



SUPERSERVER<sup>®</sup>  
SYS-521R-T



USER'S MANUAL

Revision 1.0a

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Manual Revision 1.0a

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# Preface

## About this Manual

This manual is written for professional system integrators and PC technicians. It provides information for the installation and use of the SYS-521R-T server system. Installation and maintenance should be performed by certified service technicians only.

Please refer to the SYS-521R-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/wdl>
- 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.

## Secure Data Deletion

A secure data deletion tool designed to fully erase all data from storage devices can be found on our website: [https://www.supermicro.com/about/policies/disclaimer.cfm?url=/wdl/utility/Lot9\\_Secure\\_Data\\_Deletion\\_Utility/](https://www.supermicro.com/about/policies/disclaimer.cfm?url=/wdl/utility/Lot9_Secure_Data_Deletion_Utility/)

## 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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# Chapter 1

## Introduction

### 1.1 Overview

This chapter provides a brief outline of the functions and features of the SuperServer SYS-521R-T. This system is based on the X13SCL-IF motherboard and the CSE-721TS-350BP2 chassis.

The following provides an overview of the specifications and capabilities.

System Overview	
<b>Motherboard</b>	X13SCL-IF
<b>Chassis</b>	CSE-721TS-350BP2
<b>Backplane</b>	BPN-NVME5-733N-S4 (this backplane sku is only available with the 2024H2 system version)
<b>Processor</b>	Intel Xeon E-2400 and 12th Generation Pentium (V0 - LGA1700) processor with up to eight cores
<b>Memory</b>	Up to 64 GB of DDR5 ECC UDIMM memory with speeds of up to 4800 MT/s in two DIMM slots
<b>Drive Support</b>	Four front hot-swappable 3.5" drive bays Two internal fixed 2.5" drive bays Two SlimSAS x4 connectors (2x PCIe 4.0 x4 or 1x PCIe 4.0 x4 + 4x SATA 6 Gb/s) One M.2 socket (M-key 2280 PCIe 4.0 x4)
<b>Expansion Slots</b>	One PCIe 5.0 x16 slot (for one low-profile expansion card)
<b>I/O Ports</b>	One VGA port One COM port Two 1 GbE LAN ports (Intel i210) One Dedicated IPMI LAN port Two USB 3.2 Gen1 (5 Gbps) Type A ports (front) Two USB 3.2 Gen1 (5 Gbps) Type A ports (rear) Two USB 2.0 ports (rear)
<b>System Cooling</b>	One 12-cm rear exhaust fan
<b>Power</b>	One 350 Watt (80+ Gold Level) power supply module
<b>Form Factor</b>	Compact Mini-Tower, 9.45 x 8.27 x 11 in. / 240 x 210 x 279 mm (H x W x D)

**Notes:** A Quick Reference Guide can be found on the product page of the Supermicro website.

The following safety models associated with the SYS-521R-T have been certified as compliant with UL or CSA: 721-S3X13, 721-3.

## 1.2 System Features

### System: Front View

The CSE-721TS-350BP2 is a compact mini-tower chassis. Refer to Appendix B for additional specifications. The chassis front offers access to the storage drives, a control panel, four pullout service tags, and two thumbscrews.

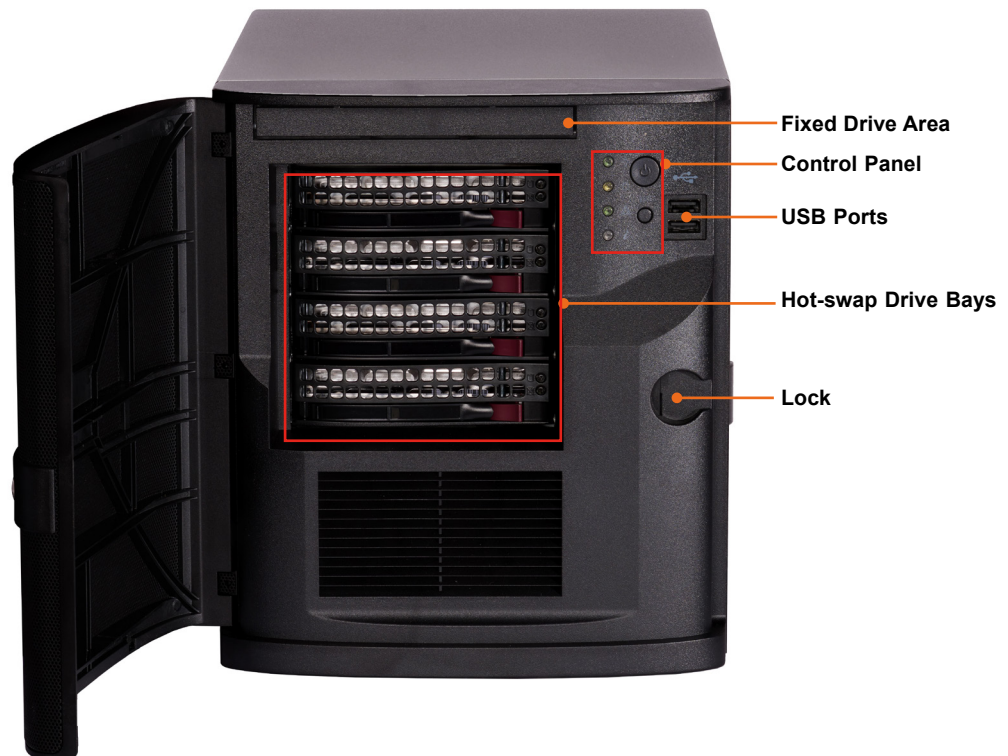


Figure 1-1. System Front View

Front Chassis Features	
Feature	Description
Fixed Drive Area	Space for two internal 2.5" drives and one slim DVD drive
Control Panel	Control panel buttons and LEDs, see next page for details
USB Ports	Two USB 3.2 Gen1 (5 Gbps) ports
Hot-swap Drive Bays	Four hot-swappable drive bays for NVMe5/SATA3/SAS4 drives
Lock	Locking mechanism for front bezel

## Control Panel

Power switches and status LEDs are located on the control panel on the front of the chassis.

