



Storage SuperServer<sup>®</sup>  
SSG-641E-E1CR24H  
SSG-641E-E1CR24L



USER'S MANUAL

Revision 1.0

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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 server. Installation and maintenance should be performed by certified service technicians only.

Please refer to the SSG-641E-E1CR24(H/L) server specifications page on our website for updates on supported memory, processors and operating systems (<http://www.supermicro.com>).

## Notes

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

- Supermicro product manuals: <http://www.supermicro.com/support/manuals/>
- Product drivers and utilities: <https://www.supermicro.com/wdl>
- Product safety info: [http://www.supermicro.com/about/policies/safety\\_information.cfm](http://www.supermicro.com/about/policies/safety_information.cfm)

If you have any questions, please contact our support team at:  
[support@supermicro.com](mailto:support@supermicro.com)

This manual may be periodically updated without notice. Please check the Supermicro website for possible updates to the manual revision level.

## Secure Data Deletion

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/](https://www.supermicro.com/about/policies/disclaimer.cfm?url=/wdl/utility/Lot9_Secure_Data_Deletion_Utility/)

## Warnings

Special attention should be given to the following symbols used in this manual.



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



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

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# Chapter 1

## Introduction

### 1.1 Overview

This chapter provides an outline of the functions and features of the Storage SuperServer SSG-641E-E1CR24(H/L). The following provides an overview of the specifications and capabilities.

System Overview	
<b>Motherboard</b>	X13DEI-T
<b>Chassis</b>	CSE-846BTS-R1K23BP4
<b>Processors</b>	Dual Socket-E (LGA4677) 4th Gen Intel® Xeon® Scalable processors with up to 60 cores
<b>Memory</b>	Supports up to 4 TB memory capacity with 16 DIMMs of 256 GB 3DS RDIMM DDR5 ECC memory for up to 4800 MT/s
<b>Storage</b>	Twenty-four 3.5" hot-swap SAS3/SATA3 drive bays (six hybrid NVMe drive bays) Two optional rear 2.5" hot-swap SATA drive bays Two internal NVMe PCIe 4.0 x2 M.2 (2280/22110) Two internal SATA3 DOM ports
<b>Expansion Slots</b>	One PCIe 5.0 x8 (Slot 1) occupied by SAS controller One PCIe 5.0 x16 (Slot 2) occupied by AOM Three PCIe 5.0 x16 slots (Slots 3, 4, and 5) available One PCIe 5.0 x8 slots (Slot 6) available
<b>I/O Ports</b>	Two 10GbE LAN ports (Broadcom 57416) One rear COM port One rear VGA port Four rear USB 3.0 ports One dedicated BMC LAN port
<b>System Cooling</b>	Five heavy duty 8-cm fans with optimal fan speed control One air shroud
<b>Power</b>	Two redundant 1200 W power supplies, 80Plus Titanium level
<b>Form Factor</b>	4U; (WxHxD) 17.2 x 7 x 26.5 in (437 x 178 x 673 mm)

A Quick Reference Guide can be found on the product page of the Supermicro website.

The following safety models associated with the SSG-641E-E1CR24(H/L) have been certified as compliant with UL or CSA: 846-R12X13, 846-12.

### Models

- SSG-641E-E1CR24H includes HW RAID support via Broadcom® S3908.
- SSG-641E-E1CR24L includes HBA controller support via Broadcom® S3808.

## 1.2 System Features

The following views of the system display the main features.

### Front View

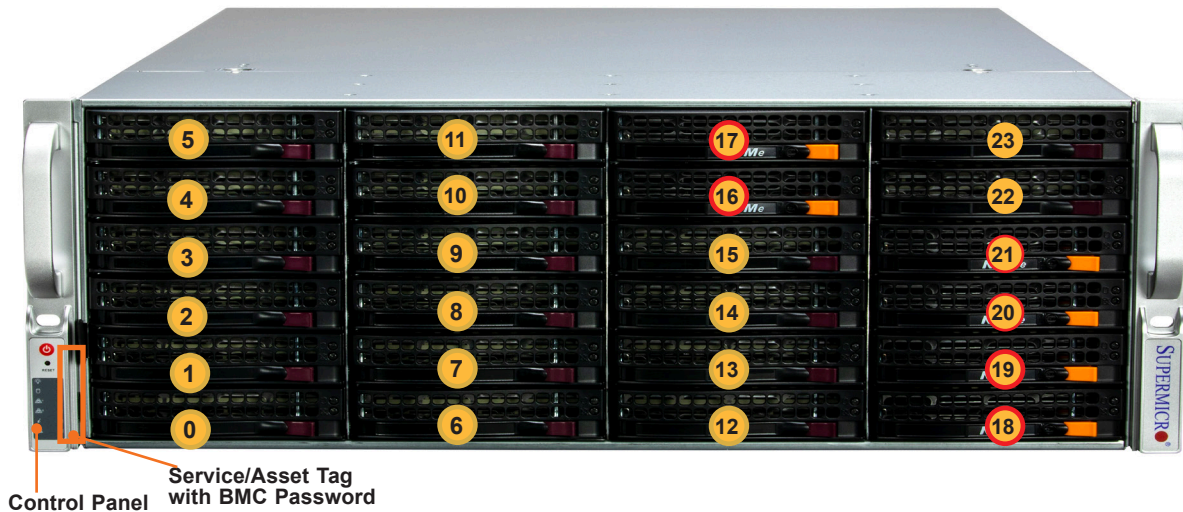


Figure 1-1. Front View

System Features: Front	
Feature	Description
Control Panel	One control Panel (see <a href="#">Control Panel</a> for details)

Logical Storage Drive Numbers	
Item	Description
0 – 15 22 – 23	Eighteen 3.5" hot-swap SAS3/SATA3 front drive bays
16 – 21	Six 3.5" hot-swap SAS3/SATA3/NVMe front drive bays

### Drive Carrier Indicators

Each drive carrier has two LED indicators: an activity indicator and a status indicator. For RAID configurations using a controller, the meaning of the status indicator is described in the table below. For OS RAID or non-RAID configurations, some LED indications are not supported, such as hot spare. For VROC configurations, refer to the [VROC section](#) in this manual.

<b>Drive Carrier LED Indicators</b>			
	<b>Color</b>	<b>Blinking Pattern</b>	<b>Behavior for Device</b>
<b>Activity LED</b>	Blue	Solid On	Idle SAS/NVMe drive installed
	Blue	Blinking	I/O activity
	Off		Idle SATA drive installed
<b>Status LED</b>	Red	Solid On	Failure of drive with RSTe support
	Red	Blinking at 1 Hz	Rebuild drive with RSTe support
	Red	Blinking with two blinks and one stop at 1 Hz	Hot spare for drive with RSTe support
	Red	On for five seconds, then off	Power on for drive with RSTe support
	Red	Blinking at 4 Hz	Identify drive with RSTe support
	Green	Solid on	Safe to remove NVMe drive
	Amber	Blinking at 1Hz	Do not remove NVMe drive

## Control Panel

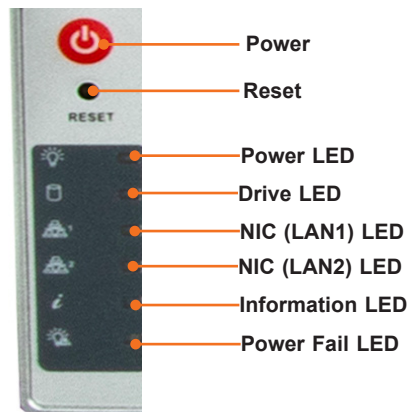


Figure 1-2. Control Panel

Control Panel Features	
Feature	Description
Power button	The main power switch applies or removes primary power from the power supply to the server but maintains standby power.
Reset Button	The reset button is used to reboot the system.
Power LED	Indicates power is being supplied to the system power supply units. This LED is illuminated when the system is operating normally.
Drive LED	Indicates activity on the storage drives when flashing.
NIC LEDs	Indicates network activity on LANs when flashing.
Power Fail LED	Indicates a power supply module has failed.
Information LED	Alerts operator to several states, as noted in the table below.

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 a non-operational 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 using the 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

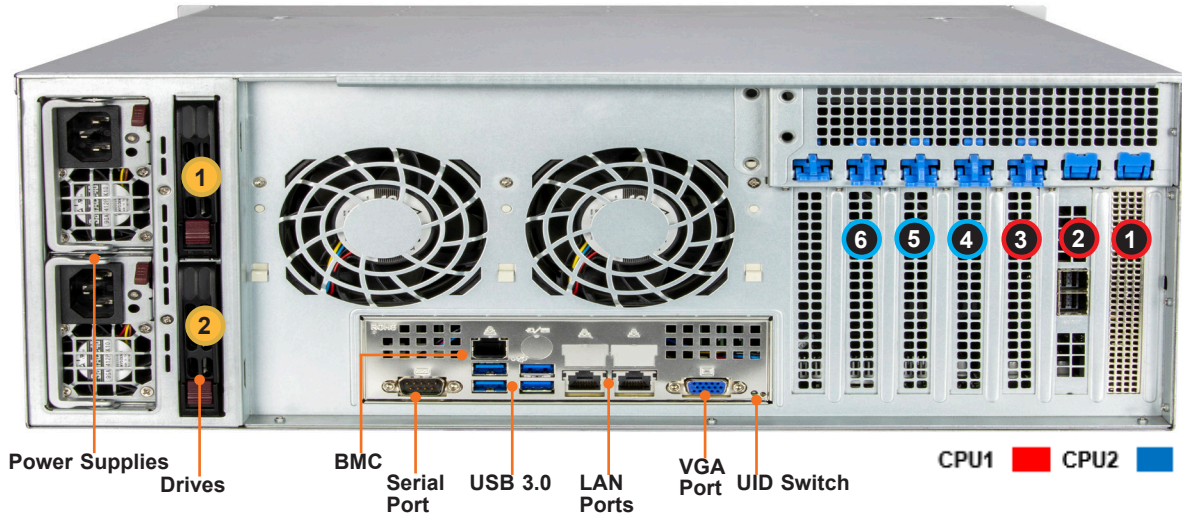


Figure 1-3. System: Rear View

System Features: Rear	
Feature	Description
Power Supplies	Two redundant power supply modules, PWS1 on the bottom, PWS2 on the top
Drives	Two optional 2.5" hot-swap SATA storage drives
BMC	Dedicated LAN port for BMC; for indicator details.
USB	Four USB 3.0 ports
LAN	Two 10G BASE-T ports
VGA	One video port
UID Switch/LED	The unit identification (UID) button turns on or off the blue light function of the Information LED and this blue LED on the rear of the chassis. This button can also be used to reset the BMC.
System Fans	Two heavy duty 8-cm fans with optimal fan speed control

Expansion Card Chassis Slots	
Item	Description
1	PCIe 5.0 x8 low-profile slot (occupied by 3908 or 3808 SAS controller)
2	PCIe 5.0 x16 low-profile slot (occupied by AOM for external SAS)
3	PCIe 5.0 x16 low-profile slot
4	PCIe 5.0 x16 low-profile slot
5	PCIe 5.0 x16 low-profile slot
6	PCIe 5.0 x8 low-profile slot

Note: PCIe slots 1 and 2 are occupied by the JBOD Expansion/Storage Controller.

CPU1  CPU2 

### Power Supply Indicator

Power Supply Indicator	
LED Color and State	Power Supply Condition
Off	No AC power to modules
Amber, solid	AC cord unplugged and in redundant mode OR power supply critical events causing a shutdown, failure, OCP, OVP, fan fail, OTP, UVP
Amber, blinking	Power supply warning events where the power supply continues to operate: high temperature, over voltage, under voltage, etc
Green, blinking	AC present, only 12vsb on (module off)
Green, solid	Output on, functioning normally

## 1.3 System Architecture

This section shows the locations of the main system components.

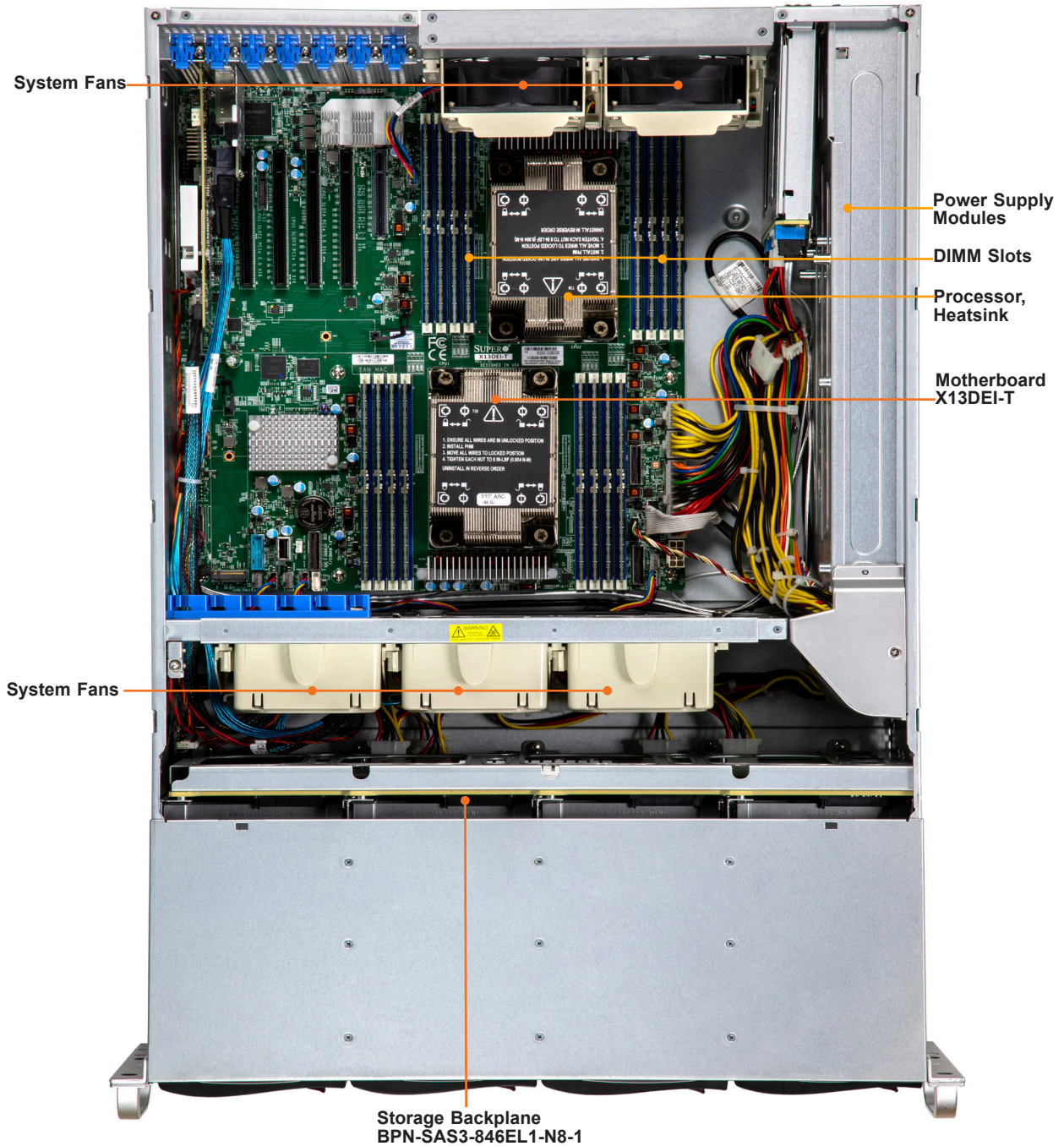


Figure 1-4. Main Component Locations

System Features: Top	
Feature	Description
Power Supply	Dual redundant modules
DIMM Slots	16 DIMM memory slots
Processors	4th Gen Intel Xeon Scalable with heatsinks, SNK-P0078P
System Fans	Five 8-cm fans with optimal fan speed control, FAN-0166L4
Motherboard	X13DEI-T
Storage Backplane	BPN-SAS3-846EL1-N8-1





## Quick Reference Table

Jumper	Description	Default Setting
JBT1	CMOS Clear	Open (Normal)
JPL1	LAN1, LAN2 Enable/Disable	Pins 1-2 (Enabled)

LED	Description	Status
LED4, LED7	M.2 LEDs (for M.2-C1, M.2-C2)	Blinking Green: Device Working
LED6	Unit Identifier (UID) LED	Solid Blue: Unit Identified
LEDBMC	BMC Heartbeat LED	Blinking Green: BMC Normal (Active), Solid Green: (During BMC Reset or during a Cold Reboot)
LEDPWR	Power LED	LED On: Onboard Power On

Connector	Description
BT1	Onboard CMOS Battery
BMC_LAN	Dedicated BMC LAN Port
COM1	Rear I/O COM Port
FAN1 - FAN6, FANA, FANB	CPU/System Fan Headers
I-SATA0, I-SATA1	Intel PCH Powered I-SATA 3.0 Ports with support of SuperDOM devices *DOM: Disk on Module
JBP_I2C1	4-pin BMC External I <sup>2</sup> C Header
JCOM2	Front Accessible COM Port Header
JF1	Front Control Panel Header
JFP2	Front Accessible VGA Connection Header
JIPMB1	4-pin BMC External I <sup>2</sup> C Header (for Inlet Temperature Sensor)
JL1	Chassis Intrusion Header
JNCSI1	NC-SI (Network Controller Sideband Interface) Connector
JNVI2C1	NVMe SMBus I <sup>2</sup> C Header with hot-plug support
JPCIE1 (SLOT1), JPCIE6 (SLOT6)	PCIe 5.0 x8 Slots (Slot1: supported by CPU1, Slot6: supported by CPU2)
JPCIE2/3 (SLOT2/3), JPCIE4/5 (SLOT4/5)	PCIe 5.0 x16 Slots (Slot2/3: supported by CPU1, Slot4/5: supported by CPU2)
JPI2C1	Power System Management Bus (SMBus) I <sup>2</sup> C Header
JPWR1, JPWR2, JPWR4	8-pin Power Connectors
JPWR3	24-pin ATX Power Connector
JRK1	Intel VROC Key Header for NVMe RAID support
JS1 (SATA0 - SATA7)	SlimSAS x8 Connector with support of eight Intel PCH SATA 3.0 connections (RAID 0, 1, 5, and 10 supported)
JSD1, JSD2	SATA DOM Power Connectors

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<b>Connector</b>	<b>Description</b>
JSTBY1	5V Standby Power Header
JTPM1	Trusted Platform Module/Port 80 Header
JUIDB1	Unit Identifier (UID) Switch / BMC Reset Button
JNVME1	MCIO x8 Connector that supports two PCIe 5.0 x4 NVMe devices on CPU1. The two NVMe devices are P1_NVME0 and P1_NVME1.
JNVME2	MCIO x8 Connector that supports two PCIe 5.0 x4 NVMe devices on CPU1. The two NVMe devices are P1_NVME2 and P1_NVME3.
JNVME3	MCIO x8 Connector that supports two PCIe 5.0 x4 NVMe devices on CPU2. The two NVMe devices are P2_NVME4 and P2_NVME5.
LAN1, LAN2	Ethernet LAN (RJ45) Port 1 and Port 2 (1G LAN support on X13DEI-T and 10G LAN support on X13DEI-T)
M.2-C1, M.2-C2	PCIe 4.0 x2 NVMe M.2 Slots supported by CPU1 (with support of M-Key 2280 and 22110)
S-SGPIO1	Serial General Purpose I/O Header (for I-SATA0/1 SuperDOM support)
USB0/1	USB 2.0 Header with support of two USB connections
USB2	Internal USB 2.0 Vertical Type-A Connector
USB3/4 (3.0)	Back Panel USB 3.0 Ports (5Gbps, Type-A)
USB5/6 (3.0)	Back Panel USB 3.0 Ports (5Gbps, Type-A)
USB7/8 (3.0)	USB 3.0 Header with support of two USB connections
VGA	Rear I/O VGA Port

## Motherboard Block Diagram

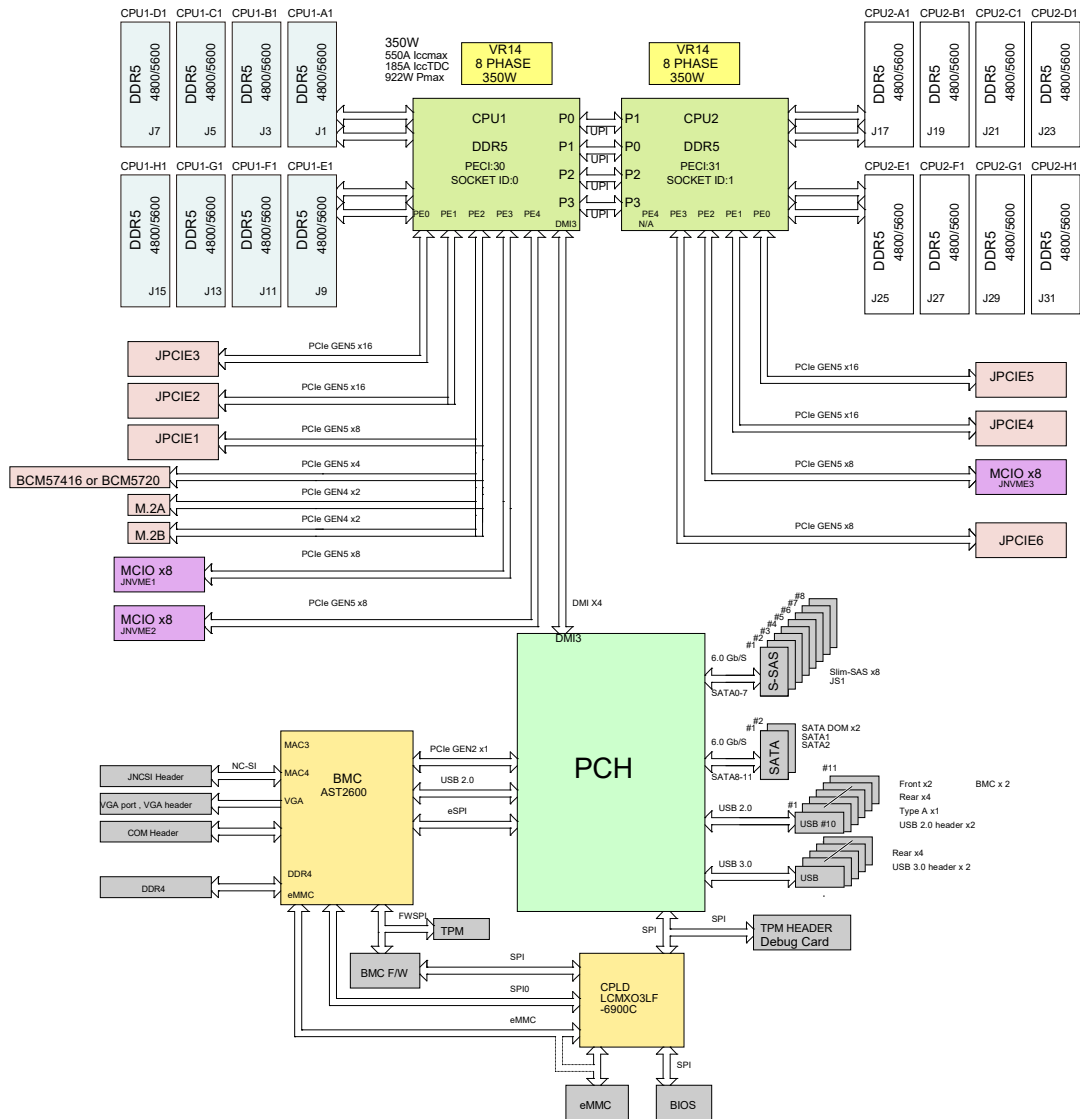


Figure 1-6. Motherboard Block Diagram

**Note:** The figure is for illustrative purposes only and may not be exactly what is in your system. See [Appendix B](#) for more details about system specifications.

# Chapter 2

## Server Installation

### 2.1 Overview

This chapter provides advice and instructions for mounting your system in a server rack. If your system is not already fully integrated with processors, system memory etc., refer to [Chapter 3](#) for details on installing those specific components.

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

### 2.2 Unpacking the System

Inspect the box in which the system was shipped, and note if it was damaged. If any equipment appears damaged, file a claim with the carrier.

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 [Appendix A](#).

### 2.3 Preparing for Setup

The box in which the system was shipped should include the rackmount hardware needed to install it into the rack. Please read this section in its entirety before you begin the installation.

#### Choosing a Setup Location

- The system 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.
- Do not use a two-post "telco" type rack for 2U or larger servers.

## Server Precautions

- Review the electrical and general safety precautions in [Appendix A](#).
- 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

### *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.).



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:

- This unit should be mounted at the bottom of the rack if it is the only unit in the rack.
- When mounting this unit in a partially filled rack, load the rack from the bottom to the top with 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 work space.

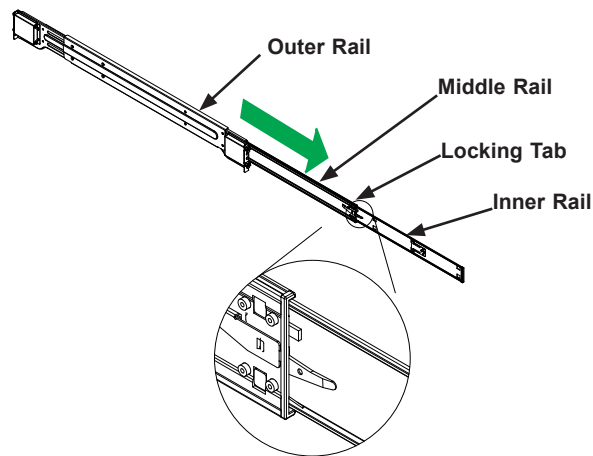
## 2.4 Installing the Rails

There are a variety of rack units on the market, which may require a slightly different assembly procedure. This rail set fits a rack between 26.8" and 36.4" deep.

