X13DEI
X13DEI-T

USER'S MANUAL

Revision 1.0

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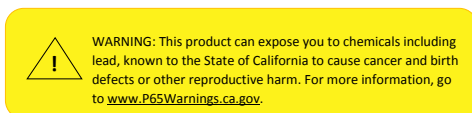
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Manual Revision 1.0

Release Date: February 21, 2023

Preface

About This Manual

This manual is written for system integrators, IT technicians and knowledgeable end users. It provides information for the installation and use of the X13DEI/X13DEI-T motherboard.

About This Motherboard

The Supermicro X13DEI/X13DEI-T supports dual 4th Generation Intel® Xeon® Scalable Processors (in Socket E LGA 4677) with four Ultra Path Interconnects (UPIs) (16 GT/s max.), up to 60 CPU cores, and a thermal design power (TDP) of up to 350W. Built with the Intel C741 chipset, the X13DEI/X13DEI-T supports up to 4TB memory capacity with 16 DIMMs of 256GB 3DS RDIMM/RDIMM DDR5 ECC memory. This motherboard features superior I/O expandability and flexibility, including four PCIe 5.0 x16 slots, two PCIe 5.0 x8 slots, three MICO x8 connectors (with six PCIe 5.0 x4 NVMe connections), ten SATA 3.0 connections (eight SATA connections via one SlimSAS port and two SATA ports with support of SuperDOM), two PCIe 4.0 x2 NVMe M.2 slots, and nine USB 2.0/3.0 ports/headers. It also offers the most advanced data protection capability that provides Trusted Platform Module (TPM) and hardware Root of Trust (RoT) support. The X13DEI/X13DEI-T is optimized for future PCIe specifications with flexible I/O, networking, storage, and GPU (optional) support. It is ideal for use in general purpose servers with storage head-node, virtualization, and High Performance Computing (HPC) applications. Please note that this motherboard is intended to be installed and serviced by professional technicians only. For processor/memory updates, please refer to our website at https://www.supermicro.com/products/.

Note 1: Memory speed support depends on the processors used in the system.

Note 2: The 4th Generation Intel platform only supports TPM 2.0 standard.

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:

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

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

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

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

Contacting Supermicro

Headquarters

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

Europe

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

Asia-Pacific

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

Table of Contents

Chapter 1

Introduction

Congratulations on purchasing your computer motherboard from an industry leader. Supermicro motherboards are designed to provide you with the highest standards in quality and performance.

In addition to the motherboard, several important parts that are included in the retail box are listed below. If anything listed is damaged or missing, please contact your retailer.

1.1 Checklist

Main Parts List		
Description	Part Number	Quantity
Supermicro Motherboard	X13DEI or X13DEI-T	1
I/O Shield	MCP-260-00042-0N / MCP-260-00042-3N	1
E1A Carrier for SP XCC CPU	SKT-1333L-0000-FXC	2
E1B Carrier for SP MCC CPU	SKT-1424L-001B-LTS	2
SATA Cables	CBL-0044L	2
Quick Reference Guide	MNL-2509-QRG	1

Important Links

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

- Supermicro product manuals: https://www.supermicro.com/support/manuals/

- Product drivers and utilities: https://www.supermicro.com/wdl/driver

- 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 at our website: https://www.supermicro.com/about/policies/disclaimer.cfm?url=/wdl/utility/Lot9_Secure_Data_Deletion_Utility/

- Firmware-related and AOC user's guides: https://www.supermicro.com/support/manuals/

- If you have any questions, please contact our support team at: support@supermicro.com

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

X13DEI Motherboard Image
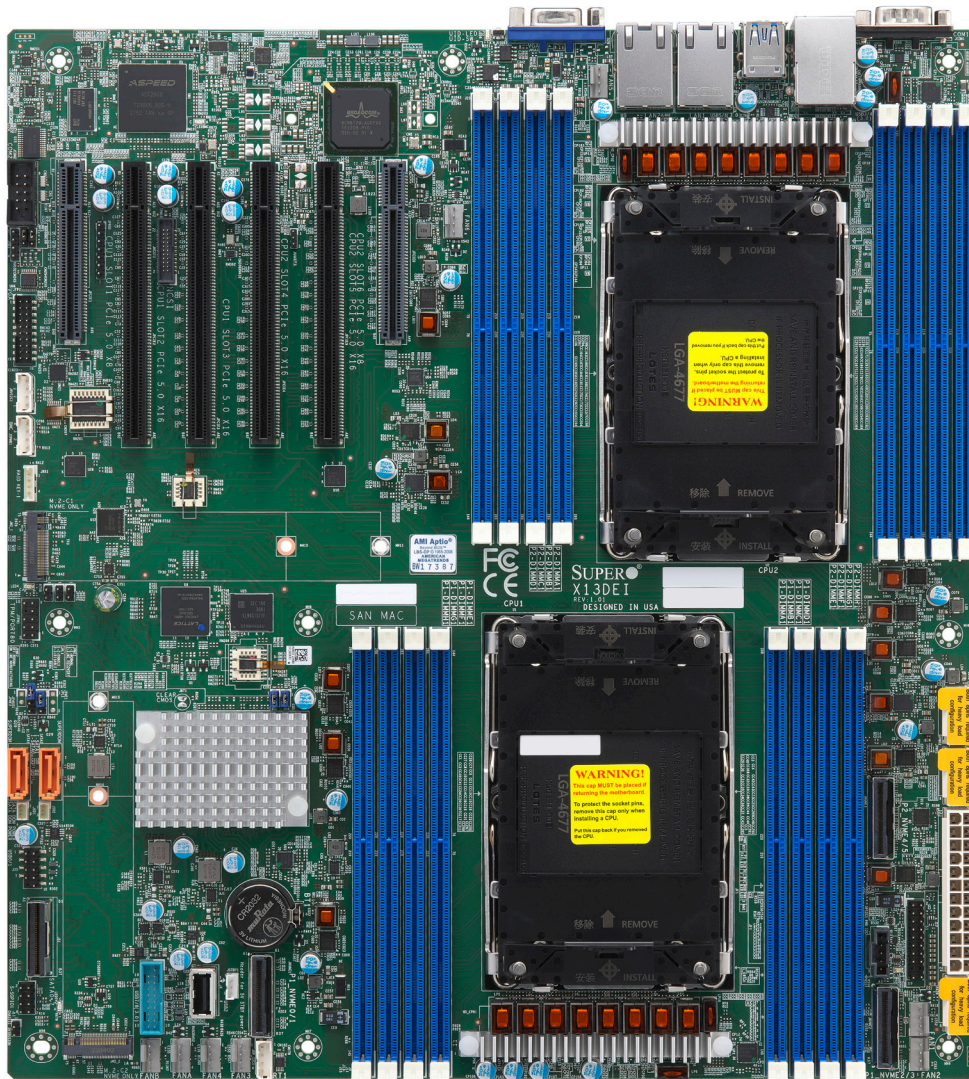
Differences between X13DEI and X13DEI-T		
	X13DEI	X13DEI-T
LAN1, LAN2	1G	10G

X13DEI-T Motherboard Image
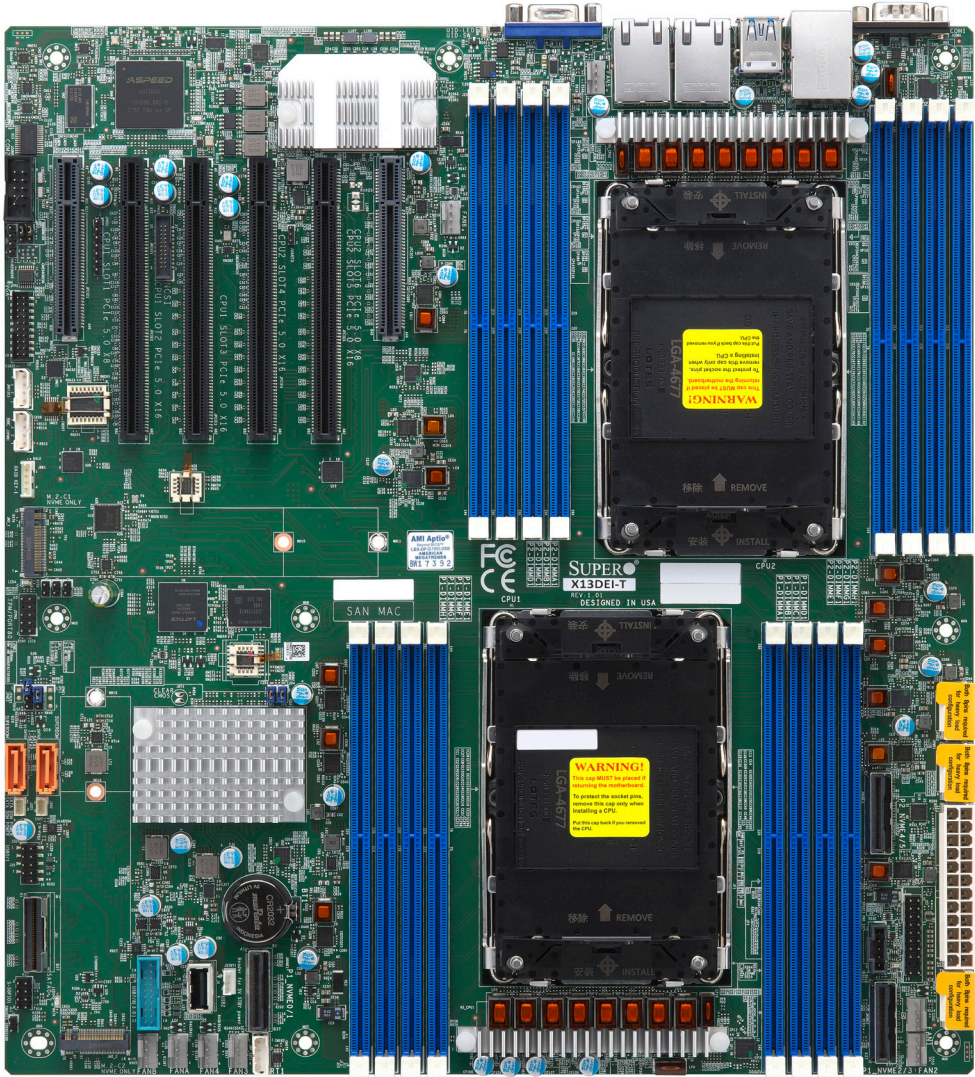
Differences between X13DEI and X13DEI-T		
	X13DEI	**X13DEI-T**
LAN1, LAN2	1G	10G

Note: All graphics shown in this manual were based upon the latest PCB revision available at the time of publication of the manual. The motherboard you received may or may not look exactly the same as the graphics shown in this manual.

X13DEI/X13DEI-T Motherboard Layout

(not drawn to scale)

Differences between X13DEI and X13DEI-T		
	X13DEI	X13DEI-T
LAN1, LAN2	1G	10G

Note: Components not documented are for internal testing only.

Quick Reference
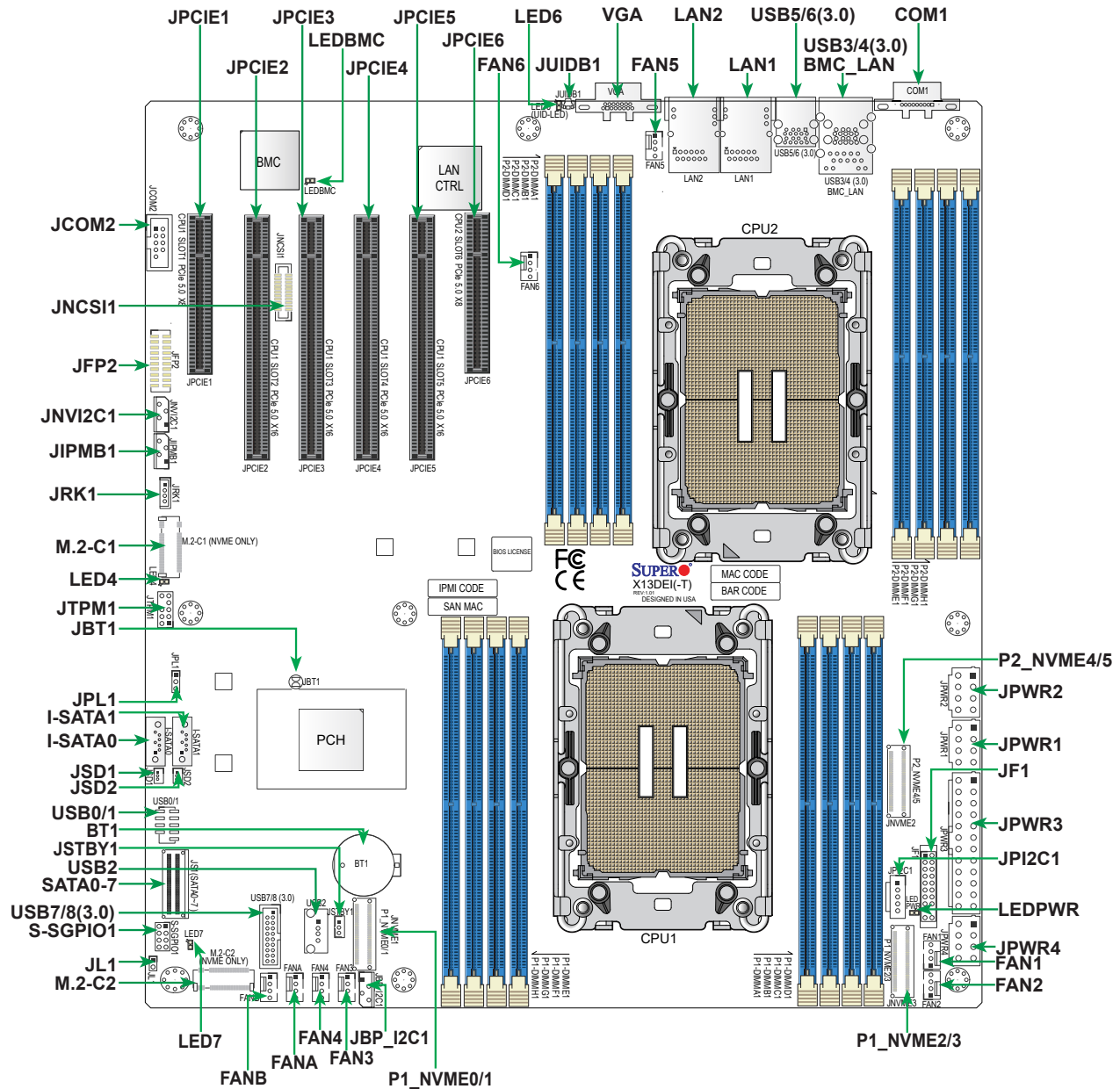
Notes:

- See Chapter 2 for detailed information on jumpers, I/O ports, and JF1/JFP2 front panel connections.

- "▪" indicates the location of Pin 1.

- Jumpers/LED indicators not indicated are used for testing only.

- Use only the correct type of onboard CMOS battery as specified by the manufacturer. Do not install the onboard battery upside down to avoid a possible explosion.

Quick Reference Table

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

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

Connector	Description
BT1	Onboard CMOS Battery
BMC_LAN	Dedicated BMC LAN Port
COM1	Rear I/O COM Port
FAN1 – FAN6, FANA, FANB	CPU/System Fan Headers
I-SATA0, I-SATA1	Intel PCH Powered I-SATA 3.0 Ports with support of SuperDOM devices *DOM: Disk on Module
JBP_I2C1	4-pin BMC External I^2C Header (for backplane firmware update if MCIO is not connected to the backplane)
JCOM2	Front Accessible COM Port Header
JF1	Front Control Panel Header
JFP2	Front Accessible VGA Connection Header
JIPMB1	4-pin BMC External I^2C Header (for Inlet Temperature Sensor)
JL1	Chassis Intrusion Header
JNCSI1	NC-SI (Network Controller Sideband Interface) Connector
JNVI2C1	NVMe SMBus I^2C Header with hot-plug support
JPCIE1 (SLOT1), JPCIE6 (SLOT6)	PCIe 5.0 x8 Slots (SLOT1: supported by CPU1, SLOT6: supported by CPU2)
JPCIE2/3 (SLOT2/3), JPCIE4/5 (SLOT4/5)	PCIe 5.0 x16 Slots (SLOT2/3: supported by CPU1, SLOT4/5: supported by CPU2)
JPI2C1	Power System Management Bus (SMBus) I^2C Header
JPWR1, JPWR2, JPWR4	8-pin Power Connectors
JPWR3	24-pin ATX Power Connector
JRK1	Intel VROC Key Header for NVMe RAID support
JS1 (SATA 0 – SATA7)	SlimSAS x8 Connector with support of eight Intel PCH SATA 3.0 connections (RAID 0, 1, 5, and 10 supported)
JSD1, JSD2	SATA DOM Power Connectors

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

Connector	Description
JSTBY1	5V Standby Power Header
JTPM1	Trusted Platform Module/Port 80 Header
JUIDB1	Unit Identifier (UID) Switch / BMC Reset Button
LAN1, LAN2	Ethernet LAN (RJ45) Port 1 and Port 2 (1G LAN support on X13DEI and 10G LAN support on X13DEI-T)
M.2-C1, M.2-C2	PCIe 4.0 x2 NVMe M.2 Slots supported by CPU1 (with support of M-Key 2280 and 22110)
P1_NVME0/1 (JNVME1) P1_NVME2/3 (JNVME2)	MCIO x8 Connectors supported by CPU1 with four PCIe 5.0 x4 NVMe connections
P2_NVME4/5 (JNVME3)	MCIO x8 Connector supported by CPU2 with two PCIe 5.0 x4 NVMe connections
S-SGPIO1	Serial General Purpose I/O Header (for I-SATA0/1 SuperDOM support)
USB0/1	USB 2.0 Header with support of two USB connections
USB2	Internal USB 2.0 Vertical Type-A Connector
USB3/4 (3.0)	Back Panel USB 3.0 Ports (5Gbps, Type-A)
USB5/6 (3.0)	Back Panel USB 3.0 Ports (5Gbps, Type-A)
USB7/8 (3.0)	USB 3.0 Header with support of two USB connections
VGA	Rear I/O VGA Port

Memory Slots

This motherboard contains 16 DIMM slots which supports up to 4TB memory capacity with 16 DIMMs of 256GB 3DS RDIMM/RDIMM DDR5 ECC memory. Please refer to the layout drawing below for the locations of the DIMM slots.

DIMM Slots Supported by CPU1	DIMM Slots Supported by CPU2
P1-DIMMA1	P2-DIMMA1
P1-DIMMB1	P2-DIMMB1
P1-DIMMC1	P2-DIMMC1
P1-DIMMD1	P2-DIMMD1
P1-DIMME1	P2-DIMME1
P1-DIMMF1	P2-DIMMF1
P1-DIMMG1	P2-DIMMG1
P1-DIMMH1	P2-DIMMH1
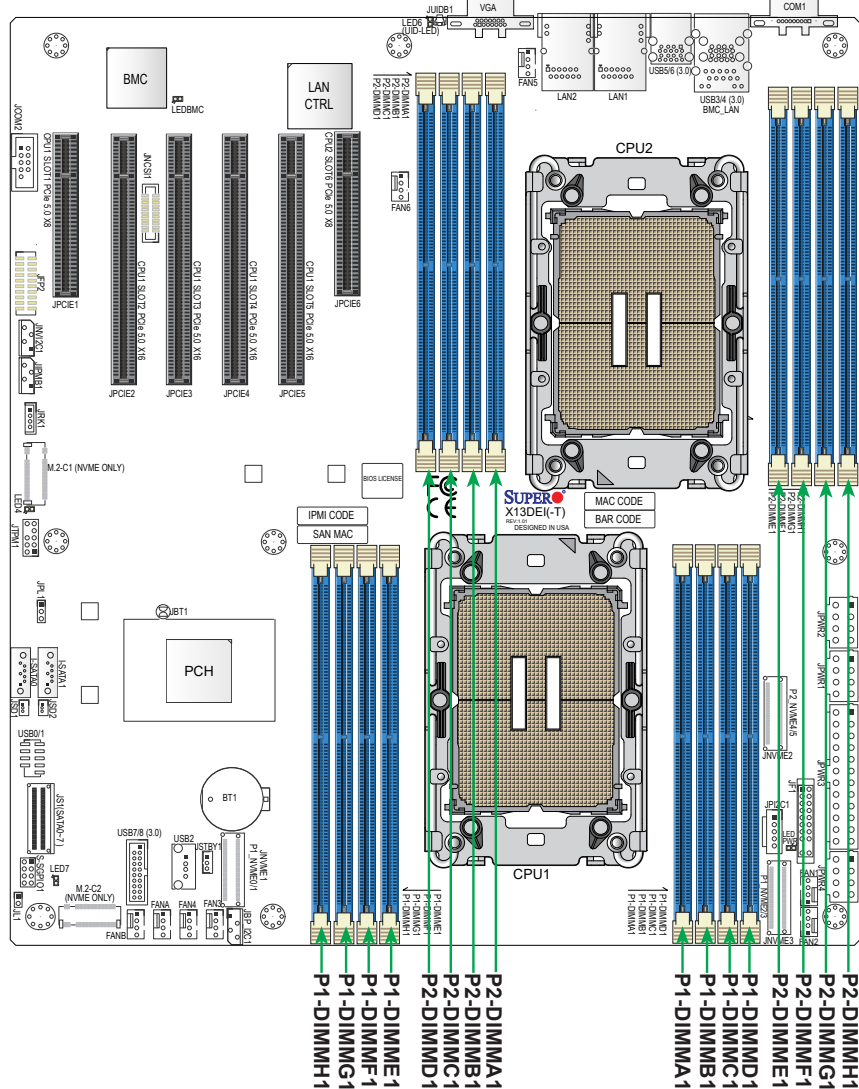
Motherboard Features

<table>
<tr><td colspan="2" align="center">**Motherboard Features**</td></tr>
<tr><td colspan="2">**CPU**</td></tr>
<tr><td colspan="2">• Supports dual 4th Generation Intel Xeon Scalable Processors (in Socket E LGA 4677) with four UPIs (16GT/s max.), up to 60 CPU cores, and a thermal design power (TDP) of up to 350W</td></tr>
<tr><td colspan="2">**Memory**</td></tr>
<tr><td colspan="2">• Supports up to 4TB memory capacity with 16 DIMMs of 256GB 3DS RDIMM/RDIMM DDR5 ECC memory.
    Note: Memory speed and capacity support depends on the processors used in the system.</td></tr>
<tr><td colspan="2">**DIMM Size**</td></tr>
<tr><td colspan="2">• Up to 256GB
    Note: For the latest CPU/memory updates, please refer to our website at https://www.supermicro.com/products/motherboard.</td></tr>
<tr><td colspan="2">**Chipset**</td></tr>
<tr><td colspan="2">• Intel C741 PCH</td></tr>
<tr><td colspan="2">**Expansion Slots**</td></tr>
<tr><td colspan="2">• Four PCIe 5.0 x16 slots (SLOT2/SLOT3 supported by CPU1, SLOT4/SLOT5 supported by CPU2)
• Two PCIe 5.0 x8 slots (SLOT1 supported by CPU1, SLOT6 supported by CPU2)
• Two PCIe 4.0 x2 NVMe M.2 slots (with support of M-Key 2280 and 22110)
• Three MCIO x8 connectors with support of six PCIe 5.0 x4 NVMe connections (P1_NVME0/1, P1_NVME2/3, and P2_NVME4/5)
    Note: Retimer card is supported only in two PCIe slots: SLOT3 and SLOT5</td></tr>
<tr><td colspan="2">**Baseboard Management Controller (BMC)**</td></tr>
<tr><td colspan="2">• ASPEED AST2600 with one dedicated BMC LAN supporting shared LAN function via LAN1 port on X13DEI and X13DEI-T</td></tr>
<tr><td colspan="2">**Network**</td></tr>
<tr><td colspan="2">• Two 1G BaseT Ethernet LAN ports supported by Broadcom 5720 on LAN Controller on X13DEI
• Two 10G BaseT Ethernet LAN ports supported by Broadcom 57416 on LAN Controller on X13DEI-T</td></tr>
<tr><td colspan="2">**Graphics**</td></tr>
<tr><td colspan="2">• Graphics controller and VGA support via ASPEED AST2600 BMC</td></tr>
<tr><td colspan="2">**I/O Devices**</td></tr>
<tr><td>• Serial (COM) Port</td><td>• One serial port on the rear I/O panel (COM1)
• One front accessible serial port header (JCOM2)</td></tr>
<tr><td>• SATA 3.0</td><td>• One SlimSAS x8 connector (JS1 for SATA0 – 7) with support of eight Intel PCH SATA 3.0 connections (RAID 0, 1, 5, and 10 supported)
• Two Intel PCH powered SATA 3.0 ports with support of SuperDOM (I-SATA0 and I-SATA1)</td></tr>
<tr><td>• Video (VGA) Port</td><td>• One VGA connection on the I/O back panel
• One VGA connection header (JFP2)</td></tr>
</table>

Peripheral Devices

- One USB 2.0 header for two USB connections (USB0/1)
- One internal USB 2.0 connector (USB2, vertical Type-A)
- Four USB 3.0 ports on the rear I/O panel (5Gbps, USB3/4 and USB5/6, Type-A)
- One USB 3.0 header for two connections (5Gbps, USB7/8)

BIOS

- AMI SPI BIOS
- EFI GUI, SPI dual/quad speed control, riser card auto detection support, Real Time Clock (RTC) wakeup, IPMIView, SMCIPMITOOL, IPMI CFG, SuperDoctor® 5 (for Windows and Linux platforms), Redundant power supply unit detection, SPM, and SUM-OOB/InBand

Power Management

- ACPI power management
- S1 and S5 support
- Power button override mechanism
- Power-on mode for AC power recovery
- Wake-on-LAN
- Power supply monitoring

System Health Monitoring

- Onboard voltage monitoring for +12V, +5V/+5V standby, +3.3V, and +3.3V standby, Vcore, Vmem
- Onboard temperature monitoring for CPU, VRM, LAN, PCH, system, and memory
- 7+1 CPU switch phase voltage regulator
- CPU thermal trip support
- Platform Environment Control Interface (PECI)

Fan Control

- Fan status monitoring via BMC connections
- Dual cooling zones
- Low-noise fan speed control
- Eight 4-pin fan headers

System Management

- SuperDoctor® 5 (for Windows and Linux platforms)
- Chassis intrusion header and detection
- Server platform service

Firmware Integrity/System Security

- Trusted Platform Module (TPM) support
- Root of Trust (RoT) support to protect firmware security by detecting critical data corruption, and restoring platform integrity

LED Indicators

- CPU/system overheat LED
- Power LED
- Fan failed LED
- UID/remote UID
- M.2 LEDs
- LAN activity LED
- BMC/CPLD firmware LED

Dimensions

- 12.1" (W) x 13.05" (L) E-ATX (307.34 mm x 331.47 mm)

Note 1: The CPU maximum thermal design power (TDP) is subject to chassis and heatsink cooling restrictions. For proper thermal management, please check the chassis and heatsink specifications.

Note 2: For BMC configuration instructions, please refer to the Embedded BMC Configuration User's Guide available at https://www.supermicro.com/support/manuals/.

X13DEI/X13DEI-T

CPU1-D1 CPU1-C1 CPU1-B1 CPU1-A1

DDR5 4800/5600 J7
DDR5 4800/5600 J5
DDR5 4800/5600 J3
DDR5 4800/5600 J1

350W
550A Iccmax
185A IccTDC
922W Pmax

VR14
8 PHASE
350W

VR14
8 PHASE
350W

CPU2-A1 CPU2-B1 CPU2-C1 CPU2-D1

DDR5 4800/5600 J17
DDR5 4800/5600 J19
DDR5 4800/5600 J21
DDR5 4800/5600 J23

CPU1
DDR5
PECI:30
SOCKET ID:0

P0 P1
P1 P0
P2 P2
P3 P3

UPI

CPU2
DDR5
PECI:31
SOCKET ID:1

CPU1-H1 CPU1-G1 CPU1-F1 CPU1-E1

DDR5 4800/5600 J15
DDR5 4800/5600 J13
DDR5 4800/5600 J11
DDR5 4800/5600 J9

PE0 PE1 PE2 PE3 PE4 DMI3

PE4 PE3 PE2 PE1 PE0
N/A

CPU2-E1 CPU2-F1 CPU2-G1 CPU2-H1

DDR5 4800/5600 J25
DDR5 4800/5600 J27
DDR5 4800/5600 J29
DDR5 4800/5600 J31

JPCIE3 — PCIe GEN5 x16
JPCIE2 — PCIe GEN5 x16
JPCIE1 — PCIe GEN5 x8
BCM57416 or BCM5720 — PCIe GEN5 x4
M.2A — PCIe GEN4 x2
M.2B — PCIe GEN4 x2
MCIO x8 JNVME1 — PCIe GEN5 x8
MCIO x8 JNVME2 — PCIe GEN5 x8

PCIe GEN5 x16 — JPCIE5
PCIe GEN5 x16 — JPCIE4
PCIe GEN5 x8 — MCIO x8
PCIe GEN5 x8 — JPCIE6 JNVME3

DMI X4

DMI3

PCH

6.0 Gb/S   S-SAS   #1 #2 #3 #4 #5 #6 #7 #8
SATA0-7   Slim-SAS x8 JS1

6.0 Gb/S   SATA   #1 #2   SATA DOM x2 SATA1 SATA2
SATA8-11

MAC3
MAC4
BMC AST2600
VGA
DDR4
eMMC

JNCSI Header — NC-SI
VGA port , VGA header
COM Header

DDR4

PCIe GEN2 x1
USB 2.0
eSPI

USB 2.0   USB #10   #1   #11   Front x2 BMC x 2 / Rear x4 / Type A x1 / USB 2.0 header x2
USB 3.0   USB   Rear x4 / USB 3.0 header x 2

FWSPI — TPM

BMC F/W — SPI

SPI0

eMMC

SPI   SPI   TPM HEADER Debug Card

CPLD LCMXO3LF -6900C

SPI

eMMC   BIOS

System Block Diagram

Note: This is a general block diagram and may not exactly represent the features on your motherboard. See the previous pages for the actual specifications of your motherboard.

1.2 Processor and Chipset Support

Built upon the functionality and capability of the 4th Generation Intel Xeon Scalable Processors (Socket E) and the Intel C741 PCH, the X13DEI/X13DEI-T motherboard offers critical, pivotal technological breakthroughs that unleash unprecedented computing capabilities and provides a scalable platform optimized for applications used in Artificial Intelligence (AI) Acceleration, Deep Learning Boost, Network Interconnectivity, and Platform Manageability technologies. The key features supported by the platform include the following:

Processor Features Supported

- Increased, scalable performance with substantial advancements, including UPI speed improvement, memory speed/capacity/utilization enhancement, hardware-based security innovations for virtualization, and platform interconnectivity optimization

- Integrated accelerators optimized for workload enhancement including Advanced Matrix Extensions (Intel AMX), In-Memory Analytics Accelerator (Intel IAX), Data Streaming Accelerator (Intel DSA), and QuickAssist Technology (Intel QAT)

- Breakthroughs in memory and I/O support, including DDR5 (4800 MT/s max.), PCIe 5.0 (80 lanes max.), and CXL 1.1 (supported CXL devices are subject to CPU SPEC)

- Increased operational and performance efficiency with substantial enhancements in virtualization, network security,and telemetry and power management

- Integrated AI accelerators with support of 3rd Gen. Intel Deep Learning Boost and new Tile Matrix Multiply (AMX/MUL)

- Enhanced Intel Security Boost Software Guard Extensions with Integrity Platform Firmware Resilience support

- Intel Ultra Path Interconnect (Intel UPI) up to four links per processor at 16 GT/s

- New Computer Express Link (CXL) and Intel Speed Select Technology

- CPU with 52 physical address/57 virtual address support

    Note: A total of four CXL devices are supported per CPU.

PCH Features Supported

- Up to 24 HSIO lanes for flexible I/O configuration of DMI ports, SATA ports, USB ports, and PCIe 3.0

1.3 Special Features

Recovery from AC Power Loss

The Basic I/O System (BIOS) provides a setting that determines how the system will respond when AC power is lost and then restored to the system. You can choose for the system to remain powered off (in which case you must press the power switch to turn it back on), or for it to automatically return to the power-on state. See the Advanced BIOS Setup section for this setting. The default setting is **Last State.**

1.4 System Health Monitoring

Onboard Voltage Monitors

An onboard voltage monitor will scan the voltages of the onboard chipset, memory, and CPU continuously. Once a voltage becomes unstable, a warning is given, or an error message is sent to the screen.

Fan Status Monitor with Firmware Control

The system health monitor embedded in the BMC chip can check the RPM status of the cooling fans. The CPU and chassis fans are controlled via BMC.

Environmental Temperature Control

System Health sensors monitor temperatures and voltage settings of onboard processors and the system in real time via the BMC interface. Whenever the temperature of the CPU or the system exceeds Supermicro's pre-defined threshold, the system and CPU cooling fan speed will increase to prevent the CPU or system from overheating.

> **Note**: To avoid possible system overheating, please be sure to provide adequate airflow to your system.

System Resource Alert

This feature is available when used with SuperDoctor® 5 in the Windows and Linux platforms. SuperDoctor 5 is used to notify the user of certain system events. For example, you can configure SuperDoctor 5 to provide you with warnings when the system temperature, CPU temperatures, voltages, and fan speeds go beyond a predefined range.

1.5 ACPI Features

ACPI stands for Advanced Configuration and Power Interface. The ACPI specification defines a flexible and abstract hardware interface that provides a standard way to integrate power management features throughout a computer system, including its hardware, operating system and application software. This enables the system to automatically turn on and off peripherals such as network cards, hard disk drives and printers.

In addition to enabling operating system-directed power management, ACPI also provides a generic system event mechanism for Plug and Play, and an operating system-independent interface for configuration control. ACPI leverages the Plug and Play BIOS data structures, while providing a processor architecture-independent implementation that is compatible with appropriate Windows operating systems. For detailed information regarding OS support, please refer to the Supermicro website.

1.6 Power Supply

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

It is strongly recommended that you use a high quality power supply that meets ATX power supply Specification 2.02 or above.

1.7 Serial Port

The X13DEI/X13DEI-T motherboard supports two serial communication connections. COM1 port and JCOM2 header can be used for input/output. The UART provides legacy speeds with a baud rate of up to 115.2 Kbps.

Chapter 2

Installation

2.1 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 motherboard from the antistatic bag.

- Handle the motherboard by its edges only; 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. Do not install the onboard battery upside down to avoid a possible battery explosion.

Unpacking

The motherboard is shipped in antistatic packaging to avoid static damage. When unpacking the motherboard, make sure that the person handling it is static protected.

2.2 Processor and Heatsink Installation

The processor (CPU) and CPU carrier should be assembled together first to form the CPU carrier assembly. This assembly will be then attached to the heatsink to form the processor heatsink module (PHM) before being installed into the CPU socket. Before installation, be sure to perform the following steps below:

* Please carefully follow the instructions given on the previous page to avoid ESD-related damages.

* Unplug the AC power cords from all power supplies after shutting down the system.

* Check that the plastic protective cover is on the CPU socket, and none of the socket pins are bent. If they are, contact your retailer.

* When handling the processor, avoid touching or placing direct pressure on the LGA lands (gold contacts). Improper installation or socket misalignment can cause serious damage to the processor or CPU socket, which may require manufacturer repairs.

* Thermal grease is pre-applied on a new heatsink. No additional thermal grease is needed.

* Refer to the Supermicro website for updates on processor and memory support.

* All graphics in this manual are for illustrations only. Your components may look different.