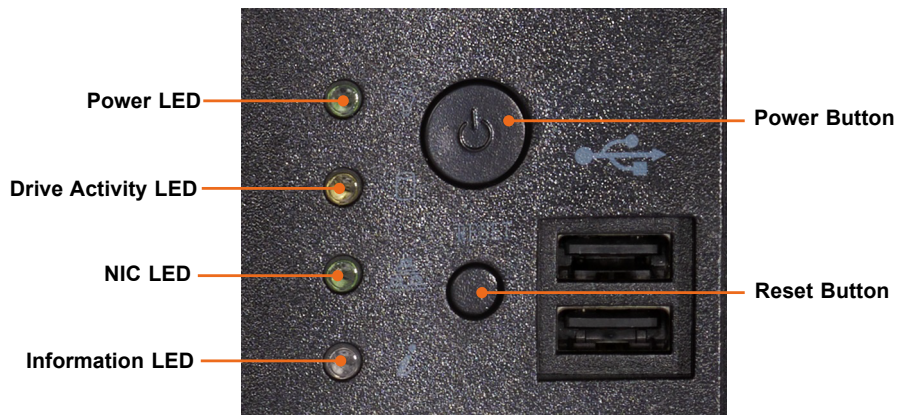


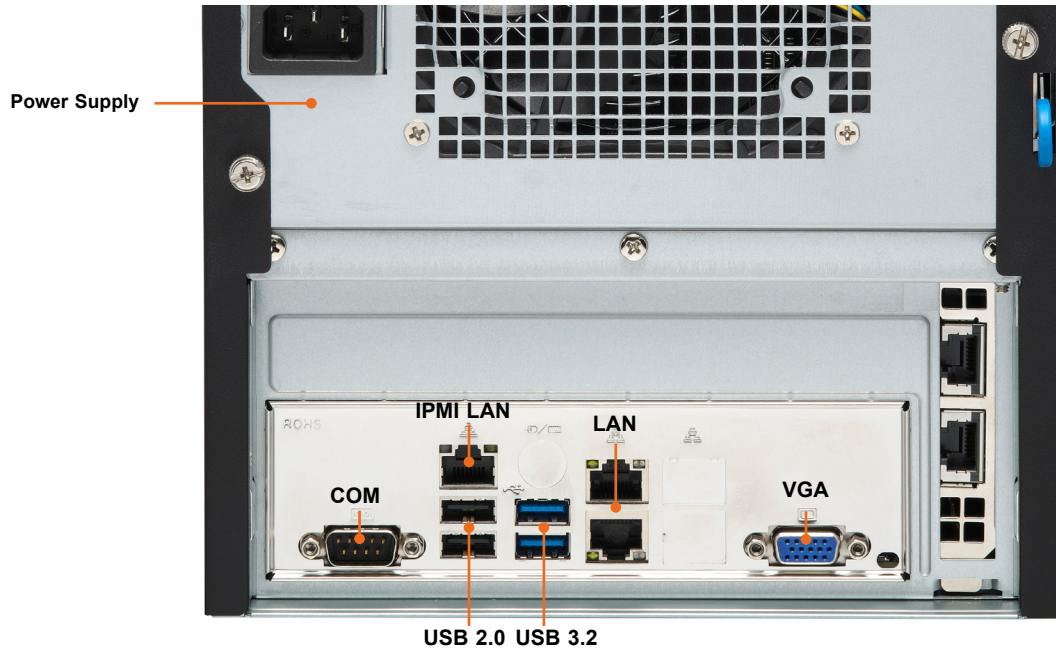
Figure 1-2. Control Panel

Control Panel Features	
Feature	Description
Power Button	The main power button applies or removes primary power from the power supply to the server but maintains standby power.
Reset Button	Resets the system
Power LED	Indicates main system power is on
Drive Activity LED	Indicates activity on any of the hot-swap drives
NIC LED	Indicates network activity on the LAN when flashing.
Information LED	Universal information LED (see table below for details).

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

## System: Rear View

The illustration below shows the rear view of the chassis. The various I/O ports are located below the power supply.



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

Rear Chassis Features	
Feature	Description
Power Supply	One 350 Watt 80+ Gold Level power supply module
COM	Serial (COM ) port
IPMI LAN	Dedicated IPMI LAN port
USB 2.0	Two USB 2.0 ports
USB 3.2	Two USB 3.2 Gen1 (5 Gbps) ports
LAN	Two 1GbE LAN ports
VGA	VGA port

## 1.3 Motherboard Layout

Below is a layout of the X13SCL-IF 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](#).

