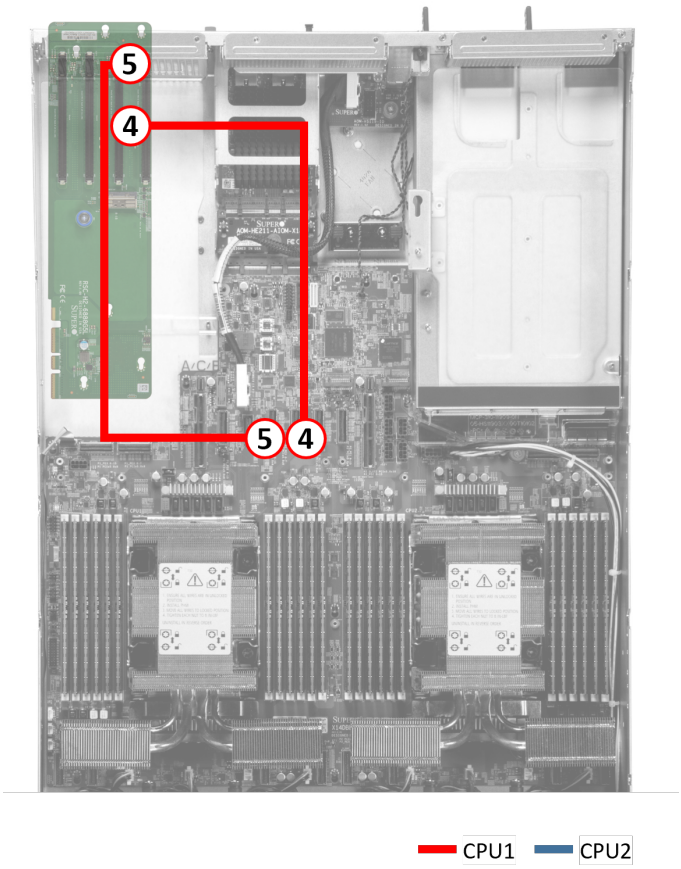



**Figure 3-60. Slot 5, 6 PCIe Cables x8, x8 Cable Routing Diagram**

### *Expansion Card Slots (x16, x0)*

| Cable | Cable Part Number | Connection From | Connection To | Reference |
|---|---|---|---|---|
| 1 | CBL-MCIO-1230M5R | Motherboard, JPCIE7A1 | Riser Card, JPCIE1A1 | Expansion Card Slot 1 (x16) |
| 2 | CBL-MCIO-1218M5R | Motherboard, JPCIE7B1 | Riser Card, JPCIE1B1 | |
| 3 | CBL-GNZ4-1217M5YRR27 | Motherboard, JPCIE6 | Riser Card, JPCIE1A1 & JPCIE1B1 | Expansion Card Slot 3 (x16) |
| 4 | CBL-MCIO-1226M5R-1 | Motherboard, JPCIE4A1 | Riser Card (RSC-H-68G5), JPCIE1A1 | Expansion Card Slot 5 (x16) |
| 5 | CBL-MCIO-1226M5R-1 | Motherboard, JPCIE4B1 | Riser Card (RSC-H-68G5), JPCIE1B1 | |
| 6 | CBL-MCIO-1221M5 | Motherboard, JPCIE4A1 | Riser Card (RSC-H2-6888G5L), JPCIE1A1 | |
| 7 | CBL-MCIO-1227M5 | Motherboard, JPCIE4B1 | Riser Card (RSC-H2-6888G5L), JPCIE1B1 | |

### *Slot 1, 2: PCIe Cables x16, x0*

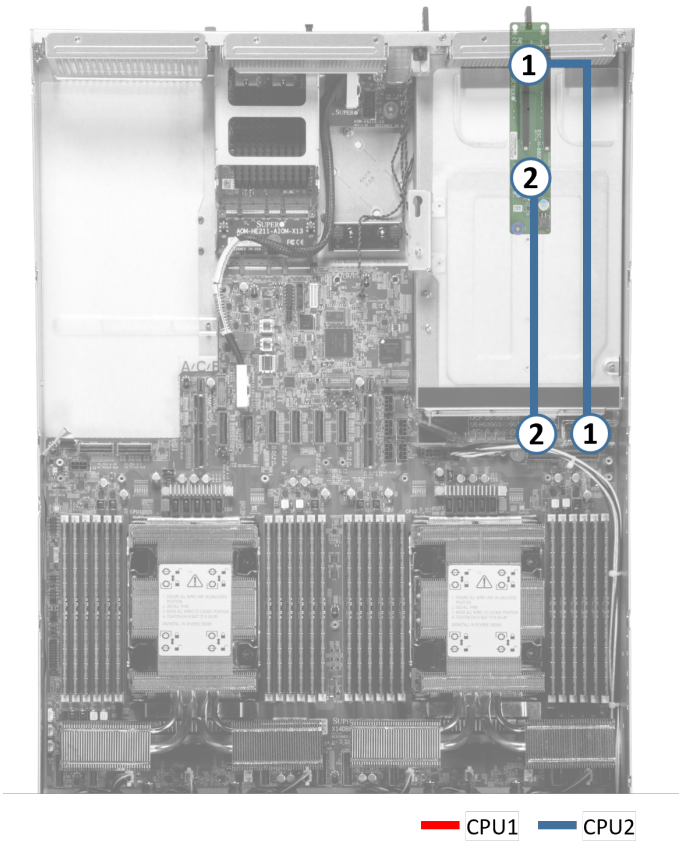



**Figure 3-61. Slots 1, 2 PCIe Cables x16, x0 Cable Routing Diagram**

### *Slots 3, 4: PCIe Cables x16, x0*

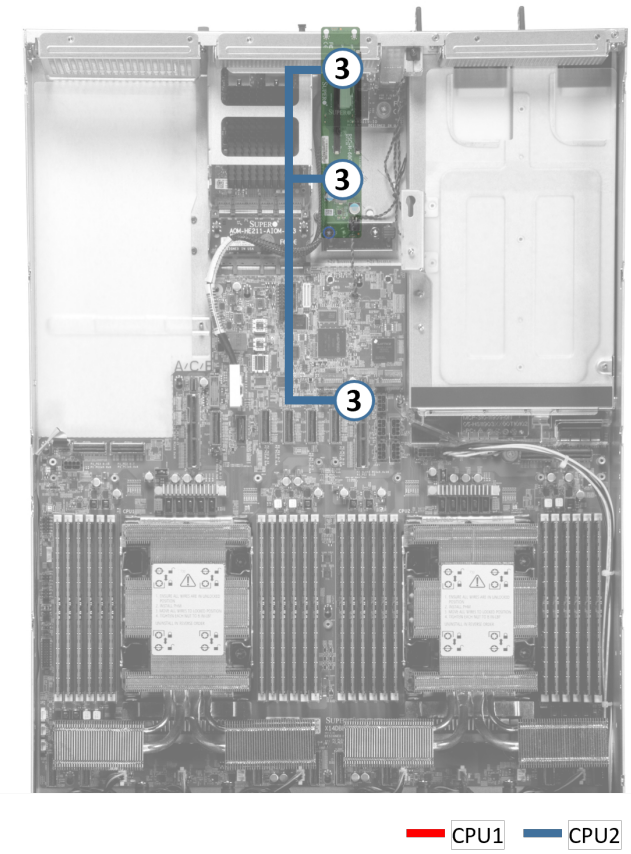



**Figure 3-62. Slots 3, 4 PCIe Cables x16, x0 Cable Routing Diagram**

### *Slot 5, 6: PCIe x16, x0*

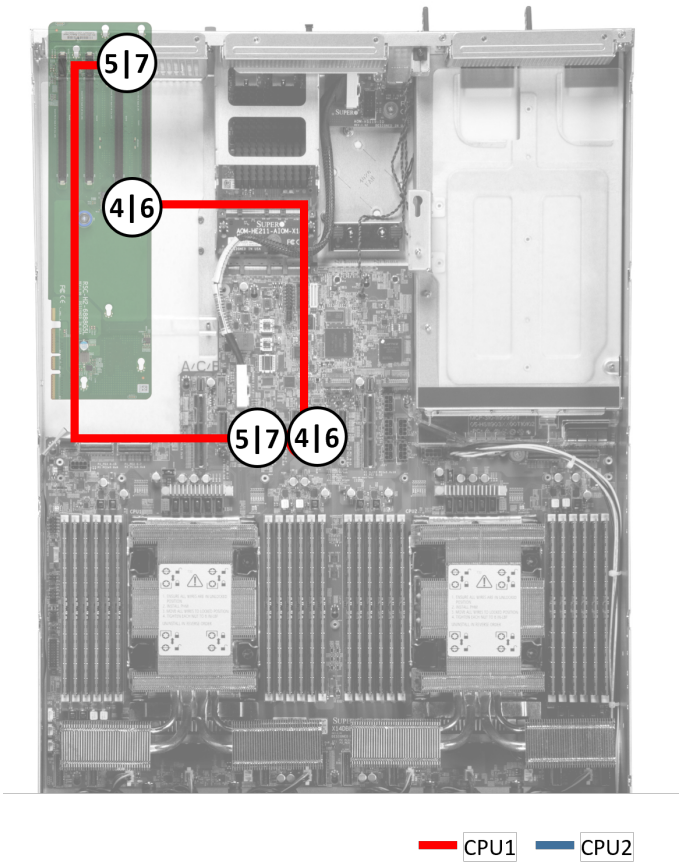



**Figure 3-63. Expansion Card Slots 5, 6 Cable Routing Diagram**

## I/O Board Cable

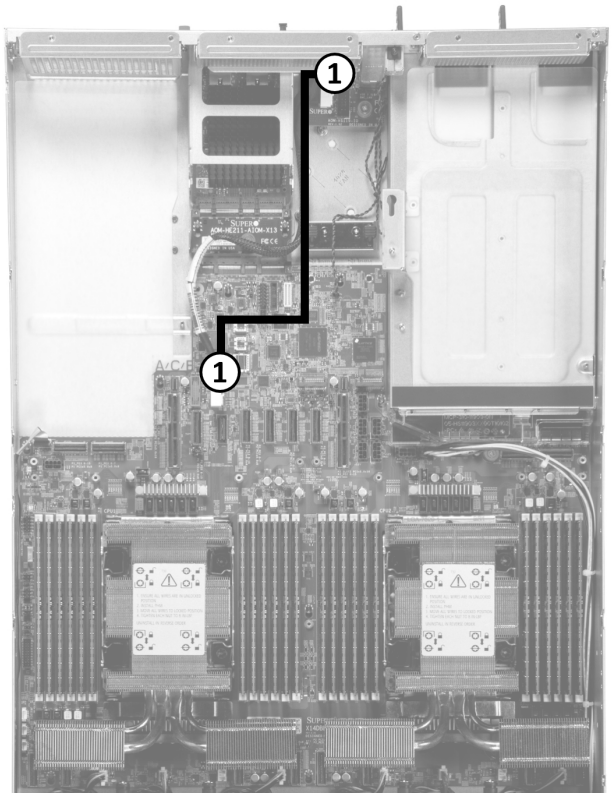



**Figure 3-64. I/O Board Cable Routing Diagram**

| Cable | Cable Part Number | Connection From | Connection To | Reference |
|---|---|---|---|---|
| 1 | CBL-LPST-1230REL4R | Motherboard, JIO1 | I/O Board, JIO1 | I/O Board VGA, USB, BMC LAN |

## Power Cables

### *Riser Cards Power Cable Configuration*

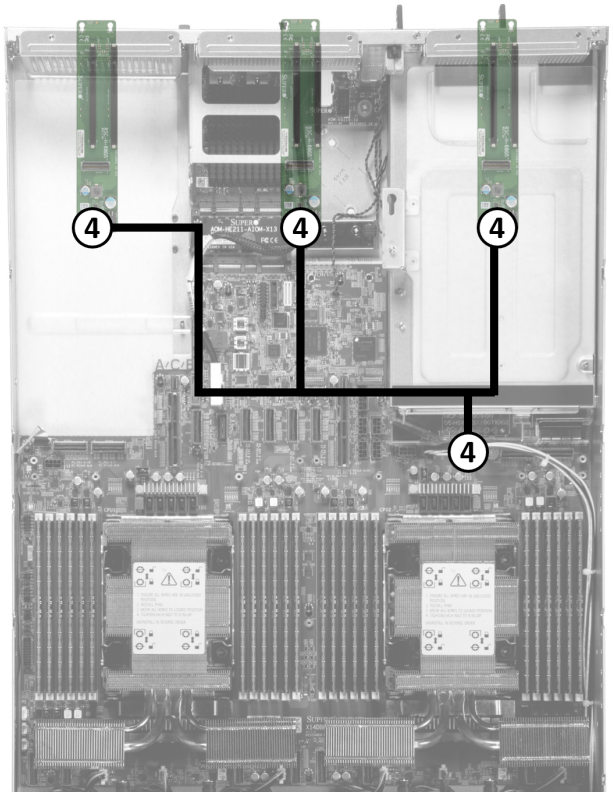



**Figure 3-65. Riser Cards Power Cable Configuration Diagram**

### *Storage Backplane Power Cable Configuration*

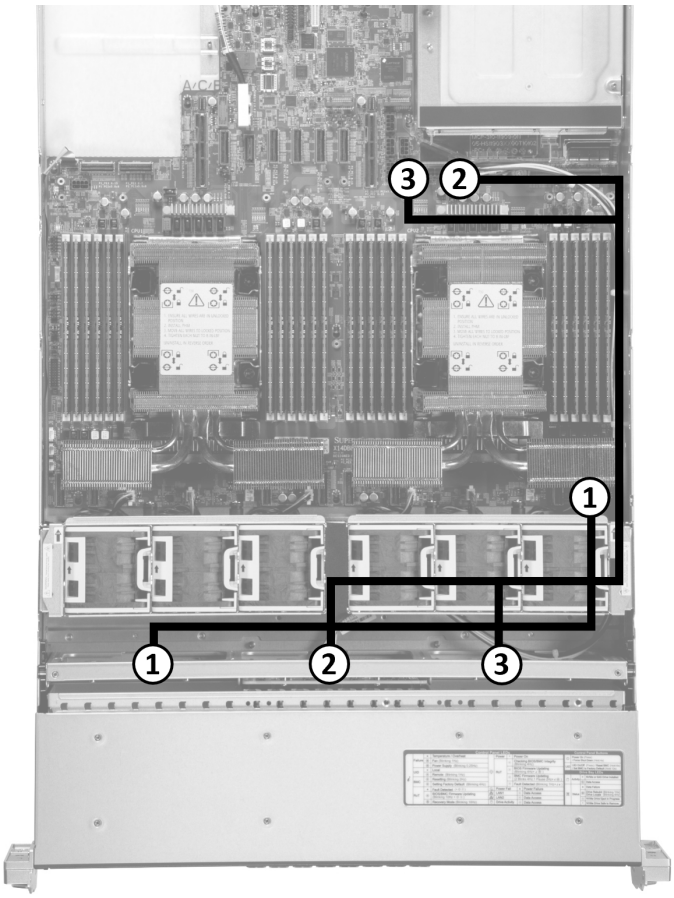



**Figure 3-66. Storage Backplane Power Cable Configuration Diagram**

| Cable | Cable Part Number | Connection From | Connection To | Reference |
|---|---|---|---|---|
| 1 | CBL-PWEX-1142B-60 | Motherboard, JPMW8 | Left Backplane, JPWR1 | Power for Drives 0–7 |
| 2 | CBL-PWEX-1142B-70 | Motherboard, JPMW9 | Mid Backplane, JPWR1 | Power for Drives 8–15 |
| 3 | CBL-PWEX-1142B-60 | Motherboard, JPMW2 | Right Backplane, JPWR1 | Power for Drives 16–23 |
| 4 | CBL-PWEX-1136YVB-45 | Motherboard, JPMW7 | Left, Right, & Mid Riser Cards, JPWR1 | Power for Expansion Card Slots 1–6 |

# 3.1 Power Supply

The SYS-222HA-TN server includes two hot-plug power supply modules. These modules will automatically sense and operate at an input voltage between 100 V to 240 V. Note that different input voltages will result in different maximum power output levels.

In the event of a power module failure, the other power module will continue to power the system on its own. Failed power supply modules can be replaced without powering down the system. Replacement modules can be ordered directly from Supermicro. An amber light on the power supply is illuminated when the power is switched off.

## Changing the Power Supply

1. Unplug the AC cord from the module to be replaced.
2. Push the release tab on the back of the power supply as illustrated.
3. Pull the power supply out using the handle provided.

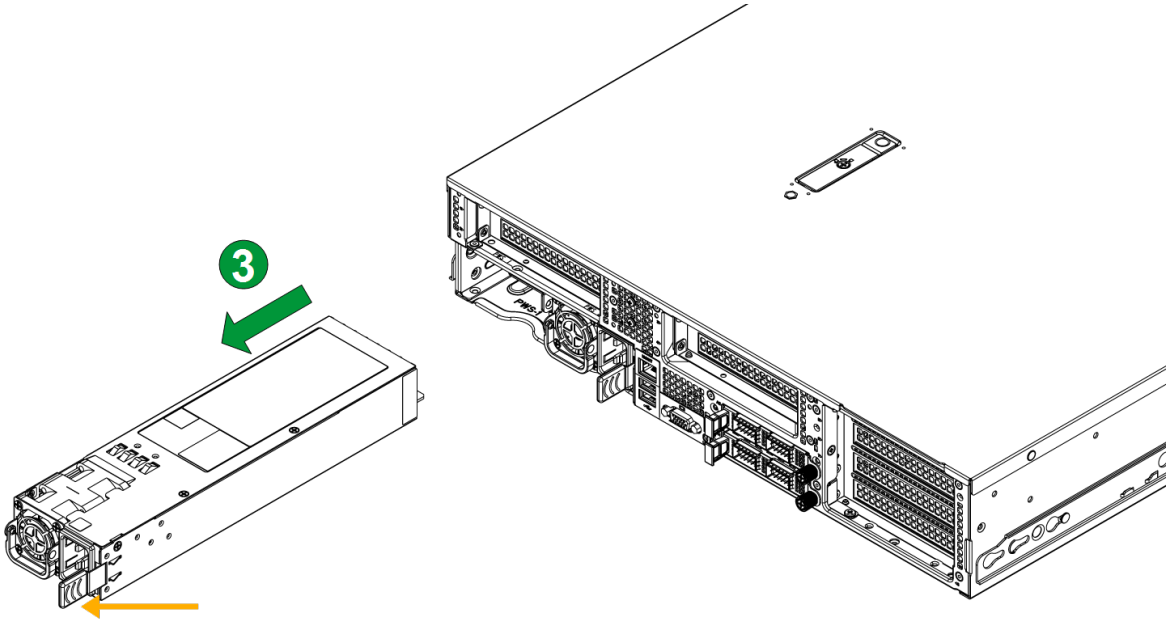



**Figure 3-67. Power Supply Release Tab**

4. Replace the failed power module with the same model.
5. Push the new power supply module into the power bay until it clicks.
6. Plug the AC power cord back into the module.

# Chapter 4:

# Motherboard Connections, Jumpers, and LEDs

This section describes the connections on the motherboard and provides pinout definitions. Note that depending on how the system is configured, not all connections are required. The LEDs on the motherboard are also described here. A motherboard layout indicating component locations may be found in the "Introduction" on page 15. More detail can be found in the X14DBM-AP motherboard manual.

Review the "Standardized Warning Statements for AC Systems" on page 230 before installing or removing components.

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# 4.1 Power Supply and Power Connections

For information about the power supply and power connections of the SYS-222HA-TN server, refer to the following content.

## Power Supply

As with all computer products, a stable power source is necessary for proper and reliable operation. It is even more important for processors that have high CPU clock rates where noisy power transmission is present.

The X14DBM-AP Hyper server board accommodates two Supermicro proprietary power supply units (PSU1/PSU2), two 6-pin +12 V power connectors (JPWR1/JPWR2), and eight 8-pin +12 V power connectors (JPMW1–JPMW7, JPMW9). Although most power supplies generally meet the specifications required by the processors, some are inadequate. All these power connections are also required to ensure adequate power supply to the system.

It is strongly recommended that you use a high quality power supply that meets ATX power supply specification 2.02 or above. It must also be SSI compliant.

**Important:** To avoid damaging the power supply or the motherboard, be sure to use a power supply that accommodates two power supply units. Be sure to also connect the power supplies to eight 8-pin +12 V power connectors (JPMW1–JPMW7, JPMW9) and two 6-pin power connectors (JPWR1/JPWR2) on the motherboard. Failure in doing so may void the manufacturer warranty on your power supply and motherboard.

## 6-Pin Riser Card Power Connectors (JPWR1/JPWR2)

Two 6-pin 12 V power connectors (JPWR1/JPWR2) are used for riser cards on the motherboard.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

## 8-Pin Backplane/GPU Power Connectors (JPMW1–JPMW9)

Eight 8-pin 12 V power supply connectors (PMW1–JPMW9) are used to provide power to backplane and GPU devices via cables.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

| 8-pin PWR Connector for Backplane/GPU Devices (JPMW1-4)<br>Pin Definitions: Eight Total | |
|---|---|
| **Pin#** | **Definition** |
| 1–4 | GND |
| 5–8 | P12 V (12 V Power) |

## Main Server Power Connectors (PSU1/PSU2)

Two power supply connectors (for 1U systems), located at PSU1/PSU2, provide main server power to the Hyper server.

**Notes:**

- The tables below represent the power supplies that are used with PSU1/PSU2 in Supermicro Hyper and Hyper-E servers. For detailed power supply support for a particular server, refer to the appropriate Hyper server user manual.
  - For Hyper Systems:

| |
|---|
| PWS-2K07A-1R |
| PWS-1K63A-1R |
| PWS-2K63A-1R |
| PWS-1K24A-1R |

  - For Hyper-E Systems:

| | |
|---|---|
| PWS-2K08F-1R | PWS-1K30D-1R |
| PWS-2K08A-1R | PWS-1K30F-1R |
| PWS-2K08A-1R2 | PWS-1K22F-1R |
| PWS-1K22A-1R | |

- All power connectors used on this motherboard meet the ATX SSI EPS 12 V specification and must be connected to a power supply to provide adequate power to the system for all devices and components use.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

# 4.2 Headers and Connections

For information about the headers of the SYS-222HA-TN server, refer to the following content.

## 4-pin BMC External I²C Header

A System Management Bus header for the BMC is located at JIPMB1. Connect the appropriate cable here to use the IPMB I²C connection on your system.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

## BMC LAN/USB/VGA Connector

A low-profile SlimSAS I/O x8 connector, located at JIO1 on the X14DBM-AP motherboard, provides dedicated BMC LAN/USB/VGA support for access.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

## Chassis Intrusion

A Chassis Intrusion header is located at JL1 on the X14DBM-AP motherboard. Attach the appropriate cable from the chassis to inform you when the chassis is opened.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

| Chassis Intrusion<br>Pin Definitions: Two Total | |
|---|---|
| **Pin#** | **Definition** |
| 1 | Intrusion Input |
| 2 | GND |

## Expansion Slots

There are two PCIe 5.0 x16 slots on the X14DBM-AP motherboard. P1 SLOT1 PCIe 5.0 x16, located at JPCIE2, and P2 SLOT2 PCIe 5.0 x16, located at JPCIE6, both support PCIe 5.0 x16 PCIe devices. P1 SLOT1 PCIe 5.0 x16 is supported by CPU1 while P2 SLOT2 PCIe 5.0 x16 is supported by CPU2.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

## Fan Headers

There are eight 6-pin fan headers (FAN1–FAN8) and one 4-pin fan header (FAN9) on the motherboard. These fan headers are used for cooling fans for your system. Fan speed control for these fans is supported by thermal management via BMC 2.0 interface.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

| 4-pin Fan Header<br>Pin Definitions: Four Total | |
|---|---|
| **Pin#** | **Definition** |
| 1 | GND (Black) |
| 2 | +12 V (Red) |
| 3 | Tachometer |
| 4 | PWM Control |

| 6-pin Fan Header<br>Pin Definitions: Six Total | | | |
|---|---|---|---|
| **Pin#** | **Definition** | **Pin#** | **Definition** |
| 1 | GND | 4 | +12 V |
| 2 | +12 V | 5 | Tachometer |
| 3 | GND | 6 | PWM |

## Liquid Cooling Leakage Sensor Headers

Liquid cooling leakage sensor headers are located at JLC1 and JLCS1–JLCS5 on the X14DBM-AP motherboard. This header is reserved for liquid cooling support in systems. Liquid cooling leakage sensor headers are used to detect leakage of the coolant used in your liquid cooling system. There is one 4-pin header on the motherboard at JLC1 and five 2-pin headers at JLCS1–JLCS5.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

## M.2 M-Key PCIe 5.0 x2 Slots

Two M.2 M-key slots are located at M.2-C1 and M.2-C2 on the X14DBM-AP motherboard. The M.2 M-key slots on the motherboard support PCIe 5.0 x2 devices in a 2280/22110 form factor.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

## MCIO NVMe Connectors

MCIO NVMe connectors, located at P1_NVME0–P1_NVME3 and P2_NVME0–P2_NVME3, provide eight PCIe 5.0 x8 connections on the motherboard. P0_ NVME0– P0_ NVME3 connections are supported by CPU1, and P1_NVME0–P1_NVME3 connections are supported by CPU2. Use these MCIO connectors to support high-speed PCIe storage devices.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

**Note:** When installing an NVMe device on a motherboard, please be sure to connect the first NVMe port (P0_NVME0) first for your system to work properly.

## MCIO PCIe 5.0 x8 Connectors

Mini Cool Edge IO (MCIO) PCIe 5.0 x8 connectors are located at JPCIE1A1, JPCIE1B1, JPCIE4A1, JPCIE4B1, JPCIE5A1, JPCIE5B1, JPCIE7A1, JPCIE7B1 on the X14DBM-AP motherboard. The connectors JPCIE1A1 and JPCIE1B1 are supported by CPU1, while JPCIE4A1, JPCIE4B1, JPCIE5A1, JPCIE5B1, JPCIE7A1, and JPCIE7B1 are supported by CPU2.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

## MCIO PCIe 5.0 x16 Connector

Mini Cool Edge IO (MCIO) PCIe 5.0 x16 connectors are located at JPCIE2 (P1_PE1 0–15) and JPCIE6 (P2_PE2 0–15) on the X14DBM-AP motherboard.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

## NC-SI Connection

The Network Controller Sideband Interface (NC-SI) connection is located at JNCSI2 on the X14DBM-AP motherboard. This connection is used to connect a Network Interface Card (NIC) to the motherboard to allow the onboard Baseboard Management Controller (BMC) to communicate with a network.

**Note:** For detailed instructions on how to configure Network Interface Card (NIC) settings, refer to the Network Interface Card Configuration User's Guide posted on the web page under the link: https://www.supermicro.com/support/manuals.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

## NVMe SMBus Header

An NVMe SMBus (I²C) header is located at JNVI²C1 on the X14DBM-AP motherboard. It is used for PCIe SMBus clock and data connections, and provides hot-plug support through a dedicated SMBus interface. This feature is only available for a Supermicro complete system with a Supermicro proprietary NVMe add-on card and a proper cable installed.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

| NVMe SMBus Header<br>Pin Definitions: Four Total | |
|---|---|
| **Pin#** | **Definition** |
| 1 | Data |
| 2 | GND |
| 3 | Clock |
| 4 | VCCIO |

## NVMe VPP Bus Connector

An NVMe VPP Bus connector is located at JNVVPP1 on the motherboard. The NVMe VPP connector provides hot-plug support for the NVMe devices, which allows the user to replace NVMe devices without shutting down and powering off the system.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

## PCIe I²C Header

A PCIe I²C (SMBus) header is located at JRSI²C1 on the X14DBM-AP motherboard. The PCIe SMBus connector is used for PCIe cards to allow the BMC or the BIOS to read storage drive information or Field Replace Units (FRUs) more effectively.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

| Chassis Intrusion<br>Pin Definitions: Two Total | |
|---|---|
| **Pin#** | **Definition** |
| 1 | Intrusion Input |
| 2 | Ground |

## TPM/Port 80 Header

The JTPM1 header on the X14DBM-AP motherboard is used to connect a Trusted Platform Module (TPM)/Port 80, which is available from Supermicro (optional). A TPM/Port 80 connector is a security device that supports encryption and authentication in storage drives. It allows the motherboard to deny access if the TPM associated with the storage drive is not installed in the system. Information on the TPM is available at the following page:

https://www.supermicro.com/manuals/other/AOM-TPM-9670V_9670H__X12_H12.pdf

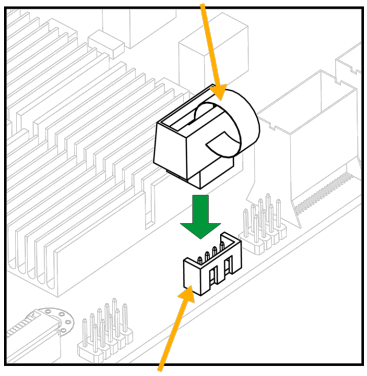
For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

| Trusted Platform Module Header<br>Pin Definitions: 10 Total | | | |
|---|---|---|---|
| **Pin#** | **Definition** | **Pin#** | **Definition** |
| 1 | +3.3 V | 2 | SPI_CS# |
| 3 | RESET# | 4 | SPI_MISO |
| 5 | SPI_CLK | 6 | Ground |
| 7 | SPI_MOSI | 8 | No Connection |
| 9 | +1.8 V Standby | 10 | SPI_IRQ# |

## VROC RAID Key Header

A VROC RAID Key header is located at JRK1 on the X14DBM-AP motherboard. Install a VROC RAID key on JRK1 for NVMe RAID support as shown in the illustration below.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.



| Intel VROC Key Pin Definitions: Four Total | |
|---|---|
| **Pin#** | **Definition** |
| 1 | GND |
| 2 | +3.3 V Standby |
| 3 | GND |
| 4 | CPU RAID Key |

**Note:** Images displayed are for illustrative purposes only. The components installed in your system may or may not look exactly the same as the graphics shown in the manual.

**Note:** For detailed instructions on how to configure VROC RAID settings, refer to the VROC RAID Configuration User's Guide posted on the web page under the following link: https://www.supermicro.com/support/manuals.

# 4.3 Control Panel

Refer to the following content for information about the front control panel header on the X14DBM-AP motherboard.

## Front Control Panel Header with I²C

There are two front control panel headers located on this motherboard.

