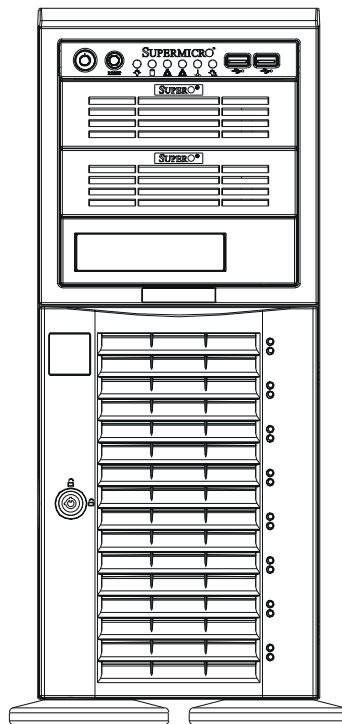




# SuperWorkstation® 5049A-T



USER'S MANUAL

Revision 1.0

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# Preface

## About this Manual

This manual is written for professional system integrators and PC technicians. It provides information for the installation and use of the SuperWorkstation 5049A-T. Installation and maintenance should be performed by experienced technicians only.

Please refer to the 5049A-T 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](http://www.supermicro.com/about/policies/safety_information.cfm)

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

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

## Warnings

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



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



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

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## **Appendix C System Specifications**

## **Appendix D UEFI BIOS Recovery**

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# Chapter 1

## Introduction

### 1.1 Overview

This chapter provides a brief outline of the functions and features of the 5049A-T SuperWorkstation. The 5049A-T is based on the X11SPA-TF motherboard and the SC743AC-1200B-SQ 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
HD Backplane	BPN-SAS3-743A	1
Heatsink (Optional)	SNK-P0071APS4	1
Hot-swap HDD Carriers	MCP-220-00092-0B	8
9-cm Super Quiet Rear Exhaust Fan	FAN-0103L4	1
8-cm Mid-Chassis Cooling Fan	FAN-0104L4	2
Rack Rail Kit (optional)	CSE-PT26L-B	1

### 1.2 Unpacking the System

Inspect the box the SuperServer 5049A-T 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 5049A-T. Please refer to Appendix C for additional specifications.

System Features
<b>Motherboard</b>
X11SPA-TF
<b>Chassis</b>
SC743AC-1200B-SQ
<b>CPU</b>
Supports Intel® Xeon® Scalable Processors, up to 205W TDP
<b>Socket Type</b>
Socket P0-LGA3647
<b>Memory</b>
Up to 768GB of RDIMM, 3TB of 3DS RDIMM, 1.5TB of LRDIMM, and 3TB of 3DS LRDIMM DDR4 (288-pin) ECC memory with speeds of up to 2933MHz (2DPC) in twelve memory slots. (1DPC and 2DPC are recommended for memory installation. Only selected 2 <sup>nd</sup> Gen Xeon® Scalable Processors support Intel® DC Persistent memory.)
<b>Chipset</b>
C621 chipset
<b>Expansion Slots</b>
Four PCI-E 3.0 x16 Slots (CPU SLOT 1, 3, 5, 7) Three PCI-E 3.0 x8 Slots (IN x16) (CPU SLOT 2, 4, 6) Four M.2 PCI-E 3.0 x4 Slots (Supports M-Key 2280 and 22110) <b>Note:</b> CPU SLOT 1 is configurable as a x8, x16, or disabled slot. See Section 4.2 M.2 Slot for more details.
<b>Hard Drives</b>
Eight hot-swappable 3.5" drive bays Three 5.25" external peripheral bays
<b>Power</b>
Single 1200W power supply
<b>Form Factor</b>
4U or Tower
<b>Dimensions</b>
7 x 17.2 x 25.5 in. (178 x 437 x 648 mm) (W x H x D as a tower)

## 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	Applies or removes power to the system.
2	Reset Button	Resets (reboots) the system.
3	Power LED	Indicated power is being supplied to the system.
4	HDD LED	Indicates activity on one or more hard drives.
5	NIC1 LED	Indicates activity on the LAN1 port.
6	NIC2 LED	Indicates activity on the LAN2 port.
7	Overheat/Fan Fail LED	When this LED flashes, it indicates a fan failure. When on continuously, it indicates an overheat condition.
8	Power Fail LED	Indicates a power supply fan failure. An alarm will also sound, which can be turned off with the reset switch on the back of the power supply.
9	USB	USB 3.1 Gen 1 Port.
10	USB	USB 3.1 Gen 1 Port.

### Front Features

The SC743AC-1200B-SQ is a 4U chassis. See the illustration below for the features included on the front of the chassis.

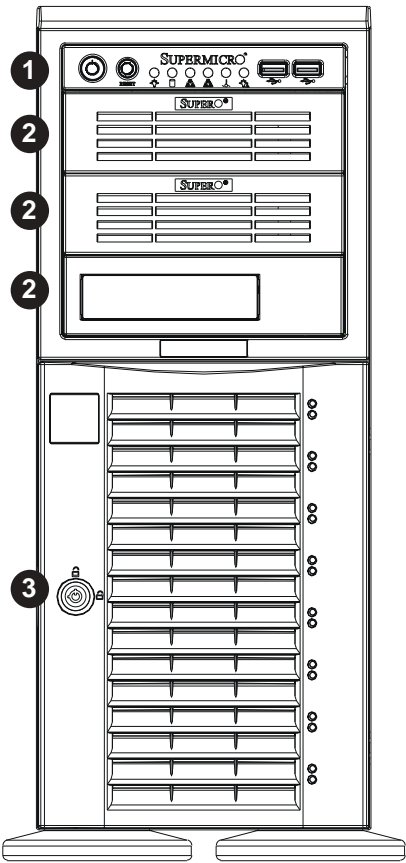


Figure 1-2. Chassis Front View

Front Chassis Features		
Item	Feature	Description
1	Control Panel	See previous page for details.
2	5.25" Drive Bay	Three drive bays for DVD-ROM or other optional drives.
3	Drive Bays	Eight SATA drive bays (behind locking bezel).

## Rear Features

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

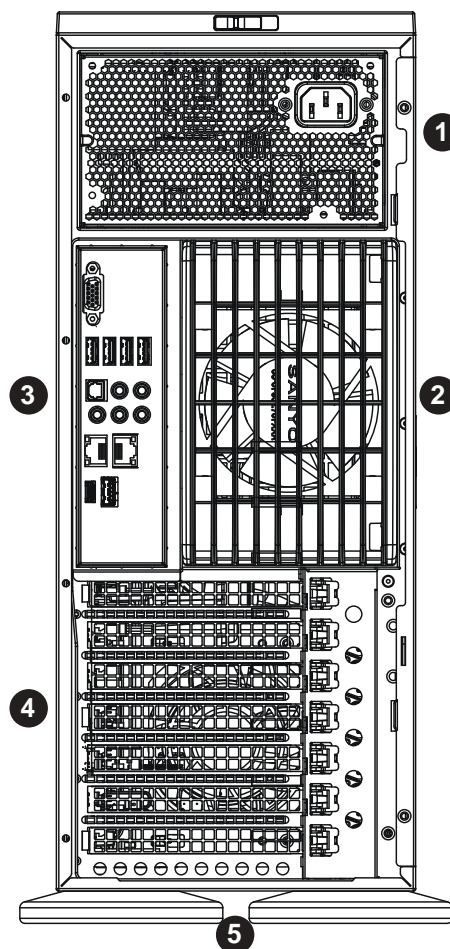


Figure 1-3. Chassis Rear View

Rear Chassis Features		
Item	Feature	Description
1	Power Supply	Single 1200W power supply (p/n PWS-1K25P-PQ).
2	Fan	9-cm Super Quiet exhaust fan.
3	Rear I/O Ports	See Section 4.3 for details.
4	PCI Slots	Slots for add-on cards.
5	Chassis Feet	Feet for 4U use, remove to rackmount the chassis.



## 1.5 Motherboard Layout

Below is a layout of the X11SPA-TF 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.

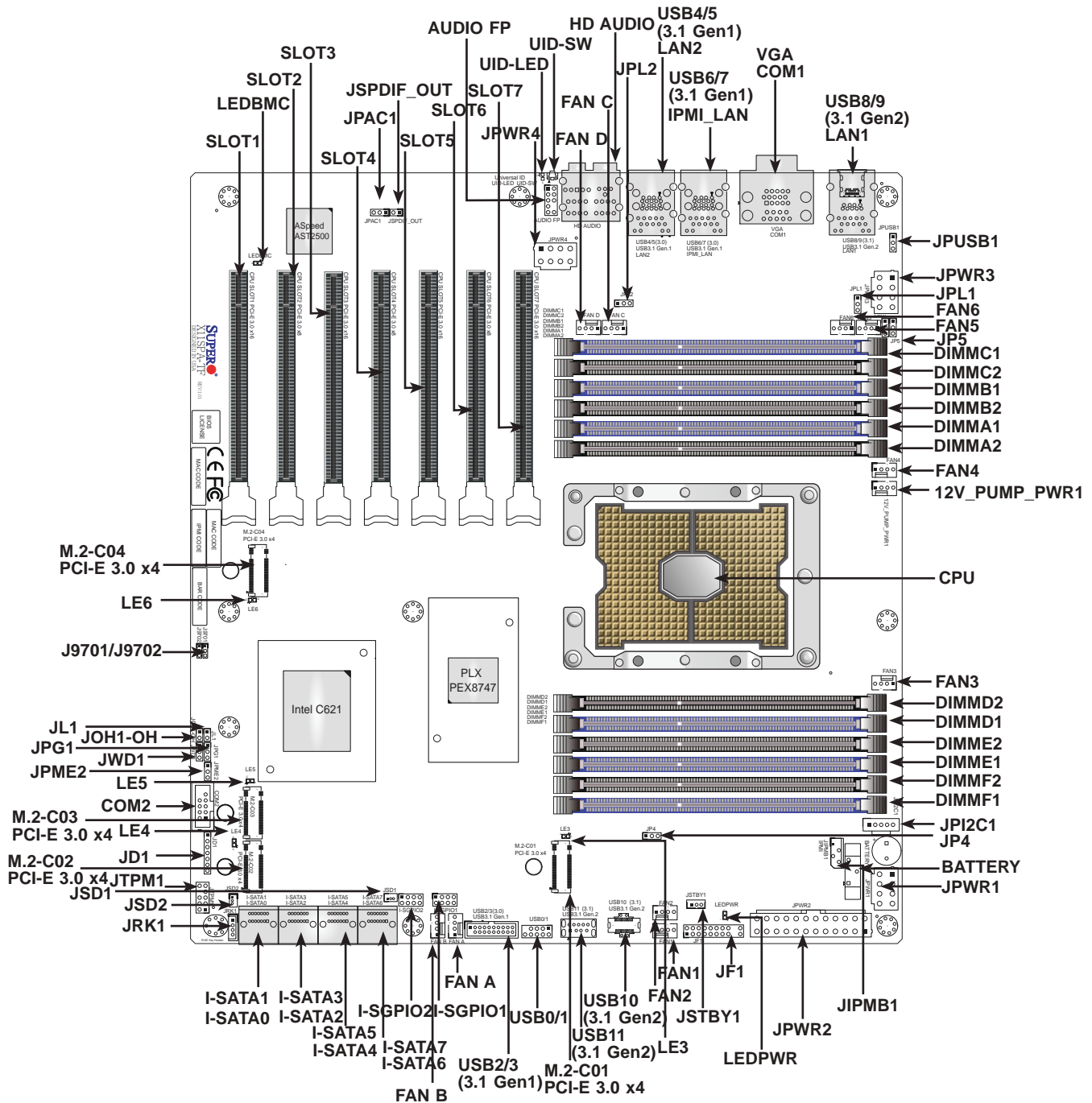


Figure 1-4. Motherboard Layout

## Quick Reference Table

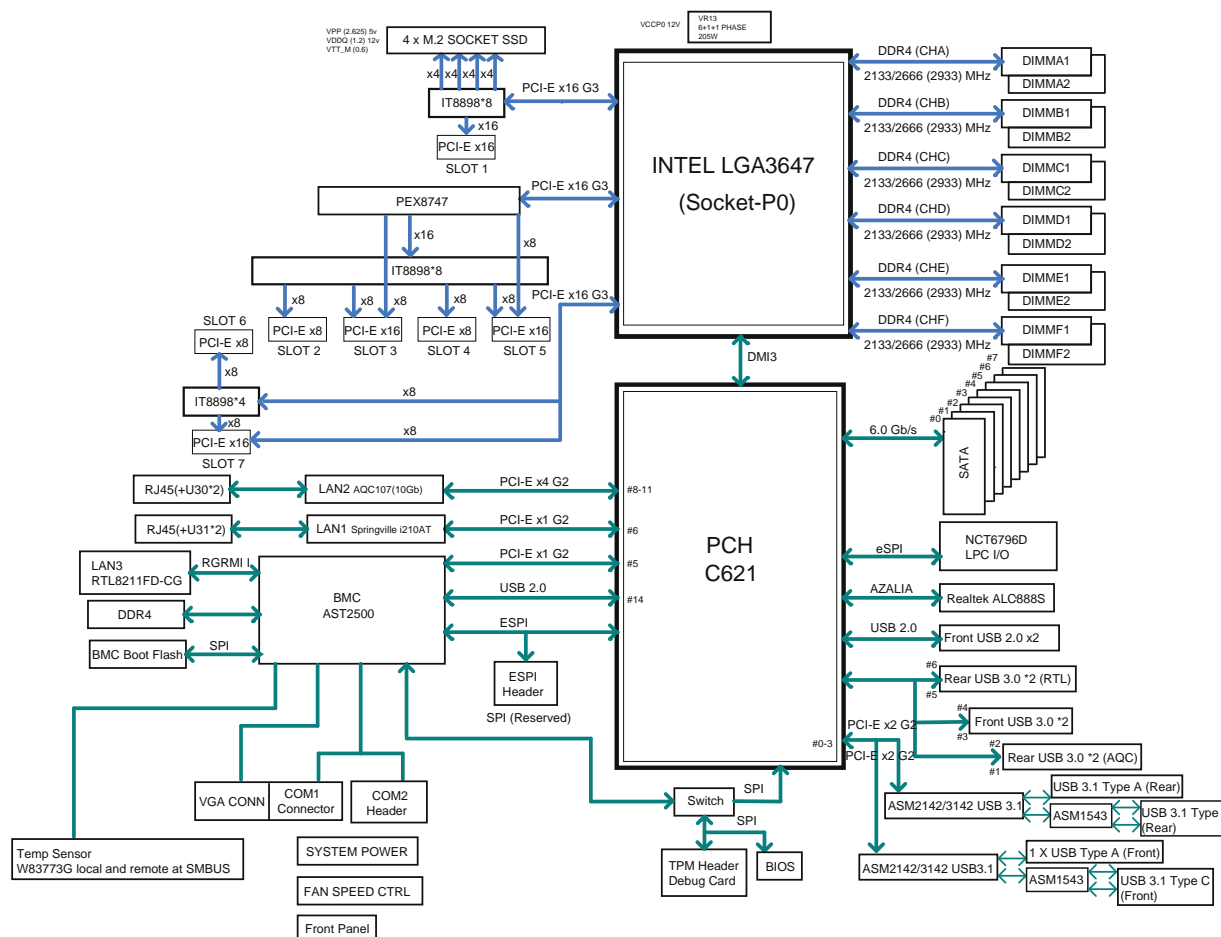
Jumper	Description	Default Setting
J9701/J9702	Manufacturing Mode	Pins 1-2 (Normal)
JPAC1	Audio Enable/Disable	Pins 1-2 (Enabled)
JPG1	VGA Enable/Disable	Pins 1-2 (Enabled)
JPL1/2	LAN1/LAN2 Enable/Disable	Pins 1-2 (Enabled)
JPME2	Intel® Manufacturing Mode	Pins 1-2 (Normal)
JWD1	Watch Dog Function Enable	Pins 1-2 (Reset)

Connector	Description
12V_PUMP_PWR1	12V 4-pin power connector for CPU liquid cooling pump
AUDIO FP	Front Panel Audio Header
BATTERY	Onboard Battery
COM1/COM2	COM1: COM Port (Back Panel), COM2: COM Header
CPU SLOT1/3/5/7 PCI-E 3.0 x16	PCI-Express x16 Slots *PCI-E SLOT#1 will change to PCI-Express x8 link when either M.2-C03 or M.2-C04 is populated with SSD. PCI-E SLOT#1 will be completely disabled when either M.2-C01 or M.2-C02 is populated with SSD.
CPU SLOT2/4/6 PCI-E 3.0 x8 (INx16)	PCI-Express x16 Slots (PCI-Express x8 link)
FAN 1 ~ 6	CPU Fan Headers
FAN A ~ D	System Fan Headers *System fan's initial rated speed must not be less than 600RPM.
HD AUDIO	High Definition Audio (back panel)
IPMI_LAN	IPMI dedicated LAN Port *X11SPA-TF's BIOS firmware is SPS
I-SATA0 ~ 7	Intel® Serial ATA (SATA 3.0) Ports 0~7 (6Gb/sec)
I-SGPIO1/I-SGPIO2	Serial General Purpose I/O Headers
JD1	Speaker/Power LED Indicator
JF1	Front Control Panel Header
JIPMB1	4-pin External I <sup>2</sup> C Header (for an IPMI card)
JL1	Chassis Intrusion Header
JOH1-OH	Overheat LED Indicator
JP4/JP5	JP4: Enable/Disable USB10/11, JP5: Enable/Disable USB8/9
JPI2C1	Power Supply SMBus I2C Header
JPUSB1	Enable/Disable USB6/7 Wake Up
JPWR1/3/4	+12V 8-pin CPU Power Connectors (Required)
JPWR2	24-pin ATX Main Power Connector (Required)
JRK1	Intel® RAID Key Header *A VROC Key is required to enable an M.2 RAID card
JSD1/JSD2	SATA DOM (Disk-On-Module) Power Connectors
JSTBY1	Standby Power Header (5V)
JSPDIF_OUT	Sony/Philips Digital Interface (S/PDIF) Out Header
JTPM1	Trusted Platform Module (TPM) Header
LAN1/LAN2	RJ45 1GbE/10GbE LAN Ports

Connector	Description
PCI-E M.2-C01/C02/C03/C04 PCI-E 3.0 x4	PCI-E 3.0 x4 M.2 Connectors. Small form factor devices and other portable devices for high speed NVMe SSDs
UID-SW	Unit Identifier (UID) Switch
USB0/1	Front Access USB 2.0 Header
USB2/3	Front Access USB 3.1 Gen1 Header
USB4/5/6/7	Back Panel USB3.1 Gen1 Ports <small>*X11SPA-TF does not support S3 or S4. Either USB4/5 or USB 6/7 will support standby power.</small>
USB8/9	Back Panel USB3.1 Gen2 Ports
USB10/11	Front Access USB3.1 Gen2 Headers (USB10: Type A, USB11: Type C)
VGA	VGA Ports

LED	Description	Status
LE3/4/5/6	M.2 LED	Blinking Green: Device Working
LEDBMC	BMC Heartbeat LED	Blinking Green: BMC Normal
LEDPWR	Onboard Power LED	Solid Green: Power On
UID-LED	Unit Identifier (UID) LED	Blue on: Unit Identified



**Figure 1-5. 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.).

## **Workstation Precautions**

- Ensure that the caster wheels on the workstation are locked.
- Review the electrical and general safety precautions in Appendix B.
- Use a regulating uninterruptible power supply (UPS) to protect the workstation from power surges, voltage spikes and to keep your system operating in case of a power failure.
- Allow the power supply units and hot-swap SATA drives to cool before touching them.
- To maintain proper cooling, always keep all chassis panels closed and all SATA carriers installed when not being serviced.



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

- This unit should be mounted at the bottom of the rack if it is the only unit in the rack.
- When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.



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



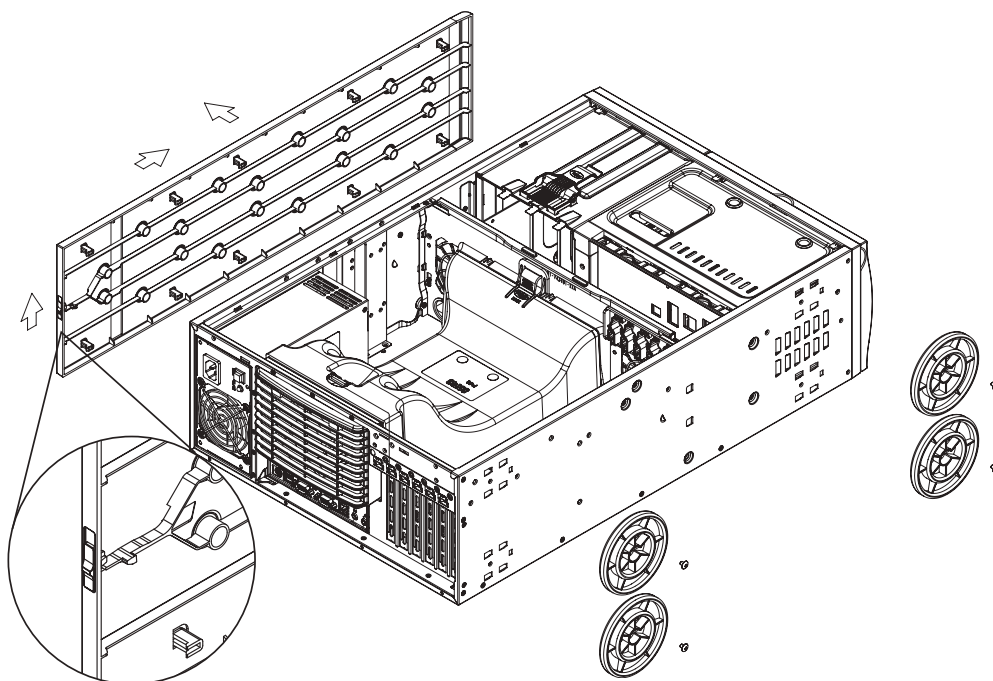
**Warning:** Do not pick up the server with the front handles. They are designed to pull the system from a rack only.

## 2.3 Preparing the Chassis

The chassis top tower cover and feet must be removed before rack installation.

### Removing the Top Tower Cover

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



**Figure 2-1. Removing the Top Tower Cover and Feet**

### Removing the Chassis Feet

1. Lay the chassis on its side.
2. Remove the screws holding the chassis feet in place.
3. Each foot has a foot lock tab at the center. Use a flat head screwdriver to gently lift the foot lock upward. Slide the foot toward the rear of the chassis.

