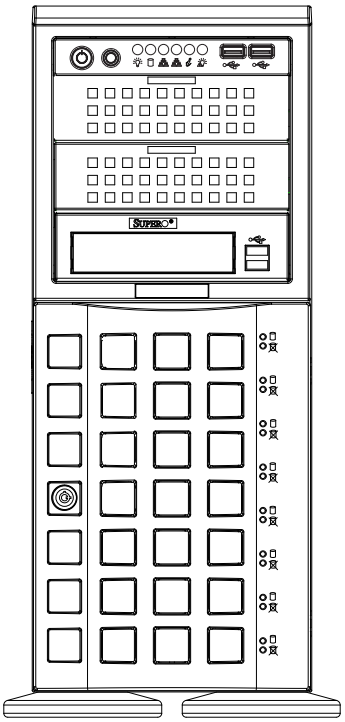
# SuperServer®
# 7049P-TR
# 7049P-TRT



## USER'S MANUAL

Revision 1.0d

The information in this User's Manual has been carefully reviewed and is believed to be accurate. The vendor assumes no responsibility for any inaccuracies that may be contained in this document, and makes no commitment to update or to keep current the information in this manual, or to notify any person or organization of the updates. **Please Note: For the most up-to-date version of this manual, please see our website at www.supermicro.com.**

Super Micro Computer, Inc. ("Supermicro") reserves the right to make changes to the product described in this manual at any time and without notice. This product, including software and documentation, is the property of Supermicro and/or its licensors, and is supplied only under a license. Any use or reproduction of this product is not allowed, except as expressly permitted by the terms of said license.

IN NO EVENT WILL Super Micro Computer, Inc. BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, SPECULATIVE OR CONSEQUENTIAL DAMAGES ARISING FROM THE USE OR INABILITY TO USE THIS PRODUCT OR DOCUMENTATION, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN PARTICULAR, SUPER MICRO COMPUTER, INC. SHALL NOT HAVE LIABILITY FOR ANY HARDWARE, SOFTWARE, OR DATA STORED OR USED WITH THE PRODUCT, INCLUDING THE COSTS OF REPAIRING, REPLACING, INTEGRATING, INSTALLING OR RECOVERING SUCH HARDWARE, SOFTWARE, OR DATA.

Any disputes arising between manufacturer and customer shall be governed by the laws of Santa Clara County in the State of California, USA. The State of California, County of Santa Clara shall be the exclusive venue for the resolution of any such disputes. Supermicro's total liability for all claims will not exceed the price paid for the hardware product.

FCC Statement: This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the manufacturer's instruction manual, may cause harmful interference with radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case you will be required to correct the interference at your own expense.

California Best Management Practices Regulations for Perchlorate Materials: This Perchlorate warning applies only to products containing CR (Manganese Dioxide) Lithium coin cells. "Perchlorate Material-special handling may apply. See www.dtsc.ca.gov/hazardouswaste/perchlorate".

WARNING: This product can expose you to chemicals including lead, known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, go to www.P65Warnings.ca.gov.

The products sold by Supermicro are not intended for and will not be used in life support systems, medical equipment, nuclear facilities or systems, aircraft, aircraft devices, aircraft/emergency communication devices or other critical systems whose failure to perform be reasonably expected to result in significant injury or loss of life or catastrophic property damage. Accordingly, Supermicro disclaims any and all liability, and should buyer use or sell such products for use in such ultra-hazardous applications, it does so entirely at its own risk. Furthermore, buyer agrees to fully indemnify, defend and hold Supermicro harmless for and against any and all claims, demands, actions, litigation, and proceedings of any kind arising out of or related to such ultra-hazardous use or sale.

Manual Revision 1.0d

Release Date: February 16, 2023

# Preface

## About this Manual

This manual is written for professional system integrators and PC technicians. It provides information for the installation and use of the server. Installation and maintenance should be performed by experienced technicians only.

Please refer to the 7049P-TR(T) server specifications page on our website for updates on supported memory, processors and operating systems (https://www.supermicro.com).

## Notes

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

- Supermicro product manuals: http://www.supermicro.com/support/manuals/
- Product drivers and utilities: https://www.supermicro.com/wdl
- Product safety info: https://www.supermicro.com/about/policies/safety_information.cfm

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.

## Warnings

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

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

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

# Contents

## *Chapter 3 Maintenance and Component Installation*

# Contacting Supermicro


**Headquarters**

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

**Europe**

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

**Asia-Pacific**

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

# Chapter 1

# Introduction

## 1.1 Overview

This chapter provides a brief outline of the functions and features of the 7049P-TR(T). The 7049P-TR(T) is based on the X11DPi-N(T) motherboard and the SC745BAC-R1K28B chassis.

The server offers two network ports:

- The 7049P-TR model supports 1 Gbps.
- The 7049P-TRT model supports 10 Gbps.

In addition to the motherboard and chassis, several included parts are listed below.

| Main Parts List | | |
|---|---|---|
| **Description** | **Part Number** | **Quantity** |
| Power Supply | PWS-1K28P-SQ | 2 |
| SAS/SATA hard drive backplane | BPN-SAS3-743A | 1 |
| Heatsink (passive) | SNK-P0068PS | 2 |
| Rear exhaust fans | FAN-0180L4 | 2 |
| Mid-chassis fans | FAN-0182L4 | 3 |
| Air shroud | MCP-310-49001-0N | 1 |
| Carriers for hot-swap hard drives | MCP-220-00092-0B | 8 |
| Chassis rail kit (*optional*) | CSE-PT26L-B | 1 |

## 1.2 Unpacking the System

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

## 1.3 System Specifications

The following provides an overview of the main features.

| System Specifications |
|---|
| **Motherboard** |
| X11DPi-N (7049P-TR), X11DPi-NT (7049P-TRT) |
| **Chassis** |
| SC745BAC-R1K28B |
| **CPU** |
| Dual Intel Xeon 82xx/62xx/52xx/42xx/32xx or 81xx/61xx/51xx/41xx/31xx processors (in Socket P (LGA3647)) (Intel Xeon Processor Scalable Family). For the latest CPU/memory updates, refer to our website at http://www.supermicro.com/products/motherboard/Xeon/C620/X11DPi-N.cfm. |
| **Memory** |
| Supports up to 4 TB of 3DS LRDIMM/LRDIMM/3DS RDIMM/RDIMM/NV-DIMM DDR4 (288-pin) ECC up to 2933 MHz modules in 16 slots; up to 256 GB size; support for Non-Volatile DIMM (NVDIMM) and Intel Optane DC Persistent Memory (DCPMM)<br>**Notes**: 1. Up to 5TB of memory is supported with DCPMM modules installed.<br>2. 2933 MHz speed is supported by 82xx/62xx processors only |
| **Chipset** |
| Intel C621 or C622 series |
| **Expansion Slots** |
| Six PCIexpress 3.0 slots: four x16 and two x8 |
| **Input/Output** |
| Network: Two LAN ports--7049P-TR model 1 Gbps, or 7049P-TRT model 10 Gbps<br>IPMI: One dedicated LAN port<br>USB: Two USB 3.0 ports, two USB 2.0 port, additional ports optional<br>COM: One<br>VGA: One<br>Optional addtional drives and I/O ports available as kits |
| **Storage Drives** |
| Up to eight SATA3 3.5" hot-swap drives, or optionally, 2.5" drives with converters |
| **Power** |
| Redundant 1000/1280 W power supply, 80Plus Platinum level |
| **Cooling** |
| Three 8-cm 11K RPM, 4-pin PWM mid-chassis fans; two 8-cm exhaust fans; one airflow shroud, two CPU heatsinks |
| **Form Factor** |
| 4U Tower; Dimensions (WxHxD) 7.0 x 19 x 27 in. (178 x 483 x 686 mm) |

# 1.4 Server Chassis Features

## Control Panel

The switches and LEDs located on the control panel are described below. See Chapter 4 for details on the control panel connections.

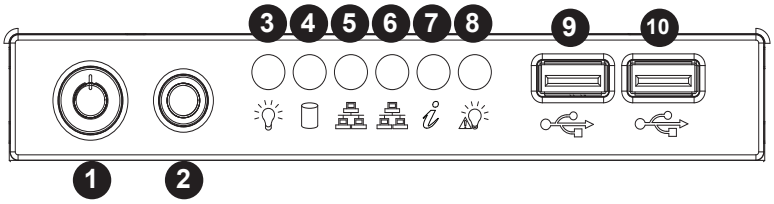



**Figure 1-1. Control Panel View**

| Control Panel Features | | |
|---|---|---|
| **Item** | **Feature** | **Description** |
| 1 | Power Button | The main power button is used to apply or remove power from the power supply to the server. Turning off system power with this button removes the main power but maintains standby power. To perform many maintenance tasks, you should also unplug the system's AC power cord before servicing. |
| 2 | Reset Button | The reset button is used to reboot the system. |
| 3 | Power LED | Indicates power is being supplied to the system power supply. This LED should normally be illuminated when the system is operating. |
| 4 | HDD LED | Indicates hard drive activity when flashing. |
| 5 | NIC1 LED | Indicates network activity on LAN port 1 when flashing. |
| 6 | NIC2 LED | Indicates network activity on LAN port 2 when flashing. |
| 7 | Information LED | See table below for details. |
| 8 | Power Fail LED | This LED flashes to indicate one of the redundant power supply modules has failed. The flashing light should be accompanied by an audible warning. |
| 9 | USB0 Port | USB 3.0 port |
| 10 | USB1 Port | USB 3.0 port |

| Information LED | |
|---|---|
| **Status** | **Description** |
| Continuously on and red | An overheat condition has occurred. (This may be caused by cable congestion.) |
| Blinking red (1Hz) | Fan failure, check for an inoperative fan. |
| Solid blue | Local UID has been activated. Use this function to locate the server in a rackmount environment. |
| Blinking blue | Remote UID is on. Use this function to identify the server from a remote location. |

## Front Features

The SC745BAC-R1K28B is a tower chassis. See the illustration below for the features included on the front of the chassis.

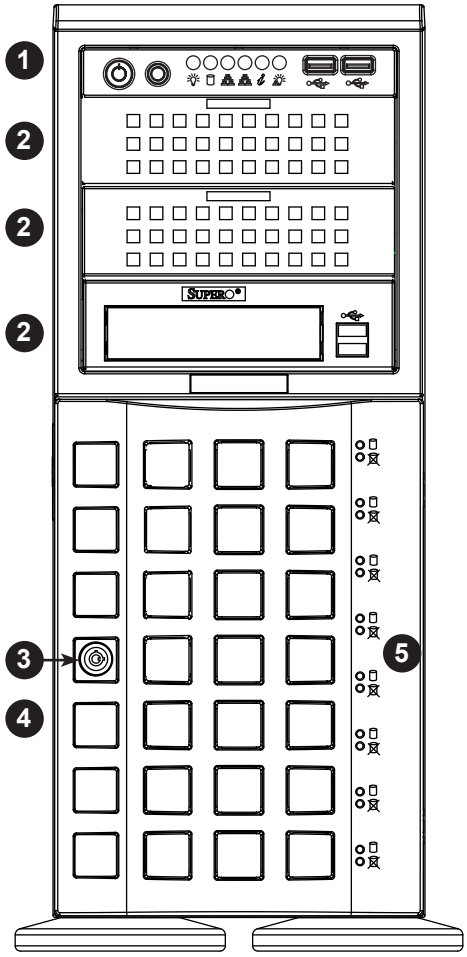



**Figure 1-2. Chassis Front View**

| Front Chassis Features | | |
|---|---|---|
| **Item** | **Feature** | **Description** |
| 1 | Control Panel | Front control panel with LEDs and buttons (see preceding page) |
| 2 | Peripheral Drive Bays | Three 5.25" bays for optional peripherals such as a DVD drive |
| 3 | Lock | Front bezel lock |
| 4 | Drive Bays | Eight 3.5" bays for hot-swap hard drives behind front bezel |
| 5 | Drive Indicators | Eight pairs of LED status indicators for drives |

## Rear Features

The illustration below shows the features included on the rear of the chassis.

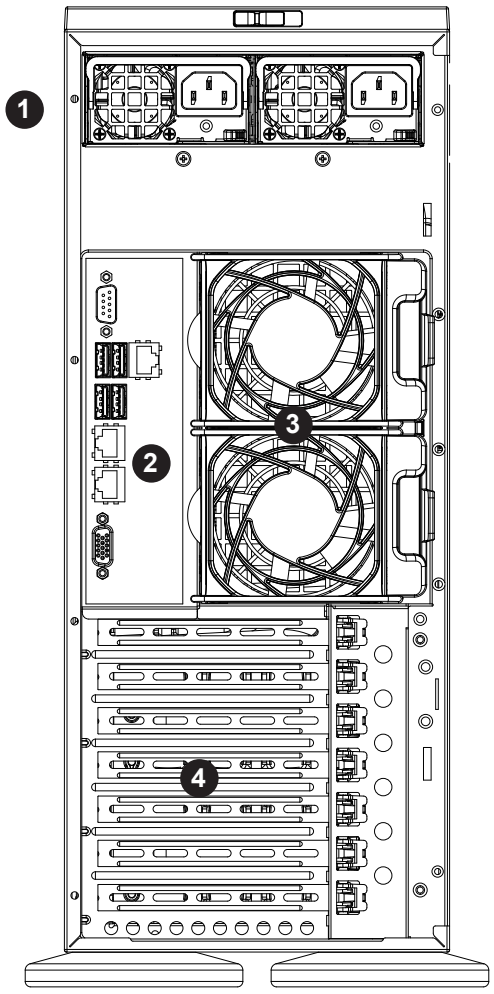



**Figure 1-3. Chassis Rear View**

| Rear Chassis Features | | |
|---|---|---|
| **Item** | **Feature** | **Description** |
| 1 | Power Supply | Redundant 1280 W Platinum Level Power Supplies |
| 2 | I/O Back Panel | Rear I/O ports (see Section 4.3) |
| 3 | Fans | Two 8-cm exhaust fans |
| 4 | Expansion Slots | Six PCIexpress expansion card slots |

## 1.5 Motherboard Layout

Below is a layout of the X11DPi-N(T) with jumper, connector and LED locations shown. See the table on the following pages for descriptions. For detailed descriptions, pinout information and jumper settings, refer to Chapter 4.

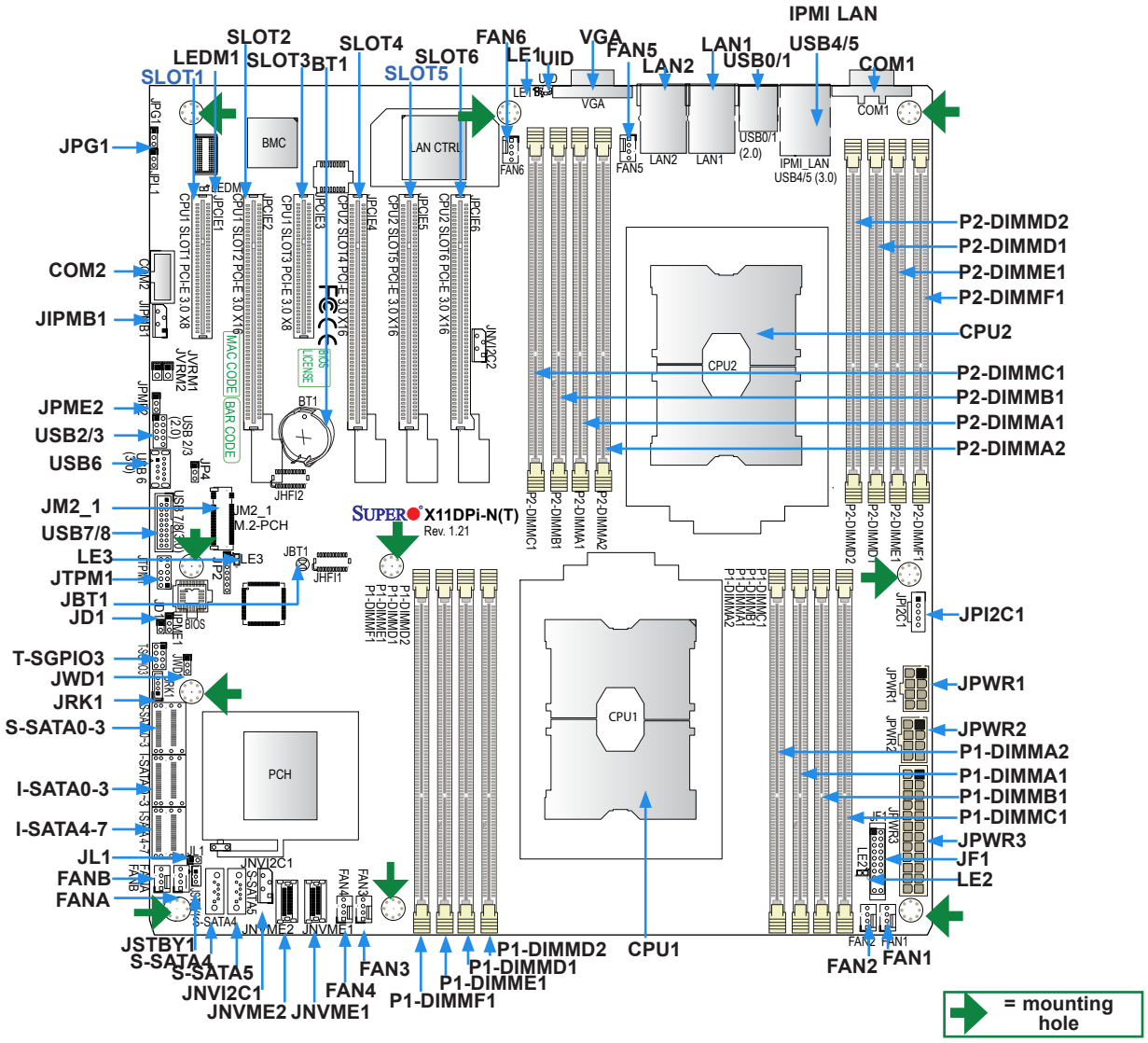



**Figure 1-4. Motherboard Layout**

**Notes:**

- " " indicates the location of pin 1.
- Jumpers/LED indicators not indicated are used for testing only.

## Quick Reference

| Jumper | Description | Default Setting |
|---|---|---|
| JBT1 | CMOS Clear | Open (Normal) |
| JPG1 | VGA Enable | Pins 1-2 (Enabled) |
| JPME2 | Manufacturing Mode Select | Pins 1-2 (Normal) |
| JWD1 | Watch Dog Timer Enable | Pins 1-2 (Reset to System) |

| Connector | Description |
|---|---|
| BT1 | Onboard CMOS battery socket |
| COM1/COM2 | Back panel COM port/COM header for front access |
| FAN1-6, FANA/FANB | System cooling fan headers (FAN1-FAN6, FAN A, FAN B) |
| IPMI_LAN | Dedicated IPMI_LAN port |
| I-SATA0~3, I-SATA4~7 | SATA 3.0 iPass header supported by the Intel PCH |
| JD1 | Power LED header |
| JF1 | Front Panel Control header |
| JHFI1/JHFI2 | Host Fabric Interface (HFI) sideband connection headers used for the HFI carrier cards (when the SKX-F processors are used.) (JHFI1: for CPU1, JHFI2: for CPU2). |
| JIPMB1 | 4-pin BMC External $I^2C$ header (for an IPMI-supported card) |
| JL1 | Chassis Intrusion header |
| JM2_1 | PCIe M.2 slot |
| JNVI$^2$C1/JNVI$^2$C2 | NVMe $I^2C$ headers used for PCIe hot-plug SMBus clock and data connections (a proprietary NVMe add-on card and cable are required; available for a Supermicro complete system only) |
| JNVME1 | NVMe Connector1 |
| JNVME2 | NVMe Connector2 |
| JPI$^2$C1 | Power Supply SMBbus $I^2C$ header |
| JPWR1/JPWR2 | 8-pin Power Supply connectors |
| JPWR3 | 24-pin ATX main power supply connector |
| JRK1 | Intel RAID Key headier for NVMe SSD |
| JSTBY1 | Standby power header |
| JTPM1 | Trusted Platform Module (TPM)/Port 80 connector |
| LAN1/LAN2 | Gigabit LAN/10G LAN Ethernet Ports on the IO back panel (10G LAN ports on X11DPi-NTX11DPi-N(T) only) |
| S-SATA0-3 | S-SATA 3.0 iPass header supported by the Intel SCU |
| S-SATA4/S-SATA5 | S-SATA Ports with built-in power pins and with support of Supermicro SuperDOM (Disk On Module) devices |
| SLOT1/SLOT3 | PCIexpress 3.0 X8 Slots supported by CPU1 |
| SLOT2 | PCIexpress 3.0 X16 Slot supported by CPU1 |
| SLOT4/SLOT5/SLOT6 | PCIexpress 3.0 X16 Slots supported by CPU2 |
| T-SGPIO3 | General Purpose Serial I/O Port |
| UID | Unit Identifier (UID) Switch |
| USB0/1 | Back panel USB 2.0 Ports |
| USB2/3 | Front Accessible USB 2.0 Header |
| USB4/5 | Back panel USB 3.0 Ports |

| Connector | Description |
|---|---|
| USB6 | Type A USB 3.0 Header |
| USB7/8 | Front Accessible USB 3.0 Header |
| VGA | VGA Port |

| LED | Description | State: Status |
|---|---|---|
| LE1 | UID (Unit Identifier) LED | Solid Blue: Unit identified |
| LE2 | Onboard Power LED | On: Onboard power on |
| LE3 | M.2 Active LED | On: M.2 active |
| LEDM1 | BMC Heartbeat LED | Blinking Green: BMC normal |

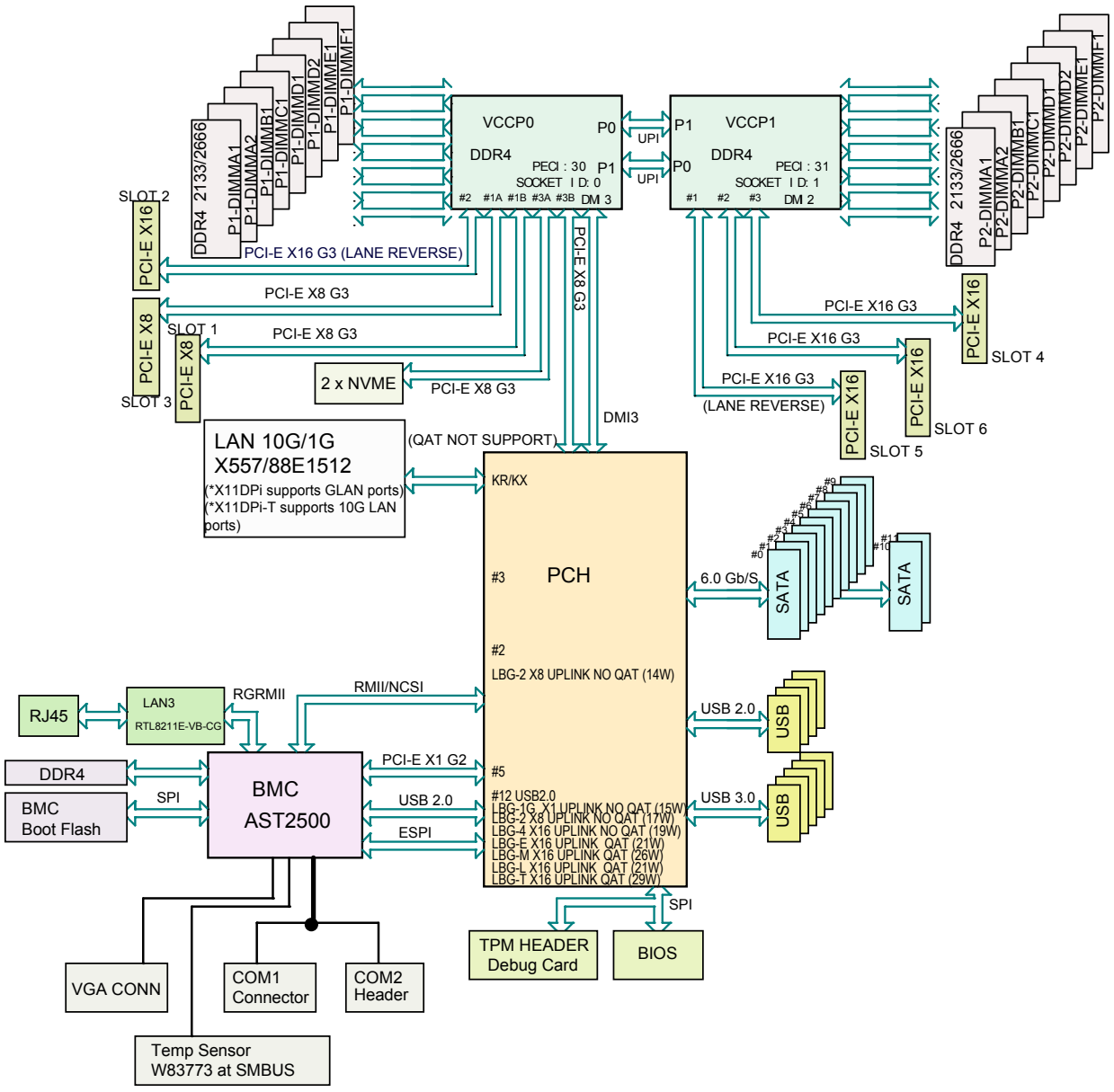



**Figure 1-5. Intel C621 or C622 series Chipset: System Block Diagram**

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

# Chapter 2

# Rack Mount Installation

## 2.1 Overview

This chapter provides instructions for preparing and mounting your chassis in a rack. By default, the chassis is shipped configured as a tower. The tower top cover and bottom feet must be removed to mount in a rack. Also, the control panel/drive module should be rotated 90 degrees.

Mounting rails are optional for this system. Be sure you have received the correct rail kit for your server.

## 2.2 Preparing for Rack Mounting

### Choosing a Setup Location

- The system should be situated in a clean, dust-free area that is well ventilated. Avoid areas where heat, electrical noise and electromagnetic fields are generated.
- Leave at least 25 inches clearance in front of the rack to open the front door completely.
- Leave approximately 30 inches of clearance in the back of the rack to allow for sufficient airflow and access for servicing.
- It should be a restricted access location, such as a dedicated equipment room or a service closet.
- This product is not suitable for use with visual display workplace devices acccording to §2 of the German Ordinance for Work with Visual Display Units.

### Rack Precautions

- Ensure that the leveling jacks on the bottom of the rack are extended to the floor so that the full weight of the rack rests on them.
- In single rack installations, stabilizers should be attached to the rack. In multiple rack installations, the racks should be coupled together.
- Always make sure the rack is stable before extending a server or other component from the rack.

- You should extend only one server or component at a time; extending two or more simultaneously may cause the rack to become unstable.
- When initially installing the server to a rack, test that the rail locking tabs engage to prevent the server from being overextended. Have a rack lift in place as a precaution in case the test fails.

## Server Precautions

- Review the electrical and general safety precautions in Appendix B.
- Determine the placement of each component in the rack *before* you install the rails.
- Install the heaviest server components at the bottom of the rack first and then work your way up.
- Use a regulating uninterruptible power supply (UPS) to protect the server from power surges and voltage spikes and to keep your system operating in case of a power failure.
- Allow any drives and power supply modules to cool before touching them.
- When not servicing, always keep the front door of the rack and all covers/panels on the servers closed to maintain proper cooling.

## Rack Mounting Considerations

### *Ambient Operating Temperature*

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

### *Airflow*

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

### *Mechanical Loading*

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

### *Circuit Overloading*

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

### *Reliable Ground*

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

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

- This unit should be mounted at the bottom of the rack if it is the only unit in the rack.
- When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.
- Slide rail mounted equipment is not to be used as a shelf or a work space.

## 2.3 Chassis Preparation

The chassis is shipped with the tower top cover and feet installed. Both must be removed for before installing the rails.

***Removing the Tower Top Cover***

1. Locate the chassis cover lock (blue lever) at the rear of the chassis cover.
2. Slide the chassis cover lock to the right and push chassis cover forward.
3. Lift the chassis top cover off the chassis.

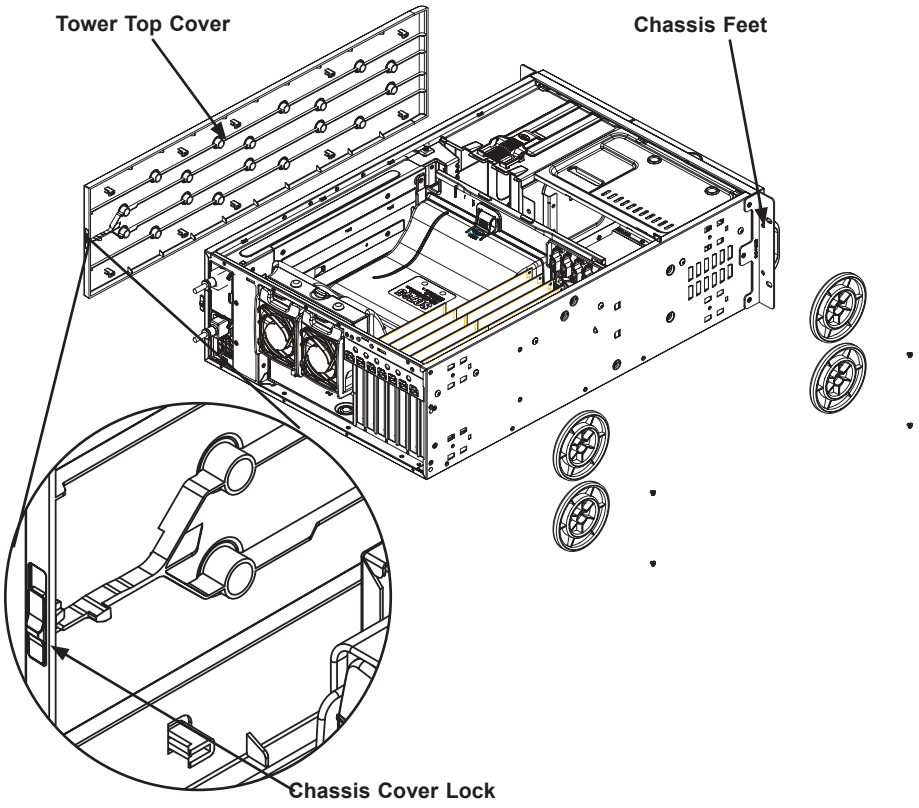



**Figure 2-1. Remove Feet and Chassis Top Cover**

***Removing the Chassis Feet***

1. Place the chassis on its side.
2. Remove the screw holding a chassis foot in place.
3. The foot lock is a tab located in the center of the foot. It prevents the foot from sliding. Using a flat head screwdriver, gently lift the foot lock upward and slide the foot toward the rear of the chassis.

# 2.4 Installing the Rails

There are a variety of rack units on the market, which may require a slightly different assembly procedure. Do not use a two post "telco" type rack. This rail set fits a rack between 26" and 35.9" deep.

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

## Identifying the Rails

The optional rackmount kit includes two rack rail assemblies, one for each side. Each of these assemblies consist of several sections: an inner fixed rail that secures to the chassis, an outer rack rail that secures to the rack, a middle rail that slides within the outer rail, and two brackets that attach the outer rail to the rack. The brackets are specific to the left and right side, and front and back, and labeled.

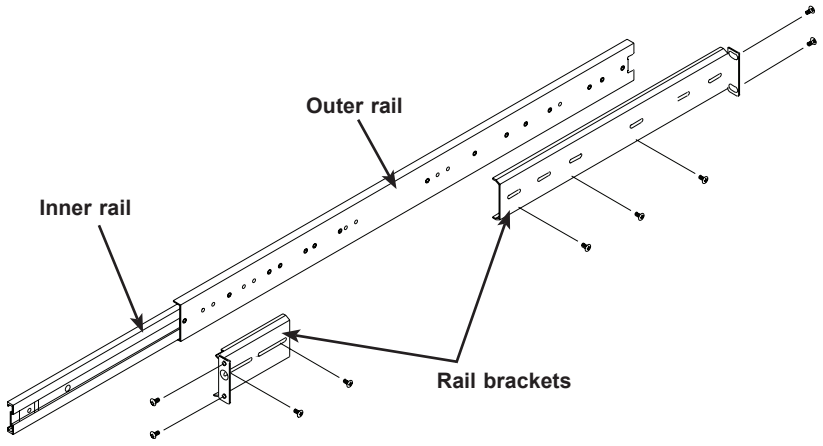



**Figure 2-2. Identifying the Sections of the Rack Rails**

## Releasing the Inner Rails

The inner rails must be removed from the outer rails to install onto the chassis. To remove the inner rail, pull it out as far as possible until it clicks to a stop. Depress the locking lever on the inner rail next to the middle rail to pull the inner rail completely out.

## Installing the Inner Rails

Identify the left and right inner rails.

1. Attach the handles to the front sides of the chassis with three screws each.
2. Position the inner rails along the side of the chassis making sure the screw holes line up.
3. Screw the rail securely to the side of the chassis.

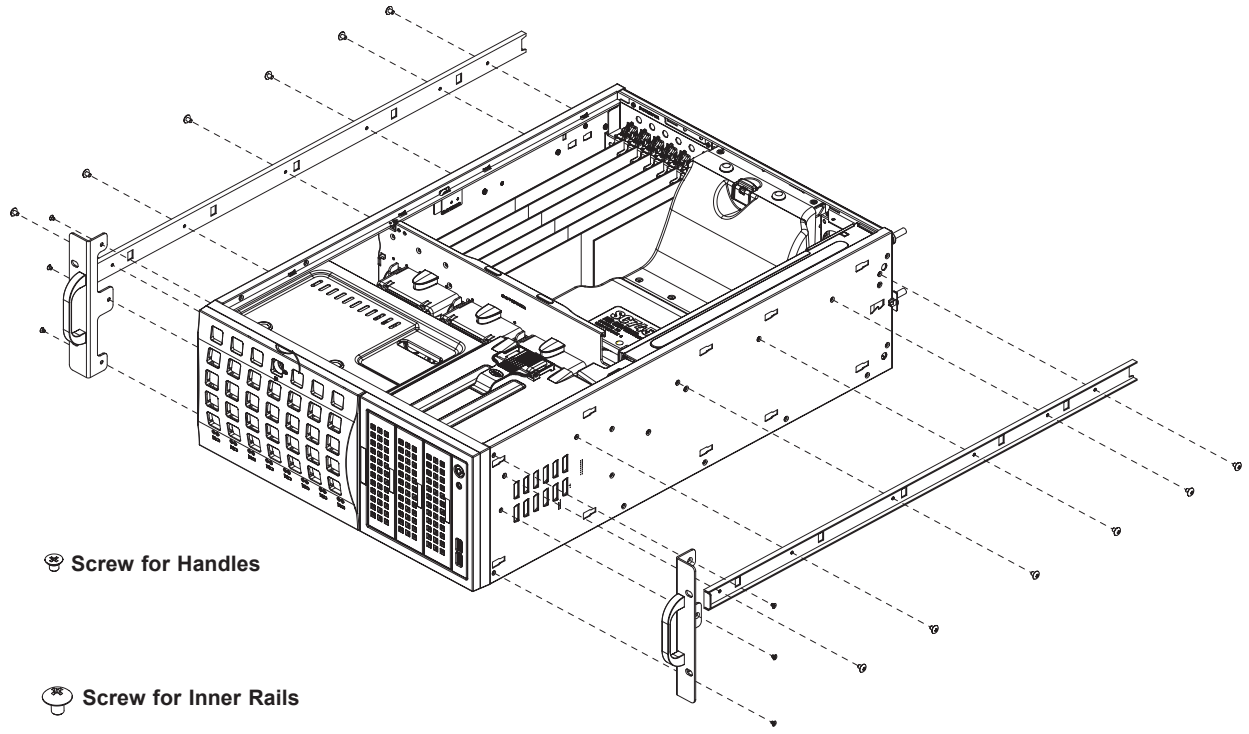



**Figure 2-3. Installing the Chassis Rails**

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

## Assembling and Installing the Outer Rails

Each outer rail comes in three sections that require assembly before mounting onto the rack.