The following is a basic guideline for installing the system into a rack with the rack mounting hardware provided. You should also refer to the installation instructions that came with the specific rack you are using.

### Identifying the Rails

The 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.



**Figure 2-1. Identifying the Outer Rail, Middle Rail and Inner Rail**  
(Left Rail Assembly Shown)



## Releasing the Inner Rail

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

To mount the rail onto the chassis, first release the inner rail from the outer rails.

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.

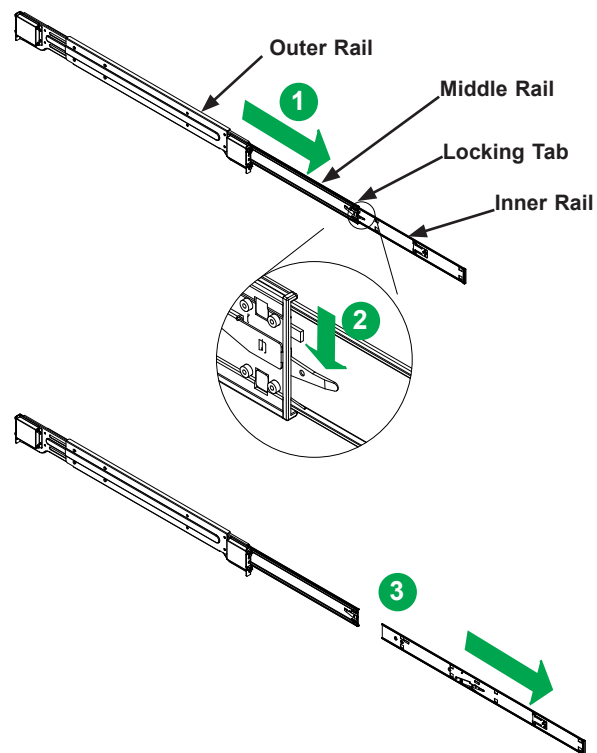


Figure 2-2. Extending and Releasing the Inner Rail

## Installing the Inner Rails on the Chassis

### *Installing the Inner Rails*

1. Extend the inner rail toward the front of the rail assembly as far as possible, then depress the locking tab to pull it completely out.
2. Place the inner rail on the side of the chassis aligning the hooks of the chassis with the rail extension holes.
3. Slide the extension toward the front of the chassis.
4. You may secure the chassis with screws if desired.
5. Repeat steps 1-3 for the other inner rail.

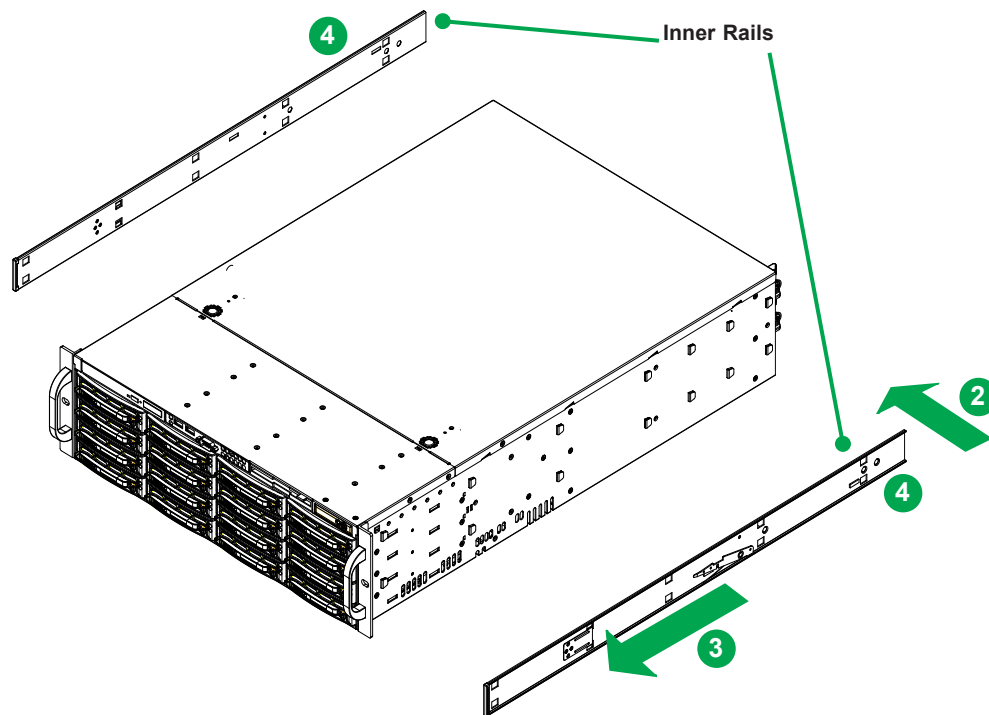


Figure 2-3. Installing the Inner Rails

## Installing the Outer Rails onto the Rack

Each end of the assembled outer rail includes a bracket with hooks and square, spring-loaded pegs to fit into the square holes in your rack.

### *Installing the Outer Rail*

1. Attach the right outer rail to the rack by inserting the hooks included on the rails into the holes provided on the rack.
2. If desired, screw the rails to the chassis for added support.
3. Repeat these steps for the left outer rail.

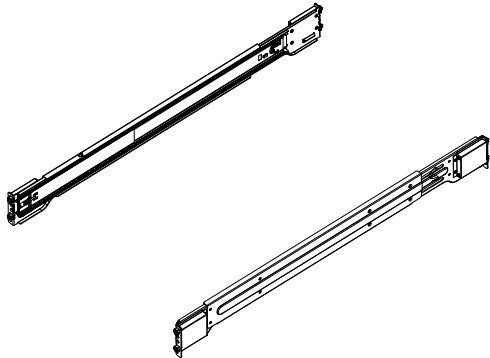


Figure 2-4. Outer Rails

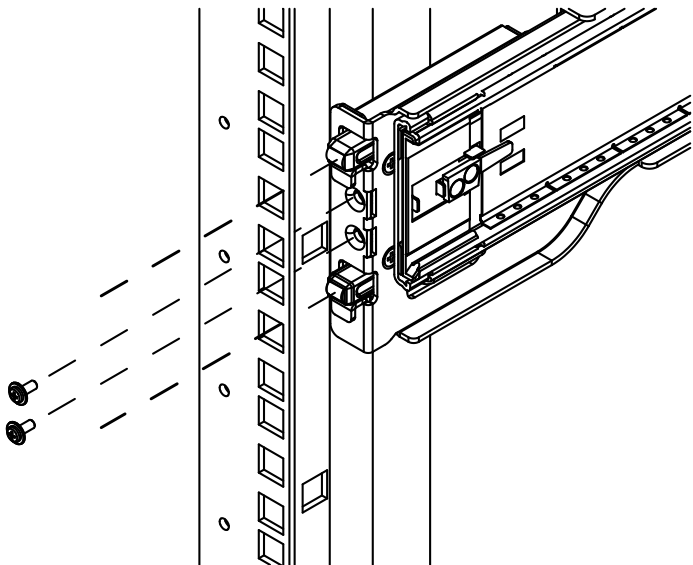




Figure 2-5. Installing the Outer Rails

**Note:** The figure above is for illustrative purposes only. Always install servers at the bottom of the rack first.

 **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.

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

## 2.5 Installing the Chassis into a Rack

Once rails are attached to the chassis and the rack, you can install the server.

**Warning:** Mounting the system into the rack requires at least two people to support the chassis during installation. Please follow safety recommendations printed on the rails.

### *Installing the Chassis into a Rack*

1. Confirm that chassis includes the inner rails (A), also confirm that the outer rails (B) are installed on the rack.
2. Align chassis rails (A) with the front of the rack rails (B).
3. Slide the chassis rails into the rack rails, keeping the pressure even on both sides (you may have to depress the locking tabs when inserting). When the server has been pushed completely into the rack, you should hear the locking tabs "click" into the locked position.
4. Tighten up all the screws on the front side and rear side of both outer rails.
5. (Optional) Insert and tightening the thumbscrews that hold the front of the server to the rack.

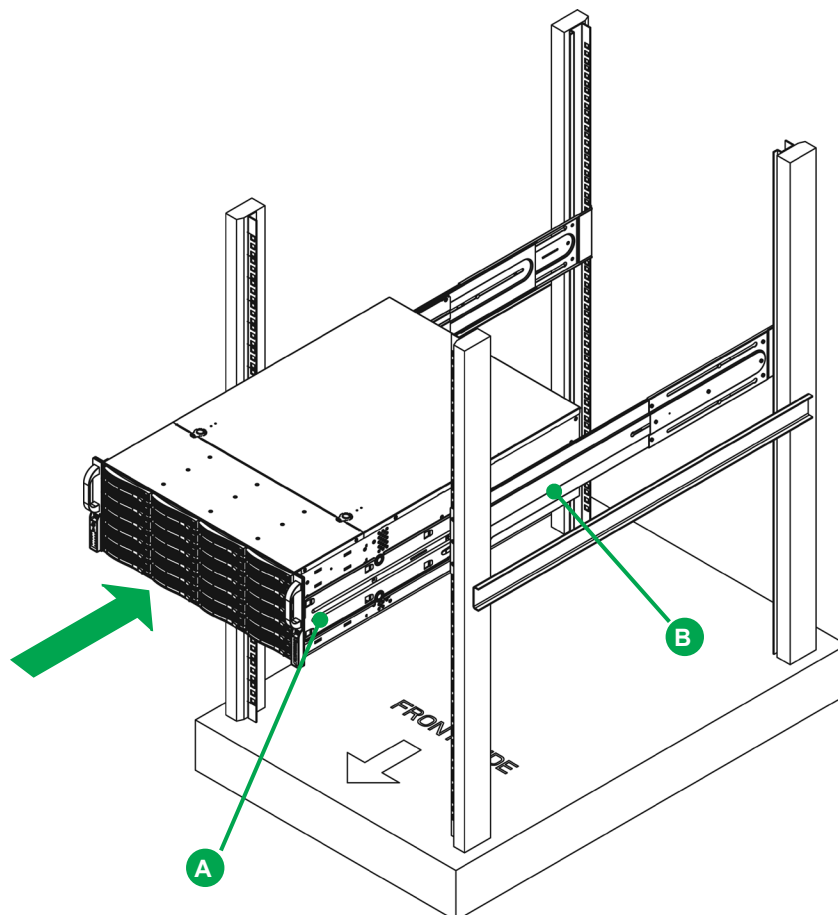


Figure 2-6. Installing the Server into the Rack

**Note:** Keep the ball bearing shuttle locked at the front of the middle rail during installation.

**Note:** Figure is for illustrative purposes only. Always install servers to the bottom of a rack first.

### **Removing the Chassis from the Rack**

**Caution!** It is dangerous for a single person to off-load the heavy chassis from the rack without assistance. Be sure to have sufficient assistance supporting the chassis when removing it from the rack. Use a lift.

1. If necessary, loosen the thumb screws on the front of the chassis that hold it in the rack.
2. Pull the chassis forward out the front of the rack until it stops.
3. Press the release latches on each of the inner rails downward simultaneously and continue to pull the chassis forward and out of the rack.

## Chapter 3

# Maintenance and Component Installation

This chapter provides instructions on installing and replacing main system components. 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. Please follow the procedures given in each section.

### 3.1 Removing Power

Use the following procedure to ensure that power has been removed from the system. 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).

**Note:** This caution statement applies when changing any component or subsystem that is not hot-swap/hot-plug.

## 3.2 Accessing the System

The chassis features a removable top cover for access to the internal components.

### **Removing the Chassis Cover**

1. Remove power from the system as described in [Section 3.1](#).
2. Press the release tabs to remove the cover from the locked position. Press both tabs at the same time.
3. Once the top cover is released from the locked position, slide the cover toward the rear of the chassis.
4. Lift the cover off the chassis.

Check that all ventilation openings on the top cover and the top of the chassis are clear and unobstructed.

**Caution:** 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.

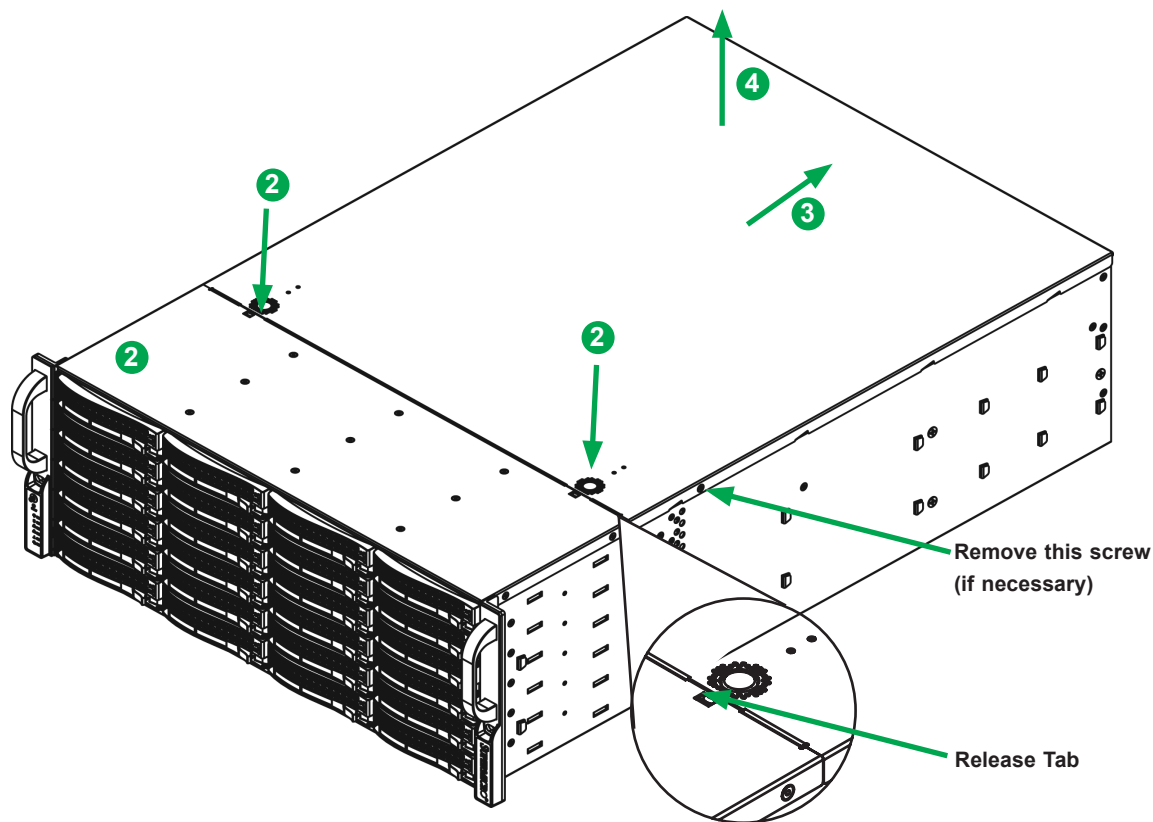


Figure 3-1. Removing the Chassis Cover

### 3.3 Processor and Heatsink Installation

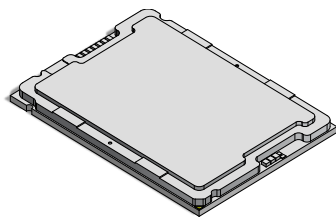
The processor (CPU) and processor carrier should be assembled together first to form the processor carrier assembly. This will be attached to the heatsink to form the processor heatsink module (PHM) before being installed onto the CPU socket.

**Notes:**

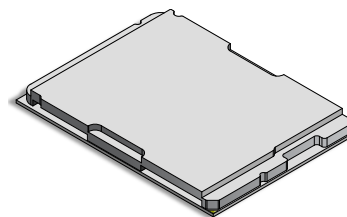
- Use ESD protection.
- Shut down the system and then unplug the AC power cord from all power supplies.
- Check that the plastic protective cover is on the CPU socket and none of the socket pins are bent. If they are, contact your retailer.
- When handling the processor, avoid touching or placing direct pressure on the LGA lands (gold contacts). Improper installation or socket misalignment can cause serious damage to the processor or socket, which may require manufacturer repairs.
- Thermal grease is pre-applied on a new heatsink. No additional thermal grease is needed.
- Refer to the Supermicro website for updates on processor support.
- All graphics in this manual are for illustration purposes only. Your components may look different.
- Please order the CPU carrier with the CPU heatsink.

CPU carrier for 4th Generation Intel Xeon Scalable Processors (XCC)	SKT-1333L-0000-FXC
CPU carrier for 4th Generation Intel Xeon Scalable Processors (MCC)	SKT-1424L-001B-FXC

#### The 4th Generation Intel Xeon Scalable Processor



SP XCC



SP MCC



## **Installation Overview**

After preparing the system and following ESD precautions, there are four steps to installing the processor and heatsink onto the motherboard.

1. Attach the processor to a plastic carrier to create the processor carrier assembly.
2. Attach the processor carrier assembly to the heatsink to create the processor heatsink module (PHM).
3. Prepare the socket for PHM installation.
4. Install the PHM.

## **Removal Overview**

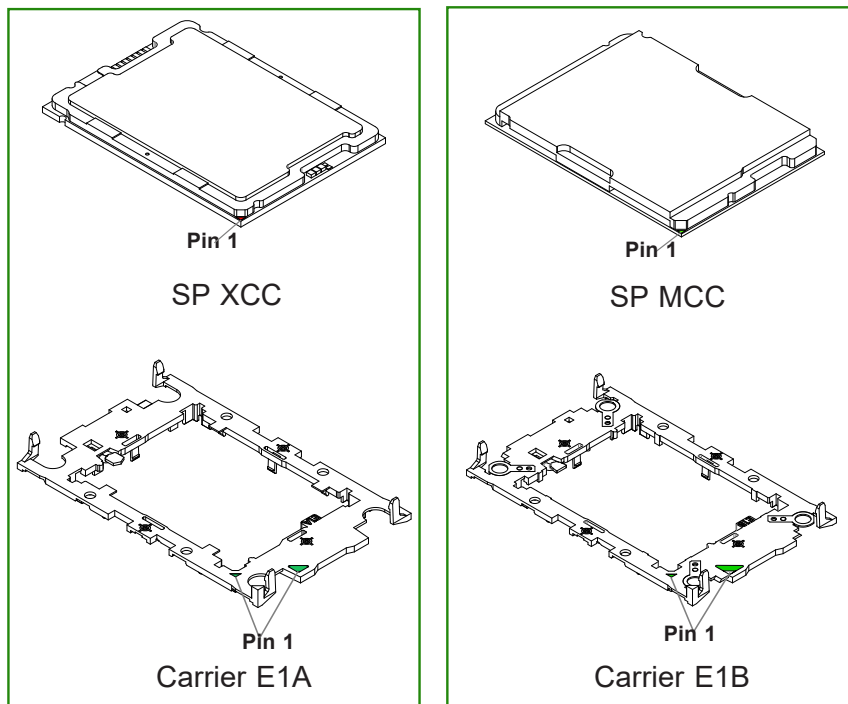
After preparing the system and following ESD precautions, there are three steps to removing the processor and heatsink from the motherboard.

1. Remove the PHM from the motherboard.
2. Remove the processor carrier assembly from the heatsink.
3. Remove the processor from the carrier.

## Create the Processor Carrier Assembly

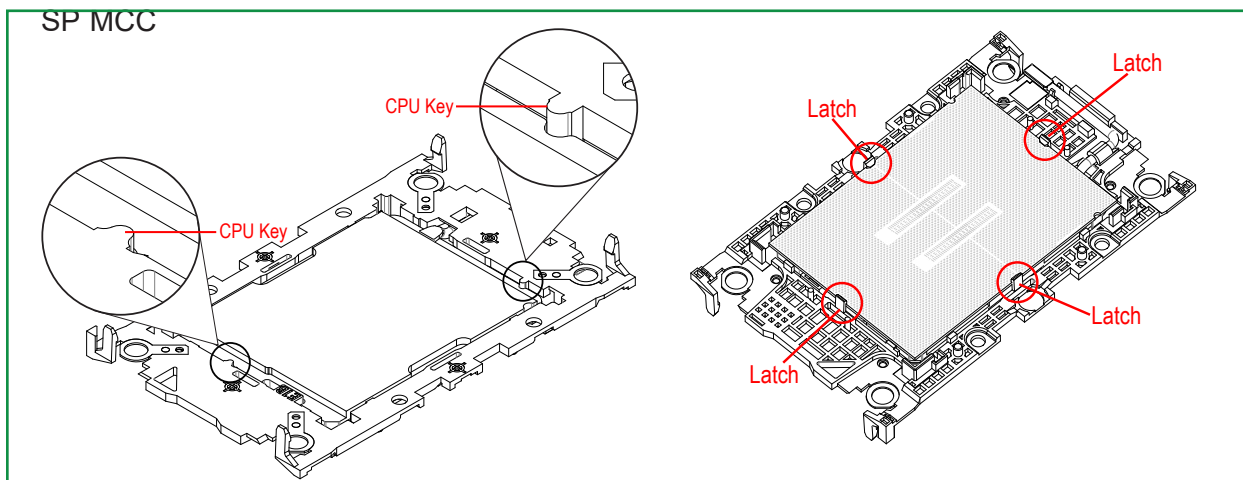
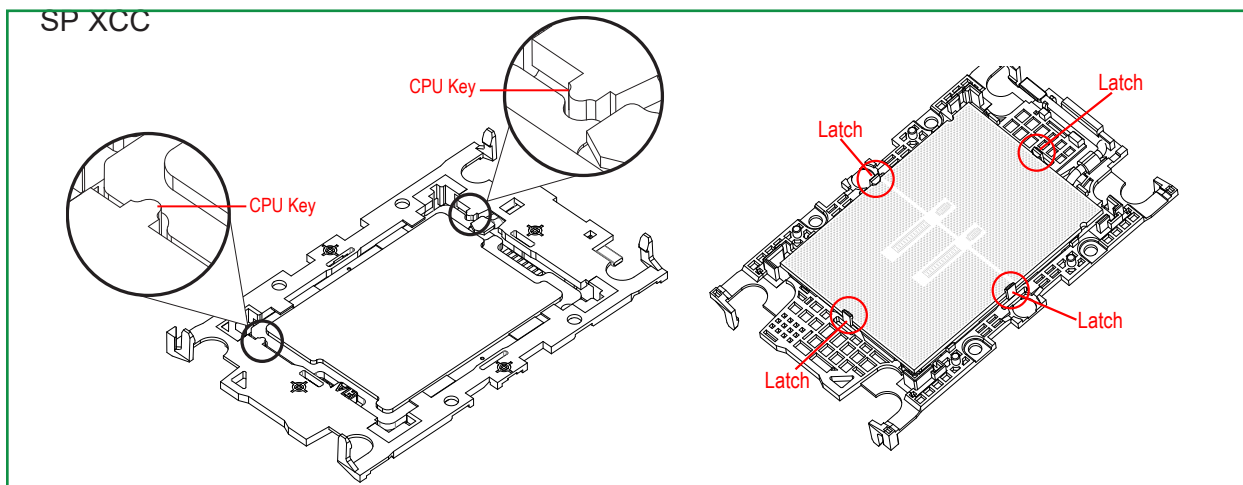
### Process Carrier Assembly

1. Hold the processor with the gold pins (LGA lands) facing down. Locate the gold triangle at the corner of the processor and the corresponding hollowed triangle on the processor carrier as shown below. These triangles indicate the location of pin 1.

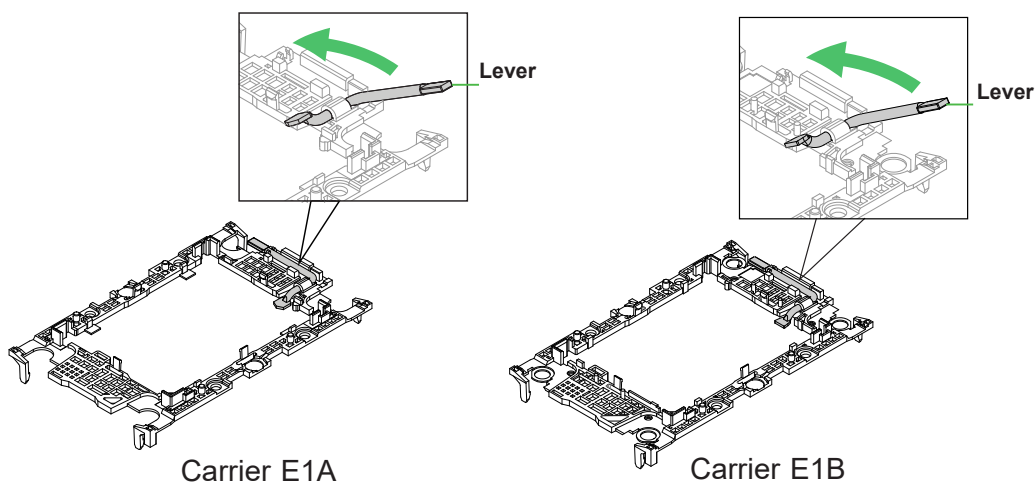


The Processor with its Matching Carrier

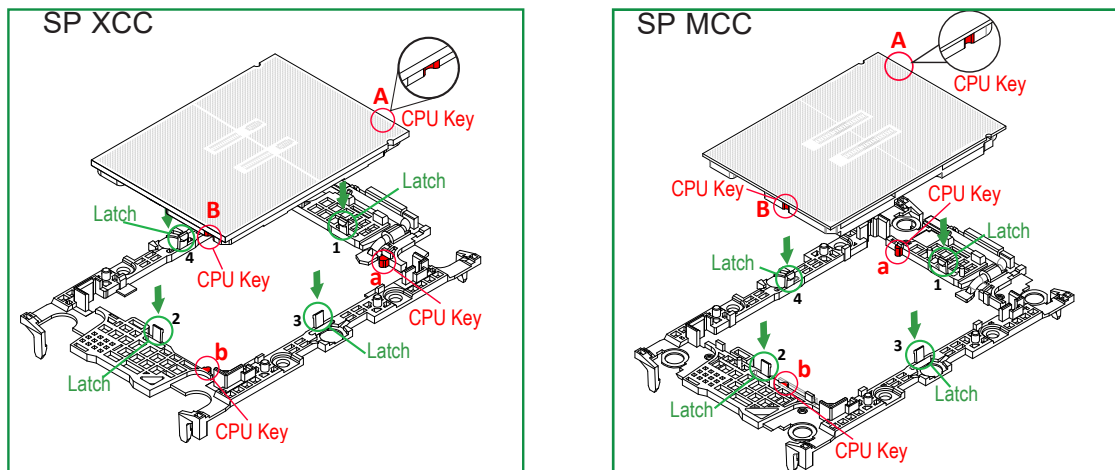
2. Turn the processor over (with the gold pins up). Locate the CPU keys on the processor and the four latches on the carrier as shown below.