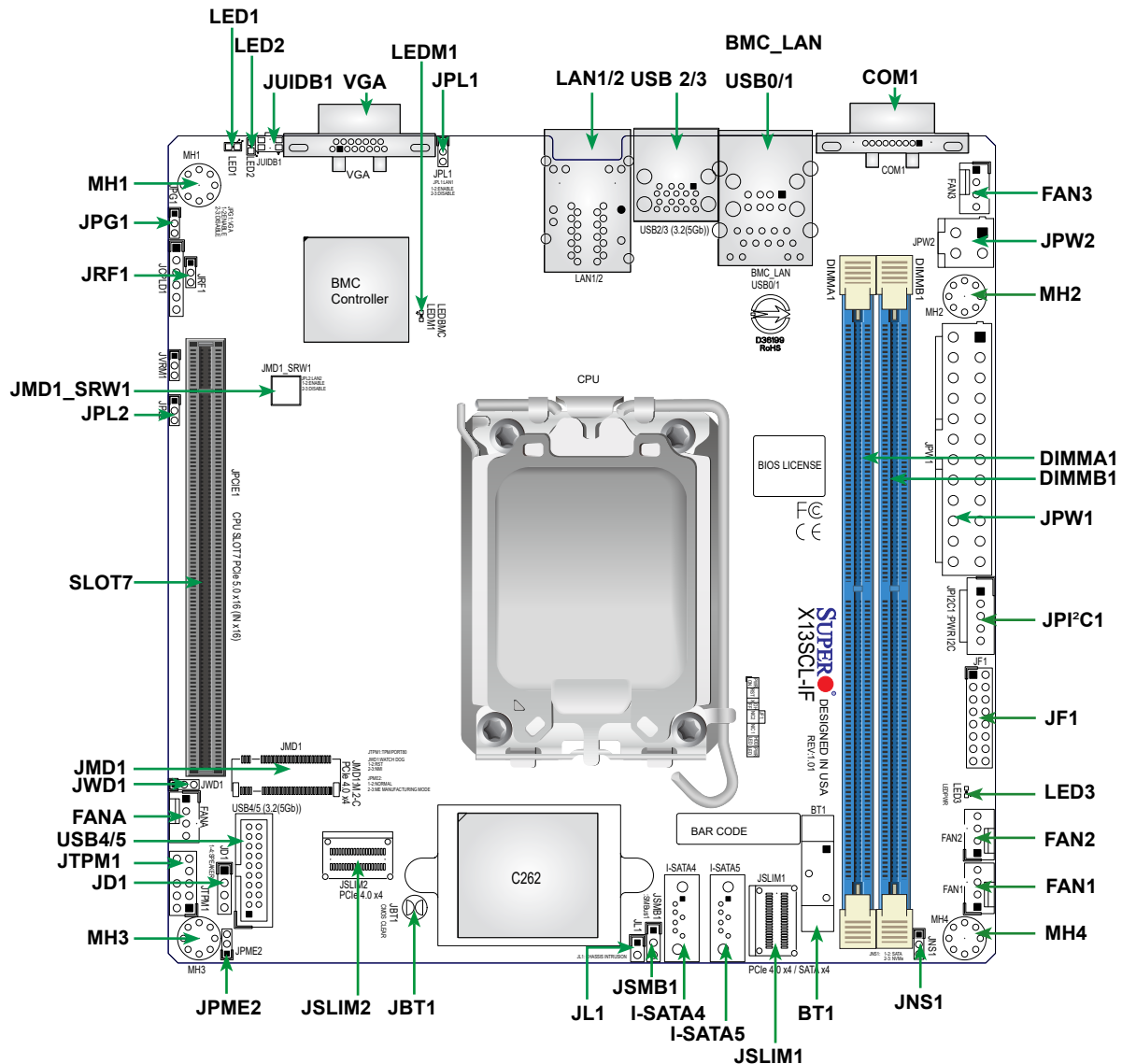


Figure 1-4. Motherboard Layout

### Notes:

- "■" indicates the location of Pin 1.
- Jumpers/LED indicators not indicated are used for testing only.
- Use only the correct type of onboard CMOS battery as specified by the manufacturer. To avoid possible explosion, do not install the onboard battery upside down.