1. Find the outer rail mounting brackets in the chassis accessory box.

   - A pair of long brackets for the rear of each rail
   - A pair of short brackets for the front of each rail

   Note that the brackets are labeled as to front, rear, and up. They are specific for the left and right rails.

2. Secure the front (short) bracket onto the outer rail with M5 screws.
3. Mount the rear (long) bracket onto the outer rail at the approximate position to fit your rack. Use two or three M5 screws into holes that are convenient. Leave the screws just loose enough that the bracket can slide.
4. Install the outer rail assembly onto your rack. Adjust the outer rail to the exact depth of the rack by sliding the rear bracket. Then use screws and fasteners to secure the outer rail to the front and rear rack posts.
5. Further tighten the screws holding the rear bracket to the rail.

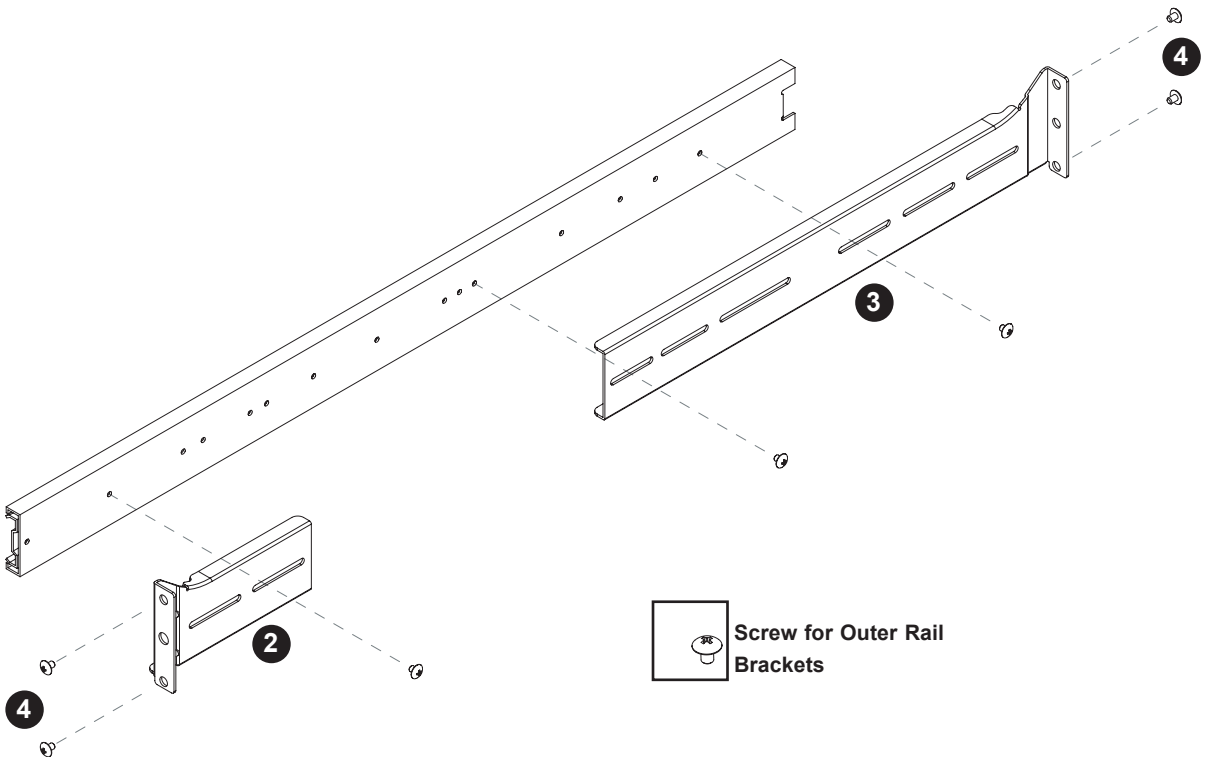



**Figure 2-4. Assembling the Outer Rails**

## 2.5 Installing the Server into the Rack

After attaching rails to both the chassis and the rack, slide the server into the rack.

1. Pull the middle rail out of the front of the outer rail and make sure that the ball bearing shuttle is locked at the front of the middle rail.
2. Align the rear of the inner (chassis) rails with the front of the outer (rack) rails and slide the inner rails into the outer rails until the server is completely in the rack.
3. Insert and tighten the thumbscrews that hold the front of the server to the rack.

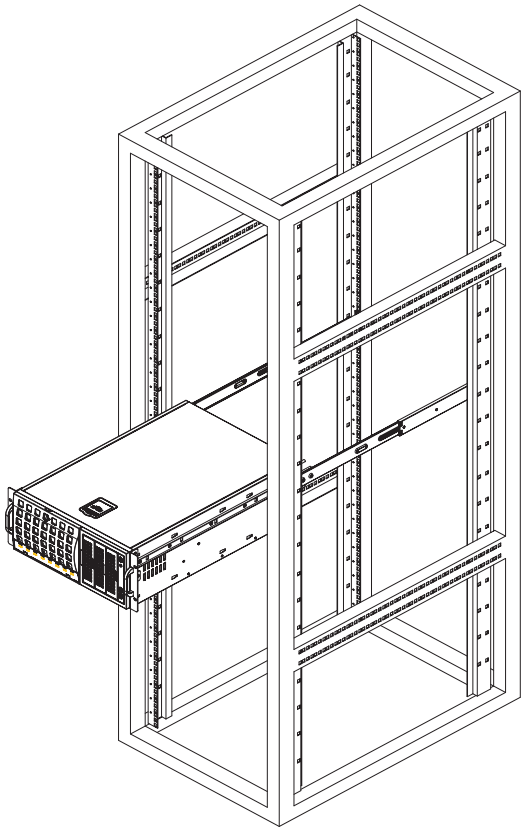


**Figure 2-5. Installing the Server into a Rack**

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

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

When initially installing the server to a rack, test that the rail locking tabs engage to prevent the server from being overextended. Have a rack lift in place as a precaution in case the test fails.

## Removing the Chassis from the Rack

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

1. Pull the chassis forward out the front of the rack until it stops.
2. Find the release lever on each side of the chassis on the inner rails. Release the chassis by simultaneously and lifting the left lever and pushing down the right lever. Continue to pull the chassis out of the rack.

**Warning:** In any instance of pulling the system from the rack, always use a rack lift and follow all associated safety precautions.

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

## 2.6 Control Panel Orientation

The server can be configured for either tower or server rack orientation. It is shipped in tower mode and can be immediately used as desktop server. To use it in a rack, rotate the module that contains the control panel and the three drive trays (1 in Figure 2-6) 90 degrees.

Note that two of the 5.25" drives may be replaced by a *mobile rack* containing eight 2.5" storage drives.

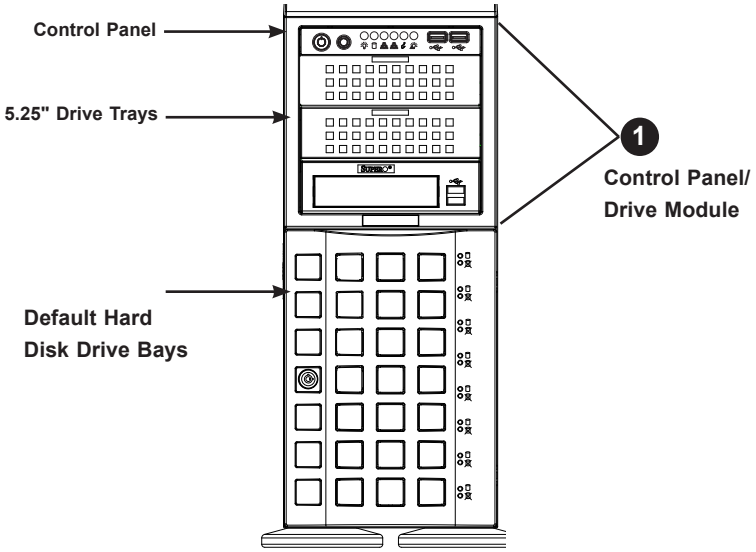



**Figure 2-6. Chassis in Tower Mode** (Default Configuration)

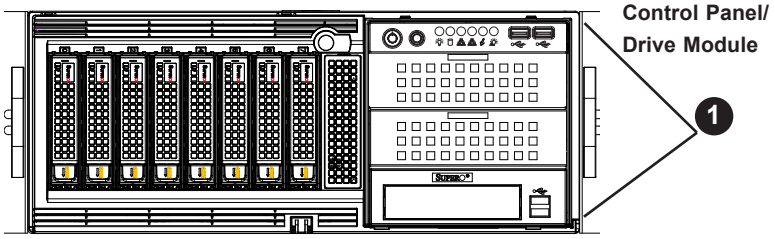



**Figure 2-7. Chassis in Rack Mount Mode**

### *Rotating the Control Panel/Drive Module for Rack Mounting*

1. Power down the system as described in section 3.1 and open the chassis cover.
2. Disconnect any cables from the back of the Control Panel/Drive Module.
3. Push the module release lever to unlock the module.

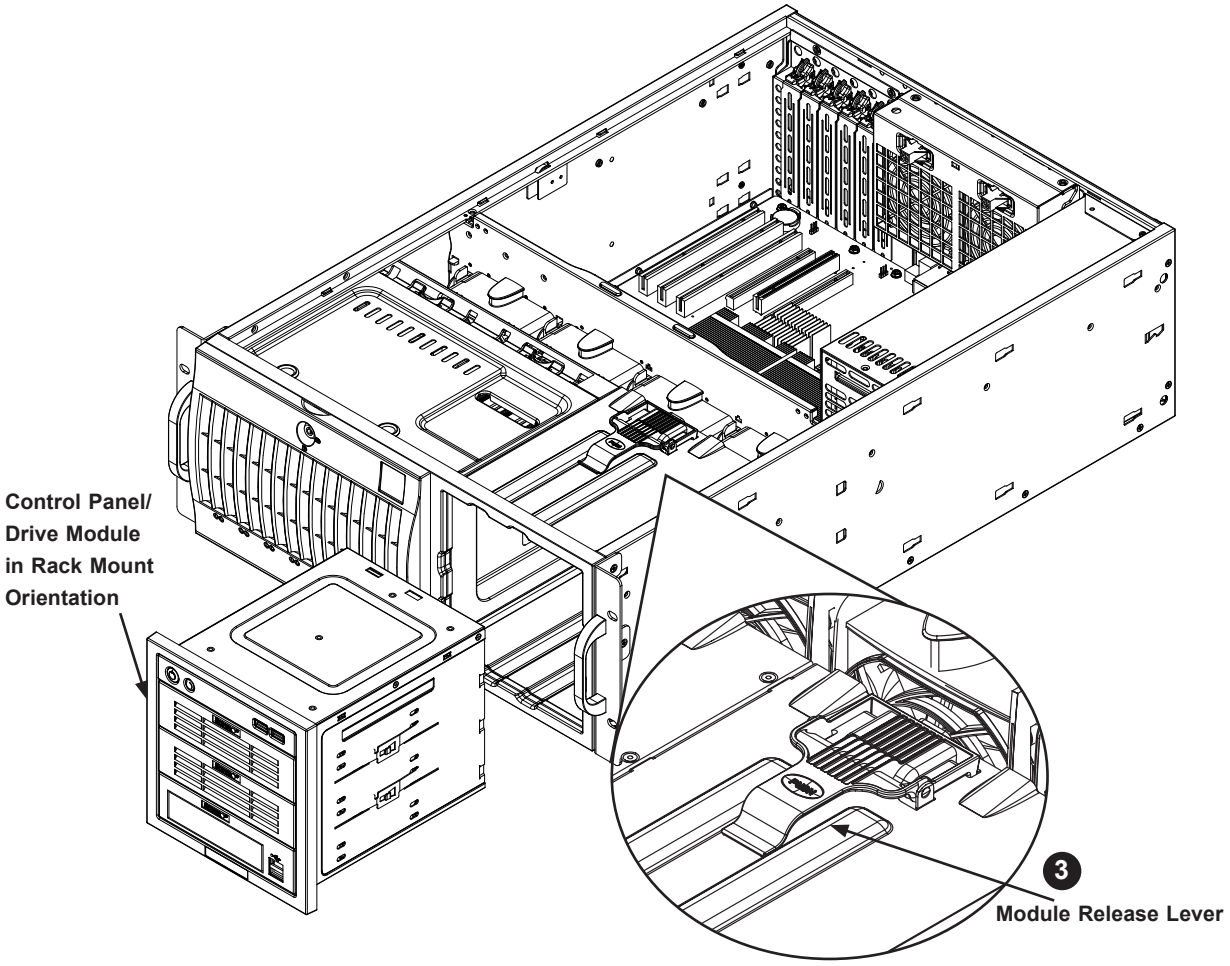



**Figure 2-8. Rotating the Control Panel/Drive Module**

4. Grasp the edges of the module and pull it from the chassis.
5. Rotate the module 90 degrees so that the control panel is on top.
6. Reinsert the module into the chassis and reconnect the cables.

**Caution:** Use caution when working around the backplane. Do not touch the module backplane with any metal objects and make sure no ribbon cables touch the backplane or obstruct the holes, which aid in proper airflow.

# Chapter 3

# Maintenance and Component Installation

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

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

## 3.1 Removing Power

Use the following procedure to ensure that power has been removed from the system. This step is necessary when removing or installing non-hot-swap components.

1. Use the operating system to power down the system.
2. After the system has completely shut down, disconnect both the AC power cords from the power strip or outlet.
3. Disconnect the power cords from both the power supply modules.

## 3.2 Accessing the System

The chassis offers a removable side cover (top, if rack mounted) which allows access to the internal components.

***Removing the Side Cover***

1. Locate the latch on the cover, depress where it says "push," then lift the latch to release the cover.
2. Slide the cover to the rear and off.

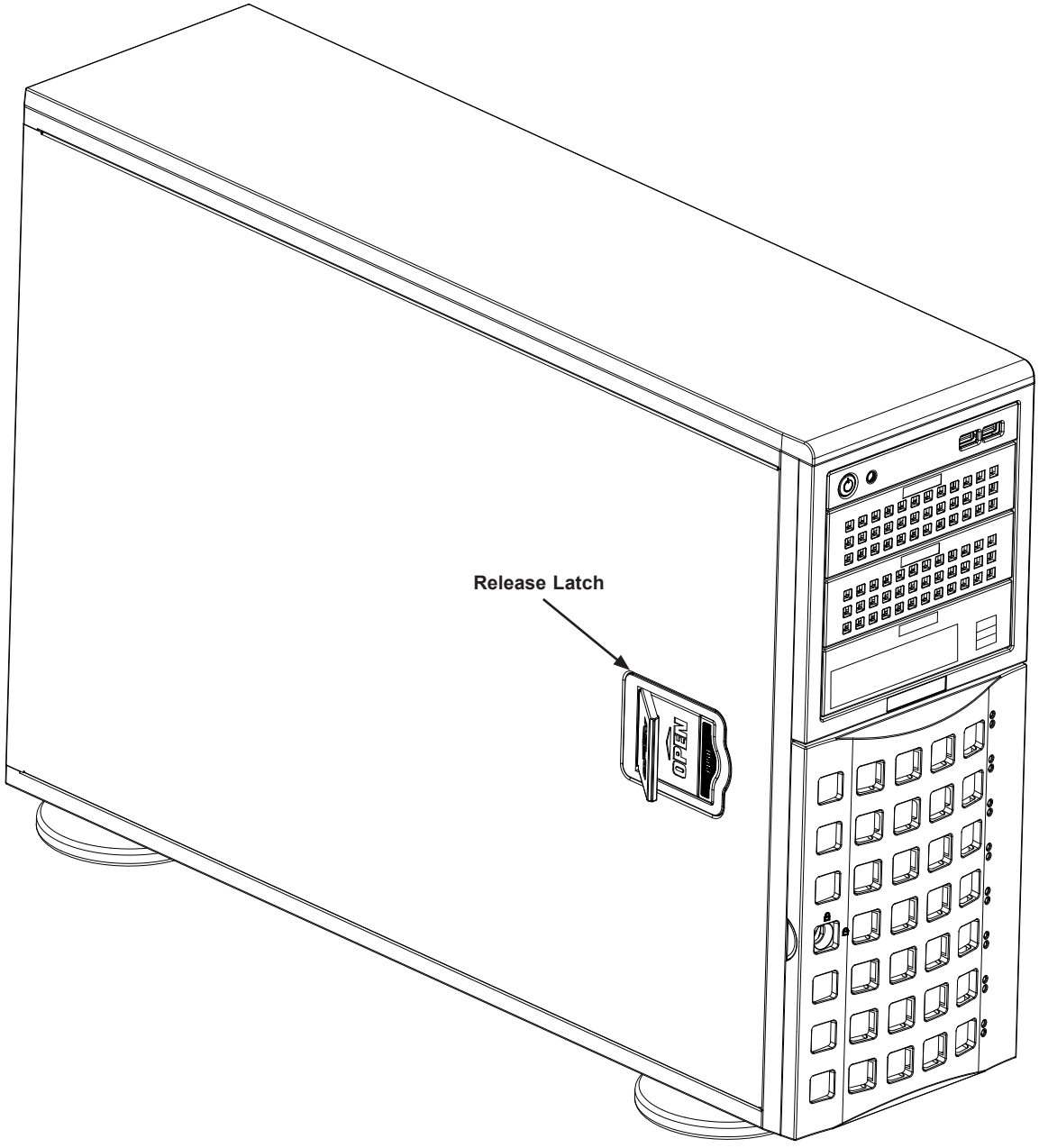



**Figure 3-1. Removing the Chassis Cover**

# 3.3 Motherboard Components

## Processor and Heatsink Installation

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

**Notes:**

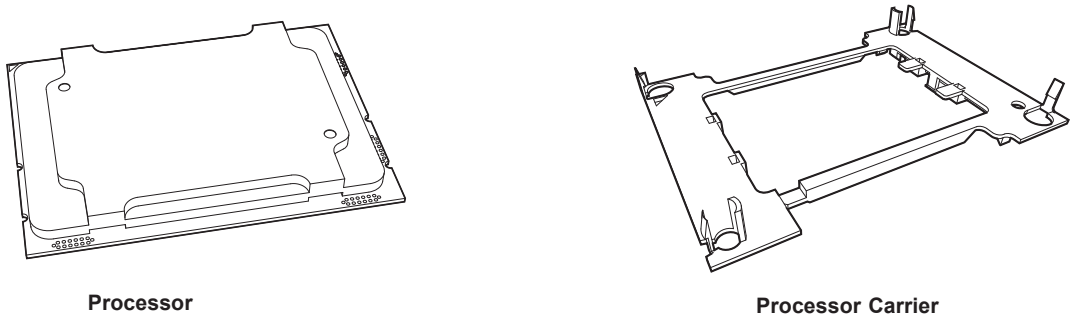
- Use ESD protection.
- Unplug the AC power cord from all power supplies after shutting down the system.
- Check that the plastic protective cover is on the CPU socket and none of the socket pins are bent. If they are, contact your retailer.
- When handling the processor, avoid touching or placing direct 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 support.
- All graphics in this manual are for illustration only. Your components may look different.

### *The Processor*

The Intel Xeon 82xx/62xx/52xx/42xx/32xx or 81xx/61xx/51xx/41xx/31xx processor series comes in two models: Fabric (F Model) and Non-Fabric (Non-F Model). Only the Non-Fabric model is supported for this system.

### *The Processor Carrier Assembly*

The assembly is the processor and a plastic carrier.



Processor

Processor Carrier

**Figure 3-2. Processor and Carrier**

### *Heatsinks*

The 7049P-TR(T) server uses a slightly different heatsink design for each CPU. The SNK-P0068PSC model is used for CPU1, the CPU closer to the mid-chassis fans.

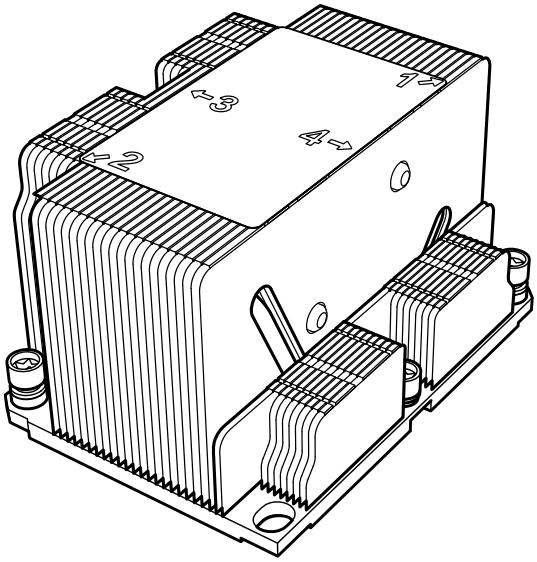



**Figure 3-3. Heatsink SNK-P0068PSC**
(for CPU1)

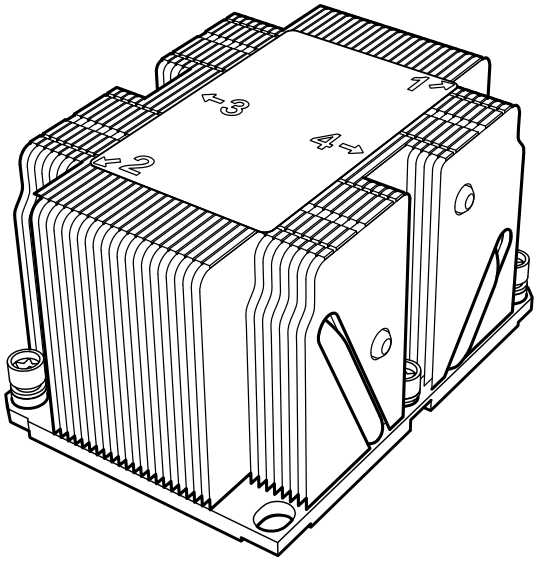



**Figure 3-4. Heatsink SNK-P0068PS**
(for CPU2)

**Note:** For CPU1, the SNK-P0068PSC heatsink must be installed with the side with short fins facing the power supply modules.

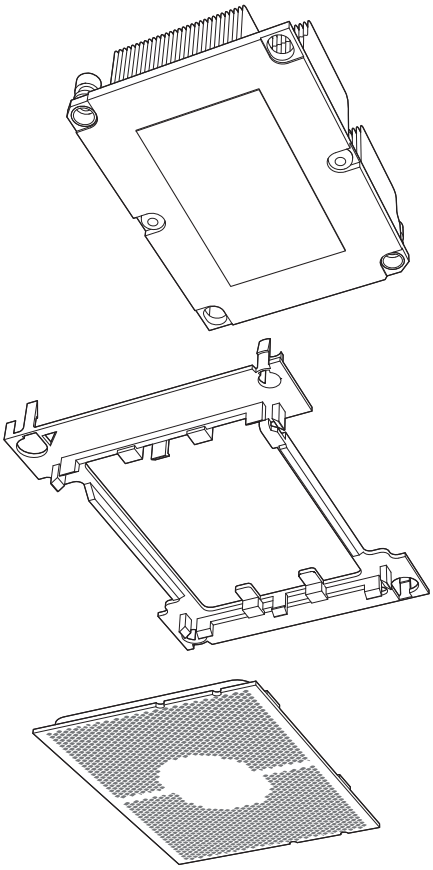
### *Overview of the Processor Heatsink Module*

The Processor Heatsink Module (PHM) contains a heatsink, a processor carrier, and the processor. Note that there are two different heatsink models, SNK-P0068PS and SNK-P0069PS (not as tall).

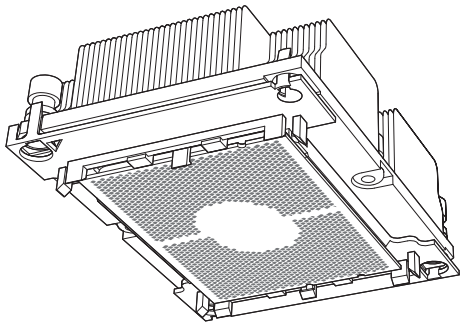
**Heatsink with Thermal Grease**

**Processor Carrier**

**Processor**



**Processor Heatsink Module**



**Bottom View**

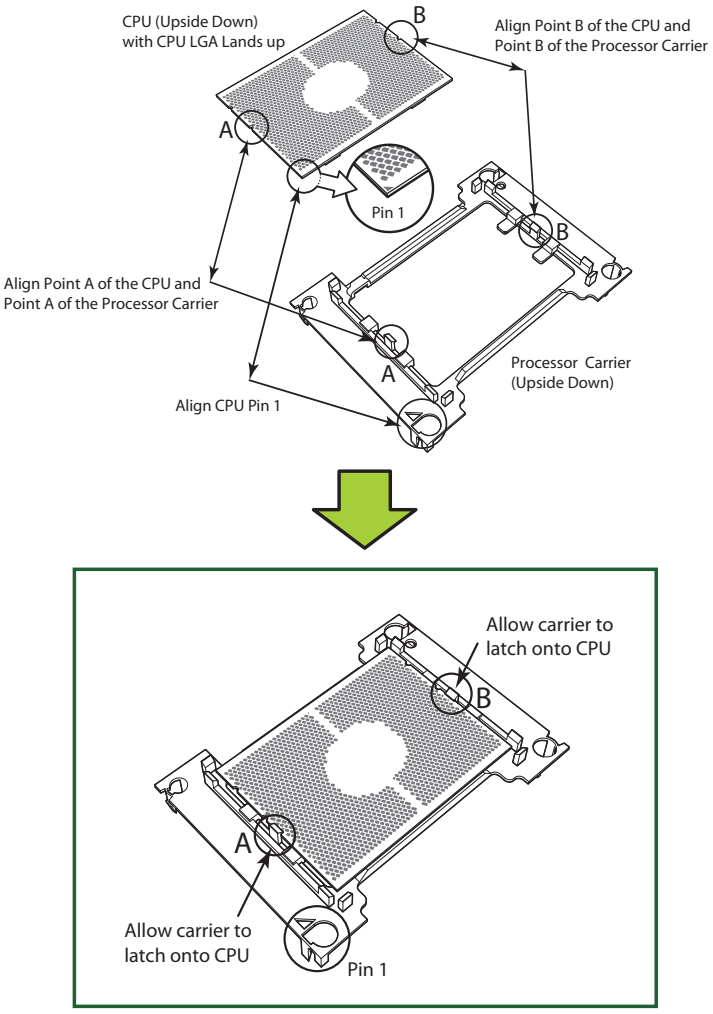
### *Creating the Processor Carrier Assembly*

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

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

2. Using the triangles as a guide, carefully align and place Point A of the processor into Point A of the carrier. Then gently flex the other side of the carrier for the processor to fit into Point B.

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



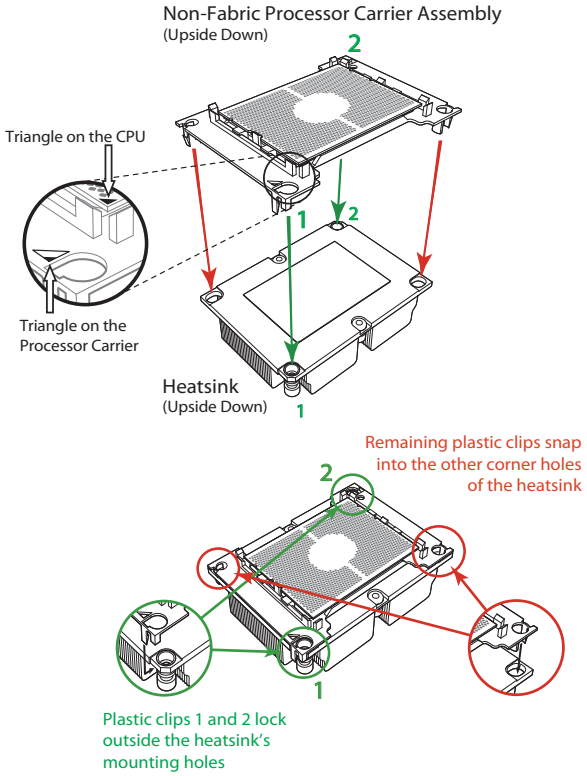
### *Assembling the Processor Heatsink Module*

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

1. Note the label on top of the heatsink, which marks the heatsink mounting holes as 1, 2, 3, and 4. If this is a new heatsink, the thermal grease has been pre-applied on the underside. Otherwise, apply the proper amount of thermal grease.

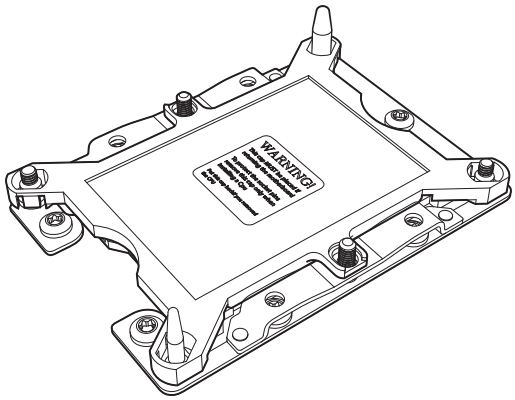
2. Turn the heatsink over with the thermal grease facing up. Hold the processor carrier assembly so the processor's gold contacts are facing up, then align the triangle on the assembly with hole 1 of the heatsink. Press the processor carrier assembly down. The plastic clips of the assembly will lock outside of holes 1 and 2, while the remaining clips will snap into their corresponding holes.

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

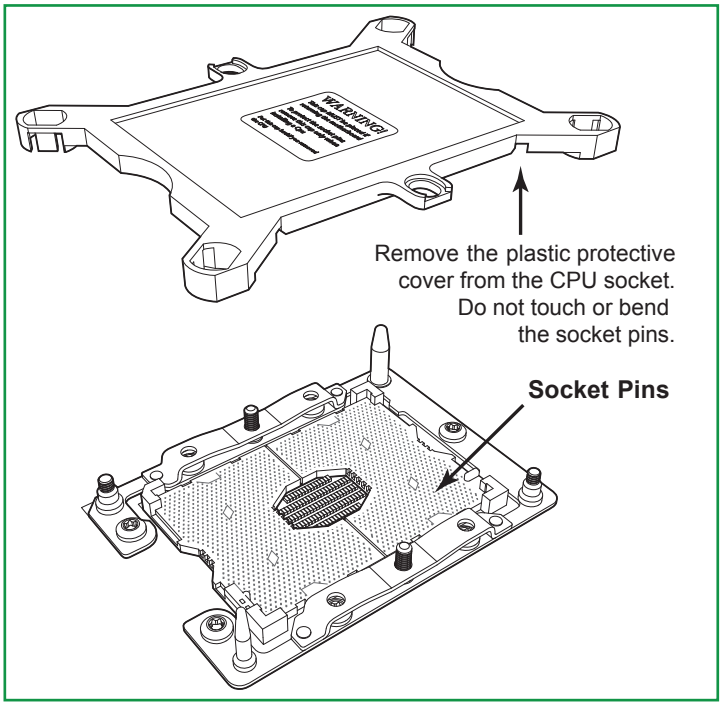


### *Preparing the CPU Socket for Installation*

This motherboard comes with a plastic protective cover on the CPU socket. Remove it carefully to install the Processor Heatsink Module (PHM).



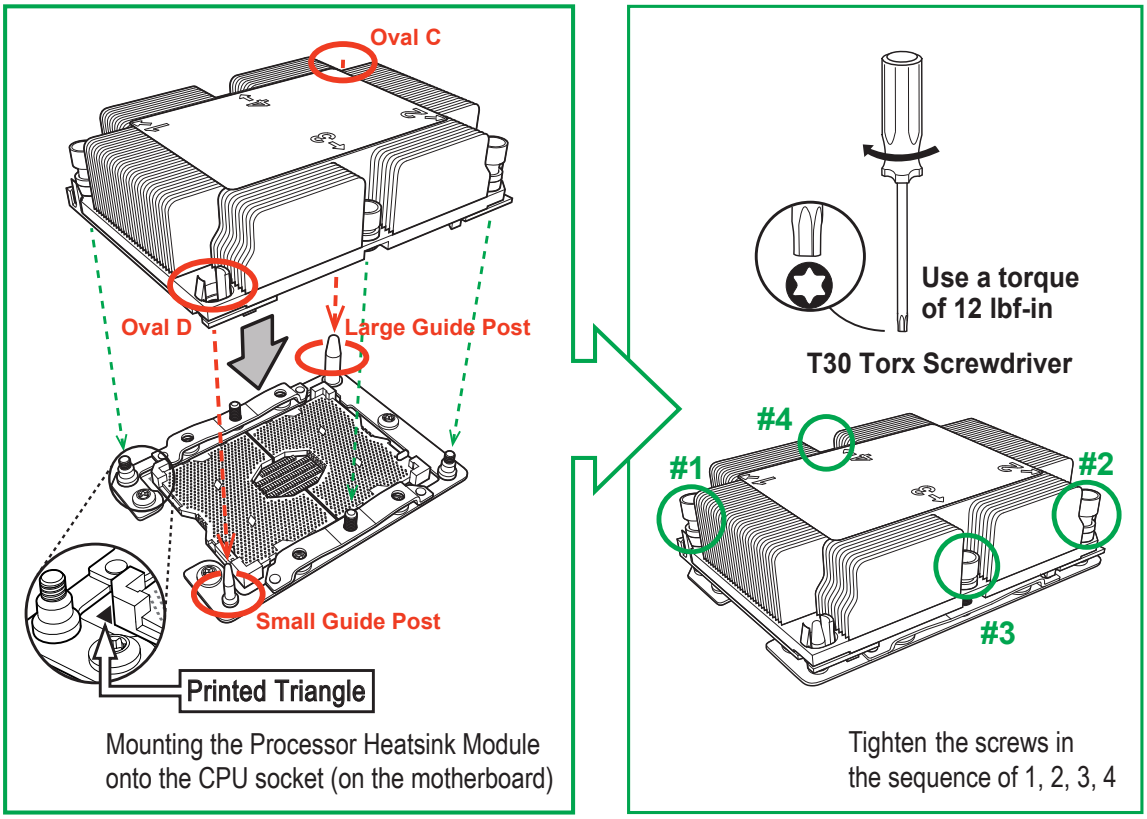

**CPU Socket with Plastic Protective Cover**



### *Installing the Processor Heatsink Module*

After assembling the Processor Heatsink Module (PHM), install it onto the CPU socket: Note that there are two different heatsink models, SNK-P0067PS and SNK-P0067PSM. Use the SNK-P0067PSM for CPU2 in each node.

1. Align hole 1 of the heatsink with the printed triangle on the CPU socket. See the left image below.
2. Make sure all four holes of the heatsink are aligned with the socket before gently placing the heatsink on top.
3. With a T30 Torx-bit screwdriver, gradually tighten screws #1 – #4 to assure even pressure. The order of the screws is shown on the label on top of the heatsink. To avoid damaging the processor or socket, do not use a force greater than 12 lbf-in when tightening the screws.
4. Examine all corners to ensure that the PHM is firmly attached to the socket.




If at any time the PHM must be removed, power off, then loosen the screws in the sequence of #4, #3, #2, and #1.

