SuperServer®

SYS-512B-WR

USER'S MANUAL

Revision 1.0c (MNL-2687)

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Preface

About This Manual

This manual is written for professional system integrators and PC technicians. It provides information for the installation and use of the SYS-512B-WR server. Installation and maintenance should be performed by certified service technicians only.

Notes

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

- Supermicro product manuals: https://www.supermicro.com/support/manuals
- Product drivers and utilities: https://www.supermicro.com/wdl
- Product safety info: https://www.supermicro.com/about/policies/safety_information.cfm
- A secure data deletion tool designed to fully erase all data from storage devices can be found on our website: https://www.supermicro.com/about/policies/disclaimer.cfm?url=/wdl/utility/Lot9_Secure_Data_Deletion_Utility
- Frequently Asked Questions: https://www.supermicro.com/FAQ/index.php
- If you still have questions after referring to our FAQs, contact our support team. Region-specific Technical Support email addresses can be found at: "Contacting Supermicro" on page 13
- If you have any feedback on Supermicro product manuals, contact our writing team at: Techwriterteam@supermicro.com

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Conventions Used in the Manual

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

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

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

Warning! Indicates hazardous moving parts may be encountered while handling a fan or components near a fan.

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

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

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Chapter 1:

Introduction

This chapter provides a brief outline of the functions and features of the SYS-512B-WR system. It is based on the X14SBW-F motherboard and the CSE-815BTS-R000WNP chassis.

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1.1 Overview

This chapter provides a brief outline of the functions and features of the SuperServer® SYS-512B-WR. The following provides an overview of the system specifications and capabilities.

System Overview	
Motherboard	X14SBW-F
Chassis	CSE-815BTS-R000WNP
Processor	Single processor (Intel® Xeon® 6700/6500-series processor with P-cores or Intel® Xeon® 6700-series processor with E-cores) with Socket E2 LGA 4710 and a thermal design power (TDP) of up to 350 W
Memory	Total eight DIMM slots that support up to 2 TB of RDIMM DDR5 ECC memory with speeds of up to 6400 MT/s
Drive Support	Default: Four front hot-swap 3.5" SATA drive bays Option A: Four front hot-swap 2.5" PCIe 5.0 x4 NVMe drive bays Option B: Four front hot-swap 3.5"/2.5" SAS drive bays (NVMe/SAS support may require additional storage controller and/or cables; for details, see "Optional Components" on page 104) Two M.2 PCIe 5.0 x2 NVMe slots (M-key 2280/22110; VROC required for RAID)
Expansion Slots	Two PCIe 5.0 x16 full-height, full-length (FHFL) slots One PCIe 5.0 x8 (in x16) low-profile (LP) slot
I/O Ports	Two RJ45 1 GbE LAN ports One RJ45 1 GbE Dedicated BMC LAN port (IPMI shared on LAN port 1) Two USB 3.2 Gen1 Type-A ports (rear) Two USB 3.2 Gen1 ports (header) Two COM ports (one rear, one header) One TPM header One VGA port
System Cooling	Default: Five 4-cm heavy-duty fans with optimal fan speed control Optional: One add-on card cooling fan One CPU air shroud One CPU heatsink
Power	Two 860 W redundant Titanium level power supplies
Form Factor	1U rackmount: 17.2" x 1.7" x 25.6" (437 x 43 x 650 mm) (WxHxD)

Notes:

- A link to the Quick Reference Guide can be found on the following page of the Supermicro website: https://www.supermicro.com/en/products/system/wio/1u/sys-512b-wr
- The following safety models associated with the SYS-512B-WR have been certified as compliant with UL or CSA: 815-R8X14, 815-8, 815-R6X14, 815-6, 815-R6DX14, or 815-6D.

1.2 System Features

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

Front View

The following features are located on the front of the SYS-512B-WR server.

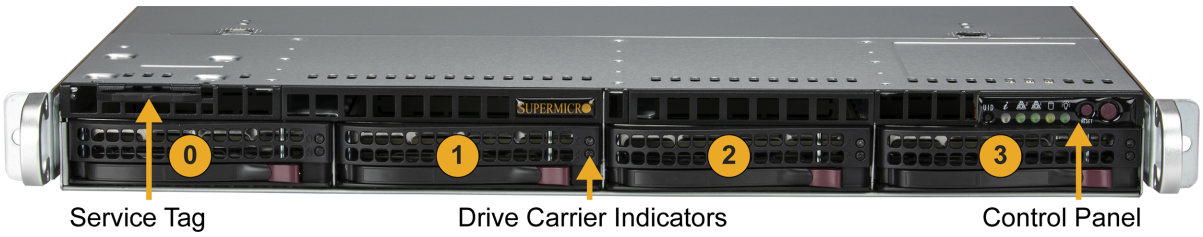

Figure 1-1. SYS-512B-WR Front View

System Features: Front	
Feature	**Description**
Service Tag	Pull-out service tag with BMC password label
Drive Carrier Indicators	Activity and status LED indicators for each drive carrier
Control Panel	Front control panel with LEDs and buttons

Storage Drive Locations	
Item	**Description**
0–3	3.5" hot-swap NVMe/SAS3/SATA3 drive bays
NVMe or SAS3 support requires additional parts from the optional components list.	

Control Panel

The following switches and LEDs are located on the SYS-512B-WR server control panel.

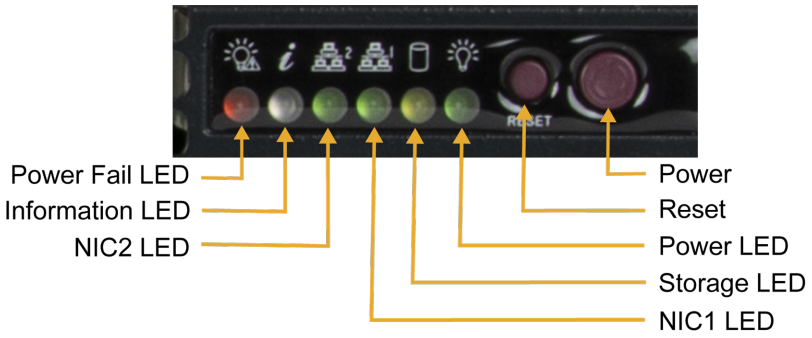

Figure 1-2. Control Panel

Control Panel Features	
Feature	**Description**
Power Fail LED	When this LED flashes, it indicates a power failure in the power supply.
Information LED	Alerts operator to several states, as noted in the table below.
NIC1/NIC2 LED	Indicates network activity on LANs when flashing.
Storage LED	Indicates activity on the storage drives when flashing.
Power LED	Steady on: Power on. Blinking at 4 Hz: Checking BIOS/BMC integrity. Blinking at 4 Hz and "i" LED is blue: BIOS firmware updating. Two blinks at 4 Hz, one pause 2 Hz, and "i" LED blue: BMC firmware updating. Blinking at 1 Hz and "i" LED red: Fault detected.
Reset	Reboot the system.
Power Button	The main power switch applies or removes primary power from the power supply to the server but maintains standby power. Hold for four seconds to force a shut-down.

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

Rear View

The following features are located on the rear of the SYS-512B-WR server.

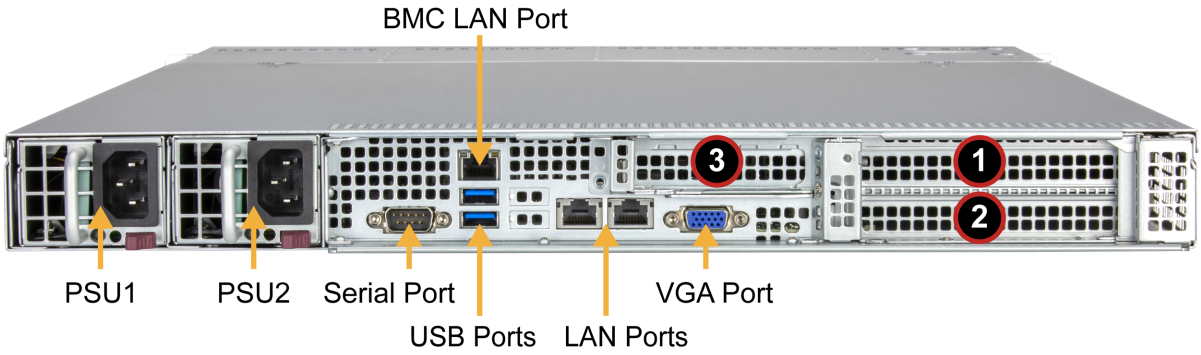

Figure 1-3. SYS-512B-WR Rear View

System Features: Rear	
Feature	**Description**
Power Supplies	Two redundant power supply modules
BMC LAN Port	One dedicated BMC LAN port
LAN Ports	Two RJ45 and 1GbE LAN ports
USB Ports	Two USB 3.2 Gen 1 ports
VGA Port	One video port
Serial Port	One serial port

Expansion Slot Locations	
Item	**Description**
1–2	PCIe 5.0 x16 FHFL slots
3	PCIe 5.0 x8 (in x16) LP slot

1.3 System Architecture

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

Main Components

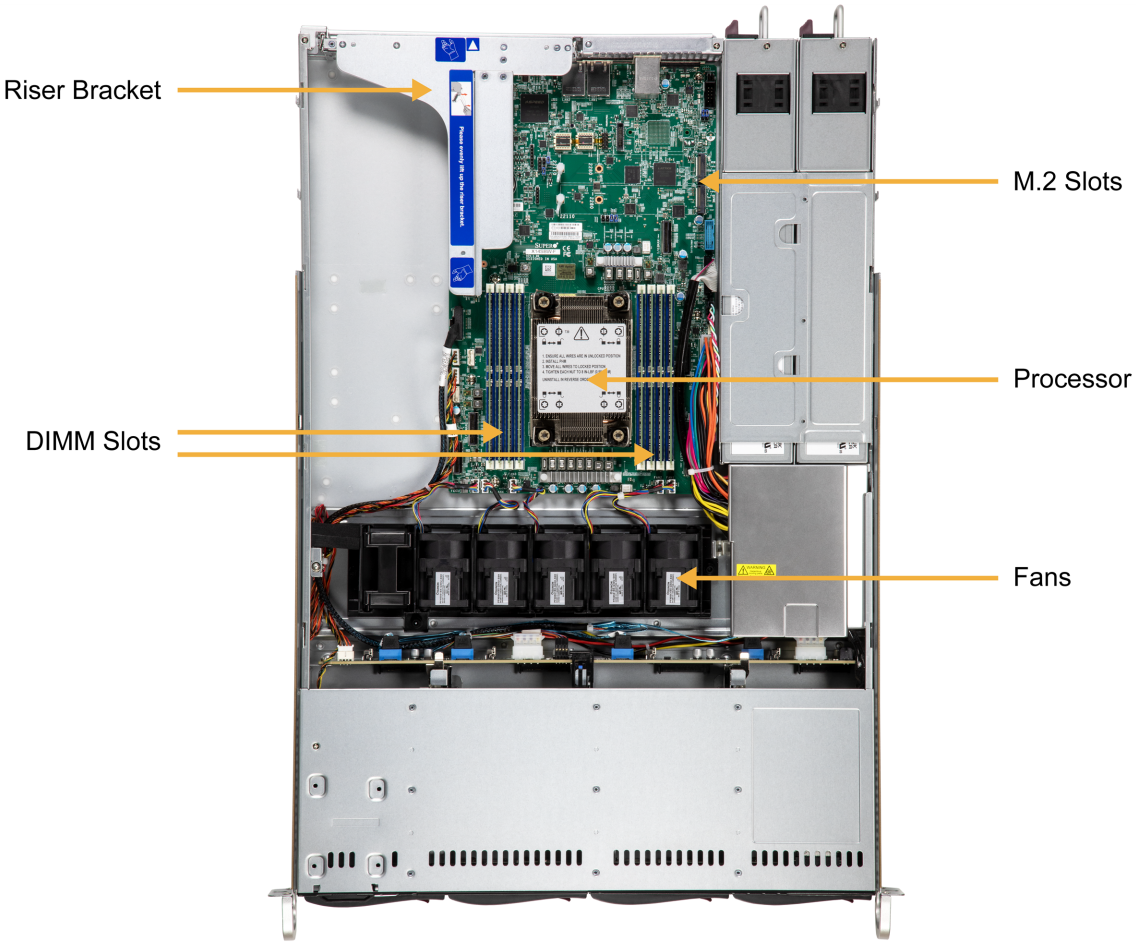

Figure 1-4. SYS-512B-WR Main Component Locations

System Features: Top	
Feature	**Description**
Riser Bracket	Tool-less, top-loading riser bracket with FHFL double-width GPU support
DIMM Slots	Total eight DIMM slots DDR5
M.2 Slots	Two M.2 NVMe slots for internal boot drives
Processor	Single processor (Intel® Xeon® 6700/6500-series processor with P-cores or Intel® Xeon® 6700-series processor with E-cores)
Fans	Five counter-rotating system fans, plus one optional fan

Motherboard Block Diagram

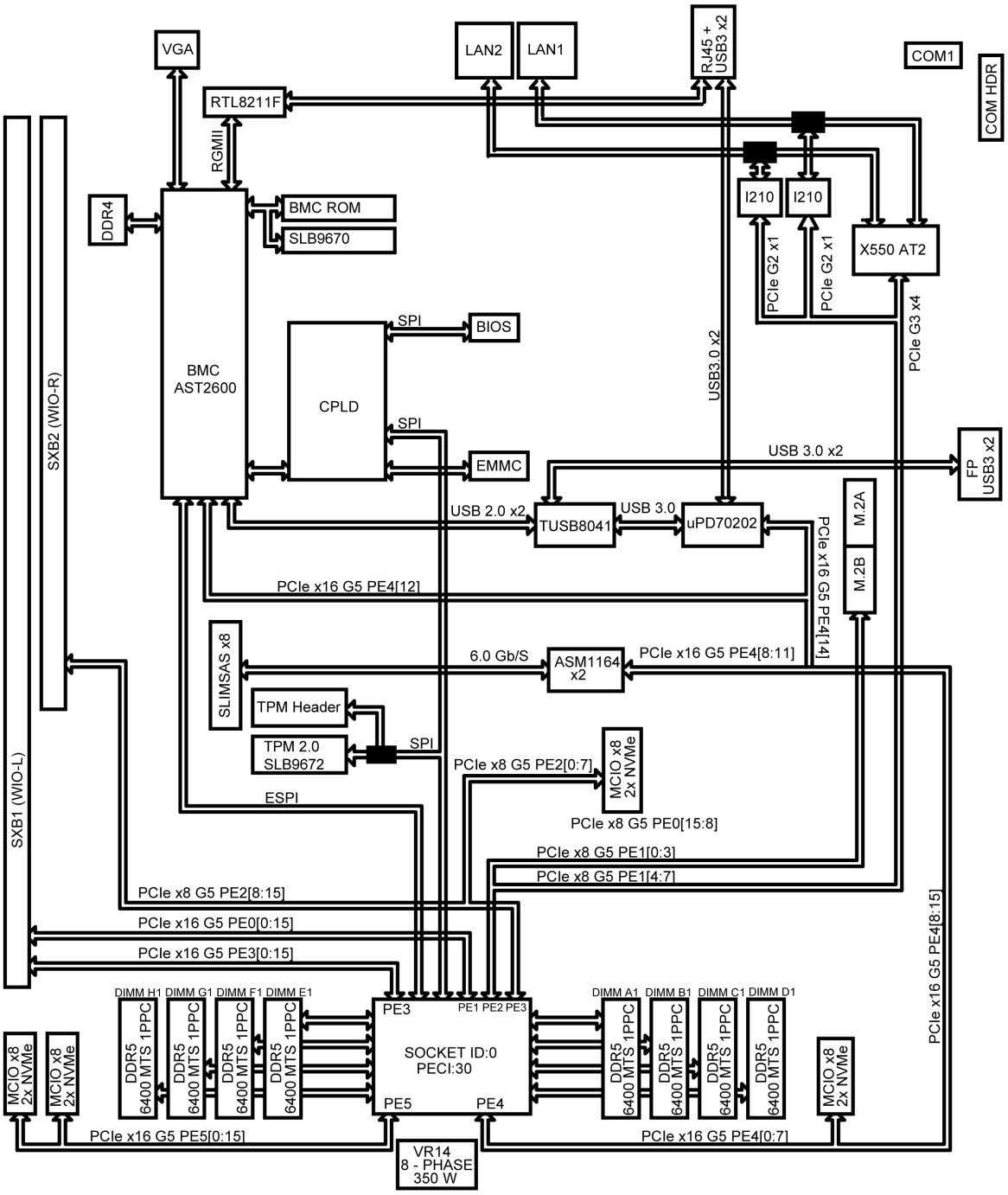

Figure 1-5. X14SBW-F Motherboard Block Diagram

1.4 Motherboard Quick Reference

For details on the X14SBW-F motherboard layout and other quick reference information, refer to the content below.

Motherboard Layout

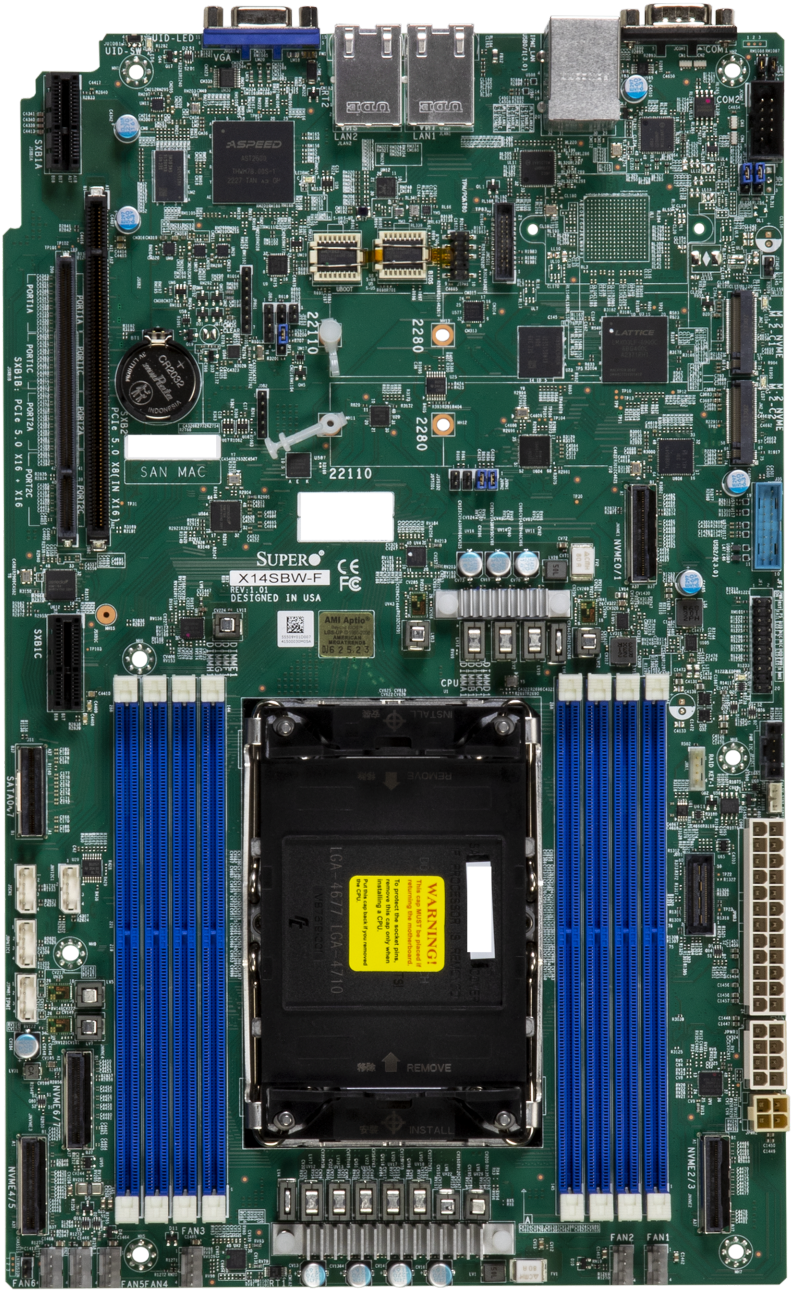

Figure 1-6. X14SBW-F Motherboard Image

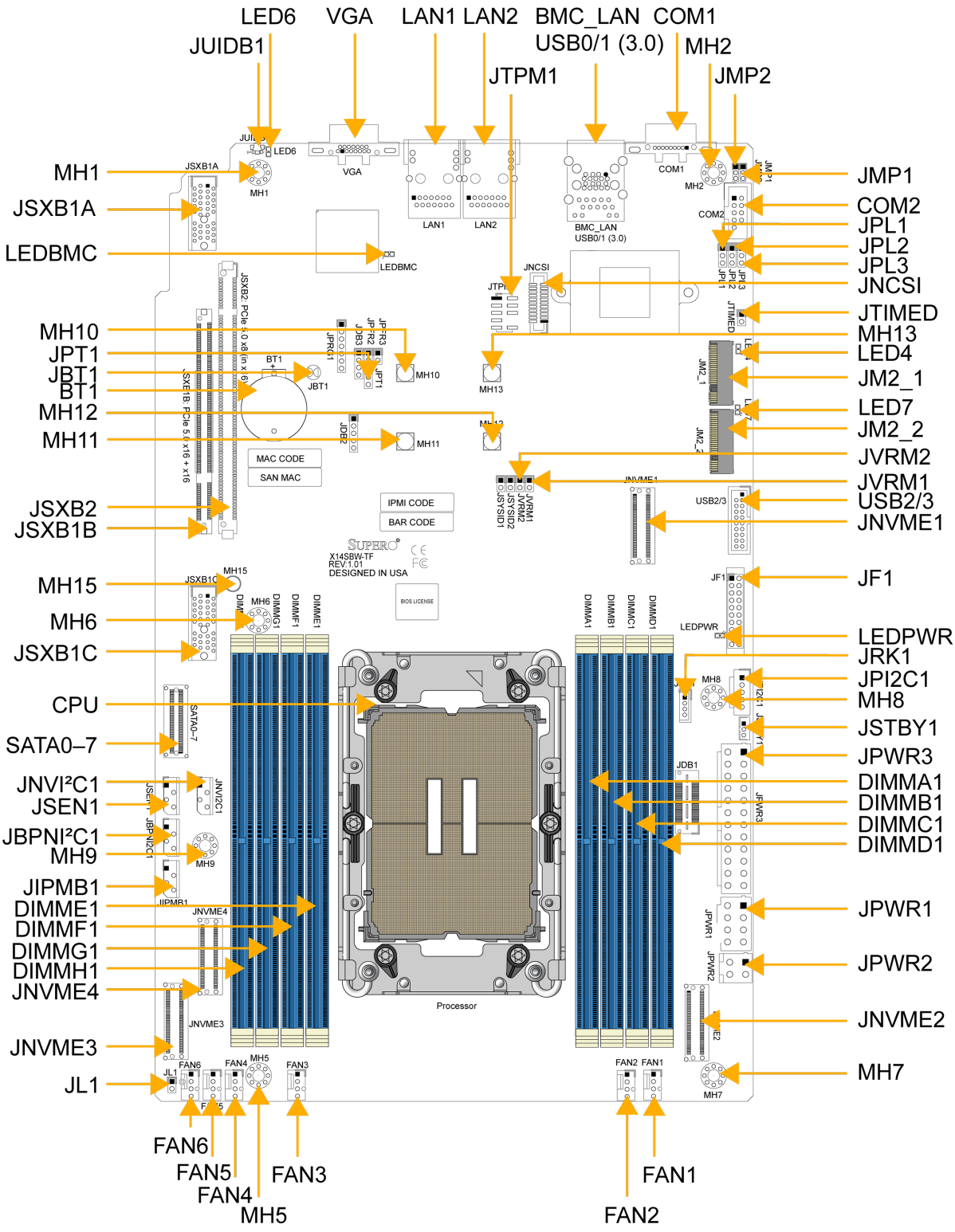

Figure 1-7. X14SBW-F Motherboard Layout

Notes:

- For detailed information on jumpers, connectors, and LED indicators, see "Maintenance and Component Installation" on page 36.
- "■" indicates the location of pin 1.
- "MH" indicates the location of a mounting hole.
- Components not documented are for internal testing purposes only.
- Use only the correct type of onboard CMOS battery as specified by the manufacturer. To avoid possible explosion, do not install the onboard battery upside down.

Quick Reference Table

Jumper	Description	Default Setting
JBT1	CMOS Clear	Open (Normal)
JPL1	i210 LAN1 Enable/Disable	Pins 1–2 (Enabled) Pins 2–3 (Disabled)
JPL2	i210 LAN2 Enable/Disable	Pins 1–2 (Enabled) Pins 2–3 (Disabled)
JPT1	Onboard TPM Enable	Pins 1–2 (Enabled) Pins 2–3 (Disabled)
JVRM1	VRM SMB Clock (to BMC)	Pins 1–2 (Enabled)
JVRM2	VRM SMB Data (to BMC)	Pins 1–2 (Enabled)

LED	Description	Status
LED4	M.2 LED	Blinking: Device Working
LED6	Unit Identifier LED	Solid Blue: Unit Identified
LED7	M.2 LED	Blinking: Device Working
LEDBMC	BMC Heartbeat LED	Blinking Green: Device Working
LEDPWR	Onboard Power LED	Solid Green: Power On

Connector	Description
BMC LAN	Dedicated BMC LAN Port
BT1	Onboard Battery
COM1, COM2	COM Port/COM Header
FAN1–FAN6	CPU/System Fan Headers
JBPNI²C1	4-pin BMC External I²C Header (for a BPN-NVME4-LA15-S4 backplane)
JF1	Front Control Panel Header
JIPMB1	System Management Bus Header (for IPMI only)
JL1	Chassis Intrusion Header
JM2_1, JM2_2	M.2 M-Key PCIe 5.0 x2 Connectors (supports 2280 and 22110 form factors)

Connector	Description
JNCSI1	NC-SI Port Selection
JNVI²C1	Non-volatile Memory (NVMe) I²C Header
JNVME1–JNVME4	MCIO PCIe 5.0 x8 Connectors
JPI²C1	Power System Management Bus I²C Header
JPWR1	8-pin +12 V CPU Power Connector
JPWR2	4-pin +12 V CPU Power Connector
JPWR3	24-pin ATX Power Connector (Required)
JRK1	VROC RAID Key Header
JSEN1	Inlet Sensor Header
JSTBY1	Standby Power Connector
JTIMED	Timed GPIO Header
JTPM	Trusted Platform Module (TPM)/Port 80 Connector
JUIDB1	Unit Identifier Switch
LAN1, LAN2	LAN (RJ45) Ports
SATA0–7 (Slimline SAS)	Asmedia SATA 3.0 Ports
SXB1A, SXB1B, SXB1C	PCIe 5.0 x16 + x16 Supermicro Proprietary WIO Left Add-on Card Slots
SXB2	PCIe 5.0 x8 (in x16) Supermicro Proprietary WIO Right Add-on Card Slot
USB0/1	Rear I/O USB 3.2 Gen 1 Ports
USB2/3	Front Panel USB 3.2 Gen 1 Headers
VGA	VGA Port

Note: Jumpers, connectors, switches, and LED indicators that are not described in these tables are for manufacturing testing purposes only, and are not covered in this manual.

Chapter 2:

Server Installation

This chapter provides advice and instructions for mounting your server in a server rack. If your server is not already fully integrated with processors, system memory, etc., refer to "Maintenance and Component Installation" on page 36 for details on installing those specific components.

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

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2.1 Unpacking the System

Inspect the box the SYS-512B-WR server was shipped in and note if it was damaged in any way. If any equipment appears damaged, file a damage claim with the carrier who delivered it.

Decide on a suitable location for the rack unit that will hold the server. It should be situated in a clean, dust-free area that is well ventilated. Avoid areas where heat, electrical noise and electromagnetic fields are generated. It will also require a grounded AC power outlet nearby. Be sure to read the precautions and considerations noted in "Standardized Warning Statements for AC Systems" on page 196.

2.2 Preparing for Setup

The box in which the SYS-512B-WR server was shipped should include the rackmount hardware needed to install it into the rack. Read this section in its entirety before you begin the installation.

Choosing a Setup Location

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

Rack Precautions

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

System Precautions

- Review the electrical and general safety precautions in "Standardized Warning Statements for AC Systems" on page 196.
- Determine the placement of each component in the rack before you install the rails.
- Install the heaviest server components at the bottom of the rack first and then work your way up.

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

Rack Mounting Considerations

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

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

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

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

Ambient Operating Temperature

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

Airflow

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

Mechanical Loading

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

Circuit Overloading

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

Reliable Ground

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

2.3 Installing the Rails

This section provides information on installing the CSE-815BTS-R000WNP chassis into a rack unit with the rails provided. There are a variety of rack units on the market, which may mean that the assembly procedure will differ slightly from the instructions provided. You should also refer to the installation instructions that came with the rack unit you are using.

Note: This rail will fit a rack between 25.6" and 33" deep.

Identifying the Rails

The chassis comes with two sets of rack rails, one set for the right side of the chassis and one for the left. Each set consists of an inner rail that is pre-attached to the chassis, and an outer rail that attaches to the rack.

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

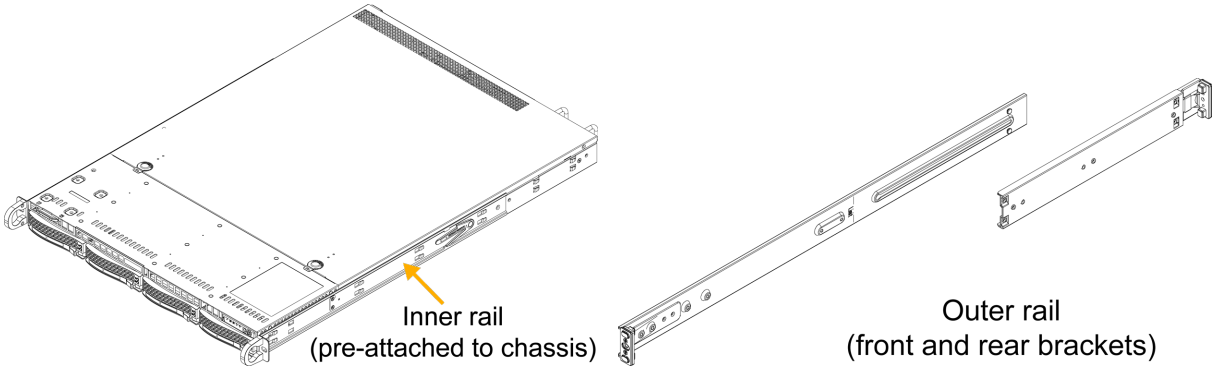

Figure 2-1. Identifying the Sections of the Rack Rails

Installing the Outer Rails onto the Rack

1. Measure the distance from the front of the rack to the rear of the rack.
2. Join the long and short rail by sliding the short rail and the long rail together as shown below.
3. Adjust the short and long rails until they cover the entire distance from the front of the rack to the rear of the rack.
4. Secure the rails to the cabinet with screws. Repeat steps 1–4 for the left outer rail.

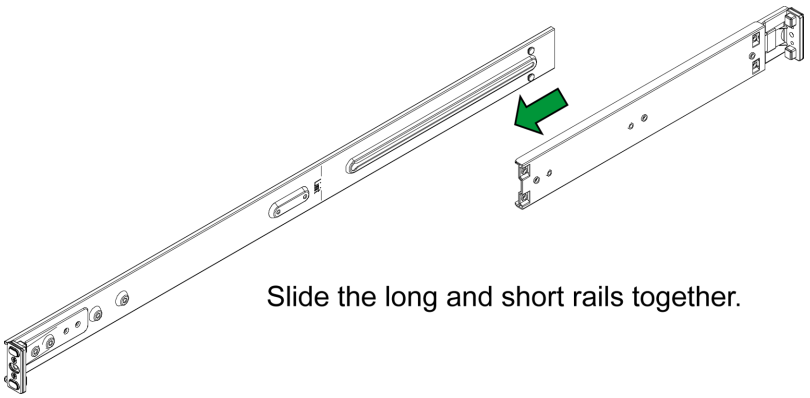

Figure 2-2. Joining the Long and Short Outer Rails

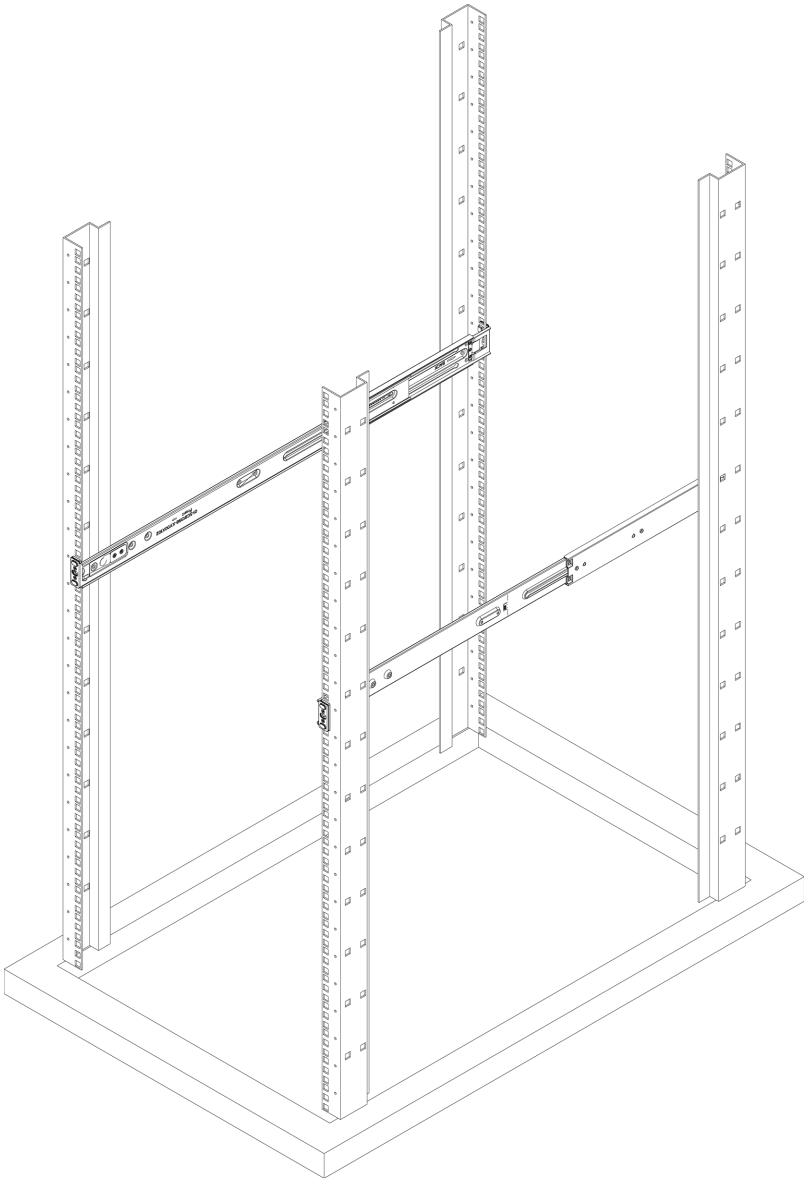

Figure 2-3. Installing the Outer Rails to the Rack

2.4 Installing a Chassis into a Rack

Once the rails are attached to the chassis and the rack, the chassis is ready to be installed into a rack.

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

1. Push the inner rails, which are attached to the chassis, into the grooves of the outer slide assemblies that are installed in the rack.
2. Slide the chassis rails into the rack rails until the chassis is completely in the rack.

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

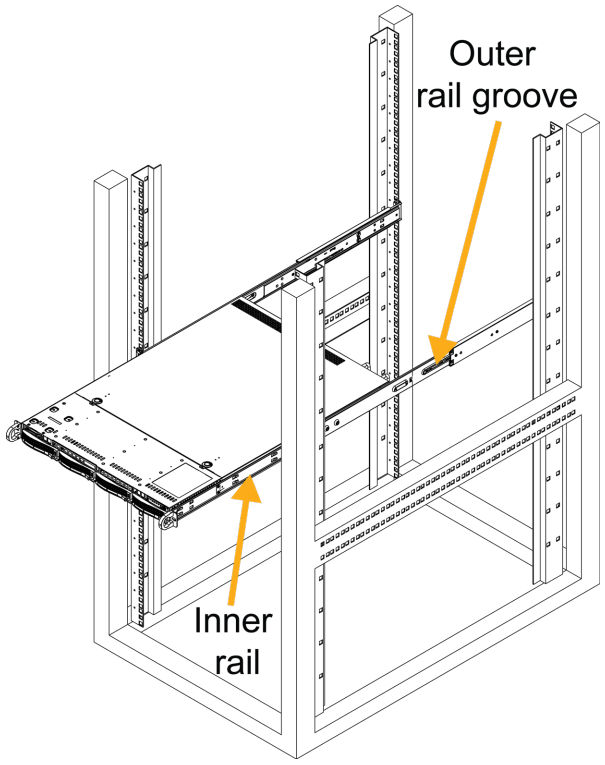

Figure 2-4. Installing the Chassis into a Rack

Removing the Chassis from the Rack

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

1. Pull the chassis forward from the rack until it stops.
2. Press the release latches on each of the inner rails downward simultaneously and continue to pull the chassis forward and completely out of the rack.

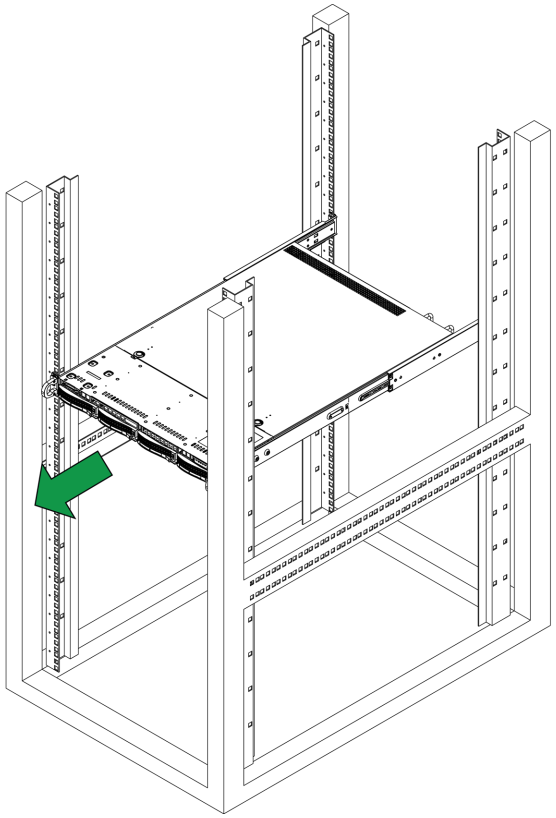

Figure 2-5. Removing the Chassis from the Rack

Chapter 3:

Maintenance and Component Installation

This chapter provides instructions on installing and replacing main system components for the SYS-512B-WR server. To prevent compatibility issues, only use components that match the specifications and/or part numbers given.