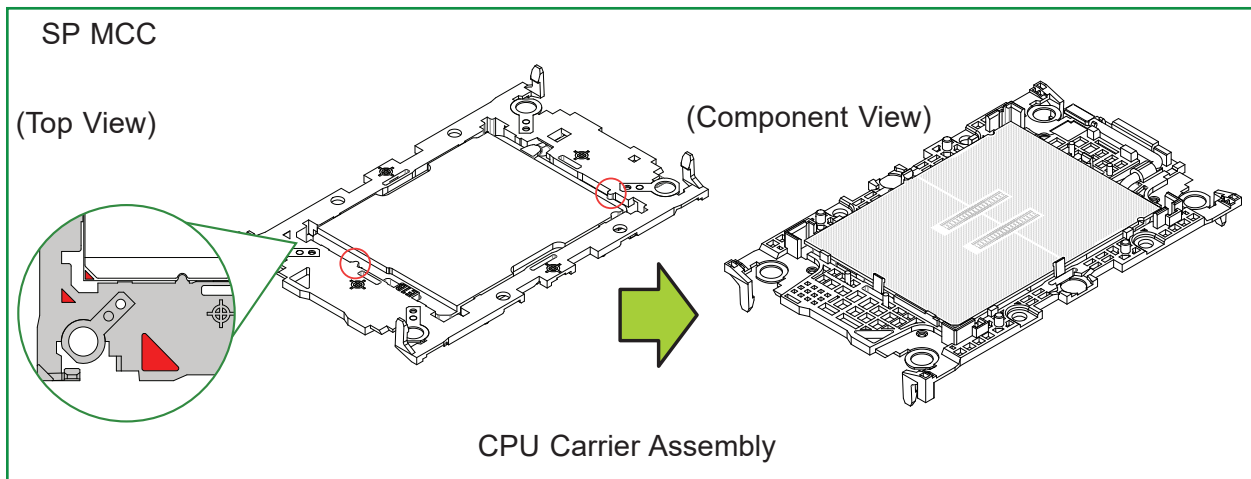
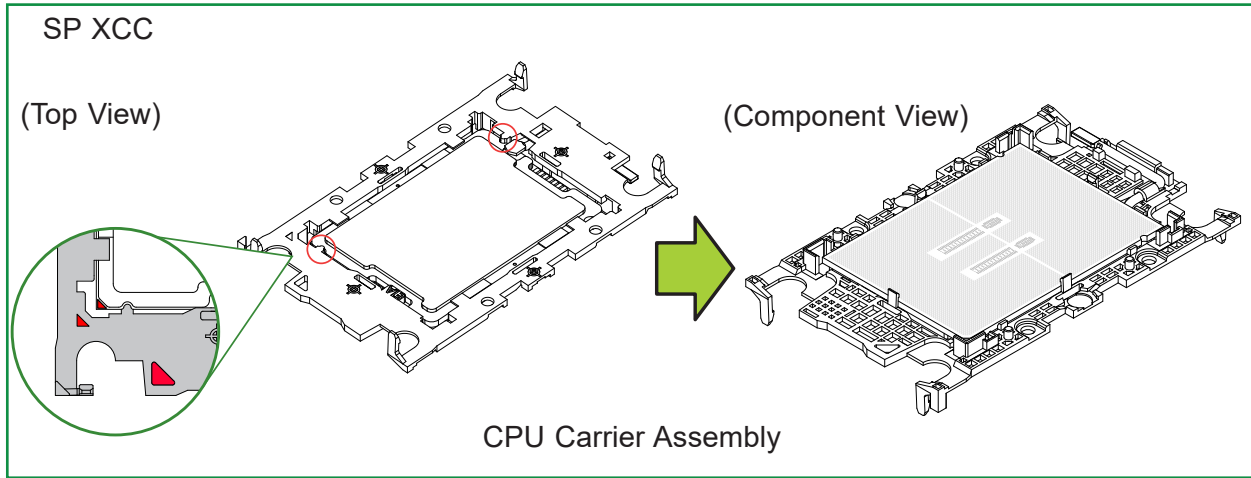
3. Locate the lever on the CPU socket and press it down as shown below.



4. Using Pin 1 as a guide, carefully align the CPU keys (A and B) on the processor against the CPU keys on the carrier (a and b) as shown in the drawing below.
5. Once they are properly aligned, carefully insert the CPU into the carrier, making sure that the CPU is properly secured by latches 1, 2, 3, and 4.



6. After the processor is placed inside the carrier, examine the four sides of the processor, making sure that the processor is properly seated on the carrier.



## Creating the PHM

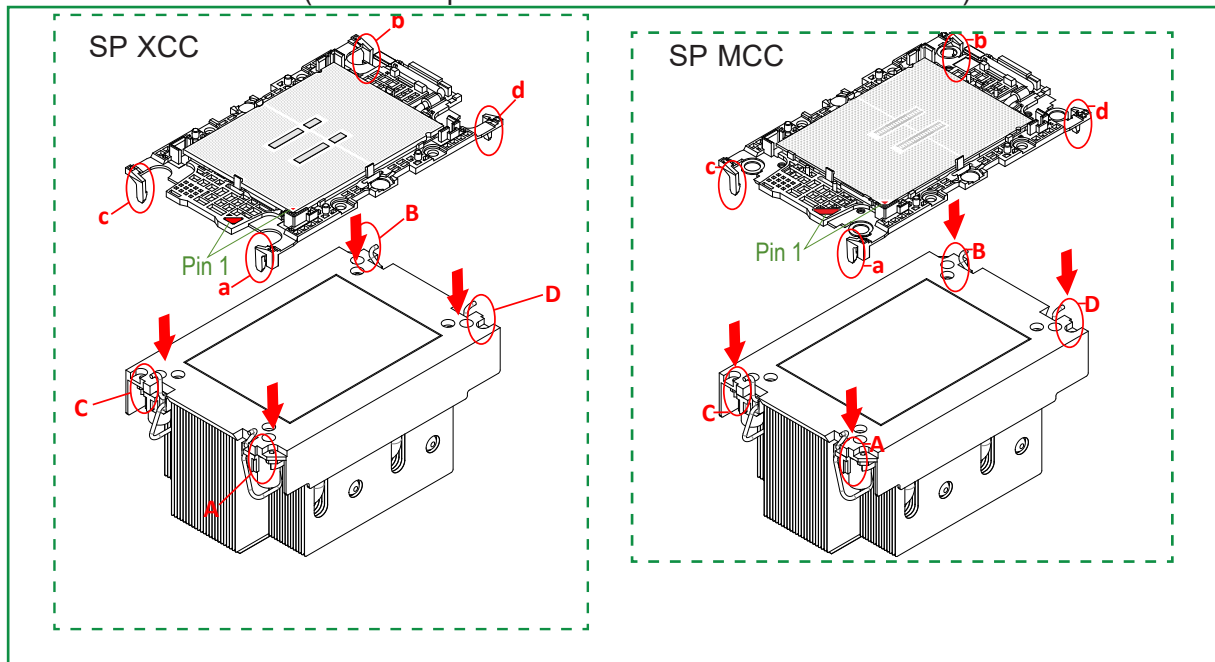
After creating the processor carrier assembly, please follow the instructions below to mount the processor carrier into the heatsink to form the PHM.

**Note:** If this is a new heatsink, the thermal grease has been pre-applied on the underside. Otherwise, apply the proper amount of thermal grease.

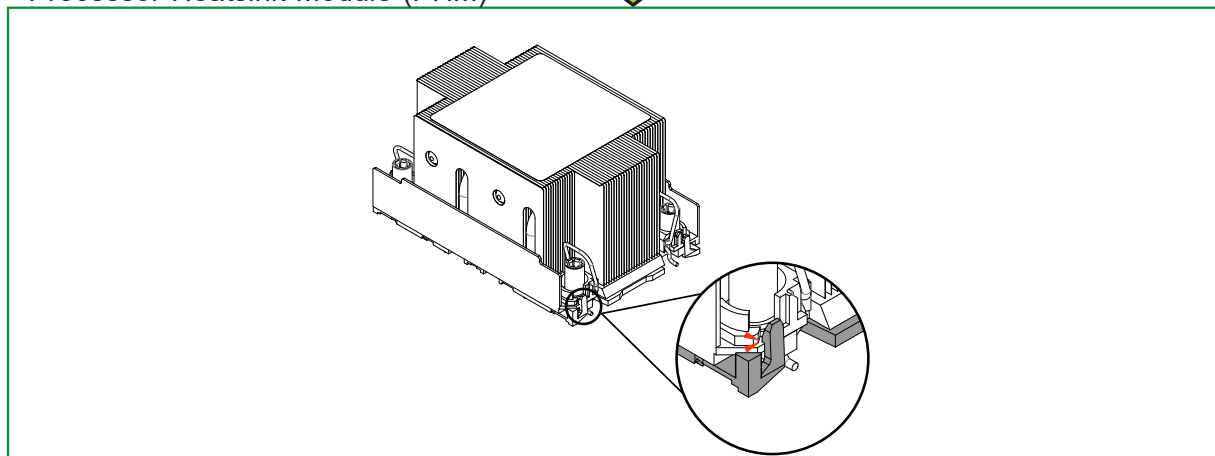
1. Turn the heatsink over with the thermal grease, which is on the reverse side of the heatsink, facing up. Pay attention to the two triangle cutouts (A, B) located at the diagonal corners of the heatsink as shown in the drawing below.
2. Hold the processor carrier component side facing up, and locate the triangle on the CPU and the triangle on the carrier. (Triangle indicates Pin 1.)
3. Using Pin 1 as a guide, turn the processor carrier assembly over with the gold contacts facing up. Locate Pin 1 (A) on the processor and Pin 1 (a) on the processor carrier assembly.
4. Align the corner marked a on the processor carrier assembly against the triangle cutout A on the heatsink, and align the corners marked b, c, and d on the processor assembly against the corners marked B, C, and D on the heatsinks.
5. Once they are properly aligned, place the corners marked a, b, c, and d on the processor carrier assembly into the corners of the heatsink marked A, B, C, and D making sure that all plastic clips are properly attached to the heatsink.

CPU Carrier Assembly (for 2U Heatsink)

(CPU Component Side and Heatsink Bottom Side)



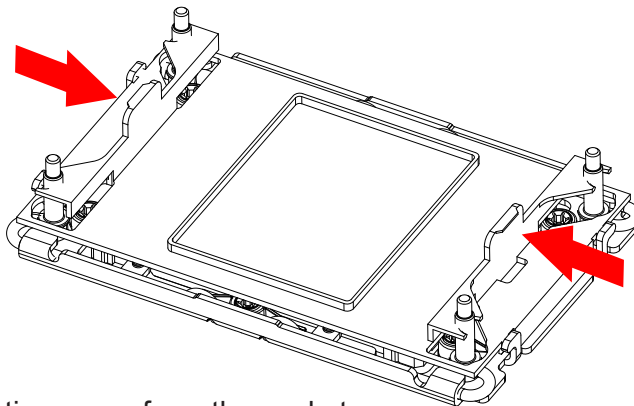
Processor Heatsink Module (PHM)



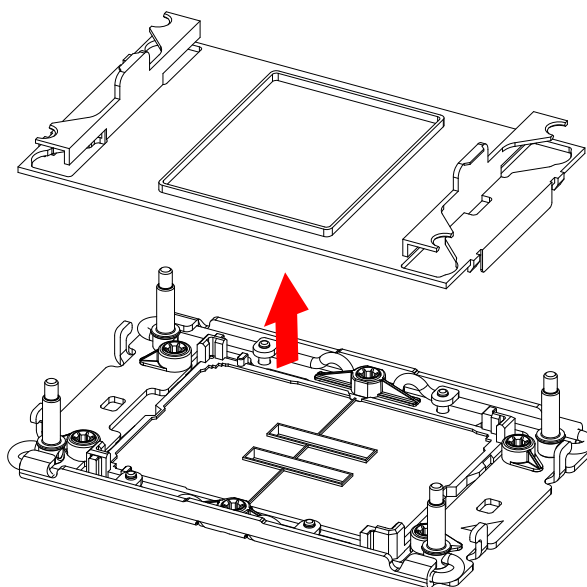
## Preparing the CPU Socket for Installation

This motherboard comes with a plastic protective cover installed on the CPU socket. Remove it from the socket by following the instructions below:

1. Press the tabs inward.



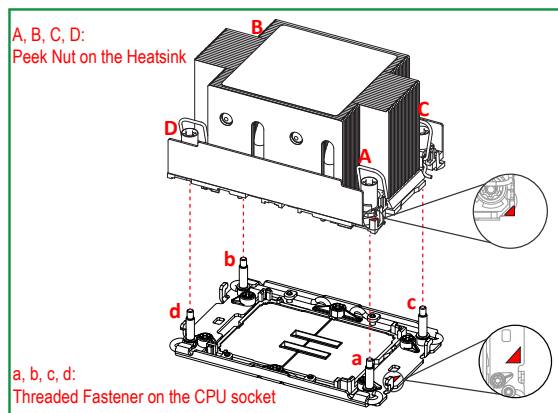
2. Pull up the protective cover from the socket.



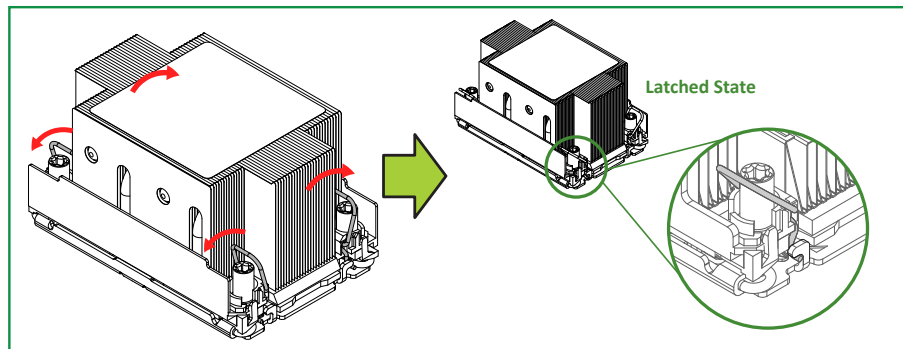


## Installing the PHM into the CPU Socket

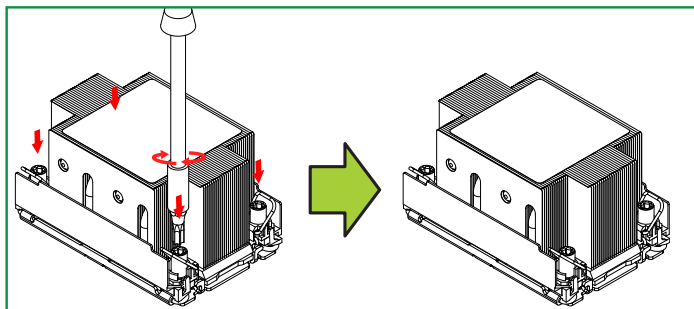
1. Locate four threaded fasteners (a, b, c, d) on the CPU socket.
2. Align PEEK nut A, which is next to the triangle (Pin 1) on the heatsink, against threaded fastener a on the CPU socket. Then align PEEK nuts B, C, and D on the heatsink against threaded fasteners b, c, and d on the CPU socket, making sure that all PEEK nuts on the heatsink are properly aligned with the correspondent threaded fasteners on the CPU socket.



3. Once they are aligned, gently place the heatsink on top of the CPU socket, making sure that each PEEK nut is properly attached to its corresponding threaded fastener.



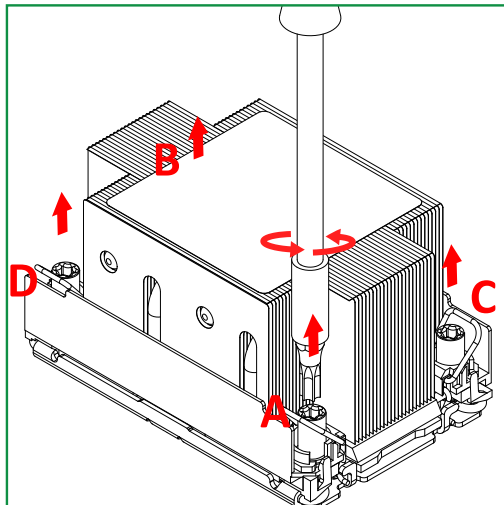
4. Press all four rotating wires outwards and make sure that the heatsink is securely latched onto the CPU socket.
5. With a T30 screwdriver, tighten all PEEK nuts in the sequence of A, B, C, and D with even pressure. To avoid damaging the processor or socket, do not use excessive force when tightening the PEEK nuts. (For best durability, 8in-lbf torque is recommended.)
6. Examine all corners of the heatsink to ensure that the PHM is firmly attached to the CPU socket.



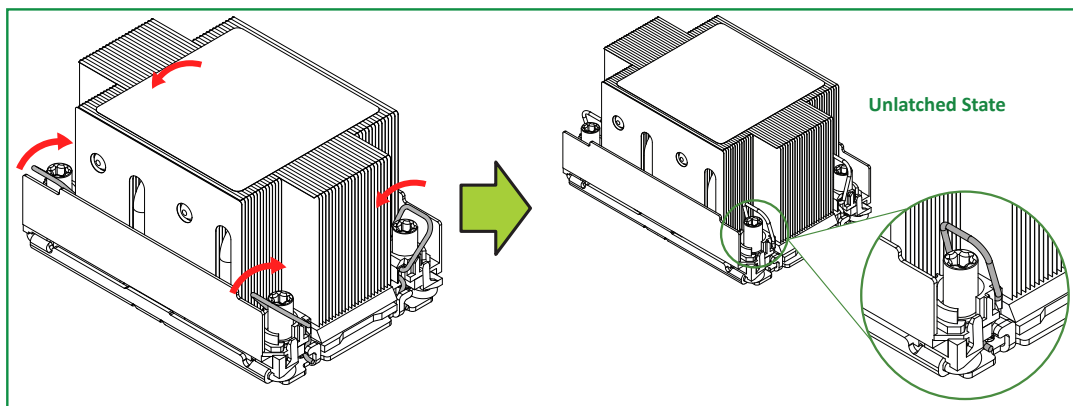
## Removing the PHM from the CPU Socket

Before removing the PHM from the motherboard, be sure to shut down the system and unplug the power cables from the power supply. Then follow the steps below:

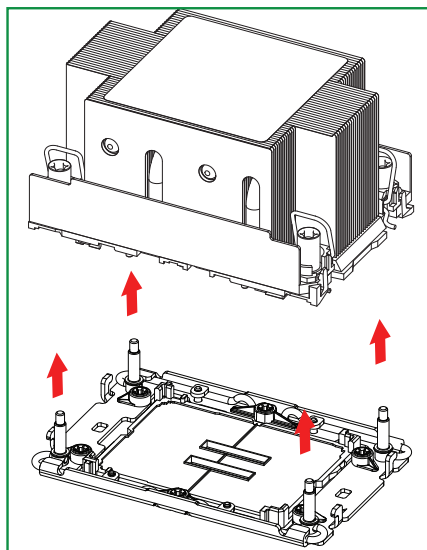
1. Use a T30 screwdriver to loosen the four PEEK nuts on the heatsink in the sequence of A, B, C, and D.



2. Once the PEEK nuts are loosened from the CPU socket, press the rotating wires inwards to unlatch the PHM from the socket as shown in the drawings below.



3. Gently pull the PHM upwards to remove it from the CPU socket.

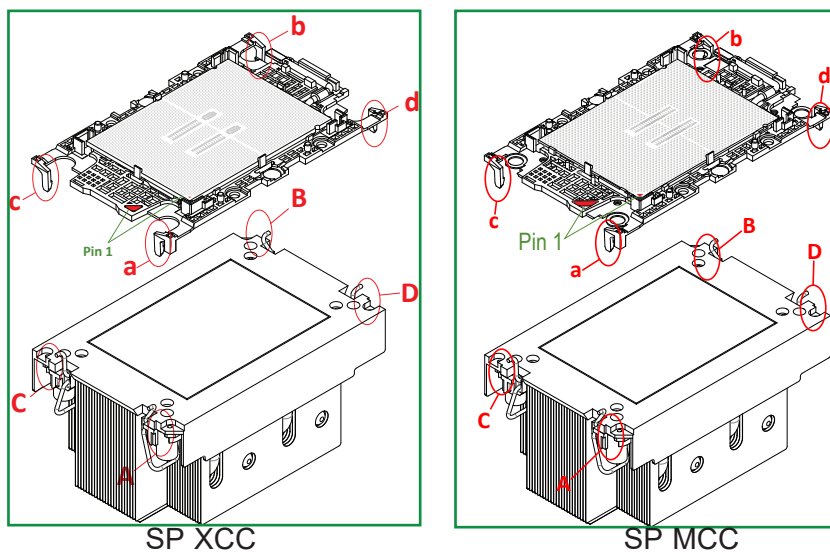


## Removing the Processor Carrier Assembly from the PHM

To remove the processor carrier assembly from the PHM, please follow the steps below:

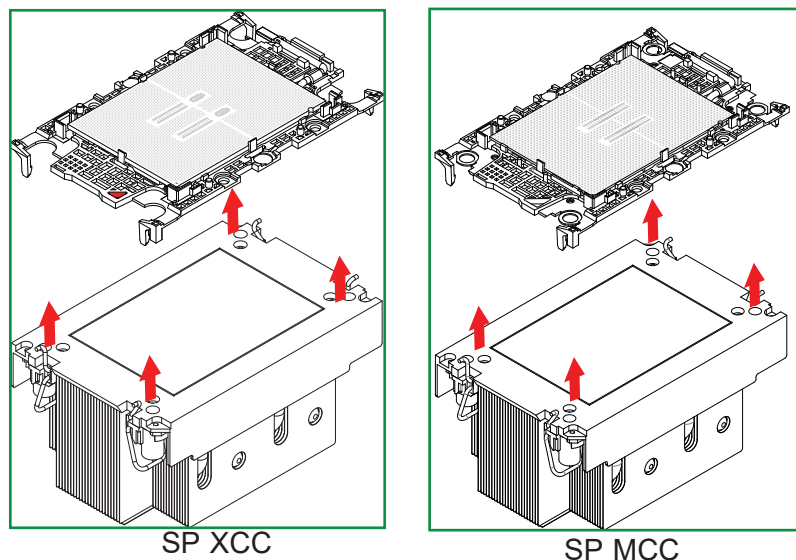
1. Detach the four plastic clips (marked a, b, c, d) on the processor carrier assembly from the four corners of the heatsink (marked A, B, C, D) as shown in the drawings below.