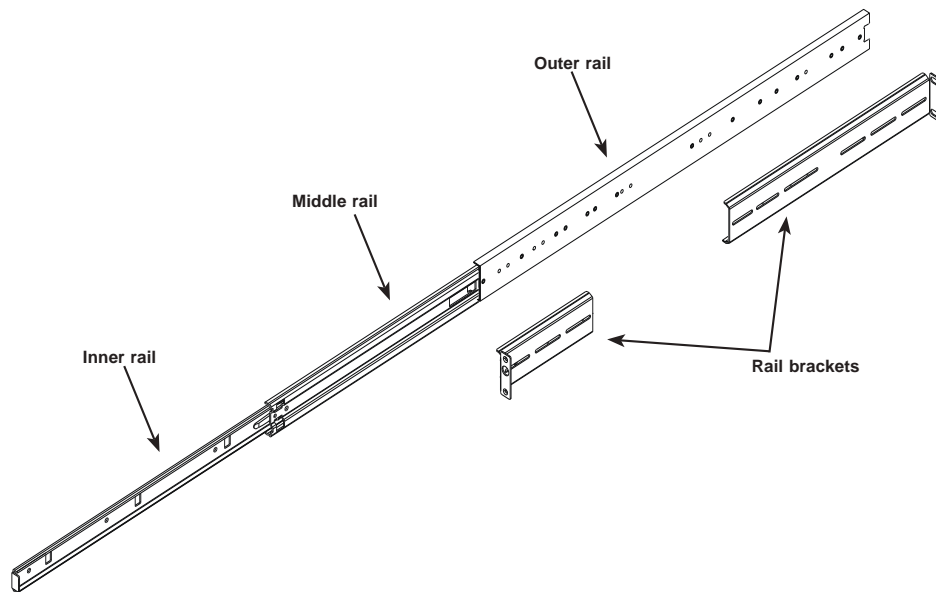


## 2.4 Installing the Rails

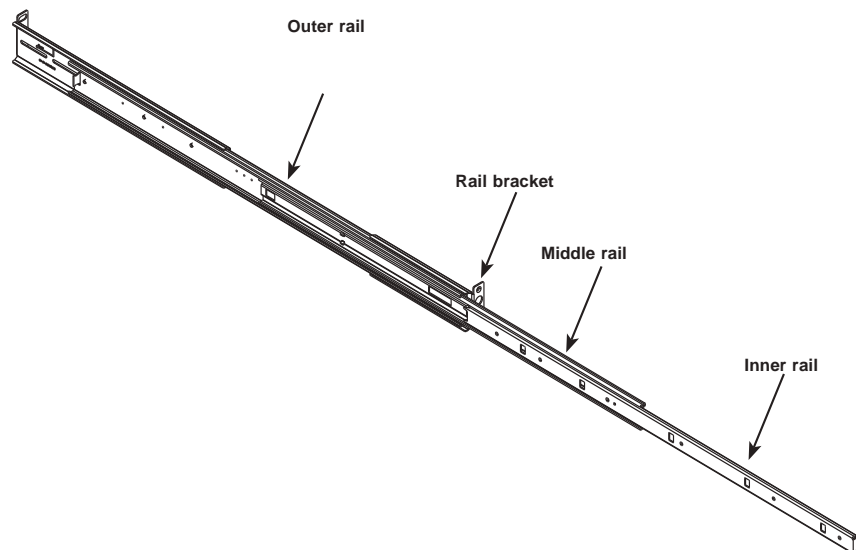
This section provides a guideline for installing the rails to the chassis and to the rack with the included rackmount kit.

### Identifying the Sections of the Rack Rails

The optional rackmount kit includes two rack rail assemblies. Figures 2-2 and 2-3 show the sections of one rail assembly from two different angles.



**Figure 2-2. Rack Rail Sections (Outer View)**



**Figure 2-3. Rack Rail Sections (Inner View)**

## Assembling the Outer Rails and the Rack Brackets

Each outer rail requires assembly with the rack brackets before mounting onto the rack.

1. Identify the two long brackets for the rear of each rail and the two short brackets for the front of each rail. The brackets are also left and right specific.
2. Secure the short bracket onto the outer rail with screws at the side as shown below.
3. Place the long bracket onto the outer rail at the approximate position to fit your rack. Use two or three screws. Leave the screws just loose enough for the bracket to slide back and forth slightly.

**Note:** The short bracket is secured firmly to the rail. However, the long bracket is slightly loose.

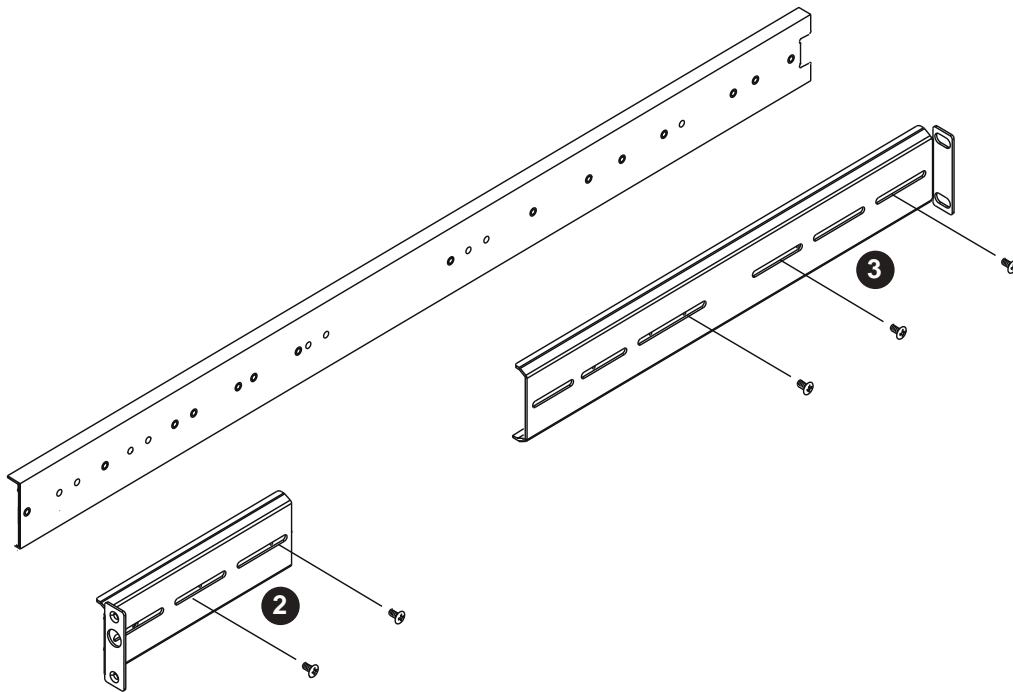


Figure 2-4. Assembling the Outer Rails

## Releasing the Inner Rail from the Outer Rail

1. Locate the rail assembly.
2. Extend the rail assembly by pulling it outward.
3. Press the quick-release tab.
4. Separate the inner rail from the outer rail assembly.

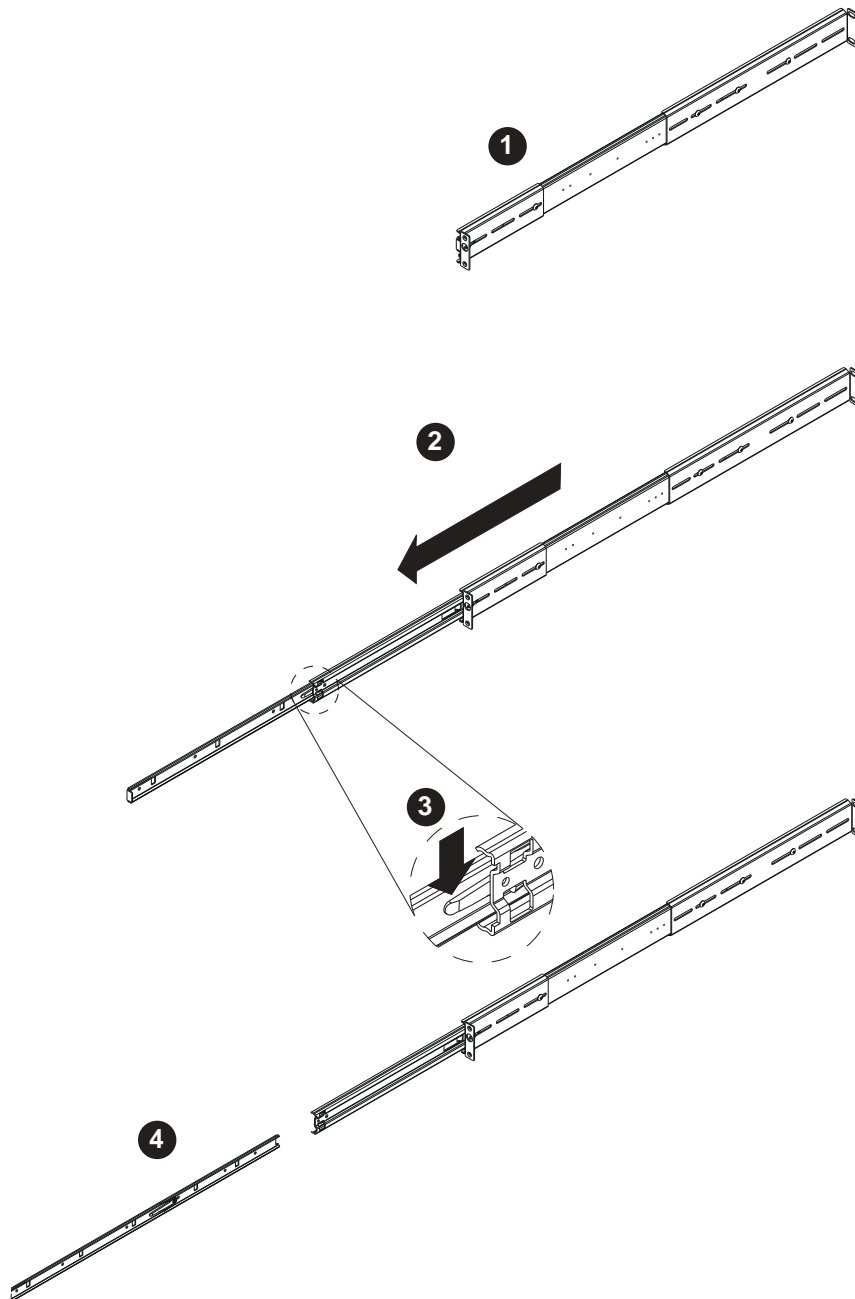


Figure 2-5. Releasing the Inner Rail (Outer View)

## Installing the Inner Rails to the Chassis

1. Attach the handles to the front of the chassis with three screws each.
2. Identify the left and right inner rails. They are labeled on the rails and in the figure below.
3. Align each rail with the screw holes along the side of the chassis.
4. Screw the rails securely to the side of the chassis.

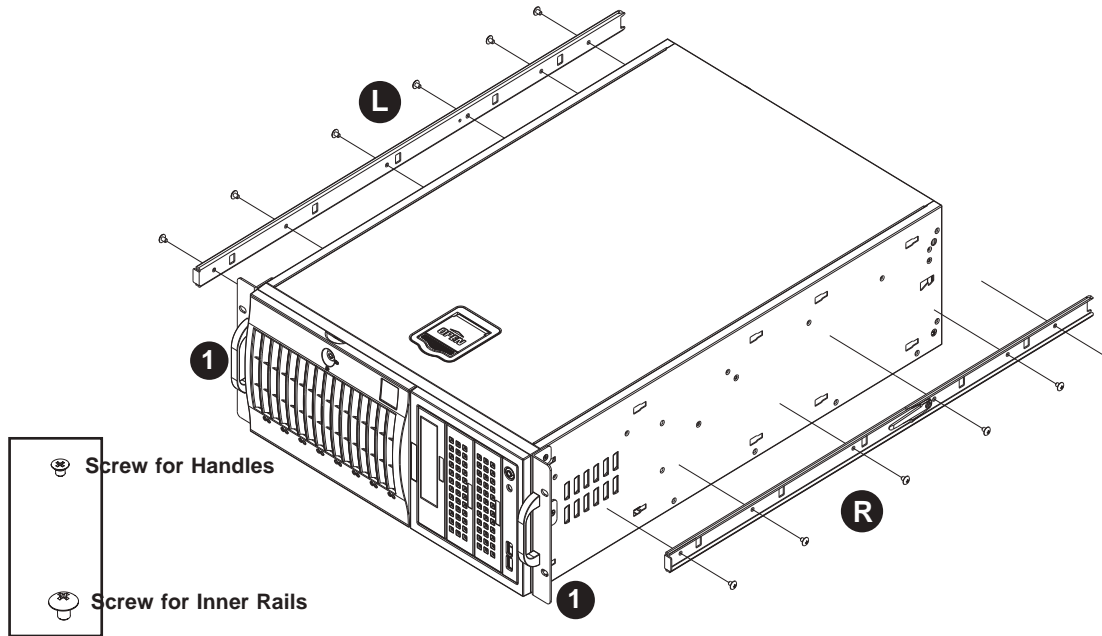


Figure 2-6. Installing the Handles and Inner Rails to the Chassis

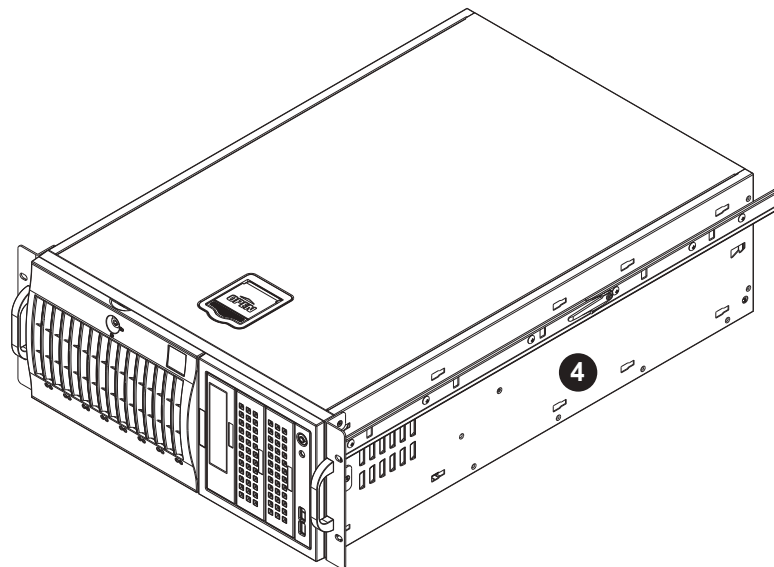


Figure 2-7. Handles and Inner Rails Installed to the Chassis

## Installing the Outer Rails to the Rack

Use the previously assembled outer rails with the rear brackets loosely attached.

1. Adjust the outer rail to fit the rack depth. Align the screw holes in the bracket ears with the holes in the rack post.
2. Use screws and fasteners to secure the outer rails to the front and rear rack posts.
3. Tighten the screws holding the rear bracket.

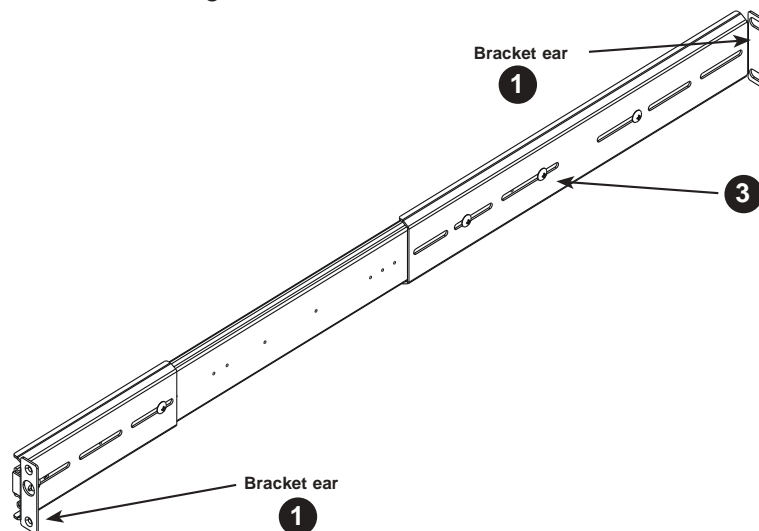


Figure 2-8. Installing the Outer Rails to the Rack

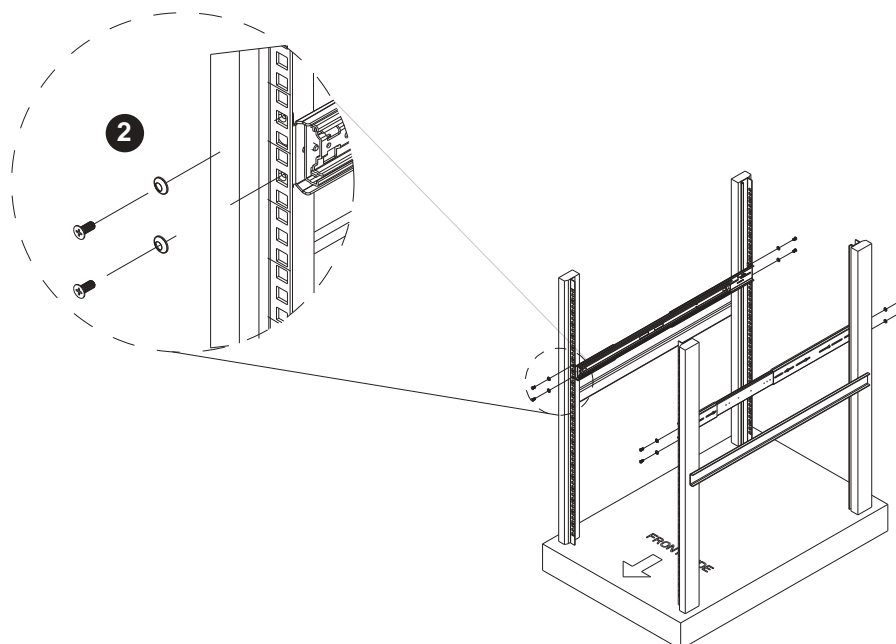
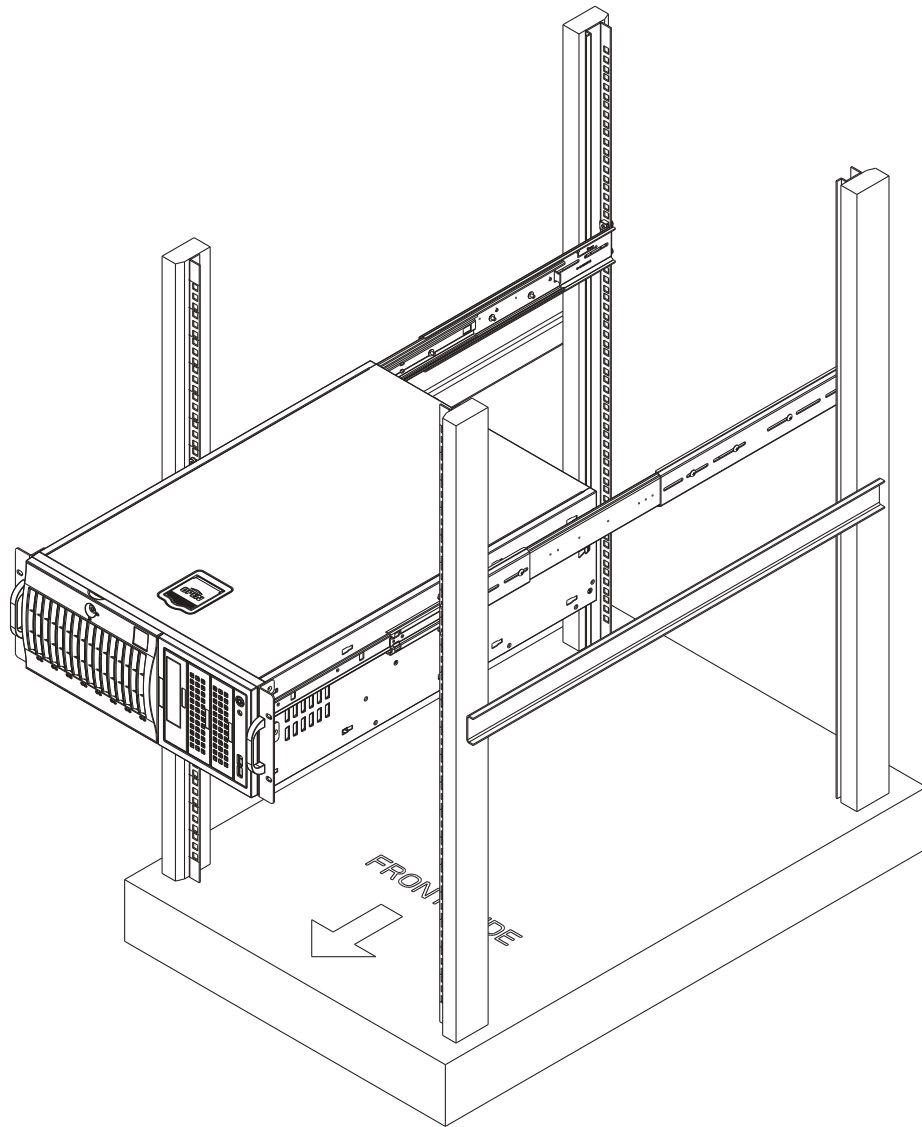


Figure 2-9. Installing the Outer Rails to the Rack

## 2.5 Installing the Server into the Rack

With rails attached to both the chassis and the rack, install the server into the rack.

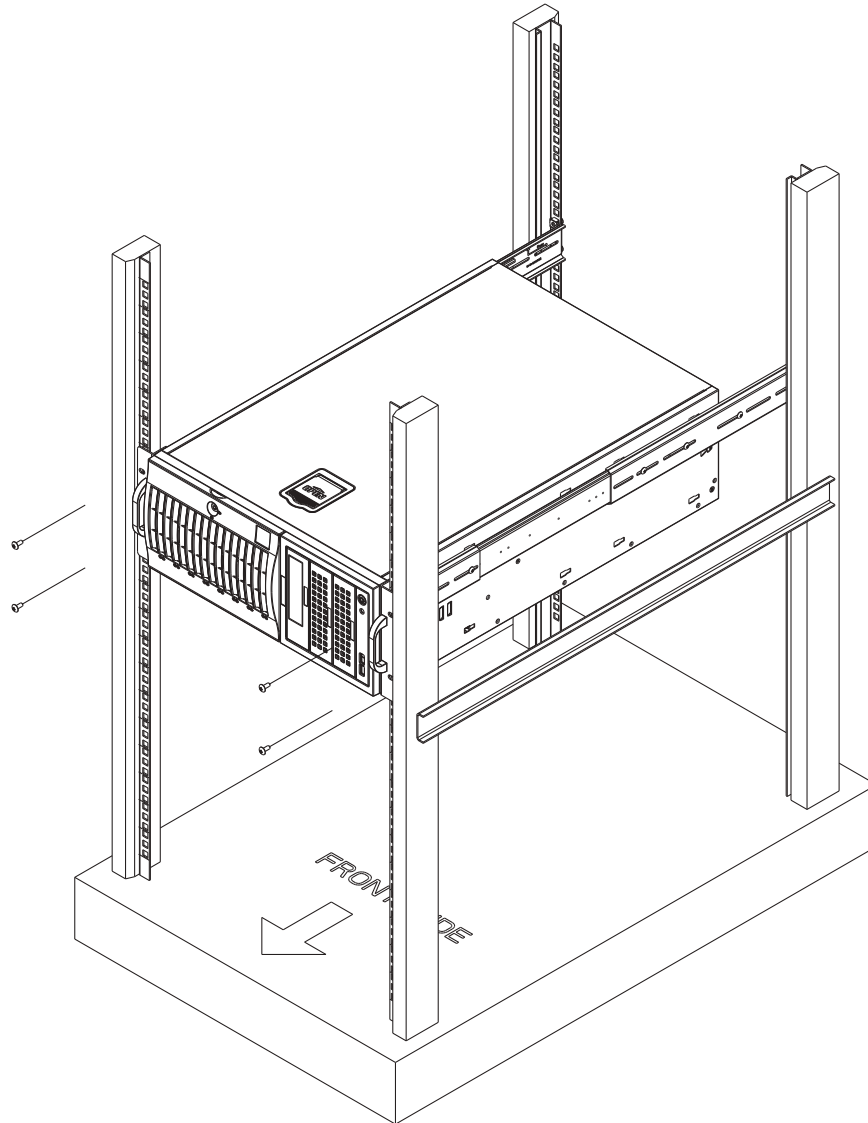
1. Pull the middle rail out of the outer rail and make sure the ball bearing shuttle is locked at the front of the middle rail.
2. Align the chassis rails with the rack rails. Slide the chassis rails into the rack rails until the server is completely in the rack (see the next page).