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

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3.1 Removing Power

Before performing some setup or maintenance tasks, use the following procedure to ensure that power has been removed from the SYS-512B-WR server. This step is necessary when removing or installing non hot-swappable 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.
3. Disconnect the power cord(s) from the power supply module(s).

3.2 Accessing the System

The SYS-512B-WR server features a removable top cover, which allows easy access to the inside of the server.

When performing service on components inside the system, remove the system from the rack and place it on a work bench or desk. Do not service with the system extended from the rack.

Removing the Chassis Cover

Before installing any components, replacing chassis fans, or accessing the motherboard, you will first need to remove the top cover from the chassis.

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

1. Remove the power cords from the rear of the power supplies as described in "Removing Power" on the previous page.
2. Press both release tabs simultaneously to release the top cover from its locked position.
3. Slide the cover back toward the rear of the chassis.
4. Lift the top cover upwards and off of the chassis.
5. Check that all ventilation openings on the top cover and the top of the chassis are clear and unobstructed.

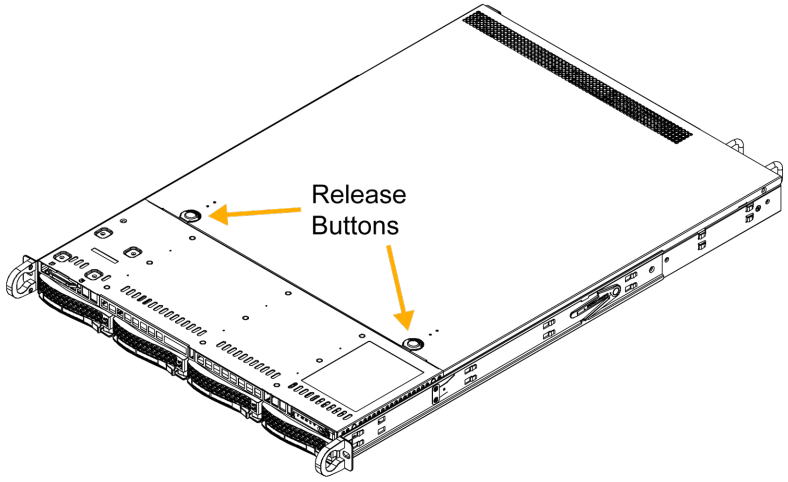


Figure 3-1. Removing the Top Cover

3.3 Static-Sensitive Devices

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

Precautions

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

3.4 Processor and Heatsink Installation

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

Notes:

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

LGA 4710 Socket E2 Processors

Processor Top View

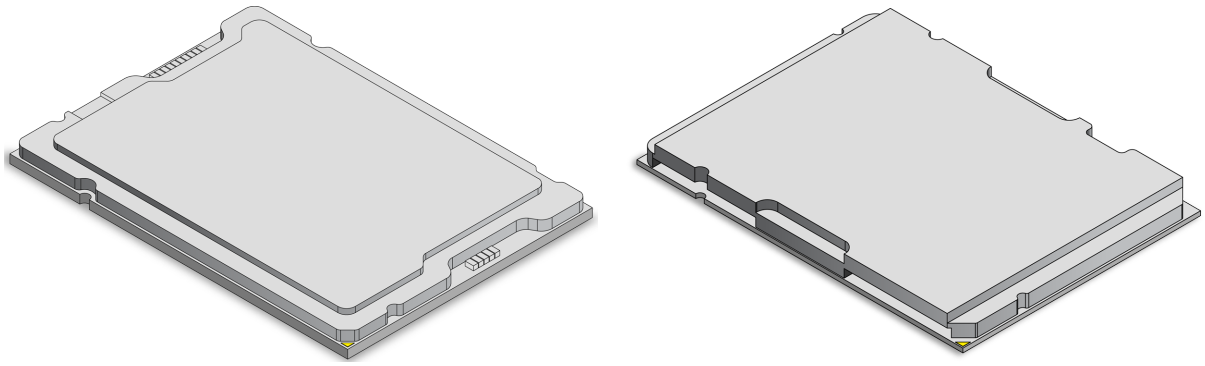


Figure 3-2. Processor (SP XCC left, SP HCC/LCC right)

Note: The motherboard supports three processor SKUs: SP XCC, SP HCC, and SP LCC. Each SKU supports a specific carrier; the SP XCC processor supports Carrier E2A while SP HCC and SP LCC support Carrier E2B. Make sure the processors of the same SKU are on the motherboard.

Overview of the Processor Carrier

The motherboard supports two types of processors and their associated processor carrier.

Processor Carriers

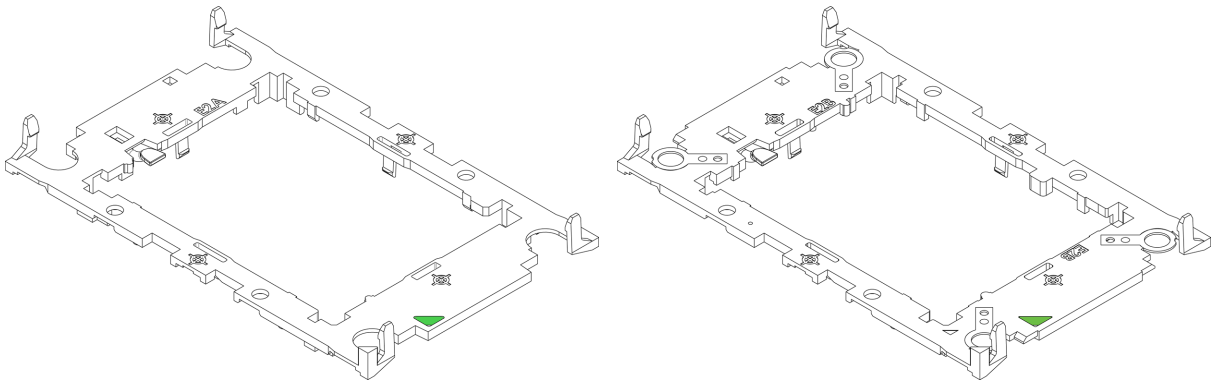


Figure 3-3. Carrier (SP XCC E2A left, SP HCC/LCC E2B right)

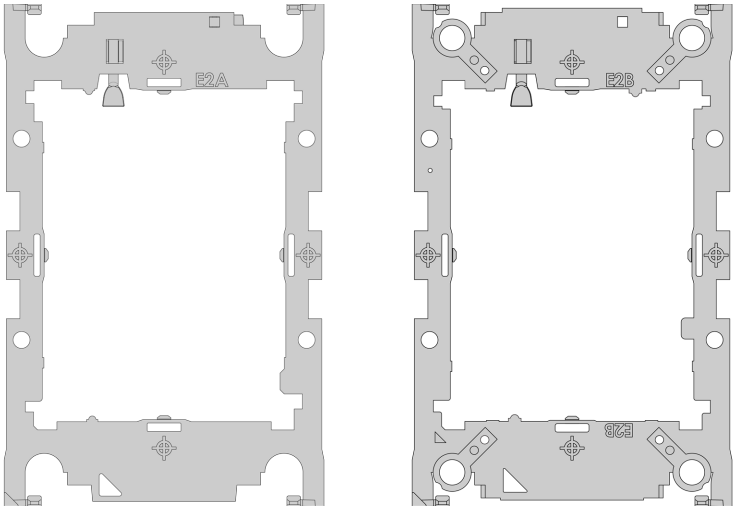


Figure 3-4. Carrier Top View (SP XCC E2A left, SP HCC/LCC E2B right)

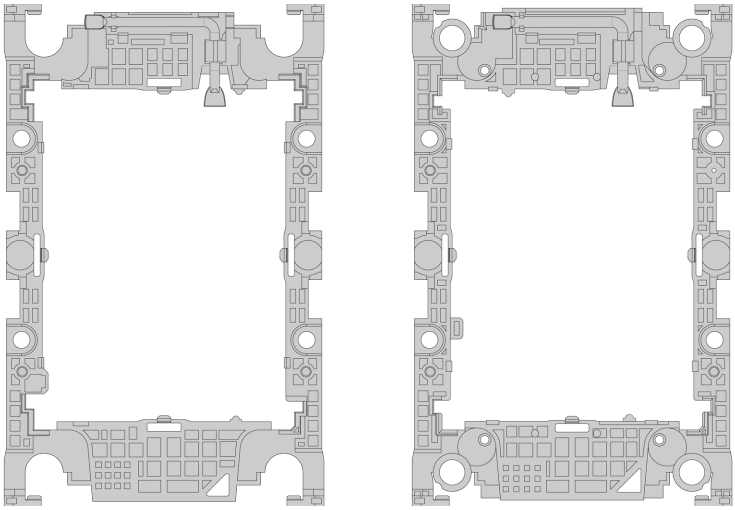


Figure 3-5. Carrier Bottom View (SP XCC E2A left, SP HCC/LCC E2B right)

Overview of the Processor Socket

The processor socket is protected by a plastic protective cover.

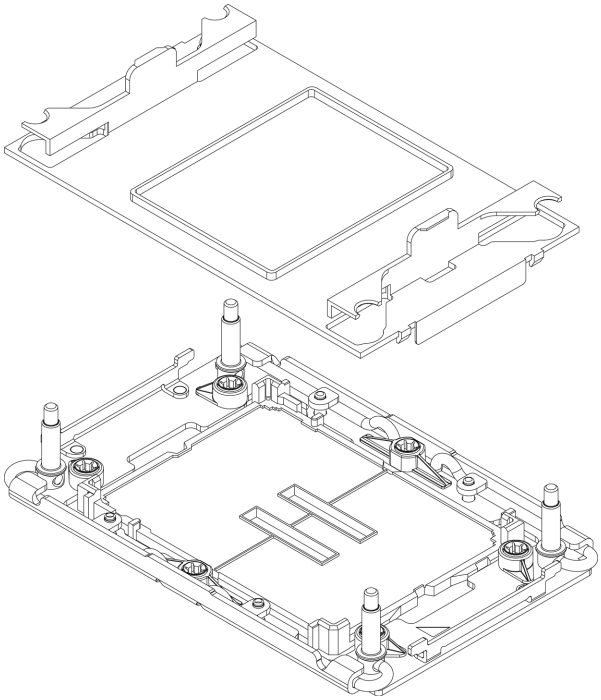


Figure 3-6. Plastic Protective Cover and Processor Socket

Overview of the Processor Heatsink Module

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

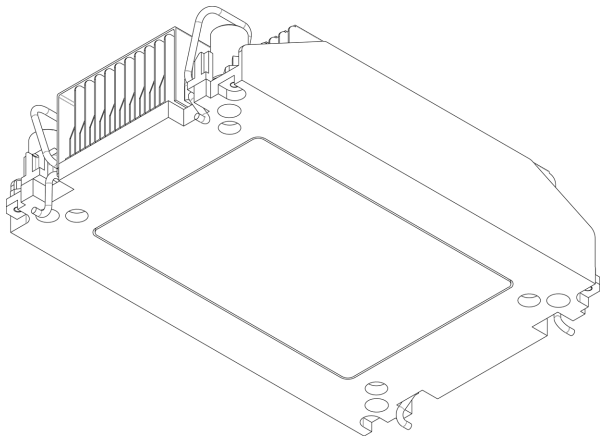


Figure 3-7. Heatsink (1U)

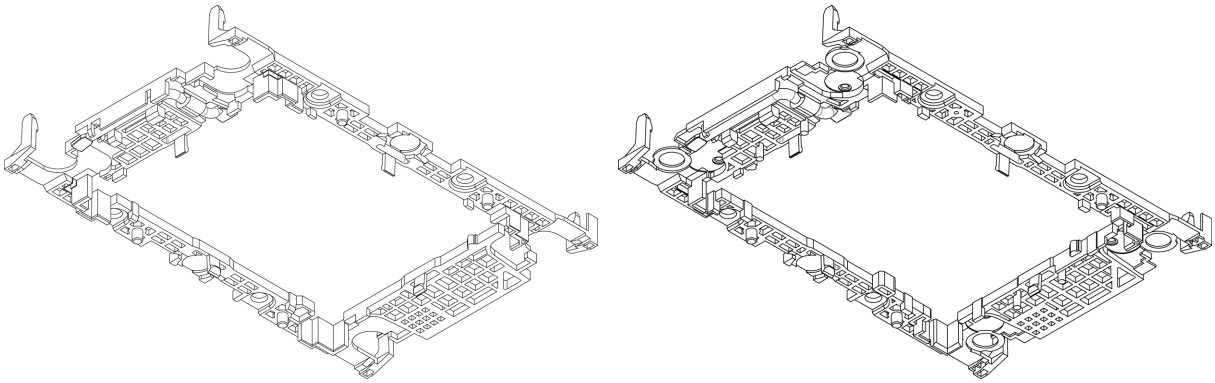


Figure 3-8. Carrier (SP XCC E2A left, SP HCC/LCC E2B right)

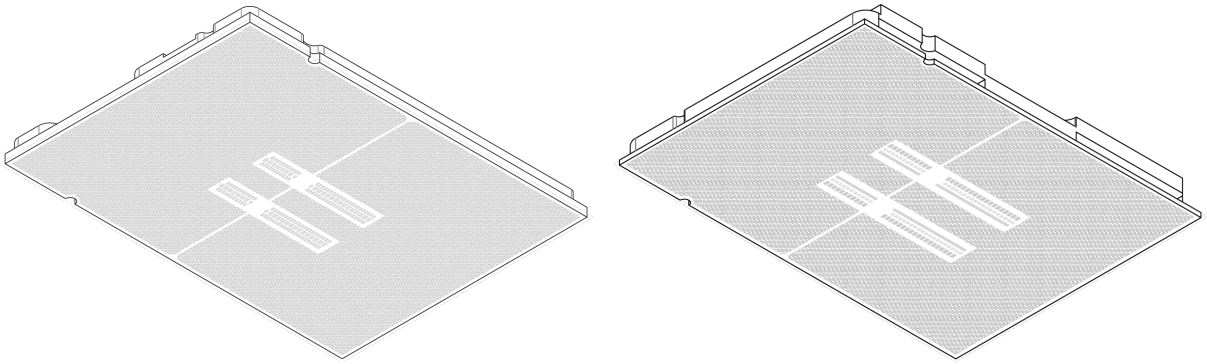


Figure 3-9. Processor (SP XCC E2A left, SP HCC/LCC E2B right)

Installing the Processor

To install the processor, follow the steps below:

1. Before installation, make sure the lever on the processor carrier is pressed down as shown below.

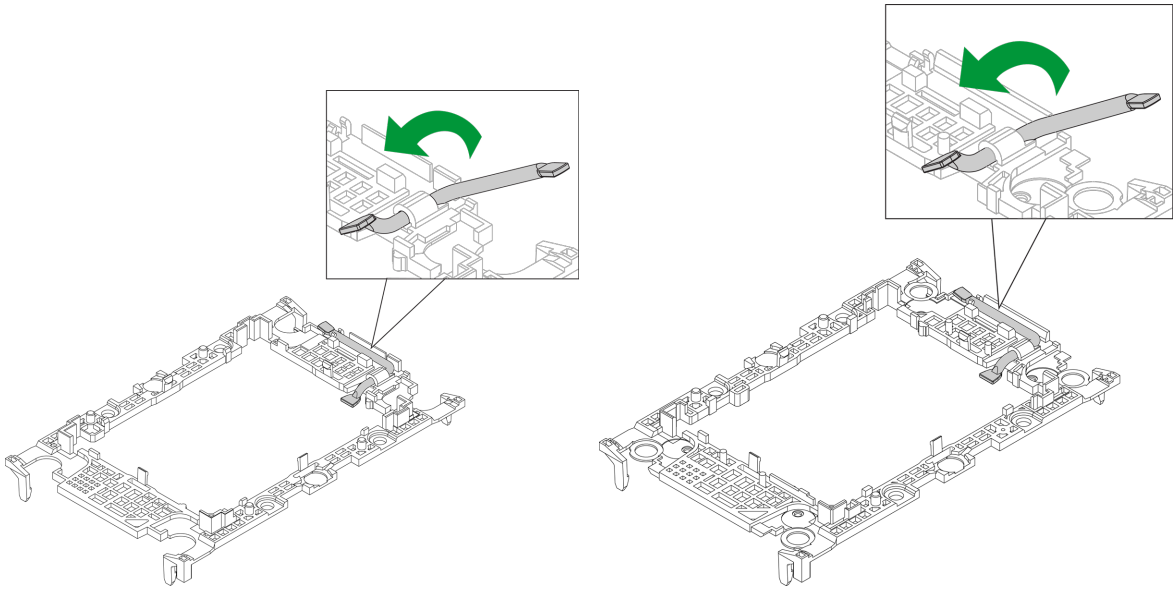


Figure 3-10. Carrier Lever (SP XCC left, SP HCC/LCC right)

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

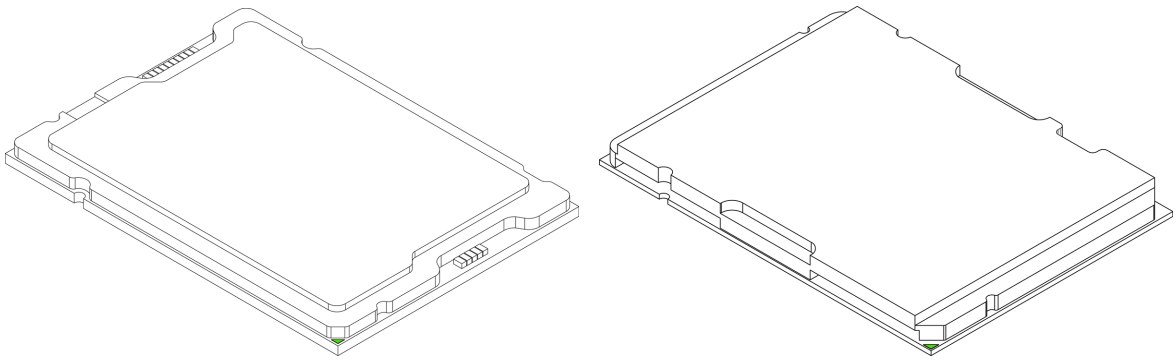


Figure 3-11. Processor (SP XCC E2A left, SP HCC/LCC E2B right)

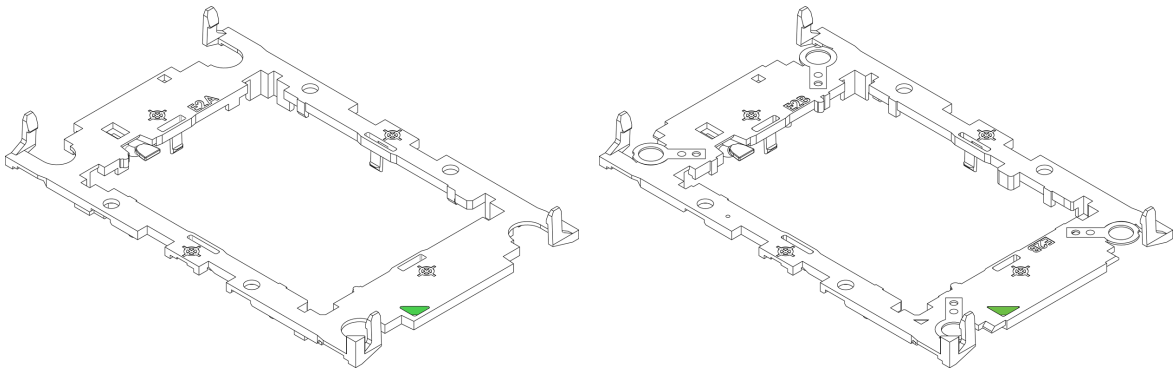


Figure 3-12. Carrier (SP XCC E2A left, SP HCC/LCC E2B right)

3. Use the triangles as a guide to carefully align and place one end of the processor into the latch marked A, and place the other end of the processor into the latch marked B as shown below.

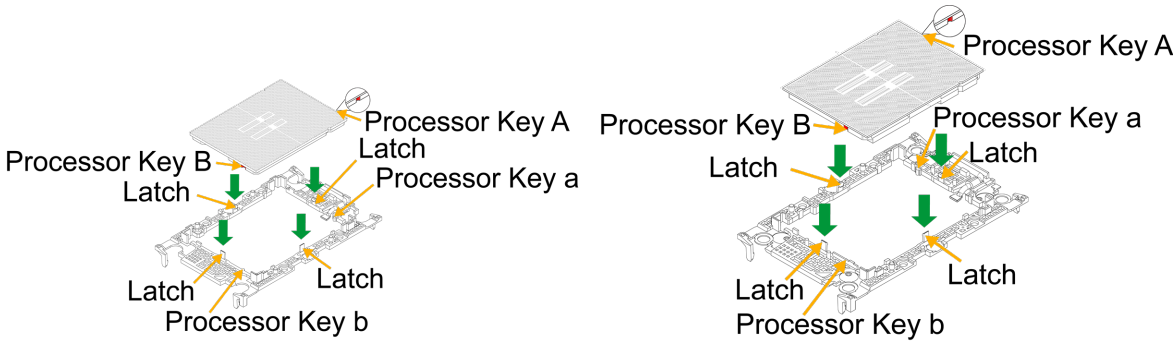


Figure 3-13. Keys and Latches Locations (SP XCC E2A left, SP HCC/LCC E2B right)

4. Examine all corners to ensure that the processor is firmly attached to the carrier.

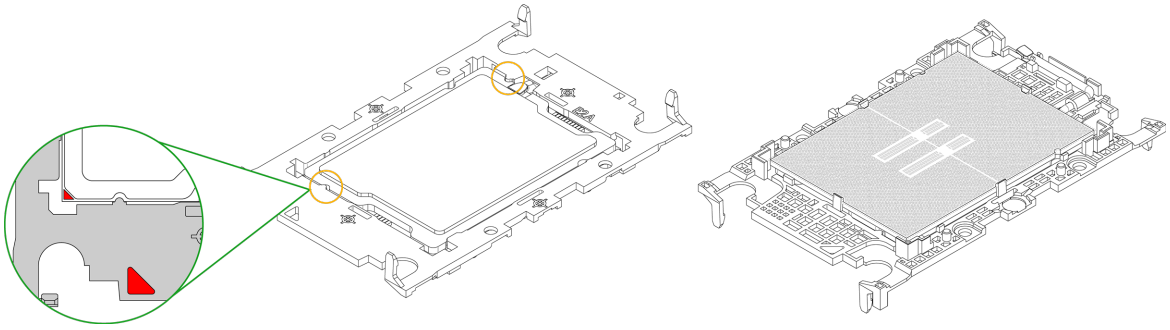


Figure 3-14. SP XCC E2A Keys and Latches

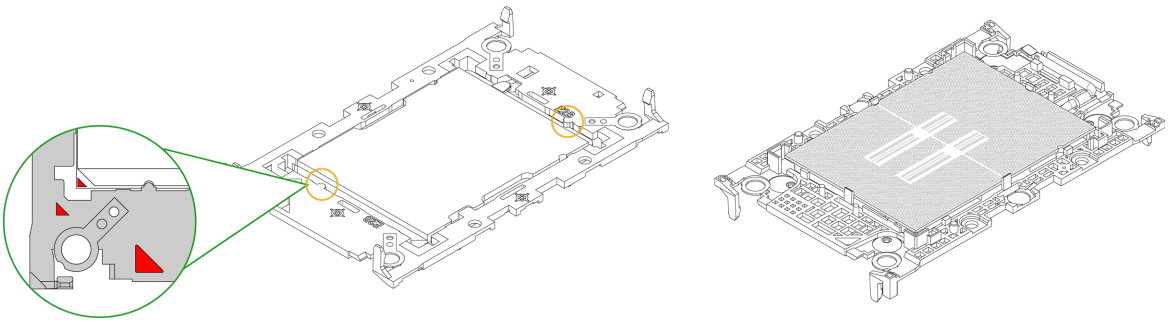


Figure 3-15. SP HCC/LCC E2B Keys and Latches Together

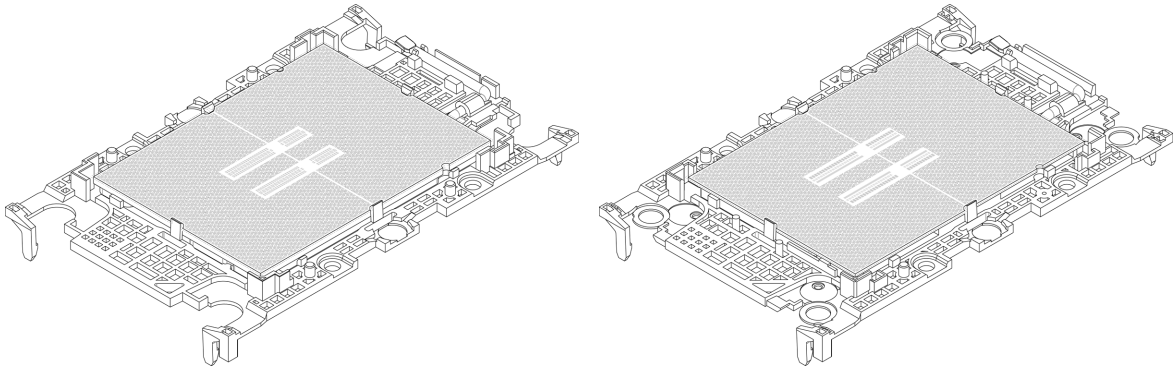


Figure 3-16. Carrier Assembly Completed (SP XCC E2A left, SP HCC/LCC E2B right)

Assembling the Processor Heatsink Module

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

1. Note the label on top of the heatsink, which marks the airflow direction. Turn the heatsink over and orient the heatsink so the airflow arrow is pointing towards the triangle on the processor.
2. If this is a new heatsink, the thermal grease has been pre-applied. Otherwise, apply the proper amount of thermal grease.
3. Hold the processor carrier so the processor's gold contacts are facing up, then align the holes of the processor carrier with the holes on the heatsink. Press the processor carrier down until it snaps into place. The plastic clips of the processor carrier will lock at the four corners.

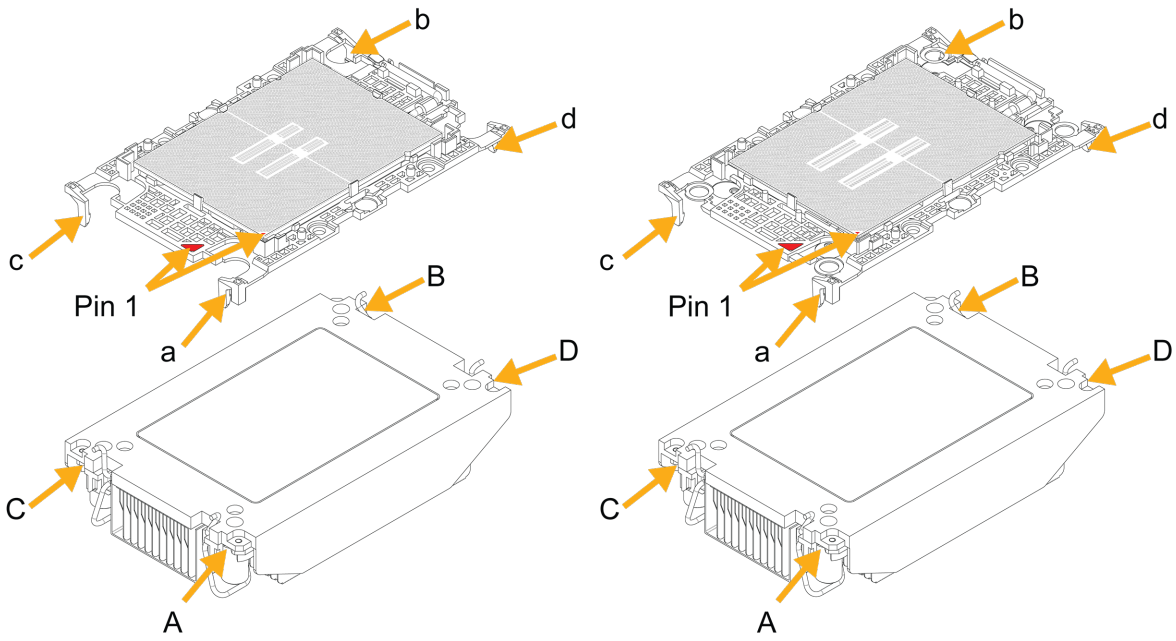


Figure 3-17. Carrier with 1U Heatsink (SP XCC left, SP HCC/LCC right)

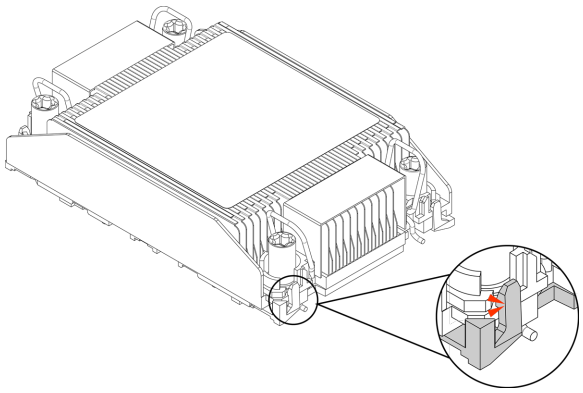


Figure 3-18. PHM Plastic Clips Locked (1U)

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

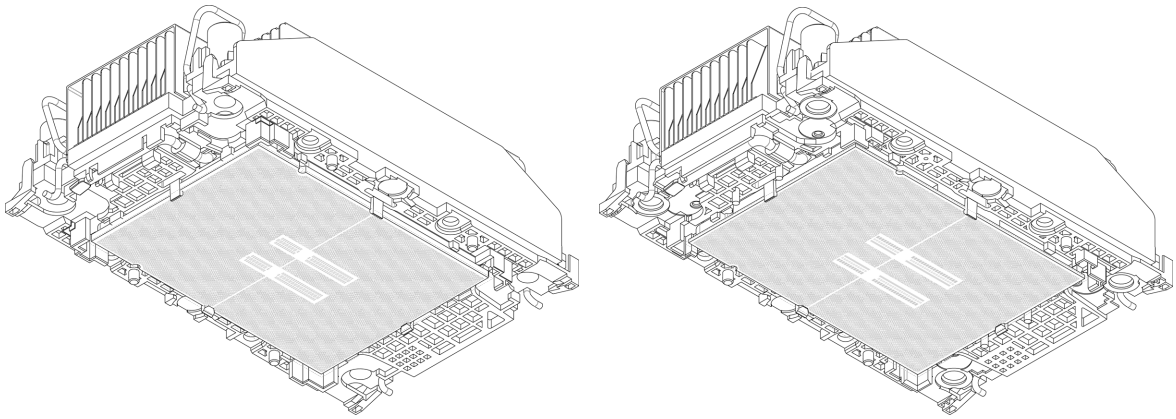


Figure 3-19. 1U PHM Completed (SP XCC left, SP HCC/LCC right)

Preparing the Processor Socket for Installation

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

1. Press the tabs inward.

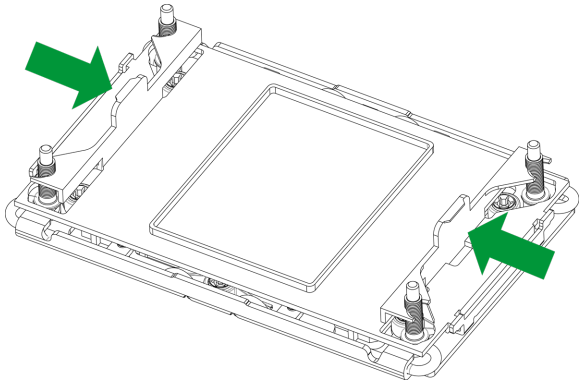


Figure 3-20. Processor Socket with Plastic Protective Cover

2. Pull up the protective cover from the socket.

Note: Do not touch or bend the socket pins.

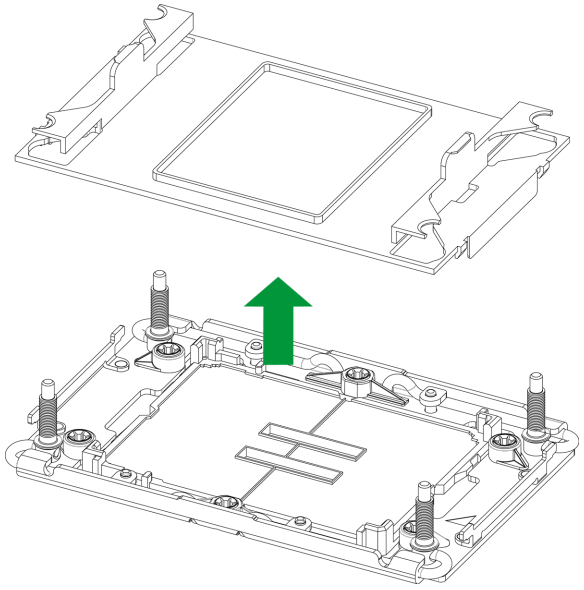
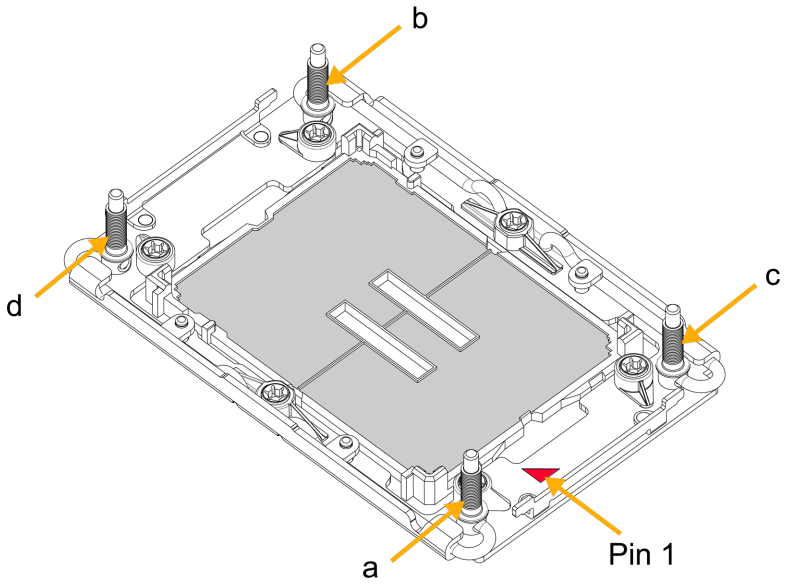


Figure 3-21. Plastic Protective Cover Removed

Preparing to Install the PHM into the Processor Socket

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

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



a, b, c, d: Threaded Fasteners

Figure 3-22. Threaded Fasteners

2. Locate four PEEK nuts (marked A, B, C, and D) and four rotating wires (marked 1, 2, 3, and 4) on the heatsink.

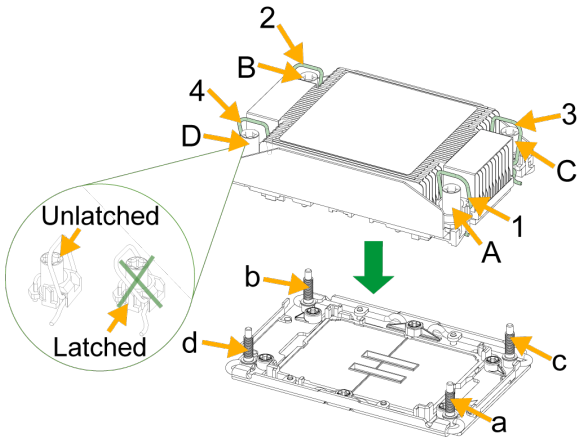


Figure 3-23. PEEK Nuts and Rotating Wires (1U)

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

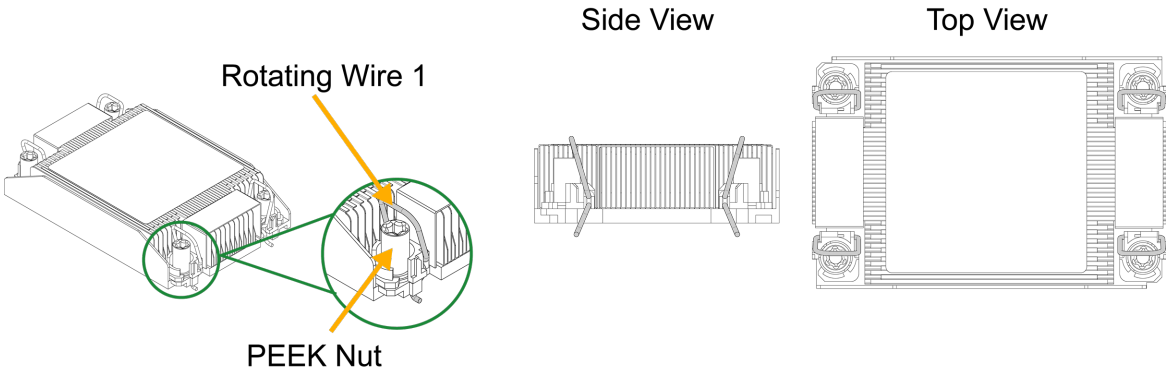


Figure 3-24. 1U Unlatched Positions

Installing the Processor Heatsink Module

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

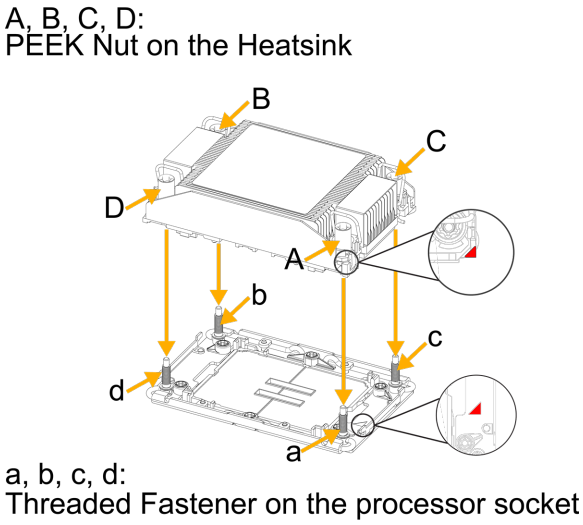


Figure 3-25. Aligning the Heatsink with the Socket (1U)

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

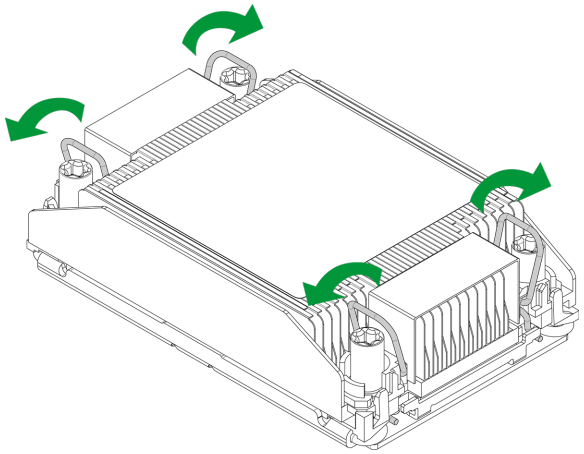


Figure 3-26. Latching the PHM (1U)