2U Heatsink (View of Component Side and Heatsink Bottom Side)



2. When all plastic clips are detached from the heatsink, remove the processor carrier assembly from the heatsink.

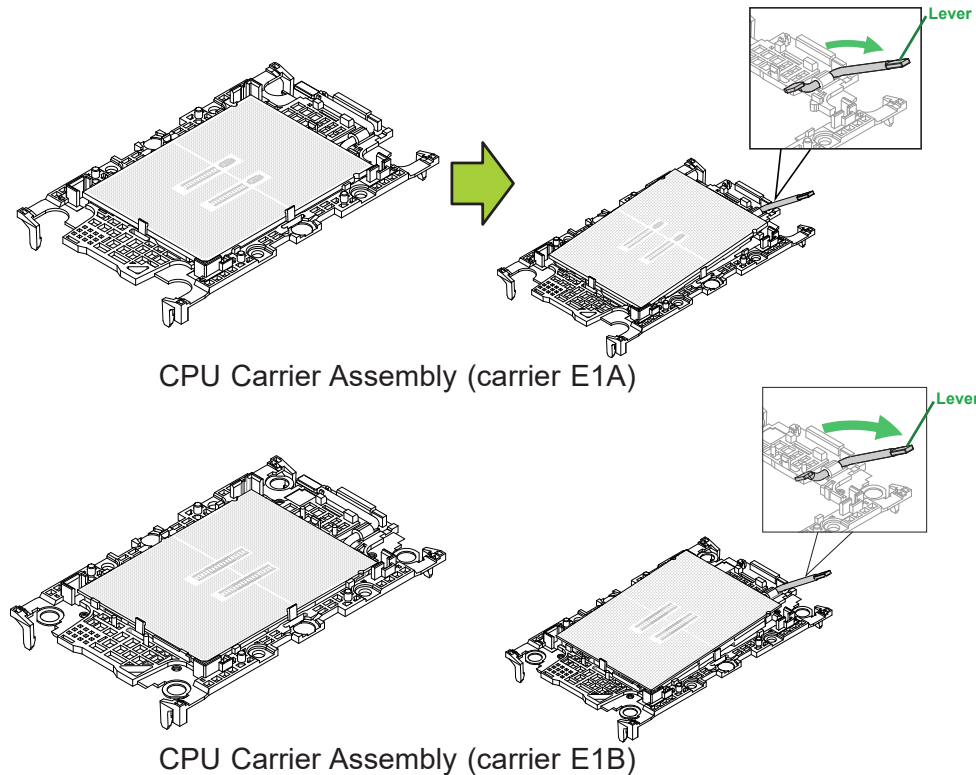
2U Heatsink (View of Component Side and Heatsink Bottom Side)



## Removing the Processor from the Processor Carrier Assembly

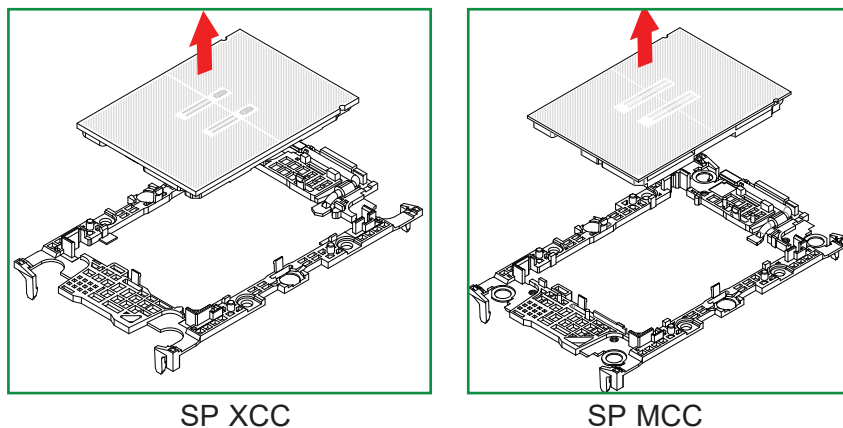
Once you have removed the processor carrier assembly from the PHM, you are ready to remove the processor from the processor carrier by following the steps below.

1. Unlock the lever from its locked position and push the lever upwards to disengage the processor from the processor carrier as shown in the drawing on the right below.



2. Once the processor is loosened from the carrier, carefully remove the processor from the processor carrier.

**Note:** Please handle the processor with care to avoid damaging the processor and its pins.



## 3.4 Memory

This motherboard supports up to 4 TB memory capacity with 16 DIMMs of 256 GB 3DS RDIMM/RDIMM DDR5 ECC memory.

**Note:** Memory speed and capacity support depends on the processors used in the system. In addition, RDIMM, RDIMM 3DS, and 9x4 RDIMM type memory cannot be mixed.

### DIMM Population Guidelines for Optimal Performance

For optimal memory performance, follow the instructions listed in the tables below when populating memory modules.

#### *Key Parameters for DIMM Configuration*

Key Parameters for DIMM Configurations	
Parameters	Possible Values
Number of Channels per Socket	1, 2, 4, 6, 8
Number of DIMMs per Channel	1DPC (1 DIMM Per Channel) or 2DPC (2 DIMMs Per Channel)
DIMM Type	RDIMM and 3DS RDIMM
DIMM Construction	non-3DS RDIMM Raw Cards: A (2Rx4), C (1Rx4), D (1Rx8), E (2Rx8) 3DS RDIMM Raw Cards: A (4Rx4, 8Rx4) 9x4 RDIMM Raw Cards: B (2Rx4), F (1Rx4)

## Memory Population Tables

DDR5 Memory Support for the 4th Generation Intel Xeon Scalable Processors				
Type	Ranks Per DIMM & Data Width (Stack)	DIMM Capacity (GB) (Memory Density:16Gb)	Speed (MT/s); Voltage (V); DIMM Per Channel (DPC)	
			1DPC (Note)	2DPC
			1.1V	
RDIMM	SRx8 (RC D)	16GB	4800	4400
	SRx4 (RC C)	32GB		
	SRx4 (RC F) 9x4	32GB		
	DRx8 (RC E)	32GB		
	DRx4 (RC A)	64GB		
	DRx4 (RC B) 9x4	64GB		
RDIMM 3DS	(4R/8R) x4 (RC A)	2H-128GB 4H-256GB		
LRDIMM/LRDIMM-3DS	N/A	N/A	Not Supported	Not Supported

**Note:** 1DPC applies to 1 SPC (Sockets Per Channel) or 2 SPC implementation.

### Memory Population Table

DDR5 Memory Population Table	
<b>1 CPU</b>	<b>Memory Population Sequence</b>
1 CPU & 1 DIMM	P1-DIMMA1 or P1-DIMME1 or P1-DIMMB1 or P1-DIMMF1
1 CPU & 2 DIMMs	P1-DIMMA1 / P1-DIMMG1 or P1-DIMMC1 / P1-DIMME1
1 CPU & 4 DIMMs	P1-DIMMA1 / P1-DIMMC1 / P1-DIMME1 / P1-DIMMG1
1 CPU & 6 DIMM	P1-DIMMA1 / P1-DIMMC1 / P1-DIMMD1 / P1-DIMME1 / P1-DIMMF1 / P1-DIMMG1 or P1-DIMMA1 / P1-DIMMB1 / P1-DIMMC1 / P1-DIMME1 / P1-DIMMG1 / P1-DIMMH1 or P1-DIMMB1 / P1-DIMMC1 / P1-DIMMD1 / P1-DIMME1 / P1-DIMMF1 / P1-DIMMH1 or P1-DIMMA1 / P1-DIMMB1 / P1-DIMMD1 / P1-DIMMF1 / P1-DIMMG1 / P1-DIMMH1
1 CPU & 8 DIMMs	P1-DIMMA1 / P1-DIMMB1 / P1-DIMMC1 / P1-DIMMD1 / P1-DIMME1 / P1-DIMMF1 / P1-DIMMG1 / P1-DIMMH1
<b>2 CPUs (Recommended)</b>	<b>Memory Population Sequence</b>
2 CPUs & 2 DIMMs	<b>CPU1:</b> P1-DIMMA1, <b>CPU2:</b> P2-DIMMA1 or <b>CPU1:</b> P1-DIMME1, <b>CPU2:</b> P2-DIMME1 or <b>CPU1:</b> P1-DIMMB1, <b>CPU2:</b> P2-DIMMB1 or <b>CPU1:</b> P1-DIMMF1, <b>CPU2:</b> P2-DIMMF1
2 CPUs & 4 DIMMs	<b>CPU1:</b> P1-DIMMA1 / P1-DIMMG1, <b>CPU2:</b> P2-DIMMA1 / P2-DIMMG1 or <b>CPU1:</b> P1-DIMMC1 / P1-DIMME1, <b>CPU2:</b> P2-DIMMC1 / P2-DIMME1
2 CPUs & 8 DIMMs	<b>CPU1:</b> P1-DIMMA1 / P1-DIMMC1 / P1-DIMME1 / P1-DIMMG1 <b>CPU2:</b> P2-DIMMA1 / P2-DIMMC1 / P2-DIMME1 / P2-DIMMG1
2 CPUs & 12 DIMMs	<b>CPU1:</b> P1-DIMMA1/P1-DIMMC1/P1-DIMMD1/P1-DIMME1/P1-DIMMF1/P1-DIMMG1 <b>CPU2:</b> P2-DIMMA1/P2-DIMMC1/P2-DIMMD1/P2-DIMME1/P2-DIMMF1/P2-DIMMG1 <b>CPU1:</b> P1-DIMMA1/P1-DIMMB1/P1-DIMMC1/P1-DIMME1/P1-DIMMG1/P1-DIMMH1 <b>CPU2:</b> P2-DIMMA1/P2-DIMMB1/P2-DIMMC1/P2-DIMME1/P2-DIMMG1/P2-DIMMH1 <b>CPU1:</b> P1-DIMMB1/P1-DIMMC1/P1-DIMMD1/P1-DIMME1/P1-DIMMF1/P1-DIMMH1 <b>CPU2:</b> P2-DIMMB1/P2-DIMMC1/P2-DIMMD1/P2-DIMME1/P2-DIMMF1/P2-DIMMH1 <b>CPU1:</b> P1-DIMMA1/P1-DIMMB1/P1-DIMMD1/P1-DIMMF1/P1-DIMMG1/P1-DIMMH1 <b>CPU2:</b> P2-DIMMA1/P2-DIMMB1/P2-DIMMD1/P2-DIMMF1/P2-DIMMG1/P2-DIMMH1
2 CPUs & 16 DIMMs	<b>CPU1:</b> P1-DIMMA1/P1-DIMMB1/P1-DIMMC1/P1-DIMMD1/P1-DIMME1/P1-DIMMF1/P1-DIMMG1/P1-DIMMH1 <b>CPU2:</b> P2-DIMMA1/P2-DIMMB1/P2-DIMMC1/P2-DIMMD1/P2-DIMME1/P2-DIMMF1/P2-DIMMG1/P2-DIMMH1

**Note:** This memory configuration is recommended by Supermicro for optimal memory performance. Please use this configuration to maximize your memory performance.

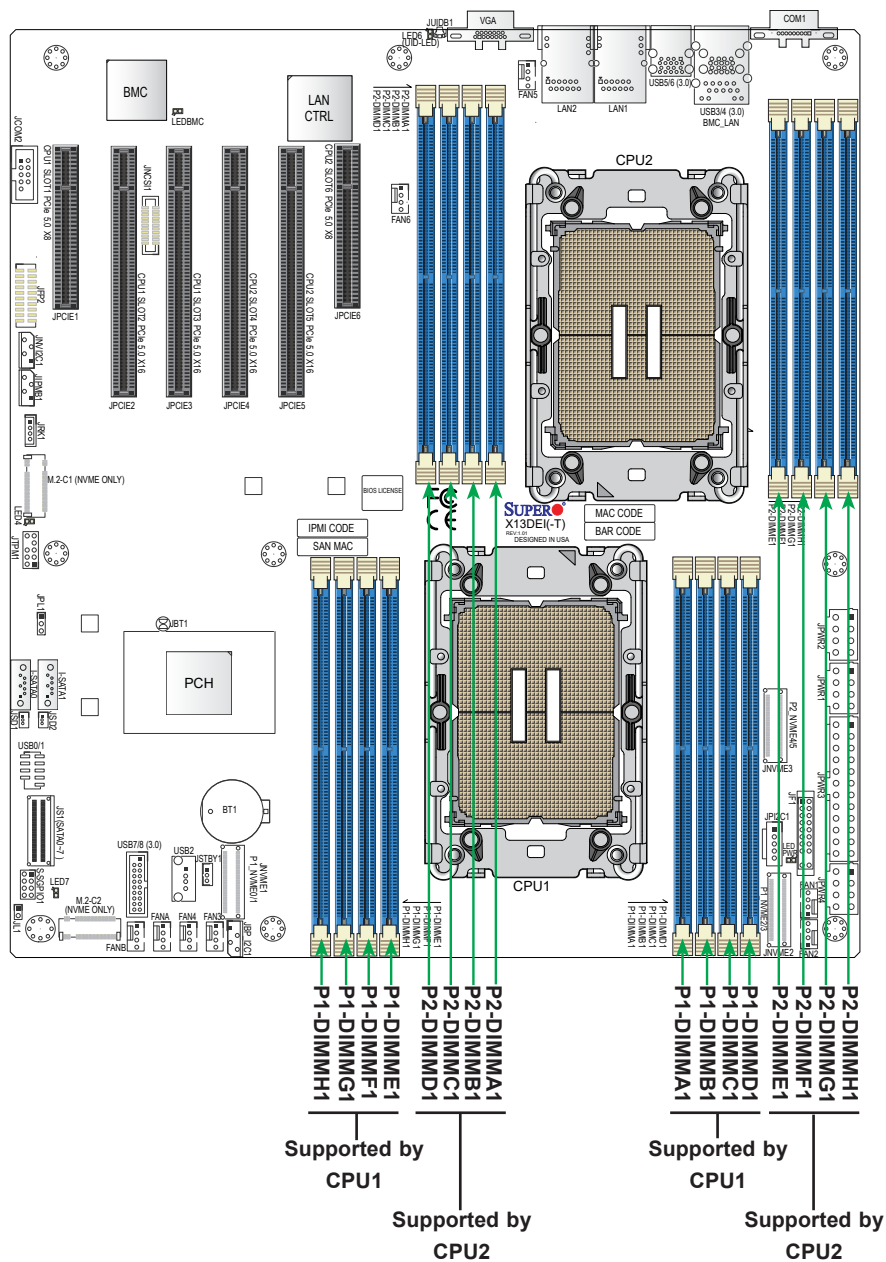
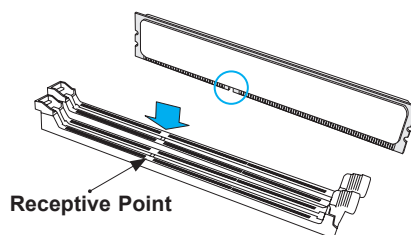


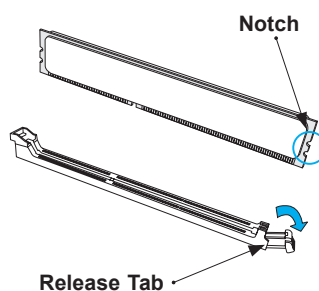
Figure 3-2. DIMM Slot Locations

## DIMM Installation

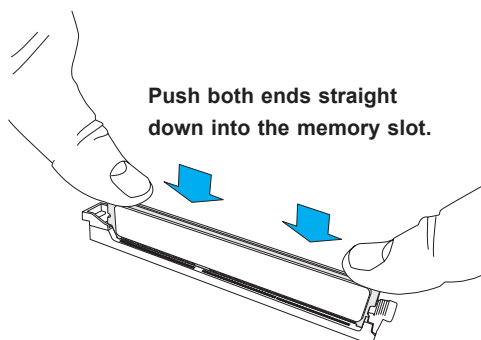
1. Insert the desired number of DIMM modules based on the recommended DIMM population table at the beginning of this section (3.4 Memory).
2. Align the DIMM module key with the receptive point on the single-latch DIMM slot.



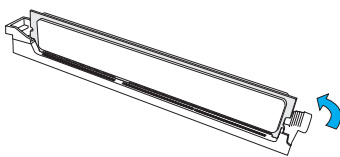
3. Push the release tab outwards to unlock the slot.



4. Press both ends of the module straight down into the slot until the module snaps into place.



5. Push the release tab to the lock position to secure the module into the slot.



## DIMM Removal

Reverse the steps above to remove the DIMM modules from the motherboard.



## 3.5 Motherboard Battery

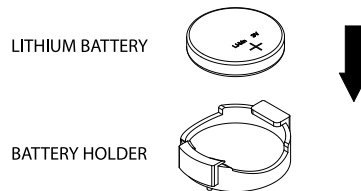
The motherboard uses non-volatile memory to retain system information when system power is removed. This memory is powered by a lithium battery residing on the motherboard.

### ***Replacing the Battery***

Begin by [removing power](#) from the system.

1. Push aside the small clamp that covers the edge of the battery. When the battery is released, lift it out of the holder.
2. To insert a new battery, slide one edge under the lip of the holder with the positive (+) side facing up. Then push the other side down until the clamp snaps over it.

**Note:** 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. Please comply with the regulations set up by your local hazardous waste management agency to dispose of your used battery properly.



**Figure 3-3. Installing the Onboard Battery**

**Warning:** There is a danger of explosion if the onboard battery is installed upside down (which reverses its polarities). This battery must be replaced only with the same or an equivalent type recommended by the manufacturer (CR2032).

## 3.6 Storage Drives

The system supports 24 hot-swap 3.5" SAS3/SATA3 (up to six native hybrid SAS3/SATA3/NVMe drive bays) storage drives in hybrid bays.

The drives are mounted in toolless drive carriers that simplify their removal from the chassis. These carriers also help promote proper airflow.

**Note:** Enterprise level storage drives are recommended for use in Supermicro chassis and servers. For information on recommended drives, visit the Supermicro website product pages at [www.supermicro.com/products](http://www.supermicro.com/products).

### Drive Carrier Indicators

Each drive carrier has two LED indicators: an activity indicator and a status indicator. The meaning of each indicator is described in the table below.

Drive Carrier LED Indicators		
LED	Color	Status
Activity	Green	When illuminated this LED indicates drive activity.
Status	Red	When illuminated this LED indicates a drive failure.

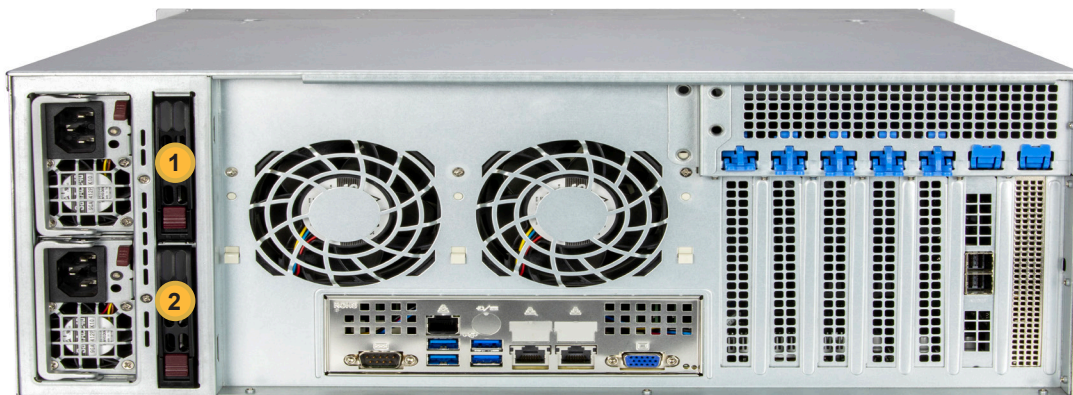
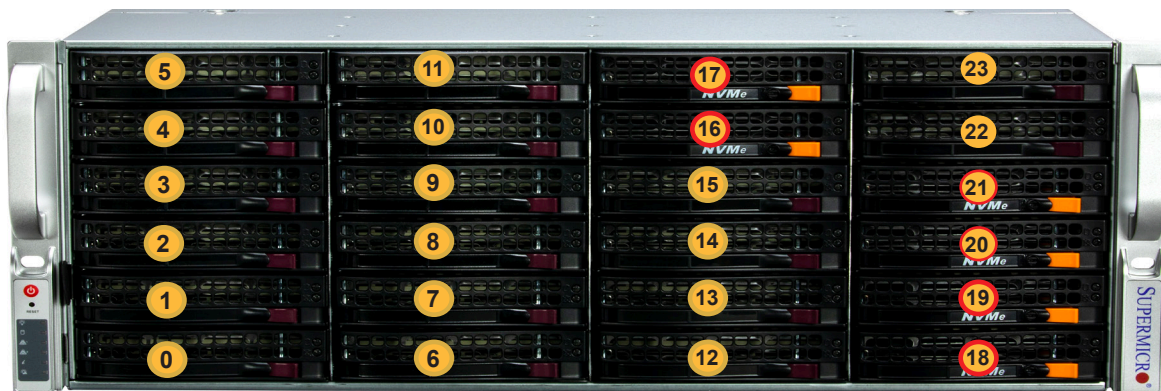
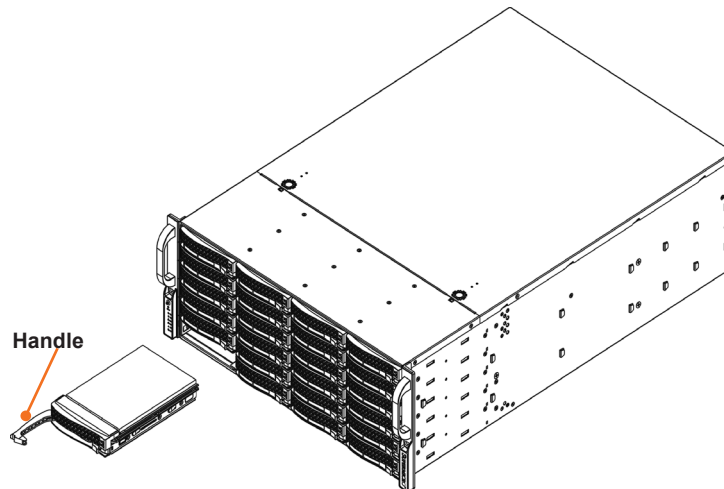


Figure 3-4. Logical Drive Numbers

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

1. Remove the two screws securing the dummy drive to the drive tray and remove the dummy drive. Place the drive tray on a flat surface such as a desk, table or work bench.



**Figure 3-5. Removing a Drive Carrier**

2. Slide the drive into the tray with the printed circuit board side facing down.
3. Carefully align the mounting holes in both the drive tray and the drive.
4. Secure the drive to the tray using six screws.
5. Replace the drive tray into the chassis. Make sure to close the drive tray handle to lock the drive tray into place.

### ***Installing a Drive***

1. Insert a drive into the carrier with the connector end toward the rear of the carrier. Align the drive in the carrier so that the screw holes line up. Note that there are holes in the carrier marked "SATA" to aid in correct installation.
2. Secure the drive to the carrier with four M3 screws as illustrated below. These screws are included in the chassis accessory box.
3. Insert the drive carrier with the disk drive into its bay, keeping the carrier oriented so that the drive is on the top of the carrier and the release button is on the right side. When the carrier reaches the rear of the bay, the release handle will retract.
4. Push the handle in until it clicks into its locked position

## 3.7 System Cooling

### Fans

Three 8-cm hot-swap chassis fans and two 8-cm exhaust fans provide the cooling for the SSG-641E-E1CR24(H/L). It is very important that the top cover of the chassis is properly installed in order for the cooling air to circulate properly through the chassis and cool the components.

System power does not need to be shut down since the fans are hot-swappable.

### *System Fan Failure*

Fan speed is controlled by system temperature via IPMI. If a fan fails, the remaining fans will ramp up to full speed and the overheat/fan fail LED on the control panel will turn on. Replace any failed fan at your earliest convenience with the same type and model (the system can continue to run with a failed fan). Remove the top chassis cover while the system is still running to determine which of the fans has failed.

### *Replacing a System Fan*

1. Depress the tab on the side of the fan to unlock and remove the fan along with its housing. The fan's power connections will automatically detach.
2. Replace the failed fan with an identical 8-cm, 12 volt fan (available from Supermicro).
3. Position the new fan into the space vacated by the failed fan previously removed. A "click" can be heard when the fan is fully installed in place and the power connections are made.
4. If the system power is on, the hot-swap feature will cause the fan to start immediately upon being connected to its header on the serverboard.

### *Replacing an Exhaust Fan*

The two rear exhaust fans are also hot-swappable.

1. Depress the tab on the side of the fan to unlock it.
2. Pull it straight up and out of the chassis.
3. Replace the failed fan with an identical 8-cm, 12 volt fan (available from Supermicro).
4. Position the new fan into the space vacated by the failed fan previously removed. A "click" can be heard when the fan is fully installed in place and the power connections are made.