**Figure 2-10. Installing the Server into the Rack**

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

3. Insert and tighten the thumbscrews that hold the front of the server to the rack.



**Figure 2-11. Securing the Server to the Rack**

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



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



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

## Removing the Chassis from the Rack

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

1. Remove the screws that hold the front of the server to the rack.
2. Pull the chassis forward out 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.



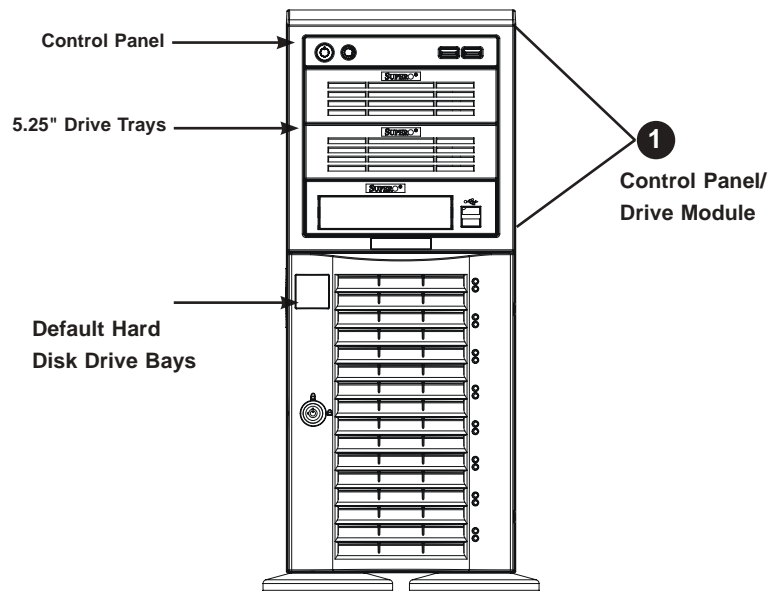
Slide rail mounted equipment is not to be used as a shelf or a work space.



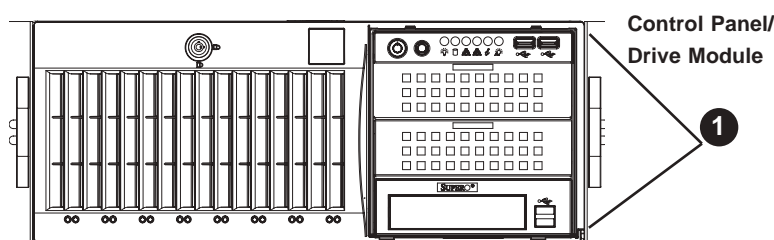
## 2.6 Control Panel Orientation

The server can be configured for either tower or server rack orientation. It is shipped in tower mode and can be immediately used as a desktop server. To use it in a rack, rotate the module that contains the control panel and the three drive trays (1 in Figure 2-8) 90 degrees.

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



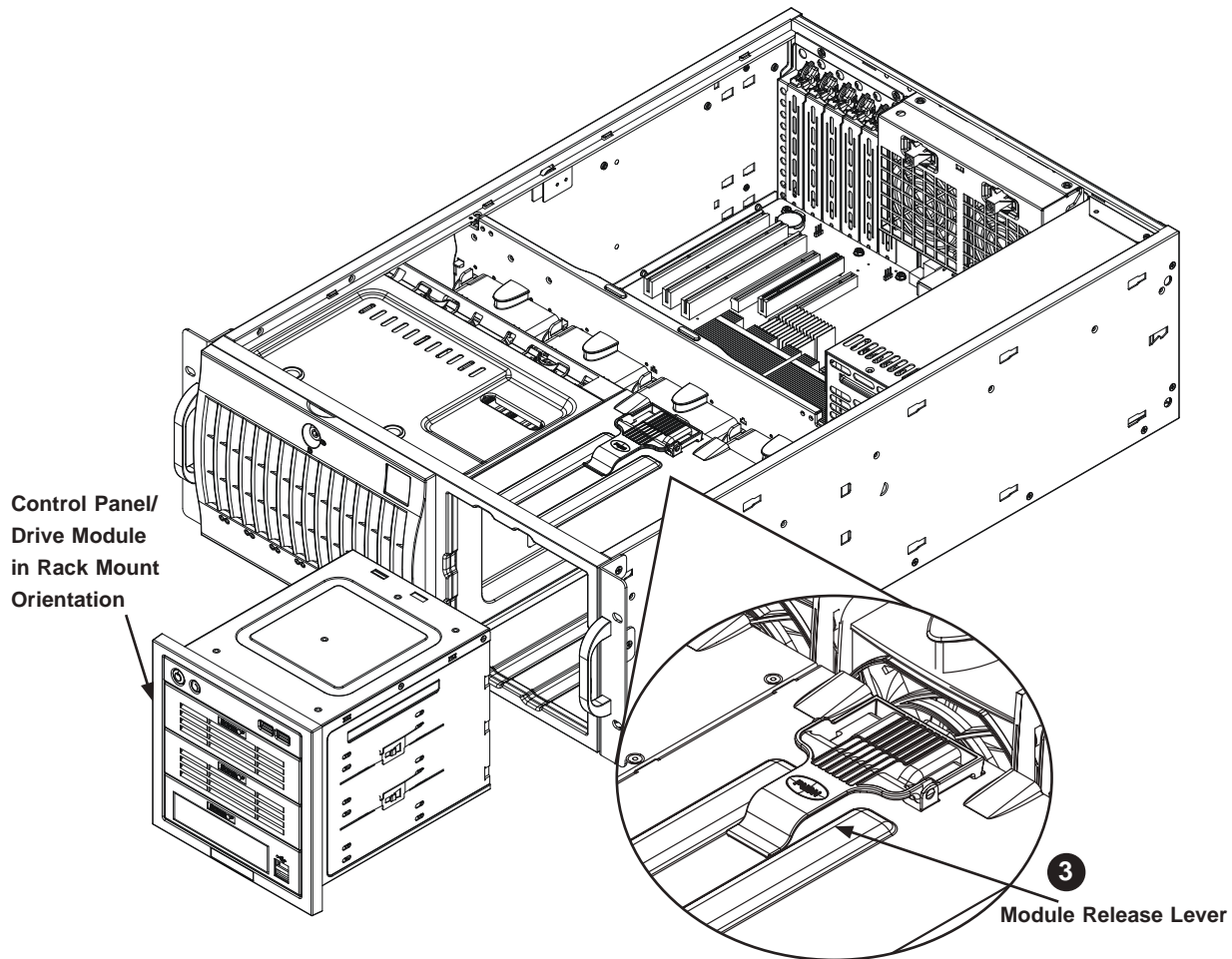
**Figure 2-12. Chassis in Tower Mode (Default Configuration)**



**Figure 2-13. Chassis in Rack Mount Mode**

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

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



**Figure 2-14. Rotating the Control Panel/Drive Module**

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

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

## Chapter 3

# Maintenance and Component Installation

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

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

### 3.1 Removing Power

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

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

### 3.2 Accessing the System

A bezel covers the drive area but does not need to be removed to access the drives; simply swing open the bezel. Follow the steps below if you wish to remove the bezel.

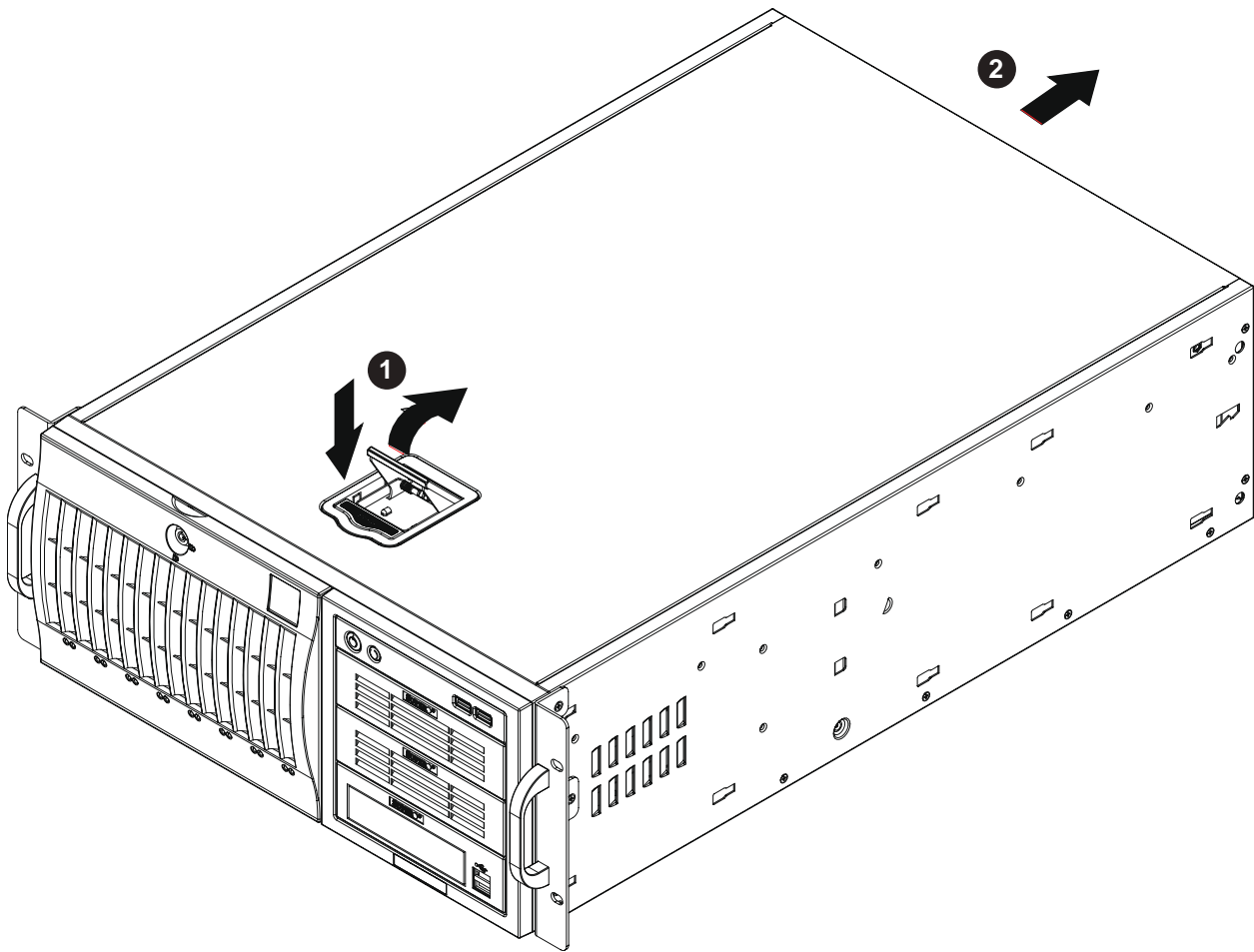
#### ***Removing the Bezel***

1. Push on the three tabs on the inside of the left lip of the front chassis cover.
2. Slightly swing out the same (left) side of the cover - about ½ inch only.
3. Remove by pushing on the open side of the cover to remove it from the chassis (do not try to swing or pull it straight out after opening the left side).

***Removing the Side Tower Cover***

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

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



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

## 3.3 Motherboard Components

### Processor and Heatsink Installation

Intel® Xeon® Scalable Processors come in two models: Fabric (F model) and Non-Fabric (Non-F model). Only the Non-Fabric model is supported for this system.

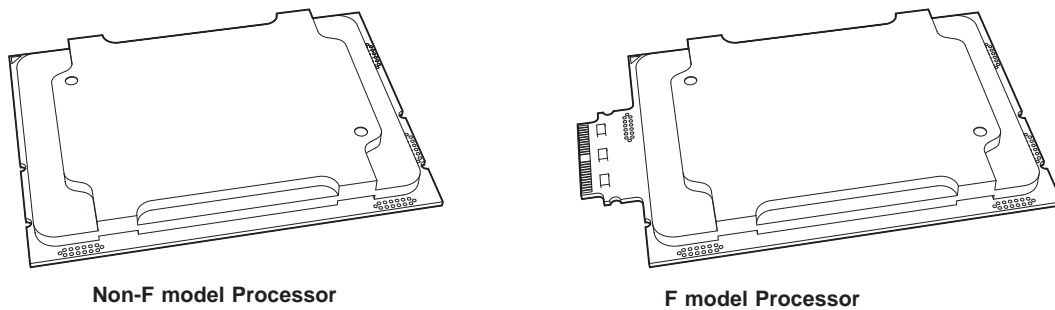
The processor (CPU) and heatsink should be assembled together first to form the processor heatsink module (PHM), and then install the PHM into the CPU socket.

**Caution:** Use ESD protection. Do not touch the underside of the CPU. Improper installation or socket misalignment can cause serious damage to the CPU or socket which may require manufacturer repairs.

**Notes:**

- All power should be off, as described in Section 3.1, before installing the processors.
- When handling the processor package, avoid placing direct pressure on the label area of the CPU or socket.
- Check that the plastic socket dust cover is in place and none of the socket pins are bent—otherwise, contact your retailer.
- Refer to the Supermicro website for updates on CPU support.
- Graphics in this manual are for illustration. Your components may look slightly different.

## ***The Xeon Scalable Processor***



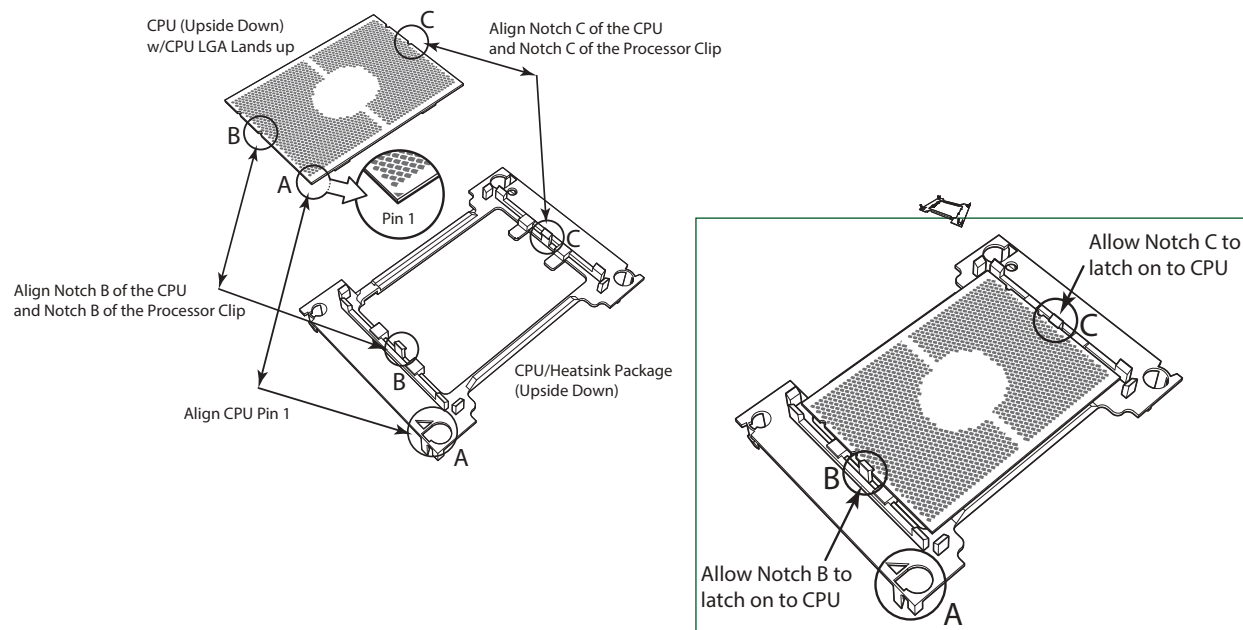
**Figure 3-2. Xeon Scalable Processors**

### ***Assembling the Processor Package***

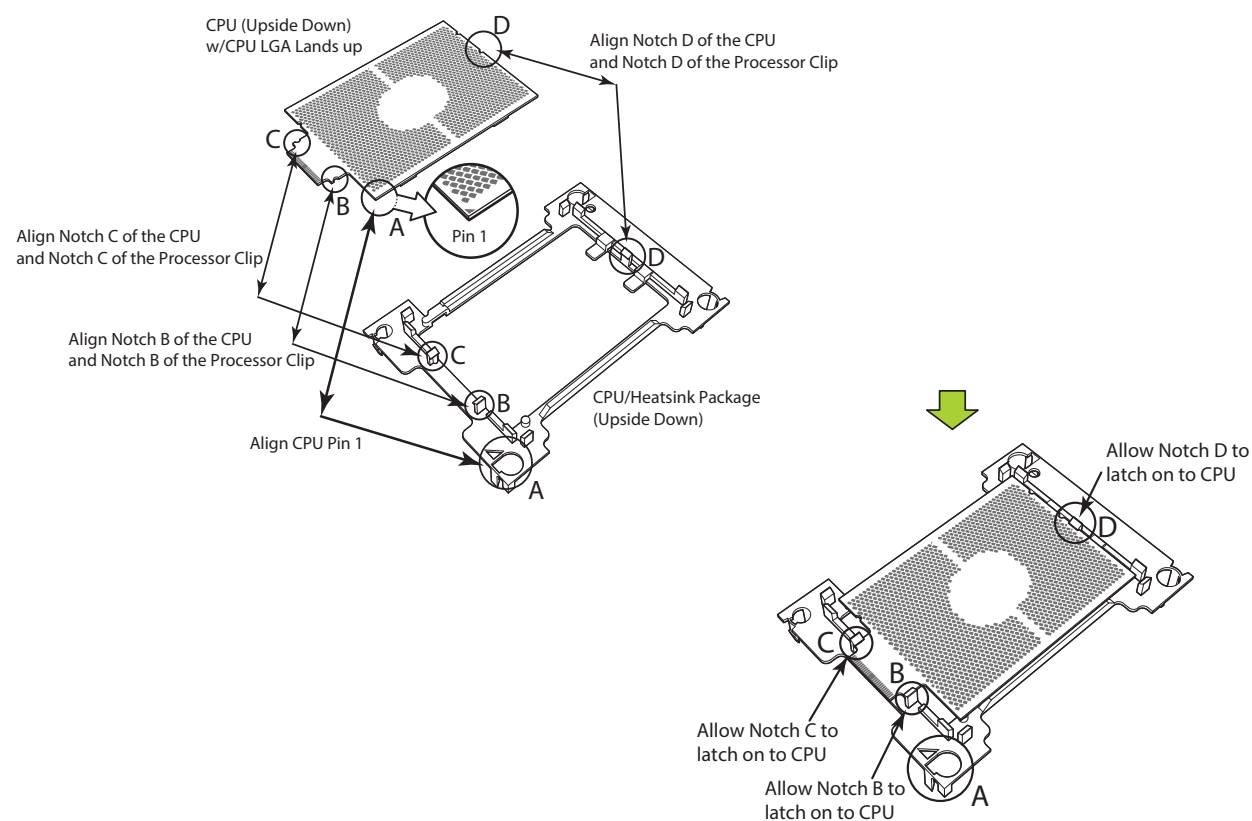
Attach the processor to the thin processor clip to create the processor package.

1. On the top corner of the CPU, locate pin 1 (A), marked by a triangle. Also, locate notch B and notch C (and notch D for F models) on the CPU as shown below.
2. On the top of the processor clip, locate the corner marked by a hollow triangle as the position for pin 1. Also locate notch B and notch C (and D for F models) on the processor clip.
3. Align pin 1 of the CPU with its proper position on the processor clip and carefully insert the CPU into the processor clip. Slide notch B of the CPU into tab B of the processor clip, and slide notch C of the CPU into tab C of the processor clip (and D for F models) until the processor clip tabs snap onto the CPU.
4. Examine all corners to ensure that the CPU is properly seated and secure on the processor clip.

The processor package assembly is created.



**Figure 3-3. Processor Package Assembly for the non-F Model Processors**



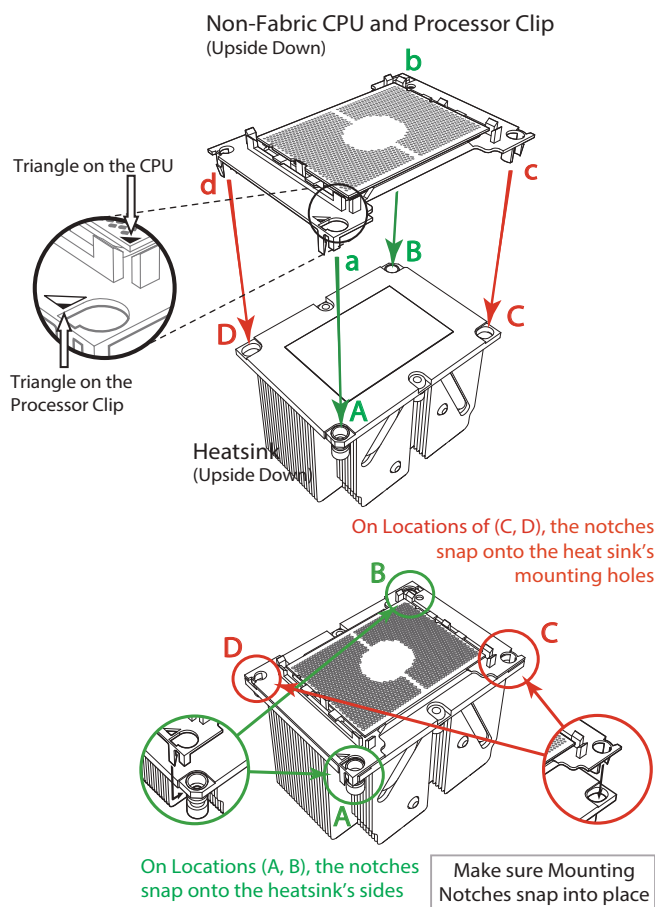
**Figure 3-4. Processor Package Assembly for the F Model Processors**

### Assembling the Processor Heatsink Module (PHM)

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

1. On the heatsink label, locate "1" and the corner next to it. Turn the heatsink upside down with the thermal grease side facing up, keeping track of the "1" corner.
2. Remove the protective thermal film if present. If this is a new heatsink, the necessary thermal grease has been pre-applied in the factory. If the heatsink is not new, apply the proper amount of the thermal grease.
3. In the plastic processor clip, locate the hollow triangle at the corner ("a" in the drawing below) next to a hole and plastic mounting clips. There is a similar hole and mounting clips at the diagonal corner of the of the processor clip ("b" in the drawing).
4. With the underside of heatsink and the underside of the processor package facing up, align the "1" corner on the heatsink ("A" in the drawing) against the mounting clips next to the hollow triangle ("a") on the processor package.
5. Also align the corner ("B") at the diagonal side of the heatsink with the corresponding clips on the processor package ("b").
6. Once aligned, press the processor package assembly onto the heatsink until the mounting clips (at a, b, c, and d) snap into place.