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

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

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

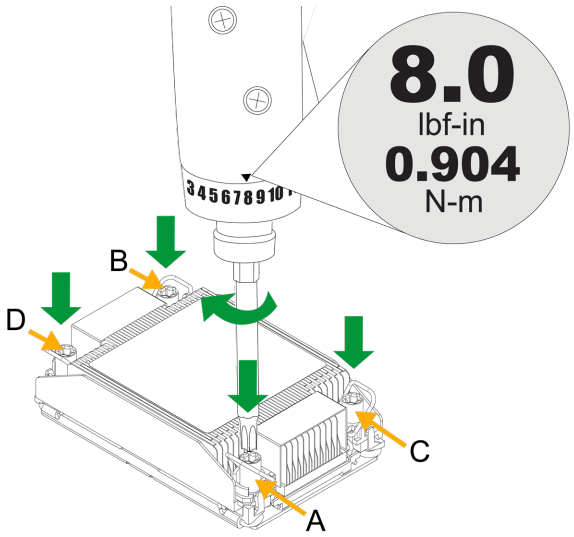


Figure 3-27. Installing the PHM with a Torque Driver (1U)

Removing the Processor Heatsink Module

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

Then follow the steps below:

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

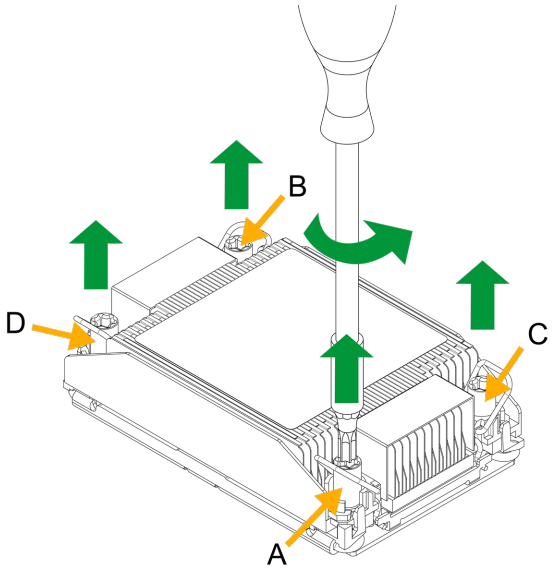


Figure 3-28. Loosening the Screws (1U)

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

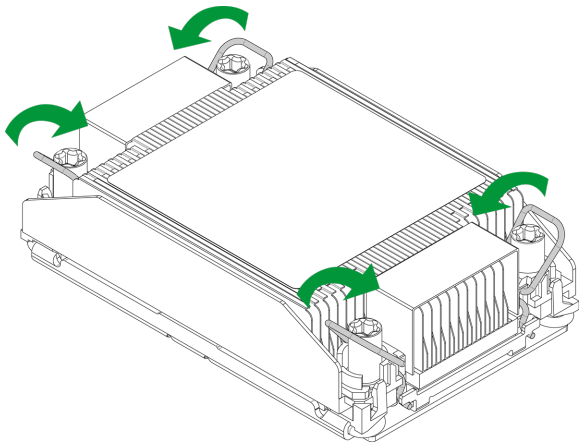


Figure 3-29. Unlatching the PHM (1U)

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

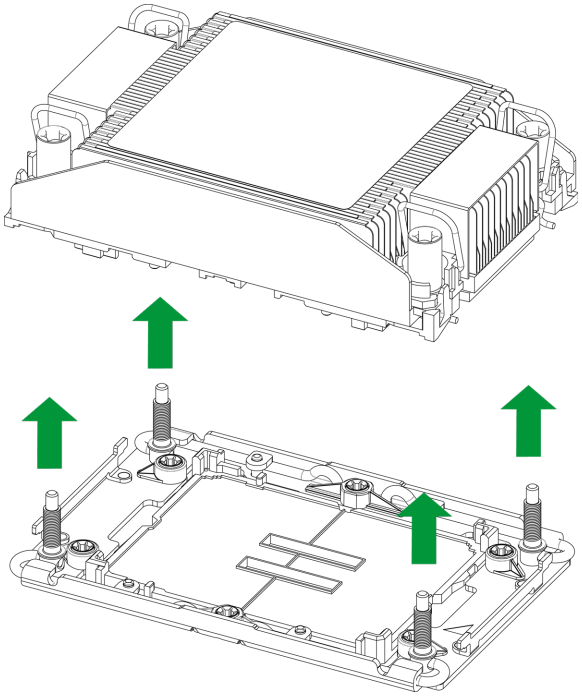


Figure 3-30. Removing the PHM from the Socket (1U)

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

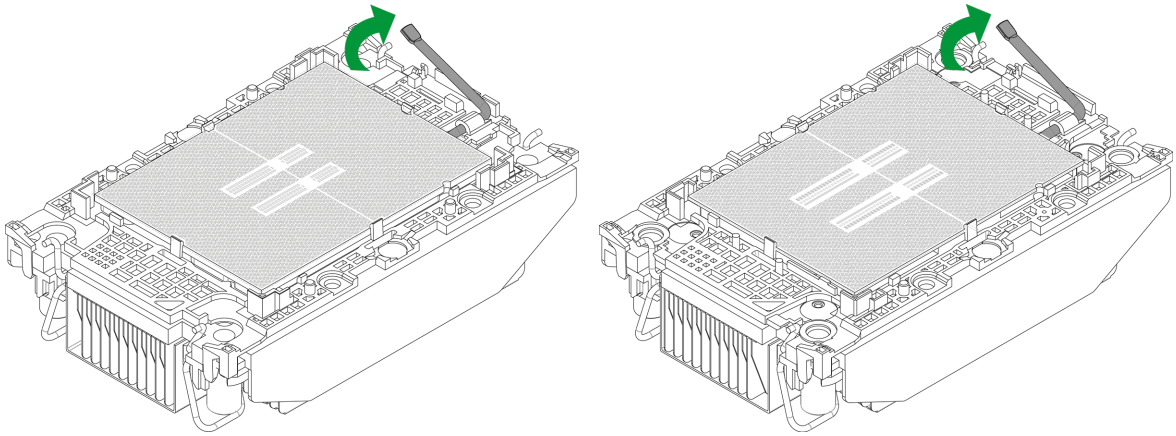


Figure 3-31. Carrier with 1U Heatsink (SP XCC left, SP HCC/LCC right)

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

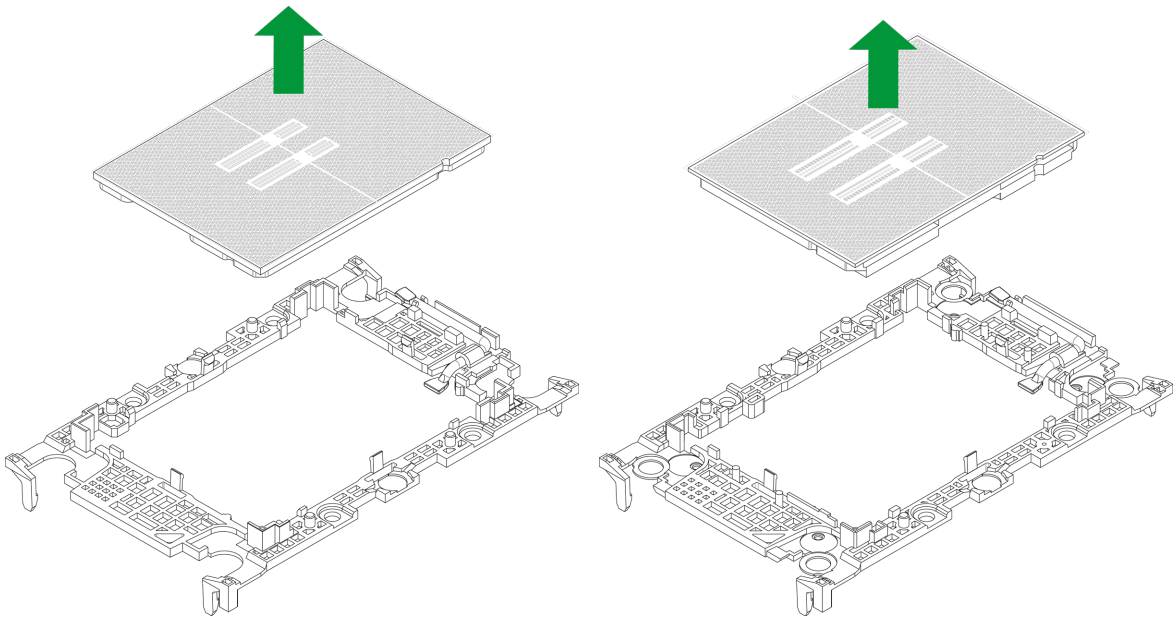


Figure 3-32. Removing the Processor (SP XCC left, SP HCC/LCC right)

3.5 Memory Support and Installation

Important: To prevent any damage, exercise extreme care when installing or removing memory modules.

Note: Check the Supermicro website for recommended memory modules.

Memory Support

The X14SBW-F motherboard supports up to 2 TB of 3DS RDIMM/MRDIMM DDR5 ECC memory with speeds of up to 8000 MT/s in eight memory slots.

Note: Intel® Xeon® 6700/6500-series processor with P-cores is required to support MRDIMM.

DDR5-6400 Memory Support for Intel® Xeon® 6700/6500-Series Processors with P-Cores					
Type	Ranks Per DIMM, Data Width (Stack)	DIMM Capacity (GB)			Speed (MT/s); Voltage (V); Slots per Channel (SPC) and DIMMs per Channel (DPC)
		DRAM Density			
		16 Gb	24 Gb	32 Gb	1DPC/2SPC
		1DPC	1DPC	1DPC	+1.1 V
RDIMM	1Rx8	16 GB	24 GB	-	6400, 6000, 5600, 5200, 4800 (DDR5-6400 rated RDIMMs only)
	1Rx4	32 GB	48 GB	-	
	2Rx8	32 GB	48 GB	-	
	2Rx4	64 GB	96 GB	128 GB*	
3DS RDIMM	4Rx4	-	-	-	
	8Rx4	-	-	256 GB*^	
MRDIMM	2Rx8	32 GB	-	-	8000, 7200 (MRDIMM-8800 only)
	2Rx4	64 GB	-	-	

Notes:

- The items marked with an asterisk (*) are supported in 1S/2S/4S systems. The items with circumflex (^) are supported in 8S systems. All others support 1S/2S only.

CXL Memory Configuration Support for Intel® Xeon® 6700/6500-Series Processors with P-Cores									
Native DDR5 Memory Per Socket				CXL Memory Per Socket					
Slot 0 DIMM Ranks	Slot 0 DIMM Capacity (GB)	DIMM Type	DRAM Density (Gb)	CXL Memory Channels	CXL Memory Type	CXL Capacity Per Device/ Module	CXL Inter leave	CXL Mode	4S and 8S support
2Rx4	96	10x4	24	2+2	DDR5 x8	96 GB	1x4*, 2x2, 4x1	1LM+Vol	Yes
2Rx4	128	10x4	32	2+2	DDR4 x8, DDR x8	128 GB	1x4*, 2x2, 4x1	1LM+Vol	Yes
2Rx4	128	10x4	32	2+2	DDR5 x8	128 GB	hetero x12	Hetero	Yes
2Rx4	64	10x4	16	2+2+2	DDR5 x8	128 GB	1x6*, 2x3, 3x2	1LM+Vol	No
2Rx4	64	10x4	16	2	DDR5 x8	128 GB	1x2*	1LM+Vol	No
2Rx4	64	10x4	16	1+1	DDR5 x16	2ch 128 GB	1x2*	Intel Flat Memory Mode	Yes

Notes:

- The items with an asterisk (*) are the default settings in the BIOS.
- The Intel® Xeon® 6700/6500-series processors with P-cores CXL memory configurations are 1DPC ('Slot 0') only for native DDR5.
- CXL Memory Channel: number of devices per root port, with root ports separated by "+". e.g. 2+2+2+2 = four root ports populated with two devices per root port.
- CXL Interleave: sets x ways, e.g. 2x4 = one set of two modules, interleaved four-way
- CXL Modes:
  - 1LM+Vol= Native DDR5 ('1LM') and (volatile) CXL memory visible to SW as separate tiers, separately interleaved.
  - Hetero x12 = DDR5 and (volatile) CXL memory interleaved together in one 12-way set.
  - Flat Memory Mode = HW manages data movement between DDR5 and CXL memory, total capacity visible to SW

Intel® Xeon® 6700/6500-Series Processors with P-Cores DDR5 Memory Population Table **(1 Processor and 8 DIMMs Installed, 1DPC)**	
DIMM Counts	***Memory Population Sequence (1DPC)***
1 DIMM (Recommended)	DIMMA1
4 DIMMs (Recommended)	DIMMA1/DIMMC1/DIMME1/DIMMG1 DIMMB1/DIMMD1/DIMMF1/DIMMH1
8 DIMMs (Recommended)	DIMMA1/DIMMB1/DIMMC1/DIMMD1/DIMME1/DIMMF1/DIMMG1/DIMMH1

DDR5-6400 Memory Support for Intel® Xeon® 6700-Series Processors with E-Cores (Only DDR5-6400 Related RDIMMs Supported)					
Type	**Ranks Per DIMM, Data Width (Stack)**	**DIMM Capacity (GB)**			**Speed (MT/s); Voltage (V); Slots per Channel (SPC) and DIMMs per Channel (DPC)**
		DRAM Density			
		16 Gb	**24 Gb**	**32 Gb**	**1DPC/2SPC**
		1DPC	**1DPC**	**1DPC**	**+1.1 V**
RDIMM	1Rx4	32 GB	-	-	6400, 6000, 5600, 5200, 4800 (DDR5-6400 rated RDIMMs only)
	2Rx8	32 GB	-	-	
	2Rx4	64 GB	96 GB	-	
	2Rx4	-	-	128 GB	
3DS RDIMM	4Rx4	-	-	256 GB	

CXL Memory Configuration Support for Intel® Xeon® 6700-Series Processors with E-Cores								
Native DDR5 Memory Per Socket				**CXL Memory Per Socket**				
Slot 0 DIMM Ranks	**Slot 0 DIMM Capacity (GB)**	**DIMM Type**	**DRAM Density (Gb)**	**CXL Memory Channels**	**CXL Memory Type**	**CXL Capacity Per Device/ Module**	**CXL Interleave**	**CXL Mode**
2Rx4	64	10x4	16	2+2	DDR5 x8	64 GB	1x4*, 2x2, 4x1	1LM+Vol
2Rx4	64	10x4	16	1+1	DDR5 x16	128 GB	1x2*, 2x1	1LM+Vol
1Rx4	32	10x4	16	2	DDR5 x8	128 GB	1x2*	Intel Flat Memory Mode

Notes:

- The items with an asterisk (*) are the default settings in the BIOS.
- The Intel® Xeon® 6700-series processors with E-cores CXL memory configurations are 1DPC ('Slot 0') only for native DDR5.
- CXL Memory Channel: number of devices per root port, with root ports separated by "+," e.g. 2+2+2+2 = four root ports populated with two devices per root port.
- CXL Interleave: sets x ways, e.g. 2x4 = one set of two modules, interleaved four-way.
- CXL Modes:
  - 1LM + Vol = DDR5 ('1LM') and (volatile) CXL memory visible to SW as separate tiers, separately interleaved.
  - Flat Memory Mode = HW manages data movement between DDR5 and CXL memory, total capacity visible to SW.

Intel® Xeon® 6700-Series Processors with E-Cores DDR5 Memory Population Table (1 Processor and 8 DIMMs Installed, 1DPC)	
DIMM Counts	***Memory Population Sequence (1DPC)***
1 DIMM (Recommended)	DIMMA1
4 DIMMs	DIMMA1/DIMMC1/DIMME1/DIMMG1 DIMMB1/DIMMD1/DIMMH1/DIMMF1
8 DIMMs (Recommended)	DIMMA1/DIMMB1/DIMMC1/DIMMD1/DIMME1/DIMMF1/DIMMG1/DIMMH1

General Guidelines for Optimizing Memory Performance

- Using DDR5 memories with the same type, size, speed, ranking, and density is a mandatory requirement.
- First, confirm whether the installed CPU supports P-cores or E-cores, then refer to the corresponding memory population table and install the memory correctly.
- The motherboard will support an odd number of memory modules. However, to achieve the best memory performance, a balanced memory population is recommended.

DIMM Installation

Important: To avoid causing any damage to the memory module or the DIMM socket, do not use excessive force when pressing the release tabs on the ends of the DIMM socket. Handle memory modules with care. To avoid ESD-related damage to your memory modules or components, carefully follow all the instructions given in "Static-Sensitive Devices" on page 40.

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

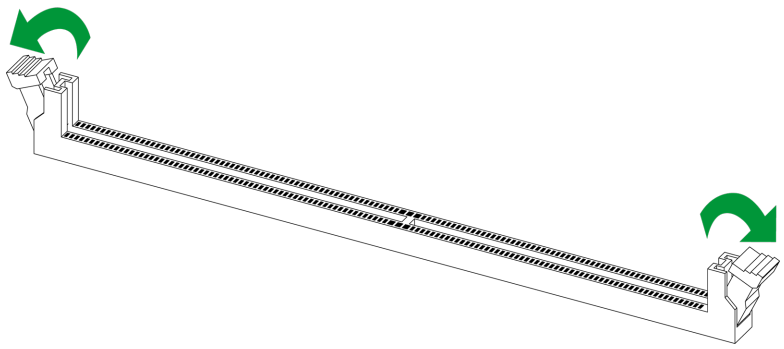


Figure 3-33. Unlocking the DIMM Slot

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

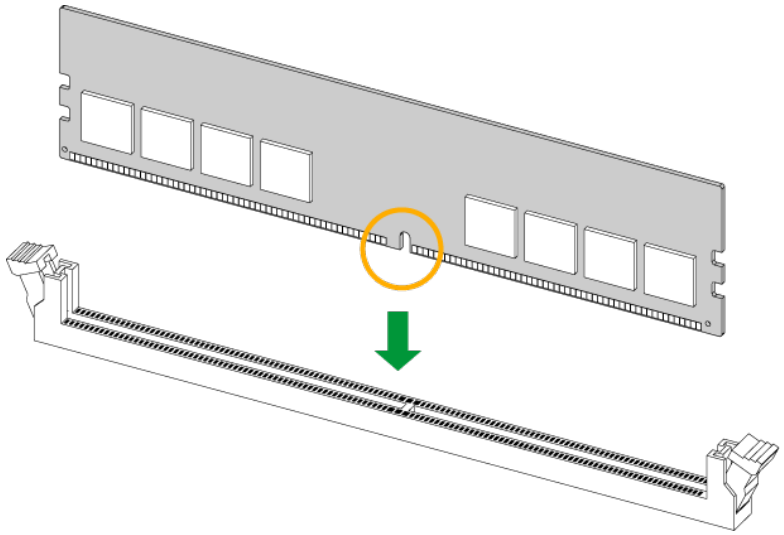


Figure 3-34. Aligning the DIMM Slot with the Receptive Point

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

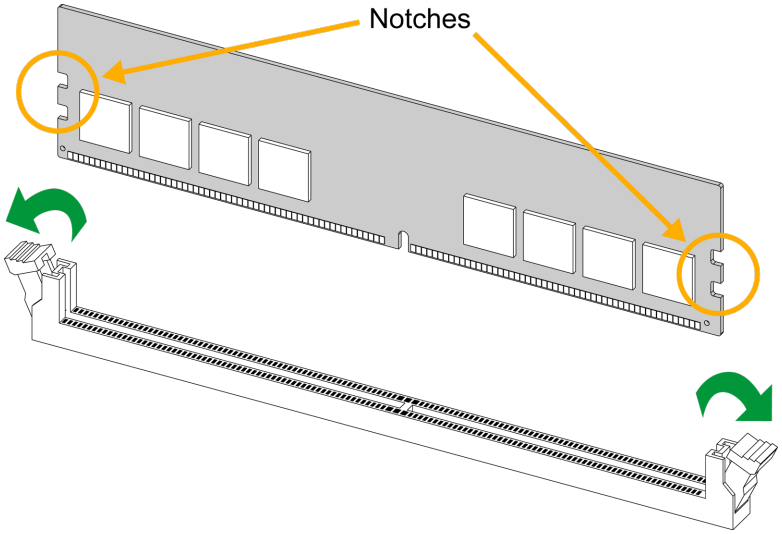


Figure 3-35. Aligning the Notches

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

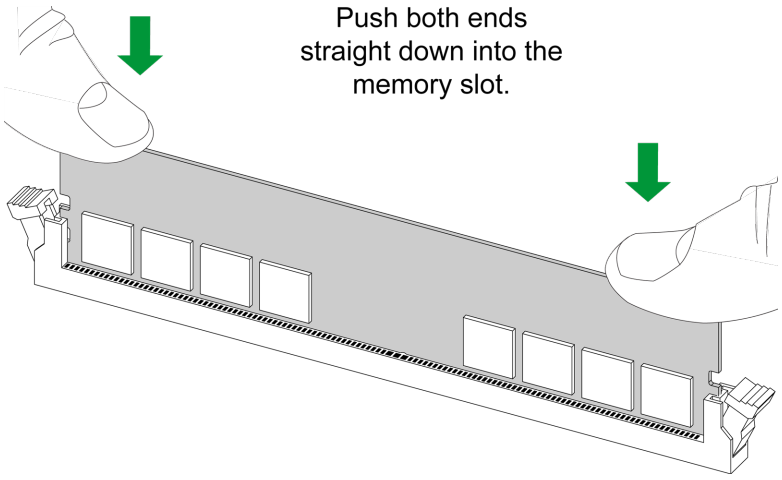


Figure 3-36. Securing the DIMM

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

DIMM Removal

Important: To avoid causing any damage to the memory module or the DIMM socket, do not use excessive force when pressing the release tabs on the ends of the DIMM socket. Handle memory modules with care. To avoid ESD-related damage to your memory modules or components, carefully follow all the instructions given in "Static-Sensitive Devices" on page 40.

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

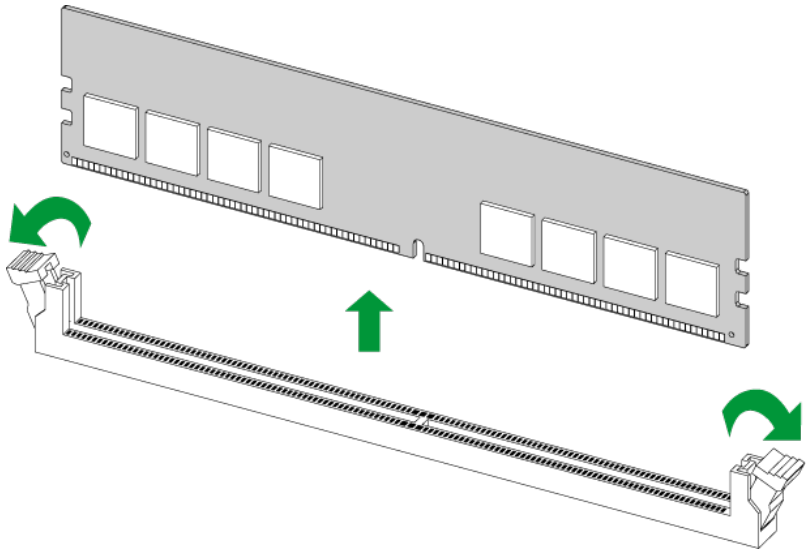


Figure 3-37. Unlocking the DIMM Slot

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

3.6 Motherboard Battery Removal and Installation

Battery Removal

To remove the onboard battery, follow the steps below:

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

Proper Battery Disposal

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

Battery Installation

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

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

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

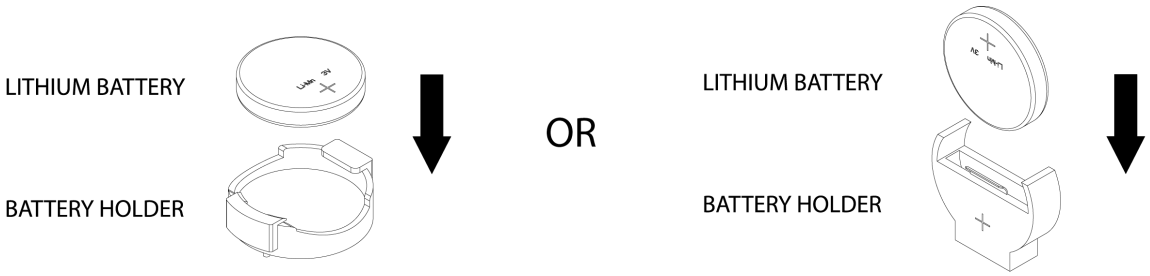


Figure 3-38. Installing a Battery

3.7 Storage Drives

The SYS-512B-WR supports four hot-swap 3.5" SAS/SATA storage drives in hybrid drive bays. An optional controller card kit is required to support SAS drives.

The drives are mounted in drive carriers that simplify their removal from the chassis. These carriers also help promote airflow. Regardless of how many drives are installed, all drive carriers must remain in the drive bays to maintain proper airflow.

The hot-swap capability of the drives allow them to be removed and installed without powering down the system.

Note: Enterprise-level disk drives are recommended for use in Supermicro servers. For a list of compatible storage drives, see https://www.supermicro.com/products/nfo/supermicro_drives.cfm.

Figure 3-39. Logical Drive Numbers

Storage Drive Locations	
Item	**Description**
0–3	3.5" hot-swap NVMe/SAS3/SATA3 drive bays
NVMe or SAS3 support requires additional parts from the optional parts list.	

Installing Drives

Removing Drive Carriers from the Chassis

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

Installing a Drive into a Carrier

1. Remove the two screws that secure the dummy tray insert (if present) to the carrier. Pull out the dummy tray out of the carrier.
2. Slide a storage drive into the drive carrier and secure it to the carrier with two screws on each side.
3. Once the drive is secured in the drive carrier, insert the carrier back to the empty drive bay pushing it fully in until it clicks into its locked position.

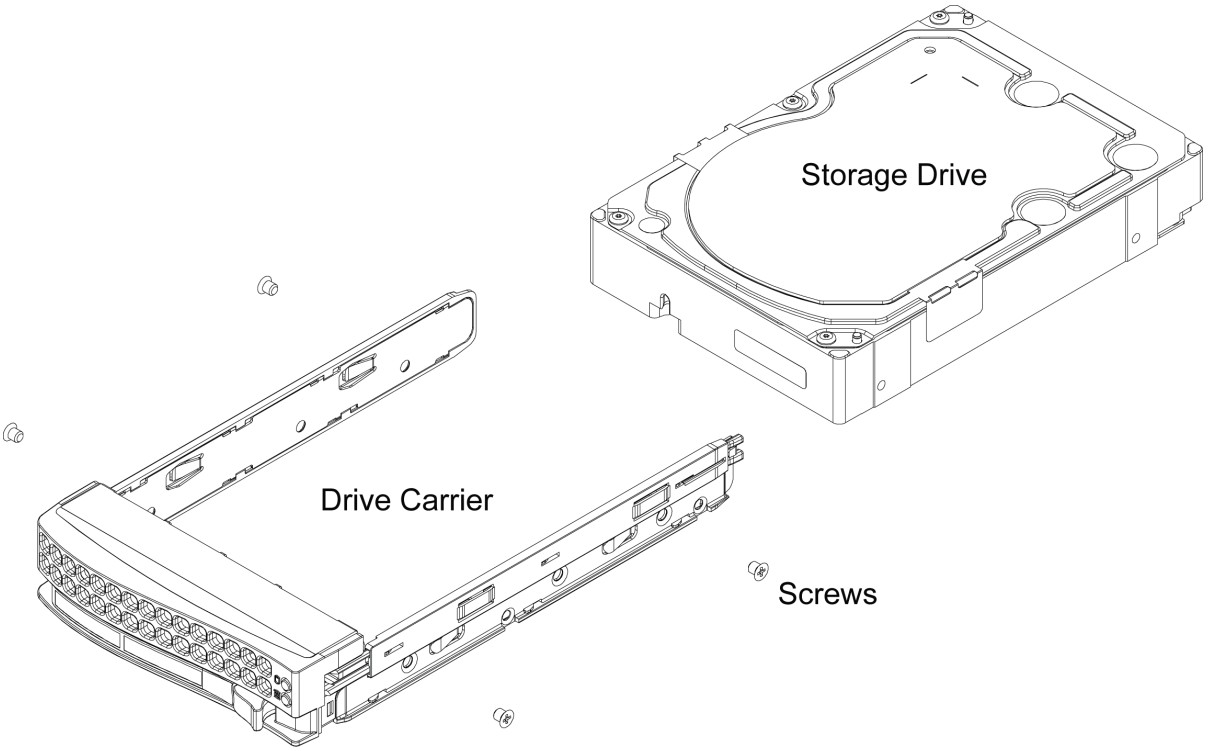


Figure 3-40. Installing a Storage Drive in a Drive Carrier

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.

Drive Carrier LED Indicators			
LED	**Color**	**Pattern**	**Device Behavior**
Activity LED	Blue	Solid	Idle SAS/NVMe drive installed
	Blue	Blinking	I/O activity
	Off	N/A	Idle SATA drive installed
Status LED	Red	Solid	Failure of drive with NVMe support
	Red	Blinking at 1 Hz	Rebuild drive with NVMe support
	Red	Blinking with two blinks and one stop at 1 Hz	Hot spare for drive with NVMe support
	Red	On for five seconds, then off	Power on for drive with NVMe support
	Red	Blinking at 4 Hz	Identify drive with NVMe support

Hot-Swap for NVMe Drives

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

Note: If you are using VROC, see "Intel Virtual RAID on CPU (VROC)" on page 108 in this manual instead.

Ejecting a Drive

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

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

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

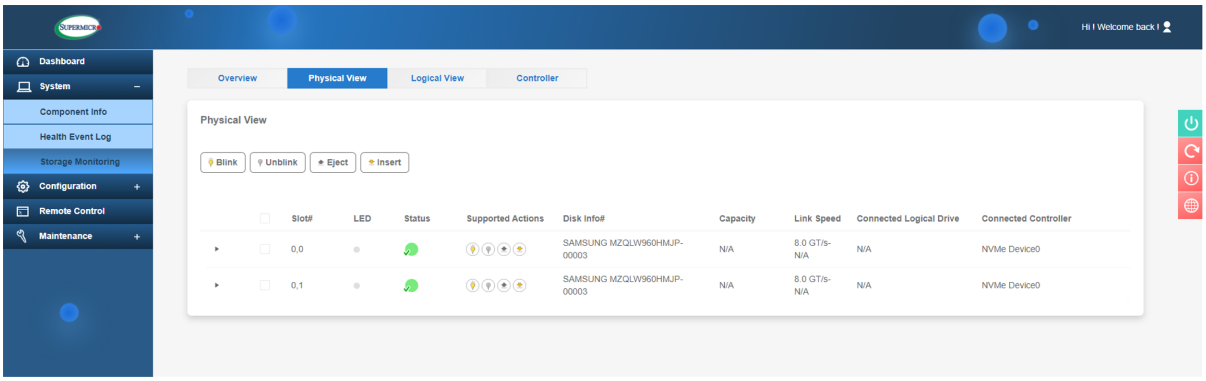


Figure 3-41. BMC Screenshot

Replacing a Drive

1. Insert the replacement drive.
2. **BMC > System > Storage Monitor > Physical View**
3. Select Device, Group, and slot and click **Insert**. The drive Status LED indicator flashes red, then turns off. The Activity LED turns blue.

3.8 System Cooling

Refer to the following sections for information about the cooling capabilities of the SYS-512B-WR server.

Fans

Five 4-cm counter-rotating fans provide the cooling for the system. Each fan unit is actually made up of two fans joined back-to-back, which rotate in opposite directions. This counter-rotating action generates exceptional airflow and works to dampen vibration levels. Make sure the chassis top cover makes a good seal so air circulates properly through the chassis.

Changing a System Fan

1. Determine which fan has failed using the Baseboard Management Controller (BMC) or, if needed, open the system while running. Never run the server for long without its cover.
2. Power down the entire server as described in "Removing Power" on page 38.
3. Remove the chassis top cover as described in "Accessing the System" on page 39.
4. Remove the failed fan's power cable from the motherboard.
5. Lift the fan up and out of the chassis.
6. Replace the failed fan with an identical fan, available from Supermicro. Place the new fan into the chassis, making sure the air flow direction is the same.
7. Reconnect the fan power cables.
8. Power up the system and check that the fan is working properly and that the LED on the control panel has turned off. Reinstall the chassis cover.

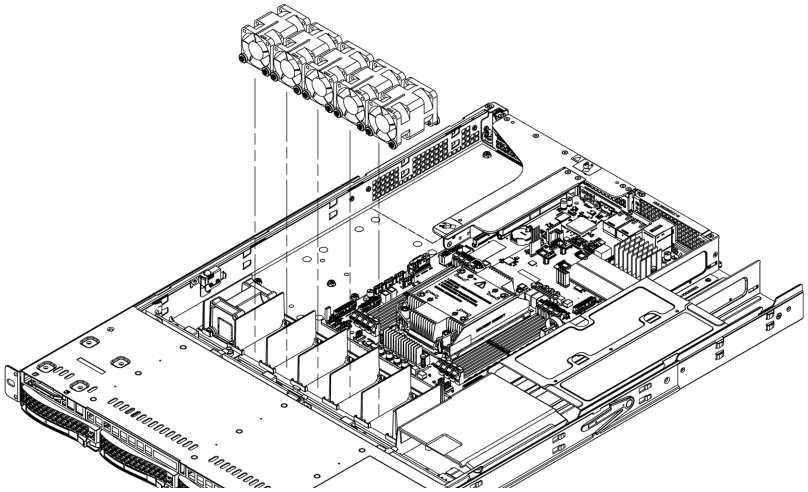


Figure 3-42. Placing a System Fan

Air Shroud

The air shroud directs airflow to maximize cooling efficiency and comes pre-installed with the system. In the rare event that the air shroud needs to be removed or installed, follow the procedure below.

Installing/Removing the Air Shroud

1. Remove power from the system as described in "Removing Power" on page 38.
2. Remove the chassis top cover as described in "Accessing the System" on page 39.
3. Position the air shrouds into the system as shown below. To remove, simply lift the air shroud out of the system.

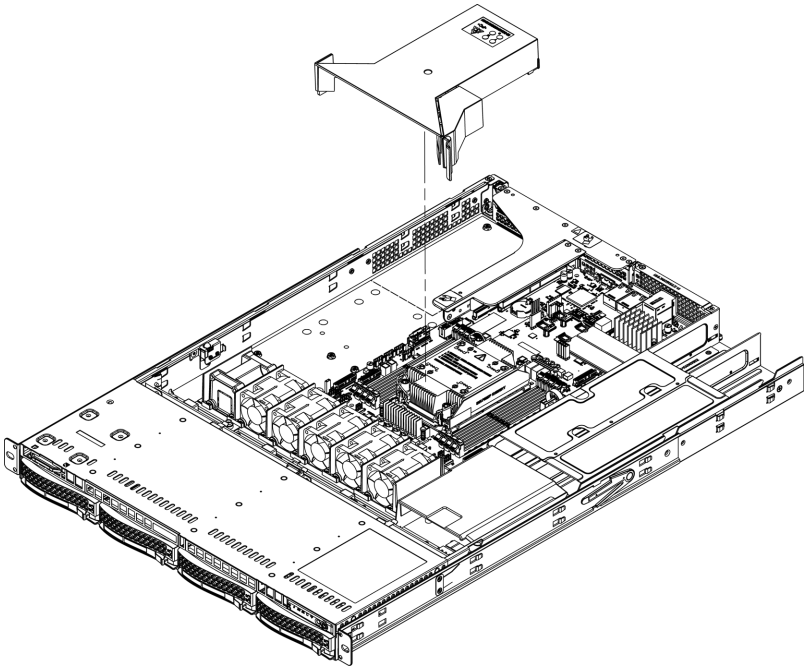


Figure 3-43. Air Shroud Location

3.9 Power Supply

The SYS-512B-WR server includes two power supply modules to provide redundant power. In the event of a power supply failure, the remaining power module will automatically take over. The failed power module can be replaced without powering-down the system. Make sure to replace it with the same model. Replacement modules can be ordered directly from Supermicro.

Power Supply LEDs

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

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

Replacing the Power Supply

1. The SYS-512B-WR features two redundant power supply modules. Unless you are replacing both modules, there is no need to power down the system or open the chassis.
2. Remove the power cord and press the release tab on the failed power module.
3. Use the handle to gently slide the power module out the back of the chassis.
4. Push the new power supply module into the power bay until it clicks into the locked position.

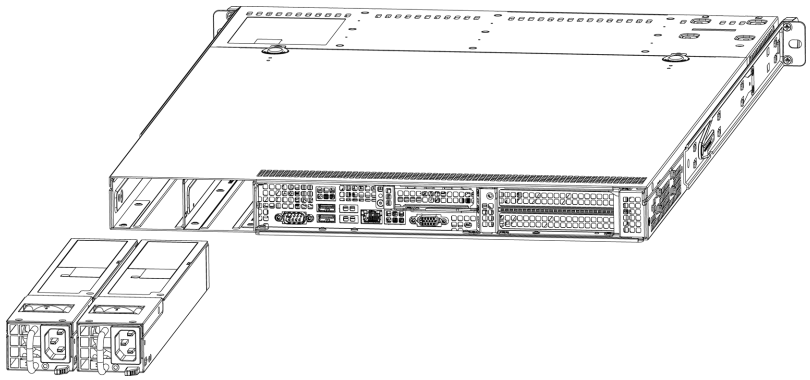


Figure 3-44. Replacing a Power Supply Module

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

Chapter 4:

Motherboard Connections, Jumpers, and LEDs

This section describes the connections on the motherboard and provides pinout definitions. Note that depending on how the system is configured, not all connections are required. The LEDs on the motherboard are also described here. A motherboard layout indicating component locations may be found in the "Introduction" on page 14. More detail can be found in the X14SBW-F motherboard manual.

Review the "Standardized Warning Statements for AC Systems" on page 196 before installing or removing components.

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4.1 Power Supply and Power Connections

For information about the power supply and power connections of the SYS-512B-WR server, refer to the following content.

Power Connectors

Power connectors are located at JPWR1, JPWR2, and JPWR3 on the X14SBW- F motherboard. JPWR3 is the 24-pin power connector for the ATX power source. JPWR1 (8-pin) and JPWR2 (4- pin) are the 12 V DC power connectors that provide power to the CPU in conjunction with JPWR3. They can also be used as the sole 12 V DC only power inputs when JPWR3 is not in use.

ATX Power 24-pin Connection Pin Definitions: 24 Total

Pin#	Definition	Pin#	Definition
13	+3.3 V	1	+3.3 V
14	No Connection	2	+3.3 V
15	GND	3	GND
16	PS_ON	4	+5 V
17	GND	5	GND
18	GND	6	+5 V
19	GND	7	GND
20	Res (No Connection)	8	PWR_OK
21	+5 V	9	+5 VSB
22	+5 V	10	+12 V
23	+5 V	11	+12 V
24	GND	12	+3.3 V

8-pin CPU Power Pin Definitions: Eight Total

Pin#	Definition
1–4	GND
5–8	+12 V (12 V Power)

4-pin CPU Power Pin Definitions: Four Total

Pin#	Definition
1–2	GND
3–4	+12 V (12 V Power)

4.2 Headers and Connections

For information about the headers on the X14SBW-F motherboard, refer to the following content.