# Memory

## *Memory Support*

The 7049P-TR(T) has sixteen slot supporting up to 4TB of 3DS Load Reduced DIMM (3DS LRDIMM), Load Reduced DIMM (LRDIMM), 3DS Registered DIMM (3DS RDIMM), Registered DIMM (RDIMM), Non-Volatile DIMM (NV-DIMM) DDR4 (288-pin) ECC up to 2933 MHz memory modules. In addition it supports Non-Volatile DIMMs (NV-DIMM) and Intel Optane DC Persistent Memory (DCPMM).Memory speed is dependent on the processor model.

| DDR4 Memory Support for 81xx/61xx/51xx/41xx/31xx Processors | | | | | | |
|---|---|---|---|---|---|---|
| Type | Ranks Per DIMM and Data Width | DIMM Capacity (GB) | | Speed (MT/s) | | |
| | | | | One Slot per Channel | Two Slots per Channel | |
| | | DRAM Density | | One DIMM per Channel | One DIMM per Channel | Two DIMMs per Channel |
| | | 4 Gb | 8 Gb | 1.2 Volts | 1.2 Volts | 1.2 Volts |
| RDIMM | SRx4 | 4 GB | 8 GB | 2666 | 2666 | 2666 |
| | SRx8 | 8 GB | 16 GB | | | |
| | DRx8 | 8 GB | 16 GB | | | |
| | DRx4 | 16 GB | 32 GB | | | |
| RDIMM 3Ds | QRX4 | N/A | 2H-64GB | | | |
| | 8RX4 | N/A | 4H-128GB | | | |
| LRDIMM | QRx4 | 32 GB | 64 GB | | | |
| LRDIMM 3Ds | QRx4 | N/A | 2H-64GB | | | |
| | 8Rx4 | N/A | 4H-128 GB | | | |

| DDR4 Memory Support for 82xx/62xx/52xx/42xx/32xx Processors | | | | | | | |
|---|---|---|---|---|---|---|---|
| Type | Ranks Per DIMM and Data Width | DIMM Capacity (GB) | | | Speed (MT/s) | | |
| | | | | | One Slot per Channel | Two Slots per Channel | |
| | | DRAM Density | | | One DIMM per Channel | One DIMM per Channel | Two DIMMs per Channel |
| | | 4 Gb* | 8 Gb | 16 Gb | 1.2 Volts | 1.2 Volts | 1.2 Volts |
| RDIMM | SRx4 | 4 GB | 8 GB | 16 GB | 2933** | 2933** | 2933** |
| | SRx8 | 8 GB | 16 GB | 32 GB | | | |
| | DRx8 | 8 GB | 16 GB | 32 GB | | | |
| | DRx4 | 16 GB | 32 GB | 64 GB | | | |
| RDIMM 3Ds | QRX4 | N/A | 2H-64GB | 2H-128GB | | | |
| | 8RX4 | N/A | 4H-128GB | 4H-256GB | | | |
| LRDIMM | QRx4 | 32 GB | 64 GB | 128 GB | | | |
| LRDIMM 3Ds | QRx4 | N/A | 2H-64GB | 2H-64GB | | | |
| | 8Rx4 | N/A | 4H-128 GB | 4H-256 GB | | | |

*4Gb DRAM density is only supported on speeds up to 2666 MT/s

**Only the 82xx and 62xx series support 2933 MT/s; for other processors, memory speed as supported by the CPU.

Check the Supermicro website for possible updates to memory support.

### *Memory Population Guidelines*

- All DIMMs must be DDR4.
- Balance memory. Using unbalanced memory topology, such as populating two DIMMs in one channel while populating one DIMM in another channel, reduces performance. It is not recommended for Supermicro systems.
- In dual-CPU configurations, memory must be installed in the slots associated with the installed CPUs.

#### *Guidelines Regarding Mixing DIMMs*

- Populating slots with a pair of DIMM modules of the same type and size results in interleaved memory, which improves memory performance.
- Use memory modules of the same type and speed, as mixing is not allowed.
- x4 and x8 DIMMs can be mixed in the same channel.
- Mixing of LRDIMMs and RDIMMs is not allowed in the same channel, across different channels, and across different sockets.
- Mixing of non-3DS and 3DS LRDIMM is not allowed in the same channel, across different channels, and across different sockets.

#### *DIMM Construction*

- RDIMM (*non-3DS*) Raw Cards: A/B (2Rx4), C (1Rx4), D (1Rx8), E (2Rx8)
- 3DS RDIMM Raw Cards: A/B (4Rx4)
- LRDIMM (*non-3DS*) Raw Cards: D/E (4Rx4)
- 3DS LRDIMM Raw Cards: A/B (8Rx4)

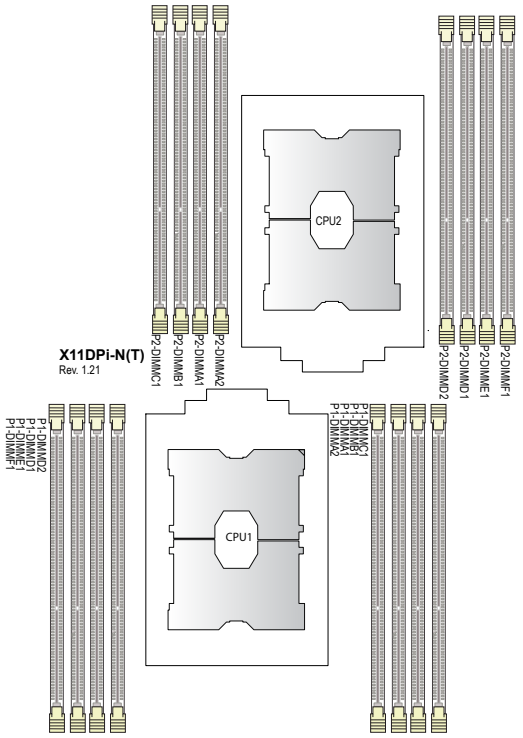
### *Memory Population Sequence*

**Blue slots versus black slots:** Install the first DIMM in the blue memory slot, which is the first of a memory channel. Then, if using two DIMMs per channel, install the second DIMM in the black slot.

The following memory population sequence table was created based on guidelines provided by Intel to support Supermicro motherboards. The diagram is for illustrative purposes; your motherboard may look different.

| Memory Population Table, 16 DIMM Slots | |
|---|---|
| **CPUs/DIMMs** | **Memory Population Sequence** |
| **1 CPU & 1 DIMM** | CPU1: P1-DIMMA1 |
| **1 CPU & 2 DIMMs** | CPU1: P1-DIMMA1/P1-DIMMD1 |
| **1 CPU & 3 DIMMs** | CPU1: P1-DIMMC1/P1-DIMMB1/P1-DIMMA1 |
| **1 CPU & 4 DIMMs** | CPU1: P1-DIMMB1/P1-DIMMA1/P1-DIMMD1/P1-DIMME1 |
| **1 CPU & 5 DIMMs*** | CPU1: P1-DIMMC1/P1-DIMMB1/P1-DIMMA1/P1-DIMMD1/P1-DIMME1 |
| **1 CPU & 6 DIMM** | CPU1: P1-DIMMC1/P1-DIMMB1/P1-DIMMA1/P1-DIMMD1/P1-DIMME1/P1-DIMMF1 |
| **1 CPU & 7 DIMMs*** | CPU1:P1-DIMMC1/P1-DIMMB1/P1-DIMMA1/P1-DIMMA2/P1-DIMMD1/P1-DIMME1/P1-DIMMF1 |
| **1 CPU & 8 DIMMs*** | CPU1: P1-DIMMC1/P1-DIMMB1/P1-DIMMA1/P1-DIMMA2/P1-DIMMD2/P1-DIMMD1/P1-DIMME1/P1-DIMMF1 |
| **2 CPUs & 2 DIMMs** | CPU1: P1-DIMMA1<br>CPU2: P2-DIMMA1 |
| **2 CPUs & 4 DIMMs** | CPU1: P1-DIMMA1/P1-DIMMD1<br>CPU2: P2-DIMMA1/P2-DIMMD1 |
| **2 CPUs & 6 DIMMs** | CPU1: P1-DIMMC1/P1-DIMMB1/P1-DIMMA1<br>CPU2: P2-DIMMC1/P2-DIMMB1/P2-DIMMA1 |
| **2 CPUs & 8 DIMMs** | CPU1: P1-DIMMB1/P1-DIMMA1/P1-DIMMD1/P1-DIMME1<br>CPU2: P2-DIMMB1/P2-DIMMA1/P2-DIMMD1/P2-DIMME1 |
| **2 CPUs & 10 DIMMs** | CPU1: P1-DIMMC1/P1-DIMMB1/P1-DIMMA1/P1-DIMMD1/P1-DIMME1/P1-DIMMF1<br>CPU2: P2-DIMMB1/P2-DIMMA1/P2-DIMMD1/P2-DIMME1 |
| **2 CPUs & 12 DIMMs** | CPU1: P1-DIMMC1/P1-DIMMB1/P1-DIMMA1/P1-DIMMD1/P1-DIMME1/P1-DIMMF1<br>CPU2: P2-DIMMC1/P2-DIMMB1/P2-DIMMA1/P2-DIMMD1/P2-DIMME1/P2-DIMMF1 |
| **2 CPUs & 14 DIMMs*** | CPU1: P1-DIMMC1/P1-DIMMB1/P1-DIMMA1/P1-DIMMA2/P1-DIMMD1/P1-DIMME1/P1-DIMMF1<br>CPU2: P2-DIMMC1/P2-DIMMB1/P2-DIMMA1/P2-DIMMA2/P2-DIMMD1/P2-DIMME1/P2-DIMMF1 |
| **2 CPUs & 16 DIMMs*** | CPU1: P1-DIMMC1/P1-DIMMB1/P1-DIMMA1/P1-DIMMA2/P1-DIMMD2/P1-DIMMD1/P1-DIMME1/P1-DIMMF1<br>CPU2: P2-DIMMC1/P2-DIMMB1/P2-DIMMA1/P2-DIMMA2/P2-DIMMD2/P2-DIMMD1/P2-DIMME1/P2-DIMMF1 |

*Unbalanced, not recommended.




**Memory Slot Labels, 16**

| Symmetric Population within One CPU Socket | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Modes** | **P1/P2-DIMMF1** | **P1/P2-DIMME1** | **P1/P2-DIMMD1** | **P1/P2-DIMMD2** | **P1/P2-DIMMA2** | **P1/P2-DIMMA1** | **P1/P2-DIMMB1** | **P1/P2-DIMMC1** | **Channel Config.** |
| AD | DRAM1 | DRAM1 | DRAM1 | DCPMM | DCPMM | DRAM1 | DRAM1 | DRAM1 | 2-1-1 |
| MM | DRAM2 | DRAM2 | DRAM2 | DCPMM | DCPMM | DRAM2 | DRAM2 | DRAM2 | 2-1-1 |
| AD + MM | DRAM3 | DRAM3 | DRAM3 | DCPMM | DCPMM | DRAM3 | DRAM3 | DRAM3 | 2-1-1 |
| AD | DCPMM | DRAM1 | DRAM1 | | | DRAM1 | DRAM1 | DCPMM | 1-1-1 |
| MM | DCPMM | DRAM1 | DRAM1 | | | DRAM1 | DRAM1 | DCPMM | 1-1-1 |
| AD + MM | DCPMM | DRAM3 | DRAM3 | | | DRAM3 | DRAM3 | DCPMM | 1-1-1 |

AD: App Direct, MM: Memory Mode

| Asymmetric Population within One CPU Socket | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Modes** | **P1-DIMMF1** | **P1-DIMME1** | **P1-DIMMD1** | **P1-DIMMD2** | **P1-DIMMA2** | **P1-DIMMA1** | **P1-DIMMB1** | **P1-DIMMC1** | **Channel Config.** |
| AD | DRAM1 | DRAM1 | DRAM1 | - | DCPMM | DRAM1 | DRAM1 | DRAM1 | 2-1-1 |
| AD* | DRAM1 | DRAM1 | DRAM1 | - | DCPMM | DRAM1 | DRAM1 | DRAM1 | 2-1-1 |

*Second socket has no DCPMM

| Legend (for the tables above) | | | | | |
|---|---|---|---|---|---|
| **DDR4 Type** | | | | | **Capacity** |
| **DRAM1** | RDIMM | 3DS RDIMM | LRDIMM | 3DS LRDIMM | Any Capacity |
| **DRAM2** | RDIMM | - | | - | Refer to Validation Matrix below. |
| **DRAM3** | RDIMM | 3DS RDIMM | LRDIMM | - | |

**Note**: DDR4 single rank x8 is not available for DCPMM Memory Mode or App-Direct Mode.

| Validation Matrix (DDR4 DIMMs Validated w/DCPMM) | | | |
|---|---|---|---|
| **DIMM Type** | **Ranks Per DIMM & Data Width (Stack)** | **DIMM Capacity (GB)** | |
| | | **DRAM Density** | |
| | | **4Gb** | **8Gb** |
| RDIMM | 1Rx4 | 8GB | 16GB |
| | 2Rx8 | 8GB | 16GB |
| | 2Rx4 | 16GB | 32GB |
| LRDIMM | 4Rx4 | N/A | 64GB |
| LRDIMM 3DS | 8Rx4 (4H) | N/A | 128GB |

- For MM, general NM/FM ratio is between 1:4 and 1:16. Excessive capacity for FM can be used for AD. (NM = Near Memory; FM = Far Memory)
- For each individual population, rearrangements between channels are allowed as long as the resulting population is compliant with the PDG rules for the 82xx/62xx/52xx/42xx platform.
- For each individual population, please use the same DDR4 DIMM in all slots.
- For each individual population, sockets are normally symmetric with exceptions for 1 DCPMM per socket and 1 DCPMM per node case. Currently, DCPMM modules operate at 2666 MHz.
- No mixing of DCPMM and NVMDIMMs within the same platform is allowed.
- This DCPMM population guide targets a balanced DCPMM-to-DRAM-cache ratio in MM and MM + AD modes.

## *Installing Memory*

### *ESD Precautions*

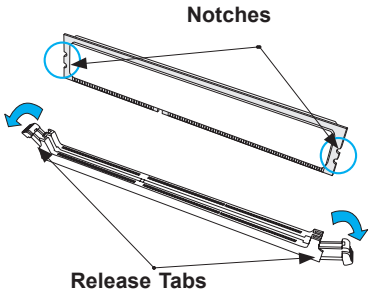
Electrostatic Discharge (ESD) can damage electronic components including memory modules. To avoid damaging DIMM modules, it is important to handle them carefully. The following measures are generally sufficient.

- Use a grounded wrist strap designed to prevent static discharge.
- Handle the memory module by its edges only.
- Put the memory modules into the antistatic bags when not in use.

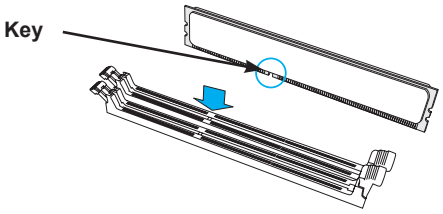
### *Installing Memory*

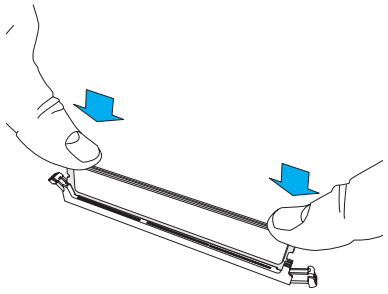
Begin by removing power from the system as described in Section 3.1. Follow the memory population sequence in the table above.

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




2. Align the key of the DIMM with the receptive point on the memory slot and with your thumbs on both ends of the module, press it straight down into the slot until the module snaps into place.



3. Press the release tabs to the locked position to secure the DIMM module into the slot.

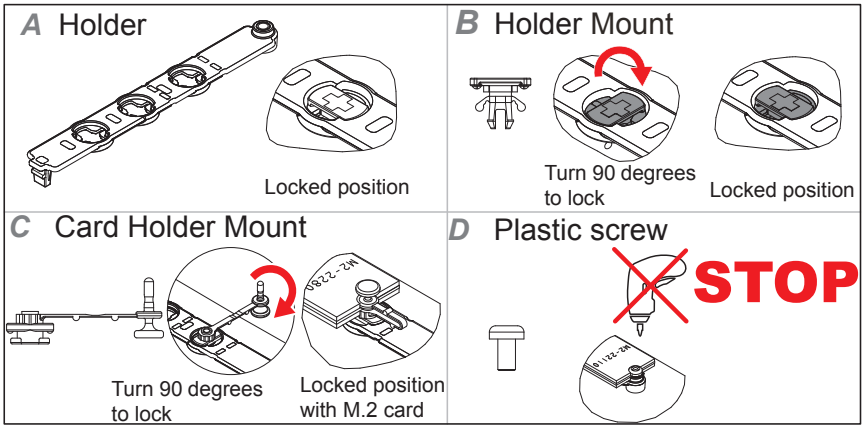
**Caution:** Exercise extreme caution when installing or removing memory modules to prevent damage to the DIMMs or slots.

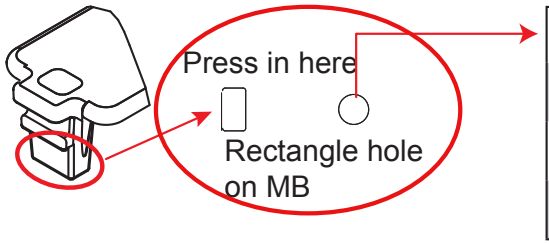
### *Removing Memory*

To remove a DIMM, unlock the release tabs then pull the DIMM from the memory slot.

## PCIe M.2 Slot

The motherboard has one M.2 slot. M.2 was formerly Next Generation Form Factor (NGFF) and serves to replace mini-PCIe. M.2 allows for a variety of card sizes, increased functionality, and spatial efficiency. The M.2 socket on the motherboard supports PCIe 3.0 X4 (32 Gb/s) SSD cards in the 2280 and 22110 form factors.




| Hole Location on the MB 42 | |
|---|---|
| M.2 Card 60 | A+B+C |
| M.2 Card 80 | A+B+C |
| M.2 Card 110 | A+B+D |

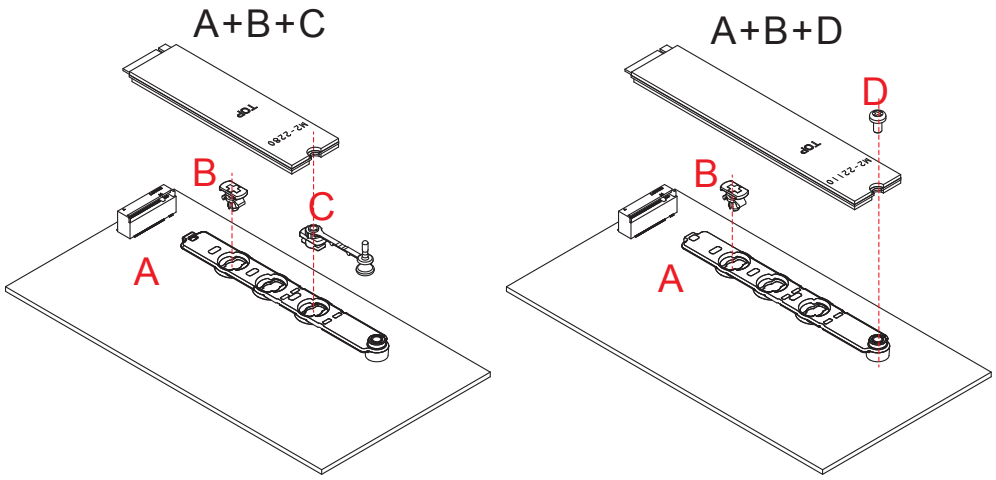



**Figure 3-5. M.2 Mounting Instructions**

## Motherboard Battery

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

***Replacing the Battery***

Begin by removing power from the system as described in section 3.1.

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

**Note:** 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.

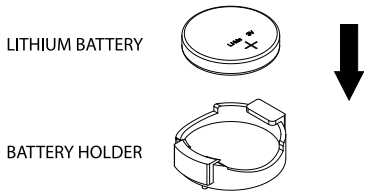



**Figure 3-6. Installing the Onboard Battery**

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

# 3.4 Chassis Components

## Storage Drives

The standard system provides hot-swap drive bays for eight 3.5" SATA drives covered by the front bezel. Alternatively, each bay can house a 2.5" SATA drive with an optional converter (pn MCP-220-00080-0B). The drive IDs for these bays are preconfigured as 0 through 7 from bottom to top.

The drives are hot-swappable, meaning they can be removed and replaced without powering down the system, if that capability is supported by your operating system. The drives are mounted in drive carriers to simplify their installation and removal from the chassis. The carriers also promote airflow for the system. For this reason, even carriers without drives must remain in the server.

There are several options that provide additional SAS or SATA storage drives if an optional SAS RAID controller card is purchased. Each 5.25" bay can house one 3.5" drive, or two 2.5" drives with a bracket. Or two 5.25" bays can be replaced by an optional enclosure called a *mobile rack* that houses eight hot-swap 2.5" drives. Additional cables are also required.

**Note:** Enterprise level hard disk drives are recommended for use in Supermicro chassis and servers. For information on recommended HDDs, visit the Supermicro website at http://www.supermicro.com/products/nfo/files/storage/SBB-HDDCompList.pdf.

The server also supports PCIe M.2 storage that can be installed directly on the motherboard. See Section 3.3.

### *Drive Indicators*

Each hot-swap drive has two LED indicators: an activity indicator and a status indicator. In RAID configurations, the status indicator lights to indicate the status of the drive. In non-RAID configurations, the status indicator remains off. See the table below for details.

| Drive Carrier LED Indicators | | | |
|---|---|---|---|
| | **Color** | **Blinking Pattern** | **Behavior for Device** |
| **Activity LED** | Off | | No drive, or SATA drive installed |
| | Blue | Solid On | SAS drive installed |
| | Blue | Blinking | I/O activity |
| **Status LED** | Red | Solid On | Failure of drive with RSTe support |
| | Red | Blinking at 1 Hz | Rebuild drive with RSTe support |
| | Red | Blinking with two blinks and one stop at 1 Hz | Hot spare for drive with RSTe support |
| | Red | On for five seconds, then off | Power on for drive with RSTe support |
| | Red | Blinking at 4 Hz | Identify drive with RSTe support |

## *Installing the Standard 3.5" Drives*

### *Removing Drive Carriers from the Chassis*

1. Swing open the front bezel.
2. Press the release button on the drive carrier. This extends the drive carrier handle.

**Figure 3-7. Removing a Drive Carrier**

3. Use the handle to pull the carrier out of the chassis.
4. Remove the dummy drive from the carrier.

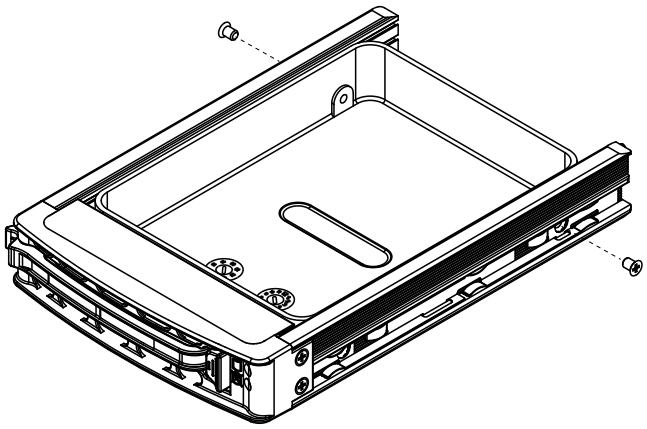


**Figure 3-8. Removing the Dummy Drive**

**Caution:** Except for short periods of time (swapping drives), do not operate the server with the drive carriers removed from the bays, regardless of how many drives are installed, for proper airflow.

### *Installing a Hard Drive*

1. Place the hard drive carrier on a flat surface.
2. Insert the hard drive into the carrier with the printed circuit board side facing downward and so that the mounting holes in the drive align with those in the drive carrier.
3. Secure the hard drive to the carrier with the screws included with the hard drive.
4. Use the open handle of the drive carrier to insert the drive carrier into the open drive bay.
5. Secure the drive carrier into the drive bay by closing the drive carrier handle.

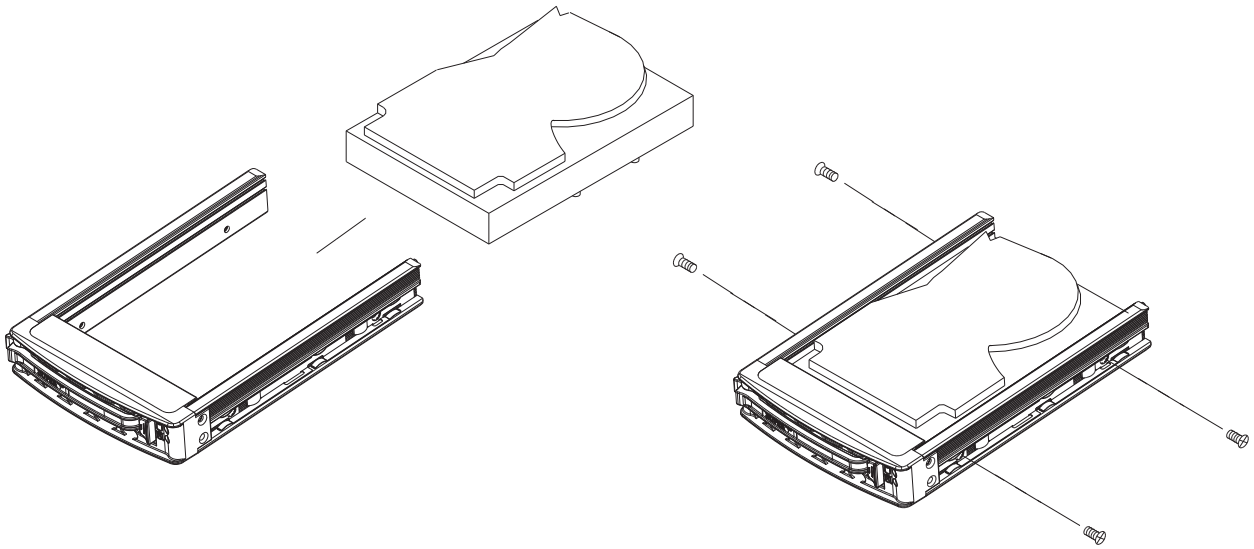


**Figure 3-9. Mounting a Drive in a Carrier**

## Configuring the 5.25" Drive Bays

The control panel/drive module includes three 5.25" drive bays under the front control panel. It can be set up in a variety of configurations to suit the user's needs.

- Up to three 5.25" peripheral drives, such as a DVD drive
- One or two additional fixed SATA, SAS or solid state drives in a single tray
- A mobile rack with eight additional 2.5" hot-swap hard drives (replaces two 5.25" bays; requires an optional expansion card and cables)
- A combination of the above

### *Accessing the 5.25" Trays*

1. Open the chassis cover.
2. Locate the drive tray and pull the appropriate release tab.
3. Push the drive tray out of the front of the chassis.

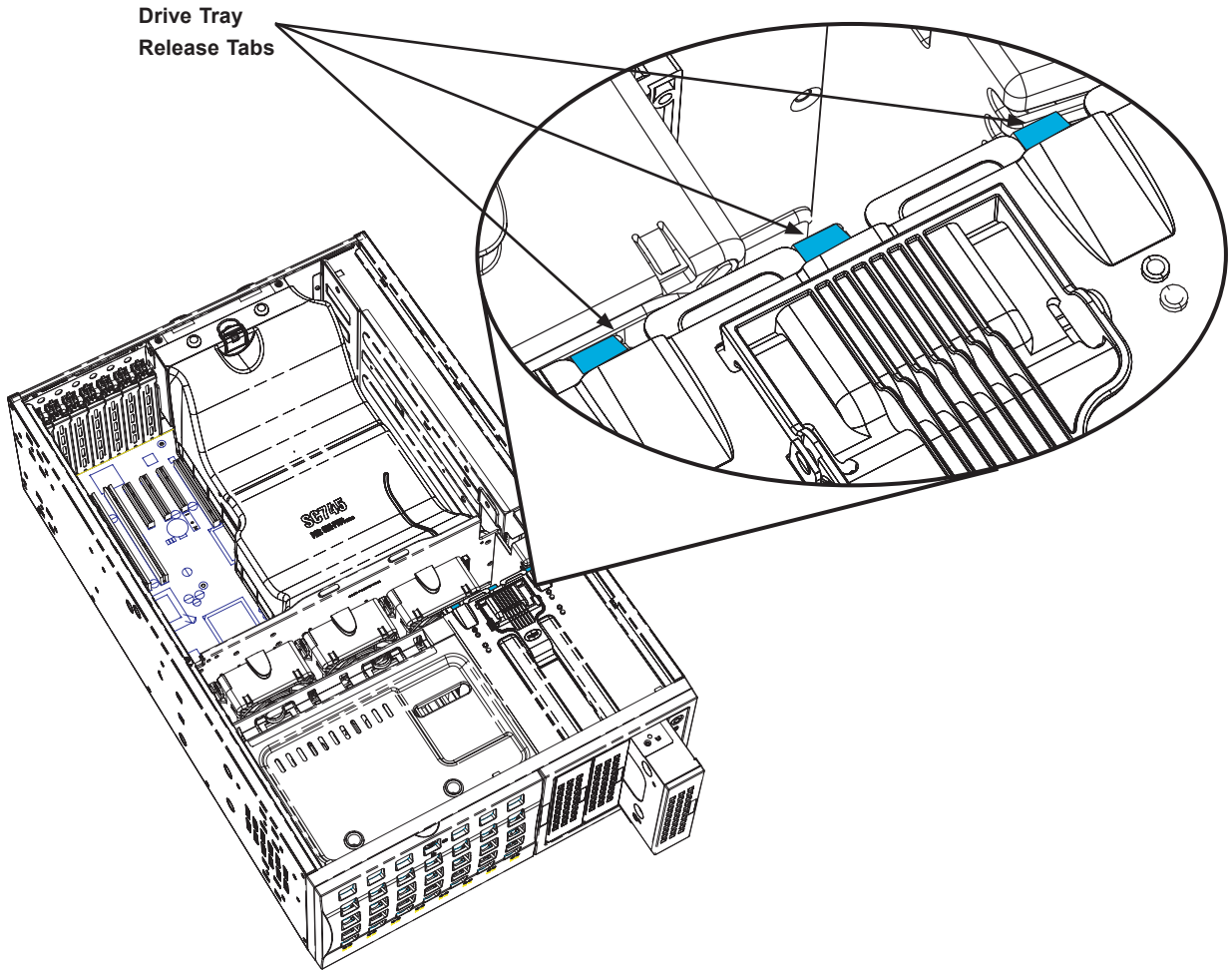



**Figure 3-10. Removing a Drive Tray**

### *Installing a Storage Drive into a 5.25" Tray*

One 3.5" drive, or two 2.5" drives with an optional bracket (pn MCP-220-00044-0N) can be installed. An optional expansion card and cables are also required.

1. Remove the tray from the drive bay.
2. For a 3.5" drive, place the drive in the drive tray, and secure the drive to the tray with four screws from the bottom.

   For one or two 2.5" drives, install the drives into the special purpose bracket, then secure the bracket to drive tray with screws through the bottom of the tray.

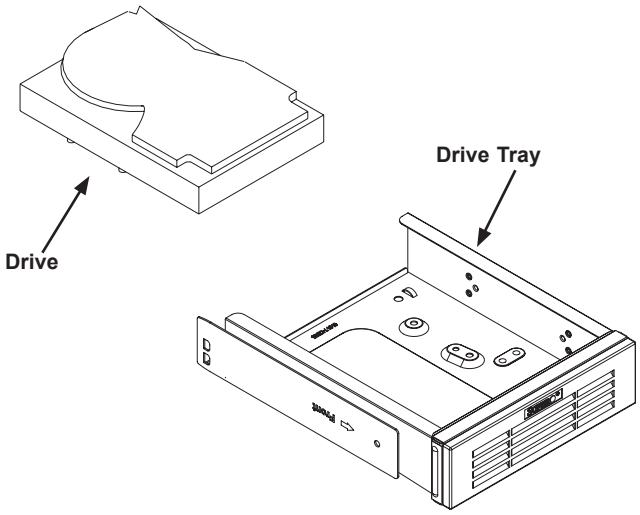



**Figure 3-11. Installing a 3.5" Drive to the Drive Tray**

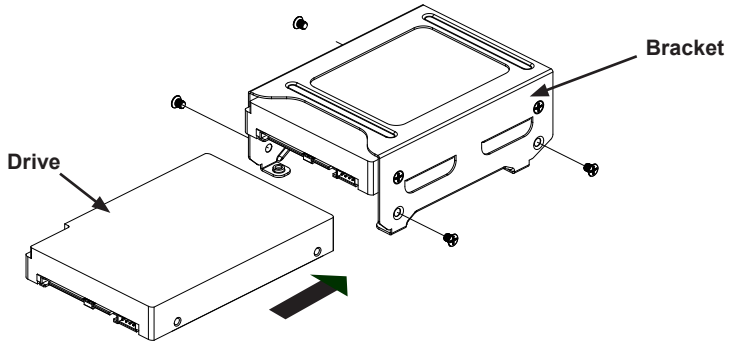



**Figure 3-12. Installing 2.5" Drives into the Bracket**

3. Slide the drive tray into the chassis until the tray clicks into place.
4. Connect the data and power cables for the new drive.
5. Replace the chassis cover and power up the system.

### *Installing a 5.25" Peripheral Device*

An optional peripheral device such as a DVD drive can be installed in a 5.25" bay.

1. Remove the tray from the drive bay.
2. Re-use the side rails from the tray and install them onto the peripheral device.

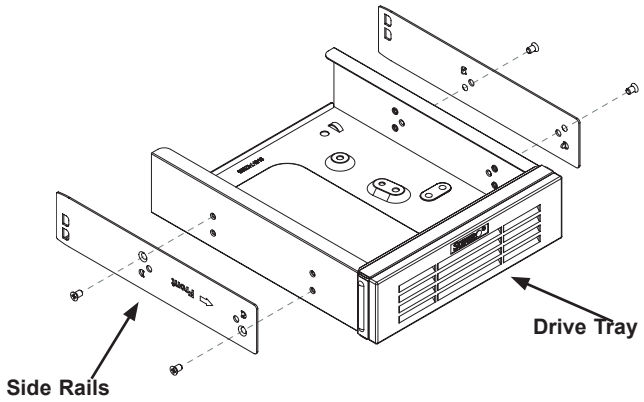



**Figure 3-13. Removing Rails from the Drive Tray**

3. Insert the new device in the slot until the tab locks in place.
4. Connect the data and power cables.
5. Replace the chassis cover and power up the system.

### *Additional Storage Drives in a Mobile Rack*

The chassis accepts a Supermicro mobile rack (pn CSE-M28SABP) in place of two 5.25" bays. This adds eight hot-swap 2.5" SAS or SATA drives. An optional expansion card and cables are also required.