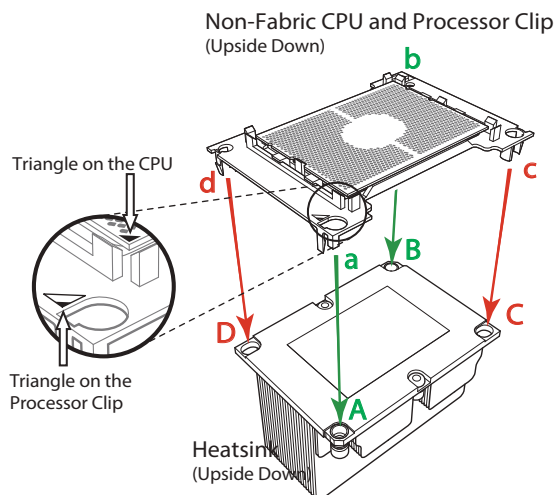
The processor heatsink module is assembled.



**Figure 3-5. Assembling the Processor Heatsink Module**

**Note:** The heatsink displayed may be different than the one used in the 5049A-T.

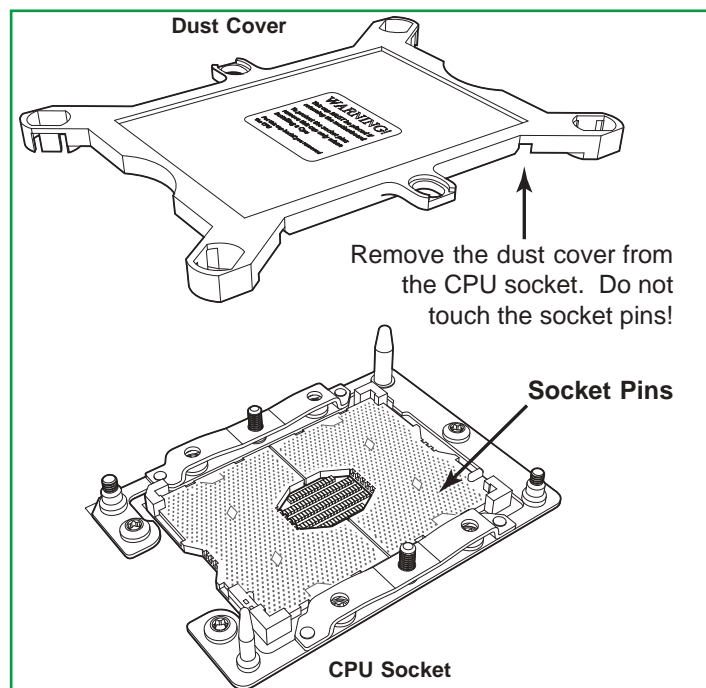




### ***Removing the Dust Cover from the CPU Socket***

Remove the dust cover from the CPU socket, exposing the socket pins as shown below.

**Caution:** Do not touch the socket pins.



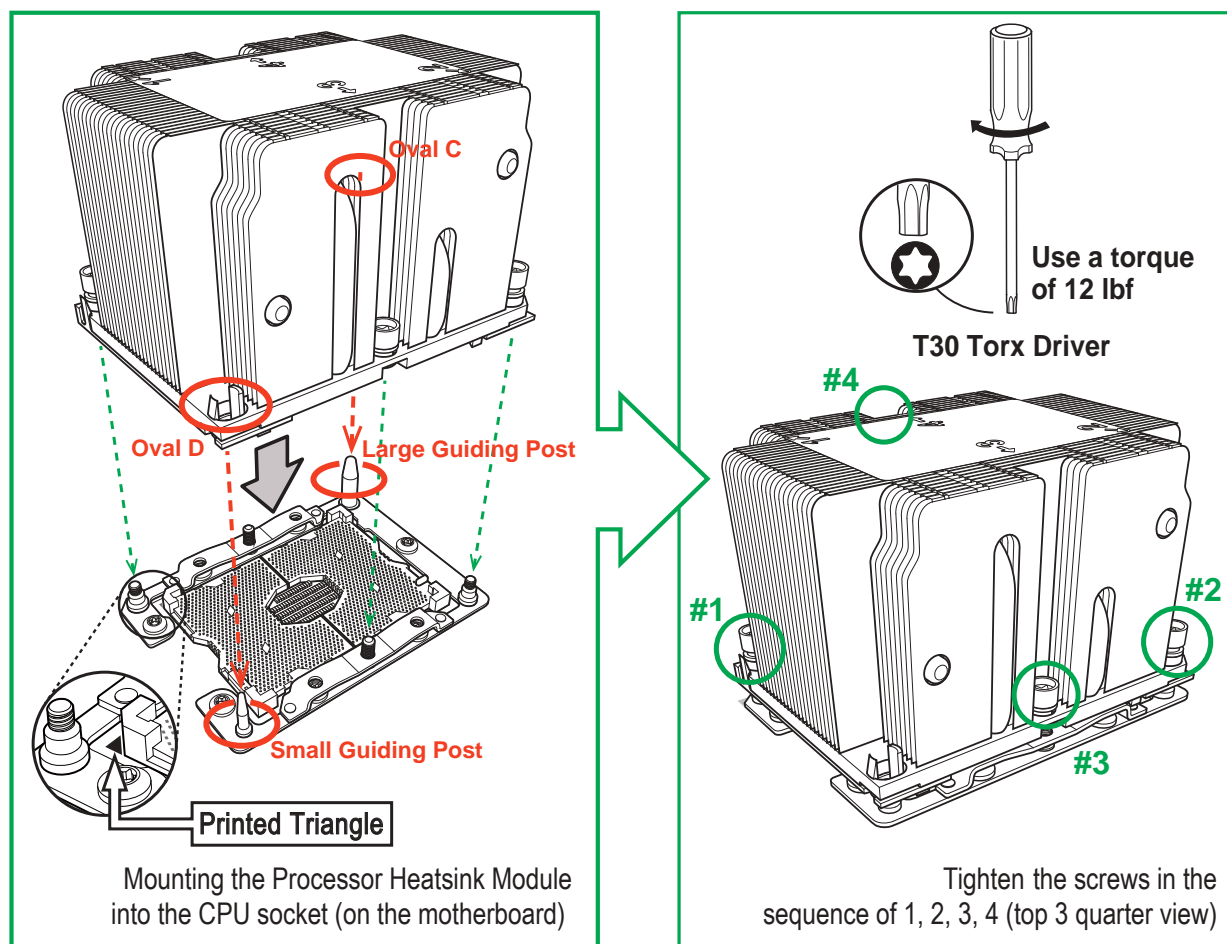
**Figure 3-6. Removing the Socket Dust Cover**

### ***Installing the Processor Heatsink Module (PHM)***

1. Locate the triangle (pin 1) on the CPU socket. Also locate the pin 1 corner of the PHM that is closest to "1" on the heatsink label. To confirm, look at the underside of the PHM and note the hollow triangle in the processor clip and printed triangle on the CPU located next to a screw at the corner.
2. Align the pin 1 corner of the PHM over the pin 1 corner on the CPU socket.

3. Align the two holes at diagonal corners of the PHM onto the two guide posts on the socket bracket and carefully lower the PHM onto the socket.
4. Use a T30 Torx-bit screwdriver to install four screws into the mounting holes on the socket to securely attach the PHM onto the motherboard in the sequence of 1, 2, 3, and 4, as marked on the heatsink label. Gradually tighten each to assure even pressure.

**Note:** Use only 12 foot-pounds of torque when tightening the screws to avoid damaging the processor or the socket.

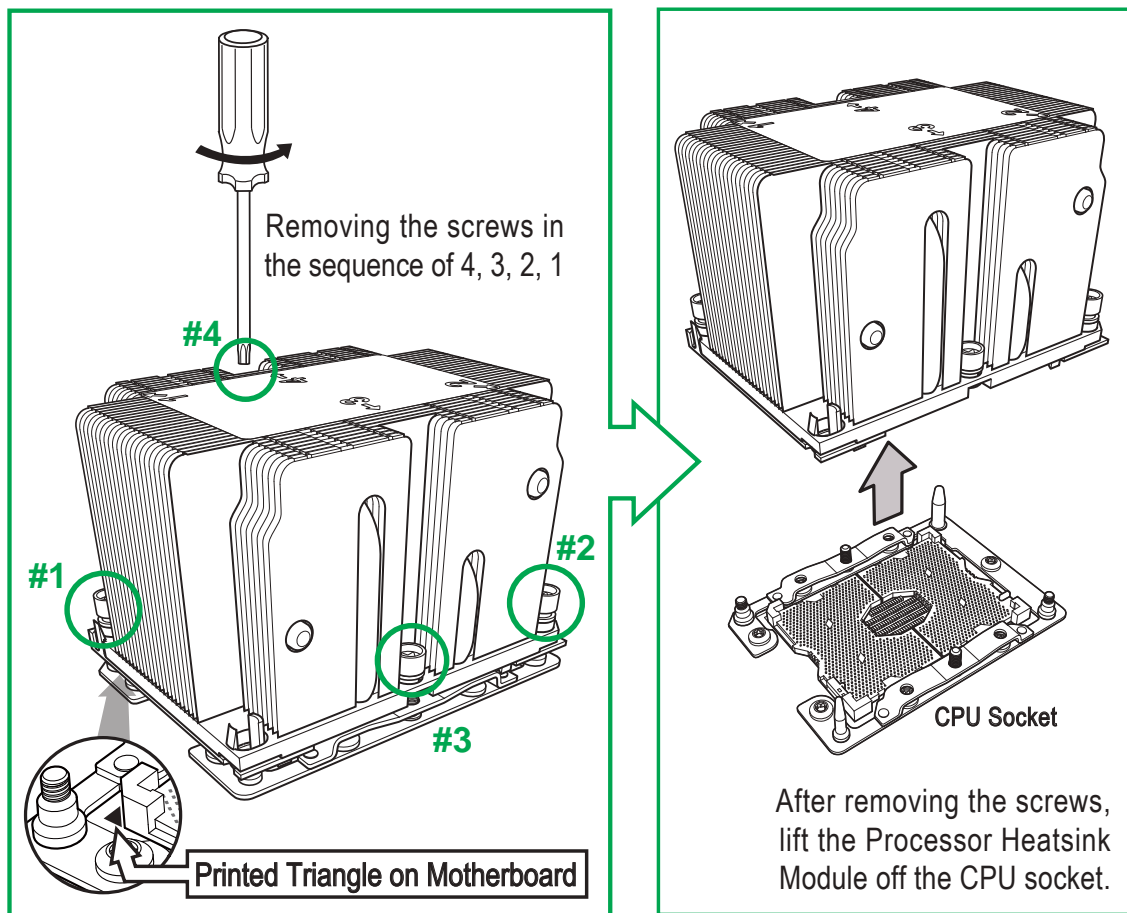


**Figure 3-7. Installing the Processor Heatsink Module**

### ***Removing the Processor Heatsink Module from the Motherboard***

Before removing the processor heatsink module (PHM), power down as described in Section 3.1.

1. Using a T30 Torx-bit screwdriver, loosen and remove the screws on the PHM from the socket, starting with the screw marked #4, in the sequence of 4, 3, 2, 1.
2. Pull up the PHM while releasing the small snap tabs on two corners of the socket.



**Figure 3-8. Removing the Processor Heatsink Module**

## Memory Support

The X11SPA-TF supports up to 768GB of ECC RDIMM, 3TB of 3DS RDIMM, 1.5TB of LRDIMM, and 3TB of 3DS LRDIMM DDR4 (288-pin) ECC memory with speeds of up to 2933MHz in twelve memory slots. (1DPC and 2DPC are recommended for memory installation. Only selected 2<sup>nd</sup> Gen Xeon® Scalable Processors support Intel® DC Persistent memory.)

### ***Memory Population Guidelines***

- All DIMMs must be DDR4.
- Balance memory. Using unbalanced memory topology, such as populating two DIMMs in one channel while populating one DIMM in another channel, reduces performance. It is not recommended for Supermicro systems.

#### *Guidelines Regarding Mixing DIMMs*

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

#### *DIMM Construction*

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

### ***Memory Population Sequence***

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

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

1 CPU, 12-DIMM Slots	
Number of DIMMs	Memory Population Sequence
1	DIMMA1
2	DIMMA1,DIMMD1
3	DIMMA1,DIMMB1,DIMMD1
4	DIMMA1,DIMMB1,DIMMD1,DIMME1
5	DIMMA1,DIMMB1,DIMMC1,DIMMD1,DIMME1
6	DIMMA1,DIMMB1,DIMMC1,DIMMD1,DIMME1,DIMMF1
7	DIMMA1,DIMMA2,DIMMB1,DIMMC1,DIMMD1,DIMME1,DIMMF1
8	DIMMA1,DIMMA2,DIMMB1,DIMMC1,DIMMD1,DIMMD2,DIMME1,DIMMF1
9	DIMMA1,DIMMA2,DIMMB1,DIMMB2,DIMMC1,DIMMD1,DIMMD2,DIMME1,DIMMF1
10	DIMMA1,DIMMA2,DIMMB1,DIMMB2,DIMMC1,DIMMD1,DIMMD2,DIMME1,DIMME2,DIMMF1
11	DIMMA1,DIMMA2,DIMMB1,DIMMB2,DIMMC1,DIMMC2,DIMMD1,DIMMD2,DIMME1,DIMME2,DIMMF1
12	DIMMA1,DIMMA2,DIMMB1,DIMMB2,DIMMC1,DIMMC2,DIMMD1,DIMMD2,DIMME1,DIMME2,DIMMF1,DIMMF2

Table 3-1. DIMM Population Sequence

DIMM Type	Ranks Per DIMM and Data Width	DIMM Capacity (GB)		Speed (MT/s), Voltage (V), Slot Per Channel (SPC), and DIMM Per Channel (DPC)		
				1 Slot Per Channel	2 Slots Per Channel	
		DRAM Density		1DPC	1DPC	2DPC
		4GB	8GB	1.2V	1.2V	1.2V
RDIMM	SRx4	8GB	16GB	2933	2933	2933
RDIMM	SRx8	4GB	8GB			
RDIMM	DRx8	8GB	16GB			
RDIMM	DRx4	16GB	32GB			
RDIMM 3DS	QRx4	N/A	2H-64GB			
	8Rx4	N/A	4H-128GB			
LRDIMM	QRx4	32GB	64GB			
LRDIMM 3DS	QRx4	N/A	2H-64GB			
	8Rx4	N/A	4H-128GB			

Table 3-2. DIMM Capacity, Speed, and Voltage

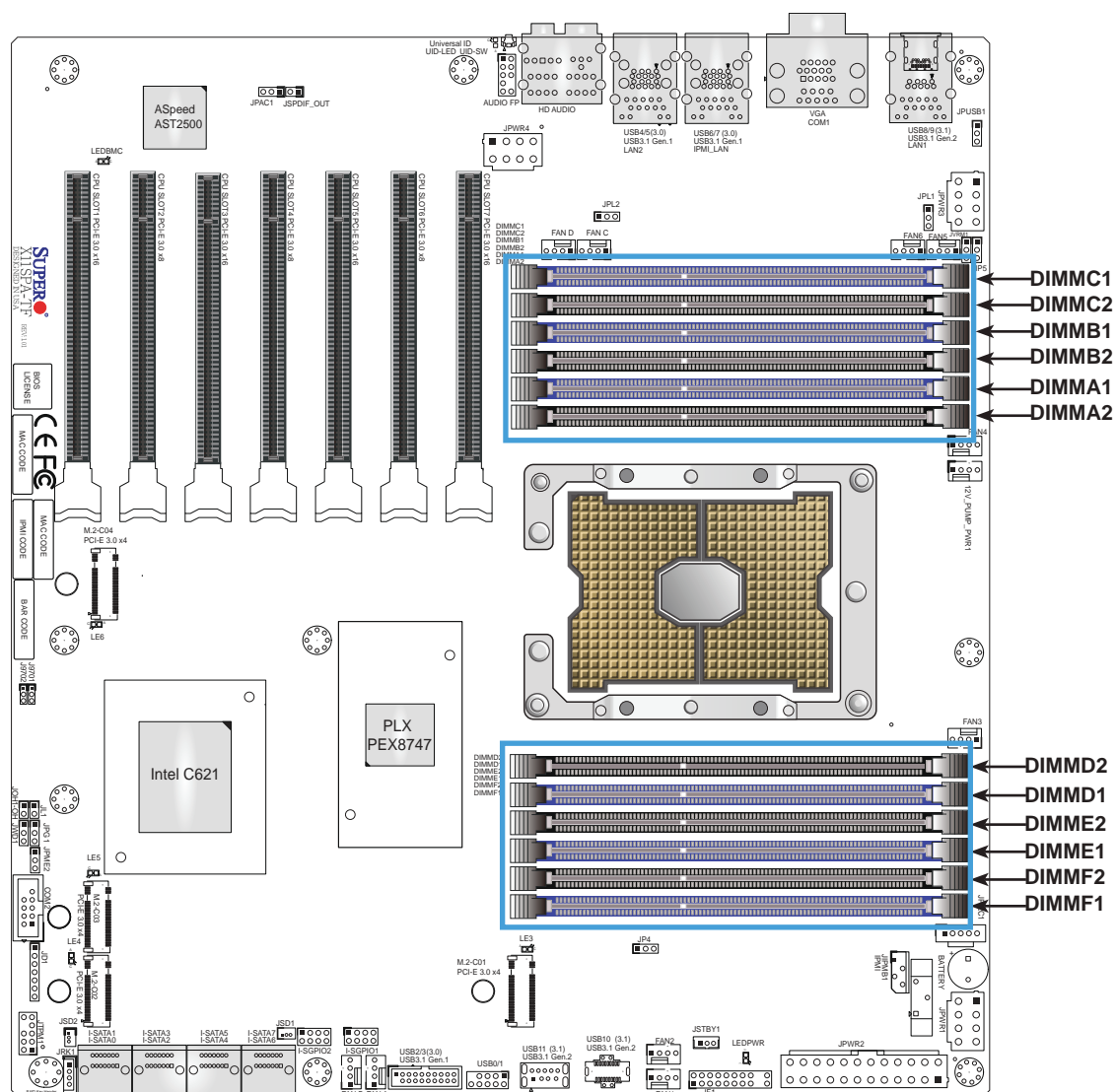


Figure 3-9. DIMM Slots

### ***Installing Memory***

To install memory, first decide on the number of DIMMs to install. Refer to Table 3-1 for the sequence of DIMM population for the desired number of DIMMs. Populate the DIMM slots according to the sequence listed in Table 3-1.

### ***ESD Precautions***

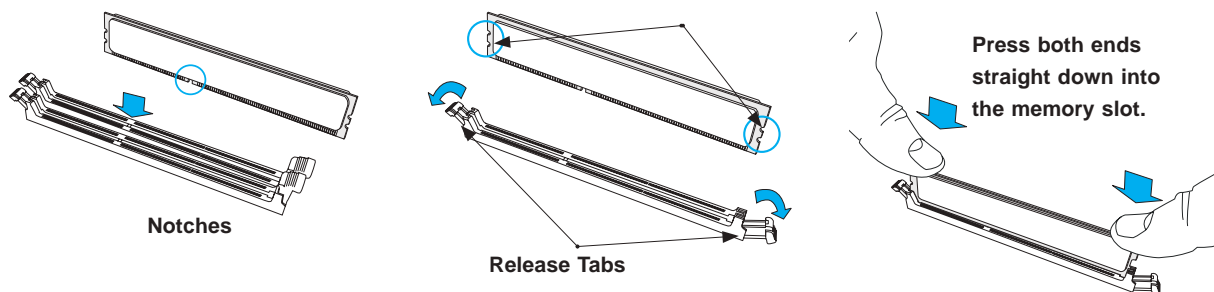
Electrostatic Discharge (ESD) can damage electronic components including memory modules. To avoid damaging DIMM modules, it is important to handle them carefully. The following measures are generally sufficient.

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

### ***Installing Memory***

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

1. Push the release tabs outwards on both ends of the DIMM slot to unlock it.
2. Align the key of the DIMM with the receptive point on the memory slot and with your thumbs on both ends of the module, press it straight down into the slot until the module snaps into place.
3. Press the release tabs to the locked position to secure the DIMM module into the slot.



**Figure 3-10. Installing DIMMs**

## PCI Expansion Card Installation

The 5049A-T can accommodate standard size add-on cards populated in all slots on the X11SPA-TF serverboard.

### *Installing PCI Expansion Cards*

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

1. Begin by removing the PCI slot shield for the slot you wish to populate.
2. Fully seat the card into the card slot, pushing down with your thumbs evenly on both sides of the card.
3. Finish by using a screw to secure the top of the card shield to the chassis. The PCI slot shields protect the serverboard and its components from EMI and aid in proper ventilation, so make sure there is always a shield covering each unused slot.

## Motherboard Battery

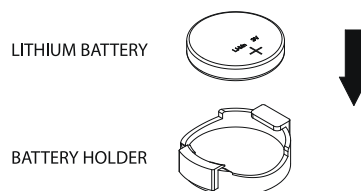
The motherboard uses non-volatile memory to retain system information when system power is removed. This memory is powered by a lithium battery residing on the motherboard.

### *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 3-11. Installing the Onboard Battery**



## 3.4 Chassis Components

### Hard Drives

A total of eight SATA drives may be housed in the SC743AC-1200B-SQ chassis. The drive IDs are preconfigured as 0 through 7 in order from bottom to top (or from left to right if rackmounted).

The drives are mounted in drive carriers to simplify their installation and removal from the chassis. (Both procedures may be done without removing power from the system.)

#### *Removing a Hot-Swap Drive Carrier*

1. Open the front bezel then push the release button located beside the drive LEDs.
2. Swing the handle fully out and then use it to pull the unit straight out.

**Note:** Your operating system must have RAID support to enable the hot-swap capability of the SATA drives.

#### *Mounting a Drive in a Drive Carrier*

The SATA drive carriers help to promote proper airflow for the system. For this reason, even carriers without SATA drives must remain in the chassis.

1. To add a new drive, install it into the carrier with the printed circuit board side facing down so that the mounting holes align with those in the carrier.
2. Secure the drive to the carrier with the screws provided, then push the carrier completely into the drive bay. You should hear a \*click\* when the drive is fully inserted. This indicates that the carrier has been fully seated and connected to the midplane, which automatically makes the power and logic connections to the hard drive.

#### *Removing a Drive from a Drive Carrier*

1. Remove the screws that secure the hard drive to the carrier and separate the hard drive from the carrier.
2. Replace the carrier back into the drive bay.