JF1 on the X14DBM-AP motherboard contains header pins for various buttons and indicators that are normally located on a control panel at the front of the chassis. These connectors are designed specifically for use with Supermicro chassis.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

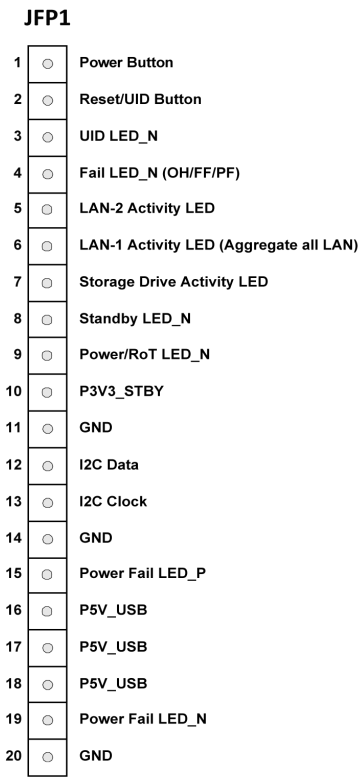



**Figure 4-1. JFP1 Header Pins**

## Power On and BMC/BIOS Status LED Button

The Power On and BMC/BIOS Status LED button is located on pin 1 of the front control panel header located at JFP1 on the X14DBM-AP motherboard. Momentarily contacting pin 1 of JFP1 will power on/off the system or display BMC/BIOS status.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

| Power Button<br><br>BMC/BIOS Status LED Indicator | |
|---|---|
| **Status** | **Event** |
| Green: Solid on | System power on |
| BMC/BIOS blinking green at 4 Hz | BMC/BIOS checking |
| BIOS blinking green at 4 Hz | BIOS recovery/update in progress |
| BMC blinking red x2 (two blinks red) at 4 Hz, one pause at 2 Hz (on-on-off-off) | BMC recovery/update in progress |
| BMC/BIOS blinking green at 1 Hz | Flash not detected or golden image checking failure |

## UID LED and System_Reset Button Select Jumper

Jumper JRU1 on the X14DBM-AP motherboard is used in conjunction with pin 2 of Front Control Panel header 1 (JFP1) to function as a System_Reset button or a UID LED button. To configure pin 2 of JFP1 for front UID button use in a chassis that supports front UID connection, close pins 1 and 2 of jumper JRU1. To set pin 2 of JFP1 for system reset support, close pins 3 and 4 of jumper JRU1.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

| UID Switch/Reset Button Select Jumper (JRU1)<br><br>Jumper Settings | |
|---|---|
| **State** | **Description** |
| Close pins 1 and 2 of JRU1 | Pin 2 of JFP1: used for UID switch support |
| Close pins 3 and 4 of JRU1 | Pin 2 of JFP1: used for System Reset support |

## UID LED

The unit identifier LED connection is located on pin 3 of JFP1 on the X14DBM-AP motherboard.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

## Fail LED (Information LED for OH/FF/PF)

The Fail LED (Information LED for OH/Fan Fail/PWR Fail) connection, located on pin 4 of JFP1, provides warnings of overheating, power failure, or fan failure for the system.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

| Fail LED (Information LED) (OH/Fan Fail/PWR Fail)<br>LED States | |
|---|---|
| **Status** | **Description** |
| Solid red (on) | An overheat condition has occurred. |
| Blinking red (1 Hz) | Fan failure: check for an inoperative fan. |
| Blinking red (0.25 Hz) | Power failure: check for a non-operational power supply. |
| Blinking red (10 Hz) (FP red LED) | CPLD recovery mode error(s). |
| Solid blue | UID has been activated locally. Use this function to locate a unit in the system that might be in need of service. |
| Blinking blue (1 Hz) | Local UID has been activated locally on. Use this function to identify a unit that might be in need of service. |
| BIOS/BMC blinking blue (10 Hz) | BIOS/BMC: recovery and/or update in progress. |
| Red Info LED blinking (10 Hz) and MB UID LED blue blinking (10 Hz) | CPLD: recovery and/or update in progress. |

## LAN1/LAN2 (NIC1/NIC2) LED

The Network Interface Controller (NIC) LED connection for LAN Port 1 is located on pin 6 of JFP1 on the X14DBM-AP motherboard, and LAN Port 2 is on pin 5.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

| LAN1/LAN2 LED<br>LED States | |
|---|---|
| **Color** | **State** |
| NIC 2: Blinking green | LAN 2: Active |
| NIC 1: Blinking green | LAN 1: Active |

## Storage Drive Activity LED

The storage drive activity LED connection is located on pin 7 of JFP1 on the X14DBM-AP motherboard. When this LED is blinking green, it indicates storage drive activity.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

| Storage Drive Activity LED<br>LED State | |
|---|---|
| **Color** | **State** |
| Blinking Green | Storage Drive Activity |

## Standby Power LED

The LED indicator for standby power is located on pin 8 of JFP1 on the X14DBM-AP motherboard. If this LED is on, standby power is on.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

## Root of Trust (RoT) Power LED

The Power LED for the Root of Trust (RoT) connection is located on pin 9 of JFP1 on the X14DBM-AP motherboard. If this LED is on, power for the RoT chip is on.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

## Standby Power

A Standby Power (I²C) connection is located on pins 10–14 of JFP1 on the X14DBM-AP motherboard to provide power to the system when it is in standby mode.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

| +3.3 V Standby Power<br>Pin Definitions: Five Total | |
|---|---|
| **Pin#** | **Definition** |
| 10 | +3.3 Standby |
| 11 | Ground |

| +3.3 V Standby Power<br>Pin Definitions: Five Total | |
|---|---|
| **Pin#** | **Definition** |
| 12 | I²C Data |
| 13 | I²C Clock |
| 14 | Ground |

## Power Fail LED Indicators

Power Failure LED Indicators are located on pins 15 and 19 of JFP1 on the X14DBM-AP motherboard.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

| FP Power LED<br>Pin Definitions (JFP1) | |
|---|---|
| **Pin#** | **Definition** |
| 15 | PWR Failure LED-Positive |
| 19 | PWR Failure LED-Negative |

## FP USB Power

Front panel USB power connections, located on pins 16–18 of JFP1, provide power to front USB devices.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

| FP USB PWR<br>Pin Definitions: Three Total | |
|---|---|
| **Pin#** | **Definition** |
| 16 | +5 V USB PWR |
| 17 | |
| 18 | |

## Front Control Panel Header 2

In addition to front control panel header 1 (JFP1), front control panel header 2 (JFP2), also located on the front side of the chassis, provides additional functions, including USB and VGA support to the system.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

# 4.4 I/O Ports

## Advanced I/O Module (AIOM) for I/O Support

A Supermicro proprietary Advanced I/O Module (AIOM) connector used for an add-on module is located at JAIOM1 (P1-AIOM PCIe 5.0 x16) on the X14DBM-AP motherboard. This AIOM connector provides input/output connections on the I/O face of your system.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

## AIOM Sideband Connector (JAIOM2SB1)

A Supermicro proprietary Advanced I/O Module (AIOM) sideband connector, located at JAIOM2SB1 and supported by CPU1, provides PCIe 5.0 x16 (with OCP 3.0 support) for AIOM sideband connections.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

## BMC LAN/USB/VGA Connector

A low-profile SlimSAS I/O x8 connector, located at JIO1 on the X14DBM-AP motherboard, provides dedicated BMC LAN/USB/VGA support for access.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

## Universal Serial Bus (USB) 3.2 Header

A USB header that supports two USB 3.2 Gen 1 ports (USB2/3) is located at JUSB1 on the rear side of the motherboard. These USB ports can be used for USB support via USB cables (not included).

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

| (USB 3.2 Gen 1) Header<br>Pin Definitions: 20 Total | | | |
|---|---|---|---|
| **Pin#** | **Definitions** | **Pin#** | **Definitions** |
| 1 | VBUS | 11 | IntA_P2_D+ |
| 2 | IntA_P1_SSRX- | 12 | IntA_P2_D- |

| (USB 3.2 Gen 1) Header<br>Pin Definitions: 20 Total | | | |
|---|---|---|---|
| **Pin#** | **Definitions** | **Pin#** | **Definitions** |
| 3 | IntA_P1_SSRX+ | 13 | GND |
| 4 | GND | 14 | IntA_P2_SSTX+ |
| 5 | IntA_P1_SSTX- | 15 | IntA_P2_SSTX- |
| 6 | IntA_P1_SSTX+ | 16 | GND |
| 7 | GND | 17 | IntA_P2_SSRX+ |
| 8 | IntA_P1_D- | 18 | IntA_P2_SSRX- |
| 9 | IntA_P1_D+ | 19 | VBUS |
| 10 | GND | 20 | No Connection |

## VGA Connection Ports

There are two VGA connections in your system. One VGA connection is located on the BMCLAN/USB/VGA slot (JIO1) on the I/O side of the X14DBM-AP motherboard. The other VGA header is located on the Front Panel Control Module (JFP2). These VGA connections provide analog interface support between the computer and the video displays.

The onboard VGA port is located on the I/O ports of the motherboard. Use this connection for VGA display.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

## 4.5 Jumper Settings

To modify the operation of the motherboard, jumpers can be used to choose between optional settings. Jumpers create shorts between two pins to change the function of the connector. Pin 1 is identified with a square solder pad on the printed circuit board. See the diagram below for an example of jumping pins 1 and 2. Refer to the motherboard layout page for jumper locations.

**Note:** On two-pin jumpers, "Closed" means the jumper is on and "Open" means the jumper is off the pins.

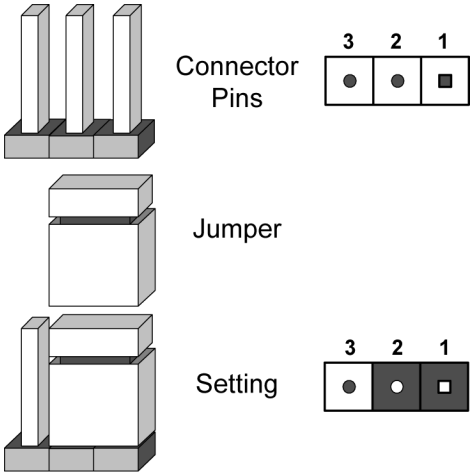



**Figure 4-2. Jumping Connector Pins**

### CMOS Clear

JBT1 on the X14DBM-AP motherboard is used to clear CMOS, which will also clear any passwords. Instead of pins, this jumper consists of contact pads to prevent accidentally clearing the contents of CMOS.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.




1. First power down the system and unplug the power cord(s).
2. Remove the cover of the chassis to access the motherboard.
3. Remove the onboard battery from the motherboard.

4. Short the CMOS pads, JBT1, with a metal object such as a small screwdriver for at least four seconds.

   **Note:** Clearing CMOS will also clear all passwords.

5. Remove the screwdriver (or shorting device).
6. Replace the cover, reconnect the power cord(s), and power on the system.

# 4.6 LED Indicators

For information about the LED indicators on the SYS-222HA-TN server, refer to the following content.

## BMC Heartbeat LED

A BMC Heartbeat LED is located at LEDBMC (LEDM1) on the X14DBM-AP motherboard. When this LED is blinking, the BMC is functioning normally.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

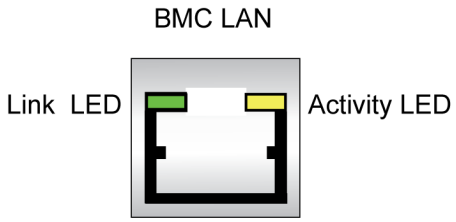
| BMC Heartbeat LED Indicator | |
|---|---|
| **LED Color** | **Definition** |
| Green: Blinking | BMC Normal |

## BMC LAN LEDs

The dedicated BMC LAN connection on the X14DBM-AP motherboard features two LEDs. The LED on the right indicates activity, and the LED on the left indicates the speed of the connection.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

| BMC LAN LEDs | | |
|---|---|---|
| | **Color/State** | **Definition** |
| Link (left) | Green: Solid<br>Amber: Solid | 100 Mbps<br>1 Gbps |
| Activity (right) | Amber: Blinking | Active |



## Onboard Power LED

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

| Onboard Power LED Indicator | |
|---|---|
| **LED Color** | **Definition** |
| Off | System Power Off (power cable not connected) |
| Green | System Power On |

## Unit ID (UID) LED

The UID LED indicator is located at LED2 on the X14DBM-AP motherboard. This UID indicator provides easy identification of a system that may need to be serviced.

For a detailed diagram of the X14DBM-AP motherboard, see the layout under "Motherboard Quick Reference" on page 27.

| UID LED<br>LED Indicator | |
|---|---|
| **LED Color** | **Definitions** |
| Blue: On | System Identified |

# Chapter 5:

# Software

After the SYS-222HA-TN server has been installed, you can install the Operating System (OS), configure RAID settings, and install the drivers.

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Installing the OS ..... 134

**5.2 Driver Installation** ..... **136**

**5.3 BMC** ..... **138**

BMC ADMIN User Password ..... 138

# 5.1 Microsoft Windows OS Installation

If you will be using RAID, you must configure RAID settings before installing the Windows OS and the RAID driver. Refer to the RAID Configuration User Guides posted on our website at https://www.supermicro.com/support/manuals.

## Installing the OS

1. Create a method to access the Microsoft Windows installation ISO file. That can be a USB flash or media drive, or the BMC KVM console.
2. Retrieve the proper drivers. Go to the Supermicro web page for your motherboard and click on "Download the Latest Drivers and Utilities," select the proper driver, and copy it to a USB flash drive.
3. Boot from a bootable device with Windows OS installation. You can see a bootable device list by pressing <F11> during the system bootup.

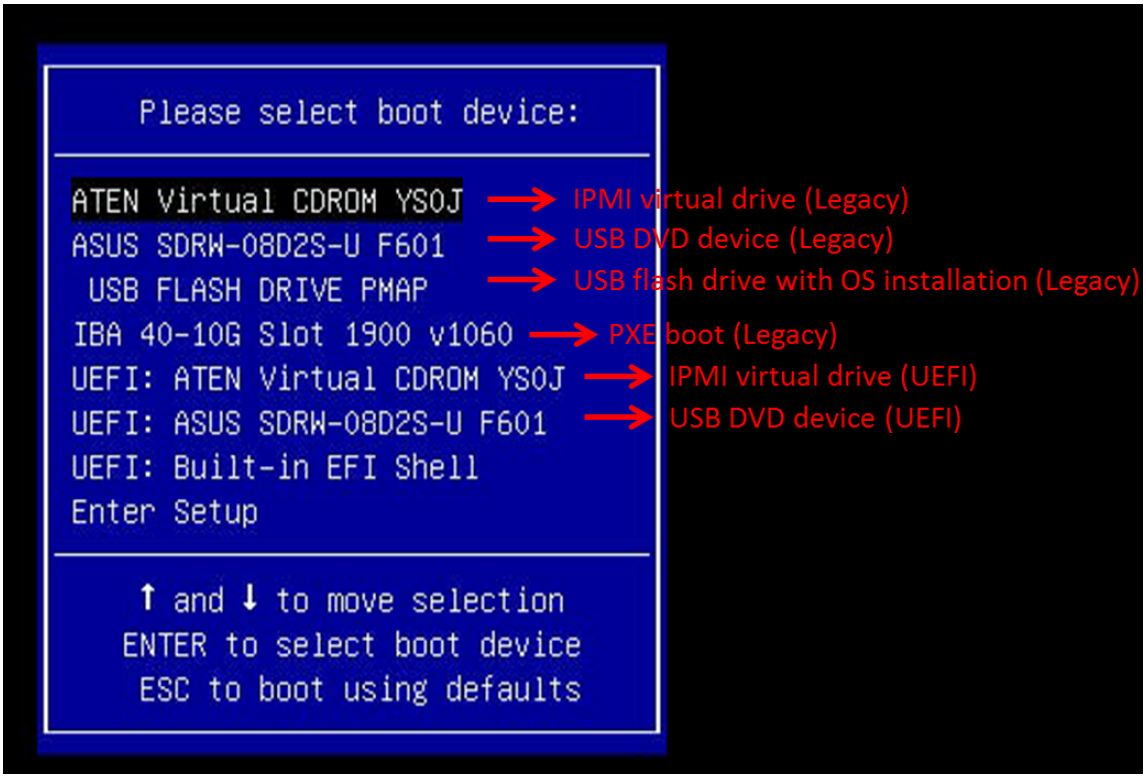



**Figure 5-1. Selecting the Boot Device**

4. During Windows Setup, continue to the dialog box where you select the drives on which to install Windows. If the disk you want to use is not listed, click on the “Load driver” link at the bottom left corner.

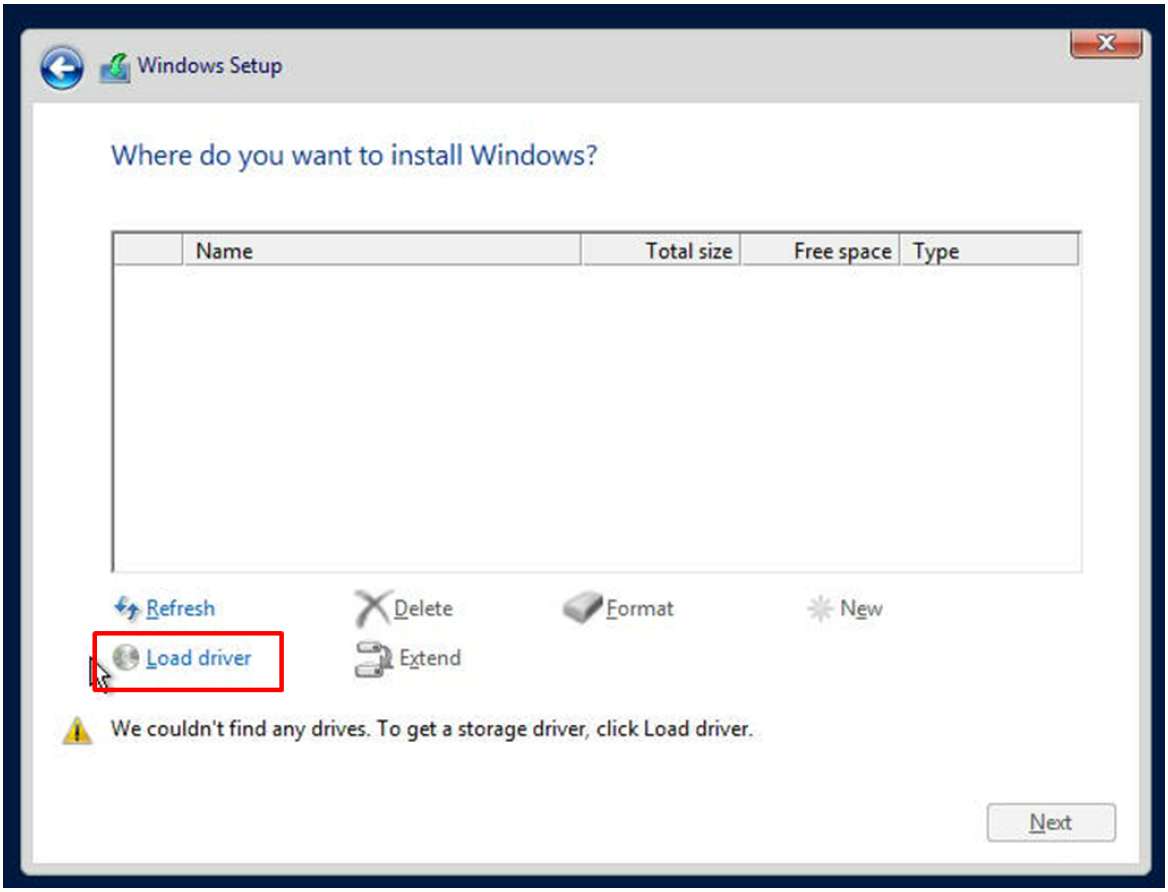



**Figure 5-2. Loading the Driver Link**

To load the driver, browse the USB flash drive for the proper driver files.

5. Once all devices are specified, continue with the installation.
6. After the Windows OS installation has completed, the system will automatically reboot multiple times for system updates.

## 5.2 Driver Installation

The Supermicro website contains drivers and utilities for your system at the following page:

https://www.supermicro.com/wdl.

Some of these drivers and utilities must be installed, such as the chipset driver. After accessing the website, go into the CDR_Images (in the parent directory of the above link) and locate the ISO file for your motherboard. Download this file to a USB flash or media drive. You may also use a utility to extract the ISO file if preferred.

Another option is to go to the Supermicro website at https://www.supermicro.com. Find the product page for your motherboard and download the latest drivers and utilities. Insert the flash drive or disk, and the screenshot shown below should appear.

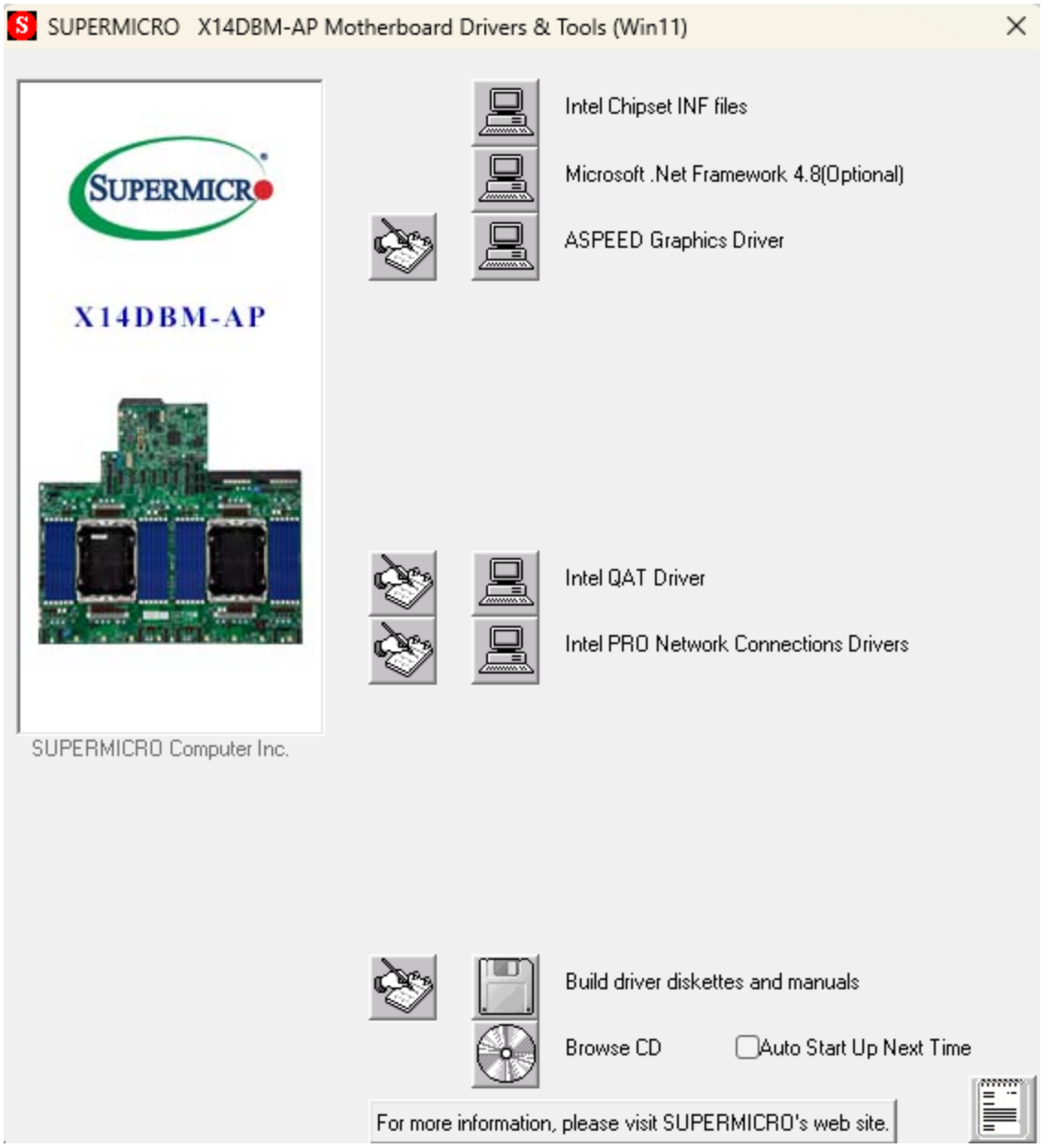



**Figure 5-3. Driver Installation Screen**

**Note:** Click the icons showing a hand writing on paper to view the readme files for each item. Click the computer icons to the right of these items to install each item (from top to bottom) one at a time. *After installing each item, you must reboot the system before moving on to the next item on the list.* The bottom icon with a CD on it allows you to view the entire contents.

## 5.3 BMC

The X14DBM-AP motherboard provides remote access, monitoring, and management through the baseboard management controller (BMC) and other management controllers distributed among different system modules. There are several BIOS settings that are related to BMC. For general documentation and information on BMC, visit our website at the following page:

https://www.supermicro.com/en/solutions/management-software/bmc-resources

### BMC ADMIN User Password

For security, each system is assigned a unique default BMC password for the ADMIN user. The password can be found on a sticker on the motherboard and a sticker on the chassis, for Supermicro chassis. The sticker also displays the BMC MAC address. If necessary, the password can be reset using the Supermicro IPMICFG tool.




**Figure 5-4. BMC Password Label**

# Chapter 6:

# Optional Components

This chapter describes alternate configurations and optional system components for the SYS-222HA-TN server.

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**6.2 HBA Card** ..... **141**
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Configuring Intel VMD ..... 146
Creating NVMe RAID Configurations ..... 152

## 6.1 TPM Security Module

This is an SPI-capable TPM 2.0 with Infineon 9672 controller.

The JTPM1 header is used to connect a Trusted Platform Module (TPM). A TPM is a security device that supports encryption and authentication in hard drives. It enables the X14DBM-AP motherboard to deny access if the TPM associated with the hard drive is not installed in the SYS-222HA-TN server.

For details and installation procedures, refer to the following page:

https://www.supermicro.com/en/products/accessories/addon/AOM-TPM-9672V.php

- AOM-TPM-9672V (TCG 2.0)

## 6.2 HBA Card

This is a 12 Gb/s, multi-port SAS PCIe Gen 4.0 internal Host Bus Adapter (HBA) card.

The Supermicro HBA AOC-S3816L-L16iT features 16 internal SAS connectors, while the AOC-S3808L-L8iT features eight internal SAS connectors. Both are designed for high-performance storage connectivity.

These cards use Broadcom's 3816 and 3808 I/O processors for optimum performance with PCI Express Gen 4.0 host interface for increased bandwidth.

Each Add-On-Card supports up to 122 devices as HBA in IT mode via expander backplane.

## 6.3 RAID Cards

These are Super Micro Computer, Inc. 12 Gb/s, multi-port PCIe Gen 4.0 RAID adapter cards.

The low-profile AOC-S3908L-H8iR RAID card features eight internal SAS connectors and the AOC-S3916L-H16iR features 16 internal SAS connectors. Both offer high-performance storage connectivity. These RAID cards are built on the Broadcom SAS IC technology and MegaRAID technology to address the growing demand for increased data throughput and scalability requirements across the enterprise-class server platforms.

With high-performance RAID architecture, including hardware RAID 5 and 6, these RAID controller cards support high capacity storage applications. They deliver cost-effective storage solutions using SATA drives and maximum performance and reliability with SAS drives. Using expander backplanes, they support up to 16, 32, and 240 drives (depending on SKU) with RAID 0, 1, 5, 6, 10, 50, and 60.

## 6.4 Cable Management Arm

The SYS-222HA-TN server supports a cable management arm (CMA), which keeps the rear cables organized and clear of the rail mechanisms when the system is extended out the front of the rack for maintenance.

The CMA attaches to the rack mounting rails using four connectors. They are labeled as connectors 1, 2, 3, and 4.

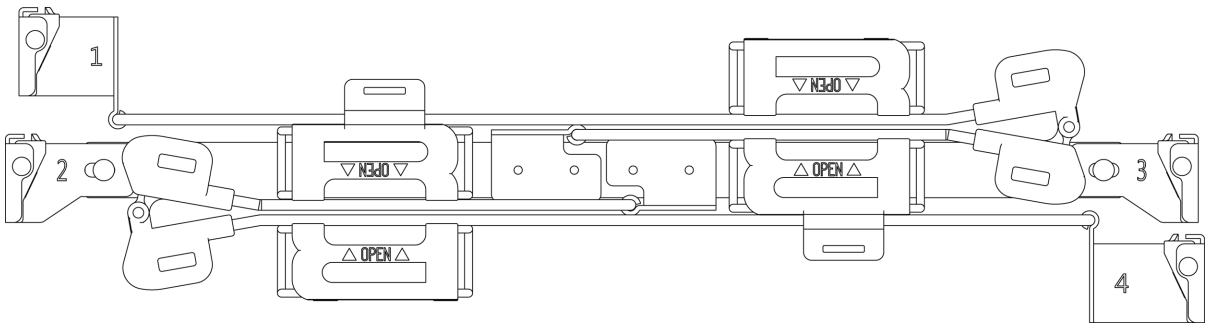



**Figure 6-1. Cable Management Arm**

| Cable Arm Details | | |
|---|---|---|
| **Optional Part** | **Part Number** | **Description** |
| Cable Arm | MCP-290-00168-0N | 7.5" deep cable arm |
| Rail Set | MCP-290-11901-0N | 41.2" rails (optimized for 1200-mm deep racks) |

### Installing the Cable Management Arm

1. Slide CMA connector #1 forward onto the two posts on the rear of the right inner rail (right side when viewed from the front). It snaps into place.
2. Slide CMA connector #2 forward onto the two posts on the rear of the right middle rail. It snaps into place.

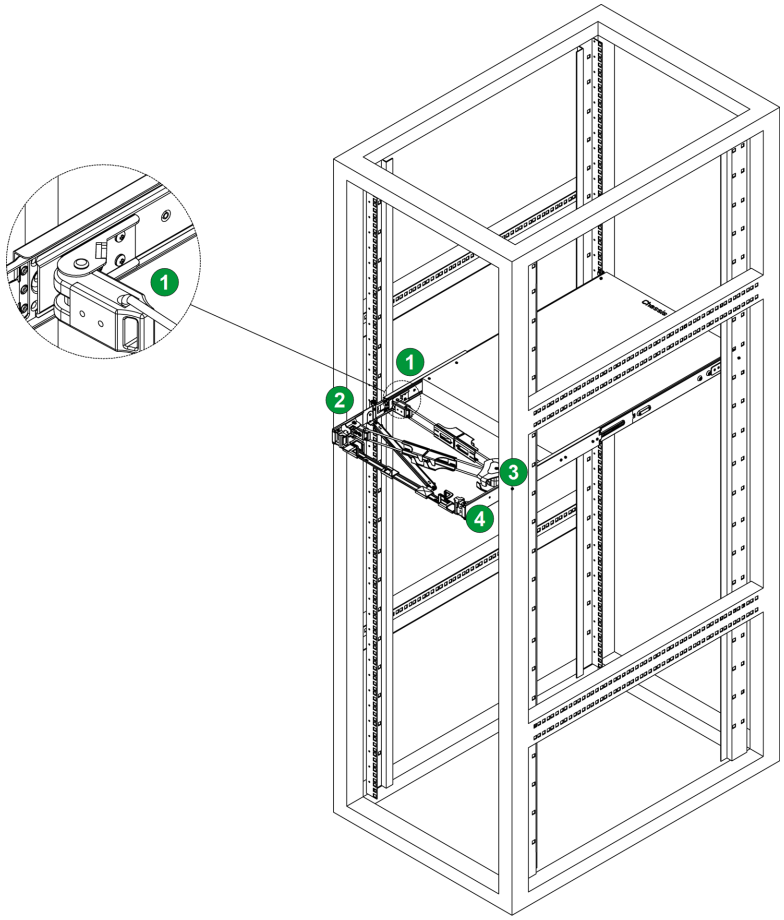



**Figure 6-2. Installing the Connectors**

3. Slide CMA connector #3 forward onto the two posts on the rear of the left middle rail. It snaps into place.
4. For CMA connector #4, align the metal tabs with the slots on the rear of the left outer rail and push it forward. It snaps into place.
5. Route the cables through the holding brackets, leaving enough slack.

## Removing the Cable Management Arm

1. Remove cables from the CMA.
2. For CMA connector #4, pull the metal release tab toward the center of the rack and slide the connector toward the rear to release it.
3. For CMA connectors #3, #2, and #1, depress the front edge of the yellow plastic rocker lock and slide the connector toward the rear to release it.

## 6.5 Intel Virtual RAID on CPU (VROC)

Intel® Virtual RAID on CPU (Intel VROC) is an enterprise RAID solution for NVMe SSDs directly attached to Intel Xeon Scalable processors. Intel Volume Management Device (VMD) is an integrated controller inside the CPU PCIe root complex.

- A single processor supports up to 12 NVMe SSDs and up to 6 RAID arrays.
- A dual processor system supports up to 24 NVMe SSDs and 12 RAID arrays.

Stripe sizes are 4K, 8K, 16K, 32K, 64K, 128K.

### Requirements and Restrictions

- *Intel VROC is only available when the system is configured for UEFI boot mode.*
- To enable the **mdadm** command and support for RSTe, install the patch from
  - Linux: https://downloadcenter.intel.com/download/28158/Intel-Virtual-RAID-on-CPU-Intel-VROC-and-Intel-Rapid-Storage-Technology-enterprise-Intel-RSTe-Driver-for-Linux-
  - Windows: https://downloadcenter.intel.com/download/28108/Intel-Virtual-RAID-on-CPU-Intel-VROC-and-Intel-Rapid-Storage-Technology-enterprise-Intel-RSTe-Driver-for-Windows-
- To enable Intel VROC, a hardware key must be inserted on the motherboard, and the appropriate processor's Virtual Management Devices must be enabled in the BIOS setup.
- Intel VROC is not compatible with secure boot. This feature must be disabled.
- When creating bootable OS RAID1 devices, you must have both devices on the same CPU, and a VMD on that CPU.
- Spanning drives when creating RAID devices is not recommended due to performance issues, even though it is supported.