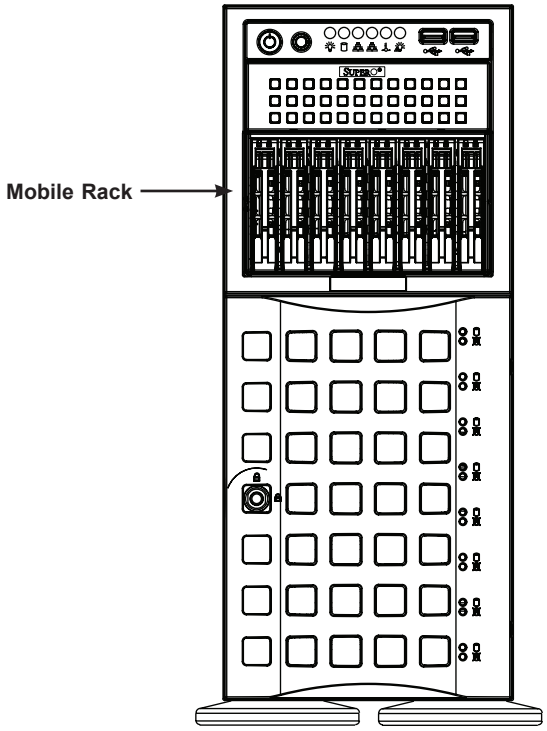



**Figure 3-14. Chassis with a Mobile Rack Installed**

#### *Installing the Mobile Rack*

1. Remove two adjacent trays from the drive bays.
2. Remove the drive tray rails.

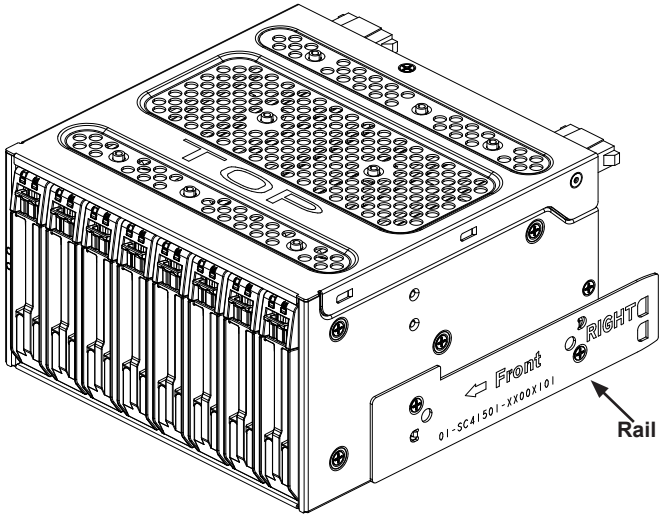



**Figure 3-15. Mobile Rack with Drive Tray Rails**

3. Install a drive tray rail onto each side of the mobile rack. Make sure the arrow on the rail points toward the front of the chassis.
4. Slide the mobile rack into the chassis.
5. Connect the data and power cables.

## Installing Expansion Cards

The system can accommodate six PCIe cards. The chassis has seven slots, but the slot nearest the chassis top is not supported by this motherboard.

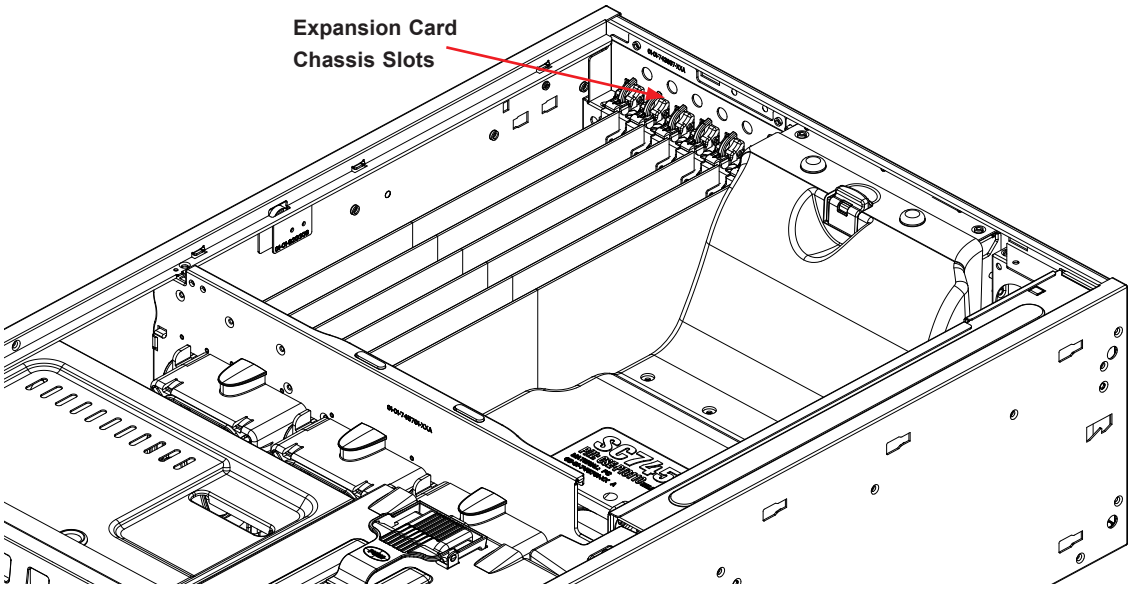



**Figure 3-16. PCI Slots**

### *Installing an Expansion Card*

1. Power down the system and remove the cover.
2. In the rear of the chassis, push on PCI shield lock, then lift the lock.
3. Remove the screw holding the PCI shield in place and remove the shield.
4. Push the expansion card into the expansion slot on the motherboard while aligning it with the chassis slot in the rear of the chassis.
5. Secure the expansion card shield onto the rear of the chassis with a screw and the lock.

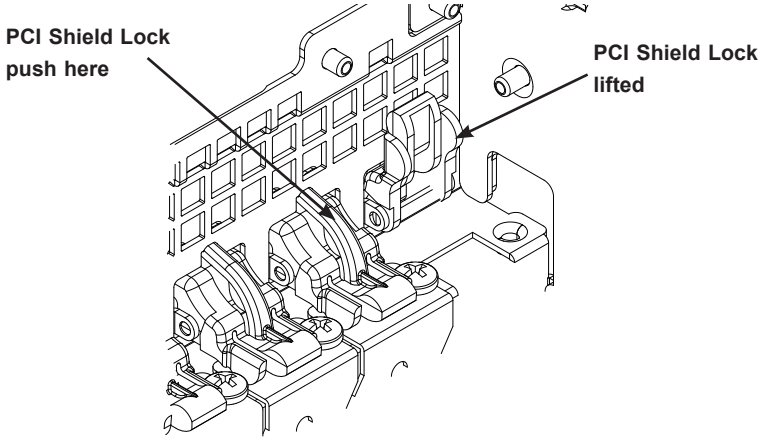



**Figure 3-17. Removing a Blank PCI Shield**

## System Cooling

Three 8-cm fans located in the center of the chassis provide cooling airflow while two 8-cm exhaust fans at the rear of the chassis expel hot air. The chassis is also fitted with an air shroud to concentrate the flow of cooling air over the areas of highest generated heat. The fans should all be connected to headers on the motherboard (see Chapter 4). Each power supply module also has a cooling fan.

### *Chassis Fans*

Under normal operation, all three chassis fans and both exhaust fans run continuously. They can be replaced without powering down the system (hot-swap).

#### *Replacing Chassis Cooling Fans*

1. Depress the locking tab on the failed fan.
   - On a mid-chassis fan, push the tab on the side of the housing inward.
   - On an exhaust fan, push down on the colored tab.
2. With the tab depressed, pull the unit straight out.
3. Replace the failed fan, noting the air flow direction. It should click into place. Check that the fan is working before replacing the chassis cover.

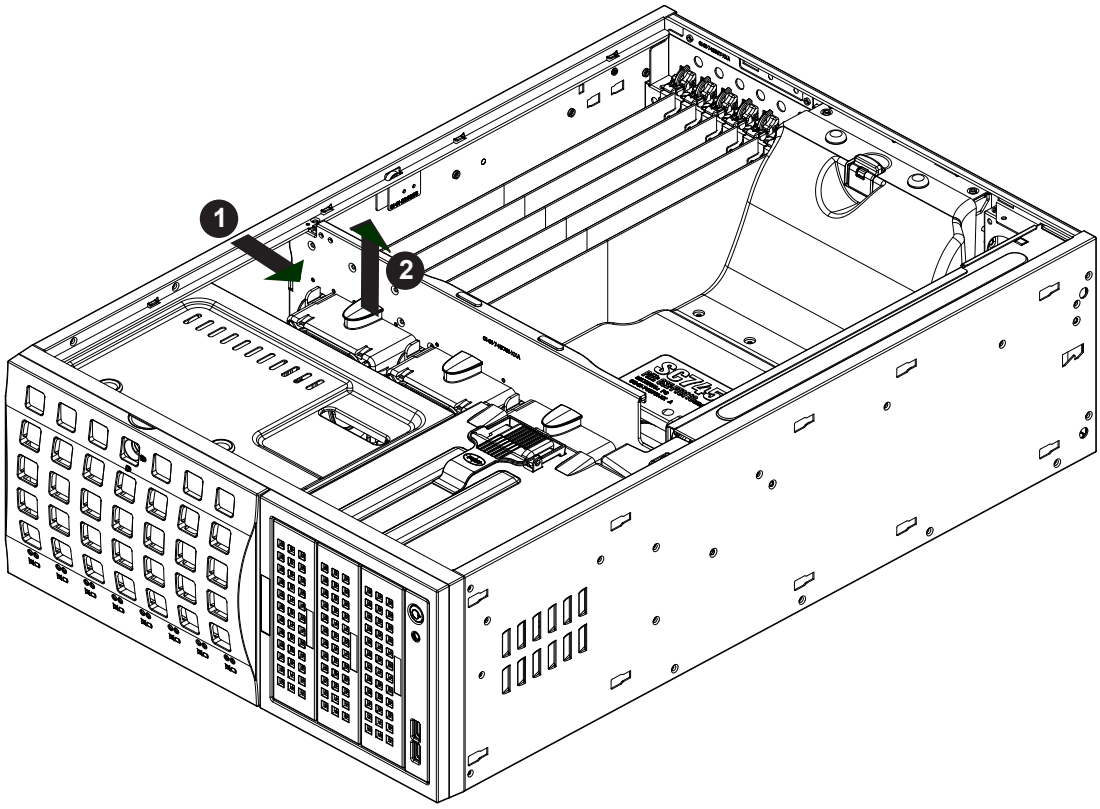



**Figure 3-18. Removing a Chassis Fan**

### *Air Shroud*

Air shrouds concentrate airflow to maximize fan efficiency. It covers the processors and heatsinks.

#### *Installing the Air Shroud*

The air shroud fits behind the two fans closest to the power supply. Align the pins and press the air shroud into the chassis. It should click into place.

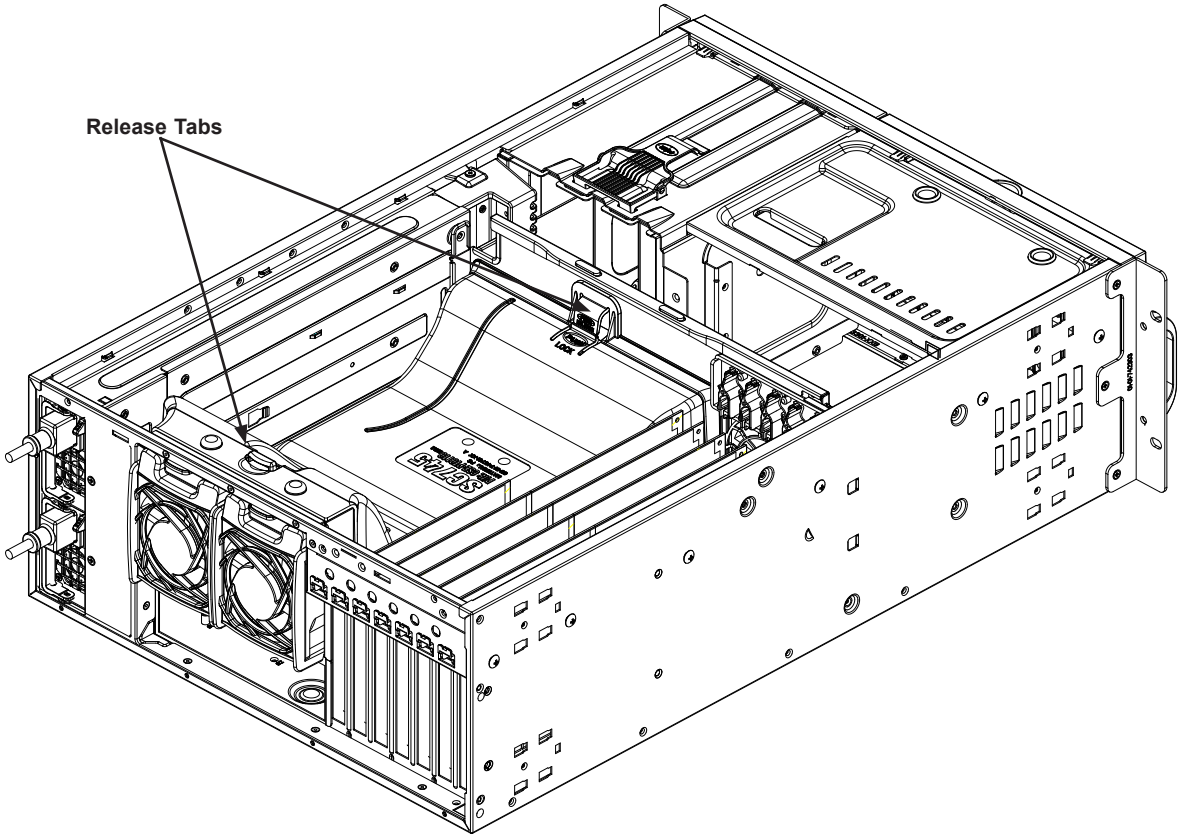



**Figure 3-19. Installing the Air Shroud**

To remove the air shroud, press the release tabs at the front and rear of the shroud to unlock it, the lift it out.

## Power Supply

The system has a redundant power supply consisting of two power modules. Each power supply module has an auto-switching capability, which enables it to automatically sense and operate at a 100 V – 240 V input voltage.

If either of the two power supply modules fail, the other module will take the full load and allow the system to continue operation without interruption. The PWR Fail LED will illuminate and remain on until the failed unit has been replaced. The hot-swap capability of the power supply modules allows you to replace the failed module without powering down the system. Replacement units can be ordered directly from Supermicro (see contact information in the Preface).

### *Power Supply LEDs*

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

- **Solid Green**: When illuminated, indicates that the power supply is on.
- **Solid Amber**: When illuminated, indicates the power supply is plugged in and turned off, or the system is off but in an abnormal state.
- **Blinking Amber**: When blinking, this system power supply temperature has reached 63C. The system will automatically power-down when the power supply temperature reaches 70C and restart when the power supply temperature goes below 60C.

***Replacing the Power Supply***

You do not need to shut down the system to replace a power supply module.

1. Unplug the AC power cord from the failed power supply module.
2. Push the release tab on the power module to the side to unlock it then grasp the handle to pull it from the chassis.

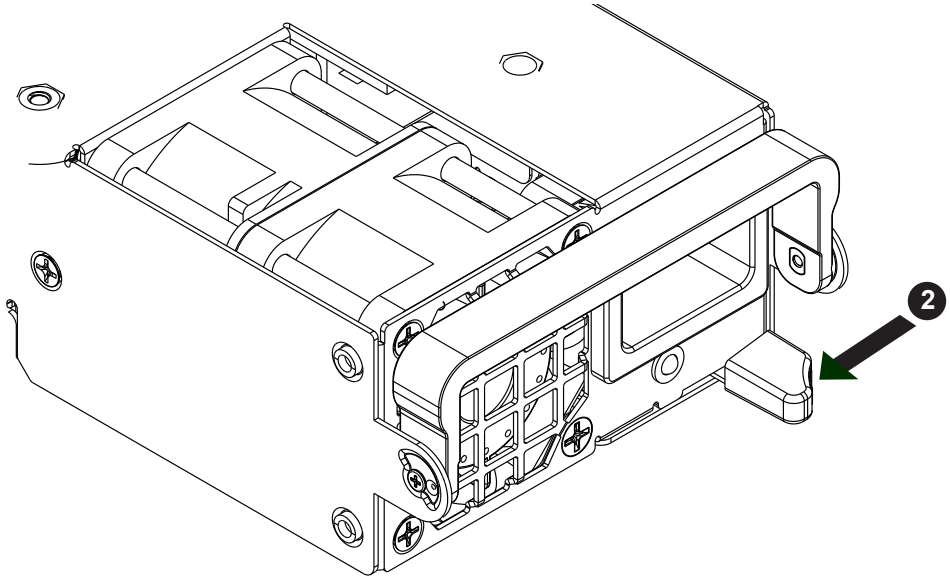



**Figure 3-20. Power Supply Release Tab**

3. Replace the failed module with another unit of the same model.
4. Push the new module all the way into the open bay until the release tab clicks into a locked position.
5. Plug the AC power cord back into the newly installed power module.

## Removing the Front Bezel

If you wish to remove the front bezel, push on the three tabs on the inside of the left lip of the front chassis cover. Then slightly swing out the same (left) side of the cover, about ½ inch only. Remove by pushing on the open side of the cover to remove it from the chassis (do not try to swing or pull it straight out after opening the left side).

# Chapter 4

# Motherboard Connections

This section describes the connections on the motherboard and provides pinout definitions. Note that depending on how the system is configured, not all connections are required. The LEDs on the motherboard are also described here. A motherboard layout indicating component locations may be found in Chapter 1.

Please review the safety precautions in Appendix B before installing or removing components.

## 4.1 Power Connections

Three power connections on the X11DPi-N(T) must be connected to the power supply. The wiring is included with the power supply.

- One 24-pin Primary ATX Power (JPWR3)
- Two 8-pin Processor Power (JPWR1, JPWR2)

### Main ATX Power Connector

The primary power connector (JPWR3) meets the ATX SSI EPS 24-pin specification. You must also connect the 8-pin (JPWR1, JPWR2) processor power connectors to your power supply.

**ATX Power 24-pin Connector Pin Definitions**

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

**Required Connection**

**Important:** To provide adequate power to the motherboard, connect the 24-pin *and* the 8-pin power connectors to the power supply. Failure to do so may void the manufacturer's warranty on your power supply and motherboard.

### Processor Power Connector

JPWR1 and JPWR2 must also be connected to the power supply. These connectors are used to power the processors.

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

**Required Connection**

## 4.2 Headers and Connectors

### Fan Headers

There are eight fan headers (FAN1-6, FANA, FANB) on the motherboard. These are 4-pin fan headers; pins 1-3 are backward compatible with traditional 3-pin fans. The onboard fan speeds are controlled by Thermal Management via IPMI. When using Thermal Management setting, please use all 3-pin fans or all 4-pin fans.

| Fan Header Pin Definitions | |
|---|---|
| Pin# | Definition |
| 1 | Ground (Black) |
| 2 | +12V (Red) |
| 3 | Tachometer |
| 4 | PWM Control |

### I-SATA 3.0 and S-SATA 3.0 Ports

SATA is supported on the X11DPi-N(T) motherboard by three iPass connectors and two SATA powered ports. The powered ports, S-SATA4/S-SATA5, are yellow connectors with power pins built in. They can be used with Supermicro SuperDOMs and do not require external power cables.

### Host Fabric Interface (HFI) Carrier Card Sideband Headers (for the SKX-F CPU Only)

Two Host Fabric Interface carrier card headers are located at JHFI1/JHFI2 on the motherboard. A JHFI Sideband header is used when a SKX-F processor is installed on the motherboard. Use a Host Fabric Interface (HFI) sideband cable to connect the carrier card to the JHFI header, and use an Internal-Faceplate-to-Processor cable (IFPA54B) to connect the carrier card to the SKX-F processor to enhance system performance. Note that in a dual-processor system, JHFI1 is used for CPU1, and JHFI2 is for CPU2.

### TPM Header

The JTPM1 header is used to connect a Trusted Platform Module (TPM)/Port 80, which is available from Supermicro. 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.

### RAID Key Header

A RAID Key header is located at JRK1 on the motherboard. It supports VMD used in creating optional advanced NVMe RAID configurations.

**Intel RAID Key Pin Definitions**

| Pin# | Definition |
|---|---|
| 1 | Ground |
| 2 | +3.3 V Standby |
| 3 | Ground |
| 4 | PCH RAID key |

### SGPIO Header

The T-SGPIO3 (Serial General Purpose Input/Output) header is used to communicate with the enclosure management chip on the backplane.

**SGPIO Header Pin Definitions**

| Pin# | Definition | Pin# | Definition |
|---|---|---|---|
| 1 | NC | 2 | NC |
| 3 | Ground | 4 | DATA Out |
| 5 | Load | 6 | Ground |
| 7 | Clock | 8 | NC |

**NC = No Connection**

### Standby Power

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

**Standby Power Pin Definitions**

| Pin# | Definition |
|---|---|
| 1 | +5V Standby |
| 2 | Ground |
| 3 | No Connection |

### Power SMBus ($I^2C$) Header

The Power System Management Bus ($I^2C$) connector ($JPI^2C1$) monitors the power supply, fan, and system temperatures.

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

### 4-pin BMC External $I^2C$ Header

A System Management Bus header for IPMI 2.0 is located at JIPMB1. Connect the appropriate cable here to use the IPMB $I^2C$ connection on your system.

| External $I^2C$ Header Pin Definitions | |
|---|---|
| **Pin#** | **Definition** |
| 1 | Data |
| 2 | Ground |
| 3 | Clock |
| 4 | No Connection |

### Chassis Intrusion

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

| Chassis Intrusion Pin Definitions | |
|---|---|
| **Pin#** | **Definition** |
| 1 | Intrusion Input |
| 2 | Ground |

### NVMe SMBus Headers

NVMe SMB ($I^2C$) headers (JNVI2C1/2) are used for PCIe SMBus clock and data connections and provide hot-plug support by a dedicated SMBus interface. This feature is only available for a Supermicro complete system with a proprietary NVMe add-on card and cable installed.

**NVMe SMBus Header Pin Definitions**

| Pin# | Definition |
|---|---|
| 1 | Data |
| 2 | Ground |
| 3 | Clock |
| 4 | VICCIO |

### NVMe Connectors

NVMe $I^2C$ headers used for PCIe hot-plug SMBus clock and data connections. (A proprietary NVMe add-on card and cable are required; available for a Supermicro complete system only)

### PCIe M.2 Slot

The motherboard has one M.2 slot (JM2_1). See Chapter 3 for details.

## Control Panel

JF1 contains header pins for various control panel connections. See the figure below for the pin locations and definitions of the control panel buttons and LED indicators.

All JF1 wires have been bundled into a single cable to simplify this connection. Make sure the red wire plugs into pin 1 as marked on the motherboard. The other end connects to the control panel PCB board.

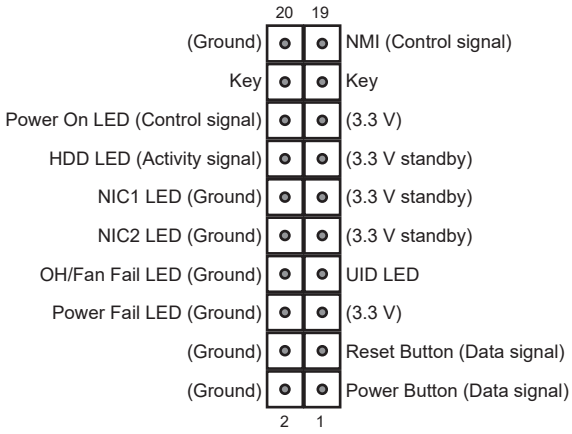



**Figure 4-1. JF1: Control Panel Pins**

### Power Button

The Power Button connection is located on pins 1 and 2 of JF1. Momentarily contacting both pins will power on/off the system. This button can also be configured to function as a suspend button (with a setting in the BIOS--see Chapter 6). To turn off the power when the system is in suspend mode, press the button for 4 seconds or longer.

| Power Button Pin Definitions (JF1) | |
|---|---|
| **Pin#** | **Definition** |
| 1 | Signal |
| 2 | Ground |

### Reset Button

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

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

### Power Fail LED

The Power Fail LED connection is located on pins 5 and 6 of JF1.

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

### Overheat (OH)/Fan Fail

Connect an LED cable to pins 7 and 8 of JF1 to use the Overheat/Fan Fail LED connections. The LED on pin 8 provides warnings of overheat or fan failure.

| OH/Fan Fail Indicator Status | |
|---|---|
| **Status** | **Definition** |
| Off | Normal |
| On | Overheat |
| Flashing | Fan Fail |

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

### NIC1/NIC2 (LAN1/LAN2)

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

| LAN1/LAN2 LED Pin Definitions (JF1) | |
|---|---|
| **Pin#** | **Definition** |
| 9 | NIC2 Activity LED |
| 10 | NIC2 Link LED |
| 11 | NIC1 Activity LED |
| 12 | NIC1 Link LED |

### HDD LED/UID Switch

The HDD LED/UID Switch connection is located on pins 13 and 14 of JF1. Attach a cable to Pin 14 to show hard drive activity status. Attach a cable to Pin 13 to use UID switch. Refer to the table below for pin definitions.

**HDD LED Pin Definitions (JF1)**

| Pin# | Definition |
|---|---|
| 13 | 3.3V Standby/UID Switch |
| 14 | HDD Active |

### Power LED

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

**Power LED Pin Definitions (JF1)**

| Pin# | Definition |
|---|---|
| 15 | 3.3V |
| 16 | Power LED |

### NMI Button

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

**NMI Button Pin Definitions (JF1)**

| Pin# | Definition |
|---|---|
| 19 | Control |
| 20 | Ground |

## Data Cables

The data cables in the system have been carefully routed to maintain airflow efficiency. If you disconnect any of these cables, take care to re-route them as they were originally when reconnecting them.

**Important!** Make sure the the cables do not come into contact with the fans.

## 4.3 Input/Output Ports and Interface Buttons

The rear I/O panel offers these ports and control switches.

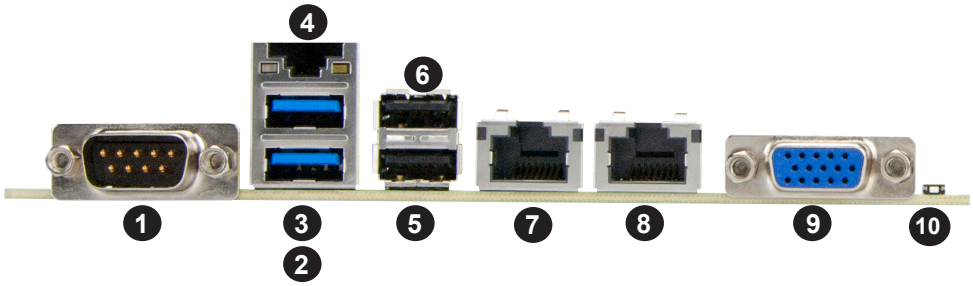



**Figure 4-2. Back Panel I/O Ports**

| Back Panel I/O Ports | | | |
|---|---|---|---|
| **No.** | **Description** | **No.** | **Description** |
| 1. | COM1 | 6. | USB 1 |
| 2. | USB 4 | 7. | GLAN1 (7049P-TR), 10G_LAN1 7049P-TRT) |
| 3. | USB 5 | 8. | GLAN2 (7049P-TR), 10G_LAN2 (7049P-TRT) |
| 4. | IPMI LAN | 9. | VGA |
| 5. | USB 0 | 10. | Unit Identifier Switch (UID) |

### Serial Port

There is one COM port (COM1) on the I/O back panel and one COM header (COM2) on the motherboard.

### Universal Serial Bus (USB) Ports

There are two USB 2.0 ports (USB0/1) and two USB 3.0 port (USB4/5) on the I/O back panel. There is one USB 2.0 header (USB2/3) and one USB 3.0 header (USB7/8) on the motherboard. USB6 is a Type A USB 3.0 header. The onboard headers can be used to provide front side USB access with a cable (not included).

### IPMI Port

A LAN port is a dedicated connection for IPMI.

### Ethernet Ports

Two Ethernet ports (LAN1, LAN2):

- X11DPi-NT supports 10GbE connections
- X11DPi-N supports 1 GbE connections

### UID

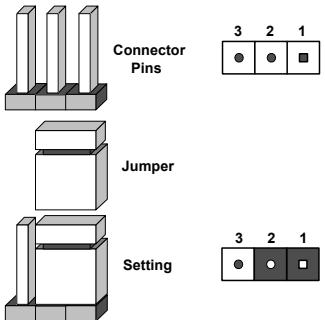
The unit identifier (UID) switch toggles the UID LED indicator on or off. This indicator can be used to identify the node for troubleshooting or service.

# 4.4 Jumpers

### *Explanation of Jumpers*

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

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




**CMOS Clear**

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

***To Clear CMOS***

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

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

*Do not use the PW_ON connector to clear CMOS.*


**JBT1 contact pads**

### VGA Enable/Disable

JPG1 allows you to enable or disable the VGA port using the onboard graphics controller. The default setting is Enabled.

| VGA Enable/Disable Jumper Settings | |
|---|---|
| **Jumper Setting** | **Definition** |
| Pins 1-2 | Enabled |
| Pins 2-3 | Disabled |

### Manufacturer Mode Select

Close pin 2 and pin 3 of jumper JPME2 to bypass SPI flash security and force the system to operate in the manufacturer mode, which will allow the user to flash the system firmware from a host server for system setting modifications. The default setting is Normal.

| Manufacturer Mode Jumper Settings | |
|---|---|
| **Jumper Setting** | **Definition** |
| Pins 1-2 | Normal (Default) |
| Pins 2-3 | Manufacturer Mode |

### Watch Dog

JWD1 controls the Watch Dog function. Watch Dog is a monitor that can reboot the system when a software application hangs. Jumping pins 1-2 will cause Watch Dog to reset the system if an application hangs. Jumping pins 2-3 will generate a non-maskable interrupt signal for the application that hangs. Watch Dog must also be enabled in BIOS. The default setting is Reset.

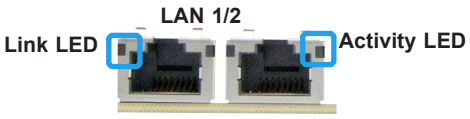
**Note:** When Watch Dog is enabled, the user needs to write their own application software to disable it.

| Watch Dog Jumper Settings | |
|---|---|
| **Jumper Setting** | **Definition** |
| Pins 1-2 | Reset |
| Pins 2-3 | NMI |
| Open | Disabled |

# 4.5 LED Indicators

## LAN LEDs

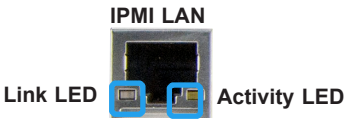
The LAN ports are located on the I/O back panel on the motherboard. Each Ethernet LAN port has two LEDs. The yellow LED indicates activity. Link LED, located on the left side of the LAN port, may be green, amber or off indicating the speed of the connection.




| LAN Link Indicator LED Settings | |
|---|---|
| **LED Color** | **Definition** |
| Off | No Connection, 10 or 100 Mbps |
| Green | 10 Gbps (7049P-TRT only) |
| Amber | 1 Gbps |

## IPMI LAN LED

The yellow LED indicates activity, while the green/amber LED indicates the speed of the connection.




| IPMI LAN LED Link LED (left) | |
|---|---|
| **LED Color** | **Definition** |
| Amber: Solid | 1 Gb/s |
| Green: Solid | 100 Mb/s |

## BMC Heartbeat LED

LEDM1 is the BMC heartbeat indicator. When the LED is blinking green, BMC is functioning normally.

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

## Onboard Power LED

The Onboard Power LED is located at LE2 on the motherboard. When this LED is on, the system is on. Be sure to turn off the system and unplug the power cord before removing or installing components.

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

### M.2 Power LED

The LE3 indicator shows when M.2 is active.

### Unit ID LED

A rear UID LED indicator at LE1 is located near the UID switch on the I/O back panel. The switch toggles the LED indicator to provide easy identification of a system when, for example, it may need service.

# Chapter 5

# Software

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

## 5.1 Microsoft Windows OS Installation

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

***Installing the OS***

1. Create a method to access the MS Windows installation ISO file. That might be a DVD, perhaps using an external USB/SATA DVD drive, or a USB flash drive, or the IPMI KVM console.

2. Retrieve the proper RST/RSTe driver. Go to the Supermicro web page for your motherboard and click on "Download the Latest Drivers and Utilities", select the proper driver, and copy it to a USB flash drive.

3. Boot from a bootable device with Windows OS installation. You can see a bootable device list by pressing **F11** during the system startup.

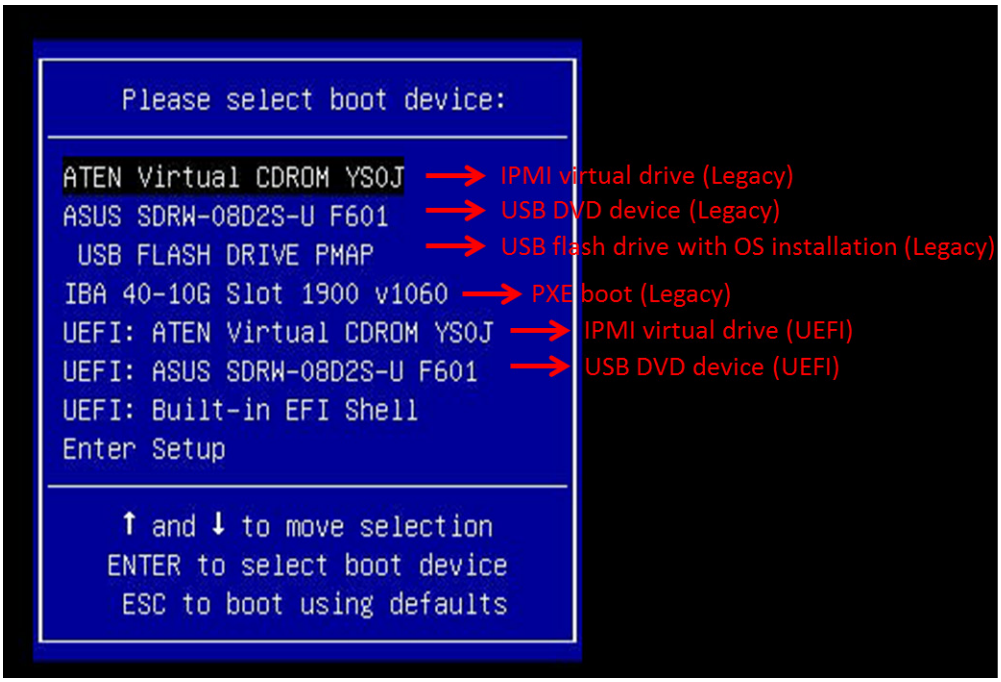



**Figure 5-1. Select Boot Device**

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

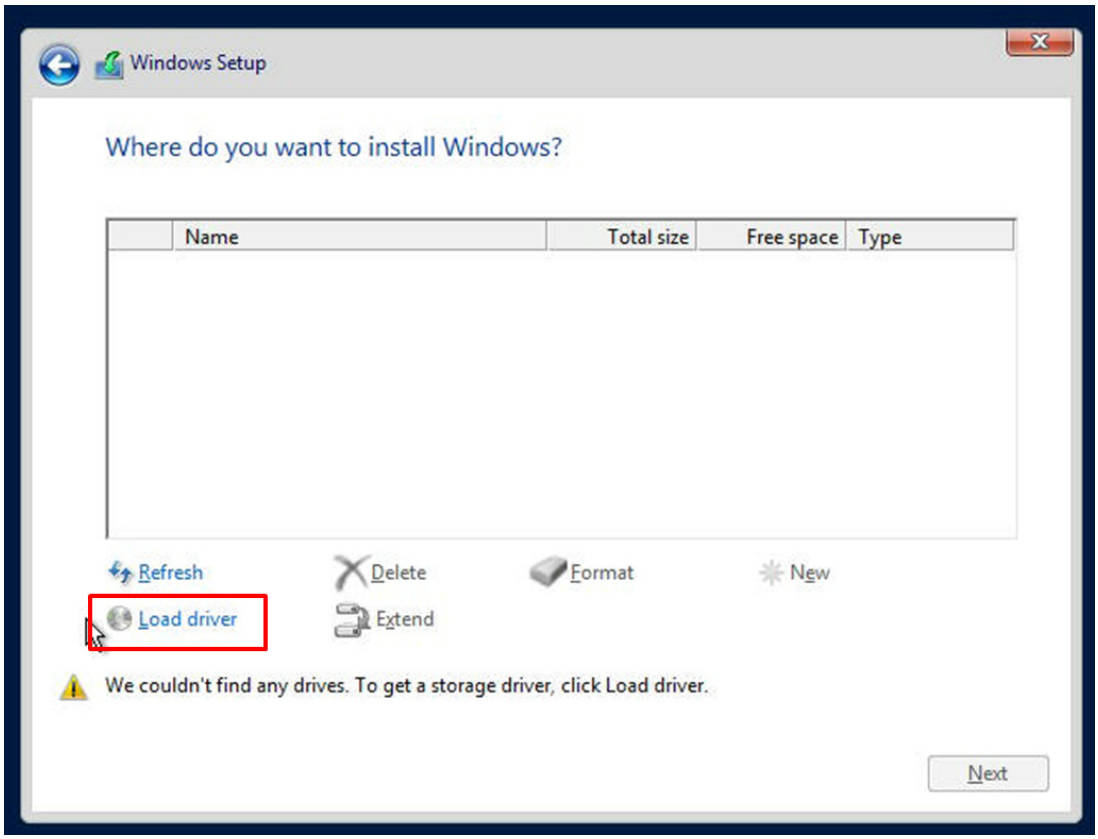



**Figure 5-2. Load Driver Link**

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

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

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

## 5.2 Driver Installation

The Supermicro website contains drivers and utilities for your system at https://www.supermicro.com/wdl/driver. Some of these must be installed, such as the chipset driver.