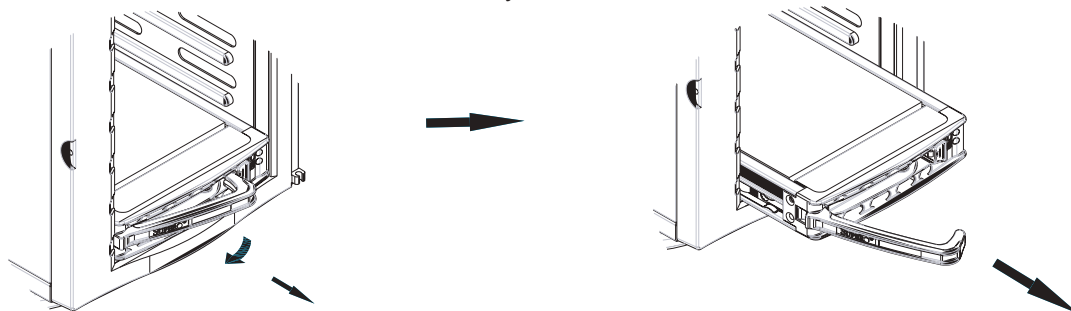
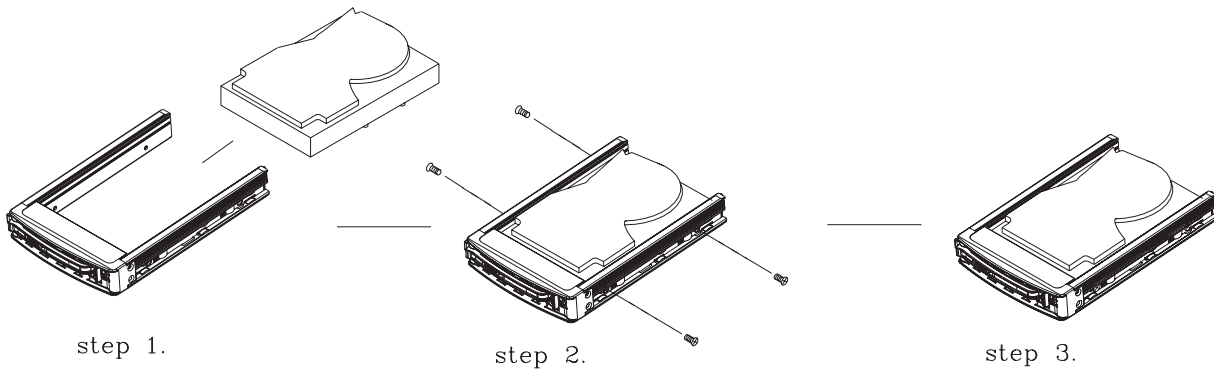


Figure 3-12. Removing a Drive Carrier



**Figure 3-13. Mounting a Drive in a Carrier**

**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/storage.cfm>

### ***SATA Backplane***

The SATA drives plug into a drive backplane. A data cable for each drive and two LED cables need to be connected from the serverboard to the appropriate connectors on the backplane. Note that you cannot cascade the SATA backplane.

### ***Installing Components in the 5.25" Drive Bays***

The 5049A-T has two 5.25" drive bays. Components such as an extra DVD-ROM drive can be installed into these 5.25" drive bays.

### ***Removing the Empty Drive Bay***

1. First power down the system.
2. Remove the top/left chassis cover to access the drive components.
3. With the cover off, remove the screws that secure the drive carrier to the chassis (one side only) then push the entire empty drive carrier out from the back.

### ***Adding a DVD-ROM Drive***

1. Remove the guide plates (one on each side) from the empty drive carrier and screw them into both sides of the DVD-ROM drive using the holes provided.
2. Slide the DVD-ROM into the bay and secure it to the chassis with the drive carrier screws you first removed.
3. Attach the power and data cables to the drive.
4. Replace the top/left chassis cover and restore power to the system.

## System Fans

The SuperWorkstation 5049A-T includes two mid-chassis fans, one rear exhaust fan, and two power supply fans. All fans are low-noise and operate in "Whisper-Quiet" mode (~28 dB). None of the fans are hot-swappable.

### ***Replacing Mid-Chassis and Rear Exhaust Fans***

#### *Identify the Failed Fan*

1. Determine from the front control panel Fan Fail LED if a mid-chassis or rear exhaust fan has failed.
2. Use the IPMI to determine the number of fans that have failed.
3. Confirm the number of fans that have failed by doing a physical inspection.
  - a. With the system on, examine the rear exhaust fan to determine if it has failed.
  - b. Next, turn off the system and remove the power cord as described in Section 3.1.
  - c. Remove the side cover as described in Section 3.2 Removing the Side Tower Cover.
  - d. Reconnect the power cord and press the power button on the front control panel.
  - e. Determine if a mid-chassis fan has stopped working.
  - f. Turn off the system and remove the power cord again as described in Section 3.1.



**WARNING!** The mid-chassis fans and the rear exhaust fan are **NOT** hot-swappable.

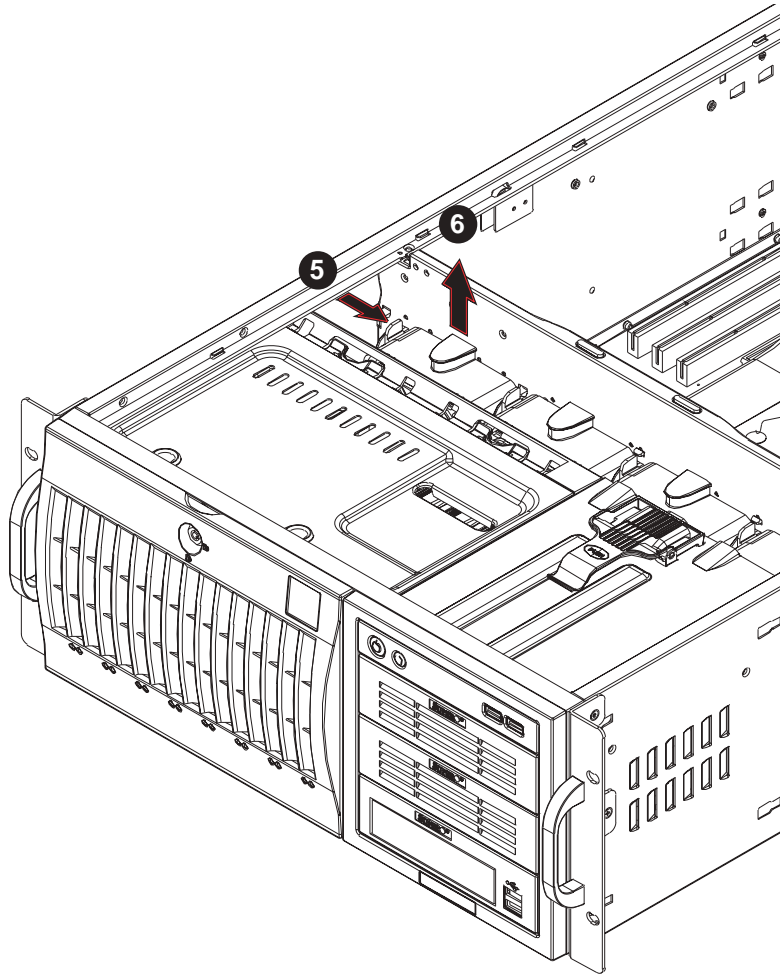


**WARNING!** Turn off the system, remove power, and allow the system to cool before reaching into the chassis.

#### *Replace the Failed Fan*

4. Disconnect the failed fan from the motherboard.
5. Locate the locking tab(s) on the failed fan.
  - a. On the mid-chassis fan, the locking tab is on the side of the mid-chassis fan housing. Push the tab inward. (See Figure 3-14).
  - b. On the rear exhaust fan, there are two locking tabs near the edge of the chassis. Push down on both tabs.
6. With the tab(s) depressed, pull the unit straight out.
7. Replace the failed fan, noting the air flow direction. It should click into place.
8. Reconnect the power cord and press the power button on the front control panel.
9. Check that the fan is working.

10. Check that the Fan Fail LED is off.
11. Replace the chassis side cover.



**Figure 3-14. Removing a Mid-Chassis Fan**

**Note:** The figure is for illustrative purposes only. The number of fans may differ on the 5049A-T.

## ***Power Supply Fans***

### *Identify the Failed Fan*

1. Determine if a power supply fan has failed. An audible alarm will sound and the front control panel Power Fail LED will light up.
2. Turn off the alarm by pressing the reset button on the back of the power supply.

### *Replace the Entire Power Supply*

The power supply fan cannot be replaced independently. If a power supply fan fails, replace the entire power supply at your earliest convenience. See the next section (Power Supply) for replacement instructions.

## Power Supply

The SuperWorkstation 5049A-T has a single 1200 watt power supply. This power unit is equipped with low-noise technology, making the system ideal for workstation environments.

The power supply has an auto-switching capability that enables it to automatically sense and operate with 100 or 240 volt inputs.

### ***Power Supply Failure***

If the power supply unit fails, the system will shut down and you will need to replace the power supply unit. Replace with the same model, which can be ordered directly from Supermicro. As there is only one power supply unit, the system must be powered down before removing and/or replacing the power supply for whatever reason.

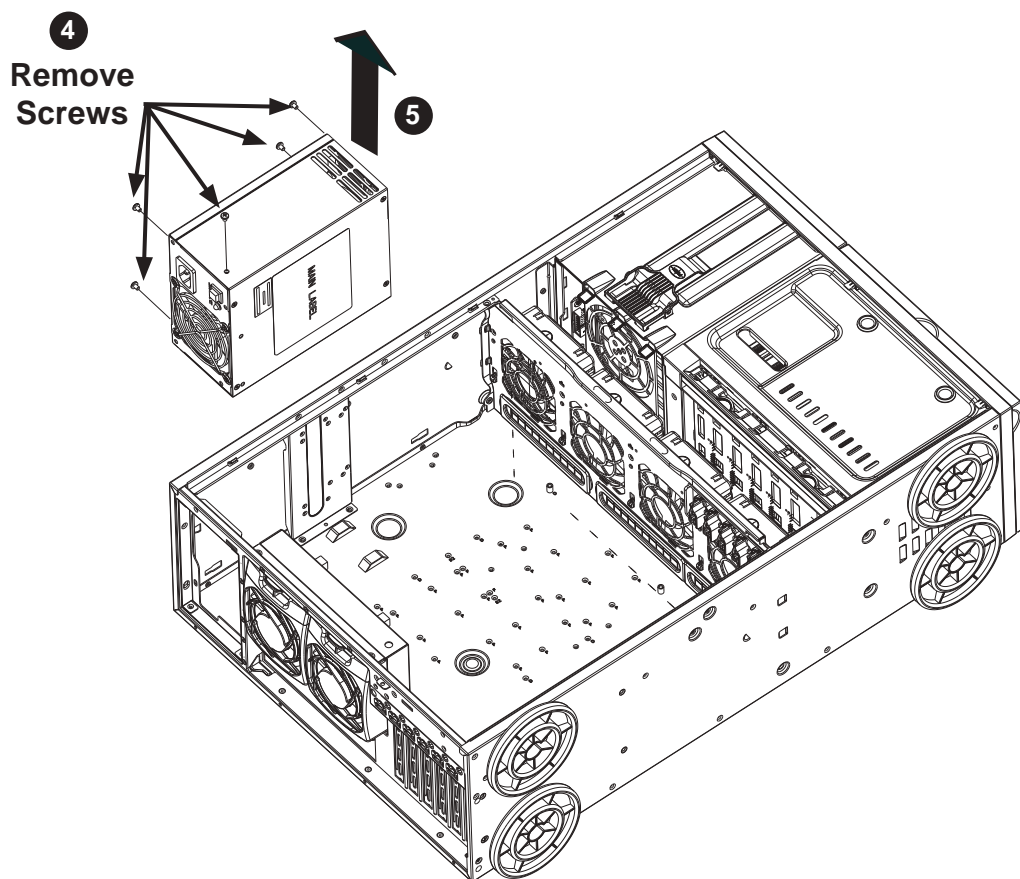
### ***Replacing the Power Supply***

1. Power down the system.
2. Unplug the power cord from the power supply.



**WARNING!** Always unplug the power cord before removing the power supply.

3. Remove both the top and side covers from the chassis as described in Section 2.3 Removing the Top Tower Cover and Section 3.2 Removing the Side Tower Cover.
4. Using a Phillips head screw driver, remove the five screws securing the power supply to the chassis. Set the screws aside.
5. Carefully lift the power supply up and out of the chassis.
6. Replace the failed unit with another unit of the exact same part number.
7. Gently but firmly push the new unit all the way into the open bay.
8. Secure it to the chassis using the screws you previously removed.
9. Finish by replacing the chassis left/top cover and then plugging the power cord back into the new power supply you just added.
10. Push the power button to restart the system.



**Figure 3-15. Removing the Power Supply Screws**

**Note:** The figure is for illustrative purposes only. Some components may differ on the 5049A-T.

## 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 serverboard 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

Two power connections on the X11SPA-TF must be connected to the power supply. The wiring is included with the power supply.

- 24-pin Primary ATX Power (JPWR2)
- 8-pin Processor Power (JPWR1)

##### Main ATX Power Connector

The primary power connector (JPWR2) meets the ATX SSI EPS 12V specification. You must also connect the 8-pin (JPWR1) processor power connectors to your power supply.

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



### 12V 8-pin CPU Power Connectors

JPWR1/3/4 are the 8-pin 12V DC power input for the CPU. Refer to the table below for pin definitions.

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

## 4.2 Headers and Connectors

### Fan Headers

There are ten fan headers on the motherboard. These are 4-pin fan headers; pins 1-3 are backward compatible with traditional 3-pin fans. The onboard fan speeds are controlled by the Thermal Management in the BIOS. When using the Thermal Management setting, please use 4-pin fans.

Fan Header Pin Definitions	
Pin#	Definition
1	Ground (Black)
2	2.5A/+12V (Red)
3	Tachometer
4	PWM Control

### SGPIO Headers

There are two Serial Link General Purpose Input/Output (I-SGPIO1 and I-SGPIO2) headers located on the motherboard. Refer to the tables below for pin definitions.

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

NC = No Connection

## M.2 Slot

The X11SPA-TF has four M.2 slots. M.2 was formerly called Next Generation Form Factor (NGFF) and are used to replace mini PCI-E. M.2 supports a variety of card sizes with increased functionality and spatial efficiency. The M.2 socket on the motherboard supports PCI-E 3.0 x4 (32 Gb/s) SSD cards in the 2280 and 22110 form factors.

The M.2 slots affect the configuration of the CPU SLOT 1 PCI-E slot. If all four M.2 slots are unoccupied, CPU SLOT 1 is a x16 slot. If M.2-C01, M.2-C02, or both are occupied, CPU SLOT 1 is disabled. If M.2-C03, M.2-C04, or both are occupied and neither M.2-C01 nor M.2-C02 are occupied, then CPU SLOT 1 is a x8 slot. The table below shows the M.2 slots and the CPU SLOT 1 configurations. Chapter 1 contains a layout of the motherboard.

M.2 and CPU SLOT 1 PCI-E Configurations				
M.2-C01	M.2-C02	M.2-C03	M.2-C04	CPU SLOT 1
				x16
x	x	x	x	Disable
		x		x8
			x	x8
		x	x	x8
x				Disable
	x			Disable
x	x			Disable

x = occupied

### TPM Header

The JTPM1 header is used to connect a Trusted Platform Module (TPM)/Port 80, which is available from a third-party vendor. A TPM/Port 80 connector is a security device that supports encryption and authentication in hard drives. It allows the motherboard to deny access if the TPM associated with the hard drive is not installed in the system. See the table below for pin definitions.

Trusted Platform Module/Port 80 Header Pin Definitions			
Pin#	Definition	Pin#	Definition
1	+3.3V	2	SPI_CS#
3	RESET#	4	SPI_MISO
5	SPI_CLK	6	GND
7	SPI_MOSI	8	No connection
9	+3.3V Stdbby	10	SPI_IRQ#

### Disk-On-Module Power Connector

The Disk-On-Module (DOM) power connectors at JSD1 and JSD2 provide 5V power to solid-state DOM storage devices connected to the SATA ports. See the table below for pin definitions.

DOM PWR Pin Definitions	
Pin#	Definition
1	+5V
2	Ground
3	Ground

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

The Power System Management Bus (I<sup>2</sup>C) connector (JPI<sup>2</sup>C1) monitors the power supply, fan, and system temperatures. Refer to the table below for pin definitions.

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

### RAID Key Header

A RAID Key header is located at JRK1 on the motherboard. The RAID key enables RAID functions for NVMe connections. Refer to the table below for pin definitions.

Intel RAID Key Header Pin Definitions	
Pin#	Definition
1	GND
2	PU 3.3V Stdbby
3	GND
4	PCH RAID KEY

## 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

## Power LED/Speaker

Header JD1 provides the connection for power LED indication and an external speaker. Pins 1-3 are used for the power LED. Pins 4-7 are used for the external speaker. To use the onboard speaker, close pins 6-7 with a cap. Refer to the tables below for pin definitions.

PWR LED Connector Pin Definitions	
Pin#	Signal
1	JD1_PIN1
2	FP_PWR_LED
3	FP_PWR_LED

Speaker Connector Pin Definitions	
Pin#	Signal
4	P5V
5	Key
6	R_SPKPIN_N
7	R_SPKPIN

## Standby Power

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

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

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

A System Management Bus header for IPMI 2.0 is located at JIPMB1. Connect the appropriate cable here to use the IPMB I<sup>2</sup>C connection on your system. Refer to the table below for pin definitions.

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

#### Overheating and Fan Fail LED Header

The JOH1-OH header is used to connect an LED indicator to provide warnings of chassis overheating and fan failure. The LED blinks when a fan failure occurs. Refer to the tables below for pin definitions.

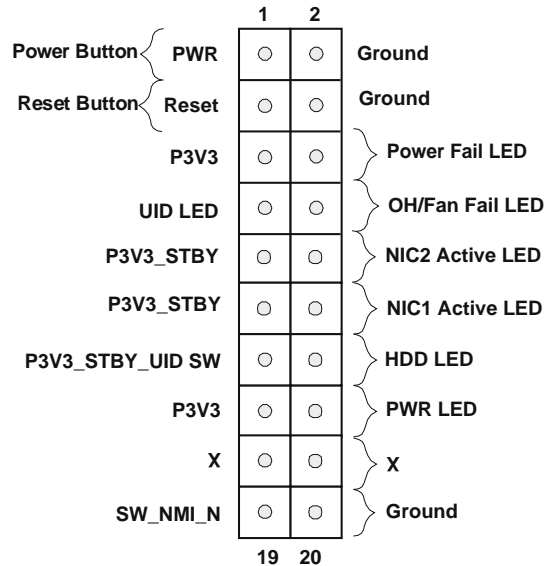
Overheat LED Header Status	
State	Definition
Solid	Overheat
Blinking	Fan Fail

Overheat LED Pin Definitions	
Pin	Signal
1	Pull high to +3.3V power through a 330Ω resistor
2	OH Active

## Control Panel

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

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



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

### Power Button

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

Power Button Pin Definitions (JF1)	
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.

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.

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

## Overheating and Fan Fail

Connect an LED cable to pins 7 and 8 of the Front Control Panel to use the Overheat/Fan Fail LED connections. The LED on pin 8 provides warnings of overheating or fan failure. Refer to the tables below for pin definitions.

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

Overheat/Fan Fail LED Pin Definitions (JF1)	
Pin	Signal
7	Blue LED
8	OH/Fan Fail LED

## NIC1/NIC2 (LAN1/LAN2)

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

LAN1/LAN2 LED Pin Definitions (JF1)	
Pin#	Definition
9	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

## 4.3 Ports

### SATA Ports

The X11SPA-TF has eight SATA 3.0 ports (SATA0-7) supported by the C621 chipset. These SATA ports support RAID 0, 1, 5, and 10. SATA ports provide serial-link signal connections, which are faster than the connections of Parallel ATA.

### Rear I/O Ports

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

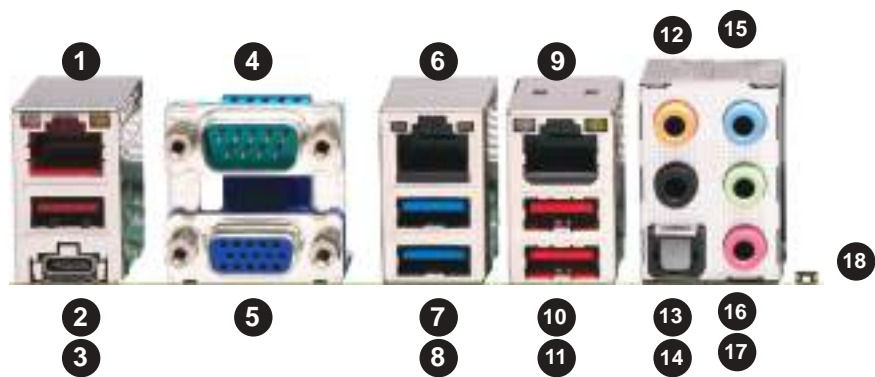


Figure 4-2. Rear I/O Ports

#	Description	#	Description	#	Description
1	1Gb RJ45 Port 1	7	USB 3.1 Gen1 Port 7	13	Surround Out
2	USB 3.1 Gen2 Port 9	8	USB 3.1 Gen1 Port 6	14	S/PDIF Out
3	USB 3.1 Gen2 Port 8 (Type C)	9	10Gb RJ45 Port2	15	Line In
4	COM1 Port	10	USB 3.1 Gen1 Port 5	16	Line Out
5	VGA Port	11	USB 3.1 Gen1 Port 4	17	Mic In
6	Dedicated IPMI LAN Port	12	Center/LFE Out	18	UID Switch

### VGA Port

The onboard VGA port is located on the I/O back panel. Use this connection for VGA display.

## COM Ports

The COM ports (COM1, COM2) are located on the I/O back panel. Use this connection for serial communication.

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

## Ethernet LAN Ports

Two Ethernet LAN ports and a dedicated IPMI port are located on the I/O backplane. All of these ports accept RJ45 cables. Please refer to the LED Indicator section for LAN LED information. Refer to the tables below for the pin definitions.

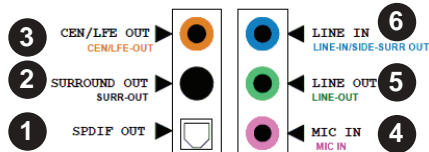
Ethernet LAN Port Pin Definition			
Pin#	Definition	Pin#	Definition
1	TD0-	11	P3V3_Dual
2	TD0+	12	Act LED (Yellow)
3	TD1-	13	Link 1000 (Amber)
4	TD1+	14	Link 100 LED (Green)
5	TD2-	15	GND
6	TD2+	16	GND
7	TD3-	17	GND
8	TD3+	18	GND
9	COMMCT		
10	GND		

IPMI LAN Pin Definition			
Pin#	Definition	Pin#	Definition
9		19	GND
10	TD0+	20	Act LED (Yellow)
11	TD0-	21	Link 100 LED (Green)
12	TD1+	22	Link 1000 LED (Amber)
13	TD1-	23	SGND
14	TD2+	24	SGND
15	TD2-	25	SGND
16	TD3+	26	SGND
17	TD3-		
18	GND		

## 7.1 HD (High-Definition) Audio

This motherboard features a 7.1 Channel High-Definition Audio (HDA) codec that provides 8 DAC channels. The HD audio supports multiple-streaming 7.1 sound playback through the front\_panel stereo output via the subwoofer speakers. Download the appropriate software from our website to enable this function.