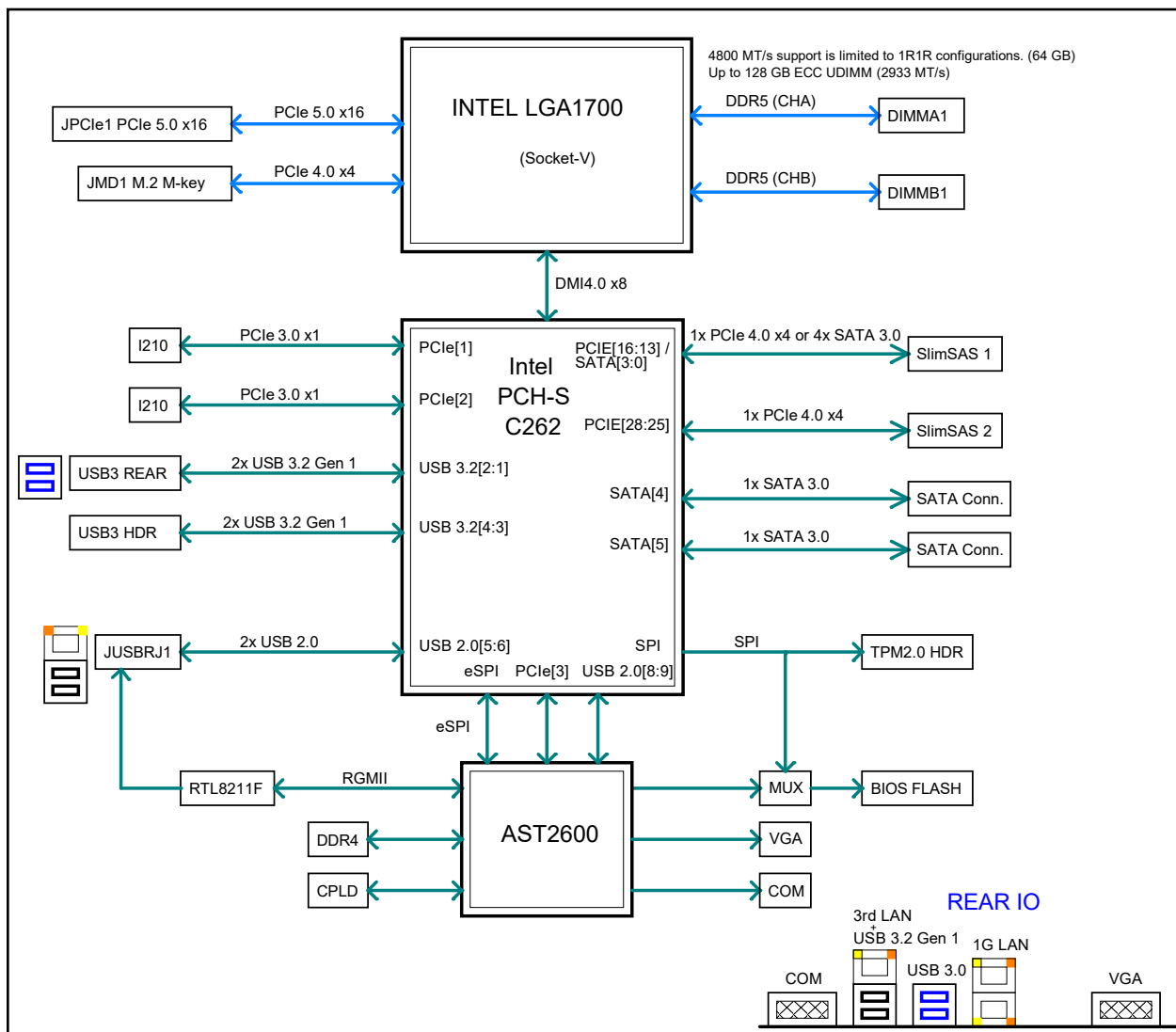
## Quick Reference Table

Jumper	Description	Default Setting
JBT1	CMOS Clear	Open (Normal)
JNS1	SATA 3.0 or PCIe 4.0 Selection	Pins 1–2 (4x SATA) Pins 2–3 (PCIe x4)
JPG1	VGA Enable/Disable	Pins 1–2 (Enabled)
JPL1	LAN1 Enable/Disable	Pins 1–2 (Enabled)
JPL2	LAN2 Enable/Disable	Pins 1–2 (Enabled)
JPME2	Manufacturing Mode	Pins 1–2 (Normal)
JRF1	CPU PCIe Bifurcation	Pins 1–2 (JPCIE x16)
JWD1	Watch Dog Timer	Pins 1–2 (Reset)
LED	Description	Status
LED1	Overheat/Power Fail/Fan Fail LED	Solid Red: System Overheat Blinking Red: Power Fail or Fan Fail
LED2	UID LED	Solid Blue: Unit Identified
LED3	Onboard Power LED	Solid Green: Power On
LEDM1	BMC Heartbeat LED	Blinking Green: Device Working
Connector	Description	
BMC_LAN	Dedicated BMC LAN Port	
BT1	Onboard Battery	
COM1	COM Port	
FAN1–FAN3, FANA	System Fan Headers (FAN1: CPU Fan)	
I-SATA4, I-SATA5	Intel PCH SATA 3.0 Ports (RAID 0, 1, 5, 10)	
JD1	Speaker	
JF1	Front Control Panel Header	
JL1	Chassis Intrusion Header	
JMD1	M.2 PCIe 4.0 x4 Slot (supports 2280 form factor)	
JMD1_SRW1	M.2 Holding Screw	
JPI <sup>2</sup> C1	Power I <sup>2</sup> C System Management Bus (Power SMB) Header	
JPW1	24-pin ATX Power Connector	
JPW2	4-pin Power Connector	
JSMB1	System Management Bus Header	
JTPM1	Trusted Platform Module/Port 80 Connector	
JUIDB1	UID Switch	
LAN1/2	Gigabit Ethernet RJ45 Ports	
MH1–MH4	Mounting Holes	
SLOT7	PCIe 5.0 x16 Slot (IN x16)	

**Note:** Table continues on the next page.

Connector	Description
USB0/1	Back Panel USB 2.0 Ports
USB2/3	Back Panel USB 3.2 Gen 1 Ports
USB4/5	Front Panel 3.2 Gen 1 Header
VGA	VGA Port

## Block Diagram



**Figure 1-5. Chipset Block Diagram**

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

## Chapter 2

# 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 requires that power first be removed from the system. Please follow the procedures given in each section.