### Supported SSDs and Operating Systems

To see the latest support information:

https://www.intel.com/content/www/us/en/support/articles/000030310/memory-and-storage/ssd-software.html

## Additional Information

Additional information is available on the product page for the Supermicro add-on card and the linked manuals.

https://www.supermicro.com/products/accessories/addon/AOC-VROCxxxMOD.cfm

## Hardware Key

The Intel VROC hardware key is a license key that detects the Intel VROC SKU and activates the function accordingly. The key must be plugged into the Supermicro motherboard (connector JRK1). The key options are:

| Intel® VROC Keys | | | |
|---|---|---|---|
| **VROC Package** | **Description** | **Part Number** | **Intel MM Number** |
| Standard | RAID 0, 1, 10<br>Supports 3rd party SSDs | AOC-VROCSTNMOD | 951605 |
| Premium | RAID 0, 1, 5, 10<br>Supports 3rd party SSDs | AOC-VROCPREMOD | 951606 |

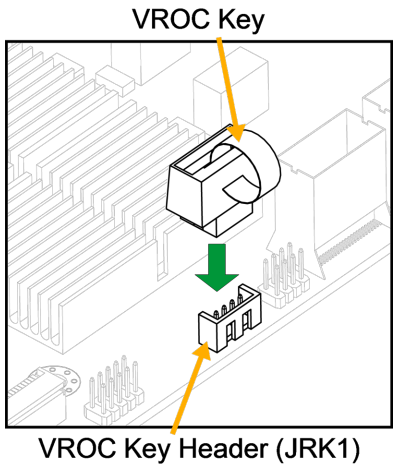



**Figure 6-3. Intel VROC RAID Key and Motherboard Connector JRK1**

## Configuring Intel VMD

VMD must be enabled on PCIe ports which have NVMe drives attached to them in order for those drives to be added to a VROC RAID configuration. The default BIOS setting for the NVMe Mode Switch is Auto which automatically enables VMD on all installed NVMe drives.

NVMe Mode Switch:

- Auto: Enables VMD for all NVMe ports if VROC Key is installed.
- VMD: Enables VMD for all NVMe ports despite the lack of the VROC Key.
- Manual: Allows the user to select specific NVMe ports on which to enable VMD.

The NVMe Mode Switch can be viewed or selected at BIOS > Advanced > Chipset Configuration > IIO Configuration > NVMe Mode Switch.

### *Configuring VMD Manually*

The steps for manually configuring VMD on specific NVMe ports in UEFI BIOS are shown below. Example screenshots may differ from your server.

1. Reboot the server and press [DEL] key to access the BIOS options.
2. Switch to Advanced > Chipset Configuration > IIO Configuration .
3. Select NVMe Mode Switch, then select Manual.

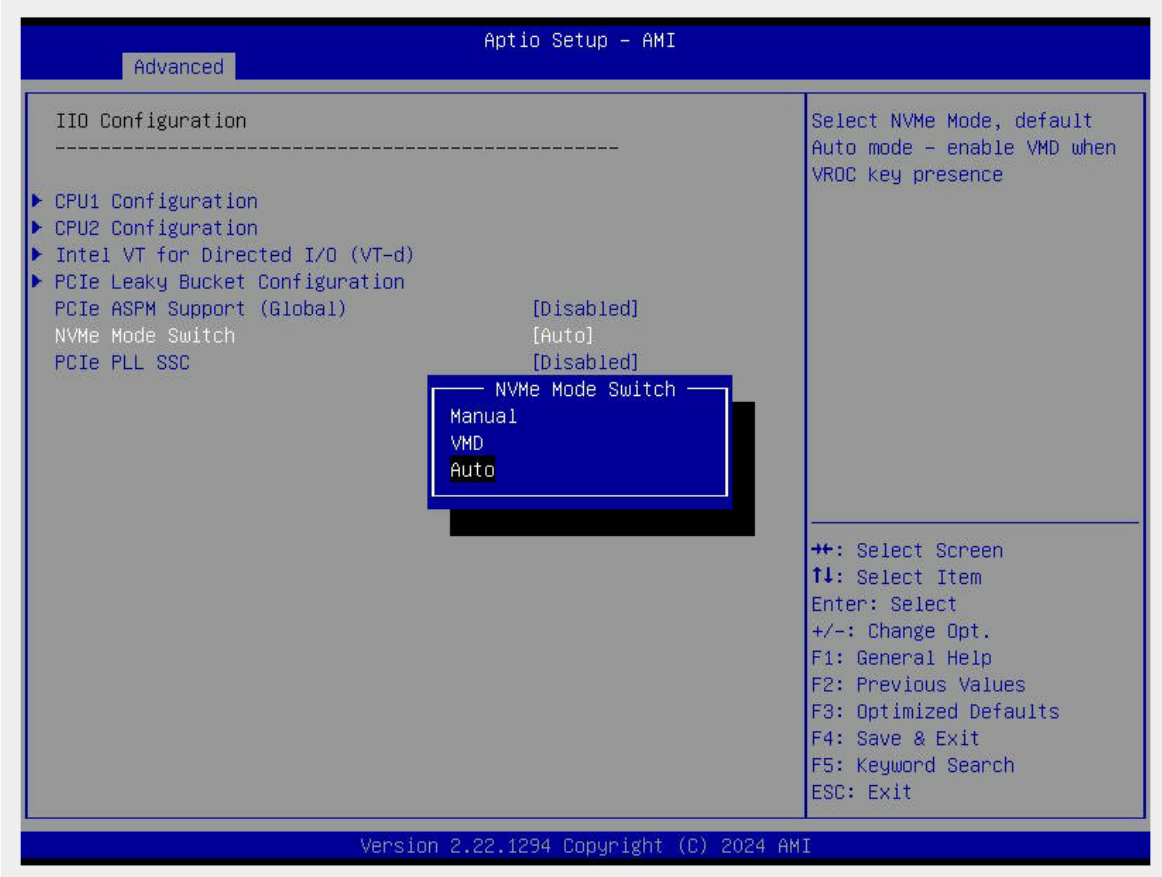



**Figure 6-4. BIOS, Selecting VMD Mode**

4. This table identifies the NVMe Port Resources in the X14 Hyper-AP servers. Enable VMD on the NVMe drive's corresponding PCI Express port identifier according to the VMD BIOS Settings table.

### *Intel VMD BIOS Settings for SYS-222HA-TN*

| CPU1 | NVMe Slots |
|---|---|
| PCI Express 0 Port A (x2) | Internal NVMe M.2 Slots |
| PCI Express 0 Port B (x2) | M.2-C1, M.2-C2 |
| PCI Express 1 Port A<br>PCI Express 1 Port C<br>PCI Express 1 Port E<br>PCI Express 1 Port G | NVMe Drive Bays 0, 1, 2, 3 |
| PCI Express 3 Port A<br>PCI Express 3 Port C<br>PCI Express 3 Port E<br>PCI Express 3 Port G | NVMe Drive Bays 4, 5, 6, 7 |
| PvCI Express 4 Port A<br>PCI Express 4 Port C<br>PCI Express 4 Port E<br>PCI Express 4 Port G | NVMe Drive Bays 8, 9, 10, 11 |
| PCI Express 5 Port A<br>PCI Express 5 Port C<br>PCI Express 5 Port E<br>PCI Express 5 Port G | NVMe Drive Bays 12, 13, 14, 15 |
| **CPU2** | **NVMe Slots** |
| PCI Express 4 Port A<br>PCI Express 4 Port C<br>PCI Express 4 Port E<br>PCI Express 4 Port G | NVMe Drive Bays 16, 17, 18, 19 |
| PCI Express 5 Port A<br>PCI Express 5 Port C<br>PCI Express 5 Port E<br>PCI Express 5 Port G | NVMe Drive Bays 20, 21, 22, 23 |

**Important:** VMD must only be enabled on NVMe port resources. If VMD is enabled on other PCIe ports, the functionality of those ports will be impacted. See the table above.

5. Select "CPU1 Configuration" or "CPU2 Configuration" to enable VMD for devices under the respective CPU. The Ports will be listed under each PCI Express Root Port (PEx) shown in the CPU1 Configuration or CPU2 Configuration menus.

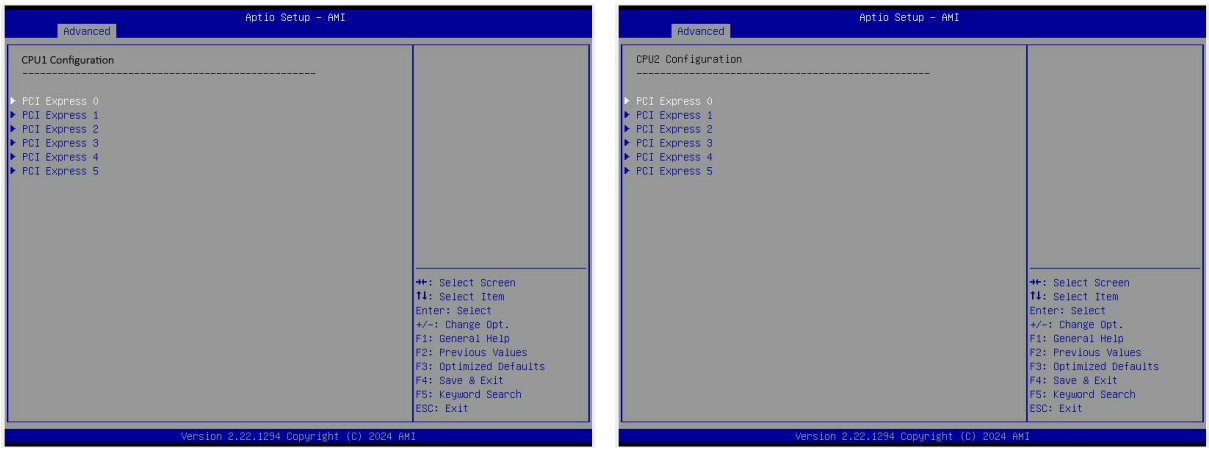



**Figure 6-5. CPU1 Configuration or CPU2 Configuration**

6. Select a PCI Express Root port to display the available ports to configure.

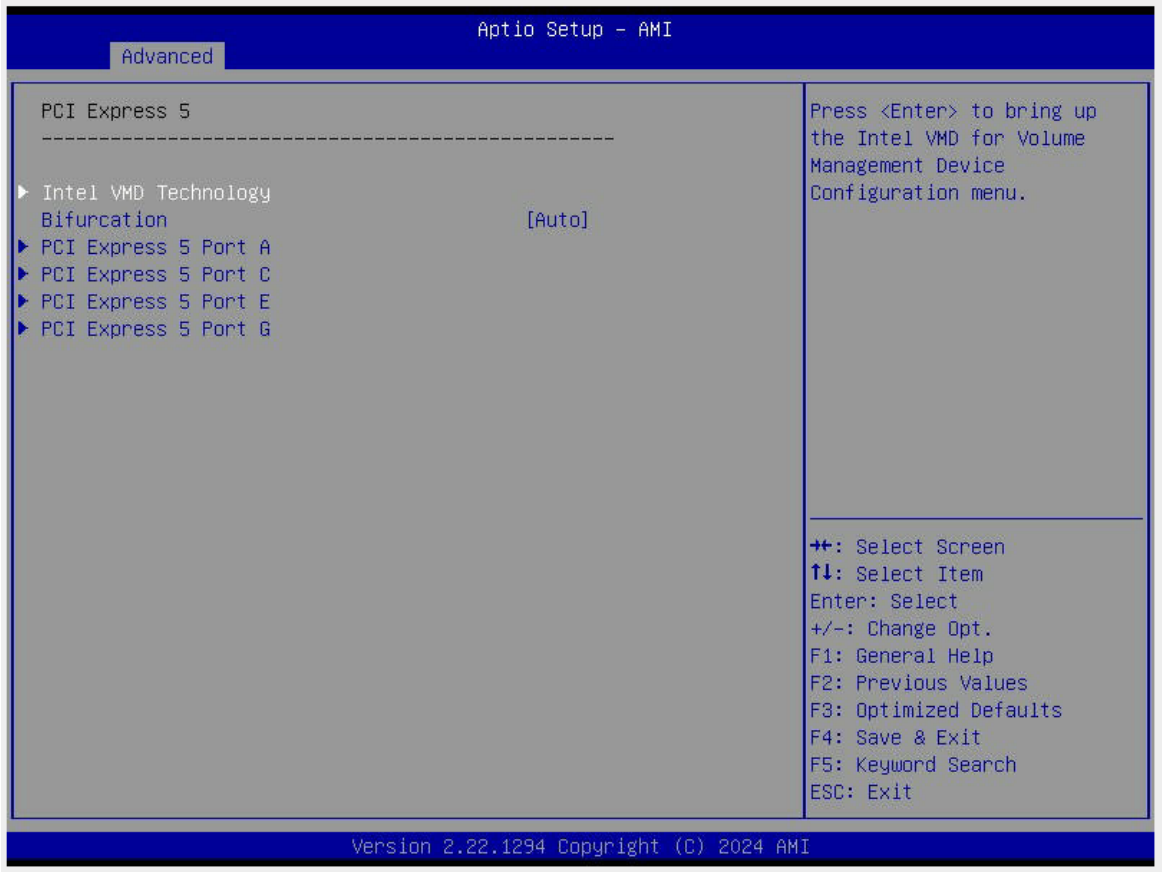



**Figure 6-6. NVMe Ports listed under CPU1, PCI Express 5 (Example)**

7. Select the root port and enable VMD technology at the root port level. VMD must be enabled at the Root Port level and at the individual port level for the VMD to function on a given port.

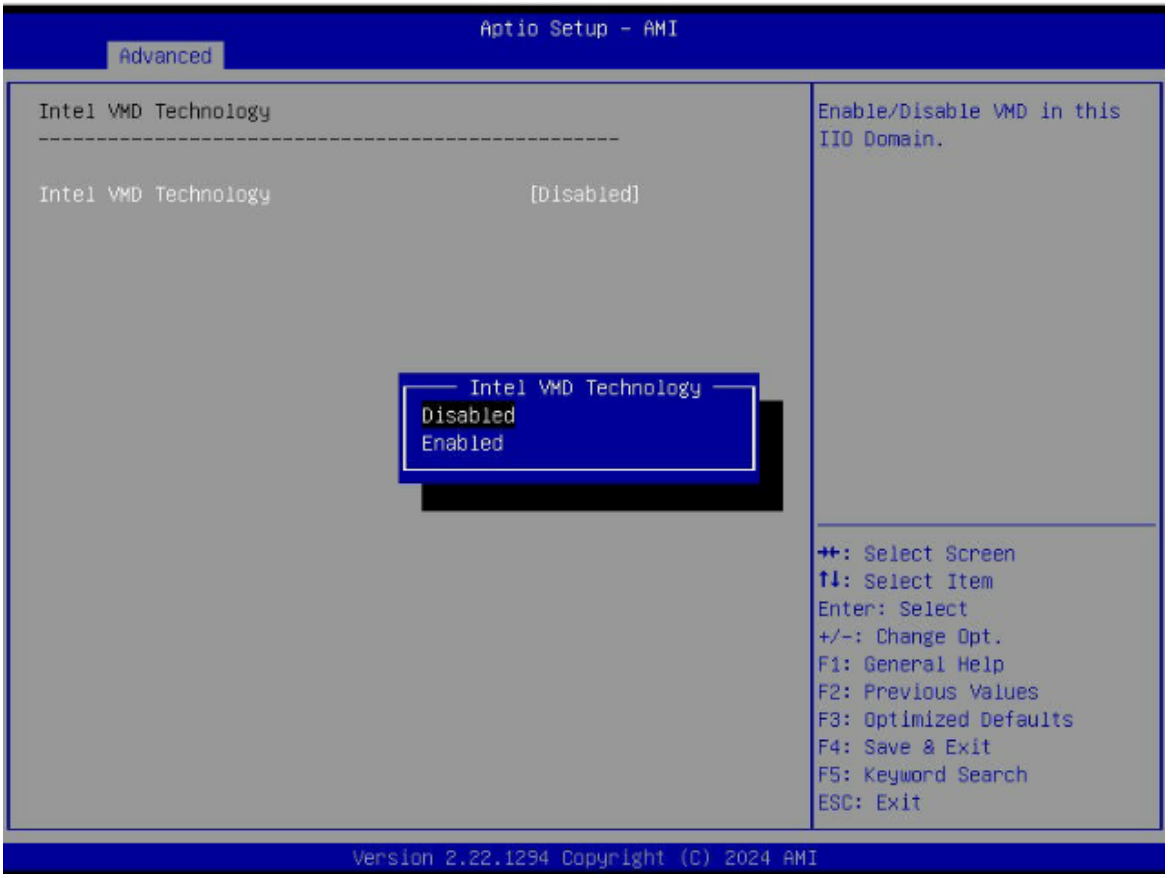



**Figure 6-7. Enabling VMD at the Root Port Level (Example)**

8. Select the port to configure, and then select the Enabled option under "Intel VMD Technology" to enable VMD support for the individual NVMe port.

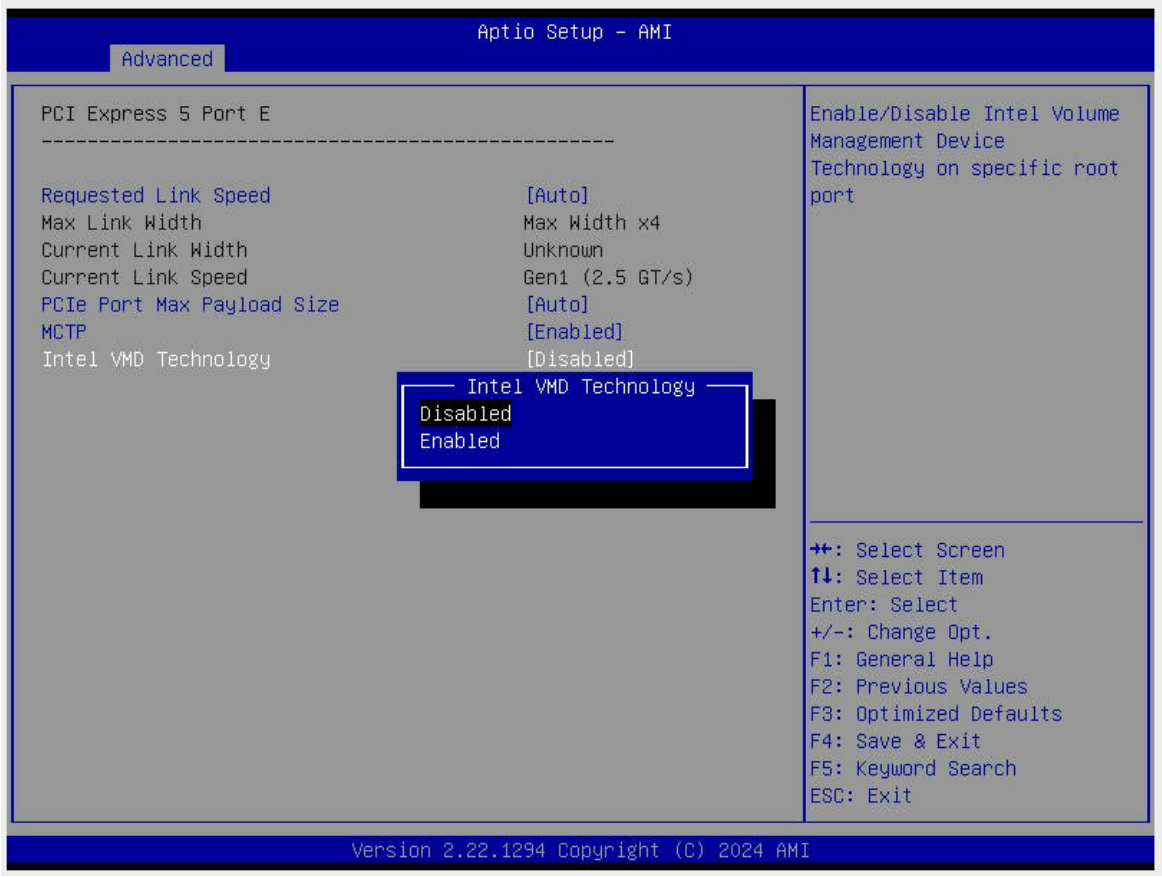



**Figure 6-8. BIOS, Enabling CPU1 PCI Express 5 Port E (Example)**

9. Continue with other PCI Express ports until all desired NVMe Ports have VMD enabled as well as the corresponding PCIe root ports.
10. Press [F4] to save the configuration and reboot the system.

**Notes:**

- If there is an existing RAID configuration, delete the RAID volume associated with the VMD controller before disabling the controller. Failure to do so may lead to unexpected behavior.
- The effects of physically changing or swapping a CPU on the VMD controller have not been thoroughly tested or documented.

## Creating NVMe RAID Configurations

1. Open Advanced > Intel(R) Virtual RAID on CPU > All Intel VMD Controllers > Create RAID Volume.

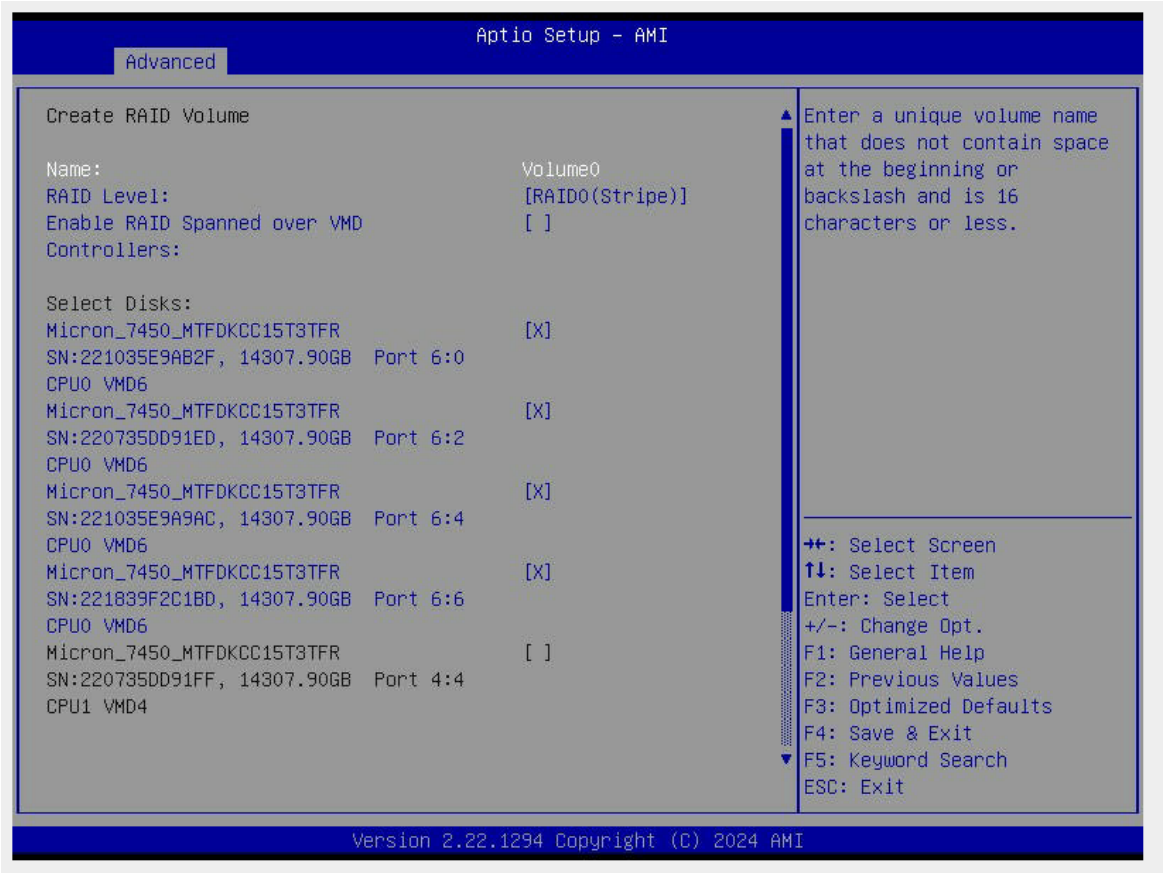



**Figure 6-9. Created Volume Without Enabling RAID Spanned Over VMD Controller**

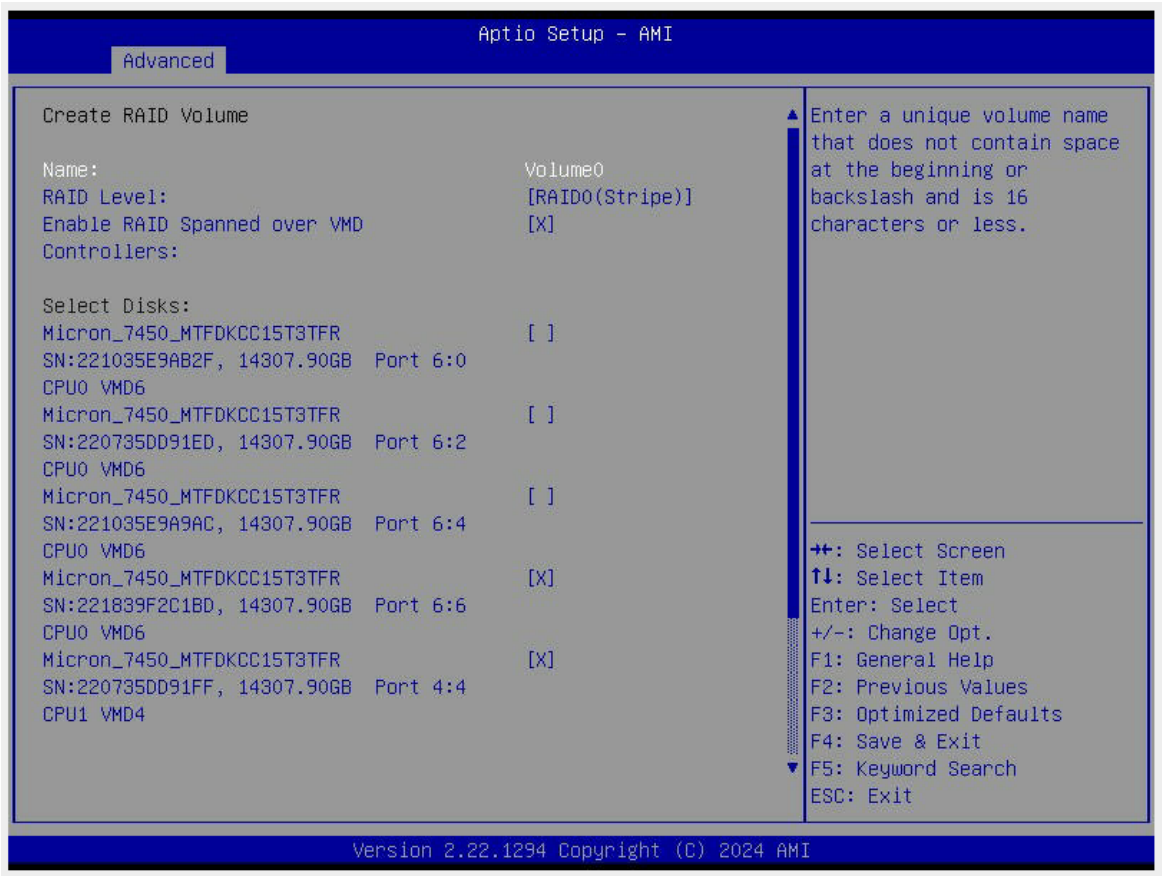



**Figure 6-10. Created Volume with Enabling RAID Spanned Over VMD Controller**

2. Set Name.
3. Set RAID Level.
4. If cross-controller RAID is required, select Enable RAID spanned over VMD Controller.
5. Select specific disks for RAID with an [X].
   - RAID0: Select at least two [2–24] disks
   - RAID1: Select only two disks
   - RAID5: Select at least three [3–24] disks
   - RAID10: Select only four disks
6. Select Strip Size (Default 64 KB).
7. Select Create Volume.
8. If another RAID is needed, start again at step 1.

### *Status Indications*

An LED indicator on the drive carrier shows the RAID status of the drive.

| Drive Carrier Status LED Indicator | |
|---|---|
| **Status** | **State (red)** |
| Normal function | Off |
| Locating | 4 Hz blinking |
| Fault | Solid on |
| Rebuilding | 1 Hz blinking |
| **IBPI SFF 8489 Defined Status LED States** | |

### *Hot-Swap Drives*

Intel VMD enables hot-plug and hot-unplug for NVMe SSDs, whether from Intel or other manufacturers. Under vSphere ESXi, several steps are necessary to avoid potential stability issues. See the information at link [1] below.

#### *Hot-unplug*

1. Prevent devices from being re-detected during rescan:

   ```
   esxcli storage core claiming autoclaim --enabled=false
   ```

2. Unmount the VMFS volumes on the device. Check link [2] for details.
3. Detach the device. Check link [3] for details.
4. Physically remove the device.

#### *Hot-plug*

- Physically install the device.

ESXi will automatically discover NVMe SSDs, but a manual scan may be required in some cases.

### *Related Information Links*

1. https://kb.vmware.com/s/article/2151404
2. https://docs.vmware.com/en/VMware-vSphere/6.5/com.vmware.vsphere.storage.doc/GUID-1B56EF97-F60E-4F21-82A7-8F2A7294604D.html
3. https://docs.vmware.com/en/VMware-vSphere/6.5/com.vmware.vsphere.storage.doc/GUID-F2E75F67-740B-4406-9F0C-A2D99A698F2A.html

# Chapter 7:

# Troubleshooting and Support

The following content contains information on common issues and how to resolve them.

**7.1 Online Resources** ..... **156**
Direct Links for the SYS-222HA-TN System ..... 156
Direct Links for General Support and Information ..... 156
**7.2 Baseboard Management Controller (BMC)** ..... **157**
**7.3 Troubleshooting Procedures** ..... **158**
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If the System Becomes Unstable ..... 159
**7.4 CMOS Clear** ..... **161**
**7.5 Motherboard Battery** ..... **162**
**7.6 Where to Get Replacement Components** ..... **163**
**7.7 Technical Support Procedures** ..... **164**
Returning Merchandise for Service ..... 164
**7.8 Feedback** ..... **166**

## 7.1 Online Resources

A great deal of information is available on the Supermicro website. From the top menu of the Supermicro home page at https://www.supermicro.com:

- Specifications for servers and other hardware are available by clicking **Products**.
- The **Support** option offers downloads (manuals, BIOS/BMC, drivers, etc.), FAQs, RMA, warranty, and other service extensions.

### Direct Links for the SYS-222HA-TN System

- SYS-222HA-TN system specifications page:

  https://www.supermicro.com/en/products/system/hyper/2u/sys-222ha-tn

- X14DBM-AP motherboard page for links to the quick reference guide, user manual, validated storage drives, and more:

  https://www.supermicro.com/en/products/motherboard/X14DBM-AP

### Direct Links for General Support and Information

- Frequently Asked Questions: https://www.supermicro.com/FAQ/index.php
- TPM User Guide: https://www.supermicro.com/manuals/other/AOM-TPM-9670V_9670H__X12_H12.pdf
- BMC User Guide: https://www.supermicro.com/manuals/other/BMC_IPMI_X14_H14.pdf
- Product Resources page for validated memory details: https://www.supermicro.com/support/resources/mem.cfm
- Product Matrices page for links to tables summarizing specs for systems, motherboards, power supplies, riser cards, add-on cards, and more: https://www.supermicro.com/en/support/product-matrices
- Security Center for recent security notices: https://www.supermicro.com/en/support/security_center
- Supermicro Phone and Addresses: https://www.supermicro.com/en/about/contact

## 7.2 Baseboard Management Controller (BMC)

The SYS-222HA-TN server supports the Baseboard Management Controller (BMC). BMC is used to provide remote access, monitoring, and management. There are several BIOS settings that are related to BMC.

