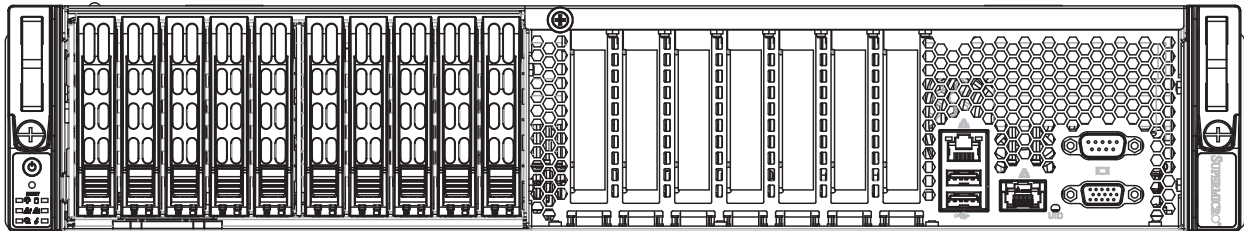




SuperServer[®] 2049P-TN8R



USER'S MANUAL

Revision 1.0

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 B 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 1.0

Release Date: August 23, 2019

Unless you request and receive written permission from Super Micro Computer, Inc., you may not copy any part of this document. Information in this document is subject to change without notice. Other products and companies referred to herein are trademarks or registered trademarks of their respective companies or mark holders.

Copyright © 2019 by Super Micro Computer, Inc.

All rights reserved.

Printed in the United States of America

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 SuperServer 2049P-TN8R. Installation and maintenance should be performed by experienced technicians only.

Please refer to the 2049P-TN8R server specifications page on our website for updates on supported memory, processors and operating systems (<http://www.supermicro.com>).

Notes

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

- Supermicro product manuals: <http://www.supermicro.com/support/manuals/>
- Product drivers and utilities: <https://www.supermicro.com/wftp/driver>
- Product safety info: http://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 1 Introduction

1.1 Overview.....	9
1.2 Unpacking the System	9
1.3 System Features	10
1.4 Server Chassis Features.....	11
Control Panel	11
Front Features.....	12
Rear Features	13
1.5 Motherboard Layout	14
Quick Reference Table.....	15

Chapter 2 Server Installation

2.1 Overview.....	17
2.2 Preparing for Setup	17
Choosing a Setup Location.....	17
Rack Precautions	17
Server Precautions.....	18
Rack Mounting Considerations	18
Ambient Operating Temperature.....	18
Airflow	18
Mechanical Loading.....	18
Circuit Overloading	19
Reliable Ground.....	19
2.3 Installing the Rails	20
Identifying the Rails.....	20
Releasing the Inner Rail.....	21
Installing the Inner Rails on the Chassis	22
Installing the Outer Rails onto the Rack	23
Sliding the Chassis onto the Rack Rails.....	24
Removing the Chassis from the Rack	25

Chapter 3 Maintenance and Component Installation

3.1 Removing Power	26
3.2 Accessing the System.....	26
3.3 Processor and Heatsink Installation.....	30
The Intel® Xeon® Scalable Processors Series	30
Overview of the Processor Carrier Assembly	31
Overview of the CPU Socket	31
Overview of the Processor Heatsink Module.....	32
Creating the Non-F Model Processor Carrier Assembly.....	33
Assembling the Processor Heatsink Module	34
Preparing the CPU Socket for Installation	35
Installing the Processor Heatsink Module.....	36
Removing the Processor Heatsink Module.....	37
3.4 Memory Support and Installation	38
ESD Precautions	38
Precautions	38
Introduction to Intel® Optane DC Persistent Memory	38
Memory Support.....	38
DDR4 Memory Support for the Intel Xeon Scalable-SP Processors.....	39
DDR4 Memory Support for the 2nd Gen Intel Xeon Scalable-SP Processors.....	39
Memory Installation Sequence	39
General Memory Population Requirements	40
DIMM Population Guidelines for Optimal Performance	40
DDR4 Memory Population Table for the Motherboards based-on the Intel Xeon Scalable-SP-based Processors.....	44
DDR4 Memory Population Table w/Half Memory Configuration Support (w/24 DIMMs Installed)	44
DDR4 Memory Population Table w/Full Memory Configuration Support (w/48 DIMMs Installed)	44
DCPMM Population for the Motherboards based on the 2nd Gen Intel Xeon Scalable-SP Processors with Full Configuration (48-DIMMs Installed).....	45
DIMM Installation	48
DIMM Module Removal.....	48
Motherboard Battery	49

PCI-E Expansion Cards Installation.....	50
Installing an Expansion Card.....	50
3.5 Chassis Components	51
Front Bezel.....	51
Hard Drives	51
Drive Carrier Indicators.....	54
Hot-Swap for NVMe Drives	55
Checking the Temperature of an NVMe Drive	55
System Cooling	56
Replacing a System Fan	56
Air Shroud.....	57
Power Supply	58
Chapter 4 Motherboard Connections	
4.1 Power Connections	60
4.2 Headers and Connectors	61
4.3 Ports	63
Front I/O Ports	63
Front Control Panel.....	66
4.4 Jumpers.....	70
Explanation of Jumpers	70
4.5 LED Indicators.....	73
Chapter 5 Software	
5.1 Microsoft Windows OS Installation.....	74
5.2 Driver Installation.....	76
5.3 SuperDoctor® 5.....	77
5.4 IPMI	77
Chapter 6 UEFI BIOS	
6.1 Introduction.....	78
Starting the Setup Utility	78
6.2 Main Setup	79
6.3 Advanced Setup Configurations.....	81
6.4 Event Logs	125
6.5 IPMI	127

6.6 Security Settings	130
6.7 Boot Settings	134
6.8 Save & Exit.....	136

Appendix A BIOS Error Codes

Appendix B Standardized Warning Statements for AC Systems

Appendix C System Specifications

Appendix D UEFI BIOS Recovery

Appendix E Traditional Chinese Version of Safety Warnings

Appendix F CPU-Based RAID for NVMe

Contacting Supermicro

Headquarters

Address: Super Micro Computer, Inc.
980 Rock Ave.
San Jose, CA 95131 U.S.A.

Tel: +1 (408) 503-8000

Fax: +1 (408) 503-8008

Email: marketing@supermicro.com (General Information)
support@supermicro.com (Technical Support)

Website: www.supermicro.com

Europe

Address: Super Micro Computer B.V.
Het Sterrenbeeld 28, 5215 ML
's-Hertogenbosch, The Netherlands

Tel: +31 (0) 73-6400390

Fax: +31 (0) 73-6416525

Email: sales@supermicro.nl (General Information)
support@supermicro.nl (Technical Support)
rma@supermicro.nl (Customer Support)

Website: www.supermicro.nl

Asia-Pacific

Address: Super Micro Computer, Inc.
3F, No. 150, Jian 1st Rd.
Zhonghe Dist., New Taipei City 235
Taiwan (R.O.C)

Tel: +886-(2) 8226-3990

Fax: +886-(2) 8226-3992

Email: support@supermicro.com.tw

Website: www.supermicro.com.tw

Chapter 1

Introduction

1.1 Overview

This chapter provides a brief outline of the functions and features of the 2049P-TN8R. The 2049P-TN8R is based on the X11QPL motherboard and the CSE-218LTS-R2K21P chassis.

In addition to the motherboard and chassis, several important parts that are included with the system are listed below.

Main Parts List		
Description	Part Number	Quantity
8-pin female to 2x 4-pin female power, 30cm, 18AWG cable	CBL-PWEX-1076	1
Slimline SAS (LE) to Slimline SAS, INT, 57cm, 32AWG cable	CBL-SAST-1044	1
Slimline SAS (LE) to Slimline SAS, INT, 62cm, 32AWG cable	CBL-SAST-1045	1
Slimline SAS (LE) to Slimline SAS, INT, 39cm, 32AWG cable	CBL-SAST-1046	1
Slimline SAS x8 to Slimline SAS x8, INT, 10cm, 32AWG cable	CBL-SAST-1048	1
2U Passive CPU Heat Sink with Narrow Retention Mechanism	SNK-P0068PS	4
MINI SAS-4 SAA, INT, 51cm, 51cm SB, 30AWG cable	CBL-0097L-03	1
2U Hybrid Backplane for 2xSAS3/SATA3 and 8xSAS3/SATA3/NVMe	BPN-NVMe3-218L-S2	1
Black Gen 3 2.5" NVMe drive tray, orange tab with lock	MCP-220-00121-0B	8
Black Gen 3 hot-swap 2.5" HDD tray	MCP-220-00047-0B	2
80x80x38mm, 14.9K RPM, hot-swap cooling fan	FAN-0198L4	2
Rail Set, quick/quick, default for 2,3U 17.2"W	MCP-290-00057-0N	1
2U 2200W power supply with PMBus and 200-240Vdc input, RoHS	PWS-2K21A-2R1	2

1.2 Unpacking the System

Inspect the box the SuperServer 2049P-TN8R was shipped in and note if it was damaged in any way. If any equipment appears damaged, please file a damage claim with the carrier who delivered it.

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

1.3 System Features

The following table provides you with an overview of the main features of the 2049P-TN8R. Please refer to Appendix C for additional specifications.

System Features
Motherboard
X11QPL
Chassis
CSE-218LTS-R2K21P
CPU
Four Intel® Xeon® Scalable Processors in Socket P0 with up to 205W TDP for VM optimized SKUs. Three UltraPath Interconnects (UPI) up to 10.4GT/s per processor.
Memory
Supports up to 12TB of DDR4 3DS LRDIMM/LRDIMM/3DS RDIMM/RDIMM ECC memory of up to 2933*/2666 MHz in 48 DIMM slots. (* Note: Support for 2933MHz memory is dependent on the CPU SKU.) Supports up to 18TB memory with Intel Optane DC Persistent Memory modules.
Chipset
Intel PCH C621 chipset
Expansion Slots
Two low-profile PCI-E 3.0 x16 slots Five low-profile PCI-E 3.0 x8 slots
Input/Output
Front panel: one VGA port, one COM port, two USB 3.0 ports Internal: one USB 3.0 header with two connections, one Type A USB 3.0 connector
Network
Front panel: one GbE LAN, one IPMI dedicated LAN
Hard Drives
Front panel: eight hot-swappable U.2 NVMe hard drives, two 2.5" SAS/SATA3 drives Internal: two M.2 SATA/PCI-E connectors in the 22110 form factor
Power
Dual 2200W Titanium level redundant power supply
Cooling
Two 8cm heavy duty rear fans
Dimensions
(WxHxD) 17.2 x 3.5 x 30.2-in (437 x 89 x 767-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.

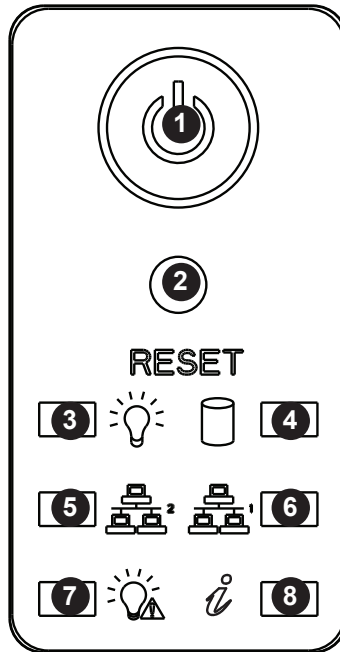


Figure 1-1. Control Panel View

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 must also unplug the system 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 activity on a hard drive when flashing
5	NIC2 LED	Indicates network activity on LAN port 2 when flashing
6	NIC1 LED	Indicates network activity on LAN port 1 when flashing
7	Power Fail LED	Indicates a power supply module has failed
8	Universal Information LED	See table below for details

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 CSE-218LTS-R2K21P is a 2U chassis. See the illustration below for the features included on the front of the chassis.

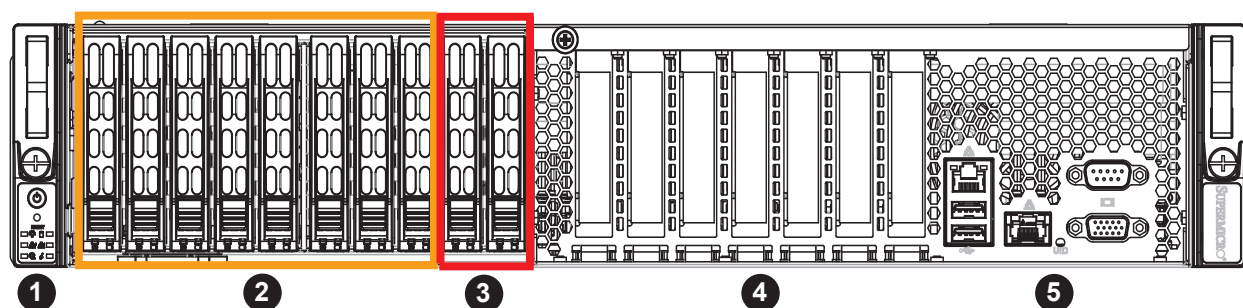


Figure 1-2. Chassis Front View

Front Chassis Features		
Item	Feature	Description
1	Control Panel	Control panel for the server. See Section 1.4 for details
2	Hard Drive Carriers	Eight hot-swap hard drive carriers for NVMe drives
3	Hard Drive Carriers	Two hard drive carriers for SAS/SATA3 drives
4	Expansion Slots	Seven PCI-E Expansion Slots
5	Input/Output	Two USB 3.0, one IPMI dedicated LAN, one GbE LAN, one VGA, one COM

Rear Features

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

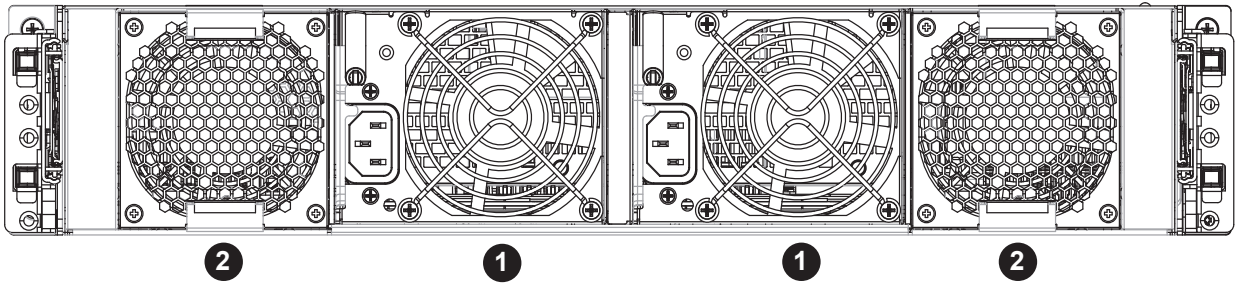


Figure 1-3. Chassis Rear View

Rear Chassis Features		
Item	Feature	Description
1	Power Supplies	Two redundant power supplies
2	Cooling Fans	Two hot-swappable heavy duty cooling fans

1.5 Motherboard Layout

Below is a layout of the X11QPL with jumper, connector and LED locations shown. See the table on the following page for descriptions. For detailed descriptions, pinout information and jumper settings, refer to Chapter 4.

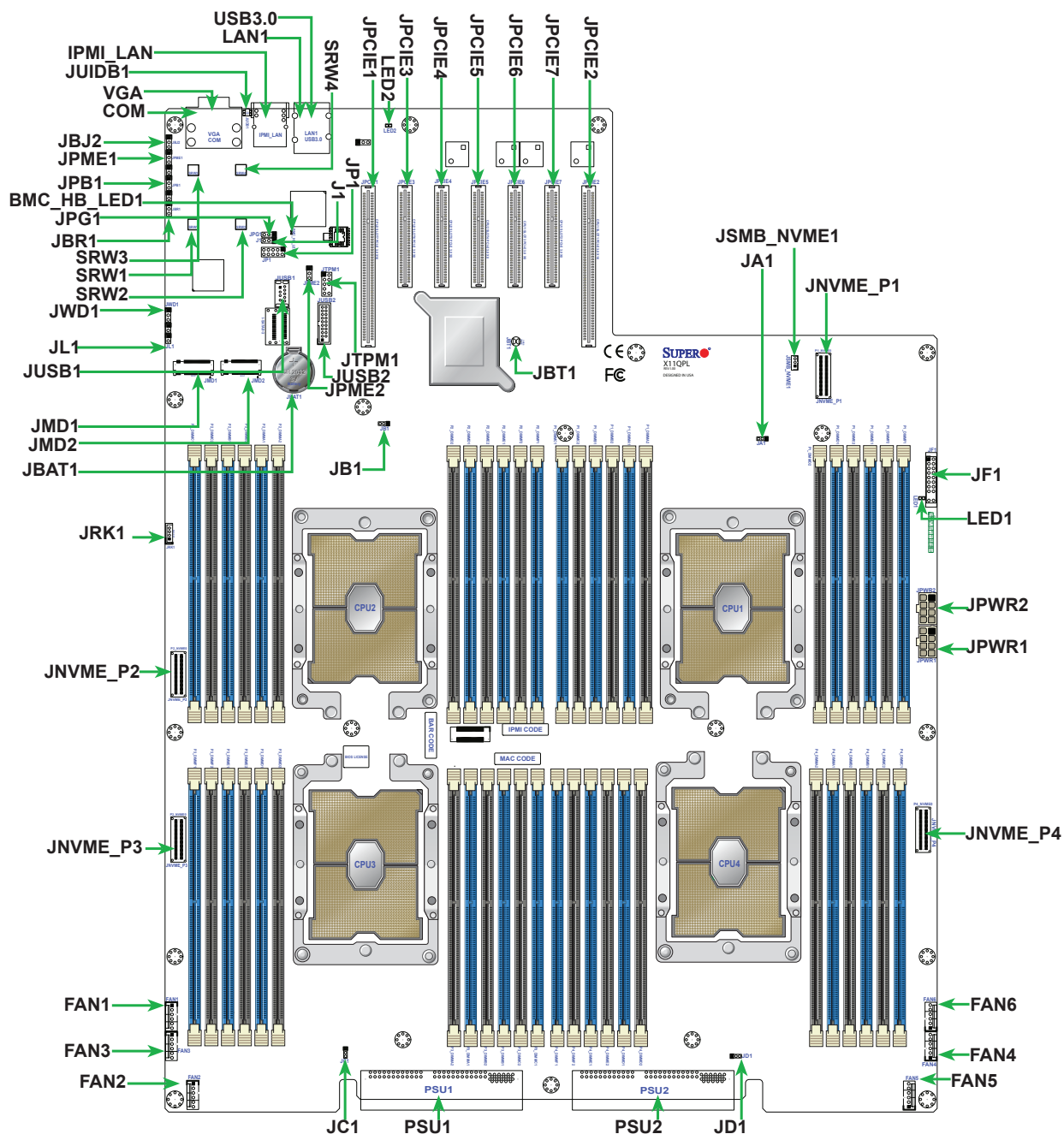


Figure 1-4. Motherboard Layout

Quick Reference Table

Jumper	Description	Default Setting
J1	PWR Fail Trigger Thermal Throttle	Pins 1-2 (Disabled)
JBR1	Top (BOOT) Block Swap	Pins 1-2 (Disabled)
JB2	ASD Debug Enabled jumper	Pins 1-2 (Disabled)
JBT1	CMOS Clear	Open (Normal)
JP1	CPLD flash header	
JPB1	BMC Enabled/Disabled	Pins 1-2 (Enabled)
JPG1	VGA Enabled	Pins 1-2 (Enabled)
JPME1	ME Recovery	Pins 1-2 (Normal)
JPME2	Manufacture (ME) Mode Select	
JWD1	Watch Dog Enabled	Pins 1-2 (Reset)
JA1/JB1/JC1/JD1	VRM_12C header	

Connector	Description
COM	Backplane COM port
FAN1-6	System/CPU cooling fan headers (FAN1- FAN6)
IPMI_LAN	Dedicated IPMI LAN port
I-SATA0-3	SATA 3.0 ports 0-3 supported by the Intel C621 chipset
JBAT1	Onboard CMOS battery
JF1	Front Control Panel header
JL1	Chassis Intrusion header (Note: Connect a cable from JL1 to the chassis to receive alerts via IPMI when the chassis is forced open.)
JMD1	M.2 PCI-E 3.0 x4 SATA4 connector (M-Key 22110)
JMD2	M.2 PCI-E 3.0 x4 S-SATA2 connector (M-Key 22110)
JNVME_P1/JNVME_P2/ JNVME_P3/JNVME_P4	P1_NVME0/P2_NVME0/P3_NVME0/P4_NVME0
JPWR1/JPWR2	12V 8-pin power connectors for the backplane (BPN-NVME3-218L-S2)
JRK1	Onboard VROC RAID Key header for Solid State Devices (SSD)
JSMB_NVME1	NVME_I2C header
JTPM1	Trusted Platform Module/Port 80 connector
JUSB1	Type A USB 3.0 header
JUSB2	Universal Serial Bus (USB) header with two USB 3.0 connections
LAN1	1GbE port on the front panel
PSU1/PSU2	Power Supply Unit 1/Power Supply Unit 2
UID (JUIDB1)	Unit Identifier (UID) switch
USB0/1	Two USB 3.0 connections providing front access
USB4	One Type A USB header providing front access
VGA	VGA port

LED	Description	Status
BMC_HB_LED1	BMC Heartbeat LED	Blinking Green: BMC Normal
LED1	Power LED	Solid Green: Power On
LED2	UID LED	Solid Blue: Unit Identified

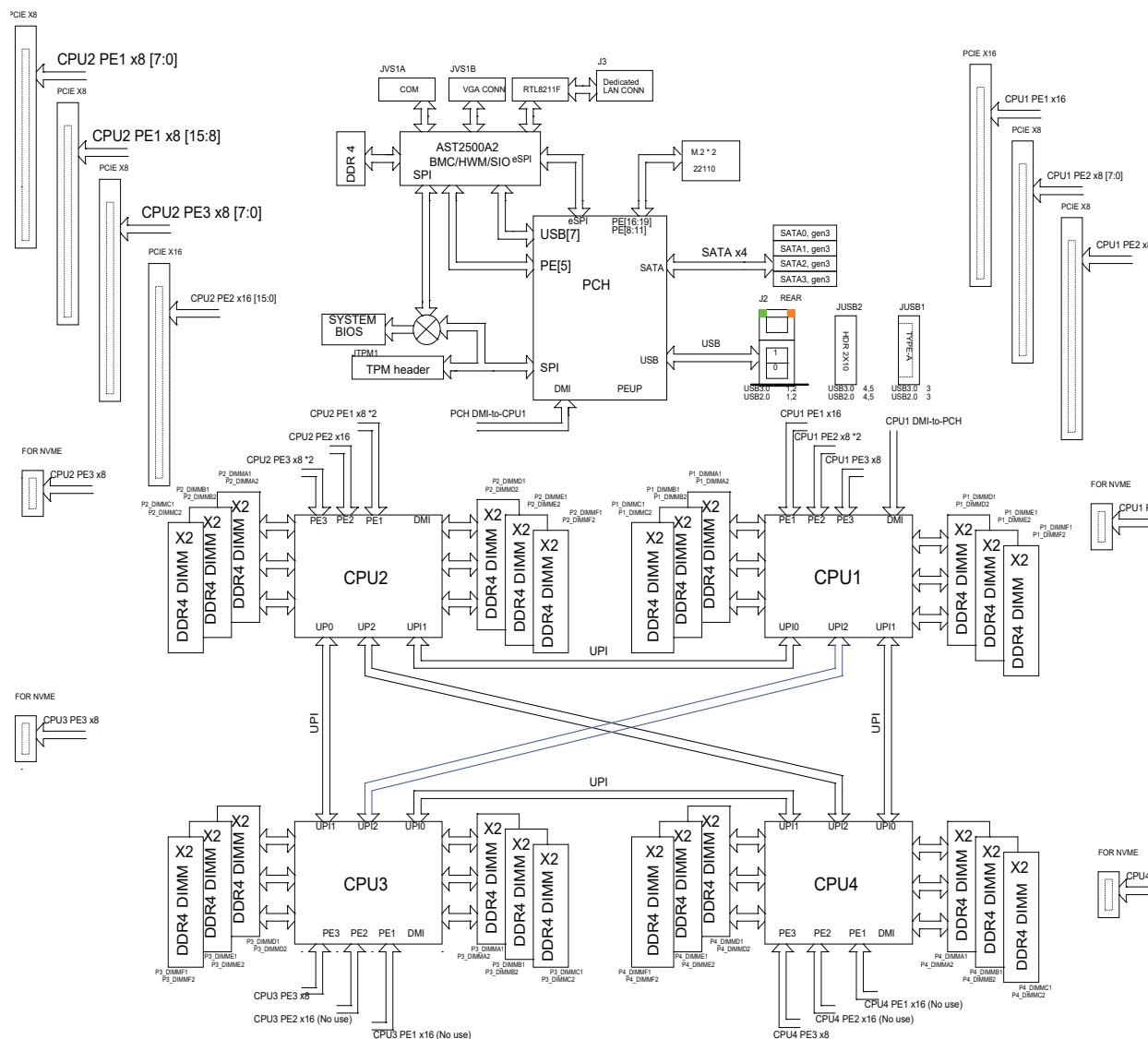


Figure 1-5. Intel PCH C621 Chipset: System Block Diagram

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

Server Installation

2.1 Overview

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

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

2.2 Preparing for Setup

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

Choosing a Setup Location

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

Rack Precautions

- Ensure that the leveling jacks on the bottom of the rack are extended to the floor so that the full weight of the rack rests on them.
- In single rack installations, stabilizers should be attached to the rack. In multiple rack installations, the racks should be coupled together.