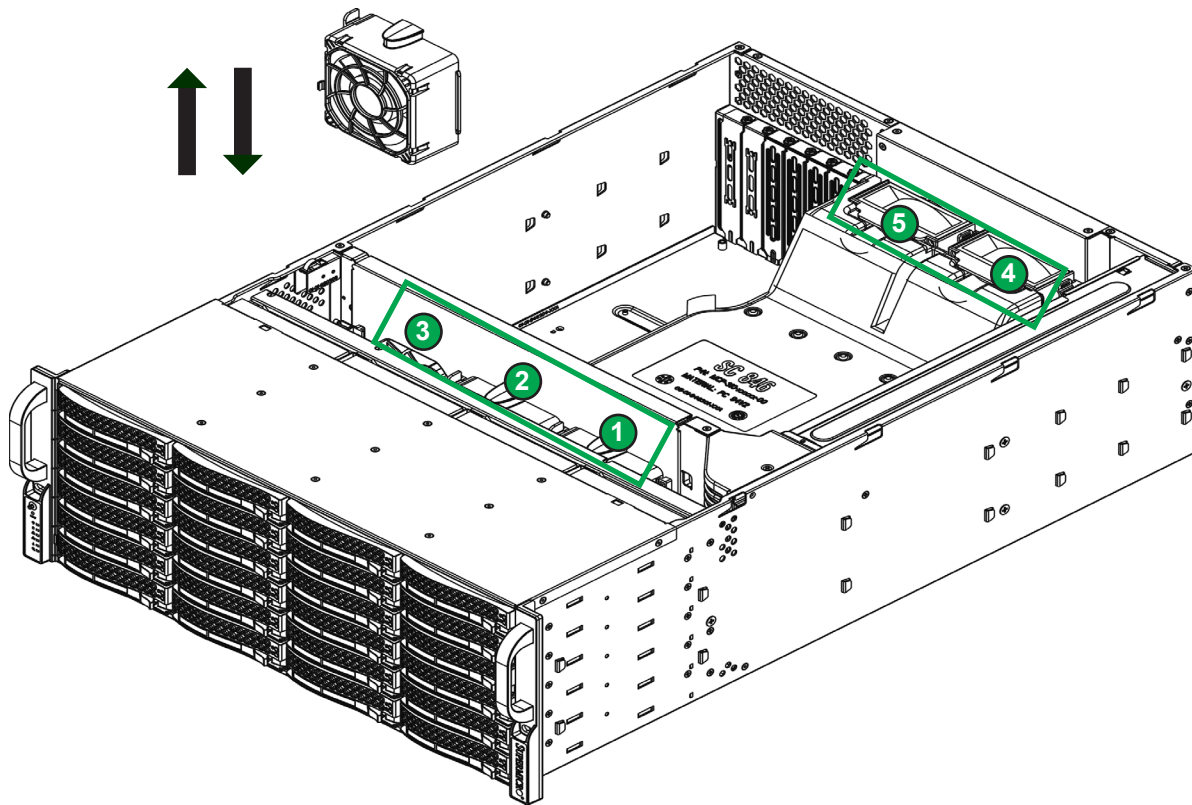


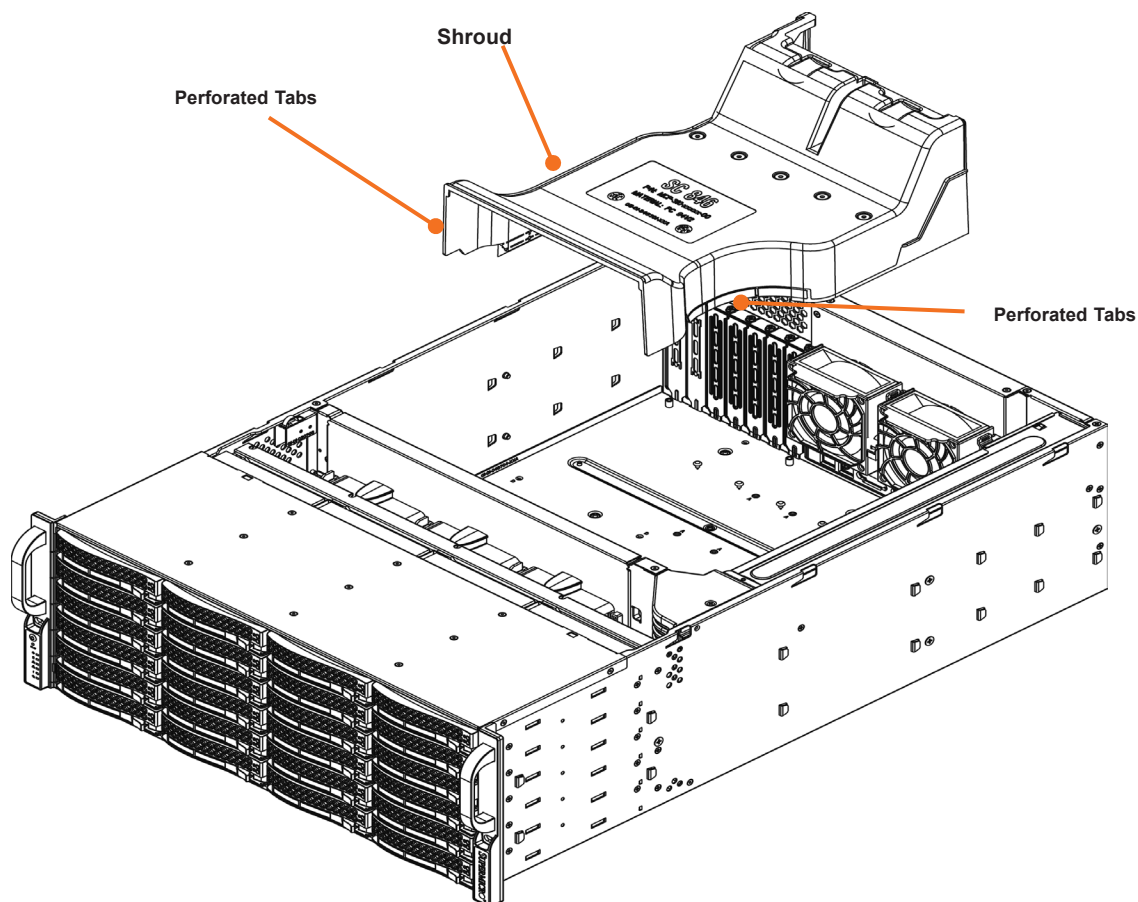
Figure 3-6. Fan Positions

### ***Installing the Air Shrouds***

Air shrouds concentrate airflow to maximize fan efficiency. They do not require screws to install.

#### ***Installing the Standard Air Shrouds***

- Position the air shrouds as illustrated in the figure below, sliding the front over the edge of the fan tray. Align the holes in the edge of the shrouds with the hold in the fan tray.



**Figure 3-7. Installing the Air Shrouds**

## 3.8 Power Supply

The chassis features redundant power supplies. The system will continue to operate if one module fails. It should be replaced as soon as convenient. The power supply modules are hot-swappable, meaning they can be changed without powering down the system. New units can be ordered directly from Supermicro or authorized distributors.

These power supplies are auto-switching capable. This feature enables them to automatically sense the input voltage and operate at a 100-120v or 180-240v.

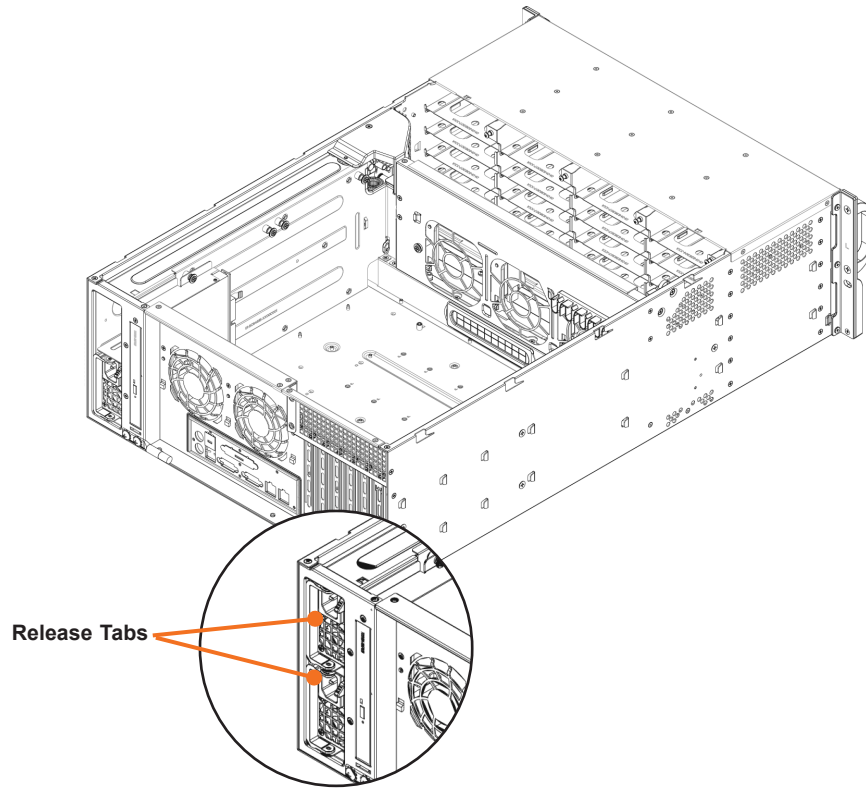
### Power Supply LEDs

On the rear of the power supply module, an LED displays the status.

- **Solid Green:** When illuminated, indicates that the power supply is on.
- **Blinking Green:** When blinking, indicates that the power supply is plugged in and turned off by the system.
- **Blinking Amber:** When blinking, indicates that the power supply has a warning condition and continues to operate.
- **Solid Amber:** When illuminated, indicates that the power supply is plugged in, and is in an abnormal state. The system might need service. Please contact Supermicro technical support.

#### ***Changing the Power Supply Module:***

1. Unplug the AC cord from the module to be replaced.
2. On the back of the module, push the release tab sideways.
3. Pull the module out using the handle.
4. Push the new power supply module into the power bay until it clicks. Replace with the same model.
5. Plug the AC power cord back into the module.



**Figure 3-8. Replacing the Power Supply**



## 3.9 PCI Expansion Cards

The system accepts up to four PCIe expansion cards.



Figure 3-9. Expansion Slots

Expansion Card Chassis Slots	
Item	Description
1	PCIe 5.0 x8 low-profile slot (occupied by 3908 or 3808 SAS controller)
2	PCIe 5.0 x16 low-profile slot (occupied by AOM for external SAS)
3	PCIe 5.0 x16 low-profile slot
4	PCIe 5.0 x16 low-profile slot
5	PCIe 5.0 x16 low-profile slot
6	PCIe 5.0 x8 low-profile slot

Note: PCIe slots 1 and 2 are occupied by the JBOD Expansion/Storage Controller.

### *Installing an Expansion Card*

1. Power down the system as described in section 3.1 and remove the cover.
2. Unscrew and remove the PCIe slot cover.
3. Insert the expansion card into a slot on the motherboard while aligning the expansion card backplate with the open slot in the rear of the chassis. Secure with a screw.
4. Replace the cover and power on the system.

### 3.10 Cable Routing Diagram

Use this section to route or reroute cables. Proper routing is important to maintain airflow through the system.

Cable part numbers and descriptions are available at the [Online Cable Matrix](#).

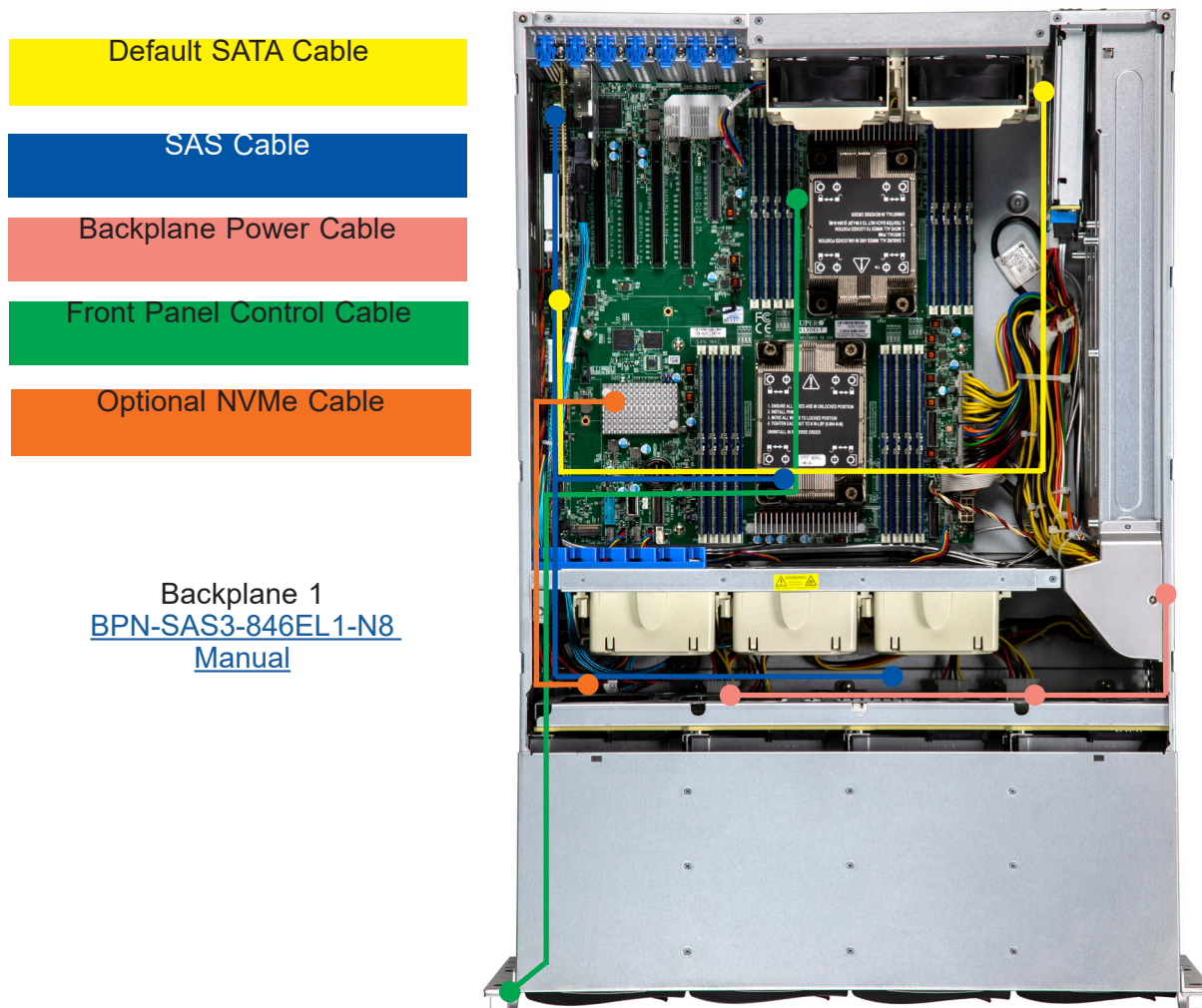


Figure 3-10. Cable Routing Diagram

## Chapter 4

# Motherboard Connections

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 [Chapter 1](#). More detail can be found in the [Motherboard Manual](#). Please review the Safety Precautions in [Appendix A](#) before installing or removing components.

## 4.1 Power Connections

### ATX Power Supply Connector

There is one 24-pin power supply connector (JPWR3) and three 8-pin 12V DC power connectors (JPWR1, JPWR2 and JPWR4) on the motherboard to provide power to your system. Refer to the table below for pin definitions.

ATX Power 24-pin Connector Pin Definitions			
Pin#	Definition	Pin#	Definition
13	+3.3 V	1	+3.3 V
14	NC	2	+3.3 V
15	Ground	3	Ground
16	PS_ON	4	+5 V
17	Ground	5	Ground
18	Ground	6	+5 V
19	Ground	7	Ground
20	Res (NC)	8	PWR_OK
21	+5 V	9	5VSB
22	+5 V	10	+12 V
23	+5 V	11	+12 V
24	Ground	12	+3.3 V

Required Connection

12 V 8-pin Power Pin Definitions	
Pin#	Definition
1 - 4	Ground
5 - 8	+12 V

## 4.2 Headers and Connectors

### Fan Headers

There are eight 4-pin fan headers (FAN1-FAN6, FANA-FANB) on the motherboard. All these 4-pin fan headers are backwards compatible with the traditional 3-pin fans. However, fan speed control is available for 4-pin fans only by Thermal Management via the BMC interface.

Fan Header Pin Definitions	
Pin#	Definition
1	Ground
2	2.5 A/+12 V
3	Tachometer
4	PWM_Control

### S-SGPIO Header

The S-SGPIO (Serial General Purpose Input/Output) header is used to communicate with the enclosure management chip on the backplane.

S-SGPIO Header Pin Definitions			
Pin#	Definition	Pin#	Definition
1	NC	2	NC
3	Ground	4	Data
5	Load	6	Ground
7	Clock	8	NC

NC = No Connection

### TPM/Port 80 Header

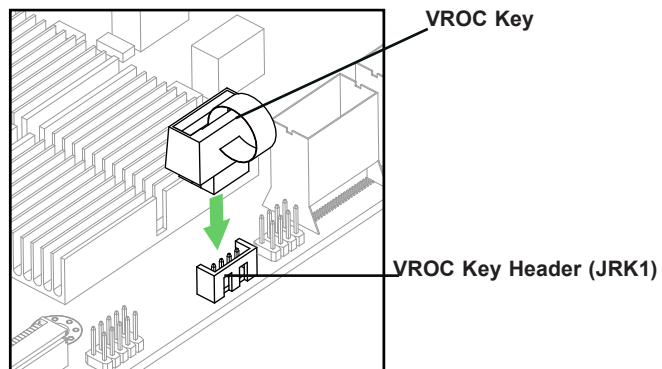
The JTPM1 header is used to connect a Trusted Platform Module (TPM)/Port 80, which is available from Supermicro (optional). A TPM/Port 80 connector is a security device that supports encryption and authentication in storage drives. It allows the motherboard to deny access if the TPM associated with the storage drive is not installed in the system. Please go to the following link for more information on the TPM: [https://www.supermicro.com/manuals/other/AOM-TPM-9670V\\_9670H.pdf](https://www.supermicro.com/manuals/other/AOM-TPM-9670V_9670H.pdf).

Trusted Platform Module Header Pin Definitions			
Pin#	Definition	Pin#	Definition
1	+3.3 V	2	SPI_CS#
3	RESET#	4	SPI_MISO
5	SPI_CLK	6	GND
7	SPI_MOSI	8	NC
9	+3.3 V Stdby	10	SPI_IRQ#

### VROC RAID Key Header

A VROC RAID Key header is located at JRK1 on the motherboard. For NVMe RAID support, install a VROC RAID Key on JRK1 as shown in the illustration below.

Intel VROC Key Pin Definitions	
Pin#	Definition
1	Ground
2	3.3V Standby
3	Ground
4	PCH RAID Key



### Standby Power

The Standby Power header is located at JSTBY1 on the motherboard. You must have a card with a Standby Power connector and a cable to use this feature.

Standby Power Pin Definitions	
Pin#	Definition
1	+5 V Standby
2	Ground
3	No Connection

### Power SMB (I<sup>2</sup>C) Header

The Power System Management Bus (I<sup>2</sup>C) connector (JPI2C1) monitors the power supply, fan, and system temperatures.

Power SMB Header Pin Definitions	
Pin#	Definition
1	Clock
2	Data
3	PMBUS_Alert
4	Ground
5	+3.3 V

### 4-pin BMC External I<sup>2</sup>C Header

Two System Management Bus headers for BMC are located at JIPMB1 and JBP\_I2C1. Connect the appropriate cable here to use the IPMB I<sup>2</sup>C connection on your system.

External I <sup>2</sup> C Header Pin Definitions	
Pin#	Definition
1	Data
2	Ground
3	Clock
4	No Connection

### Chassis Intrusion

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

Chassis Intrusion Pin Definitions	
Pin#	Definition
1	Intrusion Input
2	Ground

### NVMe SMBus Header

The NVMe SMBus (I<sup>2</sup>C) header (JNVI2C1) provides hot-plug support via a dedicated SMBus interface. This feature is only available for a Supermicro complete system with an SMCI-proprietary NVMe add-on card and a proper cable installed.

NVMe SMBus Header Pin Definitions	
Pin#	Definition
1	Data
2	Ground
3	Clock
4	VCCIO

### PCIe 4.0 M.2 Slots

The X13DEI-T motherboard has two PCIe 4.0 M.2 slots. M.2 allows for a variety of card sizes, increased functionality, and spatial efficiency. The M.2 slots on the motherboard support PCIe 4.0 x2 M.2 NVMe SSDs in the 2280 and 22110 form factors.

### NCSI Connector

The Network Controller Sideband Interface (NCSI) connector is located at JNCSI1. The connector is used to connect a Network Interface Card (NIC) to the motherboard to allow the onboard BMC to communicate with a network.

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

### SATA 3.0 Ports

The X13DEI-T has two SATA 3.0 ports (I-SATA0~1). These SATA ports are supported by the Intel® C741 chipset. I-SATA0/1 can be used with Supermicro SuperDOMs which are orange SATA DOM connectors with power pins built in, and do not require external power cables.

A slim SAS connector, located at JS1, supports eight SATA 3.0 connections (SATA0~7). These SATA 3.0 ports are supported by the Intel® C741 chipset. Connect a proper SATA cable to JS1 to use SATA 3.0 connections.

### DOM Power Connector

Two power connectors for SATA DOM (Disk-On-Module) devices are located at JSD1 and JSD2. Connect appropriate cables here to provide power support for your Serial Link DOM devices.

DOM Power Connector Pin Definitions	
Pin#	Definition
1	5V
2	Ground
3	Ground

### MCIO NVMe Connectors

MCIO NVMe connectors, located at JNVME1, JNVME2, and JNVME3. Each connector provides two PCIe 5.0 x4 connections for a total of six connections. JNVME1 and JNVME2 connections are supported by CPU1. JNVME3 is supported by CPU2. Use these MCIO connectors to support high-speed PCIe NVMe storage devices.

**Note:** When installing an NVMe device on a motherboard, please be sure to connect the first NVMe port (JNVME1) first for your system to work properly.

## Front Control Panel

The front control panel header (JF1) 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. See the table below for the descriptions of the front control panel buttons and LED indicators.

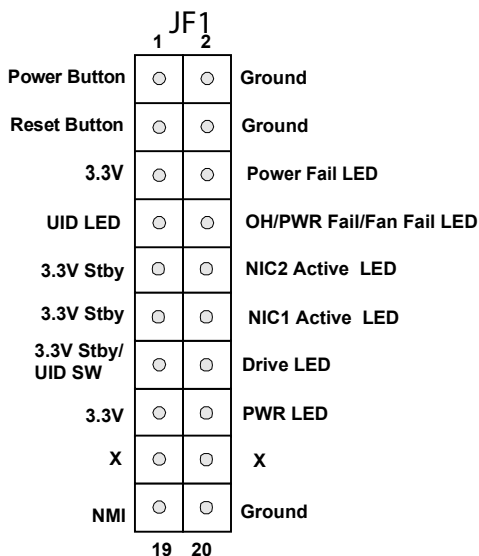


Figure 4-1. Front Control Panel Header (JF1)

Front Control Panel (JF1) LED Indicators						
Event	Power (LED1)	Drive (LED2)	LAN (LED3/4)	UID (LED5)	Information (LED5)	Power Fail (LED6)
Power On	Solid On					
Drive Activity		Blinking				
NIC Activity			Blinking			
Overheat					Solid On	
Fan Fail					Blinking @1Hz	
Power Fail					Blinking @1/4Hz	Solid On
Local UID On				Solid On		
Remote UID On				Blinking 1Hz		
Checking	BMC/BIOS Blinking @4HZ					
Recovering/Updating	BMC Blinking @4HZ BMC 2 Blinks @4Hz, 1 Pause @2Hz (on-on-off-off)			BIOS/BMC Blinking @10Hz		
Flash Not Detected or Golden Image Check Failed	BMC/BIOS Blinking @1HZ					
CPLD Recovery Mode				Blinking @10Hz (MB UID LED)	Blinking @10Hz (FP Red LED)	



### Power On & BMC/BIOS Status LED Button

The Power On and BMC/BIOS Status LED button is located on pins 1 and 2 of JF1. Momentarily contacting both pins will power on/off the system or display BMC/BIOS status.

Power Button & BIOS/BMC Status LED Indicator Pin Definitions (JF1)	
Pin#	Definition
1	Signal
2	Ground

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

### Reset Button

The Reset Button connection is located on pins 3 and 4 of JF1. Momentarily contacting both pins will reset the system.

Reset Button Pin Definitions (JF1)	
Pin#	Definition
3	Reset
4	Ground

### Power Fail LED

The Power Fail LED connection is located on pins 5 and 6 of JF1. When this LED turns solid red, it indicates a power failure.

Power Fail LED Pin Definitions (JF1)	
Pin#	Definition
5	3.3V
6	PWR Fail for LED6 (Solid red on: PWR failure)

### Information LED (OH/Fan Fail/PWR Fail/UID LED)

The Information LED (OH/Fan Fail/PWR Fail/UID LED) connection is located on pins 7 and 8 of JF1. The LED on pin 7 is active when the UID button (JUIDB1) on the rear I/O panel is pressed. The LED on pin 8 provides warnings of overheat, power failure, or fan failure.

Information LED-Blue+ (OH/Fan Fail/PWR Fail LED for LED5/blue UID LED) (Pin 7 & Pin 8 of JF1) LED Indicator Status	
Status	Description
<b>Solid red (on)</b>	An overheat condition has occurred.
<b>Blinking red (1 Hz)</b>	Fan failure: check for an inoperative fan.
<b>Blinking red (0.25 Hz)</b>	Power failure: check for a non-operational power supply
<b>Blinking red (10 Hz) (FP red LED)</b>	CPLD recovery mode error(s)
<b>Solid blue</b>	Local UID is activated. Use this function to locate a unit in a rack mount environment that might be in need of service.
<b>Blinking blue (1 Hz)</b>	Remote UID is on. Use this function to identify a unit from a remote location that might be in need of service.
<b>BIOS/BMC blinking blue (10 Hz)</b>	BIOS/BMC: recovery and/or update in progress
<b>Red Info LED blinking (10 Hz) and MB UID LED blue blinking (10 Hz)</b>	CPLD: recovery and/or update in progress

### NIC1/NIC2 (LAN1/LAN2)

The NIC (Network Interface Controller) LED connection for LAN port 1 is located on pins 11 and 12 of JF1, and LAN port 2 is on pins 9 and 10.

LAN1/LAN2 LED Pin Definitions (JF1)			
Pin#	Definition	Pin#	Definitin
9	NIC 2 Activity LED	10	NIC 2 Link LED
11	NIC 1 Activity LED	12	NIC 1 Link LED

LAN1/LAN2 LED LED Indicator Status	
Color	State
NIC 2: Blinking green	LAN 2: Active
NIC 1: Blinking green	LAN 1: Active

### ID\_UID Switch/Drive LED

The UID Switch/Drive LED connection is located on pins 13 and 14 of JF1. The UID switch is used for a chassis that supports a front UID switch. The front UID switch functions in the same way as the rear UID switch; both are for input only and cannot be used for output.

When this LED is blinking green, it indicates the drive is active. Attach a cable to pins 13 and 14 to show ID\_UID status and storage drive activity.

ID_UID/Drive LED Pin Definitions (JF1)	
Pins	Definition
13	ID_UID/3.3 V Stdby
14	Drive Activity

ID_UID/Drive LED Pin Definitions (JF1)	
Color	State
Blinking Green	Drive Active

### Front Panel Power LED

The Front Panel Power LED connection is located on pins 15 and 16 of JF1.

FP Power LED Pin Definitions (JF1)	
Pins	Definition
15	3.3V
16	FP PWR LED

### NMI Button

The non-maskable interrupt (NMI) button header is located on pins 19 and 20 of JF1.