For general documentation and information on BMC, visit our website at the following page:

https://www.supermicro.com/en/solutions/management-software/bmc-resources

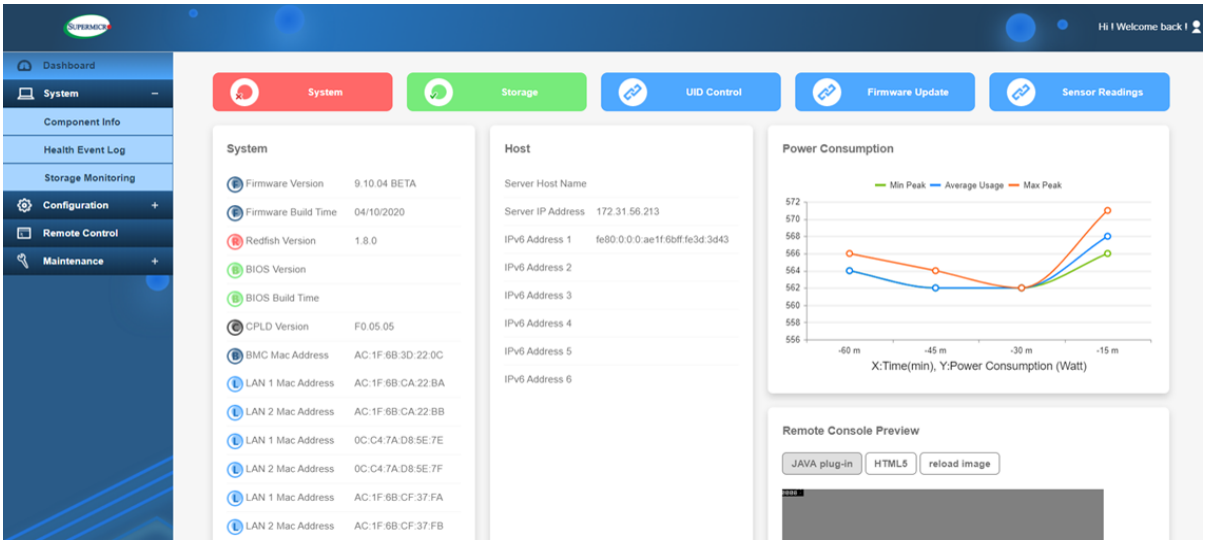



**Figure 7-1. BMC Dashboard**

## 7.3 Troubleshooting Procedures

Use the following procedures to troubleshoot your system. If you have followed all of the procedures below and still need assistance, refer to the "Technical Support Procedures" on page 164 section in this chapter. Always disconnect the AC power cord before adding, changing or installing any non hot-swap hardware components. If the below steps do not fix the setup configuration problem, contact your vendor for repairs.

### Before Power On

1. Make sure that there are no short circuits between the motherboard and chassis.
2. Disconnect all ribbon/wire cables from the motherboard, including those for the keyboard and mouse.
3. Remove all add-on cards.
4. Install the processor (making sure it is fully seated) and connect the front panel connectors to the motherboard.

### No Power

1. Make sure that there are no short circuits between the motherboard and the chassis.
2. The battery on your motherboard may be old. Check to verify that it still supplies approximately 3 VDC. If it does not, replace it with a new one.

### No Video

1. If the power is on, but you do not have video, remove all add-on cards and cables.
2. Remove all memory modules and turn on the system (if the alarm is on, check the specs of memory modules, reset the memory, or try a different one).

### System Boot Failure

If the system does not display Power-On-Self-Test (POST) or does not respond after the power is turned on, do the following:

1. Remove all components from the motherboard, especially the DIMMs. Power on the system and check if the power-on LED and the BMC Heartbeat LED are on, and system fans are spinning.

2. Turn on the system with only one DIMM installed. If the system boots, check for bad DIMMs or slots by following the Memory Errors Troubleshooting procedure in this chapter.

## Memory Errors

When suspecting faulty memory is causing the system issue, check the following:

1. Make sure that the memory modules are compatible with the system and are properly installed. See "Maintenance and Component Installation" on page 45 for installation instructions. (For memory compatibility, refer to the "Tested Memory List" link on the motherboard's product page to see a list of supported memory.)
2. Check if different speeds of DIMMs have been installed. It is strongly recommended that you use the same RAM type and speed for all DIMMs in the system.
3. Make sure that you are using the correct type of DIMMs recommended by the manufacturer.
4. Check for bad DIMMs or slots by swapping a single module among all memory slots and check the results.

## Losing the System's Setup Configuration

1. Make sure that you are using a high-quality power supply. A poor-quality power supply may cause the system to lose the CMOS setup information. Refer to "Introduction" on page 15 for details on recommended power supplies.
2. The battery on your motherboard may be old. Check to verify that it still supplies approximately 3 VDC. If it does not, replace it with a new one.

## If the System Becomes Unstable

If the system becomes unstable during or after OS installation, check the following:

1. Processor/BIOS support: Make sure that your processor is supported and that you have the latest BIOS installed in your system.
2. Memory support: Make sure that the memory modules are supported. Refer to the product page on our website at https://www.supermicro.com. Test the modules using memtest86 or a similar utility.

   **Note:** Click on the "Tested Memory List" link on the motherboard's product page to see a list of supported memory.

3. Storage Drive support: Make sure that all storage drives work properly. Replace the failed storage drives with good ones.
4. System cooling: Check the system cooling to make sure that all heatsink fans and processor/system fans, etc., work properly. Check the hardware monitoring settings in the BMC to make sure that the processor and system temperatures are within the normal range. Also, check the front panel Overheat LED and make sure that it is not on.
5. Adequate power supply: Make sure that the power supply provides adequate power to the system. Make sure that all power connectors are connected. Refer to our website for more information on the minimum power requirements.
6. Proper software support: Make sure that the correct drivers are used.

If the system becomes unstable before or during OS installation, check the following:

1. Source of installation: Make sure that the devices used for installation are working properly, including boot devices such as a CD/Media drive.
2. Cable connection: Check to make sure that all cables are connected and working properly.
3. Use the minimum configuration for troubleshooting: Remove all unnecessary components (starting with add-on cards first), and use the minimum configuration (but with the processor and a memory module installed) to identify the trouble areas. Refer to the steps listed above in this section for proper troubleshooting procedures.
4. Identify bad components by isolating them: If necessary, remove a component in question from the chassis, and test it in isolation to make sure that it works properly. Replace a bad component with a good one.
5. Check and change one component at a time instead of changing several items at the same time. This will help isolate and identify the problem.
6. To find out if a component is good, swap this component with a new one to see if the system will work properly. If so, then the old component is bad. You can also install the component in question in another system. If the new system works, the component is good and the old system has problems.

## 7.4 CMOS Clear

JBT1 on the X14DBM-AP motherboard is used to clear CMOS, which will also clear any passwords. For information on clearing CMOS, refer to "CMOS Clear" on page 129 earlier in this manual.

## 7.5 Motherboard Battery

For information on removing, disposing of, and replacing the motherboard battery of your system, refer to "Motherboard Battery Removal and Installation" on page 75.

## 7.6 Where to Get Replacement Components

If you need replacement parts for your SYS-222HA-TN server, to ensure the highest level of professional service and technical support, purchase exclusively from our Supermicro Authorized Distributors/System Integrators/Resellers. A list can be found on the Supermicro website:

https://www.supermicro.com

Under the "Buy" menu, click the "Where to Buy" link.

## 7.7 Technical Support Procedures

Before contacting Technical Support, take the following steps. Also, note that as a motherboard manufacturer, Supermicro also sells motherboards through its channels, so it is best to first check with your distributor or reseller for troubleshooting services. They should know of any possible problems with the specific system configuration that was sold to you.

1. Refer to "Troubleshooting Procedures" on page 158 or see the FAQs on our website (https://www.supermicro.com/FAQ/index.php) before contacting Technical Support.
2. BIOS upgrades can be downloaded from our website (https://www.supermicro.com/support/resources/bios_ipmi.php).
3. If you still cannot resolve the problem, include the following information when contacting Supermicro for technical support:
   - Motherboard model and PCB revision number
   - BIOS release date/version (This can be seen on the initial display when your system first boots up.)
   - System configuration
4. An example of a Technical Support form is on our website at https://webpr3.supermicro.com/SupportPortal.
5. Distributors: For immediate assistance, have your account number ready when placing a call to our Technical Support department. For Supermicro contact information, refer to "Contacting Supermicro" on page 14.

### Returning Merchandise for Service

A receipt or copy of your invoice marked with the date of purchase is required before any warranty service will be rendered. You can obtain service by calling your vendor for a Returned Merchandise Authorization (RMA) number. When returning the server to the manufacturer, the RMA number should be prominently displayed on the outside of the shipping carton, and the shipping package is mailed prepaid or hand-carried. Shipping and handling charges will be applied for all orders that must be mailed when service is complete.

For faster service, RMA authorizations can be requested online at the following page:

https://www.supermicro.com/RmaForm

Whenever possible, repack the server in the original Supermicro carton, using the original packaging material. If these are no longer available, be sure to pack the server securely, using packaging material to surround the server so that it does not shift within the carton and become damaged during shipping.

This warranty only covers normal consumer use and does not cover damages incurred in shipping or from failure due to the alternation, misuse, abuse or improper maintenance of products.

During the warranty period, contact your distributor first for any product problems.

## 7.8 Feedback

Supermicro values your feedback as we strive to improve our customer experience in all facets of our business. Email us at Techwriterteam@supermicro.com to provide feedback on our manuals.

# Chapter 8:

# UEFI BIOS

The following content contains information on BIOS configuration with the SYS-222HA-TN server.


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**8.2 Main Setup** ..... **170**

**8.3 Advanced Setup Configurations** ..... **172**

**8.4 Event Logs** ..... **212**

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# 8.1 Introduction

This chapter describes the AMIBIOS™ Setup utility for the motherboard. The BIOS is stored on a chip and can be easily upgraded using the UEFI script (flash.nsh), the BMC WebUI, or the SuperServer Automation Assistant (SAA) utility.

**Note:** Due to periodic changes to the BIOS, some settings may have been added or deleted and might not yet be recorded in this manual. Refer to the Manual Download area of our website for any changes to BIOS that may not be reflected in this manual.

## Updating BIOS

It is recommended that you do not upgrade your BIOS if you are not experiencing any problems with your system. Updated BIOS files are located on our website at the following page:

https://www.supermicro.com/support/resources/bios_ipmi.php

Check our BIOS warning message and the information on how to update your BIOS on our website. Select your motherboard model and download the BIOS file to your computer. Also, check the current BIOS revision to make sure that it is newer than your BIOS before downloading.

**Important:** Do not shut down or reset the system while updating the BIOS to prevent possible system boot failure! Read the motherboard README file carefully before you perform the BIOS update.

Unzip the BIOS file onto a bootable USB device and then boot into the built-in UEFI Shell and type "flash.nsh <BIOS filename><BMC Username><BMC Password>" to start the BIOS update. The flash script will invoke the SCC (EFI) tool automatically to perform the BIOS update, beginning with uploading the BIOS image to BMC. After uploading the firmware, the system will reboot to continue the process. The BMC will take over and continue the BIOS update in the background. The process will take 3–5 minutes.

## Starting the Setup Utility

To enter the BIOS Setup utility, press the <Delete> key while the system is booting-up. In most cases, the <Delete> key is used to invoke the BIOS Setup screen. There are a few cases when other hot keys are used, such as <F1>, <F2>, etc. Each main BIOS menu option is described in this manual.

The Main BIOS screen has two main frames. The left frame displays all the options that can be configured. “Grayed-out” options cannot be configured. The right frame displays the key legend. Above the key legend is an area reserved for a text message. When a BIOS submenu or item is selected in the left frame, it is highlighted in white. Often a text message will accompany it. (Note that BIOS has default text messages built in. We retain the option to include, omit, or change any of these text messages.) Settings printed in Bold are the default values.

A "►" indicates a submenu. Highlighting such an item and pressing the <Enter> key open the list of settings within that submenu.

The BIOS Setup utility uses a key-based navigation system called hot keys. Most of these hot keys (<F1>, <F2>, <F3>, <F4>, <F5>, <F6>, <Enter>, <ESC>, the arrow keys, etc.) can be used at any time during the setup navigation process.

## 8.2 Main Setup

The Main setup screen appears when the AMI BIOS Setup utility is first entered. To return to the Main setup screen, select the Main tab at the top of the screen. The Main BIOS setup screen is shown below.

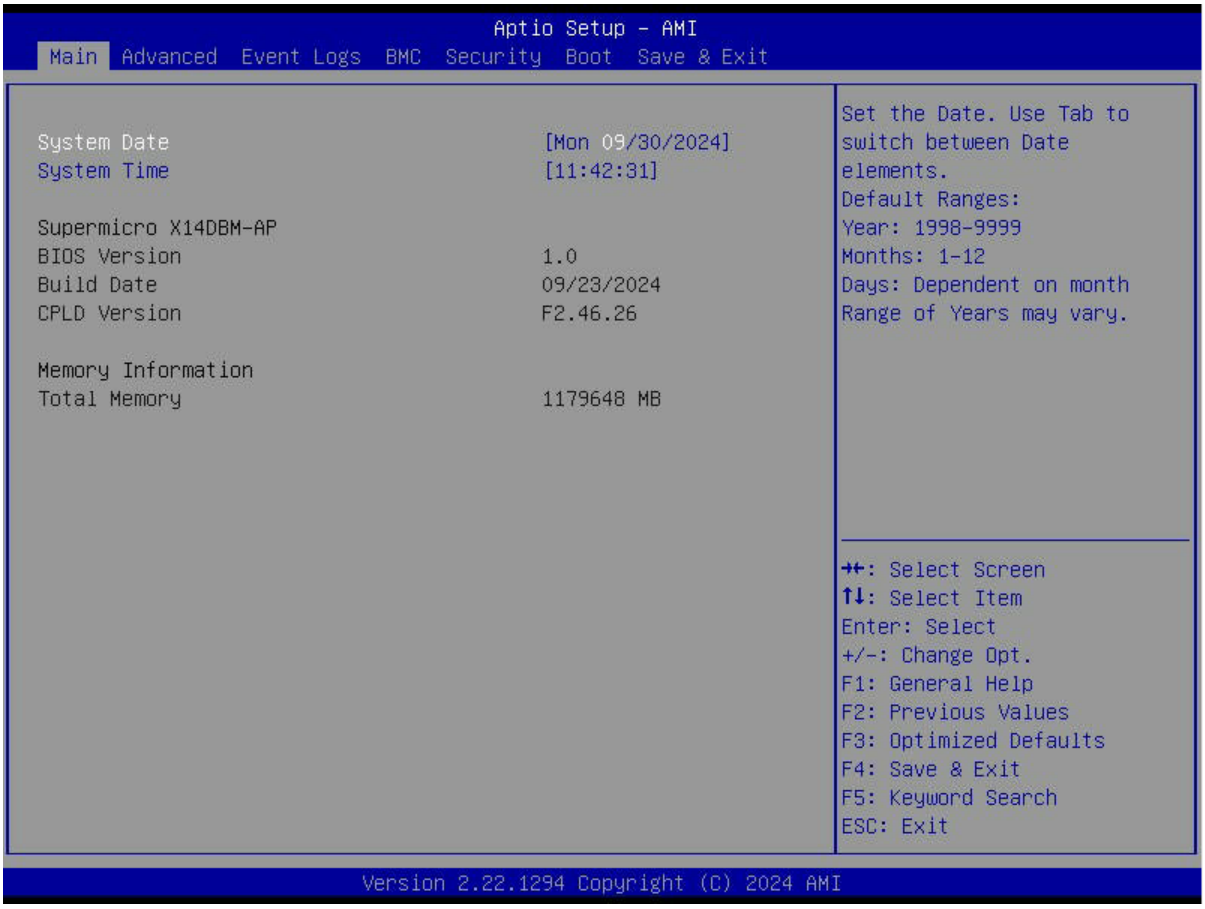



**Figure 8-1. Main Setup UEFI BIOS Menu Screenshot**

### System Date/System Time

Use the two features to change the system date and time. Highlight **System Date** or **System Time** using the arrow keys. Enter new values using the keyboard. Press the <Tab> key or the arrow keys to move between fields. The date must be entered in MM/DD/YYYY format. The time is entered in HH:MM:SS format.

**Note:** The time is in the 24-hour format. For example, 5:30 P.M. appears as 17:30:00.

### Supermicro X14DBM-AP

### BIOS Version

This feature displays the version of the BIOS ROM used in the system.

**Build Date**

This feature displays the date when the version of the BIOS ROM used in the system was built.

**CPLD Version**

This feature displays the version of the Complex-Programmable Logical Device (CPLD) used in the system.

**Memory Information**

**Total Memory**

This feature displays the total size of memory available in the system.

## 8.3 Advanced Setup Configurations

Use the arrow keys to select the Advanced submenu and press <Enter> to access the submenu items.

**Important:** Use caution when changing the Advanced settings. An incorrect value, an improper DRAM frequency, or a wrong BIOS timing setting may cause the system to malfunction. When this occurs, revert the setting to the manufacture default settings.

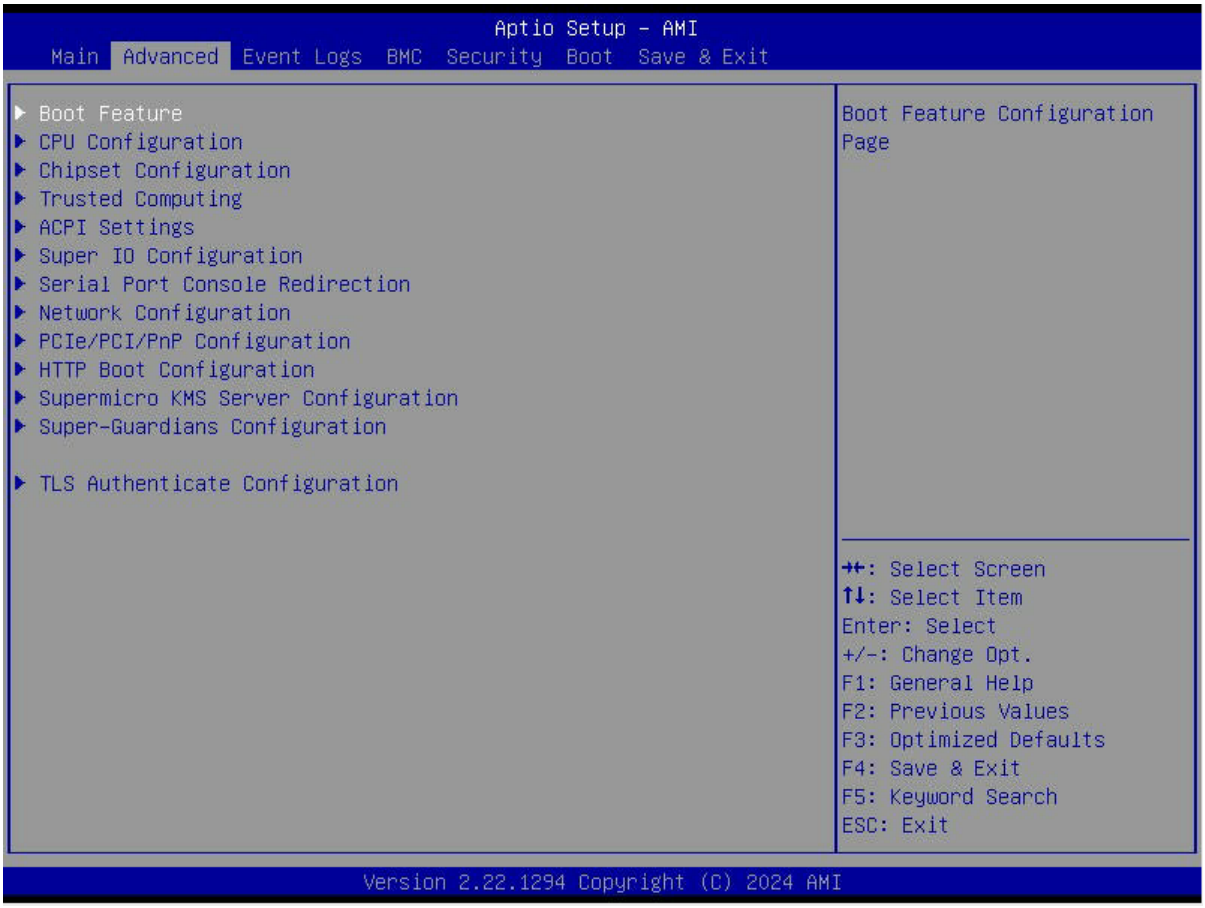



**Figure 8-2. Advanced Setup Configurations UEFI BIOS Menu Screenshot**

### Boot Feature Menu

#### ►Boot Feature

**Quiet Boot**

Use this feature to select the screen between displaying the Power-on Self Test (POST) messages or the OEM logo upon bootup. Select Disabled to display the POST messages. Select Enabled to display the OEM logo instead of the normal POST messages. The options

are Disabled and **Enabled**.

**Note:** BIOS POST messages are always displayed regardless of the setting of this feature.

**Bootup NumLock State**

Use this feature to set the Power-on state for the <Numlock> key. The options are **On** and Off.

**Wait For "F1" If Error**

Select Enabled to force the system to wait until the <F1> key is pressed if an error occurs. The options are **Disabled** and Enabled.

**Re-try Boot**

If this feature is set to Enabled, the system BIOS will automatically reboot the system from an Extensible Firmware Interface (EFI) boot device after an initial boot failure. The options are **Disabled** and Enabled.

**Power Configuration**

**Watch Dog Function**

Select Enabled to allow the Watch Dog timer to reboot the system when it is inactive for more than five minutes. The options are **Disabled** and Enabled.

**Watch Dog Action (Available when "Watch Dog Function" is set to Enabled)**

Use this feature to configure the Watch Dog Time_out setting. The options are **Reset** and NMI.

**Restore on AC Power Loss**

Use this feature to set the power state after a power outage. Select Stay Off for the system power to remain off after a power loss. Select Power On for the system power to be turned on after a power loss. Select Last State to allow the system to resume its last power state before a power loss. The options are Stay Off, Power On, and **Last State**.

**Power Button Function**

This feature controls how the system shuts down when the power button is pressed. Select 4 Seconds Override to power off the system after pressing and holding the power button for four seconds or longer. Select Instant Off to instantly power off the system as soon as you press the power button. The options are **Instant Off** and 4 Seconds Override.

## CPU Configuration Menu

### ►CPU Configuration

**Important:** Setting the wrong values for the features included in the following sections may cause the system to malfunction.

The following processor information is displayed:

- Processor BSP Revision
- Processor Socket
- Processor ID
- Processor Frequency
- Processor Max Ratio
- Processor Min Ratio
- Microcode Revision
- L1 Cache RAM (Per Core)
- L2 Cache RAM (Per Package)
- L3 Cache RAM (Per Package)
- Processor 0 Version

**Hyper-Threading [ALL]**

Select Enabled to use Intel Hyper-Threading Technology to enhance CPU performance. The options are Disabled and **Enabled**. This feature is CPU-dependent.

**Note:** This feature is NOT available when "Workload Profile" is set to Telco FlexRAN.

**Hardware Prefetcher**

If this feature is set to Enabled, the hardware prefetcher will prefetch data from the main system memory to Level 2 cache to help expedite data transaction to enhance memory performance. The options are **Enabled** and Disabled.

**Note:** This feature is NOT available when "Workload Profile" is set to HPC, I/O, or Virtualization.

**Adjacent Cache Prefetch**

Select Enabled for the CPU to prefetch both cache lines for 128 bytes as comprised. Select Disabled for the CPU to prefetch both cache lines for 64 bytes. The options are **Enabled** and Disabled.

**Note:** This feature is NOT available when "Workload Profile" is set to HPC, I/O, or Virtualization.

### DCU Streamer Prefetcher

If this feature is set to Enabled, the Data Cache Unit (DCU) streamer prefetcher will prefetch data streams from the cache memory to the DCU to speed up data accessing and processing to enhance CPU performance. The options are Enabled, Disabled, and **Auto**.

**Note:** This feature is NOT available when "Workload Profile" is set to HPC, I/O, or Virtualization.

### DCU IP Prefetcher

This feature allows the system to use the sequential load history, which is based on the instruction pointer of previous loads, to determine whether the system will prefetch additional lines. The options are **Enabled** and Disabled.

**Note:** This feature is NOT available when "Workload Profile" is set to HPC, I/O, or Virtualization.

### LLC Prefetch

If this feature is set to Enabled, LLC (hardware cache) prefetching on all threads will be supported. The options are **Disabled** and Enabled. This feature is CPU-dependent.

**Note:** This feature is available when "Workload Profile" is set to Disabled, Telco NFVI, or Telco NFVI-FP.

### Homeless Prefetch

Select Enabled for Homeless Prefetch support on all threads, which is an Effective Prefetch Strategy (EPS) used to enhance memory performance by reducing communication overhead, network latency, and the wait time needed for barrier synchronization in memory prefetching commonly associated with the home-based software Distributed Shared Memory (DSM) system. The options are Disabled, Enabled, and **Auto**. Please note that the option of Auto is program-specific. This feature is CPU-dependent.

**Note:** This feature is NOT available when "Workload Profile" is set to Telco FlexRAN.

### AMP Prefetch

Select Enabled to use a machine learning algorithm to predict the best L2 prefetcher configuration for the currently running workload. This feature can improve the performance of various general-purpose workloads. The options are Disabled and **Enabled**. This feature is CPU-dependent.

**Note:** This feature is NOT available when "Workload Profile" is set to Telco FlexRAN.

### APIC Physical Mode

Use this feature to enable the APIC physical destination mode. The options are **Disabled** and Enabled. (APIC is the abbreviation for Extended Advanced Programmable Interrupt Controller.)

### TXT Support

Select Enabled to enable Intel Trusted Execution Technology (TXT) support to enhance system integrity and data security. The options are **Disabled** and Enabled. This feature is CPU-dependent.

**Note:** If this feature is set to Enabled, be sure to disable Device Function On-Hide (EV DFX) support when it is present in the BIOS for the system to work properly.

### Intel Virtualization Technology

Select Enabled to enable the Intel Vanderpool Technology for Virtualization platform support, which allows multiple operating systems to run simultaneously on the same computer to maximize system resources for performance enhancement. The options are Disabled and **Enabled**. Changes take effect after you save settings and reboot the system.

**Notes:**

- This feature is NOT available when "TXT Support" is set to Enabled.
- This feature is NOT available when "Workload Profile" is set to Virtualization, Telco NFVI, Telco NFVI-FP, or Telco FlexRAN.

### Enable SMX

Select Enabled to support Safer Mode Extensions (SMX), which provides a programming interface for system software to establish a controlled environment to support the trusted platform configured by the end user and to verify a virtual machine monitor before it is allowed to run. The options are **Disabled** and Enabled.

**Note:** This feature is available when "TXT Support" is set to Disabled.

### PPIN Control

Select Unlock/Enabled to use the Protected Processor Inventory Number (PPIN) in the system. The PPIN is a unique number set for tracking a given Intel Xeon server processor. The options are Lock/Disabled and **Unlock/Enabled**.

### AES-NI

Select Enabled to use the Intel Advanced Encryption Standard (AES) New Instructions (NI) to ensure data security. The options are Disabled and **Enabled**.

## *Advanced Power Management Configuration Menu*

### ►Advanced Power Management Configuration

**Latency Optimized Mode**

Select Enabled to set the power mode to the latency optimized mode to improve the latency. The options are **Disabled** and Enabled. This feature is motherboard-dependent.

**Note:** This feature is NOT available when "Workload Profile" is set to HPC or Virtualization.

**Workload Profile**

Use this feature to select a preconfigured workload profile, which is used to tune the resources in your system. The options are **Disabled**, HPC, I/O, Virtualization, Telco NFVI, Telco NFVI-FP, and Telco FlexRAN. Changes take effect after you save settings and reboot the system. (NFVI is the abbreviation for Network Functions Virtualization Infrastructure. NFVI-FP is the abbreviation for Network Functions Virtualization Infrastructure Forwarding Platform. RAN is the abbreviation for Radio Access Network.)

**Note:** Select HPC to optimize power performance of High Performance Computing (HPC) workloads for your system running in the HPC environment. Select I/O for I/O intensive workloads to optimize power performance of high volume of data transfers to and from system memory and storage devices or any program. Select Virtualization to optimize power performance of the workload for your system running in the virtualization environment. Select Telco NFVI to optimize power performance of NFVI workloads for your system. Select Telco NFVI-FP to optimize power performance of NFVI-FP workloads for your system. Select Telco FlexRAN to achieve optimal performance with low power consumption for Intel FlexRAN™ based implementations.

**Power Performance Tuning**

This feature allows either operating system (OS) or BIOS to control the EPB. The options are **OS Controls EPB** and BIOS Controls EPB. (PECI is the abbreviation for Platform Environment Control Interface. EPB is the abbreviation for Intel Performance and Energy Bias Hint.)

**Note:** This feature is available when "Workload Profile" is set to Disabled.

**ENERGY_PERF_BIAS_CFG Mode (ENERGY PERFORMANCE BIAS CONFIGURATION Mode)**

Use this feature to configure the proper operation setting for your machine by achieving the desired system performance level and energy saving (efficiency) level at the same time. Select Maximum Performance to maximize system performance to its highest potential; however, this may consume maximal amount of power as energy is needed to fuel processor operation.

Select Performance to enhance system performance; however, this may consume more power as energy is needed to fuel the processors for operation. The options are Extreme Performance, Maximum Performance, Performance, **Balanced Performance**, Balanced Power, Power, and Max Power Efficient. Please note that the options of Extreme Performance and Max Power Efficient are motherboard-dependent.

**Notes:**

- This feature is available when "Power Performance Tuning" is set to BIOS Controls EPB.
- This feature is available when "Workload Profile" is set to Disabled.

### *CPU P State Control Menu*

#### ►CPU P State Control

**Note:** This submenu is available when “Power Performance Tuning” is set to BIOS Controls EPB.

**AVX P1**

Use this feature to set the appropriate TDP level for the system. The Intel Advanced Vector Extensions (Intel AVX) P1 feature allows you to set the base P1 ratio for Streaming SIMD Extensions (SSE) and AVX workloads. Each P1 ratio has the corresponding AVX Impressed Current Cathodic Protection (ICCP) pre-grant license level, which refers to the selection between different AVX ICCP transition levels. The options are **Nominal**, Level 1, and Level 2. This feature is CPU-dependent.

**Notes:**

- This feature is available when "SpeedStep (P-States)" is set to Enabled.
- This feature is NOT available when "Workload Profile" is set to Telco FlexRAN.

**Intel SST-PP**

Use this feature to choose from two additional Base-Frequency conditions maximum for CPU P State Control. The options are **Auto**, Level 0, Level 1, Level 2, Level 3, and Level 4. The options regarding SST-PP levels are CPU-dependent. (SST-PP is the abbreviation for Speed Select Technology-Performance Profile.)

**Notes:**

- This feature is available when "SpeedStep (P-States)" is set to Enabled and when the number of SST-PP levels supported by your CPU is no less than two.
- This feature is NOT available when "Workload Profile" is set to Telco NFVI, Telco NFVI-FP, or Telco FlexRAN.

**Dynamic SST-PP**

Use this feature to disable or enable the dynamic SST-PP. The options are **Disabled** and Enabled.

**Notes:**

- This feature is available when "SpeedStep (P-States)" is set to Enabled and when your CPU supports the Intel Speed Select function.
- This feature is available when "AVX P1" is set to Nominal.
- This feature is NOT available when "Hardware P-States" is set to Disabled or Out of Band Mode.
- This feature is NOT available when "Workload Profile" is set to HPC or Virtualization.

When "SpeedStep (P-States)" is set to Enabled, the information about SST-PP levels supported by your CPU is displayed.

- SST-PP Level
- Capable
- Core Count
- P1 Ratio
- Package TDP (W)
- DTS_Max

**SpeedStep (P-States)**

Enhanced Intel SpeedStep Technology (EIST) allows the system to automatically adjust processor voltage and core frequency in an effort to reduce power consumption and heat dissipation. Please refer to Intel’s website for detailed information. The options are Disabled and **Enabled**.

**Note:** This feature is available when "Workload Profile" is set to Disabled.

**EIST PSD Function**

This feature reduces the latency that occurs when one P-state changes to another, thus allowing the transitions to occur more frequently. This will allow for more demand-based P-state switching to occur based on the real-time energy needs of applications so that the power-to-performance balance can be optimized for energy efficiency. The options are **HW_ALL** and SW_ALL.

**Notes:**

- This feature is available when "SpeedStep (P-States)" is set to Enabled.
- This feature is NOT available when "Workload Profile" is set to Telco NFVI, Telco NFVI-FP, or Telco FlexRAN.

**Turbo Mode (Available when "SpeedStep (P-States)" is set to Enabled and when "Workload Profile" is set to Disabled)**

Select Enabled to allow the CPU to operate at the manufacturer-defined turbo speed by increasing CPU clock frequency. This feature is available when it is supported by the processors used in the system. The options are Disabled and **Enabled**.