- Always make sure the rack is stable before extending a server or other component from the rack.
- You should extend only one server or component at a time - extending two or more simultaneously may cause the rack to become unstable.

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.

2.3 Installing the Rails

There are a variety of rack units on the market, which may require a slightly different assembly procedure.

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

Identifying the Rails

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

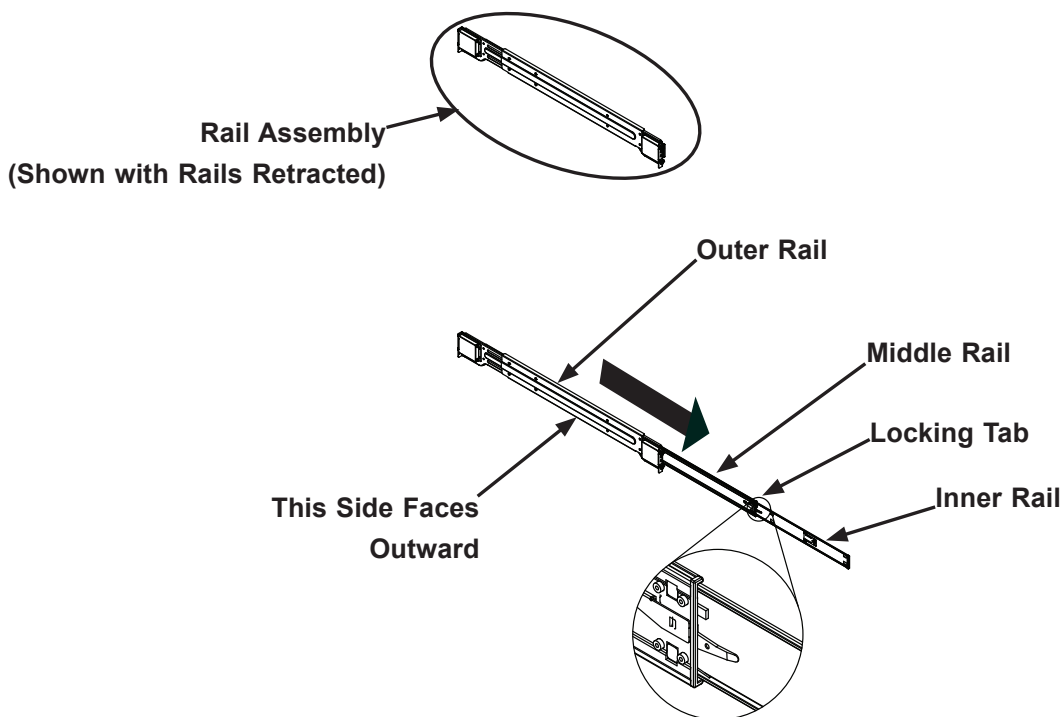


Figure 2-1. Identifying the Rail Sections



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



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

Releasing the Inner Rail

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

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

Releasing Inner Rail from the Outer Rails

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

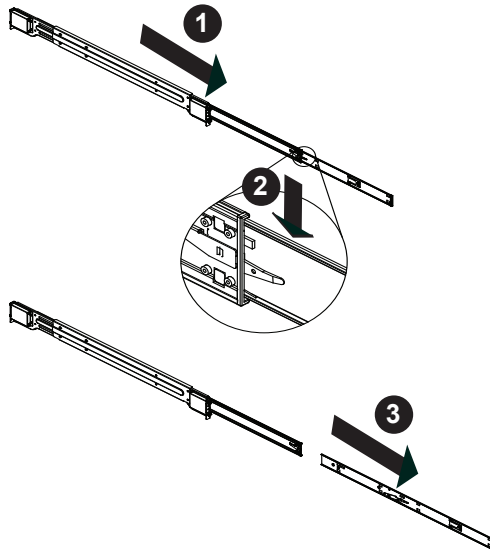


Figure 2-2. Extending and Releasing the Inner Rail

Installing the Inner Rails on the Chassis

Installing the Inner Rails

1. Identify the left and right inner rails. They are labeled.
2. Place the inner rail firmly against the side of the chassis, aligning the hooks on the side of the chassis with the holes in the inner rail.
3. Slide the inner rail forward toward the front of the chassis until the quick-release bracket snaps into place, securing the rail to the chassis.
4. Optionally, you can further secure the inner rail to the chassis with a screw.
5. Repeat for the other inner rail.

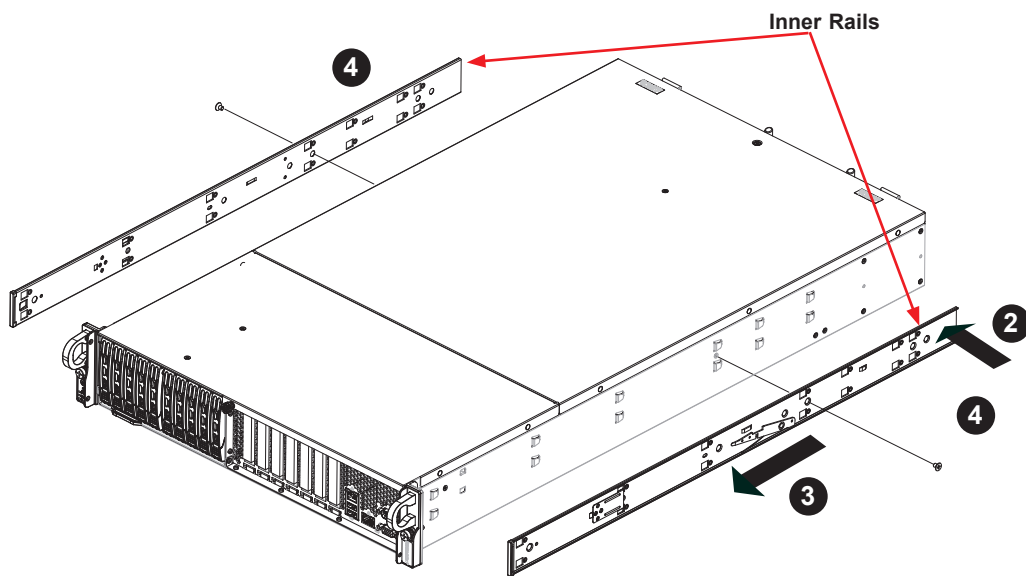


Figure 2-3. Installing the Inner Rails

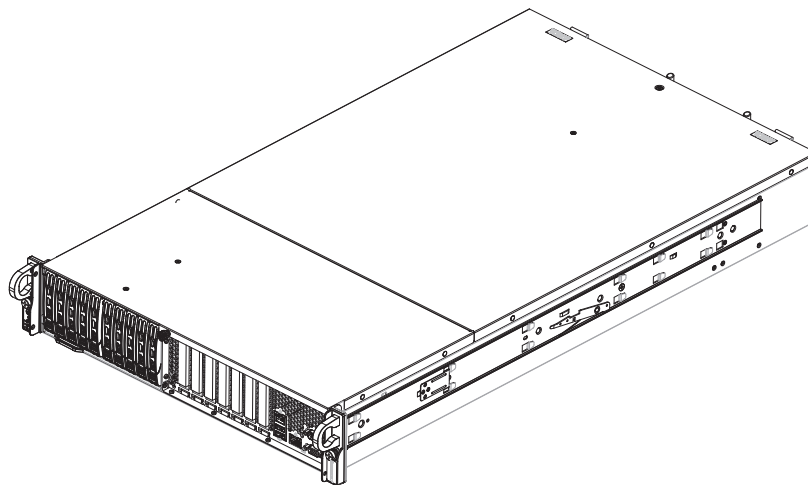


Figure 2-4. Inner Rails Installed on the Chassis

Installing the Outer Rails onto the Rack

Installing the Outer Rails

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

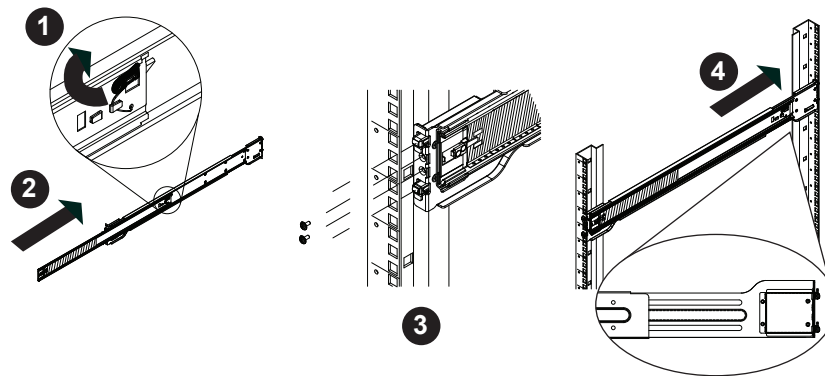


Figure 2-5. Extending and Mounting the Outer Rails

Note: Both front chassis rails and the rack rails have a locking tab, which serves two functions. First, it locks the server into place when installed and pushed fully into the rack (its normal operating position). In addition, these tabs lock the server in place when fully extended from the rack. This prevents the server from coming completely out of the rack when pulled out for servicing.



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.

Sliding the Chassis onto the Rack Rails



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

Installing the Chassis into a Rack

1. Extend the outer rails as illustrated above.
2. Align the inner rails of the chassis with the outer rails on the rack.
3. Slide the inner rails into the outer rails, keeping the pressure even on both sides. When the chassis has been pushed completely into the rack, it should click into the locked position.
4. Optional screws may be used to hold the front of the chassis to the rack.

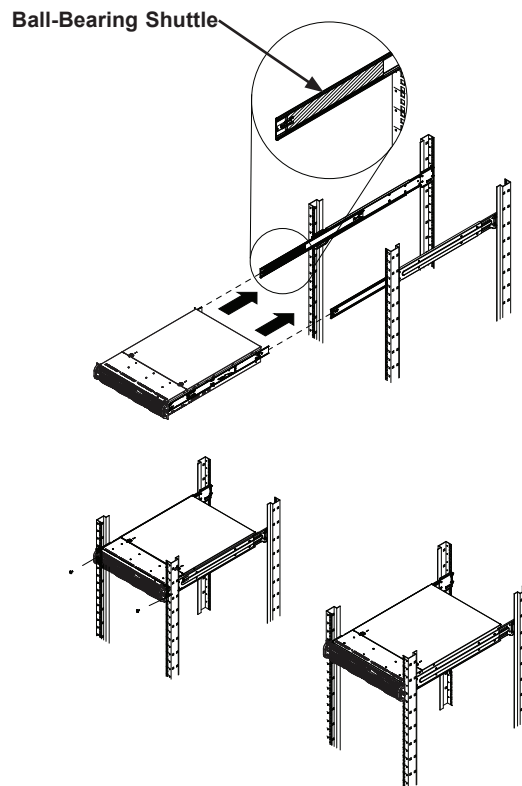


Figure 2-6. Installing into a Rack



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

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

Removing the Chassis from the Rack

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

1. Remove the screws that hold the front of the server to the rack.
2. Pull the chassis forward out of the front of the rack until it stops.
3. Find the quick-release tab on each side of the chassis on the inner rails. Press down on the quick-release tab and 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.

Chapter 3

Maintenance and Component Installation

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

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

3.1 Removing Power

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

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

3.2 Accessing the System

The CSE-218LTS-R2K21P top cover comes in two sections, the front cover and the back cover. Remove the front cover before removing the back cover.

Removing the Top Covers

1. If rack mounted, remove the system from the rack and place on a stable surface.
2. Remove the two screws on the front cover.
3. Grab the knob at the front of the cover and slowly slide the cover towards the front of the chassis until the cover is no longer latched onto the notches.
4. Lift the front cover off.
5. Remove the two screws on the back cover.
6. Slide the back cover towards the back of the chassis until the cover is no longer latched onto the notches.
7. Lift the back cover off.



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

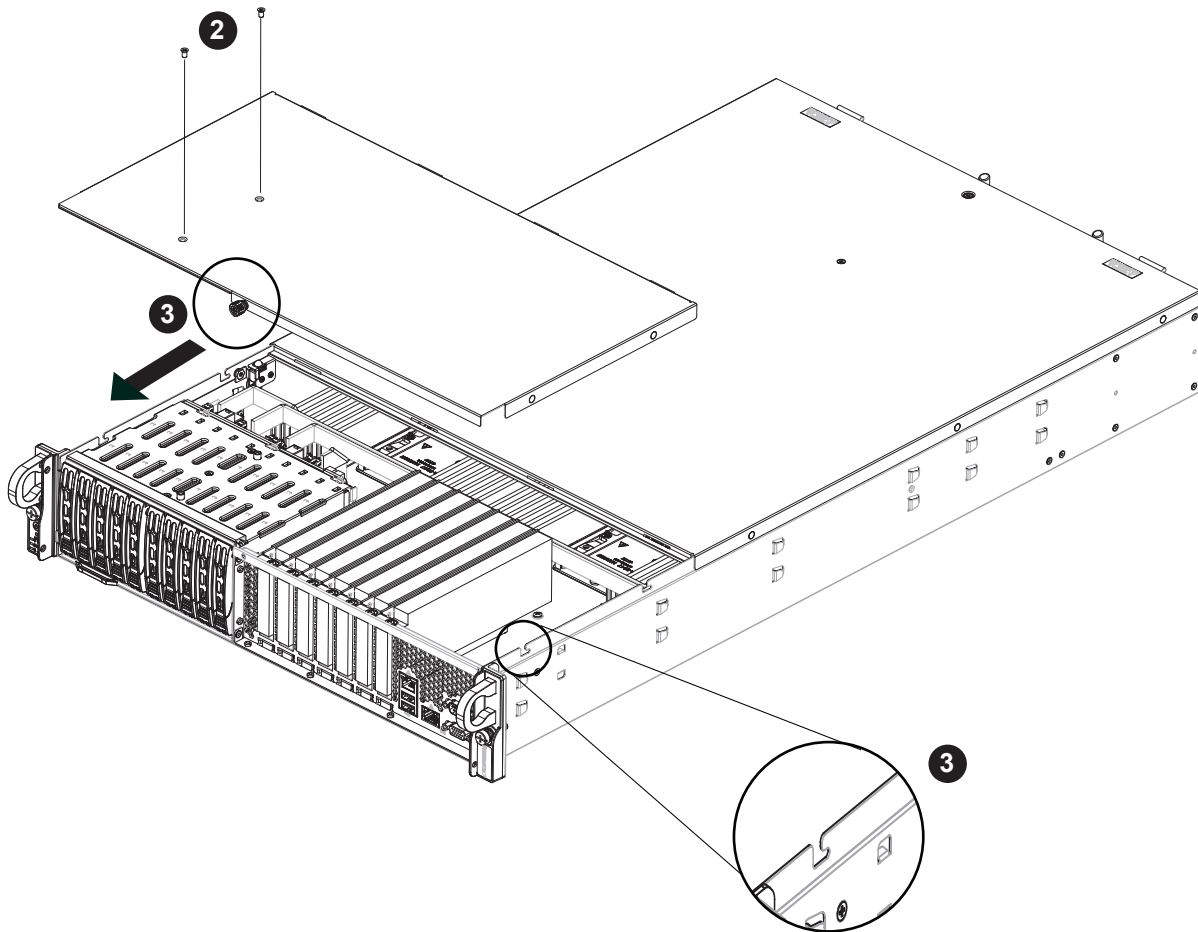


Figure 3-1. Removing the Chassis Front Cover

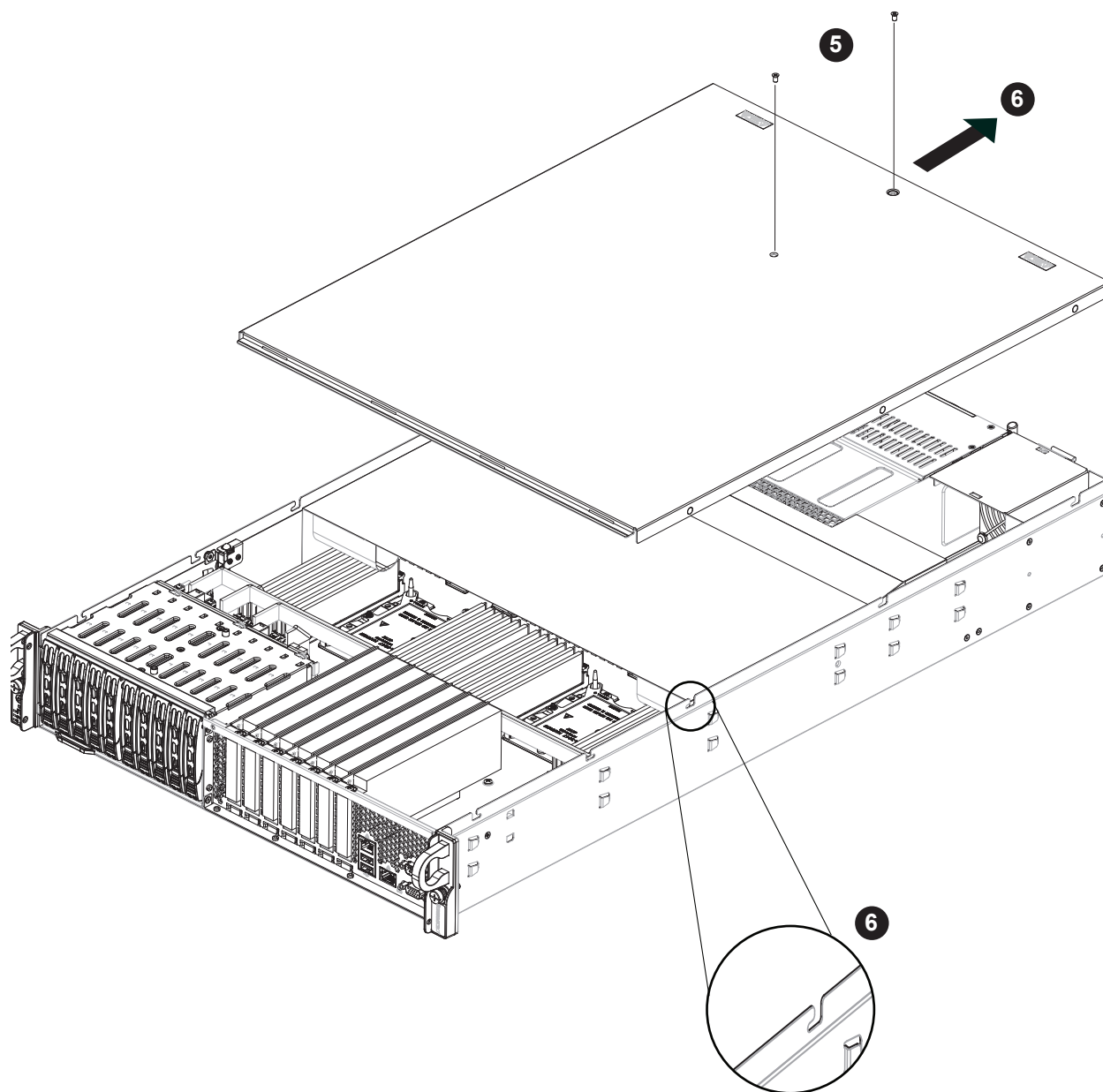


Figure 3-2. Removing the Chassis Back Cover

Replacing the Top Covers

1. Align the back cover with the notches on the chassis. Slide the cover towards the front of the chassis until the cover is hooked into the notches on the chassis.
2. Replace the two screws on the back cover.
3. Align the four tabs on the front cover with the four slots on the back cover. Align the front cover with the notches on the chassis. Push the cover towards the back of the chassis until the cover is in place.
4. Replace the two screws on the front cover.

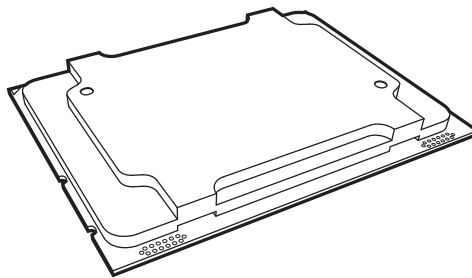
3.3 Processor and Heatsink Installation

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

Notes:

- Use ESD protection.
- 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 illustrations only. Your components may look different.

The Intel® Xeon® Scalable Processors Series

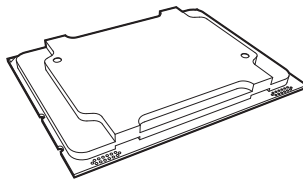


Non-Fabric Model

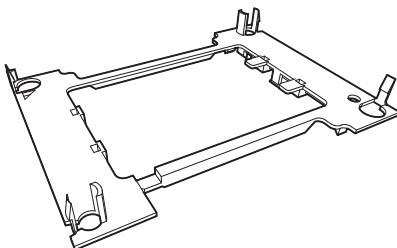
Overview of the Processor Carrier Assembly

The processor carrier assembly contains the Intel Xeon Non-Fabric (Non-F) processor and a processor carrier.

1. Non-F Processor



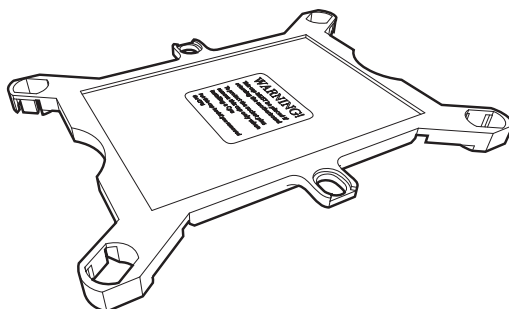
2. Processor Carrier



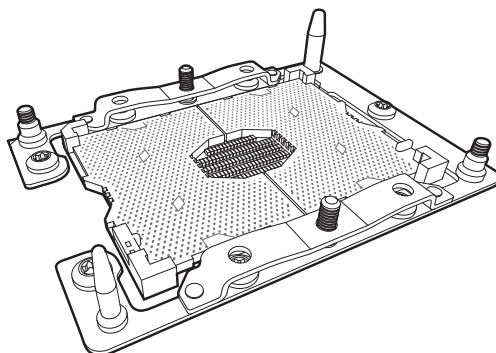
Overview of the CPU Socket

The CPU socket is protected by a plastic protective cover.

1. Plastic Protective Cover



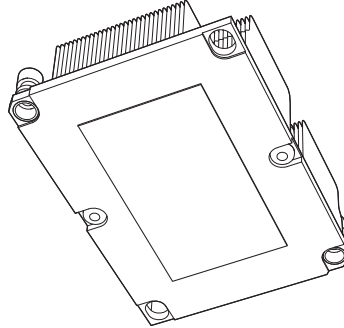
2. CPU Socket



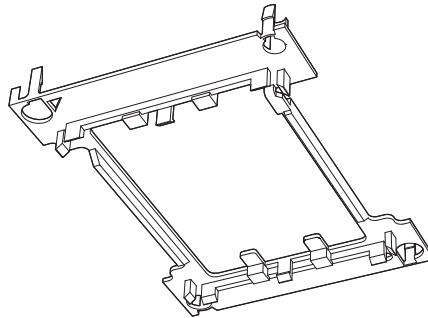
Overview of the Processor Heatsink Module

The Processor Heatsink Module (PHM) contains a heatsink, a processor carrier, and the Intel Xeon Non-Fabric (Non-F) processor.

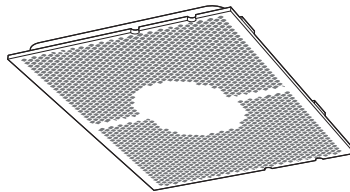
1. Heatsink with Thermal Grease



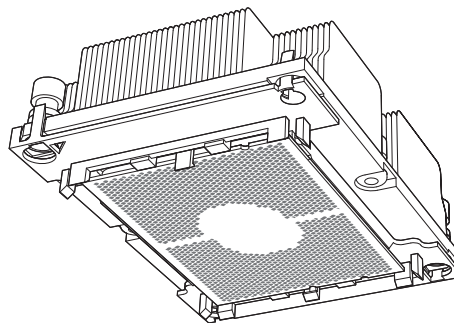
2. Processor Carrier



3. Non-F Processor



Processor Heatsink Module

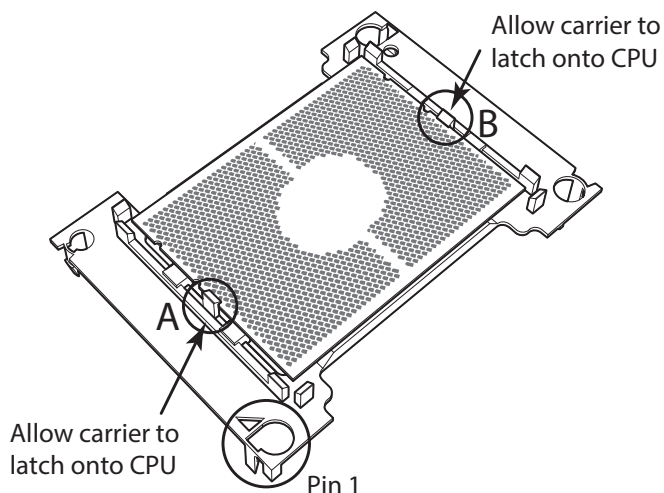
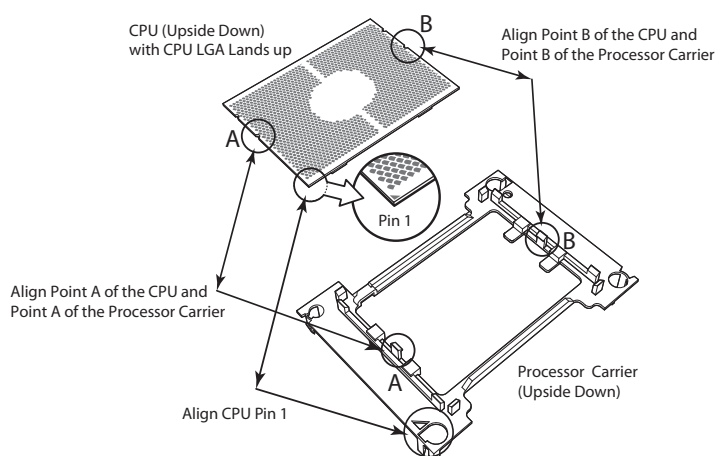


Bottom View

Creating the Non-F Model Processor Carrier Assembly

To install a Non-F model 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.