### 2.1 Removing Power

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

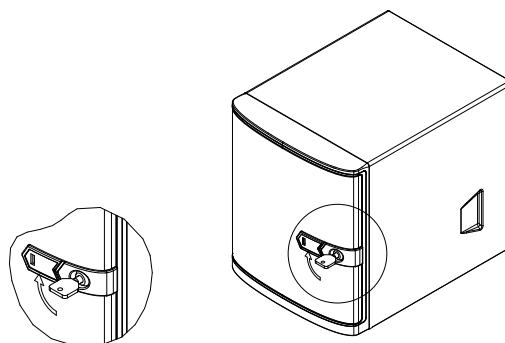
1. Use the operating system to power down the system.
2. After the system has completely shut-down, disconnect the AC power cord from the power source.
3. Disconnect the power cord from the chassis.

### 2.2 Hardware Security

The chassis features multiple locking devices to help deter hardware theft and protect user data. While no lock is infallible, it is recommended that users keep their systems locked when not in use.

#### Front Bezel Lock

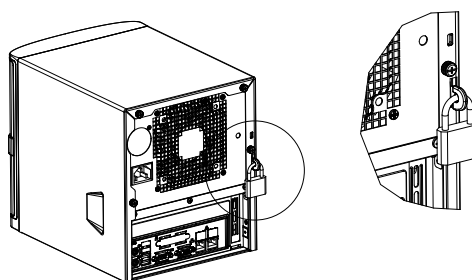
The locking front bezel protects against unauthorized removal of the storage drives. Use the key to lock or unlock the bezel. Always remove the key from the lock and store it in a secure place.



**Figure 2-1. Front Bezel Lock**

### **Rear Chassis Hasp**

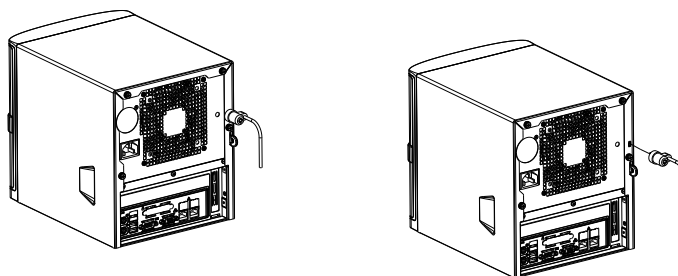
Unauthorized entry through the rear of the chassis may be discouraged by placing a lock on the rear of the chassis. The chassis is equipped with a rear chassis hasp that can accommodate a variety of commonly available locks (not included).



**Figure 2-2. Rear Chassis Hasp**

### **Kensington Cable Slot (K-Slot)**

The chassis features a Kensington cable slot or K-slot. This slot accepts a standard Kensington cable locking device (not included). Attach the loop end of the cable to a secure object, then insert the device into the K-slot as illustrated below.



**Figure 2-3. Inserting a Kensington Cable Device (not included)**

## 2.3 Accessing the System

The CSE-721TS-350BP2 features a removable top cover to access to the inside of the chassis.

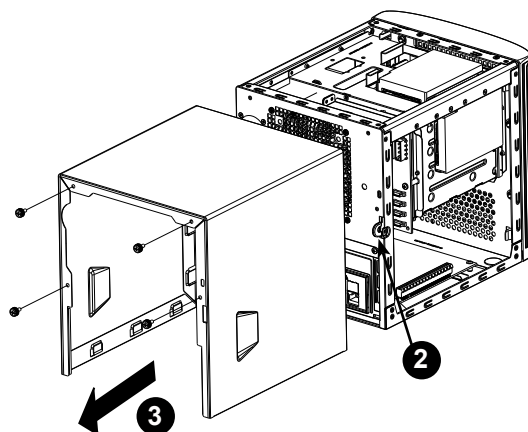


Figure 2-4. Removing the Chassis Cover

### *Removing the Top Cover*

1. Power down the system as described in section 2.1.
2. Lift the release lever located on the right side rear of the chassis.
3. Slide the cover toward the rear of the chassis the lift it off.

**Caution:** Except for short periods of time, do *not* operate the server without the cover in place. The chassis cover helps maintain proper airflow and prevent system overheating.

## 2.4 Motherboard Components

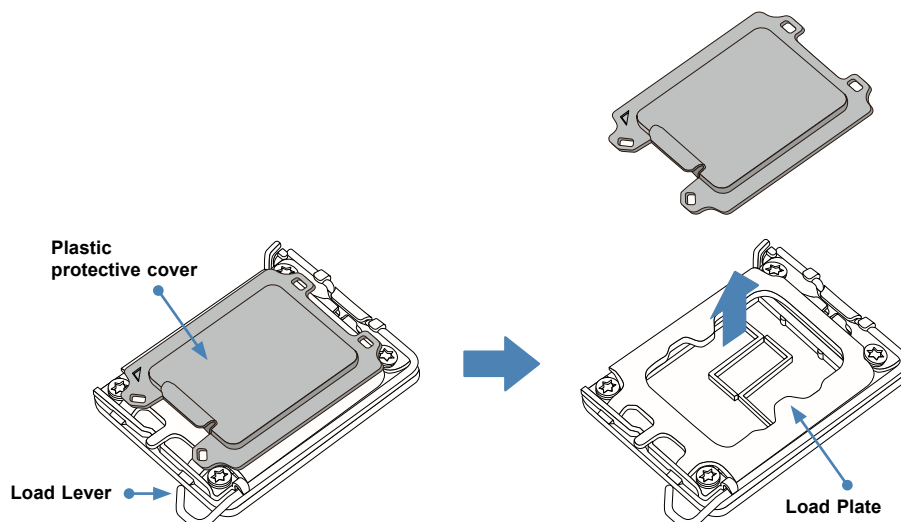
### Processor

The SYS-521R-T supports a single Intel Xeon E-2400 or Pentium series processor.