The 4th Gen Intel Xeon Scalable Processor

SP XCC   SP MCC
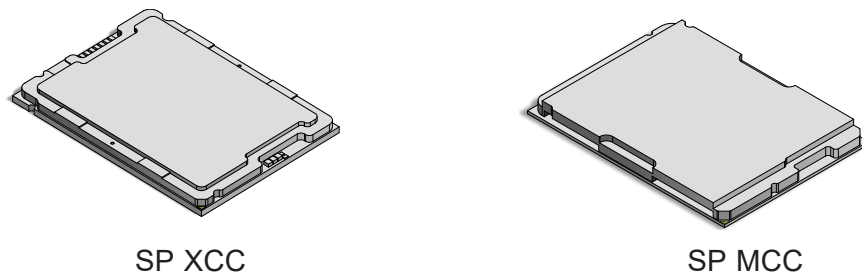
Processor Top View

1. The 4th Gen Intel Xeon Scalable Processor

SP XCC   SP MCC

CPU Key   CPU Key

Pin 1   Pin 1

⬛ = Cutout   ▲ = Pin 1   ⭕ = CPU Key
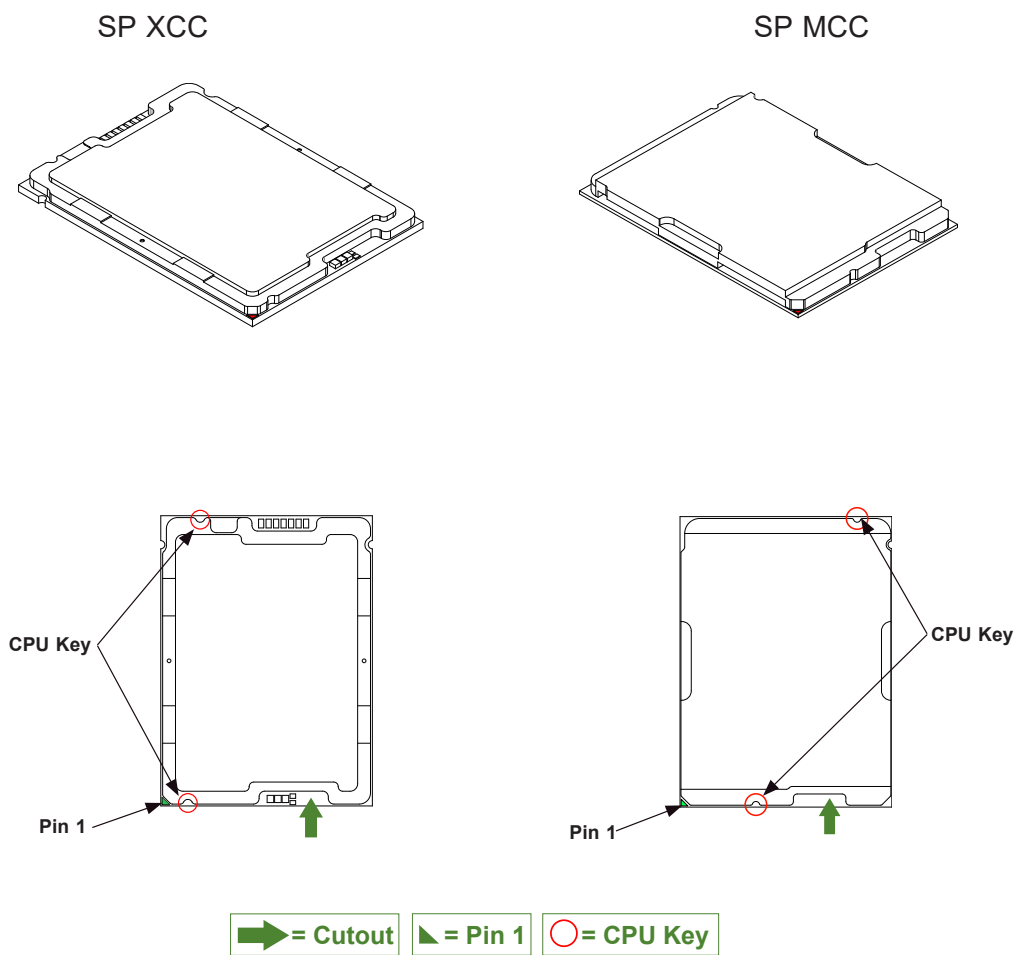
Processor Top View

Note: The motherboard supports two CPU SKUs: SP XCC and SP MCC. Each SKU supports a specific carrier; the SP XCC CPU supports Carrier E1A and SP MCC supports Carrier E1B. Also, be sure to use processors of the same SKU on the motherboard.

2. The CPU Carrier

Carrier E1A for SP XCC   Carrier E1B for SP MCC
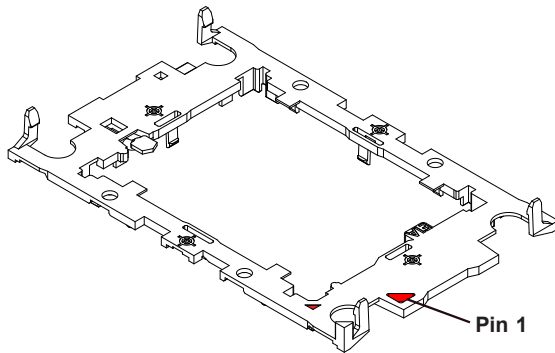
Pin 1   Pin 1
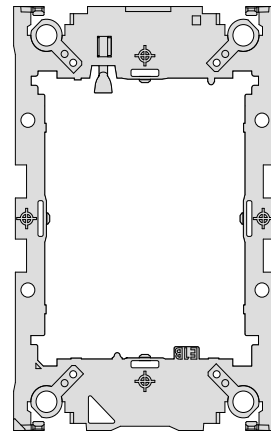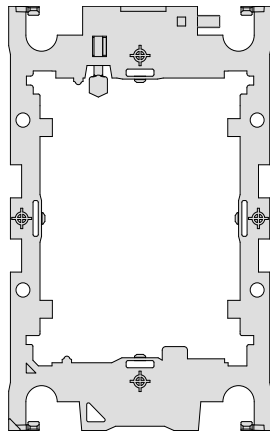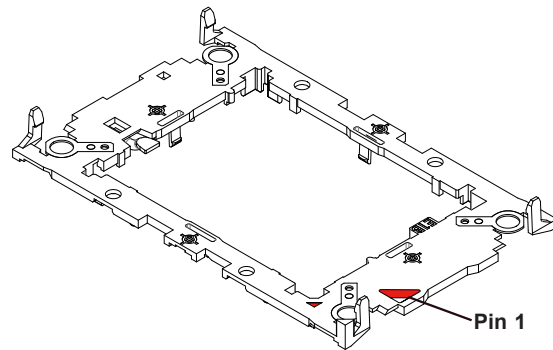
Carrier Top View
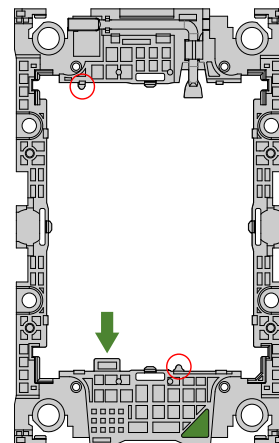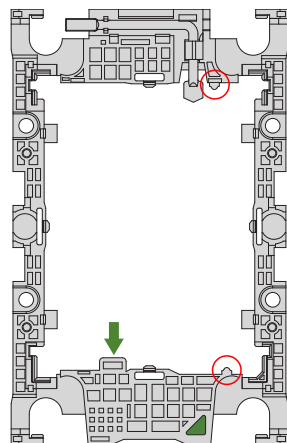
= Cutout   = Pin 1   = CPU Key

Carrier Bottom View

3. Heatsink
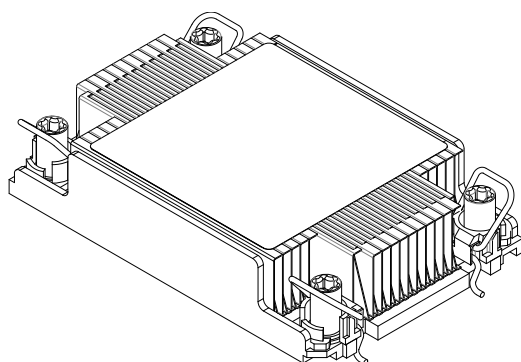
1U Heatsink
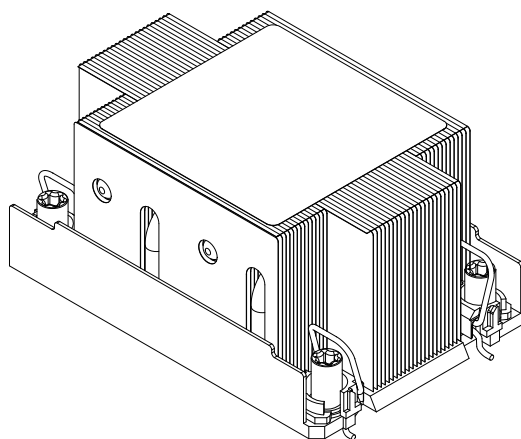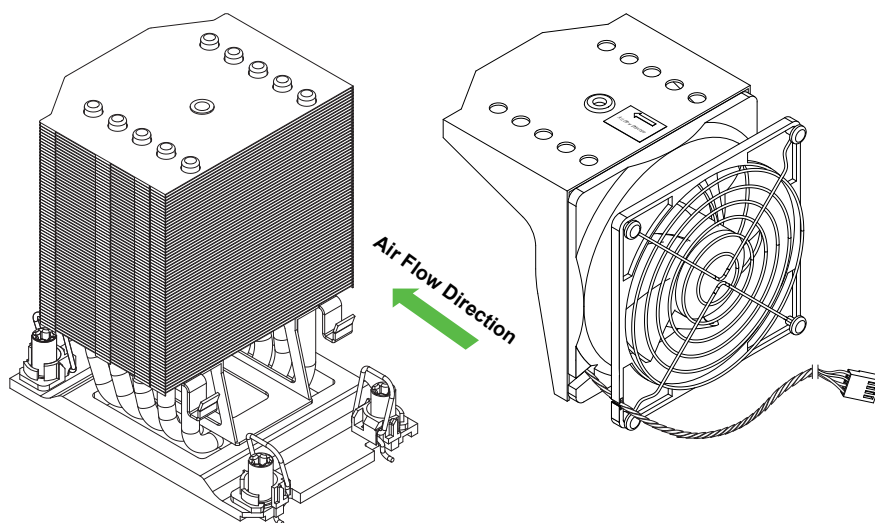
2U Heatsink

4U Heatsink and Heatsink Fan

Note: Exercise extreme care when handling the heatsink. Pay attention to the edges of heatsink fins, which can be sharp! To avoid damaging the heatsink, please do not apply excessive force on the fins.

Overview of the CPU Socket

The CPU socket is protected by a plastic protective cover.

Plastic Protective Cover
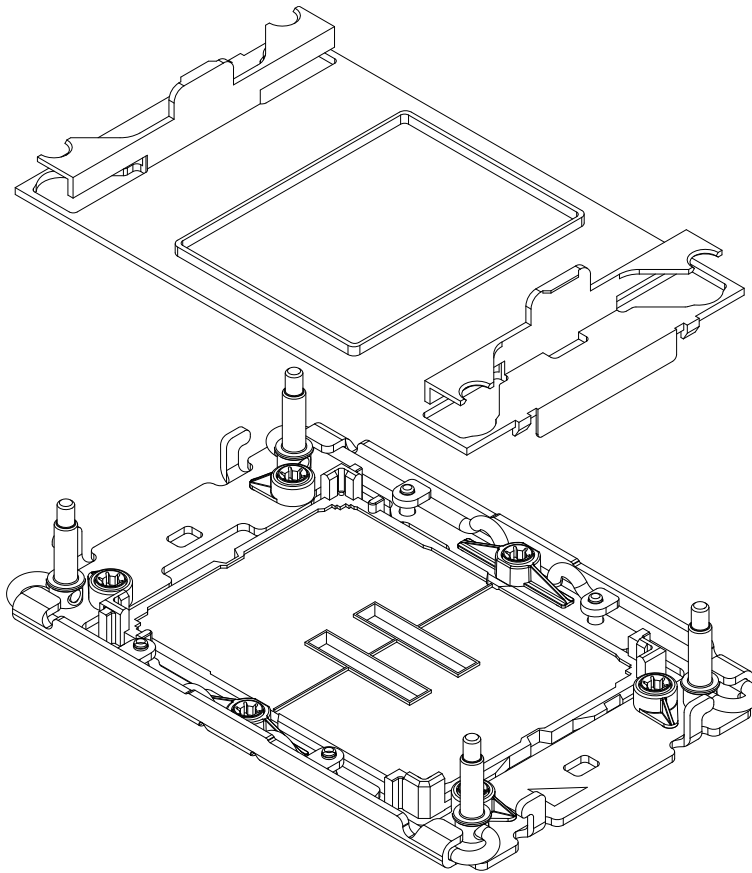
CPU Socket

Overview of the CPU Carrier Assembly

The CPU carrier assembly contains a 4th Gen Intel Xeon Scalable processor and a CPU carrier. Carefully follow the instructions given in the installation section to place a processor into the carrier to create a CPU carrier. Please note that SP XCC CPU supports Carrier E1A and SP MCC CPU supports Carrier E1B.

The CPU carrier assembly includes a processor and a carrier as shown below:

1. The 4th Gen Intel Xeon Scalable Processor (Component Side)

SP XCC   SP MCC

Processor (2D)

SP XCC   SP MCC

Processor (3D)

2. CPU Carrier (Top View)

Carrier E1A   Carrier E1B

CPU Carrier (2D)
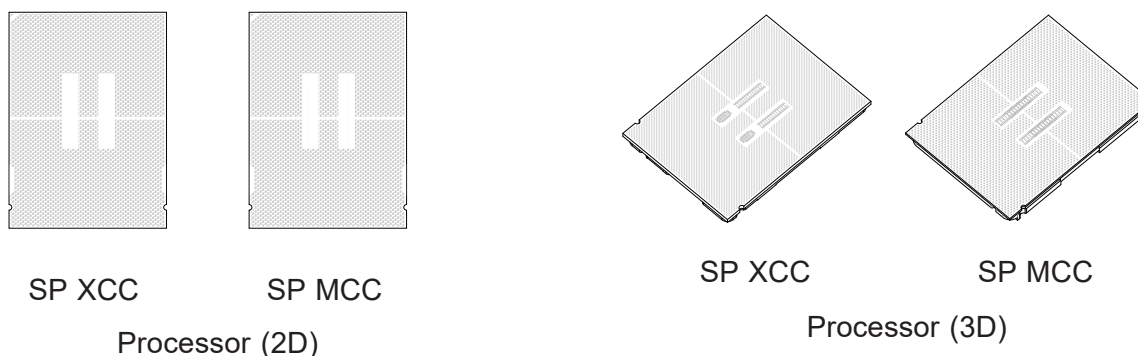
Carrier E1A   Carrier E1B
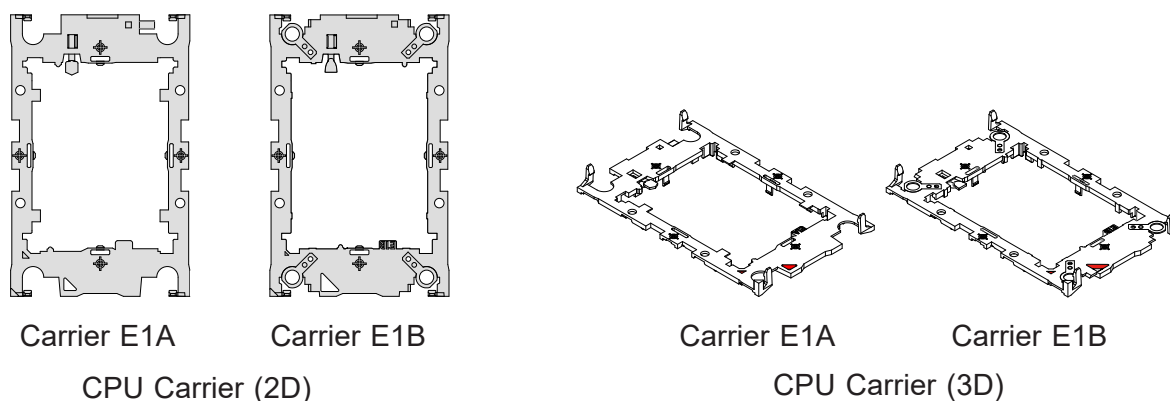
CPU Carrier (3D)

3. CPU Carrier Assembly (with CPU Seated inside the Carrier)

Carrier E1A with SP XCC Installed

Carrier E1B with SP MCC Installed
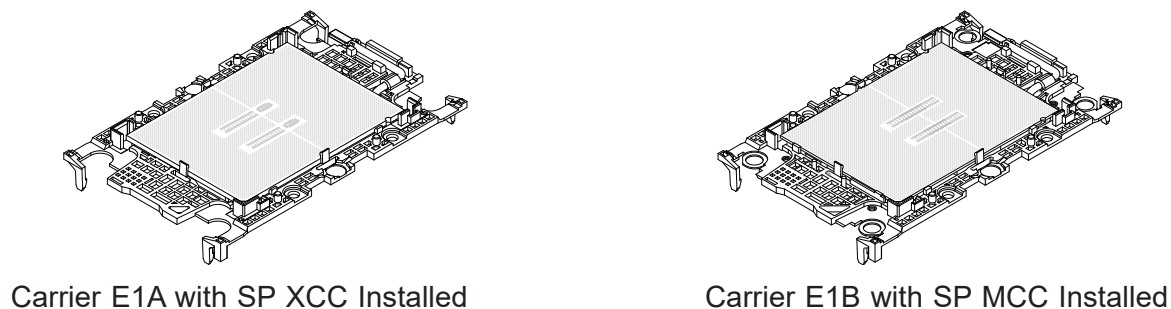
Overview of the Processor Heatsink Module (PHM) with SP XCC and Carrier E1A

The Processor Heatsink Module (PHM) contains a heatsink, a CPU carrier, and a 4th Gen Intel Xeon Scalable processor.

1. Heatsink

1U Heatsink	**2U Heatsink**	**4U Heatsink**

(Bottom View)

(Bottom View)

(Bottom View)
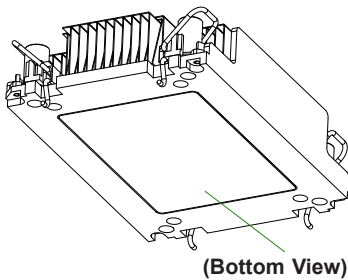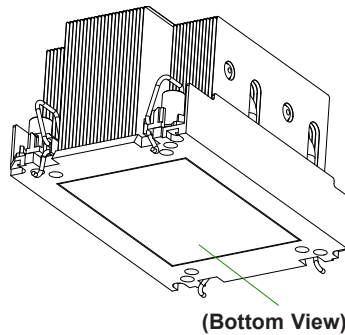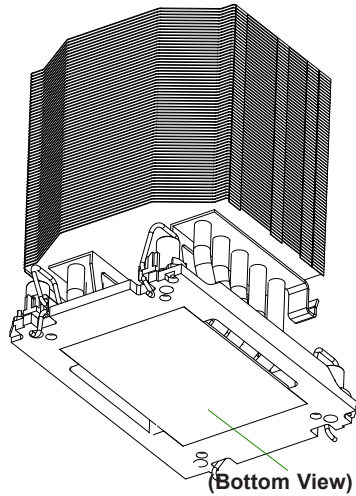
2. CPU Carrier E1A

3. The 4th Gen Intel Xeon Scalable Processor (SP XCC)

(Component Side)

(Component Side)

(Component Side)

4. Processor Heatsink Module (PHM)

(Bottom View)
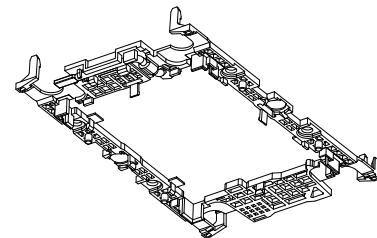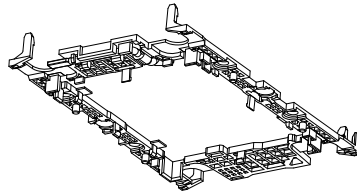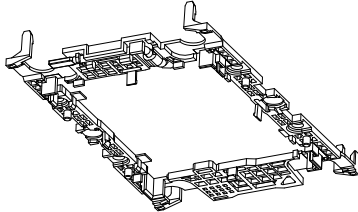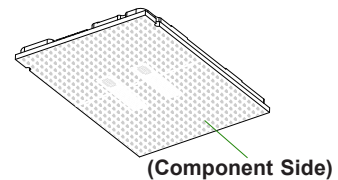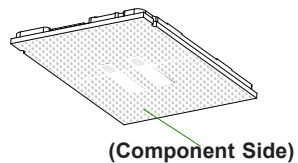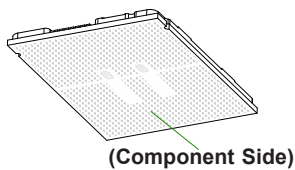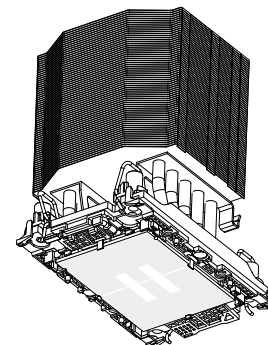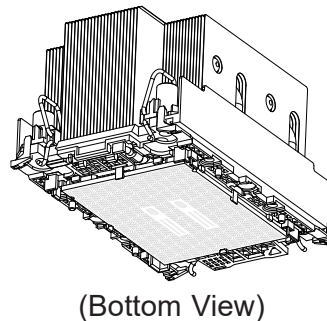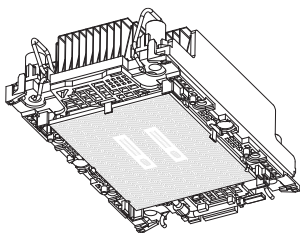
Overview of the Processor Heatsink Module (PHM) with SP MCC and Carrier E1B

The Processor Heatsink Module (PHM) contains a heatsink, a CPU carrier, and a 4th Gen Intel Xeon Scalable processor.

1. Heatsink

1U Heatsink   **2U Heatsink**   **4U Heatsink**
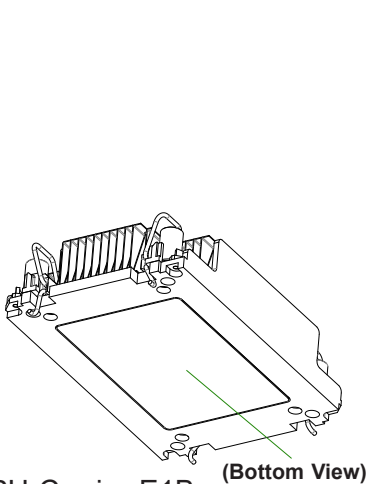
(Bottom View)   (Bottom View)   (Bottom View)
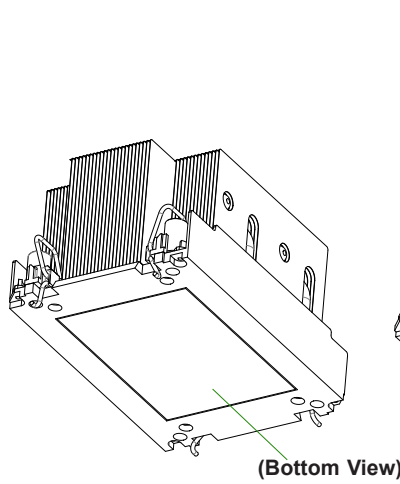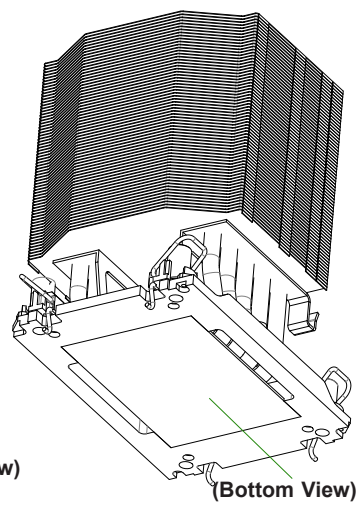
2. CPU Carrier E1B

3. The 4th Gen Intel Xeon Scalable Processor (SP MCC)

(Component Side)   (Component Side)   (Component Side)
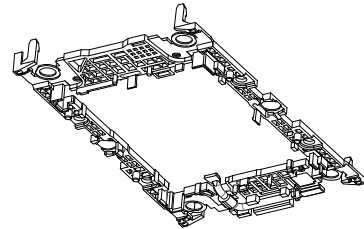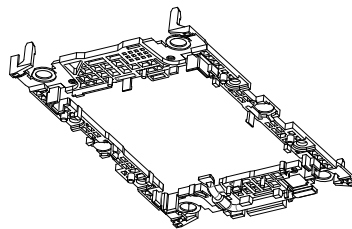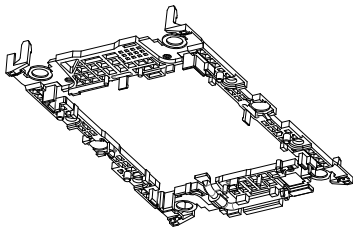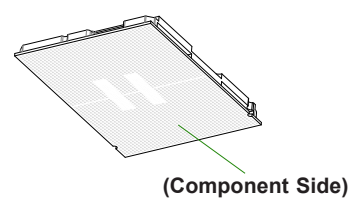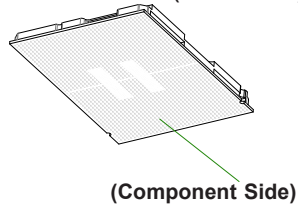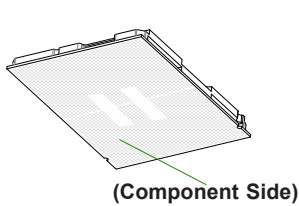
4. Processor Heatsink Module (PHM)
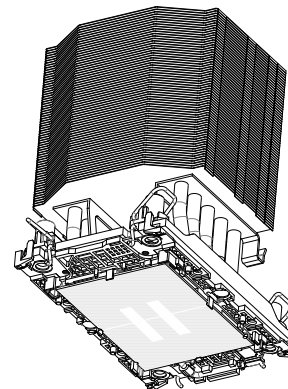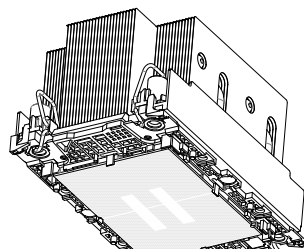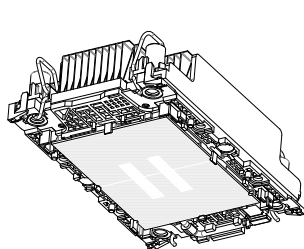
(Bottom View)

Creating the CPU Carrier Assembly

The CPU carrier assembly contains a 4th Gen Intel Xeon Scalable processor and a CPU carrier.

To create the CPU carrier assembly, please follow the steps below:

> **Note**: Before installation, be sure to follow the instructions given on pages 1 and 2 of this chapter to properly prepare for installation.

1. Hold the processor with the component side (including the gold contacts) facing down. Locate the small, gold triangle at the corner of the processor and the corresponding hollowed triangle on the CPU carrier as shown below. Please note that the triangle indicates the Pin 1 location.
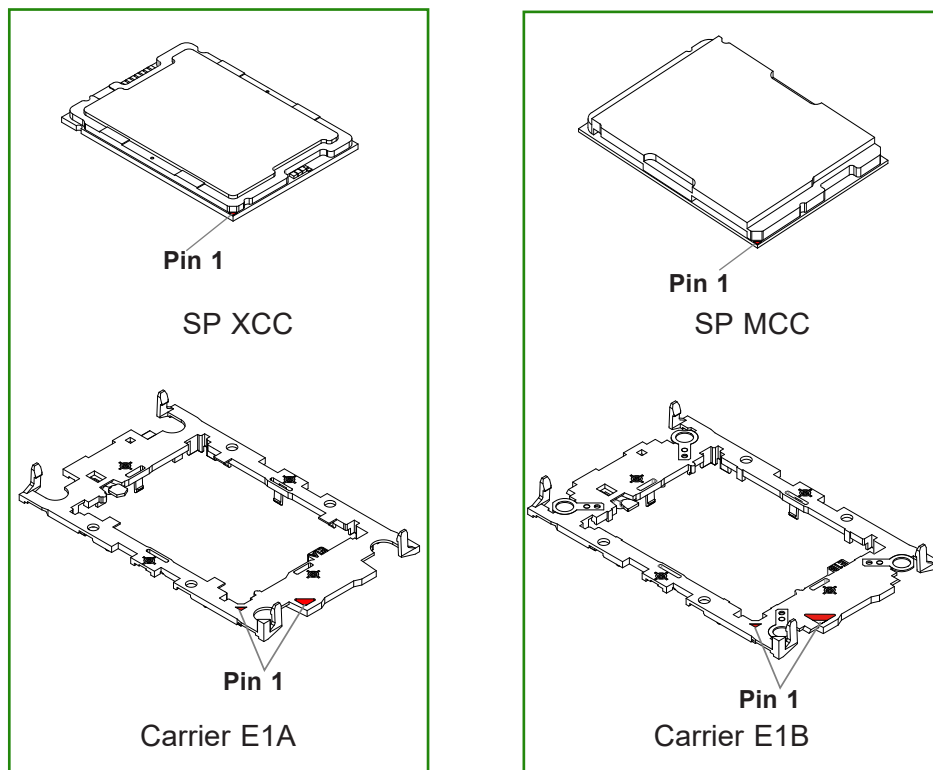
Processor with matching carrier

2. First, turn over the CPU carrier and locate Pin 1 on the CPU and Pin 1 on the carrier. Then, turn the processor over with component side (including the gold contacts) facing up and locate CPU keys on the processor. Finally, locate the CPU keys and four latches on the carrier as shown below.
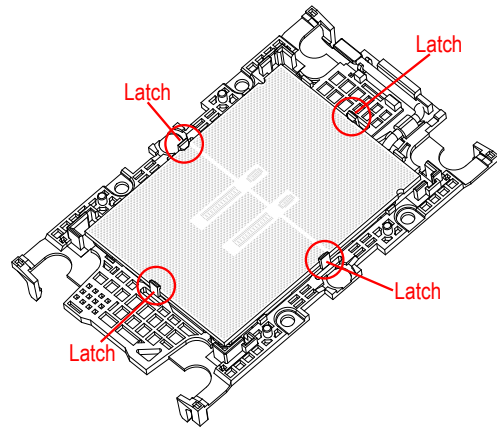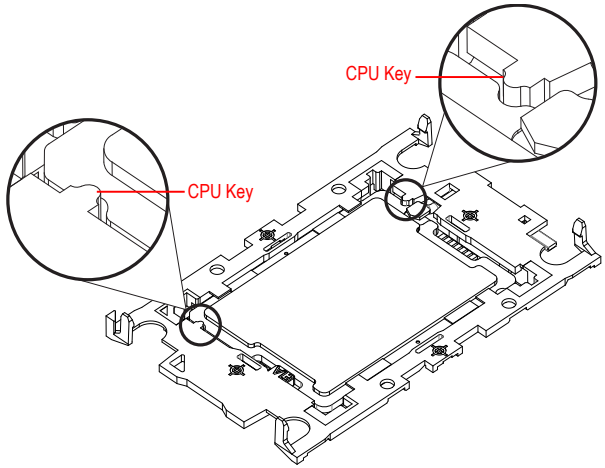
SP XCC
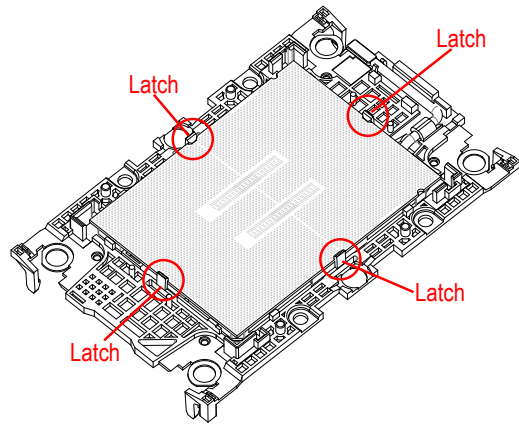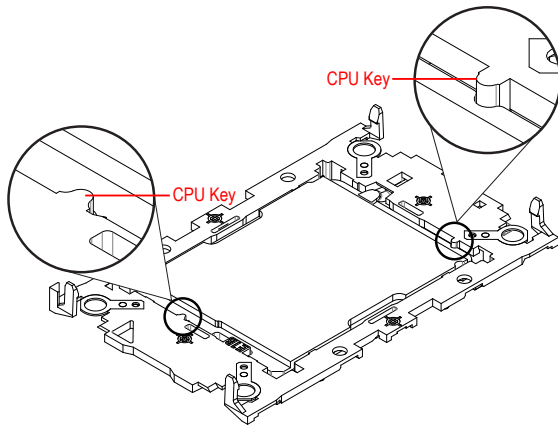
SP MCC

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

Carrier E1A

Carrier E1B
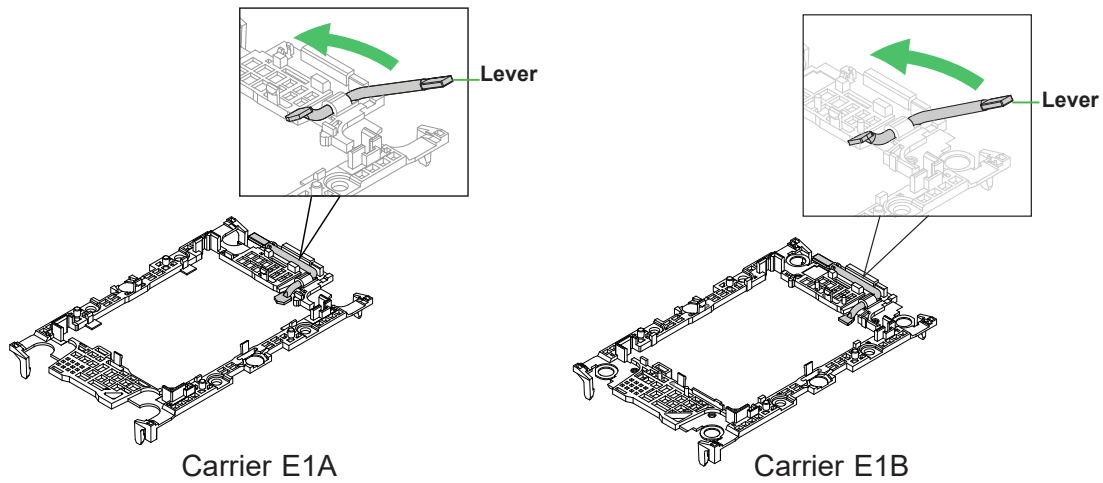
4. Using Pin 1 as a guide, carefully align the CPU keys (marked A and B) on the processor against the CPU keys on the carrier (marked a and b) as shown below.

5. Once they are properly aligned, carefully insert the CPU into the carrier, making sure that the CPU is properly secured by latches (marked 1, 2, 3, and 4).

SP XCC

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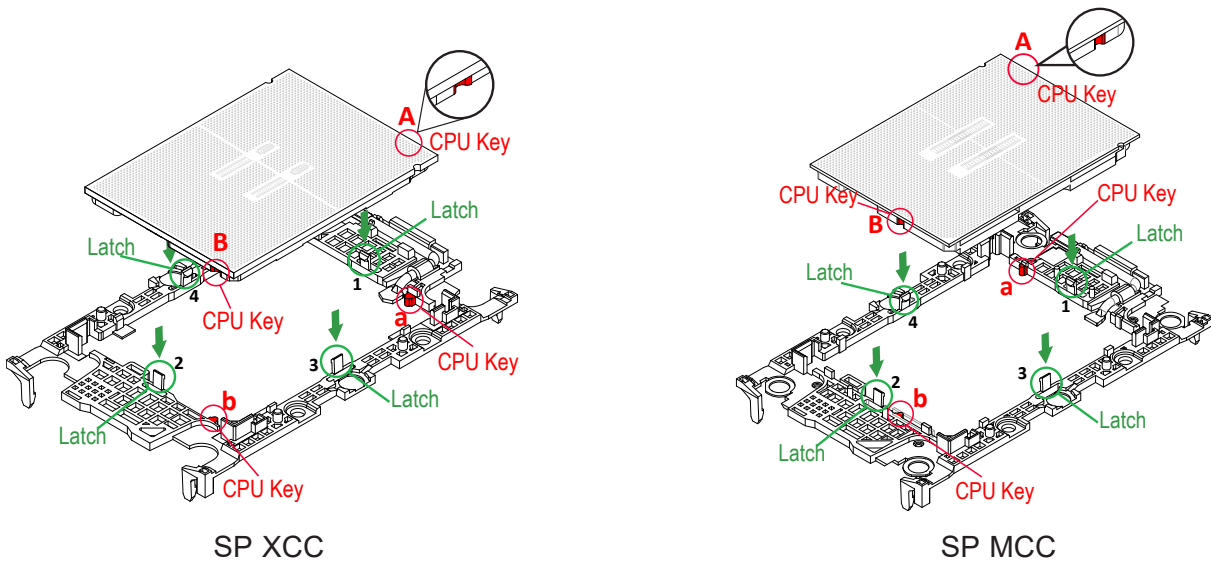
6. After the processor is placed inside the carrier, examine the four sides of the processor, making sure that the processor is properly seated on the carrier.