After accessing the website, go into the CDR_Images (in the parent directory of the above link) and locate the ISO file for your motherboard. Download this file to to a USB flash drive or a DVD. (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.

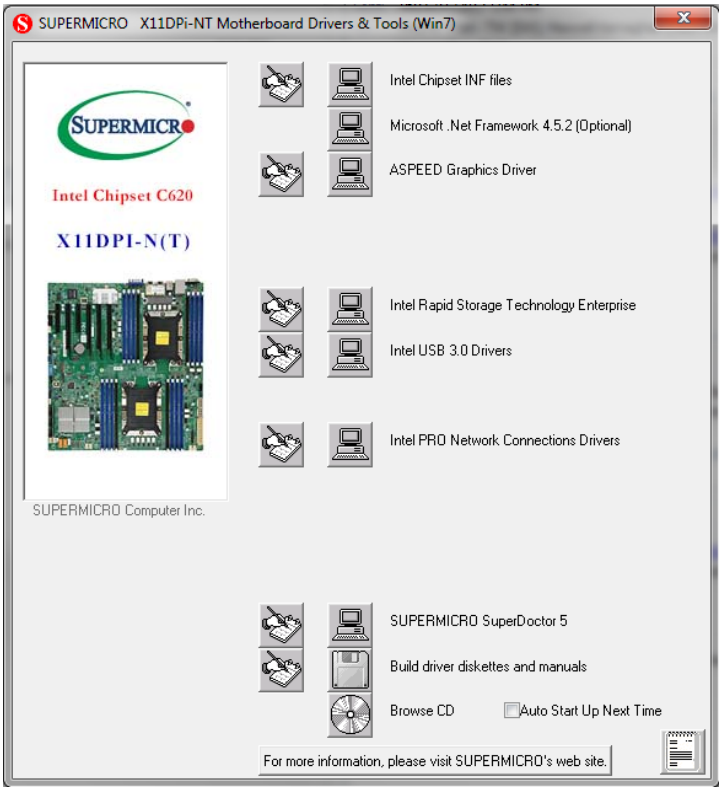



**Figure 5-3. Driver & Tool Installation Screen**

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

## 5.3 SuperDoctor® 5

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

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

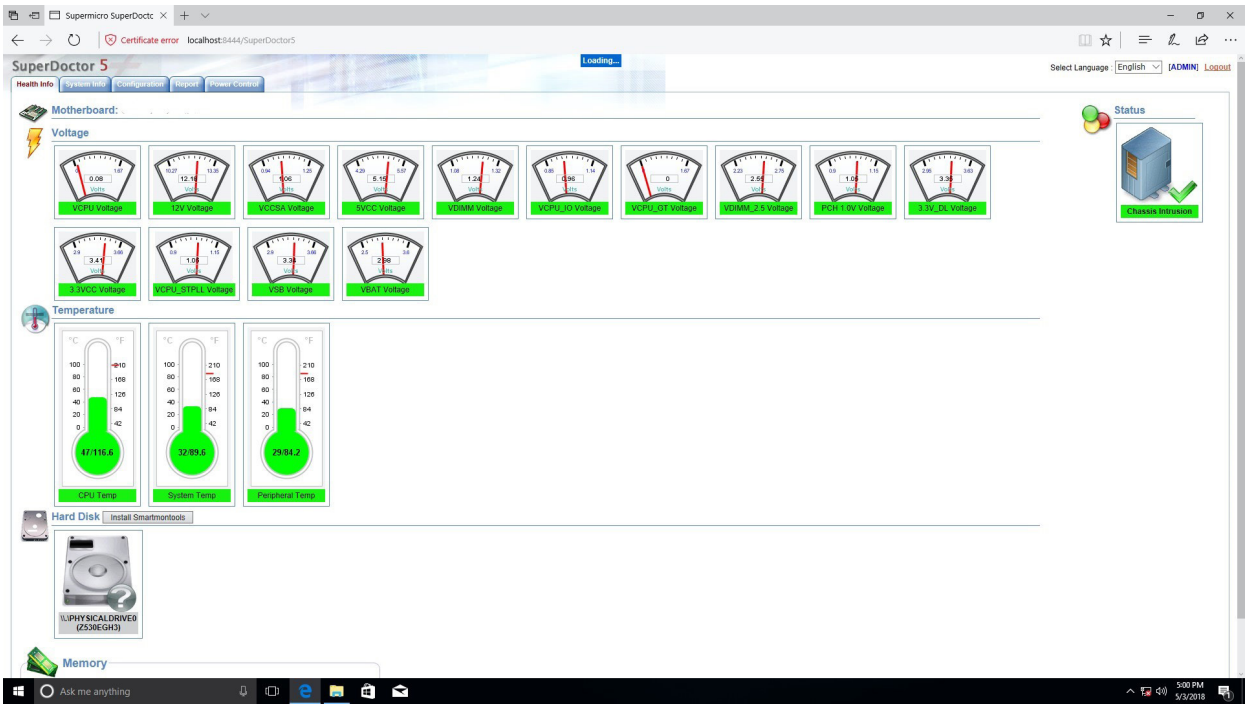



**Figure 5-4. SuperDoctor 5 Interface Display Screen (Health Information)**

## 5.4 IPMI

The X11DPi-N(T) supports the Intelligent Platform Management Interface (IPMI). IPMI is used to provide remote access, monitoring and management. There are several BIOS settings that are related to IPMI.

For general documentation and information on IPMI, please visit our website at: http://www.supermicro.com/products/nfo/IPMI.cfm.

# Chapter 6

# BIOS

## 6.1 Introduction

This chapter describes the AMI BIOS setup utility for the X11DPi-N(T) and provides the instructions on navigating the setup screens. The BIOS is stored in a Flash EEPROM and can be updated.

**Note:** Due to periodic changes to the BIOS, some settings may have been added or deleted since this manual was published.

### Starting BIOS Setup Utility

To enter the AMI BIOS setup utility screens, press the <Delete> key while the system is booting up. (There are a few cases when other keys are used, such as <F1>, <F2>, etc.)

The BIOS screens have three main frames. The large left frame displays options can be configured by the user. These are blue. When an option is selected, it is highlighted in white. Settings printed in **Bold** are the default values.

In the left frame, a " ▶" indicates a submenu. Highlighting such an item and pressing the <Enter> key opens the list of settings in that submenu.

The upper right frame displays helpful information for the user. The AMI BIOS has default informational messages built in. The manufacturer retains the option to include, omit, or change any of these informational messages.

The lower right frame lists navigational methods. The AMI BIOS setup utility uses a key-based navigation system called *hot keys*. Most of these hot keys can be used at any time during setup navigation. These keys include <F3>, <F4>, <Enter>, <ESC>, arrow keys, etc.

Some system parameters may be changed.

## 6.2 Main Setup

When running the AMI BIOS setup utility, it starts with the Main screen. You can always return to it by selecting the Main tab on the top of the screen.


The Main tab page allows you to set the date and time, and it displays system information.

**System Date/System Time**

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

**Note:** The time is in the 24-hour format. For example, 5:30 P.M. appears as 17:30:00. The date's default value is 01/01/2016 after RTC reset.

**Supermicro X11DPi-N/X11DPi-NT** (Motherboard model)

**BIOS Version**

**Build Date** (of the BIOS)

**CPLD** (Complex Programmable Logic Device) **Version**

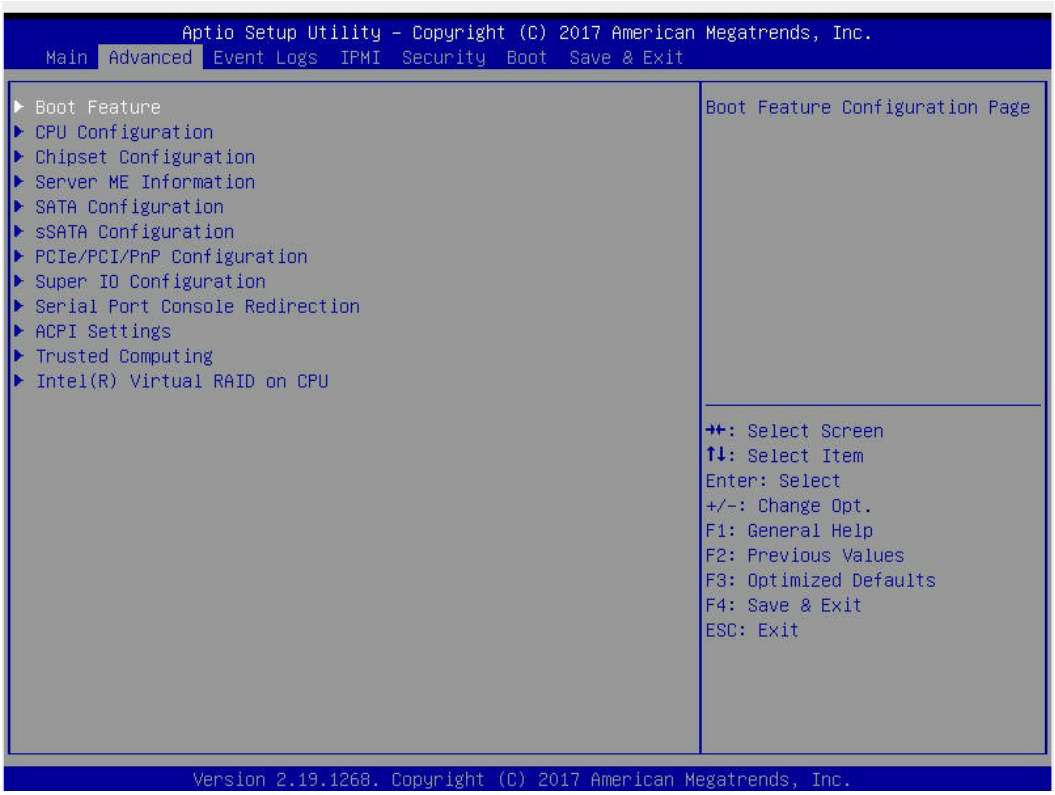
**Memory Information**

**Total Memory** (for the system)

**Memory Speed**

## 6.3 Advanced Setup Configurations

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




**Caution**: Take caution when changing the Advanced settings. An incorrect value, a very high DRAM frequency, or an incorrect DRAM timing setting may make the system unstable. If this occurs, revert to the manufacture default settings.

### ▸Boot Configuration

#### Quiet Boot

Use this feature to select the screen between displaying 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 **Enabled** and Disabled.

**Note:** POST message is always displayed regardless of the item setting.

#### 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 Off and **On**.

**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**.

**Interrupt 19 Capture**

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 item 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 5 minutes. The options are Enabled and **Disabled.**

**Power Button Function**

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

**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**.

## ▶CPU Configuration

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

## ▶Processor Configuration

The following CPU information will be displayed:

- Processor BSP Revision
- Processor Socket
- Processor ID
- Processor Frequency
- Processor Max Ratio
- Processor Min Ratio
- Microcode Revision
- L1 Cache RAM
- L2 Cache RAM
- L3 Cache RAM
- Processor 0 Version
- Processor 1 Version

**Hyper-Threading (ALL)**

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

**Core Enabled**

Use this feature to enable or disable CPU cores in the processor specified by the user. Use the <+> key and the <-> key on the keyboard to set the desired number of CPU cores you want to enable in a processor. Please note that the maximum of 24 CPU cores are currently available in each CPU package. The default setting is **0**.

**Monitor/Mwait**

Select Enable to enable the Monitor/Mwait instructions in the processor. The options are **Enable** and Disable.

**Execute Disable Bit (Available if supported by the OS & the CPU)**

Select Enable for Execute Disable Bit support which will allow the processor to designate areas in the system memory where an application code can execute and where it cannot, thus preventing a worm or a virus from flooding illegal codes to overwhelm the processor, damaging the system during a virus attack. The options are **Enable** and Disable. (Refer to Intel and Microsoft websites for more information.)

**Intel Virtualization Technology (Available when two processors are installed on the motherboard)**

Select Enable to use Intel Virtualization Technology which will allow multiple workloads to share the same set of common resources. On shared virtualized hardware, various workloads (or tasks) can co-exist, sharing the same resources, while functioning in full independence

from each other, and migrating freely across multi-level infrastructures and scale as needed. The settings are **Enable** and Disable.

**PPIN Control**

Select Unlock/Enable to use the Protected-Processor Inventory Number (PPIN) in the system. The options are **Unlock/Enable** and Unlock/Disable.

**Hardware Prefetcher (Available when supported by the CPU)**

If this feature is set to Enable, the hardware prefetcher will prefetch streams of data and instructions from the main memory to the Level 2 (L2) cache to improve CPU performance. The options are Disable and **Enable**.

**Adjacent Cache Prefetch (Available when supported by the CPU)**

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 Disable and **Enable**.

**Note**: Please power off and reboot the system for the changes you've made to take effect. Please refer to Intel's website for detailed information.

**DCU Streamer Prefetcher (Available when supported by the CPU)**

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

**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.

**Extended APIC (Extended Advanced Programmable Interrupt Controller)**

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.

**AES-NI**

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

## ▶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)**

Select BIOS to allow the system BIOS to configure the Power-Performance Tuning Bias setting. The options are BIOS Controls EPB and **OS Controls EPB**.

**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 set the processor power use policy to achieve the desired operation settings for your machine by prioritizing system performance or energy savings. Select Maximum Performance to maximize system performance (to its highest potential); however, this may result in maximum power consumption as energy is needed to fuel the processor frequency. The higher the performance is, the higher the power consumption will be. Select Max Power Efficient to maximize power saving; however, system performance may be substantially impacted because limited power use decreases the processor frequency. The options are Max (Maximum) Performance, Performance, **Balanced Performance**, Balanced Power, and Power.

## ▶CPU P State Control (Available when "Power Technology" is set to Custom)

**SpeedStep (PStates)**

EIST (Enhanced Intel SpeedStep Technology) 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**.

**Config (Configure) TDP (Available when SpeedStep is set to Enable)**

Use this feature to set the appropriate TDP (Thermal Design Power) level for the system. The TDP refers to the maximum amount of power allowed for running "real applications" without triggering an overheating event. The options are **Normal**, Level 1, and Level 2.

**Activate PBF (Available when SpeedStep is set to Enable)**

Select Enable to enable Prioritized Base Frequency (PBF) feature support which will enhance CPU performance. The options are **Disable** and Enable.

**Configure PBF (Available when Activate PBF is set to Enable)**

Select Enable to allow the BIOS to configure high priority CPU cores as Prioritized Base Frequency (PBF) so that software programs do not have to configure the PBF (Prioritized Base Frequency) settings. The options are **Enable** and Disable.

**EIST PSD Function (Available when SpeedStep is set to Enable)**

Use this item to configure the processor's P-State coordination settings. During a P-State, the voltage and frequency of the processor will be reduced when it is in operation. This makes the processor more energy efficient, resulting in further energy gains. The options are **HW_ALL**, SW_ALL and SW-ANY.

**Turbo Mode (Available when SpeedStep is set to Enable)**

Select Enable for processor cores to run faster than the frequency specified by the manufacturer. The options are Disable and **Enable**.

## ▶Hardware PM (Power Management) State Control Available when "Power Technology" is set to Custom)

**Hardware P-States**

If this feature is set to Disable, 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 OS guidance. If this feature is set to Native Mode with No Legacy Support, 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

**Autonomous Core C-State**

Select Enable to support Autonomous Core C-State control which will allow the processor core to control its C-State setting automatically and independently. The options are **Disable** and Enable.

**CPU C6 Report (Available when Autonomous Core C-State is set to Disable)**

Select Enable to allow the BIOS to report the CPU C6 state (ACPI C3) to the operating system. During the CPU C6 state, power to all caches is turned off. The options are **Auto**, Enable, and Disable.

**Enhanced Halt State (C1E) (Available when Autonomous Core C-State is set to Disable)**

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

**Package C State**

Use this feature to set the limit on the C-State package register. The options are C0/C1 state, C2 state, C6 (non-Retention) state, C6 (Retention) state, No Limit, and **Auto**.

### ▶CPU T State Control  Available when "Power Technology" is set to Custom)

**Software Controlled T-States**

If this feature is set to Enable, CPU throttling settings will be supported by the software of the system. The options are **Enable** and Disable.

## ▶Chipset Configuration

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

## ▶North Bridge

This feature allows the user to configure the settings for the Intel North Bridge.

### ▶UPI (Ultra Path Interconnect) Configuration

This section displays the following UPI General Configuration information:

- Number of CPU
- Number of Active UPI Link
- Current UPI Link Speed
- Current UPI Link Frequency
- UPI Global MMIO Low Base/Limit
- UPI Global MMIO High Base/Limit
- UPI PCI-E 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 to enable Link L0p. The options are Disable, Enable, and **Auto**.

**Link L1 Enable**

Select Enable to enable Link L1 (Level 1 link). The options are Disable, Enable, and **Auto**.

**IO Directory Cache (IODC)**

Select Enable for the IODC (I/O Directory Cache) 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**

Select Enable to use "Sub NUMA Clustering" (SNC), which supports full SNC (2-cluster) interleave and 1-way IMC interleave. Select Auto for 1-cluster or 2-cluster support depending on the status of IMC (Integrated Memory Controller) Interleaving. The options are **Disable**, Enable, and Auto.

**XPT Prefetch**

Select Enable to support XPT Prefetching to enhance system performance. The options are Enable, **Disable**, and Auto.

**KTI Prefetch**

Select Enable to support KTI Prefetching to enhance system performance. The options are **Enable** and Disable.

**Local/Remote Threshold**

This feature allows the user to set the threshold for the Interrupt Request (IRQ) signal, which handles hardware interruptions. The options are Disable, **Auto**, Low, Medium, and High.

**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 the "Stale AtoS" feature 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 deadlines in the LLC. The options are **Enable**, Disable, and Auto.

**Isoc Mode**

Select Enable to enable Isochronous support to meet QoS (Quality of Service) requirements. This feature is especially important for Virtualization Technology. The options are Disable, Enable, and **Auto**.

## ▶Memory Configuration

**Enforce POR (Plan of Record)**

Select POR to enforce POR restrictions for DDR4 memory frequency and voltage programming. The options are **POR** and Disable.

**PPR Type**

Post Package Repair (PPR) is a new feature available for the DDR4 Technology. PPR provides additional spare capacity within a DDR4 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 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 **Auto**, Enable, Soft PPR, and Disabled.

**Memory Frequency**

Use this feature to set the maximum memory frequency for onboard memory modules. The options are **Auto**, 1866, 2000, 2133, 2400, 2666, and 2933. **Note**: 2933 MHz memory is supported by 2nd Gen Intel Xeon Scalable-SP (82xx/62xx series) processors only.

**Data Scrambling for DDR4**

Select Enable to enable data scrambling for DDR4 memory to enhance system performance and security. Select Auto for the default setting of the Memory Reference Code (MRC) to set configure data scrambling for DDR4 setting. The options are **Auto**, Disable, and Enable.

**tCCD_L Relaxation**

If this feature is set to Enable, SPD (Serial Presence Detect) will override tCCD_L ("Column to Column Delay-Long", or “Command to Command Delay-Long” on the column side.) If this feature is set to Disable, tCCD_L will be enforced based on the memory frequency. The options are **Auto**, Enable and Disable.

**tRWSR (Read to Write turnaround time for Same Rank) Relaxation**

Select Enable to use the same tRWSR DDR timing setting among all memory channels, and in which case, the worst case value among all channels will be used. Select Disable

to use different values for the tRWSR DDR timing settings for different channels as trained. The options are Auto, **Disable**, and Enable.

**Enable ADR**

Select Enable for ADR (Async DIMM Self-Refresh) support to enhance memory performance. The options are Disable and **Enable**.

**Data Scrambling for NVDIMM**

Select Enable to enable data scrambling support for onboard NVDIMM memory to improve system performance and security. The options are **Auto**, Disable, and Enable.

**Erase-Arm NVDIMMs**

If this feature is set to Enable, the function that arms the NVDIMMs for safe operations in the event of a power loss will be removed. The options are **Enable** and Disable.

**Restore NVDIMMs**

Select Enable to restore the functionality and the features of NVDIMMs. The options are **Enable** and Disable.

**Interleave NVDIMMs**

If this item is set to Enable, all onboard NVDIMM modules will be configured together as a group for the interleave mode. If this item is set to Disable, individual NVDIMM modules will be configured separately for the interleave mode. The options are Enable and **Disable**.

**Reset Trigger ADR (Async DIMM Self-Refresh)**

Upon system power loss, an ADR sequence will be triggered to allow ADR to flush the write-protected data buffers in the memory controller and place the DRAM memory in self-refresh mode. When this process is complete, the NVDIMM will then take control of the DRAM memory and transfer the contents to the onboard Flash memory. After the transfer is complete, the NVDIMM goes into a zero power state. The data transferred will be retained for the duration specified by the flash memory. The options are Enable and **Disable**.

**S5 Trigger ADR**

Select Enabled to support S5-Triggered ADR to enhance system performance and data integrity. The options are **Disabled** and Enabled.

**2X Refresh**

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

**Page Policy**

Use this feature to set the page policy for onboard memory support. The options are Closed, Adaptive, and **Auto**.

**IMC Interleaving**

Use this feature to configure interleaving settings for the IMC (Integrated Memory Controller), which will improve memory performance. The options are 1-way Interleave, 2-way Interleave, and **Auto**.

**Average Power Budget (in mW)**

This feature sets the power management policy for average power use (in an increment of 250 mW). The default setting is **15000**.

## ▶Memory Topology

This item displays the information of onboard memory modules as detected by the BIOS.

- P1 DIMMA1/DIMMA2/DIMMB1/DIMMC1/DIMMD1/DIMMD2/DIMME1/DIMMF1
- P1DIMMA1/DIMMA2/DIMMB1/DIMMC1/DIMMD1/DIMMD2/DIMME1/DIMMF1

## ▶Memory RAS (Reliability_Availability_Serviceability) Configuration

Use this submenu to configure the following Memory RAS settings.

**Static Virtual Lockstep Mode**

Select Enable to support Static Virtual Lockstep mode to enhance memory performance. The options are Enable and **Disable**.

**Mirror Mode**

Use this feature to configure the mirror mode settings for all 1LM/2LM memory modules installed 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 **Disable**, Mirror Mode 1LM, and Mirror Mode 2LM.

**UEFI ARM Mirror**

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 **Disable** and Enable.

**Memory Rank Sparing**

Select Enable to support memory-rank sparing to optimize memory performance. The options are Enable and **Disable**.

**Note:** This item will not be available when memory mirror mode is set to Mirror Mode 1LM or an AEP device is plugged in.

**Correctable Error Threshold**

Use this item to enter the threshold value for correctable memory errors. The default setting is **100**.

**Intel Run Sure**

Select Enable to use Intel Run Sure Technology which will enhance critical data protection and increase system uptime and resiliency. The options are Enable and **Disable**.

**ADDDC (Adaptive Double Device Data Correction) Sparing (Available when Intel Run Sure is set to Enable)**

Select Enable 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 Enable and **Disable**.

**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 **Enable** and Disable.

**Patrol Scrub Interval**

Use this item to specify the number of hours (between 0 to 24) required for the system to complete a full patrol scrubbing. Enter 0 for patrol scrubbing to be performed automatically. The default setting is **24**.

**Note:** This item is hidden when Patrol Scrub item is set to Disable.

## ▶IIO Configuration

**EV DFX (Device Function On-Hide) Features**

When this feature is set to Enable, the EV_DFX Lock Bits that are located in a processor will always remain clear during electric tuning. The options are **Disable** and Enable.

## ▶CPU1 Configuration/CPU2 Configuration

**IOU0 (IIO PCIe Br1)**

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

**IOU1 (IIO PCIe Br2)**

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

**IOU2 (IIO PCIe Br3)**

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

**MCP0 (IIO PCIe Br4)**

Use this feature to configure the PCI-E Bifurcation setting for a PCI-E port specified by the user. The options are x16 and **Auto**.

**MCP1 (IIO PCIe Br5)**

Use this feature to configure the PCI-E Bifurcation setting for a PCI-E port specified by the user. The options are x16 and **Auto**.

## ▶Socket 0 PCI-E Br0D00F0 - Port 0/DMI (Available for CPU 1 Configuration only)

**Link Speed**

Use this feature to configure the link speed of a PCI-E port specified by the user. The options are **Auto**, Gen 1 (Generation 1) (2.5 GT/s), Gen 2 (Generation 2) (5 GT/s), and Gen 3 (Generation 3) (8 GT/s)

The following information will be displayed:

- PCI-E Port Link Status
- PCI-E Port Link Max
- PCI-E Port Link Speed

**PCI-E Port Max (Maximum) Payload Size (Available for CPU 1 Configuration only)**

Select Auto for the system BIOS to automatically set the maximum payload value for a PCI-E device specified by to user for system performance enhancement. The options are **Auto**, 128B, and 256B.

## ▶IOAT Configuration

**Disable TPH (TLP Processing Hint)**

TPH is used for data-tagging with a destination ID and a few important attributes. It can send critical data to a particular cache without writing through to memory. Select No in this item for TLP Processing Hint support, which will allow a "TPL request" to provide "hints" to help optimize the processing of each transaction occurred in the target memory space. The options are Yes and **No**.

**Prioritize TPH (TLP Processing Hint)**

Select Yes to prioritize the TPL requests that will allow the "hints" to be sent to help facilitate and optimize the processing of certain transactions in the system memory. The options are Enable and **Disable**.

**Relaxed Ordering**

Select Enable to allow certain transactions to be processed and completed before other transactions that have already been enqueued. The options are **Disable** and Enable.

## ▶Intel VT for Directed I/O (VT-d)

**Intel® VT for Directed I/O (VT-d)**

Select Enable to use Intel Virtualization Technology support for Direct I/O VT-d by reporting the I/O device assignments to the VMM (Virtual Machine Monitor) 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.

**ACS (Access Control Services) Control**

Select Enable to program Access Control Services to Chipset PCI-E Root Port Bridges. Select Disable to program Access Control Services to all PCI-E Root Port Bridges. The options are **Enable** and Disable.

**Interrupt Remapping**

Select Enable for Interrupt Remapping support to enhance system performance. The options are **Enable** and Disable.

**PassThrough DMA**

Select Enable for the Non-Isoch VT-d engine to pass through DMA (Direct Memory Access) to enhance system performance. The options are **Enable** and Disable.

**ATS**

Select Enable to enable ATS (Address Translation Services) support for the Non-Isoch VT-d engine to enhance system performance. The options are **Enable** and Disable.

**Posted Interrupt**

Select Enable to support VT_D Posted Interrupt which will allow external interrupts to be sent directly from a direct-assigned device to a client machine in non-root mode to improve virtualization efficiency by simplifying interrupt migration and lessening the need of physical interrupts. The options are **Enable** and Disable.

**Coherency Support (Non-Isoch)**

Select Enable for the Non-Isoch VT-d engine to pass through DMA (Direct Memory Access) to enhance system performance. The options are **Enable** and Disable.

## ▶Intel® VMD Technology

This section describes the configuration settings for the Intel Volume Management Device (VMD) Technology. **Note**: See Appendix F, Section 2 for RAID settings.

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

### ▶Intel® VMD for Onboard NVMe

#### VMD Configuration Onboard NVMe

#### Onboard NVMe Mode

Select Legacy Mode for the onboard NVMe devices to support Legacy Mode. The options are **Legacy Mode** and the VMD Mode.

**Note**: When this option is set to VMD Mode, the following two items will display.

#### P1_NVMe0 VMD/P2_NVMe1 VMD

Select Enable to enable Intel Volume Management Device Technology support for the root port specified by the user. The options are **Enable** and Disable.

**Note**: After you've enabled VMD support on a NMVe port, this port will be dedicated for VMD use only. To reactivate this port for NMVe use, please disable VMD support on the port.

#### Hot Plug Capable

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

## ▶IIO-PCIE Express Global Options

#### IIO-PCIE Express Global Options

The section allows the user to configure the following PCI-E global options:

#### PCE-E Hot Plug

Select Enable to support Hot-plugging for the selected PCI-E slots which will allow the user to replace the devices installed in the slots without shutting down the system. The options are **Enable** and Disabled.

#### PCI-E Completion Timeout (Global) Disable

Use this feature to select the PCI-E Completion Time-out settings. The options are Yes, **No**, and Per-Port.

## ▶South Bridge

The following South Bridge information will display:

- USB Module Version
- 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 Disable 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 XHCI (Extensible Host Controller Interface) hand-off. The XHCI ownership change should be claimed by the XHCI driver. The options are Disabled and **Enabled**.

**Port 60/64 Emulation**

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

**PCIe PLL SSC**

Select Enabled for PCH PCI-E Spread Spectrum Clocking support, which will allow the BIOS to monitor and attempt to reduce the level of Electromagnetic Interference caused by the components whenever needed. The options are Enabled and **Disabled**.

**Port 61h Bit-4 Emulation**

Select Enabled for I/O Port 61h-Bit 4 emulation support to enhance system performance. The options are Enabled and **Disabled**.

**Install Windows 7 USB Support**

Select Enabled to install the Windows 7 USB utility to support legacy USB devices for Windows 7 systems. The options are Enabled and **Disabled**.

## ▶Server ME (Management Engine) Configuration

This feature displays the following system ME configuration settings.

- Oper. (Operational) Firmware Version
- Backup Firmware Version
- Recovery Firmware Version
- ME Firmware Status #1/ME Firmware Status #2
  - Current State
  - Error Code

## ▶(PCH) SATA 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 items:

**SATA Controller**

This item enables or disables the onboard SATA controller supported by the Intel PCH chip. The options are **Enable** and Disable.

**Configure SATA as (Available when SATA Controller is set to Enable)**

Select AHCI to configure a SATA drive specified by the user as an AHCI drive. Select RAID to configure a SATA drive specified by the user as a RAID drive. The options are **AHCI** and RAID. (**Note:** This item is hidden when the SATA Controller item is set to Disabled.)

**SATA HDD Unlock (Available when SATA Controller is set to Enable)**

Select Enable to unlock SATA HDD password in the OS. The options are **Enable** and Disable.

**SATA/sSATA RAID Boot Select (Available when Configure SATA as is set to RAID)**

This feature allows the user to decide which controller should be used to boot the system. The options are None, SATA Controller, **sSATA Controller**, and Both.

**Aggressive Link Power Management**

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

**SATA RAID Option ROM/UEFI Driver (Available when Configure SATA as is set to RAID)**

Select EFI to load the EFI driver for system boot. Select Legacy to load a legacy driver for system boot. The options are Disable, EFI, and **Legacy**.

**SATA Port 0 - SATA Port 7**

**Hot Plug**

Select Enable to support Hot-plugging for the device installed on a selected SATA port which will allow the user to replace the device installed in the slot without shutting down the system. The options are **Enable** and Disable.

**Spin Up Device**

When this feature is set to Enable, the SATA device installed on the SATA port specified by the user will start a COMRESET initialization when an edge is detected from 0 to 1. The options are Enable and **Disable**.

**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.

## ▶sSATA Configuration

When this submenu is selected, the AMI BIOS automatically detects the presence of the sSATA devices that are supported by the sSATA controller and displays the following items:

**sSATA Controller**

This item enables or disables the onboard sSATA controller supported by the Intel PCH. The options are **Enable** and Disable.

**Configure sSATA as (Available when sSATA Controller is set to Enable)**

Select AHCI to configure an sSATA drive specified by the user as an AHCI drive. Select RAID to configure an sSATA drive specified by the user as a RAID drive. The options are **AHCI** and RAID. (**Note:** This feature is hidden when the sSATA Controller item is set to Disabled.)

**SATA HDD Unlock (Available when sSATA Controller is set to Enable)**

Select Enable to unlock sSATA HDD password in the OS. The options are **Enable** and Disable.

**SATA/sSATA RAID Boot Select (Available when Configure sSATA as is set to RAID)**

This feature allows the user to decide which controller should be used to boot the system. The options are None, SATA Controller, **sSATA Controller**, and Both.

**Aggressive Link Power Management**

When this feature is set to Enable, the sSATA AHCI controller manages the power use of the sSATA 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 **Disable** and Enable.

**sSATA RAID Option ROM/UEFI Driver (Available when Configure sSATA as is set to RAID)**

Select EFI to load the EFI driver for system boot. Select Legacy to load a legacy driver for system boot. The options are Disable, EFI, and **Legacy**.

**sSATA Port 0 - sSATA Port 5**

**Hot Plug**

Select Enable to support Hot-plugging for the device installed on an sSATA port specified by the user which will allow the user to replace the device installed in the slot without shutting down the system. The options are **Enable** and Disabled.

**Spin Up Device**

This setting allows the SATA device installed on the SATA port specified by the user to start a COMRESET initialization when an edge is detected from 0 to 1. The options are Enable and **Disable**.

**sSATA Device Type**

Use this feature to specify if the device installed on the sSATA 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.

## ▶PCIe/PCI/PnP Configuration

The following PCI information will be displayed:

- **PCI Bus Driver Version**
- **PCI Devices Common Settings**

**Above 4G Decoding (Available if 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 **Enabled** and Disabled.

**SR-IOV Support (Available if the system supports Single-Root Virtualization)**

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

**MMIOHBase**

Use this feature to select the base memory size according to memory-address mapping for the IO hub. The base memory size must be between 4032G to 4078G. The options are **56T**, 40T, 24T, 16T, 4T, and 1T.

**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.

**Maximum Read Request**

Select Auto for the system BIOS to automatically set the maximum size for a read request for a PCI-E device to enhance system performance. The options are **Auto**, 128 Bytes, 256 Bytes, 512 Bytes, 1024 Bytes, 2048 Bytes, and 4096 Bytes.