7.1 HD Audio	
#	Definition
1	SPDIF_Out
2	Surround_Out
3	CEN/LFE_Out
4	Mic_In
5	Line_Out
6	Line_In



10-Pin Audio Pin Definitions	
#	Definition
1	Microphone_Left
2	Audio_Ground
3	Microphone_Right
4	Audio_Detect
5	Line_2_Right
6	Ground
7	Jack_Detect
8	Key
9	Line_2_Left
10	Ground

## Unit Identifier Switch/UID LED Indicator

A Unit Identifier (UID) switch and an LED Indicator are located on the motherboard. The UID switch is located at UID SW, which is next to the HD AUDIO port on the back panel. The UID LED is located next to the switch. When you press the UID switch, the UID LED will be turned on. Press the UID switch again to turn off the LED indicator. 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

UID LED Pin Definitions	
Color	Status
Blue: On	Unit Identified

## Universal Serial Bus (USB) Ports

There are four USB 3.1 Gen 1 ports (USB4/5, USB6/7) and two USB 3.1 Gen 2 ports (USB 8/9) on the I/O back panel. The motherboard also has two front access USB 3.1 Gen 2 headers (USB10, USB11), one front access USB 2.0 header (USB0/1), and one front access 3.1 Gen 1 header (USB2/3). The USB10 header is Type A and the USB11 header is Type C. The onboard headers can be used to provide front side USB access with a cable (not included).

Back Panel USB 0/1 (2.0) Pin Definitions			
Pin#	Definition	Pin#	Definition
1	+5V	5	+5V
2	USB_N	6	USB_N
3	USB_P	7	USB_P
4	Ground	8	Ground

Front Panel USB 2/3,4/5,6/7 (3.1 Gen1) Pin Definitions			
Pin#	Definition	Pin#	Definition
1	+5V	2	+5V
3	USB_N	4	USB_N
5	USB_P	6	USB_P
7	Ground	8	Ground
9	Key	10	NC

Front Panel USB 10 (3.1 Gen2) 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+

Back Panel USB 8/9 (3.1 Gen2) Pin Definitions			
Pin#	Definition	Pin#	Definition
1	VBUS	19	Power
2	Stda_SSRX-	18	USB3_RN
3	Stda_SSRX+	17	USB3_RP
4	GND	16	GND
5	Stda_SSTX-	15	USB3_TN
6	Stda_SSTX+	14	USB3_TP
7	GND	13	GND
8	D-	12	USB_N
9	D+	11	USB_P
10		x	

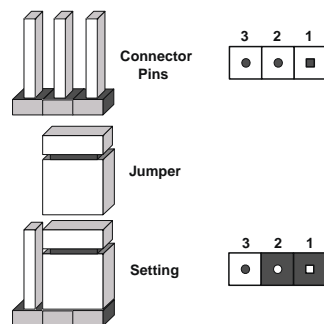
Back Panel USB 11 (3.1 Gen2) Pin Definitions			
Pin#	Definition	Pin#	Definition
A1	VBUS	B1	Power
A2	D-	B2	USB_N
A3	D+	B3	USB_P
A4	GND	B4	GND
A5	Stda_SSRX-	B5	USB3_RN
A6	Stda_SSRX+	B6	USB3_RP
A7	GND	B7	GND
A8	Stda_SSTX-	B8	USB3_TN
A9	Stda_SSTX+	B9	USB3_TP

## 4.4 Jumpers

### *Explanation of Jumpers*

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

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



### **CMOS Clear**

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

#### ***To Clear CMOS***

1. First power down the system and unplug the power cord.
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 and power on the system.

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

Do not use the PW ON connector to clear CMOS.



### VGA Enable/Disable

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

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

### Management Engine (ME) Manufacturing Mode

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

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

### Watch Dog

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

The default setting is Reset.

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

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

### 1Gb/10Gb LAN Enable/Disable

JPL1/2 allows you to enable or disable the 1Gb/10Gb LAN. The default setting is Enabled.

1Gb/10Gb LAN Enable/ Disable Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled

### USB Wake-Up

This jumper allows you to "wake up" the system by pressing a key on the USB keyboard or by clicking the USB mouse of your system. The JPUSB1 jumper is used together with the USB Wake-Up feature in BIOS. Both JPUSB1 and the BIOS setting must be enabled to use this feature. The default setting is Enabled.

**Note:** Please be sure to remove all other USB devices from the USB ports whose jumpers are set to disabled before the system goes into standby mode.



## 4.5 LED Indicators

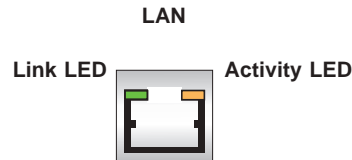
### Unit ID LED

A rear UID LED indicator (UID-LED) is located near the UID switch on the I/O back panel. This UID indicator provides easy identification of a system unit that may need service.

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

### LAN LEDs

Two Ethernet LAN ports are located in the I/O back panel. Each LAN port has two LEDs. The activity LED blinks yellow. The link LED may be green, amber or off to indicate the speed of the connections. Refer to the tables below for more information.

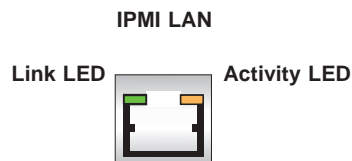


1Gbit LAN Link LED	
Color	Definition
Off	No Connection
Amber	100Mbps/10Mbps
Green	1 Gbps

10Gbit LAN Link LED	
Color	Definition
Off	No Connection
Amber	5Gbps/2.5Gbps/1Gbps/100Mbps
Green	10 Gbps

### IPMI LAN LEDs

In addition to LAN1 and LAN2, an IPMI LAN is also located on the I/O back panel. The amber LED on the right indicates activity, while the green LED on the left indicates the speed of the connection. Refer to the table below for more information.



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

## M.2 LED

M.2 LEDs are located at LE3, LE4, LE5, and LE6 on the motherboard. When a M.2 LED is blinking, its corresponding M.2 device functions normally. Refer to the table below for more information.

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

## Onboard Power LED

The Onboard Power LED is located at LEDPWR 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

## BMC Heartbeat LED

A BMC Heartbeat LED is located at LEDBMC on the motherboard. When LEDBMC is blinking, the BMC is functioning normally. Refer to the table below for more information.

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

# Chapter 5

## Software

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

### 5.1 Microsoft Windows OS Installation

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

#### *Installing the OS*

1. Create a method to access the 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.

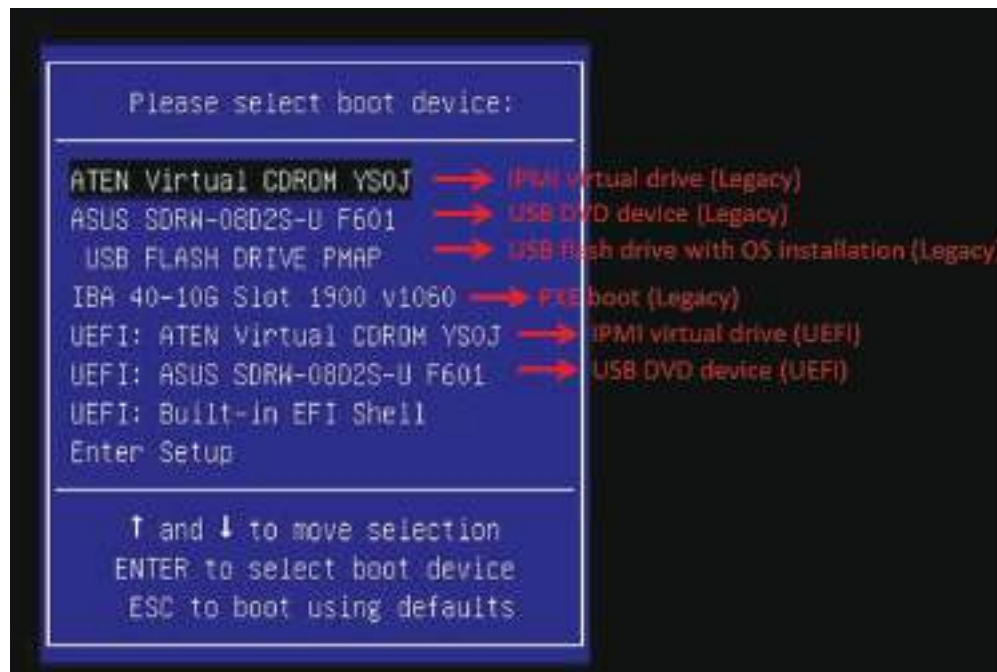
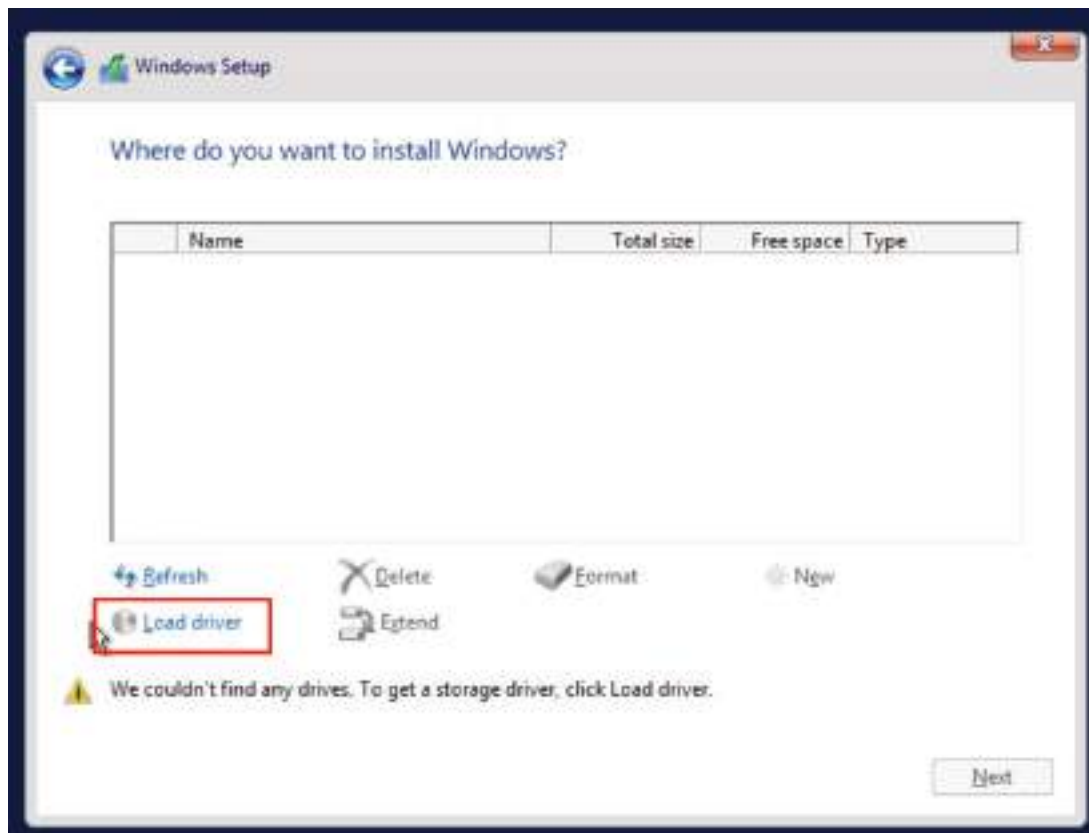


Figure 5-1. Select Boot Device

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.

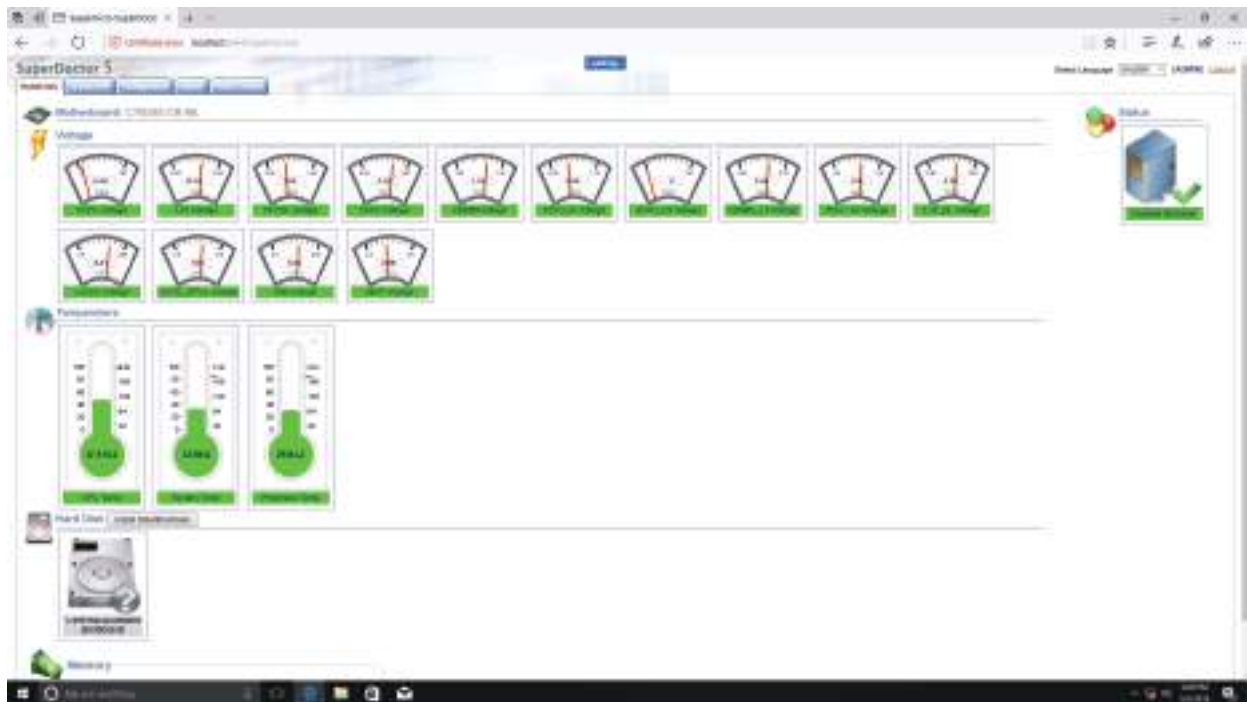


Figure 5-4. SuperDoctor 5 Interface Display Screen (Health Information)

## 5.4 IPMI

The X11SPA-TF 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 motherboard. The BIOS is stored on a chip and can be easily upgraded using a flash program.

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

#### Starting the Setup Utility

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

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

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

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



## 6.2 Main Setup

When you first enter the AMI BIOS setup utility, you will enter 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 and the following features will be displayed:



### System Date/System Time

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

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

### Supermicro X11SPA-TF

#### 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 Complex Programmable Logic Device version.

### **Memory Information**

#### **Total Memory**

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

## 6.3 Advanced Setup Configurations

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



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

### ► Boot Feature

#### Quiet Boot

Use this feature to select the screen display between the POST messages and the OEM logo upon bootup. Select Disabled to display the POST messages. Select Enabled to display the OEM logo instead of the normal POST messages. The options are Disabled and **Enabled**.

#### Option ROM Messages

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

#### Bootup NumLock State

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

**Wait For "F1" If Error**

Use this feature to force the system to wait until the "F1" key is pressed if an error occurs. The options are Disabled and **Enabled**.

**INT19 (Interrupt 19) Trap Response**

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

**Re-try Boot**

If this feature is enabled, the BIOS will automatically reboot the system from a specified boot device after its initial boot failure. The options are **Disabled**, Legacy Boot, and EFI Boot.

**Install Windows 7 USB Support**

Enable this feature to use the USB keyboard and mouse during the Windows 7 installation since the native XHCI driver support is unavailable. Use a SATA optical drive as a USB drive, and USB CD/DVD drives are not supported. Disable this feature after the XHCI driver has been installed in Windows. The options are **Disabled** and Enabled.

**Port 61h Bit-4 Emulation**

Select Enabled to enable the emulation of Port 61h bit-4 toggling in SMM (System Management Mode). The options are **Disabled** and Enabled.

**Power Configuration****Watch Dog Function**

If enabled, the Watch Dog Timer will allow the system to reset or generate NMI based on jumper settings when it is expired for more than five minutes. The options are **Disabled** and Enabled.

**Restore on AC Power Loss**

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

**Power Button Function**

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

## ►CPU Configuration

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
- Intel(R) Xeon(R) Gold 5118 CPU @ 2.30GHz

### **Hyper-Threading (ALL) (Available when supported by the CPU)**

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

### **Cores Enabled**

Use this feature to enable or disable CPU cores in the processor specified by the user. The default setting is 0.

### **Monitor/Mwait**

This feature allows the user to configure Monitor/Mwait. The options are Disable and **Enable**.

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

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

**Intel Virtualization Technology**

Use this feature to enable the Vanderpool Technology. This technology allows the system to run several operating systems simultaneously. The options are Disable and **Enable**.

**PPIN Control**

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

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

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

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

The CPU prefetches the cache line for 64 bytes if this feature is set to Disabled. The CPU prefetches both cache lines for 128 bytes as comprised if this feature is set to Enable. The options are **Enable** and Disable.

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

Select Enable to enable the DCU (Data Cache Unit) Streamer Prefetcher which will stream and prefetch data and send it to the Level 1 data cache to improve data processing and system performance. The options are Disable and **Enable**.

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

Select Enable for DCU (Data Cache Unit) IP Prefetcher support, which will prefetch IP addresses to improve network connectivity and system performance. The options are **Enable** and Disable.

**LLC Prefetch**

If set to Enable, the hardware prefetcher will prefetch streams of data and instructions from the main memory to the L3 cache to improve CPU performance. The options are **Disable** and Enable.

**Extended APIC**

Select Enable to activate APIC (Advanced Programmable Interrupt Controller) support. 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 Disable and **Enable**.

## ► 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.

*\*If the feature is set to Custom, the following features will display:*

### 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 below. The options are **OS Controls EPB** and BIOS Controls EPB.

### ENERGY\_PERF\_BIAS\_CFG mode (ENERGY PERFORMANCE BIAS CONFIGURATION Mode) (Available when supported by the Processor and 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 Performance, **Balanced Performance**, Balanced Power, and Power.

## ► CPU P State Control

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

### SpeedStep (P-States)

Intel SpeedStep Technology allows the system to automatically adjust processor voltage and core frequency to reduce power consumption and heat dissipation. The options are Disable and **Enable**.

### EIST PSD Funtion

This feature allows the user to choose between Hardware and Software to control the processor's frequency and performance (P-state). In HW\_ALL mode, the processor hardware is responsible for coordinating the P-state, and the OS is responsible for keeping the P-state request up to date on all Logical Processors. In SW\_ALL mode, the OS Power Manager is responsible for coordinating the P-state, and must initiate the transition on all Logical Processors. In SW\_ANY mode, the OS Power Manager is responsible for coordinating the P-state and may initiate the transition on any Logical Processors. The options are **HW\_ALL**, SW\_ALL, and SW\_ANY.

### **Turbo Mode**

This feature will enable dynamic control of the processor, allowing it to run above stock frequency. The options are Disable and **Enable**.

### **► Hardware PM State Control**

#### **Hardware P-States**

This feature allows the user to select between OS and hardware-controlled P-states. Selecting Native Mode allows the OS to choose a P-state. Selecting Out of Band Mode allows the hardware to autonomously choose a P-state without OS guidance. Selecting Native Mode with No Legacy Support functions as Native Mode with no support for older hardware. 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**

Enabling this feature allows the hardware to autonomously choose to enter a C-state based on power consumption and clock speed. The options are **Disable** and Enable.

#### **CPU C6 Report**

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

#### **Enhanced Halt State (C1E)**

Select Enable to use Enhanced Halt State technology, which will significantly reduce the CPU's power consumption by reducing its clock cycle and voltage during a Halt-state. The options are Disable and **Enable**.

### **► Package C State Control**

#### **Package C State**

This feature allows the user 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

### Software Controlled T-States

Use this feature to enable Software Controlled T-States. The options are Disable and Enable.

## ►Chipset Configuration

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

### ►North Bridge

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

#### ►UPI Configuration

The following UPI information will display:

- 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 set degrade precedence when system settings are in conflict. Select Topology Precedence to degrade Features. Select Feature Precedence to degrade Topology. The options are **Topology Precedence** and Feature Precedence.

### Link L0p Enable

Select Enable for the QPI to enter the L0p state for power saving. The options are Disable, Enable, and **Auto**.

### Link L1 Enable

Select Enable for the QPI to enter the L1 state for power saving. The options are Disable, Enable, and **Auto**.

### IO Directory Cache (IODC)

IO Directory Cache is an 8-entry cache that stores the directory state of remote IIO writes and memory lookups, and saves directory updates. Use this feature to lower cache to cache (C2C) transfer latencies. 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 WCiLF.

### SNC

Select Enable to use the "Sub NUMA (Non-Uniform Memory Access) Cluster" (SNC) memory scheme, 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 for Extended (Xtended) Prediction Table (XPT) Prefetch support which will allow a read request to be sent to the memory controller requesting the prefetch in parallel to an LLC (Last Level Cache) look-up. The options are **Disable** and Enable.

### KTI Prefetch

KTI Prefetch is a feature that enables memory read to start early on a DDR bus, where the KTI Rx path will directly create a Memory Speculative Read command to the memory controller. The options are Disable and **Enable**.

### Local/Remote Threshold

Use this feature to configure the threshold settings for local and remote systems that are connected in the network. The options are Disable, **Auto**, Low, Medium, and High.

### Stale AtoS

Select Enable to remove the contents and the structures of the files that are no longer needed in the remote host server but are still in use by the local client machine from Directory A to Directory S in the NFS (Network File System) to optimize system performance. The options are Disable, Enable, and **Auto**.

### LLC Dead Line Alloc

Select Enable to opportunistically fill the deadlines in LLC (Last Level Cache). The options are Disable, **Enable**, and Auto.

### Isoc Mode

Select Enable for 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

Select POR (Plan of Record) to enforce POR restrictions on DDR4 frequency and voltage programming. The options are **POR** and Disable.

### PPR Type

Use this feature to select Post Package Repair Type. The options are **Auto**, Hard PPR, Soft PPR, and PPR Disabled.

### Memory Frequency

Use this feature to set the maximum memory frequency for onboard memory modules. The options are **Auto**, 1866, 2000, 2133, 2400, 2666, and 2933.

### Data Scrambling for DDR4

Use this feature to enable or disable data scrambling for DDR4 memory. The options are **Auto**, Disable, and Enable.

### tCCD\_L Relaxation

Select Enable to get TCDD settings from SPD (Serial Presence Detect) and implement into memory RC code to improve system reliability. Select Disable for TCCD to follow Intel POR. The options are **Auto** and Disable.

### tRWSR Relaxation

Select Enable to use the same tRWSR DDR timing setting among all memory channels, 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 **Disable** and Enable.

### 2x Refresh

Use this feature to select the memory controller refresh rate to 2x refresh mode. The options are **Auto** and Enable.

### Page Policy

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

### IMC Interleaving

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

## ►Memory Topology

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

## ►Memory RAS Configuration

### Static Virtual Lockstep Mode

Select Enable to run the system's memory channels in lockstep mode to minimize memory access latency. The options are **Disable** and Enable.