Chassis Intrusion

A Chassis Intrusion header is located at JL1 on the X14SBW-F motherboard. Attach the appropriate cable from the chassis to inform you when the chassis is opened.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

Chassis Intrusion Pin Definitions: Two Total	
Pin#	**Definition**
1	Intrusion Input
2	GND

External BMC I²C Header

A System Management Bus header for the BMC is located at JIPMB1 on the X14SBW-F motherboard. Connect the appropriate cable here to use the IPMB I²C connection on your system.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

Fan Headers

There are six 4-pin fan headers (FAN1–FAN6) on the X14SBW-F motherboard. All the 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 IPMI 2.0 interface.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

4-pin Fan Header Pin Definitions: Four Total	
Pin#	**Definition**
1	GND (Black)

4-pin Fan Header Pin Definitions: Four Total	
Pin#	**Definition**
2	+12 V (Red)
3	Tachometer
4	PWM Control

Inlet Sensor Header

An inlet sensor header is located at JSEN1 on the X14SBW-F motherboard. The inlet temperature sensor represents the ambient air temperature entering the system. The equivalent temperature sensor retrievable by the onboard BMC is RT0.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

Inlet Sensor Header Pin Definitions: Four Total	
Pin#	**Definition**
1	Data
2	GND
3	Clock
4	+3.3 V Standby

M.2 Slots

Two M.2 M-Key slots are located at JM2_1, JM2_2 on the X14SBW-F motherboard. M.2 was formerly known as Next Generation Form Factor (NGFF) and serves to replace mini PCIe. M.2 allows for a variety of card sizes, increased functionality, and spatial efficiency. The M.2 M-Key slots on the motherboard support PCIe 5.0 x2 devices in a 2280/22110 form factor.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

MCIO PCIe 5.0 x8 Connectors

Mini Cool Edge IO (MCIO) PCIe 5.0 x8 connectors are located at JNVME1–JNVME4 on the X14SBW-F motherboard.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

NC-SI Connection

The Network Controller Sideband Interface (NC-SI) connection is located at JNCSI1 on the X14SBW-F motherboard. This connection is used to connect a Network Interface Card (NIC) to the motherboard to allow the onboard Baseboard Management Controller (BMC) to communicate with a network.

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

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

NVMe SMBus Headers

Two NVMe SMBus (I²C) headers are located at JNVI²C1 and JNVI²C2 on the X14SBW-F motherboard. They are used for PCIe SMBus clock and data connections, and provide hot-plug support through a dedicated SMBus interface. This feature is only available for a complete Supermicro system with a proprietary Supermicro NVMe add-on card and a proper cable installed.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

NVMe SMBus Headers Pin Definitions: Four Total

Pin#	Definition
1	Data
2	GND
3	Clock
4	+3.3 V

Power SMB (I²C) Header

The Power System Management Bus (I²C) connector (JPI²C1 on the X14SBW-F motherboard) monitors the power supply, fan, and system temperatures.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

Power SMBus Header Pin Definitions: Five Total	
Pin#	**Definition**
1	Clock
2	Data
3	PMBUS_Alert
4	GND
5	+3.3 V

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.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

Standby Power Pin Definitions: Three Total	
Pin#	**Definition**
1	+5 V Standby
2	GND
3	No Connection

SATA 3.0 Ports (Slimline SAS)

Eight SATA 3.0 ports (SATA0–SATA7) are located on the X14SBW-F motherboard. The connections are supported by the chipset through a SlimSAS connector that supports eight SATA3 devices.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

Timed GPIO Header

The JTIMED header provides two timed GPIO pins that enable non-time aware interfaces to achieve PTP synchronized global time for event scheduling and timestamping through GPIO events.

Timed GPIO Header Pin Definitions: Two Total	
Pin#	**Definition**
1	TIMED_GPIO0
2	TIMED_GPIO1

TPM/Port 80 Header

The JTPM1 header on the X14SBW-F motherboard is used to connect a Trusted Platform Module (TPM)/Port 80, which is available from Supermicro (optional). A TPM/Port 80 connector is a security device that supports encryption and authentication in storage drives. It allows the motherboard to deny access if the TPM associated with the storage drive is not installed in the system. Information on the TPM is available at the following page:

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

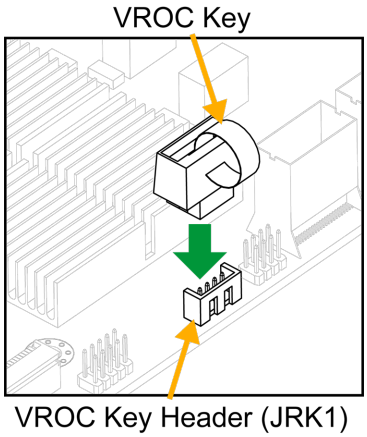
For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

Trusted Platform Module Header Pin Definitions: 10 Total			
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	No Connection
9	+1.8 V Standby	10	SPI_IRQ#

VROC RAID Key Header

A VROC RAID Key header is located at JRK1 on the X14SBW-F motherboard. Install a VROC RAID key on JRK1 for NVMe RAID support as shown in the illustration below.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.



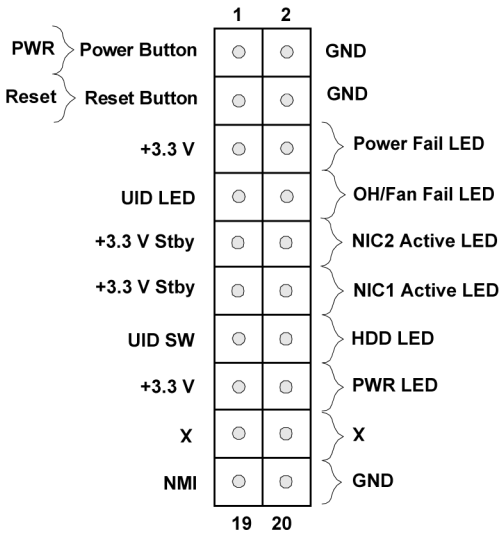
Intel VROC Key Pin Definitions: Four Total	
Pin#	**Definition**
1	GND
2	+3.3 V Standby
3	GND
4	CPU RAID Key

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

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

Front Control Panel Header

JF1 on the X14SBW-F motherboard contains header pins for various buttons and indicators that are normally located on a control panel at the front of the chassis. These connectors are designed specifically for use with Supermicro chassis.



Power Button

The Power Button connection is located on pins 1 and 2 of JF1 on the X14SBW-F motherboard. Momentarily contacting both pins will power on/off the system. This button can also be configured to function as a suspend button (with a setting in the BIOS). To turn off the power when the system is in suspend mode, press the button for four seconds or longer.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

Power Button Pin Definitions (JF1)	
Pin#	**Definition**
1	Signal
2	GND

Reset Button

The Reset Button connection is located on pins 3 and 4 of JF1 on the X14SBW-F motherboard. Attach it to a hardware reset switch on the computer case to reset the system.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

Reset Button Pin Definitions (JF1)	
Pin#	**Definition**
3	Reset
4	GND

Power Fail LED

The Power Fail LED connection is located on pins 5 and 6 of JF1 on the X14SBW-F motherboard.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

Power Fail LED Pin Definitions (JF1)	
Pin#	**Definition**
5	+3.3 V
6	PWR Supply Fail

Overheat/Fan Fail and UID LED

Connect an LED cable to pins 7 and 8 of the front control panel to use the Overheat/Fan Fail LED connections. The LED on pin 8 provides warnings of overheat or fan failure.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

OH/Fan Fail Indicator Status Pin Definitions (JF1)	
State	**Definition**
Off	Normal
On	Overheat
Flashing	Fan Fail

OH/Fan Fail/UID LED Pin Definitions (JF1)	
Pin#	**Definition**
7	UID LED (Blue)
8	OH/FAN Fail LED

NIC1/NIC2 (LAN1/LAN2)

The Network Interface Controller (NIC) LED connection for LAN port 1 is located on pins 11 and 12 of JF1 on the X14SBW-F motherboard, and LAN port 2 is on pins 9 and 10. Attach the NIC LED cables here to display network activity.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

LAN1/LAN2 LED Pin Definitions (JF1)	
Pin#	**Definition**
9	VCC
10	NIC2 Link/Active LED
11	VCC
12	NIC1 Link/Active LED

UID Switch/HDD LED

The UID Button/HDD LED connection is located on pins 13 and 14 of JF1 on the X14SBW-F motherboard. Attach a cable to pin 13 to use the UID button. Attach a cable to pin 14 to show storage drive activity status.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

UID Button/HDD LED Pin Definitions (JF1)	
Pin#	**Definition**
13	+3.3 V Standby/UID Button
14	HDD Activity

Power LED

The Power LED connection is located on pins 15 and 16 of JF1 on the X14SBW-F motherboard.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

Power LED Pin Definitions (JF1)	
Pin#	**Definition**
15	+3.3 V
16	PWR LED

NMI Button

The non-maskable interrupt (NMI) button header is located on pins 19 and 20 of JF1 on the X14SBW-F motherboard.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

NMI Button Pin Definitions (JF1)	
Pin#	**Definition**
19	Control
20	GND

4.3 I/O Ports

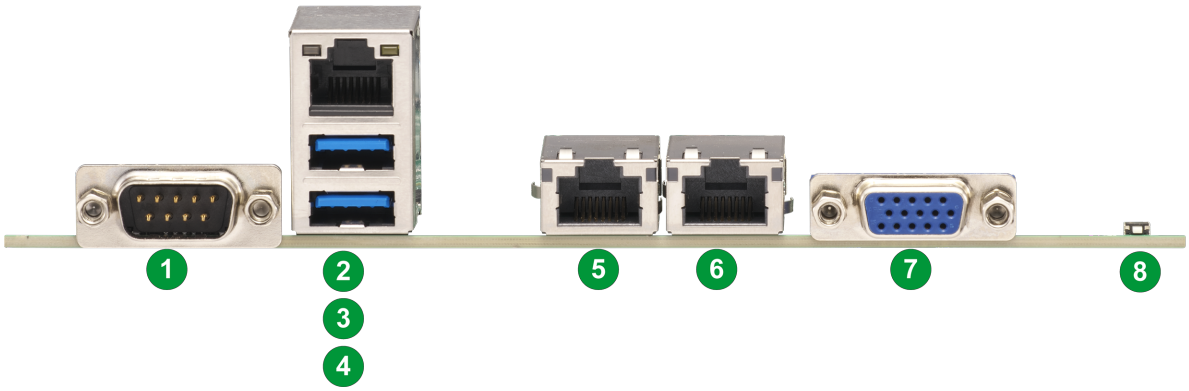


Figure 4-1. X14SBW-F I/O Ports

I/O Ports			
#	Description	#	Description
1	COM1	5	LAN1
2	BMC_LAN	6	LAN2
3	USB0 (3.2 Gen 1)	7	VGA
4	USB1 (3.2 Gen 1)	8	UID Button

COM Port

There is one COM port (COM1) on the I/O panel of the motherboard. The COM port provides serial communication support.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

COM Port Pin Definitions: 11 Total			
Pin#	Definition	Pin#	Definition
1	SP_DCD0	6	SP_DSR0
2	SP_RXD0	7	SP_RTS0
3	SP_TXD0	8	SP_CTS0
4	SP_DTR0	9	SP_RI0
5	GND	10	GND

COM Port Pin Definitions: 11 Total			
Pin#	Definition	Pin#	Definition
		11	GND

LAN Ports

The motherboard has dual 1 GbE LAN ports (i210, X14SBW-F) or dual 10 GbE LAN ports (X550, X14SBW-TF) located at the rear I/O ports of the X14SBW-F motherboard. The two 1 GbE and 10 GbE LAN ports accept RJ45 cables. In addition to the LAN ports, there is one dedicated BMC LAN port.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

LAN Ports Pin Definitions: 21 Total			
Pin#	Definition	Pin#	Definition
1	TRD1P	11	TRD4N
2	TRD1N	12	TRCT4
3	TRCT1	13	TRD5P
4	TRD2P	14	TRD5N
5	TRD2N	15	L1-GRE-
6	TRCT2	16	L1-GRE+
7	TRD3P	17	L2-YEL-
8	TRD3N	18	COMMON
9	TRCT3	19	L2-GRE
10	TRD4P	20	CG1
		21	CG2

BMC LAN Pin Definitions: 19 Total			
Pin#	Definition	Pin#	Definition
		29	Link 1000 LED (Amber)
20	TD0+	30	Link 100 LED (Green)
21	TD0-	31	Active LED (Yellow)
22	TD1+	32	GND
23	TD1-	33	SGND
24	TD2+	34	SGND
25	TD2-	35	SGND
26	TD3+	36	SGND
27	TD3-		
28	GND		

Unit Identifier Button

A Unit Identifier (UID) button and two LED indicators are located on the motherboard. The UID button is located near the I/O ports of the X14SBW-F motherboard.

Note: After pushing and holding the UID button for 12 seconds, all BMC settings including username and password will revert back to the factory default. Only the network settings and FRU are retained.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

Function	User Input	Behavior	LED Activity
UID LED Indicator	Push once Push again	Turns on the UID LED Turns off the UID LED	UID LED turns solid blue UID LED turns off
BMC Reset	Push and hold for 6 seconds Push and hold for 12 seconds	BMC will do a cold boot BMC will reset to factory default	BMC Heartbeat LED turns solid green BMC Heartbeat LED turns solid green

UID Button Pin Definitions: Four Total	
Pin#	**Definition**
1	Button In
2	GND
G1	GND
G2	GND

UID LED Pin Definitions: Four Total	
Color	**Status**
1	Button In
2	GND
G1	GND
G2	GND

USB Ports

There are two USB 3.2 Gen 1 ports (USB0/1) at the rear I/O ports of the X14SBW-F motherboard. There is one header on the motherboard that can support two USB 3.2 Gen 1 ports (USB2/3) with the proper cable for testing purposes. The header is not accessible when the system top is covered.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

USB0/1 (USB 3.2 Gen 1) Port Pin Definitions: 18 Total			
Pin#	Definitions	Pin#	Definitions
1	VBUS	10	VBUS
2	D-	11	D-
3	D+	12	D+
4	GND	13	GND
5	STDA_SSRX-	14	STDA_SSRX-
6	STDA_SSRX+	15	STDA_SSRX+
7	GND	16	GND
8	STDA_SSTX-	17	STDA_SSTX-
9	STDA_SSTX+	18	STDA_SSTX+

USB 2/3 (USB 3.2 Gen 1) Header Pin Definitions: 20 Total			
Pin#	Definitions	Pin#	Definitions
1	VBUS	11	IntA_P2_D+
2	IntA_P1_ SSRX-	12	IntA_P2_D-
3	IntA_P1_ SSRX+	13	GND
4	GND	14	IntA_P2_ SSTX+
5	IntA_P1_ SSTX-	15	IntA_P2_ SSTX-
6	IntA_P1_ SSTX+	16	GND
7	GND	17	IntA_P2_ SSRX+
8	IntA_P1_D-	18	IntA_P2_ SSRX-
9	IntA_P1_D+	19	VBUS
10	GND	20	No Connection

VGA Port

A video (VGA) port is located on the I/O ports of the motherboard. The VGA port provides analog interface support between the computer and the video displays.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

4.4 Jumper Settings

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

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

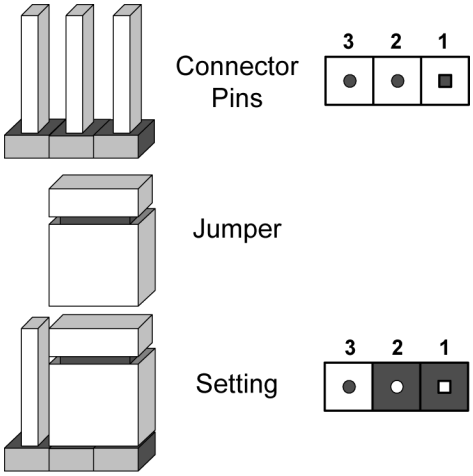


Figure 4-2. Jumping Connector Pins

CMOS Clear

JBT1 on the X14SBW-F motherboard is used to clear CMOS, which will also clear any passwords. Instead of pins, this jumper consists of contact pads to prevent accidentally clearing the contents of CMOS.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

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

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

   Note: Clearing CMOS will also clear all passwords.

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

I²C Buses for VRM

Jumpers JVRM1 and JVRM2 allow the BMC to access CPU and memory VRM controllers.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

JVRM1 Jumper Settings	
Jumper Setting	**Definition**
Pins 1–2	SMB Data (to BMC)

JVRM2 Jumper Settings	
Jumper Setting	**Definition**
Pins 1–2	SMB CLOCK (to BMC)

LAN Port Enable/Disable

Use JPL1 to enable or disable the i210 LAN1 port (for X14SBW-F). Use JPL2 to enable or disable the i210 LAN2 port (for X14SBW-F). Use JPL3 to enable or disable the X550 LAN1 and LAN2 ports (for X14SBW-TF). The default setting is Enabled.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

LAN Port Enable/Disable Jumper Settings	
Jumper Setting	**Definition**
Pins 1–2	Enabled (Default)
Pins 2–3	Disabled

Onboard TPM Enable/Disable

Use JPT1 to enable or disable the onboard TPM.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

TPM Enable/Disable Jumper Settings	
Jumper Setting	**Definition**
Pins 1–2	Enabled (Default)
Pins 2–3	Disabled

4.5 LED Indicators

For information about the LED indicators on the SYS-512B-WR server, refer to the following content.

BMC Heartbeat LED

A BMC Heartbeat LED is locatedat LEDBMC on the X14SBW-F motherboard. When this LED is blinking, the BMC is functioning normally.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

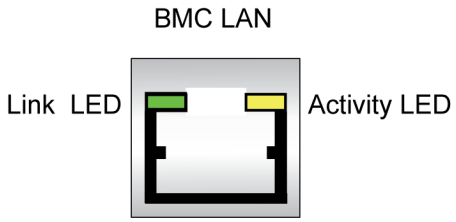
BMC Heartbeat LED Indicator	
LED Color	**Definition**
Green: Blinking	BMC Normal

BMC LAN LEDs

The dedicated BMC LAN connection on the X14SBW-F motherboard features two LEDs. The LED on the right indicates activity, and the LED on the left indicates the speed of the connection.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

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



LAN LEDs

Each LAN port of the X14SBW-F motherboard has two LEDs. The green LED indicates activity, while the other Link LED may be yellow, amber, or off to indicate the speed of the connection.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

LAN Link LED (Left) LED State	
LED Color	**Definition**
Green: Solid	10 Gbps
Yellow or Amber: Solid	1 Gbps

LAN Activity LED (Right) LED State	
LED Color	**Definition**
Green: Flashing	Active

M.2 LEDs

M.2 LEDs are located at LED4 and LED7 on the X14SBW-F motherboard. When these LEDs are blinking, the M.2 devices are functioning normally.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

M.2 LED State	
LED Color	**Definition**
Green: Blinking	Device Working

Onboard Power LED

The Onboard Power LED is located at LEDPWR on the X14SBW-F motherboard. When this LED is on, the system is on. Be sure to turn off the system and unplug the power cord before removing or installing components.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

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

Unit ID (UID) LED

The UID LED indicator is located at LED6 on the X14SBW-F motherboard. This UID indicator provides easy identification of a system that may need to be serviced.

For a detailed diagram of the X14SBW-F motherboard, see the layout under "Motherboard Quick Reference" on page 22.

UID LED LED Indicator	
LED Color	**Definitions**
Blue: On	System Identified

Chapter 5:

Software

After the SYS-512B-WR server has been installed, you can install the Operating System (OS), configure RAID settings, and install the drivers.

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5.2 Driver Installation **102**

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BMC ADMIN User Password 103

5.1 Microsoft Windows OS Installation

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

Installing the OS

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

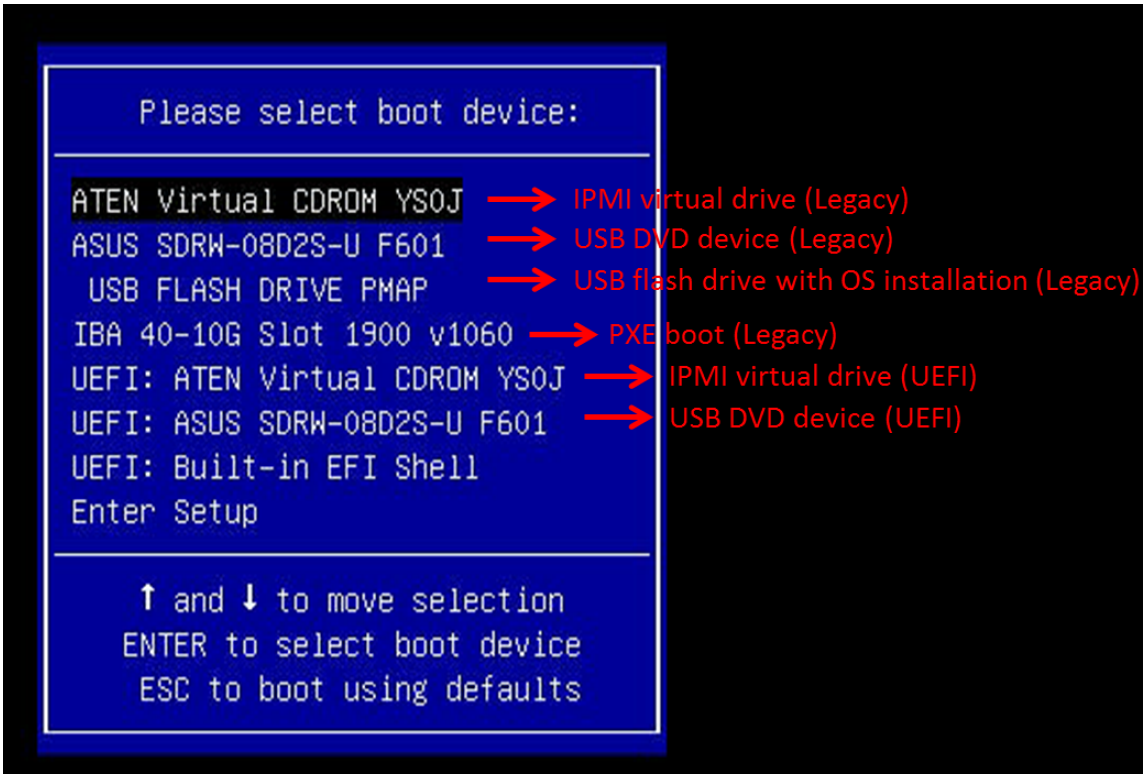

Figure 5-1. Selecting the Boot Device

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

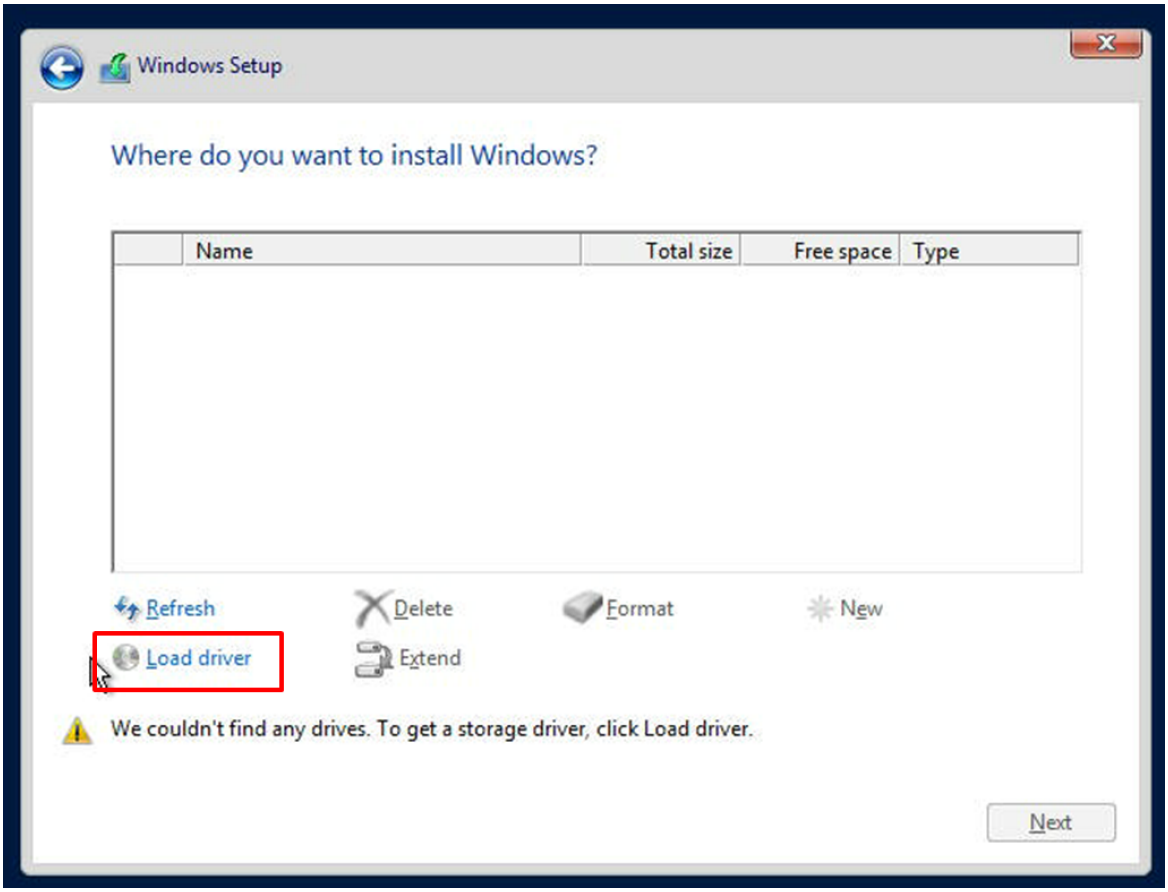

Figure 5-2. Loading the Driver Link

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

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

5.2 Driver Installation

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

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

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

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

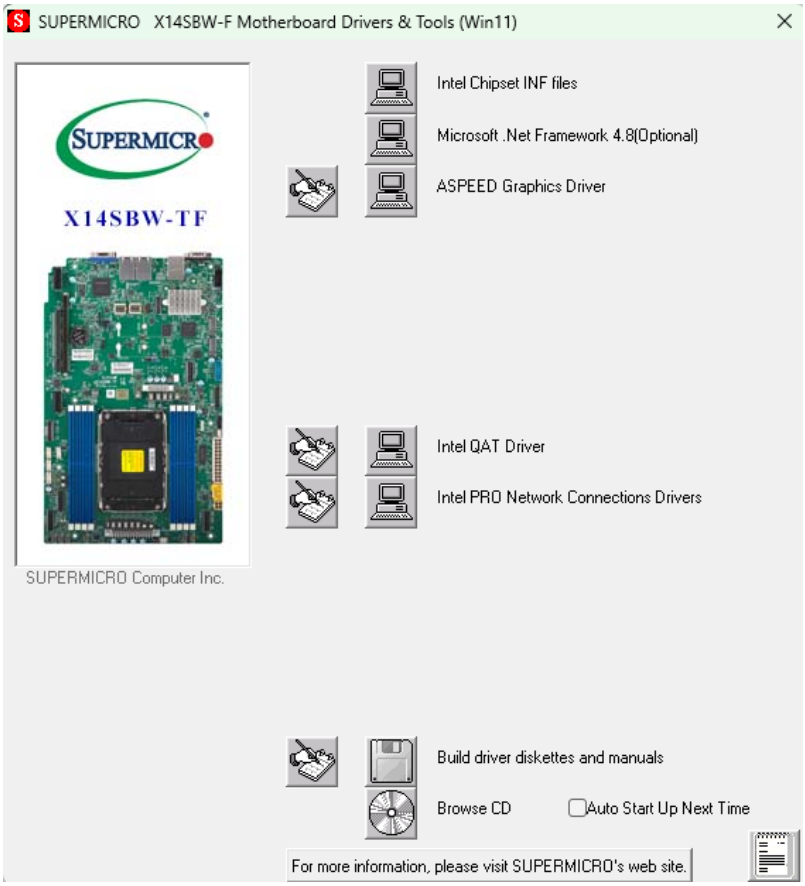

Figure 5-3. Driver & Tools Installation Screen

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

5.3 BMC

The X14SBW-F motherboard provides remote access, monitoring, and management through the baseboard management controller (BMC) and other management controllers distributed among different system modules. There are several BIOS settings that are related to BMC. For general documentation and information on BMC, visit our website at the following page:

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

BMC ADMIN User Password

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

Figure 5-4. BMC Password Label

Chapter 6:

Optional Components

This chapter describes alternate configurations and optional system components for the SYS-512B-WR server.

6.1 Storage Protocols Supported **105**
6.2 HBA Card **106**
6.3 RAID Cards **107**
6.4 Intel Virtual RAID on CPU (VROC) **108**
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Additional Information 109
Hardware Key 109
Configuring Intel VMD 110
Creating NVMe RAID Configurations 114

6.1 Storage Protocols Supported

The storage drive bays can support NVMe, SAS, and SATA in the following configurations. To enable NVMe and SAS, additional hardware is required. Once the supporting hardware is installed for a selection of bays, drives of the corresponding storage protocol type can be inserted.

- Default configuration: Four front hot-swap 3.5" SATA drive bays
- Optional NVMe configuration: Four front hot-swap 2.5" PCIe 5.0 x4 NVMe drive bays
- Optional SAS configuration: Four front hot-swap 3.5"/2.5" SAS drive bays

6.2 HBA Card

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

The Supermicro HBA AOC-S3808L-L8iT features eight internal SAS connectors, and is designed for high-performance storage connectivity.

This card uses Broadcom's 3808 I/O processor for optimum performance with PCI Express Gen 4.0 host interface for increased bandwidth.

6.3 RAID Cards

This is a 12 Gb/s, multi-port PCIe Gen 4.0 RAID adapter card.

The Supermicro low-profile AOC-S3908L-H8iR RAID card features eight internal SAS connectors and offers high-performance storage connectivity. This RAID card is built on the Broadcom SAS IC technology and MegaRAID technology to address the growing demand for increased data throughput and scalability requirements across the enterprise-class server platforms.

With high-performance RAID architecture, including hardware RAID 5 and 6, this RAID controller card supports high-capacity storage applications. It delivers cost-effective storage solutions using SATA drives and maximum performance and reliability with SAS drives.

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 due to performance issues, even though it is supported.

Supported SSDs and Operating Systems

To see the latest support information:

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

Additional Information

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

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

Hardware Key

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

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

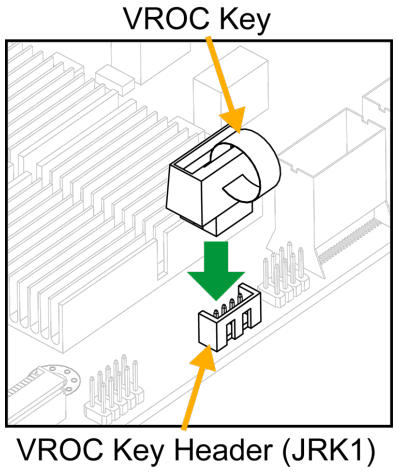

Figure 6-1. Intel VROC RAID Key and Motherboard Connector JRK1

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.

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.

NVMe Mode Switch:

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

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

Configuring VMD Manually

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

Notes:

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

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

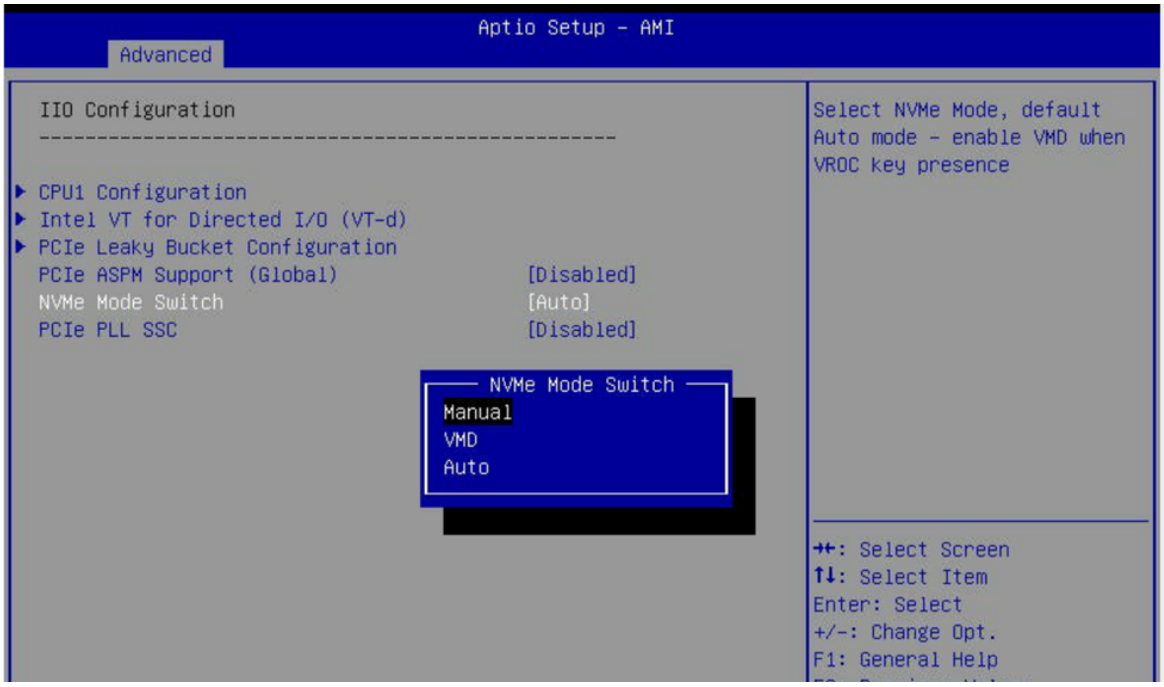

Figure 6-2. BIOS, Selecting NVMe Mode

4. VMD must only be enabled on NVMe port resources. If VMD is enabled on other PCIe ports, the functionality of those ports will be impacted.

   Select Intel VMD Technology and enable VMD for devices under the respective PCIe ports.

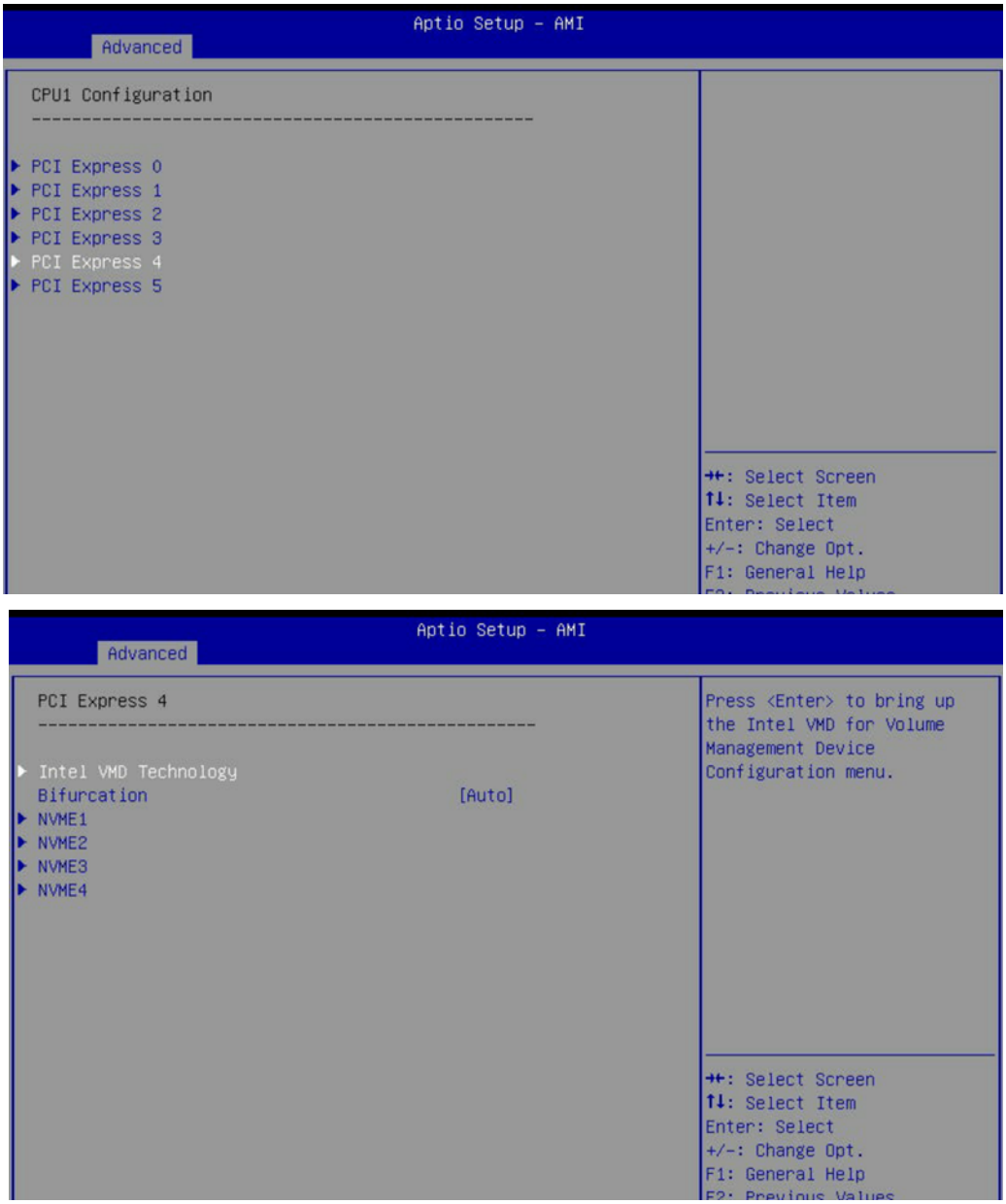

Figure 6-3. Intel VMD Technology for PCIe ports

5. Choose Enabled under Intel VMD Technology to enable VMD in the selected IIO Domain.

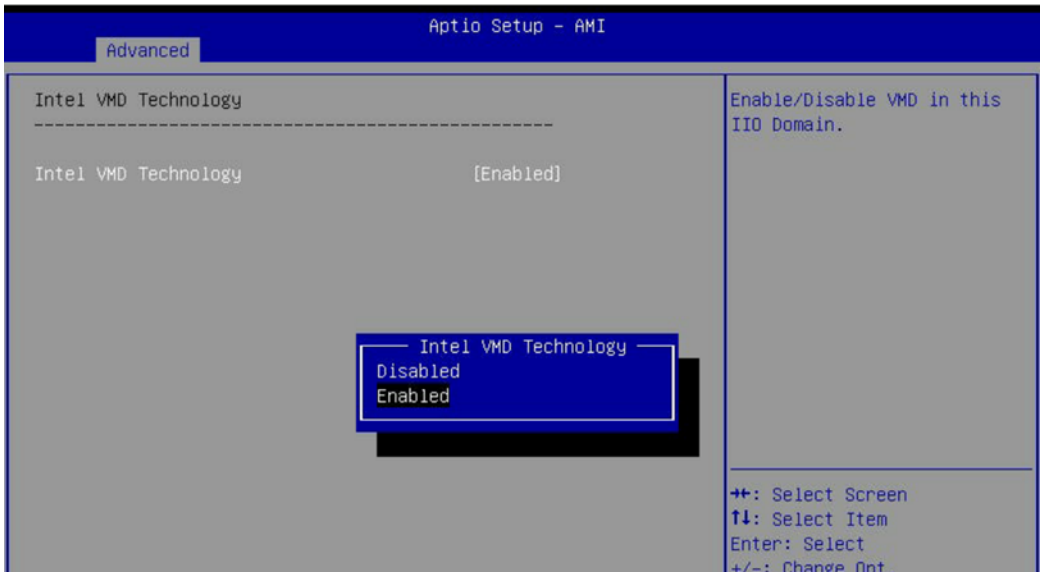

Figure 6-4. BIOS, Enabling VMD on IIO Domain (Example)

6. Enable the NVMe port resource for the NVMe drives that will be used in a RAID configuration.

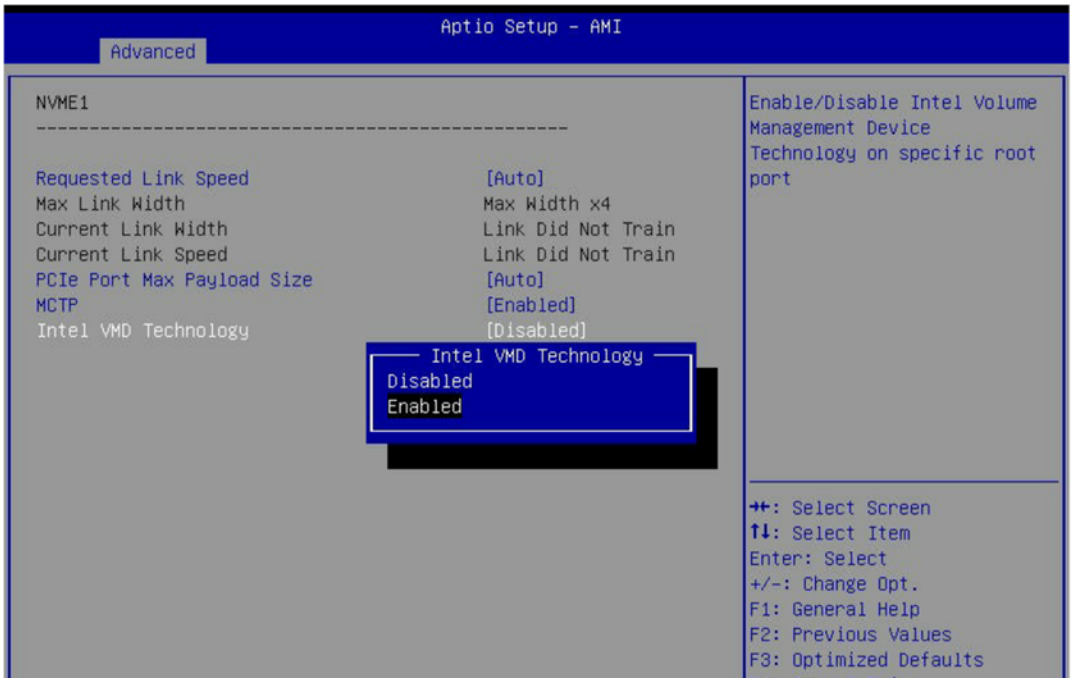

Figure 6-5. BIOS, Enabling Intel VMD for NVMe1 (Example)

7. Repeat steps 4 through 6 for each PCIe number to enable VMD on the desired NVMe ports.
8. Press [F4] to save the configuration and reboot the system.