CPU Carrier Assembly
(Top View)

CPU Carrier Assembly
(Component Side)

SP XCC

SP MCC
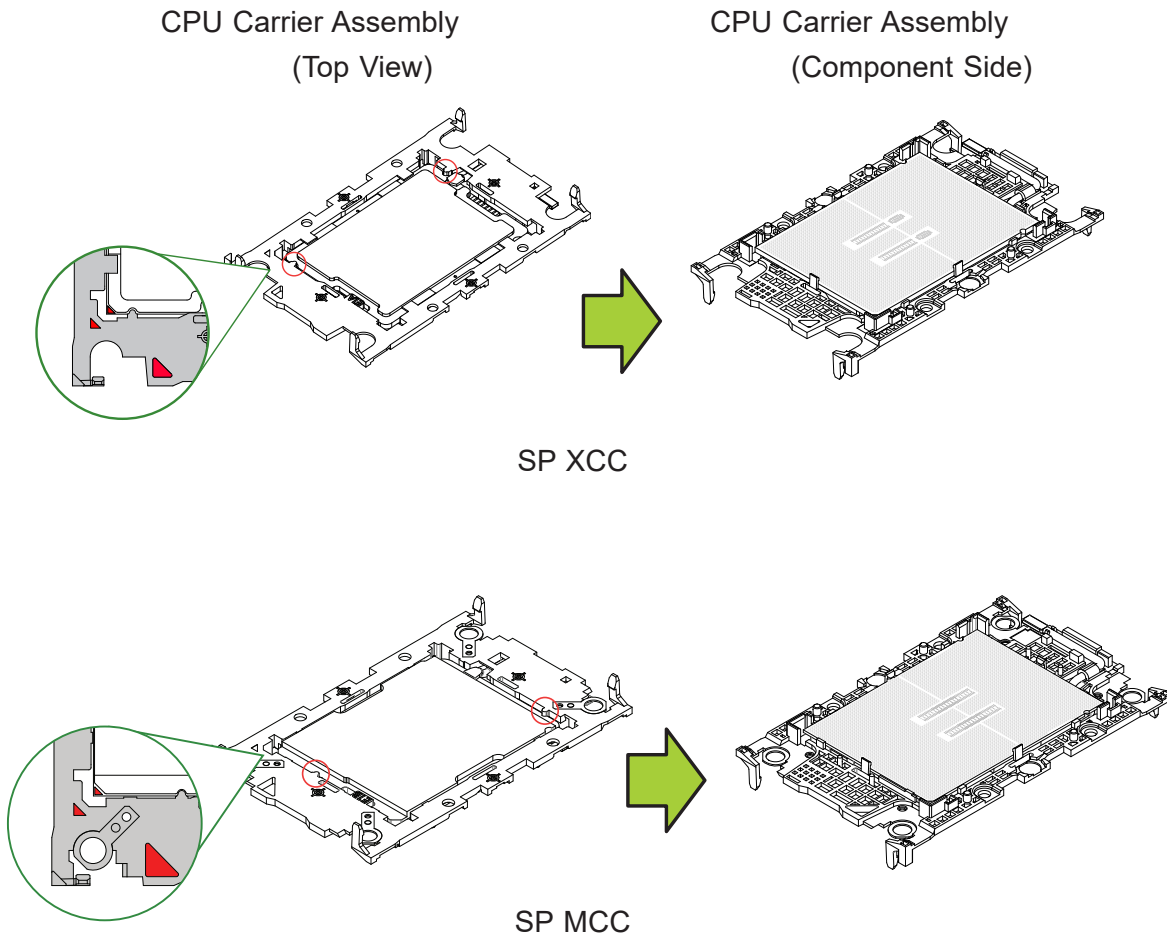
Creating the PHM

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

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

1. Turn the heatsink over with the thermal grease, which is on the bottom side of the heatsink, facing up. Pay attention to the two triangle cutouts (marked A and B) located at the diagonal corners of the heatsink as shown below.

2. Hold the CPU carrier component side facing up, and locate the triangle on the CPU and the triangle on the carrier. (Triangle indicates Pin 1.)

3. Using Pin 1 as a guide, turn the CPU carrier assembly over with the gold contacts facing up. Locate the triangle cutout (marked A) on the heatsink and the corner (marked a) on the CPU carrier assembly.

4. Align the corner (marked a) on the CPU carrier assembly against the triangle cutout (marked A) on the heatsink, and align the corners (marked b, c, and d) on the CPU carrier assembly against the corners (marked B, C, and D) on the heatsink.

5. Once they are properly aligned, place the corners (marked a, b, c, and d) on the processor carrier assembly into the corners of the heatsink (marked A, B, C, and D), making sure that all plastic clips are properly attached to the heatsink.

CPU Carrier Assembly (Component Side)

CPU Carrier Assembly (Component Side)

b

d

c

Pin 1

a

B

D

C

A

Heatsink (Bottom Side)

b

d

c

Pin 1

a

B

D

C

A

Heatsink (Bottom Side)
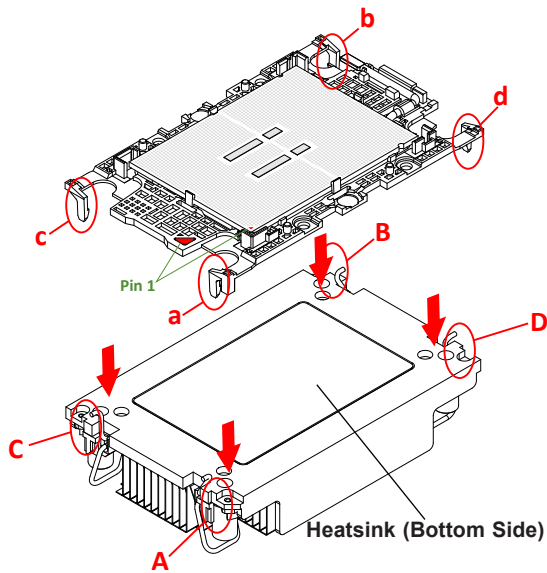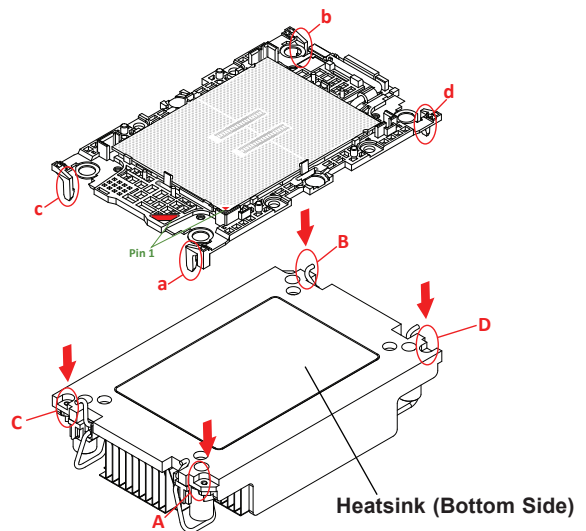
SP XCC

SP MCC

PHM (1U Heatsink)

CPU Carrier Assembly (Component Side)

CPU Carrier Assembly (Component Side)

b

d

c

Pin 1

a

B

B

D

C

A

Heatsink (Bottom Side)

d

c

Pin 1

a

B

B

D

C

A

Heatsink (Bottom Side)
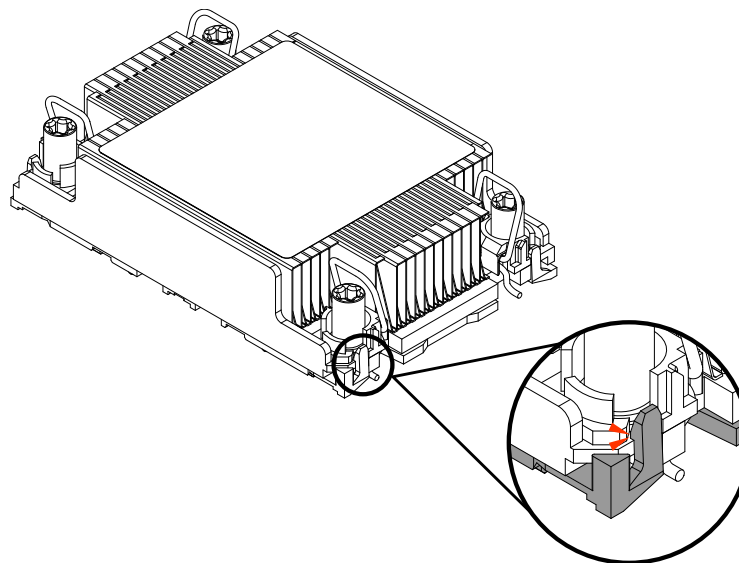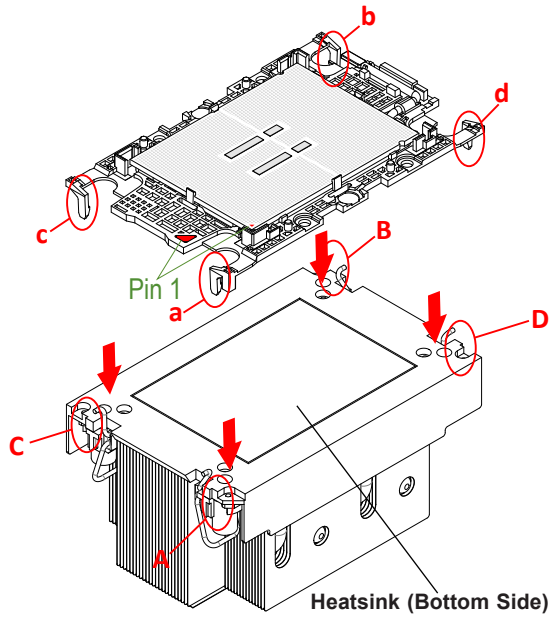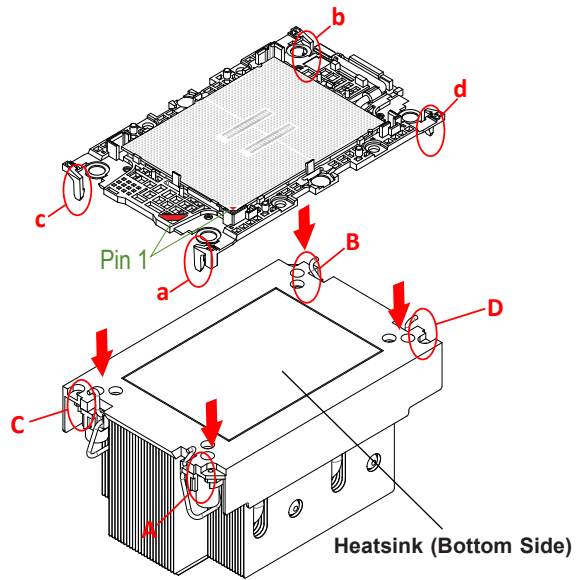
SP XCC

SP MCC

PHM (2U Heatsink)

CPU Carrier Assembly (Component Side)

Air Flow Direction

Air Flow Direction

(CPU1) Pin 1

(CPU2) Pin 1

Fan to be installed on the rear side of 4U heatsink

For CPU2 Socket

For CPU1 Socket
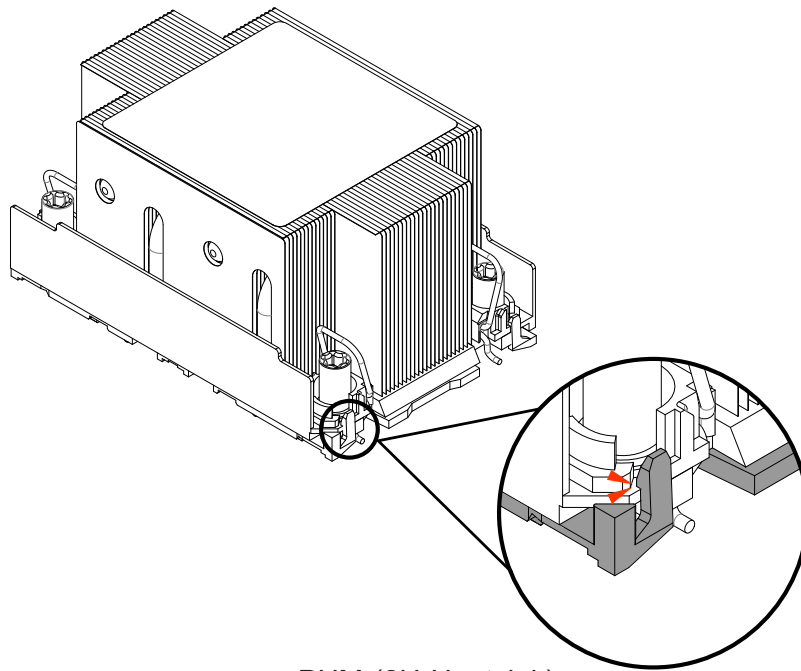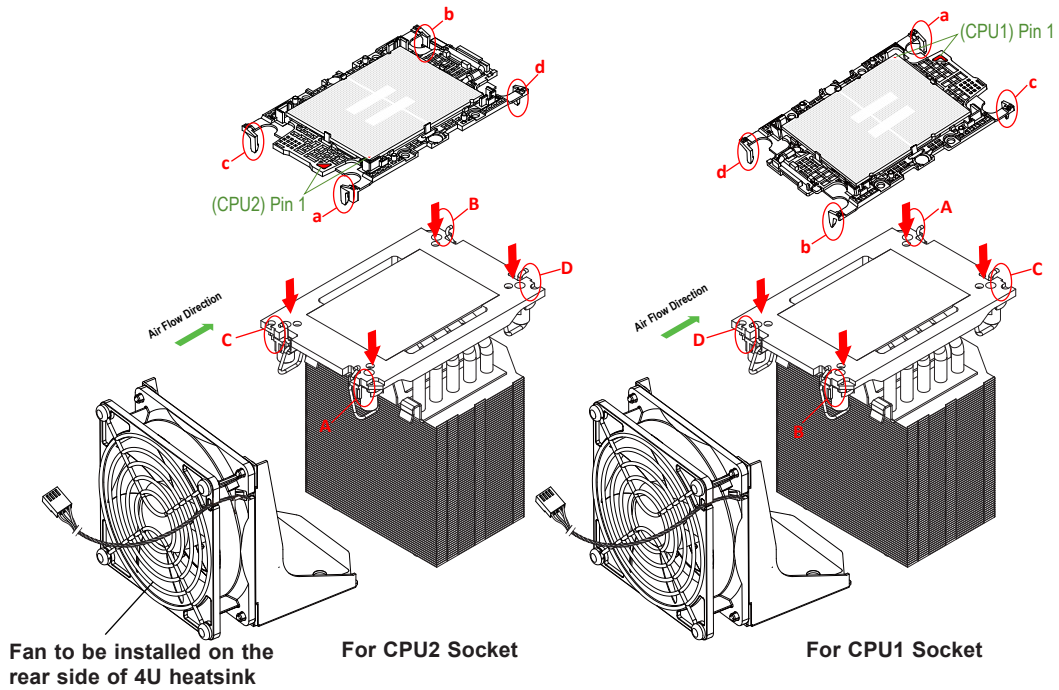
Note: The process of installing the CPU carrier assembly to the 4U heatsink is the same for SP XCC and SP MCC CPU. The graphics above show the SP XCC as an example.

Air Flow Direction

Air Flow Direction

For CPU2 Socket

For CPU1 Socket

PHM (4U Heatsink)
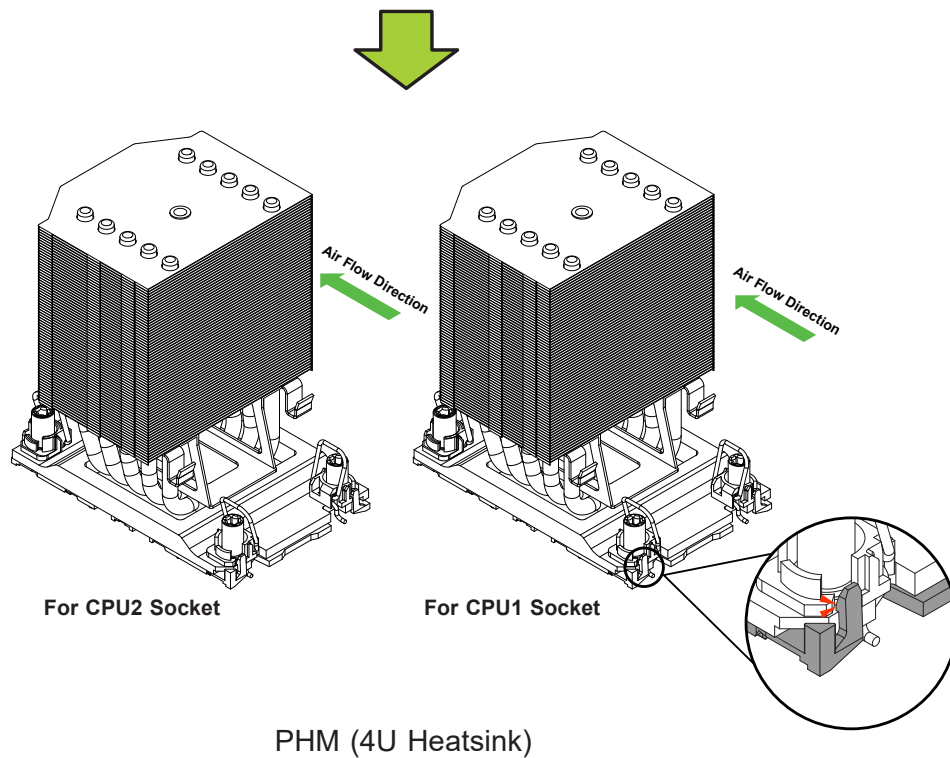
Preparing the CPU Socket for Installation

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

1. Press the tabs inward.
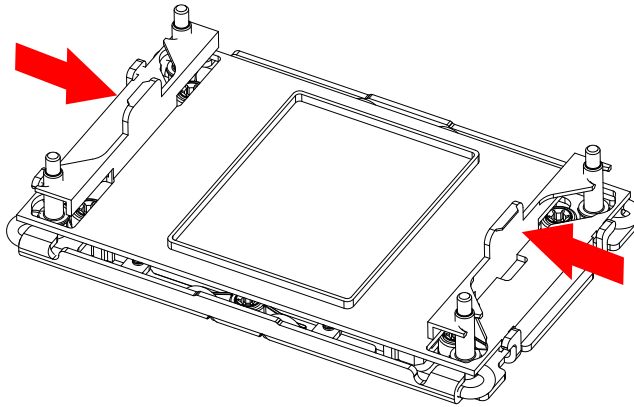
2. Pull up the protective cover from the socket.
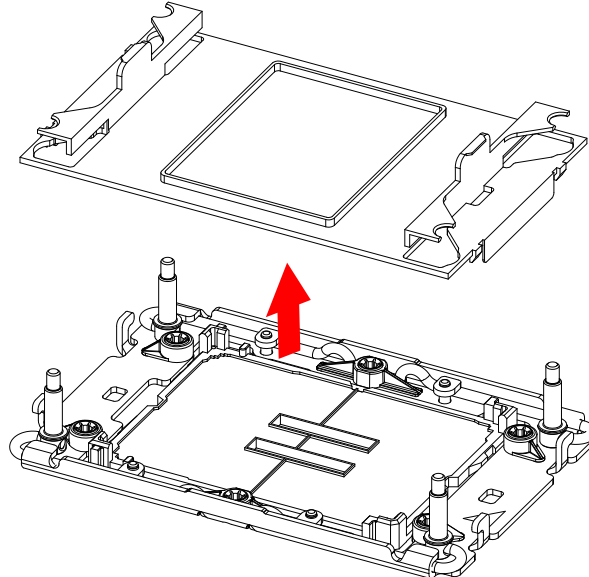
Preparing to Install the PHM into the CPU Socket

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

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

CPU Socket

(a, b, c, d: Threaded Fasteners)

CPU Socket Pin1

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

Heatsink (Top Side)

A, B, C, D: Peek Nut
1, 2, 3, 4: Rotating Wire
a, b, c, d: Threaded Fastener

Rotating Wire 2

B

Rotating Wire 4

Rotating Wire 3

D

C

Rotating Wire
Peek Nut

Rotating Wire 1
Peek Nut

(Unlatched)   (Latched)

A

b

d

c

a

CPU1/CPU2 Socket

1U Heatsink

Heatsink (Top Side)

Rotating Wire 2

A, B, C, D: Peek Nut
1, 2, 3, 4: Rotating Wire
a, b, c, d: Threaded Fastener

B

Rotating Wire 3

C

Rotating Wire 4

D

Rotating Wire

Peek Nut

(Unlatched)   (Latched)

A

Rotating Wire 1
Peek Nut

b

d   c

a

CPU1/CPU2 Socket

2U Heatsink

4U Heatsink (Top Side)

A, B, C, D: Peek Nut
1, 2, 3, 4: Rotating Wire
a, b, c, d: Threaded Fastener

Air Flow Direction

Rotating Wire 2 B

Rotating Wire 4

D

Rotating Wire 3

C

Rotating Wire

Peek Nut

(Unlatched) (Latched)

Rotating Wire 1
Peek Nut

Pin 1   A

b

d   c

a

Pin 1

CPU2 Socket

Pin 1   A

Rotating Wire 1

Rotating Wire 3

Air Flow Direction

Rotating Wire 4

D

C

Rotating Wire 2
Peek Nut

B

a

c   d

b

Pin 1

CPU1 Socket

4U Heatsink

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

Unlatched State

Side View

Top View

Rotating Wire 1

Peek Nut

1U Heatsink

Unlatched State

Side View

Top View

Rotating Wire 1

Peek Nut

2U Heatsink

Unlatched State

Side View

Top View

Rotating Wire 1

Peek Nut

4U Heatsink

Installing the PHM into the CPU Socket

1. Align peek nut (marked A) on the heatsink against threaded fastener (marked a) on the CPU socket. Then align peek nuts (marked B, C, D) on the heatsink against threaded fasteners (marked b, c, d) on the CPU socket, making sure that all peek nuts on the heatsink are properly aligned with the correspondent threaded fasteners on the CPU socket.

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

A, B, C, D:
Peek Nut on the Heatsink

a, b, c, d:
Threaded Fastener on
the CPU socket

1U Heatsink

A, B, C, D:
Peek Nut on the Heatsink

a, b, c, d:
Threaded Fastener on the CPU socket

2U Heatsink

A, B, C, D:
Peek Nut on
the Heatsink

Air Flow Direction

a, b, c, d:
Threaded Fastener on
the CPU socket

CPU2 Socket

Pin1

CPU1 Socket

Pin1

Rear Side
(Air Flow Direction)

CPU2

CPU1

Pin1

Pin1

4U Heatsink

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

1U Heatsink

2U Heatsink

4U Heatsink

4. With a T30 screwdriver, tighten all peek nuts in the sequence of A, B, C, and D with even pressure. To avoid damaging the processor or socket, do not use excessive force when tightening the peek nuts. (For best durability, 8in-lbf torque is recommended.)

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

1U Heatsink

2U Heatsink
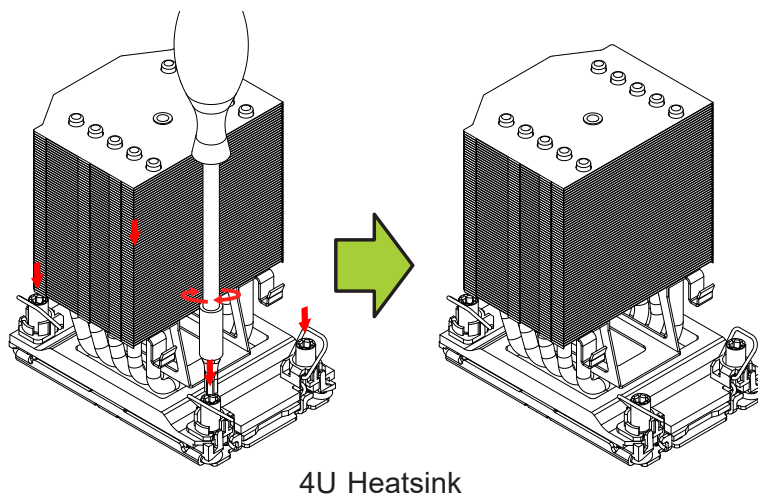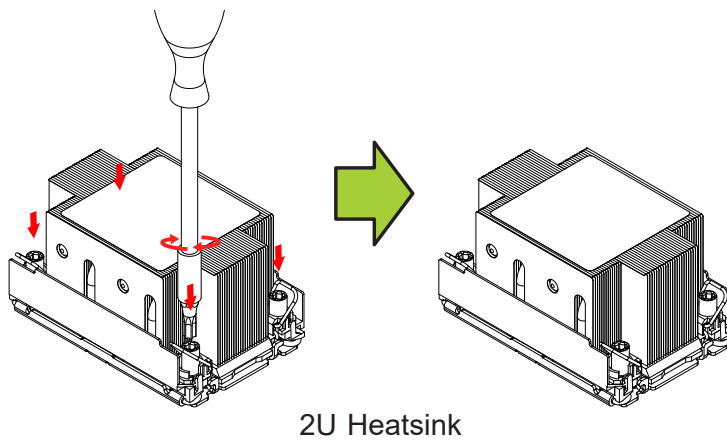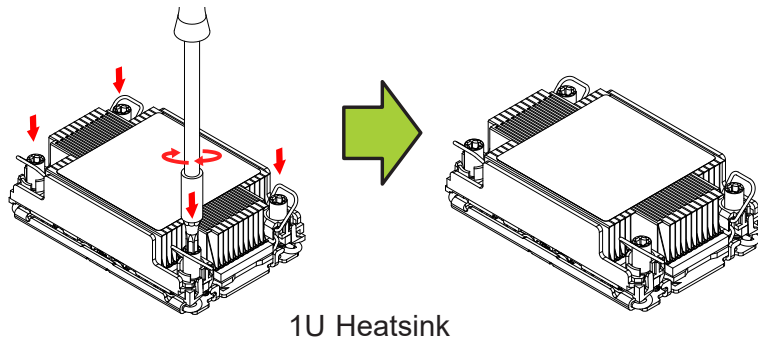
4U Heatsink

Installing the Fan onto the 4U Heatsink (for 4U Heatsinks Only)

1. Align the aluminum fan shroud against the top of the 4U heatsink. The fan shroud was designed to match perfectly with the top of the heatsink in terms of geometric shape.

2. When the fan shroud and the top of the heatsink are properly aligned, gently push the fan onto the heatsink until the bottom of the fan properly rests on the two hooks of the heatsink as shown in the illustration below.

hooks
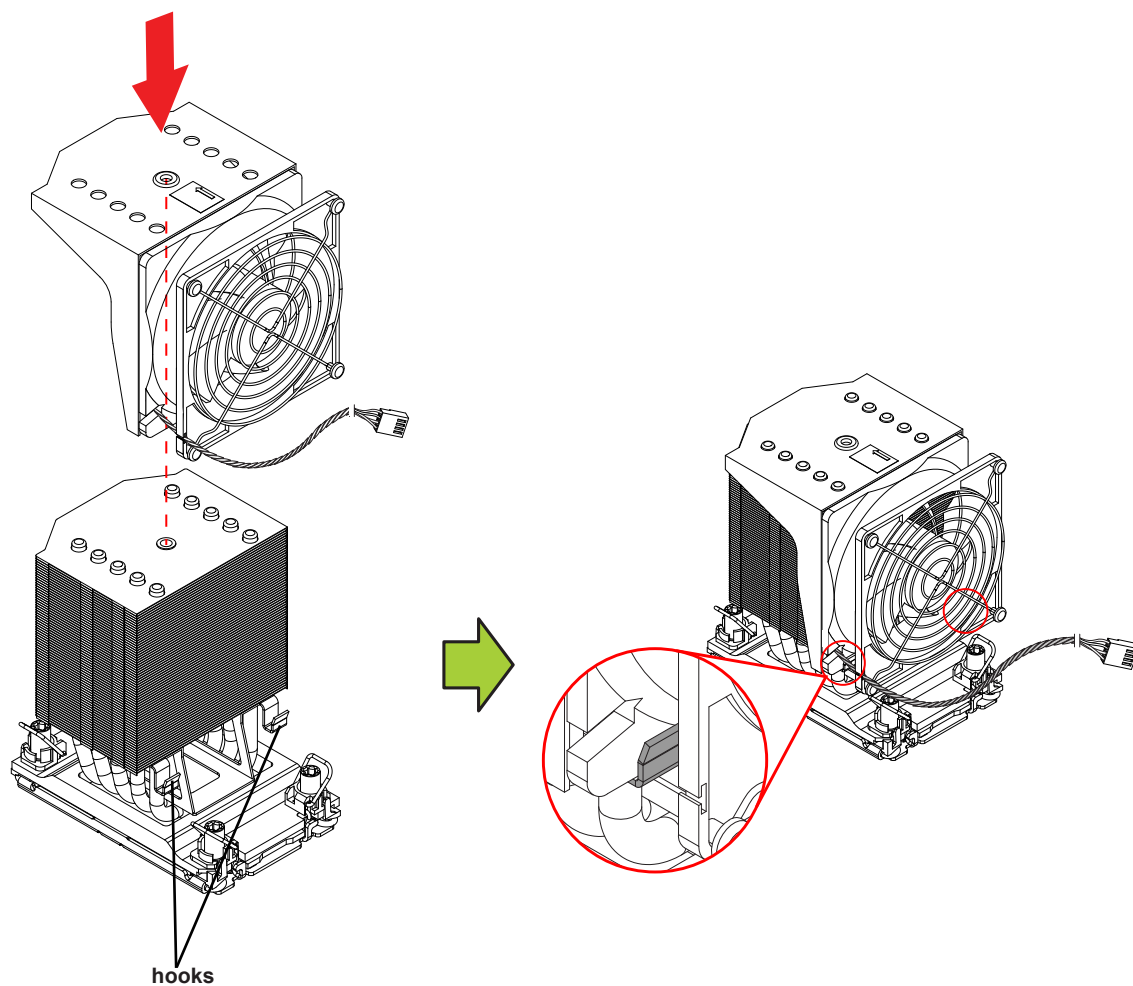
3. Insert the torx screw into the screw hole on top the heatsink and turn it clockwise to tighten the screw.
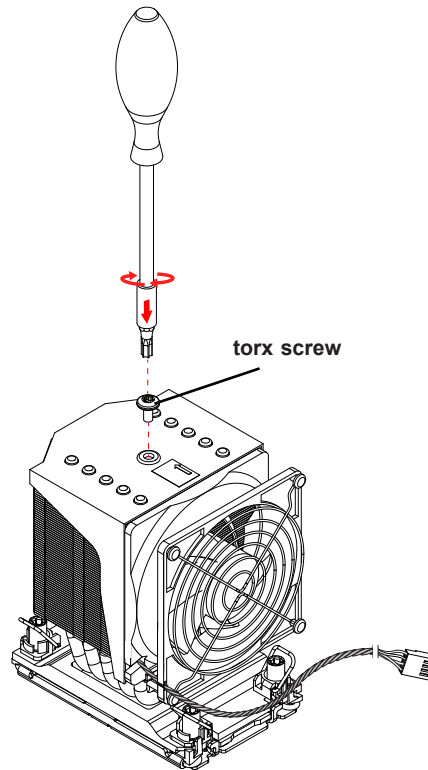
4. Connect the fan power connector to a 4-pin fan header on the motherboard.
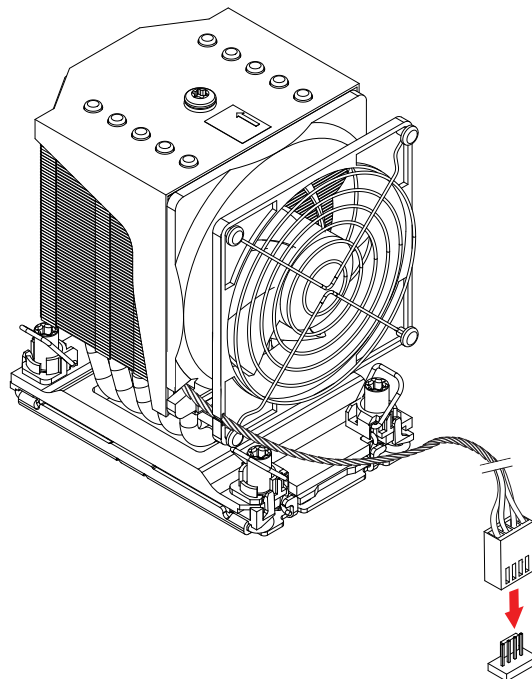
Uninstalling the Fan Before Removing the PHM (for 4U Heatsinks Only)

1. Loosen the torx screw from the heatsink. Unplug the fan power connector from the fan header.
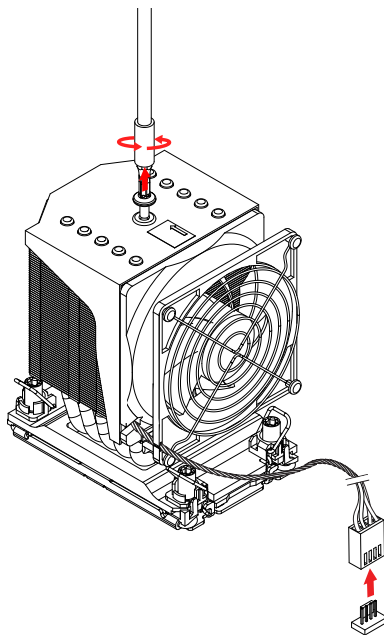
2. Gently pull the heatsink fan upward to detach it from the heatsink.
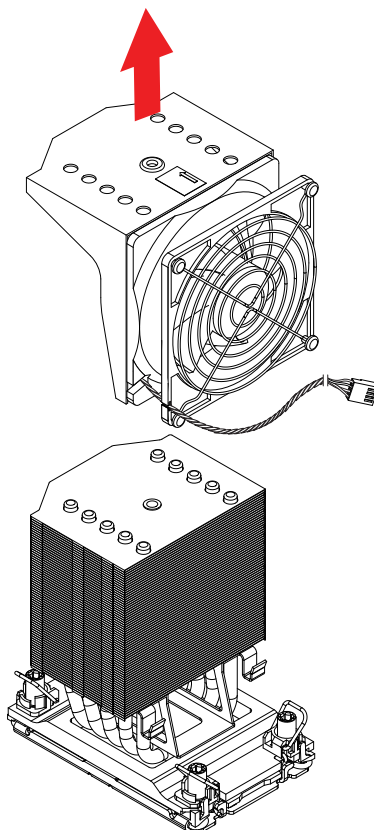
Removing the PHM from the CPU Socket

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

1. Use a T30 screwdriver to loosen the four peek nuts on the heatsink in the sequence of A, B, C, and D.
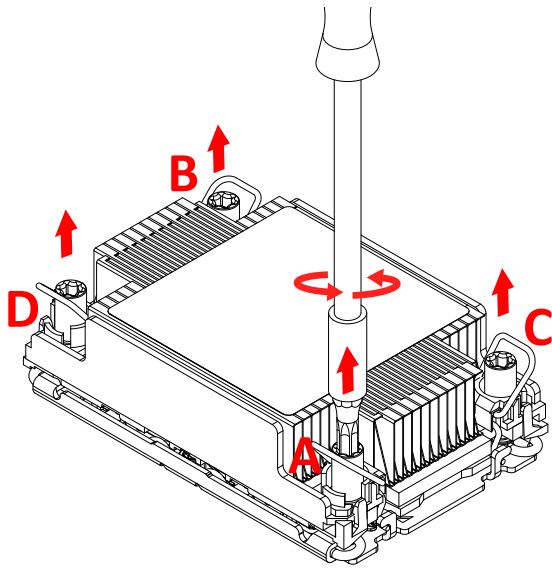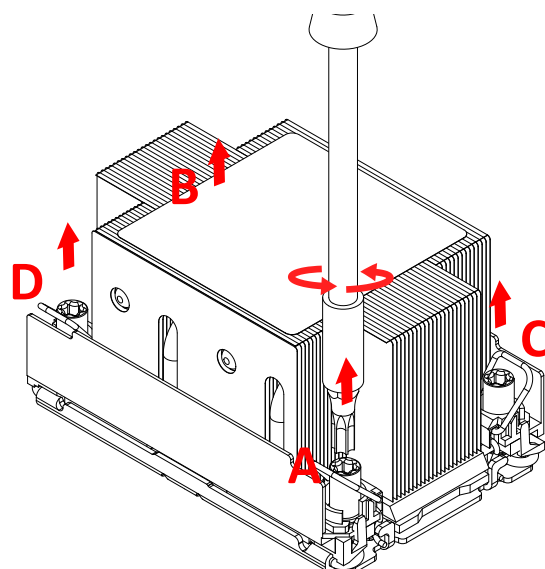
1U Heatsink   2U Heatsink
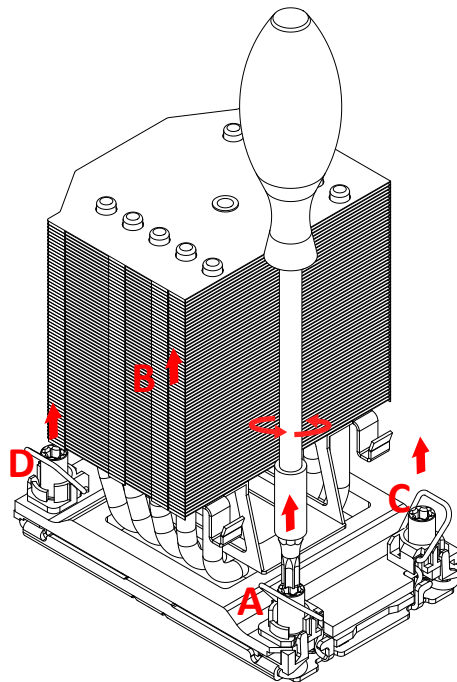
4U Heatsink

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

Unlatched State

1U Heatsink

Unlatched State

2U Heatsink

Unlatched State

4U Heatsink
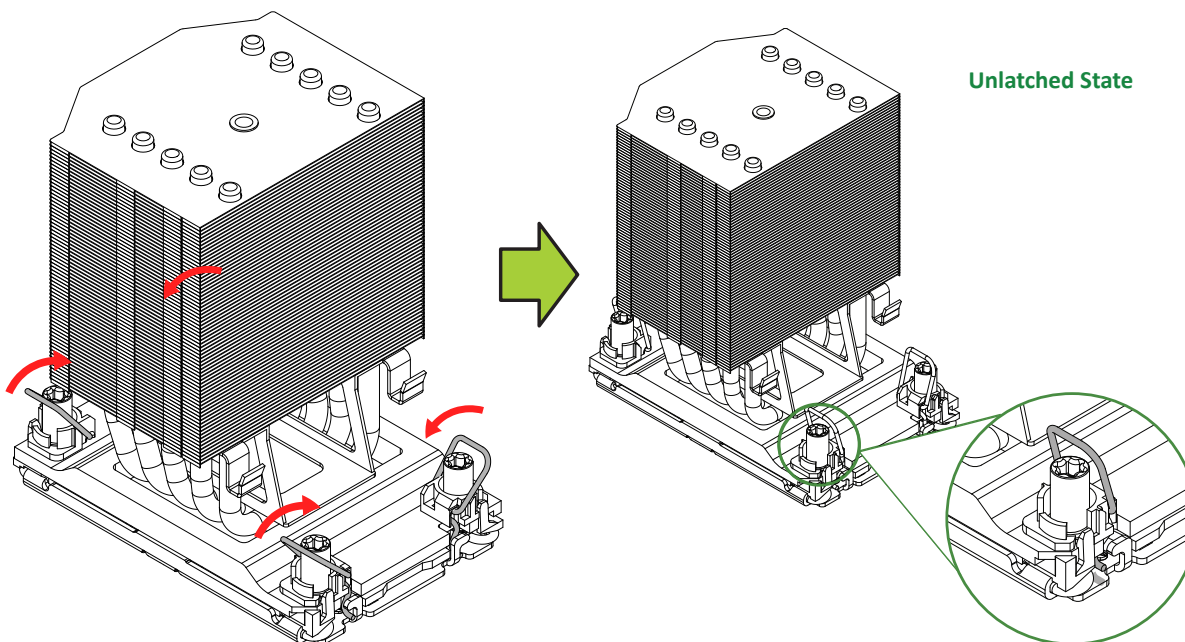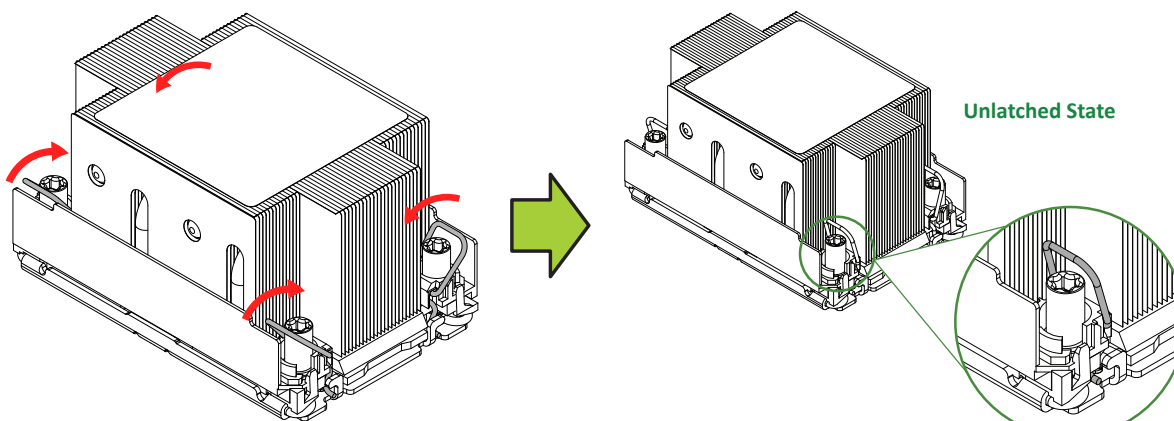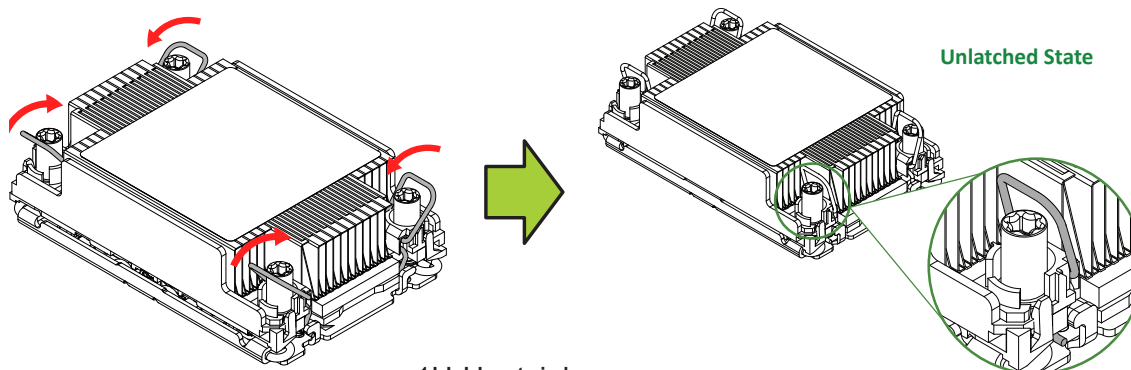
3. Gently pull the PHM upwards to remove it from the CPU socket.