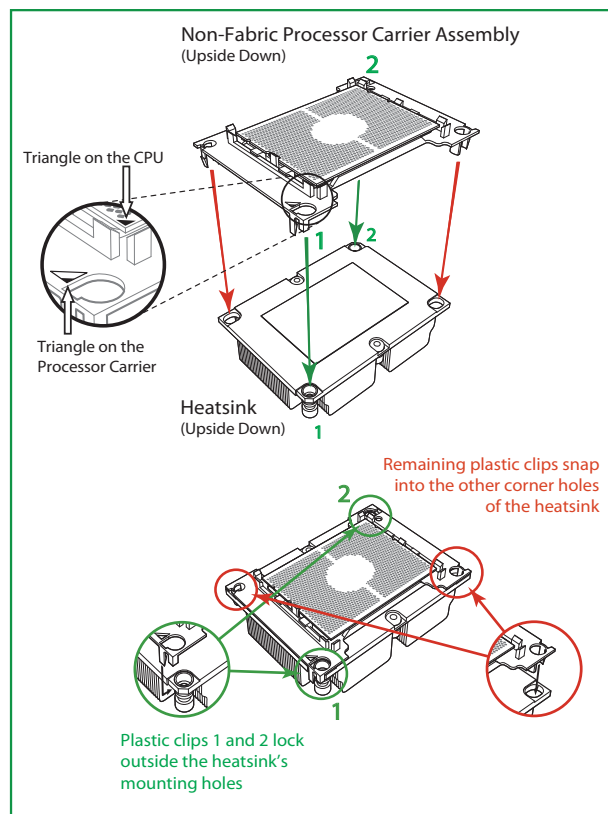


Processor Carrier Assembly (Non-F Model)

Assembling the Processor Heatsink Module

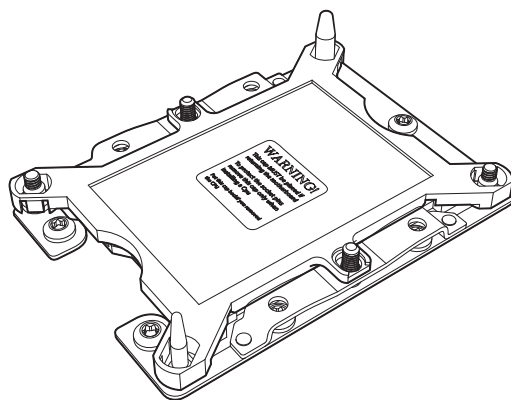
After creating the processor carrier assembly for the Non-F model processor, mount it onto the heatsink to create the processor heatsink module (PHM):

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.

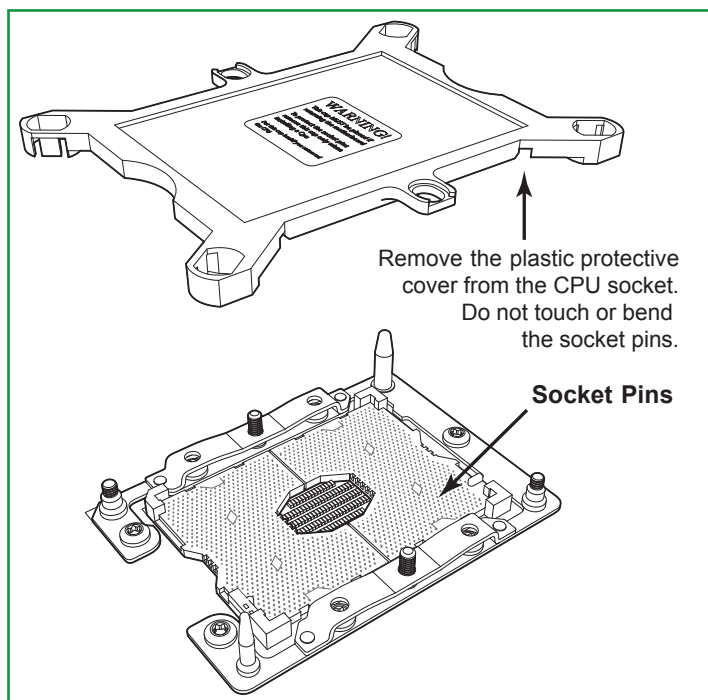


Preparing the CPU Socket for Installation

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



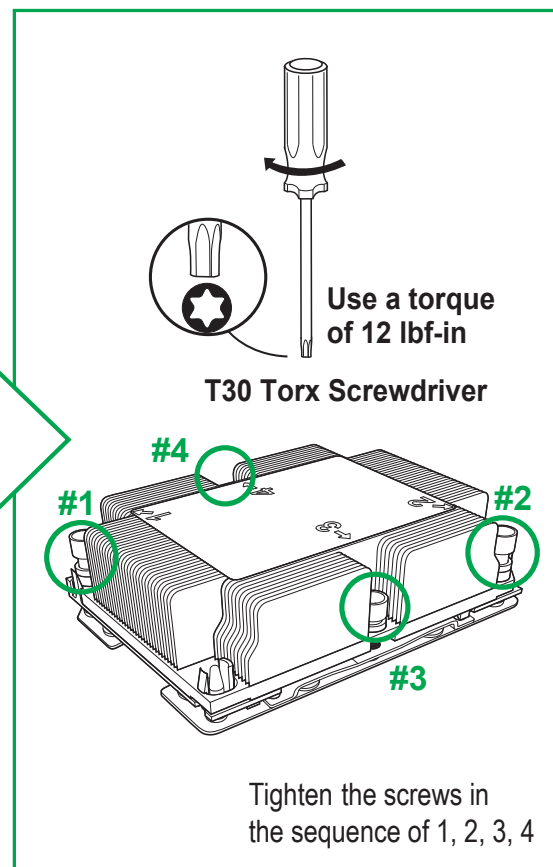
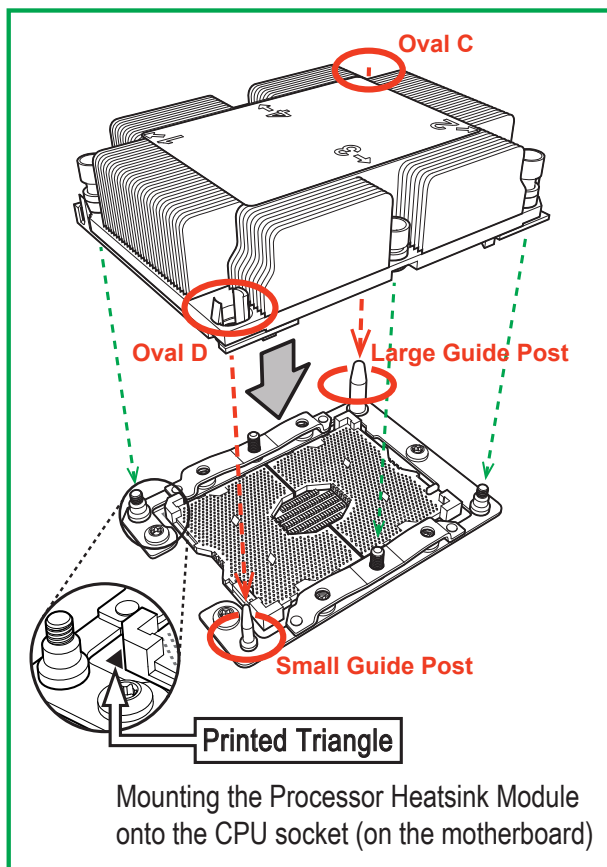
CPU Socket with Plastic Protective Cover



Installing the Processor Heatsink Module

After assembling the Processor Heatsink Module (PHM), install the PHM onto the CPU socket:

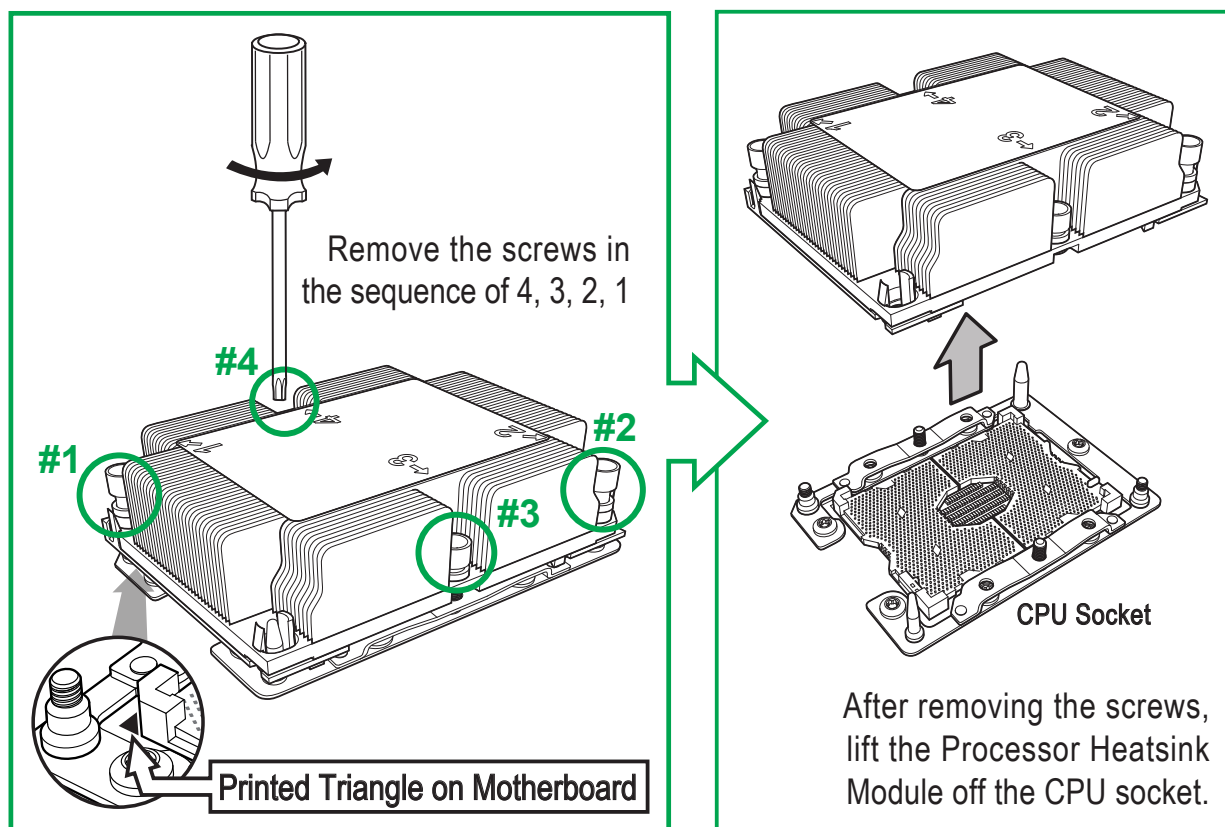
1. Align hole 1 of the heatsink with the printed triangle on the CPU socket. See the left image below.
2. Make sure all four holes of the heatsink are aligned with the socket before gently placing the heatsink on top.
3. With a T30 Torx-bit screwdriver, gradually tighten screws #1 - #4 to assure even 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.



Removing the Processor Heatsink Module

Before removing the processor heatsink module (PHM) from the motherboard, unplug the AC power cord from all power supplies after shutting down the system. Then follow the steps below:

1. Use a T30 Torx-bit screwdriver to loosen the four screws in a backwards sequence of #4, #3, #2, and #1.
2. Gently lift the PHM upwards to remove it from the socket.



3.4 Memory Support and Installation

Note: Check the Supermicro website for recommended memory modules.

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

ESD Precautions

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

Precautions

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

Introduction to Intel® Optane DC Persistent Memory

The 2nd Generation Intel® Xeon® Scalable Processors support new DCPMM (Optane™ DC Persistent Memory Modules) technology. DCPMM offers data persistence with higher capacity at lower latencies than the existing memory modules and provides hyper-speed storage capability for high performance computing platforms with flexible configuration options. Up to 24 DCPMMs are supported by the system.

Memory Support

The X11QPL motherboard supports up to 12TB of DDR4 3DS LRDIMM/LRDIMM/3DS RDIMM/RDIMM ECC memory at 2933*/2666 MHz in 48 DIMM slots. (***Note below**). Refer to the following tables for detailed information on memory support for the X11QPL motherboard.

Note: Support for 2933MHz memory is dependent on the CPU SKU.

DDR4 Memory Support for the Intel Xeon Scalable-SP Processors

DDR4 Memory Support						
Type	Ranks Per DIMM & Data Width	DIMM Capacity (GB)		Speed (MT/s); Voltage (V); Slots Per Channel (SPC) and DIMMs Per Channel (DPC)		
				1 Slot Per Channel	2 Slots Per Channel	
		DRAM Density		1DPC (1-DIMM Per Channel)	1DPC (1-DIMM Per Channel)	2DPC (2-DIMM Per Channel)
				4Gb*	8Gb	1.2 V
RDIMM	SRx4	4GB	8GB	2666	2666	2666
RDIMM	SRx8	8GB	16GB	2666	2666	2666
RDIMM	DRx8	8GB	16GB	2666	2666	2666
RDIMM	DRx4	16GB	32GB	2666	2666	2666
RDIMM 3Ds	QRX4	N/A	2H-64GB	2666	2666	2666
RDIMM 3Ds	8RX4	N/A	4H-128GB	2666	2666	2666
LRDIMM	QRx4	32GB	64GB	2666	2666	2666
LRDIMM 3Ds	QRX4	N/A	2H-64GB	2666	2666	2666
LRDIMM 3Ds	8Rx4	N/A	4H-128GB	2666	2666	2666

DDR4 Memory Support for the 2nd Gen Intel Xeon Scalable-SP Processors

DDR4 Memory Support							
Type	Ranks Per DIMM & Data Width	DIMM Capacity (GB)			Speed (MT/s); Voltage (V); Slots Per Channel (SPC) and DIMMs Per Channel (DPC)		
					1 Slot Per Channel	2 Slots Per Channel	
		DRAM Density			1DPC (1-DIMM Per Channel)	1DPC (1-DIMM Per Channel)	2DPC (2-DIMM Per Channel)
		4Gb*	8Gb	16Gb	1.2 V	1.2 V	1.2 V
RDIMM	SRx4	4GB	8GB	16GB	2933	2933	2933
RDIMM	SRx8	8GB	16GB	32GB	2933	2933	2933
RDIMM	DRx8	8GB	16GB	32GB	2933	2933	2933
RDIMM	DRx4	16GB	32GB	64GB	2933	2933	2933
RDIMM 3Ds	QRX4	N/A	2H-64GB	2H-128GB	2933	2933	2933
RDIMM 3Ds	8RX4	N/A	4H-128GB	4H-256GB	2933	2933	2933
LRDIMM	QRx4	32GB	64GB	128GB	2933	2933	2933
LRDIMM 3Ds	QRX4	N/A	2H-64GB	2H-128GB	2933	2933	2933
LRDIMM 3Ds	8Rx4	N/A	4H-128GB	4H-256GB	2933	2933	2933

Memory Installation Sequence

Memory modules for the X11QPL motherboard are populated using the "Fill First" method. The blue memory slot of each channel is considered the "first DIMM module" of the channel, and the black slot, the second module of the channel. When installing memory modules, be sure to populate the blue memory slots first and then populate the black slots. To maximize memory capacity and performance, please populate all DIMM slots on the motherboard, including all blue slots and black slots.

General Memory Population Requirements

1. Be sure to use the memory modules of the same type and speed on the motherboard. Mixing of memory modules of different types and speeds is not allowed.
2. Using unbalanced memory topology such as populating two DIMMs in one channel while populating one DIMM in another channel on the same motherboard will result in reduced memory performance.
3. Populating memory slots with a pair of DIMM modules of the same type and size will result in interleaved memory, which will improve memory performance.

DIMM Population Guidelines for Optimal Performance

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

Key Parameters for DIMM Configuration

Key Parameters for DIMM Configurations	
Parameters	Possible Values
Number of Channels	1, 2, 3, 4, 5, or 6
Number of DIMMs per Channel	1DPC (1 DIMM Per Channel) or 2DPC (2 DIMMs Per Channel)
DIMM Type	RDIMM (w/ECC), 3DS RDIMM, LRDIMM, 3DS LRDIMM
DIMM Construction	non-3DS RDIMM Raw Cards: A/B (2Rx4), C (1Rx4), D (1Rx8), E (2Rx8) 3DS RDIMM Raw Cards: A/B (4Rx4) non-3DS LRDIMM Raw Cards: D/E (4Rx4) 3DS LRDIMM Raw Cards: A/B (8Rx4)

DIMM Mixing Guidelines

General DIMM Mixing Guidelines
DIMM Mixing Rules
<ul style="list-style-type: none"> • All DIMMs must be all DDR4 DIMMs. • 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.

(DDR4 Only) Socket Level Population Requirements	
DDR4 Socket Level Minimum Population Requirements	
<ul style="list-style-type: none"> There should be at least one DDR4 DIMM per socket. If only one DIMM is populated in a channel, then populate it in the slot furthest away from CPU. Always populate DIMMs with a higher electrical loading in DIMM0 followed by DIMM1. 	

(DDR4 Only) Memory Populations with Possible Mixes					
DDR4 RDIMM		DIMM0/DIMM1 Config. Set A	DIMM0/DIMM1 Config. Set B	DIMM0/DIMM1 Config. Set C	Possible Mixes DIMM0/DIMM1
Within IMC DIMM Population	DDR0	x8, None, x8, x8	x4, None, x4, x4	x8, x4, or x4, x8	Single Rank, None Single Rank, Single Rank Dual Rank, Single Rank, Dual Rank, None Dual Rank, Dual Rank, Single Rank, Single Rank
	DDR1	None or same as DDR0	None or same as DDR0	None or same as DDR0	
	DDR2	None or same as DDR1 (excludes DIMM 1 in 5DIMM configurations)	None or same as DDR1 (excludes DIMM 1 in 5DIMM configurations)	None or same as DDR1 (excludes DIMM 1 in 5DIMM configurations)	

(DDR4 Only) Memory Populations with Possible Mixes			
3DS LRDIMM or 3DS RDIMM		DIMM0/DIMM1 Config. Set A	Possible Mixes DIMM0/DIMM1
Within IMC DIMM Population	DDR0	x4, None, x4, x4	Quad Rank, None Quad Rank, Quad Rank Cannot mix 3DS LRDIMM and RDIMM
	DDR1	None or same as DDR0	
	DDR2	None or same as DDR1	

(DDR4 Only) Memory Populations with Possible Mixes			
LRDIMMs		DIMM0/DIMM1	Possible Mixes DIMM0/DIMM1
Within IMC DIMM Population	DDR0	x4, None, x4, x4	Quad Rank, None Quad Rank, Quad Rank Note: Requirements *Match DIMM types installed across DDR channels within an IMC *Always populate IMC0 first
	DDR1	None or same as DDR0	
	DDR2	None or same as DDR1	

(DDR4 Only) 2SPC Memory Configuration with x8 DIMMs				
	Total # of DIMMs	DDR Channel	Number of Ranks	Virtual Lock Step
DIMM Population within an IMC (Note: Uniformly populate with x8 DRAMs DIMMs)	1 x8 DIMM	Must be installed on IMC0 DDR Channel 0	1	N/A
			>1	SVLS
	2 x8 DIMMs	DDR0: Populate with 1 DIMM DDR1: Populate identically as DDR0	1	N/A
			>1	SVLS
	3 x8 DIMMs	DDR0: Populate with 1 DIMM DDR1: Populate identically as DDR0 DDR2: Populate identically as DDR1	1	N/A
			>1	SVLS
	4 x8 DIMMs	DDR0: Populate with 2 DIMMs DDR1: Populate identically as DDR0	x	SVLS
DIMM Population within an IMC (Note: Non-equal in rank pair of x8 DIMMs)	1 pair of DIMMs	DDR0: Populate with 1 DIMM DDR1: Populate the second DIMM (for best performance)	1	N/A
			>1	SVLS
	2 pairs of DIMMs	DDR0: Populate with 1 pair of non-equal rank DIMMs DDR1: Populate identically as DDR0	1	N/A
			>1	SVLS
	3 pairs of DIMMs	DDR0: Populate with 1 pair of non-equal rank DIMMs DDR1: Populate identically as DDR0 DDR2: Populate identically as DDR1	x	SVLS
	2 pairs+1 (5DIMMs)	DDR0: Populate with 1 pair of non-equal rank DIMMs DDR1: Populate with identical DIMMs as DDR0 DDR2: DIMM0 is populated with identical DIMM as DDR1	>1	SVLS
			>1	SVLS

(DDR4 Only) 2SPC Memory Configuration with x4 DIMMs				
	Total # of DIMMs	DDR Channel	Number of Ranks	Adaptive Virtual Lock Step
DIMM Population within an IMC Note: Uniformly populate with x4 DRAMs/DIMMs	1 x4 DIMM	Must be installed on iMC0 DDR Channel 0	1	Y, only Bank VLS
			>1	Y
	2 x4 DIMMs	DDR0: Populate with 1 DIMM DDR1: Populate identically as DDR0	1	Y, only Bank VLS
			>1	Y
	3 x4 DIMMs	DDR0: Populate with 1 DIMM DDR1: Populate identically as DDR0 DDR2: Populate identically as DDR1	1	Y, only Bank VLS
			>1	Y
	4 x4 DIMMs	DDR0: Populate with 2 DIMMs DDR1: Populate identically as DDR0	x	Y
DIMM Population within an IMC Note: Non-equal in rank pair of x4 DIMMs	5 x4 DIMMs	DDR Channel 0, 1, 2: DIMM0 is populated with identical DIMMs, DDR Channel 0, 1: DIMM1 is populated with identical DIMMs	>1	Y
	6 x4 DIMMs	Populate 2 DIMMs per DDR channel	x	Y
	1 pair of DIMMs	DDR0: Populate with 1 DIMM DDR1: Populate the second DIMM (for best performance)	>1	Y
	2 pairs of DIMMs	DDR0: Populate with 1 pair of non-equal rank DIMMs DDR1: Populate identically as DDR0	>1	Y
	3 pairs of DIMMs	DDR0: Populate with 1 pair of non-equal rank DIMMs DDR1: Populate identically as DDR0 DDR2: Populate identically as DDR1	x	Y
	2 pairs+1 (5DIMMs)	DDR0: Populate with 1 pair of non-equal rank DIMMs DDR1: Populate with identical DIMMs as DDR0 DDR2: DIMM0 is populated with identical DIMM as DDR1	>1	Y

(DDR4 Only) 2SPC Memory Configuration with x8/x4 DIMMs Mixed			
DDR4 RDIMM	Total # of DIMMs	DDR Channel	ADDC/SDDC Features
DIMM Population within an IMC	1 pair of x8, x4	DDR0: Populate with 1 DIMM DDR1: Populate the second DIMM (for best performance)	No
	2 pairs of x8, x4	Populate with 1 pair of DIMMs on DDR0, and identical pair on DDR1	No
	3 pairs of x8, x4	A pair of DIMMs on DDR0, and identical pair on DDR1, and DDR2	No

DDR4 Memory Population Table for the Motherboards based-on the Intel Xeon Scalable-SP-based Processors

Note: Unbalanced memory configuration decreases memory performance and is not recommended for Supermicro motherboards.