### Mirror Mode

This feature allows memory to be mirrored between two channels, providing 100% redundancy. The options are **Disable**, Mirror Mode 1LM, and Mirror Mode 2LM.

### Memory Rank Sparing

Select Enable to enable memory-sparing support for memory ranks to improve memory performance. The options are **Disable** and Enable.

### Correctable Error Threshold

Use this feature to specify the threshold value for correctable memory-error logging, which sets a limit on the maximum number of events that can be logged in the memory error log at a given time. The default setting is **100**.

### Intel® Run Sure

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

### SDDC Plus One

Single Device Data Correction (SDDC) organizes data in a single bundle (x4/x8 DRAM). If any or all the bits become corrupted, corrections occur. The x4 condition is corrected on all cases. The x8 condition is corrected only if the system is in Lockstep Mode. The options are **Disable** and Enable.

### ADDDC Sparing

Adaptive Double Device Data Correction (ADDDC) Sparing detects when the predetermined threshold for correctable errors is reached, copying the contents of the failing DIMM to spare memory. The failing DIMM or memory rank will then be disabled. The options are **Disable** and Enable.

### Patrol Scrub

Patrol Scrubbing is a process that allows the CPU to correct correctable memory errors detected on a memory module and send the correction 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 Disable and **Enable**.

### Patrol Scrub Interval

This feature allows you to decide how many hours the system should wait before the next complete patrol scrub is performed. Use the keyboard to enter a value from 0-24. The default setting is **24**.

## ► IIO Configuration

### EV DFX Features

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

## ► CPU Configuration

### IOU1 (IIO PCIe Br2)

This feature configures the PCI-E port 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)

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

### ► CPU SLOT7 PCI-E 3.0 x16/CPU SLOT1 PCI-E 3.0 x16/M.2C01 PCI-E 3.0 x4/M.2C02 PCI-E 3.0 x4/M.2C03 PCI-E 3.0 x4/M.2C04 PCI-E 3.0 x4

### Link Speed

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

The following information will also be displayed:

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

### PCI-E Port Max Payload Size

Selecting **Auto** for this feature will enable the motherboard to automatically detect the maximum Transaction Layer Packet (TLP) size for the connected PCI-E device, allowing for maximum I/O efficiency. Selecting 128B or 256B will designate maximum packet size of 128 or 256. The options are 128B, 256B, and **Auto**.

## ►IOAT Configuration

### Disable TPH

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 feature 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 **No** and Yes.

### Prioritize TPH

Use this feature to enable Prioritize TPH support. The options are Enable and **Disable**.

### Relaxed Ordering

Select Enable to enable Relaxed Ordering support, which will allow certain transactions to violate the strict-ordering rules of PCI bus for a transaction to be completed prior to 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 for Direct I/O VT-d support 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 Control

This feature allows users to choose whether they want to enable or disable PCI-E Access Control Services (ACS) Extended Capability. The options are **Enable** and Disable.

### Interrupt Remapping

Use this feature to enable Interrupt Remapping support, which detects and controls external interrupt requests. The options are **Enable** and Disable.

**PassThrough DMA**

Use this feature to allow devices such as network cards to access the system memory without using a processor. Select Enable to use the Non-Isoch VT-d Engine Pass Through Direct Memory Access (DMA) support. The options are **Enable** and Disable.

**ATS**

Use this feature to enable Non-Isoch VT-d Engine Address Translation Services (ATS) support. ATS translates virtual addresses to physical addresses. The options are **Enable** and Disable.

**Posted Interrupt**

Use this feature to enable VT-d Posted Interrupt. The options are **Enable** and Disable.

**Coherency Support (Non-Isoch)**

Use this feature to maintain setting coherency between processors or other devices. Select Enable for the Non-Isoch VT-d engine to pass through DMA to enhance system performance. The options are **Enable** and Disable.

**►Intel® VMD Technology****►Intel® VMD for Volume Management Device on CPU1****VMD Config for PStack0****Intel® VMD for Volume Management Device**

Select Enable to use the Intel Volume Management Device Technology for this stack. The options are **Disable** and Enable.

***\*If the feature above is set to Enable, the following features will become available for configuration:***

**CPU SLOT2/3/4/5 PCI-E 3.0 VMD (Available when the device is detected by the system)**

Select Enable to use the Intel Volume Management Device Technology for this specific root port. The options are **Disable** and Enable.

**Hot Plug Capable (Available when the device is detected by the system)**

Use this feature to enable hot plug support for PCI-E root ports 1A~1D. The options are **Disable** and Enable.

### VMD Config for PStack1

#### Intel VMD for Volume Management Device

Select Enable to use the Intel Volume Management Device Technology for this stack. The options are **Disable** and Enable.

***\*If the feature above is set to Enable, the following features will become available for configuration:***

#### **CPU SLOT7 PCI-E 3.0 x16 VMD/CPU SLOT6 PCI-E 3.0 x8 VMD (Available when the device is detected by the system)**

Select Enable to use the Intel Volume Management Device Technology for this specific root port. The options are **Disable** and Enable.

#### **Hot Plug Capable (Available when the device is detected by the system)**

Use this feature to enable hot plug support for PCI-E root ports 2A~2D. The options are **Disable** and Enable.

### VMD Config for PStack2

#### Intel® VMD for Volume Management Device

Select Enable to use the Intel Volume Management Device Technology for this stack. The options are **Disable** and Enable.

***\*If the feature above is set to Enable, the following features will become available for configuration:***

#### **CPU SLOT1 PCI-E 3.0 x16 VMD/M.2C01 PCI-E 3.0 x4 VMD/M.2C02 PCI-E 3.0 x4 VMD/M.2C03 PCI-E 3.0 x4 VMD/M.2C04 PCI-E 3.0 x4 VMD (Available when the device is detected by the system)**

Select Enable to use the Intel® Volume Management Device Technology for this specific root port. The options are **Disable** and Enable.

#### **Hot Plug Capable (Available when the device is detected by the system)**

Use this feature to enable hot plug support for PCI-E root ports 3A~3D. The options are **Disable** and Enable.

### PCI-E Completion Timeout Disable

Use this feature to enable PCI-E Completion Timeout support for electric tuning. The options are Yes, **No**, and Per-Port.

## ► South Bridge

The following USB information will display:



- USB Module Version
- USB Devices

### **Legacy USB Support**

This feature enables support for USB 2.0 and older. The options are **Enabled**, Disabled, and Auto.

### **XHCI Hand-off**

When this feature is disabled, the motherboard will not support USB 3.0. The options are **Enabled** and Disabled.

### **Port 60/64 Emulation**

This feature allows legacy I/O support for USB devices like mice and keyboards. The options are **Enabled** and Disabled.

### **PCIe PLL SSC**

Select Enable 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 Enable and **Disable**.

### **Azalia**

Use this feature to enable or disable Azalia audio devices. If Auto is selected, BIOS will automatically enable Azalia once an Azalia device is detected. The options are Enable, Disable, and **Auto**.

### **Azalia PME Enable**

Use this feature to enable or disable PME (Power Management Event) for Azalia. The options are Enable and **Disable**.

## **► Server ME Configuration (for X11SPA-TF only)**

The following General ME Configuration will display:

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

## ► Workstation Me Configuration (for X11SPA-T only)

The following General ME Configuration will display:

- Oper. Firmware Version
- Me Firmware
- Me Firmware SKU
- Backup Firmware Version
- Recovery Firmware Version
- ME Firmware Status #1
- ME Firmware Status #2
- Current State
- Error Code

## ► PCH SATA Configuration

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

### SATA Controller

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

### Configure SATA as

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

This feature allows the user to remove any password-protected SATA disk drives. The options are **Enable** and Disable.

### Aggressive Link Power Management

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

***\*If the feature "Configure SATA as" above is set to RAID, the following features will become available for configuration:***

### **SATA Port 0 ~ Port 7**

This feature displays the information detected on the installed SATA drive on the particular SATA port.

- Model number of drive and capacity
- Software Preserve Support

### **Port 0 ~ Port 7 Hot Plug**

Set this feature to Enable for hot plug support, which will allow the user to replace a SATA drive without shutting down the system. The options are Disable and **Enable**.

### **Port 0 ~ Port 7 Spin Up Device**

On an edge detect from 0 to 1, set this feature to allow the PCH to initialize the device. The options are **Disable** and Enable.

### **Port 0 ~ Port 7 SATA Device Type**

Use this feature to specify if 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.

## **►PCIe/PCI/PnP Configuration**

The following information will display:

- 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 Disabled and **Enabled**.

### **SR-IOV Support**

Use this feature to enable or disable Single Root I/O Virtualization Support. The options are **Disabled** and Enabled.

### **MMIO High Base**

Use this feature to select the base memory size according to memory-address mapping for the I/O hub. The options are **56T**, 40T, 24T, 16T, 4T, 2T, and 1T.

### **MMIO High Granularity Size**

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

**Maximum Read Request**

Use this feature to select the Maximum Read Request size of the PCI-Express device, or select Auto to allow the System BIOS to determine the value. The options are **Auto**, 128 Bytes, 256 Bytes, 512 Bytes, 1024 Bytes, 2048 Bytes, and 4096 Bytes.

**MMCFG Base**

Use this feature to select the low base address for PCI-E adapters to increase base memory. The options are 1G, 1.5G, 1.75G, **2G**, 2.25G, and 3G.

**NVMe Firmware Source**

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

**VGA Priority**

Use this feature to select VGA priority when multiple VGA devices are detected. Select On-board to give priority to your onboard video device. Select Offboard to give priority to your graphics card. The options are **Onboard** and Offboard.

**CPU SLOT1 PCI-E 3.0 x16 OPROM**

Use this feature to select which firmware type to be loaded for the add-on card in this slot. The options are Disabled, **Legacy**, and EFI.

**CPU SLOT2 PCI-E 3.0 x8 OPROM**

Use this feature to select which firmware type to be loaded for the add-on card in this slot. The options are Disabled, **Legacy**, and EFI.

**CPU SLOT3 PCI-E 3.0 x16 OPROM**

Use this feature to select which firmware type to be loaded for the add-on card in this slot. The options are Disabled, **Legacy**, and EFI.

**CPU SLOT4 PCI-E 3.0 x8 OPROM**

Use this feature to select which firmware type to be loaded for the add-on card in this slot. The options are Disabled, **Legacy**, and EFI.

**CPU SLOT5 PCI-E 3.0 x16 OPROM**

Use this feature to select which firmware type to be loaded for the add-on card in this slot. The options are Disabled, **Legacy**, and EFI.

**CPU SLOT6 PCI-E 3.0 x8 OPROM**

Use this feature to select which firmware type to be loaded for the add-on card in this slot. The options are Disabled, **Legacy**, and EFI.

**CPU SLOT7 PCI-E 3.0 x16 OPROM**

Use this feature to select which firmware type to be loaded for the add-on card in this slot. The options are Disabled, **Legacy**, and EFI.

**M.2C01 PCI-E 3.0 x4 OPROM**

Use this feature to select which firmware type to be loaded for the add-on card in this slot. The options are Disabled, **Legacy**, and EFI.

**M.2C02 PCI-E 3.0 x4 OPROM**

Use this feature to select which firmware type to be loaded for the add-on card in this slot. The options are Disabled, **Legacy**, and EFI.

**M.2C03 PCI-E 3.0 x4 OPROM**

Use this feature to select which firmware type to be loaded for the add-on card in this slot. The options are Disabled, **Legacy**, and EFI.

**M.2C04 PCI-E 3.0 x4 OPROM**

Use this feature to select which firmware type to be loaded for the add-on card in this slot. The options are Disabled, **Legacy**, and EFI.

**Bus Master Enable**

This feature allows users to change Bus Master Enable policy. If Disabled is selected, this policy will be enable based on device settings; if Enabled is selected, the policy will be enabled all the time. The options are Disabled and **Enabled**.

**Onboard LAN Option ROM Type**

Use this feature to select which firmware function to be loaded for LAN Port1 used for system boot. The options are **Legacy** and EFI.

**Onboard LAN1 Option ROM**

Use this feature to select which firmware function to be loaded for LAN Port1 used for system boot. The options are Disabled, **PXE**, and iSCSI.

**Onboard LAN2 Option ROM**

Use this feature to select which firmware function to be loaded for LAN Port2 used for system boot. The options are **Disabled** and PXE.

**Onboard Video Option ROM**

Use this feature to select the Onboard Video Option ROM type. 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.

### IPv4 PXE Support

Select Enabled to enable IPv4 PXE boot support. The options are Disabled and **Enabled**.

### IPv4 HTTP Support

Select Enabled to enable IPv4 HTTP boot support. The options are **Disabled** and Enabled.

### IPv6 PXE Support

Select Enabled to enable IPv6 PXE boot support. The options are Disabled and **Enabled**.

### IPv6 HTTP Support

Select Enabled to enable IPv6 HTTP boot support. The options are **Disabled** and Enabled.

### PXE Boot Wait Time

Use this feature to specify the wait time to press the ESC key to abort the PXE boot. Press "+" or "-" on your keyboard to change the value. The default setting is **0**.

### Media Detect Count

Use this feature to specify the number of times media will be checked. Press "+" or "-" on your keyboard to change the value. The default setting is **1**.

## ► Super IO Configuration

The following Super IO information will display:

- Super IO Chip AST2500

### ► Serial Port 1 Configuration

This submenu allows the user to configure the settings of Serial Port 1.

#### Serial Port 1

Select Enabled to enable the selected onboard serial port. The options are Disabled and **Enabled**.

#### Device Settings

This feature displays the status of a serial part specified by the user.

### **Change Settings**

This feature specifies the base I/O port address and the Interrupt Request address of a serial port specified by the user. Select Auto to allow the BIOS to automatically assign the base I/O and IRQ address. The options for Serial Port 1 are **Auto**, (IO=3F8h; IRQ=4;), (IO=2F8h; IRQ=4;), (IO=3E8h; IRQ=4;), and (IO=2E8h; IRQ=4;).

### **► Serial Port 2 Configuration**

This submenu allows the user to configure the settings of Serial Port 2.

#### **Serial Port 2**

Select Enabled to enable the selected onboard serial port. The options are Disabled and **Enabled**.

#### **Device Settings**

This feature displays the status 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 a serial port specified by the user. Select Auto to allow the BIOS to automatically assign the base I/O and IRQ address. The options for Serial Port 2 are **Auto**, (IO=2F8h; IRQ=3;), (IO=3F8h; IRQ=3;), (IO=3E8h; IRQ=3;), and (IO=2E8h; IRQ=3;).

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

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

### **► Serial Port Console Redirection**

#### **COM1 Console Redirection**

Select Enabled to enable console redirection support for a serial port specified by the user. The options are Enabled and **Disabled**.

***\*If the feature above is set to Enabled, the following features will become available for configuration:***

#### **► COM1 Console Redirection Settings**

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.

### COM1 Terminal Type

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

### COM1 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).

### COM1 Data Bits

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

### COM1 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.

### COM1 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**.

### COM1 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.

### COM1 VT-UTF8 Combo Key Support

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

### COM1 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.



**COM1 Resolution 100x31**

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

**COM1 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**.

**COM1 Putty KeyPad**

This feature selects the settings for Function Keys and KeyPad used for Putty, which is a terminal emulator designed for the Windows OS. The options are **VT100**, LINUX, XTERMR6, SC0, ESCN, and VT400.

**COM1 Redirection After BIOS POST**

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

**SOL/COM2 Console Redirection**

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

***\*If the feature above is set to Enabled, the following features will become available for configuration:***

**► SOL/COM2 Console Redirection Settings**

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.

**COM2 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.

**COM2 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).

### COM2 Data Bits

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

### COM2 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.

### COM2 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**.

### COM2 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.

### COM2 VT-UTF8 Combo Key Support

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

### COM2 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.

### COM2 Resolution 100x31

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

### COM2 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**.

### COM2 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.

### COM2 Redirection After BIOS POST

Use this feature to enable or disable legacy Console Redirection after BIOS POST. When set to Bootloader, legacy Console Redirection is disabled before booting the OS. When set to Always Enable, legacy Console Redirection remains enabled when booting the OS. The options are **Always Enable** and BootLoader.

### Legacy Console Redirection

#### Legacy Serial Redirection Port

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

#### EMS (Emergency Management Services) Console Redirection

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

***\*If the feature above is set to Enabled, the following features will become available for configuration:***

#### ► EMS Console Redirection Settings

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

#### Out-of-Band Mgmt Port

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

#### Terminal Type

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

#### Bits Per Second

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

### Flow Control

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

## ►ACPI Settings

### WHEA Support

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

### High Precision Event Timer

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

## ►Trusted Computing

The X11SPA-TF supports TPM 1.2 and 2.0. The following Trusted Platform Module (TPM) information will display if a TPM 2.0 module is detected:

- Vendor Name
- Firmware Version

### Security Device Support

If this feature and the TPM jumper on the motherboard are both set to Enabled, onboard security devices will be enabled for TPM (Trusted Platform Module) support to enhance data integrity and network security. Please reboot the system for a change on this setting to take effect. The options are Disable and **Enable**.

- Active PCR Bank
- SHA256 PCR Bank

***\*If the feature above is set to Enable, "SHA-1 PCR Bank" and "SHA256 PCR Bank" will become available for configuration:***

### SHA-1 PCR Bank

Use this feature to disable or enable the SHA-1 Platform Configuration Register (PCR) bank for the installed TPM device. The options are Disabled and **Enabled**.

### SHA256 PCR Bank

Use this feature to disable or enable the SHA256 Platform Configuration Register (PCR) bank for the installed TPM device. The options are Disabled and **Enabled**.

### Pending Operation

Use this feature to schedule a TPM-related operation to be performed by a security device for system data integrity. Your system will reboot to carry out a pending TPM operation. The options are **None** and TPM Clear.

### Platform Hierarchy

Use this feature to disable or enable platform hierarchy for platform protection. The options are Disabled and **Enabled**.

### Storage Hierarchy

Use this feature to disable or enable storage hierarchy for cryptographic protection. The options are Disabled and **Enabled**.

### Endorsement Hierarchy

Use this feature to disable or enable endorsement hierarchy for privacy control. The options are Disabled and **Enabled**.

### PH Randomization

Use this feature to disable or enable Platform Hierarchy (PH) Randomization. The options are **Disabled** and Enabled.

### TXT Support

Intel Trusted Execution Technology (TXT) helps protect against software-based attacks and ensures protection, confidentiality, and integrity of data stored or created on the system. Use this feature to enable or disable TXT Support. The options are **Disable** and Enable.

## ► HTTP BOOT Configuration

### Http Boot One Time

This feature allows the user to disable and enable HTTP Boot feature. If a Http Boot Option is created, the system will automatically boot into Http Boot. The options are **Disable** and Enable.

### Input the description

This feature allows the user to key in descriptions for the HTTP Boot option.

**Boot URI**

A new Boot Option will be created according to this Boot URI.

**► TLS Authenticate Configuration****► Server CA Configuration****► Enroll Certification****► Enroll Cert Using File****Cert GUID****► Commit Changes and Exit****► Discard Changes and Exit****► Delete Certification****► iSCSI Configuration****iSCSI Initiator Name**

This feature allows the user to enter the unique name of the iSCSI Initiator in IQN format. Once the name of the iSCSI Initiator is entered into the system, configure the proper settings for the following *features*.

**► Add an Attempt****► Delete Attempts****► Change Attempt Order****► Driver Health**

Intel(R) DCPMM 1.0.3.3402 Driver

Healthy

## 6.4 Event Logs

Use this feature to configure Event Log settings.



### ► Change SMBIOS Event Log Settings

#### Enabling/Disabling Options

##### SMBIOS Event Log

Change this feature to enable or disable all features of the SMBIOS Event Logging during system boot. The options are **Enabled** and Disabled.

#### Erasing Settings

##### Erase Event Log

If No is selected, data stored in the event log will not be erased. Select Yes, Next Reset, data in the event log will be erased upon next system reboot. Select Yes, Every Reset, data in the event log will be erased upon every system reboot. The options are **No**, Yes, Next reset, and Yes, Every reset.

##### When Log is Full

Select Erase Immediately for all messages to be automatically erased from the event log when the event log memory is full. The options are **Do Nothing** and Erase Immediately.

## **SMBIOS Event Log Standard Settings**

### **Log System Boot Event**

This feature toggles the System Boot Event logging to enabled or disabled. The options are **Disabled** and **Enabled**.

### **MECI**

The Multiple Event Count Increment (MECI) counter counts the number of occurrences that a duplicate event must happen before the MECI counter is incremented. This is a numeric value. The default value is **1**.

### **METW**

The Multiple Event Time Window (METW) defines the number of minutes that must pass between duplicate log events before MECI is incremented. This is in minutes, from 0 to 99. The default value is **60**.

**Note:** All values changed here do not take effect until computer is restarted.

## **►View SMBIOS Event Log**

Select this submenu and press enter to see the contents of the SMBIOS event log. The following categories will be displayed: Date/Time/Error Codes/Severity



## 6.5 IPMI

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



### BMC Firmware Revision

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

### IPMI Status (Baseboard Management Controller)

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

## ► System Event Log

### Enabling/Disabling Options

#### SEL Components

Select Enabled for all system event logging at bootup. The options are **Enabled** and Disabled.

#### Erasing Settings

##### Erase SEL

Select Yes, On next reset to erase all system event logs upon next system reboot. 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 decide what the BIOS should do when the system event log is full. Select Erase Immediately to erase all events in the log when the system event log is full. The options are **Do Nothing** and Erase Immediately.

**Note:** All values changed here do not take effect until computer is restarted.

## ►BMC Network Configuration

### BMC Network Configuration

#### Update IPMI LAN Configuration

Select Yes for the BIOS to implement all IP/MAC address changes at the next system boot. The options are **No** and Yes.

#### Configure IPv4 Support

This section displays configuration features for IPv4 support.

#### 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**.

***\*If the feature above is set to Yes, the following feature will become available for configuration:***

#### Configuration Address Source

This feature allows the user to select the source of the IP address 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, the BIOS will search for a DHCP (Dynamic Host Configuration Protocol) server in the network that is attached to and request the next available IP address for this computer. The options are **DHCP** and Static.

***\*If the feature above is set to Static, the following features will become available for configuration:***

#### 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.

**Note:** To avoid OOB license issues, changing a MAC Address with IPMI command tools is not recommended.

**Station MAC Address**

This feature displays the Station MAC address for this computer. Mac addresses are 6 two-digit hexadecimal numbers.

**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., 172.31.0.1).

**VLAN**

This feature displays the virtual LAN settings. The options are **Disable** and Enable.

**Configure IPv6 Support**

This section displays configuration features for IPv6 support.

**LAN Channel 1****IPv6 Support**

Use this feature to enable IPv6 support. The options are **Enabled** and Disabled.