1U Heatsink

2U Heatsink
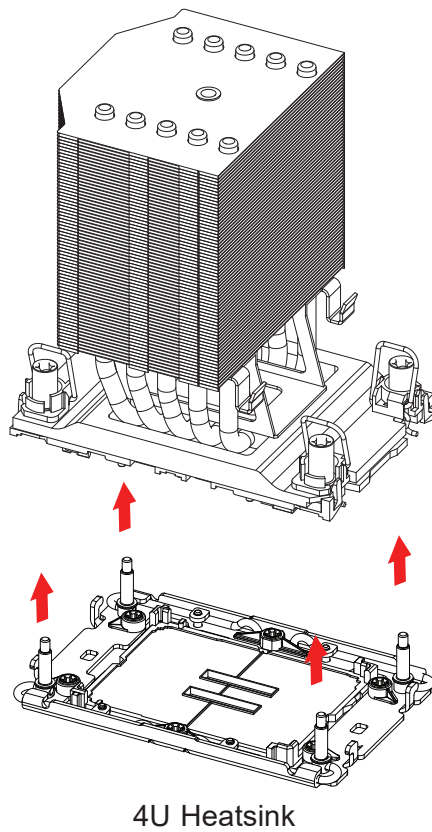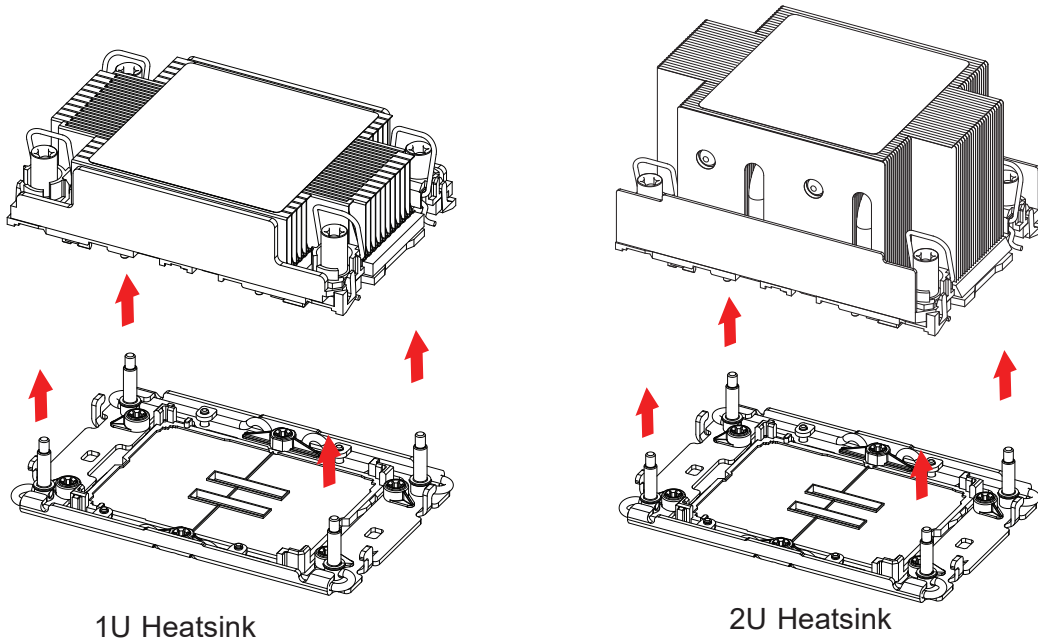
4U Heatsink

Removing the CPU Carrier Assembly from the PHM

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

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

1U Heatsink

SP XCC
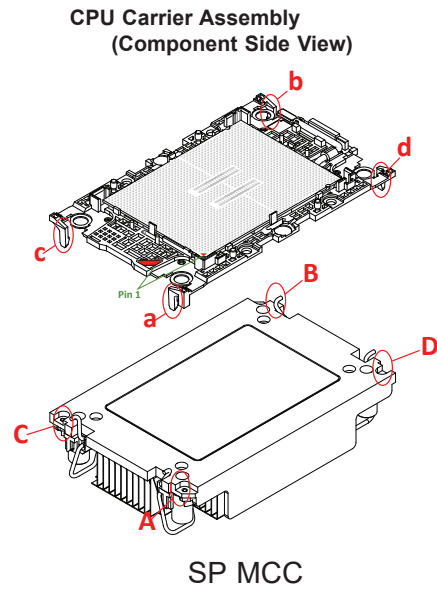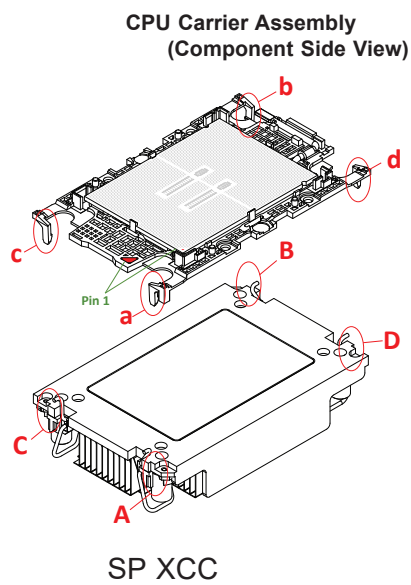
SP MCC

2U Heatsink
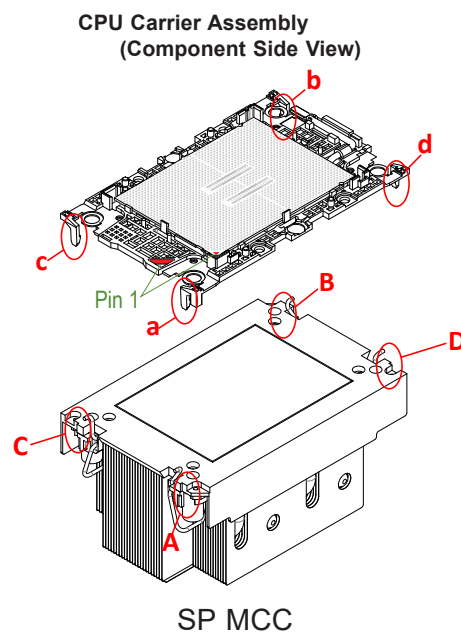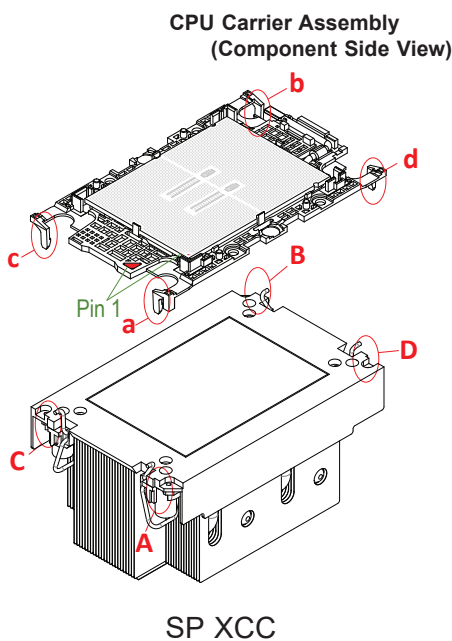
SP XCC

SP MCC

Heatsink (Bottom View)

4U Heatsink

CPU Carrier Assembly
(Component Side View)

Heatsink (Bottom View)
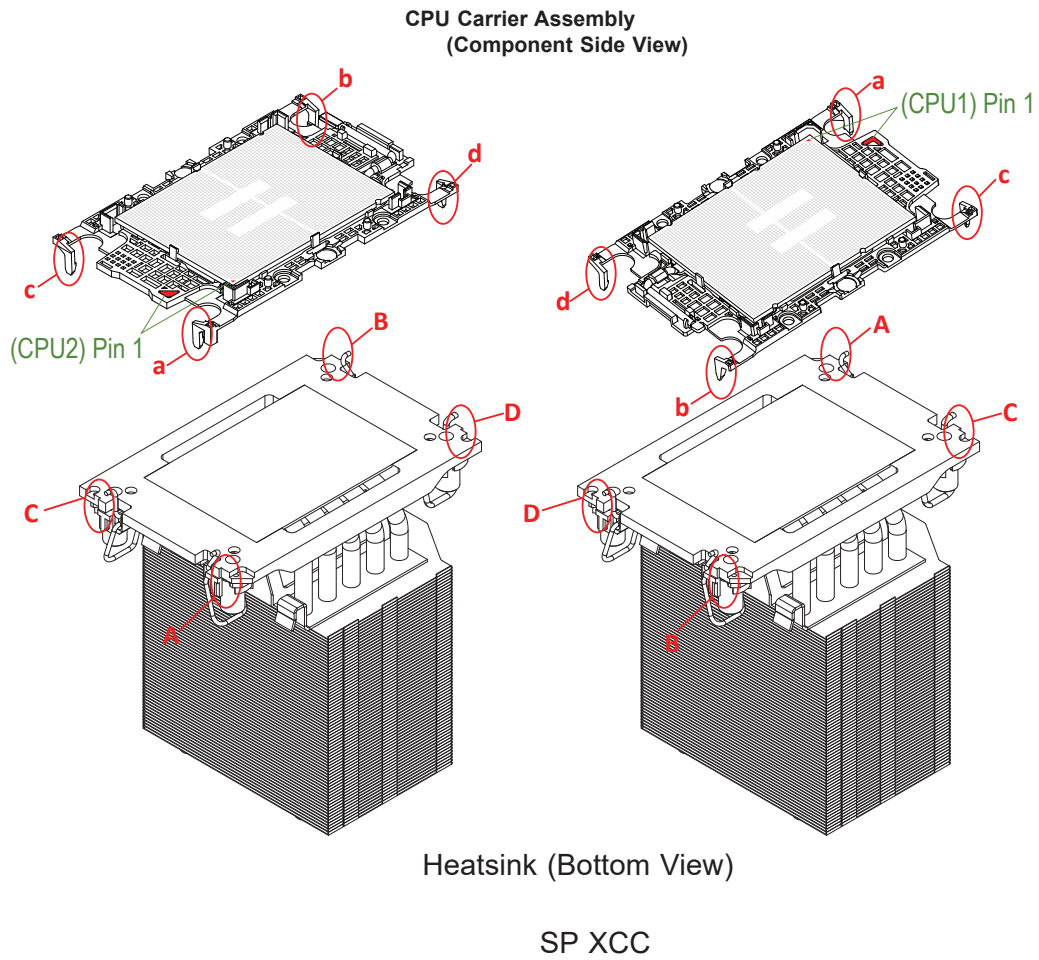
SP XCC

Note: The process of removing the CPU carrier assembly from the PHM is the same for SP XCC and SP MCC CPU. The graphics above show the SP MCC as an example.

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

1U Heatsink

SP XCC

SP MCC

2U Heatsink

SP XCC

SP MCC

4U Heatsink

SP XCC   SP MCC
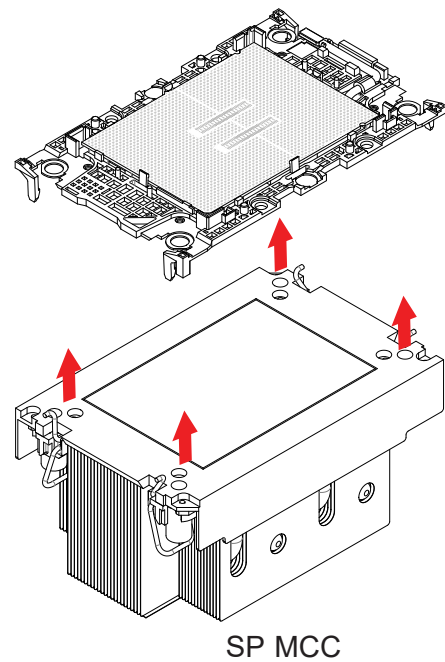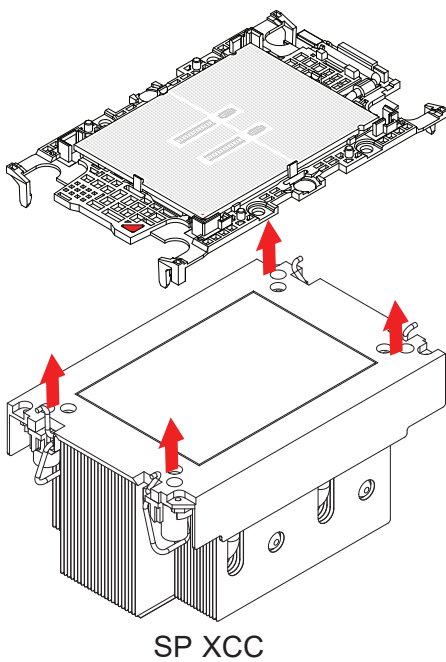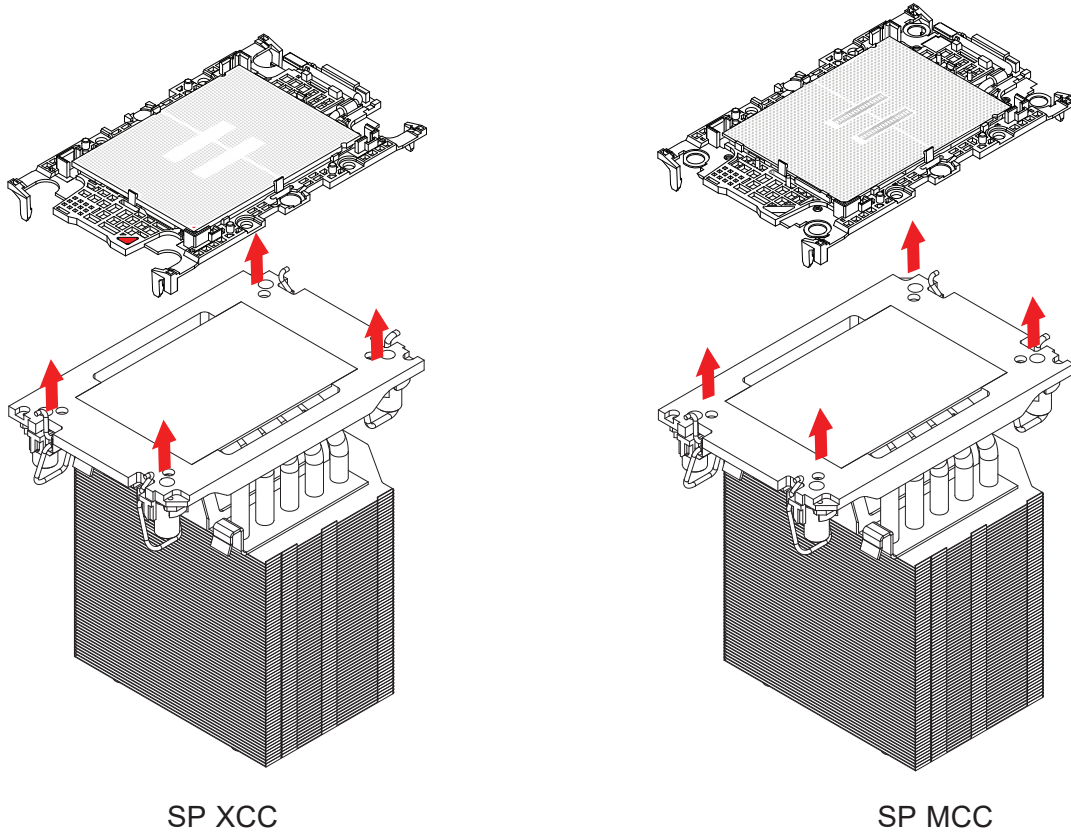
Removing the Processor from the CPU Carrier Assembly

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

1. Unlock the lever from its locked position and push the lever upwards to disengage the processor from the CPU carrier as shown in the drawing on the right below.
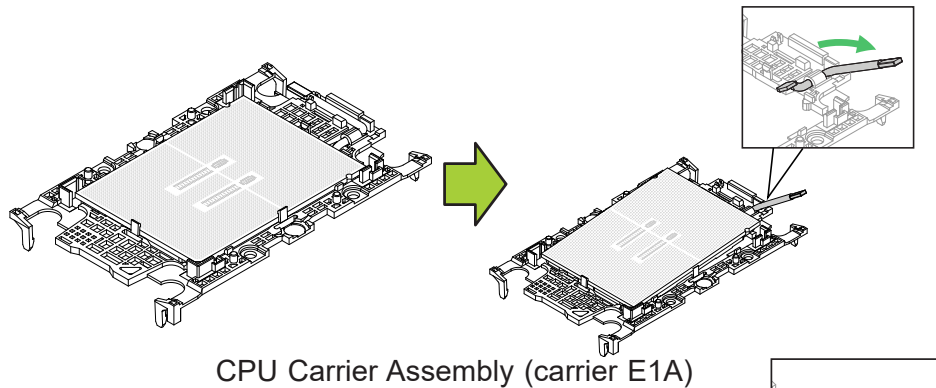
CPU Carrier Assembly (carrier E1A)
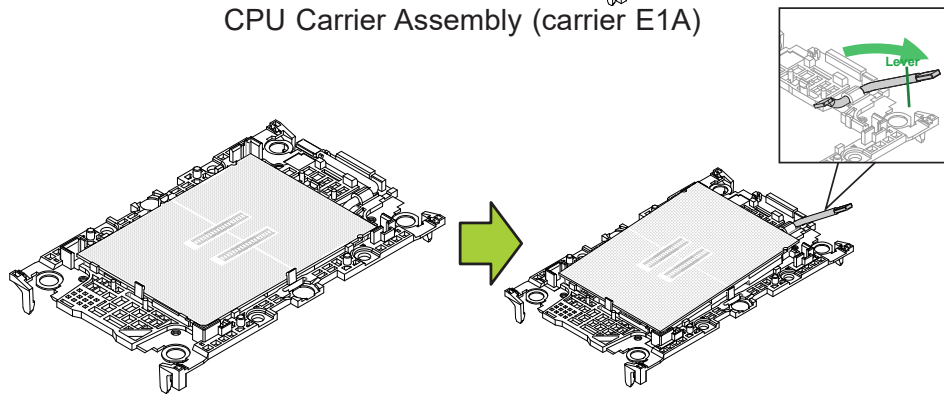
CPU Carrier Assembly (carrier E1B)

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

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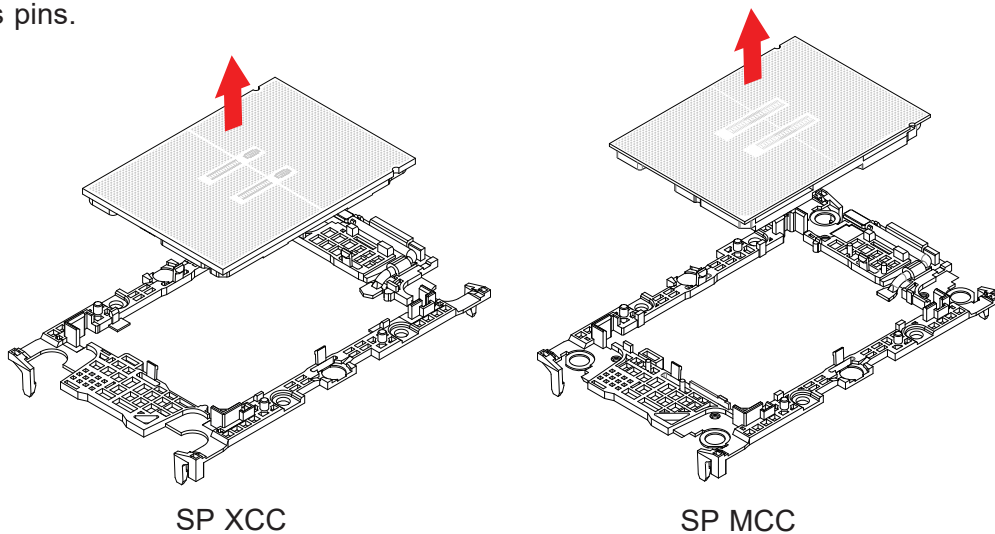
SP XCC

SP MCC

2.3 Motherboard Installation

All motherboards have standard mounting holes to fit different types of chassis. Make sure that the locations of all the mounting holes for both the motherboard and the chassis match. Although a chassis may have both plastic and metal mounting fasteners, metal ones are highly recommended because they ground the motherboard to the chassis. Make sure that the metal standoffs click in or are screwed in tightly.

Tools Needed

Phillips Screwdriver (1)

Phillips Screws (9)

Standoffs (9)
(Only if Needed)
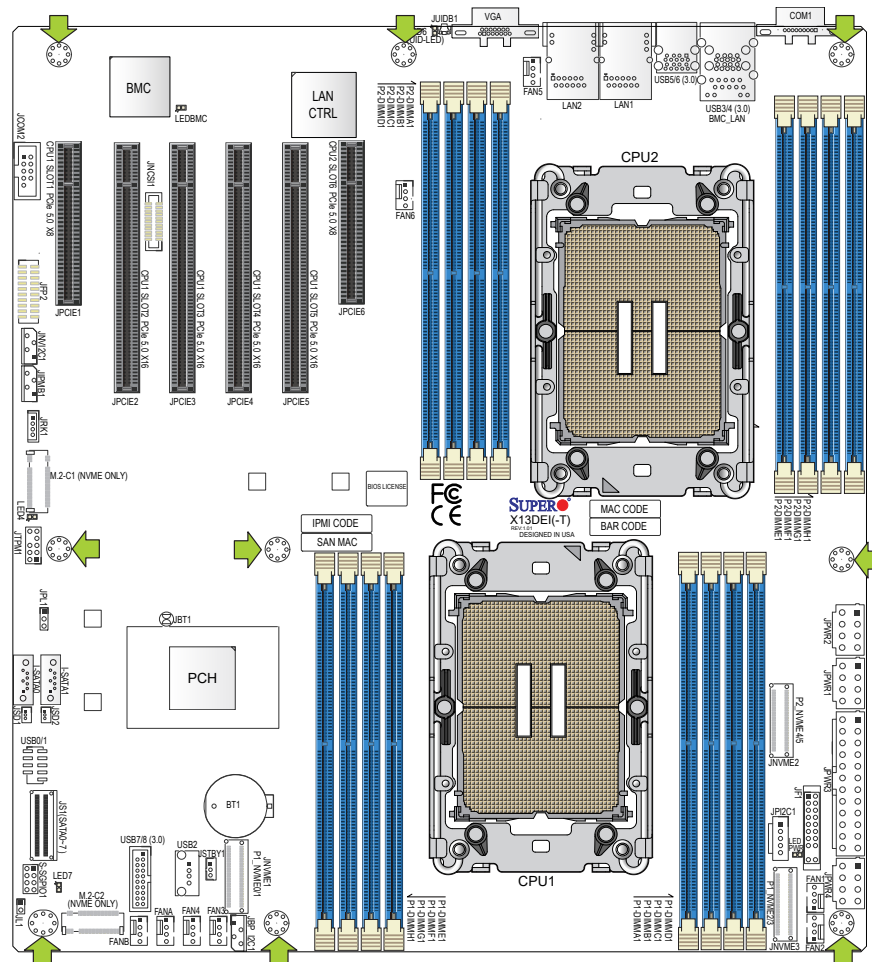
Location of Mounting Holes

Note 1: To avoid damaging the motherboard and its components, please do not use a force greater than 8 lbf-in on each mounting screw during motherboard installation.

Note 2: Some components are very close to the mounting holes. Please take precautionary measures to avoid damaging these components when installing the motherboard to the chassis.

Installing the Motherboard

1. Install the I/O shield into the back of the chassis, if applicable.

2. Locate the mounting holes on the motherboard. See the previous page for the location.
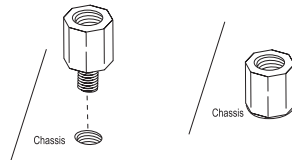
3. Locate the matching mounting holes on the chassis. Align the mounting holes on the motherboard against the mounting holes on the chassis.
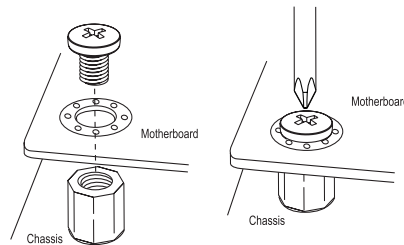
4. Install standoffs in the chassis as needed.

5. Install the motherboard into the chassis carefully to avoid damaging other motherboard components.

6. Using the Phillips screwdriver, insert a pan head #6 screw into a mounting hole on the motherboard and its matching mounting hole on the chassis.

7. Repeat Step 5 to insert #6 screws into all mounting holes.

8. Make sure that the motherboard is securely placed in the chassis.

    Note: Images displayed are for illustration only. Your chassis or components might look different from those shown in this manual.

2.4 Memory Support and Installation

Note: Check the Supermicro website for recommended memory modules.

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

Memory Support

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

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

DIMM Population Guidelines for Optimal Performance

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

Key Parameters for DIMM Configuration (for the X13Dxx Motherboards)

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

Compatible and Incompatible Type in a Channel and a System			
DIMM Type	**RDIMM**	**RDIMM 3DS**	**9x4 RDIMM**
RDIMM	Compatible	Incompatible	Incompatible
RDIMM 3DS	Incompatible	Compatible	Incompatible
9x4 RDIMM	Incompatible	Incompatible	Compatible

Memory Population Tables for the X13Dxx Motherboards

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

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

Memory Population Table (with 16 DIMM Slots)

DDR5 Memory Population Table for X13Dxx Motherboards (with 16 DIMMs installed)	
1 CPU	*Memory Population Sequence*
1 CPU & 1 DIMM	P1-DIMMA1 or P1-DIMME1 or P1-DIMMB1 or P1-DIMMF1
1 CPU & 2 DIMMs	P1-DIMMA1 / P1-DIMMG1 or P1-DIMMC1 / P1-DIMME1
1 CPU & 4 DIMMs	P1-DIMMA1 / P1-DIMMC1 / P1-DIMME1 / P1-DIMMG1
1 CPU & 6 DIMM	P1-DIMMA1 / P1-DIMMC1 / P1-DIMMD1 / P1-DIMME1 / P1-DIMMF1 / P1-DIMMG1 or P1-DIMMA1 / P1-DIMMB1 / P1-DIMMC1 / P1-DIMME1 / P1-DIMMG1 / P1-DIMMH1 or P1-DIMMB1 / P1-DIMMC1 / P1-DIMMD1 / P1-DIMME1 / P1-DIMMF1 / P1-DIMMH1 or P1-DIMMA1 / P1-DIMMB1 / P1-DIMMD1 / P1-DIMMF1 / P1-DIMMG1 / P1-DIMMH1
1 CPU & 8 DIMMs	P1-DIMMA1 / P1-DIMMB1 / P1-DIMMC1 / P1-DIMMD1 / P1-DIMME1 / P1-DIMMF1 / P1-DIMMG1 / P1-DIMMH1
2 CPUs (Recommended)	*Memory Population Sequence*
2 CPUs & 2 DIMMs	**CPU1:** P1-DIMMA1, **CPU2:** P2-DIMMA1 or **CPU1:** P1-DIMME1, **CPU2:** P2-DIMME1 or **CPU1:** P1-DIMMB1, **CPU2:** P2-DIMMB1 or **CPU1:** P1-DIMMF1, **CPU2:** P2-DIMMF1
2 CPUs & 4 DIMMs	**CPU1:** P1-DIMMA1 / P1-DIMMG1, **CPU2:** P2-DIMMA1 / P2-DIMMG1 or **CPU1:** P1-DIMMC1 / P1-DIMME1, **CPU2:** P2-DIMMC1 / P2-DIMME1
2 CPUs & 8 DIMMs	**CPU1:** P1-DIMMA1 / P1-DIMMC1 / P1-DIMME1 / P1-DIMMG1 **CPU2:** P2-DIMMA1 / P2-DIMMC1 / P2-DIMME1 / P2-DIMMG1
2 CPUs & 12 DIMMs	**CPU1:** P1-DIMMA1/P1-DIMMC1/P1-DIMMD1/P1-DIMME1/P1-DIMMF1/P1-DIMMG1 **CPU2:** P2-DIMMA1/P2-DIMMC1/P2-DIMMD1/P2-DIMME1/P2-DIMMF1/P2-DIMMG1 **CPU1:** P1-DIMMA1/P1-DIMMB1/P1-DIMMC1/P1-DIMME1/P1-DIMMG1/P1-DIMMH1 **CPU2:** P2-DIMMA1/P2-DIMMB1/P2-DIMMC1/P2-DIMME1/P2-DIMMG1/P2-DIMMH1 **CPU1:** P1-DIMMB1/P1-DIMMC1/P1-DIMMD1/P1-DIMME1/P1-DIMMF1/P1-DIMMH1 **CPU2:** P2-DIMMB1/P2-DIMMC1/P2-DIMMD1/P2-DIMME1/P2-DIMMF1/P2-DIMMH1 **CPU1:** P1-DIMMA1/P1-DIMMB1/P1-DIMMD1/P1-DIMMF1/P1-DIMMG1/P1-DIMMH1 **CPU2:** P2-DIMMA1/P2-DIMMB1/P2-DIMMD1/P2-DIMMF1/P2-DIMMG1/P2-DIMMH1
2 CPUs & 16 DIMMs	**CPU1**: P1-DIMMA1/P1-DIMMB1/P1-DIMMC1/P1-DIMMD1/P1-DIMME1/P1-DIMMF1/P1-DIMMG1/P1-DIMMH1 **CPU2**: P2-DIMMA1/P2-DIMMB1/P2-DIMMC1/P2-DIMMD1/P2-DIMME1/P2-DIMMF1/P2-DIMMG1/P2-DIMMH1

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

DIMM Installation

1. Insert the desired number of DIMMs into the memory slots based on the recommended DIMM population tables in the previous section. Locate DIMM memory slots on the motherboard as shown on the right.

2. Push the release tabs outwards on both ends of the DIMM slot to unlock it.

Release Tabs
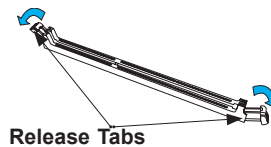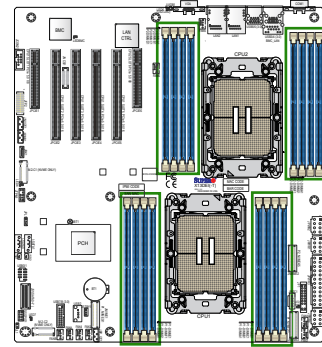
3. Align the key of the memory module with the receptive point on the memory slot.

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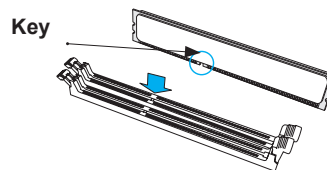
4. Align the notches on both ends of the module against the receptive points on the ends of the slot.

Notches
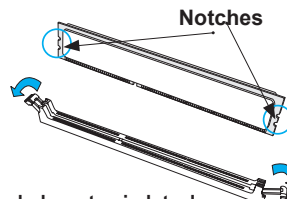
5. Push both ends of the module straight down into the slot until the module snaps into place.

6. Press the release tabs to the lock positions to secure the memory module into the slot.

Push both ends straight down into the memory slot.
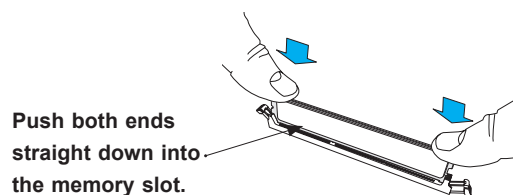
DIMM Removal

Press both release tabs on the ends of the memory module to unlock it. Once the memory module has been loosened, remove it from the memory slot.
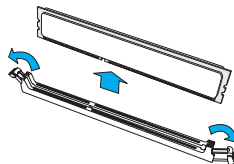
Warning! Please do not use excessive force when pressing the release tabs on the ends of the DIMM socket to avoid causing any damage to the memory module or the DIMM socket. Please handle memory modules with care. Carefully follow all the instructions given on page 1 of this chapter to avoid ESD-related damages done to your memory modules or components.