Creating NVMe RAID Configurations

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

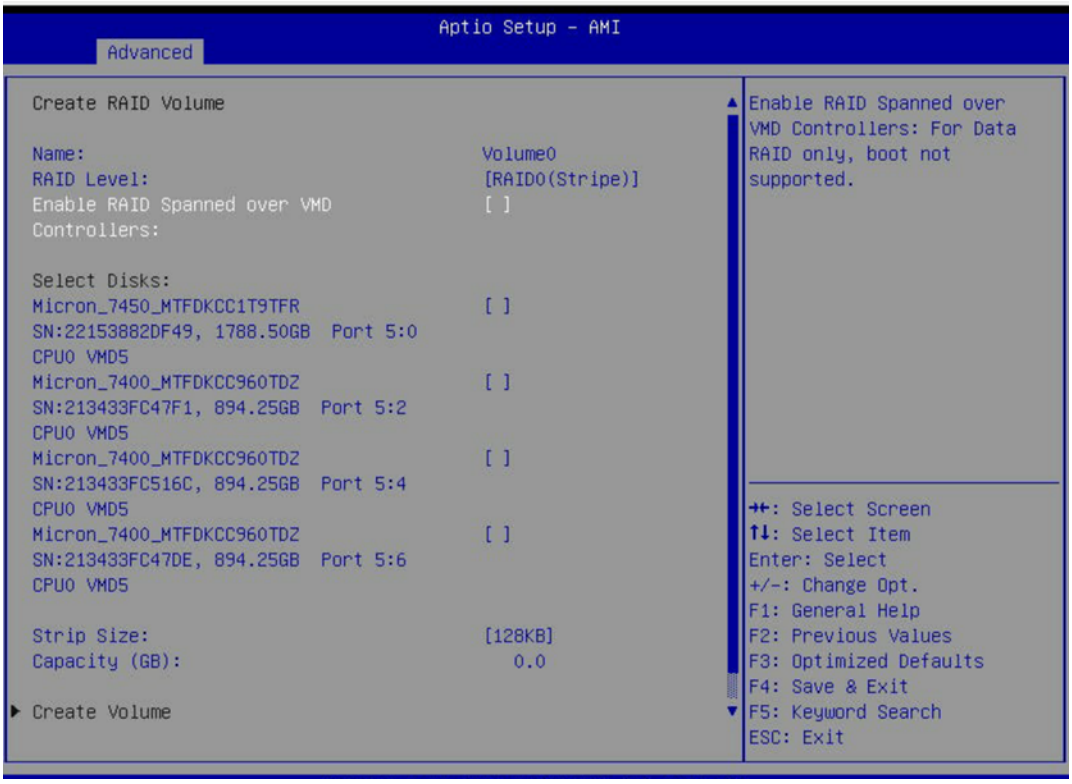

Figure 6-6. Created Volume without enabling RAID spanned over VMD controller

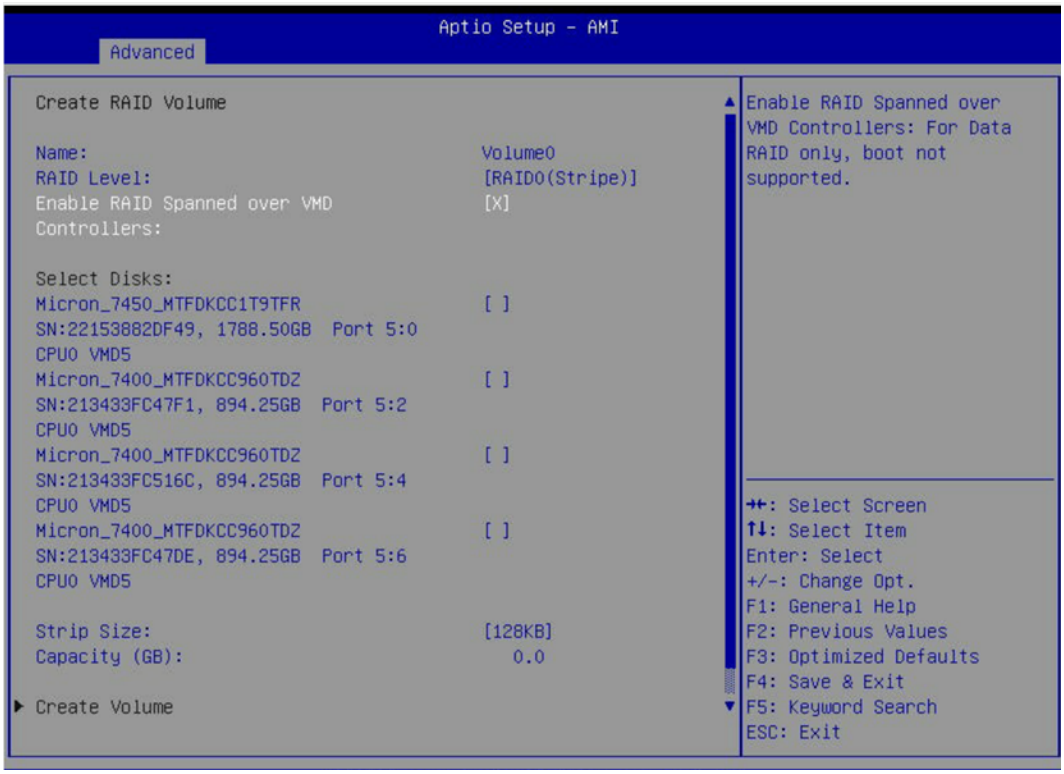

Figure 6-7. Created Volume with enabling RAID spanned over VMD controller

2. Set Name.
3. Set RAID Level.
4. If cross-controller RAID is required, select Enable RAID spanned over VMD Controller.
5. Select specific disks for RAID with an [X].
   - RAID0: Select at least two [2–24] disks
   - RAID1: Select only two disks
   - RAID5: Select at least three [3–24] disks
   - RAID10: Select only four disks
6. Select Strip Size (Default 128 KB).
7. Modify Capacity as needed. 0 will be treated as maximum size. Default Capacity is approximately 95% of maximum size.
8. Select Create Volume.
9. If another RAID is needed, start again at step 1.

Status Indications

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

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

Hot-Swap Drives

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

Hot-unplug

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

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

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

Hot-plug

- Physically install the device.

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

Related Information Links

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

Chapter 7:

Troubleshooting and Support

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

7.1 Online Resources **118**
Direct Links for the SYS-512B-WR System 118
Direct Links for General Support and Information 118
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7.3 Troubleshooting Procedures **120**
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No Video 120
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If the System Becomes Unstable 121
7.4 CMOS Clear **123**
7.5 Motherboard Battery **124**
7.6 Where to Get Replacement Components **125**
7.7 Technical Support Procedures **126**
Returning Merchandise for Service 126
7.8 Feedback **128**

7.1 Online Resources

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

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

Direct Links for the SYS-512B-WR System

- SYS-512B-WR system specifications page: https://www.supermicro.com/en/products/system/wio/1u/sys-512b-wr
- X14SBW-F motherboard page for links to the quick reference guide, user manual, validated storage drives, and more: https://www.supermicro.com/en/products/motherboard/x14sbw-f

Direct Links for General Support and Information

- General Memory Configuration Guide for X14 and B14 motherboards that use Intel® Xeon® 6700-series processors: https://www.supermicro.com/support/resources/memory/X14_B14_memory_config_guide_SP.pdf
- Frequently Asked Questions: https://www.supermicro.com/FAQ/index.php
- TPM User Guide: https://www.supermicro.com/manuals/other/AOM-TPM-9670V_9670H__X12_H12.pdf
- BMC User Guide: https://www.supermicro.com/manuals/other/BMC_IPMI_X14_H14.pdf
- Product Resources page for validated memory details: https://www.supermicro.com/support/resources/mem.cfm
- Product Matrices page for links to tables summarizing specs for systems, motherboards, power supplies, riser cards, add-on cards, and more: https://www.supermicro.com/en/support/product-matrices
- Security Center for recent security notices: https://www.supermicro.com/en/support/security_center
- Supermicro Phone and Addresses: https://www.supermicro.com/en/about/contact

7.2 Baseboard Management Controller (BMC)

The SYS-512B-WR server supports the Baseboard Management Controller (BMC). BMC is used to provide remote access, monitoring, and management. There are several BIOS settings that are related to BMC.

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

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

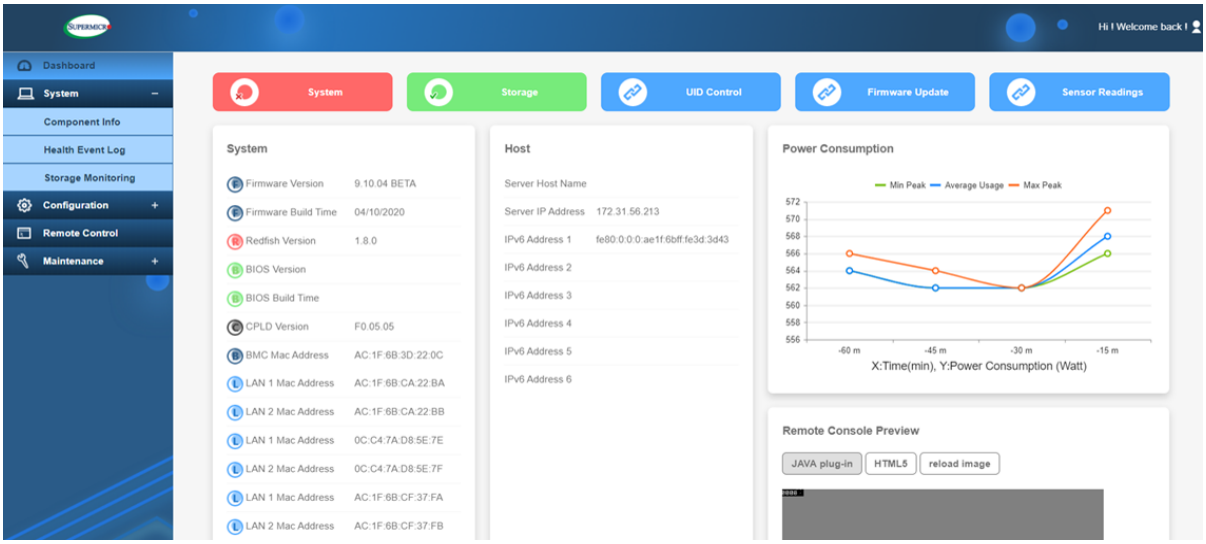

Figure 7-1. BMC Dashboard

7.3 Troubleshooting Procedures

Use the following procedures to troubleshoot your system. If you have followed all of the procedures below and still need assistance, refer to the "Technical Support Procedures" on page 126 section in this chapter. Always disconnect the AC power cord before adding, changing or installing any non hot-swappable hardware components. If the below steps do not fix the setup configuration problem, contact your vendor for repairs.

Before Power On

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

No Power

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

No Video

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

System Boot Failure

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

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

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

Memory Errors

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

1. Make sure that the memory modules are compatible with the system and are properly installed. See "Maintenance and Component Installation" on page 36 for installation instructions. (For memory compatibility, refer to the "Tested Memory List" link on the motherboard's product page to see a list of supported memory.)
2. Check if different speeds of DIMMs have been installed. It is strongly recommended that you use the same RAM type and speed for all DIMMs in the system.
3. Make sure that you are using the correct type of DIMMs recommended by the manufacturer.
4. Check for bad DIMMs or slots by swapping a single module among all memory slots and check the results.

Losing the System's Setup Configuration

1. Make sure that you are using a high-quality power supply. A poor-quality power supply may cause the system to lose the CMOS setup information. Refer to "Introduction" on page 14 for details on recommended power supplies.
2. The battery on your motherboard may be old. Check to verify that it still supplies approximately 3 VDC. If it does not, replace it with a new one.

If the System Becomes Unstable

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

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

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

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

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

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

7.4 CMOS Clear

JBT1 on the X14SBW-F motherboard is used to clear CMOS, which will also clear any passwords. For information on clearing CMOS, refer to "CMOS Clear" on page 93 earlier in this manual.

7.5 Motherboard Battery

For information on removing, disposing of, and replacing the motherboard battery of your system, refer to "Motherboard Battery Removal and Installation" on page 67.

7.6 Where to Get Replacement Components

If you need replacement parts for your SYS-512B-WR server, to ensure the highest level of professional service and technical support, purchase exclusively from our Supermicro Authorized Distributors/System Integrators/Resellers. A list can be found on the Supermicro website:

https://www.supermicro.com

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

7.7 Technical Support Procedures

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

1. Refer to "Troubleshooting Procedures" on page 120 or see the FAQs on our website (https://www.supermicro.com/FAQ/index.php) before contacting Technical Support.
2. BIOS upgrades can be downloaded from our website (https://www.supermicro.com/support/resources/bios_ipmi.php).
3. If you still cannot resolve the problem, include the following information when contacting Supermicro for technical support:
   - Motherboard model and PCB revision number
   - BIOS release date/version (This can be seen on the initial display when your system first boots up.)
   - System configuration
4. An example of a Technical Support form is on our website at https://webpr3.supermicro.com/SupportPortal.
5. Distributors: For immediate assistance, have your account number ready when placing a call to our Technical Support department. For Supermicro contact information, refer to "Contacting Supermicro" on page 13.

Returning Merchandise for Service

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

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

https://www.supermicro.com/RmaForm

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

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

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

7.8 Feedback

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

Chapter 8:

UEFI BIOS

The following content contains information on BIOS configuration with the SYS-512B-WR server.

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8.2 Main Setup **132**
8.3 Advanced Setup Configuration **134**
8.4 Event Logs **178**
8.5 BMC **180**
8.6 Security **184**
8.7 Boot **191**
8.8 Save & Exit **193**

8.1 Introduction

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

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

Updating BIOS

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

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

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

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

To update the BIOS under the UEFI Shell, unzip the BIOS file onto a bootable USB device and then boot into the built-in UEFI Shell. For motherboards with BMC support, type "flash.nsh <BIOS filename><BMC Username><BMC Password>" to start the BIOS update. The flash.nsh script will invoke the SAA (EFI) tool automatically to perform the BIOS update, beginning with uploading the BIOS image to BMC. After uploading the BIOS image, the system will reboot to continue the process. The BMC will take over and continue the BIOS update in the background. The process will take 3–5 minutes. Refer to the README file for more information.

Starting the Setup Utility

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

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

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

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

8.2 Main Setup

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

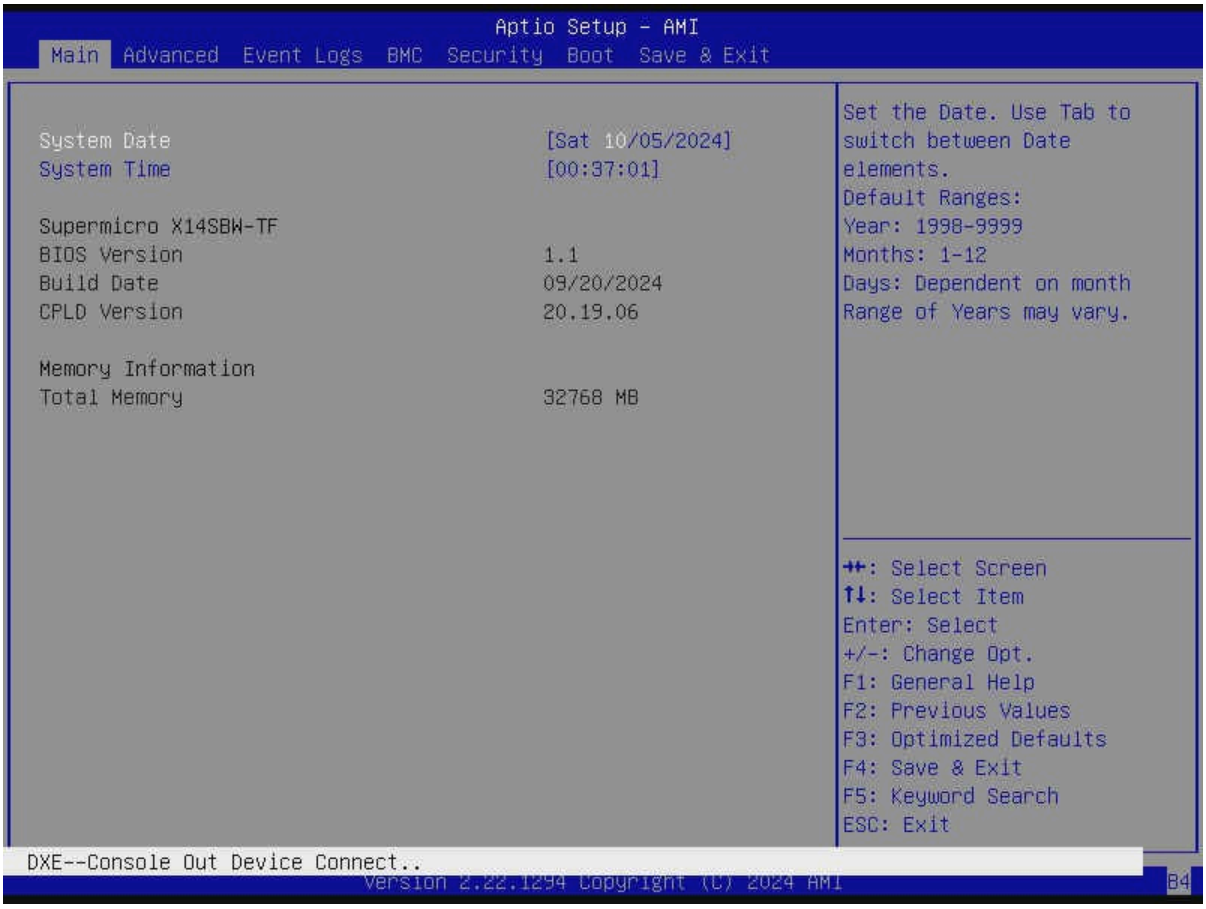


Figure 8-1. X14SBW-TF BIOS Main Setup Screen

System Date/System Time

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

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

Supermicro X14SBW-F

BIOS Version

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

Build Date

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

CPLD Version

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

Memory Information

Total Memory

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

8.3 Advanced Setup Configuration

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

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

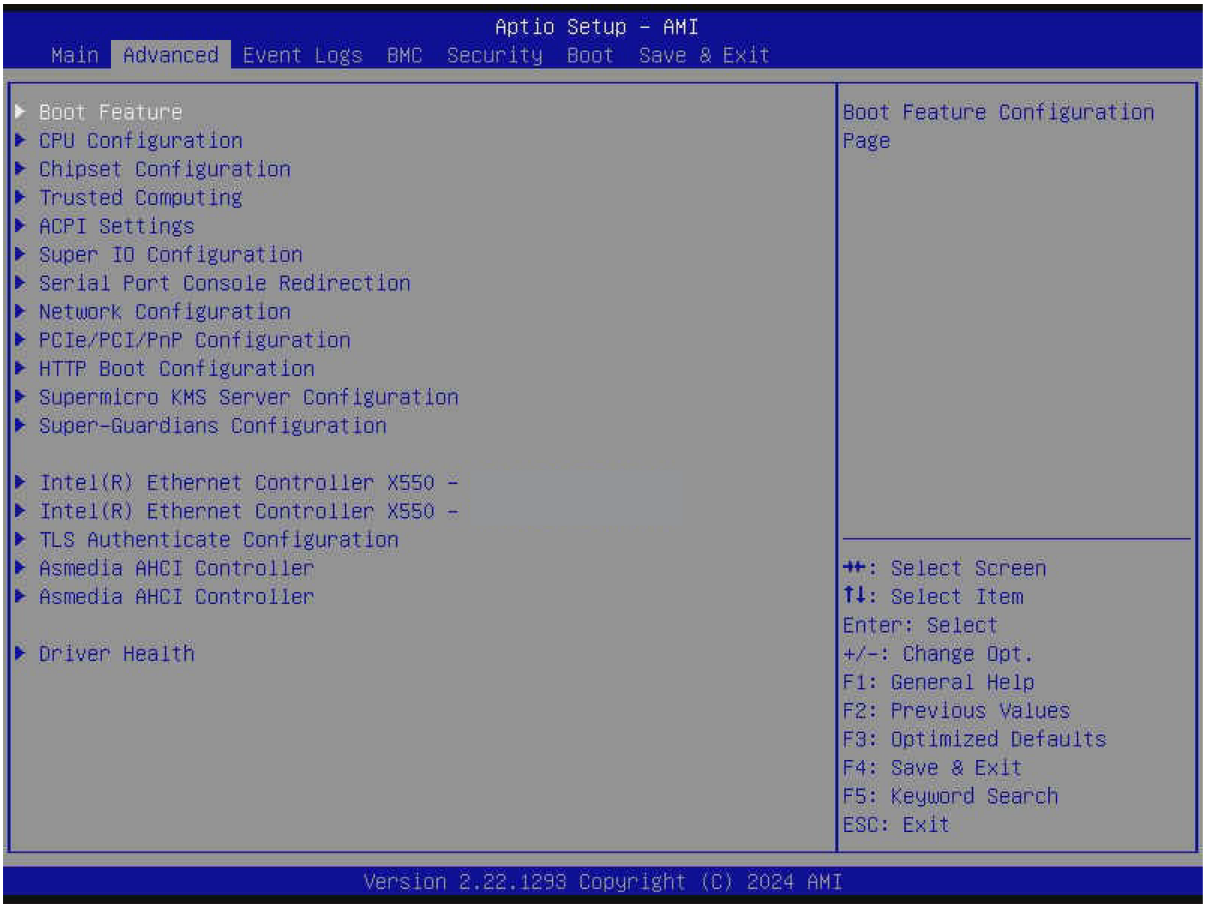


Figure 8-2. Advanced Setup Configuration Screen

Boot Feature Menu

►Boot Feature

Quiet Boot

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

are Disabled and **Enabled**.

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

Bootup NumLock State

Use this feature to set the power on state for the <Num Lock> key. The options are **On** and Off.

Wait For "F1" If Error

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

Re-try Boot

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

Runtime Variable Lock

Enable this feature to manage access to non-volatile memory (NVRAM) variables and use specific runtime services with write protection. The options are **Disabled** and Enabled.

Power Configuration

Watch Dog Function

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

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

Use this feature to configure the Watchdog timeout setting. The options are **Reset** and NMI.

Restore on AC Power Loss

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

Power Button Function

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

CPU Configuration Menu

►CPU Configuration

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

The following processor information is displayed:

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

Hyper-Threading [ALL]

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

Hardware Prefetcher

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

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

Adjacent Cache Prefetch

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

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

DCU Streamer Prefetcher

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

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

DCU IP Prefetcher

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

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

LLC Prefetch

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

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

Homeless Prefetch

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

AMP Prefetch

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

APIC Physical Mode

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

IIO LLC Ways Mask (Hex)

This feature sets a specific temporary register bit mask that is used to control or monitor Last Level Cache (LLC) cache configuration and allocation. The default setting is **0**. (IIO is the abbreviation for Intel I/O.)

TXT Support

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

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

Intel Virtualization Technology

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

Notes:

- This feature is NOT available when "TXT Support" is set to Enabled.
- This feature is NOT available when "Workload Profile" is set to Virtualization.

Enable SMX

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

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

PPIN Control

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

AES-NI

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

Advanced Power Management Configuration Menu

►Advanced Power Management Configuration

Workload Profile

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

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

Power Performance Tuning

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

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

ENERGY_PERF_BIAS_CFG Mode (ENERGY PERFORMANCE BIAS CONFIGURATION Mode)

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

Performance, Maximum Performance, Performance, **Balanced Performance**, Balanced Power, and Power. Please note that the option of Extreme Performance is motherboard-dependent.

Notes:

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

CPU P State Control Menu

►CPU P State Control

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

AVX P1

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

Notes:

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

Intel SST-PP

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

Notes:

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

Dynamic SST-PP

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

Notes:

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

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

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

SpeedStep (P-States)

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

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

EIST PSD Function

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

Notes:

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

Turbo Mode

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

Notes:

- This feature is available when "SpeedStep (P-States)" is set to Enabled.
- This feature is available when "Workload Profile" is set to Disabled.

Hardware PM State Control Menu

►Hardware PM State Control

Notes:

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

Hardware P-States

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

CPU C State Control Menu

►CPU C State Control

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

Monitor MWAIT

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

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

ACPI C1 Enumeration

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

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

ACPI C6x Enumeration

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

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

Package C State Control Menu

►Package C State Control

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

Package C State

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

Note: This feature is NOT available when "Workload Profile" is set to I/O.

LTR IIO Input

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

CPU1 Core Disable Bitmap Menu

►CPU1 Core Disable Bitmap

Disable Bitmap[0]:

Enter 0 to enable this feature for CPU Core Bitmap[0]. Enter FFFFFFFFFF to disable CPU Core Bitmap[0]. Please note that the maximum CPU cores are available in each CPU package and at least one core per CPU must be enabled. Disabling all cores is not allowed. The default setting is **0**.

Disable Bitmap[1]:

Enter 0 to enable this feature for CPU Core Bitmap[1]. Enter FFFFFFFFFF to disable CPU Core Bitmap[1]. Please note that the maximum CPU cores are available in each CPU package and at least one core per CPU must be enabled. Disabling all cores is not allowed. The default setting is **0**. This feature is available when the number of CPU cores is greater than 128.

Chipset Configuration Menu

►Chipset Configuration

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

Uncore Configuration Menu

►Uncore Configuration

The following information is displayed.

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

Degrade Precedence

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

Link L0p Enable

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

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

Link L1 Enable

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

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

KTI Prefetch

Keizer Technology Interconnect (KTI) is also known as the Intel Ultra Path Interconnect (UPI) technology. Select Enabled for the KTI prefetcher to preload the L1 cache with data deemed relevant, which allows the memory read to start earlier on a DDR bus in an effort to reduce latency. Select Auto for the KTI prefetcher to automatically preload the L1 cache with relevant data whenever it is needed. The options are Disabled, Enabled, and **Auto**.

IO Directory Cache (IODC)

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

SNC

Sub NUMA Clustering (SNC) is a feature that breaks up the LLC into clusters based on address range. Each cluster is connected to a subset of the memory controller. Enable this feature to improve average latency and reduce memory access congestion for higher performance. The

options are Disabled, Enabled, and **Auto**. This feature is CPU-dependent.

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

XPT Prefetch

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

Stale AtoS

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

LLC Dead Line Alloc

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

Memory Configuration Menu

►Memory Configuration

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

Enforce DDR Memory Frequency POR

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

Host Memory Frequency

Use this feature to set the maximum memory frequency for onboard memory modules. The options are **Auto**, 4800, 5200, 5600, 6000, 6400, 7200, and 8000. Please note that the available options are CPU-dependent.

Global Scrambling

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

Memory Topology Menu

►Memory Topology

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

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

Memory Map Menu

►Memory Map

Intel(R) Flat Memory Mode Support

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

DDR CXL Heterogeneous Interleave Support

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

Memory RAS Configuration Menu

►Memory RAS Configuration

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

Mirror Mode

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

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

UEFI ARM Mirror

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

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

Mirror TAD0

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

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

Correctable Error Threshold

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

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

DDR PPR Type

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

Enhanced PPR

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

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

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

Security Configuration Menu

►Security Configuration

Memory Encryption (TME) [Outputs]

The following information is displayed.

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

Memory Encryption (TME) [Inputs]

Memory Encryption (TME)

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

Total Memory Encryption Multi-Tenant (TME-MT)

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

Memory Integrity

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

The following information is displayed.

- KEY stock amount
- TME-MT key ID bits

TME Encryption Algorithm

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

Trust Domain Extensions (TDX) [Outputs]

The following information is displayed.

- TDX activation state

Trust Domain Extensions (TDX) [Inputs]

Software Guard Extensions (SGX) [Inputs]

The following features are available when your motherboard supports SGX.

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

TDX Memory Population for Intel Xeon 6700-Series Processors with E-Cores (1DPC)									
IMC#	**IMC7**	**IMC6**	**IMC5**	**IMC4**	**CPU**	**IMC0**	**IMC1**	**IMC2**	**IMC3**
Channel	**DIMMH1**	**DIMMG1**	**DIMMF1**	**DIMME1**		**DIMMA1**	**DIMMB1**	**DIMMC1**	**DIMMD1**
	Slot 1	**Slot 1**	**Slot 1**	**Slot 1**		**Slot 1**	**Slot 1**	**Slot 1**	**Slot 1**
8	DDR5	DDR5	DDR5	DDR5		DDR5	DDR5	DDR5	DDR5

TDX Memory Population for Intel Xeon 6700/6500-Series Processors with P-Cores (1DPC)									
IMC#	**IMC7**	**IMC6**	**IMC5**	**IMC4**	**CPU**	**IMC0**	**IMC1**	**IMC2**	**IMC3**
Channel	**DIMMH1**	**DIMMG1**	**DIMMF1**	**DIMME1**		**DIMMA1**	**DIMMB1**	**DIMMC1**	**DIMMD1**
	Slot 1	**Slot 1**	**Slot 1**	**Slot 1**		**Slot 1**	**Slot 1**	**Slot 1**	**Slot 1**
8	DDR5	DDR5	DDR5	DDR5		DDR5	DDR5	DDR5	DDR5

Trust Domain Extensions - Connect (TDX Connect) (Available when "Trust Domain Extensions (TDX)" is set to Enabled)

Use this feature to enable Intel TDX Connect support to improve I/O virtualization by removing the need to establish a secure TD-Device transport-level session. The options are **Disabled** and Enabled. This feature is CPU-dependent.

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

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

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

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

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

- TME-MT Keys:
- TDX Keys:

Processor Reserved Memory [Capabilities]

The following information is displayed.

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

Processor Reserved Memory [Outputs]

The following information is displayed.

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

Software Guard Extensions (SGX) [Outputs]

The following information is displayed when your motherboard supports SGX.

- SGX activation state
- SGX error code [HEX]

Software Guard Extensions (SGX) [Inputs]

The following features are available when your motherboard supports SGX.

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

TDX Memory Population for Intel Xeon 6700-Series Processors with E-Cores (1DPC)									
IMC#	IMC7	IMC6	IMC5	IMC4	CPU	IMC0	IMC1	IMC2	IMC3
Channel	DIMMH1	DIMMG1	DIMMF1	DIMME1		DIMMA1	DIMMB1	DIMMC1	DIMMD1
	Slot 1	Slot 1	Slot 1	Slot 1		Slot 1	Slot 1	Slot 1	Slot 1
8	DDR5	DDR5	DDR5	DDR5		DDR5	DDR5	DDR5	DDR5

TDX Memory Population for Intel Xeon 6700/6500-Series Processors with P-Cores (1DPC)									
IMC#	IMC7	IMC6	IMC5	IMC4	CPU	IMC0	IMC1	IMC2	IMC3
Channel	DIMMH1	DIMMG1	DIMMF1	DIMME1		DIMMA1	DIMMB1	DIMMC1	DIMMD1
	Slot 1	Slot 1	Slot 1	Slot 1		Slot 1	Slot 1	Slot 1	Slot 1
8	DDR5	DDR5	DDR5	DDR5		DDR5	DDR5	DDR5	DDR5

SGX Factory Reset

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

SW Guard Extensions (SGX)

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

SGX Package Info In-Band Access

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

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

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

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

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

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

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

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

Software Guard Extensions Epoch 0

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

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

Software Guard Extensions Epoch 1

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

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

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

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

SGX Launch Enclave (LE) to be signed with.

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

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

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

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

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

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

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

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

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

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

IIO Configuration Menu

►IIO Configuration

PCIe Completion Timeout

Use this feature to set the PCIe completion timeout. The options are 50us to 50ms, 50us to 100us, 1ms to 10ms, 16ms to 55ms, 65ms to 210ms, **260ms to 900ms**, 1s to 3.5s, and Disabled.

PCIe ASPM Support (Global)

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

PRM Feature Control

Use this feature to enable the Platform Runtime Mechanism (PRM). The PRM is a mechanism to reduce the System Management Mode (SMM) usages and to provide an alternate means to invoke native code through the Advanced Configuration and Power Interface (ACPI) context of runtime events. The options are **Disabled** and Enabled.

Equalization Bypass To Highest Rate

Set this feature to Enabled to reduce the link training time for PCIe 5.0 device by skipping equalization of intermediate data rates. The options are Disabled and **Enabled**.

NVMe Mode Switch

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

PCIe PLL SSC

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

Snoop Response Hold Off for PCIe Stack

Use this feature to set the IIO snoop response hold-off value to improve throughput and reduce latency. The default setting is **9**. The valid range is 0 to F. Set this feature to 0 to disable the hold-off time.

CXL Security Level

By defining security protocols, CXL standards provide protection against the data security threats. Use this feature to set the CXL security level for data transiting the CXL link. The options are Fully Trusted, Partially Trusted, Untrusted, and **Auto**.

- Fully Trusted: This option allows the CXL device to access CXL.$ for both host-attached and device-attached memory ranges in the write-back (WB) address space.
- Partially Trusted: This option allows the CXL device to access CXL.$ for device-attached memory ranges only.
- Untrusted: If this option is selected, the host (your system) will abort all requests on CXL.$.
- Auto: This option is based on Si Compatibility.

CXL Header Bypass

Use this feature to enable the CXL header bypass. The options are **Disabled** and Enabled.

CPU1 Configuration Menu

►CPU1 Configuration

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

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

Bifurcation

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

►Intel VMD Technology

Note: After you've enabled VMD in the BIOS on a PCIe slot, this PCIe slot will be dedicated for VMD use only, and it will no longer support any PCIe device. To re-activate this slot for PCIe use, disable VMD in the BIOS.

Intel VMD Technology

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

►M.2-C1 / M.2-C2 / NVME0 / NVME1 / NVME5 / NVME6 / NVME7 / NVME8

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

Requested Link Speed

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

The following information is displayed.

- Max Link Width
- Current Link Width

- Current Link Speed

PCIe Port Max Payload Size

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

MCTP

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

Intel VMD Technology

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

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

►Intel VT for Directed I/O (VT-d)

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

Kernel DMA Protection

Select Enabled to notify OS to enable DMA protection after the system has booted by setting DMA_CTRL_PLATFORM_OPT_IN_FLAG in the DMAR ACPI table. The options are Enabled and **Disabled**. (DMA is the abbreviation for Direct Memory Access. DMAR is the abbreviation for DMA Remapping Reporting.)

Pre-boot DMA Protection

Select Enabled to establish DMA protection during pre-boot processing by setting DMA_CTRL_PLATFORM_OPT_IN_FLAG in the DMAR ACPI table. The options are Enabled and **Disabled**.

PCIe ACSCTL

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

Trusted Computing Menu

►Trusted Computing

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

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

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

Security Device Support

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

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

- Active PCR banks
- Available PCR banks

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

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

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

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

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

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

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

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

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

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

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

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

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

Select Enabled for TPM Storage Hierarchy support that is intended to be used for non-privacy-sensitive operations by a platform owner such as an IT professional or the end user. Storage Hierarchy has an owner policy and an authorization value, both of which can be set and are held constant (-rarely changed) through reboots. This hierarchy can be cleared or changed independently of the other hierarchies. The options are Disabled and **Enabled**.

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

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

PH Randomization

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

Supermicro BIOS-Based TPM Provision Support

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

ACPI Settings Menu

►ACPI Settings

NUMA

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

Virtual NUMA

Enable this feature to optimize the memory-access performance for VMware virtual machines. The options are **Disabled** and Enabled.