### *Hardware PM State Control Menu*

**►Hardware PM State Control**

**Notes:**

- This submenu is available when “Power Performance Tuning” is set to BIOS Controls EPB.
- This submenu is NOT available when “Workload Profile” is set to HPC, Virtualization, Telco NFVI, Telco NFVI-FP, or Telco FlexRAN.

**Hardware P-States**

If this feature is set to Disabled, system hardware will choose a P-state setting for the system based on an OS request. If this feature is set to Native Mode, system hardware will choose a P-state setting based on the OS guidance. If this feature is set to Native Mode with No Legacy Support, system hardware will choose a P-state setting independently without the OS guidance. The options are Disabled, **Native Mode**, Out of Band Mode, and Native Mode with No Legacy Support.

### *CPU C State Control Menu*

#### ►CPU C State Control

**Notes:**

- This submenu is available when “Power Performance Tuning” is set to BIOS Controls EPB.
- This submenu is NOT available when “Workload Profile” is set to Telco NFVI, Telco NFVI-FP, or Telco FlexRAN.

**Monitor MWAIT**

Select Enabled to support Monitor and Mwait, which are two instructions in Streaming SIMD Extension 3 (SSE3) to improve synchronization between multiple threads for CPU performance enhancement. The options are Disabled and **Enabled**.

**Note:** This feature is NOT available when "Workload Profile" is set to Telco NFVI, Telco NFVI-FP, or Telco FlexRAN.

**C1 to C1e Promotion**

If this feature is set to Enabled, CPU will run at its minimum frequency for lower power consumption in the C1 state. The options are Disabled and **Enabled**. This feature is CPU-dependent.

**Note:** This feature is available when "Workload Profile" is set to Disabled.

**ACPI C1 Enumeration**

Use this feature to select the ACPI C1 state or the ACPI C1e state. The options are C1 and **C1e**. This feature is CPU-dependent. (ACPI is the abbreviation for Advanced Configuration and Power Interface.)

**Note:** This feature is available when "Workload Profile" is set to Disabled.

**ACPI C6x Enumeration**

Use this feature to configure C6 state or C6 P-state as ACPI C2 or ACPI C3 state. The options are Disabled, C6 as ACPI C2, C6 as ACPI C3, C6-P as ACPI C2, C6-P as ACPI C3, and **Auto**.

**Note:** This feature is available when "Workload Profile" is set to Disabled.

### *Package C State Control Menu*

#### ►Package C State Control

**Note:** This submenu is available when “Power Performance Tuning” is set to BIOS Controls EPB.

**Package C State**

Use this feature to optimize and reduce CPU package power consumption in the idle mode. Please note that the changes you've made in this setting will affect all CPU cores or the circuits of the entire system. The options are C0/C1 state, C2 state, C6 (non Retention) state, No Limit, and **Auto**.

**Note:** This feature is NOT available when "Workload Profile" is set to I/O, Telco NFVI, Telco NFVI-FP, or Telco FlexRAN.

**LTR IIO Input**

Use this feature to set the MSR 1FCh Bit[29]. The options are Take IIO LTR input and **Ignore IIO LTR input**.

### *CPU1 Core Disable Bitmap Menu*

#### ►CPU1 Core Disable Bitmap

**Available Bitmap[0]:**

This feature displays the available Bitmap[0]. This feature is CPU-dependent.

**Available Bitmap[1]:**

This feature displays the available Bitmap[1]. This feature is CPU-dependent.

**CPU Core Count:**

This feature displays the number of CPU cores that can be enabled.

**CPU1 Cores Enable**

Use this feature to set the number of CPU cores to be enabled. Enter 0 to enable all CPU cores. Note that it is required to enable at least one core per CPU. The default setting is **0**.

## Chipset Configuration Menu

#### ►Chipset Configuration

**Important:** Setting the wrong values in this section may cause the system to malfunction.

## *Uncore Configuration Menu*

### ►Uncore Configuration

The following information is displayed.

- Number of CPU
- Current UPI Link Speed
- Current UPI Link Frequency
- Global MMIO Low Base / Limit
- Global MMIO High Base / Limit
- PCIe Configuration Base / Size

**Degrade Precedence**

Use this feature to select the degrading precedence option for Ultra Path Interconnect (UPI) connections. Select Topology Precedence to degrade UPI features if system options are in conflict. Select Feature Precedence to degrade UPI topology if system options are in conflict. The options are **Topology Precedence** and Feature Precedence.

**Link L0p Enable**

Select Enabled for the system BIOS to enable Link L0p support, which allows the CPU to reduce the UPI links from full width to half width in the event when the CPU's workload is low in an attempt to save power. This feature is available for the system that uses Intel processors with UPI technology support. The options are **Disabled**, Enabled, and Auto.

**Note:** You can change the performance settings for non-standard applications by using this parameter. It is recommended that the default settings be used for standard applications.

**Link L1 Enable**

Select Enabled for the BIOS to activate Link L1 support, which will power down the UPI links to save power when the system is idle. This feature is available for the system that uses Intel processors with UPI technology support. The options are **Disabled**, Enabled, and Auto.

**Note:** Link L1 is an excellent feature for an idle system. L1 is used during Package C-States when its latency is hidden by other components during a wakeup.

**KTI Prefetch**

Keizer Technology Interconnect (KTI) is also known as the Intel Ultra Path Interconnect (UPI) technology. Select Enabled for the KTI prefetcher to preload the L1 cache with data deemed relevant, which allows the memory read to start earlier on a DDR bus in an effort to reduce

latency. Select Auto for the KTI prefetcher to automatically preload the L1 cache with relevant data whenever it is needed. The options are Disabled, Enabled, and **Auto**.

**IO Directory Cache (IODC)**

This feature allows the IODC to generate snoops instead of generating memory lockups for remote IIO (InvITotM) and/or WCiLF (Cores). Select Auto for the IODC to generate snoops (instead of memory lockups) for WCiLF (Cores). The options are Disabled, **Auto**, Enable for Remote InvItoM Hybrid Push, Enable for Remote InvItoM AllocFlow, Enable for Remote InvItoM Hybrid AllocNonAlloc, and Enable for Remote InvItoM and Remote WCiLF.

**SNC**

Sub NUMA Clustering (SNC) is a feature that breaks up the Last Level Cache (LLC) into clusters based on address range. Each cluster is connected to a subset of the memory controller. Enable this feature to improve average latency and reduce memory access congestion for higher performance. The options are Disabled, Enabled, and **Auto**. This feature is CPU-dependent.

**Note:** This feature is NOT available when "Workload Profile" is set to I/O, Virtualization, or Telco FlexRAN.

**XPT Prefetch**

XPT Prefetch is a feature that speculatively makes a copy to the memory controller of a read request being sent to the LLC. If the read request maps to the local memory address and the recent memory reads are likely to miss the LLC, a speculative read is sent to the local memory controller. The options are Disabled, Enabled, and **Auto**.

**Stale AtoS**

The in-memory directory has three states: I, A, and S states. The I (-invalid) state indicates that the data is clean and does not exist in the cache of any other sockets. The A (-snoop All) state indicates that the data may exist in another socket in an exclusive or modified state. The S state (-Shared) indicates that the data is clean and may be shared in the caches across one or more sockets. When the system is performing "read" on the memory and if the directory line is in A state, we must snoop all other sockets because another socket may have the line in a modified state. If this is the case, a "snoop" will return the modified data. However, it may be the case that a line "reads" in an A state, and all the snoops come back with a "miss." This can happen if another socket reads the line earlier and then has silently dropped it from its cache without modifying it. If "Stale AtoS" is enabled, a line will transition to the S state when the line in the A state returns only snoop misses. That way, subsequent reads to the line will encounter it in the S state and will not have to snoop, saving the latency and snoop bandwidth. Stale "AtoS" may be beneficial in a workload where there are many cross-socket reads. The options are Disabled, Enabled, and **Auto**.

**LLC Dead Line Alloc**

Select Enabled to optimally fill the dead lines in the LLC. The options are Disabled, **Enabled**, and Auto.

## *Memory Configuration Menu*

### ►Memory Configuration

This submenu is used to configure the Integrated Memory Controller (IMC) settings.

**Enforce DDR Memory Frequency POR**

Select Enforce POR to enforce Plan of Record (POR) restrictions for DDR memory frequency and voltage programming. The options are **Enforce POR**, Enforce Stretch Goals, and Disabled.

**Host Memory Frequency**

Use this feature to set the maximum memory frequency for onboard memory modules. The options are **Auto**, 3200, 3600, 4000, 4400, 4800, 5200, 5600, 6000, 6400, and 7200. Please note that the available options are CPU-dependent.

**Global Scrambling**

Select Enabled to enable data scrambling to enhance system performance and data integrity. The options are Disabled and **Enabled**.

## *Memory Topology Menu*

### ►Memory Topology

This submenu displays the information of onboard memory modules as detected by the BIOS, for example:

P1-DIMMA1: 5600MT/s Hynix SRx8 16GB RDIMM

## *Memory Map Menu*

### ►Memory Map

**Intel(R) Flat Memory Mode Support**

Enable this feature to allow hardware-managed data movement between DDR5 and CXL memory, making total memory capacity visible to your system. The options are **Disabled** and Enabled.

**DDR CXL Heterogeneous Interleave Support**

Select Enabled to support heterogeneous interleaving for physical DDR5 and CXL memory. The options are **Disabled** and Enabled.

## *Memory RAS Configuration Menu*

### ►Memory RAS Configuration

Use this submenu to configure the memory mirroring, Reliability Availability Serviceability (RAS) settings.

**Mirror Mode**

Use this feature to configure the mirror mode settings for all 1LM/2LM memory modules in the system, which will create a duplicate copy of data stored in the memory to increase memory security, but it will reduce the memory capacity into half. The options are **Disabled** and Full Mirror Mode.

**Note:** This feature is available when "UEFI ARM Mirror" is set to Disabled.

**UEFI ARM Mirror**

If this feature is set to Enabled, mirror mode configuration settings for UEFI-based Address Range memory will be enabled upon system boot. This will create a duplicate copy of data stored in the memory to increase memory security, but it will reduce the memory capacity into half. The options are **Disabled** and Enabled. The Address Range Mirroring (ARM) feature supports partial memory mirroring. This feature is CPU-dependent.

**Note:** This feature is available when "Mirror Mode" is set to Disabled.

**Mirror TAD0**

Use this feature to enable the mirror mode on entire memory for Target Address Decoder 0 (TAD0). The options are **Disabled** and Enabled. This feature is CPU-dependent.

**Note:** This feature is available when "Mirror Mode" is set to Disabled.

**ARM Mirror Percentage (Available when "UEFI ARM Mirror" is set to Enabled)**

Use this feature to set the percentage of memory space to be used for UEFI ARM mirroring for memory security enhancement. The default setting is **2500**.

**Correctable Error Threshold**

Use this feature to specify the threshold value for correctable memory-error logging, which sets a limit on the maximum number of events that can be logged in the memory error log at a given time. The default setting is **512**.

**Note:** This feature is available when "Memory PFA Support" is set to Disabled.

**Leaky Bucket Low Bit**

Use this feature to set the Low Bit value for the Leaky Bucket algorithm, which is used to check the data transmissions between CPU sockets and the memory controller. The default setting is **12**.

**Leaky Bucket High Bit**

Use this feature to set the High Bit value for the Leaky Bucket algorithm, which is used to check the data transmissions between CPU sockets and the memory controller. The default setting is **13**.

**ADDDC Sparing (Available when populating 1Rx4, 2Rx4, and 4Rx4 DIMMs and when "Memory PFA Support" is set to Disabled)**

Select Enabled for Adaptive Double Device Data Correction (ADDDC) support, which will not only provide memory error checking and correction but will also prevent the system from issuing a performance penalty before a device fails. Please note that virtual lockstep mode will only start to work for ADDDC after a faulty DRAM module is spared. The options are Disabled and **Enabled**.

**DDR PPR Type**

Post Package Repair (PPR) is a new feature available for the DDR4/DDR5 technology. PPR provides additional spare capacity within a DDR4/DDR5 DRAM module that is used to replace faulty cell areas detected during system boot. PPR offers two types of memory repairs. Soft Post Package Repair (sPPR) provides a quick, temporary fix on a raw element in a bank group of a DDR4/DDR5 DRAM device, while hard Post Package Repair (hPPR) will take a longer time to provide a permanent repair on a raw element. The options are PPR Disabled, **Hard PPR**, and Soft PPR.

**Note:** This feature is available when "Memory PFA Support" is set to Disabled.

**Enhanced PPR**

Use this feature to set advanced memory test. Select Enabled to always execute for every boot. The options are **Disabled**, Enabled, and Persistent.

**Memory PFA Support (Available when the DCMS key is activated)**

Select Enabled to enable memory Predictive Failure Analysis (PFA) support. PFA can be used to avoid uncorrectable faults on the same memory page. The options are **Disabled** and Enabled.

## *Security Configuration Menu*

**►Security Configuration**

---

Memory Encryption (TME) [Outputs]

---

The following information is displayed.

- MSE activation state
- MK-TME activation state
- CI activation state
- Cryptographic Algorithm configured

---

Memory Encryption (TME) [Inputs]

---

**Memory Encryption (TME)**

Select Enabled for Intel Total Memory Encryption (TME) support to enhance memory data security. The options are **Disabled** and Enabled.

**Total Memory Encryption Multi-Tenant (TME-MT)**

Use this feature to support tenant-provided (SW-provided) keys. The options are **Disabled** and Enabled.

**Memory Integrity**

Use this feature to enable TME-MT memory integrity protection for memory transactions. The options are **Disabled** and Enabled.

The following information is displayed.

- KEY stock amount
- TME-MT key ID bits

**TME Encryption Algorithm**

Use this feature to set the TME encryption algorithm. The options are AES-XTS-128 and **AES-XTS-256**.

---

Trust Domain Extensions (TDX) [Outputs]

---

The following information is displayed.

- TDX activation state

---

Trust Domain Extensions (TDX) [Inputs]

---

**Trust Domain Extensions (TDX) (Available when your motherboard supports Intel TDX)**

Use this feature to enable Intel Trust Domain Extensions (TDX) technology support to enhance control of data security. The options are **Disabled** and Enabled.

**Note:** To support TDX features, DIMM population must be symmetric across integrated Memory Controllers (IMCs) and eight DIMMs per socket at least. For each memory controller, populating the first slots (Px-DIMMX1 or DIMMX1 depending on the motherboard design) in all channels is required.

**TDX Secure Arbitration Mode Loader (SEAM Loader) (Available when your motherboard supports Intel TDX and when "Trust Domain Extensions (TDX)" is set to Enabled)**

The SEAM Loader (SEAMLDR) is used to load and update Intel TDX modules into the SEAM memory range by verifying the digital signature. The options are **Disabled** and Enabled.

**TME-MT/TDX Key Split (Available when "Trust Domain Extensions (TDX)" is set to Enabled)**

Use this feature to set the number of bits for TDX. The other bits will be used by TME-MT. The default setting is **1**.

The following information is displayed when "Trust Domain Extensions (TDX)" is set to Enabled.

- TME-MT Keys:
- TDX Keys:

---

Processor Reserved Memory [Capabilities]

---

The following information is displayed.

- PRMRR Min Size per domain
- PRMRR Max Size per domain

---

Processor Reserved Memory [Outputs]

---

The following information is displayed.

- PRMRR Size per domain
- PRM Size per socket
- PRM Size per system

---

Software Guard Extensions (SGX) [Outputs]

---

The following information is displayed when your motherboard supports SGX.

- SGX activation state
- SGX error code [HEX]

---

Software Guard Extensions (SGX) [Inputs]

---

The following features are available when your motherboard supports SGX.

**Note:** To support SGX features, DIMM population must be symmetric across Integrated Memory Controllers (IMCs) and eight DIMMs per socket at least. For each memory controller, populating the first slots (Px-DIMMX1 or DIMMX1 depending on the motherboard design) in all channels is required.

**SGX Factory Reset**

Use this feature to perform an SGX factory reset to delete all registration data and force an Initial Platform Establishment flow. Reboot the system for the changes to take effect. The options are **Disabled** and Enabled.

**SW Guard Extensions (SGX)**

Use this feature to enable Intel Software Guard Extensions (SGX) support. Intel SGX is a set of extensions that increases the security of application code and data by using enclaves in memory to protect sensitive information. The options are **Disabled** and Enabled.

**SGX Package Info In-Band Access**

Setting this feature to Enabled is required before the BIOS provides software with the key blobs, which are generated for each CPU package. The options are **Disabled** and Enabled.

**SGX PRMRR Size Requested (Available when "SW Guard Extensions (SGX)" is set to Enabled)**

Use this feature to set the Processor Reserved Memory Range Register (PRMRR) size. The options are **Auto**, 128M, 256M, 512M, 1G, 2G, 4G, 8G, 16G, 32G, 64G, 128G, 256G, and 512G. Please note that the available options are based on your motherboard features, memory size, and memory map.

**SGX QoS (Available when "SW Guard Extensions (SGX)" is set to Enabled)**

Use this feature to enable Intel SGX Quality of Service (QoS) support. QoS can enhance network performance by prioritizing network traffic. The options are Disabled and **Enabled**.

**Select Owner EPOCH Input Type (Available when "SW Guard Extensions (SGX)" is set to Enabled)**

Owner EPOCH is used as a parameter to add personal entropy into the key derivation process. A correct Owner EPOCH is required to have access to personal data previously sealed by other platform users. There are two Owner EPOCH modes. One is New Random Owner EPOCH, and the other is manually entered by the user. Each EPOCH is 64-bit. The options are **SGX Owner EPOCH deactivated**, Change to New Random Owner EPOCHs, and Manual User Defined Owner EPOCHs.

**Note:** Changing the Owner EPOCH value will lose the data in enclaves.

**Software Guard Extensions Epoch 0**

Use this feature to enter the EPOCH value. The default setting is **0**.

**Note:** This feature is available when "SW Guard Extensions (SGX)" is set to Enabled. This feature is NOT available when "Select Owner EPOCH Input Type" is set to SGX Owner EPOCH deactivated.

**Software Guard Extensions Epoch 1**

Use this feature to enter the EPOCH value. The default setting is **0**.

**Note:** This feature is available when "SW Guard Extensions (SGX)" is set to Enabled. This feature is NOT available when "Select Owner EPOCH Input Type" is set to SGX Owner EPOCH deactivated.

**SGXLEPUBKEYHASHx Write Enable (Available when "SW Guard Extensions (SGX)" is set to Enabled)**

Use this feature to enable writes to SGXLEPUBKEYHASH[3..0] from OS/SW. The options are Disabled and **Enabled**. Only those CPUs that support Intel SGX Flexible Launch Control (FLC) feature have SGXLEPUBKEYHASH, which contains the hash of the public key for the SGX

Launch Enclave (LE) to be signed with.

**SGXLEPUBKEYHASH0 (Available when both "SW Guard Extensions (SGX)" and "SGXLEPUBKEYHASHx Write Enable" are set to Enabled)**

Use this feature to enter the bytes 0–7 of SGX Launch Enclave Public Key Hash.

**SGXLEPUBKEYHASH1 (Available when both "SW Guard Extensions (SGX)" and "SGXLEPUBKEYHASHx Write Enable" are set to Enabled)**

Use this feature to enter the bytes 8–15 of SGX Launch Enclave Public Key Hash.

**SGXLEPUBKEYHASH2 (Available when both "SW Guard Extensions (SGX)" and "SGXLEPUBKEYHASHx Write Enable" are set to Enabled)**

Use this feature to enter the bytes 16–23 of SGX Launch Enclave Public Key Hash.

**SGXLEPUBKEYHASH3 (Available when both "SW Guard Extensions (SGX)" and "SGXLEPUBKEYHASHx Write Enable" are set to Enabled)**

Use this feature to enter the bytes 24–31 of SGX Launch Enclave Public Key Hash.

**SGX Auto MP Registration (Available when "SW Guard Extensions (SGX)" is set to Enabled)**

Use this feature to enable/disable SGX Auto Multi-Package Registration Agent (MPA) running automatically at boot time. The options are **Disabled** and Enabled.

## *IIO Configuration Menu*

### ►IIO Configuration

**PCIe ASPM Support (Global)**

Use this feature to disable the Active State Power Management (ASPM) support for all PCIe root ports. The options are **Disabled** and Auto.

**NVMe Mode Switch**

When this feature is set to Auto, VMD support will be automatically enabled when a VROC key is detected by the BIOS. The options are Manual, VMD, and **Auto**.

**PCIe PLL SSC**

Select Enabled for PCIe Spread Spectrum Clocking (SSC) support, which allows the BIOS to monitor and attempt to reduce the level of electromagnetic interference caused by the components whenever needed. The options are **Disabled** and Enabled.

*CPU1 Configuration Menu*

### ►CPU1 Configuration

#### ►PCI Express 0 / PCI Express 1 / PCI Express 2 / PCI Express 3 / PCI Express 4 / PCI Express 5

**Note:** The number of PCIe slots and the slot naming can differ depending on the PCIe devices connected to your motherboard.

**Intel VMD Technology**

When this feature is set to Enabled, VMD support will be automatically enabled when a VROC key is detected by the BIOS. The options are **Disabled** and Enabled.

**Notes:**

- This feature is available when "NVMe Mode Switch" is set to Manual.
- After you've enabled VMD in the BIOS on a PCIe slot, this PCIe slot will be dedicated for VMD use only, and it will no longer support any PCIe device. To re-activate this slot for PCIe use, disable VMD in the BIO.

**Bifurcation**

This feature is CPU-dependent. Use this feature to configure the PCIe Bifurcation setting for the PCIe port you specified. The options are **Auto**, x4x4x4x4, x4x4x8, x8x4x4, x8x8, and x16.

#### ►PCI Express 5 Port A/Port C/Port E/Port G

**Note:** The number of PCIe slots and the slot naming can differ depending on the PCIe devices connected to your motherboard.

**Requested Link Speed**

Use this feature to configure the link speed for the PCIe port you specified. The options are **Auto**, Gen 1 (2.5 GT/s), Gen 2 (5 GT/s), Gen 3 (8 GT/s), Gen 4 (16 GT/s), and Gen 5 (32 GT/s).

The following information is displayed.

- Max Link Width
- Current Link Width

- Current Link Speed

**Data Link Feature Exchange**

Use this feature to enable data link feature negotiation in the Data Link Feature Capabilities (DLFCAP) register. The options are Disabled and **Enabled**.

**PCIe Port Max Payload Size**

Use this feature to configure the maximum payload size supported in Direct Media Interface (DMI) device capabilities register for the device installed in the PCIe port. The options are 128B, 256B, 512B, and **Auto**.

**MCTP**

Enable this feature, Management Component Transport Protocol (MCTP), to support communications between devices in a platform management subsystem. MCTP's underlying device buses include SMBus/$I^2C$, serial links, PCIe, and USB. The options are Disabled and **Enabled**.

**Intel VMD Technology**

When this feature is set to Enabled, VMD support will be automatically enabled when a VROC key is detected by the BIOS. The options are **Disabled** and Enabled.

### *Intel VT for Directed I/O (VT-d) Menu*

**►Intel VT for Directed I/O (VT-d)**

**Note:** This submenu is NOT available when "Workload Profile" is set to Virtualization.

**Pre-boot DMA Protection**

Select Enabled to establish DMA protection during pre-boot processing by setting DMA_CTRL_PLATFORM_OPT_IN_FLAG in the DMAR ACPI table. The options are **Enabled** and Disabled. (DMA is the abbreviation for Direct Memory Access. DMAR is the abbreviation for DMA Remapping Reporting.)

**PCIe ACSCTL**

Select Enabled to program ACS control to Chipset PCIe Root Port bridges. Select Disabled to program ACS control to all PCIe Root Port bridges. The options are Enabled and **Disabled**.

### *PCIe Leaky Bucket Configuration Menu*

**►PCIe Leaky Bucket Configuration**

**Gen2 Link Degradation**

Use this feature to enable PCIe Gen2 link degradation. The options are Disabled and **Enabled**.

**Note:** The default setting is Enabled when your motherboard supports PCIe Gen2 link. Otherwise, the default setting is Disabled.

**Gen3 Link Degradation**

Use this feature to enable PCIe Gen3 link degradation. The options are Disabled and **Enabled**.

**Note:** The default setting is Enabled when your motherboard supports PCIe Gen3 link. Otherwise, the default setting is Disabled.

**Gen4 Link Degradation**

Use this feature to enable PCIe Gen4 link degradation. The options are Disabled and **Enabled**.

**Note:** The default setting is Enabled when your motherboard supports PCIe Gen4 link. Otherwise, the default setting is Disabled.

**Gen5 Link Degradation**

Use this feature to enable PCIe Gen5 link degradation. The options are Disabled and **Enabled**.

**Note:** The default setting is Enabled when your motherboard supports PCIe Gen5 link. Otherwise, the default setting is Disabled.

## Trusted Computing Menu

### ►Trusted Computing

When the TPM 2.0 (either onboard or external) is detected by your system, the following information is displayed.

- TPM 2.0 Device Found
- Firmware Version:
- Vendor:

**Note:** This submenu is available when the TPM 2.0 (either onboard or external) is detected by the BIOS.

**Security Device Support**

Select Enabled to enable BIOS support for onboard security devices, which are not displayed in the OS. If this feature is set to Enabled, TCG EFI protocol and INT1A interface will not be available. The options are Disabled and **Enabled**.

When "Security Device Support" is set to Enabled and the TPM 2.0 (either onboard or external) is detected by the BIOS, the following information is displayed.

- Active PCR banks
- Available PCR banks

**Note:** The following features are available when the TPM 2.0 (either onboard or external) is detected by the BIOS.

**SHA-1 PCR Bank (Available when "Security Device Support" is set to Enabled)**

Select Enabled to enable SHA-1 PCR Bank support to enhance system integrity and data security. The options are Disabled and **Enabled**.

**SHA256 PCR Bank (Available when "Security Device Support" is set to Enabled)**

Select Enabled to enable SHA256 PCR Bank support to enhance system integrity and data security. The options are Disabled and **Enabled**.

**SHA384 PCR Bank (Available when "Security Device Support" is set to Enabled)**

Select Enabled to enable SHA384 PCR Bank support to enhance system integrity and data security. The options are **Disabled** and Enabled.

**Pending Operation (Available when "Security Device Support" is set to Enabled)**

Use this feature to schedule a TPM-related operation to be performed by the security TPM (either onboard or external) at the next system boot to enhance system data integrity. The options are **None** and TPM Clear.

**Note:** If this feature is used, your system will reboot to carry out a pending TPM operation.

**Platform Hierarchy (Available when "Security Device Support" is set to Enabled)**

Select Enabled for TPM Platform Hierarchy support, which allows the manufacturer to utilize the cryptographic algorithm to define a constant key or a fixed set of keys to be used for initial system boot. These early boot codes are shipped with the platform and are included in the list of "public keys." During system boot, the platform firmware uses the trusted public keys to verify a digital signature in an attempt to manage and control the security of the platform firmware used in a host system via the TPM (either onboard or external). The options are Disabled and **Enabled**.

**Storage Hierarchy (Available when "Security Device Support" is set to Enabled)**

Select Enabled for TPM Storage Hierarchy support that is intended to be used for non-privacy-sensitive operations by a platform owner such as an IT professional or the end user. Storage

Hierarchy has an owner policy and an authorization value, both of which can be set and are held constant (-rarely changed) through reboots. This hierarchy can be cleared or changed independently of the other hierarchies. The options are Disabled and **Enabled**.

**Endorsement Hierarchy (Available when "Security Device Support" is set to Enabled)**

Select Enabled for Endorsement Hierarchy support, which contains separate controls to address the user's privacy concerns because the primary keys in the hierarchy are certified by the TPM key or by a manufacturer with restrictions on how an authentic TPM (either onboard or external) that is attached to an authentic platform can be accessed and used. A primary key can be encrypted and certified with a certificate created by using TPM2_ActivateCredential, which allows the user to independently enable "flag, policy, and authorization values" without involving other hierarchies. A user with privacy concerns can disable the endorsement hierarchy while still using the storage hierarchy for TPM applications, permitting the platform software to use the TPM. The options are Disabled and **Enabled**.

**PH Randomization**

Select Enabled for Platform Hierarchy (PH) Randomization support, which is used only during the platform developmental stage. This feature cannot be enabled in the production platforms. The options are **Disabled** and Enabled.

**Supermicro BIOS-Based TPM Provision Support**

Set this feature to Enabled to unlock the TPM. Save settings and exit the BIOS Setup utility. The Non-volatile (NV) indexes can be deleted after the system reboot. The options are **Disabled** and Enabled.

## ACPI Settings Menu

### ►ACPI Settings

**NUMA**

Use this feature to enable Non-Uniform Memory Access (NUMA) support to minimize memory access latencies. The options are Disabled and **Enabled**. This feature is CPU-dependent.

**Virtual NUMA**

Enable this feature to optimize the memory-access performance for VMware virtual machines. The options are **Disabled** and Enabled.

**Note:** This feature is NOT available when "Workload Profile" is set to Telco NFVI, Telco NFVI-FP, or Telco FlexRAN.

**Number of Virtual NUMA Nodes (Available when "Virtual NUMA" is set to Enabled)**

This feature displays the number of virtual NUMA nodes. A NUMA architecture divides hardware resources (including processors, memory, and I/O buses) into groups, called NUMA nodes. This feature indicates the available number of virtual NUMA nodes that can be assigned to the virtual machine. By default, this setting is automatically adjusted to match the physical NUMA topology.

**WHEA Support**

Select Enabled to support the Windows Hardware Error Architecture (WHEA) platform and provide a common infrastructure for the system to handle hardware errors within the Windows OS environment to reduce system crashes and to enhance system recovery and health monitoring. The options are Disabled and **Enabled**.

## Super IO Configuration Menu

### ►Super IO Configuration

The following information is displayed.

- Super IO Chip

**Note:** This submenu is available when your system supports this feature.

### *Serial Port 1 Configuration Menu*

### ►Serial Port 1 Configuration

**Serial Port 1**

Select Enabled to enable serial port 1. The options are Disabled and **Enabled**.

**Device Settings (Available when "Serial Port 1" above is set to Enabled)**

This feature displays the base I/O port address and the Interrupt Request address of serial port 1.

**Change Settings (Available when "Serial Port 1" above is set to Enabled)**

Use this feature to specify the base I/O port address and the Interrupt Request address of serial port 1. Select Auto for the BIOS to automatically assign the base I/O and IRQ address to serial port 1. The options are **Auto**, (IO=3F8h; IRQ=4;), (IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12;), (IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12;), (IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12;), and (IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;).

### *Serial Port 2 Configuration Menu*

#### ►Serial Port 2 Configuration

**Note:** It can be "Serial Port 2 Configuration" or "SOL Configuration" based on your system support.

**Serial Port 2/SOL ("Serial Port 2" or "SOL" based on your system support)**

Select Enabled to enable serial port 2 (or SOL). The options are Disabled and **Enabled**.

**Device Settings (Available when "Serial Port 2/SOL" above is set to Enabled)**

This feature displays the base I/O port address and the Interrupt Request address of serial port 2 (or SOL).

**Change Settings (Available when "Serial Port 2/SOL" above is set to Enabled)**

Use this feature to specify the base I/O port address and the Interrupt Request address of serial port 2 (or SOL). Select Auto for the BIOS to automatically assign the base I/O and IRQ address to serial port 2 (or SOL). The options are **Auto**, (IO=2F8h; IRQ=3;), (IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12;), (IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12;), (IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12;), and (IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;).

**Serial Port 2 Attribute (Available for Serial Port 2 only)**

Select SOL to use serial port 2 as a Serial Over LAN (SOL) port for console redirection. The options are **SOL** and COM.

## Serial Port Console Redirection Menu

#### ►Serial Port Console Redirection

**COM1 (Available when your system supports the serial port of COM1)**

**Console Redirection**

Select Enabled to enable COM port 1 for Console Redirection, which allows a client machine to be connected to a host machine at a remote site for networking. The options are **Disabled** and Enabled.

**Note:** This feature will be set to Enabled if there is no BMC support.

**SOL/COM2**

**Note:** This feature is available when your system supports serial port of SOL and/or COM2. The "SOL/COM2" here indicates a shared serial port, and SOL is used as the default.

### Console Redirection

Select Enabled to use the SOL/COM2 port for Console Redirection. The options are Disabled and **Enabled**.