DDR4 Memory Population Table w/Half Memory Configuration Support (w/24 DIMMs Installed)

Memory Population Table for the 4-way Motherboard w/Half Memory Configuration Support (X11QPL w/4 CPUs & 24 DIMMs Installed)	
4 CPUs & 24 DIMMs (6 DIMMs per CPU)	Memory Population Sequence
CPU1 + 6 DIMMs	CPU1: P1-DIMMC1/P1-DIMMB1/P1-DIMMA1/P1-DIMMD1/P1-DIMME1/P1-DIMMF1
CPU2 + 6 DIMMs	CPU2: P2-DIMMC1/P2-DIMMB1/P2-DIMMA1/P2-DIMMD1/P2-DIMME1/P2-DIMMF1
CPU3 + 6 DIMMs	CPU3: P3-DIMMC1/P3-DIMMB1/P3-DIMMA1/P3-DIMMD1/P3-DIMME1/P3-DIMMF1
CPU4 + 6 DIMMs	CPU4: P4-DIMMC1/P4-DIMMB1/P4-DIMMA1/P4-DIMMD1/P4-DIMME1/P4-DIMMF1

DDR4 Memory Population Table w/Full Memory Configuration Support (w/48 DIMMs Installed)

Memory Population Table for the 4-way Motherboard w/Full Memory Configuration Support (X11QPL w/4 CPUs & 48 DIMMs Installed)	
4 CPUs & 48 DIMMs (12 DIMMs per CPU board)	Memory Population Sequence
CPU1 + 12 DIMMs	CPU1: P1-DIMMC1/P1-DIMMC2/P1-DIMMB1/P1-DIMMB2/P1-DIMMA1/P1-DIMMA2/ P1-DIMMD2/P1-DIMMD1/P1-DIMME2/P1-DIMME1/P1-DIMMF2/P1-DIMMF1
CPU2 + 12 DIMMs	CPU2: P2-DIMMC1/P2-DIMMC2/P2-DIMMB1/P2-DIMMB2/P2-DIMMA1/P2-DIMMA2/ P2-DIMMD2/P2-DIMMD1/P2-DIMME2/P2-DIMME1/P2-DIMMF2/P2-DIMMF1
CPU3 + 12 DIMMs	CPU3: P3-DIMMC1/P3-DIMMC2/P3-DIMMB1/P3-DIMMB2/P3-DIMMA1/P3-DIMMA2/ P3-DIMMD2/P3-DIMMD1/P3-DIMME2/P3-DIMME1/P3-DIMMF2/P3-DIMMF1
CPU4 + 12 DIMMs	CPU4: P4-DIMMC1/P4-DIMMC2/P4-DIMMB1/P4-DIMMB2/P4-DIMMA1/P4-DIMMA2/ P4-DIMMD2/P4-DIMMD1/P4-DIMME2/P4-DIMME1/P4-DIMMF2/P4-DIMMF1

DCPMM Population for the Motherboards based on the 2nd Gen Intel Xeon Scalable-SP Processors with Full Configuration (48-DIMMs Installed)

Notes: 1. Unbalanced memory configuration decreases memory performance and is not recommended for Supermicro motherboards. 2. DCPMM memory is supported by the 2nd Gen Intel Xeon Scalable-SP (82xx/62xx/52xx series) processors only.

Symmetric Population												
2-2-2	(For Channel Configuration: 2-2-2)											
Modes												
CPU1	P1-DIMMF1	P1-DIMMF2	P1-DIMME1	P1-DIMME2	P1-DIMMD1	P1-DIMMD2	P1-DIMMA2	P1-DIMMA1	P1-DIMMB2	P1-DIMMB1	P1-DIMMC2	P1-DIMMC1
AD	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
MM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
AD + MM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3
CPU2	P2-DIMMF1	P2-DIMMF2	P2-DIMME1	P2-DIMME2	P2-DIMMD1	P2-DIMMD2	P2-DIMMA2	P2-DIMMA1	P2-DIMMB2	P2-DIMMB1	P2-DIMMC2	P2-DIMMC1
AD	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
MM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
AD + MM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3
CPU3	P3-DIMMF1	P3-DIMMF2	P3-DIMME1	P3-DIMME2	P3-DIMMD1	P3-DIMMD2	P3-DIMMA2	P3-DIMMA1	P3-DIMMB2	P3-DIMMB1	P3-DIMMC2	P3-DIMMC1
AD	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
MM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
AD + MM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3
CPU4	P4-DIMMF1	P4-DIMMF2	P4-DIMME1	P4-DIMME2	P4-DIMMD1	P4-DIMMD2	P4-DIMMA2	P4-DIMMA1	P4-DIMMB2	P4-DIMMB1	P4-DIMMC2	P4-DIMMC1
AD	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
MM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
AD + MM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3

Symmetric Population												
2-1-1	(For Channel Configuration: 2-1-1)											
Modes												
CPU1	P1-DIMMF1	P1-DIMMF2	P1-DIMME1	P1-DIMME2	P1-DIMMD1	P1-DIMMD2	P1-DIMMA2	P1-DIMMA1	P1-DIMMB2	P1-DIMMB1	P1-DIMMC2	P1-DIMMC1
AD	DRAM1	-	DRAM1	-	DRAM1	DCPMM	DCPMM	DRAM1	-	DRAM1	-	DRAM1
MM	DRAM2	-	DRAM2	-	DRAM2	DCPMM	DCPMM	DRAM2	-	DRAM2	-	DRAM2
AD + MM	DRAM3	-	DRAM3	-	DRAM3	DCPMM	DCPMM	DRAM3	-	DRAM3	-	DRAM3
CPU2	P2-DIMMF1	P2-DIMMF2	P2-DIMME1	P2-DIMME2	P2-DIMMD1	P2-DIMMD2	P2-DIMMA2	P2-DIMMA1	P2-DIMMB2	P2-DIMMB1	P2-DIMMC2	P2-DIMMC1
AD	DRAM1	-	DRAM1	-	DRAM1	DCPMM	DCPMM	DRAM1	-	DRAM1	-	DRAM1
MM	DRAM2	-	DRAM2	-	DRAM2	DCPMM	DCPMM	DRAM2	-	DRAM2	-	DRAM2
AD + MM	DRAM3	-	DRAM3	-	DRAM3	DCPMM	DCPMM	DRAM3	-	DRAM3	-	DRAM3
CPU3	P3-DIMMF1	P3-DIMMF2	P3-DIMME1	P3-DIMME2	P3-DIMMD1	P3-DIMMD2	P3-DIMMA2	P3-DIMMA1	P3-DIMMB2	P3-DIMMB1	P3-DIMMC2	P3-DIMMC1
AD	DRAM1	-	DRAM1	-	DRAM1	DCPMM	DCPMM	DRAM1	-	DRAM1	-	DRAM1
MM	DRAM2	-	DRAM2	-	DRAM2	DCPMM	DCPMM	DRAM2	-	DRAM2	-	DRAM2
AD + MM	DRAM3	-	DRAM3	-	DRAM3	DCPMM	DCPMM	DRAM3	-	DRAM3	-	DRAM3
CPU4	P4-DIMMF1	P4-DIMMF2	P4-DIMME1	P4-DIMME2	P4-DIMMD1	P4-DIMMD2	P4-DIMMA2	P4-DIMMA1	P4-DIMMB2	P4-DIMMB1	P4-DIMMC2	P4-DIMMC1
AD	DRAM1	-	DRAM1	-	DRAM1	DCPMM	DCPMM	DRAM1	-	DRAM1	-	DRAM1
MM	DRAM2	-	DRAM2	-	DRAM2	DCPMM	DCPMM	DRAM2	-	DRAM2	-	DRAM2
AD + MM	DRAM3	-	DRAM3	-	DRAM3	DCPMM	DCPMM	DRAM3	-	DRAM3	-	DRAM3

Symmetric Population													
2-2-1	(For Channel Configuration: 2-2-1)												
Modes													
CPU1	P1-DIMMF1	P1-DIMMF2	P1-DIMME1	P1-DIMME2	P1-DIMMD1	P1-DIMMD2	P1-DIMMA2	P1-DIMMA1	P1-DIMMB2	P1-DIMMB1	P1-DIMMC2	P1-DIMMC1	
AD	DRAM1	-	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	-	DRAM1	
MM	DRAM1	-	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	-	DRAM1	
AD + MM	DRAM3	-	DRAM3	DCPMM	DRAM3	DCPMM	DCPMM	DRAM3	DCPMM	DRAM3	-	DRAM3	
AD	DCPMM	-	DRAM1	DRAM1	DRAM1	DRAM1	DRAM1	DRAM1	DRAM1	DRAM1	-	DCPMM	2-2-1
CPU2	P2-DIMMF1	P2-DIMMF2	P2-DIMME1	P2-DIMME2	P2-DIMMD1	P2-DIMMD2	P2-DIMMA2	P2-DIMMA1	P2-DIMMB2	P2-DIMMB1	P2-DIMMC2	P2-DIMMC1	
AD	DRAM1	-	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	-	DRAM1	
MM	DRAM1	-	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	-	DRAM1	
AD + MM	DRAM3	-	DRAM3	DCPMM	DRAM3	DCPMM	DCPMM	DRAM3	DCPMM	DRAM3	-	DRAM3	
AD	DCPMM	-	DRAM1	DRAM1	DRAM1	DRAM1	DRAM1	DRAM1	DRAM1	DRAM1	-	DCPMM	2-2-1
CPU3	P3-DIMMF1	P3-DIMMF2	P3-DIMME1	P3-DIMME2	P3-DIMMD1	P3-DIMMD2	P3-DIMMA2	P3-DIMMA1	P3-DIMMB2	P3-DIMMB1	P3-DIMMC2	P3-DIMMC1	
AD	DRAM1	-	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	-	DRAM1	
MM	DRAM1	-	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	-	DRAM1	
AD + MM	DRAM3	-	DRAM3	DCPMM	DRAM3	DCPMM	DCPMM	DRAM3	DCPMM	DRAM3	-	DRAM3	
AD	DCPMM	-	DRAM1	DRAM1	DRAM1	DRAM1	DRAM1	DRAM1	DRAM1	DRAM1	-	DCPMM	2-2-1
CPU4	P4-DIMMF1	P4-DIMMF2	P4-DIMME1	P4-DIMME2	P4-DIMMD1	P4-DIMMD2	P4-DIMMA2	P4-DIMMA1	P4-DIMMB2	P4-DIMMB1	P4-DIMMC2	P4-DIMMC1	
AD	DRAM1	-	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	-	DRAM1	
MM	DRAM1	-	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	-	DRAM1	
AD + MM	DRAM3	-	DRAM3	DCPMM	DRAM3	DCPMM	DCPMM	DRAM3	DCPMM	DRAM3	-	DRAM3	
AD	DCPMM	-	DRAM1	DRAM1	DRAM1	DRAM1	DRAM1	DRAM1	DRAM1	DRAM1	-	DCPMM	2-2-1

Symmetric Population													
1-1-1	(For Channel Configuration: 1-1-1)												
Modes													
CPU1	P1-DIMMF1	P1-DIMMF2	P1-DIMME1	P1-DIMME2	P1-DIMMD1	P1-DIMMD2	P1-DIMMA2	P1-DIMMA1	P1-DIMMB2	P1-DIMMB1	P1-DIMMC2	P1-DIMMC1	
AD	DCPMM	-	DRAM1	-	DRAM1	-	-	DRAM1	-	DRAM1	-	DCPMM	
MM	DCPMM	-	DRAM1	-	DRAM1	-	-	DRAM1	-	DRAM1	-	DCPMM	
AD + MM	DCPMM	-	DRAM3	-	DRAM3	-	-	DRAM3	-	DRAM3	-	DCPMM	
CPU2	P2-DIMMF1	P2-DIMMF2	P2-DIMME1	P2-DIMME2	P2-DIMMD1	P2-DIMMD2	P2-DIMMA2	P2-DIMMA1	P2-DIMMB2	P2-DIMMB1	P2-DIMMC2	P2-DIMMC1	
AD	DCPMM	-	DRAM1	-	DRAM1	-	-	DRAM1	-	DRAM1	-	DCPMM	
MM	DCPMM	-	DRAM1	-	DRAM1	-	-	DRAM1	-	DRAM1	-	DCPMM	
AD + MM	DCPMM	-	DRAM3	-	DRAM3	-	-	DRAM3	-	DRAM3	-	DCPMM	
CPU3	P3-DIMMF1	P3-DIMMF2	P3-DIMME1	P3-DIMME2	P3-DIMMD1	P3-DIMMD2	P3-DIMMA2	P3-DIMMA1	P3-DIMMB2	P3-DIMMB1	P3-DIMMC2	P3-DIMMC1	
AD	DCPMM	-	DRAM1	-	DRAM1	-	-	DRAM1	-	DRAM1	-	DCPMM	
MM	DCPMM	-	DRAM1	-	DRAM1	-	-	DRAM1	-	DRAM1	-	DCPMM	
AD + MM	DCPMM	-	DRAM3	-	DRAM3	-	-	DRAM3	-	DRAM3	-	DCPMM	
CPU4	P4-DIMMF1	P4-DIMMF2	P4-DIMME1	P4-DIMME2	P4-DIMMD1	P4-DIMMD2	P4-DIMMA2	P4-DIMMA1	P4-DIMMB2	P4-DIMMB1	P4-DIMMC2	P4-DIMMC1	
AD	DCPMM	-	DRAM1	-	DRAM1	-	-	DRAM1	-	DRAM1	-	DCPMM	
MM	DCPMM	-	DRAM1	-	DRAM1	-	-	DRAM1	-	DRAM1	-	DCPMM	
AD + MM	DCPMM	-	DRAM3	-	DRAM3	-	-	DRAM3	-	DRAM3	-	DCPMM	

Asymmetric Population												
2/1-1-1	(For Channel Configuration: 2/1-1-1)											
Modes												
CPU1	P1-DIMMF1	P1-DIMMF2	P1-DIMME1	P1-DIMME2	P1-DIMMD1	P1-DIMMD2	P1-DIMMA2	P1-DIMMA1	P1-DIMMB2	P1-DIMMB1	P1-DIMMC2	P1-DIMMC1
AD	DRAM1	-	DRAM1	-	DRAM1	-	DCPMM	DRAM1	-	DRAM1	-	DRAM1
CPU2	P2-DIMMF1	P2-DIMMF2	P2-DIMME1	P2-DIMME2	P2-DIMMD1	P2-DIMMD2	P2-DIMMA2	P2-DIMMA1	P2-DIMMB2	P2-DIMMB1	P2-DIMMC2	P2-DIMMC1
AD	DRAM1	-	DRAM1	-	DRAM1	-	DCPMM	DRAM1	-	DRAM1	-	DRAM1
CPU3	P3-DIMMF1	P3-DIMMF2	P3-DIMME1	P3-DIMME2	P3-DIMMD1	P3-DIMMD2	P3-DIMMA2	P3-DIMMA1	P3-DIMMB2	P3-DIMMB1	P3-DIMMC2	P3-DIMMC1
AD	DRAM1	-	DRAM1	-	DRAM1	-	DCPMM	DRAM1	-	DRAM1	-	DRAM1
CPU4	P4-DIMMF1	P4-DIMMF2	P4-DIMME1	P4-DIMME2	P4-DIMMD1	P4-DIMMD2	P4-DIMMA2	P4-DIMMA1	P4-DIMMB2	P4-DIMMB1	P4-DIMMC2	P4-DIMMC1
AD	DRAM1	-	DRAM1	-	DRAM1	-	DCPMM	DRAM1	-	DRAM1	-	DRAM1

Legend (for the five tables above)					
DDR4 Type					Capacity
DRAM1	RDIMM	3DS RDIMM	LRDIMM	3DS LRDIMM	Refer to Validation Matrix (DDR4 DIMMs validated with DCPMM) on the next page.
DRAM2	RDIMM	-		-	
DRAM3	RDIMM	3DS RDIMM	LRDIMM	-	

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

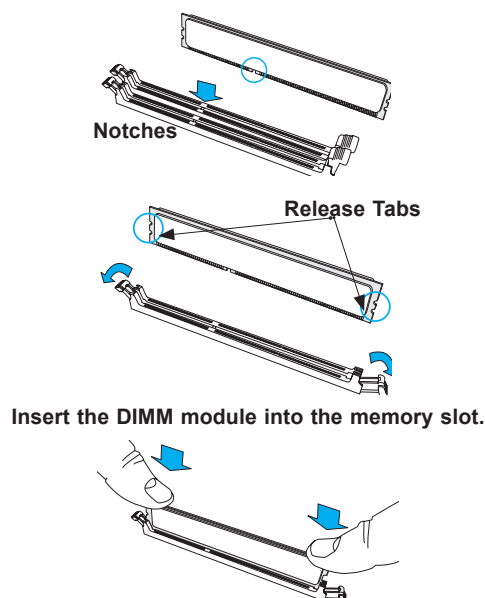
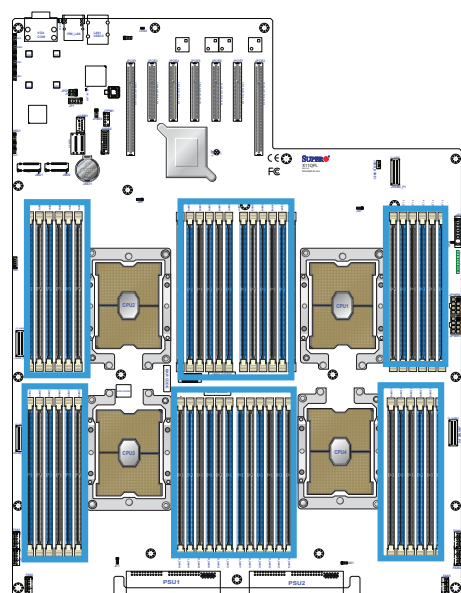
Legend (for the first five tables above)	
Capacity	
DCPMM	Any Capacity (Uniformly for all channels for a given configuration)

- Mode definitions: AD=App Direct Mode, MM=Memory Mode, AD+MM=Mixed Mode.
- For MM, general DDR4+DCPMM ratio is between 1:4 and 1:16. Excessive capacity for DCPMM can be used for AD.
- For each individual population, rearrangements between channels are allowed as long as the resulting population is compliant with the PDG rules for the 2nd Gen Intel Xeon Scalable-SP (82xx/62xx/52xx series) processors.
- 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.
- 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.

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

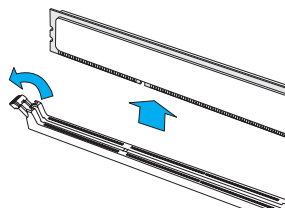
DIMM Installation

1. Follow the instructions given in the memory population guidelines listed in the previous sections to install memory modules on your motherboard. For the system to work properly, please use memory modules of the same type and speed on the motherboard. (See the Note below.)
2. Push the release tabs outwards on both ends of the DIMM slot to unlock it.
3. Align the key of the DIMM module with the receptive point on the memory slot.
4. Align the notches on both ends of the module against the receptive points on the ends of the slot.
5. Use two thumbs together to press the DIMM module straight down into the slot until the module snaps into place.
6. Press the release tabs to the lock positions to secure the DIMM module into the slot.



DIMM Module Removal

Press the release tabs on both ends of the DIMM socket to release the DIMM module from the socket as shown in the drawing on the right.



Warning! 1. To avoid damage to the DIMM module or the DIMM socket, do not use excessive force when pressing the release tabs on the ends of the DIMM socket. **2.** Handle DIMM modules with care. Carefully follow all the instructions given in Section 3.4 of this user guide to avoid ESD-related damage to your components or system. **3.** All graphics, including the layout drawing above, are for reference only. Your system components may or may not look the same as shown in this user guide.

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

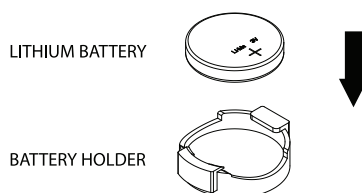


Figure 3-3. Installing the Onboard Battery

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

PCI-E Expansion Cards Installation

The system supports seven low-profile PCI-E 3.0 expansion slots at the front of the chassis. Two expansion slots are x16 slots and five are x8 slots.

Installing an Expansion Card

1. Turn off the system and remove the power cords as described in Section 3.1.
2. Remove the front top cover as described in Section 3.2.
3. Insert the add-on card into the PCI-E expansion slot on the motherboard.
4. Secure the add-on card to the chassis with a screw.
5. Replace the front top cover and reconnect the power cords.

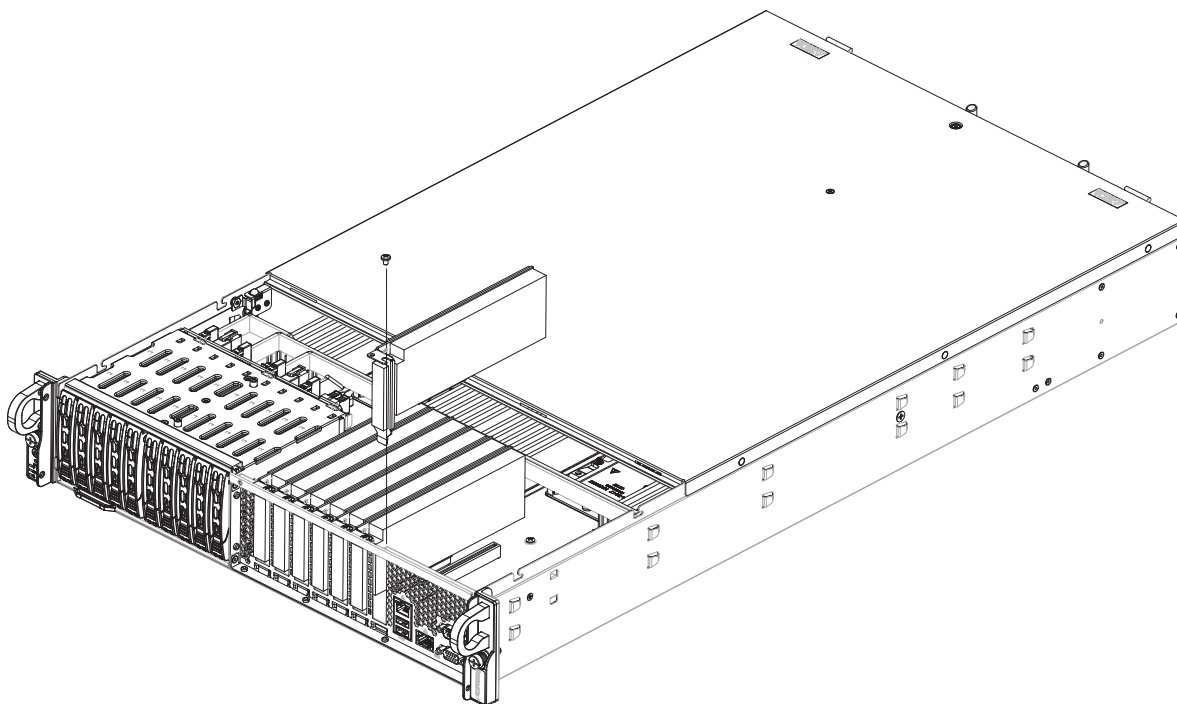


Figure 3-4. Installing a PCI-E Expansion Card

3.5 Chassis Components

Front Bezel

If your system has an optional bezel attached to the front of the chassis, you will need to remove it to gain access to the drive bays.

1. Unlock the front of the chassis and then press the release knob.
2. Carefully remove the bezel with both hands. A filter located within the bezel can be removed for replacement/cleaning.

It is recommended that you keep a maintenance log to list filter cleaning/replacement dates, since its condition affects the airflow throughout the whole system.

Hard Drives

The CSE-218LTS chassis has eight hot-swappable U.2 NVMe drive bays and two 2.5" SAS/SATA3 drive bays. The hard drives are mounted in drive carriers to simplify their installation and removal from the chassis. System power may remain on when removing the NVMe drive carriers HDD 0-7. System power must be turned off when removing the SAS/SATA3 drive carriers HDD 8-9. These carriers also help promote proper airflow for the drive bays. For this reason, even empty carriers without drives installed must remain in the chassis.

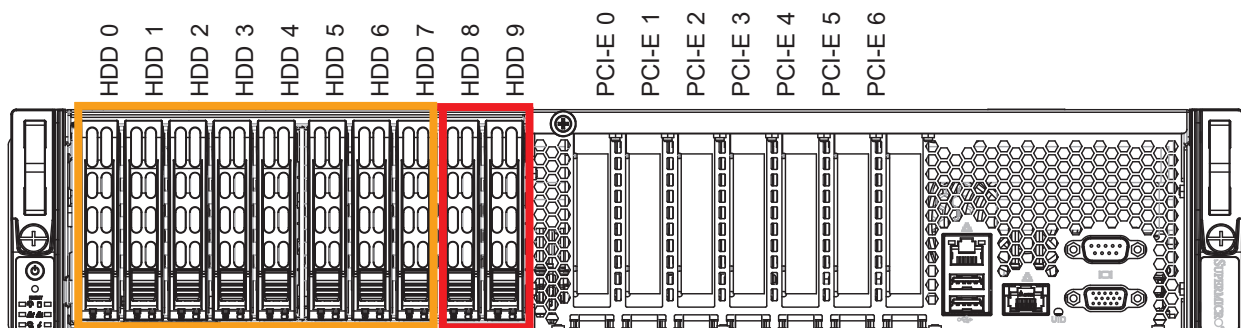


Figure 3-5. Drive Bay Configuration

Removing Hard Drive Carrier from the Chassis

1. Press the release button on the drive carrier. This extends the drive carrier handle.
2. Use the handle to pull the drive out of the chassis.
3. Remove the dummy drive from the carrier (Figure 3-7).