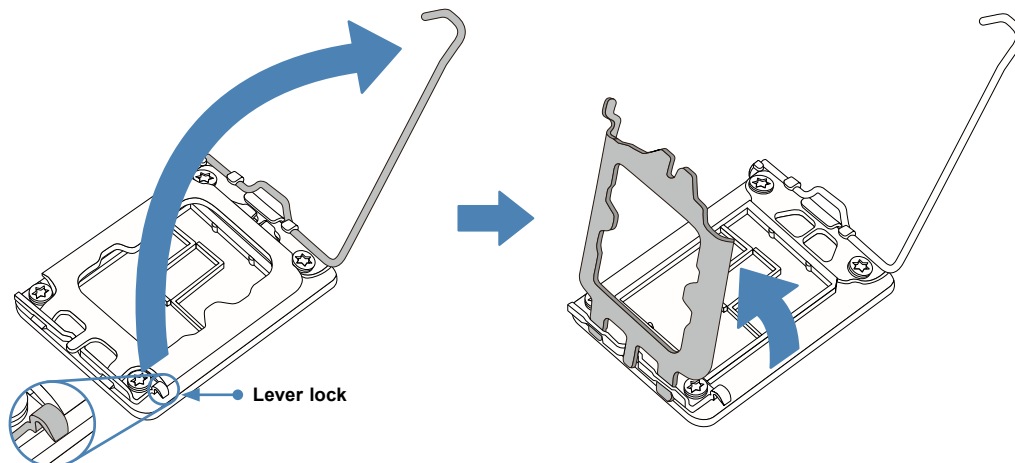
#### Notes:

- Use ESD protection.
- Unplug the AC power cord from all power supplies after shutting down the system.
- Check that the plastic protective cover is on the CPU socket and none of the socket pins are bent. If they are, contact your retailer.
- When handling the processor, avoid touching or placing direct pressure on the LGA lands (gold contacts). Improper installation or socket misalignment can cause serious damage to the processor or CPU socket, which may require manufacturer repairs.
- When installing the processor and heatsink, ensure a torque driver set to the correct force is used for each screw.
- If you buy a CPU separately, make sure that you use an Intel-certified multi-directional heatsink only.
- Refer to the Supermicro website for updates on processor support.
- All graphics in this manual are for illustrations only. Your components may look different.

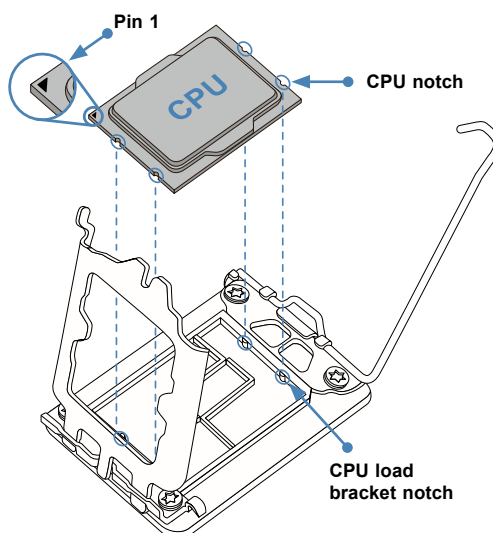
### Installing an LGA1700 CPU



1. Remove the plastic protective cover from the load plate.
2. Gently push down the load lever to release and lift it, then lift the load plate to open it completely.