### ►Console Redirection Settings

**Note:** This submenu is available when "Console Redirection" for COM1 or SOL/COM2 is set to Enabled.

#### Terminal Type

Use this feature to select the target terminal emulation type for Console Redirection. Select VT100 to use the ASCII Character set. Select VT100+ to add color and function key support. Select ANSI to use the Extended ASCII Character Set. Select VT-UTF8 to use UTF8 encoding to map Unicode characters into one or more bytes. The options are VT100, **VT100+**, VT-UTF8, and ANSI.

#### Bits Per Second

Use this feature to set the transmission speed for a serial port used in Console Redirection. Make sure that the same speed is used in the host computer and the client computer. A lower transmission speed may be required for long and busy lines. The options are 9600, 19200, 38400, 57600, and **115200** (bits per second).

#### Data Bits

Use this feature to set the data transmission size for Console Redirection. The options are 7 and **8** (bits).

#### Parity

A parity bit can be sent along with regular data bits to detect data transmission errors. Select Even if the parity bit is set to 0 and the number of 1s in data bits is even. Select Odd if the parity bit is set to 0 and the number of 1s in data bits is odd. Select None if you do not want to send a parity bit with your data bits in transmission. Select Mark to add a mark as a parity bit to be sent along with the data bits. Select Space to add a space as a parity bit to be sent with your data bits. The options are **None**, Even, Odd, Mark, and Space.

#### Stop Bits

A stop bit indicates the end of a serial data packet. Select 1 (stop bit) for standard serial data communication. Select 2 (stop bits) if slower devices are used. The options are **1** and 2.

**Flow Control**

Use this feature to set the flow control for Console Redirection to prevent data loss caused by buffer overflow. Send a "Stop" signal to stop sending data when the receiving buffer is full. Send a "Start" signal to start sending data when the receiving buffer is empty. The options are **None** and Hardware RTS/CTS.

**VT-UTF8 Combo Key Support**

Select Enabled to enable VT-UTF8 Combination Key support for ANSI/VT100 terminals. The options are Disabled and **Enabled**.

**Recorder Mode**

Select Enabled to capture the data displayed on a terminal and send it as text messages to a remote server. The options are **Disabled** and Enabled.

**Resolution 100x31**

Select Enabled for extended-terminal resolution support. The options are Disabled and **Enabled**.

**Putty KeyPad**

Use this feature to select function key and keypad settings on Putty, which is a terminal emulator designed for the Windows OS. The options are **VT100**, LINUX, XTERMR6, SCO, ESCN, and VT400.

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

Use the features below to configure Console Redirection settings to support Out-of-Band Serial Port management.

**Console Redirection EMS**

Select Enabled to use the SOL port for Console Redirection. The options are **Disabled** and Enabled.

### ►Console Redirection Settings

**Note:** This submenu is available when "Console Redirection EMS" is set to Enabled.

**Out-of-Band Mgmt Port**

The feature selects a serial port in a client server to be used by the Microsoft Windows Emergency Management Services (EMS) to communicate with a remote host server. The options are **COM1** and SOL/COM2. Please note that the option of SOL/COM2 indicates a shared serial port. SOL is available with BMC support.

**Terminal Type EMS**

Use this feature to select the target terminal emulation type for Console Redirection. Select VT100 to use the ASCII character set. Select VT100+ to add color and function key support. Select ANSI to use the extended ASCII character set. Select VT-UTF8 to use UTF8 encoding to map Unicode characters into one or more bytes. The options are VT100, VT100+, **VT-UTF8**, and ANSI.

**Bits Per Second EMS**

This feature sets the transmission speed for a serial port used in Console Redirection. Make sure that the same speed is used in the host computer and the client computer. A lower transmission speed may be required for long and busy lines. The options are 9600, 19200, 57600, and **115200** (bits per second).

**Flow Control EMS**

Use this feature to set the flow control for Console Redirection to prevent data loss caused by buffer overflow. Send a "Stop" signal to stop sending data when the receiving buffer is full. Send a "Start" signal to start sending data when the receiving buffer is empty. The options are **None**, Hardware RTS/CTS, and Software Xon/Xoff.

The following information is displayed.

- **Data Bits EMS**
- **Parity EMS**
- **Stop Bits EMS**

## Network Stack Configuration Menu

### ►Network Stack Configuration

**Network Stack**

Select Enabled to enable Preboot Execution Environment (PXE) or Unified Extensible Firmware Interface (UEFI) for network stack support. The options are Disabled and **Enabled**.

**IPv4 PXE Support (Available when "Network Stack" is set to Enabled)**

Select Enabled to enable IPv4 PXE boot support. If this feature is disabled, it will not create the IPv4 PXE boot option. The options are Disabled and **Enabled**.

**IPv4 HTTP Support (Available when "Network Stack" is set to Enabled)**

Select Enabled to enable IPv4 HTTP boot support. If this feature is disabled, it will not create the IPv4 HTTP boot option. The options are **Disabled** and Enabled.

**IPv6 PXE Support (Available when "Network Stack" is set to Enabled)**

Select Enabled to enable IPv6 PXE boot support. If this feature is disabled, it will not create the IPv6 PXE boot option. The options are Disabled and **Enabled**.

**IPv6 HTTP Support (Available when "Network Stack" is set to Enabled)**

Select Enabled to enable IPv6 HTTP boot support. If this feature is disabled, it will not create the IPv6 HTTP boot optiont. The options are **Disabled** and Enabled.

**PXE Boot Wait Time (Available when "Network Stack" is set to Enabled)**

Use this feature to set the wait time (in seconds) upon which the system BIOS will wait for you to press the <ESC> key to abort PXE boot instead of proceeding with PXE boot by connecting to a network server immediately. Press the <+> or <-> key on your keyboard to change the value. The default setting is **0**.

**Media Detect Count (Available when "Network Stack" is set to Enabled)**

Use this feature to set the wait time (in seconds) for the BIOS ROM to detect the presence of a LAN media either via the Internet connection or via a LAN port. Press the <+> or <-> key on your keyboard to change the value. The default setting is **1**.

## PCIe/PCI/PnP Configuration Menu

### ►PCIe/PCI/PnP Configuration

The following information is displayed.

- PCI Bus Driver Version

**PCI Devices Common Settings:**

**Re-Size BAR Support**

Use this feature to enable the Resizable BAR support. Resizable BAR is a PCIe interface technology that allows the CPU to access to the entire frame buffer. With this technology, your system will be able to handle multiple CPU to GPU transfers simultaneously rather than queuing, which can improve the frame rate performance. The options are **Disabled** and Enabled.

**SR-IOV Support (Unavailable when "Workload Profile" is set to Virtualization)**

Select Enabled for Single-Root IO Virtualization support. The options are Disabled and **Enabled**.

**ARI Support**

Select Enabled for Alternative Routing-ID Interpretation (ARI) support. The options are Disabled and **Enabled**.

**MMCFG Base**

This feature determines how the lowest Memory Mapped Configuration (MMCFG) base is assigned to onboard PCI devices. The options are 1G, 1.5G, 1.75G, 2G, 2.25G, 3G, and **Auto**. The options of 2G and 2.25G are not available when the MMCFG size is 2G. The option of 3G is not available when the MMCFG size is 1G or 2G.

**MMCFG Size**

Use this feature to set the MMCFG size. The options are 64M, 128M, 256M, 512M, 1G, 2G, and **Auto**. Please note that the MMCFG size is based on the memory populated.

**MMIO High Base**

Use this feature to select the base memory size according to memory-address mapping for the I/O hub. The options are 248T, 120T, 88T, 60T, 30T, 56T, 40T, 32T, 24T, 16T, 4T, 2T, 1T, 512G, 3584T, and **Auto**. The options of 248T, 120T, 88T, 60T, 30T, and 3584T are CPU-dependent.

**MMIO High Granularity Size**

Use this feature to select the high memory size according to memory-address mapping for the I/O hub. The options are 1G, 4G, 16G, 32G, 64G, 256G, and **1024G**. This feature is motherboard-dependent.

**Bus Master Enable**

If this feature is set to Enabled, the PCI Bus Driver will enable the Bus Master Attribute for DMA transactions. If this feature is set to Disabled, the PCI Bus Driver will disable the Bus Master Attribute for Pre-Boot DMA protection. The options are Disabled and **Enabled**.

**NVMe Firmware Source**

Use this feature to select the NVMe firmware to support system boot. The options are Vendor Defined Firmware and **AMI Native Support**. The option of Vendor Defined Firmware is pre-installed on the drive and may resolve errata or enable innovative functions for the drive. The default option, AMI Native Support, is offered by the BIOS with a generic method.

**VGA Priority**

Use this feature to select the graphics device to be used as the primary video display for system boot. The options are **Onboard** and Offboard.

**Onboard Video Option ROM**

Select EFI to boot the computer using the Extensible Firmware Interface (EFI) device installed on the onboard video port. The options are Disabled and **EFI**.

**PCI / PCIX / PCIe Slot 1 OPROM / PCI / PCIX / PCIe Slot 2 OPROM / RSC-H-6G5L SLOT1 PCI-E 5.0 X16 OPROM / RSC-H-68G5 SLOT1 PCI-E 5.0 X16 OPROM / AOM-AIOM-2X8-G5 SLOT1 PCI-E 5.0 X16 OPROM / RSC-H-68G5 SLOT1 PCIE 5.0 X16 OPROM / AOC-ATG-i2S LAN1 OPROM / Onboard SAS Option ROM / Onboard LAN1 Option ROM / Onboard NVMe1 Option ROM – Onboard NVMe24 Option ROM**

Select EFI to boot the computer using the EFI device installed on the PCIe slot specified. The options are Disabled and **EFI**.

**Note:** The number of slots and slot naming vary based on your motherboard features.

## HTTP Boot Configuration Menu

### ►HTTP Boot Configuration

**HTTP Boot Policy**

Use this feature to set the HTTP boot policy. The options are Apply to all LANs, **Apply to each LAN**, and Boot Priority #1 instantly.

**HTTPS Boot Checks Hostname**

**Important:** Disabling "HTTPS Boot Checks Hostname" is a violation of RFC 6125 and may expose you to Man-in-the-Middle Attacks. Supermicro is not responsible for any and all security risks incurred by you disabling this feature.

Enable this feature for HTTPS boot to check the hostname of the TLS certificates to see if it matches the host name provided by the remote server. The options are **Enabled** and Disabled (WARNING: Security Risk!).

**Priority of HTTP Boot**

**Instance of Priority 1: (Available when your motherboard supports this feature)**

This feature sets the rank target port. The default setting is **1**.

**Select IPv4 or IPv6**

This feature specifies which connection the target LAN port should boot from. The options are **IPv4** and IPv6.

**Boot Description**

Use this feature to enter a boot description, which cannot be longer than 75 characters. Please be sure to enter a boot description; otherwise, the boot option for the URI cannot be created.

**Boot URI**

Enter a Boot Uniform Research Identifier (URI) with 128 characters or shorter. This Boot URI determines how IPv4 Boot Option and IPv6 Boot Option will be created.

**Instance of Priority 2: (Available when your motherboard supports this feature)**

This feature sets the rank target port. The default setting is **0**.

**Select IPv4 or IPv6 (Unavailable when "Instance of Priority 2:" above is set to 0)**

This feature specifies which connection the target LAN port should boot from. The options are **IPv4** and IPv6.

**Boot Description (Unavailable when "Instance of Priority 2:" above is set to 0**

Use this feature to enter a boot description, which cannot be longer than 75 characters. Please be sure to enter a boot description; otherwise, the boot option for the URI cannot be created.

**Boot URI (Unavailable when "Instance of Priority 2:" above is set to 0)**

Enter a Boot URI with 128 characters or shorter. This Boot URI determines how IPv4 Boot Option and IPv6 Boot Option will be created.

## Supermicro KMS Server Configuration Menu

### ►Supermicro KMS Server Configuration

**Note:** Be sure to configure all the features in the submenu of Supermicro KMS Server Configuration and the feature of "KMS Security Policy" in the submenu of Super-Guardians Configuration so that your system can communicate with the KMS server.

**Supermicro KMS Server IP address**

Use this feature to set the Supermicro Key Management Service (KMS) server IPv4 address in dotted-decimal notation.

**Second Supermicro KMS Server IP address**

Use this feature to set the second Supermicro KMS server IPv4 address in dotted-decimal notation.

**Supermicro KMS TCP Port number**

Use this feature to set the TCP port number used in the Supermicro KMS server. The valid range is 100–9999. The default setting is **5696**. Do not change the default setting unless a different TCP port number has been specified and used in the Supermicro KMS server.

**KMS Time Out**

Use this feature to enter the KMS server connecting time-out (in seconds). The default setting is **5** (seconds).

**TimeZone**

Use this feature to set the correct time zone. The default setting is **0** (not specified).

**Client UserName**

Press <Enter> to set the client identity (UserName). The length is 0–63 characters.

**Client Password**

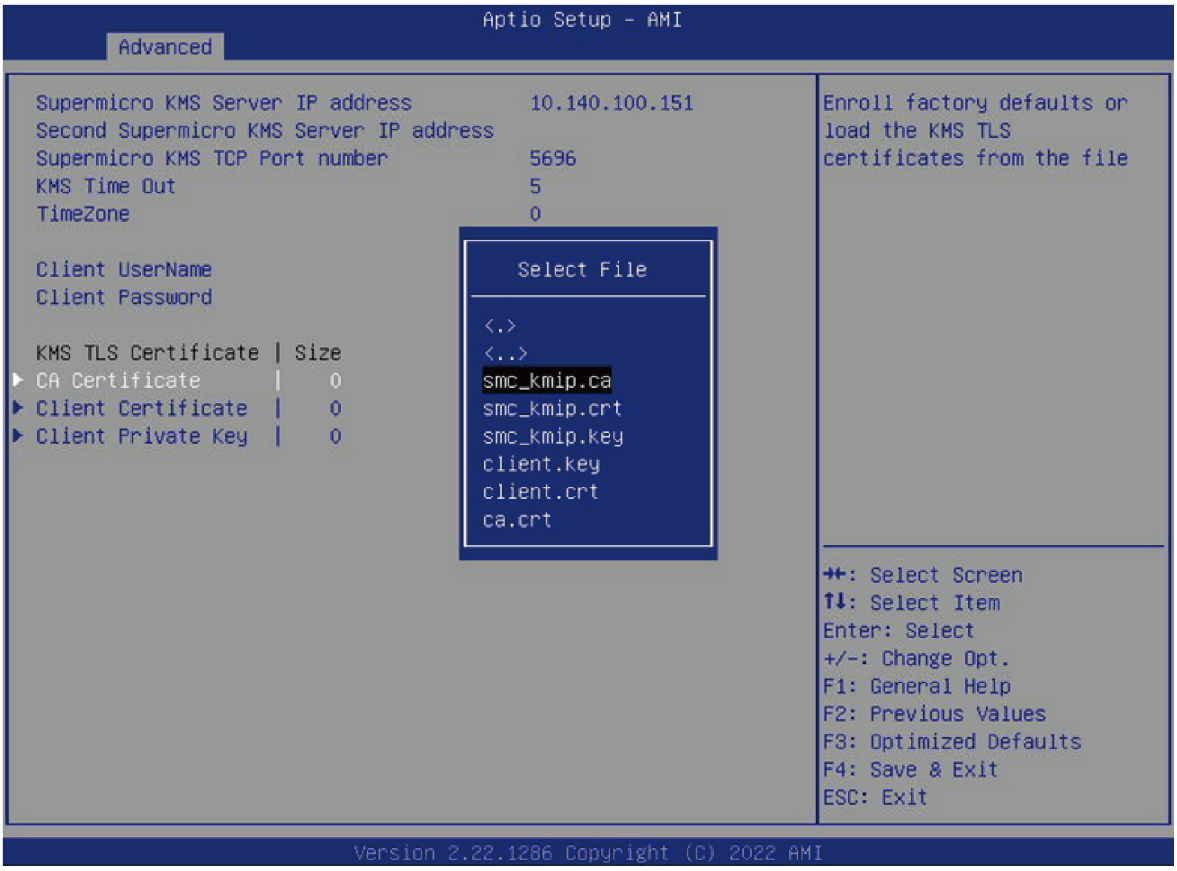
Press <Enter> to set the client identity (Password). The length is 0–31 characters.

### ►CA Certificate

### ►Client Certificate

### ►Client Private Key

Use the three features above to enroll factory defaults or load the KMS Transport Layer Security (TLS) certificates, which are generated by the KMS server, from the file stored in the USB flash drive as shown below.




**Private Key Password (Available when "Client Private Key" above has been set)**

Use this feature to change the private key password.

## Super-Guardians Configuration Menu

### ►Super-Guardians Configuration

**Super-Guardians Protection Policy**

Use this feature to enable the Super-Guardians Protection Policy. The options are **Storage**, System, and System and Storage. Set this feature to Storage to protect and have secure access to the Trusted Computing Group (TCG) NVMe devices with the Authentication-Key (AK). Set this feature to System to protect and have secure access to your system/motherboard with the AK. Set this feature to System and Storage to protect and have secure access to your system/motherboard/storage devices with the AK.

**KMS Security Policy (Available when "TPM Security Policy" and "USB Security Policy" are set to Disabled)**

Set this feature to Enabled to enable the KMS Security Policy. When this feature has not previously been set to Enabled, the options are **Disabled** and Enabled. Changes take effect after you save settings and reboot the system.

When this feature has previously been set to Enabled, the options are **Enabled**, Reset, and Key Rotation. Set this feature to Key Rotation to obtain an existing AK from the KMS server and create a new AK. To disable the KMS Security Policy, set this feature to Reset. When this feature is set to Reset, the system and TCG NVMe devices chosen in "Super-Guardians Protection Policy" will be in the unprotected mode.

**Notes:**

- Be sure that the KMS server is ready before configuring this feature.
- Use the professional KMS server solutions (e.g., Thales Server) or the Supermicro PyKMIP Software Package to establish the KMS server.

**KMS Server Retry Count (Available when "TPM Security Policy" and "USB Security Policy" are set to Disabled)**

Use this feature to specify how many times the system will attempt reconnecting to the KMS server. The valid range is 0–10. Press the <+> or <-> key on your keyboard to change the value. The default setting is **5**. If the value is 0, the system will retry infinitely.

**TPM Security Policy (Available when "KMS Security Policy" and "USB Security Policy" are set to Disabled)**

Set this feature to Enabled to enable the TPM Security Policy. When this feature has not previously been set to Enabled, the options are **Disabled** and Enabled. Changes take effect after you save settings and reboot the system.

When this feature has previously been set to Enabled, the options are **Enabled** and Reset. To disable the TPM Security Policy, set this feature to Reset. When this feature is set to Reset, the system and TCG NVMe devices chosen in "Super-Guardians Protection Policy" will be in the unprotected mode.

**Load Authentication-Key (Available when "KMS Security Policy," "TPM Security Policy," and "USB Security Policy" are set to Disabled)**

The options are **Disabled** and Enabled. Set this feature to Enabled. Changes take effect after you save settings and reboot the system. While booting, the BIOS will automatically load the Authentication-Key (filename: TPMAuth.bin) from the USB flash drive. Afterwards, the default setting will be set to Disabled by the BIOS.

**Notes:**

- Be sure to connect a USB flash drive with the Authentication-Key (filename: TPMAuth.bin) to your system before the system reboot.
- Be sure to save the Authentication-Key (filename: TPMAuth.bin) to the USB flash drive and keep a backup. Load the Authentication-Key (filename: TPMAuth.bin) after the TPM (either onboard or external) is detected by your system. Otherwise, the TPM function can not work properly.

**Save Authentication-Key (Available when "TPM Security Policy" is set to Enabled)**

The options are **Disabled** and Enabled. Set this feature to Enabled. Changes take effect after you save settings and reboot the system. While booting, the BIOS will automatically save the Authentication-Key (filename: TPMAuth.bin) to the USB flash drive. Afterwards, the default setting will be set to Disabled by the BIOS.

**Note:** Be sure to connect a USB flash drive to your system before the system reboot.

**USB Security Policy (Available when "KMS Security Policy" and "TPM Security Policy" are set to Disabled)**

Use this feature to enable the USB Security Policy. The options are **Disabled** and Enabled. Set this feature to Enabled. Changes take effect after you save settings and reboot the system. Connect a USB flash drive to your system before the system reboot. While booting, the BIOS will automatically create the USB Authentication-Key (filename: USBAuth.bin) and save it to the USB flash drive.

When this feature has been previously set to Enabled, the options are **Enabled** and Reset. To disable the USB Security Policy, set this feature to Reset. When this feature is set to Reset, the system and TCG NVMe devices chosen in "Super-Guardians Protection Policy" will be in the unprotected mode.

**Note:** Be sure to connect a USB flash drive to your system before configuring this feature. Save the USB Authentication-Key (filename: USBAuth.bin) to the USB flash drive and keep a backup.

## TLS Authenticate Configuration Menu

### ►TLS Authenticate Configuration

Use this submenu to configure Transport Layer Security (TLS) settings.

### ►Server CA Configuration

Use this feature to configure the client certificate that is to be used by the server.

#### ►Enroll Certification

Use this feature to enroll the certificate in the system.

#### ►Enroll Certification Using File

Use this feature to enroll the security certificate in the system by using a file.

**Certification GUID**

Press <Enter> and input the certification Global Unique Identifier (GUID).

#### ►Commit Changes and Exit

Use this feature to save all changes and exit TLS settings.

#### ►Discard Changes and Exit

Use this feature to discard all changes and exit TLS settings.

#### ►Delete Certification

Use this feature to delete the certificate if a certificate has been enrolled in the system.

### ►Client Certification Configuration

## 8.4 Event Logs

Use this menu to configure Event Logs settings.

**Note:** After making any changes in this section, please be sure to reboot the system for the changes to take effect.

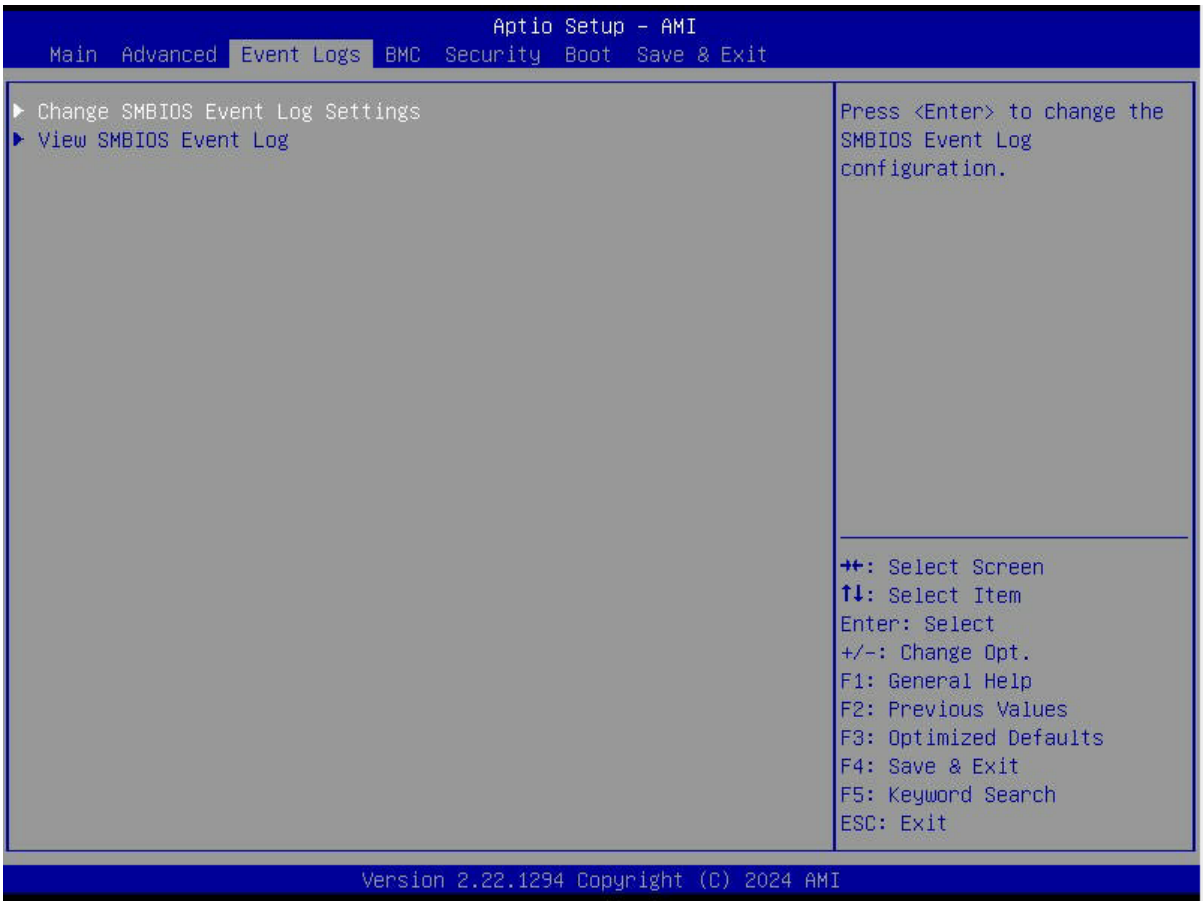



**Figure 8-3. Event Logs UEFI BIOS Menu Screenshot**

### ►Change SMBIOS Event Log Settings

**Note:** Reboot the system for the changes in this section to take effect.

**Enabling/Disabling Options**

**SMBIOS Event Log**

Select Enabled to enable System Management BIOS (SMBIOS) Event Logging during system boot. The options are Disabled and **Enabled**.

**Erasing Settings**

**Erase Event Log (Available when "SMBIOS Event Log" is set to Enabled)**

Select No to keep the event log without erasing it upon next system bootup. Select (Yes, Next reset) to erase the event log upon next system reboot. The options are **No**, (Yes, Next reset), and (Yes, Every reset).

**When Log is Full (Available when "SMBIOS Event Log" is set to Enabled)**

Select Erase Immediately to immediately erase all errors in the SMBIOS event log when the event log is full. Select Do Nothing for the system to do nothing when the SMBIOS event log is full. The options are **Do Nothing** and Erase Immediately.

**SMBIOS Event Log Standard Settings**

**Log System Boot Event (Available when "SMBIOS Event Log" is set to Enabled)**

Select Enabled to log system boot events. The options are Enabled and **Disabled**.

**MECI (Available when "SMBIOS Event Log" is set to Enabled)**

Enter the increment value for the multiple event counter. Enter a number between 1 and 255. The default setting is **1**. (MECI is the abbreviation for Multiple Event Count Increment.)

**METW (Available when "SMBIOS Event Log" is set to Enabled)**

Use this feature to determine how long (in minutes) should the multiple event counter wait before generating a new event log. Enter a number between 0 and 99. The default value is **60**. (METW is the abbreviation for Multiple Event Count Time Window.)

### ►View SMBIOS Event Log

Use this feature to view the event in the system event log. Select this feature and press <Enter> to view the status of an event in the log. The following information is displayed: DATE / TIME / ERROR CODE / SEVERITY.

# 8.5 BMC

Use this menu to configure Baseboard Management Console (BMC) settings.

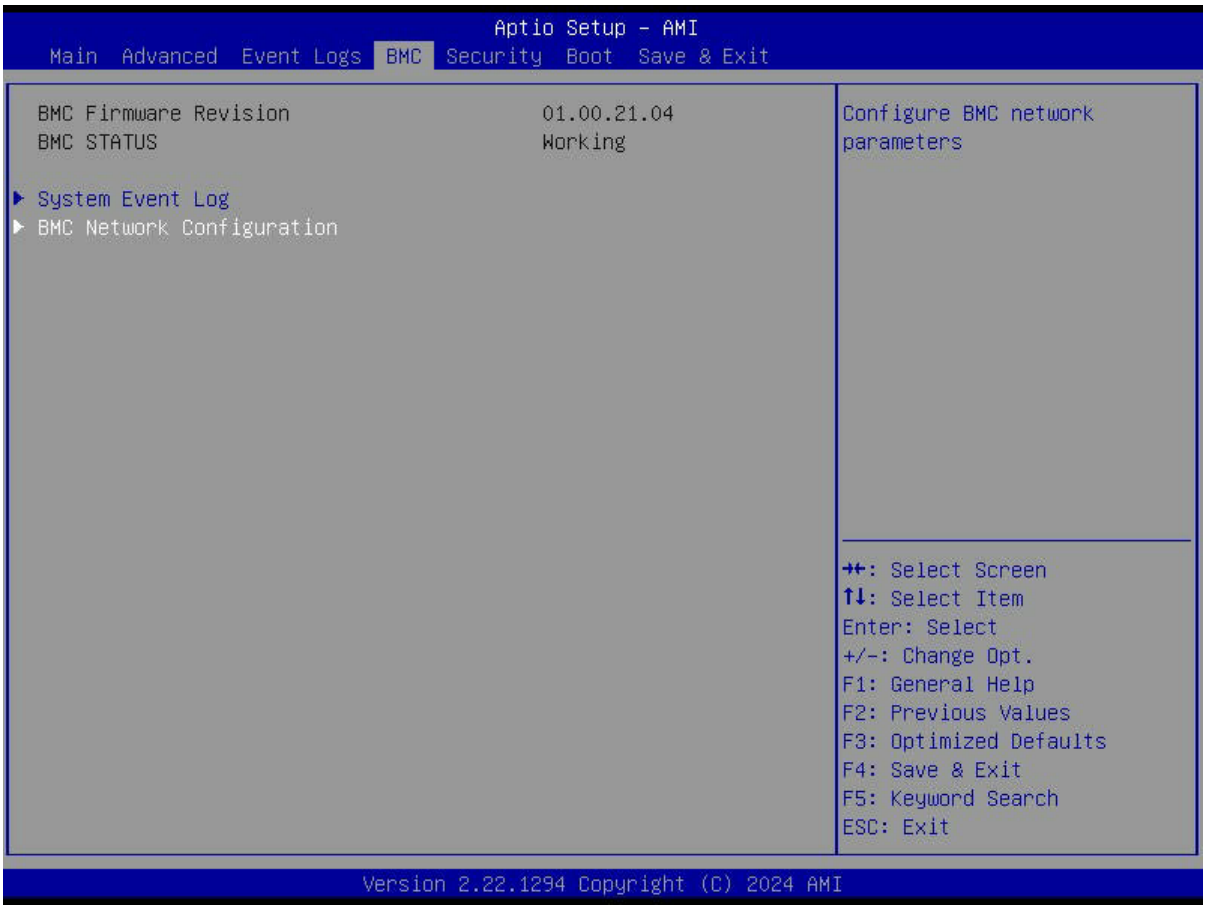



**Figure 8-4. BMC UEFI BIOS Menu Screenshot**

### BMC Firmware Revision

This feature indicates the BMC firmware revision used in this system.

### BMC STATUS

This feature indicates the status of the BMC firmware installed in this system.

## System Event Log Menu

### ►System Event Log

**Note:** All values changed in this submenu do not take effect until computer is restarted.

**Enabling/Disabling Options**

**SEL Components**

Select Enabled to enable all system event logging upon system boot. The options are Disabled and **Enabled**.

**Erasing Settings**

**Erase SEL (Available when "SEL Components" is set to Enabled)**

Select (Yes, On next reset) to erase all system event logs upon next system boot. Select (Yes, On every reset) to erase all system event logs upon each system reboot. Select No to keep all system event logs after each system reboot. The options are **No**, (Yes, On next reset), and (Yes, On every reset).

**When SEL is Full (Available when "SEL Components" is set to Enabled)**

This feature defines what the BIOS should do when the system event log is full. Select Erase Immediately to erase all events in the log when the system event log is full. The options are **Do Nothing** and Erase Immediately.

## BMC Network Configuration Menu

### ►BMC Network Configuration

**Update BMC LAN Configuration**

Select Yes for the BIOS to implement all IP/MAC address changes upon next system boot. The options are **No** and Yes.

**********

**Configure IPv4 Support**

**********

**BMC LAN Selection**

This feature displays the type of the BMC LAN.

**BMC Network Link Status:**

This feature displays the status of the BMC network link for this system.

**Configuration Address Source (Available when "Update BMC LAN Configuration" is set to Yes)**

Use this feature to select the source of the IPv4 connection. If Static is selected, note the IP address of the IPv4 connection and enter it to the system manually in the field. If DHCP is

selected, the BIOS will search for a Dynamic Host Configuration Protocol (DHCP) server in the network that is attached to and request the next available IP address for this computer. The options are Static and **DHCP**.