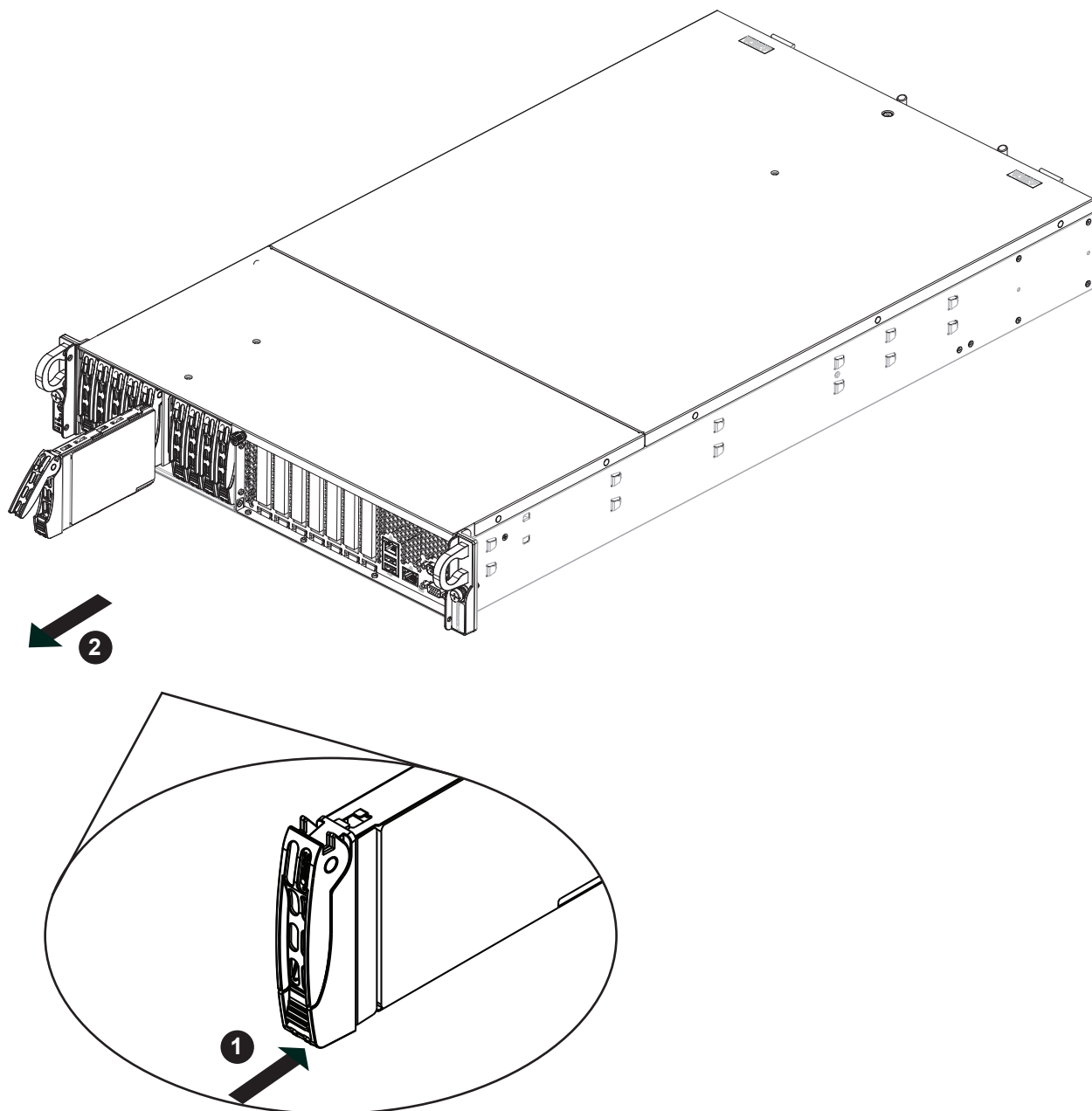


Figure 3-6. Removing a Drive Carrier

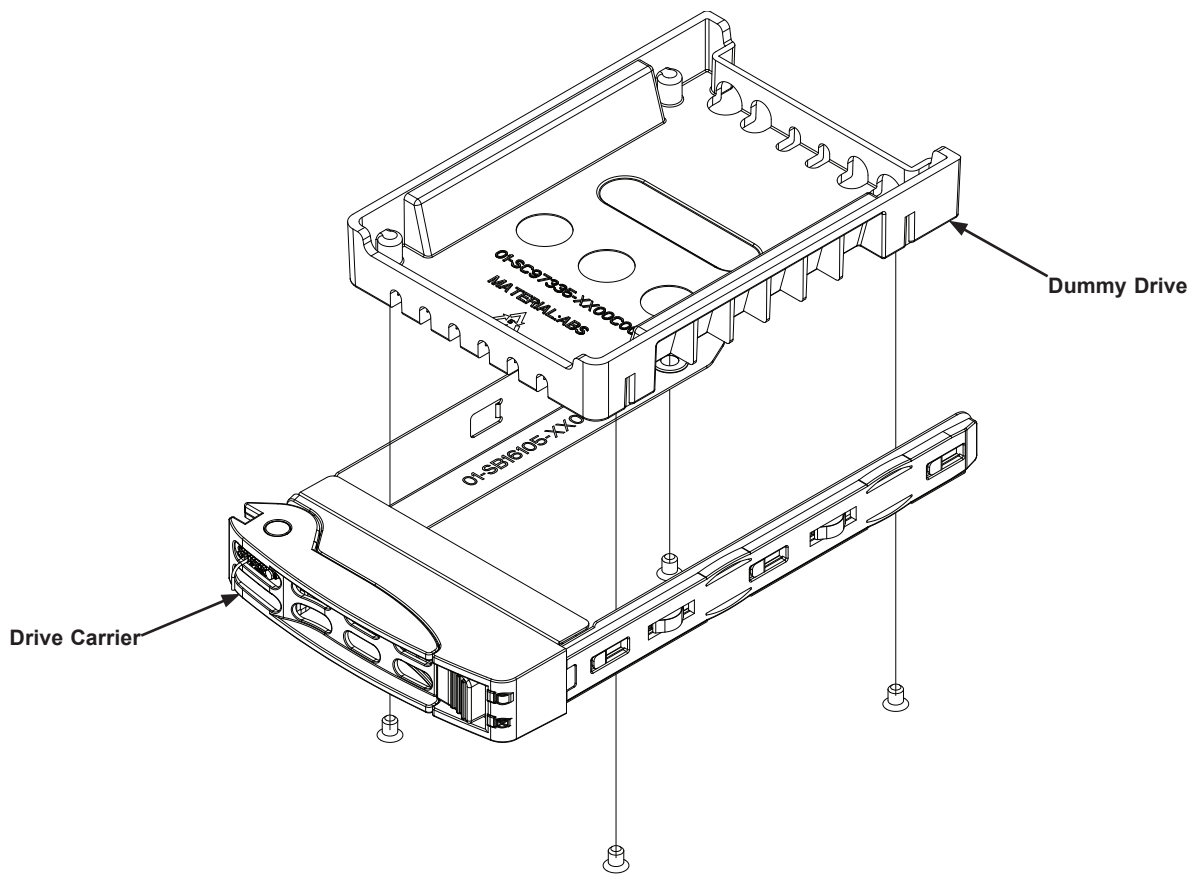


Figure 3-7. Removing a Dummy Drive from a Carrier

Caution: Except for short periods of time while swapping hard drives, do not operate the server without the carriers in the drive bays.

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>

Installing a Drive into the Carrier

1. Install a new drive into the carrier with the printed circuit board side facing down so that the mounting holes in the drive align with those in the carrier.
2. Secure the hard drive into the carrier with the screws.
3. Use the open handle to replace the drive carrier into the chassis.
4. Gently close the drive carrier handle to secure the drive and carrier into the chassis drive bay.

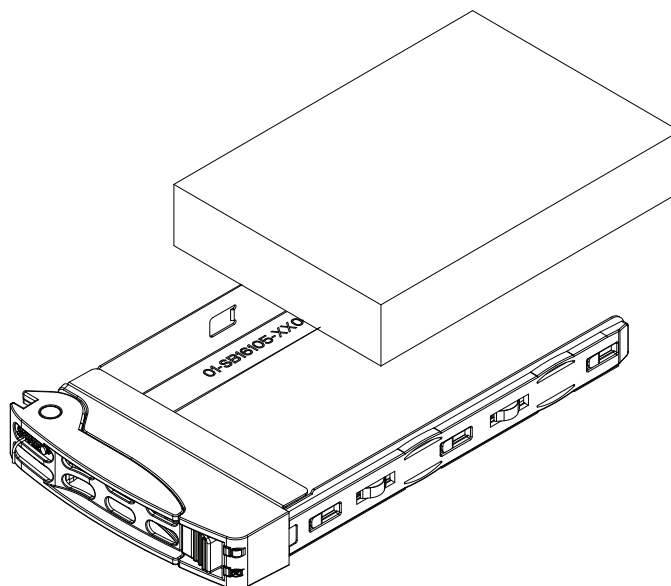


Figure 3-8. Installing a Drive into the Carrier

Drive Carrier Indicators

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

Drive Carrier LED Indicators			
	Color	Blinking Pattern	Behavior for Device
Activity LED	Blue	Solid On	SAS/NVMe drive installed
	Blue	Blinking	I/O activity
Status LED	Red	Solid On	Failure of drive with RSTe support
	Red	Blinking at 1 Hz	Rebuilding drive with RSTe support
	Red	Blinking with two blinks and one stop at 1 Hz	Hot spare for drive with RSTe support (<i>not supported in VMD mode</i>)
	Red	On for five seconds, then off	Power on for drive with RSTe support
	Red	Blinking at 4 Hz	Identify drive with RSTe support
	Green	Solid On	Safe to remove NVMe device (<i>not supported in VMD mode</i>)
	Amber	Blinking at 1 Hz	Attention state—do not remove NVMe device (<i>not supported in VMD mode</i>)

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 <https://www.supermicro.com/products/nfo/Ultra.cfm>.

Hot-Swap for NVMe Drives

An NVMe drive can be inserted and replaced using IPMI.

Note: If you are using VROC, see the VROC appendix in this manual instead.

Ejecting a Drive

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

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

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

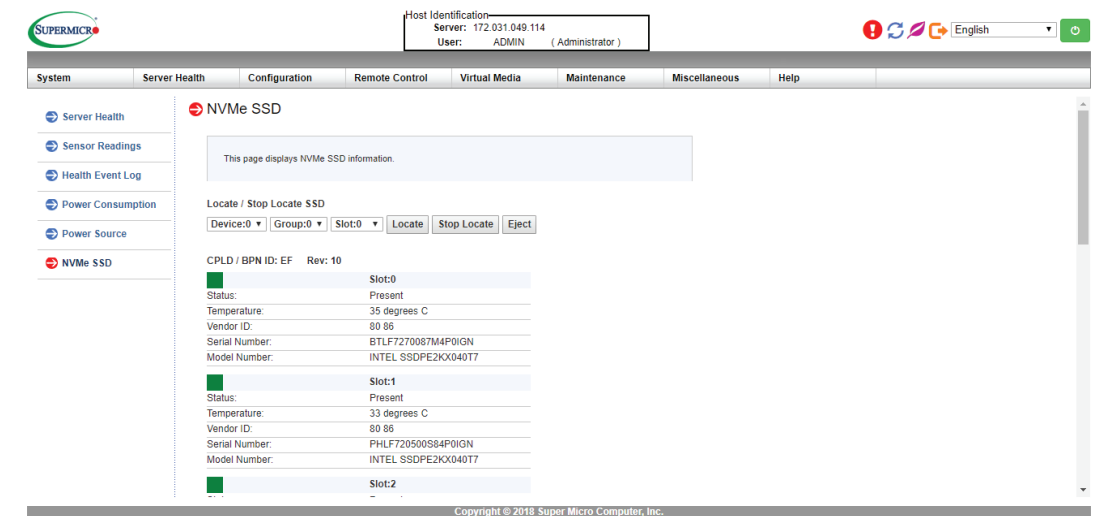


Figure 3-9. IPMI Screenshot

Replacing the Drive

1. Insert the replacement drive.
2. **IPMI > Server Health > NVMe SSD**
3. Select Device, Group and slot and click **Insert**. The drive Status LED indicator flashes red, then turns off. The Activity LED turns blue.

Checking the Temperature of an NVMe Drive

There are two ways to check using IPMI.

Checking a Drive

- **IPMI > Server Health > NVMe SSD** – Shows the temperatures of all NVMe drives, as in Figure 3-9.
- **IPMI > Server Health > Sensor Reading > NVME_SSD** – Shows the single highest temperature among all the NVMe drives.

System Cooling

The chassis contains two 8-cm hot-swappable heavy duty fans to direct air flow.

Replacing a System Fan

Fan speed is controlled by IPMI depending on the system temperature. If a fan fails, the remaining fans will ramp up to full speed. The system will continue to run with a failed fan, although it may shut down if the heat gets too great. Replace any failed fan at your earliest convenience with the same model. Failed fans can be identified through the IPMI.

Replacing System Fans

1. Determine which fan has failed using IPMI or determine from examining the fans at the rear of the chassis.
2. Grab the grips at the top and bottom of the fan and pull the fan out of the chassis.
3. Replace the failed fan with an identical fan, available from Supermicro. Push the new fan into the housing, making sure the air flow direction is the same.
4. Check that the fan is working properly and that the LED on the control panel has turned off.

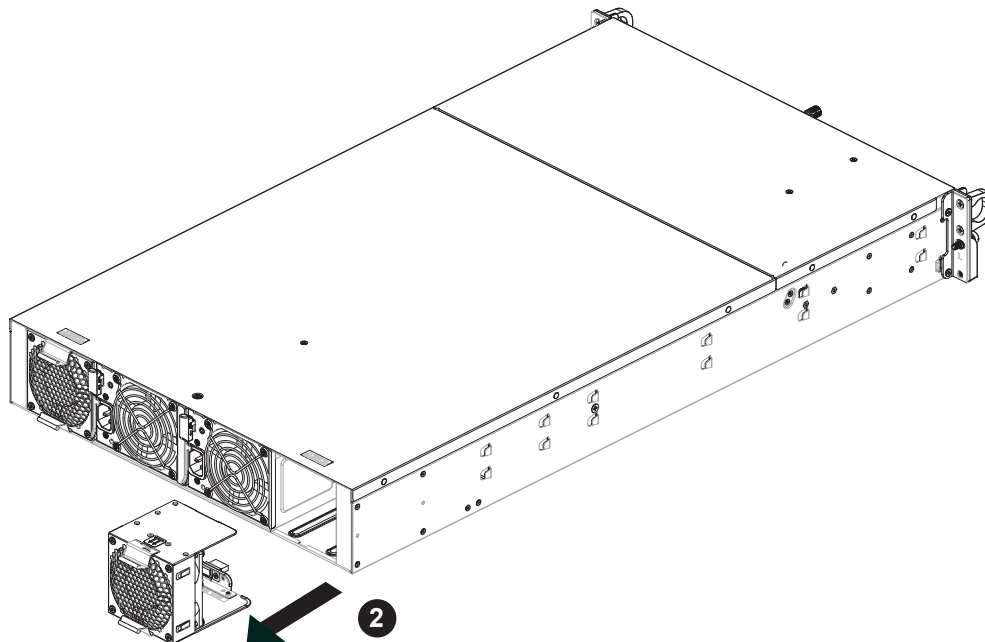


Figure 3-10. Replacing a System Fan

Air Shroud

Cooling is also improved by installing the standard air shroud.

1. If necessary, remove power as described in Section 3.1 and remove the top covers as described in Section 3.2.
2. Place the airshroud over the CPUs.
3. Align the notches on the airshroud with the knobs on the side of the power supply.
4. Gently press the airshroud into place and replace the top covers.

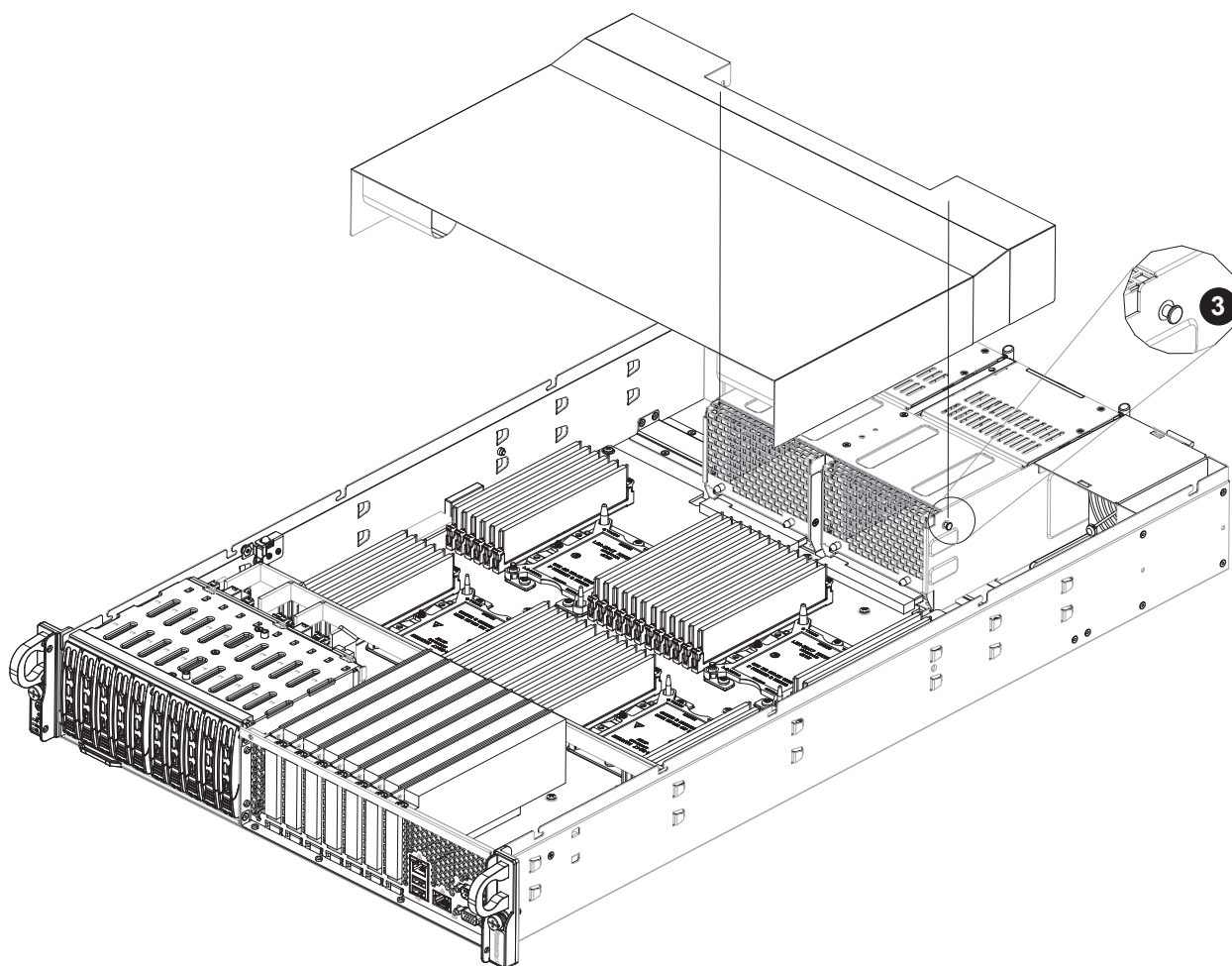


Figure 3-11. Installing the Air Shroud

Power Supply

The 2049P-TN8R has a 2200 Watt redundant power supply consisting of two power modules. They have an auto-switching capability, which enables them to automatically sense and operate at a 100V-240V 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 Power Fail LED will illuminate and remain on until the failed unit has been replaced. Replacement units can be ordered directly from Supermicro.

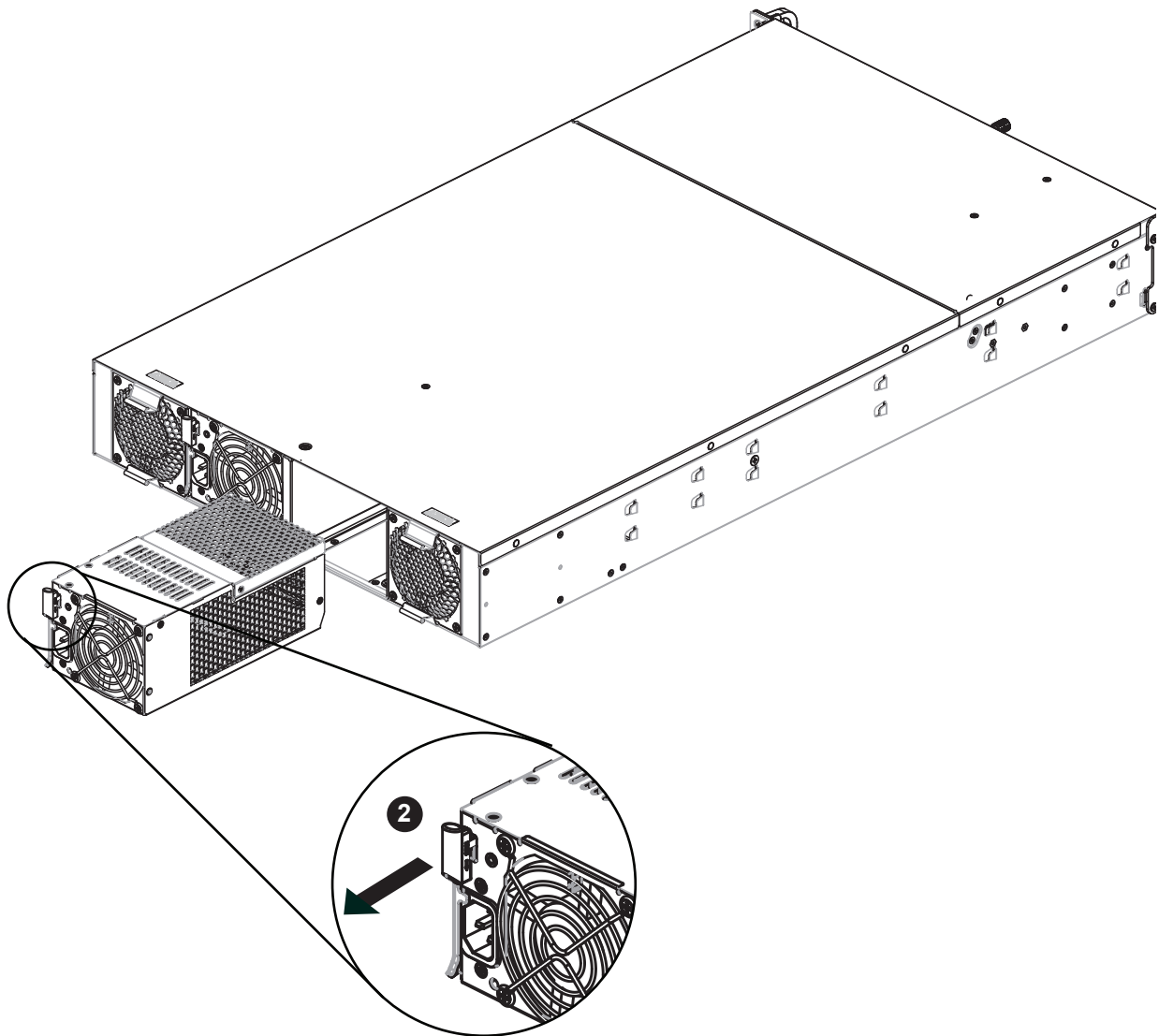


Figure 3-12. Removing/Replacing a Power Supply

Replacing the Power Supply

1. Turn off the system and unplug the power cord from the power source. Unplug the power cord from the power supply module.



Warning: The power supply modules are **NOT** hot-swappable.

2. Grab the handle at the left of the power supply module. Pull the handle out and downwards.
3. Use the handle to pull the module straight out of the chassis.
4. Replace the failed module with an identical power supply module. Push the new module into the power bay until it clicks.
5. Plug the power cord back into the power supply module. Plug the power cord into the power source.
6. Turn on the system. Check that the Power Fail LED is off.

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

Power Supply Unit Connectors

There are two main power supply connectors (PSU1/PSU2) on the motherboard. The power supplies have a built-in connector that matches PSU1 and PSU2 on the motherboard. Inserting the power supply into the chassis will connect the power supply to the motherboard with no need for cables.

12V 8-pin CPU Power Connectors

In addition to the main power supply units, there are two 8-pin 12V DC power connectors (JPWR1-JPWR2) located on the motherboard to be connected to the backplane.

4.2 Headers and Connectors

Onboard Fan Header

This motherboard has six fan headers (FAN1~FAN6) used for CPU/system cooling. These are all 6-pin fan headers, which are backward compatible with a traditional 4-pin fan. The onboard fan speed is controlled by Thermal Management (via Hardware Monitoring) in the BIOS. Please use all 6-pin fans on the motherboard for better thermal management and system cooling.

Fan Header Pin Definitions	
Pin#	Definition
1	Ground
2	12V
3	Tachometer
4	PWM Control
5	12V
6	Ground

TPM Header

The JTPM1 header is used to connect a Trusted Platform Module (TPM)/Port 80, which is available from a third-party vendor. TPM/Port 80 is a security device which 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. The RAID key is used to support Intel VROC hardware key for NVMe SSD drives.

Chassis Intrusion

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

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

I-SATA 3.0 Ports

The X11QPL has four I-SATA 3.0 ports (I-SATA0-3). These ports, supported by the Intel C621 chipset, provide serial-link signal connections.