**MMCFG Base**

This feature determines how the lowest MMCFG (Memory-Mapped Configuration) base is assigned to onboard PCI devices. The options are 1G, 1.5G, 1.75G. **2G**, 2.25G, and 3G.

### VGA Priority

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

## PCI Devices Option ROM Settings

### Onboard NVME1/NVME2 OPROM

Select EFI to allow the user to boot the computer using an EFI (Extensible Firmware Interface) device installed on the NVME connector specified by the user. Select Legacy to allow the user to boot the computer using a legacy device installed on the NVME connector specified by the user. The options are Disabled, Legacy and **EFI**.

### CPU1 Slot 1 PCI-E x8 OPROM/CPU1 Slot 2 PCI-E x16 OPROM/CPU1 Slot 3 PCI-E x8 OPROM/CPU2 Slot 4 PCI-E x16 OPROM/CPU2 Slot 5 PCI-E x16 OPROM/CPU2 Slot 6 PCI-E x16 OPROM

Select EFI to allow the user to boot the computer using an EFI (Extensible Firmware Interface) device installed on the PCI-E slot specified by the user. Select Legacy to allow the user to boot the computer using a legacy device installed on the PCI-E slot specified by the user. The options are Disabled, **Legacy** and EFI. (**Note:** Riser card names may differ in each system.)

### Onboard Video OPROM (Option ROM)

Use this feature to select the Onboard Video Option ROM type. The options are Do Not Launch, **Legacy** and UEFI.

### Onboard LAN Device

Select Enable to use onboard LAN devices. The options are Disabled, Enabled, and **Auto**.

### Onboard LAN1 Option ROM

Use this feature to select the type of device installed in LAN Port1, which will be used for system boot. The options are **Legacy**, EFI and Disabled.

### Onboard LAN2 Option ROM

Use this feature to select the type of device installed in LAN Port2, which will be used for system boot. The options are Legacy, EFI and **Disabled**.

## ▶Network Stack Configuration

### Network Stack

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

***If "Network Stack" is set to Enabled, the following items will display:***

### Ipv4 PXE Support

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**

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 Enabled and **Disabled**.

**Ipv6 PXE Support**

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**

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 Enabled and **Disabled**.

**IPSEC Certificate**

Select Enable to enable the IPSEC certificate for Ikev support. The options are Disabled and **Enabled**.

**PXE Boot Wait Time**

Use this feature to select the wait time to press the <ESC> key to abort the PXE boot. The default is **0**.

**Media Detect Time**

Use this feature to select the wait time in seconds for the BIOS ROM to detect the LAN media (Internet connection or LAN port). The default is **1**.

## ▶Super IO Configuration

## Super IO Chip AST2500

## ▶Serial Port 1 Configuration

**Serial Port**

Select Enabled to enable Serial Port 1. The options are **Enabled** and Disabled.

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

This item displays the base I/O port address and the Interrupt Request address of a serial port specified by the user.

**Change Settings**

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 a serial port specified.

The options for Serial Port 1 are **Auto**, (IO=3F8h; IRQ=4), (IO=3F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12), (IO=2F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12); (IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12), and (IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12).

## ▶Serial Port 2 Configuration

**Serial Port**

Select Enabled to enable Serial Port 2. The options are **Enabled** and Disabled.

**Device Settings (Available when the item above "Serial Port (2)" is set to Enabled)**

This feature displays the base I/O port address and the Interrupt Request address of a serial port specified by the user.

**Change Settings**

This feature specifies the base I/O port address and the Interrupt Request address of Serial Port 2. Select Auto for the BIOS to automatically assign the base I/O and IRQ address to a serial port specified.

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

**Serial Port 2 Attribute**

Select SOL to use COM Port 2 as a Serial_Over_LAN (SOL) port for console redirection. The options are COM and **SOL**.

## ▶Serial Port Console Redirection

**COM 1 Console Redirection**

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

**If the item above set to Enabled, the following items will become available for configuration:*

**COM 1**

### ▶Console Redirection Settings (for COM 1)

**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 ANSI, VT100, **VT100+**, and VT-UTF8.

**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 (Bits) 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 **Enabled** and Disabled**.**

**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 (Serial-Over-LAN)/COM2**

**Console Redirection (for SOL/COM2)**

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

**If the item above set to Enabled, the following items will become available for user's configuration:*

## ▶Console Redirection Settings (for SOL/COM2)

Use this feature to specify how the host computer will exchange data with the client computer, which is the remote computer used by the user.

**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 ANSI, VT100, **VT100+**, and VT-UTF8.

**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 (Bits) 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 data-sending 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 **Enabled** and Disabled**.**

**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 Settings

**Legacy Console Redirection Settings**

Use this feature to select the COM port to display redirection of Legacy OS and Legacy OPROM messages. The options are COM1 and **COM2/SOL**.

**Legacy OS Redirection Resolution**

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

**Redirection 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 the user to configure Console Redirection settings to support Out-of-Band Serial Port management.

**Console Redirection (for EMS)**

Select Enabled to use a COM port specified by the user for EMS Console Redirection. The options are Enabled and **Disabled.**

**If the item above set to Enabled, the following items will become available for user's configuration:*

## ▶Console Redirection Settings (for EMS)

**Out-of-Band Management Port**

This feature selects a serial port in a client server to be used by the Windows Emergency Management Services (EMS) to communicate with a remote host server. The options are **COM1 (Console Redirection)** and COM2/SOL (Console Redirection).

**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 ANSI, VT100, VT100+, and **VT-UTF8**.

**Bits Per Second**

This feature sets the transmission speed for a serial port used in Console Redirection. Make sure that the same speed is used in both 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**

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 data-sending when the receiving buffer is full. Send a "Start" signal to start data-sending when the receiving buffer is empty. The options are **None,** Hardware RTS/CTS, and Software Xon/Xoff.

The setting for each these features is displayed:

**Data Bits, Parity, Stop Bits**

## ▶ACPI Settings

Use this feature to configure Advanced Configuration and Power Interface (ACPI) power management settings for your system.

**NUMA Support (Available when the OS supports this feature)**

Select Enabled to enable Non-Uniform Memory Access support to enhance system performance. The options are **Enabled** and Disabled.

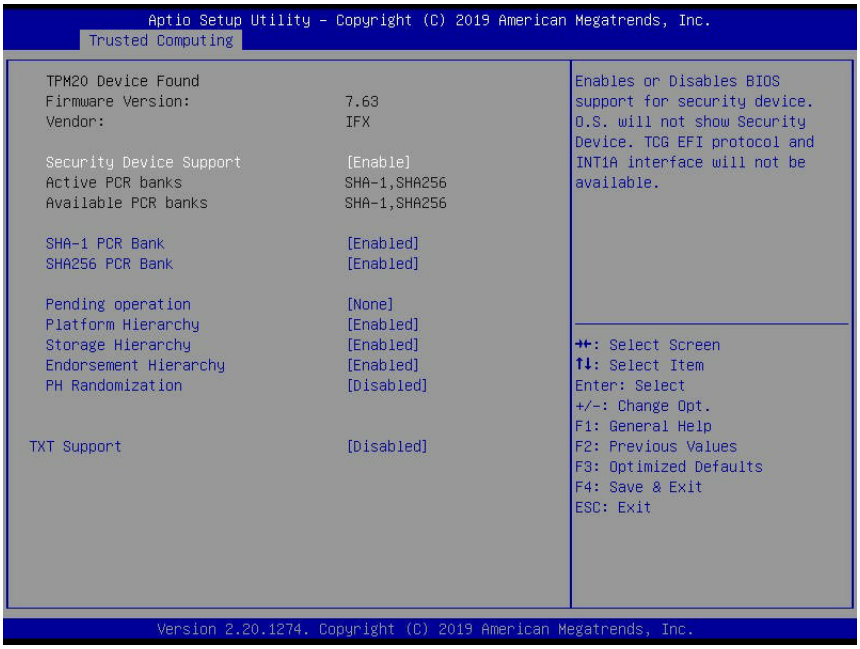
**WHEA Support**

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 **Enabled** and Disabled.

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

When a TPM (Trusted-Platform Module) device is detected in your machine, the following information will be displayed.




- TPM2.0 Device Found
- Firmware Version
- Vendor

### Security Device Support

If this feature and the TPM jumper (JPT1) on the motherboard are both enabled, the onboard security (TPM) device will be enabled in the BIOS to enhance data integrity and system security. Please note that the OS will not show the security device. Neither TCG EFI protocol nor INT1A interaction will be made available for use. If you have made changes on the setting on this item, be sure to reboot the system for the change to take effect. The options are Disable and **Enable**. If this option is set to Enable, the following screen and items will display:

- Active PCR Banks
- Available PCR Banks

### SHA-1 PCR Bank

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

**SHA256 PCR Bank**

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

**Pending Operation**

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. Your system will reboot to carry out a pending TPM operation. The options are **None** and TPM Clear.

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

**Platform Hierarchy (for TPM Version 2.0 and above)**

Select Enabled for TPM Platform Hierarchy support which will allow 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 **Enabled** and Disabled.

**Storage Hierarchy**

Select Enabled for TPM Storage Hierarchy support that is intended to be used for non-privacy-sensitive operations by the 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 **Enabled** and Disabled.

**Endorsement Hierarchy**

Select Enabled for Endorsement Hierarchy support, which contains separate controls to address the user's privacy concerns because the primary keys in this hierarchy are certified by the TPM or a manufacturer to be constrained to an authentic TPM device that is attached to an authentic platform. A primary key can be an encrypted, and a certificate can be created using TPM2_ ActivateCredential. It allows the user to independently enable "flag, policy, and authorization value" without involving other hierarchies. A user with privacy concerns can disable the endorsement hierarchy while still using the storage hierarchy for TPM applications and permitting the platform software to use the TPM. The options are **Enabled** and Disabled.

**PH (Platform Hierarchy) Randomization (for TPM Version 2.0 and above)**

Select Enabled for Platform Hierarchy 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 security and data integrity. The options are **Disabled** and Enabled.

**Note 1**: If the option for this item (TXT Support) is set to Enabled, be sure to disable EV DFX (Device Function On-Hide) support for the system to work properly. (EV DFX is under "IIO Configuration" in the "Chipset/North Bridge" submenu).

**Note 2:** For more information on TPM, please refer to the TPM manual at http://www.supermicro.com/manuals/other.

## ▶TLS Authenticate Configuration

When this submenu is selected, the following items will be displayed:

## ▶Server CA Configuration

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

### ▸Enroll Certification

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

#### ▸Enroll Cert (Certification) Using File

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

#### Cert (Certification) GUID (Global Unique Identifier)

This feature displays the GUID for this system.

#### ▸Commit Changes and Exit

Select this feature to keep the changes you have made and exit from the system.

#### ▸Discard Changes and Exit

Select this feature to discard the changes you have made and exit from the system.

### ▸Delete Certification

If this feature is set to Enable, the certificate enrolled in the system will be deleted. The options are Enable and **Disable**.

## ▶Client Certification Configuration

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

### ▶Enroll Certification

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

#### ▶Enroll Cert (Certification) Using File

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

#### Cert (Certification) GUID (Global Unique Identifier)

This feature displays the GUID for this system.

#### ▶Commit Changes and Exit

Select this feature to keep the changes you have made and exit from the system.

#### ▶Discard Changes and Exit

Select this feature to discard the changes you have made and exit from the system.

### ▶Delete Certification

If this feature is set to Enable, the certificate enrolled in the system will be deleted. The options are Enable and **Disable**.

## ▶RAM Disk Configuration

This feature allows the user to configure the settings for the RAM disks installed in the system. When you select this submenu and press <Enter>, the following items will display:

- Disk Memory Type: This feature specifies the type of memory that is available for you to create a RAM disk. The options are **Boot Service Data** and Reserved.

## ▶Create Raw

This feature allows the user to create a raw RAM disk from all available memory modules in the system. When you select this submenu and press <Enter>, the following items will display:

- **Size (Hex)**: Use this feature to set the size of the raw RAM disk. The default setting is **1**.
- **Create & Exit**: Select this feature when you want to exit from this submenu after you've created a raw RAM disk.
- **Discard & Exit**: Select this feature when you want to abandon the changes you've made and to exit from the submenu.

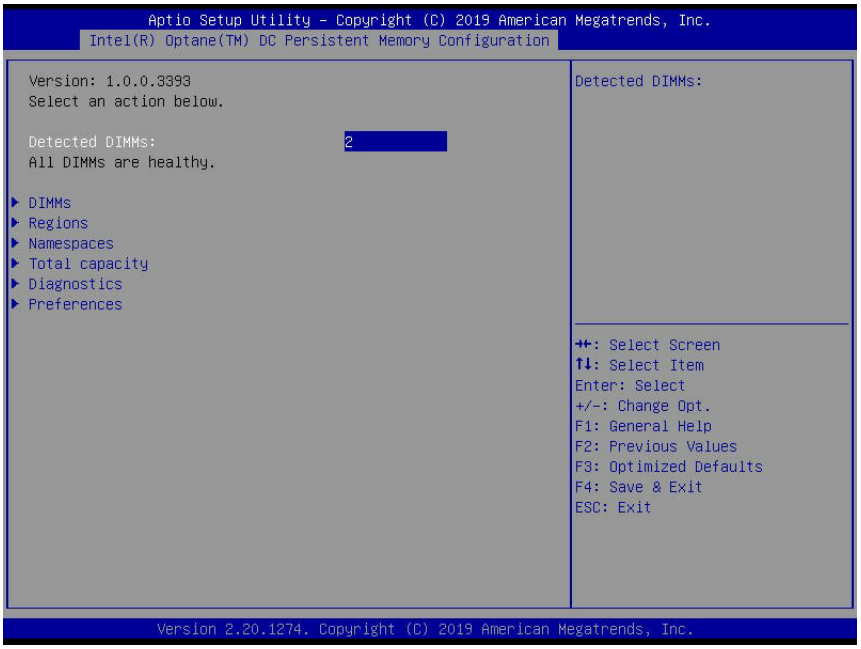
## ▶Create from File

This feature allows the user to create a RAM disk from a file specified by the user. Select this submenu and press <Enter>, the following items will display:

- **Create RAM Disk List**: Use this feature to create a RAM disk list.
- **Remove Selected RAM Disk(s)**: Use this feature to delete the RAM disk(s) specified by the user.

## ▶Intel® Optane® DC Persistent Memory Configuration

When you select this submenu and press <Enter>, the following screen will display:




- **Version**: This feature displays the version of DCPMM used in the system.
- **Select an action below**
- **Detected DIMMs**: This feature displays the number of DCPMM memory modules detected by the BOS.
- **All DIMMs are healthy** (The health status of the DCPMM is displayed.)

## ▶DIMMs

This submenu allows the user to view and configure the settings of the DCPMM memory modules installed in the system. Select this submenu and press <Enter>, the following items will display:

- Select a specific DIMM that you want to view.
- DIMMs on Socket 0x0000:

- DIMMs on Socket 0x0001:

## ▶DIMM ID

This submenu allows the user to view and to perform an action on a DCPMM module specified by the user. When this submenu is selected, the following items will display:

- **DIMM UID**: This feature displays the unique ID of the DCPMM module.
- **DIMM Handle:** This feature displays the unique handle that the CPU assigns to the DCPMM module.
- **DIMM Physical ID:** This feature displays the physical ID of the DCPMM module.
- **Manageability State:** This feature indicates the manageability state of the DCPMM module.
- **Health State:** This feature indicates the health state of the DCPMM module.
- **Health State Reason:** This feature indicates the reason that effectuates the health state of the DCPMM module.
- **Capacity:** This feature indicates the capacity of the DCPMM module.
- **Firmware Version:** This feature indicates the firmware version of the DCPMM module.
- **Firmware API Version:** This feature indicates the firmware API version of the DCPMM module.
- **Lock State:** This feature indicates the lock state of the DCPMM module.
- **Staged Firmware Version:** This feature indicates the staged firmware version of the DCPMM module.
- **Firmware Update Status:** This feature indicates the firmware update status of the DCPMM module.
- **Manufacturer:** This feature indicates the manufacturer of the DCPMM module.

**Show More Details**

Select Enabled to view more detailed information on the DCPMM module. The options are **Disabled** and Enabled.

**If this option is set to Enabled, the following items will display:*

- Serial Number
- Part Number
- Socket
- Memory Controller ID
- Vendor ID
- Device ID

- System Vendor ID
- Subsystem Vendor ID
- Subsystem Device ID
- Device Locator
- Subsystem Revision ID
- Interface Format Code
- Manufacturing Information Valid
- Manufacturing Date
- Manufacturing Location
- Memory Type
- Memory Bank Label
- Data Width Label [b]
- Total Width [b]
- Speed [MHz]
- Channel ID
- Channel Position
- Revision ID
- Form Factor
- Manufacturer ID
- Controller Revision ID
- IS New
- Memory Capacity
- APP Direct Capacity
- Unconfigured Capacity
- Inaccessible Capacity
- Reserved Capacity
- Peak Power Budget [mW]
- Avg (Average) Power Budget [mW]
- Max Average Power Budget [mW]
- Package Sparing Capable
- Package Sparing Enabled
- Package Spares Available
- Configuration Status
- SKU Violation
- ARS Status

- Overwrite DIMM Status
- Last Shutdown Time
- First Fast Refresh
- Viral Policy Enable
- Viral State
- Latched Last Shutdown Status
- Unlatched Last Shutdown Status
- Security Capabilities
- Modes Supported
- Boot Status
- AIT DRAM Enabled
- Error Injection Enabled
- Media Temperature Injection Enabled
- Software Triggers Enabled
- Software Triggers Enabled Details
- Poison Error Injections Counter
- Poison Error Clear Counter
- Media Temperature Injections Counter
- Software Triggers Counter
- Master Passphrase Enabled

## ▶Monitor Health

Select this submenu to view the health status and thresholds of the DCPMM module specified by the user.

- **Sensor Type**: This feature displays the type of health items that are being monitored.
- **Value**: This feature displays the value of the monitor sensor mentioned above.
- **Non-critical Thresholds:** This feature displays the normal threshold value for the DCPMM module to maintain normal operations.
- **Critical Lower Threshold:** This feature displays the lowest threshold value for the DCPMM module to maintain normal operations.
- **Critical Upper Threshold:** This feature displays the higher threshold value for the DCPMM module to maintain normal operations.
- **Fatal Threshold:** This feature indicates the highest value allowed for the DCPMM module to remain functional. Beyond this value, the DCPMM selected will become non-operational.
- **State:** This feature indicates the health state of the DCPMM module.

- A**larm Enabled State:** This feature indicates the status of the non-critical threshold alarm for the DCPMM module specified by the user.
- **Modify Non-critical Thresholds:** Use this feature to modify non-critical thresholds.
- **Controller Temperature:** This feature displays the controller temperature in Celsius.
- **Media Temperature:** This feature displays the media temperature in Celsius.
- **Percentage Remaining**

## ▶Apply Changes

Use this feature to apply changes that you've made on the DCPMM modules to the system.

## ▶Back to Main Menu

Select this feature and press <Enter> to go back to the **Intel® Optane® DC Persistent Memory Configuration** menu.

## ▶Update Firmware

Use this feature to select the firmware image to be loaded on the DCPMM module. Once it is loaded to the system, please reboot the system and select update for the firmware to take effect. The following items will display:

- **Current Firmware Version**: This feature displays the current firmware version.
- **Selected Firmware Version**: This feature allows the user to select a new firmware version to use.
- **File:** This feature allows the user to specify the file path in the root directory that contains the new firmware for firmware update.
- **Staged Firmware Version:** This feature indicates the staged firmware version of the DCPMM module specified by the user.

## ▶Update

Select this feature to update the firmware settings.

## ▶Back to Main Menu

Select this feature and press <Enter> to go back to the **Intel® Optane® DC Persistent Memory Configuration** menu.

## ▶Configure Security

Use this feature to configure the security settings for all onboard DCPMM modules.

**State**

Select Enabled to configure the security settings for the DCPMM modules installed in the system. The options are **Disabled** and Enabled.

- **Enable Security**: Use this feature to enable security settings for the onboard DCPMM modules.
- **Secure Erase**: Use this feature to erase all the persistent data saved in the DCPMM modules.
- **Freeze Lock:** Use this feature to enable the security lock for the onboard DCPMM modules.

## ▶Back to Main Menu

- Select this feature and press <Enter> to go back to the **Intel® Optane® DC Persistent Memory Configuration** menu.

## ▶Configure Data Policy

Use this feature to configure the data policy settings for all onboard DCPMM modules.

**First Fast Fresh State**

Select Enabled to display the First Fast Fresh state for onboard DCPMM modules.

## ▶Enable First Fast Fresh State

Select Enabled to support the first fast fresh state of DCPMM data policy.

## ▶Disable First Fast Fresh State

Select Disable to disable the first fast fresh state of DCPMM data policy.

## ▶Back to Main Menu

Select this feature and press <Enter> to go back to the **Intel® Optane® DC Persistent Memory Configuration** menu.

## ▶Regions

**Current Configuration**

## ▶Region ID

When this submenu is selected, the following items will display:

- **Region ID**: This feature displays the Region ID of the DCPMM module.
- **DIMM ID:** This feature displays the DIMM ID of the DCPMM module.
- **ISet ID:** This feature displays the ISet ID of the DCPMM module.

- **Persistent Memory Type:** This feature indicates the persistent memory type of the DCPMM module.
- **Capacity:** This feature indicates the capacity of the DCPMM module.
- **Free Capacity:** This feature indicates the capacity of the DCPMM module that is available for use.
- **Health:** This feature indicates the health state of the DCPMM module.
- **Socket ID:** This feature displays the Socket ID of the DCPMM module.

**Persistent Memory Type**

**Capacity**

**Free Capacity**

## ▶Create Goal Configuration

When this submenu is selected, the following items will display:

- **Create Goal Configuration for**: Use this feature to select the target to create goal configuration for the DCPMM modules. The options are **Platform** and Socket.
- **Reserved [%]:** Use this feature to reserve a percentage of the DCPMM capacity for a particular purpose and keep this portion of memory space from being mapped into the physical address of system for system use.
- **Memory Mode [%]:** Use this feature to reserve a percentage of the DCPMM capacity for special use in a specific Memory Mode. Please note that this value can be automatically set by the system.

**Persistent Memory Type**

This feature allows the user to specify the type of DCPMM memory capacity to be created. The options are **App Direct** and App Direct Not Interleave.

**Namespace Label Version**

Use this feature to view and modify the namespace label version to initialize when creating goals. The options are **1.2** and 1.1.

## ▶Back to Regions Menu

Select this feature and press <Enter> to go back to the Regions submenu.

## ▶Back to Main Menu

Select this feature and press <Enter> to go back to the **Intel® Optane® DC Persistent Memory Configuration** menu.

## ▶Namespaces

This subsection allows the user to select a namespace to view the following information on the selected namespace

**Namespace ID/Name/Heath Status**

**▶0x00000201**

Select this feature and press <Enter>, the following items will display:

- UUID
- ID
- Name
- Region
- Health
- Mode
- Block Size
- Units: Use this feature to change the namespace capacity (in the unit of B, MB, MiB, GB, **GiB**, TB, and TiB.)
- Capacity
- Label Version

▶**Save**: After configuring the settings for the namespace above, click on <Save> to save changes.

▶**Delete** After configuring the settings for the namespace above, click on <delete> to delete the changes you've made on the namespace. Please note that all data contained in the namespace will be deleted as well when you press <delete>.

**▶Back to Namespaces**

**▶Back to Main Menu**

## ▶Create Namespace

Use this submenu to create a namespace. The following information will display:

**Name**

**Region ID**

This feature displays the region ID of the DCPMM module. The options are **0x0001** and 0x0002.

**Mode**

Use this item to set the Namespace mode. The options are **None** and Sector.

**Capacity Input**

Select Remaining to use the maximum memory capacity currently available as system memory capacity. Select Manual to enter the system memory capacity manually. The options are **Remaining** and Manual.

**Units**

Use this feature to select the type of unit to use when inputting namespace capacity in the system.

The options are B, MB, MiB, GB, **GiB**, TB, and TiB.

- **Capacity**: This feature displays the namespace capacity.

## ▶Back to Namespace

Select this feature and press <Enter> to go back to the **Namespaces** submenu.

## ▶Back to Main Menu

Select this feature and press <Enter> to go back to the **Intel® Optane® DC Persistent Memory Configuration** menu.

## ▶Total Capacity

This feature allows the user to set the total DCPMM resource capacity allocated across all segments in the host server.

- **Raw Capacity**: This feature specifies the raw capacity of the DCPMM module.
- **App. Direct Capacity**: This feature specifies the App. direct capacity of the DCPMM module.
- **Memory Capacity**: This feature specifies the memory capacity of the DCPMM module.
- **Unconfigured Capacity**: This feature specifies the capacity of the DCPMM module that has not been configured.
- **Inaccessible Capacity**: This feature specifies the capacity of the DCPMM memory that is not accessible to the user.
- **Reserved Capacity**: This feature specifies the capacity of the DCPMM memory that is reserved for a particular use.

## ▶Back to Main Menu

Select this feature and press <Enter> to go back to the **Intel® Optane® DC Persistent Memory Configuration** menu.

## ▶Diagnostics

**Perform Diagnostic Tests on DIMMs**

When you select this submenu and press <enter>, the following items will display:

**Choose Diagnostics Type:**

**Quick Diagnostics**

Select Enabled for the quick diagnostics test to be performed on the DCPMM module installed in the system when needed. The options are **Enabled** and Disabled.

**DIMM ID**

Select Enabled for the quick diagnostics test to be performed on the DCPMM module. The options are **Enabled** and Disabled. (**Note**: More DIMM IDs will appear If more DCPMM modules are installed on the motherboard.)

**Config (Configure) Diagnostics**

Select Enabled for the platform configuration diagnostics test to be performed on the DCPMM module. The options are **Enabled** and Disabled.

**FW (Firmware) Diagnostics**

Select Enabled for the firmware diagnostics test to be performed on the DCPMM module. The options are **Enabled** and Disabled.

**Security Diagnostics**

Select Enabled for the security diagnostics test to be performed on the DCPMM module. The options are **Enabled** and Disabled.

## ▶Execute Tests

Select this feature and press <Enter> to execute the selected diagnostic tests.

## ▶Back to Main Menu

Select this feature and press <Enter> to go back to the **Intel® Optane® DC Persistent Memory Configuration** menu.

## ▶Preferences

**View and/or modify user preferences**

**Default DIMM ID**

This feature allows the user to view and to modify the default DIMM ID as displayed on the screen. The options are **Handle** and UID.

**Capacity Units**

This feature allows the user to view and to set the default capacity unit of the selected DCPMM to be displayed on the screen. The options are **Auto**, Auto_10, B, MB, MiB, GB, GiB, TB, and TiB.

**App Direct Settings**

This feature displays the Application Direct Settings. The default setting is **4KB_4KB (Recommended)**.

**App Direct Granularity**

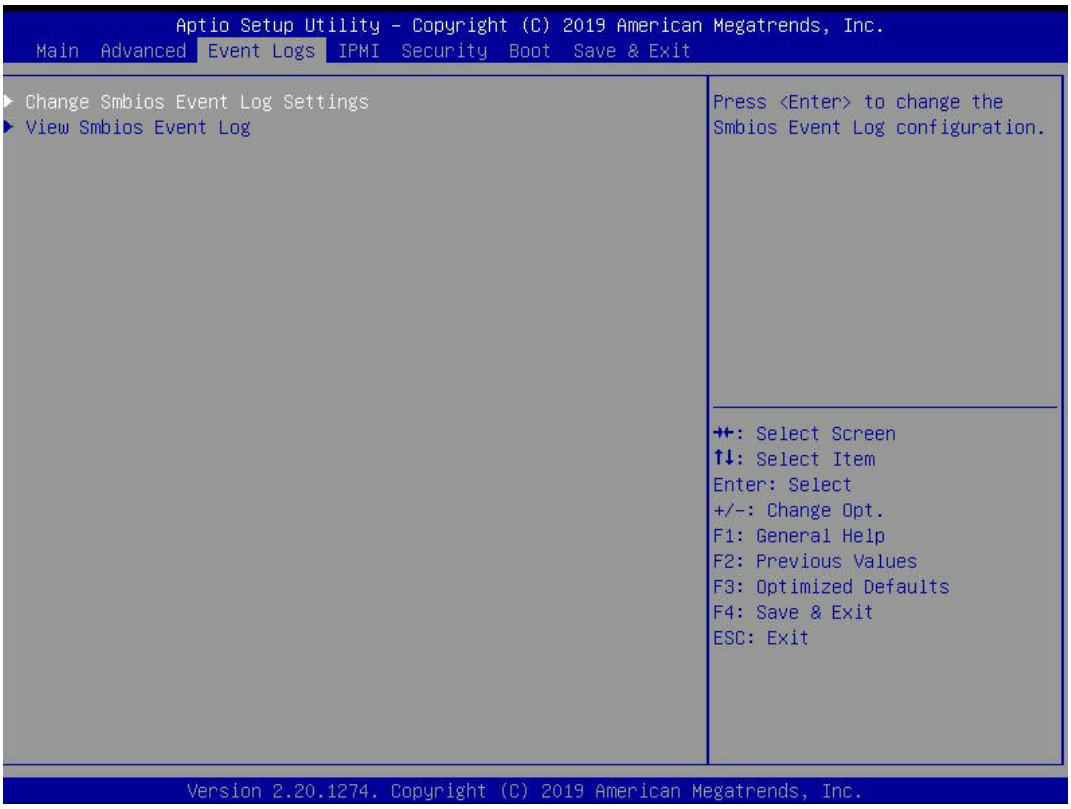
This feature allows the user to view and modify the minimum App Direct Granularity for each DIMM installed on the motherboard. The default setting is **Recommended** and 1.

## ▶Back to Main Menu

Use this feature to go back to the **Intel® Optane® DC Persistent Memory Configuration** menu.

# 6.4 Event Logs

Use this tab page to configure Event Log settings.




## ▶Change SMBIOS Event Log Settings

### Enabling/Disabling Options

### SMBIOS Event Log

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

### Erasing Settings

### Erase Event Log

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

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

Select Enabled to log system boot events. The options are Enabled and **Disabled**.

### MECI (Multiple Event Count Increment)

Enter the increment value for the multiple event counter. Enter a number between 1 to 255. The default setting is **1**.

### METW (Multiple Event Count Time Window)

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**.

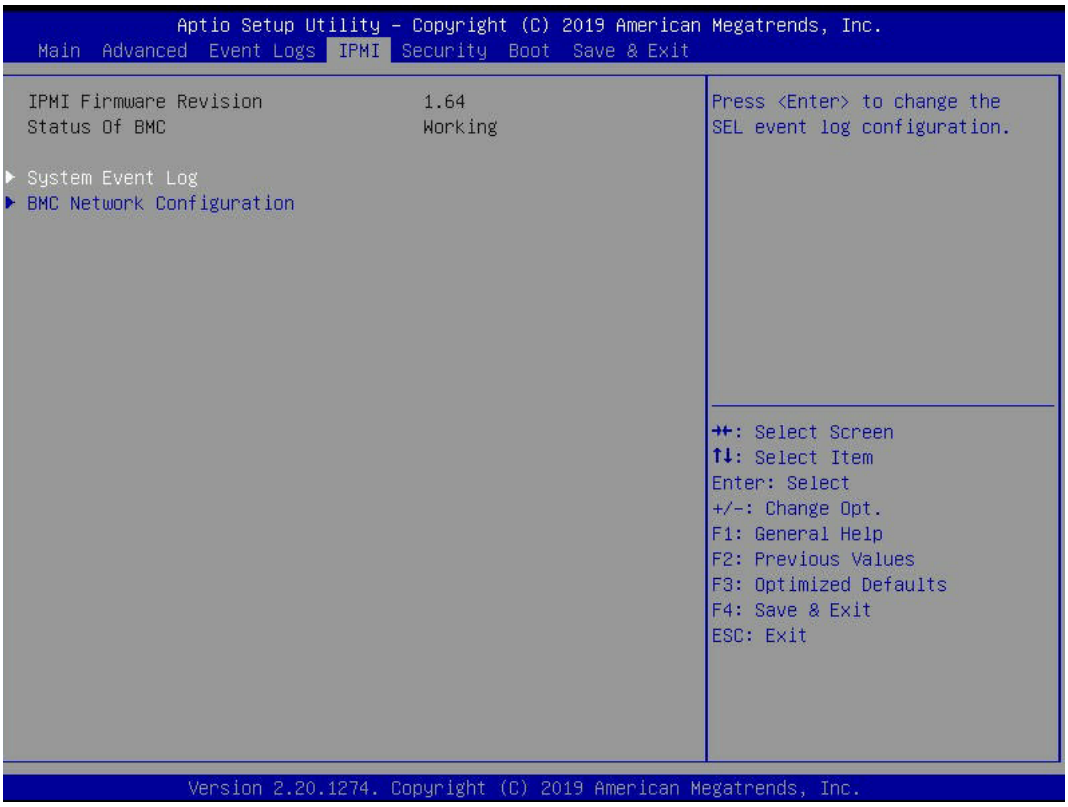
## ▶View System Event Log

This feature allows the user to view the event in the system event log. Select this item and press <Enter> to view the status of an event in the log. The following categories are displayed:

**Date/Time/Error Code/Severity**

# 6.5 IPMI

Use this tab page to configure Intelligent Platform Management Interface (IPMI) settings.




The following items will be displayed:

- IPMI Firmware Revision
- Status of BMC
- **IPMI Firmware Revision**: This feature indicates the IPMI firmware revision used in your system.
- **Status of BMC**: This feature indicates the status of the BMC (Baseboard Management Controller) 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 **Enabled** and Disabled.

**Erasing Settings**

**Erase SEL**

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**

This feature allows the user 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.

## ▶BMC Network Configuration

The following items will be displayed:

- IPMI LAN Selection: This feature displays the IPMI LAN setting. The default setting is **Failover**.
- IPMI Network Link Status: This feature displays the IPMI Network Link status. The default setting is **Dedicated LAN**.
- Station MAC Address: This feature displays the Station MAC address for this computer. Mac addresses are 6 two-digit hexadecimal numbers.
- VLAN: This feature displays the status of VLAN support. The default setting is **Disabled**.
- IPv4 Address Source: This feature displays the source of IPv4 addresses. The default setting is **DHCP**.
- Station IP Address: This feature displays the Station IP address for this computer. This should be in decimal and in dotted quad form (i.e., 192.168.10.253).
- Subnet Mask: 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.
- Gateway IP Address: This feature displays the Gateway IP address for this computer. This should be in decimal and in dotted quad form (i.e., 192.168.10.253).
- IPv6 Address Status: This feature displays the IPv6 address status. The default setting is **Disabled**.
- Station IPv6 Address: This feature displays the station IPv6 address.
- Prefix Length: This item displays the prefix length.
- IPv6 Router IP Address: This feature displays the IPv6 router IP address.

**Update IPMI LAN Configuration**

Select Yes for the BIOS to implement all IP/MAC address changes upon next system boot. The options are **No** and Yes. If this option is set to Yes, the following items will display:

**IPMI LAN Selection (Available when Update IPMI LAN Configuration is set to Yes)**

Use this feature to select the type of the IPMI LAN. The options are Dedicated, Shared, and **Failover**.

**VLAN**

Select Enabled to enable IPMI VLAN function support. The default setting is **Disabled**.