**Station IP Address**

This feature displays the Station IP address in decimal and in dotted quad form (i.e., 172.29.176.131). It is available for configuration when "Configuration Address Source" above is set to Static.

**Subnet Mask**

This feature displays the sub- network that this computer belongs to. It is available for configuration when "Configuration Address Source" above is set to Static.

**Station MAC Address**

This feature displays the Station MAC address for this computer. Mac addresses are six two-digit hexadecimal numbers.

**Gateway IP Address**

This feature displays the Gateway IP address for this computer. This should be in decimal and in dotted quad form (i.e., 172.29.0.1). It is available for configuration when "Configuration Address Source" above is set to Static.

**********

**Configure IPv6 Support**

**********

**IPv6 Address Status**

This feature displays the status of the IPv6 address.

**IPv6 Support (Available when "Update BMC LAN Configuration" is set to Yes)**

Use this feature to enable IPv6 support. The options are **Enabled** and Disabled.

**Configuration Address Source (Available when "IPv6 Support" is set to Enabled)**

Use this feature to select the source of the IPv6 connection. If Static Configuration is selected, note the IP address of IPv6 connection and enter it to the system manually in the field. If the other two options are selected, the BIOS will search for a DHCP server in the network that is attached to and request the next available IP address for this computer. The options are Static Configuration, **DHCPv6 Stateless**, and DHCPv6 Stateful.

**IPv6 Address ("Static," "DHCPv6 Stateless," or "DHCPv6 Stateful," depending on the option you selected for "Configuration Address Source" above)**

This feature displays the station IPv6 address. It is available for configuration when "Configuration Address Source" above is set to Static Configuration.

**Prefix Length**

This feature displays the prefix length. It is available for configuration when "Configuration Address Source" above is set to Static Configuration.

**Gateway IP**

This feature displays the IPv6 gateway IP address. It is available for configuration when "Configuration Address Source" above is set to Static Configuration.

**Advanced Settings (Available when "Configuration Address Source" is set to DHCPv6 Stateless)**

Use this feature to set the DNS server IP. The default setting allows this system to obtain the DNS server IP automatically. The options are **Auto obtain DNS server IP** and Manually obtain DNS server IP.

**Preferred DNS server IP (Available when "Advanced Settings" above is set to Manually obtain DNS server IP)**

This feature displays the preferred DNS server IP. It can be configured via Redfish.

**Alternative DNS server IP (Available when "Advanced Settings" above is set to Manually obtain DNS server IP)**

This feature displays the alternative DNS server IP. It can be configured via Redfish.

**********

**Configure VLAN Support**

**********

**VLAN Support (Available when "Update BMC LAN Configuration" is set to Yes)**

Use this feature to enable the virtual LAN (VLAN) support. The options are Enabled and **Disabled**.

**VLAN ID (Available when "VLAN Support" is set to Enabled)**

Use this feature to create a new VLAN ID. The valid range is 1–4094. The default setting is **1**.

## 8.6 Security

Use this menu to configure the following security settings for the system.

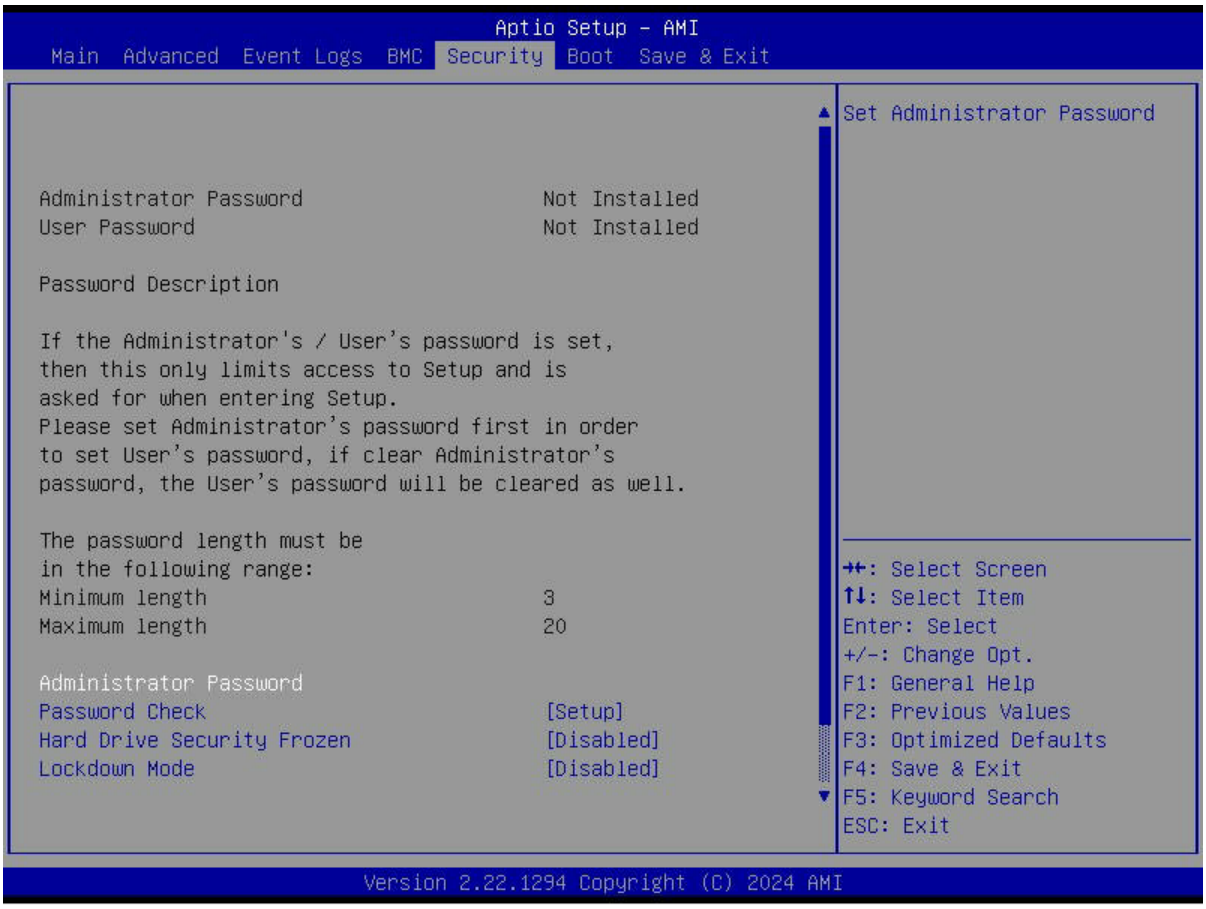



**Figure 8-5. Security UEFI BIOS Menu Screenshot**

**Disable Block Sid and Freeze Lock (Available when your storage devices support TCG)**

Select Enabled to allow SID authentication to be performed in TCG storage devices. The options are **Disabled** and Enabled.

The following information is displayed:

- Administrator Password
- User Password
- Password Description

**Administrator Password**

This feature indicates if an administrator password has been installed. Use this feature to set the administrator password, which is required to enter the BIOS Setup utility. The length of the password can be between three and 20 characters long.

**User Password (Available when "Administrator Password" has been set)**

This feature indicates if a user password has been installed. Use this feature to set the user password which is required to enter the BIOS Setup utility. The length of the password can be between three and 20 characters long.

**Password Check**

Select Setup for the system to check for a password upon entering the BIOS Setup utility. Select Always for the system to check for the passwords needed at bootup and upon entering the BIOS Setup utility. The options are **Setup** and Always.

**Hard Drive Security Frozen**

Select Enabled to freeze the Lock Security feature for HDD to protect key data in hard drives from being altered. The options are **Disabled** and Enabled.

**Lockdown Mode (Available when the DCMS key is activated)**

Select Enabled to support the Lockdown Mode, which prevents the existing data or keys stored in the system from being altered or changed in an effort to preserve system integrity and security. The options are **Disabled** and Enabled.

## Supermicro Security Erase Configuration Menu

### ►Supermicro Security Erase Configuration

Use this submenu to configure the Supermicro-proprietary Security Erase settings. When this submenu is selected, the following information is displayed. Please note that the order of the following information may differ based on the storage devices being detected.

- HDD Name: This feature displays the model name of the storage device that is detected by the BIOS.
- HDD Serial Number: This feature displays the serial number of the storage device that is detected by the BIOS.
- Security Mode: This feature displays the security mode of the storage device that is detected by the BIOS.
- Estimated Time: This feature displays the estimate time needed to perform the selected Security Erase features.
- HDD User Pwd Status: This feature indicates if a password has been set as a storage device user password, which enables configuring Supermicro Security Erase settings on this storage device.
- TCG Device Type: This feature displays the TCG device type detected by the system.

- Admin Pwd Status: This feature indicates if a password has been set as a storage device administrator password, which enables configuring Supermicro Security Erase settings on this storage device.

**Note:** This submenu is available when any storage device is detected by the BIOS. For more information about this feature, refer to our website.

**Security Function**

Select Set Password to set a storage device password which enables configuring the security settings of the storage device. Select Security Erase - Password to enter a storage device user password to enable erasing the password and the contents previously stored in the storage device. Select Security Erase - Without Password to use the manufacturer default password "111111111" as the storage device user password and enable erasing the contents of the storage device by using this default password. The options are **Disabled**, Set Password, Change Password, Clear Password, Security Erase - Password, Security Erase - PSID, and Security Erase - Without Password.

**Notes:**

- The option of Security Erase - PSID is based on the storage device support. PSID is the abbreviation for Physical Security Identification.
- The options of Change Password and Clear Password are available when "Password" below has been set.
- The option of Set Password is not available when "Password" below has been set.

**Password**

Use this feature to set the storage device user password, which enables configuring the Supermicro Security Erase settings by using this user password.

**New Password (Available when "Password" above has been set)**

Use this feature to set the new user password for the storage device, which enables configuring the Supermicro Security Erase settings by using this new user password.

## HDD Security Configuration Menu

### ►P4: (Storage device model name)

This submenu is available when the storage device is detected by the BIOS. Select this device. Press <Enter> and the following information is displayed:

- HDD Password Description:
- HDD PASSWORD CONFIGURATION:
- Security Supported:
- Security Enabled:
- Security Locked:
- Security Frozen:
- HDD User Pwd Status:
- HDD Master Pwd Status:

**Set User Password (Available when "Security Frozen:" above is No)**

Press <Enter> to set the HDD user password.

## Secure Boot Menu

### ►Secure Boot

The following information is displayed:

- System Mode
- Secure Boot

**Note:** For detailed instructions on configuring Security Boot settings, refer to the Security Boot Configuration User's Guide at https://www.supermicro.com/support/manuals.

**Secure Boot**

Select Enabled to configure Secure Boot settings. The options are **Disabled** and Enabled.

**Secure Boot Mode**

Use this feature to select the desired secure boot mode for the system. The options are Standard and **Custom**.

#### ►Enter Audit Mode

Select Ok to enter the Audit Mode workflow. It will result in erasing the Platform Key (PK) variables and resetting the system to the Setup/Audit Mode.

**Note:** This submenu is available when "Secure Boot Mode" is set to Custom.

### ►Enter Deployed Mode / Exit Deployed Mode

Select Ok to reset system to the User Mode or to the Deployed Mode.

**Note:** This submenu is available when "Secure Boot Mode" is set to Custom.

### ►Key Management

The following information is displayed:

- Vendor Keys

**Note:** This submenu is available when "Secure Boot Mode" is set to Custom.

**Provision Factory Defaults**

Select Enabled to install provision factory default settings after a platform reset while the system is in the Setup Mode. The options are **Disabled** and Enabled.

### ►Restore Factory Keys

Select Yes to restore manufacturer default keys to ensure system security. The options are **Yes** and No. Selecting Yes will reset system to the User Mode.

**Note:** This submenu is available when any secure keys have been installed.

### ►Reset To Setup Mode

This feature resets the system to the Setup Mode. The options are **Yes** and No.

**Note:** This submenu is available when any secure keys have been installed.

### ►Enroll Efi Image

This feature allows the Efi image to run in the secure boot mode, which will enroll the SHA256 Hash certificate of a PE image into the Authorized Signature Database (DB).

### ►Export Secure Boot Variables

This feature exports the NVRAM contents of secure boot variables to a storage device. The options are **Yes** and No.

**Note:** This submenu is available when any secure keys have been installed.

**Secure Boot variable / Size / Keys / Key Source**

### ►Platform Key (PK)

Use this feature to enter and configure a set of values to be used as platform firmware keys for the system. These values also indicate the sizes, key numbers, and the sources of the authorized signatures. Select Update to update the platform key.

### ►Key Exchange Keys (KEK)

Use this feature to enter and configure a set of values to be used as Key Exchange Keys for the system. These values also indicate the sizes, key numbers, and the sources of the authorized signatures. Select Update to update the Key Exchange Keys. Select Append to append the Key Exchange Keys.

### ►Authorized Signatures (db)

Use this feature to enter and configure a set of values to be used as Authorized Signatures for the system. These values also indicate the sizes, key numbers, and sources of the authorized signatures. Select Update to update the Authorized Signatures. Select Append to append the new Authorized Signatures.

### ►Forbidden Signatures (dbx)

Use this feature to enter and configure a set of values to be used as Forbidden Signatures for the system. These values also indicate sizes, key numbers, and key sources of the forbidden signatures. Select Update to update the Forbidden Signatures. Select Append to append the Forbidden Signature.

### ►Authorized TimeStamps (dbt)

Use this feature to set and save the timestamps for the Authorized Signatures, which will indicate the time when these signatures are entered into the system. These values also indicate sizes, keys, and key sources of the authorized timestamps. Select Update to update the Authorized TimeStamps. Select Append to append the Authorized TimeStamps.

### ►OsRecovery Signatures (dbr)

Use this feature to set and save the Authorized Signatures used for OS recovery. Select Update to update the OsRecovery Signatures. These values also indicate sizes, keys, and key sources of the OsRecovery Signatures. Select Append to append the OsRecovery Signatures.

## TCG Storage Security Configuration Menu

### ►(Storage device model name)

Select this device. Press <Enter> and the following information is displayed:

- TCG Storage Security Password Description:
- PASSWORD CONFIGURATION:
- Security Subsystem Class:
- Security Supported:
- Security Enabled:
- Security Locked:
- Security Frozen:
- User Pwd Status:
- Admin Pwd Status:

**Note:** This submenu is available when the storage device is compliant with TCG specifications.

**Set Admin Password**

Use this feature to set the administrator password for this storage device.

**Set User Password (Available when "Set Admin Password" has been set)**

Use this feature to set the user password for this storage device.

**Device Reset**

Use this feature to reset the password configuration for this storage device.

# 8.7 Boot

Use this menu to configure Boot settings.

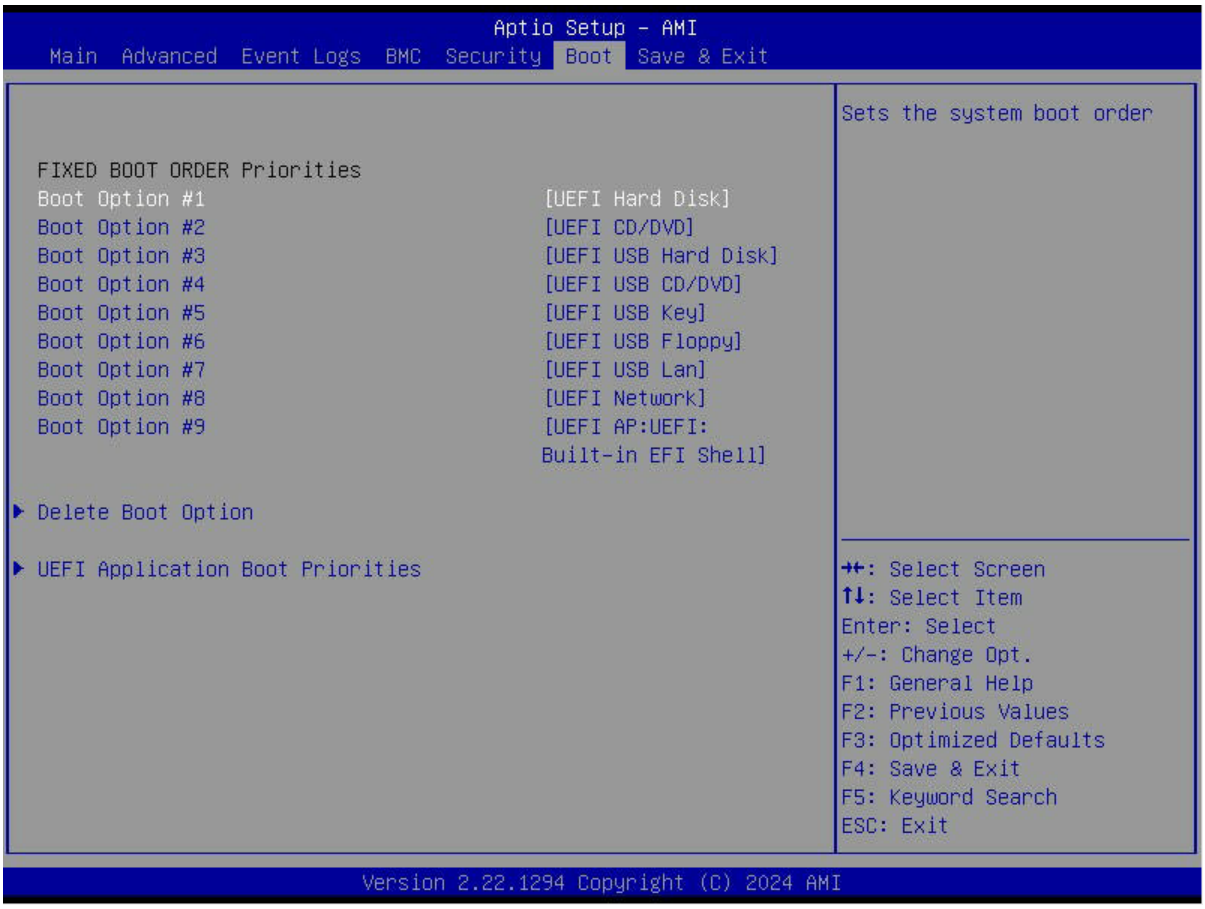



**Figure 8-6. Boot UEFI BIOS Menu Screenshot**

### FIXED BOOT ORDER Priorities

Use this feature to prioritize the order of a bootable device from which the system will boot. Press <Enter> on each item sequentially to select the device.

- Boot Option #1 – Boot Option #9

### ►Add New Boot Option

Use this feature to add a new boot option to the boot priority features for system boot.

**Note:** This submenu is available when any storage device is detected by the BIOS.

#### Add boot option

Use this feature to specify the name for the new boot option.

**Path for boot option**

Use this feature to enter the path for the new boot option in the format fsx:\path\filename.efi.

**Boot option File Path**

Use this feature to specify the file path for the new boot option.

**Create**

After setting the name and the file path for the boot option, press <Enter> to create the new boot option in the boot priority list.

### ►Delete Boot Option

Use this feature to select a boot device to delete from the boot priority list.

**Delete Boot Option**

Use this feature to remove an EFI boot option from the boot priority list.

### ►UEFI Application Boot Priorities

Use this feature to set the system boot order of detected devices.

## 8.8 Save & Exit

Select Save & Exit from the BIOS Setup screen to configure the settings below.

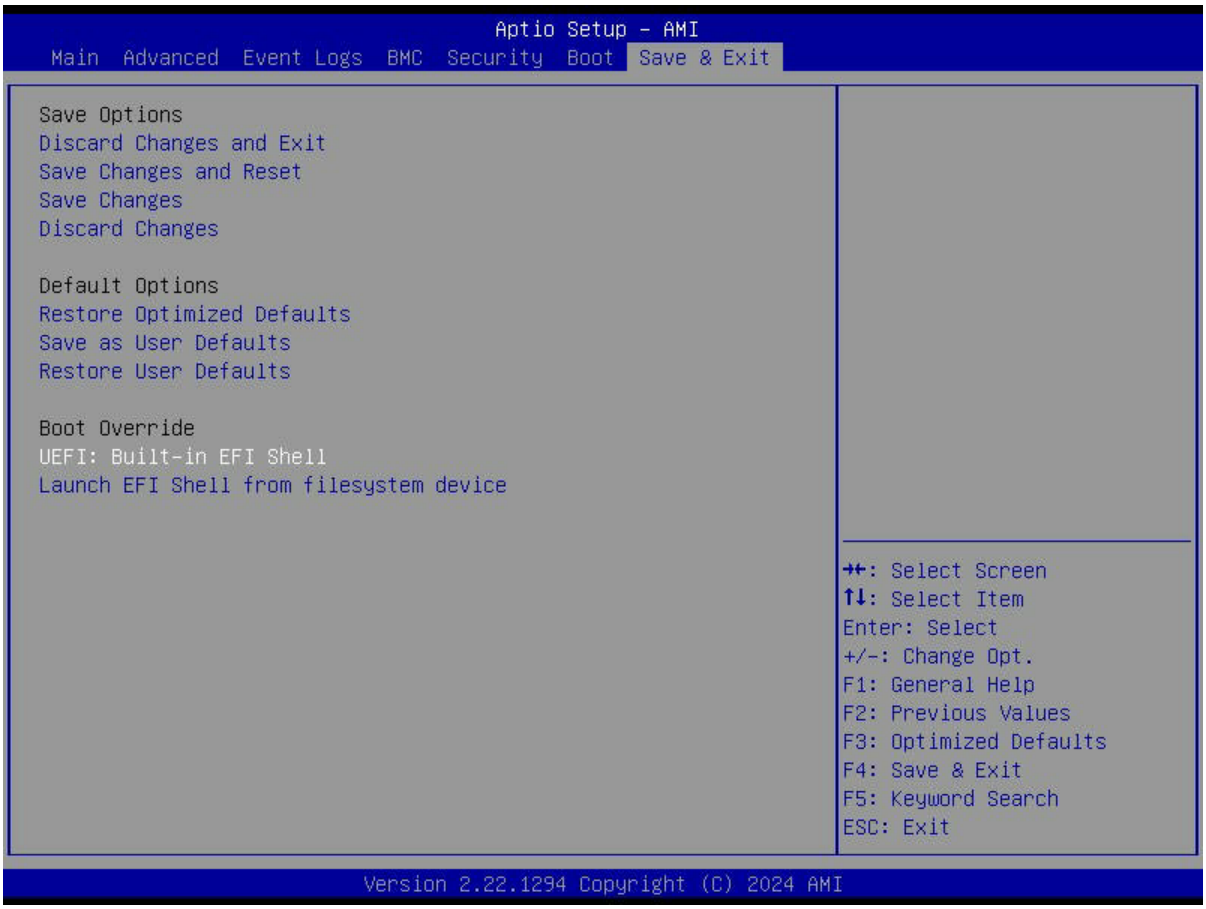



**Figure 8-7. Save & Exit UEFI BIOS Menu Screenshot**

### Save Options

#### Discard Changes and Exit

Use this feature to exit from the BIOS Setup utility without making any permanent changes to the system configuration and reboot the computer.

#### Save Changes and Reset

On completing the system configuration changes, use this feature to exit the BIOS Setup utility and reboot the computer for the new system configuration parameters to take effect.

#### Save Changes

On completing the system configuration changes, use this feature to save all changes made. This will not reset (reboot) the system.

### Discard Changes

Select this feature and press <Enter> to discard all changes made and return to the BIOS Setup utility.

### Default Options

### Restore Optimized Defaults

Select this feature and press <Enter> to load manufacturer optimized default settings, which are intended for maximum system performance but not for maximum stability.

**Note:** After pressing <Enter>, reboot the system for the changes to take effect, which ensures that this system has the optimized default settings.

### Save As User Defaults

Select this feature and press <Enter> to save all changes as the default values specified to the BIOS Setup utility for future use.

### Restore User Defaults

Select this feature and press <Enter> to retrieve user-defined default settings that have been saved previously.

### Boot Override

**Note:** Use this section to override the Boot priorities sequence in the Boot menu, and immediately boot the system with a device specified here instead of the one specified in the boot list. This is a one-time boot override.

### UEFI: Built-in EFI Shell

Use this feature to launch the built-in EFI shell environment.

### Launch EFI Shell from filesystem device

Use this feature to launch the EFI shell application (Shell.efi) from one of the available filesystem devices. A filesystem is a virtual, logical, or physical system for organizing, managing, and accessing the files and directories on devices such as SSDs, HDDs, or other storage devices.

# Appendix A:

# BIOS Codes

For information about BIOS codes for the SYS-222HA-TN server, refer to the following content.

## BIOS Error POST (Beep) Codes

During the Power-On Self-Test (POST) routines, which are performed each time the system is powered on, errors may occur.

Non-fatal errors are those which, in most cases, allow the system to continue the boot up process. The error messages normally appear on the screen.

*Fatal errors* are those which will not allow the system to continue the boot up process. If a fatal error occurs, you should consult with your system manufacturer for possible repairs.

These fatal errors are usually communicated through a series of audible beeps that can be heard on an external buzzer connected to JD1. The table shown below lists some common errors and their corresponding beep codes encountered by users.

| BIOS Beep (POST) Codes | | |
|---|---|---|
| **Beep Code** | **Error Message** | **Description** |
| 1 beep | Refresh | Circuits have been reset (Ready to power up) |
| 5 short, 1 long | Memory error | No memory detected in system |
| 5 short, 2 long | Display memory read/write error | Video adapter missing or with faulty memory |
| 1 long continuous | System OH | System overheat condition |

## Additional BIOS POST Codes

The AMI BIOS supplies additional checkpoint codes, which are documented online at https://www.supermicro.com/support/manuals ("AMI BIOS POST Codes User's Guide").

For information on AMI updates, refer to https://www.ami.com/products.

# Appendix B:

# Standardized Warning Statements for AC Systems

The following statements are industry standard warnings, provided to warn the user of situations which have the potential for bodily injury. Should you have questions or experience difficulty, contact Supermicro's Technical Support department for assistance. Only certified technicians should attempt to install or configure components.

Read this section in its entirety before installing or configuring components in the Supermicro SYS-222HA-TN server.

These warnings may also be found on our website at the following page:

https://www.supermicro.com/about/policies/safety_information.cfm

## Warning Definition



**Warning!** This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents.

警告の定義

この警告サインは危険を意味します。

人身事故につながる可能性がありますので、いずれの機器でも動作させる前に、

電気回路に含まれる危険性に注意して、標準的な事故防止策に精通して下さい。

此警告符号代表危险。

您正处于可能受到严重伤害的工作环境中。在您使用设备开始工作之前，必须充分意识到触电的危险，并熟练掌握防止事故发生的标准工作程序。请根据每项警告结尾的声明号码找到此设备的安全性警告说明的翻译文本。

此警告符號代表危險。

您正處於可能身體可能會受損傷的工作環境中。在您使用任何設備之前，請注意觸電的危險，並且要熟悉預防事故發生的標準工作程序。請依照每一注意事項後的號碼找到相關的翻譯說明內容。

Warnung

WICHTIGE SICHERHEITSHINWEISE

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu Verletzungen führen kann. Machen Sie sich vor der Arbeit mit Geräten mit den Gefahren elektrischer Schaltungen und den üblichen Verfahren zur Vorbeugung vor Unfällen vertraut. Suchen Sie mit der am Ende jeder Warnung angegebenen Anweisungsnummer nach der jeweiligen Übersetzung in den übersetzten Sicherheitshinweisen, die zusammen mit diesem Gerät ausgeliefert wurden.

BEWAHREN SIE DIESE HINWEISE GUT AUF.

INSTRUCCIONES IMPORTANTES DE SEGURIDAD

Este símbolo de aviso indica peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Al final de cada advertencia encontrará el número que le ayudará a encontrar el texto traducido en el apartado de traducciones que acompaña a este dispositivo.

GUARDE ESTAS INSTRUCCIONES.

IMPORTANTES INFORMATIONS DE SÉCURITÉ

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers liés aux circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions des avertissements figurant dans les consignes de sécurité traduites qui accompagnent cet appareil, référez-vous au numéro de l'instruction situé à la fin de chaque avertissement.

CONSERVEZ CES INFORMATIONS.

תקנון הצהרות אזהרה

הצהרות הבאות הן אזהרות על פי תקני התעשייה, על מנת להזהיר את המשתמש מפני חבלה

פיזית אפשרית. במידה ויש שאלות או היתקלות בבעיה כלשהי, יש ליצור קשר עם מחלקת תמיכה

טכנית של סופרמיקרו. טכנאים מוסמכים בלבד רשאים להתקין או להגדיר את הרכיבים.

יש לקרוא את הנספח במלואו לפני התקנת או הגדרת הרכיבים במארזי סופרמיקרו.

ا كً ف حالة وٌكي أى تتسبب ف اصابة جسذ ةٌ هذا الز هز عٌ خطز !تحذ زٌ.

قبل أى تعول على أي هعذات،كي على علن بالوخاطز ال اجٌوة عي الذوائز

الكهزبائ ةٍ

وكي على درا ةٌ بالووارسات النقائ ةٍ لو عٌ وقنع أي حادث

استخذم رقن الب إى الو صٌنص ف هًا ةٌ كل تحذ زٌ للعثٌر تزجوتها

안전을 위한 주의사항

경고!

이 경고 기호는 위험이 있음을 알려 줍니다. 작업자의 신체에 부상을 야기 할 수 있는 상태에 있게 됩니다. 모든 장비에 대한 작업을 수행하기 전에 전기회로와 관련된 위험요소들을 확인하시고 사전에 사고를 방지할 수 있도록 표준 작업절차를 준수해 주시기 바랍니다.

해당 번역문을 찾기 위해 각 경고의 마지막 부분에 제공된 경고문 번호를 참조하십시오

BELANGRIJKE VEILIGHEIDSINSTRUCTIES

Dit waarschuwings symbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij een elektrische installatie betrokken risico's en dient u op de hoogte te zijn van de standaard procedures om ongelukken te voorkomen. Gebruik de nummers aan het eind van elke waarschuwing om deze te herleiden naar de desbetreffende locatie.

BEWAAR DEZE INSTRUCTIES

## Installation Instructions

**Warning!** Read the installation instructions before connecting the system to the power source.

設置手順書

システムを電源に接続する前に、設置手順書をお読み下さい。

警告

将此系统连接电源前,请先阅读安装说明。

警告

將系統與電源連接前,請先閱讀安裝說明。

Warnung

Vor dem Anschließen des Systems an die Stromquelle die Installationsanweisungen lesen.

¡Advertencia!

Lea las instrucciones de instalación antes de conectar el sistema a la red de alimentación.

Attention

Avant de brancher le système sur la source d'alimentation, consulter les directives d'installation.

יש לקרוא את הוראות התקנה לפני חיבור המערכת למקור מתח.

اقر إرشادات التركيب قبل توصيل النظام إلى مصدر للطاقة

시스템을 전원에 연결하기 전에 설치 안내를 읽어주십시오.

Waarschuwing

Raadpleeg de installatie-instructies voordat u het systeem op de voedingsbron aansluit.

## Circuit Breaker

**Warning!** This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 250 V, 20 A.

サーキット・ブレーカー

この製品は、短絡(過電流)保護装置がある建物での設置を前提としています。

保護装置の定格が250 V、20 Aを超えないことを確認下さい。

警告

此产品的短路(过载电流)保护由建筑物的供电系统提供,确保短路保护设备的额定电流不大于 250V,20A。

警告

此產品的短路(過載電流)保護由建築物的供電系統提供,確保短路保護設備的額定電流不大於 250V,20A。

Warnung

Dieses Produkt ist darauf angewiesen, dass im Gebäude ein Kurzschluss- bzw. Überstromschutz installiert ist. Stellen Sie sicher, dass der Nennwert der Schutzvorrichtung nicht mehr als: 250 V, 20 A beträgt.

¡Advertencia!

Este equipo utiliza el sistema de protección contra cortocircuitos (o sobrecorrientes) del edificio. Asegúrese de que el dispositivo de protección no sea superior a: 250 V, 20 A.

Attention

Pour ce qui est de la protection contre les courts-circuits (surtension), ce produit dépend de l'installation électrique du local. Vérifiez que le courant nominal du dispositif de protection n'est pas supérieur à :250 V, 20 A.

מוצר זה מסתמך על הגנה המותקנת במבנים למניעת קצר חשמלי. יש לוודא כי

המכשיר המגן מפני הקצר החשמלי הוא לא יותר מ-250V, 20A

هذا المنتج يعتمد على معداث الحمايت مه الدوائر القصيرة التي تم تثبيتها في

المبنى

تأكد من أن تقييم الجهاز الوقائي ليس أكثر من : 20A, 250V

경고!