2.5 Rear I/O Ports

See Figure 2-1 below for the locations and descriptions of the various I/O ports on the rear of the motherboard.
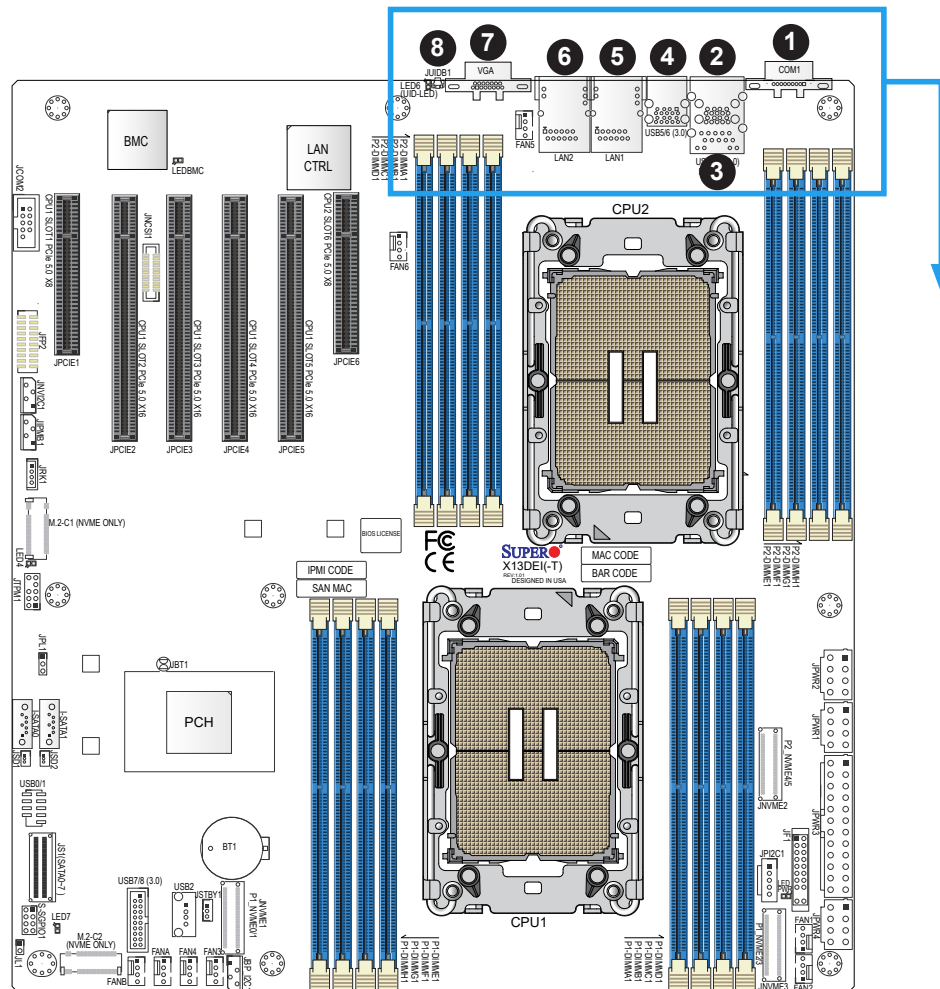
Figure 2-1. I/O Port Locations and Definitions
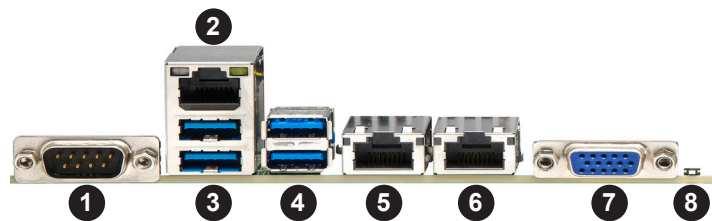
Rear I/O Ports			
#	**Description**	**#**	**Description**
1.	COM Port 1	5.	1G LAN1 (X13DEI), 10G LAN1 (X13DEI-T)
2.	Dedicated BMC LAN	6.	1G LAN2 (X13DEI), 10G LAN2 (X13DEI-T)
3.	USB3/4 (3.0)	7.	VGA Port
4.	USB5/6 (3.0)	8.	UID/BMC Reset Switch

VGA Connections

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

JFP2

	20	19	
Ground	○	○	Ground
X	○	○	X
X	○	○	X
GROUND	○	○	GROUND
FRONT_DAC_BLUE	○	○	FRONT_DAC_GREEN
GROUND	○	○	GROUND
FRONT_HSYNC_BUF	○	○	FRONT_DAC_RED
FRONT_VSYNC_BUF	○	○	GROUND
FRONT_MONITOR_DETECT	○	○	SMB_HEADER_DDC_DATA
P5V_FVGA	○	○	SMB_HEADER_DDC_CLK
	2	1	
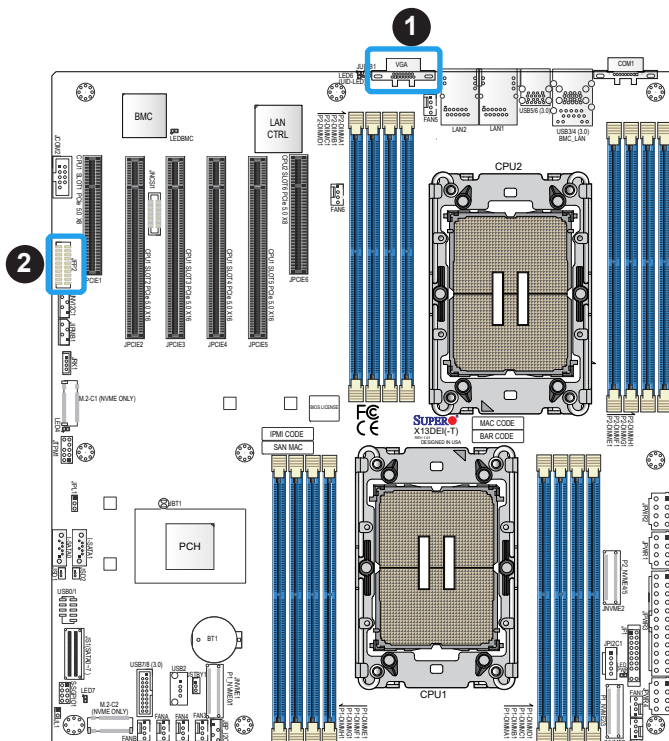
1. (Rear) VGA
2. (Front) VGA (JFP2)

COM Ports

Two COM (communication) ports that support serial link interface are on this motherboard. COM1 is located on the rear I/O panel. JCOM2 is located next to PCIe Slot 1 (JPCIE1). Refer to the board layout below for the locations of COM1 and COM2.

COM2 (JCOM2) Pin Definitions			
Pin#	Definition	Pin#	Definition
1	SP_DCD2	6	SP_DSR2
2	SP_RXD2	7	SP_RTS2
3	SP_TXD2	8	SP_CTS2
4	SP_DTR2	9	SP_R12
5	Ground		
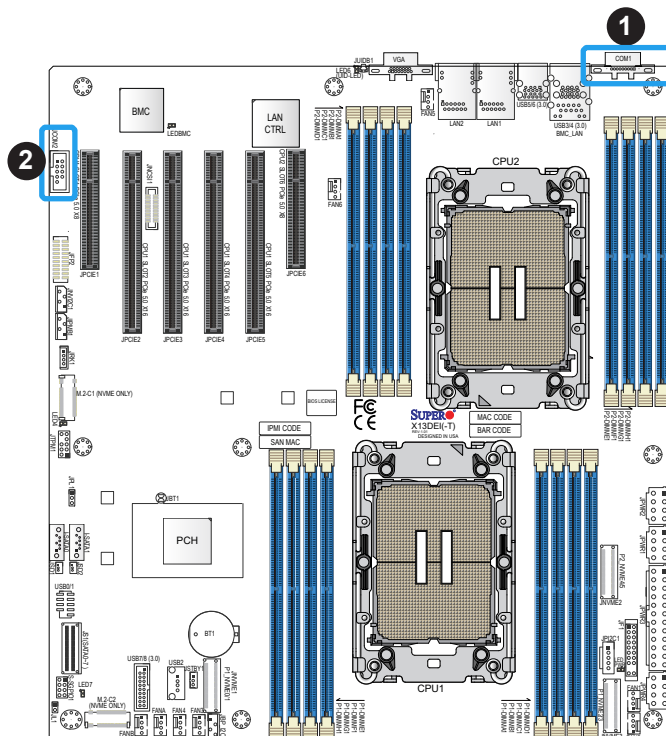
1. COM1

2. COM2 (JCOM2)
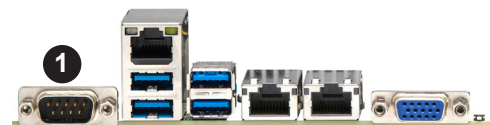
LAN Ports (LAN1/LAN2 & BMC LAN)

Two Ethernet LAN ports (LAN1/LAN2) and an BMC dedicated LAN (BMC_LAN) are located on the rear I/O panel. LAN1/LAN2 ports support 1 GbE LAN connection (via the Broadcom 5720 LAN controller) on the X13DEI, and support 10 GbE LAN connection (via the Broadcom 57416 LAN controller) on the X13DEI-T. The dedicated BMC LAN (BMC_LAN), located above the USB3/4 ports on the rear I/O panel, provides LAN support for the BMC (Baseboard Management Controller). All of these LAN ports accept RJ45 cables. Please refer to the LED Indicator section for LAN LED information.
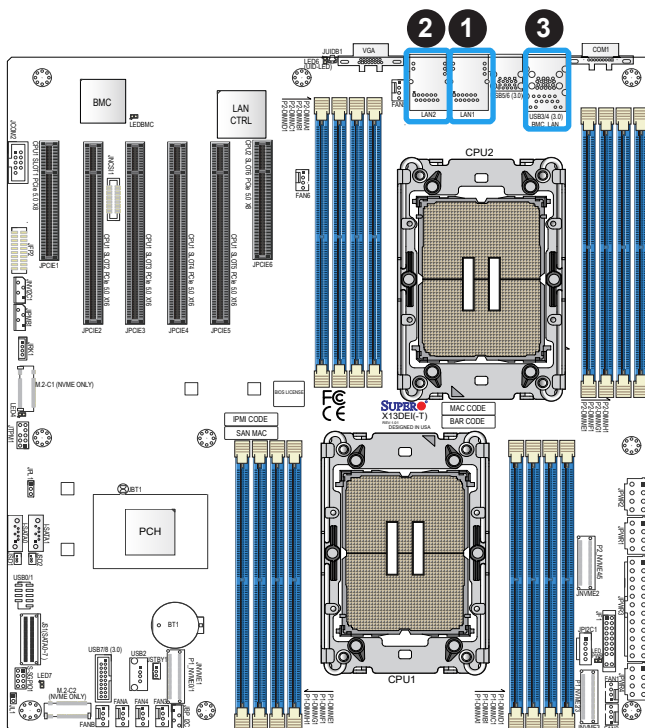
1. LAN1
2. LAN2
3. BMC LAN port
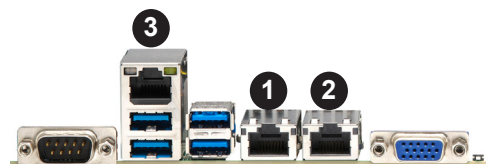
Universal Serial Bus (USB) Ports and Headers

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

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

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

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

Rear I/O Panel USB 3.0 Ports (USB5/6) Pin Definitions			
Pin#	Definition	Pin#	Definition
A1	VBUS	B1	VBUS
A2	USB_N	B2	USB_N
A3	USB_P	B3	USB_P
A4	GND	B4	GND
A5	USB3_RN	B5	USB3_RN
A6	USB3_RP	B6	USB3_RP
A7	GND	B7	GND
A8	USB3_TN	B8	USB3_TN
A9	USB3_TP	B9	USB3_TP
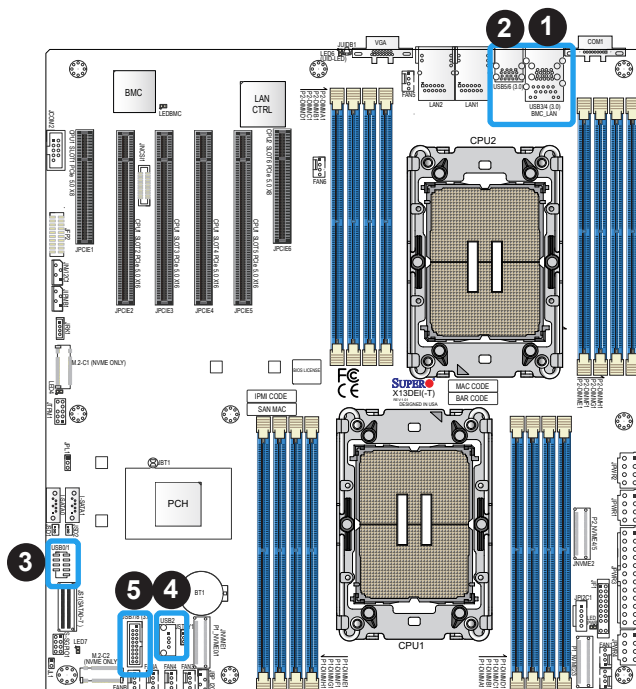
1. USB3/4 (3.0) on rear I/O panel

2. USB5/6 (3.0) on rear I/O panel

3. USB0/1 (2.0) for front access

4. USB2 (Internal USB 2.0 vertical Type-A connector)

5. USB7/8 (3.0) for front access
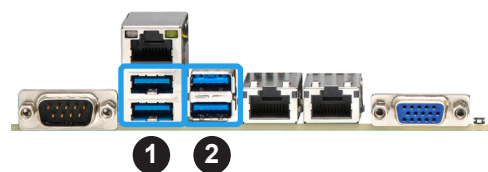
(Continued to next page)

(Continued from previous page)

USB 3.0 Header (USB7/8) Pin Definitions			
Pin#	Definition	Pin#	Definition
1	VBUS	20	NC
2	USB3_RN	19	VBUS
3	USB3_RP	18	USB3_RN
4	GND	17	USB3_RP
5	USB3_TN	16	GND
6	USB3_TP	15	USB3_TN
7	GND	14	USB3_TP
8	USB_N	13	GND
9	USB_P	12	USB_N
10	GND	11	USB_P
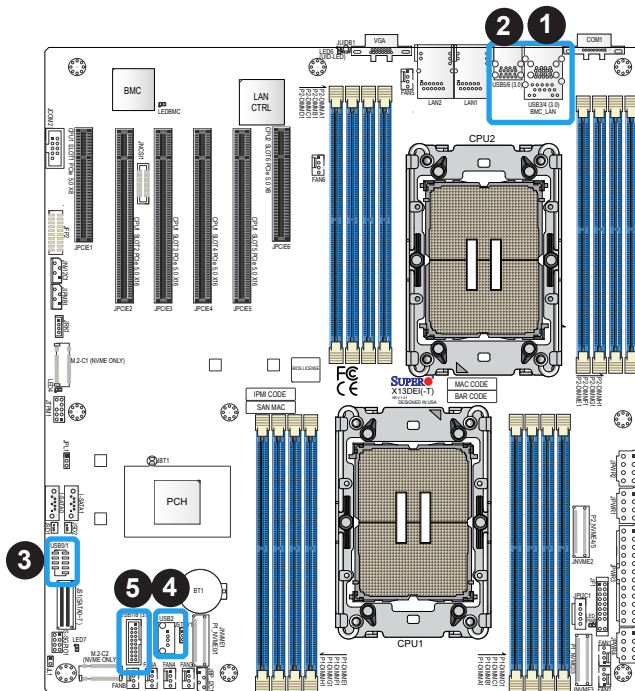
1. USB3/4 (3.0) on rear I/O panel

2. USB5/6 (3.0) on rear I/O panel

3. USB0/1 (2.0) for front access

4. USB2 (Internal USB 2.0 vertical Type-A connector)

5. USB7/8 (3.0) for front access
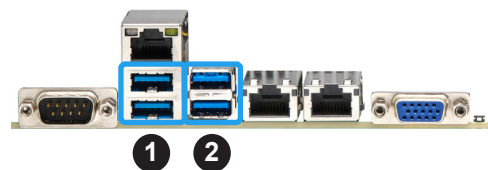
UID (Unit Idenfication)/BMC Reset Switch and UID/BMC Reset LED Indicators

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

When functioning as a BMC reset switch, JUIDB1 will trigger a cold reboot when the user presses and holds the switch for 6 seconds. It will also restore the BMC to the manufacturer's default when the user presses and holds the switch for 12 seconds.

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

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

UID/BMC Reset Switch (JUIDB1) Features & Settings					
When Used as a UID LED Switch			**When Used as a BMC Reset Switch**		
Work w/Rear UID LED (LED6) & Front UID LED (JF1: Pins 7& 8)			**Work with BMC Heartbeat LED (LEDBMC)**		
Rear UID LED	LED6	Blue: Unit identified	BMC Heartbeat LED	LEDBMC	Green Blinking: BMC Normal
Front UID LED	Pins 7 & 8 (JF1)	Blue: Unit identified	BMC Reset: Press & hold the switch (JUIDB1) 6 seconds	LEDBMC	Solid green: during reboot
Press the switch (JUIDB1) to turn on and off both rear and front UID LED indicators;				Triggering a cold reboot; LED: solid green on during cold reboot	
			BMC Reset: Press & hold the switch (JUIDB1) 12 seconds	LEDBMC: Solid green: during BMC reset	
				BMC: Reset to the manufacturer's default; LED solid on during BMC Reset	

UID/BMC Reset Switch (JUIDB1) Pin Definitions	
Pin#	**Definition**
1	Ground
2	Ground
3	Button In
4	Button In

JF1

	1	2	
Power Button	○	○	Ground
Reset Button	○	○	Ground
3.3V	○	○	Power Fail LED
UID LED	○	○	OH/PWR Fail/Fan Fail LED
3.3V Stby	○	○	NIC2 Active LED
3.3V Stby	○	○	NIC1 Active LED
3.3V Stby/ UID SW	○	○	HDD LED
3.3V	○	○	PWR LED
X	○	○	X
NMI	○	○	Ground
	19	20	

1. UID LED/BMC Reset Switch
2. Rear UID LED (LED6)
3. Front UID LED (Pins 7 & 8 of JF1)
4. BMC Heartbeat LED (LEDBMC)

2.6 Front Control Panel

The front control panel header (JF1) contains header pins for various buttons and indicators that are normally located on a control panel at the front of the chassis. These connectors are designed specifically for use with Supermicro chassis. See the figure below for the descriptions of the front control panel buttons and LED indicators.

	JF1	
	1 **2**	
Power Button	○ ○	**Ground**
Reset Button	○ ○	**Ground**
3.3V	○ ○	**Power Fail LED**
UID LED	○ ○	**OH/PWR Fail/Fan Fail LED**
3.3V Stby	○ ○	**NIC2 Active LED**
3.3V Stby	○ ○	**NIC1 Active LED**
3.3V Stby/ UID SW	○ ○	**HDD LED**
3.3V	○ ○	**PWR LED**
X	○ ○	**X**
NMI	○ ○	**Ground**
	19 **20**	

Figure 2-2. JF1 Header Pins

Front Control Panel LEDs

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

Power On & BMC/BIOS Status LED Button

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

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

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

Reset Button

The Reset Button connection is located on pins 3 and 4 of JF1. Momentarily contacting both pins will reset the system. Refer to the table below for pin definitions.

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

JF1

1		2
Power Button	○ ○	Ground
Reset Button	○ ○	Ground
3.3V	○ ○	Power Fail LED
UID LED	○ ○	OH/PWR Fail/Fan Fail LED
3.3V Stby	○ ○	NIC2 Active LED
3.3V Stby	○ ○	NIC1 Active LED
3.3V Stby/ UID SW	○ ○	HDD LED
3.3V	○ ○	PWR LED
X	○ ○	X
NMI	○ ○	Ground

19 20
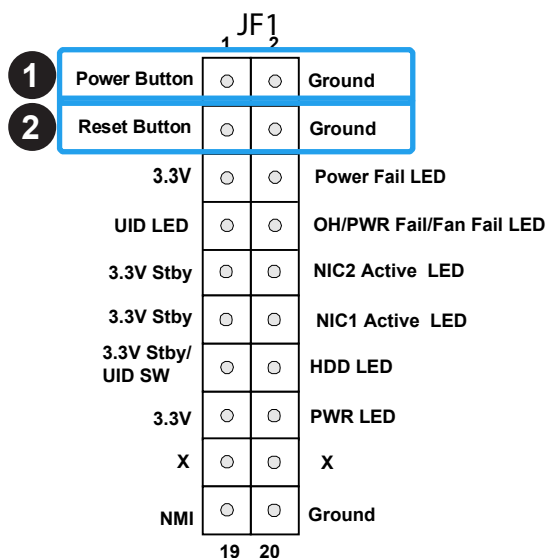
1. PWR Button

2. Reset Button

Power Fail LED

The Power Fail LED connection is located on pins 5 and 6 of JF1. When this LED turns solid red, it indicates a power failure. Refer to the table below for pin definitions.

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

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

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

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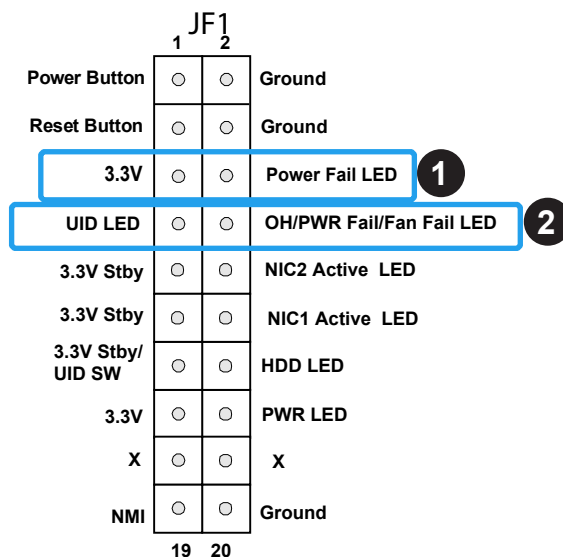
1. Power Fail LED

2. Information LED

NIC1/NIC2 (LAN1/LAN2)

The NIC (Network Interface Controller) activity LED for LAN port 1 is located on pin 12 of JF1, and LAN port 2 is on pin 10. Refer to the tables below for pin definitions.

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

ID_UID Switch/HDD LED

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

When this LED is blinking green, it indicates HDD is active. Attach a cable to pins 13 and 14 to show ID_UID status and hard drive activity. Refer to the tables below for pin definitions.

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

ID_UID/HDD LED Pin Definitions (JF1)	
Color	State
Blinking Green	HDD Active
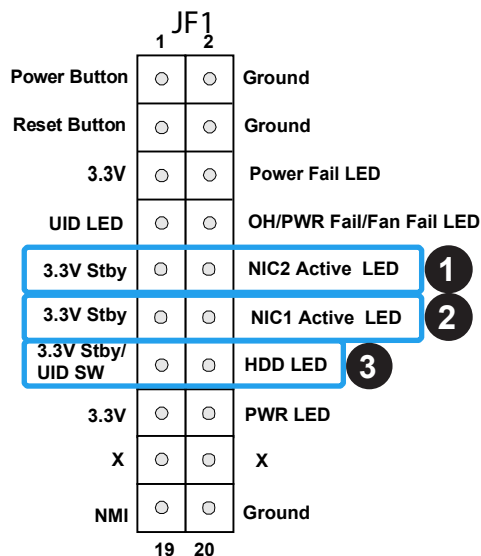
1. NIC2 (LAN 2) LED
2. NIC1 (LAN 1) LED
3. ID_UID/HDD LED

Front Panel Power LED

The Front Panel Power LED connection is located on pins 15 and 16 of JF1. Refer to the table below for pin definitions.

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

NMI Button

The non-maskable interrupt (NMI) button header is located on pins 19 and 20 of JF1. Refer to the table below for pin definitions.

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

JF1

	1	2	
Power Button	○	○	Ground
Reset Button	○	○	Ground
3.3V	○	○	Power Fail LED
UID LED	○	○	OH/PWR Fail/Fan Fail LED
3.3V Stby	○	○	NIC2 Active LED
3.3V Stby	○	○	NIC1 Active LED
3.3V Stby/UID SW	○	○	HDD LED
3.3V	○	○	PWR LED
X	○	○	X
NMI	○	○	Ground

19 20
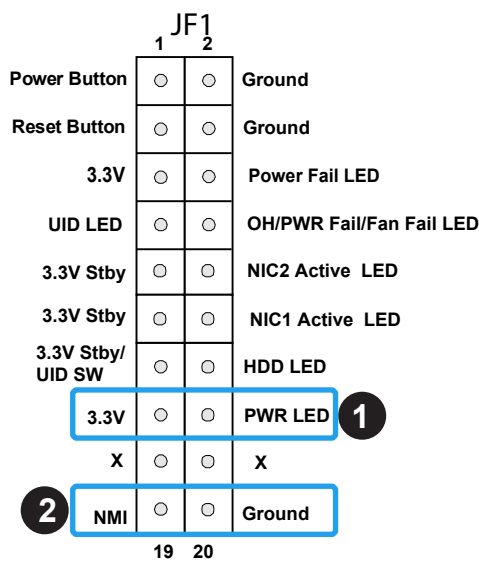
1. FP PWR LED

2. NMI

2.7 Connectors and Headers

Power Connections

ATX Power Supply Connector

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

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

Required Connection

12V 8-pin Power Pin Definitions	
Pin#	Definition
1 - 4	Ground
5 - 8	+12V
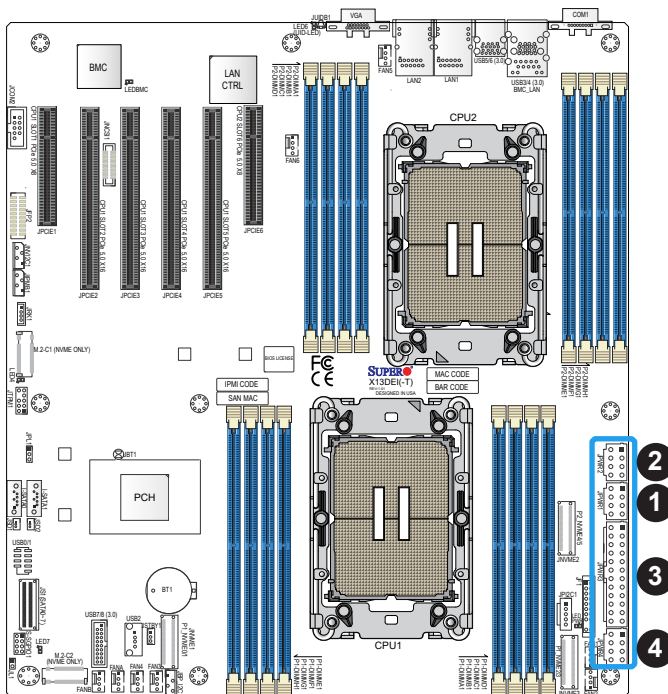
1. JPWR1: 8-Pin PWR

2. JPWR2: 8-Pin PWR

3. JPWR3: 24-Pin ATX PWR

4. JPWR4: 8-Pin PWR

Headers

Fan Headers

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

Fan Header Pin Definitions	
Pin#	Definition
1	Ground
2	2.5A/+12V
3	Tachometer
4	PWM_Control
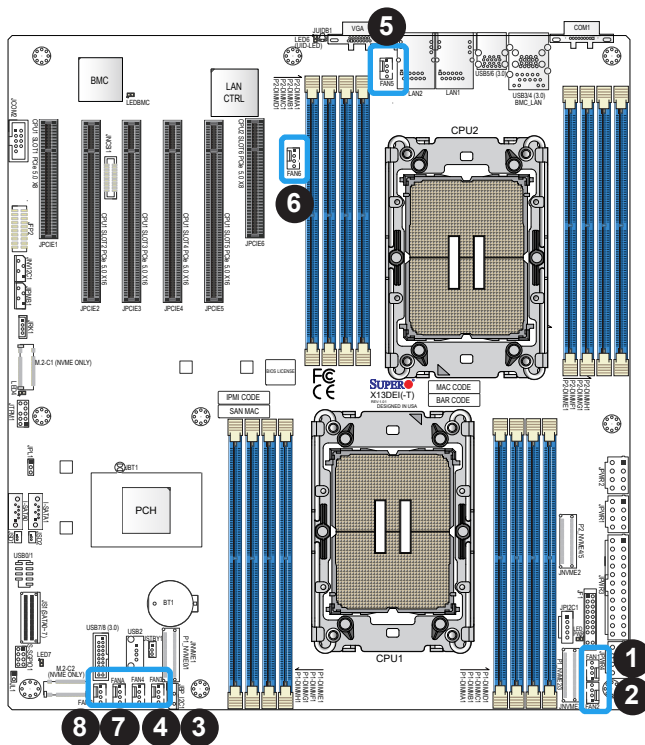
1. FAN1
2. FAN2
3. FAN3
4. FAN4
5. FAN5
6. FAN6
7. FANA
8. FANB

S-SGPIO Header

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

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

NC = No Connection
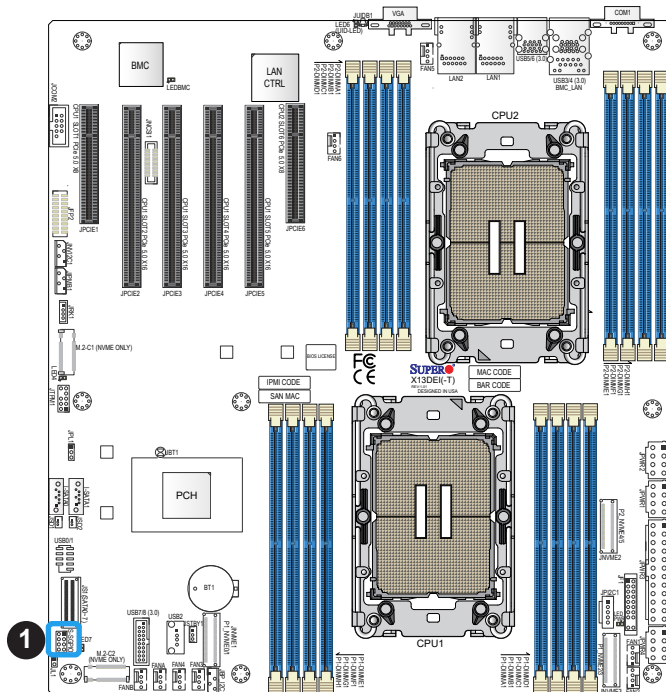
1. S-SGPIO1

TPM/Port 80 Header

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

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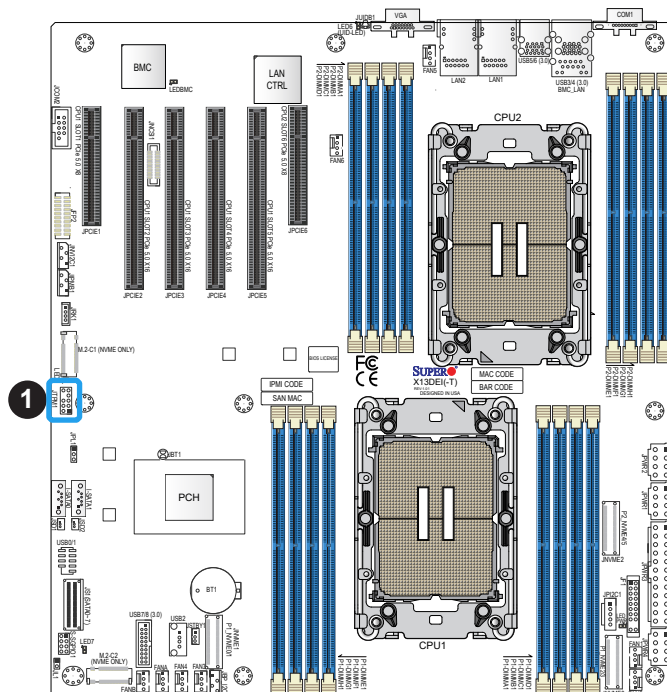
1. TPM Header

VROC RAID Key Header

A VROC RAID Key header is located at JRK1 on the motherboard. Install a VROC RAID Key on JRK1 for NVMe RAID support as shown in the illustration below. Refer to the layout below for the location of JRK1.

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

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

VROC Key

VROC Key Header (JRK1)
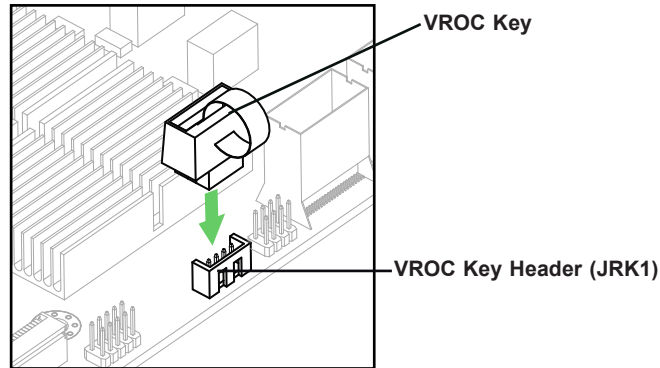
Note: The graphics contained in this user's manual are for illustration only. The components installed in your system may or may not look exactly the same as the graphics shown in the manual.

1. VROC RAID Key Header (JRK1)
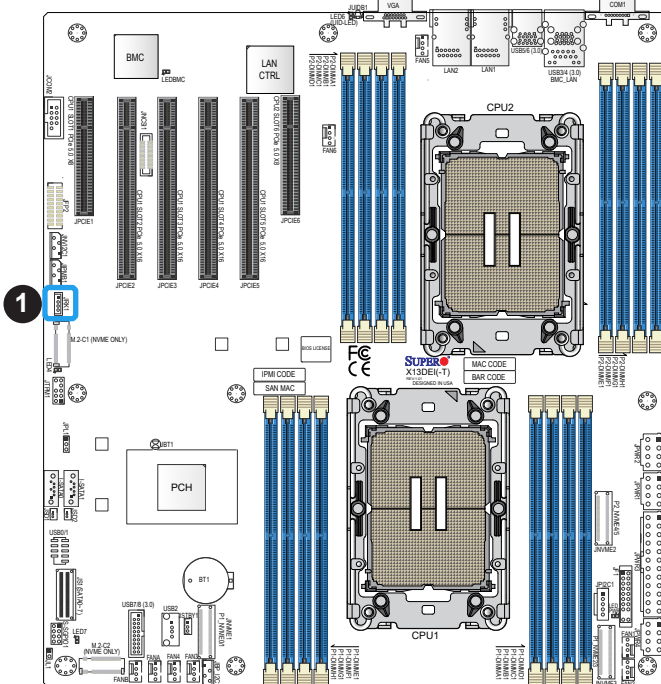
Standby Power

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. Refer to the table below for pin definitions.

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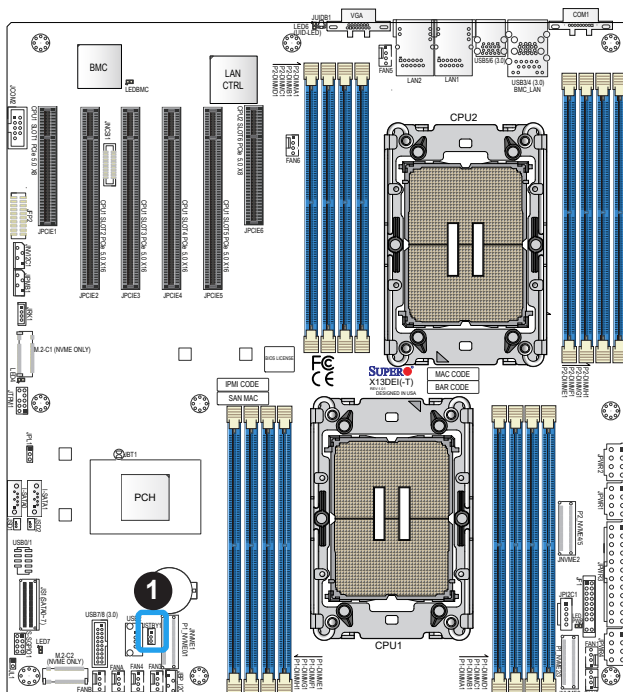
1. Standby Power

Power SMB (I²C) Header

The Power System Management Bus (I²C) connector (JPI2C1) monitors the power supply, fan, and system temperatures. Refer to the table below for pin definitions.

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

4-pin BMC External I²C Header

Two System Management Bus headers for BMC are located at JIPMB1 and JBP_I2C1. Connect the appropriate cable here to use the IPMB I²C connection on your system. Refer to the table below for pin definitions.

External I²C Header Pin Definitions	
Pin#	Definition
1	Data
2	Ground
3	Clock
4	No Connection
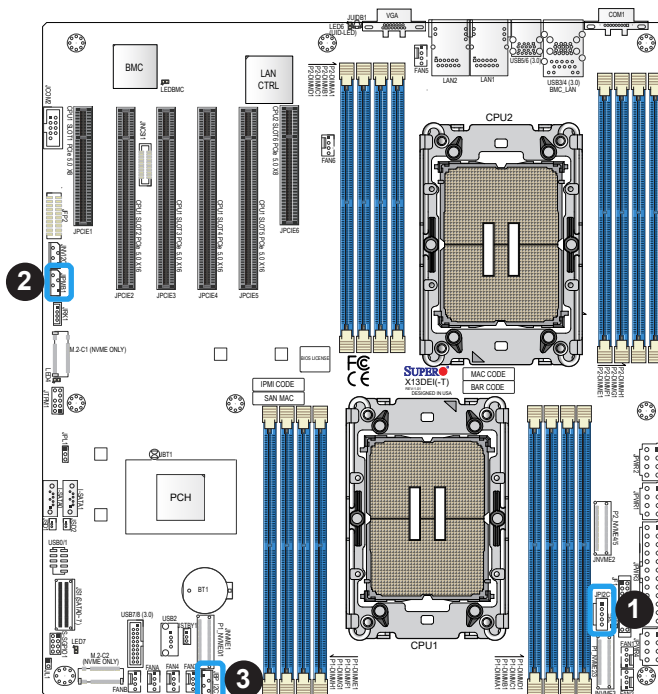
1. Power SMB Header

2. BMC External Header (JIPMB1)

3. BMC External Header (JBP_I2C1) (for Inlet Temperature Sensor)

Chassis Intrusion

A Chassis Intrusion header is located at JL1 on the motherboard. Attach the appropriate cable from the chassis to inform you when the chassis is opened. Refer to the table below for pin definitions.