NMI Button Pin Definitions (JF1)	
Pins	Definition
19	NMI
20	Ground

## 4.3 Input/Output Ports

See the figure below for the locations and descriptions of the I/O ports on the rear of the motherboard.

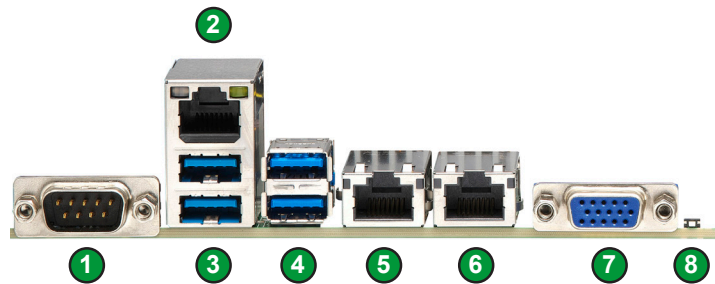


Figure 4-2. Rear I/O Ports

Rear I/O Ports			
#	Description	#	Description
1.	COM Port 1	5.	10GbE LAN1
2.	Dedicated IPMI LAN	6.	10GbE LAN2
3.	USB3/4 (3.0)	7.	VGA Port
4.	USB5/6 (3.0)	8.	UID/BMC Reset Switch

### VGA Connections

There are two VGA connections in your system. The rear VGA port is located at VGA on the rear I/O panel, and the front VGA header is located at JFP2 on the motherboard. These VGA connections provide analog interface support between the computer and the video displays.

### COM Ports

Two COM (communication) ports that support serial link interface are on this motherboard. COM1 is located on the rear I/O panel. COM2 is located at JCOM2 next to PCIe Slot 1 (JPCIE1).

COM2 (JCOM2) Pin Definitions			
Pin#	Definition	Pin#	Definition
1	SP_DCD2	6	SP_DSR2
2	SP_RXD2	7	SP_RTS2
3	SP_TXD2	8	SP_CTS2
4	SP_DTR2	9	SP_R12
5	Ground		

## LAN Ports (LAN1/LAN2 & BMC LAN)

Two Ethernet LAN ports (LAN1/LAN2) and an IPMI dedicated LAN (BMC\_LAN) are located on the rear I/O panel. The LAN1/LAN2 ports support a 10GbE LAN connection (via the Broadcom 5720 LAN controller). The dedicated IPMI LAN, located above the USB2/3 ports on the rear I/O panel, provides LAN support for the BMC (Baseboard Management Controller). All of these LAN ports accept RJ45 cables. Please refer to the LED Indicator section for LAN LED information.

**Note:** To avoid LAN port overheating, the system will disable LAN2 in S5 mode.

## Universal Serial Bus (USB) Ports and Headers

There are four USB 3.0 ports (USB3/4 and USB5/6) on the rear I/O panel. One 10-pin black USB 2.0 header (USB0/1) and one USB 3.0 header (USB7/8) are located on the motherboard, and each supports two USB connections for front access. There is also one vertical Type-A USB 2.0 connector (USB2) on the motherboard. These USB ports and headers can be used for USB support via USB cables (not included).

USB 2.0 Header (USB0/1) Pin Definitions			
Pin#	Definition	Pin#	Definition
1	+5 V	2	+5 V
3	USB_N	4	USB_N
5	USB_P	6	USB_P
7	GND	8	GND
9	Key	10	NC

Internal USB 2.0 Vertical Header (USB2) Pin Definitions	
Pin#	Definition
1	+5 V
2	USB_N
3	USB_P
4	GND

Rear I/O Panel USB 3.0 Ports (USB3/4) Pin Definitions			
Pin#	Definition	Pin#	Definition
1	VBUS	10	VBUS
2	USB_N	11	USB_N
3	USB_P	12	USB_P
4	GND	13	GND
5	USB3_RN	14	USB3_RN
6	USB3_RP	15	USB3_RP
7	GND	16	GND
8	USB3_TN	17	USB3_TN
9	USB3_TP	18	USB3_TP

Rear I/O Panel USB 3.0 Ports (USB5/6) Pin Definitions			
Pin#	Definition	Pin#	Definition
A1	VBUS	B1	VBUS
A2	USB_N	B2	USB_N
A3	USB_P	B3	USB_P
A4	GND	B4	GND
A5	USB3_RN	B5	USB3_RN
A6	USB3_RP	B6	USB3_RP
A7	GND	B7	GND
A8	USB3_TN	B8	USB3_TN
A9	USB3_TP	B9	USB3_TP

USB 3.0 Header (USB7/8) Pin Definitions			
Pin#	Definition	Pin#	Definition
1	VBUS	20	NC
2	USB3_RN	19	VBUS
3	USB3_RP	18	USB3_RN
4	GND	17	USB3_RP
5	USB3_TN	16	GND
6	USB3_TP	15	USB3_TN
7	GND	14	USB3_TP
8	USB_N	13	GND
9	USB_P	12	USB_N
10	GND	11	USB_P

### UID (Unit Identification)/BMC Reset Switch and UID/BMC Reset LED Indicators

A UID LED/BMC Reset switch (JUIDB1) is located on the rear side of the motherboard. This switch has dual functions. It can be used to identify a system unit that is in need of service, and it can also be used to reset the BMC settings.

When functioning as a BMC reset switch, JUIDB1 will trigger a cold reboot when the user presses and holds the switch for six seconds. It will also restore the BMC to the manufacturer's default when the user presses and holds the switch for 12 seconds.

When functioning as a UID LED switch, JUIDB1 will turn both rear UID LED (LED6) and front UID LED (pin 7/pin 8 of JF1) on and off when the user presses the switch on/off.

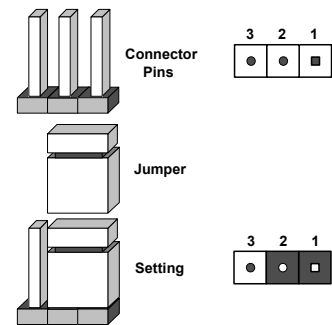
To achieve these dual purposes, the UID LED/BMC Reset switch works in conjunction with the BMC Heartbeat LED (LEDBMC) and front/rear UID LEDs. Please note that UID can also be triggered via BMC on the motherboard. For more details, refer to the BMC User's Guide posted on our website at <http://www.supermicro.com> for more information on BMC.

## 4.4 Jumpers

### *Explanation of Jumpers*

To modify the operation of the motherboard, jumpers are used to choose between optional settings. Jumpers create shorts between two pins to change the function associated with it. Pin 1 is identified with a square solder pad on the printed circuit board. See the motherboard layout page for jumper locations.

**Note:** On a two-pin jumper, "Closed" means the jumper is on both pins and "Open" indicates the jumper is either on only one pin or has been completely removed.



### **CMOS Clear**

JBT1 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.



### **To Clear CMOS**

1. First power down the system and unplug the power cord(s).
2. Remove the cover of the chassis to access the motherboard and remove the battery from the motherboard.
3. Short the CMOS pads, JBT1, with a metal object such as a small screwdriver for at least four seconds.
4. Remove the screwdriver (or shorting device).
5. Re-install the battery.
6. Replace the cover, reconnect the power cord(s), and power on the system.

**Notes:** Clearing CMOS will also clear all passwords. Do not use the PW\_ON connector to clear CMOS.

**LAN Port Enable/Disable**

Jumper JPL1 allows the user to enable the onboard LAN1 and LAN2 ports. The default setting is pins 1-2 to enable the connection.

<b>LAN Enable/Disable Jumper Settings</b>	
<b>Jumper Setting</b>	<b>Definition</b>
Pins 1-2	Enabled
Pins 2-3	Disabled



## 4.5 LED Indicators

### Unit ID LED

The rear UID LED indicator is located at LED6. This UID indicator provides easy identification of a system that may need service.

UID LED LED Indicator	
LED Color	Definition
Blue: On	System Identified

### LAN LEDs

Two LAN ports (LAN1 and LAN2) are located on the rear I/O panel of the motherboard. Each Ethernet LAN port has two LEDs. One LED indicates activity, while the other LED may be green, amber, or off to indicate the speed of the connection.

LAN1/2 Activity LED (Right) LED State		
Color	Status	Definition
Green	Flashing	Active

LAN1/2 Link LED (Left) LED State	
LED Color	Definition
Off	No connection
Green	10Gbps (X13DEI-T only)
Yellow/Amber	1Gbps

### BMC LAN LEDs

In addition to LAN1 and LAN2, a BMC LAN is also located on the rear I/O panel. The LED on the right indicates activity, and the LED on the left indicates the speed of the connection.

BMC LAN LEDs		
	Color/State	Definition
Link (Left)	Green: Solid Amber: Solid	100 Mbps 1Gbps
Activity (Right)	Amber: Blinking	Active

### BMC Heartbeat LED

A BMC Heartbeat LED is located at LEDBMC on the motherboard. When LEDBMC is blinking green, the BMC is functioning normally.

## M.2 LED Indicators

Two M.2 LED indicators are located at LED4 and LED7 on the motherboard. When LED4 is blinking, M.2-C1 is functioning normally. When LED7 is blinking, M.2-C2 is functioning properly.

M.2 LED State	
LED Color	Definition
Green: Blinking	M.2 device working

## Onboard Power LED

The Onboard Power LED is located at LEDPWR on the motherboard. When this LED is on, the system power is on.

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

# Chapter 5

## Software

After the hardware has been installed, you can install the Operating System (OS), configure RAID settings and install the drivers.

### 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 [www.supermicro.com/support/manuals](http://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.
2. Retrieve the proper RST/RSTe driver. 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 startup.

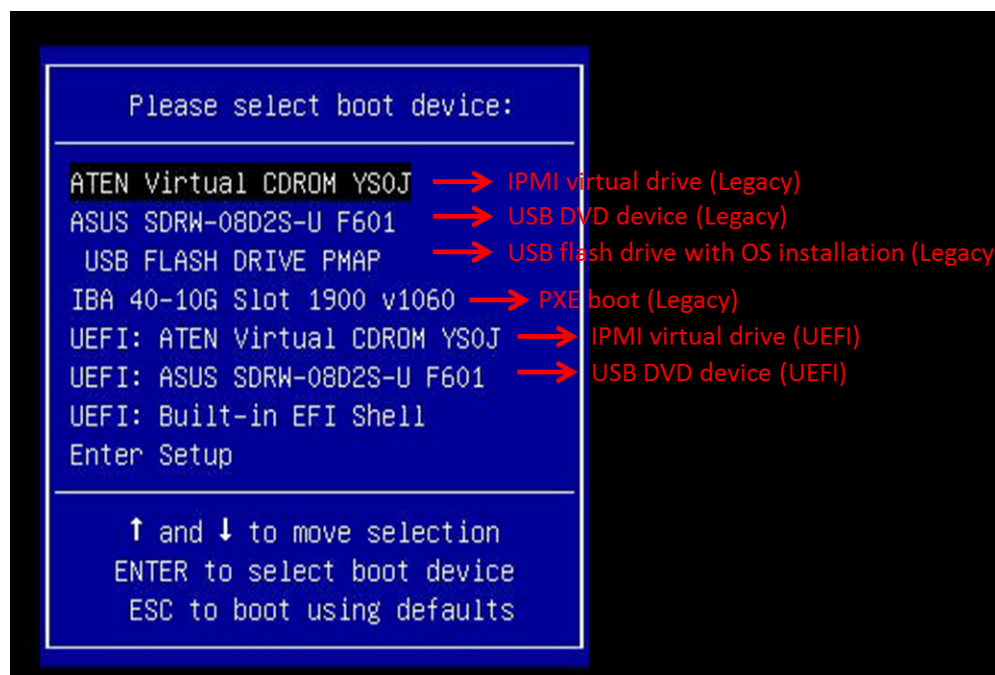
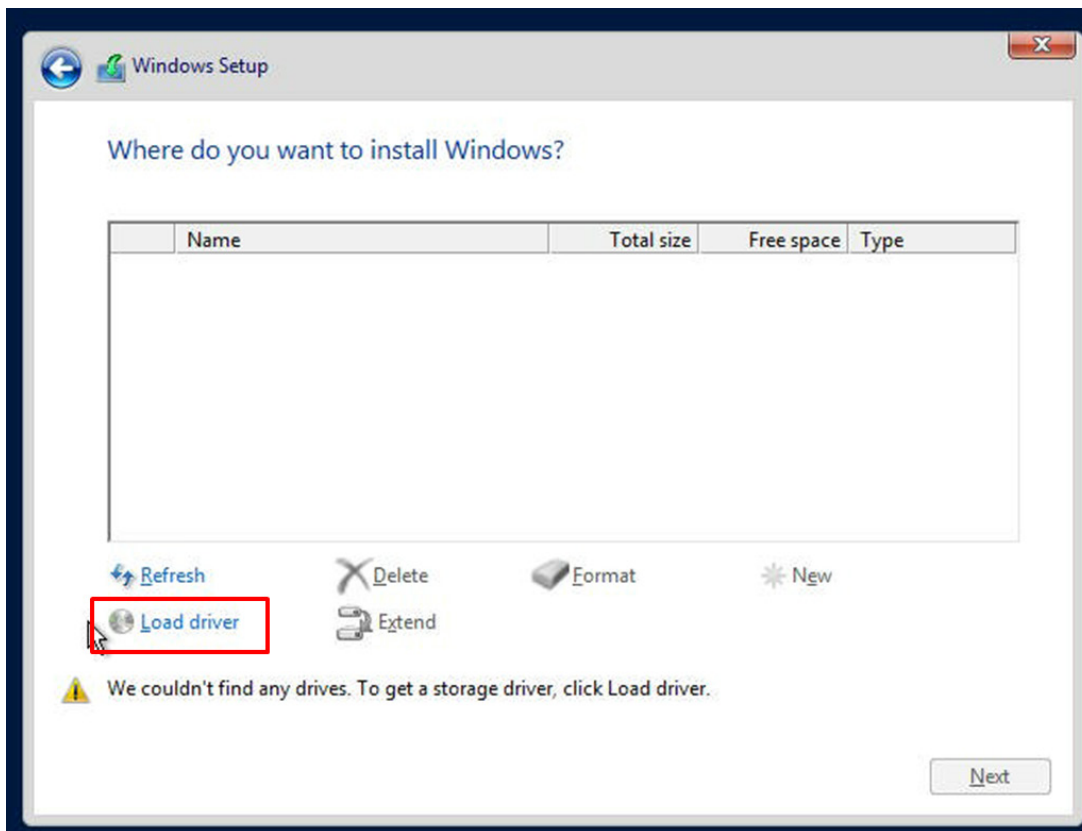


Figure 5-1. Select Boot Device

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



**Figure 5-2. Load Driver Link**

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

- For RAID, choose the SATA/sSATA RAID driver indicated then choose the storage drive on which you want to install it.
  - For non-RAID, choose the SATA/sSATA AHCI driver indicated then choose the storage drive on which you want to install it.
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.

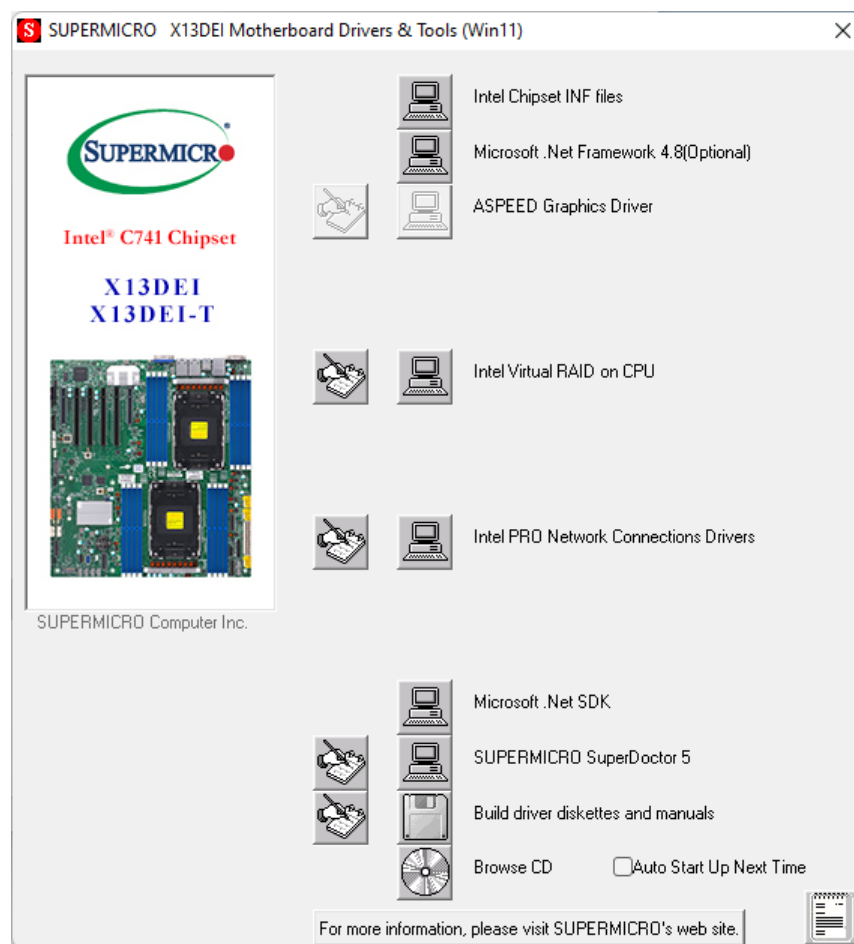
## 5.2 Driver Installation

The Supermicro website contains drivers and utilities for your system at <https://www.supermicro.com/wdl/driver>. Some of these 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 <http://www.supermicro.com/products/>. 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 & Tool 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 the bottom) one at a time. **After installing each item, you must re-boot 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 SuperDoctor® 5

The Supermicro SuperDoctor 5 is a program that functions in a command-line or web-based interface for Windows and Linux operating systems. The program monitors such system health information as CPU temperature, system voltages, system power consumption, fan speed, and provides alerts via email or Simple Network Management Protocol (SNMP).

SuperDoctor 5 comes in local and remote management versions and can be used with Nagios to maximize your system monitoring needs. With SuperDoctor 5 Management Server (SSM Server), you can remotely control power on/off and reset chassis intrusion for multiple systems with SuperDoctor 5 or BMC. SuperDoctor 5 Management Server monitors HTTP, FTP, and SMTP services to optimize the efficiency of your operation.

### SuperDoctor® Manual and Resources

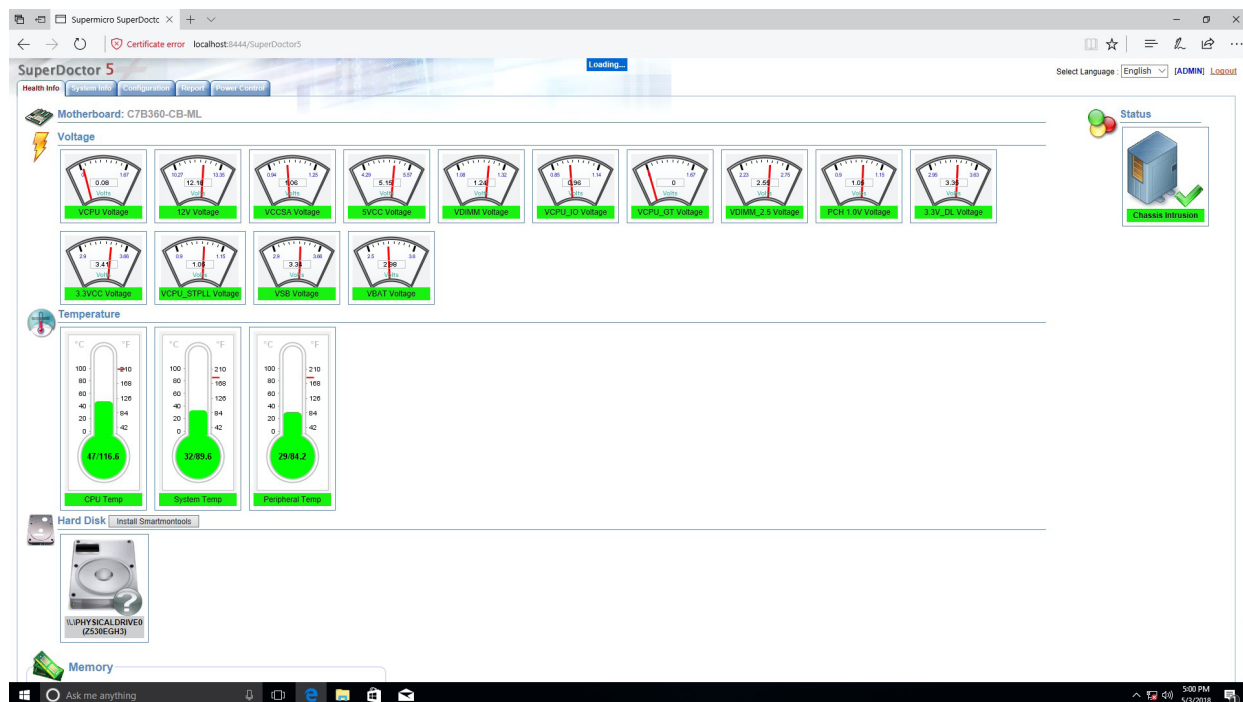


Figure 5-4. SuperDoctor 5 Interface Display Screen (Health Information)

## 5.4 BMC

The 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:

[www.supermicro.com/en/solutions/management-software/bmc-resources](http://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. This can be found on a sticker on the chassis and a sticker on the motherboard. The sticker also displays the BMC MAC address.

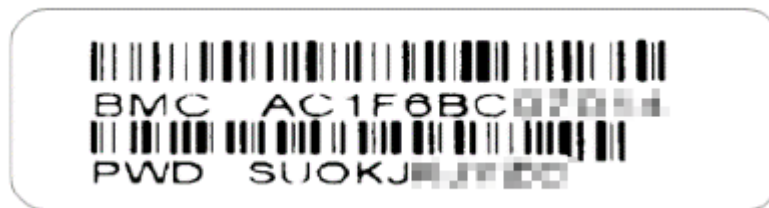


Figure 5-5. BMC Password Label

## Chapter 6

# Optional Components

This chapter describes optional system components and installation procedures.

Optional Parts
Rear 2.5" Storage Drives
Storage Control Card and Cable(s)
<a href="#">TPM security module</a>
Intel <a href="#">VROC</a> RAID Key

### 6.1 Additional Storage Drives

The system supports two hot-swap 2.5" SATA drives, accessible from the chassis rear.

### 6.2 Storage Control Card and Cable(s)

Supermicro offers storage controller cards for various data protection and drive RAID levels. Please refer to the product page for the latest cards and add-on options.



## 6.3 TPM Security Module

SPI capable TPM 2.0 (or 1.2) with Infineon 9670 controller, horizontal form factor

The JTPM1 header is used to connect a Trusted Platform Module (TPM). A TPM is a security device that supports encryption and authentication in storage drives. It enables the motherboard to deny access if the TPM associated with the storage drive is not installed in the system.

Details and installation procedures are at:

<http://www.supermicro.com/manuals/other/TPM.pdf>.

- AOM-TPM-9670V
- AOM-TPM-9671V

## 6.4 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.
- It is possible to enable Intel VROC without a hardware key installed, but only RAID0 will be enabled.
- 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 to 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.

[www.supermicro.com/products/accessories/addon/AOC-VROCxxxMOD.cfm](http://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 Supports 3rd party SSDs	AOC-VROCSTNMOD	951605
Premium	RAID 0, 1, 5, 10 Supports 3rd party SSDs	AOC-VROCPREMOD	951606
Intel SSD only	RAID 0, 1, 5, 10 Supports Intel SSDs only	AOC-VROCINTMOD	956822

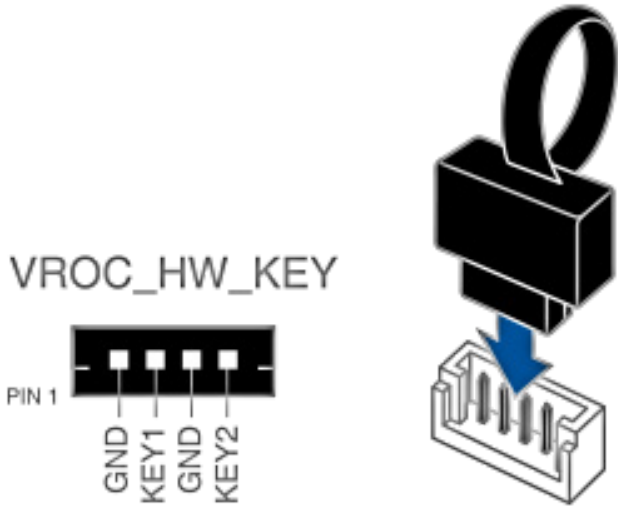


Figure 6-1. Intel VROC RAID Key and Motherboard Connector JRK1

## 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 > North Bridge > IIO Configuration > Intel® VMD Technology**.

**Note:** Without a VROC Key, there is no RAID support with the **Auto** switch. Only RAID 0 is supported with the **VMD** and **Manual** switches.

### 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 > North Bridge > IIO Configuration > Intel® VMD Technology**.
3. Select **VMD Mode Switch**, then select **Manual**.