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

Number of Virtual NUMA Nodes (Available when "Virtual NUMA" is set to Enabled)

This feature displays the number of virtual NUMA nodes. A NUMA architecture divides hardware resources (including processors, memory, and I/O buses) into groups, called NUMA nodes. This feature indicates the available number of virtual NUMA nodes that can be assigned to the virtual machine. By default, this setting is automatically adjusted to match the physical NUMA topology.

WHEA Support

Select Enabled to support the Windows Hardware Error Architecture (WHEA) platform and provide a common infrastructure for the system to handle hardware errors within the Windows OS environment to reduce system crashes and to enhance system recovery and health monitoring. The options are Disabled and **Enabled**.

Super IO Configuration Menu

►Super IO Configuration

The following information is displayed.

- Super IO Chip

Note: This submenu is available when your system supports this feature.

Serial Port 1 Configuration Menu

►Serial Port 1 Configuration

Serial Port 1

Select Enabled to enable serial port 1. The options are Disabled and **Enabled**.

Device Settings (Available when "Serial Port 1" above is set to Enabled)

This feature displays the base I/O port address and the Interrupt Request address of serial port 1.

Change Settings (Available when "Serial Port 1" above is set to Enabled)

Use this feature to specify the base I/O port address and the Interrupt Request address of serial port 1. Select Auto for the BIOS to automatically assign the base I/O and IRQ address to serial port 1. The options are **Auto**, (IO=3F8h; IRQ=4;), (IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12;), (IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12;), (IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12;), and (IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;).

Serial Port 2 Configuration Menu

►Serial Port 2 Configuration

Note: It can be "Serial Port 2 Configuration" or "SOL Configuration" based on your system support.

Serial Port 2/SOL ("Serial Port 2" or "SOL" based on your system support)

Select Enabled to enable serial port 2 (or SOL). The options are Disabled and **Enabled**.

Device Settings (Available when "Serial Port 2/SOL" above is set to Enabled)

This feature displays the base I/O port address and the Interrupt Request address of serial port 2 (or SOL).

Change Settings (Available when "Serial Port 2/SOL" above is set to Enabled)

Use this feature to specify the base I/O port address and the Interrupt Request address of serial port 2 (or SOL). Select Auto for the BIOS to automatically assign the base I/O and IRQ address to serial port 2 (or SOL).

The options are **Auto**, (IO=2F8h; IRQ=3;), (IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12;), (IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12;), (IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12;), and (IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;).

Serial Port 2 Attribute (Available for Serial Port 2 only)

Select SOL to use serial port 2 as a Serial Over LAN (SOL) port for console redirection. The options are **SOL** and COM.

Serial Port Console Redirection Menu

►Serial Port Console Redirection

COM1 (Available when your system supports the serial port of COM1)

Console Redirection

Select Enabled to enable COM port 1 for Console Redirection, which allows a client machine to be connected to a host machine at a remote site for networking. The options are **Disabled** and Enabled.

Note: This feature will be set to Enabled if there is no BMC support.

SOL/COM2

Note: This feature is available when your system supports serial port of SOL and/or COM2. The "SOL/COM2" here indicates a shared serial port, and SOL is used as the default.

Console Redirection

Select Enabled to use the SOL/COM2 port for Console Redirection. The options are Disabled and **Enabled**.

►Console Redirection Settings

Note: This submenu is available when "Console Redirection" for COM1 or SOL/COM2 is set to Enabled.

Terminal Type

Use this feature to select the target terminal emulation type for Console Redirection. Select VT100 to use the ASCII character set. Select VT100+ to add color and function key support. Select ANSI to use the extended ASCII character set. Select VT-UTF8 to use UTF8 encoding to map Unicode characters into one or more bytes. The options are VT100, **VT100+**, VT-UTF8, and ANSI.

Bits Per Second

Use this feature to set the transmission speed for a serial port used in Console Redirection. Make sure that the same speed is used in the host computer and the client computer. A lower transmission speed may be required for long and busy lines. The options are 9600, 19200, 38400, 57600, and **115200** (bits per second).

Data Bits

Use this feature to set the data transmission size for Console Redirection. The options are 7 and **8** (bits).

Parity

A parity bit can be sent along with regular data bits to detect data transmission errors. Select Even if the parity bit is set to 0 and the number of 1s in data bits is even. Select Odd if the parity bit is set to 0 and the number of 1s in data bits is odd. Select None if you do not want to send a parity bit with your data bits in transmission. Select Mark to add a mark as a parity bit to be sent along with the data bits. Select Space to add a space as a parity bit to be sent with your data bits. The options are **None**, Even, Odd, Mark, and Space.

Stop Bits

A stop bit indicates the end of a serial data packet. Select 1 (stop bit) for standard serial data communication. Select 2 (stop bits) if slower devices are used. The options are **1** and 2.

Flow Control

Use this feature to set the flow control for Console Redirection to prevent data loss caused by buffer overflow. Send a "Stop" signal to stop sending data when the receiving buffer is full. Send a "Start" signal to start sending data when the receiving buffer is empty. The options are **None** and Hardware RTS/CTS.

VT-UTF8 Combo Key Support

Select Enabled to enable VT-UTF8 Combination Key support for ANSI/VT100 terminals. The options are Disabled and **Enabled**.

Recorder Mode

Select Enabled to capture the data displayed on a terminal and send it as text messages to a remote server. The options are **Disabled** and Enabled.

Resolution 100x31

Select Enabled for extended-terminal resolution support. The options are Disabled and **Enabled**.

Putty KeyPad

Use this feature to select the function key and keypad settings on Putty, which is a terminal emulator designed for the Windows OS. The options are **VT100**, LINUX, XTERMR6, SCO, ESCN, and VT400.

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

Use the features below to configure Console Redirection settings to support Out-of-Band Serial Port management.

Console Redirection EMS

Select Enabled to use the SOL port for Console Redirection. The options are **Disabled** and Enabled.

►Console Redirection Settings

Note: This submenu is available when "Console Redirection EMS" is set to Enabled.

Out-of-Band Mgmt Port

Use this feature to select a serial port in a client server to be used by the Microsoft Windows Emergency Management Services (EMS) to communicate with a remote host server. The options are **COM1** and SOL/COM2. Note that the option of SOL/COM2 indicates a shared serial port. SOL is available with BMC support.

Terminal Type EMS

Use this feature to select the target terminal emulation type for Console Redirection. Select VT100 to use the ASCII character set. Select VT100+ to add color and function key support. Select ANSI to use the extended ASCII character set. Select VT-UTF8 to use UTF8 encoding to map Unicode characters into one or more bytes. The options are VT100, VT100+, **VT-UTF8**, and ANSI.

Bits Per Second EMS

This feature sets the transmission speed for a serial port used in Console Redirection. Make sure that the same speed is used in the host computer and the client computer. A lower transmission speed may be required for long and busy lines. The options are 9600, 19200, 57600, and **115200** (bits per second).

Flow Control EMS

Use this feature to set the flow control for Console Redirection to prevent data loss caused by buffer overflow. Send a "Stop" signal to stop sending data when the receiving buffer is full. Send a "Start" signal to start sending data when the receiving buffer is empty. The options

are **None**, Hardware RTS/CTS, and Software Xon/Xoff.

The following information is displayed.

- **Data Bits EMS**
- **Parity EMS**
- **Stop Bits EMS**

Network Stack Configuration Menu

►Network Stack Configuration

Network Stack

Select Enabled to enable Preboot Execution Environment (PXE) or Unified Extensible Firmware Interface (UEFI) for network stack support. The options are Disabled and **Enabled**.

IPv4 PXE Support (Available when "Network Stack" is set to Enabled)

Select Enabled to enable IPv4 PXE boot support. If this feature is disabled, it will not create the IPv4 PXE boot option. The options are Disabled and **Enabled**.

IPv4 HTTP Support (Available when "Network Stack" is set to Enabled)

Select Enabled to enable IPv4 HTTP boot support. If this feature is disabled, it will not create the IPv4 HTTP boot option. The options are **Disabled** and Enabled.

IPv6 PXE Support (Available when "Network Stack" is set to Enabled)

Select Enabled to enable IPv6 PXE boot support. If this feature is disabled, it will not create the IPv6 PXE boot option. The options are Disabled and **Enabled**.

IPv6 HTTP Support (Available when "Network Stack" is set to Enabled)

Select Enabled to enable IPv6 HTTP boot support. If this feature is disabled, it will not create the IPv6 HTTP boot option. The options are **Disabled** and Enabled.

PXE Boot Wait Time (Available when "Network Stack" is set to Enabled)

Use this feature to set the wait time (in seconds) upon which the system BIOS will wait for you to press the <ESC> key to abort PXE boot instead of proceeding with PXE boot by connecting to a network server immediately. Press the <+> or <-> key on your keyboard to change the value. The default setting is **0**.

Media Detect Count (Available when "Network Stack" is set to Enabled)

Use this feature to set the wait time (in seconds) for the BIOS ROM to detect the presence of a LAN media either via the Internet connection or via a LAN port. Press the <+> or <-> key on your keyboard to change the value. The default setting is **1**.

MAC:(MAC address)-IPv4 Network Configuration Menu

►MAC:(MAC address)-IPv4 Network Configuration

Configured

Enable this feature to configure network addresses for DHCP, local IP address, local netmask, local gateway, and local DNS server. The options are **Disabled** and Enabled.

Enable DHCP (Available when "Configured" is set to Enabled)

Select Enabled to support Dynamic Host Configuration Protocol (DHCP), which allows the BIOS to search for a DHCP server attached to the network and request the next available IP address for this computer. The options are **Disabled** and Enabled.

Local IP Address (Available when "Configured" is set to Enabled and "Enable DHCP" is set to Disabled)

Use this feature to enter an IP address for the local machine.

Local NetMask (Available when "Configured" is set to Enabled and "Enable DHCP" is set to Disabled)

Use this feature to set the netmask for the local machine.

Local Gateway (Available when "Configured" is set to Enabled and "Enable DHCP" is set to Disabled)

Use this feature to set the gateway address for the local machine.

Local DNS Servers (Available when "Configured" is set to Enabled and "Enable DHCP" is set to Disabled)

Use this feature to set the Domain Name System (DNS) server address for the local machine.

Save Changes and Exit

Press <Enter> to save changes and exit.

MAC:(MAC address)-IPv6 Network Configuration Menu

►MAC:(MAC address)-IPv6 Network Configuration

►Enter Configuration Menu

The following information is displayed.

- Interface Name
- Interface Type
- MAC address

- Host address
- Route Table
- Gateway addresses
- DNS addresses

Interface ID

Use this feature to change/enter the 64-bit alternative interface ID for the device. The string format is colon separated. The default setting is the MAC address above.

DAD Transmit Count

Use this feature to set the number of consecutive neighbor solicitation messages that have been sent while performing duplicate address detection on a tentative address. The default setting is **1**.

Policy

Use this feature to select how the policy is to be configured. The options are **automatic** and manual.

►Advanced Configuration

Note: This submenu is available when "Policy" is set to manual.

New IPv6 address: Use this feature to enter the IPv6 address for the local machine.

New Gateway addresses: Use this feature to set the gateway address for the local machine.

New DNS addresses: Use this feature to set the DNS server address for the local machine.

Commit Changes and Exit: Press <Enter> to save changes and exit.

Discard Changes and Exit: Press <Enter> to discard changes and exit.

Save Changes and Exit

Press <Enter> to save changes and exit.

PCIe/PCI/PnP Configuration Menu

►PCIe/PCI/PnP Configuration

The following information is displayed.

- PCI Bus Driver Version

PCI Devices Common Settings:

Re-Size BAR Support

Use this feature to enable the Resizable BAR support. Resizable BAR is a PCIe interface technology that allows the CPU to access the entire frame buffer. With this technology, your system will be able to handle multiple CPU to GPU transfers simultaneously rather than queuing, which can improve the frame rate performance. The options are **Disabled** and Enabled.

SR-IOV Support (Unavailable when "Workload Profile" is set to Virtualization)

Select Enabled for Single- Root IO Virtualization support. The options are Disabled and **Enabled**.

ARI Support

Select Enabled for Alternative Routing- ID Interpretation (ARI) support. The options are Disabled and **Enabled**.

MMCFG Base

This feature determines how the lowest Memory Mapped Configuration (MMCFG) base is assigned to onboard PCI devices. The options are 1G, 1.5G, 1.75G, 2G, 2.25G, 3G, and **Auto**. The options of 2G and 2.25G are not available when the MMCFG size is 2G. The option of 3G is not available when the MMCFG size is 1G or 2G.

MMCFG Size

Use this feature to set the MMCFG size. The options are 64M, 128M, 256M, 512M, 1G, 2G, and **Auto**. Note that the MMCFG size is based on the memory populated.

MMIO High Base

Use this feature to select the base memory size according to memory-address mapping for the I/O hub. The options are 248T, 120T, 88T, 60T, 30T, 56T, 40T, 32T, 24T, 16T, 4T, 2T, 1T, 512G, 3584T, and **Auto**. The options of 248T, 120T, 88T, 60T, 30T, and 3584T are CPU-dependent.

MMIO High Granularity Size

Use this feature to select the high memory size according to memory-address mapping for the I/O hub. The options are 1G, 4G, 16G, 32G, 64G, 256G, and **1024G**. This feature is motherboard-dependent.

Bus Master Enable

If this feature is set to Enabled, the PCI Bus Driver will enable the Bus Master Attribute for DMA transactions. If this feature is set to Disabled, the PCI Bus Driver will disable the Bus Master Attribute for Pre-Boot DMA protection. The options are Disabled and **Enabled**.

NVMe Firmware Source

Use this feature to select the NVMe firmware to support system boot. The options are Vendor Defined Firmware and **AMI Native Support**. The option of Vendor Defined Firmware is pre-installed on the drive and may resolve errata or enable innovative functions for the drive. The option of AMI Native Support is offered by the BIOS with a generic method. The default option is motherboard-dependent.

VGA Priority

Use this feature to select the graphics device to be used as the primary video display for system boot. The options are **Onboard** and Offboard.

Onboard Video Option ROM

Select EFI to boot the computer using the Extensible Firmware Interface (EFI) device installed on the onboard video port. The options are Disabled and **EFI**.

Onboard LAN1 Option ROM

Select EFI to boot the computer using the EFI device installed on LAN port 1. The options are Disabled and **EFI**.

Note: This feature is available when your motherboard supports onboard LAN ports.

Onboard LAN2 Option ROM

Use this feature to boot the computer using the EFI device installed on LAN port 2. Select Disabled to disable this feature. The default setting is **Disabled**.

Note: This feature is available when your motherboard supports onboard LAN ports and when "Onboard LAN1 Option ROM" is set to Disabled.

AOC-ATG-i2S LAN1 OPROM / Onboard SAS Option ROM / Onboard LAN1 Option ROM / Onboard NVMe1 Option ROM – Onboard NVMe24 Option ROM

Select EFI to boot the computer using the EFI device installed on the PCIe slot specified. The options are Disabled and **EFI**.

Note: The number of slots and slot naming vary based on your motherboard features.

HTTP Boot Configuration Menu

►HTTP Boot Configuration

HTTP Boot Policy

Use this feature to set the HTTP boot policy. The options are Apply to all LANs, **Apply to each LAN**, and Boot Priority #1 instantly.

HTTPS Boot Checks Hostname

Important: Disabling "HTTPS Boot Checks Hostname" is a violation of RFC 6125 and may expose you to Man-in-the-Middle Attacks. Supermicro is not responsible for any and all security risks incurred by you disabling this feature.

Enable this feature for HTTPS boot to check the hostname of the TLS certificates to see if it matches the host name provided by the remote server. The options are **Enabled** and Disabled (WARNING: Security Risk!!).

Priority of HTTP Boot

Instance of Priority 1: (Available when your motherboard supports this feature)

This feature sets the rank target port. The default setting is **1**.

Select IPv4 or IPv6

This feature specifies which connection the target LAN port should boot from. The options are **IPv4** and IPv6.

Boot Description

Use this feature to enter a boot description, which cannot be longer than 75 characters. Be sure to enter a boot description; otherwise, the boot option for the URI cannot be created.

Boot URI

Enter a Boot Uniform Research Identifier (URI) with 128 characters or shorter. This Boot URI determines how IPv4 Boot Option and IPv6 Boot Option will be created.

Instance of Priority 2: (Available when your motherboard supports this feature)

This feature sets the rank target port. The default setting is **0**.

Select IPv4 or IPv6 (Unavailable when "Instance of Priority 2:" above is set to 0)

This feature specifies which connection the target LAN port should boot from. The options are **IPv4** and IPv6.

Boot Description (Unavailable when "Instance of Priority 2:" above is set to 0)

Use this feature to enter a boot description, which cannot be longer than 75 characters. Please be sure to enter a boot description; otherwise, the boot option for the URI cannot be created.

Boot URI (Unavailable when "Instance of Priority 2:" above is set to 0)

Enter a Boot URI with 128 characters or shorter. This Boot URI determines how IPv4 Boot Option and IPv6 Boot Option will be created.

Supermicro KMS Server Configuration Menu

►Supermicro KMS Server Configuration

Note: Be sure to configure all the features in the submenu of Supermicro KMS Server Configuration and the feature of "KMS Security Policy" in the submenu of Super-Guardians Configuration so that your system can communicate with the KMS server.

TPM-KMS Support

This feature combines the capabilities of a hardware-based security module (TPM) with the Key Management Service (KMS) to enhance security by managing cryptographic keys and ensuring secure access to sensitive data. The options are **Disabled** and Enabled.

Supermicro KMS Server IP address

Use this feature to set the Supermicro KMS server IPv4 address in dotted-decimal notation.

Second Supermicro KMS Server IP address

Use this feature to set the second Supermicro KMS server IPv4 address in dotted-decimal notation.

Supermicro KMS TCP Port number

Use this feature to set the TCP port number used in the Supermicro KMS server. The valid range is 100–9999. The default setting is **5696**. Do not change the default setting unless a different TCP port number has been specified and used in the Supermicro KMS server.

KMS Time Out

Use this feature to enter the KMS server connecting time-out (in seconds). The default setting is **5** (seconds).

TimeZone

Use this feature to set the correct time zone. The default setting is **0** (not specified).

Client UserName

Press <Enter> to set the client identity (UserName). The length is 0–63 characters.

Client Password

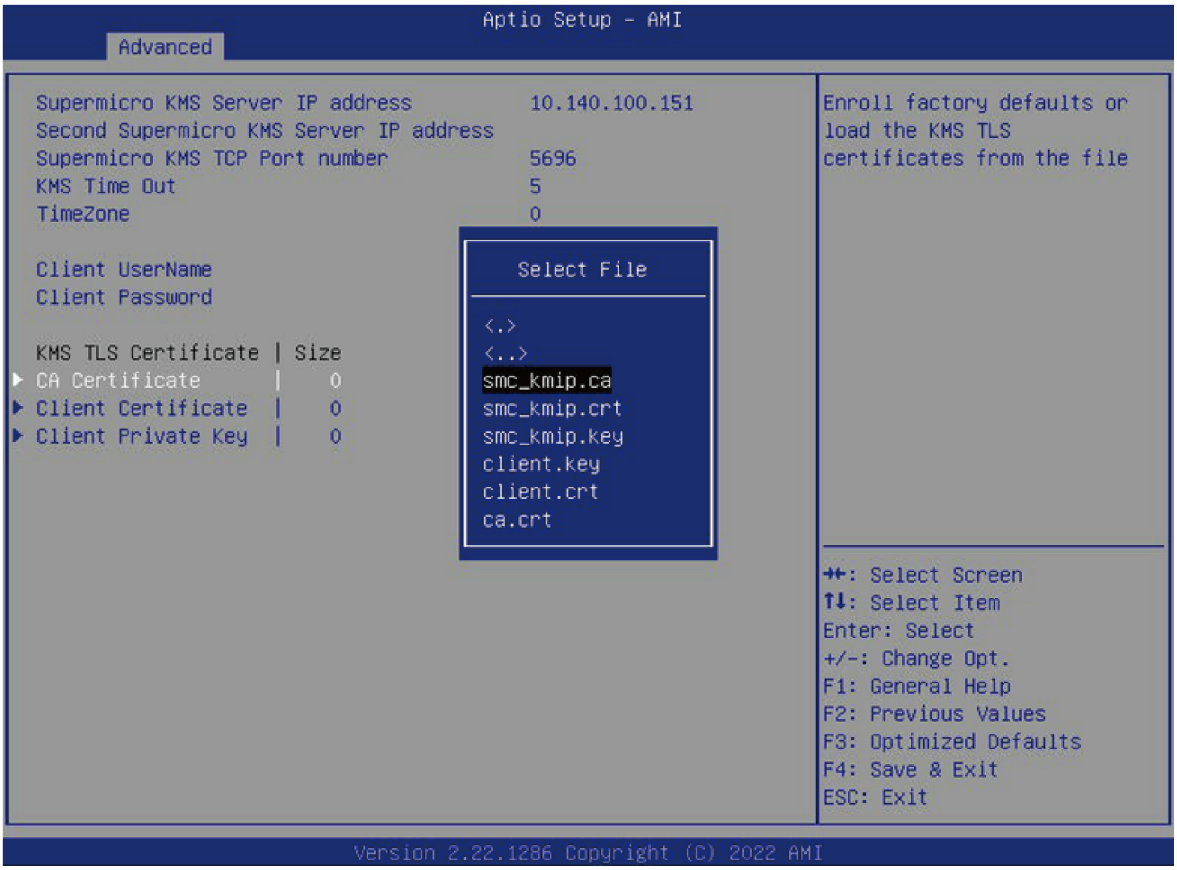
Press <Enter> to set the client identity (Password). The length is 0–31 characters.

►CA Certificate

►Client Certificate

►Client Private Key

Use the three features above to enroll factory defaults or load the KMS Transport Layer Security (TLS) certificates, which are generated by the KMS server, from the file stored in the USB flash drive as shown below.



Private Key Password (Available when "Client Private Key" above has been set)

Use this feature to change the private key password.

Super-Guardians Configuration Menu

►Super-Guardians Configuration

Super-Guardians Protection Policy

Use this feature to enable the Super-Guardians Protection Policy. The options are **Storage**, System, and System and Storage. Set this feature to Storage to protect and have secure access to the Trusted Computing Group (TCG) NVMe devices with the Authentication-Key (AK). Set this feature to System to protect and have secure access to your system/motherboard with the AK. Set this feature to System and Storage to protect and have secure access to your system/motherboard/storage devices with the AK.

KMS Security Policy (Available when "TPM Security Policy" and "USB Security Policy" are set to Disabled)

Set this feature to Enabled to enable the KMS Security Policy. When this feature has not previously been set to Enabled, the options are **Disabled** and Enabled. Changes take effect after you save settings and reboot the system.

When this feature has previously been set to Enabled, the options are **Enabled**, Reset, and Key Rotation. Set this feature to Key Rotation to obtain an existing AK from the KMS server and create a new AK. To disable the KMS Security Policy, set this feature to Reset. When this feature is set to Reset, the system and TCG NVMe devices chosen in "Super-Guardians Protection Policy" will be in the unprotected mode.

Notes:

- Be sure that the KMS server is ready before configuring this feature.
- Use the professional KMS server solutions (e.g., Thales Server) or the Supermicro PyKMIP Software Package to establish the KMS server.

KMS Server Retry Count (Available when "TPM Security Policy" and "USB Security Policy" are set to Disabled)

Use this feature to specify how many times the system will attempt reconnecting to the KMS server. The valid range is 0–10. Press the <+> or <-> key on your keyboard to change the value. The default setting is **5**. If the value is 0, the system will retry infinitely.

TPM Security Policy (Available when "KMS Security Policy" and "USB Security Policy" are set to Disabled)

Set this feature to Enabled to enable the TPM Security Policy. When this feature has not previously been set to Enabled, the options are **Disabled** and Enabled. Changes take effect after you save settings and reboot the system.

When this feature has previously been set to Enabled, the options are **Enabled**, Reset, and Key Rotation. To disable the TPM Security Policy, set this feature to Reset. When this feature is set to Reset, the system and TCG NVMe devices chosen in "Super-Guardians Protection Policy" will be in the unprotected mode.

Note: The TPM 2.0 (either onboard or external) is required to configure this feature.

Load Authentication-Key (Available when "KMS Security Policy," "TPM Security Policy," and "USB Security Policy" are set to Disabled)

Use this feature to load the Authentication-Key. The options are **Disabled** and Enabled. Set this feature to Enabled. Changes take effect after you save settings and reboot the system. While booting, the BIOS will automatically load the Authentication-Key (filename: TPMAuth.bin) from the USB flash drive. Afterwards, the default setting will be set to Disabled by the BIOS.

Notes:

- Be sure to connect a USB flash drive with the Authentication-Key (filename: TPMAuth.bin) to your system before the system reboot.
- Be sure to save the Authentication-Key (filename: TPMAuth.bin) to the USB flash drive and keep a backup. Load the Authentication-Key (filename: TPMAuth.bin) after the TPM (either onboard or external) is detected by your system. Otherwise, the TPM function can not work properly.

Save Authentication-Key (Available when "TPM Security Policy" is set to Enabled)

Use this feature to save the Authentication-Key. The options are **Disabled** and Enabled. Set this feature to Enabled. Changes take effect after you save settings and reboot the system. While booting, the BIOS will automatically save the Authentication-Key (filename: TPMAuth.bin) to the USB flash drive. Afterwards, the default setting will be set to Disabled by the BIOS.

Note: Be sure to connect a USB flash drive to your system before the system reboot.

USB Security Policy (Available when "KMS Security Policy" and "TPM Security Policy" are set to Disabled)

Use this feature to enable the USB Security Policy. The options are **Disabled** and Enabled. Set this feature to Enabled. Changes take effect after you save settings and reboot the system. Connect a USB flash drive to your system before the system reboot. While booting, the BIOS will automatically create the USB Authentication-Key (filename: USBAuth.bin) and save it to the USB flash drive.

When this feature has been previously set to Enabled, the options are **Enabled** and Reset. To disable the USB Security Policy, set this feature to Reset. When this feature is set to Reset, the system and TCG NVMe devices chosen in "Super-Guardians Protection Policy" will be in the unprotected mode.

Note: Be sure to connect a USB flash drive to your system before configuring this feature. Save the USB Authentication-Key (filename: USBAuth.bin) to the USB flash drive and keep a backup.

Intel(R) Ethernet Controller Menu

►Intel(R) Ethernet Controller (Ethernet controller) - (MAC address)

Notes:

- The Ethernet controller and MAC address shown above are based on your system features.
- This submenu is available when the LAN Option ROM type is EFI.

►NIC Configuration

Link Speed

Use this feature to set the connection speed of a selected LAN port. The options are **Auto Negotiated**, 10 Mbps Half, 10 Mbps Full, 100 Mbps Half, and 100 Mbps Full.

Wake On LAN

Set this feature to support system wake-up via the selected LAN port. If this feature is set to Enabled, the LAN port selected will be enabled when the system is powered on. The options are Disabled and **Enabled**.

LLDP Agent

Use this feature to enable or disable Link Layer Discovery Protocol (LLDP) agent support on a long-term basis. The LLDP, a vendor-neutral link layer protocol, is used by a network device to identify itself and announce its capability to the neighboring devices in a network environment for networking. When disabling the LLDP agent in the firmware, the function of Data Center Bridging (DCB) will also be disabled. The options are Disabled and **Enabled**.

Blink LEDs

Use this feature to identify the physical network port by blinking the associated LEDs. The default setting is **0** (up to 15 seconds).

The following information is displayed.

- UEFI Driver
- Adapter PBA
- Device Name
- Chip Type
- PCI Device ID
- PCI Address
- Link Status
- MAC Address
- Virtual MAC Address

TLS Authenticate Configuration Menu

►TLS Authenticate Configuration

Use this submenu to configure Transport Layer Security (TLS) settings.

►Server CA Configuration

Use this feature to configure the client certificate that is to be used by the server.

►Enroll Certification

Use this feature to enroll the certificate in the system.

►Enroll Certification Using File

Use this feature to enroll the security certificate in the system by using a file.

►Commit Changes and Exit

Use this feature to save all changes and exit TLS settings.

►Discard Changes and Exit

Use this feature to discard all changes and exit TLS settings.

►Delete Certification

Use this feature to delete the certificate if a certificate has been enrolled in the system.

►Client Certification Configuration

Asmedia AHCI Controller Menu

►Asmedia AHCI Controller Menu / Asmedia AHCI Controller Menu

The following information is displayed.

- SATA Port 0
- SATA Port 1
- SATA Port 2
- SATA Port 3

Driver Health Menu

►Driver Health

This feature displays the health information of the drivers installed in your system, including LAN controllers, as detected by the BIOS. Select one and press <Enter> to see the details.

Note: This section is provided for reference only, for the driver health status will differ depending on the drivers installed in your system. It's also based on your system configuration and the environment that your system is operating in.

8.4 Event Logs

Use this menu to configure Event Logs settings.

Note: After making any changes in this section, be sure to reboot the system for the changes to take effect.

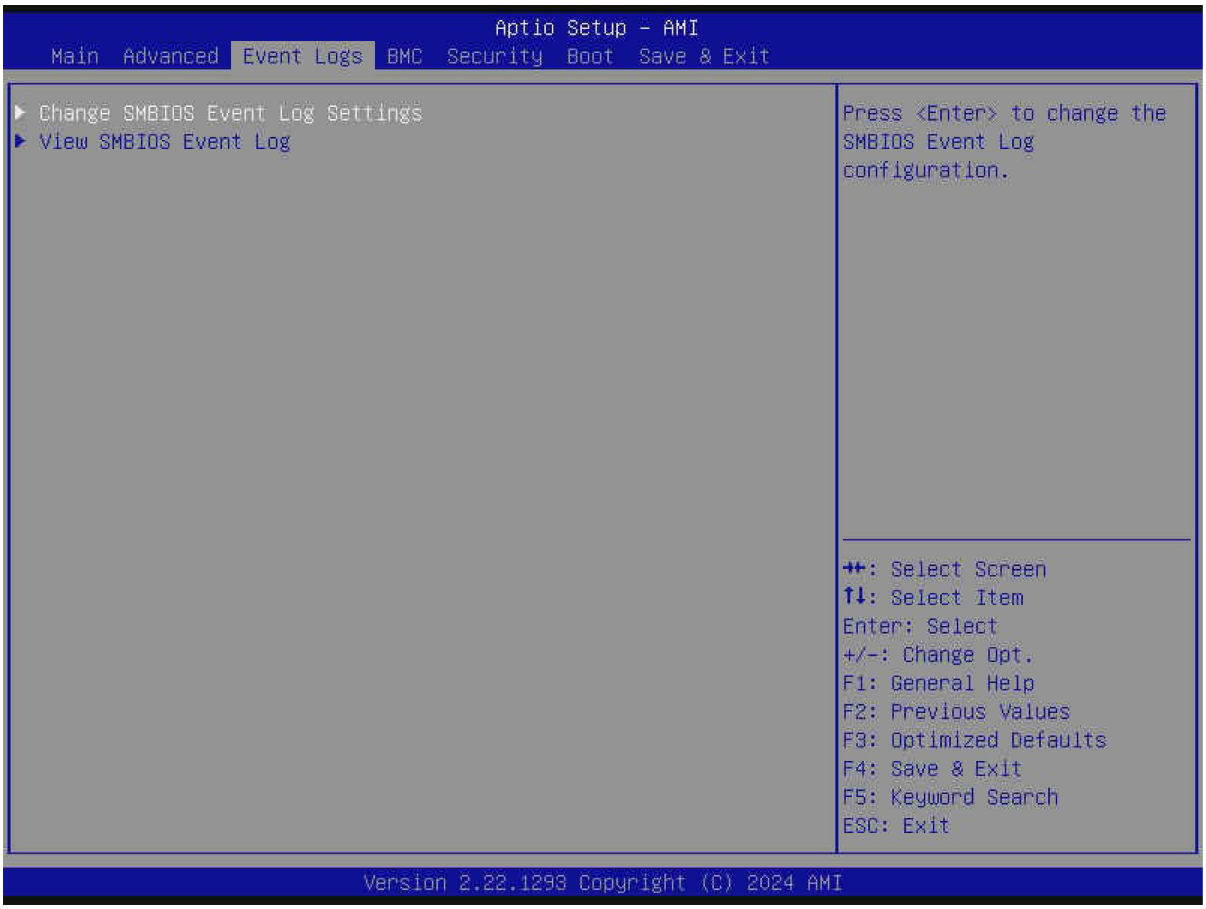


Figure 8-3. Event Logs Screen

►Change SMBIOS Event Log Settings

Note: Reboot the system for the changes in this section to take effect.

Enabling/Disabling Options

SMBIOS Event Log

Select Enabled to enable System Management BIOS (SMBIOS) Event Logging during system boot. The options are Disabled and **Enabled**.

Erasing Settings

Erase Event Log (Available when "SMBIOS Event Log" is set to Enabled)

Select No to keep the event log without erasing it upon next system bootup. Select (Yes, Next reset) to erase the event log upon next system reboot. The options are **No**, (Yes, Next reset), and (Yes, Every reset).

When Log is Full (Available when "SMBIOS Event Log" is set to Enabled)

Select Erase Immediately to immediately erase all errors in the SMBIOS event log when the event log is full. Select Do Nothing for the system to do nothing when the SMBIOS event log is full. The options are **Do Nothing** and Erase Immediately.

SMBIOS Event Log Standard Settings

Log System Boot Event (Available when "SMBIOS Event Log" is set to Enabled)

Select Enabled to log system boot events. The options are Enabled and **Disabled**.

MECI (Available when "SMBIOS Event Log" is set to Enabled)

Enter the increment value for the multiple event counter. Enter a number between 1 and 255. The default setting is **1**. (MECI is the abbreviation for Multiple Event Count Increment.)

METW (Available when "SMBIOS Event Log" is set to Enabled)

Use this feature to determine how long (in minutes) should the multiple event counter wait before generating a new event log. Enter a number between 0 and 99. The default value is **60**. (METW is the abbreviation for Multiple Event Count Time Window.)

►View SMBIOS Event Log

Use this feature to view the events in the system event log. Select this feature and press <Enter> to view the status of an event in the log. The following information is displayed: DATE / TIME / ERROR CODE / SEVERITY.

8.5 BMC

Use this menu to configure Baseboard Management Console (BMC) settings.

Figure 8-4. BMC Screen

System Event Log Menu

►System Event Log

Note: All values changed in this submenu do not take effect until computer is restarted.

Enabling/Disabling Options

SEL Components

Select Enabled to enable all system event logging upon system boot. The options are Disabled and **Enabled**.

Erasing Settings

Erase SEL (Available when "SEL Components" is set to Enabled)

Select (Yes, On next reset) to erase all system event logs upon next system boot. Select (Yes, On every reset) to erase all system event logs upon each system reboot. Select No to keep all system event logs after each system reboot. The options are **No**, (Yes, On next reset), and (Yes, On every reset).

When SEL is Full (Available when "SEL Components" is set to Enabled)

This feature defines what the BIOS should do when the system event log is full. Select Erase Immediately to erase all events in the log when the system event log is full. The options are **Do Nothing** and Erase Immediately.

BMC Network Configuration Menu

►BMC Network Configuration

Update BMC LAN Configuration

Select Yes for the BIOS to implement all IP/MAC address changes upon next system boot. The options are **No** and Yes.

****

Configure IPv4 Support

****

BMC LAN Selection

This feature displays the type of the BMC LAN.

BMC Network Link Status:

This feature displays the status of the BMC network link for this system.

Configuration Address Source

Use this feature to select the source of the IPv4 connection. If Static is selected, note the IP address of the IPv4 connection and enter it to the system manually in the field. If DHCP is selected, the BIOS will search for a Dynamic Host Configuration Protocol (DHCP) server in the network that is attached to and request the next available IP address for this computer. The options are Static and **DHCP**. It is available for configuration when "Update BMC LAN Configuration" is set to Yes.

Station IP Address

This feature displays the Station IP address in decimal and in dotted quad form (i.e., 172.29.176.131). It is available for configuration when "Update BMC LAN Configuration" is set to Yes and "Configuration Address Source" above is set to Static.

Subnet Mask

This feature displays the sub- network that this computer belongs to. It is available for configuration when "Update BMC LAN Configuration" is set to Yes and "Configuration Address Source" above is set to Static.

Station MAC Address

This feature displays the Station MAC address for this computer. MAC addresses are six two-digit hexadecimal numbers.

Gateway IP Address

This feature displays the IPv4 gateway IP address for this computer. This should be in decimal and in dotted quad form (i.e., 172.29.0.1). It is available for configuration when "Update BMC LAN Configuration" is set to Yes and "Configuration Address Source" above is set to Static.

****

Configure IPv6 Support

****

IPv6 Address Status

This feature displays the status of the IPv6 address.

IPv6 Support

Use this feature to enable IPv6 support. The options are **Enabled** and Disabled. It is available for configuration when "Update BMC LAN Configuration" is set to Yes.

Configuration Address Source

Use this feature to select the source of the IPv6 connection. If Static Configuration is selected, note the IP address of IPv6 connection and enter it to the system manually in the field. If the other two options are selected, the BIOS will search for a DHCP server in the network that is attached to and request the next available IP address for this computer. The options are Static Configuration, **DHCPv6 Stateless**, and DHCPv6 Stateful. It is available for configuration when "Update BMC LAN Configuration" is set to Yes.

IPv6 Address ("Static," "DHCPv6 Stateless," or "DHCPv6 Stateful," depending on the option you selected for "Configuration Address Source" above)

This feature displays the station IPv6 address. It is available for configuration when "Update BMC LAN Configuration" is set to Yes and "Configuration Address Source" above is set to Static Configuration.

Prefix Length

This feature displays the prefix length. It is available for configuration when "Update BMC LAN Configuration" is set to Yes and "Configuration Address Source" above is set to Static Configuration.

Gateway IP

This feature displays the IPv6 gateway IP address. It is available for configuration when "Update BMC LAN Configuration" is set to Yes and "Configuration Address Source" above is set to Static Configuration.

Advanced Settings

Use this feature to set the DNS server IP. The default setting allows this system to obtain the DNS server IP automatically. The options are **Auto obtain DNS server IP** and Manually obtain DNS server IP. It is available for configuration when "Update BMC LAN Configuration" is set to Yes and "Configuration Address Source" above is set to DHCPv6 Stateless.

Preferred DNS server IP (Available when "Advanced Settings" above is set to Manually obtain DNS server IP)

This feature displays the preferred DNS server IP. It can be configured via Redfish.

Alternative DNS server IP (Available when "Advanced Settings" above is set to Manually obtain DNS server IP)

This feature displays the alternative DNS server IP. It can be configured via Redfish.

****

Configure VLAN Support

****

Lan channel 1

VLAN Support

Use this feature to enable the virtual LAN (VLAN) support. The options are Enabled and **Disabled**.

VLAN ID (Available when "VLAN Support" is set to Enabled)

Use this feature to create a new VLAN ID. The valid range is 1–4094. The default setting is **1**.

8.6 Security

Use this menu to configure the following security settings for the system.