이 제품은 전원의 단락(과전류)방지에 대해서 전적으로 건물의 관련 설비에 의존합니다. 보호장치의 정격이 반드시 250V(볼트), 20A(암페어)를 초과하지 않도록 해야 합니다.

Waarschuwing

Dit product is afhankelijk van de kortsluitbeveiliging (overspanning) van uw electrische installatie. Controleer of het beveiligde aparaat niet groter gedimensioneerd is dan 250V, 20A.

## Power Disconnection Warning



**Warning!** The system must be disconnected from all sources of power and the power cord removed from the power supply module(s) before accessing the chassis interior to install or remove system components (except for hot-swap components).

電源切断の警告

システムコンポーネントの取り付けまたは取り外しのために、シャーシー内部にアクセスするには、

システムの電源はすべてのソースから切断され、電源コードは電源モジュールから取り外す必要があります。

警告

在你打开机箱并安装或移除内部器件前,必须将系统完全断电,并移除电源线。

警告

在您打開機殼安裝或移除內部元件前,必須將系統完全斷電,並移除電源線。

Warnung

Das System muss von allen Quellen der Energie und vom Netzanschlusskabel getrennt sein, das von den Spg.Versorgungsteilmodulen entfernt wird, bevor es auf den Chassisinnenraum zurückgreift, um Systemsbestandteile anzubringen oder zu entfernen.

¡Advertencia!

El sistema debe ser disconnected de todas las fuentes de energía y del cable eléctrico quitado de los módulos de fuente de alimentación antes de tener acceso el interior del chasis para instalar o para quitar componentes de sistema.

Attention

Le système doit être débranché de toutes les sources de puissance ainsi que de son cordon d'alimentation secteur avant d'accéder à l'intérieur du chassis pour installer ou enlever des composants de systéme.

אזהרה מפני ניתוק חשמלי

אזהרה!

יש לנתק את המערכת מכל מקורות החשמל ויש להסיר את כבל החשמלי מהספק

לפני גישה לחלק הפנימי של המארז לצורך התקנת או הסרת רכיבים.

يجب فصم اننظاو من جميع مصادر انطاقت وإزانت سهك انكهرباء من وحدة امداد

انطاقت قبم

انصل إنى انمناطق انداخهيت نههيكم نتثبيج أو إزانت مكنناث الجهاز

경고!

시스템에 부품들을 장착하거나 제거하기 위해서는 섀시 내부에 접근하기 전에 반드시 전원 공급장치로부터 연결되어있는 모든 전원과 전기코드를 분리해주어야 합니다.

Waarschuwing

Voordat u toegang neemt tot het binnenwerk van de behuizing voor het installeren of verwijderen van systeem onderdelen, dient u alle spanningsbronnen en alle stroomkabels aangesloten op de voeding(en) van de behuizing te verwijderen

## Equipment Installation

**Warning!** Only authorized personnel and qualified service persons should be allowed to install, replace, or service this equipment.

機器の設置

トレーニングを受け認定された人だけがこの装置の設置、交換、またはサービスを許可されています。

警告

只有经过培训且具有资格的人员才能进行此设备的安装、更换和维修。

警告

只有經過受訓且具資格人員才可安裝、更換與維修此設備。

Warnung

Nur autorisiertes Personal und qualifizierte Servicetechniker dürfen dieses Gerät installieren, austauschen oder warten.

¡Advertencia!

Sólo el personal autorizado y el personal de servicio calificado deben poder instalar, reemplazar o dar servicio a este equipo.

Attention

Seul le personnel autorisé et le personnel de maintenance qualifié doivent être autorisés à installer, remplacer ou entretenir cet équipement.

אזהרה!

יש לאפשר רק צוות מורשה ואנשי שירות מוסמכים להתקין, להחליף או לטפל בציוד זה

.ينبغي السماح فقط للموظفين المعتمدين وأفراد الخدمة المؤهلين بتركيب هذا الجهاز أو استبداله أو صيانته

경고!

승인된 직원과 자격을 갖춘 서비스 담당자만이 이 장비를 설치, 교체 또는 서비스할 수 있습니다.

Waarschuwing

Alleen geautoriseerd personeel en gekwalificeerd onderhoudspersoneel mag deze apparatuur installeren, vervangen of onderhouden.

## Rack Stability Hazard



**Warning!** Stability hazard. The rack may tip over causing serious personal injury. Before extending the rack to the installation position, read the installation instructions. Do not put any load on the slide-rail mounted equipment in the installation position. Do not leave the slide-rail mounted equipment in the installation position.

ファンの警告

安定性に危険があります。ラックが転倒して、重大な人身事故を引き起こす可能性があります。ラックを設置位置まで伸ばす前に、設置手順をお読みください。設置位置にあるスライドレールに取り付けられた機器に負荷をかけないでください。スライドレールに取り付けられた機器を設置位置に放置しないでください。

警告

稳定性危险。机架可能会翻倒，造成严重的人身伤害。在将机架延伸到安装位置之前，请阅读安装说明。请勿在安装位置对滑轨安装的设备施加任何负载。请勿将滑轨安装的设备留在安装位置。

警告

穩定性危險。機架可能會翻倒，造成嚴重的人身傷害。將機架延伸至安裝位置前，請先閱讀安裝說明。請勿在安裝位置的滑軌安裝設備上放置任何負載。請勿將滑軌安裝設備留在安裝位置。

Warnung

Gefahr der Instabilität. Das Rack kann umkippen und schwere Verletzungen verursachen. Lesen Sie die Installationsanweisungen, bevor Sie das Rack in die Einbauposition ausfahren. Belasten Sie die auf den Gleitschienen montierten Geräte nicht in der Einbauposition. Lassen Sie die auf den Gleitschienen montierten Geräte nicht in der Einbauposition.

¡Advertencia!

Peligro de inestabilidad. El rack podría volcarse y causar lesiones personales graves. Antes de extender el rack a la posición de instalación, lea las instrucciones de instalación. No coloque ninguna carga sobre el equipo montado sobre rieles deslizantes en la posición de instalación. No deje el equipo montado sobre rieles deslizantes en la posición de instalación.

Attention

Danger d’instabilité. Le rack peut basculer et provoquer des blessures corporelles graves. Avant d’étendre le rack en position d’installation, lire les instructions d’installation. Ne pas charger l’équipement monté sur rail de glissière en position d’installation. Ne pas laisser l’équipement monté sur rail de glissière en position d’installation.

אזהרה!

סכנת חוסר יציבות

המתלה עלול להתהפך ולגרום לפציעה חמורה

לפני הארכת המתלה למצב ההתקנה, קרא את הוראות ההתקנה

אין להעמיס כל עומס על הציוד המותקן על מסילת ההחלקה במצב ההתקנה

אל תשאיר את הציוד המותקן על מסילת ההחלקה במצב ההתקנה

تحذير!

خطر عدم الاستقرار.

قد ينقلب الرف مسبباً إصابات جسدية خطيرة.

قبل تمديد الرف إلى موضع التركيب، اقرأ تعليمات التركيب.

لا تضع أي حمولة على الجهاز المثبت على سكة الانزلاق في موضع التركيب.

لا تترك الجهاز المثبت على سكة الانزلاق في موضع التركيب.

경고!

안정성 위험. 랙이 넘어져 심각한 개인 부상을 입을 수 있습니다. 랙을 설치 위치까지 확장하기 전에 설치 지침을 읽으십시오. 설치 위치에서 슬라이드 레일 장착 장비에 하중을 가하지 마십시오. 슬라이드 레일 장착 장비를 설치 위치에 두지 마십시오.

Waarschuwing

Gevaar voor instabiliteit. Het rek kan kantelen en ernstig persoonlijk letsel veroorzaken. Lees de installatie-instructies voordat u het rek uitschuift naar de installatiepositie. Plaats geen last op de op de glijrail gemonteerde apparatuur in de installatiepositie. Laat de op de glijrail gemonteerde apparatuur niet in de installatiepositie staan.

## Restricted Area



**Warning!** This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security. (This warning does not apply to workstations).

アクセス制限区域

このユニットは、アクセス制限区域に設置されることを想定しています。

アクセス制限区域は、特別なツール、鍵と錠前、その他のセキュリティの手段を用いてのみ出入りが可能です。

警告

此部件应安装在限制进出的场所，限制进出的场所指只能通过使用特殊工具、锁和钥匙或其它安全手段进出的场所。

警告

此裝置僅限安裝於進出管制區域，進出管制區域係指僅能以特殊工具、鎖頭及鑰匙或其他安全方式才能進入的區域。

Warnung

Diese Einheit ist zur Installation in Bereichen mit beschränktem Zutritt vorgesehen. Der Zutritt zu derartigen Bereichen ist nur mit einem Spezialwerkzeug, Schloss und Schlüssel oder einer sonstigen Sicherheitsvorkehrung möglich.

¡Advertencia!

Esta unidad ha sido diseñada para instalación en áreas de acceso restringido. Sólo puede obtenerse acceso a una de estas áreas mediante la utilización de una herramienta especial, cerradura con llave u otro medio de seguridad.

Attention

Cet appareil doit être installée dans des zones d'accès réservés. L'accès à une zone d'accès réservé n'est possible qu'en utilisant un outil spécial, un mécanisme de verrouillage et une clé, ou tout autre moyen de sécurité.

אזור עם גישה מוגבלת

אזהרה!

יש להתקין את היחידה באזורים שיש בהם הגבלת גישה. הגישה ניתנת בעזרת

'כלי אבטחה בלבד (מפתח, מנעול וכד.)

اتخصيص هذه انحذة نترك بُها ف مناطق محظورة تم .

مَكن انصل إن منطقت محظورة فقط من خلال استخذاو أداة خاصت،

أو أ وس هُت أخري نلالأمما قفم ومفتاح

경고!

이 장치는 접근이 제한된 구역에 설치하도록 되어있습니다. 특수도구, 잠금 장치 및 키, 또는 기타 보안 수단을 통해서만 접근 제한 구역에 들어갈 수 있습니다.

Waarschuwing

Dit apparaat is bedoeld voor installatie in gebieden met een beperkte toegang. Toegang tot dergelijke gebieden kunnen alleen verkregen worden door gebruik te maken van speciaal gereedschap, slot en sleutel of andere veiligheidsmaatregelen.

## Battery Handling



**CAUTION** There is risk of explosion if the battery is replaced by an incorrect type. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

電池の取り扱い

バッテリーを間違ったタイプに交換すると爆発の危険があります。交換する電池はメーカーが推奨する型、または同等のものを使用下さい。使用済電池は製造元の指示に従って処分して下さい。

警告

如果更换的电池类型不正确。请只使用同类电池或制造商推荐的功能相当的电池更换原有电池。请按制造商的说明处理废旧电池。

警告

如果更換的電池類型不正確。請使用製造商建議之相同或功能相當的電池更換原有電池。請按照製造商的說明指示處理廢棄舊電池。

WARNUNG

Es besteht Explosionsgefahr, wenn die Batterie durch einen falschen Typ ersetzt wird. Ersetzen Sie die Batterie nur durch den gleichen oder vom Hersteller empfohlenen Batterietyp. Entsorgen Sie die benutzten Batterien nach den Anweisungen des Herstellers.

ADVERTENCIA

Existe riesgo de explosión si la batería se reemplaza por un tipo incorrecto. Reemplazar la batería exclusivamente con el mismo tipo o el equivalente recomendado por el fabricante. Desechar las baterías gastadas según las instrucciones del fabricante.

ATTENTION

Il existe un risque d'explosion si la batterie est remplacée par un type incorrect. Ne la remplacer que par une pile de type semblable ou équivalent, recommandée par le fabricant. Jeter les piles usagées conformément aux instructions du fabricant.

אזהרה!

קיימת סכנת פיצוץ אם הסוללה תוחלף בסוג שגוי. יש להחליף

את הסוללה בסוג התואם מחברת יצרן מומלצת.

סילוק הסוללות המשומשות יש לבצע לפי הוראות היצרן.

هناك خطر الانفجار إذا تم استبدال البطارية بنوع غير صحيح.

اسحبذال البطارية

فقط بنفس النمع أو ما يعادلها مما أوصث به الشرمة المصنعة

جخلص من البطاريات المسحعملة وفقا لحعليمات الشرمة الصانعة

경고!

배터리를 잘못된 종류로 교체하면 폭발의 위험이 있습니다. 기존 배터리와 동일하거나 제조사에서 권장하는 동등한 종류의 배터리로만 교체해야 합니다. 제조사의 안내에 따라 사용된 배터리를 처리하여 주십시오.

WAARSCHUWING

Er bestaat explosiegevaar als de batterij wordt vervangen door een verkeerd type. Vervang de batterij slechts met hetzelfde of een equivalent type die door de fabrikant aanbevolen wordt. Gebruikte batterijen dienen overeenkomstig fabrieksvoorschriften afgevoerd te worden.

## Redundant Power Supplies



**Warning!** This unit might have more than one power supply connection. All connections must be removed to de-energize the unit.

冗長電源装置

このユニットは複数の電源装置が接続されている場合があります。

ユニットの電源を切るためには、すべての接続を取り外さなければなりません。

警告

此部件连接的电源可能不止一个，必须将所有电源断开才能停止给该部件供电。

警告

此裝置連接的電源可能不只一個，必須切斷所有電源才能停止對該裝置的供電。

Warnung

Dieses Gerät kann mehr als eine Stromzufuhr haben. Um sicherzustellen, dass der Einheit kein trom zugeführt wird, müssen alle Verbindungen entfernt werden.

¡Advertencia!

Puede que esta unidad tenga más de una conexión para fuentes de alimentación. Para cortar por completo el suministro de energía, deben desconectarse todas las conexiones.

Attention

Cette unité peut avoir plus d'une connexion d'alimentation. Pour supprimer toute tension et tout courant électrique de l'unité, toutes les connexions d'alimentation doivent être débranchées.

אם קיים יותר מספק אחד

אזהרה!

ליחדה יש יותר מחיבור אחד של ספק. יש להסיר את כל החיבורים על מנת לרוקן

את היחידה.

قد يكون لهذا الجهاز عدة اتصالات بوحدات امداد الطاقة .

يجب إزالة كافة الاتصالات لعسل الوحدة عن الكهرباء

경고!

이 장치에는 한 개 이상의 전원 공급 단자가 연결되어 있을 수 있습니다. 이 장치에 전원을 차단하기 위해서는 모든 연결 단자를 제거해야만 합니다.

Waarschuwing

Deze eenheid kan meer dan één stroomtoevoeraansluiting bevatten. Alle aansluitingen dienen verwijderd te worden om het apparaat stroomloos te maken.

## Backplane Voltage



**Warning!** Hazardous voltage or energy is present on the backplane when the system is operating. Use caution when servicing.

バックプレーンの電圧

システムの稼働中は危険な電圧または電力が、バックプレーン上にかかっています。

修理する際には注意ください。

警告

当系统正在进行时，背板上有很危险的电压或能量，进行维修时务必小心。

警告

當系統正在進行時，背板上有危險的電壓或能量，進行維修時務必小心。

Warnung

Wenn das System in Betrieb ist, treten auf der Rückwandplatine gefährliche Spannungen oder Energien auf. Vorsicht bei der Wartung.

¡Advertencia!

Cuando el sistema está en funcionamiento, el voltaje del plano trasero es peligroso. Tenga cuidado cuando lo revise.

Attention

Lorsque le système est en fonctionnement, des tensions électriques circulent sur le fond de panier. Prendre des précautions lors de la maintenance.

מתח בפנל האחורי

אזהרה!

קיימת סכנת מתח בפנל האחורי בזמן תפעול המערכת. יש להיזהר במהלך

העבודה.

هناك خطز مه التيار الكهزبائي أوالطاقة المىجىدة على اللىحة

عندما يكىن النظام يعمل كه حذرا عند خدمة هذا الجهاس

경고!

시스템이 동작 중일 때 후면판 (Backplane)에는 위험한 전압이나 에너지가 발생 합니다. 서비스 작업 시 주의하십시오.

Waarschuwing

Een gevaarlijke spanning of energie is aanwezig op de backplane wanneer het systeem in gebruik is. Voorzichtigheid is geboden tijdens het onderhoud.

## Comply with Local and National Electrical Codes



**Warning!** Installation of the equipment must comply with local and national electrical codes.

地方および国の電気規格に準拠

機器の取り付けはその地方および国の電気規格に準拠する必要があります。

警告

设备安装必须符合本地与本国电气法规。

警告

設備安裝必須符合本地與本國電氣法規。

Warnung

Die Installation der Geräte muss den Sicherheitsstandards entsprechen.

¡Advertencia!

La instalacion del equipo debe cumplir con las normas de electricidad locales y nacionales.

Attention

L'équipement doit être installé conformément aux normes électriques nationales et locales.

תיאום חוקי החשמל הארצי

אזהרה!

התקנת הציוד חייבת להיות תואמת לחוקי החשמל המקומיים והארציים.

تركيب المعدات الكهربائية يجب أن يمتثل للقناويه المحلية والبطنية المتعلقة

بالكهرباء

경고!

현 지역 및 국가의 전기 규정에 따라 장비를 설치해야 합니다.

Waarschuwing

Bij installatie van de apparatuur moet worden voldaan aan de lokale en nationale elektriciteitsvoorschriften.

## Product Disposal

**Warning!** Ultimate disposal of this product should be handled according to all national laws and regulations.

製品の廃棄

この製品を廃棄処分する場合、国の関係する全ての法律・条例に従い処理する必要があります。

警告

本产品的废弃处理应根据所有国家的法律和规章进行。

警告

本產品的廢棄處理應根據所有國家的法律和規章進行。

Warnung

Die Entsorgung dieses Produkts sollte gemäß allen Bestimmungen und Gesetzen des Landes erfolgen.

¡Advertencia!

Al deshacerse por completo de este producto debe seguir todas las leyes y reglamentos nacionales.

Attention

La mise au rebut ou le recyclage de ce produit sont généralement soumis à des lois et/ou directives de respect de l'environnement. Renseignez-vous auprès de l'organisme compétent.

סילוק המוצר

אזהרה!

סילוק סופי של מוצר זה חייב להיות בהתאם להנחיות וחוקי המדינה.

عند التخلص النهائي من هذا المنتج ينبغي التعامل معه وفقا لجميع القانين واللنائح النطنية

경고!

이 제품은 해당 국가의 관련 법규 및 규정에 따라 폐기되어야 합니다.

Waarschuwing

De uiteindelijke verwijdering van dit product dient te geschieden in overeenstemming met alle nationale wetten en reglementen.

## Fan Warning

**Warning!** Hazardous moving parts. Keep away from moving fan blades. The fans might still be turning when you remove the fan assembly from the chassis. Keep fingers, screwdrivers, and other objects away from the openings in the fan assembly's housing




ファンの警告

警告！ 回転部品に注意。運転中は回転部(羽根)に触れないでください。シャーシから冷却ファン装置を取り外した際、ファンがまだ回転している可能性があります。ファンの開口部に、指、ドライバー、およびその他のものを近づけないで下さい。

警告!

警告！ 危险的可移动性零件。请务必与转动的风扇叶片保持距离。当您从机架移除风扇装置，风扇可能仍在转动。小心不要将手指、螺丝起子和其他物品太靠近风扇

警告

危險的可移動性零件。請務必與轉動的風扇葉片保持距離。當您從機架移除風扇裝置，風扇可能仍在轉動。小心不要將手指、螺絲起子和其他物品太靠近風扇。

Warnung

Gefährlich Bewegende Teile. Von den bewegenden Lüfterblätter fern halten. Die Lüfter drehen sich u. U. noch, wenn die Lüfterbaugruppe aus dem Chassis genommen wird. Halten Sie Finger, Schraubendreher und andere Gegenstände von den Öffnungen des Lüftergehäuses entfernt.

¡Advertencia!

Riesgo de piezas móviles. Mantener alejado de las aspas del ventilador. Los ventiladores podran dar vuelta cuando usted quite ell montaje del ventilador del chasis. Mandtenga los dedos, los destornilladores y todos los objetos lejos de las aberturas del ventilador.

Attention

Pieces mobiles dangereuses. Se tenir a l’ecart des lames du ventilateur Il est possible que les ventilateurs soient toujours en rotation lorsque vous retirerez le bloc ventilateur du châssis. Prenez garde à ce que doigts, tournevis et autres objets soient éloignés du logement du bloc ventilateur.

אזהרה!

חלקים נעים מסוכנים. התרחק מלהבי המאוורר בפעולהכאשר מסירים את חלקי

המאוורר מהמארז, יתכן והמאוררים עדיין עובדים. יש להרחיק למרחק בטוח את

האצבעות וכלי עבודה שונים מהפתחים בתוך המאוורר

تحذير! أجزاء متحركة خطرة. ابتعد عن شفرات المروحة المتحركة.من الممكن أن

المراوح لا تزال تدور عند إزالة كتلة المروحة من الهيكل يجب إبقاء الأصابع

ومفكات البراغي وغيرها من الأشياء بعيدا عن الفتحات في كتلة المروحة.

경고!

움직이는 위험한 부품. 회전하는 송풍 날개에 접근하지 마세요. 섀시로부터 팬 조립품을 제거할 때 팬은 여전히 회전하고 있을 수 있습니다. 팬 조림품 외관의 열려있는 부분들로부터 손가락 및 스크류드라이버, 다른 물체들이 가까이 하지 않도록 배치해 주십시오.

Waarschuwing

Gevaarlijk bewegende onderdelen. Houd voldoende afstand tot de bewegende ventilatorbladen. Het is mogelijk dat de ventilator nog draait tijdens het verwijderen van het ventilatorsamenstel uit het chassis. Houd uw vingers, schroevendraaiers en eventuele andere voorwerpen uit de buurt van de openingen in de ventilatorbehuizing.

## Power Cable and AC Adapter



**Warning!** When installing the product, use the provided or designated connection cables, power cables and AC adaptors. Using any other cables and adaptors could cause a malfunction or a fire. Electrical Appliance and Material Safety Law prohibits the use of UL or CSA -certified cables (that have UL/CSA shown on the cord) for any other electrical devices than products designated by Supermicro only.

電源コードとACアダプター

製品を設置する場合、提供または指定および購入された接続ケーブル、電源コードとACアダプターを該当する地域の条例や安全基準に適合するコードサイズやプラグと共に使用下さい。他のケーブルやアダプタを使用すると故障や火災の原因になることがあります。

電気用品安全法は、ULまたはCSA認定のケーブル(UL/CSAマークがコードに表記)をSupermicroが指定する製品以外に使用することを禁止しています。

警告

安装此产品时,请使用本身提供的或指定的或采购的连接线,电源线和电源适配器,包含遵照当地法规和安全要求的合规的电源线尺寸和插头.使用其它线材或适配器可能会引起故障或火灾。除了Supermicro所指定的产品,电气用品和材料安全法律规定禁止使用未经UL或CSA认证的线材。(线材上会显示UL/CSA符号)。

警告

安裝此產品時,請使用本身提供的或指定的或採購的連接線,電源線和電源適配器,包含遵照當地法規和安全要求的合規的電源線尺寸和插頭.使用其它線材或適配器可能會引起故障或火災。除了Supermicro所指定的產品,電氣用品和材料安全法律規定禁止使用未經UL或CSA認證的線材。(線材上會顯示UL/CSA符號)。

Warnung

Nutzen Sie beim Installieren des Produkts ausschließlich die von uns zur Verfügung gestellten Verbindungskabeln, Stromkabeln und/oder Adapater, die Ihre örtlichen Sicherheitsstandards einhalten. Der Gebrauch von anderen Kabeln und Adapter können Fehlfunktionen oder Feuer verursachen. Die Richtlinien untersagen das Nutzen von UL oder CAS zertifizierten Kabeln (mit UL/CSA gekennzeichnet), an Geräten oder Produkten die nicht mit Supermicro gekennzeichnet sind.

¡Advertencia!

Cuando instale el producto, utilice la conexión provista o designada o procure cables, Cables de alimentación y adaptadores de CA que cumplan con los códigos locales y los requisitos de seguridad, incluyendo el tamaño adecuado del cable y el enchufe. El uso de otros cables y adaptadores podría causar un mal funcionamiento o un incendio. La Ley de Seguridad de Aparatos Eléctricos y de Materiales prohíbe El uso de cables certificados por UL o CSA (que tienen el certificado UL / CSA en el código) para cualquier otros dispositivos eléctricos que los productos designados únicamente por Supermicro.

Attention

Lors de l'installation du produit, utilisez les cables de connection fournis ou désigné ou achetez des cables, cables de puissance et adaptateurs respectant les normes locales et les conditions de securite y compris les tailles de cables et les prises electriques appropries. L'utilisation d'autres cables et adaptateurs peut provoquer un dysfonctionnement ou un incendie. Appareils électroménagers et la Loi sur la Sécurité Matériel interdit l'utilisation de câbles certifies- UL ou CSA (qui ont UL ou CSA indiqué sur le code) pour tous les autres appareils électriques sauf les produits désignés par Supermicro seulement.

AC ימאתמו ם"ילמשח ם"ילבכ

הרהזא!

ררוצל ומאתוה וא ושכרנ רשא AC ם"ימאתמו ם"יקפס ,ם"ילבכב שמתשהל שי ,רצומה תא ם"יניקתמ רשאכ לכב שומיש . עקתהו לבכה לש הנוכנ הדימ ללוכ ,תוימוקמה תוחיטבה תושירדל ומאתוה רשאו ,הנקתהה למשחה ירישכמב שומישה יקוחל מאתהב .ילמשח רצק וא הלקתל מורגל לולע ,רחא גוסמ מאתמ וא לבכ לש דוק מהילע עיפומ רשאכ) CSA- ב וא UL - ב מיכמסומה ם"ילבכב שמתשהל רוסיא ם"ייק ,תוחיטבה יקוחו דבלב Supermicro י"ע מאתוה רשא רצומב קר אלא ,רחא ילמשח רצומ לכ רובע UL/CSA).

تالباكلا ءارشب مق وأ ةددحملا وأ ةرفوتملا تاليصوتلا مادختساب مق ،جتنملا بيكرت دنع

كلذ يف امب ةيلحملا ةمالسلا تابلطتمو نيناوقب مازتلالا عم ددرتملا رايتلا تالوحمو ةيئابرهكلا

قيرح وأ لطع يف ببستي دق برخأ تالوحمو تالباك يأ مادختسا .ميلسلا سباقلاو لصوملا مجح.

CSA وأ UL لبق نم ةدمتعملا تالباكلا مادختسا تادعملاو ةيئابرهكلا ةزهجألل ةمالسلا نوناق رظحي

Supermicro لبق نم ةددحملاو ةينعملا تاجتنملا ريغ برخأ تادعم يأ عم (UL/CSA) ةمالع لمحت يتلاو.

전원 케이블 및 AC 어댑터

경고! 제품을 설치할 때 현지 코드 및 적절한 굵기의 코드와 플러그를 포함한 안전 요구 사항을 준수하여 제공되거나 지정된 연결 혹은 구매 케이블, 전원 케이블 및 AC 어댑터를 사용하십시오.

다른 케이블이나 어댑터를 사용하면 오작동이나 화재가 발생할 수 있습니다. 전기 용품 안전법은 UL 또는 CSA 인증 케이블 (코드에 UL / CSA가 표시된 케이블)을 Supermicro 가 지정한 제품 이외의 전기 장치에 사용하는 것을 금지합니다.

Stroomkabel en AC-Adapter

Waarschuwing! Bij het aansluiten van het Product uitsluitend gebruik maken van de geleverde Kabels of een andere geschikte aan te schaffen Aansluitmethode, deze moet altijd voldoen aan de lokale voorschriften en veiligheidsnormen, inclusief de juiste kabeldikte en stekker. Het gebruik van niet geschikte Kabels en/of Adapters kan een storing of brand veroorzaken. Wetgeving voor Elektrische apparatuur en Materiaalveiligheid verbied het gebruik van UL of CSA -gecertificeerde Kabels (met UL/CSA in de code) voor elke andere toepassing dan de door Supermicro hiervoor beoogde Producten.

# Appendix C:

# System Specifications

| |
|---|
| **Processors** |
| Intel® Xeon® 6900-series processors with P-cores that supports Dual Socket BR (LGA-7529) |
| CPU TDP supports up to 500 W TDP CPUs (air cooled or liquid cooled) |
| **Chipset** |
| System on Chip |
| **BIOS** |
| AMI 64 MB SPI Flash |
| **Memory** |
| 24 DIMM slots that support up to 6 TB of RDIMM DDR5 ECC memory with speeds of up to 6400 MT/s, or up to 6 TB of MRDIMM DDR5 ECC memory with speeds of up to 8800 MT/s |
| **Storage Drives** |
| Default: Eight front hot-swap 2.5" NVMe*/SAS*/SATA* drive bays |
| Option A: 16 front hot-swap 2.5" NVMe*/SAS*/SATA* drive bays |
| Option B: 24 front hot-swap 2.5" NVMe*/SAS*/SATA* drive bays |
| *NVMe/SAS/SATA support may require additional storage controller and/or cables, please see the optional parts list for details. |
| **PCI Expansion Slots** |
| Up to four CXL 2.0 x16/x8 devices |
| Option A*: |
| Four PCIe 5.0 x16 FH/10.5"L double-width slots |
| Two PCIe 5.0 x16 AIOM slots (OCP 3.0 compatible) |
| Option B*: |
| Eight PCIe 5.0 x8 (in x16) FH/10.5"L slots |
| Two PCIe 5.0 x16 AIOM slots (OCP 3.0 compatible) |
| *Requires additional parts, please see the optional parts list for details. For more details on PCIe slot configuration options, please refer to the"Expansion Slot Configurations" on page 85. |
| **Input/Output** |
| LAN: One RJ45 1 GbE dedicated BMC LAN port |
| USB: Two USB 3.0 ports (rear) |
| Video: One VGA port |
| **Motherboard** |
| X14DBM-AP; (WxL) 17" x 15.565" (43.18 x 39.54 cm) |
| **Chassis** |
| CSE-HS201-R000NFP; 2U rackmount; (WxHxD) 3.5" x 17.2" x 31.74" (88.9 x 437 x 806.2 mm) |

| |
|---|
| **System Cooling** |
| Six counter-rotating 60 x 60 x 56-mm fans |
| Direct-to-chip cold plate (optional) |
| **Power Supply** |
| Two 2600 W redundant (1 + 1) Titanium Level (96%) power supplies |
| **Operating Environment** |
| Operating Temperature: 10°C ~ 35°C (50°F ~ 95°F) |
| Non-operating Temperature: -40°C to 70°C (-40°F to 158°F) |
| Operating Relative Humidity: 8% to 90% (non-condensing) |
| Non-operating Relative Humidity: 5% to 95% (non-condensing) |
| **Regulatory Compliance** |
| FCC, ICES, CE, UKCA, VCCI, RCM, NRTL, CB |
| **Certified Safety Models** |
| HS201-R16X14, HS201-R20X14, HS201-R26X14 |

**Applied Directives, Standards**

**Directives:**

EMC/EMI: 2014/30/EU (EMC Directive)

Electromagnetic Compatibility Regulations 2016

FCC Part 15 Subpart B

ICES-003

VCCI-CISPR 32

AS/NZS CISPR 32

CISPR 32

CISPR 35

BS/EN 55032

BS/EN 55035

BS/EN 61000-3-2

BS/EN 61000-3-3

BS/EN 61000-4-2

BS/EN 61000-4-3

BS/EN 61000-4-4

BS/EN 61000-4-5

BS/EN 61000-4-6

BS/EN 61000-4-8

BS/EN 61000-4-11

**Environment:**

Delegated Directive (EU) 2015/863

Directive 2011/65/EU (RoHS)

REACH Regulation EC 1907/2006

WEEE Directive 2012/19/EU

California Proposition 65

**Product Safety:**

2014/35/EU (LVD Directive)

UL/CSA 62368-1 (USA and Canada)

Electrical Equipment (Safety) Regulations 2016

IEC/BS/EN 62368-1

**Perchlorate Warning**

California Best Management Practices Regulations for Perchlorate Materials: This Perchlorate warning applies only to products containing CR (Manganese Dioxide) Lithium coin cells. Perchlorate Material-special handling may apply. See https://www.dtsc.ca.gov/hazardouswaste/perchlorate

この装置は、クラスＡ機器です。この装置を住宅環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

VCCI ー A