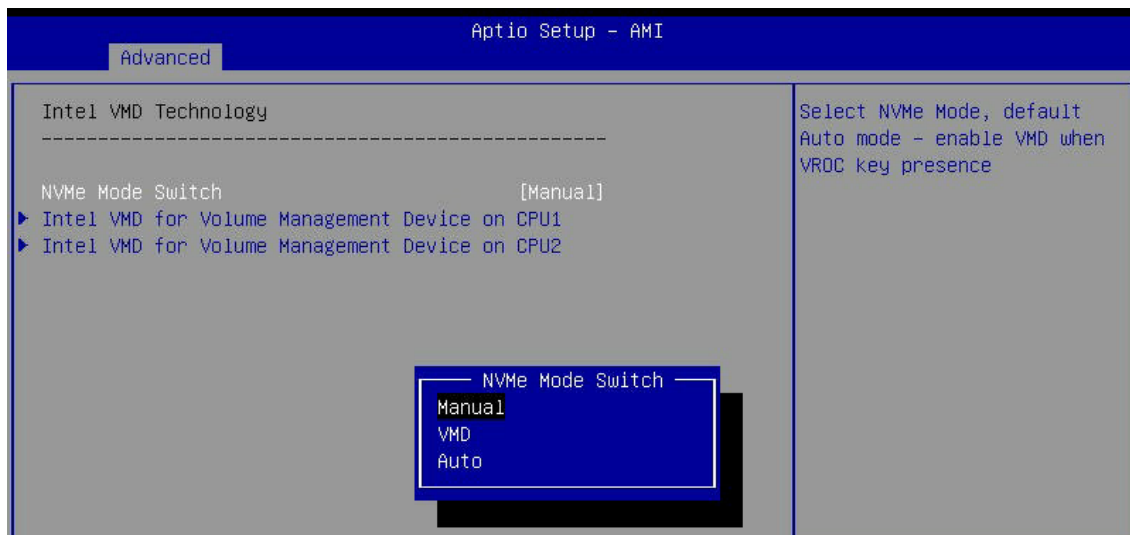


Figure 6-2. BIOS, Selecting VMD Mode

4. This system supports eight NVMe devices. There are two M.2 NVMe and four NVMe SSDs connected to CPU1. There are two NVMe SSDs connected to CPU2. We are going to enable VMD on all eight NVMe devices.

**Caution:** VMD must only be enabled on NVMe port resources shown below. If VMD is enabled on other PCIe ports, the functionality of those ports will be impacted.

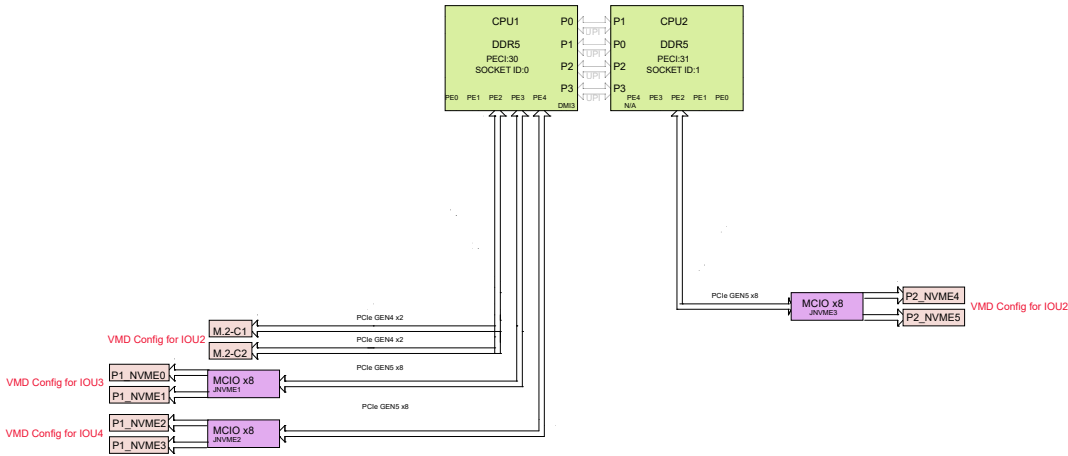
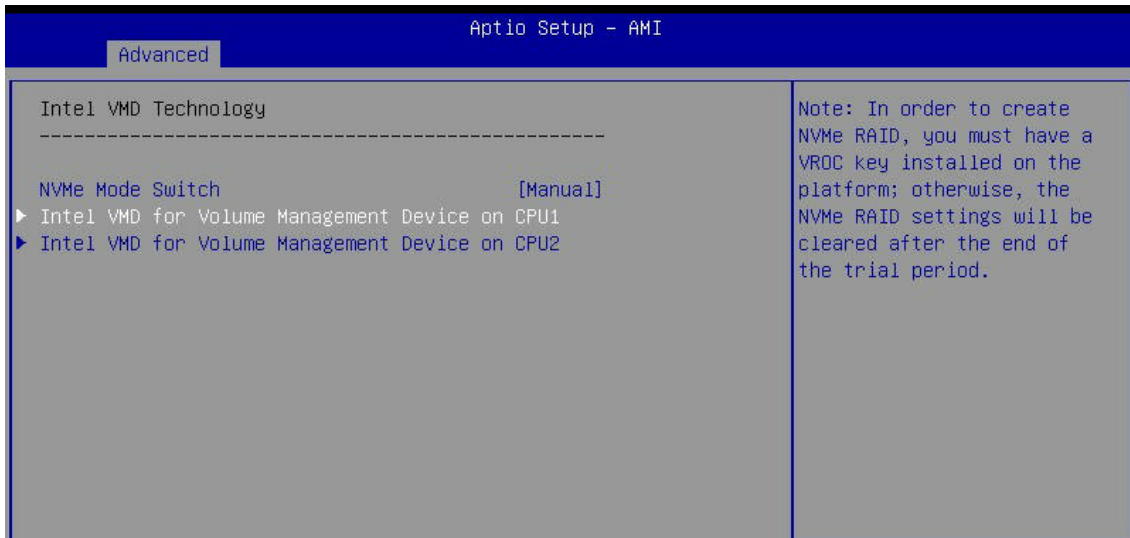


Figure 6-3. NVMe Port Resources

Intel VMD BIOS Settings for X13 SuperStorage Systems				
Model	CPU1 NVMe Ports	NVMe Slot	CPU2 NVMe Ports	NVMe Slot
<b>SSG-621E-ACR12H/L</b>	VMD Config for IOU 2	M.2-C1 M.2-C2	VMD Config for IOU 2	P2_NVME4 P2_NVME5
	VMD Config for IOU 3	P1_NVME0 P1_NVME1	-	-
	VMD Config for IOU 4	P1_NVME2 P2_NVME3	-	-
<b>SSG-621E-ACR16H/L</b>	VMD Config for IOU 2	M.2-C1 M.2-C2	VMD Config for IOU 2	P2_NVME4 P2_NVME5
	VMD Config for IOU 3	P1_NVME0 P1_NVME1	-	-
	VMD Config for IOU 4	P1_NVME2 P2_NVME3	-	-
<b>SSG-631E-ACR16H/L</b>	VMD Config for IOU 2	M.2-C1 M.2-C2	-	-
<b>SSG-641E-E1CR24H/L</b>	VMD Config for IOU 2	M.2-C1 M.2-C2	VMD Config for IOU 2	P2_NVME4 P2_NVME5
	VMD Config for IOU 3	P1_NVME0 P1_NVME1	-	-
	VMD Config for IOU 4	P1_NVME2 P2_NVME3	-	-
<b>SSG-641E-E1CR36H/L</b>	VMD Config for IOU 2	M.2-C1 M.2-C2	VMD Config for IOU 2	P2_NVME4 P2_NVME5
	VMD Config for IOU 3	P1_NVME0 P1_NVME1	-	-
	VMD Config for IOU 4	P1_NVME2 P2_NVME3	-	-

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

5. Select **Intel VMD for Volume Management Device on CPU1**.



**Figure 6-4. Intel VMD for Volume Management Device on CPU 1**

6. Under VMD Config for IOU 2, select the **Enable/Disable VMD** option. Change from **Disable** to **Enable**.
7. Select the **M.2-C1 VMD** option. Change from **Disable** to **Enable**.
8. Select the **M.2-C2 VMD** option. Change from **Disable** to **Enable**.
9. Select the **Hot Plug Capable** option. Change from **Disable** to **Enable**.

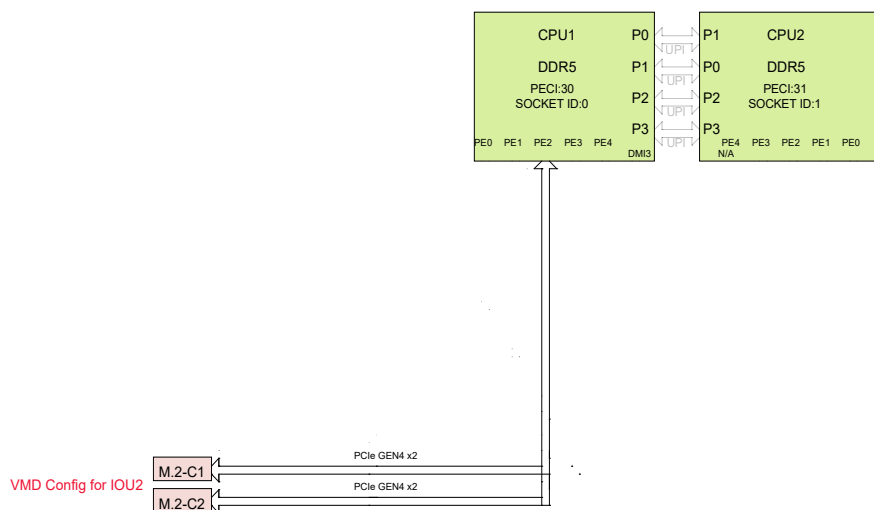


Figure 6-5. NVMe Port Resources, CPU1 IOU2

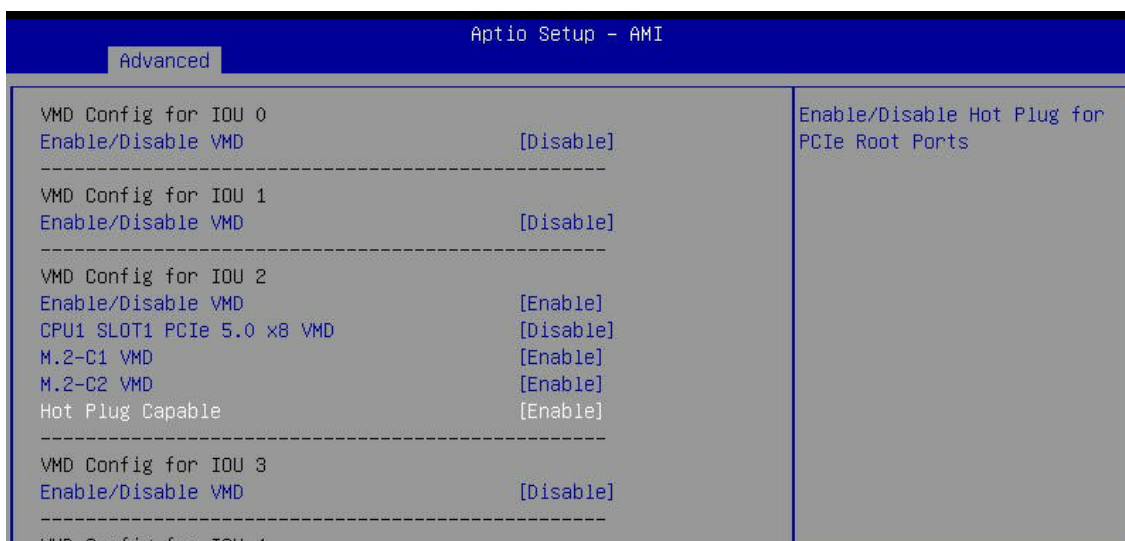


Figure 6-6. Enabling NVMe Port Resources in BIOS



10. Under VMD Config for IOU 3, select the **Enable/Disable VMD** option. Change from **Disable** to **Enable**.
11. Select the **P1\_NVME0 VMD** option. Change from **Disable** to **Enable**.
12. Select the **P1\_NVME1 VMD** option. Change from **Disable** to **Enable**.
13. Select the **Hot Plug Capable** option. Change from **Disable** to **Enable**.

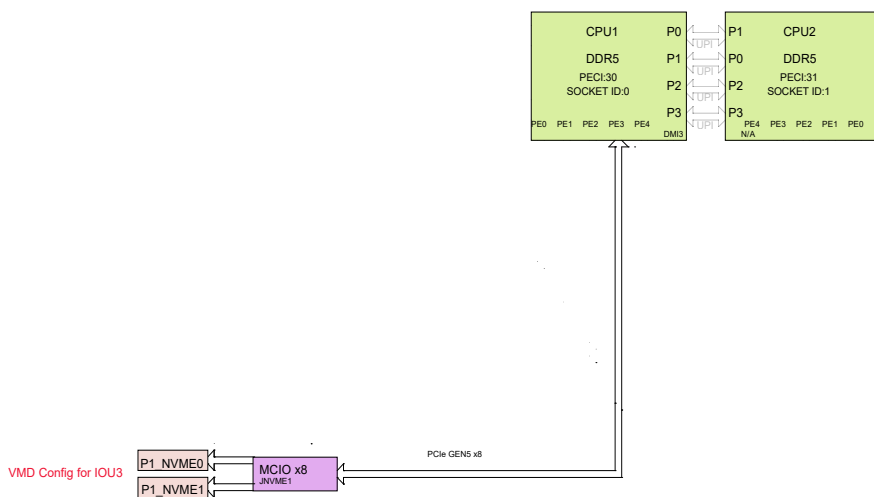


Figure 6-7. NVMe Port Resources, CPU1 IOU3

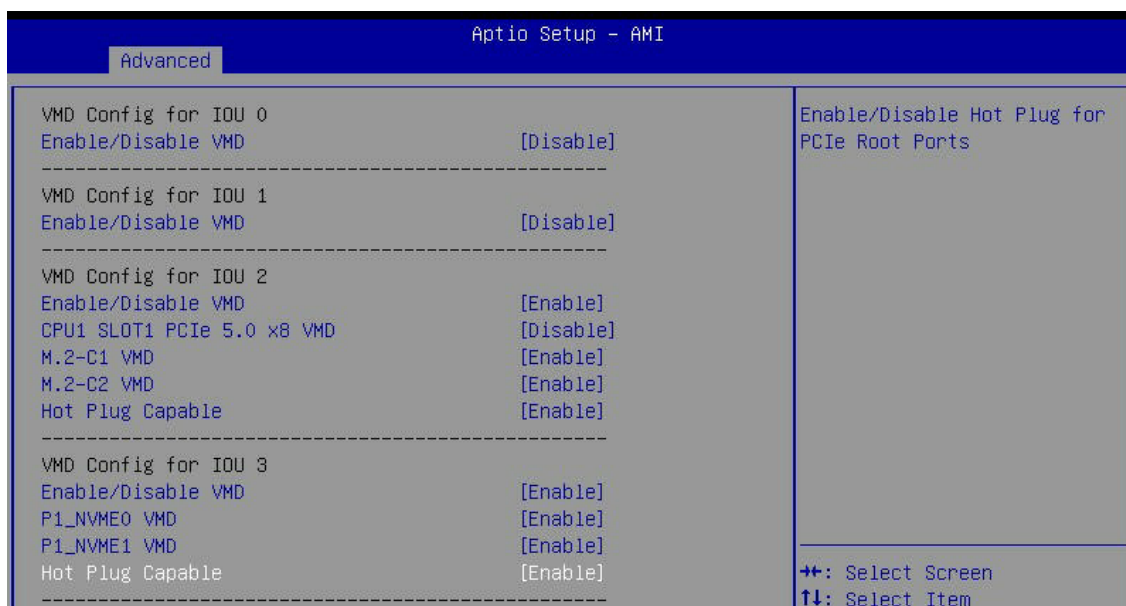


Figure 6-8. Enabling NVMe Port Resources in BIOS

14. Under VMD Config for IOU 4, select the **Enable/Disable VMD** option. Change from **Disable** to **Enable**.
15. Select the **P1\_NVME2 VMD** option. Change from **Disable** to **Enable**.
16. Select the **P1\_NVME3 VMD** option. Change from **Disable** to **Enable**.
17. Select the **Hot Plug Capable** option. Change from **Disable** to **Enable**.

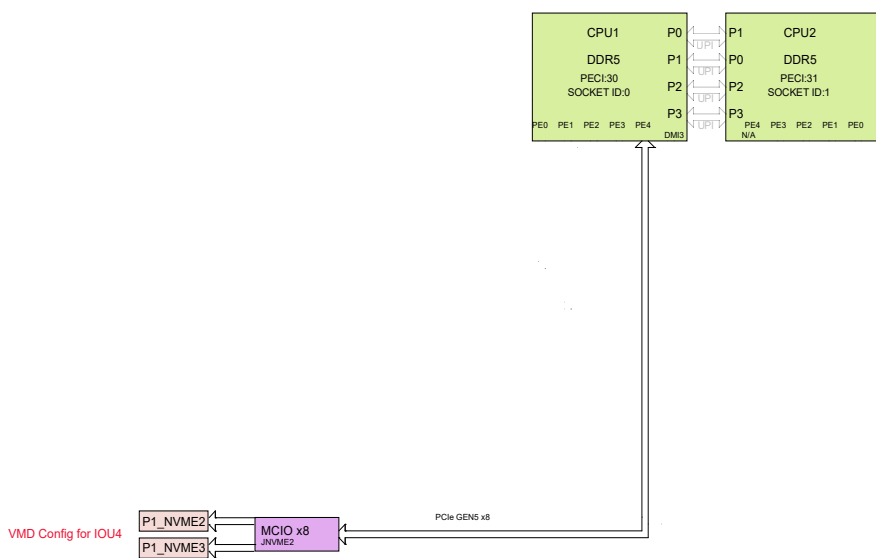


Figure 6-9. NVMe Port Resources, CPU1 IOU4

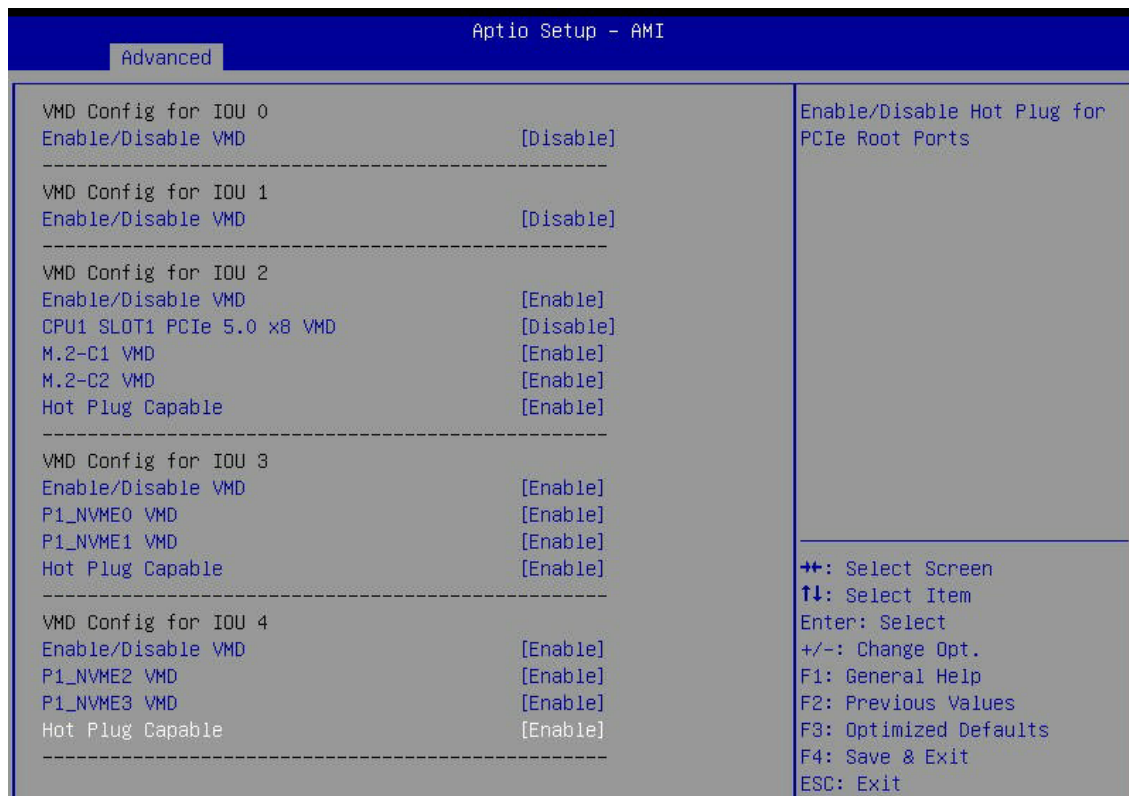
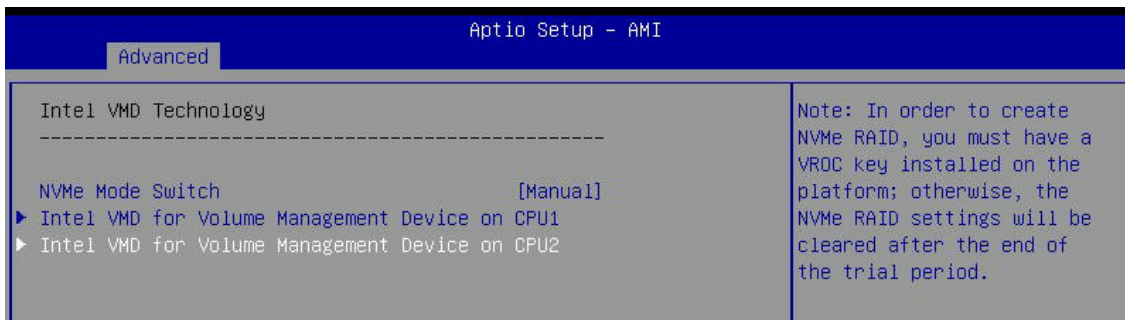


Figure 6-10. Enabling NVMe Port Resources in BIOS

18. Press [ESC] to return to the previous page.
19. Select **Intel VMD for Volume Management Device on CPU2**.



**Figure 6-11. Intel VMD for Volume Management Device on CPU 2**

20. Under VMD Config for IOU 2, select the **Enable/Disable VMD** option. Change from **Disable** to **Enable**.
21. Select the **P2\_NVME4 VMD** option. Change from **Disable** to **Enable**.
22. Select the **P2\_NVME5 VMD** option. Change from **Disable** to **Enable**.
23. Select the **Hot Plug Capable** option. Change from **Disable** to **Enable**.

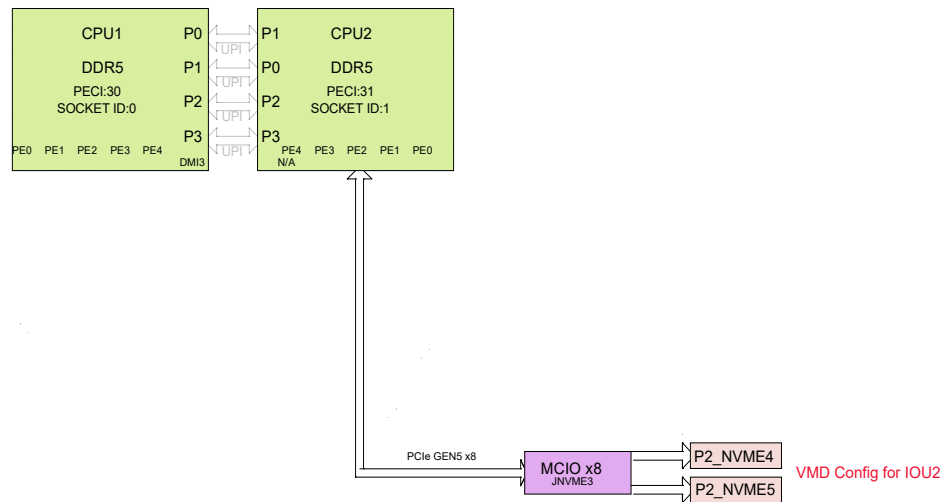


Figure 6-12. NVMe Port Resources, CPU2 IOU2

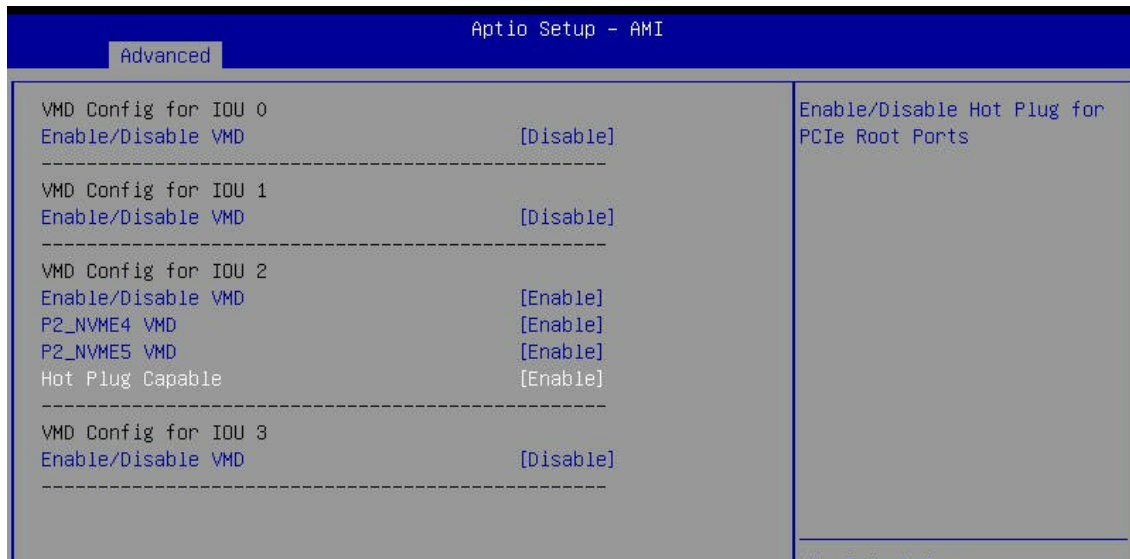


Figure 6-13. Enabling NVMe Port Resources in BIOS

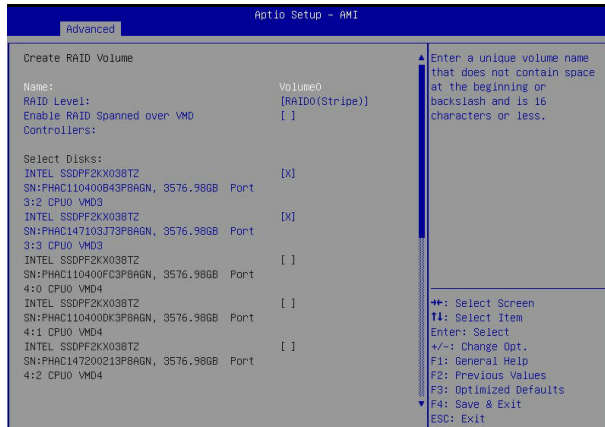
24. Press [F4] to save the configuration and reboot the system and press [DEL] to enter the BIOS.