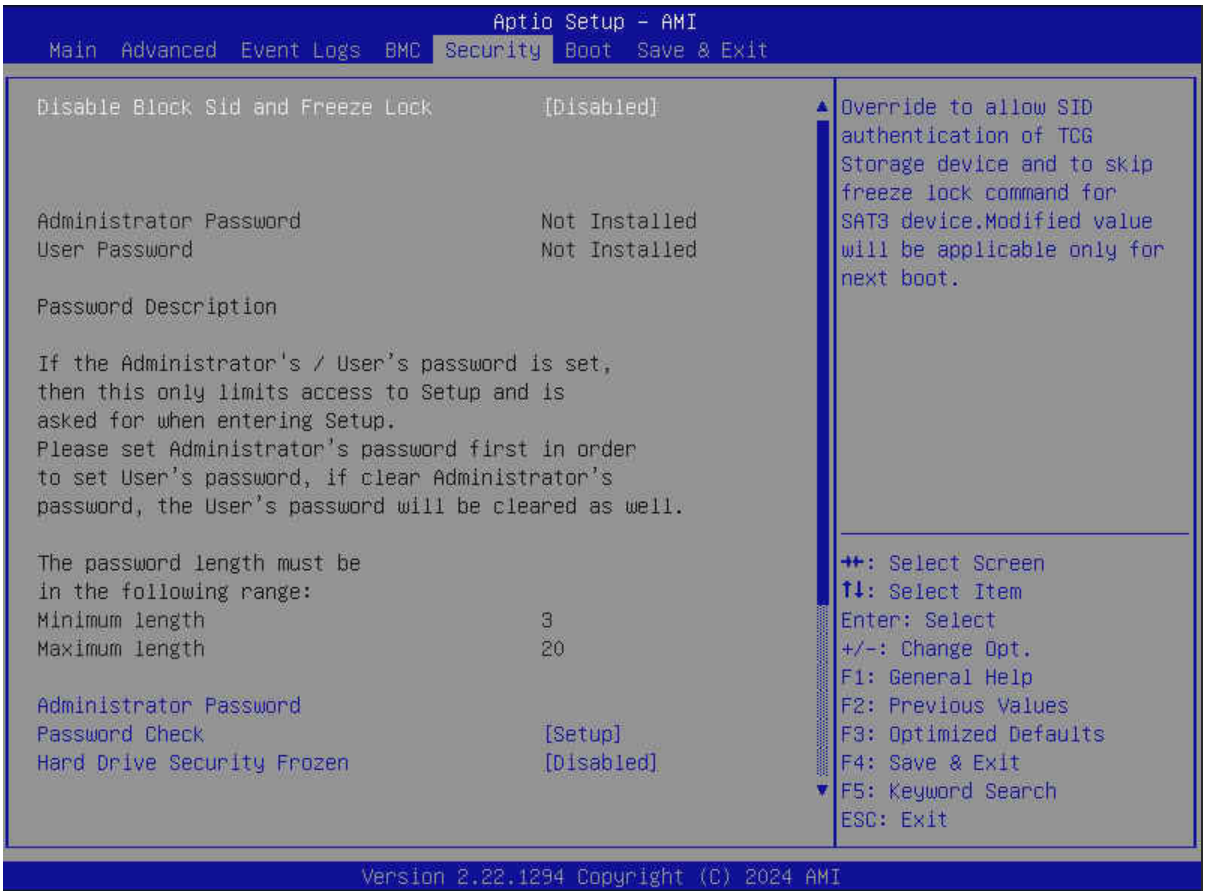


Figure 8-5. Security Screen

Disable Block Sid and Freeze Lock (Available when your storage devices support TCG)

Select Enabled to allow SID authentication to be performed in TCG storage devices. The options are **Disabled** and Enabled.

The following information is displayed:

- Administrator Password
- User Password
- Password Description

Administrator Password

This feature indicates if an administrator password has been installed. Use this feature to set the administrator password, which is required to enter the BIOS Setup utility. The length of the password can be between three and 20 characters long.

User Password (Available when "Administrator Password" has been set)

This feature indicates if a user password has been installed. Use this feature to set the user password which is required to enter the BIOS Setup utility. The length of the password can be between three and 20 characters long.

Password Check

Select Setup for the system to check for a password upon entering the BIOS Setup utility. Select Always for the system to check for the passwords needed at bootup and upon entering the BIOS Setup utility. The options are **Setup** and Always.

Hard Drive Security Frozen

Select Enabled to freeze the Lock Security feature for HDD to protect key data in hard drives from being altered. The options are **Disabled** and Enabled.

Lockdown Mode (Available when the DCMS key is activated)

Select Enabled to support the Lockdown Mode, which prevents the existing data or keys stored in the system from being altered or changed in an effort to preserve system integrity and security. The options are **Disabled** and Enabled.

Supermicro Security Erase Configuration Menu

►Supermicro Security Erase Configuration

Use this submenu to configure the Supermicro-proprietary Security Erase settings. When this submenu is selected, the following information is displayed. Note that the order of the following information may differ based on the storage devices being detected.

- HDD Name: This feature displays the model name of the storage device that is detected by the BIOS.
- HDD Serial Number: This feature displays the serial number of the storage device that is detected by the BIOS.
- Security Mode: This feature displays the security mode of the storage device that is detected by the BIOS.
- Estimated Time: This feature displays the estimate time needed to perform the selected Security Erase features.
- HDD User Pwd Status: This feature indicates if a password has been set as a storage device user password, which enables configuring Supermicro Security Erase settings on this storage device.
- TCG Device Type: This feature displays the TCG device type detected by the system.

- Admin Pwd Status: This feature indicates if a password has been set as a storage device administrator password, which enables configuring Supermicro Security Erase settings on this storage device.

Note: This submenu is available when any storage device is detected by the BIOS. For more information about this feature, refer to our website.

Security Function

Select Set Password to set a storage device user password to enable configuring the security settings on the storage device. Select Security Erase - Password to enter a storage device user password to enable erasing the password and the contents previously stored in the storage device. Select Security Erase - Without Password to use the manufacturer default password "111111111" as the storage device user password and enable erasing the contents of the storage device by using this default password. The options are **Disabled**, Set Password, Change Password, Clear Password, Security Erase - Password, Security Erase - PSID, and Security Erase - Without Password.

Notes:

- The option of Security Erase - PSID is based on the storage device support. PSID is the abbreviation for Physical Security Identification.
- The options of Change Password and Clear Password are available when "Password" below has been set.
- The option of Set Password is NOT available when "Password" below has been set.

Password

Use this feature to set the storage device user password, which enables configuring the Supermicro Security Erase settings by using this user password.

New Password (Available when "Password" above has been set)

Use this feature to set the new user password for the storage device, which enables configuring the Supermicro Security Erase settings by using this new user password.

HDD Security Configuration Menu

►P4: (Storage device model name)

This submenu is available when the storage device is detected by the BIOS. Select this device. Press <Enter> and the following information is displayed:

- HDD Password Description:
- HDD PASSWORD CONFIGURATION:
- Security Supported:
- Security Enabled:
- Security Locked:
- Security Frozen:
- HDD User Pwd Status:
- HDD Master Pwd Status:

Set User Password (Available when "Security Frozen:" above is No)

Press <Enter> to set the HDD user password.

Secure Boot Menu

►Secure Boot

The following information is displayed:

- System Mode
- Secure Boot

Note: For detailed instructions on configuring Security Boot settings, refer to the Security Boot Configuration User's Guide at https://www.supermicro.com/support/manuals.

Secure Boot

Select Enabled to configure Secure Boot settings. The options are **Disabled** and Enabled.

Secure Boot Mode

Use this feature to select the desired secure boot mode for the system. The options are Standard and **Custom**.

►Enter Audit Mode

Select Ok to enter the Audit Mode workflow. It will result in erasing the Platform Key (PK) variables and resetting the system to the Setup/Audit Mode.

Note: This submenu is available when "Secure Boot Mode" is set to Custom.

►Enter Deployed Mode / Exit Deployed Mode

Select Ok to reset system to the User Mode or to the Deployed Mode.

Note: This submenu is available when "Secure Boot Mode" is set to Custom.

►Key Management

The following information is displayed:

- Vendor Keys

Note: This submenu is available when "Secure Boot Mode" is set to Custom.

Provision Factory Defaults

Select Enabled to install the default secure boot keys when the system is in the Setup Mode. Changes take effect after you save settings and reboot the system. The options are **Disabled** and Enabled.

►Restore Factory Keys

Select Yes to restore manufacturer default keys to ensure system security. The options are **Yes** and No. Selecting Yes will reset the system to the User Mode.

Note: This submenu is available when any secure keys have been installed.

►Reset To Setup Mode

This feature resets the system to the Setup Mode. The options are **Yes** and No.

Note: This submenu is available when any secure keys have been installed.

►Enroll Efi Image

This feature allows the Efi image to run in the secure boot mode and enroll the SHA256 Hash certificate of a PE image into the Authorized Signature Database (DB).

►Export Secure Boot Variables

This feature exports the NVRAM contents of secure boot variables to a storage device. The options are **Yes** and No.

Note: This submenu is available when any secure keys have been installed.

Secure Boot variable / Size / Keys / Key Source

►Platform Key (PK)

Use this feature to enter and configure a set of values to be used as platform firmware keys for the system. These values also indicate the sizes, key numbers, and the sources of the authorized signatures. Select Update to update the platform key.

►Key Exchange Keys (KEK)

Use this feature to enter and configure a set of values to be used as Key Exchange Keys for the system. These values also indicate the sizes, key numbers, and the sources of the authorized signatures. Select Update to update the Key Exchange Keys. Select Append to append the Key Exchange Keys.

►Authorized Signatures (db)

Use this feature to enter and configure a set of values to be used as Authorized Signatures for the system. These values also indicate the sizes, key numbers, and sources of the authorized signatures. Select Update to update the Authorized Signatures. Select Append to append the new Authorized Signatures.

►Forbidden Signatures (dbx)

Use this feature to enter and configure a set of values to be used as Forbidden Signatures for the system. These values also indicate sizes, key numbers, and key sources of the forbidden signatures. Select Update to update the Forbidden Signatures. Select Append to append the Forbidden Signature.

►Authorized TimeStamps (dbt)

Use this feature to set and save the timestamps for the Authorized Signatures, which will indicate the time when these signatures are entered into the system. These values also indicate sizes, keys, and key sources of the authorized timestamps. Select Update to update the Authorized TimeStamps. Select Append to append the Authorized TimeStamps.

►OsRecovery Signatures (dbr)

Use this feature to set and save the Authorized Signatures used for OS recovery. Select Update to update the OsRecovery Signatures. These values also indicate sizes, keys, and key sources of the OsRecovery Signatures. Select Append to append the OsRecovery Signatures.

TCG Storage Security Configuration Menu

►(Storage device model name)

Select this device. Press <Enter> and the following information is displayed:

- TCG Storage Security Password Description:
- PASSWORD CONFIGURATION:
- Security Subsystem Class:
- Security Supported:
- Security Enabled:
- Security Locked:
- Security Frozen:
- User Pwd Status:
- Admin Pwd Status:

Note: This submenu is available when the storage device is compliant with TCG specifications.

Set Admin Password

Use this feature to set the administrator password for this storage device.

Set User Password (Available when "Set Admin Password" has been set)

Use this feature to set the user password for this storage device.

Device Reset

Use this feature to reset the password configuration for this storage device.

8.7 Boot

Use this menu to configure Boot settings.

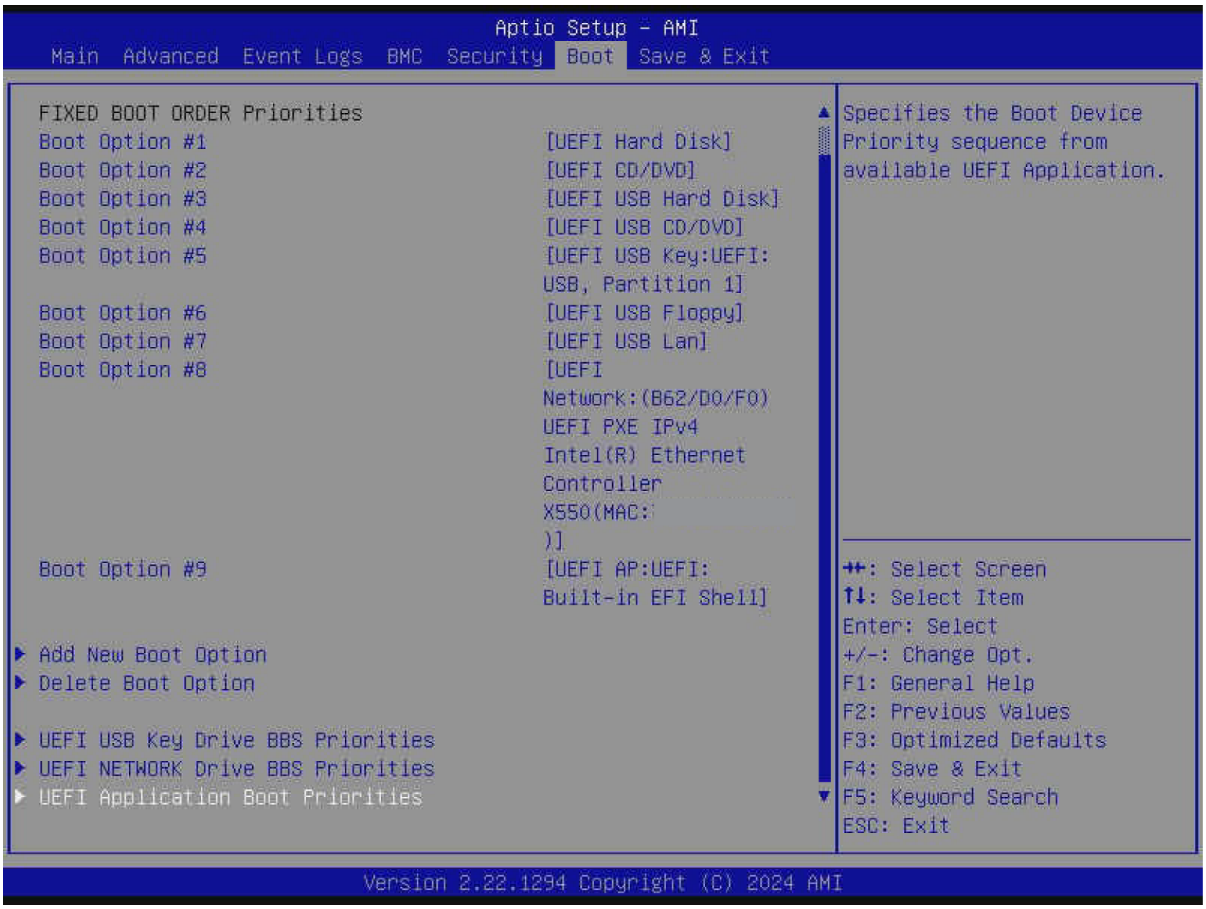


Figure 8-6. Boot Screen

FIXED BOOT ORDER Priorities

Use this feature to prioritize the order of a bootable device from which the system will boot. Press <Enter> on each item sequentially to select the device.

- Boot Option #1 – Boot Option #9

►Add New Boot Option

Use this feature to add a new boot option to the boot priority features for system boot.

Note: This submenu is available when any storage device is detected by the BIOS.

Add boot option

Use this feature to specify the name for the new boot option.

Path for boot option

Use this feature to enter the path for the new boot option in the format fsx:\path\filename.efi.

Boot option File Path

Use this feature to specify the file path for the new boot option.

Create

After setting the name and the file path for the boot option, press <Enter> to create the new boot option in the boot priority list.

►Delete Boot Option

Use this feature to select a boot device to delete from the boot priority list.

Delete Boot Option

Use this feature to remove an EFI boot option from the boot priority list.

►UEFI NETWORK Drive BBS Priorities

Use this feature to set the system boot order of detected devices.

►UEFI Application Boot Priorities

Use this feature to set the system boot order of detected devices.

►UEFI USB Key Drive BBS Priorities

Use this feature to set the system boot order of detected devices.

8.8 Save & Exit

Select Save & Exit from the BIOS Setup screen to configure the settings below.

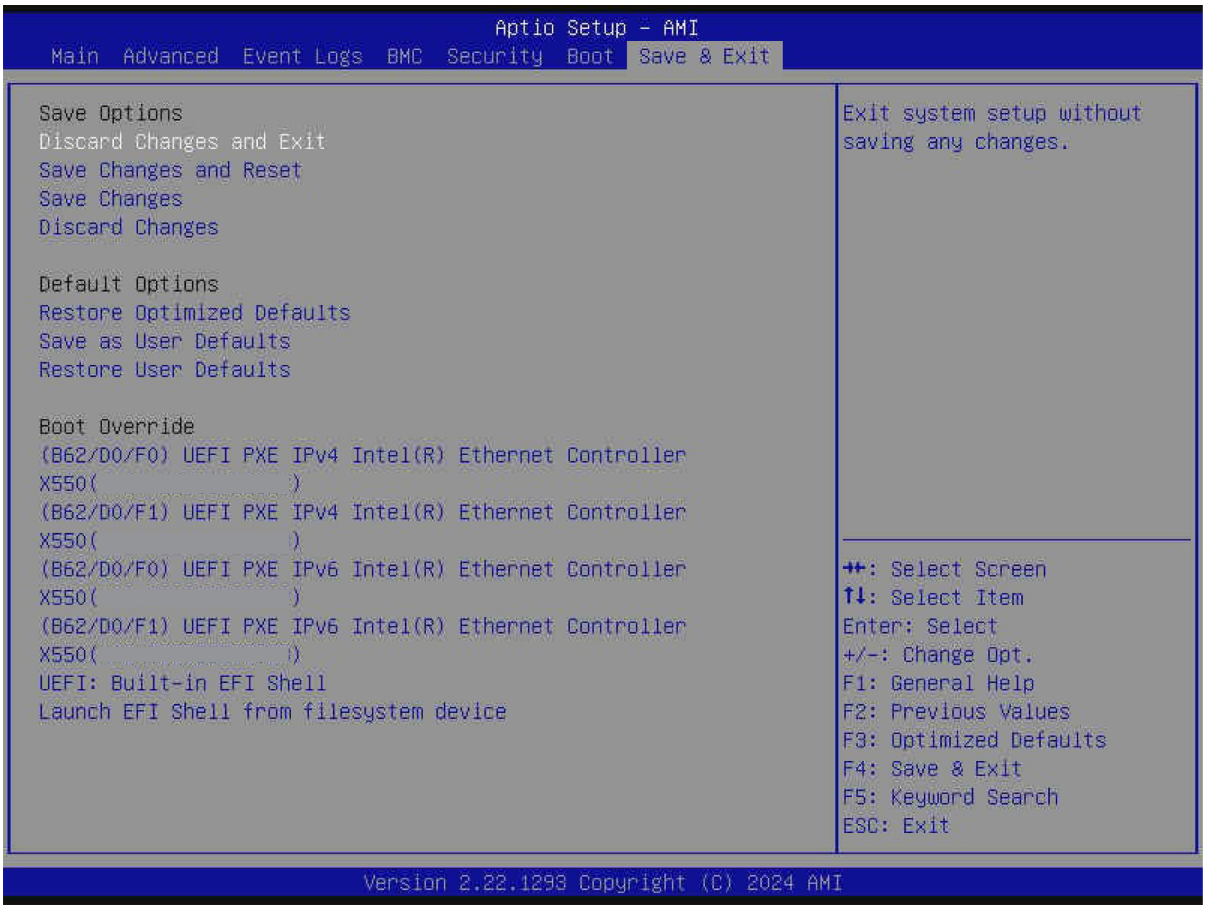


Figure 8-7. Save & Exit Screen

Save Options

Discard Changes and Exit

Use this feature to exit from the BIOS Setup utility without making any permanent changes to the system configuration and reboot the computer.

Save Changes and Reset

On completing the system configuration changes, use this feature to exit the BIOS Setup utility and reboot the computer for the new system configuration parameters to take effect.

Save Changes

On completing the system configuration changes, use this feature to save all changes made. This will not reset (reboot) the system.

Discard Changes

Select this feature and press <Enter> to discard all changes made and return to the BIOS Setup utility.

Default Options

Restore Optimized Defaults

Select this feature and press <Enter> to load manufacturer optimized default settings, which are intended for maximum system performance but not for maximum stability.

Note: Reboot the system for the changes to take effect to ensure that the system has the optimized default settings.

Save as User Defaults

Select this feature and press <Enter> to save all changes as the default values specified to the BIOS Setup utility for future use.

Restore User Defaults

Select this feature and press <Enter> to retrieve user-defined default settings that have been saved previously.

Boot Override

Note: Use this section to override the Boot priorities sequence in the Boot menu, and immediately boot the system with a device specified here instead of the one specified in the boot list. This is a one-time boot override.

Appendix A:

BIOS Codes

For information about BIOS codes for the SYS-512B-WR server, refer to the following content.

Additional BIOS POST Codes

The AMI BIOS supplies additional checkpoint codes, which are documented online at https://www.supermicro.com/support/manuals ("AMI BIOS POST Codes User's Guide").

For information on AMI updates, refer to https://www.ami.com/products.

Appendix B:

Standardized Warning Statements for AC Systems

The following statements are industry standard warnings, provided to warn the user of situations which have the potential for bodily injury. Should you have questions or experience difficulty, contact Supermicro's Technical Support department for assistance. Only certified technicians should attempt to install or configure components.

Read this section in its entirety before installing or configuring components in the Supermicro SYS-512B-WR server.

These warnings may also be found on our website at the following page:

https://www.supermicro.com/about/policies/safety_information.cfm

Warning Definition

Warning! This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be familiar with standard practices for preventing accidents.

تحذير! هذا الرمز التحذيري يعني خطر. إنك في موقف قد يتسبب في إصابة جسدية. قبل العمل على أي أجهزة يجب أن تكون على دراية بالممارسات القياسية للحيلولة دون وقوع حوادث.

警告！此警告符号代表危险，表示正处于可能遭受严重身体伤害的工作环境。在使用任何设备开始工作之前，务必熟悉防止事故发生的标准工作规范。

警告！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。操作任何設備之前，請熟悉標準做法以預防事故發生。

Advarsel! Dette advarselssymbol betyder fare. Du er i en situation, der kan føre til personskader. Før du arbejder på noget udstyr, skal du være bekendt med standardpraksis for at forebygge ulykker.

Waarschuwing! Dit waarschuwingssymbool betekent gevaar. U bevindt zich in een situatie die lichamelijk letsel zou kunnen veroorzaken. Voordat u aan enige apparatuur gaat werken, moet u vertrouwd zijn met standaard praktijken voor het voorkomen van ongevallen.

Varoitus! Tämä varoitussymboli tarkoittaa vaaraa. Olet tilanteessa, joka voi aiheuttaa ruumiinvammoja. Ennen kuin ryhdyt työskentelemään laitteiden parissa, tutustu onnettomuuksien ehkäisemistä koskeviin vakiintuneisiin käytäntöihin.

Attention! 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, familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents.

Warnung! Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu Körperverletzungen führen kann. Bevor Sie an Geräten arbeiten, machen Sie sich mit den üblichen Verfahren zur Unfallverhütung vertraut.

אזהרה! סמל אזהרה זה מסמן סכנה. אתה נמצא במצב שעלול לגרום לפגיעה גופנית. לפני שתתחיל לעבוד על כל ציוד, הכר את הנהלים הסטנדרטיים למניעת תאונות.

चेतावनी! यह चेतावनी चिह्न खतरे का प्रतीक है। आप ऐसी स्थिति में हैं जिससे शारीरिक चोट लग सकती है। किसी भी उपकरण पर काम करने से पहले, दुर्घटनाओं को रोकने के लिए मानक प्रथाओं से परिचित हो लें।

警告！ この警告記号は危険を意味します。人身事故につながる可能性のある状況にあります。機器で作業を行う前に、標準的な事故防止策に精通してください。

경고! 이 경고 기호는 위험이 있음을 알려 줍니다. 신체 상해를 초래할 수 있는 상황입니다. 장비에서 작업하기 전에 사고 예방을 위한 표준 수칙을 숙지하십시오.

Advarsel! Dette advarselsymbolet betyr fare. Du er i en situasjon som kan forårsake kroppsskade. Før du arbeider på noe utstyr, må du gjøre deg kjent med standardrutiner for å forhindre ulykker.

¡Advertencia! Este símbolo de advertencia significa peligro. Se encuentra en una situación que podría provocar lesiones corporales. Antes de trabajar con cualquier equipo, familiarícese con las prácticas estándar para prevenir accidentes.

Varning! Denna varningssymbol betyder fara. Du befinner dig i en situation som kan orsaka personskada. Innan du arbetar på någon utrustning måste du bekanta dig med standardrutiner för att förhindra olyckor.

Electrical Warning Definition

Warning! This warning symbol indicates high voltage may be encountered when performing a procedure. Before you work on any equipment, be aware of the hazards involved with electrical circuitry.

تحذير! يشير رمز التحذير هذا إلى احتمالية مواجهة جهد كهربائي عالٍ عند إجراء عملية ما. قبل البدء في العمل على أي أجهزة كن على دراية بالمخاطر المرتبطة بالدوائر الكهربائية.

警告！此警告符号表示作业过程中可能会遇到高电压。操作任何设备之前，请务必了解电路的危险。

警告！此警告符號表示執行程序時可能會遇到高電壓。操作任何設備之前，請瞭解與電路相關的危害。

Advarsel! Dette advarselssymbol indikerer, at der kan opstå høj spænding under udførelsen af en procedure. Før du arbejder på noget udstyr, skal du være opmærksom på de farer, der er forbundet med elektriske kredsløb.

Waarschuwing! Dit waarschuwingssymbool geeft aan dat men hoge spanning tegen kan komen bij het uitvoeren van een procedure. Voordat u aan enige apparatuur gaat werken, moet u zich bewust zijn van de gevaren van elektrische schakelsystemen.

Varoitus! Tämä varoitussymboli osoittaa, että toimenpiteen suorittamisen aikana voi esiintyä korkeaa jännitettä. Ennen kuin ryhdyt työskentelemään laitteiden parissa, ota huomioon sähköpiireihin liittyvät vaarat.

Attention! Ce symbole d'avertissement indique un risque d’exposition à une tension élevée lors de l'exécution d'une procédure. Avant de travailler sur un équipement, prenez connaissance des dangers liés aux circuits électriques.

Warnung! Dieses Warnsymbol weist darauf hin, dass bei der Durchführung eines Vorgangs Hochspannung auftreten kann. Bevor Sie an Geräten arbeiten, machen Sie sich mit den Gefahren elektrischer Schaltungen vertraut.

אזהרה! סמל אזהרה זה מציין כי ייתכן שתיתקל במתח גבוה בעת ביצוע הליך. לפני עבודה על ציוד כלשהו, עליך להיות מודע לסכנות הכרוכות במעגלים חשמליים.

चेतावनी! यह चेतावनी चिह्न इंगित करता है कि प्रक्रिया को निष्पादित करते समय उच्च वोल्टेज का सामना करना पड़ सकता है। किसी भी उपकरण पर काम करने से पहले, विद्युत सर्किट्री से जुड़े खतरों के प्रति सचेत रहें।

警告！ この警告記号は、手順を実行する際に高電圧が発生する可能性があることを示しています。機器で作業を行う前に、電気回路に関連する危険に注意してください。

경고! 이 경고 기호는 절차 수행 중 고전압에 노출될 수 있음을 알려 줍니다. 장비에서 작업하기 전에 전기 회로와 관련된 위험 요소를 충분히 인지하십시오.

Advarsel! Dette varselsymbolet indikerer at det kan oppstå høy spenning når en prosedyre utføres. Før du arbeider på utstyr, må du være oppmerksom på farene forbundet med elektriske kretser.

¡Advertencia! Este símbolo de advertencia indica que puede haber alto voltaje al realizar un procedimiento. Antes de trabajar con cualquier equipo, tenga en cuenta los peligros que conllevan los circuitos eléctricos.

Varning! Denna varningssymbol indikerar att hög spänning kan förekomma när en procedur utförs. Innan du arbetar med någon utrustning ska du vara medveten om de faror som är förknippade med elektriska kretsar.

Installation Instructions

Warning! Read the installation instructions before connecting the system to the power source.

تحذير! اقرأ تعليمات التثبيت قبل توصيل النظام بمصدر الطاقة.

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。

Advarsel! Læs monteringsvejledningen, før systemet sluttes til strømforsyningen.

Waarschuwing! Raadpleeg de installatie-instructies voordat u het systeem op de voedingsbron aansluit.

Varoitus! Lue asennusohjeet ennen järjestelmän liittämistä virtalähteeseen.

Attention! Avant de brancher le système sur la source d'alimentation, consulter les directives d'installation.

Warnung! Vor dem Anschließen des Systems an die Stromquelle die Installationsanweisungen lesen.

אזהרה! יש לקרוא את הוראות ההתקנה לפני חיבור המערכת למקור המתח.

चेतावनी! सिस्टम को बिजली के स्रोत से जोड़ने से पहले स्थापना निर्देश पढ़ें।

警告！ 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。

경고! 시스템을 전원에 연결하기 전에 설치 안내를 읽어주십시오.

Advarsel! Les installasjonsinstruksjonene før du kobler systemet til strømkilden.

¡Advertencia! Lea las instrucciones de instalación antes de conectar el sistema a la red de alimentación.

Varning! Läs installationsanvisningarna innan du ansluter systemet till strömkällan.

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 VAC, 20 A.

تحذير! يعتمد هذا المنتج على التركيبات الكهربائية في المبنى للحماية من حدوث قصر دائرة (تيار زائد). تأكد من أن تصنيف جهاز الحماية لا يتجاوز: 250 فولت تيار متردد, 20 أمبير.

警告！此产品由建筑物的供电系统提供短路(过载)保护，并确保额定电压/电流不大于 250 VAC/20 A。

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 250 VAC、20 A。

Advarsel! Dette produkt forudsætter, at bygningens elinstallation sørger for kortslutningsbeskyttelse (overstrøm). Sørg for, at beskyttelsesanordningen ikke er klassificeret til mere end: 250 VAC, 20 A.

Waarschuwing! Dit product vertrouwt op de installatie van het gebouw voor kortsluitbeveiliging (overstroombeveiliging). Zorg ervoor dat de beveiligingsvoorziening is gespecificeerd voor niet meer dan: 250 VAC, 20 A.

Varoitus! Tämä tuote on riippuvainen rakennuksen asennuksesta oikosulku- (ylivirta-) suojauksen osalta. Varmista, että suojalaitteen nimellisarvot eivät ylitä seuraavia arvoja: 250 VAC, 20 A.

Attention! Ce produit dépend de l'installation du bâtiment pour la protection contre les courts-circuits (surintensité). Assurez-vous que le dispositif de protection n'est pas supérieur à : 250 VAC, 20 A.

Warnung! Dieses Produkt ist auf den Kurzschluss- bzw. Überstromschutz der Gebäudeinstallation angewiesen. Stellen Sie sicher, dass die Schutzvorrichtung für maximal 250 VAC, 20 A ausgelegt ist.

אזהרה! מוצר זה מסתמך על תשתית החשמל של המבנה להגנה מפני קצר חשמלי (זרם יתר). ודא שדירוג התקן ההגנה אינו עולה על: 250 VAC, 20 A.

चेतावनी! यह उत्पाद शॉर्ट-सर्किट (ओवरकरंट) सुरक्षा के लिए भवन की स्थापना पर निर्भर करता है। सुनिश्चित करें कि सुरक्षात्मक उपकरण की रेटिंग निम्नलिखित से अधिक न हो: 250 VAC, 20 A.

警告！ 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。保護装置の定格が次の値以下であることを確認ください：250 VAC、20 A。

경고! 이 제품은 단락(과전류) 방지에 대해서 전적으로 건물의 관련 설비에 의존합니다. 보호 장치의 정격이 다음 값을 초과하지 않도록 하십시오: 250 VAC(볼트), 20 A(암페어).

Advarsel! Dette produktet er avhengig av bygningens installasjon for kortslutningsbeskyttelse (overstrømsbeskyttelse). Sørg for at beskyttelsesanordningen ikke er klassifisert som høyere enn: 250 V vekselstrøm, 20 A.

¡Advertencia! Este producto depende de la instalación del edificio para protección contra cortocircuitos (sobrecorriente). Asegúrese de que el dispositivo de protección tenga una clasificación no mayor a: 250 VAC, 20 A.

Varning! Denna produkt är beroende av byggnadens installation för kortslutningsskydd (överströmsskydd). Se till att skyddsanordningen inte är märkt för mer än: 250 VAC, 20 A.

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-swappable components).

تحذير! يجب فصل النظام عن جميع مصادر الطاقة، وإزالة سلك الطاقة من وحدة/وحدات إمداد الطاقة قبل الدخول إلى الجزء الداخلي من الهيكل لتركيب أو فك مكونات النظام (باستثناء المكونات القابلة للاستبدال السريع).

警告！在打开机箱并安装或移除内部器件(热插拔器件除外)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(熱插拔元件除外)前，必須將系統完全斷電，並移除電源線。

Advarsel! Systemet skal afbrydes fra alle strømkilder, og strømkablet skal fjernes fra strømforsyningsmodulerne, før der gives adgang til kabinettet for at montere eller fjerne systemkomponenter (undtagen hot-swap-komponenter).

Waarschuwing! Het systeem moet worden losgekoppeld van alle voedingen en het stroomsnoer moet uit de voedingsmodule(s) worden gehaald voorafgaand aan toegang tot de binnenkant van het chassis voor installeren of verwijderen van systeemcomponenten (behalve hot-swap componenten).

Varoitus! Järjestelmä on irrotettava kaikista virtalähteistä ja virtajohto on irrotettava virtalähdemoduulista (moduuleista) ennen kotelon sisälle pääsyä järjestelmän komponenttien asentamista tai poistamista varten (lukuun ottamatta hot-swap-komponentteja).

Attention! Le système doit être déconnecté de toutes les sources d'alimentation et le cordon d'alimentation doit être débranché du/des modules d'alimentation avant d'accéder à l'intérieur du châssis pour installer ou retirer des composants du système (à l'exception des composants remplaçables à chaud).

Warnung! Das System muss von allen Stromquellen getrennt und das Netzkabel von den Netzteilmodulen entfernt werden, bevor auf den Innenraum des Chassis zugegriffen wird, um Systemkomponenten zu installieren oder zu entfernen (ausgenommen Hot- Swap-Komponenten).

אזהרה! יש לנתק את המערכת מכל מקורות הכוח ולהסיר את כבל החשמל ממודול/י אספקת החשמל לפני הגישה לחלק הפנימי של המארז לצורך התקנה או הסרה של רכיבי המערכת (למעט רכיבים הניתנים להחלפה חמה).

चेतावनी! सिस्टम के घटकों को इंस्टॉल करने या निकालने (हॉट-स्वैप घटकों को छोड़कर) के लिए चेसिस के आंतरिक भाग तक पहुँचने से पहले, सिस्टम को बिजली के सभी स्रोतों से डिस्कनेक्ट किया जाना चाहिए और बिजली की आपूर्ति मॉड्यूल से पावर कॉर्ड को निकाल दिया जाना चाहिए।

警告！ システムコンポーネント(ホットスワップコンポーネントを除く) の取り付けまたは取り外しを行うために、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。

경고! (핫스왑 구성품을 제외하고) 시스템에 부품들을 장착하거나 제거하기 위해서는 섀시 내부에 접근하기 전에 반드시 전원 공급장치로부터 연결되어있는 모든 전원과 전기코드를 분리해주어야 합니다.

Advarsel! Systemet må kobles fra alle strømkilder, og strømledningen må fjernes fra strømforsyningsmodulen (e) før man går inn i kabinettet for å installere eller fjerne systemkomponenter (unntatt komponenter som kan byttes ut under drift).

¡Advertencia! El sistema debe estar desconectado de todas las fuentes de energía y el cable de alimentación debe retirarse de los módulos de fuente de alimentación antes de acceder al interior del chasis para instalar o quitar componentes del sistema (excepto los componentes reemplazables en caliente).

Varning! Systemet måste vara frånkopplat från alla strömkällor och strömsladden måste vara borttagen från strömförsörjningsmodulerna innan du öppnar chassit för att installera eller ta bort systemkomponenter (med undantag för hot-swap-komponenter).

Equipment Installation

Warning! Only authorized personnel and qualified service persons should be allowed to install, replace, or service this equipment.

تحذير! لا يُسمح إلا للعاملين المعتمدين وفنيي الخدمة المؤهلين بتركيب هذا الجهاز أو استبداله أو صيانته.

警告！ 仅限经过授权培训且拥有相关资质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。

Advarsel! Dette udstyr må kun installeres, udskiftes eller serviceres af autoriseret personale og kvalificerede servicemedarbejdere.

Waarschuwing! Alleen geautoriseerd personeel en gekwalificeerd onderhoudspersoneel mag deze apparatuur installeren, vervangen of onderhouden.

Varoitus! Vain valtuutetut henkilöt ja pätevät huoltoteknikot saavat asentaa, vaihtaa tai huoltaa tätä laitetta.

Attention! Seul le personnel autorisé et le personnel de maintenance qualifié doivent être autorisés à installer, remplacer ou entretenir cet équipement.

Warnung! Nur autorisiertes Personal und qualifizierte Servicetechniker dürfen dieses Gerät installieren, austauschen oder warten.

אזהרה! רק אנשי צוות מורשים ואנשי שירות מוסמכים רשאים להתקין, להחליף או לטפל בציוד זה.

चेतावनी! केवल अधिकृत कर्मियों और योग्य सेवा व्यक्तियों को ही इस उपकरण को स्थापित करने, बदलने या सेवा देने की अनुमति दी जानी चाहिए।

警告！ トレーニングを受け認定された人だけがこの機器の設置、交換、またはサービスを許可されています。

경고!승인된 직원과 자격을 갖춘 서비스 담당자만이 이 장비를 설치, 교체 또는 서비스할 수 있습니다.

Advarsel! Kun autorisert personell og kvalifiserte servicefolk skal ha tillatelse til å installere, bytte ut eller utføre service på dette utstyret.

¡Advertencia! Sólo el personal autorizado y el personal de servicio calificado pueden instalar, reemplazar o dar servicio a este equipo.

Varning! Endast auktoriserad personal och kvalificerade servicetekniker får installera, byta ut eller utföra service på denna utrustning.

Rack Stability Hazard

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

تحذير! خطر عدم الاستقرار. قد ينقلب الحامل، مما قد يتسبب في إصابات شخصية خطيرة. قبل تمديد الحامل إلى موضع التركيب اقرأ إرشادات التركيب. لا تضع أي حمولة على الأجهزة المركبة على حوامل منزلقة في وضع التركيب. لا تترك الأجهزة المركبة على حوامل منزلقة في وضع التركيب.

警告！ 稳定性危险。机架可能会翻倒，造成严重的人身伤害。在将机架延伸到安装位置之前，请阅读安装说明。请勿在安装位置对滑轨安装的设备施加任何负载。请勿将滑轨安装的设备留在安装位置。

警告！ 穩定性危險。機架可能會翻倒，造成嚴重的人身傷害。將機架延伸至安裝位置前，請先閱讀安裝說明。請勿在安裝位置的滑軌安裝設備上放置任何負載。請勿將滑軌安裝設備留在安裝位置。

Advarsel! Stabilitetsfare. Udstyrsskabet kan vælte, hvilket kan føre til alvorlige personskader. Læs monteringsvejledningen, før udstyrsskabet trækkes ud til monteringsstedet. Anbring ikke nogen belastning på udstyr monteret på skinner, når det er på monteringsstedet. Efterlad ikke udstyr monteret på skinner på monteringsstedet.