SATA 3.0 Port Pin Definitions	
Pin#	Signal
1	Ground
2	SATA_TXP
3	SATA_TXN
4	Ground
5	SATA_RXN
6	SATA_RXP
7	Ground

M.2 Connection

This motherboard has two M.2 connectors at JMD1 and JMD2. JMD1 supports M-Key 22110 and is multiplexed with SATA4 while JMD2 supports M-Key 22110 and is multiplexed with S-SATA2. M.2 was formerly Next Generation Form Factor (NGFF) and serves to replace mini PCI-E and mSATA. M.2 allows for a greater variety of card sizes, increased functionality, and spatial efficiency.

4.3 Ports

Front I/O Ports

See Figure 4-1 below for the locations and descriptions of the various I/O ports on the front of the motherboard.

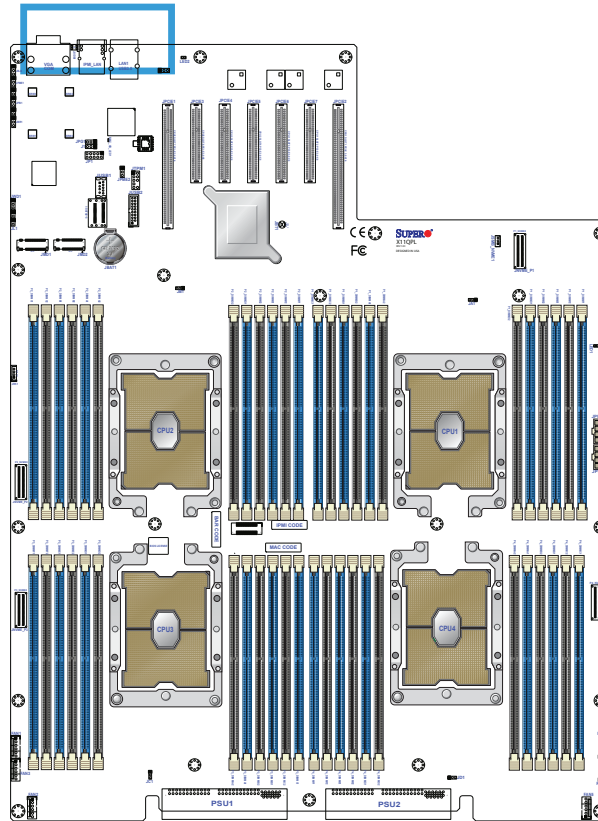
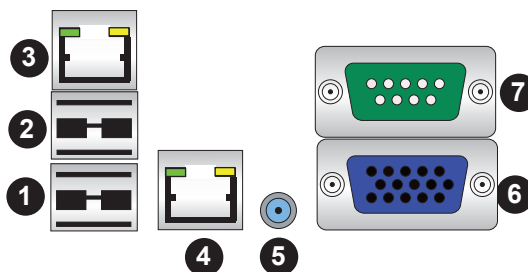


Figure 4-1. Front I/O Port Locations and Definitions



Front Panel I/O Ports			
No.	Description	No.	Description
1.	USB 2 (USB 3.0)	5.	UID Switch
2.	USB 3 (USB 3.0)	6.	VGA
3.	LAN1	7.	COM1
4.	Dedicated IPMI LAN		

VGA Port

The onboard VGA port is located next to the UID switch on the I/O front panel. Use this connection for VGA display.

Serial Port

There is one COM port (COM) next to the IPMI LAN on the I/O front panel. The COM port provides serial communication support. See the table below for pin definitions.

COM Port Pin Definitions			
Pin#	Definition	Pin#	Definition
1	DCD	6	DSR
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	RI
5	Ground	10	N/A

Unit Identifier Switch

A Unit Identifier (UID) switch is located on the I/O front panel. When you press the UID switch, the UID LED indicator will be turned on. Press the UID switch again to turn off the LED. The UID Indicator provides easy identification of a system unit that may be in need of service.

Note: UID can also be triggered via IPMI on the motherboard. For more information on IPMI, please refer to the IPMI User's Guide posted on our website at <http://www.supermicro.com>.

UID Switch Pin Definitions	
Pin#	Definition
1	Ground
2	Ground
3	Button In
4	Button In

IPMI_LAN Port

A dedicated IPMI LAN that supports GbE LAN is located next to the USB 2/3 ports on the I/O front panel. The IPMI_LAN is supported by the AST2500 BMC (Baseboard Management Controller). This port accepts an RJ45 type cable. Please refer to the LED Indicator Section for IPMI_LAN LED information.

Universal Serial Bus (USB) Ports

There are two USB 3.0 ports (USB2/3) on the I/O front panel. A USB header that supports two USB 3.0 connections (USB0/1) is located on the motherboard to provide front access support. Another USB header (USB4), a Type A USB header, offers additional front access support. Connect cables to these connections for front access. Cables are not included.

Front Panel USB 2/3 (3.0) Pin Definitions			
Pin#	Definition	Pin#	Definition
A1	VBUS	B1	Power
A2	D-	B2	USB_N
A3	D+	B3	USB_P
A4	GND	B4	GND
A5	Std_a_SSRX-	B5	USB3_RN
A6	Std_a_SSRX+	B6	USB3_RP
A7	GND	B7	GND
A8	Std_a_SSTX-	B8	USB3_TN
A9	Std_a_SSTX+	B9	USB3_TP

Onboard USB 0/1 (2.0) Pin Definitions			
Pin#	Definition	Pin#	Definition
1	VUBS	2	VUBS
3	USB_N	4	USB_N
5	USB_P	6	USB_P
7	Ground	8	Ground
9	Key	10	No Connection

Onboard Type A USB 4 (3.0) Pin Definitions			
Pin#	Definition	Pin#	Definition
1	VBUS	5	SSRX-
2	USB_N	6	SSRX+
3	USB_P	7	GND
4	Ground	8	SSTX-
		9	SSTX+

Front Control Panel

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

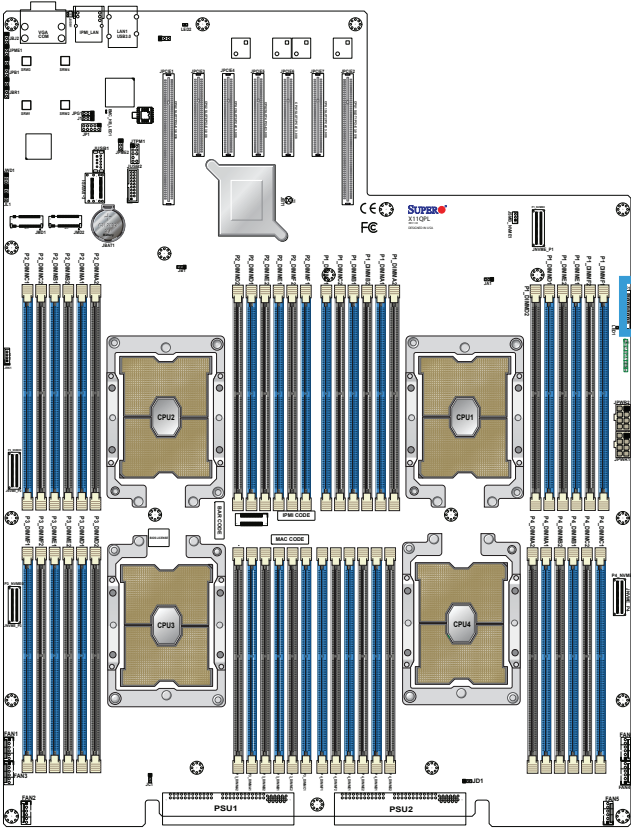


Figure 4-2. JF1 Header Pins

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

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 4). To turn off the power when the system is in suspend mode, press the button for 4 seconds or longer. Refer to the table below for pin definitions.

Power Button Pin Definitions (JF1)	
Pins	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 to reset the system. Refer to the table below for pin definitions.

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

Power Fail LED

The Power Fail LED connection is located on pins 5 and 6 of JF1. Refer to the table below for pin definitions.

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

OH/Fan Fail/PWR Fail/UID LED

Connect an LED cable to pins 7 and 8 of the Front Control Panel (JF1) to use UID/Overheat/Fan Fail/Power Fail LED connections. The LED on pin 8 provides warnings of overheat, power failure or fan failure. Refer to the table below for details.

Informational LED-UID/OH/PWR Fail/Fan Fail LED Pin Definitions (Pin 7 & Pin 8 of JF1)	
Status	Description
Solid red	An overheat condition has occurred. (This may be caused by cable congestion).
Blinking red (1Hz)	Fan failure: check for an inoperative fan.
Blinking red (0.25Hz)	Power failure: check for a non-operational power supply.
Solid blue	Local UID is activated. Use this function to locate a unit in a rack mount environment that might be in need of service.
Blinking blue (300 msec)	Remote UID is on. Use this function to identify a unit from a remote location that might be in need of service.

OH/Fan Fail Indicator Status	
State	Definition
Off	Normal
On	Overheat
Flashing	Fan Fail

OH/Fan Fail LED Pin Definitions (JF1)	
Pin#	Definition
7	Blue LED
8	OH/PWR Fail/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 LAN port 2 is on pins 9 and 10. Attach the NIC LED cables here to display network activity. Refer to the table below for pin definitions.

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

HDD LED

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

HDD LED Pin Definitions (JF1)	
Pins	Definition
13	3.3V Stdbby
14	HDD Active

Power LED

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

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

NMI Button

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

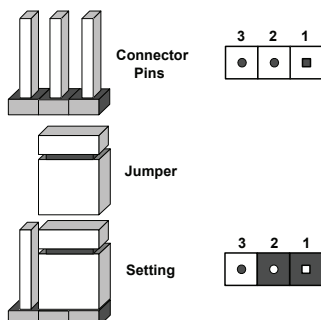
NMI Button Pin Definitions (JF1)	
Pins	Definition
19	Control
20	Ground

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 cords.
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.

Note: Clearing CMOS will also clear all passwords.

Do not use the PW_ON connector to clear CMOS.



JBT1 contact pads

Power-Failure Throttling Enable/Disable

The Power-Failure Throttling jumper is located at J1. Close pins 2-3 of J1 to enable power throttling feature. The default setting is to close pins 1-2 for normal (Disabled) operation. See the jumper setting table below.

Power-Failure Throttling Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Normal (Disabled)
Pins 2-3	Enabled

Management Engine (ME) Recovery

Use jumper JPME1 to select ME Firmware Recovery mode, which will limit resource allocation for essential system operation only in order to maintain normal power operation and management. In the single operation mode, online upgrade will be available via Recovery mode. See the table below for jumper settings.

Manufacturer Mode Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Normal
Pins 2-3	ME Recovery

Watch Dog

JWD1 controls the Watch Dog function. The Watch Dog is a monitor that can reboot the system when a software application hangs. Jumping pins 1-2 will cause the 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. The Watch Dog must also be enabled in the BIOS. The default setting is Reset.

Note: When the 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

VGA Enable/Disable

JPG1 allows you to enable or disable the VGA port, which is supported by the onboard BMC controller. The default setting is Enabled.

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

BIOS Recovery

Close pins 2 and 3 of jumper JBR1 for BIOS recovery. The default setting is on pins 1 and 2 for normal operation. See the table below for jumper settings. The default setting is Normal.

BIOS Recovery Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Normal
Pins 2-3	BIOS Recovery

BMC Enable/Disable

Close pins 1-2 of JPB1 to enable onboard Baseboard Management Controller (BMC) to provide health monitoring for your system. The default setting is pins 1-2 enabled.

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

Manufacturing Mode Select

Close JPME2 to bypass the SPI flash security mechanism and force the system to use the Manufacturing Mode, which will allow you to flash the system firmware from a host server to modify system settings. See the table below for jumper settings.

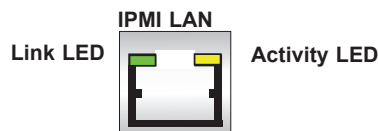
Manufacturing Mode Select Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Normal (Default)
Pins 2-3	Manufacturing Mode

4.5 LED Indicators

IPMI LAN LEDs

A dedicated IPMI LAN, supported by the onboard Baseboard Management controller, is located on the I/O front panel. The amber LED on the right indicates activity, while the green LED on the left indicates the speed of the connection. See the table below for more information.

IPMI LAN Link LED & Activity LED		
LED	Color	Definition
Link LED	Green: Solid	1 Gbps
Activity LED	Amber: Blinking	Active



BMC Heartbeat LED

BMC_HB_LED1 is the BMC heartbeat LED. When the LED is blinking green, BMC is functioning normally. See the table below for the LED status.

BMC Hearbeat LED Indicator	
LED Color	Definition
Green: Blinking	BMC Normal

Onboard Power LED

The Onboard Power LED is located at LED1 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. Refer to the table below for more information.

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

Chapter 5

Software

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

5.1 Microsoft Windows OS Installation

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

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.

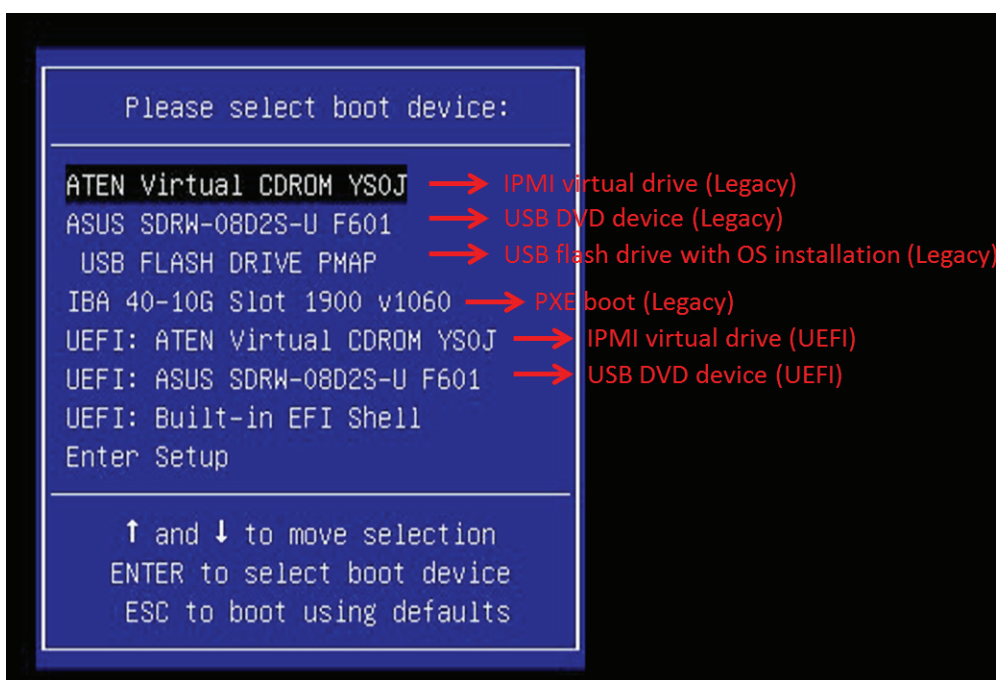


Figure 5-1. Select Boot Device

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.

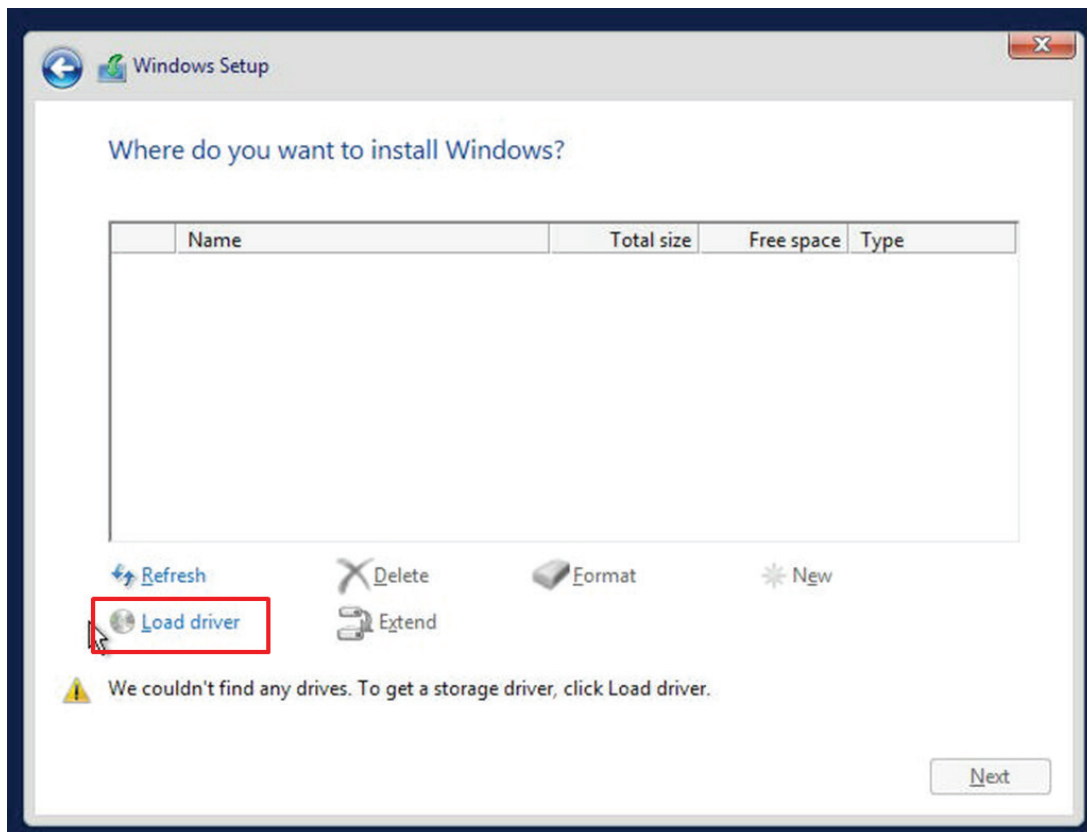


Figure 5-2. Load Driver Link

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/wftp/driver>. Some of these must be installed, such as the chipset driver.

After accessing the website, go into the CDR_Images (in the parent directory of the above link) and locate the ISO file for your motherboard. Download this file to a USB flash 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 <http://www.supermicro.com/products/>. Find the product page for your motherboard, and "Download the Latest Drivers and Utilities".

Insert the flash drive or disk and the screenshot shown below should appear.

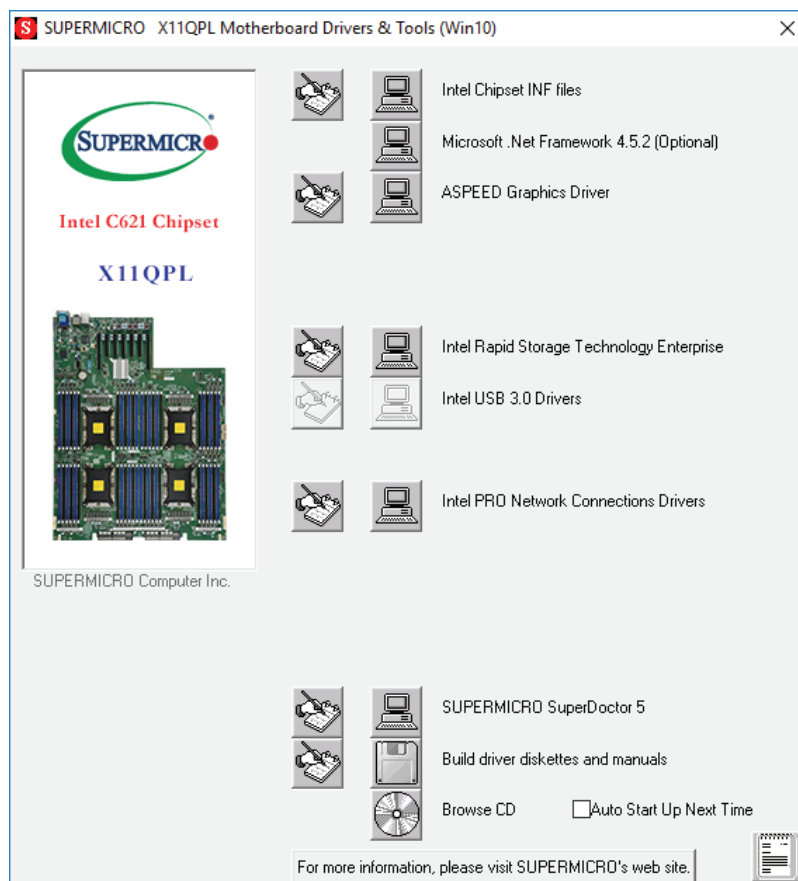


Figure 5-3. Driver & Tool Installation Screen

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

5.3 SuperDoctor® 5

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

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

Note: The default User Name and Password for SuperDoctor 5 is ADMIN / ADMIN.

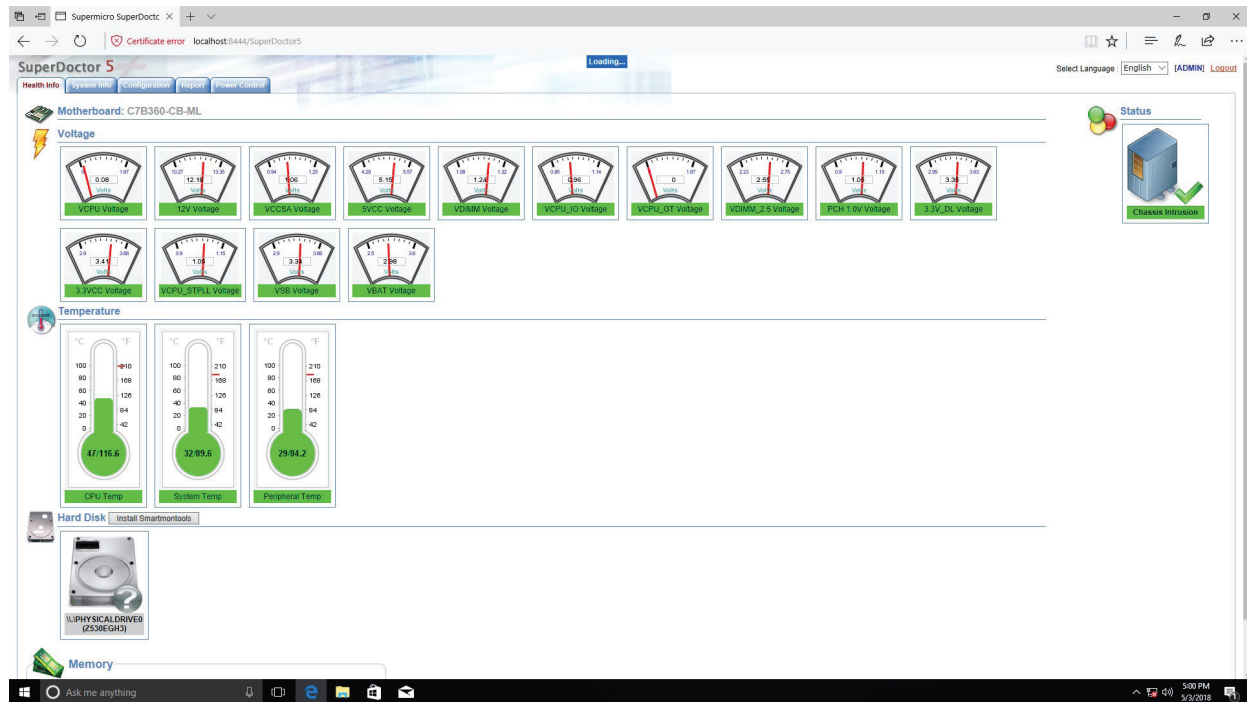


Figure 5-4. SuperDoctor 5 Interface Display Screen (Health Information)

5.4 IPMI

The X11QPL 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

UEFI BIOS

6.1 Introduction

This chapter describes the AMIBIOS™ setup utility for the X11QPL motherboard. The BIOS is stored on a chip and can be easily upgraded using a flash program.

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

Starting the Setup Utility

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

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

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

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

6.2 Main Setup

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



System Date/System Time

Use this item 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 Day MM/DD/YYYY format. The time is entered in HH:MM:SS format.

Note: The time is in the 24-hour format. For example, 5:30 P.M. appears as 17:30:00. The date's default value is the BIOS build date after the RTC (Real Time Clock) reset.

Supermicro X11QPL

BIOS Version

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

Build Date

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

CPLD Version

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

Memory Information

Total Memory

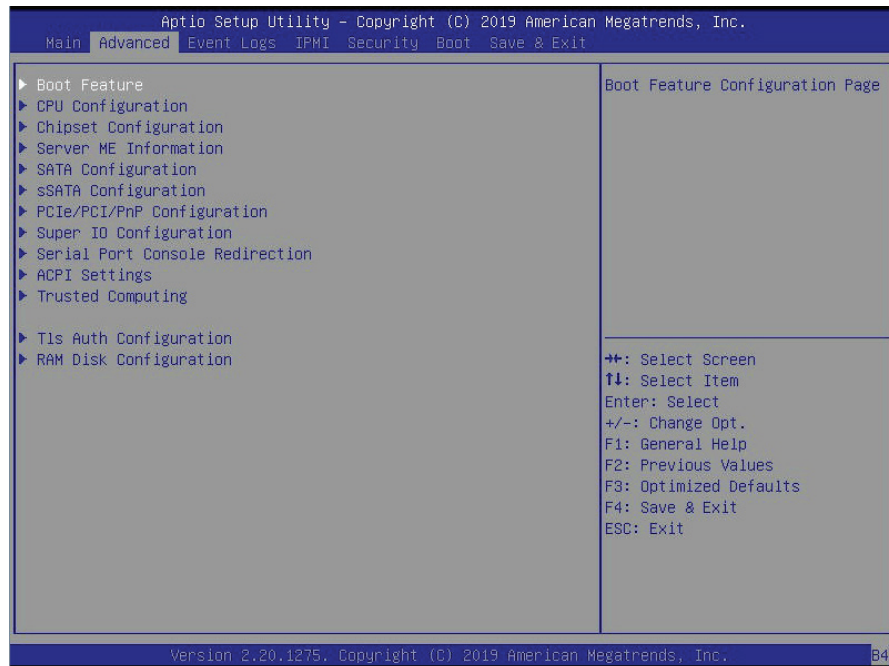
This feature displays the total size of memory available in the system.