**Note:** Disabling the VMD controller without first deleting the associated existing RAID volume can lead to unexpected behavior. This action is strongly not recommended.

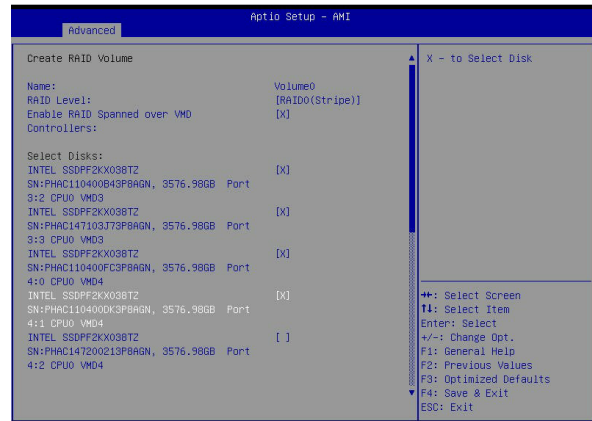
**Note:** The effects of physically changing or swapping a CPU on the VMD controller enablement has not yet been thoroughly tested or documented.

## Creating NVMe RAID Configurations

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



**Figure 6-14. Created Volume *without* enabling RAID spanned over VMD controller**



**Figure 6-15. 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 disks
  - RAID1: Select only two disks
  - RAID5: Select at least three disks
  - RAID10: Select only four disks
6. Select **Strip Size** (Default 64KB).
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 [2] for details.
3. Detach the device. Check [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>

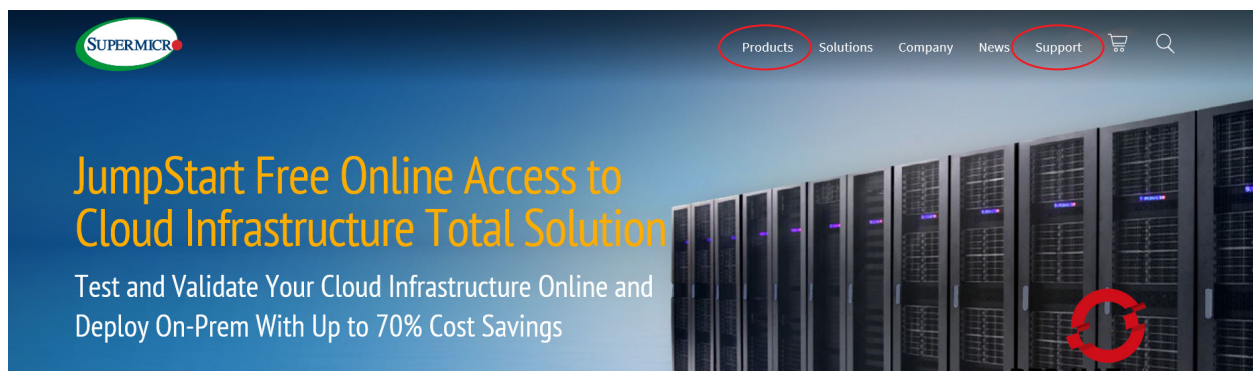
## Chapter 7

# Troubleshooting and Support

## 7.1 Information Resources

### Website

A great deal of information is available on the Supermicro website, [www.supermicro.com](http://www.supermicro.com).



**Figure 7-1. Supermicro Website**

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

### ***Direct Links for the SSG-641E-E1CR24(H/L) System***

Web [SSG-641E-E1CR24H](#) and [SSG-641E-E1CR24L](#) specifications page

[X13DEI-T motherboard page](#) for links to the Quick Reference Guide, User Manual, validated storage drives, etc.

[BPN-SAS3-826EL1-N4-1 Backplane Manual](#)

[BPN-SAS3-846EL1-N8-1 Backplane Manual](#)

### ***Direct Links for General Support and Information***

[Frequently Asked Questions](#)

[Add-on card descriptions](#)

[TPM User Guide](#)

[SuperDoctor5 Large Deployment Guide](#)

## Direct Links (continued)

For validated memory, use our [Product Resources page](#)

[Product Matrices](#) page for links to tables summarizing specs for systems, motherboards, power supplies, riser cards, add-on cards, etc.

[Security Center](#) for recent security notices

[Supermicro Phone and Addresses](#)

## 7.2 Baseboard Management Controller (BMC)

The system 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, please visit our website at: <https://www.supermicro.com/en/solutions/management-software/bmc-resources>.

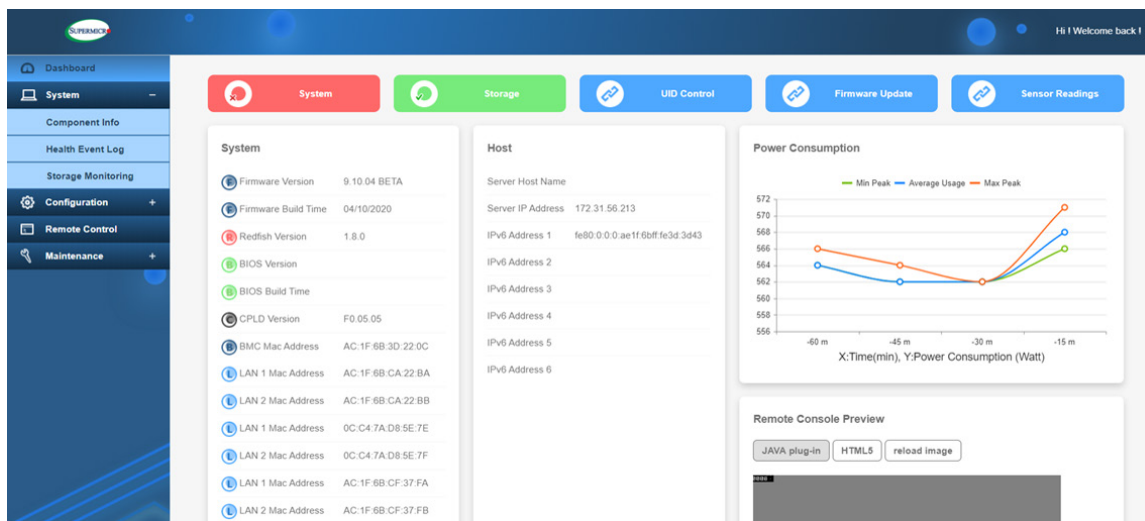


Figure 7-2. BMC Sample



## 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](#) or [Returning Merchandise for Service](#) section(s) in this chapter. [Power down](#) the system before changing any non hot-swap hardware components.

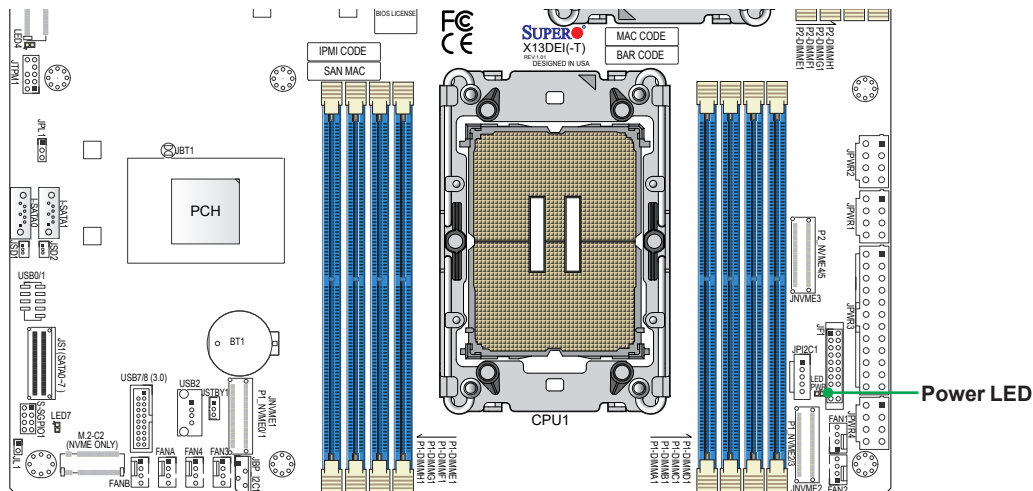
### General Technique

If you experience unstable operation or get no boot response, try:

1. With power off, remove all but one DIMM and other added components, such as add-on cards, from the motherboard. Make sure the motherboard is not shorted to the chassis.
2. Set all jumpers to their default positions.
3. Power up. If the system boots, check for memory errors and add-on card problems.

### No Power

- Check that the power LED on the motherboard is on.



**Figure 7-3. Location of the MB Power LED**

- Make sure that the power connector is connected to the power supply.
- Check that the motherboard battery still supplies approximately 3 VDC. If it does not, replace it.
- Check that the system input voltage is 100-120 VAC or 180-240 VAC.
- Turn the power switch on and off to test the system

## No Video

If the power is on but you have no video, remove all add-on cards and cables.

## System Boot Failure

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

- Turn on the system with only one DIMM module installed. If the system boots, check for bad DIMM modules or slots by following the Memory Errors Troubleshooting procedure below.

## Memory Errors

- Make sure that the DIMM modules are properly and fully installed.
- Confirm that you are using the correct memory. Also, it is recommended that you use the same memory type and speed for all DIMMs in the system. See [Section 3.4](#) for memory details.
- Check for bad DIMM modules or slots by swapping modules between slots and noting the results.

## Losing the System Setup Configuration

- Always replace power supplies with the exact same model that came with the system. A poor quality power supply may cause the system to lose the CMOS setup configuration.
- Check that the motherboard battery still supplies approximately 3 VDC. If it does not, replace it.

If the above steps do not fix the setup configuration problem, contact your vendor for repairs.

## When the System Becomes Unstable

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

- CPU/BIOS support: Make sure that your CPU is supported and that you have the latest BIOS installed in your system.
- Memory: Make sure that the memory modules are supported. Refer to the product page on our website at [www.supermicro.com](http://www.supermicro.com). Test the modules using **memtest86** or a similar utility.
- Storage drives: Make sure that all drives work properly. Replace if necessary.

- System cooling: Check that all heatsink fans and system fans work properly. Check the hardware monitoring settings in the BMC to make sure that the CPU and system temperatures are within the normal range. Also check the Control panel Overheat LED.
- 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 the Supermicro website for the minimum power requirements.
- Proper software support: Make sure that the correct drivers are used.

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

- Source of installation: Make sure that the devices used for installation are working properly, including boot devices.
- Cable connection: Check to make sure that all cables are connected and working properly.
- Use the minimum configuration for troubleshooting: Remove all unnecessary components (starting with add-on cards first), and use the minimum configuration (but with a CPU and a memory module installed) to identify the trouble areas.
- Identify a bad component by isolating it. Check and change one component at a time.
  - Remove a component in question from the chassis, and test it in isolation. Replace it if necessary.
  - Or swap in a new component for the suspect one.
  - Or install the possibly defective component into a known good system. If the new system works, the component is likely not the cause or the problem.

## 7.4 Crash Dump Using BMC

In the event of a processor internal error (IERR) that crashes your system, you may want to provide information to support staff. You can download a crash dump of status information using BMC.

### Check the BMC Error Log

1. Access the BMC web interface.
2. Click the **Server Health** tab, then **Event Log** to verify an IERR error.

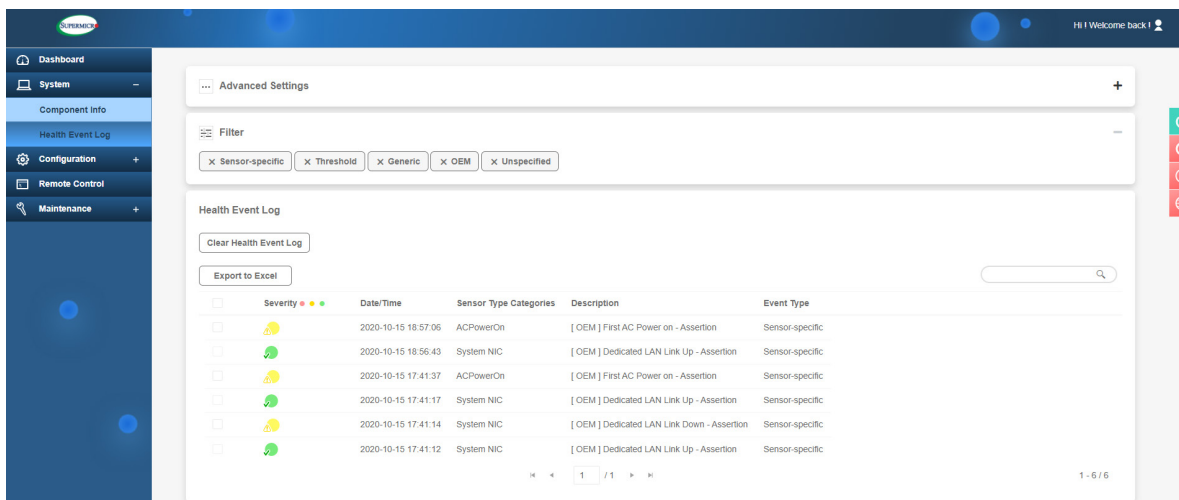


Figure 7-3. BMC Event Log

In the event of an IERR, the BMC executes a crash dump. You must download the crash dump and save it.

## 7.5 CMOS Clear

JBT1 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.

### To Clear CMOS

1. First [power down](#) the system completely.
2. [Remove the cover](#) of the chassis to access the motherboard.
3. [Remove the onboard battery](#) from the motherboard.
4. Short the CMOS pads with a metal object such as a small screwdriver for at least four seconds.
5. Remove the screwdriver or shorting device.
6. Replace the cover, reconnect the power cords and power on the system.



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

*Do not use the PW\_ON connector to clear CMOS.*

## 7.6 BMC Reset

The BMC can be reset using the UID button.

- Reset – Press and hold the button. After six seconds, the LED blinks at 2 Hz. The BMC resets and the reset duration is approximately 250 ms. Then the BMC starts to boot.
- Restore factory default configuration – Hold the button for twelve seconds. The LED blinks at 4Hz while defaults are configured. **Note:** All BMC settings including username and password will be removed except the FRU and network settings.
- Firmware update – When the BMC firmware is being updated, the UID LED blinks at 10Hz.

BMC Reset Options		
Event	UID LED	BMC Heartbeat LED
Reset	Blue, Blinks at 2 Hz	Green, solid
Restore Defaults	Blue, Blinks at 4 Hz	Off
Update	Blue, Blinks at 10 Hz	

## 7.7 Where to Get Replacement Components

If you need replacement parts for your system, 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 at: <http://www.supermicro.com>. Click the "Where to Buy" tab.

## 7.8 Reporting an Issue

### Technical Support Procedures

Before contacting Technical Support, please take the following steps. If your system was purchased through a distributor or reseller, please contact them for troubleshooting services. They have the best knowledge of your specific system configuration.

1. Please review the [Troubleshooting Procedures](#) in this manual and [Frequently Asked Questions](#) on our website before contacting Technical Support.
2. BIOS upgrades can be downloaded from our website. **Note:** Not all BIOS can be flashed depending on the modifications to the boot block code.
3. If you still cannot resolve the problem, include the following information when contacting us for technical support:
  - System, motherboard, and chassis model numbers and PCB revision number
  - BIOS release date/version (this can be seen on the initial display when your system first boots up)
  - System configuration

An example of a Technical Support form is posted on our [website](#). Distributors: For immediate assistance, please have your account number ready when contacting our technical support department by email.

### 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 to the manufacturer, the RMA number should be prominently displayed on the outside of the shipping carton, and 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 may be requested online (<http://www.supermicro.com/support/rma/>).

Whenever possible, repack the chassis in the original Supermicro carton, using the original packaging material. If these are no longer available, be sure to pack the chassis securely, using packaging material to surround the chassis 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 alteration, misuse, abuse or improper maintenance of products.

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

### **Vendor Support Filing System**

For issues related to Intel, use the Intel IPS filing system:

<https://www.intel.com/content/www/us/en/design/support/ips/training/welcome.html>

For issues related to Red Hat Enterprise Linux, since it is a subscription based OS, contact your account representative.

## **7.9 Feedback**

Supermicro values your feedback as we strive to improve our customer experience in all facets of our business. To provide feedback on our manuals, please email us at

[techwriterteam@supermicro.com](mailto:techwriterteam@supermicro.com).

## Appendix A

# Standardized Warning Statements for AC Systems

### About Standardized Warning Statements

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 appendix in its entirety before installing or configuring components in the Supermicro chassis.

These warnings may also be found on our website at [http://www.supermicro.com/about/policies/safety\\_information.cfm](http://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。

此警告符号代表危險。

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 הזהרות אזהרה

הזהרות 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.

اَكْ ف حالة وُكِي اَي تتسبب ف اصابة جسدهُ هذا الزهز عْ خطر! تحذُرُ .  
 قبل اَي تعول على اَي هعدات، كي على علن بالوخاطز ال اُجوة عي الذوائر  
 الكهزبائِة  
 وكي على دراةُ بالووارسات النقاىِة لو عْ وقع اَي حادث  
 استخدم رقن الب اى الو صُص ف هاةُ كل تحذُرُ للعشر 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-250VDC, 20A

هذا المنتج يعتمد على معدات الحماية 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 elektrische installatie. Controleer of het beveiligde apparaat 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 chasis pour installer ou enlever des composants de système.

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 فصل انظاؤ من جميع مصادر انطاقت وإزانت سهك انكهرباء من وحدة امداد انطاقت قيم

انصل إلى امناطق انداخييت نههيكم نشييج أو إزانت مكنناث الجهاز

경고!

시스템에 부품들을 장착하거나 제거하기 위해서는 새시 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..

**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 installé 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.).

تخصيص هذه انحدة نترك بُها ف مناطق محظورة تم .

،ممكن اننصل إن منطقت محظورة فقط من خلال استخذاو أداة خاصت أو أ وس هُت أخري نلالأمما ققم 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



**Warning!** There is the danger of explosion if the battery is replaced incorrectly. 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

電池交換が正しく行われなかった場合、破裂の危険性があります。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

電池更換不當會有爆炸危險。請只使用同類電池或制造商推荐的功能相当的電池更換原有電池。請按制造商的說明處理廢舊電池。

### 警告

電池更換不當會有爆炸危險。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

Bei Einsetzen einer falschen Batterie besteht Explosionsgefahr. Ersetzen Sie die Batterie nur durch den gleichen oder vom Hersteller empfohlenen Batterietyp. Entsorgen Sie die benutzten Batterien nach den Anweisungen des Herstellers.

### Attention

Danger d'explosion si la pile n'est pas remplacée correctement. 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.

### ¡Advertencia!

Existe peligro de explosión si la batería se reemplaza de manera incorrecta. Reemplazar la batería exclusivamente con el mismo tipo o el equivalente recomendado por el fabricante. Desechar las baterías gastadas según las instrucciones del fabricante.

### אזהרה!

קיימת סכנת פיצוץ של הסוללה במידה והוחלפה בדרך לא תקינה. יש להחליף את הסוללה בסוג התואם מחברת יצרן מומלצת. סילוק הסוללות המשומשות יש לבצע לפי הוראות היצרן.

هناك خطر من انفجار في حالة اسبدال البطارية بطريقة غير صحيحة فعلى  
اسبدال البطارية  
فقط بنفس النوع أو ما يعادلها مما أوصت به الشركة المصنعة  
جخلص من البطاريات المسحومة وفقا لعمليات الشركة الصانعة

경고!

배터리가 올바르게 교체되지 않으면 폭발의 위험이 있습니다. 기존 배터리와 동일하거나 제조사에서 권장하는 동등한 종류의 배터리로만 교체해야 합니다. 제조사의 안내에 따라 사용된 배터리를 처리하여 주십시오.

Waarschuwing

Er is ontplofingsgevaar indien de batterij verkeerd vervangen wordt. 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

此装置连接的电源可能不只一个，必须切断所有电源才能停止对该装置的供电。

Warnung

Dieses Gerät kann mehr als eine Stromzufuhr haben. Um sicherzustellen, dass der Einheit kein Strom 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!

ליחידה 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 خطر من التيار الكهربائي أو الطاقة المتجددة على اللوحة  
عندما يكون النظام يعمل كه حذرا عند خدمة هذا الجهاز

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 instalación 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 للقوايه المحلية والبطية 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.

التخلص النهائي من هذا المنتج ينبغي التعامل معه وفقا لجميع القوانين واللوائح الوطنية عند

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! 危險的可移動性零件。請務必與轉動的风扇叶片保持距離。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

警告

危險的可移動性零件。請務必與轉動的风扇叶片保持距離。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 el montaje del ventilador del chasis. Mantenga los dedos, los destornilladores y todos los objetos lejos de las aberturas del ventilador

**Attention**

Pieces mobiles dangereuses. Se tenir a l'écart 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 בפעולה כאשר מסירים את חלקי המאוורר מהמארז, יתכן והמאווררים עדיין עובדים. יש להרחיק למרחק בטוח את האצבעות וכלי עבודה שונים מהפתחים בתוך המאוורר

تحذير! أجزاء متحركة خطيرة. 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. 새시로부터 팬 조립품을 제거할 때 팬은 여전히 회전하고 있을 수 있습니다. 팬 조립품 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 Adapter, 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.



### 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 Supermicro가 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 B

## System Specifications

### Processors

Dual Socket-E (LGA4677) 4th Gen Intel® Xeon® Scalable processors with up to 60 cores

### Chipset

Intel® C741

### BIOS

AMI BIOS

ACPI 3.0 or later, PCI firmware 4.0 support, BIOS rescue hot-key, SPI dual/quad speed support, RTC (Real Time Clock) wakeup, and SMBIOS 3.0 or later

### Memory

Supports up to 4 TB memory capacity with 16 DIMMs of 256 GB 3DS RDIMM DDR5 ECC memory for up to 4800 MT/s

### Storage Drives

Twenty-four x3.5" hot-swap SATA/SAS hybrid drive bays

Two optional rear 2.5" hot-swap SATA bays

Two internal NVMe PCIe 4.0 x2 M.2 (2280/22110)

Two internal SATA3 DOM ports

### PCI Expansion Slots

One PCIe 5.0 x8 (Slot 1) occupied by SAS controller

One PCIe 5.0 x16 (Slot 2) occupied by AOM

Three PCIe 5.0 x16 slots (Slots 3, 4, and 5) available

One PCIe 5.0 x8 slots (Slot 6) available

### Input/Output

Two 10GbE LAN ports (Broadcom 57416)

One rear COM port

One rear VGA port

Four rear USB 3.0 ports

One dedicated IPMI LAN port

### Motherboard

X13DEI-T

### Chassis

CSE-846BTS-R1K23BP4; 4U; (WxHxD) 17.2 x 7 x 26.5 in (437 x 178 x 673 mm)

### System Cooling

Five heavy duty 8-cm fans with optimal fan speed control

One air shroud

### Power Supply

Model: PWS-1K23A-1R, Two 1200 W redundant modules, 80Plus Platinum Level

AC Input

1000 W: 100-127 Vac / 12A-15 A / 50-60 Hz

1200 W: 200-240 Vac / 7A-8.5 A / 50-60 Hz

+12 V

Max: 83 A (1000 W) / Min: 0 A (100 Vac-127 Vac)

Max: 100 A (1200 W) / Min: 0 A (200 Vac-240 Vac)

+5 V SB

Max: 4 A / Min: 0 A

**Operating Environment**

Operating Temperature: 10°C to 35°C (50°F to 95°F)  
 Non-operating Temperature: -40°C to 60°C (-40°F to 140°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

**Applied Directives, Standards**

EMC/EMI: 2014/30/EU (EMC Directive)  
 Electromagnetic Compatibility Regulations 2016  
 FCC Part 15  
 ICES-003  
 VCCI-CISPR 32  
 AS/NZS CISPR 32  
 BS/EN 55032  
 BS/EN 55035  
 CISPR 32  
 CISPR 35  
 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

Product Safety: 2014/35/EU (LVD Directive)  
 UL/CSA 62368-1 (USA and Canada)  
 Electrical Equipment (Safety) Regulations 2016  
 IEC/BS/EN 62368-1

**Environment:**

2011/65/EU (RoHS Directive)  
 EC 1907/2006 (REACH)  
 2012/19/EU (WEEE Directive)

Warning! This product can expose you to chemicals including lead, known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

**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 [www.dtsc.ca.gov/hazardouswaste/perchlorate](http://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 – A