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

NVMe SMBus Header

The NVMe SMBus (I^2C) header (JNVI2C1) provides hot-plug support via a dedicated SMBus interface. This feature is only available for a Supermicro complete system with an SMCI-proprietary NVMe add-on card and a proper cable installed. See the table below for pin definitions.

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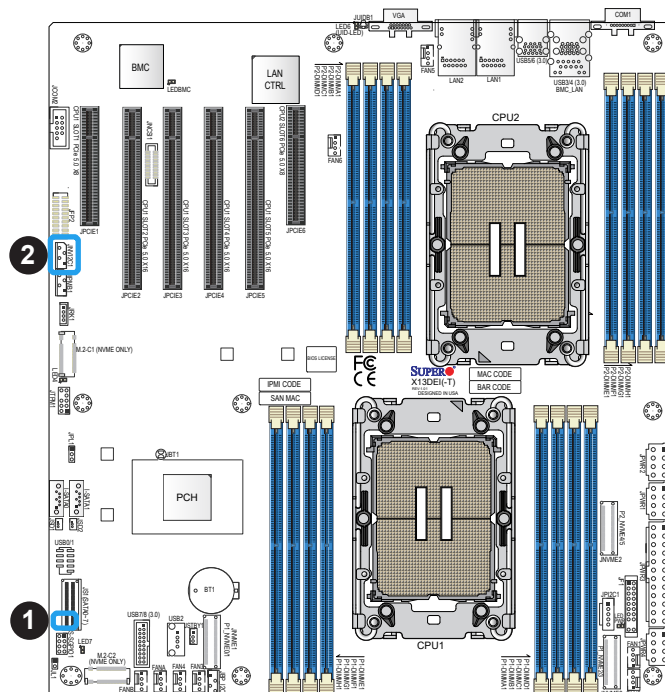
1. Chassis Intrusion
2. NVMe SMBus Header

PCIe 4.0 M.2 Slots

The X13DEI/X13DEI-T motherboard has two PCIe 4.0 M.2 slots. M.2 allows for a variety of card sizes, increased functionality, and spatial efficiency. The M.2 slots on the motherboard support PCIe 4.0 x2 M.2 NVMe SSDs in the 2280 and 22110 form factors. Refer to the layout below for the locations of the M.2 slots.
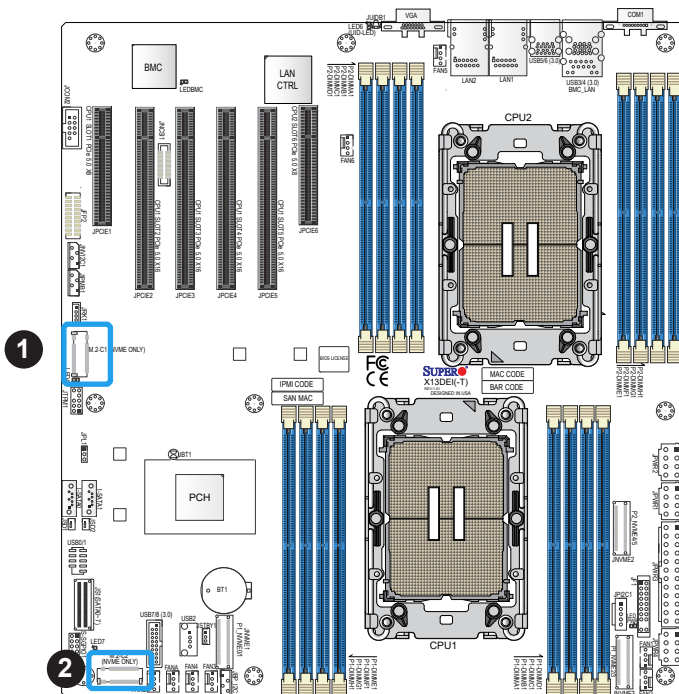
1. M.2 Slot (M.2-C1)
2. M.2 Slot (M.2-C2)

MCIO NVMe Connectors

MCIO NVMe connectors, located at P1_NVME0/1, P1_NVME2/3 and P2_NVME4/5, provide six PCIe 5.0 x4 connections on the motherboard. P1_NVME0/1 and P1_NVME2/3 connections are supported by CPU1. P2_NVME4/5 are supported by CPU2. Use these MCIO connectors to support high-speed PCIe NVMe storage devices.

> **Note**: When installing an NVMe device on a motherboard, please be sure to connect the first NVMe port (P1_NVME0/1) first for your system to work properly.

NCSI Connector

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

> **Note**: For detailed instructions on how to configure Network Interface Card (NIC) settings, please refer to the Network Interface Card Configuration User's Guide posted on the web page under the link: https://www.supermicro.com/support/manuals/.
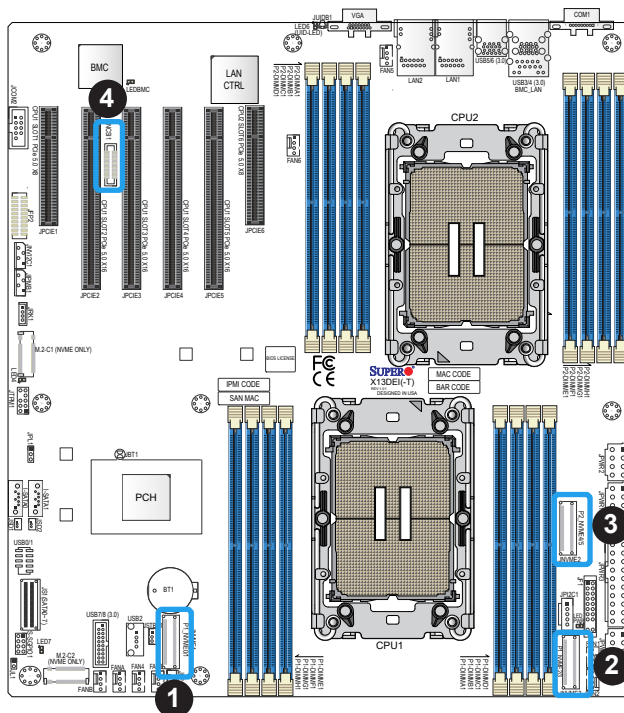
1. P1_NVME0/1
2. P1_NVME2/3
3. P2_NVME4/5
4. JNCSI1

SATA 3.0 Ports

The X13DEI/X13DEI-T has two SATA 3.0 ports (I-SATA0 and I-SATA1) on the motherboard. These SATA ports are supported by the Intel C741 chipset. I-SATA0/1 can be used with Supermicro SuperDOMs which are orange SATA DOM connectors with power pins built in, and do not require external power cables.

A slim SAS connector, located at JS1, supports eight SATA 3.0 connections (SATA0 – 7) on the motherboard. These SATA 3.0 ports are supported by the Intel C741 chipset. Connecting a proper SATA cable to JS1 to use SATA 3.0 connections.
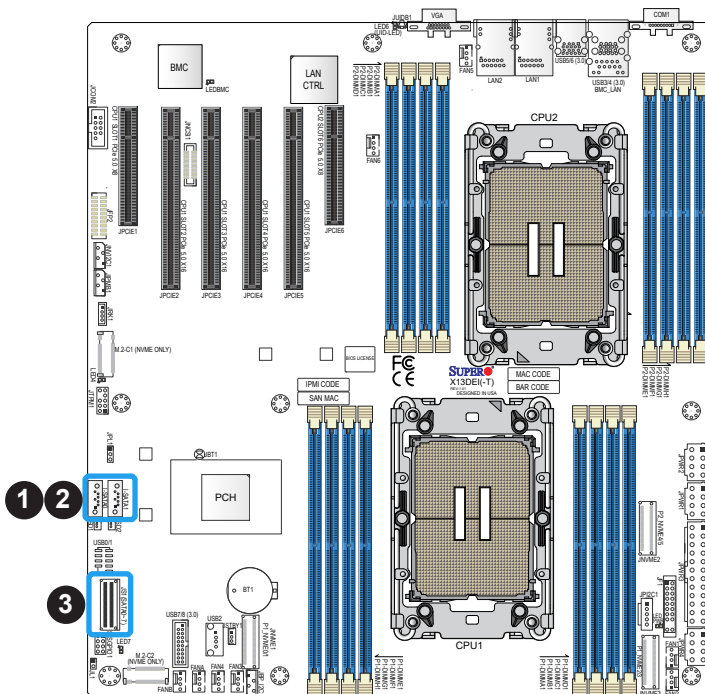
1. I-SATA0 (SuperDOM)
2. I-SATA1 (SuperDOM)
3. SATA0 – 7 (JS1)

DOM Power Connector

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

DOM Power Connector Pin Definitions	
Pin#	Definition
1	5V
2	Ground
3	Ground
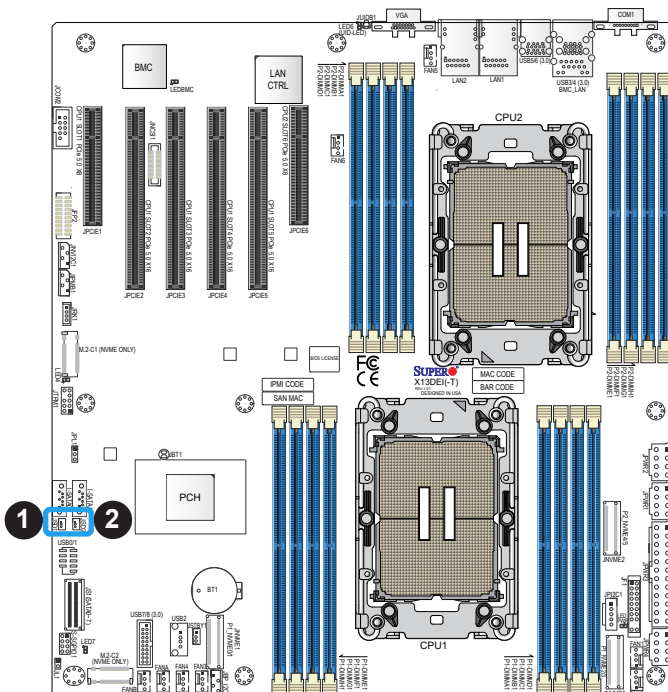
1. JSD1 (DOM PWR)
2. JSD2 (DOM PWR)

2.8 Jumper Settings

How Jumpers Work

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 on the right for an example of jumping pins 1 and 2. Refer to the motherboard layout page for jumper locations.

Connector Pins

3 2 1

Jumper

Setting

3 2 1
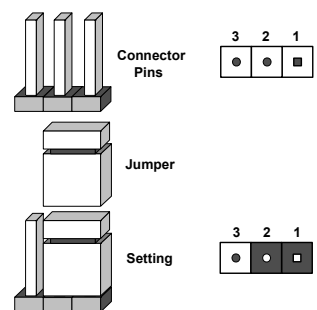
> **Note 1:** On two-pin jumpers, "Closed" means the jumper is on and "Open" means the jumper is off the pins.

> **Note 2:** Unplug the power cord from all power supplies before adjusting jumper settings.

CMOS Clear

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

To Clear CMOS

1. First power down the system and unplug the power cord(s).

2. Remove the cover of the chassis to access the motherboard and remove the battery from the motherboard.

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

4. Remove the screwdriver (or shorting device).

5. Replace the cover, reconnect the power cord(s), and power on the system.

> **Note**: Clearing CMOS will also clear all passwords.
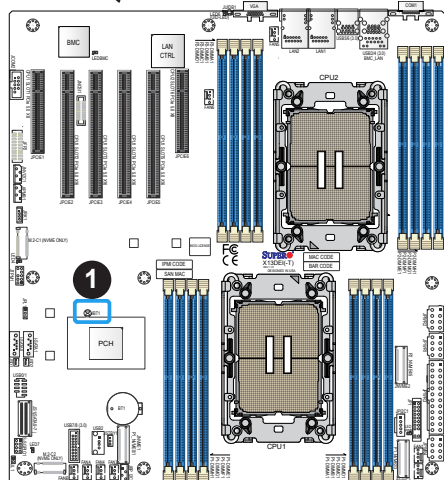
1. JBT1

LAN Port Enable/Disable

Jumper JPL1 allows the user to enable the onboard LAN1 and LAN2 ports. The default setting is pins 1-2 to enable the connection. Refer to the table below for jumper settings.

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

1. JPL1

89
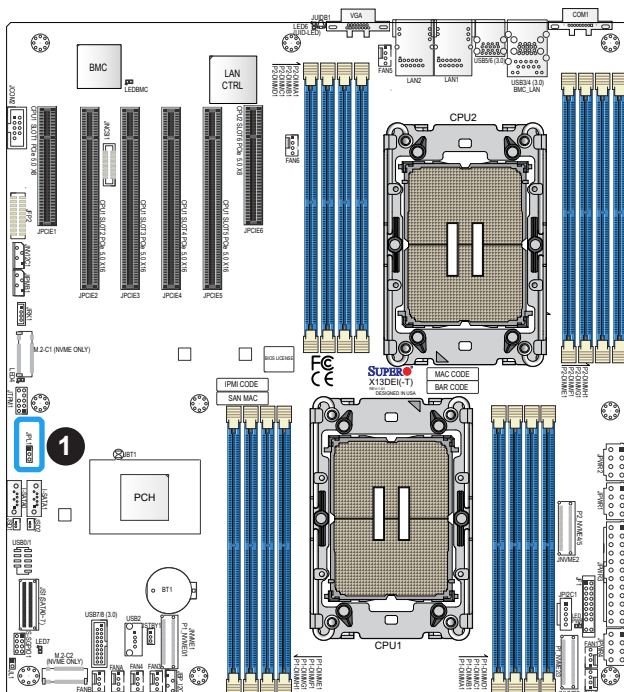
2.9 LED Indicators

Unit ID LED

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

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

Note: For information on UID LED Indicator and BMC Heartbeat LED Indicator, please refer to the section on UID LED/BMC Reset Switch and LED Indicator on page .
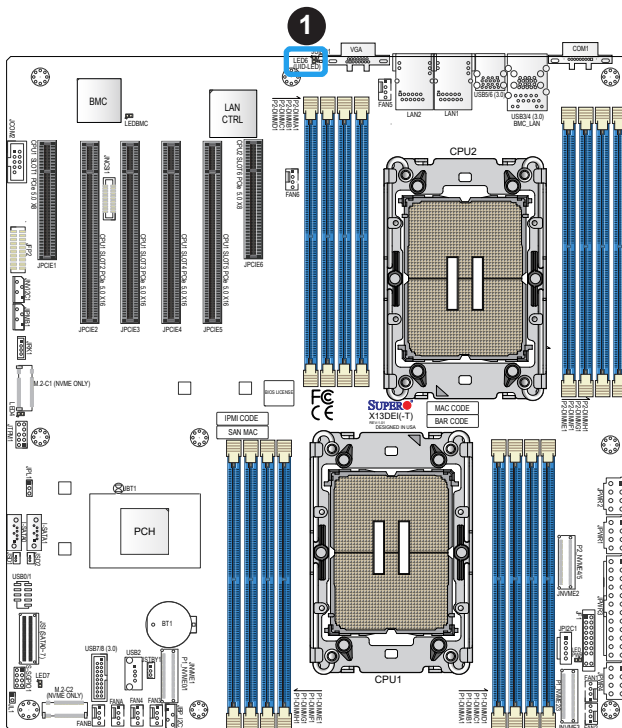
1. UID LED (LED6)

LAN LEDs

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

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

LAN1/2 Link LED (Left) LED State	
LED Color	Definition
Green	10Gbps (X13DEI-T only)
Yellow/Amber	1Gbps

BMC LAN LEDs

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

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

BMC LAN

Link LED Activity LED
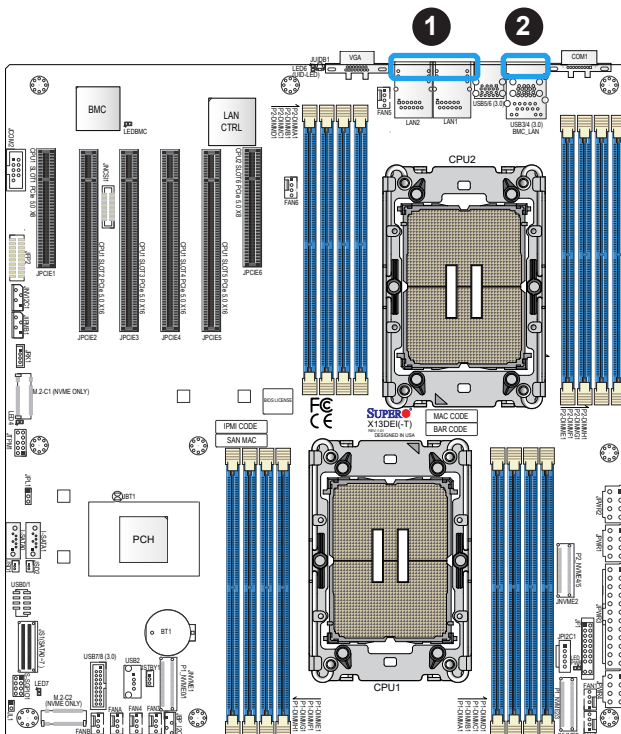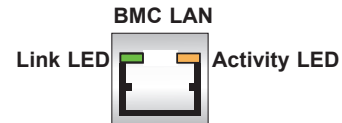
1. LAN1/LAN2 LEDs
2. BMC LAN LEDs
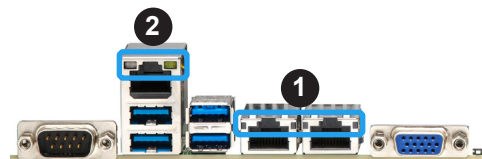
M.2 LED Indicators

Two M.2 LED indicators are located at LED4 and LED7 on the motherboard. When LED4 is blinking, M.2-C1 functions normally, while LED7 is blinking, M.2-C2 functions properly. Refer to the layout below for locations of LED4 and LED7.

M.2 LED State	
LED Color	**Definition**
Green: Blinking	M.2 device working
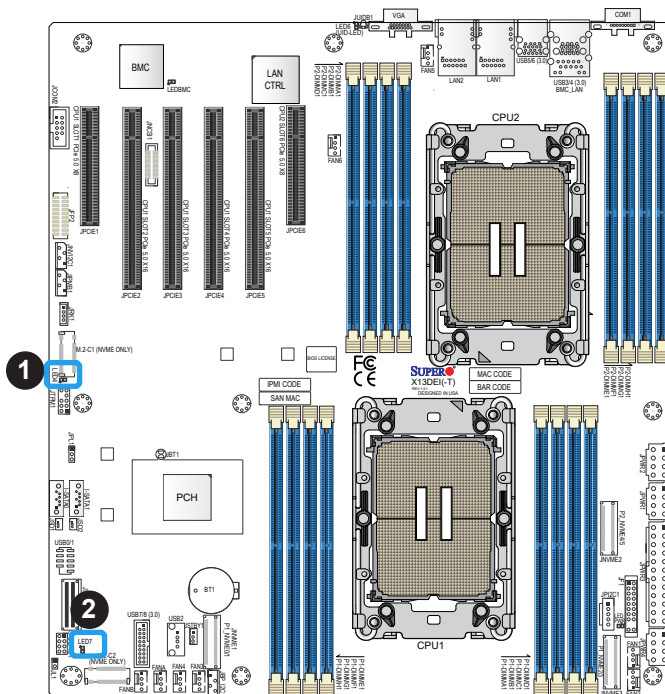
1. M.2-C1 LED (LED4)
2. M.2-C2 LED (LED7)

Onboard Power LED

The Onboard Power LED is located at LEDPWR on the motherboard. When this LED is on, the system power is on. Be sure to turn off the system power and unplug the power cord before removing or installing components. Refer to the table below for more information.

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

BMC Heartbeat LED

A BMC Heartbeat LED is located at LEDBMC on the motherboard. When LEDBMC is blinking green, the BMC is functioning normally. Refer to the layout below for the location of LEDBMC.

BMC Heartbeat LED Indicator	
LED Color	**Definition**
Green: Blinking	BMC Normal
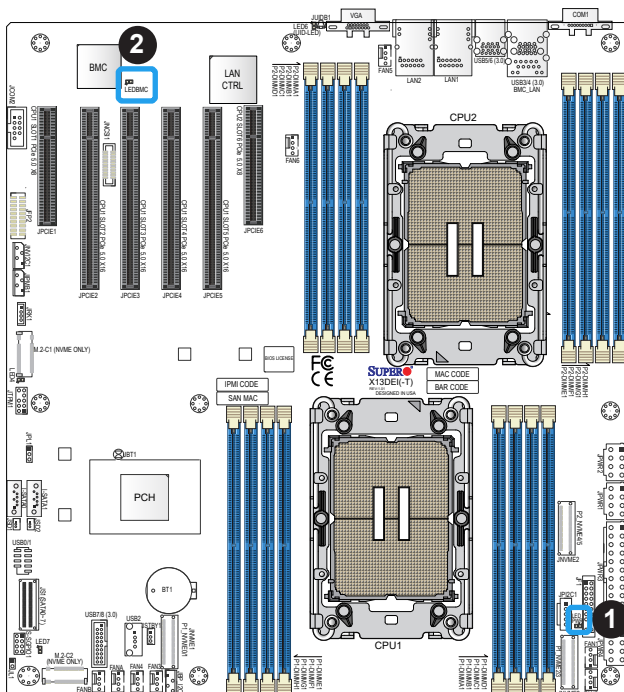
1. Power LED (LEDPWR)

2. BMC Heartbeat LED (LEDBMC)

Chapter 3

Troubleshooting

3.1 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' and/ or 'Returning Merchandise for Service' section(s) in this chapter. Always disconnect the AC power cord before adding, changing or installing any non hot-swap hardware components.

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 CPU (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. Make sure that the power connectors are properly connected.

3. Check that the 115V/230V switch, if available, on the power supply is properly set.

4. Turn the power switch on and off to test the system, if applicable.

5. The battery on your motherboard may be old. Check to verify that it still supplies approximately 3VDC. If it does not, replace it with a new one.

No Video

1. Be sure that your peripherals and devices work properly.

2. If there is no video when the power is on, please turn off your system and remove all add-on cards and cables. Then turn on your system.

System Boot Failure

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

1. Remove all components from the motherboard, especially the DIMM modules. Power on the system and check if the power-on LED (LEDPWR) and the BMC Heartbeat LED (LEDBMC) are on, and system fans are spinning.

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

Memory Errors

1. Make sure that the memory modules are compatible with the system and are properly installed. See Chapter 2 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 DIMM modules in the system.

3. Make sure that you are using the correct type of ECC DDR5 modules recommended by the manufacturer.

4. Check for bad DIMM modules 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 Chapter 1 for details on recommended power supplies.

2. The battery on your motherboard may be old. Check to verify that it still supplies approximately 3VDC. If it does not, replace it with a new one.

When the System Becomes Unstable

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

1. CPU/BIOS support: Make sure that your CPU is supported and that you have the latest BIOS installed in your system.

2. Memory support: Make sure that the memory modules are supported by testing 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. HDD support: Make sure that all hard disk drives (HDDs) work properly. Replace the bad HDDs with good ones.

4. System cooling: Check the system cooling to make sure that all heatsink fans and CPU/ system fans, etc., work properly. Check the hardware monitoring settings in the BMC to make sure that the CPU and system temperatures are within the normal range. Also check the front panel Overheat LED and make sure that it is not on.

5. Power source: Make sure that the power supply provides adequate power to the system. Make sure that all power connectors are connected. Please refer to our website for more information on the minimum power requirements.

6. Proper software support: Make sure that the correct drivers are used.

B. 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 USB flash or media drives.

2. Cable connection: Check to make sure that all cables are connected and working properly.

3. Using the minimum configuration for troubleshooting: Remove all unnecessary components (starting with add-on cards first), and use the minimum configuration (but with the CPU and a memory module installed) to identify the trouble areas. Refer to the steps listed in Section A above for proper troubleshooting procedures.

4. Identifying 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.

3.2 Technical Support Procedures

Before contacting Technical Support, please take the following steps. Also, please 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. Please go through the Troubleshooting Procedures and Frequently Asked Questions (FAQ) sections in this chapter 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/ ResourceApps/BIOS_BMC_Intel.html).

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. For immediate assistance, please have your account number ready when placing a call to our Technical Support department. We can be reached by email at support@ supermicro.com.

5. For worldwide services and support, please visit our website at Worldwide Services & Support | Supermicro.

3.3 Frequently Asked Questions

Question: What type of memory does my motherboard support?

Answer: This motherboard supports up to 4TB memory capacity with 16 DIMMs of 256GB 3DS RDIMM/RDIMM DDR5 ECC memory. To enhance memory performance, do not mix memory modules of different speeds and sizes. Please follow all memory installation instructions given in Section 2.4.

Question: How do I update my BIOS?

Answer: 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 https://www.supermicro.com/ResourceApps/BIOS_BMC_Intel.html. Please 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.

> **Note 1:** The SPI BIOS chip used on this motherboard cannot be removed. Send your motherboard back to our RMA Department at Supermicro for repair.

> **Note 2:** For BIOS Update and Recovery instructions, please refer to the Firmware Update and Recovery Instructions for Supermicro's X13 motherboard user's manuals posted at https://www.supermicro.com/support/manuals/.

3.4 Battery Removal and Installation

Battery Removal

To remove the onboard battery, follow the steps below:

1. Power off your system and unplug your power cable.

2. Locate the onboard battery as shown below.

3. Using a tool such as a pen or a small screwdriver, push the battery lock outwards to unlock it. Once unlocked, the battery will pop out from the holder.

4. Remove the battery.

Proper Battery Disposal

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

Battery Installation

To install an onboard battery, follow the steps below:

1. Power off your system and unplug your power cable.

2. Locate the onboard battery as shown below

3. Identify the battery's polarity. The positive (+) side should be facing up.

4. Insert the battery into the battery holder and push it down until you hear a click to ensure that the battery is securely locked.

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

LITHIUM BATTERY

BATTERY HOLDER

OR

LITHIUM BATTERY

BATTERY HOLDER
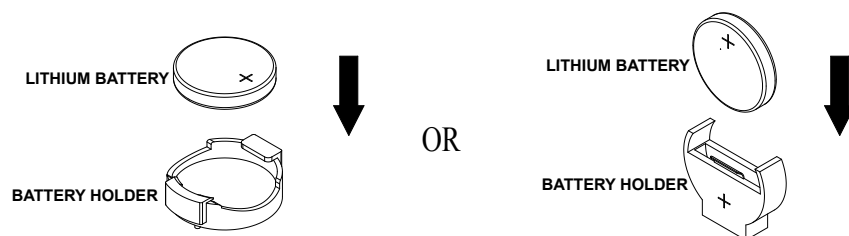
3.5 Returning Merchandise for Service

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 motherboard 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, you can also request a RMA authorization online (https://www.supermicro.com/RmaForm/).

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.

Chapter 4

UEFI BIOS

4.1 Introduction

This chapter describes the AMIBIOS™ Setup utility for the motherboard. The BIOS is stored on a chip and can be easily upgraded using a flash program.

> **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. Please refer to the Manual Download area of our website for any changes to the BIOS that may not be reflected in this manual.

Starting the Setup Utility

To enter the BIOS Setup Utility, hit 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 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 an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it. (Note that the 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 will 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>, <Enter>, <ESC>, <Arrow> keys, etc.) can be used at any time during the setup navigation process.

4.2 Main Setup

When you first enter the AMI BIOS Setup utility, you will see the Main setup screen. You can always return to the Main setup screen by selecting the Main tab on the top of the screen. The Main BIOS Setup screen is shown below.

```
                          Aptio Setup - AMI
   Main  Advanced  Event Logs  BMC  Security  Boot  Save & Exit

                                                        Set the Date. Use Tab to
  System Date                      [Fri 01/06/2023]     switch between Date
  System Time                      [17:06:20]           elements.
                                                        Default Ranges:
  Fru1BM47 Fru1BPN47                                    Year: 1998-9999
  BIOS Version                     1.1                  Months: 1-12
  Build Date                       01/04/2023           Days: Dependent on month
  CPLD Version                     F5.08.B7             Range of Years may vary.

  Memory Information
  Total Memory                     32768 MB




                                                        →←: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit

                   Version 2.22.1287 Copyright (C) 2023 AMI
```

System Date / System Time

Use the two features to change the system date and time. To change system date and time settings, please highlight *System Date* or *System Time* using the arrow keys and enter new values using the keyboard. Press the <Tab> key or the arrow keys to move between fields. The date must be entered in Day 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. The date's default value is the BIOS build date after the RTC (Real Time Clock) reset.

Supermicro X13DEI/X13DEI-T

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.

4.3 Advanced Setup Configurations

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

```
                          Aptio Setup - AMI
          Main  Advanced  Event Logs  BMC  Security  Boot  Save & Exit

    ▶ Boot Feature                               Boot Feature Configuration
    ▶ CPU Configuration                          Page
    ▶ Chipset Configuration
    ▶ Server ME Information
    ▶ PCH SATA1 Configuration
    ▶ PCH SATA2 Configuration
    ▶ Trusted Computing
    ▶ ACPI Settings
    ▶ Super IO Configuration
    ▶ Serial Port Console Redirection
    ▶ Network Configuration
    ▶ PCIe/PCI/PnP Configuration
    ▶ HTTP Boot Configuration
    ▶ Supermicro KMS Server Configuration
    ▶ Super-Guardians Configuration

    ▶ Supermicro 10GBASE-T Ethernet Controller - 7C:C2:55:34:2E:E8
    ▶ Supermicro 10GBASE-T Ethernet Controller - 7C:C2:55:34:2E:E9   ↔: Select Screen
    ▶ TLS Authenticate Configuration                                 ↑↓: Select Item
                                                                     Enter: Select
    ▶ Driver Health                                                  +/-: Change Opt.
                                                                     F1: General Help
                                                                     F2: Previous Values
                                                                     F3: Optimized Defaults
                                                                     F4: Save & Exit
                                                                     ESC: Exit

                    Version 2.22.1287 Copyright (C) 2023 AMI
```

Warning: Take 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, restore the setting to the manufacturer default setting.

▶Boot Feature

Quiet Boot

Use this feature to select the screen between displaying Power-on Self Test (POST) messages or the OEM logo at 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 for this feature.

Option ROM Messages

Use this feature to set the display mode for the Option ROM. Select Keep Current to use the current AddOn ROM display settings. Select Force BIOS to use the Option ROM display mode set by the system BIOS. The options are **Force BIOS** and Keep Current.

Bootup NumLock State

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

Wait For "F1" If Error

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

INT19 Trap Response

Interrupt 19 is the software interrupt that handles the boot disk function. When this feature is set to Immediate, the ROM BIOS of the host adaptors will "capture" Interrupt 19 at bootup immediately and allow the drives that are attached to these host adaptors to function as bootable disks. If this feature is set to Postponed, the ROM BIOS of the host adaptors will not capture Interrupt 19 immediately to allow the drives attached to these adaptors to function as bootable devices at bootup. The options are **Immediate** and Postponed.

Re-try Boot

When EFI (Extensible Firmware Interface) Boot is selected, the system BIOS will automatically reboot the system from an EFI boot device after an initial boot failure. Select Legacy Boot to allow the BIOS to automatically reboot the system from a Legacy boot device after an initial boot failure. The options are **Disabled**, Legacy Boot, and EFI Boot.

Power Configuration

Watch Dog Function

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

Front USB Port(s) (Available when "Lockdown Mode" is set to Enabled with the DCMS key)

Select Enabled to allow the specific type of USB devices to be used in the front USB ports. Select Enabled (Dynamic) to allow or disallow this particular type of USB devices to be used in the front USB ports without rebooting the system. The options are **Enabled**, Disabled, and Enabled (Dynamic).

> **Note 1:** Supermicro DataCenter Management Suite per Node License Key (SFT-DCMS-SINGLE) is Supermicro's Data Center Management Suite license that enables server node to take full advantage of Supermicro Management Software and Utilities features. Contact us for more information.

> **Note 2:** Refer to the submenu of Security -> Supermicro Security Erase Configuration to set "Lockdown Mode".

Rear USB Port(s) (Available when "Lockdown Mode" is set to Enabled with the DCMS key)

Select Enabled to allow the specific type of USB devices to be used in the rear USB ports. Select Enabled (Dynamic) to allow or disallow this particular type of USB devices to be used in the rear USB ports without rebooting the system. The options are **Enabled**, Disabled, and Enabled (Dynamic).

Restore on AC Power Loss

Use this feature to set the power state after a power outage. Select Power 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 the user presses the power button. The options are **Instant Off** and 4 Seconds Override**.**

▶CPU Configuration

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

Processor Configuration

The following CPU 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

- Processor 1 Version

►Advanced Power Management Configuration

Power Technology

Select Energy Efficient to support power-saving mode. Select Custom to customize system power settings. Select Disabled to disable power-saving settings. The options are Disable, Energy Efficient, and **Custom**.

Power Performance Tuning (Available when "Power Technology" is set to Custom)

Set this feature to allow either operating system (OS) or the BIOS to control the EPB. The options are **OS Controls EPB** and BIOS Controls EPB. (EPB is the abbreviation for Intel Performance and Energy Bias Hint.)

ENERGY_PERF_BIAS_CFG Mode (ENERGY PERFORMANCE BIAS CONFIGURATION Mode) (Available when "Power Performance Tuning" is set to BIOS Controls EPB)

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 Maximum Performance, Performance, **Balanced Performance**, Balanced Power, and Power.

Optimized Power Mode (Available when "Power Technology" is set to Custom)

Use this feature to enable optimized power mode. The options are **Disable** and Enable.

►CPU P State Control

This feature allows you to configure the following CPU power settings:

AVX P1 (Available when "SpeedStep (P-States)" is set to Enable)

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.

SpeedStep (P-States)

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

EIST PSD Function (Available when "SpeedStep (P-States)" is set to Enable)

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.

Turbo Mode (Available when "SpeedStep (P-States)" is set to Enable)

Select Enable 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 Disable and **Enable**.

▶**Hardware PM State Control**

Hardware P-States

If this feature is set to Disable, system hardware will choose a P-state setting for the system based on an OS request. If this feature is set to Native Mode, 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 OS guidance. The options are **Disable**, Native Mode, Out of Band Mode, and Native Mode with No Legacy Support.

▶**CPU C State Control**

Enable Monitor MWAIT

Select Enable 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 Disable, Enable, and **Auto**.

CPU C1 Auto Demotion

Enable this feature to allow CPU to automatically demote to the C1 state. Reboot the system for the change to take effect. The options are Disable and **Enable**.

CPU C6 Report

Select Enable to allow the BIOS to report the CPU C6 State (ACPI C3) to the operating system. During the CPU C6 State, the power to all cache is turned off. The options are Disable, Enable, and **Auto**. (ACPI is the abbreviation for Advanced Configuration and Power Interface.)

Enhanced Halt State (C1E)

Select Enable to enable "Enhanced Halt State" support, which will significantly reduce the CPU's power consumption by minimizing CPU's clock cycles and reduce voltage during a "Halt State". The options are Disable and **Enable**.

▶**Package C State Control**

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, C6 (Retention) state, No Limit, and **Auto**.

▶**CPU1 Core Disable Bitmap / CPU2 Core Disable Bitmap**

Available Bitmap:

This feature displays the available bitmap.

Disable Bitmap

Enter 0 to enable this feature for all CPU cores. Enter FFFFFFFFFFFF to disable this feature for all CPU cores. Please note that at least one core per CPU must be enabled. Disabling all cores is not allowed. The default setting is **0**.

Hyper-Threading [ALL]

Select Enable to use Intel Hyper-Threading Technology to enhance CPU performance. The options are **Enable** and Disable.

Hardware Prefetcher

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

Adjacent Cache Prefetch

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

DCU Streamer Prefetcher

If this feature is set to Enable, 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 **Enable** and Disable.

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 **Enable** and Disable.

LLC Prefetch

If this feature is set to Enable, LLC (hardware cache) prefetching on all threads will be supported. The options are **Disable** and Enable.

Homeless Prefetch

If this feature is set to Enable, homeless prefetching on all threads will be supported. The setting Auto maps is program specific. The options are Disabled, Enabled, and **Auto**.

Extended APIC

Based on the Intel Hyper-Threading technology, each logical processor (thread) is assigned 256 APIC IDs (APIDs) in 8-bit bandwidth. When this feature is set to Enable, the APIC ID will be expanded from 8 bits to 16 bits to provide 512 APIDs to each thread to enhance CPU performance. The options are Disable and **Enable**. (APIC is the abbreviation for Extended Advanced Programmable Interrupt Controller.)

Intel Virtualization Technology

Select Enable to enable the Intel Vanderpool Technology for Virtualization platform support, which will allow multiple operating systems to run simultaneously on the same computer to maximize system resources for performance enhancement. The options are Disable and **Enable**.

Note: Please reboot the system for any change of the setting to take effect.

Enable SMX

Select Enable 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 **Disable** and Enable.