Memory Speed

This feature displays the default speed of the memory modules installed in the system.

6.3 Advanced Setup Configurations

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



Warning: Take Caution when changing the Advanced settings. An incorrect value, an improper DRAM frequency, or a wrong BIOS timing setting may cause the system to malfunction. When this occurs, restore the setting to the manufacturer default setting.

► Boot 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 display:

- 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
- Processor 2 Version
- Processor 3 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 to

prevent a worm or a virus from flooding illegal codes to overwhelm the processor, causing damages to 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 this feature supported by the processor)

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 feature 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 (InvlToM) 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 InvltoM Hybrid Push, InvltoM AllocFlow, Enable for Remote InvltoM Hybrid AllocNonAlloc, and Enable for Remote InvltoM 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 Disable.

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 the 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 feature 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**.

►Memory Topology

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

- P1 DIMMA1/DIMMA2/DIMMB1/DIMMB2/DIMMC1/DIMMC2/DIMMD1/DIMMD2/DIMME1/DIMME2/DIMMF1/DIMMF2
- P2 DIMMA1/DIMMA2/DIMMB1/DIMMB2/DIMMC1/DIMMC2/DIMMD1/DIMMD2/DIMME1/DIMME2/DIMMF1/DIMMF2
- P3 DIMMA1/DIMMA2/DIMMB1/DIMMB2/DIMMC1/DIMMC2/DIMMD1/DIMMD2/DIMME1/DIMME2/DIMMF1/DIMMF2
- P4 DIMMA1/DIMMA2/DIMMB1/DIMMB2/DIMMC1/DIMMC2/DIMMD1/DIMMD2/DIMME1/DIMME2/DIMMF1/DIMMF2

►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 feature to enter the threshold value for correctable memory errors. The default setting is **512**.

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.

SDDC Plus One

Select Enable for SDDC (Single Device Data Correction) Plus One support, which will activate memory ECC mode for memory error checking and correction. It will also protect against memory failures caused by 'single-bit' errors in the same memory rank. 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 (Available when Patrol Scrub is set to Enable)

Use this feature 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**.

►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/CPU3 Configuration/CPU4 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)**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 display:

- 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.

►Socket 0 PCI-E Br1D00F0 - Port 1A/Socket 0 PCI-E Br2D00F0 - Port 2A/Socket 0 PCI-E Br2D02F0 - Port 2C/Socket 0 PCI-E Br3D00F0 - Port 3A/Socket 0 PCI-E Br3D01F0 - Port 3B/Socket 0 PCI-E Br3D02F0 - Port 3C/Socket 0 PCI-E Br4D00F0 - MCP 0/Socket 0 PCI-E Br5D00F0 - MCP 1 (Available for CPU 1 Configuration)**PCI-E Port**

In Auto mode, the BIOS will remove the EXP port if there is no device or errors on that device and the device is not HP capable. Disable is used to disable the port and hide its CFG space. The options are **Auto**, Disable, and Enable.

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 display:

- 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

Use this feature to configure Intel Volume Management Device (VMD) Technology 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 Volume Management Device on CPU1 - Intel® VMD for Volume Management Device on CPU4**VMD Configuration for PStack0 - VMD Configuration for PStack2****Intel®VMD for Volume Management Device for PStack0 - PStack2**

Select Enable to enable Intel Volume Management Device Technology support for the for the device specified by the user. 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 Disable, **Enable**, Auto, and Manual.

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.

- General ME Configuration
- 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 Intel PCH and displays the following items:

SATA Controller

This feature enables or disables the onboard SATA controller supported by Intel PCH. 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.

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 3/M.2 SATA Port 1

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 feature enables or disables the onboard sSATA controller supported by 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.

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**.

M.2 sSATA Port 2**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

Note: PCIe/PCI/PnP Configuration settings may differ depending on the PCI-E devices installed on the motherboard.

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.

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 NVMe Option ROM Type

Use this feature to select the Onboard NVMe Option ROM Type. The options are Disabled, Legacy, and **EFI**.

SLOT1 PCI-E 3.0x8 (in x16) Option ROM/SLOT2 PCI-E 3.0 x8 Option ROM/SLOT3 PCI-E 3.0x8 Option ROM/SLOT4 PCI-E 3.0x8 Option ROM/SLOT5 PCI-E 3.0x8 Option ROM/SLOT6 PCI-E 3.0x8 Option ROM/SLOT7 PCI-E 3.0x16 Option ROM

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 LAN1 OPROM (Option ROM)

Use this feature to select the Onboard LAN1 OPROM option. The options are Disabled, **Legacy**, and EFI.

► 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 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 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:*

► 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 OPRM 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)

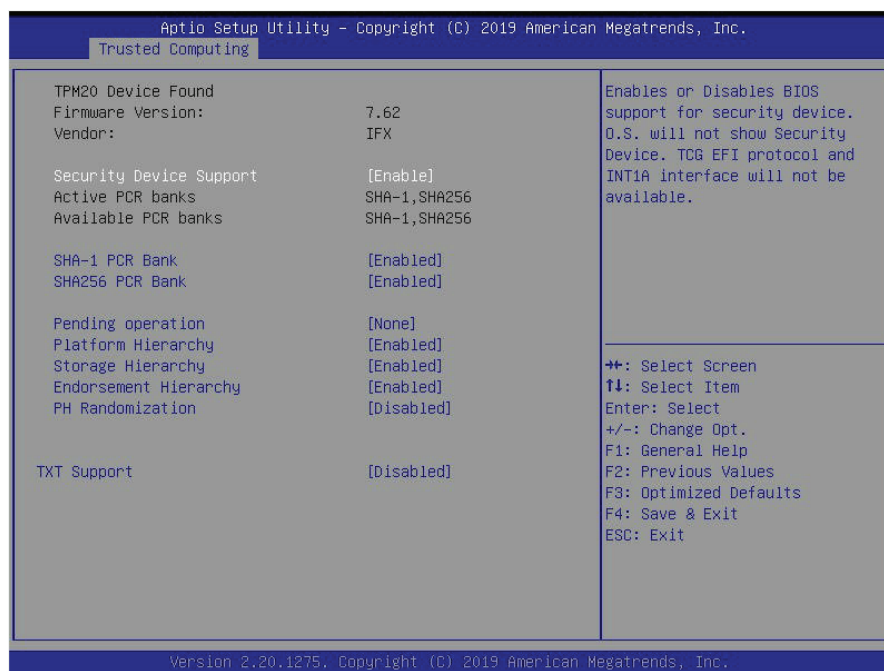
Select Enabled to enable Non-Uniform Memory Access support to enhance system performance. The options are **Enabled** and Disabled.

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.



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 "I/O 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

- **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.

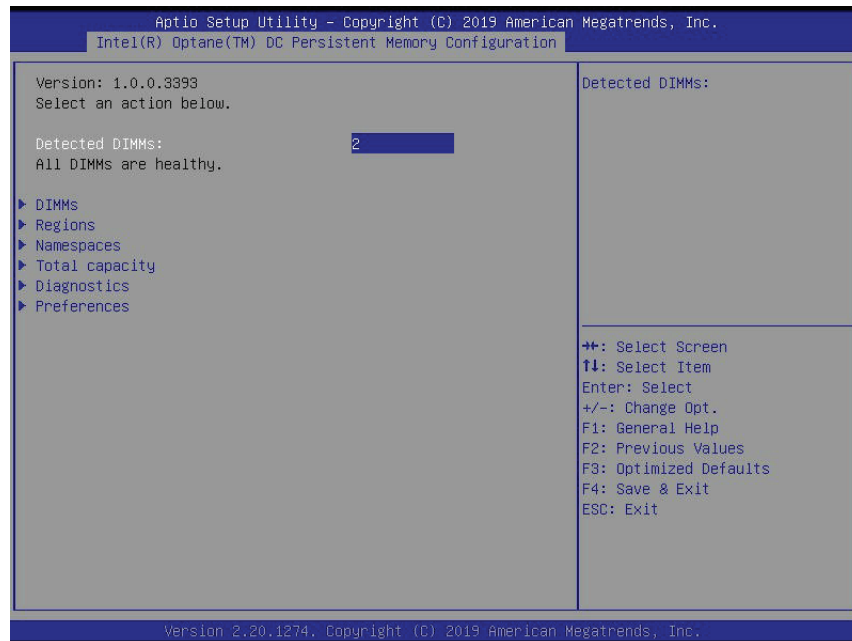
► Create from File

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 0x0101/DIMM ID 0x0111/DIMM ID 0x0121

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.
- **Alarm 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 1/Region ID 2/Region ID 3

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/Health Status

►0x00000101/0x00000201/0x00000301

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 0x0101/DIMM ID 0x0111/DIMM ID 0x0121

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. The following items will display:

- TestName
- State
- Message

►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.

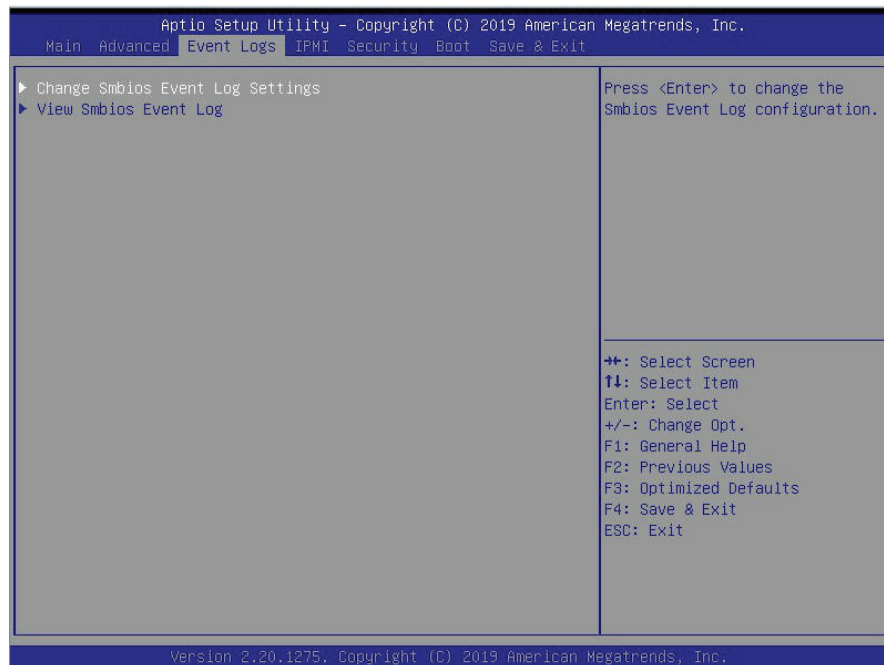
►Back to Main Menu

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

6.4 Event Logs

Use this feature to configure Event Log settings.

Note: After you've made a change on a setting below, please be sure to reboot the system for the change to take effect.



► 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)

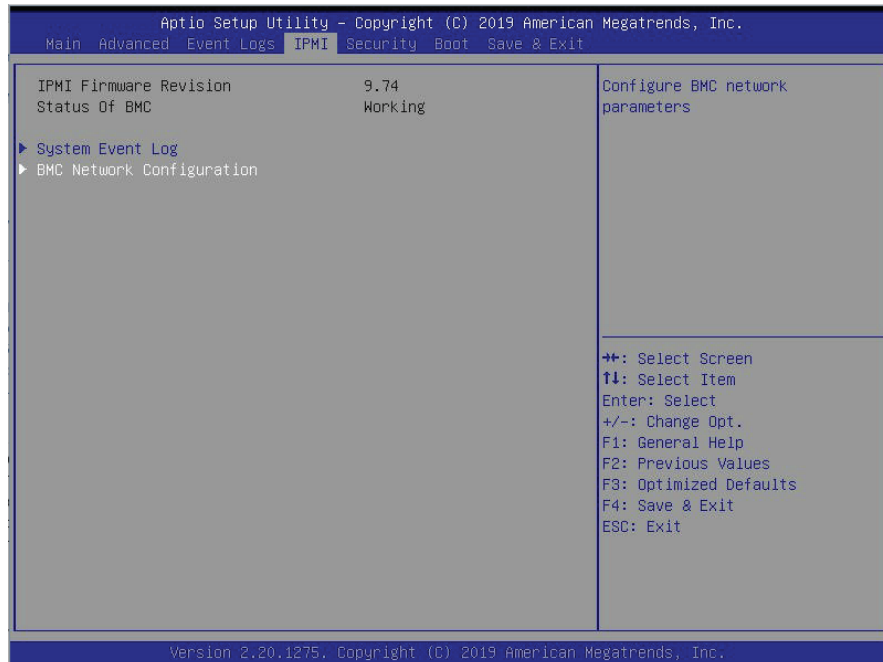
This feature is used to determine how long (in minutes) should the multiple event counter wait before generating a new event log. Enter a number between 0 to 99. The default setting is **60**.

►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 feature to configure Intelligent Platform Management Interface (IPMI) settings.



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

- **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

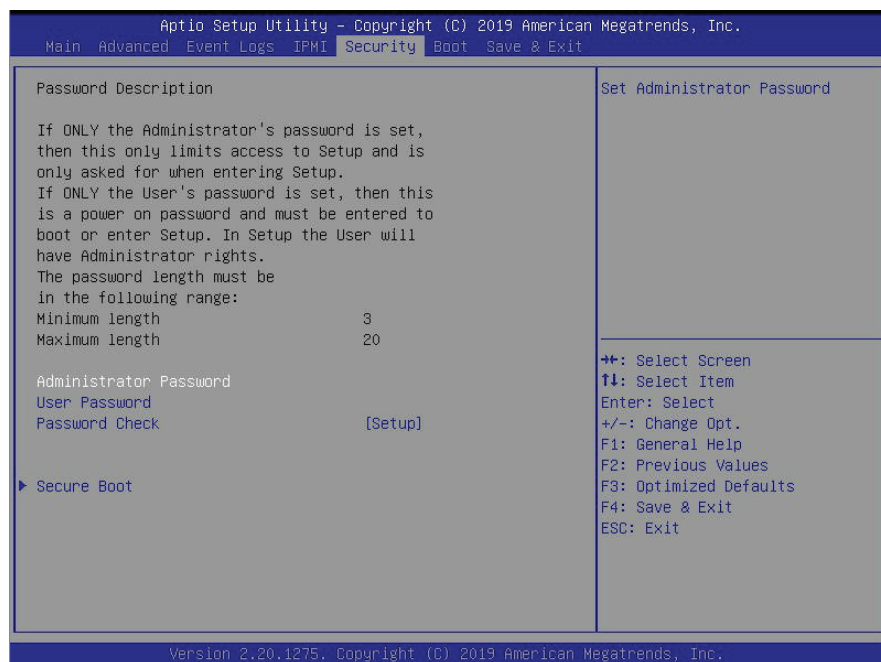
Use this feature to select the IP address source for this computer. If Static is selected, you will need to know the IP address of this computer and enter it to the system manually in the field. If DHCP is selected, AMI BIOS will search for a DHCP (Dynamic Host Configuration Protocol) server attached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

This menu allows the user to configure the following security settings for the system.



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 Update, and Append.

►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 Update, and Append.

►Authorized TimeStamps

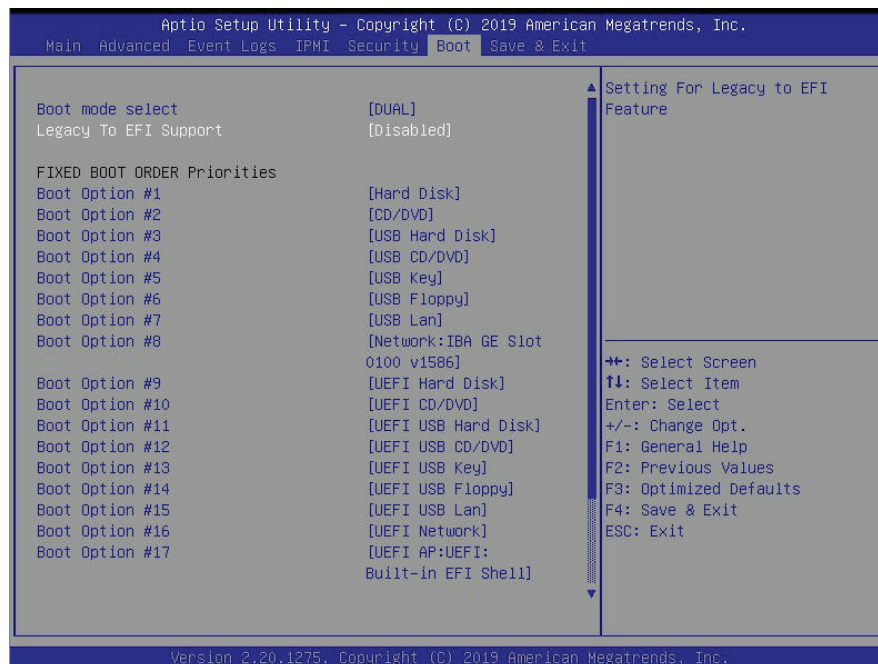
This feature allows the user to set and save the timestamps for the authorized signatures which will indicate the time when these signatures are entered into the system. Select Update to update your "Authorized TimeStamps". Select Append to append your "Authorized TimeStamps". The settings are Update,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

Use this feature 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

►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.

►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.

►UEFI Application Boot Priorities

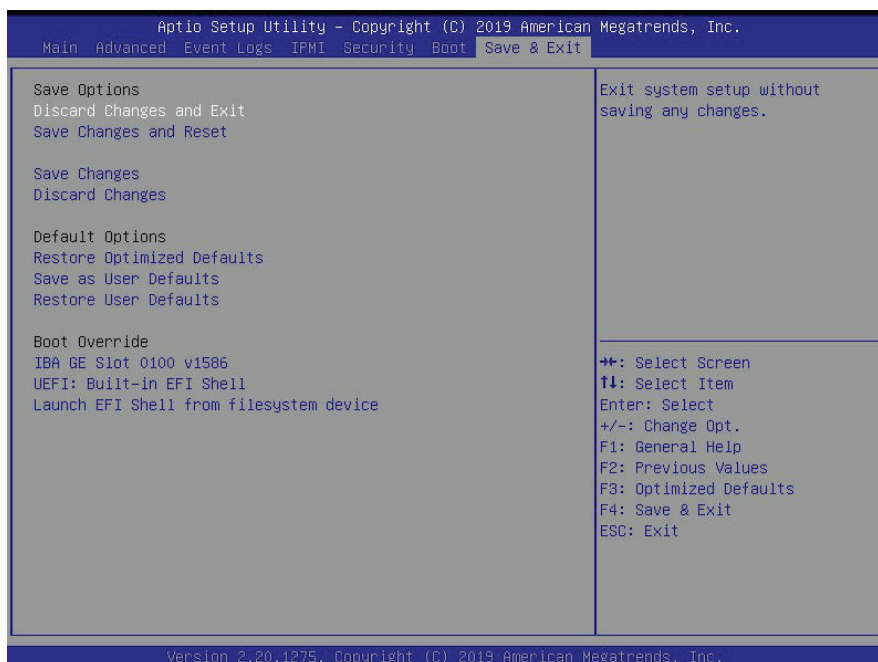
Use this feature to specify the Boot Device Priority sequence from available UEFI Application.

►Network Drive BBS Priorities

Use this feature to specify the Boot Device Priority sequence from available Network Drives.

6.8 Save & Exit

Select the Save & Exit menu from the BIOS setup screen to configure the settings below.



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.1 BIOS 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 numbers on the fatal error list (on the following page) correspond to the number of beeps for the corresponding error.

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

A.2 Additional 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

B.1 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。

此警告符号代表危險。

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

此警告符號代表危險。

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

Warnung

WICHTIGE SICHERHEITSHINWEISE

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

BEWAHREN SIE DIESE HINWEISE GUT AUF.

INSTRUCCIONES IMPORTANTES DE SEGURIDAD

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

GUARDE ESTAS INSTRUCCIONES.

IMPORTANTES INFORMATIONS DE SÉCURITÉ

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

CONSERVEZ CES INFORMATIONS.

תקנון הזהרות אזהרה

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

اَكْ فِ حَالَةٍ وُكِي اَيُّ تَتَسَبَّبُ فِ اَصَابَةِ جَسَدٍ هَذَا الزَّهْرُ عُ خَطَرٌ! تَحْذَرُ .
 قَبْلَ اَيُّ تَعْوَلُ عَلَى اَيُّ هَعْدَاتٍ، كِي عَلَى اَعْلَنَ بِالْوَخَاطِزِ اَلْ اُجُوَّةِ عِي الذَّوَائِرِ
 الكَهْزِبَائِيَّةِ
 وُكِي عَلَى دَرَاةٍ بِالْوَوَارِسَاتِ النِّقَائِيَّةِ لَوْ عُ وَقَعَ اَيُّ حَادِثٍ
 اسْتَخْدَمَ رَقْنِ اَلْبِ اِيَّ اَلْوَصُصِ فِ هَآءِ كُلِّ تَحْذَرُ لِّلْعَثَرِ تَرْجُوْتَهَا

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.

اقرأ 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-20A, 60VDC.

هذا المنتج يعتمد على معدات الحماية من الدوائر القصيرة التي تم تثبيتها في المبنى
تأكد من أن تقييم الجهاز الوقائي ليس أكثر من : 20A, 250V

경고!

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

Waarschuwing

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

Power Disconnection Warning



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

電源切斷の警告

システムコンポーネントの取り付けまたは取り外しのために、シャーシ内部にアクセスするには、システムの電源はすべてのソースから切斷され、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 système.

אזהרה מפני ניתוק חשמלי

אזהרה!

יש לנתק את המערכת מכל מקורות החשמל ויש להסיר את כבל החשמלי מהספק לפני גישה לחלק הפנימי של המארז לצורך התקנת או הסרת רכיבים.

يجب فصل انظاؤ من جميع مصادر انطاقت وإزانت سهك انكهرباء من وحدة امداد
انطاقت قېم
انصل إلى امناطق انداخھيت نهھيكم نتشيج أو إزانت مكنناث الجهاز

경고!

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

Waarschuwing

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

Equipment Installation



Warning! Only 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 الجهاز يجب أن يسمح فقط للموظفيه 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 installé dans des zones d'accès réservés. L'accès à une zone d'accès réservé n'est possible qu'en utilisant un outil spécial, un mécanisme de verrouillage et une clé, ou tout autre moyen de sécurité.

אזור עם גישה מוגבלת

אזהרה!

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

تخصيص هذه انحدزة نترك بُها ف مناطق محظورة تم .
ممكن اننصل إن منطقت محظورة فقط من خلال استخذاو أداة خاصت
أو أ وس هُت أخري نلاأمما ققم ومفتاح

경고!

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

Waarschuwing

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

Battery Handling



Warning! There is the danger of explosion if the battery is replaced incorrectly. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions

電池の取り扱い

電池交換が正しく行われなかった場合、破裂の危険性があります。交換する電池はメーカーが推奨する型、または同等のものを使用下さい。使用済電池は製造元の指示に従って処分して下さい。

警告

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

警告

電池更換不當會有爆炸危險。請使用製造商建議之相同或功能相當的電池更換原有電池。請按照製造商的說明指示處理廢棄舊電池。

Warnung

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

Attention

Danger d'explosion si la pile n'est pas remplacée correctement. Ne la remplacer que par une pile de type semblable ou équivalent, recommandée par le fabricant. Jeter les piles usagées conformément aux instructions du fabricant.

¡Advertencia!

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

אזהרה!

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

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

경고!

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

Waarschuwing

Er is ontplofingsgevaar indien de batterij verkeerd vervangen wordt. Vervang de batterij slechts met hetzelfde of een equivalent type die door de fabrikant aanbevolen wordt. Gebruikte batterijen dienen overeenkomstig fabrieksvoorschriften afgevoerd te worden.

Redundant Power Supplies



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

冗長電源装置

このユニットは複数の電源装置が接続されている場合があります。

ユニットの電源を切るためには、すべての接続を取り外さなければなりません。

警告

此部件连接的电源可能不止一个，必须将所有电源断开才能停止给该部件供电。

警告

此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 Strom zugeführt wird, müssen alle Verbindungen entfernt werden.

¡Advertencia!

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

Attention

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

אם קיים יותר מספק אחד

אזהרה!

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

قد يكون لهذا الجهاز عدة اتصالات بوحدات امداد الطاقة .

يجب إزالة كافة الاتصالات لعسل الوحدة عن الكهرباء

경고!

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

Waarschuwing

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

Backplane Voltage



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

バックプレーンの電圧

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

修理する際には注意ください。

警告

当系统正在进行时，背板上有很危险的电压或能量，进行维修时务必小心。

警告

當系統正在進行時，背板上有危險的電壓或能量，進行維修時務必小心。

Warnung

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

¡Advertencia!