Waarschuwing! Gevaar voor instabiliteit. Het rack kan kantelen en ernstig persoonlijk letsel veroorzaken. Lees de installatie- instructies voordat u het rack uitschuift naar de installatiepositie. Plaats geen last op de op de glijrail gemonteerde apparatuur in de installatiepositie. Laat de op de glijrail gemonteerde apparatuur niet in de installatiepositie staan.

Varoitus! Vakausvaara. Teline voi kaatua ja aiheuttaa vakavia henkilövahinkoja. Ennen telineen asettamista asennusasentoon, lue asennusohjeet. Älä aseta mitään kuormitusta liukukiskoon asennettuihin laitteisiin asennusasennossa. Älä jätä liukukiskoon asennettuja laitteita asennusasentoon.

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

Warnung! Gefahr der Instabilität. Das Rack kann umkippen und schwere Verletzungen verursachen. Lesen Sie vor dem Ausziehen des Racks in die Installationsposition die Installationsanweisungen. Belasten Sie in der Installationsposition keine auf Gleitschienen montierten Geräte. Lassen Sie auf Gleitschienen montierte Geräte nicht unbeaufsichtigt in der Installationsposition.

אזהרה! סכנת יציבות. הארון עלול להתהפך ולגרום לפציעה גופנית חמורה. לפני הארכת הארון למצב התקנה, יש לקרוא את הוראות ההתקנה. אין להניח עומס כלשהו על הציוד המותקן על מסילות ההחלקה כשהוא במצב התקנה. אין להשאיר את הציוד המותקן על מסילות ההחלקה במצב התקנה.

चेतावनी! स्थिरता का खतरा। रैक पलट सकता है जिससे गंभीर व्यक्तिगत चोट लग सकती है। रैक को इंस्टालेशन स्थिति तक बढ़ाने से पहले, स्थापना निर्देश पढ़ें। स्थापना स्थिति में स्लाइड-रेल पर लगे उपकरणों पर कोई भार न डालें। स्लाइड-रेल पर लगे उपकरणों को स्थापना स्थिति में न छोड़ें।

警告！ 安定性に危険があります。ラックが転倒して、重大な人身事故を引き起こす可能性があります。ラックを設置位置まで伸ばす前に、設置手順をお読みください。設置位置にあるスライドレールに取り付けられた機器に負荷をかけないでください。スライドレールに取り付けられた機器を設置位置に放置しないでください。

경고!안정성 위험. 랙이 넘어져 심각한 개인 부상을 입을 수 있습니다. 랙을 설치 위치까지 확장하기 전에 설치 지침을 읽으십시오. 설치 위치에서 슬라이드 레일 장착 장비에 하중을 가하지 마십시오. 슬라이드 레일 장착 장비를 설치 위치에 두지 마십시오.

Advarsel! Stabilitetsfare. Stativet kan velte og forårsake alvorlig personskade. Les installasjonsanvisningen før du forlenger stativet till installasjonsposisjonen. Ikke belast utstyret som er montert på glideskinnen i installasjonsposisjon. Ikke la utstyret som er montert på glideskinnen stå i installasjonsposisjon.

¡Advertencia! Peligro de inestabilidad. El rack podría volcarse y causar lesiones personales graves. Antes de extender el rack a la posición de instalación, lea las instrucciones de instalación. No coloque ninguna carga sobre el equipo montado sobre rieles deslizantes en la posición de instalación. No deje el equipo montado sobre rieles deslizantes en la posición de instalación.

Varning! Stabilitetsrisk. Racket kan välta och orsaka allvarliga personskador. Läs monteringsanvisningarna innan du skjuter ut racket till monteringspositionen. Belasta ej utrustning som är monterad på glidskena i installationsläget. Lämna ej utrustning som är monterad på glidskena i monteringsläget.

Rack Equipment Warning

Warning! Rack-mounted equipment should not be used as a shelf or work space.

تحذير! لا ينبغي استخدام المعدات المثبتة على حوامل كرف أو مساحة عمل.

警告！机架式设备不应用作货架或工作空间。

警告！不得將機架式設備當作置物架或工作空間使用。

Advarsel! Udstyr, der er monteret i udstyrsskabe, må ikke bruges som hylder eller arbejdsflader.

Waarschuwing! In rack gemonteerde apparatuur moet niet worden gebruikt als plank of werkruimte.

Varoitus! Telineasennettavia laitteita ei saa käyttää hyllyinä tai työtasoina.

Attention! Un équipement installé en rack ne doit pas être utilisé comme une étagère ou un espace de travail.

Warnung! In Racks montierte Geräte dürfen nicht als Ablagefläche oder Arbeitsfläche verwendet werden.

אזהרה! אין להשתמש בציוד המותקן במסד (Rack) כמדף או כמשטח עבודה.

चेतावनी! रैक-माउंटेड उपकरण का उपयोग शेल्फ या कार्यक्षेत्र के रूप में नहीं किया जाना चाहिए।

警告！ ラックマウント機器を棚や作業スペースとして使用しないでください。

경고! 랙 장착 장비를 선반 또는 작업대처럼 사용하지 마십시오.

Advarsel! Rackmontert utstyr skal ikke brukes som hylle eller arbeidsområde.

¡Advertencia! Los equipos montados en rack no deben utilizarse como estante o espacio de trabajo.

Varning! Rackmonterad utrustning ska inte användas som hylla eller arbetsyta.

Restricted Access Location

Warning! This unit is intended for installation in restricted access areas. A restricted access area can be accessed only by an instructed person or a skilled person.

تحذير! هذه الوحدة مخصصة للتركيب في المناطق الممنوع الدخول إليها. يقتصر الدخول إلى منطقة منع الدخول إلا للأشخاص المدربين أو المهرة.

警告！此装置应安装在限制进出的场所，而此类场所仅限经过相关训练或技术熟练的人员进出。

警告！ 此部件應安裝在限制進出區域。只有受過指導的人員或專業人員才可進出限制進出區域。

Advarsel! Denne enhed er beregnet til montering i områder med begrænset adgang. Et område med begrænset adgang må kun tilgås af en instrueret person eller en fagkyndig person.

Waarschuwing! Deze eenheid is bedoeld voor installatie in gebieden met beperkte toegang. Er kan alleen toegang worden verkregen tot een gebied met beperkte toegang door een geïnstrueerde persoon of een ervaren persoon.

Varoitus! Tämä laite on tarkoitettu asennettavaksi rajoitetun pääsyn alueille. Rajoitetun pääsyn alueelle pääsee vain koulutettu tai ammattitaitoinen henkilö.

Attention! Cet appareil est destiné à être installé dans des zones à accès restreint. Une zone à accès restreint n'est accessible qu'à une personne formée ou qualifiée.

Warnung! Diese Einheit ist zur Installation in Bereichen mit beschränktem Zutritt vorgesehen. Ein Bereich mit beschränktem Zutritt darf nur von unterwiesenen oder fachkundigen Personen betreten werden.

אזהרה! יחידה זו מיועדת להתקנה באזורים עם גישה מוגבלת. ניתן לגשת לאזור עם גישה מוגבלת רק על ידי אדם שהוכשר לכך או אדם מיומן.

चेतावनी! यह इकाई प्रतिबंधित पहुँच वाले क्षेत्रों में स्थापना के लिए ही है। प्रतिबंधित पहुँच वाले क्षेत्र में केवल एक निर्देशित व्यक्ति या कुशल व्यक्ति द्वारा ही पहुँचा जा सकता है।

警告！ このユニットはアクセス制限区域に設置することを想定しています。アクセス制限区域は、トレーニングを受けた人または熟練者だけが出入り可能です。

경고!본 장치는 접근이 제한된 구역에 설치하도록 되어있습니다. 교육을 받은 사람 또는 숙련된 사람만 접근 제한 구역에 들어갈 수 있습니다.

Advarsel! Denne enheten er beregnet for installasjon i områder med begrenset tilgang. Et område med begrenset tilgang kan kun nås av en person som har fått instruksjoner eller en fagperson.

¡Advertencia! Esta unidad está diseñada para su instalación en áreas de acceso restringido. A un área de acceso restringido solo puede acceder una persona instruida o una persona capacitada.

Varning! Denna enhet är avsedd för installation i områden med begränsad åtkomst. Ett område med begränsad åtkomst får endast beträdas av en instruerad eller kvalificerad person.

Battery Handling

Warning! There is risk of explosion if the battery is replaced by an incorrect type. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

تحذير! يوجد خطر حدوث انفجار إذا تم استبدال البطارية بنوع غير صحيح. استبدل البطارية بنفس النوع أو نوع مكافئ موصى به من قبل الشركة المصنعة فقط. يجب التخلص من البطاريات المستخدمة وفقًا لإرشادات الجهة المصنعة.

警告！ 如果更换的电池类型不正确，有爆炸危险。更换电池时，请使用制造商推荐的相同或同等型号的电池。请按制造商的说明处理废旧电池。

警告！ 如果更換的電池類型不正確。請使用製造商建議之相同或功能相當的電池更換原有電池。請按照製造商的說明指示處理廢棄舊電池。

Advarsel! Der er risiko for eksplosion, hvis batteriet skiftes med et batteri af den forkerte type. Batteriet må kun skiftes med et batteri af samme eller tilsvarende type, der anbefales af producenten. Opbrugte batterier skal bortskaffes i henhold til vejledningerne fra producenten.

Waarschuwing! Er bestaat een explosiegevaar als de batterij wordt vervangen door een onjuist type. Vervang de batterij alleen door hetzelfde type of een soortgelijk type aanbevolen door de fabrikant. Verwijder gebruikte batterijen overeenkomstig de instructies van de fabrikant.

Varoitus! Väärän tyyppisen akun käyttö voi aiheuttaa räjähdysvaaran. Vaihda akku vain valmistajan suosittelemaan samaan tai vastaavaan tyyppiseen akkuun. Hävitä käytetyt paristot valmistajan ohjeiden mukaisesti.

Attention! Il y a un risque d'explosion si la batterie est remplacée par une d'un type incorrect. Remplacez la batterie uniquement par une d'un type identique ou équivalent recommandé par le fabricant. Éliminez les batteries usagées conformément aux instructions du fabricant.

Warnung! Es besteht Explosionsgefahr, wenn die Batterie durch einen falschen Typ ersetzt wird. Ersetzen Sie die Batterie ausschließlich durch denselben oder einen vom Hersteller empfohlenen gleichwertigen Typ. Entsorgen Sie gebrauchte Batterien gemäß den Anweisungen des Herstellers.

אזהרה! קיימת סכנת פיצוץ אם הסוללה תוחלף בסוללה מסוג שגוי. החלף את הסוללה רק בסוללה מאותו סוג או בסוללה מקבילה המומלצת על ידי היצרן. השלך סוללות משומשות בהתאם להוראות היצרן.

चेतावनी! यदि बैटरी को गलत प्रकार से बदला जाता है तो विस्फोट का जोखिम है। बैटरी को केवल निर्माता द्वारा अनुशंसित समान या समकक्ष प्रकार से ही बदलें। इस्तेमाल की गई बैटरियों का निपटान निर्माता के निर्देशों के अनुसार करें।

警告！ 電池を間違ったタイプに交換すると爆発する危険があります。交換する電池はメーカーが推奨するタイプ、または同等のものを使用してください。使用済み電池は、メーカーの指示に従って廃棄してください。

경고!배터리를 잘못된 종류로 교체하면 폭발의 위험이 있습니다. 기존 배터리와 동일하거나 제조사에서 권장하는 동등한 종류의 배터리로만 교체해야 합니다. 제조사의 안내에 따라 사용된 배터리를 처리하여 주십시오.

Advarsel! Det er fare for eksplosjon hvis batteriet byttes ut med et av feil type. Batterier skal kun byttes ut med et av lik eller tilsvarende type, som anbefalt av produsenten. Kast brukte batterier i henhold til produsentens instruksjoner.

¡Advertencia! Existe riesgo de explosión si se sustituye la batería por una de tipo incorrecto. Reemplace la batería únicamente con el mismo tipo o uno equivalente recomendado por el fabricante. Deseche las baterías usadas de acuerdo con las instrucciones del fabricante.

Varning! Det finns risk för explosion om batteriet byts ut mot en felaktig typ. Byt endast ut batteriet mot ett batteri av samma eller likvärdig typ som rekommenderas av tillverkaren. Kassera förbrukade batterier i enlighet med tillverkarens anvisningar.

Redundant Power Supplies

Warning! This unit might have more than one power supply connection. All connections must be removed to de-energize the unit.

تحذير! قد تحتوي هذه الوحدة على أكثر من وصلة لإمداد الطاقة. يجب فصل جميع التوصيلات لفصل الطاقة عن الوحدة.

警告！本设备可能有多个电源连接。必须切断所有连接，才能使设备断电。

警告！此裝置連接的電源可能不只一個。必須切斷所有電源才能停止對該裝置的供電。

Advarsel! Denne enhed kan have mere end én strømforsyningsforbindelse. Alle forbindelser skal fjernes for at deaktivere spændingen.

Waarschuwing! Deze eenheid kan meer dan één stroomtoevoeraansluiting bevatten. Alle aansluitingen dienen verwijderd te worden om het apparaat stroomloos te maken.

Varoitus! Laitteessa voi olla useampi kuin yksi virtalähteen liitäntä. Laitteen virta on katkaistava irrottamalla kaikki liitännät.

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.

Warnung! Diese Einheit kann über mehr als eine Stromversorgungsanschluss verfügen. Um sicherzustellen, dass die Einheit spannungsfrei ist, müssen alle Verbindungen entfernt werden.

אזהרה! יחידה זו עשויה לכלול יותר מחיבור אחד לספק כוח. יש לנתק את כל החיבורים כדי להפסיק את הזנת המתח ליחידה.

चेतावनी! इस इकाई में एक से अधिक पावर सप्लाई कनेक्शन हो सकते हैं। इकाई को ऊर्जा-मुक्त (डी-एनर्जाइज) करने के लिए सभी कनेक्शन हटा दिए जाने चाहिए।

警告！ 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。

경고!이 장치에는 한 개 이상의 전원 공급 단자가 연결되어 있을 수 있습니다. 이 장치에 전원을 차단하기 위해서는 모든 연결 단자를 제거해야만 합니다.

Advarsel! Denne enheten kan ha mer enn én strømforsyningstilkobling. Alle tilkoblinger må fjernes for å gjøre enheten strømløs.

¡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.

Varning! Denna enhet kan ha mer än en strömförsörjningsanslutning. Alla anslutningar måste tas bort för att enheten ska bli strömlös.

Backplane Voltage

Warning! Hazardous voltage or energy is present on the backplane when the system is operating. Use caution when servicing. Read the instructions before servicing.

تحذير! يوجد جهد أو طاقة خطرة على اللوحة الخلفية أثناء تشغيل النظام. توخ الحذر عند إجراء الصيانة. اقرأ التعليمات قبل إجراء الصيانة.

警告！ 当系统运行时，背板上存在危险电压或能量，进行维修时务必小心。维修前请阅读使用说明。

警告！ 系統運作時，背板上存在危險電壓或能量。維修時請小心。維修前請閱讀說明書。

Advarsel! Når systemet er i drift, er farlig spænding eller energi til stede på bagpladen. Vær forsigtig ved servicering. Læs instruktionerne før service.

Waarschuwing! Gevaarlijke spanning of energie is aanwezig op de achterzijde wanneer het systeem in bedrijf is. Wees voorzichtig bij service. Lees de instructies voorafgaand aan service.

Varoitus! Järjestelmän ollessa käynnissä takapaneelissa on vaarallista jännitettä tai energiaa. Ole varovainen huoltotöiden aikana. Lue ohjeet ennen huoltoa.

Attention! Une tension ou de l’énergie dangereuse est présente sur le panneau arrière lorsque le système est en fonctionnement. Soyez prudent lors de l'entretien. Lisez les instructions avant d'effectuer un entretien.

Warnung! Bei eingeschaltetem System liegt an der Backplane gefährliche Spannung oder Energie an. Seien Sie bei Wartungsarbeiten vorsichtig. Lesen Sie vor der Wartung die Anweisungen.

אזהרה! מתח או אנרגיה מסוכנים קיימים בלוח האחורי כאשר המערכת פועלת. יש לנקוט בזהירות בעת ביצוע תחזוקה. קרא את ההוראות לפני ביצוע תחזוקה.

चेतावनी! जब सिस्टम चालू होता है, तो बैकप्लेन पर खतरनाक वोल्टेज या ऊर्जा मौजूद होती है। सर्विसिंग करते समय सावधानी बरतें। सर्विसिंग से पहले निर्देश पढ़ें।

警告！ システムの稼働中は、危険な電圧または電流がバックプレーン上にかかっています。修理を行う際には注意してください。修理を行う前に取扱説明書をお読みください。

경고!시스템이 동작 중일 때 후면판(Backplane)에는 위험한 전압이나 에너지가 발생합니다. 서비스 작업 시 주의하십시오. 서비스 작업 전에 지침을 읽으십시오.

Advarsel! Det er farlig spenning eller energi på bakplaten når systemet er i drift. Vær forsiktig ved service. Les instruksjonene før service.

¡Advertencia! Hay voltaje o energía peligrosos presentes en la placa posterior cuando el sistema está en funcionamiento. Tenga cuidado al realizar el mantenimiento. Lea las instrucciones antes de realizar el mantenimiento.

Varning! Farlig spänning eller energi finns på backplane när systemet är i drift. Var försiktig vid service. Läs instruktionerna före service.

Comply with Local and National Electrical Codes

Warning! Installation of the equipment must comply with local and national electrical codes.

تحذير! يجب أن يتوافق تركيب الأجهزة مع لوائح الكهرباء المحلية والوطنية.

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。

Advarsel! Alle lokale og nationale el-regler skal overholdes under montering af udstyret.

Waarschuwing! Bij installatie van de apparatuur moet worden voldaan aan de lokale en nationale elektriciteitsvoorschriften.

Varoitus! Laitteiden asennus on suoritettava paikallisten ja kansallisten sähkömääräysten mukaisesti.

Attention! L'équipement doit être installé conformément aux normes électriques nationales et locales.

Warnung! Die Installation des Geräts muss den lokalen und nationalen elektrotechnischen Vorschriften entsprechen.

אזהרה! התקנת הציוד חייבת להתבצע בהתאם לתקני החשמל המקומיים והארציים.

चेतावनी! उपकरण की इंस्टालेशन स्थानीय और राष्ट्रीय विद्युत कोड के अनुरूप होनी चाहिए।

警告！ 機器の取り付けはその地域および国の電気規定に準拠する必要があります。

경고!현 지역 및 국가의 전기 규정에 따라 장비를 설치해야 합니다.

Advarsel! Installasjon av utstyret må være i samsvar med lokale og nasjonale elektriske forskrifter.

¡Advertencia! La instalacion del equipo debe cumplir con las normas de electricidad locales y nacionales.

Varning! Installation av utrustningen måste följa lokala och nationella elektriska föreskrifter.

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.

تحذير! تجنب خطر الأجزاء المتحركة. ابتعد عن شفرات المروحة المتحركة. قد تستمر المراوح في الدوران بعد فك مجموعة المراوح من الهيكل. أبق أصابعك ومفكات البراغي والأغراض الأخرى بعيدة عن الفتحات الموجودة في مبيت مروحة التبريد.

警告！危险的活动零部件。请务必与转动的风扇叶片保持距离。从机箱移除风扇装置时，风扇可能仍在转动。小心不要将手指、螺丝起子和其他物品太靠近风扇外壳开口。

警告！危險的可移動性零件。請務必與轉動的風扇葉片保持距離。當您從機架移除風扇裝置，風扇可能仍在轉動。小心不要將手指、螺絲起子和其他物品太靠近風扇。

Advarsel! Farlige bevægelige dele. Hold dig væk fra ventilatorblade i bevægelse. Ventilatorerne kan stadig køre, når du tager ventilatorsamlingen af kabinettet. Hold fingre, skruetrækkere og andre genstande væk fra åbningerne i ventilatorkabinettet.

Waarschuwing! Gevaarlijke 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.

Varoitus! Vaaralliset liikkuvat osat. Pysy kaukana liikkuvista tuulettimen siivistä. Tuulettimet saattavat edelleen pyöriä, kun irrotat tuulettimen kokoonpanon kotelosta. Pidä sormet, ruuvimeisselit ja muut esineet poissa tuulettimen kotelon aukkojen läheltä.

Attention! Pieces mobiles dangereuses. Se tenir à l'ecart des lames du ventilateur Il est possible que les ventilateurs soient toujours en rotation lorsque vous retirerez le bloc ventilateur du châssis. Prenez garde à ce que doigts, tournevis et autres objets soient éloignés du logement du bloc ventilateur.

Warnung! Gefährliche bewegliche Teile. Halten Sie Abstand von rotierenden Lüfterblättern. Die Lüfter können sich noch drehen, wenn Sie die Lüfterbaugruppe aus dem Chassis entfernen. Halten Sie Finger, Schraubendreher und andere Gegenstände von den Öffnungen des Lüftergehäuses fern.

אזהרה! חלקים נעים מסוכנים. יש להתרחק מלהבי מאוורר נעים. המאווררים עשויים להמשיך להסתובב בעת הסרת מכלול המאוורר מהמארז. יש להרחיק אצבעות, מברגים וחפצים אחרים מהפתחים שבבית מכלול המאוורר.

चेतावनी! खतरनाक चलते हुए भाग। चलते हुए पंखे के ब्लेड से दूर रहें। जब आप चेसिस से पंखे की असेंबली निकालते हैं, तब भी पंखे घूम रहे हो सकते हैं। उंगलियों, स्क्रूड्राइवर और अन्य वस्तुओं को पंखे की असेंबली के हाउसिंग के छिद्रों से दूर रखें।

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。シャーシからファンアセンブリを取り外す際、ファンがまだ回転している可能性があります。ファンアセンブリの開口部に、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。

경고!움직이는 위험한 부품. 회전하는 송풍 날개에 접근하지 마세요. 섀시로부터 팬 조립품을 제거할 때 팬은 여전히 회전하고 있을 수 있습니다. 팬 조림품 외관의 열려있는 부분들로부터 손가락 및 스크류드라이버, 다른 물체들이 가까이 하지 않도록 배치해 주십시오.

Advarsel! Farlige bevegelige deler. Hold deg unna vifteblader i fart. Viftene kan fortsatt gå rundt når du fjerner vifteenheten fra kabinettet. Hold fingre, skrutrekkere og andre gjenstander unna åpningene i viftehuset.

¡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.

Varning! Farliga rörliga delar. Håll dig borta från rörliga fläktblad. Fläktarna kan fortfarande snurra när du tar bort fläktenheten från chassit. Håll fingrar, skruvmejslar och andra föremål borta från öppningarna i fläktenhetens hölje.

Connection to Earth

Warning! Equipment shall be connected to an Earth mains socket-outlet.

تحذير! يجب توصيل الأجهزة بمقبس كهربائي أرضي.

警告！ 设备应连接到接地电源插座。

警告！ 應將設備連接至接地電源插座。

Advarsel! Dette udstyr skal sluttes til en jordforbundet stikkontakt.

Waarschuwing! De apparatuur moet worden aangesloten op een geaard netstopcontact.

Varoitus! Laitteet on kytkettävä maadoitettuun pistorasiaan.

Attention! L'équipement doit être connecté à une prise de courant avec mise à la terre.

Warnung! Das Gerät muss an eine geerdete Netzsteckdose angeschlossen werden.

אזהרה! יש לחבר את הציוד לשקע חשמל עם הארקה.

चेतावनी! उपकरण को एक अर्थ मेन्स सॉकेट-आउटलेट से जोड़ा जाना चाहिए।

警告！ 機器は、接地主電源コンセントに接続するものとします。

경고! 장비는 접지된 전원 콘센트에 연결해야 합니다.

Advarsel! Utstyret skal kobles til en jordet stikkontakt.

¡Advertencia! El equipo deberá conectarse a una toma de corriente con conexión a tierra.

Varning! Utrustningen ska vara ansluten till ett jordat eluttag.

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.

تحذير! عند تركيب المنتج استخدم كابلات التوصيل والطاقة ومحولات التيار المتردد المرفقة أو المخصصة. قد يؤدي استخدام أي كابلات ومحولات أخرى إلى حدوث عطل أو نشوب حريق. يحظر قانون سلامة الأجهزة والمواد الكهربائية استخدام كابلات UL أو CSA المعتمدة من (التي عليها علامة UL/CSA) لأي أجهزة كهربائية أخرى غير المنتجات التي تحددها شركة Supermicro فقط.

警告！ 安装时，请使用设备本身提供或指定的连接线、电源线和交流适配器。使用任何其他电缆线材或适配器都可能导致故障或火灾。除美超微(Supermicro)指定的产品外，《电气用品和材料安全法》禁止将UL或CSA认证的电缆(线材上标有UL/CSA)用于任何其他电气设备。

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。除了美超微(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)。

Advarsel! Når du monterer produktet, skal du bruge de medfølgende eller udpegede forbindelseskabler, strømkabler og vekselstrømsadaptere (AC). Brug af andre kabler og adaptere kan føre til fejl eller brand. Loven om sikkerhed for elektriske apparater og materialer forbyder brugen af UL- eller CSA-certificerede kabler (med UL/CSA angivet på ledningen) til andre elektriske apparater end dem, der udelukkende er godkendt af Supermicro.

Waarschuwing! Bij het installeren van het product moet u de geleverde of aangewezen aansluitkabels, voedingskabels en AC-adapters gebruiken. Het gebruik van enige andere kabels en 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 enige andere elektrische apparaten dan producten die uitsluitend door Supermicro zijn aangewezzen.

Varoitus! Käytä tuotteen asennuksessa mukana toimitettuja tai tarkoitukseen sopivia liitäntäkaapeleita, virtajohtoja ja verkkolaitteita. Muiden kaapeleiden ja sovittimien käyttö voi aiheuttaa toimintahäiriön tai tulipalon. Sähkölaitteiden ja materiaalien turvallisuutta koskeva laki kieltää UL- tai CSA-sertifioitujen kaapeleiden (joissa on merkintä UL/CSA) käytön muissa sähkölaitteissa kuin Supermicron nimeämissä tuotteissa.

Attention! Lors de l'installation du produit, utilisez les câbles de connexion, les câbles d'alimentation et les adaptateurs secteur fournis ou recommandés. L'utilisation d'autres câbles et adaptateurs peut causer un dysfonctionnement ou un incendie. La loi sur la sécurité des appareils et des équipements électriques interdit l'utilisation de câbles certifiés UL ou CSA (avec la mention UL/CSA sur le cordon) pour tout autre appareil électrique que les produits désignés par Supermicro uniquement.

Warnung! Verwenden Sie bei der Installation des Produkts ausschließlich die vorgesehenen oder mitgelieferten Anschlusskabel, Netzkabel und AC-Adapter. Die Verwendung anderer Kabel oder Adapter kann zu Fehlfunktionen oder Brand führen. Das Gesetz zur Sicherheit elektrischer Geräte und Materialien untersagt die Verwendung von UL- oder CSA-zertifizierten Kabeln (mit UL/CSA-Kennzeichnung auf dem Kabel) für andere elektrische Geräte als die von Supermicro ausdrücklich vorgesehenen Produkte.

אזהרה! בעת התקנת המוצר, יש להשתמש בכבלי החיבור, בכבלי החשמל ובמתאמי ה-AC המצורפים או הייעודיים. שימוש בכבלים או במתאמים אחרים עלול לגרום לתקלה או לדליקה. החוק לבטיחות מכשירי חשמל וחומרים אוסר על שימוש בכבלים בעלי אישור UL או CSA (הנושאים סימון UL/CSA על גבי הכבל) עבור מכשירים חשמליים אחרים שאינם מוצרים ייעודיים של סופרמיקרו (Supermicro) בלבד.

चेतावनी! उत्पाद इंस्टॉल करते समय, प्रदान की गई या निर्दिष्ट कनेक्शन केबल, पावर केबल और AC एडॉप्टर का ही उपयोग करें। किसी अन्य केबल और एडॉप्टर का उपयोग करने से खराबी आ सकती है या आग लग सकती है। विद्युत उपकरण और सामग्री सुरक्षा कानून केवल सुपरमाइक्रो (Supermicro) द्वारा निर्दिष्ट उत्पादों के अलावा किसी अन्य विद्युत उपकरणों के लिए UL या CSA-प्रमाणित केबल (जिनके कॉर्ड पर UL/CSA दर्शाया गया हो) के उपयोग को प्रतिबंधित करता है।

警告！ 本製品を設置する際は、付属または指定の接続ケーブル、電源コードとACアダプターを使用してください。それ以外のケーブルやアダプターを使用すると、事故や火災の原因になることがあります。電気用品安全法では、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の電気機器に使用することを禁止しています。

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.

Advarsel! Når du installerer produktet, bruker du de medfølgende eller angitte tilkoblingskablene, strømkablene og strømadapterne. Bruk av andre kabler og adaptere kan forårsake funksjonsfeil eller brann. Lov om elektriske apparater og materialsikkerhet forbyr bruk av UL- eller CSA-sertifiserte kabler (der UL/CSA står på ledningen) til andre elektriske apparater enn produkter som kun er angitt av Supermicro.

¡Advertencia! Cuando instale el producto, utilice la conexión provista o designada o procure cables, Cables de alimentación y adaptadores de CA que cumplan con los códigos locales y los requisitos de seguridad, incluyendo el tamaño adecuado del cable y el enchufe. El uso de otros cables y adaptadores podría causar un mal funcionamiento o un incendio. La Ley de Seguridad de Aparatos Eléctricos y de Materiales prohíbe el uso de cables certificados por UL o CSA (que tienen el certificado UL / CSA en el código) para cualquier otros dispositivos eléctricos que los productos designados únicamente por Supermicro.

Varning! När du installerar produkten ska du använda de medföljande eller avsedda anslutningskablarna, strömkablarna och nätadaptrarna. Om du använder andra kablar och adaptrar kan det orsaka funktionsfel eller brand. Lagen om säkerhet för elektriska apparater och material förbjuder användning av UL- eller CSA-certifierade kablar (som har UL/CSA angivet på sladden) för andra elektriska apparater än produkter som endast betecknas av Supermicro.

Product Disposal

Warning! Ultimate disposal of this product should be handled according to all national laws and regulations.

تحذير! يجب التخلص النهائي من هذا المنتج وفقًا لجميع القوانين واللوائح الوطنية.

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。

Advarsel! Dette produkt skal bortskaffes i henhold til alle nationale love og regler.

Waarschuwing! De uiteindelijke verwijdering van dit product dient te geschieden in overeenstemming met alle nationale wetten en voorschriften.

Varoitus! Tämän tuotteen lopullinen hävittäminen on suoritettava kaikkien kansallisten lakien ja määräysten mukaisesti.

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.

Warnung! Die endgültige Entsorgung dieses Produkts muss gemäß allen nationalen Gesetzen und Vorschriften erfolgen.

אזהרה! סילוק סופי של מוצר זה חייב להתבצע בהתאם לכל החוקים והתקנות הלאומיים.

चेतावनी! इस उत्पाद का अंतिम निपटान सभी राष्ट्रीय कानूनों और नियमों के अनुसार किया जाना चाहिए।

警告！ 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。

경고!이 제품은 해당 국가의 관련 법규 및 규정에 따라 폐기되어야 합니다.

Advarsel! Når produktet til slutt skal kasseres, må det håndteres i henhold til alle nasjonale lover og forskrifter.

¡Advertencia! Al deshacerse por completo de este producto debe seguir todas las leyes y reglamentos nacionales.

Varning! Slutgiltigt bortskaffande av denna produkt ska ske i enlighet med alla nationella lagar och förordningar.

Appendix C:

System Specifications

Processors
Single processor (Intel® Xeon® 6700/6500-series processor with P-cores or Intel® Xeon® 6700-series processor with E-cores) with Socket E2 LGA 4710 and a thermal design power (TDP) of up to 350 W
Chipset
System on Chip
BIOS
512 Mb AMI BIOS® SPI Flash BIOS ACPI 6.5 or later, Plug and Play (PnP) SPI dual/quad speed support, riser card auto detection support, SMBIOS 3.7.0 or later
Memory
Total eight DIMM slots that support up to 2 TB of RDIMM DDR5 ECC memory with speeds of up to 6400 MT/s
Storage Drives
Default: Four front hot-swap 3.5" SATA drive bays Option A: Four front hot-swap 2.5" PCIe 5.0 x4 NVMe drive bays Option B: Four front hot-swap 3.5"/2.5" SAS drive bays (NVMe/SAS support may require additional storage controller and/or cables; for details, see "Optional Components" on page 104) Two M.2 PCIe 5.0 x2 NVMe slots (M-key 2280/22110; VROC required for RAID)
PCI Expansion Slots
Two PCIe 5.0 x16 FHFL slots One PCIe 5.0 x8 (in x16) LP slot
Input/Output
Two RJ45 1 GbE LAN ports One RJ45 1 GbE Dedicated BMC LAN port (IPMI shared on LAN port 1) Two USB 3.2 Gen1 Type-A ports (rear) Two USB 3.2 Gen1 ports (header) Two COM ports (one rear, one header) One TPM header One VGA port
Motherboard
X14SBW-F: proprietary 8" x 13" (230.2 mm x 330.2 mm) (WxL), WIO FF
Chassis
CSE-815BTS-R000WNP: 1U rackmount 17.2" x 1.7" x 25.6" (437 x 43 x 650 mm) (WxHxD)

System Cooling
Default: Five 4-cm heavy-duty fans with optimal fan speed control Optional: One add-on card cooling fan One air shroud One CPU heatsink
Power Supply
Two 860 W redundant Titanium level power supplies Input: 800 W: 100–127 VAC / 50–60 Hz 860 W: 200–240 VAC / 50–60 Hz 860 W: 240 VDC / 50–60 Hz Output: +12 V Max: 66.67 A (100–127 VAC) +12 V Max: 71.67 A (200–240 VAC) +12 V Max: 71.67 A (240 VDC) +5 VSB Max: 4 A
Operating Environment
Operating Temperature: 10°C to 35°C (50°F to 95°F) Non-operating Temperature: -30°C to 60°C (-30°F to 140°F) Operating Relative Humidity: 8% to 80% (Non-Condensing) Non-operating Relative Humidity: 8% to 90% (Non-Condensing)
Regulatory Compliance
FCC, ICES, CE, UKCA, VCCI, RCM, NRTL, CB
Certified Safety Models
Certified by UL or CSA: 815-R8X14, 815-8, 815-R6X14, 815-6, 815-R6DX14, or 815-6D.
Perchlorate Warning
California Best Management Practices Regulations for Perchlorate Materials: This Perchlorate warning applies only to products containing CR (Manganese Dioxide) Lithium coin cells. Perchlorate Material-special handling may apply. See https://www.dtsc.ca.gov/hazardouswaste/perchlorate

Applied Directives, Standards

Directives:

Electromagnetic Compatibility Regulations 2016

FCC Part 15 Subpart B

ICES-003

VCCI-CISPR 32

AS/NZS CISPR 32

CISPR 35

BS/EN 55032

BS/EN 55035

BS/EN 61000-3-2

BS/EN 61000-3-3

BS/EN 61000-4-2

BS/EN 61000-4-3

BS/EN 61000-4-4

BS/EN 61000-4-5

BS/EN 61000-4-6

BS/EN 61000-4-8

BS/EN 61000-4-11

Green Environment:

2011/65/EU (RoHS Directive)

EC 1907/2006 (REACH)

2012/19/EU (WEEE Directive)

California Proposition 65

Product Safety:

2014/35/EU (LVD Directive)

UL/CSA 62368-1 (USA and Canada)

Electrical Equipment (Safety) Regulations 2016

IEC/BS/EN 62368-1

この装置は、クラスA機器です。この装置を住宅環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

VCCI ー A

Appendix D:

RoHS

限用物質含有情況標示聲明書

Declaration of the Presence Condition of the Restricted Substances Marking

設備名稱: 伺服器/Server
Equipment name

型號（型式）：815-R8X14 (系列型號: 815-8、SYS-512B-WR)
Type designation (Type)

單元Unit	限用物質及其化學符號 Restricted substances and its chemical symbols					
	鉛Lead (Pb)	汞Mercury (Hg)	鎘Cadmium (Cd)	六價鉻 Hexavalent chromium (Cr^{+6})	多溴聯苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
機殼 (Chassis)	○	○	○	○	○	○
機殼風扇 (Chassis Fan)	–	○	○	○	○	○
線材 (Cable)	○	○	○	○	○	○
主機板 (Motherboard)	–	○	○	○	○	○
電源供應器 (Power Supply)	–	○	○	○	○	○
電源背板 (PDB)	–	○	○	○	○	○
硬碟 (HDD)	–	○	○	○	○	○
附加卡 (Add-on Card)	–	○	○	○	○	○

備考1. 〝超出0.1 wt %〞及〝超出0.01 wt %〞係指限用物質之百分比含量超出百分比含量基準值。
Note 1：“Exceeding 0.1 wt %” and “exceeding 0.01 wt %” indicate that the percentage content of the restricted substance exceeds the reference percentage value of presence condition.

備考2. 〝○〞係指該項限用物質之百分比含量未超出百分比含量基準值。
Note 2：“○” indicates that the percentage content of the restricted substance does not exceed the percentage of reference value of presence.

備考3. 〝–〞係指該項限用物質為排除項目。
Note 3：The “–” indicates that the restricted substance corresponds to the exemption.

警告: 為避免電磁干擾, 本產品不應安裝或使用於住宅環境。

輸入額定:

100-127V ~, 60-50Hz, 9.4-7.4A (x2)
200-240V ~, 60-50Hz, 4.8-4.0A (x2)

*使用者不能任意拆除或替換內部配備
*報驗義務人之姓名或名稱：美超微電腦股份有限公司
*報驗義務人之地址：新北市中和區建一路 150 號 3 樓

Appendix E:

General Data Center Environmental Specifications

Particulate Contamination Specifications

Air filtration: Data centers must be kept clean to Class 8 of ISO 14644-1 (ISO 2015). The air entering the data center should be filtered with a MERV 11 filter or better. The air within the data center should be continuously filtered with a MERV 8 filter or better.

Conductive dust: Air should be free of conductive dust, zinc whiskers, or other conductive particles.

Corrosive dust: Air should be free of corrosive dust.

Gaseous Contamination Specifications

Copper coupon corrosion rate: <300 Å/month per class G1 as defined by ANSI.ISA71.04-2013, reference by ASHRAE TC 9.9

Silver coupon corrosion rate: <200 Å/month per class G1 as defined by ANSI.ISA71.04-2013, reference by ASHRAE TC 9.9

Note: If testing with silver or copper coupons results in values less that 200 Å/month or 300 Å/month, respectively, then operating up to 70% relative humidity (RH) is acceptable. If the testing shows corrosion levels exceed these limits, then catalyst type pollutants are probably present and RH should be driven to 50% or lower.