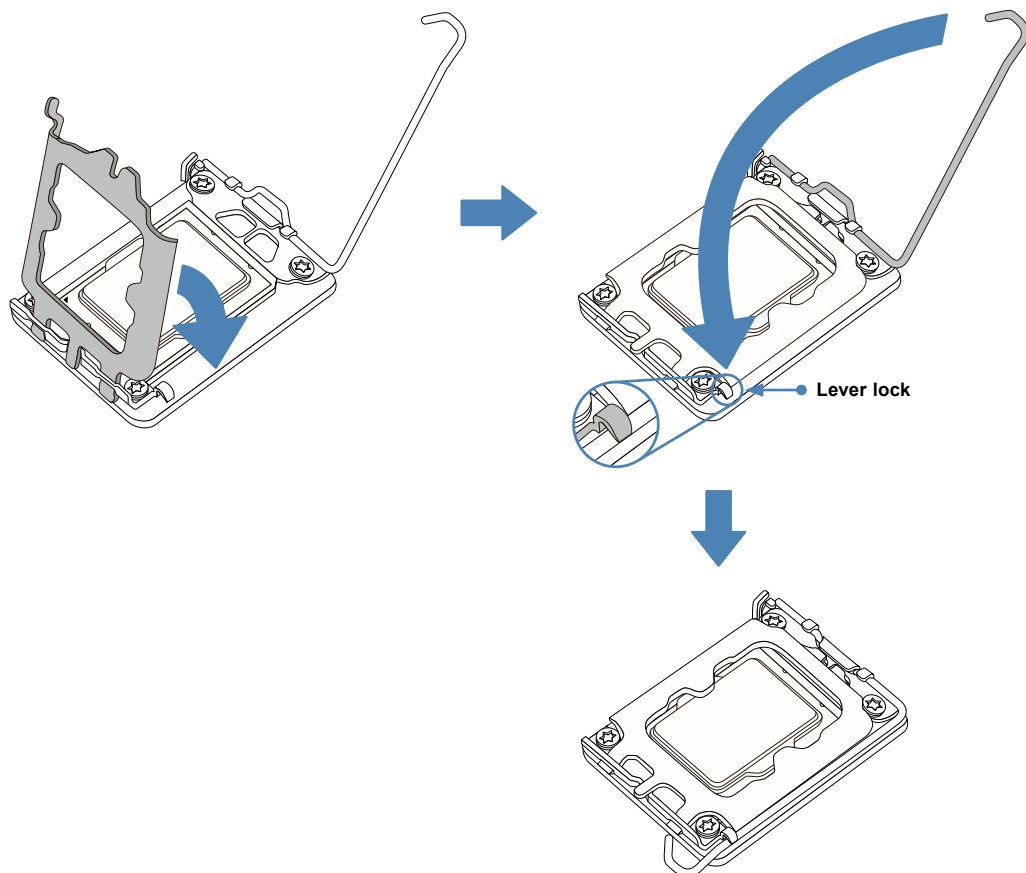


3. Use your thumb and your index finger to hold the CPU. Align the small triangle marker and notches on the CPU to the corresponding triangle marker and notches on the CPU load bracket. Once aligned, carefully lower the CPU straight down into the socket. (Do not drop the CPU on the socket, or move it horizontally or vertically.)



4. Do not rub the CPU against the surface or against any pins of the socket to avoid damaging the CPU or the socket.

5. With the CPU inside the socket, inspect all the corners to make sure it is properly installed.
6. Close the load plate with the CPU inside the socket. Gently push the load lever down until it locks under the Lever Lock latch.



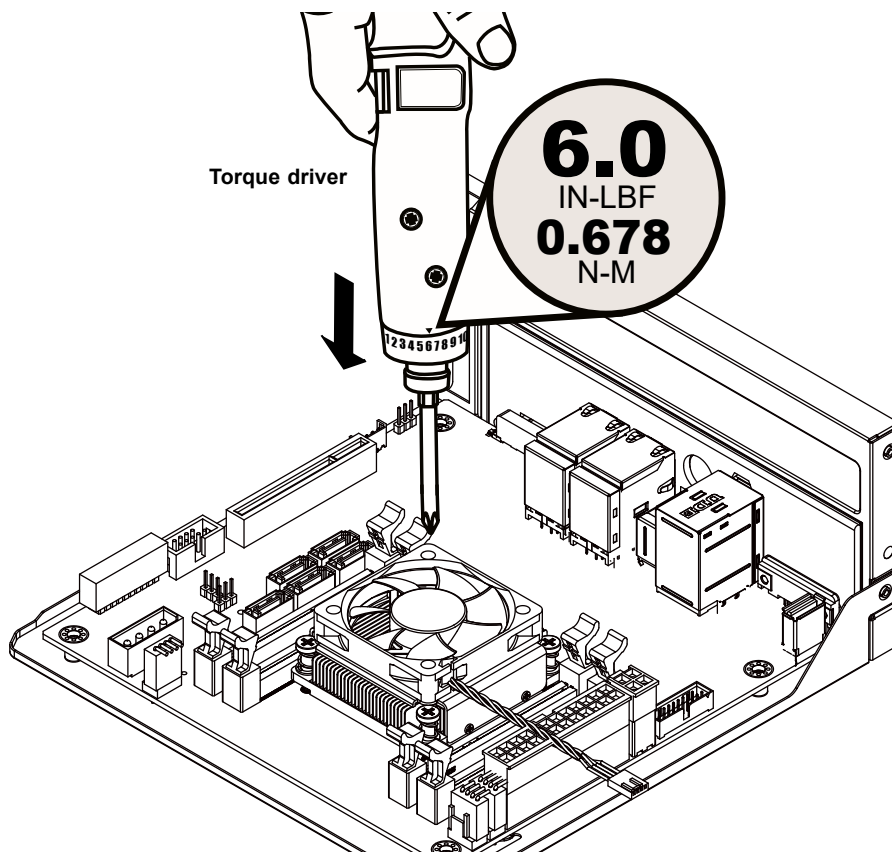
**Attention!** You can only install the CPU in the socket in one direction. Make sure that it is properly inserted into the CPU socket before closing the load plate. If it doesn't close properly, do not force it as it may damage your CPU. Instead, open the load plate again and double-check that the CPU is aligned properly.

## Heatsink

### *Installing the CPU Heatsink*

Do not apply thermal grease to the heatsink or the CPU; the required amount has already been applied. Use an Intel-certified multi-directional heatsink.

1. Power down the system as described in Section 2.1 and remove the chassis cover.
2. Remove the three screws securing the rear tray to the rear of the chassis and set them aside for later use.
3. Pull the rear tray out from the chassis.
4. Place the heatsink facing inward and on top of the CPU so that the four mounting screws on the heatsink are aligned with holes on the socket.



**Figure 2-5. CPU Heatsink**

5. With a T30 bit torque driver set to a force of 6.0 in-lbf (0.678 n-m), gradually tighten the four screws to ensure even pressure. You can start with any screw, but make sure to tighten the screws in a diagonal pattern.

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

6. Connect the heatsink fan wires to the proper motherboard connector.

## Memory Support and Installation

**Note:** Check the Supermicro website for recommended memory modules.

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

### Memory Support

The X13SCL-IF motherboard supports up to 64 GB of DDR5 ECC UDIMM memory with speeds of up to up to 4800 MT/s (with the one or two DIMM(s) per channel configurations) in two memory slots. Refer to the table below for the recommended DIMM population order.