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

Attention

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

מתח בפנל האחורי

אזהרה!

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

هناك خطر مه التيار الكهربي أو الطاقة المبددة على الساحة
عندما يكن النظام يعمل كه حذرا عند خدمة هذا الجهاز

경고!

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

Waarschuwing

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

Comply with Local and National Electrical Codes



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

地方および国の電気規格に準拠

機器の取り付けはその地方および国の電気規格に準拠する必要があります。

警告

设备安装必须符合本地与本国电气法规。

警告

設備安裝必須符合本地與本國電氣法規。

Warnung

Die Installation der Geräte muss den Sicherheitsstandards entsprechen.

¡Advertencia!

La 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 للقوانين المحلية والوطنية المتعلقة
بالكهرباء

경고!

현 지역 및 국가의 전기 규정에 따라 장비를 설치해야 합니다.

Waarschuwing

Bij installatie van de apparatuur moet worden voldaan aan de lokale en nationale elektriciteitsvoorschriften.

Product Disposal



Warning! Ultimate disposal of this product should be handled according to all national laws and regulations.

製品の廃棄

この製品を廃棄処分する場合、国の関係する全ての法律・条例に従い処理する必要があります。

警告

本产品的废弃处理应根据所有国家的法律和规章进行。

警告

本產品的廢棄處理應根據所有國家的法律和規章進行。

Warnung

Die Entsorgung dieses Produkts sollte gemäß allen Bestimmungen und Gesetzen des Landes erfolgen.

¡Advertencia!

Al deshacerse por completo de este producto debe seguir todas las leyes y reglamentos nacionales.

Attention

La mise au rebut ou le recyclage de ce produit sont généralement soumis à des lois et/ou directives de respect de l'environnement. Renseignez-vous auprès de l'organisme compétent.

סילוק המוצר

אזהרה!

סילוק סופי של מוצר זה חייב להיות בהתאם להנחיות וחוקי המדינה.

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

경고!

이 제품은 해당 국가의 관련 법규 및 규정에 따라 폐기되어야 합니다.

Waarschuwing

De uiteindelijke verwijdering van dit product dient te geschieden in overeenstemming met alle nationale wetten en reglementen.

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 el montaje del ventilador del chasis. Mantenga los dedos, los destornilladores y todos los objetos lejos de las aberturas del ventilador

Attention

Pieces mobiles dangereuses. Se tenir a l'écart des lames du ventilateur Il est possible que les ventilateurs soient toujours en rotation lorsque vous retirerez le bloc ventilateur du châssis. Prenez garde à ce que doigts, tournevis et autres objets soient éloignés du logement du bloc ventilateur.

אזהרה!

חלקים נעים מסוכנים. התרחק מלהבי המאוורר בפעולה כאשר מסירים את חלקי המאוורר מהמארז, יתכן והמאווררים עדיין עובדים. יש להרחיק למרחק בטוח את האצבעות וכלי עבודה שונים מהפתחים בתוך המאוורר

تحذير! أجزاء متحركة خطيرة. ابتعد عن شفرات المروحة المتحركة. من الممكن أن المراوح لا تزال تدور عند إزالة كتلة المروحة من الهيكل يجب إبقاء الأصابع ومفكات البراغي وغيرها من الأشياء بعيدا عن الفتحات في كتلة المروحة

경고!

움직이는 위험한 부품. 회전하는 송풍 날개에 접근하지 마세요. 새시로부터 팬 조립품을 제거할 때 팬은 여전히 회전하고 있을 수 있습니다. 팬 조립품 외관의 열려있는 부분들로부터 손가락 및 스크류드라이버, 다른 물체들이 가까이 하지 않도록 배치해 주십시오.

Waarschuwing

Gevaarlijk bewegende onderdelen. Houd voldoende afstand tot de bewegende ventilatorbladen. Het is mogelijk dat de ventilator nog draait tijdens het verwijderen van het ventilatorsamenstel uit het chassis. Houd uw vingers, schroevendraaiers en eventuele andere voorwerpen uit de buurt van de openingen in de ventilatorbehuizing.

Power Cable and AC Adapter



Warning! When installing the product, use the provided or designated connection cables, power cables and AC adaptors. Using any other cables and adaptors could cause a malfunction or a fire. Electrical Appliance and Material Safety Law prohibits the use of UL or CSA -certified cables (that have UL/CSA shown on the code) 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 Adapter, die Ihre örtlichen Sicherheitsstandards einhalten. Der Gebrauch von anderen Kabeln und Adapter können Fehlfunktionen oder Feuer verursachen. Die Richtlinien untersagen das Nutzen von UL oder CAS zertifizierten Kabeln (mit UL/CSA gekennzeichnet), an Geräten oder Produkten die nicht mit Supermicro gekennzeichnet sind.

¡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 certifiés- 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 כבלים חשמליים ומתאמי

אזהרה!

אשר נרכשו או הותאמו לצורך ההתקנה, ואשר הותאמו לדרישות AC כאשר מתקינים את המוצר, יש להשתמש בכבלים, ספקים ומתאמים הבטיחות המקומיות, כולל מידה נכונה של הכבל והתקע. שימוש בכל כבל או מתאם מסוג אחר, עלול לגרום לתקלה או קצר חשמלי. בהתאם כאשר מופיע עליהם קוד) UL-CSA או ב UL - לחוקי השימוש במכשירי החשמל וחוקי הבטיחות, קיים איסור להשתמש בכבלים המוסמכים ב Supermicro עבור כל מוצר חשמלי אחר, אלא רק במוצר אשר הותאם ע"י (UL/CSA) של

عند تركيب المنتج، قم باستخدام التوصيلات المتوفرة أو المحددة أو قم بشراء الكابلات الكهربائية ومحوّلات التيار المتردد مع الالتزام بقوانين ومتطلبات السلامة المحلية بما في ذلك حجم الموصل والقابس السليم. استخدام أي كابلات ومحوّلات أخرى قد يتسبب في عطل أو حريق. يحظر قانون السلامة للأجهزة الكهربائية والمعدات استخدام الكابلات المعتمدة Supermicro مع أي معدات أخرى غير المنتجات المعنية والمحددة من قبل (UL/CSA) والتي تحمل علامة CSA أو UL من قبل

전원 케이블 및 AC 어댑터

경고! 제품을 설치할 때 현지 코드 및 적절한 굵기의 코드와 플러그를 포함한 안전 요구 사항을 준수하여 제공되거나 지정된 연결 혹은 구매 케이블, 전원 케이블 및 AC 어댑터를 사용하십시오.

다른 케이블이나 어댑터를 사용하면 오작동이나 화재가 발생할 수 있습니다. 전기 용품 안전법은 UL 또는 CSA 인증 케이블 (코드에 UL / CSA가 표시된 케이블)을 Supermicro가 지정한 제품 이외의 전기 장치에 사용하는 것을 금지합니다.

Stroomkabel en AC-Adapter

Waarschuwing! Bij het aansluiten van het Product uitsluitend gebruik maken van de geleverde Kabels of een andere geschikte aan te schaffen Aansluitmethode, deze moet altijd voldoen aan de lokale voorschriften en veiligheidsnormen, inclusief de juiste kabeldikte en stekker. Het gebruik van niet geschikte Kabels en/of Adapters kan een storing of brand veroorzaken. Wetgeving voor Elektrische apparatuur en Materiaalveiligheid verbied het gebruik van UL of CSA -gecertificeerde Kabels (met UL/CSA in de code) voor elke andere toepassing dan de door Supermicro hiervoor beoogde Producten.

Appendix C

System Specifications

Processors

Four Intel® Xeon® Scalable Processors in Socket P0 type sockets with up to 205W TDP for VM optimized SKUs. Three UltraPath Interconnect (UPI) links of up to 10.4GT/s per processor.

Note: Please refer to the motherboard specifications pages on our website for updates to supported processors.

BIOS

32 Mb SPI AMI BIOS® SM Flash UEFI BIOS

ACPI 3.0/4.0, USB keyboard, Plug-and-Play (PnP), SPI dual/quad speed support, riser-card auto detection, Serial Peripheral Interface (SPI), and SMBIOS 2.7 or later

Memory

Supports up to 12TB of DDR4 3DS LRDIMM/LRDIMM/3DS RDIMM/RDIMM ECC memory at 2933*/2666 MHz in 48 DIMM slots. (***Note:** Support for 2933 MHz memory is dependent on the CPU SKU.)

Supports up to 18TB of memory with Intel Optane DC Persistent Memory modules

Chipset

Intel PCH C621 chipset

SATA Controller

On-chip (Intel PCH C621) controller

Expansion Slots

Two low-profile PCI-E 3.0 x16 slots

Five low-profile PCI-E 3.0 x8 slots

Hard Drives

Front panel: eight hot-swappable U.2 NVMe hard drives, two 2.5" SAS/SATA3 drives

Internal: two M.2 SATA/PCI-E connectors supporting the 22110 form factor

Input/Output

Front panel: one VGA port, one COM port, two USB 3.0 ports

Internal: one USB 3.0 header with two connections, one Type A USB 3.0 connector

Network

Front panel: one GbE LAN, one IPMI dedicated LAN

Motherboard

X11QPL

Chassis

CSE-218LTS-R2K21P; 2U Rackmount, (WxHxD) 17.2 x 3.5 x 30.2-in (437 x 89 x 767-mm)

System Cooling

Two 8cm heavy duty fans with speed control

Power Supply

Model: PWS-2K21A-2R1

AC Input Voltages: 100-127/200-240 VAC

Rated Input Current: 14-11A (100-127V)/12-11A (220-240V)

Rated Input Frequency: 50-60 Hz

Rated Output Power: 2200 Watt

Rated Output Voltages: 100-127V: +12V (100A), +12Vsb (2A); 200-240V: +12V (183.33A), +12Vsb (2A)

Operating Environment

Operating Temperature: 10° to 35° C (50° to 95° F)

Non-operating Temperature: -40° to 60° C (-40° to 140° F)

Operating Relative Humidity: 8% to 90% (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), CNS14336-1, CNS13438, GB4943.1-2011, GB9254-2008(Class A) and GB17625.1-2012

Safety: CSA/EN/IEC/UL 60950-1 Compliant, UL or CSA Listed (USA and Canada), CE Marking (Europe)

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

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 need to 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 (OOB) (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.

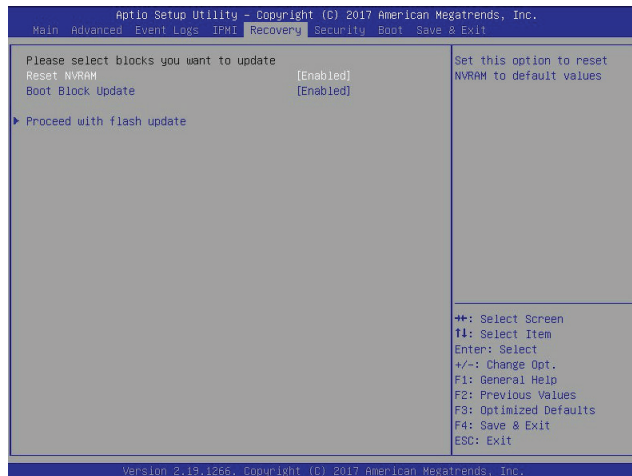
1. Using a different machine, copy the "Super.ROM" binary image file into the Root "\" directory of a USB device or a writable CD/DVD.

Note: 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.

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.



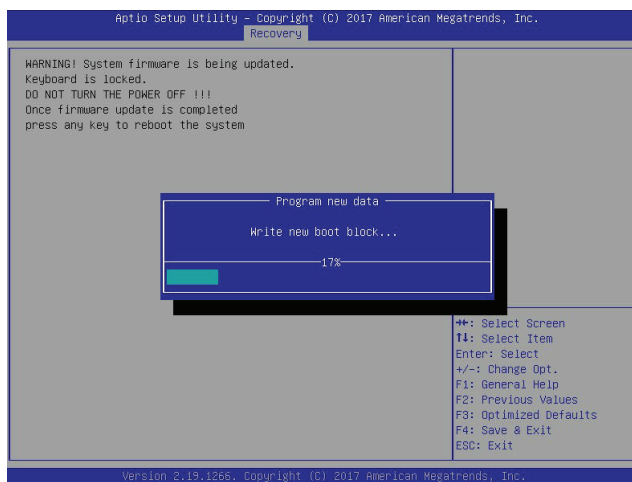
Note: At this point, you may decide if you want to start the BIOS recovery. If you decide to proceed with BIOS recovery, follow the procedures below.



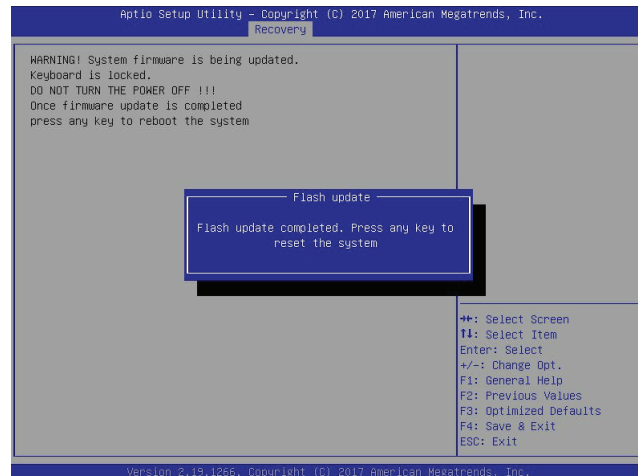
4. When the screen as shown above displays, use the arrow keys to select the item "Proceed with flash update" and press the <Enter> key. You will see the BIOS recovery progress as shown in the screen below.

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.



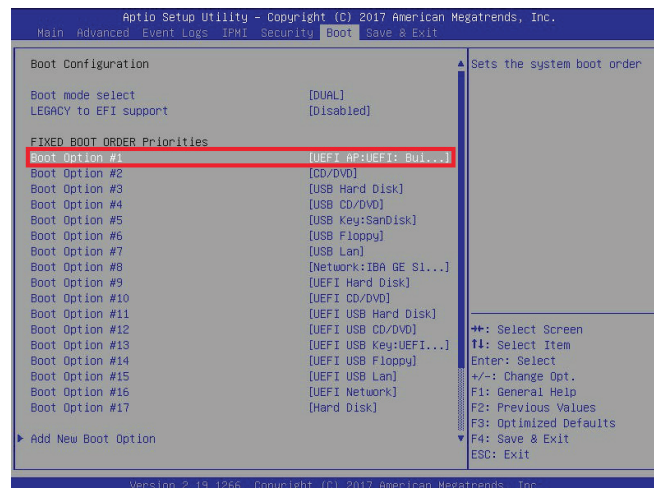
7. Press continuously during system boot to enter the BIOS Setup utility. From the top of the tool bar, select Boot to enter the submenu. From the submenu list, select Boot



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.

```

UEFI Interactive Shell v2.1
EDK II
UEFI v2.50 (American Megatrends, 0x0005000C)
Mapping table
FS0: Alias(s):HD0r0b1:BLK1:
    PciRoot(0x0)/Pci(0x14,0x0)/USB(0x11,0x0)/H0(1,MBR,0x37901072,0x800,0x1
    CA9592)
BLK0: Alias(s):
    PciRoot(0x0)/Pci(0x14,0x0)/USB(0x11,0x0)
Press F8C in 1 seconds to skip startup.nsh or any other key to continue.
Shell> f80c
FS0:\> cd \FUD05
FS0:\FUD05> cd SKUPME2_03162017
FS0:\FUD05\SKUPME2_03162017> flash.nsh X10PU7.314_

```

10. Press continuously to enter the BIOS Setup utility.

```

Done.
[ Access Cmos Port Ex ]
Reads
Index 0x51: 0x10

Done.
*****
*
* Program BIOS and ME (Including FDT) regions...
*
*****
| AMI Firmware Update Utility v5.09.01.1317 |
| Copyright (C)2017 American Megatrends Inc. All Rights Reserved. |
*****
CPUID = 50652

Reading flash ..... done
- ME Data Size checking . ok
- FFS checksums ..... ok
- Check RomLayout ..... ok
Erasing Boot Block ..... done
Updating Boot Block ..... done
Verifying Boot Block ..... done
Erasing Main Block ..... 0x0132000 (0%)

```

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.

```

Verifying MCB Block ..... done
- Update success for FDR
- Update success for IE
- Successful update Recovery Loader to OPRx11
- Successful Update MFSB11
- Successful Update FTFR11
- Successful Update MFS, IVB1 and IVB211
- Successful update PLOG and UTOX11
- ME Entire Image update success !!
WARNING : System must power-off to have the changes take effect!!
Moving FS0:\FUD05\SKUPME2_03162017\afueflx64.efi -> FS0:\FUD05\SKUPME2_03162017\F
dt.smc
- [ok]
Moving FS0:\FUD05\SKUPME2_03162017\afueflx64.efi -> FS0:\FUD05\SKUPME2_0316201
7\afuefl.smc
- [ok]
*****
* Please ignore this 'Shell: Cannot read from file - Device Error'
* warning message due to it does not impact flashing process.
*
*****
Deleting "FS0:\Startup.nsh"
Delete successful.
FS0:\>

```

Appendix E

Traditional Chinese Version of Safety Warnings

Additional traditional Chinese versions of warning statements are included in this appendix.

安全警告（注意這些警告標誌）

以下的警告標誌對於安全使用本設備非常重要，可以避免操作人員遭遇危險，以及財產受到任何損失。

錯誤使用本機器或忽視這本手冊，所引起的傷害或損失等級分類如下：



WARNING（警告）

此注意標誌提醒未能依照正確指示使用機器，可能導致生命危險 或造成嚴重傷害。



CAUTION（注意）

此注意標誌提醒未能依照正確指示使用機器，可能導致受傷或財產損失。



此標誌提示絕對不可做的動作。



此標誌提示一般性務必要採取的行為。



WARNINGS警告



本機器必須用接地線與地面確實連接。否則受到電擊或閃電時，將對您造成危險。如果電源插座沒有接地端子，或是有無法接地情況，請務必洽詢專業技術人員，妥善安裝這些設施。



1. 電源必須在 100V 至 240V 正負 10%之間
2. 使用額定合格開關來提供電源迴路。
3. 機器安裝愈接近電源插座愈好。
4. 移動機器必須由維護工程師來處理。



1. 勿使用多孔插座或延長線，否則可能造成溫度過高而引起火災。
2. 勿在電源線放置重物，否則可能引起火災或受到電擊。
3. 勿踏在電源線上，及勿損傷或任意處理電源線，否則可能引起火災或 受到電擊。
4. 勿綁住或紮緊電源線，否則可能引起火災或受到電擊。
5. 勿將花瓶、花盆或盛水容器放在機器上，如果水滴濺出，可能引起火 災或受到電擊。



1. 機器如果產生怪味或不正常聲響，必需立即關閉機器電源開關，然後 從插座取下插頭。
2. 絕對不可以沾濕的手插拔插頭，否則可能受到電擊。
3. 插頭必須確實插妥在插座上，如果未能妥善插好，可能會引起火災。
4. 僅可使用機器所附電源插頭。



拔取電源線時，確實抓住插頭部位，否則導致插頭破裂可能引起火 災或受到電擊。



不可企圖拆解或擅自修改機器，否則可能引起火災或受到電擊。



不可將機器安裝在下列場所：

1. 濕氣高及多灰塵的地方。
2. 地板不穩的地方。如果機器傾倒，可能造成傷害。



關閉上機蓋時，千萬不可將手放在上機蓋與主機體之間。



1. 移動機器前，必須記住拔下插頭，否則插頭可能受損而引起火災 或受到電擊。
2. 為安全起見，夜晚無人使用伺服器時，必須確實將它的電源關閉。
3. 連續假日長期無人使用伺服器時，必須確實將它的電源關閉。
4. 插座周圍必須淨空，以便隨時可以很輕易的拔下插頭。



警告使用者：這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策

限用物質含有情況標示聲明書

Declaration of the Presence Condition of the Restricted Substances Marking

設備名稱：伺服器， Equipment name: Server		型號（型式）：適用於 SYS-2019U-TR4, 218U-16 及其所有系列機種 Type designation (Type): SYS-2019U-TR4, 218U-16 and all its series models				
單元 Unit	限用物質及其化學符號 Restricted substances and its chemical symbols					
	鉛Lead (Pb)	汞Mercury (Hg)	鎘Cadmium (Cd)	六價鉻 Hexavalent chromium (Cr ⁺⁶)	多溴聯苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
機殼(Chassis)	○	○	○	○	○	○
主機板(Motherboard)	—	○	○	○	○	○
背板(Backplane)	—	○	○	○	○	○
機內電源單元 (Power Supply)	—	○	○	○	○	○
導風罩(Air Shroud)	○	○	○	○	○	○
線材(Cable)	○	○	○	○	○	○
風扇(Fan)	—	○	○	○	○	○
記憶體(Memory)	—	○	○	○	○	○
硬碟(HDD)	—	○	○	○	○	○
硬碟槽(Drive Trays)	○	○	○	○	○	○
導軌(Mounting Rails)	○	○	○	○	○	○
<p>備考1. “超出0.1 wt %”及“超出0.01 wt %”係指限用物質之百分比含量超出百分比含量基準值。 Note 1: “Exceeding 0.1 wt %” and “exceeding 0.01 wt %” indicate that the percentage content of the restricted substance exceeds the reference percentage value of presence condition.</p> <p>備考2. “○”係指該項限用物質之百分比含量未超出百分比含量基準值。 Note 2: “○” indicates that the percentage content of the restricted substance does not exceed the percentage of reference value of presence.</p> <p>備考3. “—”係指該項限用物質為排除項目。 Note 3: The “—” indicates that the restricted substance corresponds to the exemption.</p>						

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 due to performance issues, even though it is supported.

Supported SSDs and Operating Systems

To see the latest support information: <https://www.intel.com/content/www/us/en/support/articles/000030310/memory-and-storage/ssd-software.html>

Additional Information

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

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

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 Supports 3rd party SSDs	AOC-VROCSTNMOD	951605
Premium	RAID 0, 1, 5, 10 Supports 3rd party SSDs	AOC-VROCPREMOD	951606
Intel SSD only	RAID 0, 1, 5, 10 Supports Intel SSDs only	AOC-VROCINTMOD	956822



Figure 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 Managment Device on CPU 4.**
5. **Enable** the VMD according to the following rules.
 - For U.2 NVMe, enable all the sub-items under each PStack, based on the your model server:

VMD BIOS Setting for 2049P-TN8R
CPU4
VMD Config for PStack0

- For M.2 NVMe or NVMe AIC, enable the VMD according to which AOC card/slot it used.

An example U.2 configuration follows.

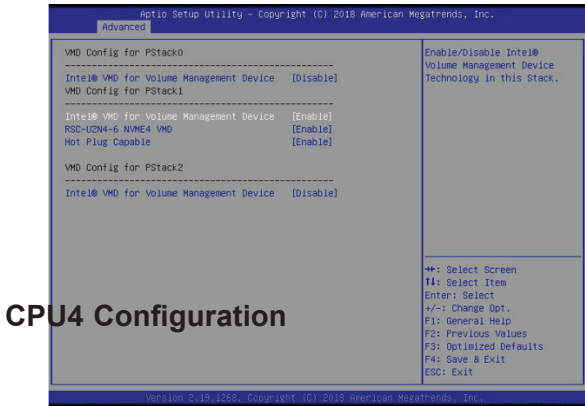


Figure F-2. BIOS VMD Setting Example for 2049P-TN8R Server

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**.
11. If cross-controller RAID is required, select **Enable RAID spanned over VMD Controller** as shown in Figure F-4.

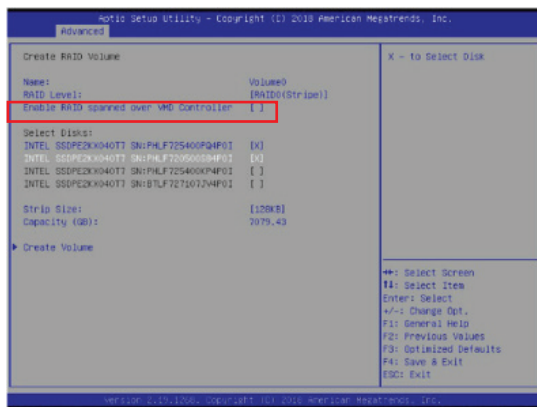


Figure F-3. Created Volume *without* enabling RAID spanned over VMD controller

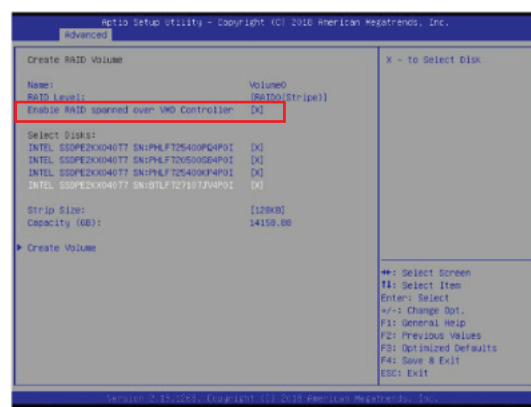


Figure F-4. Created Volume *with* enabling RAID spanned over VMD controller

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).
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 autocclaim --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>