**Configuration Address Source**

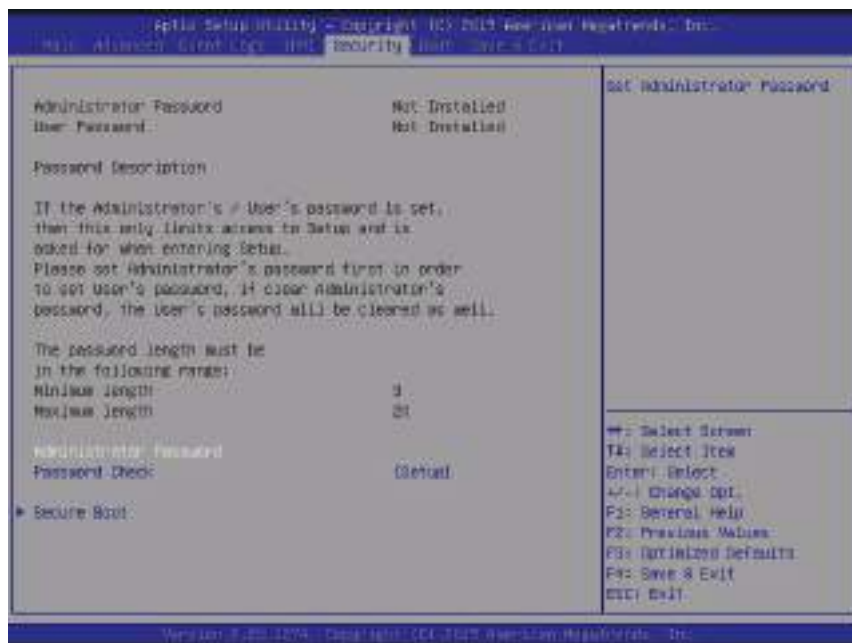
This feature allows the user to select the source of the IP address for this computer. If Static is selected, you will need to know the IP address of this computer and enter it to the system manually in the field. If DHCP is selected, the BIOS will search for a DHCP (Dynamic Host Configuration Protocol)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

***\*If the feature above is set to Static, the following features will become available for configuration:***

- Station IPv6 Address
- Prefix Length
- IPv6 Router1 IP Address

## 6.6 Security

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



### Administrator Password

Press Enter to create a new, or change an existing, Administrator password.

### User Password

Press Enter to create a new, or change an existing, User password.

### Password Check

Select Setup for the system to check for a password at Setup. Select Always for the system to check for a password at bootup or upon entering the BIOS Setup utility. The options are **Setup** and **Always**.

### ► Secure Boot

This section displays the contents of the following secure boot features:

- System Mode
- Vendor Keys
- Secure Boot

### Secure Boot

Use this feature to enable secure boot. The options are **Disabled** and **Enabled**.

### **Secure Boot Mode**

Use this feature to configure Secure Boot variables without authentication. The options are Standard and **Custom**.

### **CSM Support**

Select Enabled to support the EFI Compatibility Support Module (CSM), which provides compatibility support for traditional legacy BIOS for system boot. The options are **Enabled** and Disabled.

### **► Key Management**

This submenu allows the user to configure the following Key Management settings.

#### **Provision Factory Default Keys**

Select Enabled to install the default Secure Boot keys set by the manufacturer. The options are **Disabled** and Enabled.

#### **► Restore Factory Keys**

Select Yes to install factory default Secure Boot keys set by the manufacturer. The options are **Yes** and No.

#### **► Reset to Setup Mode**

Select Yes to delete all variables and reset the System to Setup Mode. The options are **Yes** and No.

#### **► Export Secure Boot variables**

This feature allows the user to export Secure Boot variables to a folder in the system.

#### **► Enroll Efi Image**

This feature allows the image to run in Secure Boot Mode. Enroll SHA256 Hash Certificate of the image into the Authorized Signature Database.

### **Device Guard Ready**

#### **► Remove 'UEFI CA' from DB**

This feature allows the user to remove 'UEFI CA' certificate from an authorized signature database. The options are **Yes** and No.

### ► Restore DB defaults

This feature allows the user to restore DB variables to factory default. The options are **Yes** and No.

### Secure Boot Variables

This feature allows the user to decide if all secure boot variables should be saved.

### ► Platform Key (PK)

This feature allows the user to configure the settings of the platform keys. The options are **Details**, Export, Update, and Delete.

#### Update

Select Yes to load the new platform keys (PK) from the manufacturer's defaults. Select No to load the platform keys from a file. The options are **Yes** and No.

### ► Key Exchange Keys

#### Update

Select Yes to load the KEK from the manufacturer's defaults. Select No to load the KEK from a file. The options are Yes and No.

#### Append

Select Yes to add the KEK from the manufacturer's defaults list to the existing KEK. Select No to load the KEK from a file. The options are Yes and No.

### ► Authorized Signatures

#### Update

Select Yes to load the database from the manufacturer's defaults. Select No to load the DB from a file. The options are Yes and No.

#### Append

Select Yes to add the database from the manufacturer's defaults to the existing DB. Select No to load the DB from a file. The options are Yes and No.

## ►Forbidden Signatures

### Update

Select Yes to load the DBX from the manufacturer's defaults. Select No to load the DBX from a file. The options are Yes and No.

### Append

Select Yes to add the DBX from the manufacturer's defaults to the existing DBX. Select No to load the DBX from a file. The options are Yes and No.

## ►Authorized TimeStamps

### Update

Select Yes to load the DBT from the manufacturer's defaults. Select No to load the DBT from a file. The options are Yes and No.

### Append

Select Yes to add the DBT from the manufacturer's defaults list to the existing DBT. Select No to load the DBT from a file. The options are Yes and No.

## ►OsRecovery Signatures

This feature uploads and installs an OSRecovery Signature. You may insert a factory default key or load from a file. The file formats accepted are:

- 1) Public Key Certificate
  - a. EFI Signature List
  - b. EFI CERT X509 (DER Encoded)
  - c. EFI CERT RSA2048 (bin)
  - d. EFI SERT SHA256 (bin)
- 2) EFI Time Based Authenticated Variable

When prompted, select "Yes" to load Factory Defaults or "No" to load from a file.

### Update

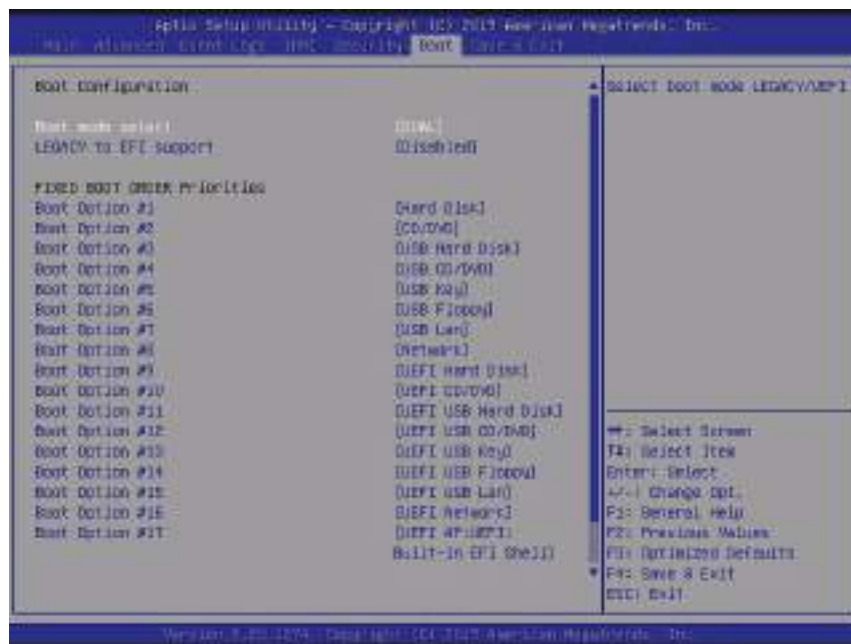
Select Yes to load the DBR from the manufacturer's defaults. Select No to load the DBR from a file. The options are Yes and No.

### Append

This feature uploads and adds an OSRecovery Signature into the Key Management. You may insert a factory default key or load from a file. When prompted, select "Yes" to load Factory Defaults or "No" to load from a file.

## 6.7 Boot

Use this feature to configure Boot settings.



### Boot Mode Select

Use this feature to select the type of device that the system is going to boot from. The options are Legacy, UEFI, and **Dual**.

### Legacy to EFI Support

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

### FIXED BOOT ORDER Priorities

This feature prioritizes the order of bootable devices that the system boots from. Press <Enter> on each entry from top to bottom to select devices.

***\*If the feature "Boot Mode Select" above is set to Legacy, UEFI, or Dual, the following features will be displayed:***

- Boot Option #1
- Boot Option #2
- Boot Option #3
- Boot Option #4
- Boot Option #5



- Boot Option #6
- Boot Option #7
- Boot Option #8
- Boot Option #9
- Boot Option #10
- Boot Option #11
- Boot Option #12
- Boot Option #13
- Boot Option #14
- Boot Option #15
- Boot Option #16
- Boot Option #17

### ► Add New Boot Option

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

#### **Add Boot Option**

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

#### **Path for Boot Option**

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

#### **Boot Option File Path**

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

#### **Create**

Use this feature to set the name and the file path of the new boot option.

### ► Delete Boot Option

This feature allows the user 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. The options are **Select one to Delete** and **UEFI: Built-in EFI Shell**.

### **►UEFI Application Boot Priorities**

This feature sets the system boot order of detected devices. The options are **UEFI: Built-in EFI Shell** and **Disabled**.

- Boot Option #1

### **►UEFI USB Key Drive BBS Priorities**

This feature sets the system boot order of detected devices.

- Boot Option #1

### **►USB Key Drive BBS Priorities**

This feature sets the system boot order of detected devices.

- Boot Option #1

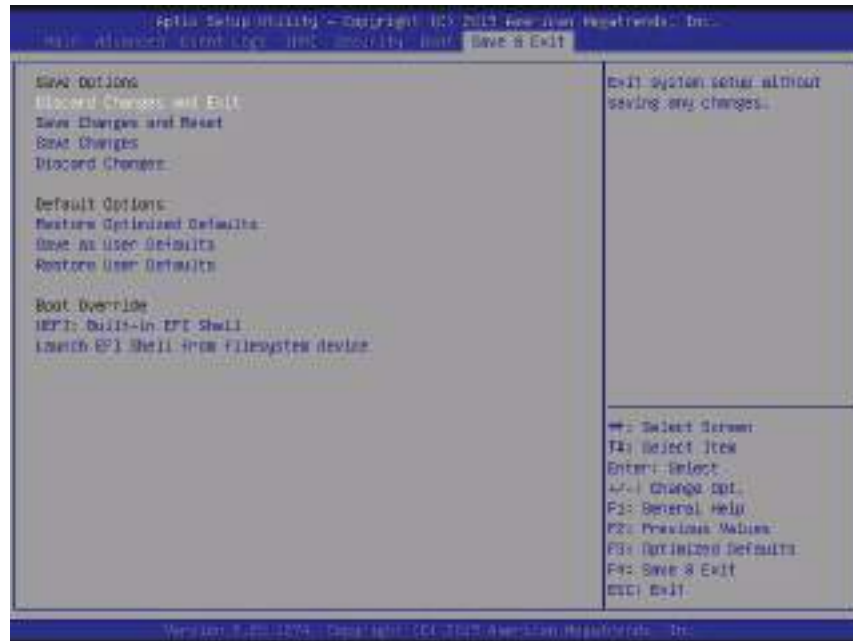
### **►NETWORK Drive BBS Priorities**

This feature sets the system boot order of detected devices.

- Boot Option #1

## 6.8 Save & Exit

Select the Save & Exit tab from the BIOS setup screen to configure the settings below:



### Save Options

#### Discard Changes and Exit

Select this feature to quit the BIOS Setup without making any permanent changes to the system configuration, and reboot the computer. Select Discard Changes and Exit from the Save & Exit menu and press <Enter>.

#### Save Changes and Reset

After completing the system configuration changes, select this feature to save the changes you have made. This will not reset (reboot) the system.

#### Save Changes

When you have completed the system configuration changes, select this feature to leave the BIOS setup utility and reboot the computer for the new system configuration parameters to take effect. Select Save Changes from the Save & Exit menu and press <Enter>.

#### Discard Changes

Select this feature and press <Enter> to discard all the changes and return to the AMI BIOS utility program.

## **Default Options**

### **Restore Optimized Defaults**

To set this feature, select Restore Defaults from the Save & Exit menu and press <Enter>. These are factory settings designed for maximum system stability, but not for maximum performance.

### **Save As User Defaults**

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

### **Restore User Defaults**

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

### **Boot Override**

Listed in this section are other boot options for the system (i.e., Built-in EFI shell). Select an option and press <Enter>. Your system will boot to the selected boot option.

# Appendix A

## BIOS Codes

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

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

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

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

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

BIOS 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 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](http://www.supermicro.com/about/policies/safety_information.cfm).

#### Warning Definition



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

#### 警告の定義

この警告サインは危険を意味します。

人身事故につながる可能性がありますので、いずれの機器でも動作させる前に、電気回路に含まれる危険性に注意して、標準的な事故防止策に精通して下さい。

此警告符号代表危險。

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

此警告符號代表危險。

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

## Warnung

### WICHTIGE SICHERHEITSHINWEISE

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

BEWAHREN SIE DIESE HINWEISE GUT AUF.

### INSTRUCCIONES IMPORTANTES DE SEGURIDAD

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

GUARDE ESTAS INSTRUCCIONES.

### IMPORTANTES INFORMATIONS DE SÉCURITÉ

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

CONSERVEZ CES INFORMATIONS.

## תקנון הזהרות אזהרה

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



اَكْ ف حالة وُكِي اَي تتسبب ف اصابة جسدهُ هذا الزهرز عُ خطر! تحذُرُ .  
 قبل اَي تعول على اَي هعدات، كي على علن بالوخاطز ال اُجوة عي الذوائر  
 الكهزبائِة  
 وكي على دراهُ بالووارسات البقائِة لو عُ وقع اَي حادث  
 استخدم رقن الب اِي الو صُص ف هَاهُ كل تحذُر للعشر تزجوتها

안전을 위한 주의사항

경고!

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

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

## BELANGRIJKE VEILIGHEIDSINSTRUCTIES

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

## BEWAAR DEZE INSTRUCTIES

### Installation Instructions



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

### 設置手順書

システムを電源に接続する前に、設置手順書をお読み下さい。

### 警告

将此系统连接电源前,请先阅读安装说明。

### 警告

將系統與電源連接前，請先閱讀安裝說明。

#### Warnung

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

#### ¡Advertencia!

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

#### Attention

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

יש לקרוא את הוראות התקנה לפני חיבור המערכת למקור מתח.

اقر إرشادات التركيب قبل توصيل النظام إلى مصدر للطاقة

시스템을 전원에 연결하기 전에 설치 안내를 읽어주십시오.

#### Waarschuwing

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

### Circuit Breaker



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

#### サーキット・ブレーカー

この製品は、短絡(過電流)保護装置がある建物での設置を前提としています。

保護装置の定格が250 V、20 Aを超えないことを確認下さい。

#### 警告

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

#### 警告

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

**Warnung**

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

**¡Advertencia!**

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

**Attention**

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

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

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

**경고!**

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

**Waarschuwing**

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

## Power Disconnection Warning



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

### 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 مكناث 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 انصلل 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 فعليل  
 اسحبذال البطارية  
 فقط بنفس النوع أو ما يعادلها مما أوصت به الشركة المصنعة  
 جخلص من البطاريات المسحعملة 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

当システム正在进行时，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 المجددة 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 للقوايه المحلية والبطية المتعلقة  
بالكهرباء

경고!

현 지역 및 국가의 전기 규정에 따라 장비를 설치해야 합니다.

Waarschuwing

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

## Product Disposal



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

製品の廃棄

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

警告

本产品的废弃处理应根据所有国家的法律和规章进行。

警告

本產品的廢棄處理應根據所有國家的法律和規章進行。

Warnung

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

¡Advertencia!

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

## Attention

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

סילוק המוצר

אזהרה!

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

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

경고!

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

## Waarschuwing

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

## 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。

**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 adapters. Using any other cables and adapters 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 appropriées. 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

Supports Intel® Xeon® Scalable Processors, up to 205W TDP.

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

### Chipset

Intel C621 chipset

### BIOS

256Mb AMI BIOS® SPI Flash ROM

ACPI 6.0, Plug and Play (PnP), BIOS rescue hot-key, riser card auto detection support, and SMBIOS 3.0 or later

### Memory

Up to 768GB of RDIMM, 3TB of 3DS RDIMM, 1.5TB of LRDIMM, and 3TB of 3DS LRDIMM DDR4 (288-pin) ECC memory with speeds of up to 2933MHz (2DPC) in twelve memory slots. (1DPC and 2DPC are recommended for memory installation. Only selected 2<sup>nd</sup> Gen Xeon® Scalable Processors support Intel® DC Persistent memory.)

**Note:** See the memory section in Chapter 3 for details and our website for updates to supported memory.

### SATA Controller

On-chip (C621) controller

### Drive Bays

Eight 3.5" hot-swap drive bays to house eight SATA drives

Three 5.25" external peripheral bays

### PCI Expansion Slots

Four PCI-E 3.0 x16 Slots (CPU SLOT 1, 3, 5, 7)

Three PCI-E 3.0 x8 Slots (IN x16) (CPU SLOT 2, 4, 6)

Four M.2 PCI-E 3.0 x4 Slots (Supports M-Key 2280 and 22110)

**Note:** CPU SLOT 1 is configurable as a x8, x16, or disabled slot. See Section 4.2 M.2 Slot for more details.

### Motherboard

X11SPA-TF; 13" (W) x 12" (L) E-ATX form factor

### Chassis

SC743AC-1200B-SQ; 4U or Tower, 7 x 17.2 x 25.5 in. (178 x 437 x 648 mm) (W x H x D as a tower)

### System Cooling

One 9-cm Super Quiet rear exhaust fan and two 8-cm mid-chassis cooling fans

### Power Supply

Model: PWS-1K25P-PQ

AC Input Voltages: 100-240 VAC

Rated Input Current: 12A (100V) to 8A (240V)

Rated Input Frequency: 60 -50 Hz

Rated Output Power: 1200W

Rated Output Voltages: +3.3V (20A), +5V (20A), +12V (99A), -12V (0.3A), +5Vsb (3A)

Efficiency Rating: 94% (peak)

### 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 B, EN 55032 Class B, EN 61000-3-2/3-3, CISPR 32 Class B

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)

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](http://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 boot block contains critical BIOS codes, including memory detection and recovery codes for the user to flash a new BIOS image if the original main BIOS image is corrupted. When the system power is first turned on, the boot block codes execute first. Once this process is completed, 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 boot crashes.

**Note 2:** When the BIOS boot 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](https://www.supermicro.com.tw/products/nfo/SMS_SUM.cfm)) to reflash the BIOS.

#### D.3 Recovering the BIOS Block with a USB Device

This feature allows the user to recover a 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 UEFI 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 disc Root "\" directory of a USB device or a writable CD/DVD.

**Note:** If you cannot locate the "Super.ROM" file in your driver disk, visit our website at [www.supermicro.com](http://www.supermicro.com) to download the BIOS image into a USB flash device and rename it "Super.ROM" for BIOS recovery use.

2. Insert the USB device that contains the new BIOS image ("Super.ROM") into your USB drive and power on the system
3. While powering on the system, please keep pressing <Ctrl> and <Home> simultaneously on your keyboard *until the following screen (or a screen similar to the one below) displays.*

**Warning:** Please **stop** pressing the <Ctrl> and <Home> keys immediately when you see the screen (or a similar screen) below; otherwise, it will trigger a system reboot.

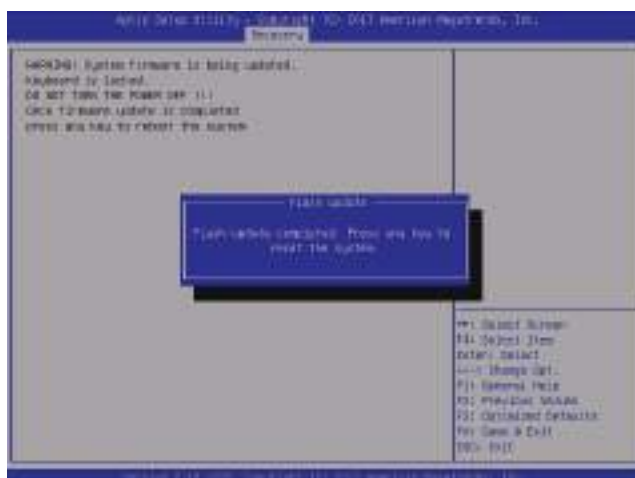


**Note:** On the other hand, if the following screen displays, please load the "Super.ROM" file to the root folder and connect this folder to the system. (You can do so by inserting a USB device that contains the new "Super.ROM" image to your machine for BIOS recovery.)

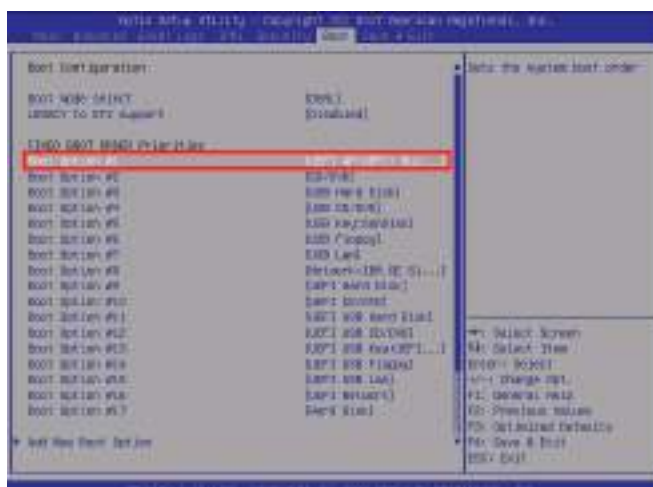




6. After the BIOS recovery process is completed, press any key to reboot the system.



7. Using a different system, extract the BIOS package into a USB flash drive.
8. Press <Del> continuously during system boot to enter the BIOS setup utility. From the top of the tool bar, click on Boot and press <Enter> to enter the submenu. From the submenu list, select Boot Option #1 as shown below. Then, boot Option #1 to [UEFI AP:UEFI: Built-in EFI Shell]. Press <F4> to save the settings and exit the BIOS setup utility.





- ```

def __init__(self, input_size):
    self.in_size = input_size
    self.out_size = 1000
    self.conv1 = nn.Conv2d(1, 16, kernel_size=5, stride=1, padding=2)
    self.conv2 = nn.Conv2d(16, 32, kernel_size=5, stride=1, padding=2)
    self.pool1 = nn.MaxPool2d(2, stride=2)
    self.pool2 = nn.MaxPool2d(2, stride=2)
    self.fc1 = nn.Linear(32 * 5 * 5, 1000)
    self.fc2 = nn.Linear(1000, 1000)
    self.fc3 = nn.Linear(1000, 1000)
    self.softmax = nn.Softmax(dim=1)

    self.parameters = list(self.parameters)

    self.optimizer = optim.Adam(self.parameters)

    self.loss = nn.CrossEntropyLoss()

    self.device = torch.device('cuda:0' if torch.cuda.is_available() else 'cpu')
    self.to(self.device)

```

```

Done.
[ Access Oms Port Ex ]
<Read>
Index 0x51: 0x1B

Done.
=====
#
# Program BIOS and ME (including FDT) regions...
#
=====
|
|      ME 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 ..... 0x00132000 (0x)

```

- [illegible]

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