PPIN Control

Select Unlock/Enable 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/Disable** and Unlock/Enable.

AES-NI

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

Limit CPU PA to 46 Bits

Select Enable to limit CPU physical address to 46 bits to support the older Hyper-V CPU platform. The options are Disable and **Enable**.

TME, TME-MT, TDX

Memory Encryption (TME) (Available when your CPU supports Intel TME)

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

Total Memory Encryption (TME) Bypass (Available when "Memory Encryption (TME)" is set to Enabled)

Use this feature to disable/enable the TME function for physical memory protection. The options are **Auto**, Disabled, and Enabled.

Total Memory Encryption Multi-Tenant (TME-MT) (Available when "Memory Encryption (TME)" is set to Enabled and when "Limit CPU PA to 46 Bits" is set to Disable)

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

Memory Integrity (Available when both "Memory Encryption (TME)" and "Total Memory Encryption Multi-Tenant (TME-MT)" are set to Enabled and when "Limit CPU PA to 46 Bits" is set to Disable)

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

Trust Domain Extension (TDX) (Available when your CPU supports Intel TDX)

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

TDX Secure Arbitration Mode Loader (SEAM Loader) (Available when your CPU supports Intel TDX)

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.

Software Guard Extension (SGX)

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*The following SGX features are available when "Memory Encryption (TME)" is set to Enabled and when your CPU supports Intel SGX.

> **Note:** Each memory channel must have at least one DIMM populated on the motherboard to support the Intel SGX features.

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 PRM Size (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 **256M**, 512M, 1G, 2G, 4G, and 8G. Please note that the available options are based on your motherboard features, memory size, and memory map.

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

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

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

Owner EPOCH is used as a parameter to allow you 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 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 (Available when "SW Guard Extensions (SGX)" is set to Enabled and "Select Owner EPOCH input type" is set to Manual User Defined Owner EPOCHs)

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

Software Guard Extensions Epoch 1 (Available when "SW Guard Extensions (SGX)" is set to Enabled and "Select Owner EPOCH input type" is set to Manual User Defined Owner EPOCHs)

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

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

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

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

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

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

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

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

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

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

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

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

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

►Chipset Configuration

Warning: Setting the wrong values in the following features may cause the system to malfunction.

►North Bridge

This feature allows you to configure the following North Bridge settings.

►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 Precedent to degrade UPI features if system options are in conflict. Select Feature Precedent to degrade UPI topology if system options are in conflict. The options are **Topology Precedence** and Feature Precedence.

Link L0p Enable

Select Enable for the system BIOS to enable Link L0p support which will allow 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 Disable, Enable, 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 Enable 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 Disable, Enable, 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 Enable for the KTI prefetcher to preload the L1 cache with data deemed relevant, which will allow 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 is needed. The options are Disable, Enable, and **Auto**.

IO Directory Cache (IODC)

Select Enable for 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 Disable, **Auto**, Enable for Remote InvItoM Hybrid Push, InvItoM AllocFlow, Enable for Remote InvItoM Hybrid AllocNonAlloc, and Enable for Remote InvItoM and Remote WViLF.

SNC

Sub NUMA Clustering (SNC) is a feature that breaks up the Last Level Cache (LLC) into clusters based on address range. Each cluster is connected to a subset of the memory controller. Enable this feature to improve average latency and reduce memory access congestion for higher performance. The options are **Auto**, Disable, Enable SNC2 (2-clusters), and Enable SNC4 (4-clusters).

Stale AtoS (A to S)

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 Disable, Enable, and **Auto**.

LLC Dead Line Alloc

Select Enable to opportunistically fill the dead lines in the LLC. The options are Disable, **Enable**, and Auto.

UPI3 (Available when your motherboard supports dual processors)

Use this feature to enable/disable the 4th Intel Ultra Path Interconnect (UPI) link. The default setting is Enable if your motherboard supports UPI3. The options are Disable and **Enable**.

▶**Memory Configuration**

This feature allows you to configure the Integrated Memory Controller (iMC) settings.

Enforce DDR Memory Frequency POR

Select POR to enforce Plan of Record (POR) restrictions for DDR memory frequency and voltage programming. The options are **POR** and Disable.

Memory Frequency

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

Data Scrambling for DDR5

Select Enable to enable data scrambling for DDR5 modules to enhance memory data security. The options are Disable and **Enable**.

Enable fADR

Select Enable for Asynchronous DRAM Refresh (ADR) support to enhance memory performance. The options are **Disable** and Enable.

Enable ADR (Available when "Enable fADR" is set to Disable)

Select Enable for Asynchronous DRAM Refresh (ADR) support to enhance memory performance. The options are Disable and **Enable**.

Legacy ADR Mode (Available when "Enable fADR" is set to Disable and "Enable ADR" is set to Enable)

Use this feature to support the Legacy ADR mode to enhance memory performance. In the Legacy ADR mode, the ADR safe domain (flush domain) includes the WPQ in memory controllers. The options are Disable, Enable, and **Auto**.

▶fADR Configuration (Available when "Enable fADR" is set to Enable)

Number of Cores

Use this feature to set the number of CPU cores to be involved in the fADR event. The options are 1 Core, 4 Cores, and **All Cores**.

Core Ratio

Use this feature to set the CPU core ratio to be involved in the fADR event. The options are **Auto** and Manual.

Core Ratio Value (Available when "Core Ratio" is set to Manual)

Use this feature to enter the core ratio value. The default value is FF.

Mesh Ratio

Use this feature to set the mesh ratio to be involved in the fADR event. The mesh ratio determines the frequency of data access between CPU cores and caches. The options are **Auto** and Manual.

Mesh Ratio Value (Available when "Mesh Ratio" is set to Manual)

Use this feature to enter the mesh ratio value. The default value is FF.

Flush Timeout

Use this feature to set the timeout setting when the data in the CPU cache memory will be flushed by the applications to persistent memory in the absence of system power. The options are **Auto** and Manual.

Flush Timeout Value (Available when "Flush Timeout" is set to Manual)

Use this feature to enter the flush timeout value. The default value is FFF.

DDR 2X Refresh Enable

Select Enable for memory 2X refresh support to enhance memory performance. The options are **Auto**, Disable, and Enable.

CXL Type 3 Legacy

Select Enable to use the CXL Type 3 memory device, which can be supported by the CXL Type 2 flows, for memory bandwidth and capacity expansion. The options are **Disable** and Enable.

▶Memory Topology

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

P1-DIMMA1: 4800MT/s Hynix DRx8 32GB RDIMM

▶Memory RAS Configuration

Use this submenu to configure the following Memory Reliability_Availability_Serviceability (RAS) settings.

Mirror Mode (Available when "ADDDC Sparing" is set to Disabled and "UEFI ARM Mirror" is set to Disabled)

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

UEFI ARM Mirror (Available when "ADDDC Sparing" is set to Disabled and "Mirror Mode" is set to Disabled)

If this feature is set to Enable, 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.

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

Use this feature to set the percentage of memory space to be used for UEFI ARM mirroring for memory security enhancement. The default setting is **0**.

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**.

The following information is displayed:

- Leaky Bucket Low Bit

- Leaky Bucket High Bit

ADDDC Sparing (Available when populating 1Rx4, 2Rx4, and 4Rx4 DIMM)

Select Enabled for Adaptive Double Device Data Correction (ADDDC) support, which will not only provide memory error checking and correction but will also prevent the

system from issuing a performance penalty before a device fails. Please note that virtual lockstep mode will only start to work for ADDDC after a faulty DRAM module is spared. The options are Disabled and **Enabled**.

Patrol Scrub

Patrol Scrubbing is a process that allows the CPU to correct correctable memory errors detected in a memory module and send the corrections to the requestor (the original source). When this feature is set to Enable, the IO hub will read and write back one cache line every 16K cycles if there is no delay caused by internal processing. By using this method, roughly 64 GB of memory behind the IO hub will be scrubbed every day. The options are Disabled and **Enable at End of POST**. (POST is the abbreviation for Power_On Self Test.)

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. Select Once to execute only one time. The options are **Disabled**, Enabled, and Once.

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 in the same memory page. The options are **Disabled** and Enabled.

▶in Configuration

▶CPU1 Configuration / CPU2 Configuration

IOU0 (IIO PCIe Port 1)

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

IOU1 (IIO PCIe Port 2)

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

IOU2 (IIO PCIe Port 3)

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

IOU3 (IIO PCIe Port 4)

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

IOU4 (IIO PCIe Port 5)

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

▶**CPU1 SLOT3 PCIe 5.0 x16 / CPU1 SLOT2 PCIe 5.0 x16 / CPU1 SLOT1 PCIe 5.0 x8 / M.2-C1 / M.2-C2 / P1_NVMe0 / P1_NVMe1 / P1_NVMe2 / P1_NVMe3**

▶**CPU2 SLOT5 PCIe 5.0 x16 / CPU2 SLOT4 PCIe 5.0 x16 / P2_NVMe4 / P2_NVMe5 / CPU2 SLOT6 PCIe 5.0 x8**

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

Link Speed

Use this feature to select the link speed for the PCIe port specified by the user. 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:

- PCIe Port Link Status

- PCIe Port Link Max

- PCIe Port Link Speed

Data Link Feature Exchange

Use this feature to enable/disable the PCIe port to enter PCIe 4.0 DL_Feature negotiation state. The options are Disable and **Enable**.

PCIe Port Max Payload Size

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

Equalization Bypass To Highest Rate

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

▶**IOAT Configuration**

Relaxed Ordering

Select Yes to allow certain transactions to be processed and completed before other transactions that have already been enqueued. The options are **No** and Yes.

▶**Intel VT for Directed I/O (VT-d)**

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

Select Enable to use Intel Virtualization Technology for Direct I/O VT-d support by reporting the I/O device assignments to the Virtual Machine Monitor (VMM) through the DMAR ACPI tables. This feature offers fully-protected I/O resource sharing across Intel platforms, providing greater reliability, security and availability in networking and data-sharing. The options are **Enable** and Disable. (DMA is the abbreviation for Direct Memory Access. DMAR is the abbreviation for DMA Remapping Reporting.)

Pre-Boot DMA protection (Available when "Intel VT for Directed I/O (VT-d)" is set to Enable)

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

Interrupt Remapping (Available when "Intel® VT for Directed I/O (VT-d)" is set to Enable)

Select Enable to support I/O DMA transfer remapping and device-generated interrupts. The options are **Auto**, Enable, and Disable.

PCIe ACSCTL (Available when "Intel® VT for Directed I/O (VT-d)" is set to Enable)

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

▶**Intel VMD Technology**

Note 1: 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, please disable VMD in the BIOS.

Note 2: The number of PCIe slots and the slot naming can differ depending on the PCIe devices connected to your motherboard.

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**.

▶**Intel VMD for Volume Management Device on CPU1 (Available when "NVMe Mode Switch" is set to Manual)**

VMD Config for PCH ports

Enable/Disable VMD

Select Enable to enable the Intel Volume Management Device (VMD) technology support for the root port specified. The options are **Disable** and Enable.

VMD Config for IOU 0 / VMD Config for IOU 1 / VMD Config for IOU 2 / VMD Config for IOU 3 / VMD Config for IOU 4

Enable/Disable VMD

Select Enable to enable the Intel VMD technology for the PCH port or IOU. The options are **Disable** and Enable.

CPU1 SLOT3 PCIe 5.0 x16 / CPU1 SLOT2 PCIe 5.0 x16 / CPU1 SLOT2 PCIe 5.0 x8 / M.2-C1 / M.2-C2 / P1_NVME0 / P1_NVME1 / P1_NVME0 / P1_NVME2 / P1_NVME3 (Available when the device is detected by the system and "Enable/Disable VMD" above is set to Enable)

Select Enable to enable the Intel VMD technology support for the root port specified. The options are **Disable** and Enable.

Hot Plug Capable (Available when the device is detected by the system and "Enable/Disable VMD" above is set to Enable)

Select Enable to enable Hot Plug support for the root ports specified, which allows you to change the devices on those root ports without shutting down the system. The options are **Disable** and Enable.

▶Intel VMD for Volume Management Device on CPU2 (Available when "NVMe Mode Switch" is set to Manual)

VMD Config for IOU 0 / VMD Config for IOU 1 / VMD Config for IOU 2 / VMD Config for IOU 3

Enable/Disable VMD

Select Enable to enable the Intel VMD technology for the PCH port or IOU. The options are **Disable** and Enable.

CPU2 SLOT11 PCIe 5.0 x8 VMD / M.2-HC1 VMD / M.2-HC2 VMD / CPU2 SLOT8 PCIe 5.0 x16 VMD / Onboard NVMe1 VMD / CPU2 SLOT6 PCIe 5.0 x16 VMD (Available when the device is detected by the system and "Enable/Disable VMD" above is set to Enable)

Select Enable to enable the Intel VMD technology support for the root port specified. The options are **Disable** and Enable.

Hot Plug Capable (Available when the device is detected by the system and "Enable/Disable VMD" above is set to Enable)

Select Enable to enable Hot Plug support for the root ports specified, which allows you to change the devices on those root ports without shutting down the system. The options are **Disable** and Enable.

IIO-PCIe Express Global Options

PCIe ASPM Support (Global)

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

PCIe Max Read Request Size

Use this feature to set the maximum read request size in PCI hierarchy. The options are **Auto**, 128B, 256B, 512B, 1024B, 2048B, and 4096B.

Equalization Bypass To Highest Rate

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

IIO eDPC Support (Available when your system supports this feature)

Use this feature to configure the setting for IIO Enhanced Downstream Port Containment (eDPC) support for your system in an effort to improve the error containment capacity within the PCIe subsystem when an uncorrected error is detected either at the root port or at the switch downstream port. Select Disable to disable IIO eDPC support. Select On Fatal Error to enable IIO eDPC support in your system when a fatal error occurs. Select On Fatal and Non-Fatal Error to enable IIO eDPC support when an error, fatal or non-fatal, has occurred. The options are **Disable**, On Fatal Error, and On Fatal and Non-Fatal Errors.

IIO eDPC Interrupt (Available when your system supports this feature and when "IIO eDPC Support" is set to On Fatal Error/On Fatal and Non-Fatal Errors)

Select Enable to enable IIO eDPC Interrupt support. The options are **Enable** and Disable.

IIO eDPC ERR_COR Message (Available when your system supports this feature and when "IIO eDPC Support" is set to On Fatal Error/On Fatal and Non-Fatal Errors)

If this feature is set to Enable, an IIO eDPC error correction message will be displayed. The options are **Enable** and Disable.

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

Set this feature to enable or disable the CXL header bypass. The options are **Disable** and Enable.

▶South Bridge

The following information is displayed:

- USB Devices:

Legacy USB Support

Select Enabled to support onboard legacy USB devices. Select Auto to disable legacy support if there are no legacy USB devices present. Select Disabled to have all USB devices available for EFI applications only. The options are **Enabled,** Disabled, and Auto.

XHCI Hand-off

This is a work-around solution for operating systems that do not support Extensible Host Controller Interface (XHCI) hand-off. The XHCI ownership change should be claimed by the XHCI driver. The options are **Enabled** and Disabled.

Port 60/64 Emulation

Select Enabled for I/O port 60h/64h emulation support, which in turn, provides complete legacy USB keyboard support for the operating systems that do not support legacy USB devices. The options are **Disabled** and Enabled.

PCIe PLL SSC

Select Enabled for PCH 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.

▶Server ME Information

The following information is displayed:

- General ME Configuration

- Oper. Firmware Version

  - Current State

  - Error Code

▶PCH SATA1 Configuration / ▶PCH SATA2 Configuration

When this submenu is selected, the AMI BIOS automatically detects the presence of the SATA devices that are supported by the Intel PCH chip and displays the following features.

SATA Controller(s)

This feature enables or disables the onboard SATA controller(s) supported by the Intel PCH chip. The options are Disabled and **Enabled**.

SATA Mode Selection (Available when "SATA Controller(s)" is set to Enabled)

Use this feature to select the mode of installed SATA drives. The options are **AHCI** and RAID.

> **Note 1:** The option of RAID is unavailable when "Boot Mode Select" is set to Legacy.

> **Note 2:** Refer to Boot submenu in the BIOS Setup main menu to set "Boot Mode Select".

Support Aggressive Link Power Management (Available when "SATA Controller(s)" is set to Enabled)

When this feature is set to Enabled, the SATA AHCI controller manages the power use of the SATA link. The controller will put the link in a low power mode during an extended period of I/O inactivity, and will return the link to an active state when I/O activity resumes. The options are **Disabled** and Enabled.

SATA SGPIO Mode (Available when "SATA Controller(s)" is set to Enabled)

Use this feature to change the serial GPIO mode for SATA controller. The options are LED and **SGPIO**.

SATA Port 0 - SATA Port 7 (Available when "SATA Controller(s)" is set to Enabled)

> **Note:** The SATA port naming may vary based on the related configuration.

Hot Plug

Select Enabled to support Hot-plugging for the device installed on a selected SATA port to allow you to replace the device installed in the slot without shutting down the system. The options are Disabled and **Enabled.**

Spin Up Device

Select Enabled for Staggered Spin Up support to allow the SATA devices specified by the user to spin up one at a time at boot up in an effort to prevent all hard drive disks from spinning up at the same time, causing a power surge. The options are **Disabled** and Enabled.

SATA Device Type

Use this feature to specify if the device installed on the SATA port specified by the user should be connected to a solid state drive or a hard disk drive. The options are **Hard Disk Drive** and Solid State Drive.

▶Trusted Computing (Available when a TPM device is installed and detected by the BIOS)

When a Trusted-Platform Module (TPM) device is detected by your system, the following information is displayed:

• TPM 2.0 Device Found

• Firmware Version:

• Vendor:

Security Device Support

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

*When "Security Device Support" is set to Enable, the following information is displayed:

• Active PCR banks

• Available PCR banks

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

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

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

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

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

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

> **Note:** Your system will reboot to carry out a pending TPM operation.

Platform Hierarchy (Available when "Security Device Support" is set to Enable) (for TPM version 2.0 and above)

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 a TPM device. The options are Disabled and **Enabled**.

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

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 Enable)

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 device 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 (for TPM version 2.0 and above)

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.

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.

> **Note 1:** 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.
>
> **Note 2:** For more information on TPM, please refer to the TPM manual at https://www.supermicro.com/manuals/other/AOM-TPM-9670V_9670H.pdf.

▶ACPI Settings

NUMA

Use this feature to enable Non-Uniform Memory Access (NUMA) to enhance system performance. The options are Disabled and **Enabled**.

UMA-Based Clustering

When this feature is set to Hemisphere, Uniform Memory Access (UMA)-based clustering will support 2-cluster configuration for system performance enhancement. The options are Disabled (All2All), Hemisphere (2-clusters), and **Quadrant (4-clusters)**.

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**.

High Precision Event Timer

Select Enabled to activate the High Precision Event Timer (HPET) that produces periodic interrupts at a much higher frequency than a Real-time Clock (RTC) does in synchronizing multimedia streams, providing smooth playback and reducing the dependency on other timestamp calculation devices, such as an x86 RDTSC Instruction embedded in the CPU. The HPET is used to replace the 8254 Programmable Interval Timer. The options are Disabled and **Enabled**.

►Super IO Configuration (Available when your system supports this feature)

The following information is displayed.

- Super IO Chip

►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" 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" is set to Enabled)

This feature specifies 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=2F8h; IRQ=4;), (IO=3E8h; IRQ=4;), and (IO=2E8h; IRQ=4;).

►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" 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" is set to Enabled)

This feature specifies 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. The options are **Auto**, (IO=3F8h; IRQ=3;), (IO=2F8h; IRQ=3;), (IO=3E8h; IRQ=3;), and (IO=2E8h; IRQ=3;).

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

COM1 (Available when your system supports 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.

▶Console Redirection Settings (Available when "Console Redirection" above 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 1's in data bits is even. Select Odd if the parity bit is set to 0, and the number of 1's 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

This feature selects Function Keys and KeyPad settings for Putty, which is a terminal emulator designed for the Windows OS. The options are **VT100**, LINUX, XTERMR6, SCO, ESCN, and VT400.

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 (Available when "Console Redirection" above is set to Enabled)**

Use this feature to specify how the host computer will exchange data with the client computer.

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 1's in data bits is even. Select Odd if the parity bit is set to 0, and the number of 1's 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

This feature selects Function Keys and KeyPad settings for Putty, which is a terminal emulator designed for the Windows OS. The options are **VT100**, LINUX, XTERMR6, SCO, ESCN, and VT400.

Legacy Console Redirection

▶**Legacy Console Redirection Settings**

Legacy Serial Redirection Port

Use this feature to select a COM port to display redirection of Legacy OS and Legacy OPROM messages. The options are **COM1** and SOL/COM2. Please note that the available options are based on your motherboard features.

Resolution

Use this feature to select the numbers of rows and columns used in Console Redirection for Legacy OS support. The options are 80x24 and **80x25**.

Redirect After BIOS POST

Use this feature to enable or disable legacy console redirection after BIOS POST. When the option - BootLoader is selected, legacy console redirection is disabled before booting the OS. When the option - Always Enable is selected, legacy console redirection remains enabled upon OS bootup. The options are **Always Enable** and BootLoader.

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

The feature allows you 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 (Available when "Console Redirection EMS" above is set to Enabled)

Out-of-Band Mgmt Port

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

Terminal Type EMS

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

Bits Per Second EMS

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

Flow Control EMS

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

The following information is displayed:

Data Bits EMS / Parity EMS / Stop Bits EMS

▶Network 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 "+" or "-" on your keyboard to change the value. The default setting is **0**.

Media Detect Count

Use this feature to select 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 "+" or "-" on your keyboard to change the value. The default setting is **1**.

▶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

This feature displays the number of consecutive neighbor solicitation messages 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 (Available when "Policy" is set to manual)

New IPv6 address

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

New Gateway address

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

New DNS address

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

Commit Changes and Exit

Press <Enter> to save changes and exit. The options are **Yes** and No.

Discard Changes and Exit

Press <Enter> to discard changes and exit. The options are **Yes** and No.

Save Changes and Exit

Press <Enter> to save changes and exit. The options are **Yes** and No.

▶MAC:(MAC address)-IPv4 Network Configuration

Configured

Select Enabled to show whether the network address has been successfully configured. 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 "Enabled 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 "Enabled 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 "Enabled 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 "Enabled 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. The options are **Yes** and No.

▶PCIe/PCI/PnP Configuration

The following information is displayed:

- PCI Bus Driver Version

PCI Devices Common Settings:

Above 4G Decoding (Available when the system supports 64-bit PCI decoding)

Select Enabled to decode a PCI device that supports 64-bit in the space above 4G Address. 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**.

MMCFG Size

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

MMIO High Base

Use this feature to select the base memory size according to memory-address mapping for the IO hub. The options are 56T, 40T, **32T**, 24T, 16T, 4T, 2T, 1T, 512G, and 3584T.

MMIO High Granularity Size

Use this feature to select the high memory size according to memory-address mapping for the IO hub. The options are 1G, 4G, 16G, **64G**, 256G, and 1024G.

SR-IOV Support

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**.

Bus Master Enable

If it is set to Enabled, the PCI Bus Driver will enable the Bus Master Attribute for DMA transactions. If it 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**.

Consistent Device Name Support

Select Enabled for ACPI_DSM (DSM: Device Specific Method) device name support for onboard devices and slots. 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 default option, Vendor Defined Firmware, is pre-installed on the drive and may resolve errata or enable innovative functions for the drive. The other option, AMI Native Support, is offered by the BIOS with a generic method.

VGA Priority

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

For the following features, please note that:

> **Note 1:** The number of slots and slot naming vary based on your motherboard features.
>
> **Note 2:** The option of Legacy is available when "Boot Mode Select" is set to Dual or Legacy.
>
> **Note 3:** Refer to Boot submenu in the BIOS Setup main menu to set "Boot Mode Select".

Onboard Video Option ROM

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

CPU1 SLOT1 PCIe 5.0 x8 OPROM / CPU1 SLOT2 PCIe 5.0 x16 OPROM / CPU1 SLOT3 PCIe 5.0 x16 OPROM / CPU2 SLOT4 PCIe 5.0 x16 OPROM / CPU2 SLOT5 PCIe 5.0 x16 OPROM / CPU2 SLOT6 PCIe 5.0 x8 OPROM / M.2-C1 OPROM / M.2-C2 OPROM

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

Onboard LAN1 Option ROM

Use this feature to select the type of device installed in LAN Port 1 used for system boot. The options are Disabled, PXE, iSCSI, Legacy, FCoE, and **EFI**. Please note that available options are based on your LAN OPROM ROM.

Onboard LAN2 Option ROM (Available when "Onboard LAN Device" is set to Enabled and "Onboard LAN1 Option ROM" is set to Disabled or PXE)

Use this feature to select the type of device installed in LAN Port 2 used for system boot. The default setting for LAN2 Option ROM is Disabled. Please note that available options are based on your LAN OPROM ROM.

Onboard NVME1 Option ROM / Onboard NVME2 Option ROM / Onboard NVME3 Option ROM / Onboard NVME4 Option ROM / Onboard NVME5 Option ROM / Onboard NVME6 Option ROM

Use this feature to select which firmware function to be loaded for the NVMe device in this slot. The options are Disabled, Legacy, and **EFI**.

►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

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

Priority of HTTP Boot

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

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

Select IPv4 or IPv6

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

Boot Description

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

Boot URI

Enter a Boot Uniform Research Identifier (URI) with 128 characters or shorter. This Boot URI determines how IPv4 Boot Option and IPv6 Boot Option will be created. This feature is only supported on Dual or EFI Boot Mode.

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 x:" 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 x:" 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 x:" 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. This feature is only supported on Dual or EFI Boot Mode.

▶Supermicro KMS Server Configuration

Note: Be sure to configure all the features in the section of Supermicro KMS Server Configuration and the feature of "KMS Security Policy" (page 141) so that your system can communicate with the KMS server.

Supermicro KMS Server IP address

Use this feature to set the Supermicro Key Management Service (KMS) server IPv4 address in dotted-decimal notation.

Second Supermicro KMS Server IP address

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

Supermicro KMS TCP Port number

Use this feature to set the TCP port number used in 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 set the KMS server connecting timeout (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 maximum length is 63 characters.

Client Password

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

▶CA Certificate/ ▶Client Certificate/ ▶Client Private Key

Use the three features 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

Press <Del> during system boot to enter the BIOS Setup utility. Navigate to the Advanced tab. Use the arrow keys to select Super-Guardians Configuration and press <Enter>.

Super-Guardians Protection Policy

Use this feature to enable the Super-Guardians Protection Policy. The options are **Storage**, System, and System and Storage. The default setting is Storage. Set this feature to Storage to protect and have secure access to your storage devices (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. (TCG is the abbreviation for Trusted Computing Group.)

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. The options are **Disabled** and Enabled. The default setting is Disabled. Save settings (you can press <F4>) and reboot the system for changes to take effect.

> **Note 1:** Be sure that the KMS Server is ready before configuring this feature.
> **Note 2:** 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 of connection retrying to the KMS server. The valid range is 0 - 10. Press "+" or "-" on your keyboard to change the value. The default setting is **5** (times). The value of 0 indicates a infinite-retrying.

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

The options are **Disabled** and Enabled. The default setting is Disabled. Set this feature to Enabled to enable the TPM Security Policy. Save settings (you can press <F4>) and reboot the system for changes to take effect.

> **Note:** Be sure to install a Trusted Platform Module (TPM) device (TPM 2.0) to your system before configuring this feature.

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

The options are **Disabled** and Enabled. The default setting is Disabled. Set this feature to Enabled; save settings (you can press <F4>) and reboot the system for changes to take effect. 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.

> **Note 1:** Be sure to connect a USB flash drive with the Authentication-Key (filename: TPMAuth.bin) to your system before the system reboot.
>
> **Note 2:** Be sure to save the Authentication-Key (filename: TPMAuth.bin) to the USB flash drive and have a backup. Please load the Authentication-Key (filename: TPMAuth. bin) after installing a TPM device. Otherwise, the TPM function can not work properly.

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

The options are **Disabled** and Enabled. The default setting is Disabled. Set this feature to Enabled; save settings (you can press <F4>) and reboot the system for changes to take effect. 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. The default setting is Disabled. Set this feature to Enabled; save settings (you can press

<F4>) and reboot the system for changes to take effect. 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.

> **Note 1:** Be sure to connect a USB flash drive to your system before configuring this feature.
>
> **Note 2:** Be sure to save the USB Authentication-Key (filename: USBAuth.bin) to the USB flash drive and have a backup.

►Supermicro 1G/10GBASE-T Ethernet Controller - (MAC address)

> **Note:** The name of the Ethernet controller(s) and MAC addresses shown above are based on you system features.

►Firmware Image Menu

The following information is displayed:

- Family Firmware Version

- Boot Code

- MBA

- EFI

- CCM

- NCSI

- RDMA FW

►Device Configuration Menu

Multi-Function Mode

Use this feature to configure NIC hardware mode. In Single Function (SF) mode, a single physical function is assigned to each network port. In Network Partitioning Mode (NPAR) mode, a single physical network port will appear as as multiple virtual network interfaces in system. The options are **SF** and NPAR 1.0.

Number of VFs per PF (Available when "SR-IOV" is set to Enabled)

Use this feature to configure the number of Virtual Function (VF) per Physical Function (PF). The valid range is from 0 to 128 in multiples of 8. Maximum value is 128 divided by number of ports. The default is **8**.

SR-IOV

Use this feature to enable or disable the Single Root I/O Virtualization (SR-IOV) feature on the network adapter. The options are **Disabled** and Enabled.

Number of MSI-X Vectors per VF

Use this feature to configure the number of Message Signaled Interrupts (MSI)-X vectors per VF. The valid range is from 0 to 64. The default is **16**.

Maximum Number of PF MSI-X Vectors

Use this feature to configure the maximum number of MSI-X Vectors of a PF. The valid range is from 0 to 512. The default is **255**.

Energy Efficient Ethernet

Use this feature to configure the Energy Efficient Ethernet (EEE) mode. The options are **Disabled** and Enabled.

Operational Link Speed

This feature controls the default link speed for the LAN port. The default setting is **AutoNeg** (Auto Negotiation).

Support RDMA

Use this feature to configure the Remote Direct Memory Access (RDMA) mode. The options are Disabled and **Enabled**.

DCB Protocol

Use this feature to configure the Data Center Bridging (DCB) settings. The options are Disabled, **Enabled (IEEE only)**, CEE (only), and Both (IEEE preferred with fallback to CEE).

LLDP Nearest bridge

Use this feature to configure the Link Layer Discovery Protocol (LLDP) nearest bridge state The options are **Disabled** and Enabled.

Default EVB Mode

Use this feature to configure the Edge Virtual Bridging (EVB) mode. The options are **VEB**, VEPA, and None.

Enable PME Capability

Use this feature to configure the Power Management Event (PME) capability support. The options are Disabled and **Enabled**.

Flow Offload

Use this feature to configure the Flow Offload mode. This feature is supported on Linux DPDK only. It is not supported on Windows or ESX OS. The options are **Disabled** and Enabled.

Live Firmware Upgrade

Use this feature to enable the upgrade of device firmware with minimal downtime and minimal traffic interruption. It avoids host reboot, device power cycle, and driver reload. This feature is only supported on Linux OS only. The options are **Disabled** and Enabled.

Adapter Error Recovery

Use this feature to enable the recovery of firmware from fatal errors without manual intervention, host reboot, or power cycle. The options are **Disabled** and Enabled.

▶MBA Configuration Menu

Option ROM

Use this feature to control the enablement of legacy boot protocols in Option ROM. The options are Disabled and **Enabled**.

Legacy Boot Protocol

Use this feature to specify the non-UEFI boot protocol. The options are None and **PXE**.

Boot Strap Type

Use this feature to specify the boot strap method used to boot to the operating system. Options are **Auto Detect**, BBS, Int 18h, and Int 19h.

Hide Setup Prompt

Use this feature to specify whether to display or hide the legacy Option ROM setup prompt during system Power-on Self Test (POST). The options are **Disabled** and Enabled.

Setup Key Stroke

Use this feature to configure key strokes to invoke configuration menu. The options are **Ctrl-S** and Ctrl-B.

Banner Message Timeout

Use this feature to specify the number of seconds that the Option ROM banner is displayed during POST. The default is **7**.

Pre-boot Wake On LAN

This feature allows you to remotely wake up the system from standby mode. The options are Disabled and **Enabled**.

VLAN Mode

Use this feature to enable or disable VLAN mode. The options are **Disabled** and Enabled.

VLAN ID

If VLAN Mode is enabled, use this feature to specify the VLAN ID. The valid VLAN ID range is from 1 to 4049. The default is **1**.

Boot Retry Count

Use this feature to specify the number of times legacy boot to be attempted in case of a boot failure. The options are **No Retry**, 1 Retry, 2 Retries, 3 Retries, 4 Retries, 5 Retries, 6 Retries, and Indefinite Retries.

Blink LEDs

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

The following information is displayed:

- Link Status

- Physical Link Speed

- Chip Type

- PCI Device ID

- Bus: Device: Function

- Permanemt MAC Address

- Virtual MAC Address

Restore Defaults

Use this feature to reset the network adapter settings to factory defaults.

▶TLS Authenticate Configuration

This submenu allows you to configure Transport Layer Security (TLS) settings.

▶Server CA Configuration

This feature allows you to configure the client certificate that is to be used by the server.

▶Enroll Certification

This feature allows you to enroll the certificate in the system.

▶Enroll Certification Using File

This feature allows you to enroll the security certificate in the system by using a file.

Certification GUID

Press <Enter> and input the certification Global Unique Identifier (GUID).

►**Commit Changes and Exit**

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

►**Discard Changes and Exit**

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

►**Delete Certification**

This feature is used to delete the certificate if a certificate has been enrolled in the system. The options are **Disabled** and Enabled.

►Client Certification Configuration

This feature allows you to configure the client certificate to be used by the server.

►**Enroll Certification**

This feature allows you to enroll the certificate in the system.

►**Enroll Certification Using File**

This feature allows you to enroll the security certificate in the system by using a file.

Certification GUID

Press <Enter> and input the certification GUID.

►**Commit Changes and Exit**

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

►**Discard Changes and Exit**

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

►**Delete Certification**

This feature is used to delete the certificate if a certificate has been enrolled in the system.

▶Intel(R) VROC sSATA Controller / ▶Intel(R) VROC tSATA Controller

The Intel VROC sSATA/tSATA Controller feature allows you to configure RAID for corresponding PCH-attached SATA device(s) as described below:

- Intel VROC sSATA Controller: Allows you to configure RAID for SATA device(s) connected to JS1 (PCH SATA1) connector. This feature will be available under the Advanced menu after you configure Advanced -> PCH SATA1 Configuration -> "SATA Mode Selection" to RAID, save the settings and reboot the system to apply the changes.

- Intel VROC tSATA Controller: Allows you to configure RAID for SATA device(s) connected to I-SATA0/1 (PCH SATA2) connector(s). This feature will be available under the Advanced menu after you configure Advanced -> PCH SATA2 Configuration -> "SATA Mode Selection" to RAID, save the settings and reboot the system to apply the changes.

The following information is displayed.
- Intel VROC sSATA/tSATA driver version

▶Create RAID Volume

Name:

This feature allows you to enter the unique name of RAID volume.

RAID Level:

This feature allows you to select the RAID level. The options are **RAID0(Stripe)**, RAID1(Mirror), RAID5(Parity), and RAID10(RAID0+1).

Select Disks:

Select the desired RAID disks one by one by setting them to **X**. The options are (not selected) and **X (selected)**.

Strip Size: (Available for RAID0/RAID5/RAID10 Only)

Use this feature to select the RAID strip size. The options are 4KB, 8KB, 16KB, 32KB, 64KB, and **128KB**. The available options are based on the setting of "RAID Level:" above.

Capacity (GB):

This feature allows you to enter the desired RAID capacity (in GB).

RWH Policy (Available for RAID5 Only)

Select a desired RAID Write Hole (RWH) policy when RWH occurs. If no disk has been set as a journaling drive, the options are Distributed PPL and Disable. If any disk has been

set as a journaling drive, the options are Distributed PPL, Journaling Drive, and Disable. For details on creating a journaling drive, refer to the Non-RAID Physical Disks section.

Note 1: A RWH occurs when a drive failure and power failure happen simultaneously or close to each other during the write. The events of a drive failure and power failure are connected and can lead to irrecoverable data or silent data corruption. This is caused by the lack of atomicity of write operations across the disks in the RAID.

Note 2: Partial parity logging (PPL) can be defined as the result of XOR calculation

of old data and old parity. PPL is a feature available only for RAID5 volumes. While a power/drive-failure/crash occurring, PPL information helps rebuild the RAID volume and reduce the potential data loss.

Select RWH Journaling Drive (Available for RAID5 Only)

If a journaling drive has been created and RWH Policy is set to Journaling Drive, select a desired journaling drive.

▶**Create RAID Volume**

Use this feature to create a RAID volume with the settings above. The options are **Yes** and No.

Non-RAID Physical Disks:

Use this feature to configure the following settings for non-RAID physical disk(s).

Mark as Spare

A spare disk is used for automatic RAID volume rebuilds when the status of "failed", "missing", or "at risk" is detected on the array disk. For a RAID0 volume, only the status of "at risk" will trigger automatic RAID volume rebuilds. Marking a disk as a spare one will remove all data on the disk.