**Configuration Address Source**

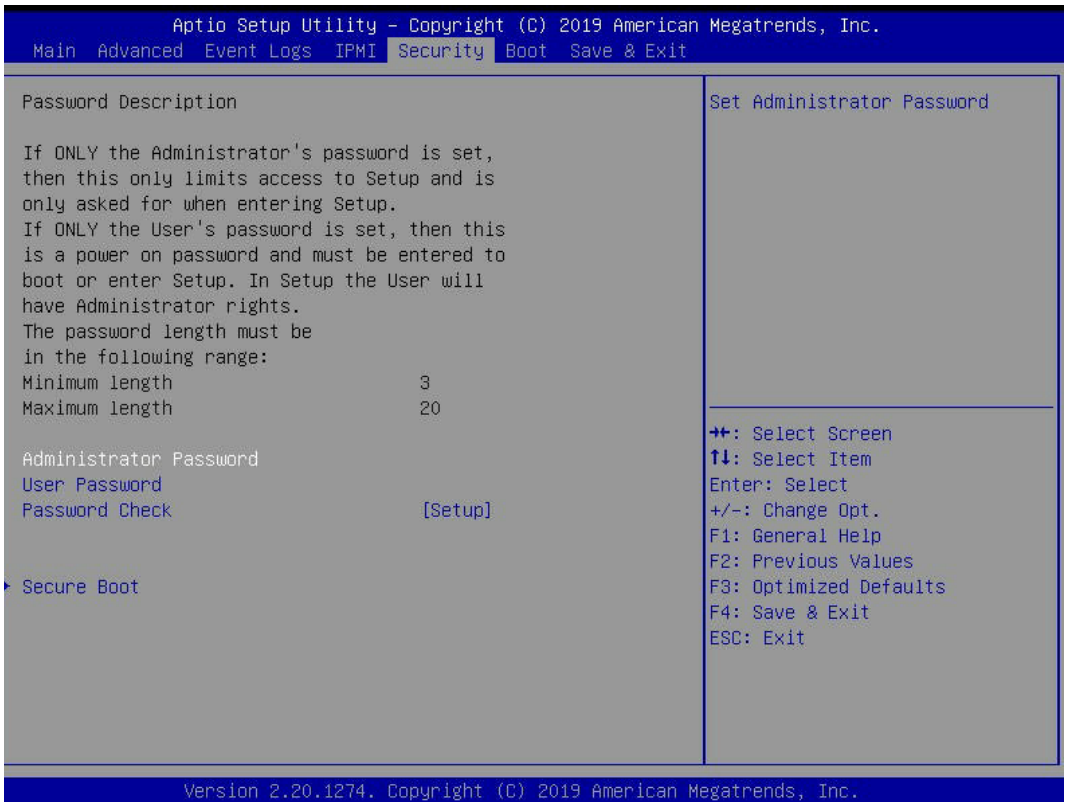
Use this feature to select the IP address source for this computer. If Static is selected, you will need to know the IP address of this computer and enter it to the system manually in the field. If DHCP is selected, AMI BIOS will search for a DHCP (Dynamic Host Configuration Protocol) server attached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

**IPv6 Support**: Select Enabled for IPv6 support. The options are Enabled, and **Disabled**. If this option is set to Enabled, the following item will display:

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

# 6.6 Security

Use this tab page to configure Security settings.




### Administrator Password

Use this feature to set the administrator password which is required to enter the BIOS setup utility. The length of the password should be from 3 characters to 20 characters long.

### User Password

Use this feature to set the user password which is required to enter the BIOS setup utility. The length of the password should be from 3 characters to 20 characters long.

### 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 system boot and upon entering the BIOS Setup utility. The options are **Setup** and Always.

## ▸Secure Boot

When you select this submenu and press the <Enter> key, the following items will display:

- System Mode

### Secure Boot

Select Enabled to use Secure Boot settings. The options are Enabled and **Disabled**.

**Secure Boot Mode**

Use this feature to select the desired secure boot mode for the system. The options are Standard and **Custom**.

**CMS Support**

If this feature is set to Enabled, legacy devices will be supported by the system. The options are **Enabled** and Disabled.

## ▸Restore Factory Keys

Select Yes to restore manufacturer default keys used to ensure system security. The options are **Yes** and No.

## ▸Reset to Setup Mode

Select Yes to reset the system to the Setup Mode. The options are **Yes** and No.

## ▸Key Management

**Vendor Keys**

**Factory Key Provision**

Select Yes to install manufacturer default keys for system security use. The options are Enabled and **Disabled**.

## ▸Restore Factory Keys

Select Yes to restore all manufacturer default keys for system security use. The options are **Yes** and No.

## ▸Reset to Setup Mode

This feature resets the system to Setup Mode.

## ▸Export Secure Boot Variables

This feature is used to copy the NVRAM content of Secure Boot variables to a storage device.

## ▸Enroll EFI Image

Select this feature and press <Enter> to specify an EFI (Extensible Firmware Interface) image for the system to use when it operates in the Secure Boot mode.

**Device Guard Ready**

## ▸Remove 'UEFI CA' from DB

Select Yes to remove UEFI CA from the database. The options are **Yes** and No.

## ▸Restore DB defaults

Select Yes to restore database variables to the manufacturer default settings. The options are **Yes** and No.

**Secure Boot Variable/Size/Keys/Key Source**

## ▸Platform Key (PK)

This feature allows the user to enter and configure a set of values to be used as platform firmware keys for the system. The sizes, keys numbers, and key sources of the platform keys will be indicated as well. Select Update to update the platform key.

## ▸Key Exchange Keys

This feature allows the user to enter and configure a set of values to be used as Key-Exchange-Keys for the system. The sizes, keys numbers, and key sources of the Key-Exchange-Keys will be indicated as well. Select Update to update your "Key Exchange Keys". Select Append to append your "Key Exchange Keys".

## ▸Authorized Signatures

This feature allows the user 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". The settings are Details, Export, Update, Append, and Delete.

## ▸Forbidden Signatures

This feature allows the user to enter and configure a set of values to be used as Forbidden Signatures for the system. These values also indicate sizes, keys numbers, and key sources of the forbidden signatures. Select Update to update your "Forbidden Signatures". Select Append to append your "Forbidden Signatures". The settings are Details, Export, Update, Append, and Delete.

## ▸Authorized TimeStamps

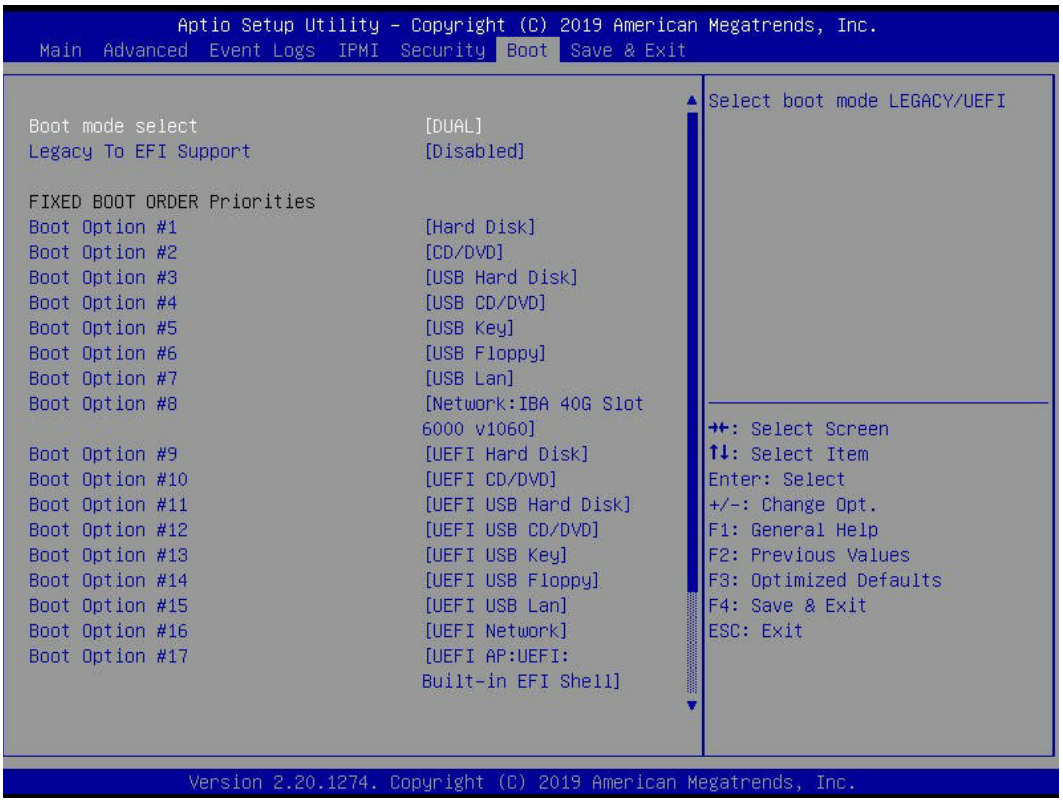
This feature allows the user to set and save the timestamps for the authorized signatures which will indicate the time when these signatures are entered into the system. Select Update to update your "Authorized TimeStamps". Select Append to append your "Authorized TimeStamps". The settings are Update, and Append.

## ▸Os Recovery Signatures

This feature allows the user to set and save the authorized signatures used for OS recovery. Select Update to update your "OS Recovery Signatures". Select Append to append your "OS Recovery Signatures". The settings are Update, and Append.

# 6.7 Boot

Use this tab page to configure Boot Settings.




### Boot Mode Select

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

### Legacy to EFI Support

Select Enabled for the system to boot from an EFI OS when the Legacy OS fails. The options are Enabled and **Disabled**.

### Fixed Boot Order 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 the item above -"Boot Mode Select" is set to **Dual** (default), the following items will be displayed for user's configuration:

- Boot Option #1 - Boot Option #17

When the item above -"Boot Mode Select" is set to Legacy, the following items will be displayed for configuration:

- Boot Option  #1 - Boot Option #8

When the item above -"Boot Mode Select" is set to UEFI, the following items will be displayed for configuration:

- Boot Option #1 - Boot Option #9

## Add New Boot Option

This feature allows the user to add a new boot option to the boot priority features for system boot.

**Add Boot Option**

Use this item to specify the name for the new boot option.

**Path for Boot Option**

Use this feature to enter the path for the new boot option in the format fsx:\path\filename.efi.

**Boot Option File Path**

Use this feature to specify the file path for the new boot option.

**Create**

After 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

Use this feature to select a boot device to delete from the boot priority list.

**Delete Boot Option**

Use this feature to remove an EFI boot option from the boot priority list.

## ▶Add New Driver Option

Use this feature to select a new driver to add to the boot priority list.

**Add Driver Option**

Use this feature to specify the name of the driver to be added to the boot priority list.

**Path for Drover Option**

Use this feature to specify the path to the driver that will be added to the boot priority list.

**Driver Option File Path**

Use this feature to specify the file path of the driver that will be added to the boot priority list.

**Create**

After the driver option name and the file path are set, press <Enter> to enter to submenu and click OK to create the new boot option drive.

## ▶Delete Driver Option

Use this item to select a boot driver to delete from the boot priority list.

**Delete Drive Option**

Select the target boot driver to delete from the boot priority list.

**▶Hard Disk Drive BBS Priorities**

- Boot Option #1 - #5

**▶USB Key Drive BBS Priorities**

- Boot Option #1

**▶UEFI Application Boot Priorities**

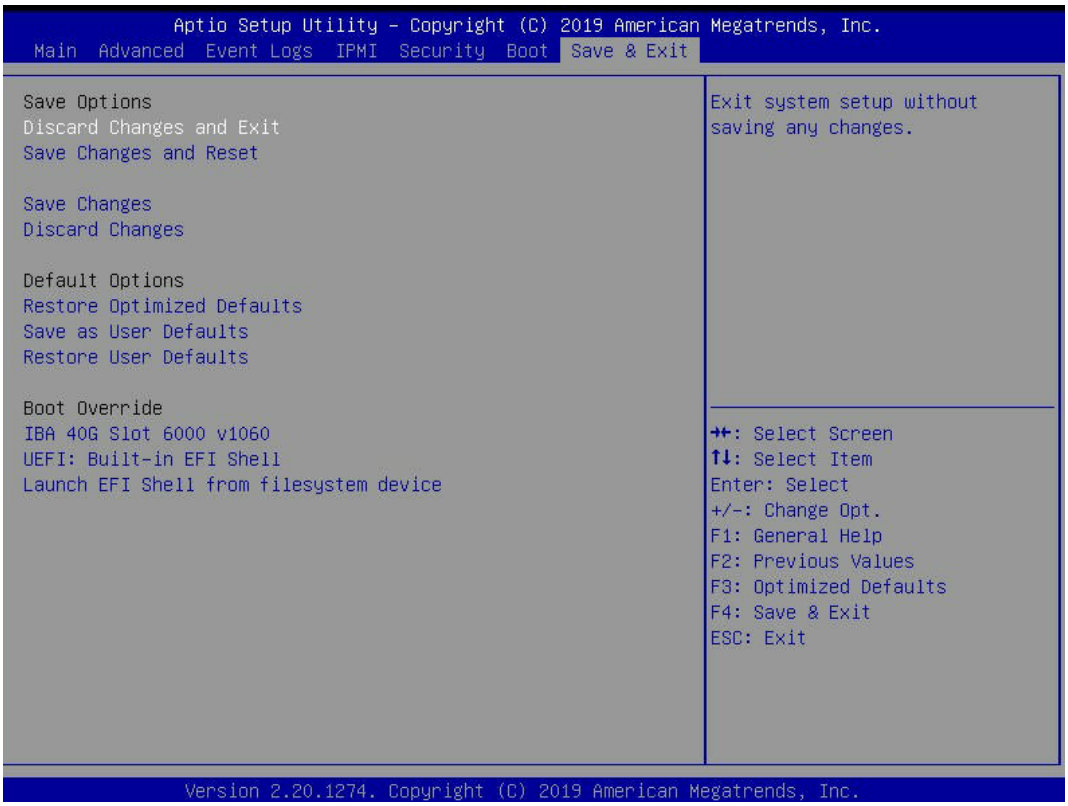
- Boot Option #1

**▶Network Drive BBS Priorities**

- Boot Option #1

# 6.8 Save & Exit

Use this tab page to configure Save & Exit settings.




## Save Options

### Discard Changes and Exit

Select this option 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, select this option to leave 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, select this option to save all changes made. This will not reset (reboot) the system.

### Discard Changes

Select this option and press <Enter> to discard all the changes you've made and return to the AMI BIOS setup utility.

## Default Options

### Restore Optimized Defaults

To set this feature, select Restore Defaults from the Exit menu and press <Enter> to load manufacturer default settings which are intended for maximum system performance but not for maximum stability.

### Save As User Defaults

To set this feature, select Save as User Defaults from the Exit menu and press <Enter>. This enables the user to save all changes to the BIOS setup for future use.

### Restore User Defaults

To set this feature, select Restore User Defaults from the Exit menu and press <Enter>. Use this feature to retrieve user-defined default settings that were saved previously.

### Boot Override

This feature allows the user to override the Boot priorities sequence in the Boot menu, and immediately boot the system with a device specified by the user instead of the one specified in the boot list. This is a one-time override.

# Appendix A

# BIOS Error Codes

## A.1BIOS Error Beep (POST) Codes

During the POST (Power-On Self-Test) routines, which are performed each time the system is powered on, errors may occur.

**Non-fatal errors** are those which, in most cases, allow the system to continue the boot-up process. The error messages normally appear on the screen.

**Fatal errors** are those which will not allow the system to continue the boot-up procedure. If a fatal error occurs, you should consult with your system manufacturer for possible repairs.

These fatal errors are usually communicated through a series of audible beeps. The table below lists some common errors and their corresponding beep codes encountered by users.

| BIOS Error Beep (POST) Codes | | |
|---|---|---|
| **Beep Code** | **Error Message** | **Description** |
| 1 short | Refresh | Circuits have been reset (Ready to power up) |
| 5 short, 1 long | Memory error | No memory detected in system |
| 5 long, 2 short | Display memory read/write error | Video adapter missing or with faulty memory |
| 1 long continuous | System OH | System overheat condition |

## A.2Additional BIOS POST Codes

The AMI BIOS supplies additional checkpoint codes, which are documented online at http://www.supermicro.com/support/manuals/ ("AMI BIOS POST Codes User's Guide").

When BIOS performs the Power On Self Test, it writes checkpoint codes to I/O port 0080h. If the computer cannot complete the boot process, a diagnostic card can be attached to the computer to read I/O port 0080h (Supermicro p/n AOC-LPC80-20).

For information on AMI updates, please refer to http://www.ami.com/products/.

# Appendix B

# Standardized Warning Statements for AC Systems

## About Standardized Warning Statements

The following statements are industry standard warnings, provided to warn the user of situations which have the potential for bodily injury. Should you have questions or experience difficulty, contact Supermicro's Technical Support department for assistance. Only certified technicians should attempt to install or configure components.

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

These warnings may also be found on our website at http://www.supermicro.com/about/policies/safety_information.cfm.

## Warning Definition

**Warning!** This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents.

**警告の定義**

**この警告サインは危険を意味します。**

**人身事故につながる可能性がありますので、いずれの機器でも動作させる前に、**

**電気回路に含まれる危険性**に注意して、標準的な事故防止策に精通して下さい。

此警告符号代表危险。

您正处于可能受到严重伤害的工作环境中。在您使用设备开始工作之前，必须充分意识到触电的危险，并熟练掌握防止事故发生的标准工作程序。请根据每项警告结尾的声明号码找到此设备的安全性警告说明的翻译文本。

此警告符號代表危險。

您正處於可能身體可能會受損傷的工作環境中。在您使用任何設備之前，請注意觸電的危險，並且要熟悉預防事故發生的標準工作程序。請依照每一注意事項後的號碼找到相關的翻譯說明內容。

Warnung

WICHTIGE SICHERHEITSHINWEISE

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu Verletzungen führen kann. Machen Sie sich vor der Arbeit mit Geräten mit den Gefahren elektrischer Schaltungen und den üblichen Verfahren zur Vorbeugung vor Unfällen vertraut. Suchen Sie mit der am Ende jeder Warnung angegebenen Anweisungsnummer nach der jeweiligen Übersetzung in den übersetzten Sicherheitshinweisen, die zusammen mit diesem Gerät ausgeliefert wurden.

BEWAHREN SIE DIESE HINWEISE GUT AUF.

INSTRUCCIONES IMPORTANTES DE SEGURIDAD

Este símbolo de aviso indica peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Al final de cada advertencia encontrará el número que le ayudará a encontrar el texto traducido en el apartado de traducciones que acompaña a este dispositivo.

GUARDE ESTAS INSTRUCCIONES.

IMPORTANTES INFORMATIONS DE SÉCURITÉ

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers liés aux circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions des avertissements figurant dans les consignes de sécurité traduites qui accompagnent cet appareil, référez-vous au numéro de l'instruction situé à la fin de chaque avertissement.

CONSERVEZ CES INFORMATIONS.

תקנון הצהרות אזהרה

הצהרות הבאות הן אזהרות על פי תקני התעשייה, על מנת להזהיר את המשתמש מפני חבלה פיזית אפשרית. במידה ויש שאלות או היתקלות בבעיה כלשהי, יש ליצור קשר עם מחלקת תמיכה טכנית של סופרמיקרו. טכנאים מוסמכים בלבד רשאים להתקין או להגדיר את הרכיבים.

יש לקרוא את הנספח במלואו לפני התקנת או הגדרת הרכיבים במארזי סופרמיקרו.

ا كً ف حالة وٌكي أى تتسبب ف اصابة جسد ةٌ هذا الزهز عٌ خطز !تحذ زٌ .
قبل أى تعول على أي هعذات،كي على علن بالوخاطز ال ٱجوة عي الذوائز
الكهزبائ ةٍ
وكي على درا ةٌ بالووارسات البقائ ةٍ لو عٌ وقع أي حادث
استخذم رقن الب إٍى الو صٌص ف هًا ةٌ كل تحذ زٌ للعشر تزجوتها

안전을 위한 주의사항

경고!

이 경고 기호는 위험이 있음을 알려 줍니다. 작업자의 신체에 부상을 야기 할 수 있는 상태에 있게 됩니다. 모든 장비에 대한 작업을 수행하기 전에 전기회로와 관련된 위험요소들을 확인하시고 사전에 사고를 방지할 수 있도록 표준 작업절차를 준수해 주시기 바랍니다.

해당 번역문을 찾기 위해 각 경고의 마지막 부분에 제공된 경고문 번호를 참조하십시오

BELANGRIJKE VEILIGHEIDSINSTRUCTIES

Dit waarschuwings symbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij een elektrische installatie betrokken risico's en dient u op de hoogte te zijn van de standaard procedures om ongelukken te voorkomen. Gebruik de nummers aan het eind van elke waarschuwing om deze te herleiden naar de desbetreffende locatie.

BEWAAR DEZE INSTRUCTIES

## Installation Instructions

**Warning!** Read the installation instructions before connecting the system to the power source.

**設置手順書**

**システムを電源に接続する前に、設置手順書をお読み下さい。**

警告

将此系统连接电源前,请先阅读安装说明。

警告

將系統與電源連接前，請先閱讀安裝說明。

Warnung

Vor dem Anschließen des Systems an die Stromquelle die Installationsanweisungen lesen.

¡Advertencia!

Lea las instrucciones de instalación antes de conectar el sistema a la red de alimentación.

Attention

Avant de brancher le système sur la source d'alimentation, consulter les directives d'installation.

יש לקרוא את הוראות התקנה לפני חיבור המערכת למקור מתח.

اقر إرشادات التركيب قبل توصيل النظام إلى مصدر للطاقة

시스템을 전원에 연결하기 전에 설치 안내를 읽어주십시오.

Waarschuwing

Raadpleeg de installatie-instructies voordat u het systeem op de voedingsbron aansluit.

## Circuit Breaker

**Warning!** This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 250 V, 20 A.

**サーキット・ブレーカー**

**この製品は、短絡（過電流）保護装置がある建物での設置を前提としています。**

**保護装置の定格が250 V、20 Aを超えないことを確認下さい。**

警告

此产品的短路(过载电流)保护由建筑物的供电系统提供,确保短路保护设备的额定电流不大于250V,20A。

警告

此產品的短路(過載電流)保護由建築物的供電系統提供,確保短路保護設備的額定電流不大於250V,20A。

Warnung

Dieses Produkt ist darauf angewiesen, dass im Gebäude ein Kurzschluss- bzw. Überstromschutz installiert ist. Stellen Sie sicher, dass der Nennwert der Schutzvorrichtung nicht mehr als: 250 V, 20 A beträgt.

¡Advertencia!

Este equipo utiliza el sistema de protección contra cortocircuitos (o sobrecorrientes) del edificio. Asegúrese de que el dispositivo de protección no sea superior a: 250 V, 20 A.

Attention

Pour ce qui est de la protection contre les courts-circuits (surtension), ce produit dépend de l'installation électrique du local. Vérifiez que le courant nominal du dispositif de protection n'est pas supérieur à :250 V, 20 A.

מוצר זה מסתמך על הגנה המותקנת במבנים למניעת קצר חשמלי. יש לוודא כי
המכשיר המגן מפני הקצר החשמלי הוא לא יותר מ-250VDC, 20A

هذا المنتج يعتمد على معداث الحمايت مه الدوائرالقصيرة التي تم تثبيتها في
المبنى
تأكد من أن تقييم الجهاز الوقائي ليس أكثر من : 20A, 250V

경고!

이 제품은 전원의 단락(과전류)방지에 대해서 전적으로 건물의 관련 설비에 의존합니다.
보호장치의 정격이 반드시 250V(볼트), 20A(암페어)를 초과하지 않도록 해야 합니다.

Waarschuwing

Dit product is afhankelijk van de kortsluitbeveiliging (overspanning) van uw electrische installatie. Controleer of het beveiligde aparaat niet groter gedimensioneerd is dan 250V, 20A.

## Power Disconnection Warning

**Warning!** The system must be disconnected from all sources of power and the power cord removed from the power supply module(s) before accessing the chassis interior to install or remove system components.

**電源切断の警告**

**システムコンポーネントの取り付けまたは取り外しのために、シャーシー内部にアクセスするには、システムの電源はすべてのソースから切断され、電源コードは電源モジュールから取り外す必要があります。**

警告

在你打开机箱并安装或移除内部器件前,必须将系统完全断电,并移除电源线。

警告

在您打開機殼安裝或移除內部元件前，必須將系統完全斷電，並移除電源線。

Warnung

Das System muss von allen Quellen der Energie und vom Netzanschlusskabel getrennt sein, das von den Spg.Versorgungsteilmodulen entfernt wird, bevor es auf den Chassisinnenraum zurückgreift, um Systemsbestandteile anzubringen oder zu entfernen.

¡Advertencia!

El sistema debe ser disconnected de todas las fuentes de energía y del cable eléctrico quitado de los módulos de fuente de alimentación antes de tener acceso el interior del chasis para instalar o para quitar componentes de sistema.

Attention

Le système doit être débranché de toutes les sources de puissance ainsi que de son cordon d'alimentation secteur avant d'accéder à l'intérieur du chassis pour installer ou enlever des composants de systéme.

אזהרה מפני ניתוק חשמלי

!אזהרה

יש לנתק את המערכת מכל מקורות החשמל ויש להסיר את כבל החשמלי מהספק

.לפני גישה לחלק הפנימי של המארז לצורך התקנת או הסרת רכיבים

يجب فصم انتظاو من جميع مصادر انطاقت وإزانت سهك انكهرباء من وحدة امداد
انطاقت قبم
انصل إنى اىمناطق انداخهيت نههيكم نتثبيج أو إزانت مكناث الجهاز

경고!

시스템에 부품들을 장착하거나 제거하기 위해서는 섀시 내부에 접근하기 전에 반드시 전원 공급장치로부터 연결되어있는 모든 전원과 전기코드를 분리해주어야 합니다.

Waarschuwing

Voordat u toegang neemt tot het binnenwerk van de behuizing voor het installeren of verwijderen van systeem onderdelen, dient u alle spanningsbronnen en alle stroomkabels aangesloten op de voeding(en) van de behuizing te verwijderen

## Equipment Installation

**Warning!** Only trained and qualified personnel should be allowed to install, replace, or service this equipment.

**機器の設置**

**トレーニングを受け認定された人だけがこの装置の設置、交換、またはサービスを許可されています。**

警告

只有经过培训且具有资格的人员才能进行此设备的安装、更换和维修。

警告

只有經過受訓且具資格人員才可安裝、更換與維修此設備。

Warnung

Das Installieren, Ersetzen oder Bedienen dieser Ausrüstung sollte nur geschultem, qualifiziertem Personal gestattet werden.

¡Advertencia!

Solamente el personal calificado debe instalar, reemplazar o utilizar este equipo.

Attention

Il est vivement recommandé de confier l'installation, le remplacement et la maintenance de ces équipements à des personnels qualifiés et expérimentés.

אזהרה!

צוות מוסמך בלבד רשאי להתקין, להחליף את הציוד או לתת שירות עבור הציוד.

والمدربيه لتزكيب واستبدال أو خدمة هذا الجهاس يجب أن يسمح فقط للمظفيه المؤهليه

경고!

훈련을 받고 공인된 기술자만이 이 장비의 설치, 교체 또는 서비스를 수행할 수 있습니다.

Waarschuwing

Deze apparatuur mag alleen worden geïnstalleerd, vervangen of hersteld door geschoold en gekwalificeerd personeel.

## Restricted Area

**Warning!** This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security. (This warning does not apply to workstations).

**アクセス制限区域**

**このユニットは、アクセス制限区域に設置されることを想定しています。**

**アクセス制限区域は、特別なツール、鍵と錠前、その他のセキュリティの手段を用いてのみ出入りが可能です。**

警告

此部件应安装在限制进出的场所，限制进出的场所指只能通过使用特殊工具、锁和钥匙或其它安全手段进出的场所。

警告

此裝置僅限安裝於進出管制區域，進出管制區域係指僅能以特殊工具、鎖頭及鑰匙或其他安全方式才能進入的區域。

Warnung

Diese Einheit ist zur Installation in Bereichen mit beschränktem Zutritt vorgesehen. Der Zutritt zu derartigen Bereichen ist nur mit einem Spezialwerkzeug, Schloss und Schlüssel oder einer sonstigen Sicherheitsvorkehrung möglich.

¡Advertencia!

Esta unidad ha sido diseñada para instalación en áreas de acceso restringido. Sólo puede obtenerse acceso a una de estas áreas mediante la utilización de una herramienta especial, cerradura con llave u otro medio de seguridad.

Attention

Cet appareil doit être installée dans des zones d'accès réservés. L'accès à une zone d'accès réservé n'est possible qu'en utilisant un outil spécial, un mécanisme de verrouillage et une clé, ou tout autre moyen de sécurité.

אזור עם גישה מוגבלת

אזהרה!

יש להתקין את היחידה באזורים שיש בהם הגבלת גישה. הגישה ניתנת בעזרת
'כלי אבטחה בלבד )מפתח, מנעול וכד.)

تخصيص هذه انحذة نترك بُها ف مناطق محظورة تم .
،مَكن انصبل إن منطقت محظورة فقط من خلال استخذاو أداة خاصت
أو أ وس هُت أخري نلالأمما قفم ومفتاح

경고!

이 장치는 접근이 제한된 구역에 설치하도록 되어있습니다. 특수도구, 잠금 장치 및 키, 또는 기타 보안 수단을 통해서만 접근 제한 구역에 들어갈 수 있습니다.

Waarschuwing

Dit apparaat is bedoeld voor installatie in gebieden met een beperkte toegang. Toegang tot dergelijke gebieden kunnen alleen verkregen worden door gebruik te maken van speciaal gereedschap, slot en sleutel of andere veiligheidsmaatregelen.

## Battery Handling

**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 النبع 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.

## Redundant Power Supplies

**Warning!** This unit might have more than one power supply connection. All connections must be removed to de-energize the unit.

**冗長電源装置**

**このユニットは複数の電源装置が接続されている場合があります。**

**ユニットの電源を切るためには、すべての接続を取り外さなければなりません。**

警告
此部件连接的电源可能不止一个，必须将所有电源断开才能停止给该部件供电。

警告
此裝置連接的電源可能不只一個，必須切斷所有電源才能停止對該裝置的供電。

Warnung

Dieses Gerät kann mehr als eine Stromzufuhr haben. Um sicherzustellen, dass der Einheit kein trom zugeführt wird, müssen alle Verbindungen entfernt werden.

¡Advertencia!

Puede que esta unidad tenga más de una conexión para fuentes de alimentación. Para cortar por completo el suministro de energía, deben desconectarse todas las conexiones.

Attention

Cette unité peut avoir plus d'une connexion d'alimentation. Pour supprimer toute tension et tout courant électrique de l'unité, toutes les connexions d'alimentation doivent être débranchées.

אם קיים יותר מספק אחד

אזהרה!

ליחדה יש יותר מחיבור אחד של ספק. יש להסיר את כל החיבורים על מנת לרוקן את היחידה.

قد يكون لهذا الجهاز عدة اتصالات بوحدات امداد الطاقة .

يجب إزالة كافة الاتصالات لعسل الوحدة عن الكهرباء

경고!

이 장치에는 한 개 이상의 전원 공급 단자가 연결되어 있을 수 있습니다. 이 장치에 전원을 차단하기 위해서는 모든 연결 단자를 제거해야만 합니다.

Waarschuwing

Deze eenheid kan meer dan één stroomtoevoeraansluiting bevatten. Alle aansluitingen dienen verwijderd te worden om het apparaat stroomloos te maken.

## Backplane Voltage

**Warning!** Hazardous voltage or energy is present on the backplane when the system is operating. Use caution when servicing.

**バックプレーンの電圧**

**システムの稼働中は危険な電圧または電力が、バックプレーン上にかかっています。**

**修理する際には注意ください。**

警告
当系统正在进行时，背板上有很危险的电压或能量，进行维修时务必小心。

警告
當系統正在進行時，背板上有危險的電壓或能量，進行維修時務必小心。

Warnung

Wenn das System in Betrieb ist, treten auf der Rückwandplatine gefährliche Spannungen oder Energien auf. Vorsicht bei der Wartung.

¡Advertencia!

Cuando el sistema está en funcionamiento, el voltaje del plano trasero es peligroso. Tenga cuidado cuando lo revise.

Attention

Lorsque le système est en fonctionnement, des tensions électriques circulent sur le fond de panier. Prendre des précautions lors de la maintenance.

מתח בפנל האחורי

אזהרה!

קיימת סכנת מתח בפנל האחורי בזמן תפעול המערכת. יש להיזהר במהלך העבודה.

هناك خطر مه التيار الكهزبائي أوالطاقة المجبدة على اللحة
عندما يكن النظام يعمل كه حذرا عند خدمة هذا الجهاس

경고!
시스템이 동작 중일 때 후면판 (Backplane)에는 위험한 전압이나 에너지가 발생 합니다. 서비스 작업 시 주의하십시오.

Waarschuwing
Een gevaarlijke spanning of energie is aanwezig op de backplane wanneer het systeem in gebruik is. Voorzichtigheid is geboden tijdens het onderhoud.

## Comply with Local and National Electrical Codes

**Warning!** Installation of the equipment must comply with local and national electrical codes.

**地方および国の電気規格に準拠**

**機器の取り付けはその地方および国の電気規格に準拠する必要があります。**

警告
设备安装必须符合本地与本国电气法规。

警告
設備安裝必須符合本地與本國電氣法規。

Warnung
Die Installation der Geräte muss den Sicherheitsstandards entsprechen.

¡Advertencia!
La instalacion del equipo debe cumplir con las normas de electricidad locales y nacionales.

Attention
L'équipement doit être installé conformément aux normes électriques nationales et locales.

תיאום חוקי החשמל הארצי
אזהרה!
התקנת הציוד חייבת להיות תואמת לחוקי החשמל המקומיים והארציים.

تركيب المعدات الكهربائية يجب أن يمتثل للقاويه المحلية والبطية المتعلقة
بالكهرباء

경고!
현 지역 및 국가의 전기 규정에 따라 장비를 설치해야 합니다.

Waarschuwing
Bij installatie van de apparatuur moet worden voldaan aan de lokale en nationale elektriciteitsvoorschriften.

## Product Disposal

**Warning!** Ultimate disposal of this product should be handled according to all national laws and regulations.

**製品の廃棄**
**この製品を廃棄処分する場合、国の関係する全ての法律・条例に従い処理する必要があります。**

警告
本产品的废弃处理应根据所有国家的法律和规章进行。

警告
本產品的廢棄處理應根據所有國家的法律和規章進行。

Warnung
Die Entsorgung dieses Produkts sollte gemäß allen Bestimmungen und Gesetzen des Landes erfolgen.

¡Advertencia!
Al deshacerse por completo de este producto debe seguir todas las leyes y reglamentos nacionales.

Attention

La mise au rebut ou le recyclage de ce produit sont généralement soumis à des lois et/ou directives de respect de l'environnement. Renseignez-vous auprès de l'organisme compétent.

סילוק המוצר

אזהרה!

סילוק סופי של מוצר זה חייב להיות בהתאם להנחיות וחוקי המדינה.

التخلص النهائي من هذا المنتج ينبغي التعامل معه وفقا لجميع القانين واللائح البطنية عند

경고!

이 제품은 해당 국가의 관련 법규 및 규정에 따라 폐기되어야 합니다.

Waarschuwing

De uiteindelijke verwijdering van dit product dient te geschieden in overeenstemming met alle nationale wetten en reglementen.

## Hot Swap Fan Warning


**Warning!** Hazardous moving parts. Keep away from moving fan blades. The fans might still be turning when you remove the fan assembly from the chassis. Keep fingers, screwdrivers, and other objects away from the openings in the fan assembly's housing.

**ファン・ホットスワップの警告**

**警告!回転部品に注意。運転中は回転部(羽根)に触れないでください。シャーシから冷却ファン装置を取り外した際、ファンがまだ回転している可能性があります。ファンの開口部に、指、ドライバー、およびその他のものを近づけないで下さい。**

警告!

警告！危险的可移动性零件。请务必与转动的风扇叶片保持距离。 当您从机架移除风扇装置，风扇可能仍在转动。小心不要将手指、螺丝起子和其他物品太靠近风扇

警告

危險的可移動性零件。請務必與轉動的風扇葉片保持距離。 當您從機架移除風扇裝置，風扇可能仍在轉動。小心不要將手指、螺絲起子和其他物品太靠近風扇。

Warnung

Gefährlich Bewegende Teile. Von den bewegenden Lüfterblätter fern halten. Die Lüfter drehen sich u. U. noch, wenn die Lüfterbaugruppe aus dem Chassis genommen wird. Halten Sie Finger, Schraubendreher und andere Gegenstände von den Öffnungen des Lüftergehäuses entfernt.

¡Advertencia!

Riesgo de piezas móviles. Mantener alejado de las aspas del ventilador. Los ventiladores podran dar vuelta cuando usted quite ell montaje del ventilador del chasis. Mandtenga los dedos, los destornilladores y todos los objetos lejos de las aberturas del ventilador

Attention

Pieces mobiles dangereuses. Se tenir a l'ecart des lames du ventilateur Il est possible que les ventilateurs soient toujours en rotation lorsque vous retirerez le bloc ventilateur du châssis. Prenez garde à ce que doigts, tournevis et autres objets soient éloignés du logement du bloc ventilateur.

אזהרה!

חלקים נעים מסוכנים. התרחק מלהבי המאוורר בפעולהכאשר מסירים את חלקי
המאוורר מהמארז, יתכן והמאוררים עדיין עובדים. יש להרחיק למרחק בטוח את
האצבעות וכלי עבודה שונים מהפתחים בתוך המאוורר

تحذير! أجزاء متحركة خطرة. ابتعد عن شفرات المروحة المتحركة.من الممكن أن
المراوح لا تزال تدورعند إزالة كتلة المروحة من الهيكل يجب إبقاء الأصابع
.ومفكات البراغي وغيرها من الأشياء بعيدا عن الفتحات في كتلة المروحة

경고!

움직이는 위험한 부품. 회전하는 송풍 날개에 접근하지 마세요. 섀시로부터 팬 조립품을 제거할 때 팬은 여전히 회전하고 있을 수 있습니다. 팬 조림품 외관의 열려있는 부분들로부터 손가락 및 스크류드라이버, 다른 물체들이 가까이 하지 않도록 배치해 주십시오.

Waarschuwing

Gevaarlijk bewegende onderdelen. Houd voldoende afstand tot de bewegende ventilatorbladen. Het is mogelijk dat de ventilator nog draait tijdens het verwijderen van het ventilatorsamenstel uit het chassis. Houd uw vingers, schroevendraaiers en eventuele andere voorwerpen uit de buurt van de openingen in de ventilatorbehuizing.

## Power Cable and AC Adapter

**Warning!** When installing the product, use the provided or designated connection cables, power cables and AC adaptors. Using any other cables and adaptors could cause a malfunction or a fire. Electrical Appliance and Material Safety Law prohibits the use of UL or CSA -certified cables (that have UL/CSA shown on the cord) for any other electrical devices than products designated by Supermicro only.

**電源コードとACアダプター**

**製品を設置する場合、提供または指定および購入された接続ケーブル、電源コードとACアダプターを 該当する地域の条例や安全基準に適合するコードサイズやプラグと共に使用下さい。他のケーブルやアダプタを使用すると故障や火災の原因になることがあります。**

**電気用品安全法は、ULまたはCSA認定のケーブル(UL/CSEマークがコードに表記)を Supermicroが指定する製品以外に使用することを禁止しています。**

警告

安装此产品时,请使用本身提供的或指定的或采购的连接线,电源线和电源适配器，包含遵照当地法规和安全要求的合规的电源线尺寸和插头.使用其它线材或适配器可能会引起故障或火灾。除了Supermicro所指定的产品,电气用品和材料安全法律规定禁止
使用未经UL或CSA认证的线材。(线材上会显示UL/CSA符号)。

警告

安裝此產品時,請使用本身提供的或指定的或採購的連接線,電源線和電源適配器，包含遵照當地法規和安全要求的合規的電源線尺寸和插頭.使用其它線材或適配器可能會引起故障或火災。除了Supermicro所指定的產品,電氣用品和材料安全法律規定禁止
使用未經UL或CSA認證的線材。 (線材上會顯示UL/CSA符號)。

Warnung

Nutzen Sie beim Installieren des Produkts ausschließlich die von uns zur Verfügung gestellten Verbindungskabeln, Stromkabeln und/oder Adapater, die Ihre örtlichen Sicherheitsstandards einhalten. Der Gebrauch von anderen Kabeln und Adapter können Fehlfunktionen oder Feuer verursachen. Die Richtlinien untersagen das Nutzen von UL oder CAS zertifizierten Kabeln (mit UL/CSA gekennzeichnet), an Geräten oder Produkten die nicht mit Supermicro gekennzeichnet sind.

¡Advertencia!

Cuando instale el producto, utilice la conexión provista o designada o procure cables, Cables de alimentación y adaptadores de CA que cumplan con los códigos locales y los requisitos de seguridad, incluyendo el tamaño adecuado del cable y el enchufe. El uso de otros cables y adaptadores podría causar un mal funcionamiento o un incendio. La Ley de Seguridad de Aparatos Eléctricos y de Materiales prohíbe El uso de cables certificados por UL o CSA (que tienen el certificado UL / CSA en el código) para cualquier otros dispositivos eléctricos que los productos designados únicamente por Supermicro.

Attention

Lors de l'installation du produit, utilisez les cables de connection fournis ou désigné ou achetez des cables, cables de puissance et adaptateurs respectant les normes locales et les conditions de securite y compris les tailles de cables et les prises electriques appropries. L'utilisation d'autres cables et adaptateurs peut provoquer un dysfonctionnement ou un incendie. Appareils électroménagers et la Loi sur la Sécurité Matériel interdit l'utilisation de câbles certifies- UL ou CSA (qui ont UL ou CSA indiqué sur le code) pour tous les autres appareils électriques sauf les produits désignés par Supermicro seulement.

AC ימאתמו סיילמשח סילבכ

!הרהזא

ךרוצל ומאתוה וא ושכרנ רשא AC סימאתמו סיקפס ,סילבכב שמתשהל שי ,רצומה תא סיניקתמ רשאכ לכב שומיש . עקתהו לבכה לש הנוכנ הדימ ללוכ ,תוימוקמה תוחיטבה תושירדל ומאתוה רשאו ,הנקתהה למשחה יריש כמב שומישה יקוחל סאתהב .ילמשח רצק וא הלקתל סורגל לולע ,רחא גוסמ סאתמ וא לבכ לש דוק סהילע עיפומ רשאכ) CSA-ב וא UL -ב סיכמסומה סילבכב שמתשהל רוסיא סייק ,תוחיטבה יקוחו .דבלב Supermicro י"ע סאתוה רשא רצומב קר אלא ,רחא ילמשח רצומ לכ רובע UL/CSA)

عند تركيب المنتج، قم باستخدام التوصيلات المتوفرة أو المحددة أو قم بشراء الكابلات الكهربائية ومحولات التيار المتردد مع الالتزام بقوانين ومتطلبات السلامة المحلية بما في ذلك حجم الموصل والقابس السليم. استخدام أي كابلات ومحولات أخرى قد يتسبب في عطل أو حريق. يحظر قانون السلامة للأجهزة الكهربائية والمعدات استخدام الكابلات المعتمدة من قبل UL أو CSA لمنتجات المعينة والمحددة من قبل Supermicro. والتي تحمل علامة (UL/CSA) مع أي معدات أخرى غير

전원 케이블 및 AC 어댑터

경고! 제품을 설치할 때 현지 코드 및 적절한 굵기의 코드와 플러그를 포함한 안전 요구 사항을 준수하여 제공되거나 지정된 연결 혹은 구매 케이블, 전원 케이블 및 AC 어댑터를 사용하십시오.

다른 케이블이나 어댑터를 사용하면 오작동이나 화재가 발생할 수 있습니다. 전기 용품 안전법은 UL 또는 CSA 인증 케이블 (코드에 UL / CSA가 표시된 케이블)을 Supermicro 가 지정한 제품 이외의 전기 장치에 사용하는 것을 금지합니다.

Stroomkabel en AC-Adapter

Waarschuwing! Bij het aansluiten van het Product uitsluitend gebruik maken van de geleverde Kabels of een andere geschikte aan te schaffen Aansluitmethode, deze moet altijd voldoen aan de lokale voorschriften en veiligheidsnormen, inclusief de juiste kabeldikte en stekker. Het gebruik van niet geschikte Kabels en/of Adapters kan een storing of brand veroorzaken. Wetgeving voor Elektrische apparatuur en Materiaalveiligheid verbied het gebruik van UL of CSA -gecertificeerde Kabels (met UL/CSA in de code) voor elke andere toepassing dan de door Supermicro hiervoor beoogde Producten.

# Appendix C

# System Specifications

**Processors**

Dual Intel Xeon 82xx/62xx/52xx/42xx/32xx or 81xx/61xx/51xx/41xx/31xx processor processors in a P (LGA3647) type socket
**Note:** Please refer to the motherboard specifications pages on our website for updates to supported processors.

**Chipset**

7049P-TR Intel C621 PCH
7049P-TRT Intel C622 PCH

**BIOS**

32 MB AMI BIOS SPI Flash BIOS

**Memory**

Supports up to 4 TB of 3DS LRDIMM/LRDIMM/3DS RDIMM/RDIMM/NV-DIMM DDR4 (288-pin) ECC up to 2933 MHz modules in 16 slots; up to 256 GB size; support for Non-Volatile DIMM (NVDIMM) and Intel Optane DC Persistent Memory (DCPMM)
**Notes**: 1. Up to 5TB of memory is supported with DCPMM modules installed.
2. 2933 MHz speed is supported by 82xx/62xx processors only

**SATA Controller**

Eight SATA 3.0 ports supported by Intel PCH (I-SATA 0-3, I-SATA 4-7)
Four S-SATA 3.0 ports supported by Intel SCU
Two SATA 3.0 ports with power-pins built-in, with support for Supermicro SuperDOM (S-SATA4/S-ISATA5)

**Storage Drives**

Eight 3.5" hot-swap SATA drive bays
Three peripheral 5.25" drive bays
Two fixed 2.5" NVMe/SSD/HDD

**PCI Expansion Slots**

Two PCI-Express 3.0 x8 slots
Four PCI-Express 3.0 x16 slots

**Motherboard**

X11DPi-N(T); Extended ATX form factor (12 x 13 in. / 305 x 330 mm.)

**Chassis**

SC745BAC-R1K28B; Tower/4U Rackmount, 7 x 19 x 27 in. / 178 x 483 x 686 mm. (W x H x D)

**System Cooling**

Three 8-cm cooling fans and two 8-cm exhaust fans

**Power Supply**

Dual 1000/1280 W modules, 80Plus Platinum level
Model: PWS-1K28P-SQ
AC Input: 100-240 V, 50-60 Hz
Rated Input Current: 1000 W Output @ 100-140 Vac: 8-12 A; 1280 W Output @ 180-240 Vac: 6-8 A
Rated DC Output Power:
+12 V, for 1000 W - 83 A, for 1280 W - 107 A
+5 V standby - 4 A

### Operating Environment

Operating Temperature: 10º to 35º C (50º to 95º F)
Non-operating Temperature: -40º to 60º C (-40º to 140º F)
Operating Relative Humidity: 20% to 95% (non-condensing)
Non-operating Relative Humidity: 5% to 95% (non-condensing)

### Regulatory Compliance

Electromagnetic Emissions: FCC Class A, EN 55032 Class A, EN 61000-3-2/3-3, CISPR 32 Class A
Electromagnetic Immunity: EN 55024/CISPR 24, (EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11)
Other: VCCI-CISPR 32 and AS/NZS CISPR 32
Environmental: Directive 2011/65/EU and Delegated Directive (EU) 2015/863 and Directive 2012/19/EU
Safety: CSA/EN/IEC/UL 60950-1 Compliant, UL or CSA Listed (USA and Canada), CE Marking (Europe))

Perchlorate Warning

California Best Management Practices Regulations for Perchlorate Materials: This Perchlorate warning applies only to products containing CR (Manganese Dioxide) Lithium coin cells. “Perchlorate Material-special handling may apply. See www.dtsc.ca.gov/hazardouswaste/perchlorate”

# Appendix D

# UEFI BIOS Recovery

**Warning:** Do not upgrade the BIOS unless your system has a BIOS-related issue. Flashing the wrong BIOS can cause irreparable damage to the system. In no event shall Supermicro be liable for direct, indirect, special, incidental, or consequential damages arising from a BIOS update. If you do update the BIOS, do not shut down or reset the system while the BIOS is updating to avoid possible boot failure.

## D.1 Overview

The Unified Extensible Firmware Interface (UEFI) provides a software-based interface between the operating system and the platform firmware in the pre-boot environment. The UEFI specification supports an architecture-independent mechanism that will allow the UEFI OS loader stored in an add-on card to boot the system. The UEFI offers clean, hands-off management to a computer during system boot.

## D.2 Recovering the UEFI BIOS Image

A UEFI BIOS flash chip consists of a recovery BIOS block and a main BIOS block (a main BIOS image). The recovery block contains critical BIOS codes, including memory detection and recovery codes for the user to flash a healthy BIOS image if the original main BIOS image is corrupted. When the system power is turned on, the recovery block codes execute first. Once this process is complete, the main BIOS code will continue with system initialization and the remaining POST (Power-On Self-Test) routines.

**Note 1:** Follow the BIOS recovery instructions below for BIOS recovery when the main BIOS block crashes.

**Note 2:** When the BIOS recovery block crashes, you will need to follow the procedures to make a Returned Merchandise Authorization (RMA) request. Also, you may use the Supermicro Update Manager (SUM) Out-of-Band (https://www.supermicro.com.tw/products/nfo/SMS_SUM.cfm) to reflash the BIOS.

## D.3 Recovering the Main BIOS Block with a USB Device

This feature allows the user to recover the main BIOS image using a USB-attached device without additional utilities used. A USB flash device such as a USB Flash Drive, or a USB CD/DVD ROM/RW device can be used for this purpose. However, a USB Hard Disk drive cannot be used for BIOS recovery at this time.

The file system supported by the recovery block is FAT (including FAT12, FAT16, and FAT32) which is installed on a bootable or non-bootable USB-attached device. However, the BIOS might need several minutes to locate the SUPER.ROM file if the media size becomes too large due to the huge volumes of folders and files stored in the device.

To perform UEFI BIOS recovery using a USB-attached device, follow the instructions below.

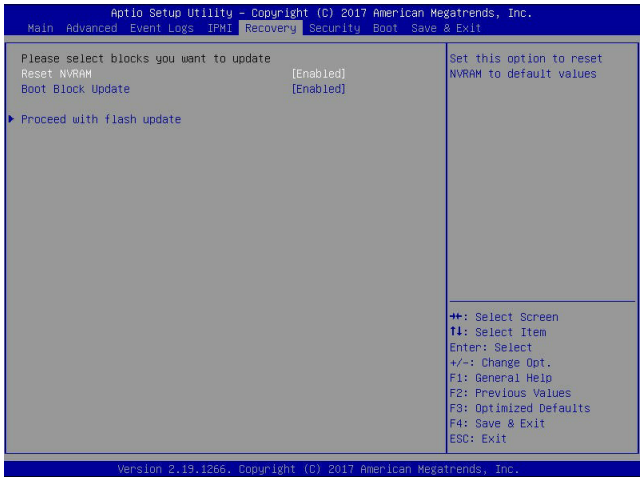
1. Using a different machine, copy the "Super.ROM" binary image file into the Root "\" directory of a USB device or a writable CD/DVD.

   **Note 1:** If you cannot locate the "Super.ROM" file in your drive disk, visit our website at www.supermicro.com to download the BIOS package. Extract the BIOS binary image into a USB flash device and rename it "Super.ROM" for the BIOS recovery use.

   **Note 2:** Before recovering the main BIOS image, confirm that the "Super.ROM" binary image file you download is the same version or a close version meant for your motherboard.

2. Insert the USB device that contains the new BIOS image ("Super.ROM") into your USB drive and reset the system when the following screen appears.

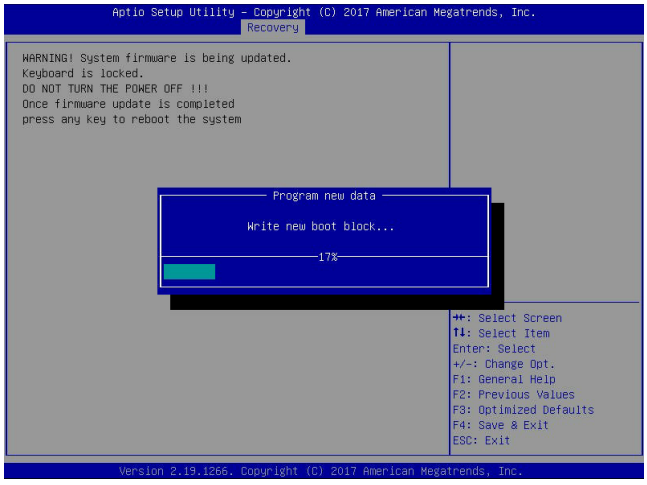
3. After locating the healthy BIOS binary image, the system will enter the BIOS Recovery menu as shown below.



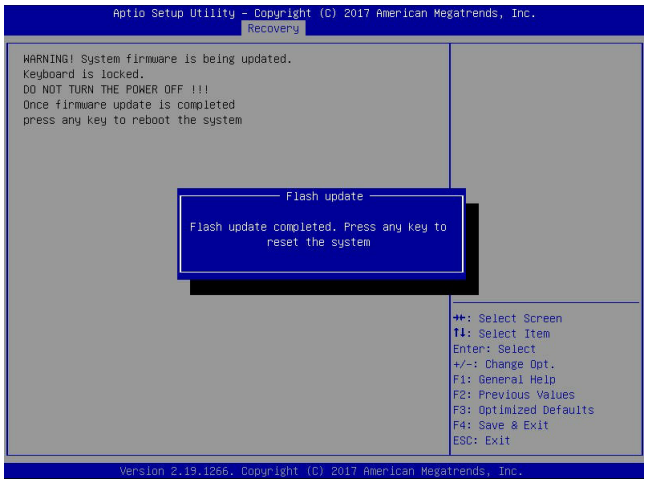

**Note**: At this point, you may decide if you want to start the BIOS recovery. If you decide to proceed with BIOS recovery, follow the procedures below.

4. When the screen as shown above displays, use the arrow keys to select the item "Proceed with flash update" and press the <Enter> key. You will see the BIOS recovery progress as shown in the screen below.

**Note:** *Do not interrupt the BIOS flashing process until it has completed*.

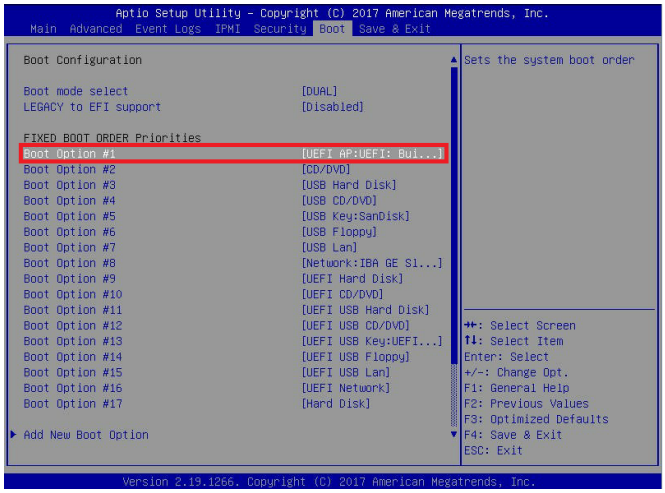


5. After the BIOS recovery process is complete, press any key to reboot the system.

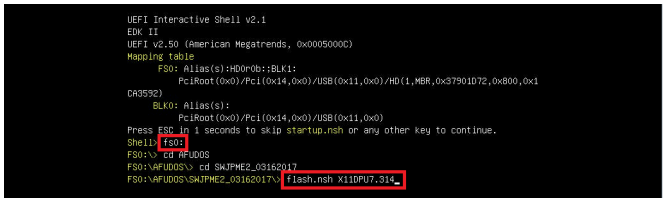



6. Using a different system, extract the BIOS package into a USB flash drive.

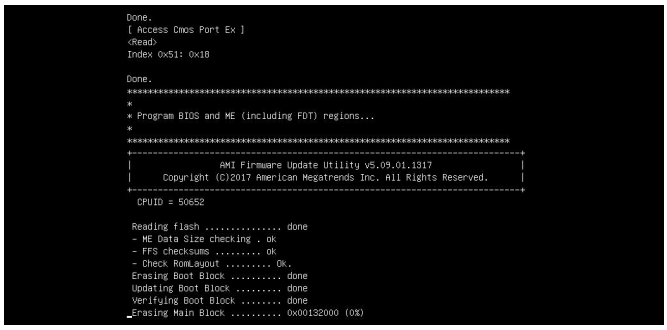
7. Press <Del> continuously during system boot to enter the BIOS Setup utility. From the top of the tool bar, select Boot to enter the submenu. From the submenu list, select Boot Option #1 as shown below. Then, set Boot Option #1 to [UEFI AP:UEFI: Built-in EFI Shell]. Press <F4> to save the settings and exit the BIOS Setup utility.



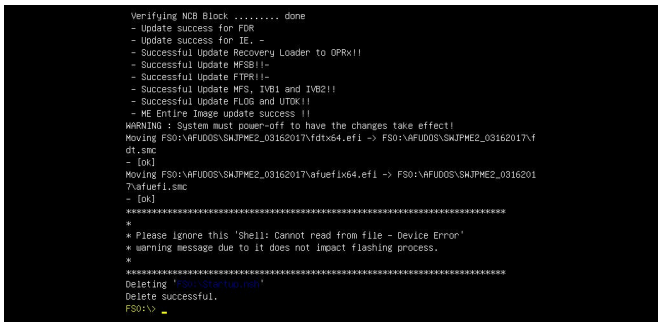
8. When the UEFI Shell prompt appears, type fs# to change the device directory path. Go to the directory that contains the BIOS package you extracted earlier from Step 6. Enter flash.nsh BIOSname.### at the prompt to start the BIOS update process.




**Note:** *Do not interrupt this process* until the BIOS flashing is complete.




9. The screen above indicates that the BIOS update process is complete. When you see the screen above, unplug the AC power cable from the power supply, clear CMOS, and plug the AC power cable in the power supply again to power on the system.




10. Press <Del> continuously to enter the BIOS Setup utility.

11. Press <F3> to load the default settings.

12. After loading the default settings, press <F4> to save the settings and exit the BIOS Setup utility.

# Appendix E

# Crash Dump Using IPMI

In the event of a processor internal error (IERR) that crashes your system, you may want to provide information to support staff. For this purpose you can download a crash dump of status information using IPMI. The IPMI manual is available at https://www.supermicro.com/solutions/IPMI.cfm.

### *Check IPMI Error Log*

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

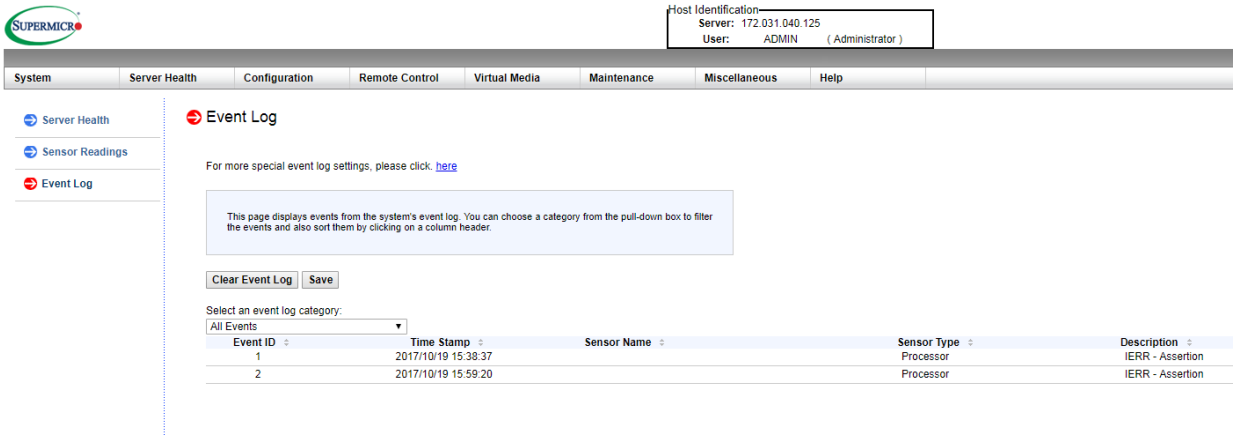



**Figure E-1. IPMI Event Log**

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

### *Downloading the Crash Dump File*

1. In the IPMI interface, click the **Miscellanous** tab, then the **Trouble Shooting** option.
2. Click the **Dump** button and wait five minutes for the file to be created. (No confirmation message will appear.)
3. Click the **Download** button and a Save As dialog appears.
4. Save the zipped dump file, noting the name and location.

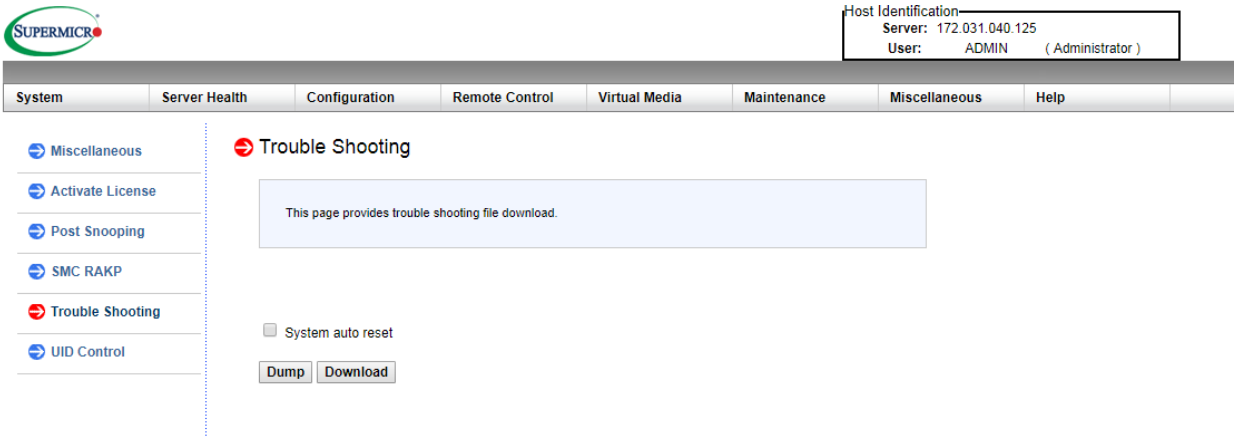



**Figure E-2. IPMI Crash Dump Download**

**Note:** The **System auto reset** check box dictates behavior after an IERR. If checked, the system will restart automatically, and the dump file will be erased. If not, the system remains in a failed state. Do not check this box until after the dump file has been sent to Support.

# Appendix F

# CPU-Based RAID for NVMe

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

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

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

## Requirements and Restrictions

- **Intel VROC is only available when the system is configured for UEFI boot mode.**
- To enable the **mdadm** command and support for RSTe, install the patch from
  - Linux: https://downloadcenter.intel.com/download/28158/Intel-Virtual-RAID-on-CPU-Intel-VROC-and-Intel-Rapid-Storage-Technology-enterprise-Intel-RSTe-Driver-for-Linux-
  - Windows: https://downloadcenter.intel.com/download/28108/Intel-Virtual-RAID-on-CPU-Intel-VROC-and-Intel-Rapid-Storage-Technology-enterprise-Intel-RSTe-Driver-for-Windows-
- To enable Intel VROC, a hardware key must be inserted on the motherboard, and the appropriate processor's Virtual Management Devices must be enabled in the BIOS setup.
- It is possible to enable Intel VROC without a hardware key installed, but only RAID0 will be enabled.
- Intel VROC is not compatible with secure boot. This feature must be disabled.
- When creating bootable OS RAID1 devices, you must have both devices on the same CPU, and a VMD on that CPU.
- Spanning drives when creating RAID devices is not recommended to due to performance issues, even though it is supported.

## Supported SSDs and Operating Sytems

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

### Additional Information

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

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

# F.1 Hardware Key

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

| Intel® VROC Keys | | | |
|---|---|---|---|
| **VROC Package** | **Description** | **Part Number** | **Intel MM Number** |
| Standard | RAID 0, 1, 10<br>Supports 3rd party SSDs | AOC-VROCSTNMOD | 951605 |
| Premium | RAID 0, 1, 5, 10<br>Supports 3rd party SSDs | AOC-VROCPREMOD | 951606 |
| Intel SSD only | RAID 0, 1, 5, 10<br>Supports Intel SSDs only | AOC-VROCINTMOD | 956822 |

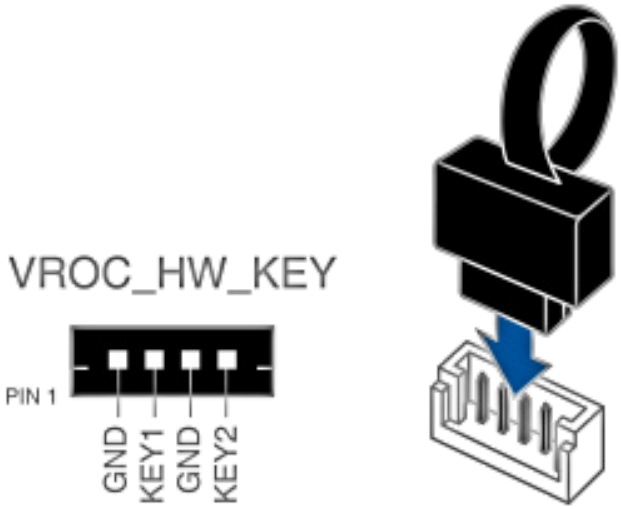



**Figure F-1. Intel® VROC RAID Key and Motherboard Connector JRK1**

# F.2 Enabling NVMe RAID

RAID for NVMe SSDs must be enabled through the UEFI BIOS.

1. Install the patch as described in the Restrictions and Requirements section on a previous page.
2. Reboot the server.
3. Press [DEL] key to enter BIOS.
4. Switch to **Advanced > Chipset Configuration > North Bridge > IIO Configuration > Intel VMD Technology > Intel VMD for Volume Management Device on CPU1**.
5. **Enable** the VMD.

Enable VMD Config for PStack0 and enable all the sub-items under PStack0

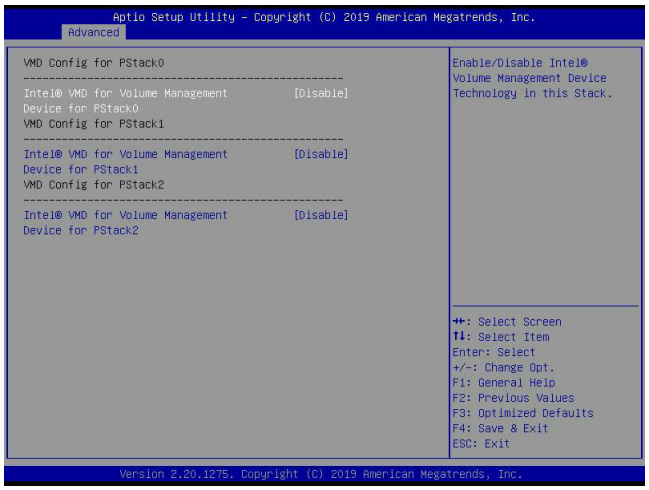



**Figure F-2. BIOS VMD Settings**

6. Press [F4] to save the configuration and reboot the system.
7. Press [DEL] to enter BIOS.
8. Switch to **Advanced > Intel® Virtual RAID on CPU > All Intel VMD Controllers > Create RAID Volume**.
9. Set **Name**.
10. Set **RAID Level**.

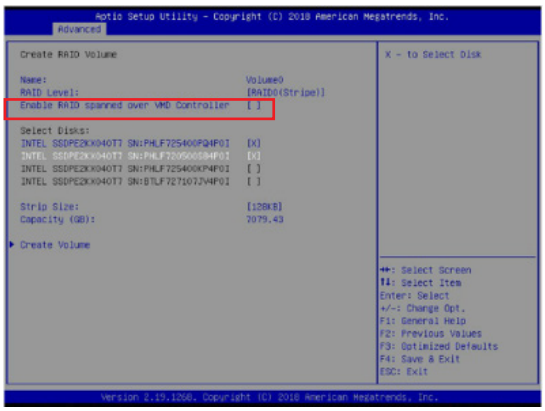



**Figure F-3. Created Volume *without* enabling RAID spanned over VMD controller**

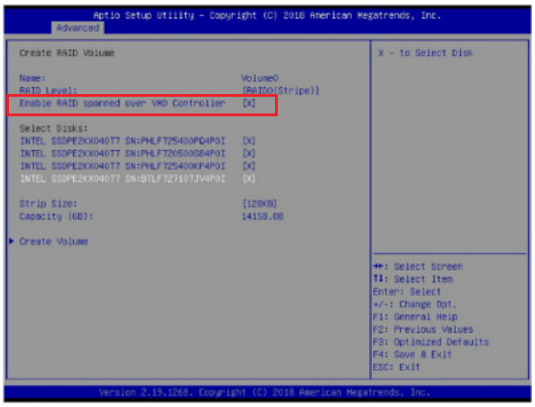



**Figure F-4. Created Volume *with* enabling RAID spanned over VMD controller**

11. If cross-controller RAID is required, select **Enable RAID spanned over VMD Controller** as shown in Figure F-4. Do not select Spanned for a bootable RAID volume.
12. Select specific disks for RAID with an [X].
    - RAID0: Select at least two [2 - 24] disks
    - RAID1: Select only two disks
    - RAID5: Select at least three [3 - 24] disks
    - RAID10: Select only four disks
13. Select **Strip Size** (Default 64KB) and **Capacity** (in GB).
14. Select **Create Volume**.
15. If another RAID is needed, start again at step 6.
16. Press [F4] to save and reboot.

# F.3 Status Indications

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

| Drive Carrier Status LED Indicator | |
|---|---|
| **Status** | **State (red)** |
| Normal function | Off |
| Locating | 4 Hz blink |
| Fault | Solid on |
| Rebuilding | 1 Hz Blink |

IBPI SFF 8489 Defined Status LED States

# F.4 Hot Swap Drives

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

## Hot-unplug

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

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

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

## Hot-plug

- Physically install the device.

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

## Related Information Links

[1] https://kb.vmware.com/s/article/2151404

[2] https://docs.vmware.com/en/VMware-vSphere/6.5/com.vmware.vsphere.storage.doc/GUID-1B56EF97-F60E-4F21-82A7-8F2A7294604D.html

[3] https://docs.vmware.com/en/VMware-vSphere/6.5/com.vmware.vsphere.storage.doc/GUID-F2E75F67-740B-4406-9F0C-A2D99A698F2A.html