Mark as Journaling Drive

A journaling drive is used as an error event log to record an event when an error occurs to a RAID5 volume. Marking a disk as a journaling drive will remove all data on the disk.

Locate LED

The feature is not applicable to this motherboard. Please ignore this feature.

Reset to Non-RAID

For a spare or journaling disk or a disk which has been added to a RAID array, you can reset it to a non-RAID disk by taking the steps below:

Note: When resetting a disk, all data on the disk will be deleted as well

RAID Volumes:

This feature displays the information of RAID volumes that have been created earlier.

▶Intel(R) Virtual RAID on CPU

Note 1: This feature is available when a device is connected to the CPU slots, M.2 slots or MCIO NVME connectors, and VMD support is enabled for the connector.

Note 2: To enable VMD support, go to Advanced -> Chipset Configuration -> North Bridge -> IIO Configuration -> Intel VMD Technology, set "NVMe Mode Switch" to VMD and reboot the system for the changes to take effect. Then the Intel(R) Virtual RAID on CPU feature will be available under the Advanced menu.

The following information is displayed:

- Intel(R) VROC with VMD Technology x.x.x.xxxx

- Upgrade key:

- Intel VROC Managed Controllers

▶All Intel VMD Controllers

The device information will be displayed in the Non-RAID Physical Disks.

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

▶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.

4.4 Event Logs

Use this feature to configure Event Logs settings.

Note: After you've made any changes in this section, please be sure to reboot the system for the changes to take effect.

```
                              Aptio Setup – AMI
       Main  Advanced  Event Logs  BMC  Security  Boot  Save & Exit

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













                                                  ↔: Select Screen
                                                  ↑↓: Select Item
                                                  Enter: Select
                                                  +/-: Change Opt.
                                                  F1: General Help
                                                  F2: Previous Values
                                                  F3: Optimized Defaults
                                                  F4: Save & Exit
                                                  ESC: Exit

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```
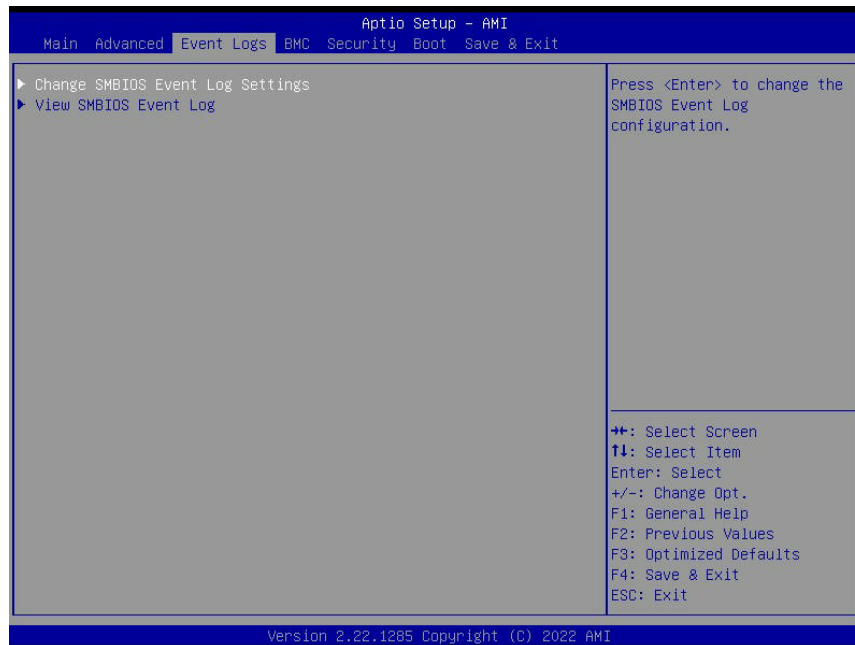
▶Change SMBIOS Event Log Settings

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 to 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)

This feature is used to determine how long (in minutes) should the multiple event counter wait before generating a new event log. Enter a number between 0 to 99. The default setting is **60**. (METW is the abbreviation for Multiple Event Count Time Window.)

Note: Please reboot the system for the changes above to take effect.

►**View SMBIOS Event Log**

This feature allows you to view the event in the system event log. Select this feature and press <Enter> to view the status of an event in the log. The following categories is displayed: DATE / TIME / ERROR CODE / SEVERITY.

4.5 BMC

Use this feature to configure BMC settings.

```
                            Aptio Setup - AMI
      Main  Advanced  Event Logs  BMC  Security  Boot  Save & Exit

   BMC Firmware Revision              01.00.11          Configure BMC network
   BMC STATUS                         Working           parameters

 ▶ System Event Log
 ▶ BMC Network Configuration




                                                        →←: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit

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```
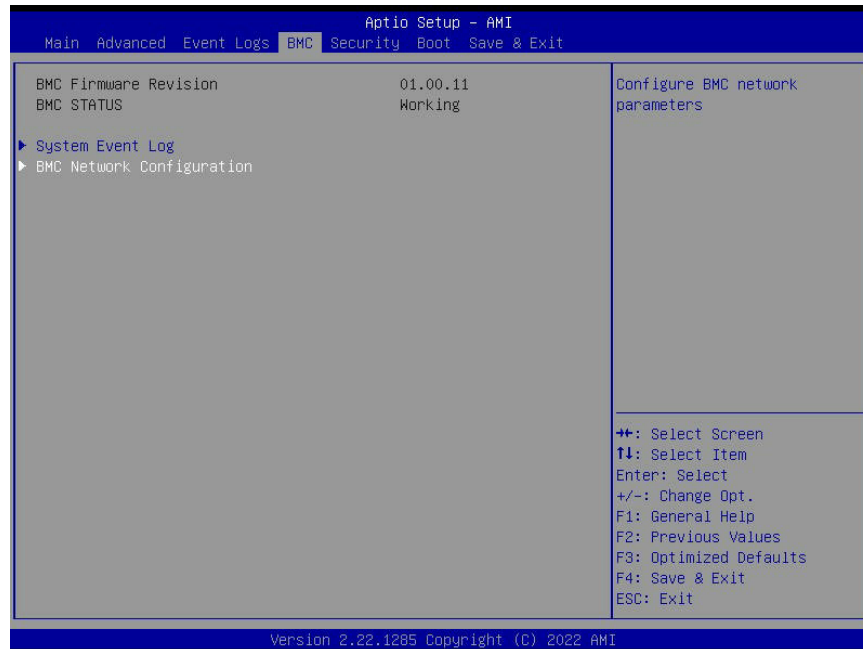
BMC Firmware Revision

This feature indicates the BMC firmware revision used in your system.

BMC STATUS

This feature indicates the status of the BMC firmware installed in your system.

▶System Event Log

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 allows you to determine 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.

> **Note**: After making changes on a setting, be sure to reboot the system for the changes to take effect.

▶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 IPMI LAN.

BMC Network Link Status:

This feature displays the status of the IPMI network link for this system. The default setting is **Dedicated LAN**.

Configuration Address Source (Available when "Update BMC LAN Configuration" is set to Yes)

Use this feature to select the source of the IPv4 connection. If Static is selected, you will need to know the IP address of IPv4 connection and enter it to the system manually in the field. If DHCP is selected, the BIOS will search for a Dynamic Host Configuration Protocol (DHCP) server in the network that is attached to and request the next available IP address for this computer. The options are Static and **DHCP**.

Station IP Address (Available when "Configuration Address Source" is set to Static)

This feature displays the Station IP address in decimal and in dotted quad form (i.e., 172.29.176.131).

Subnet Mask (Available when "Configuration Address Source" is set to Static)

This feature displays the sub-network that this computer belongs to. The value of each three-digit number separated by dots should not exceed 255.

Station MAC Address (Available when "Configuration Address Source" is set to Static)

This feature displays the Station MAC address for this computer. Mac addresses are six two-digit hexadecimal numbers.

Gateway IP Address (Available when "Configuration Address Source" is set to Static)

This feature displays the Gateway IP address for this computer. This should be in decimal and in dotted quad form (i.e., 172.29.0.1).

VLAN (Available when "Update BMC LAN Configuration" is set to Yes)

This feature displays the status of virtual LAN (VLAN) support. The options are **Disable** and Enable.

VLAN ID (Available when "VLAN" is set to Enable)

Use this feature to create a new VLAN ID by using an existing VLAN or creating a new VLAN ID. Enter a valid value between 1 - 4094. The default setting is **1**.

****

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.

Configuration Address Source (Available when "IPv6 Support" is set to Enabled)

Use this feature to select the source of the IPv6 connection. If Static Configuration is selected, you will need to know the IP address of IPv6 connection and enter it to the system manually in the field. If the other two options are selected, the BIOS will search for a DHCP server in the network that is attached to and request the next available IP address for this computer. The options are Static Configuration, **DHCPv6 Stateless**, and DHCPv6 Stateful.

IPv6 Address ("Static", "DHCPv6 Stateless", or "DHCPv6 Stateful", depending on the option you selected for "Configuration Address Source" above)

This feature displays the station IPv6 address. Press <Enter> to change the setting.

Prefix Length (Available when "Configuration Address Source" is set to Static Configuration)

This feature displays the prefix length. Press <Enter> to change the setting.

Gateway IP (Available when "Configuration Address Source" is set to Static Configuration)

Use this feature to enter the IPv6 gateway IP address. Press <Enter> to change the setting.

Advanced Settings (Available when "Configuration Address Source" is set to DHCPv6 Stateless)

Use this feature to set the DNS server IP. The options are **Auto obtain DNS server IP** and Manually obtain DNS server IP.

Preferred DNS server IP (Available when "Advanced Settings" above is set to Manually obtain DNS server IP)

This feature allows you to set the preferred DNS server IP.

Alternative DNS server IP (Available when "Advanced Settings" above is set to Manually obtain DNS server IP)

This feature allows you to set the alternative DNS server IP.

4.6 Security

This feature allows you to configure the following security settings for the system.

```
                              Aptio Setup - AMI
      Main  Advanced  Event Logs  BMC  Security  Boot  Save & Exit

                                                    ▲ Set Administrator Password

      Administrator Password              Not Installed
      User Password                       Not Installed

      Password Description

      If the Administrator's / User's password is set,
      then this only limits access to Setup and is
      asked for when entering Setup.
      Please set Administrator's password first in order
      to set User's password, if clear Administrator's
      password, the User's password will be cleared as well.

      The password length must be in the following range:

      Minimum length                      3
      Maximum length                      20                →←: Select Screen
                                                            ↑↓: Select Item
      Administrator Password                                Enter: Select
      Password Check                      [Setup]           +/-: Change Opt.
      Hard Drive Security Frozen          [Disabled]        F1: General Help
      Lockdown Mode                       [Disabled]        F2: Previous Values
                                                            F3: Optimized Defaults
                                                          ▼ F4: Save & Exit
                                                            ESC: Exit

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```

The following information is displayed:

- Administrator Password

- User Password

- Password Description

Administrator Password

This feature indicates if an administrator password has been installed. It also allows you to set the administrator password which is required to enter the BIOS Setup utility. The length of the password should be from three characters to 20 characters long.

User Password (Available when "Administrator Password" has been set)

This feature indicates if a user password has been installed. It also allows you to set the user password which is required to enter the BIOS Setup utility. The length of the password should be from three characters to 20 characters long.

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

Password Check

Select Setup for the system to check for a password at Setup. Select Always for the system to check for a password 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.

▶Supermicro Security Erase Configuration (Available when any storage device is detected by the BIOS)

> **Note:** For more information, please refer to https://www.supermicro.com/manuals/other/X11_X12_X13_B11_B12_B13_H11_H12_BH12_H13_Secure_Erase_Guide.pdf.

This section allows you to configure the Supermicro-proprietary Security Erase settings. When this section is selected, the following information is displayed. Please note that the order of the following information may differ based on the storage devices being detected.

- HDD Name: This feature displays the 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 allows you to configure Supermicro Security Erase settings on the storage device by using this user password.

- 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 allows you to configure Supermicro Security Erase settings on the storage device by using this administrator password.

Security Function

Select Set Password to set an HDD/SATA password which allows you to configure the security settings of the HDD/SATA device. Select Security Erase - Password to enter a SATA user

password to allow you to erase the password and the contents previously stored in the HDD/ SATA device. Select Security Erase - Without Password to use the manufacturer default password "111111111" as the SATA user password and allow you to erase the contents of the HDD/SATA device by using this default password. The options are **Disable**, Set Password, Security Erase - Password, Security Erase - PSID, and Security Erase - Without Password.

> **Note:** The option of Security Erase - PSID is based on the storage device support. PSID is the abbreviation for Physical Security Identification.

Password

Use this feature to set the storage device user password which allows you to configure 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 allows you to configure the Supermicro Security Erase settings by using this new user password.

Lockdown Mode (Available when the DCMS key is activated)

Select Enabled to support Lockdown Mode that will prevent 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.

HDD Security Configuration:

►Secure Boot

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

The following information is displayed:

• System Mode

• Secure Boot

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**.

CSM Support

If this feature is set to Enabled, legacy BIOS boot mode will be supported by the system. Please make sure you use the device with compatibility support for legacy boot. The options are Disabled and **Enabled**.

▶**Enter Audit Mode (Available when "Secure Boot Mode" is set to Custom)**

Select Ok to enter the Audit Mode workflow. It will result in erasing of Platform Key (PK) variables and reset system to the Setup/Audit Mode.

▶**Enter Deployed Mode / Exit Deployed Mode (Available when "Secure Boot Mode" is set to Custom)**

Select Ok to reset system to the User Mode or to the Deployed Mode.

▶**Key Management (Available when "Secure Boot Mode" is set to Custom)**

The following information is displayed.

- Vendor Keys

Provision Factory Defaults

Select Enabled to install provision factory default settings after a platform reset while the system is in the Setup Mode. The options are **Disabled** and Enabled.

▶**Restore Factory Keys (Available when any secure keys have been installed)**

Select Yes to restore manufacturer default keys to ensure system security. The options are **Yes** and No. Selecting Yes will reset system to the Deployed mode.

▶**Reset To Setup Mode (Available when any secure keys have been installed)**

This feature resets the system to the Setup Mode. The options are **Yes** and No.

▶**Enroll Efi Image**

This feature allows the Efi image to run in the secure boot mode, which will enroll the SHA256 Hash certificate of a PE image into the Authorized Signature Database (DB).

▶**Export Secure Boot Variables (Available when any secure keys have been installed)**

This feature exports the NVRAM contents of secure boot variables to a storage device. The options are **Yes** and No.

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, keys 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, keys numbers, and the sources of the authorized signatures. Select Update to update your "Key Exchange Keys". Select Append to append your "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, keys numbers, and the sources of the authorized signatures. Select Update to update your "Authorized Signatures". Select Append to append your "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 your "Forbidden Signatures". Select Append to append your "Forbidden Signatures".

▶**Authorized TimeStamps (dbt)**

This feature allows you 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 your "Authorized TimeStamps". Select Append to append your "Authorized TimeStamps".

▶OsRecovery Signature (dbr)

This feature allows you to set and save the authorized signatures used for OS recovery. Select Update to update your "OS Recovery Signatures". These values also indicate sizes, keys, and key sources of the OsRecovery signatures. Select Append to append your "OS Recovery Signatures".

TCG Storage Security Configuration:

▶(Storage Device Name) (Available when the storage device is compliant with TCG specifications)

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:

  • Admin Pwd Status:

Set Admin Password

Use this feature to set the administrator password for this storage device.

Set User Password (Available when the administrator 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.

4.7 Boot

Use this feature to configure Boot settings:

```
                              Aptio Setup - AMI
          Main  Advanced  Event Logs  BMC  Security  Boot  Save & Exit

                                                      Select boot mode LEGACY/UEFI
     Boot Mode Select                    [UEFI]
     LEGACY to EFI Support               [Disabled]

     FIXED BOOT ORDER Priorities
     Boot Option #1                      [UEFI Hard Disk]
     Boot Option #2                      [UEFI CD/DVD]
     Boot Option #3                      [UEFI USB Hard Disk]
     Boot Option #4                      [UEFI USB CD/DVD]
     Boot Option #5                      [UEFI USB Key]
     Boot Option #6                      [UEFI USB Floppy]
     Boot Option #7                      [UEFI USB Lan]
     Boot Option #8                      [UEFI
                                         Network:(B61/D0/F0)
                                         UEFI Network
                                         Card(MAC:7cc25506d872
                                         )]
     Boot Option #9                      [UEFI AP:UEFI:     ↔: Select Screen
                                         Built-in EFI Shell]↑↓: Select Item
                                                            Enter: Select
   ▶ Delete Boot Option                                     +/-: Change Opt.
                                                            F1: General Help
   ▶ UEFI NETWORK Drive BBS Priorities                      F2: Previous Values
   ▶ UEFI Application Boot Priorities                       F3: Optimized Defaults
                                                            F4: Save & Exit
                                                            ESC: Exit

                  Version 2.22.1285 Copyright (C) 2022 AMI
```

Boot Mode Select

Use this feature to select the type of devices from which the system will boot. The options are Legacy, **UEFI**, and Dual.

> **Note:** When "Boot Mode Select" is set to Dual, all OPROM-related features will be set to Legacy.

LEGACY to EFI Support

Select Enabled to boot EFI OS support after Legacy boot order has failed. The options are **Disabled** and Enabled.

FIXED BOOT Option Priorities

This feature prioritizes the order of a bootable device from which the system will boot. Press <Enter> on each item sequentially to select devices.

When "Boot Mode Select" is set to Dual, the following features will be displayed for configuration:

• Boot Option #1 ~ Boot Option #17

When "Boot Mode Select" is set to Legacy, the following features will be displayed for configuration:

• Boot Option #1 ~ Boot Option #8

When "Boot Mode Select" is set to UEFI, the following features will be displayed for configuration:

• Boot Option #1 ~ Boot Option #9

▶Add New Boot Option (Available when any storage device is detected by the BIOS)

This feature allows you to add a new boot option to the boot priority features for system boot.

Add boot option

This feature allows you 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

This feature allows you to specify the file path for the new boot option.

Create

After the name and the file path for the boot option are set, press <Enter> to create the new boot option in the boot priority list.

▶Delete Boot Option

This feature allows you to select a boot device to delete from the boot priority list.

Delete Boot Option

This feature allows you to remove an EFI boot option from the boot priority list.

▶UEFI NETWORK Drive BBS Priorities

This feature allows you to set the system boot order of detected devices.

▶UEFI Application Boot Priorities

This feature allows you to set the system boot order of detected devices.

▶UEFI USB Key Drive BBS Priorities

This feature allows you to set the system boot order of detected devices.

▶UEFI Hard Disk Drive BBS Priorities

This feature allows you to set the system boot order of detected devices.

▶Hard Disk Drive BBS Priorities

This feature allows you to set the system boot order of detected devices.
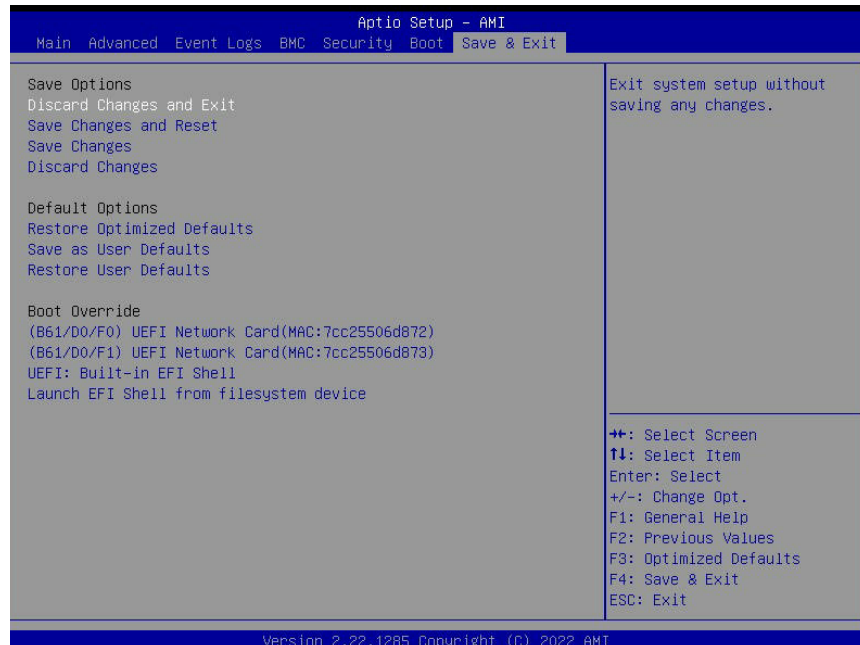
▶USB Key Drive BBS Priorities

This feature allows you to set the system boot order of detected devices.

▶NETWORK Drive BBS Priorities

This feature allows you to set the system boot order of detected devices.

4.8 Save & Exit

Select Save & Exit from the BIOS Setup screen to configure the settings below.

```
                                  Aptio Setup - AMI
        Main  Advanced  Event Logs  BMC  Security  Boot  Save & Exit

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

        Default Options
        Restore Optimized Defaults
        Save as User Defaults
        Restore User Defaults

        Boot Override
        (B61/D0/F0) UEFI Network Card(MAC:7cc25506d872)
        (B61/D0/F1) UEFI Network Card(MAC:7cc25506d873)
        UEFI: Built-in EFI Shell
        Launch EFI Shell from filesystem device

                                                        →←: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit

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```

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

When you have completed the system configuration changes, use this feature to exit the BIOS Setup utility and reboot the computer for the new system configuration parameters to become effective.

Save Changes

When you have completed the system configuration changes, use this feature to save all changes you've made. This will not reset (reboot) the system.

Discard Changes

Select this feature and press <Enter> to discard all the changes you've 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:** Please reboot the system for the changes to take effect to ensure that your system has the optimized default settings.

Save as User Defaults

Select this feature and press <Enter> to save all changes on 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

This feature allows you to override the Boot priorities sequence in the Boot menu, and immediately boot the system with a device specified instead of the one specified in the boot list. This is a one-time override.

Appendix A

BIOS POST Codes

A.1 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, please refer to https://www.ami.com/products/.

Appendix B

Software

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

## B.1 Microsoft Windows OS Installation

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

Installing the OS

1. Create a method to access the Microsoft Windows installation ISO file. That can be a USB flash or media drive.

2. Retrieve the proper RST/RSTe driver. Go to the Supermicro web page for your motherboard and click on "Download the Latest Drivers and Utilities", select the proper driver, and copy it to a USB flash drive.

3. Boot from a bootable device with Windows OS installation. You can see a bootable device list by pressing **F11** during the system startup.
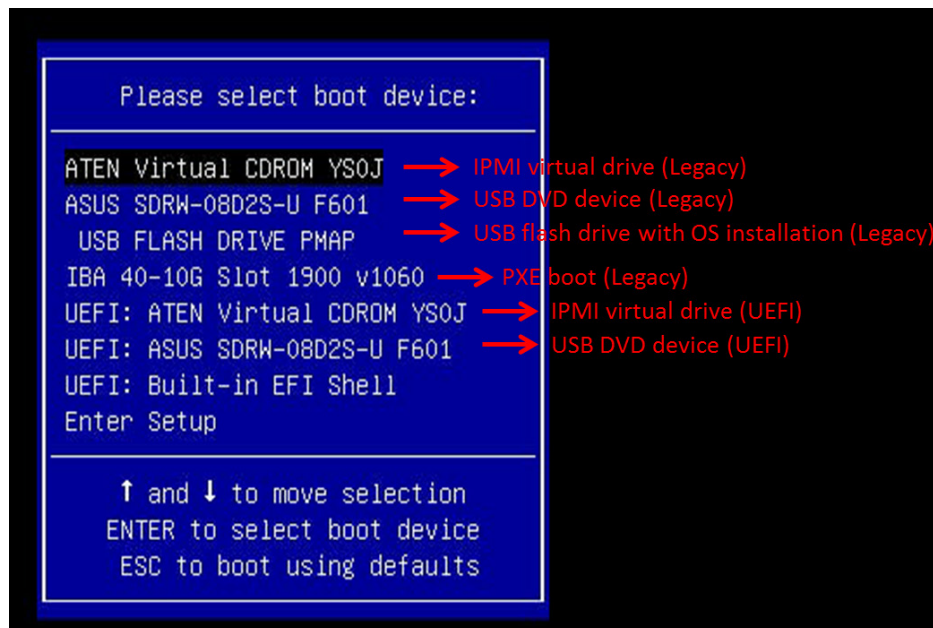
4. During Windows Setup, continue to the dialog where you select the drives on which to install Windows. If the disk you want to use is not listed, click on "Load driver" link at the bottom left corner.
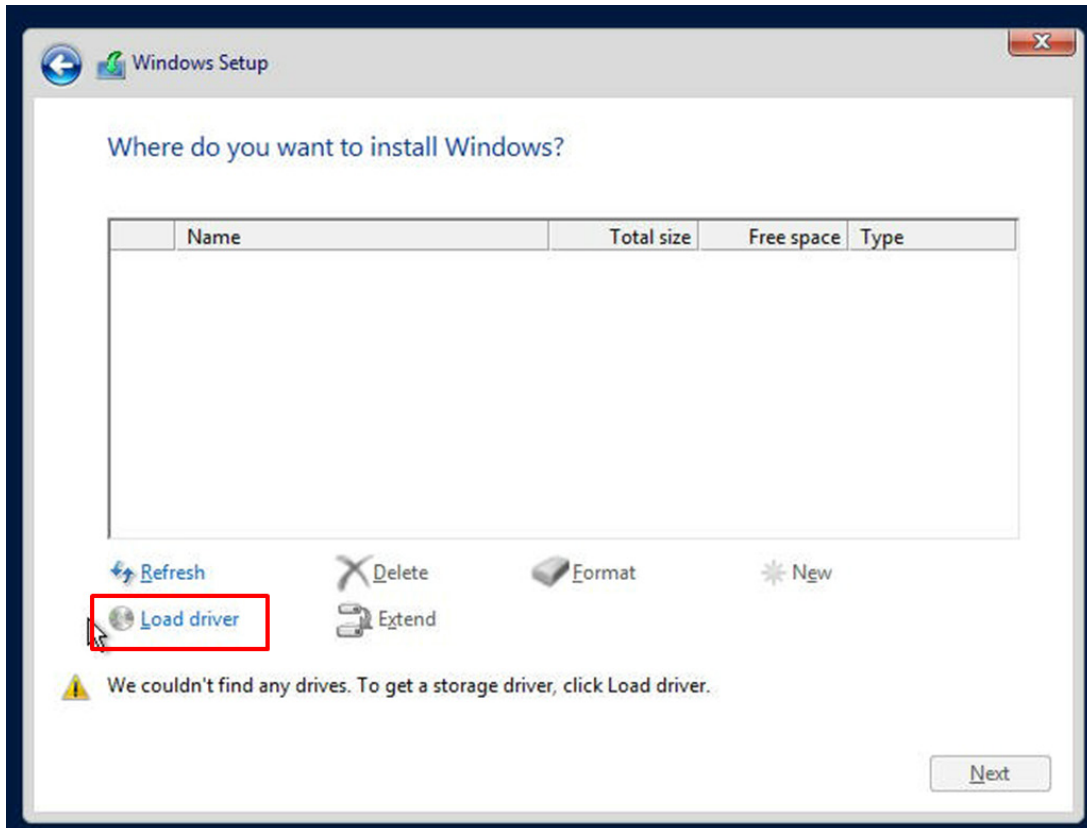
To load the driver, browse the USB flash drive for the proper driver files.

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

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

5. Once all devices are specified, continue with the installation.

6. After the Windows OS installation has completed, the system will automatically reboot multiple times.
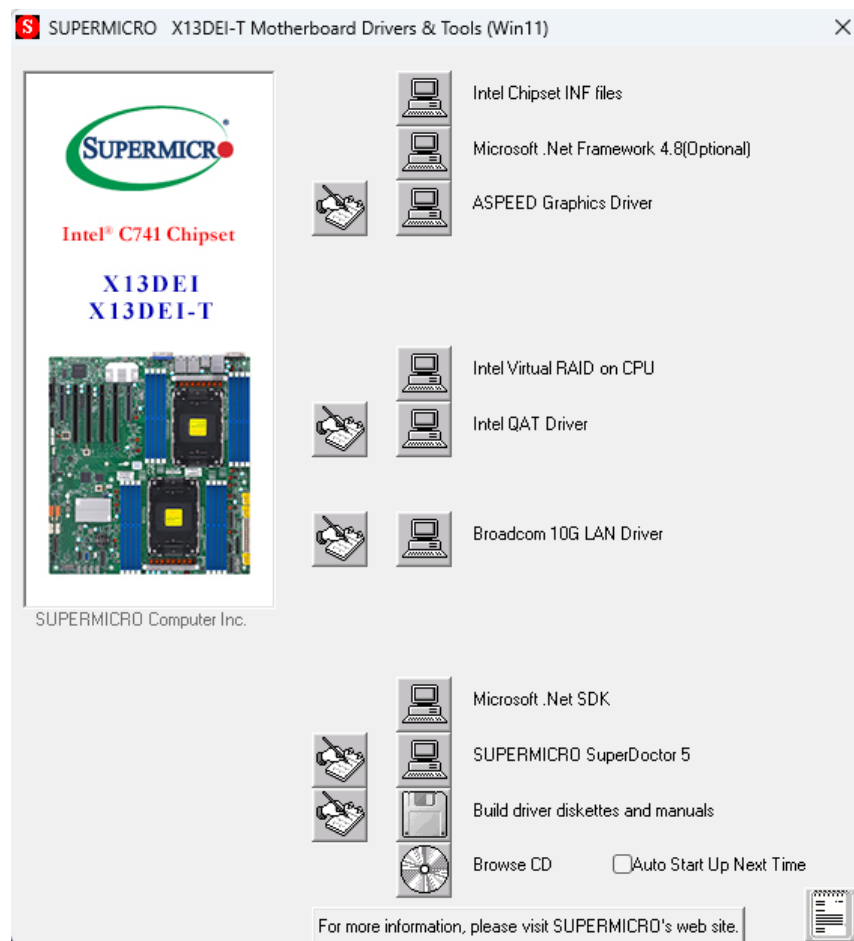
B.2 Driver Installation

The Supermicro website contains drivers and utilities for your system is at https://www.supermicro.com/wdl/driver. Some of these must be installed, such as the chipset driver.

After accessing the website, go into the CDR_Images (in the parent directory of the above link) and locate the ISO file for your motherboard. Download this file to a USB flash or media drive. (You may also use a utility to extract the ISO file if preferred.)

Another option is to go to the Supermicro website at https://www.supermicro.com/products/. Find the product page for your motherboard, and download the latest drivers and utilities.

Insert the flash drive or disk and the screenshot shown below should appear.

Driver & Tool Installation Screen (Example of X13DEI-T)

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

B.3 SuperDoctor® 5

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

SuperDoctor 5 comes in local and remote management versions and can be used with Nagios to maximize your system monitoring needs. With SuperDoctor 5 Management Server (SSM Server), you can remotely control power on/off and reset chassis intrusion for multiple systems with SuperDoctor 5 or BMC. SuperDoctor 5 Management Server monitors HTTP and SMTP services to optimize the efficiency of your operation.
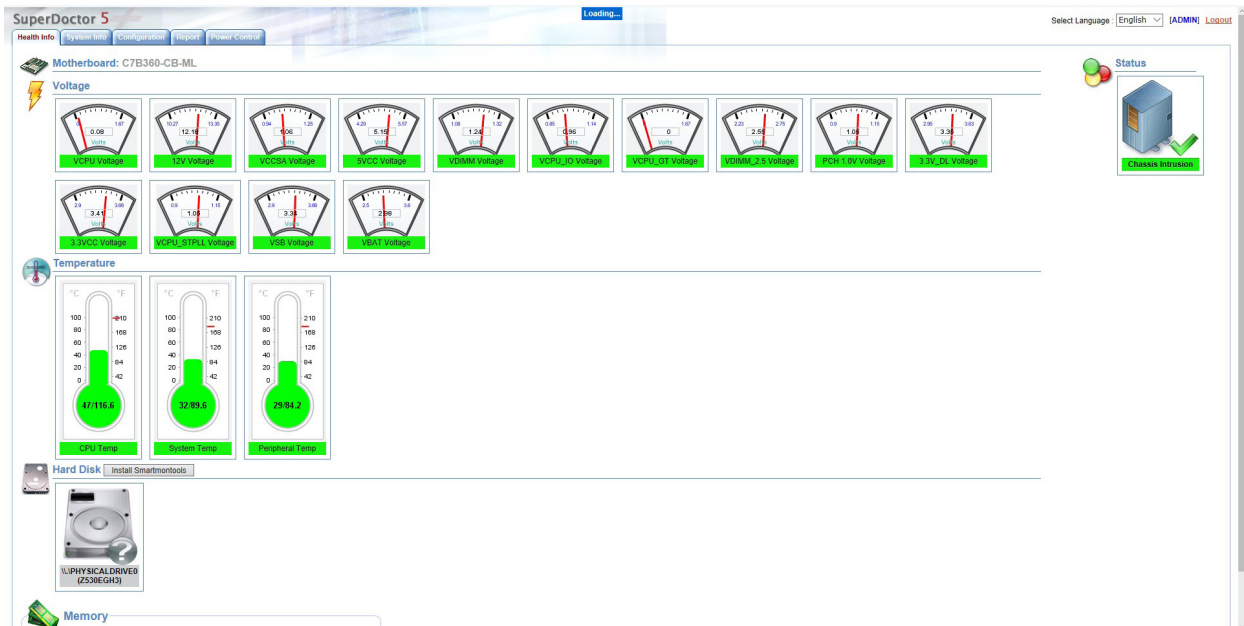
B.4 BMC

This motherboard supports the Baseboard Management Controller (BMC). BMC is used to provide remote access, monitoring and management. There are several BIOS settings that are related to BMC.

For general documentation and information on BMC, please visit our website at: https://www.supermicro.com/products/nfo/BMC.cfm.

B.5 Logging into the BMC (Baseboard Management Controller)

Supermicro ships standard products with a unique password for the BMC ADMIN user. This password can be found on a label on the motherboard.

When logging in to the BMC for the first time, please use the unique password provided by Supermicro to log in. You can change the unique password to a user name and password of your choice for subsequent logins.

For more information regarding BMC passwords, please visit our website at https://www.supermicro.com/bmcpassword.

Appendix C

Standardized Warning Statements

The following statements are industry standard warnings, provided to warn the user of situations where a potential bodily injury may occur. 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.

These warnings may also be found on our website at https://www.supermicro.com/about/policies/safety_information.cfm.

Battery Handling

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

電池の取り扱い

電池交換が正しく行われなかった場合、破裂の危険性があります。交換する電池はメーカーが推奨する型、または同等のものを使用下さい。使用済電池は製造元の指示に従って処分して下さい。

警告

电池更换不当会有爆炸危险。请只使用同类电池或制造商推荐的功能相当的电池更换原有电池。请按制造商的说明处理废旧电池。

警告

電池更換不當會有爆炸危險。請使用製造商建議之相同或功能相當的電池更換原有電池。請按照製造商的說明指示處理廢棄舊電池。

Warnung

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

Attention

Danger d'explosion si la pile n'est pas remplacée correctement. Ne la remplacer que par une pile de type semblable ou équivalent, recommandée par le fabricant. Jeter les piles usagées conformément aux instructions du fabricant.

¡Advertencia!

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

אזהרה!

קיימת סכנת פיצוץ של הסוללה במידה והוחלפה בדרך לא תקינה. יש להחליף

את הסוללה בסוג התואם מחברת יצרן מומלצת.

סילוק הסוללות המשומשות יש לבצע לפי הוראות היצרן.

هناك خطر من انفجار في حالة اسحبذال البطارية بطريقة غير صحيحة فعليل

اسحبذال البطارية

فقط بنفس النع أو ما يعادلها مما أوصث به الشرمة المصنعة

جخلص من البطاريات المسحعملة وفقا لحعليمات الشرمة الصانعة

경고!

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

Waarschuwing

Er is ontploffingsgevaar indien de batterij verkeerd vervangen wordt. Vervang de batterij slechts met hetzelfde of een equivalent type die door de fabrikant aanbevolen wordt. Gebruikte batterijen dienen overeenkomstig fabrieksvoorschriften afgevoerd te worden.

Product Disposal

Warning! Ultimate disposal of this product should be handled according to all national laws and regulations.

製品の廃棄

この製品を廃棄処分する場合、国の関係する全ての法律・条例に従い処理する必要があります。

警告

本产品的废弃处理应根据所有国家的法律和规章进行。

警告

本產品的廢棄處理應根據所有國家的法律和規章進行。

Warnung

Die Entsorgung dieses Produkts sollte gemäß allen Bestimmungen und Gesetzen des Landes erfolgen.

¡Advertencia!

Al deshacerse por completo de este producto debe seguir todas las leyes y reglamentos nacionales.

Attention

La mise au rebut ou le recyclage de ce produit sont généralement soumis à des lois et/ou directives de respect de l'environnement. Renseignez-vous auprès de l'organisme compétent.

סילוק המוצר

אזהרה!

סילוק סופי של מוצר זה חייב להיות בהתאם להנחיות וחוקי המדינה.

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

경고!

이 제품은 해당 국가의 관련 법규 및 규정에 따라 폐기되어야 합니다.

Waarschuwing

De uiteindelijke verwijdering van dit product dient te geschieden in overeenstemming met alle nationale wetten en reglementen.