1 CPU, 4 DIMM Slots	
Number of DIMMs	Memory Population Sequence
1	DIMMB1 DIMMA1
2	DIMMB1 / DIMMA1

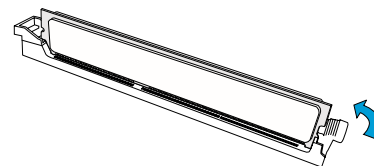
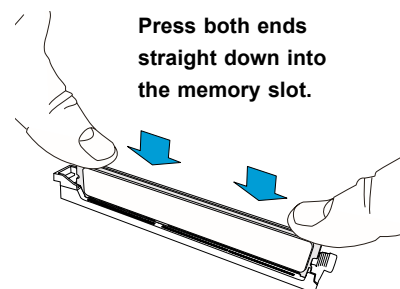
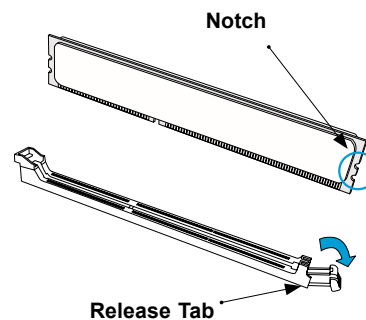
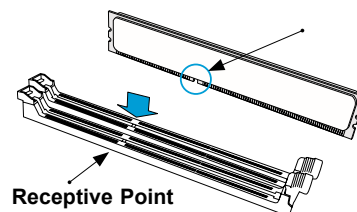
Memory Support		
DIMM Type	Speed (MT/s)	DIMM Slots
1R UDIMM	4800	DIMMA1, DIMMB1
2R UDIMM	4800	DIMMA1, DIMMB1

### General Guidelines for Optimizing Memory Performance

- It is recommended to use DDR5 memory of the same type, size, and speed.
- The motherboard will support odd-numbered modules (one module installed). However, to achieve the best memory performance, a balanced memory population is recommended.

### ***DIMM Installation***

1. Insert DIMM modules in the following order: DIMMA1 and DIMMB1. For the system to work properly, use memory modules of the same type and speed.
2. Align the DIMM module key with the receptive point on the single-latch DIMM slot.
3. Push the release tab outwards to unlock the slot.
4. Align the notch on the end of the module against the receptive point on the end of the slot.
5. Press both ends of the module straight down into the slot until the module snaps into place.
6. Push the release tab to the lock position to secure the module into the slot.



### ***DIMM Removal***

Press the release tab on one end of the DIMM module to unlock it. Once the DIMM module is loosened, remove it from the memory slot.

## Battery Removal and Installation

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.

### Battery Removal

To remove the onboard battery, follow the steps below:

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

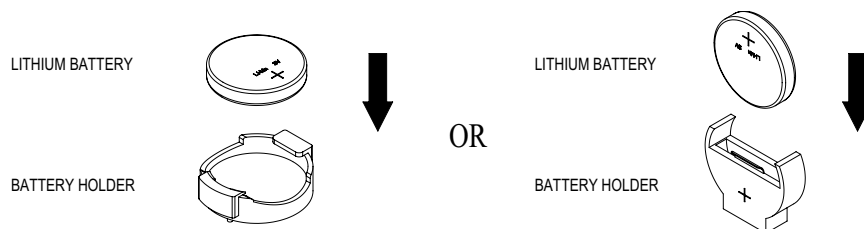
### Proper Battery Disposal

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

### Battery Installation

1. To install an onboard battery, follow steps 1 and 2 above and continue below:
2. Identify the battery's polarity. The positive (+) side should be facing up.
3. Insert the battery into the battery holder and push it down until you hear a click to ensure that the battery is securely locked.

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



**Figure 2-6. Installing the Onboard Battery**

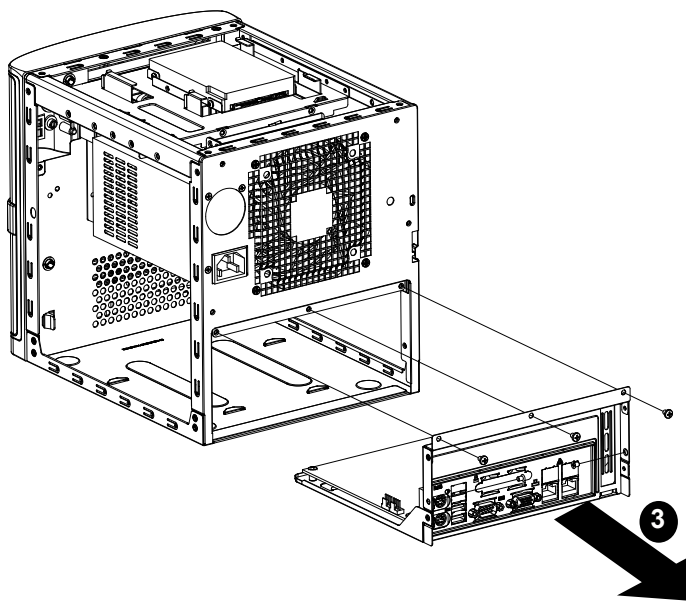
## 2.5 Chassis Components

### Installing Expansion Cards

The SYS-521R-T includes a PCIe 5.0 x16 slot to support one low-profile expansion card. The card is installed by removing the chassis tray that holds the motherboard and the rear I/O shield.

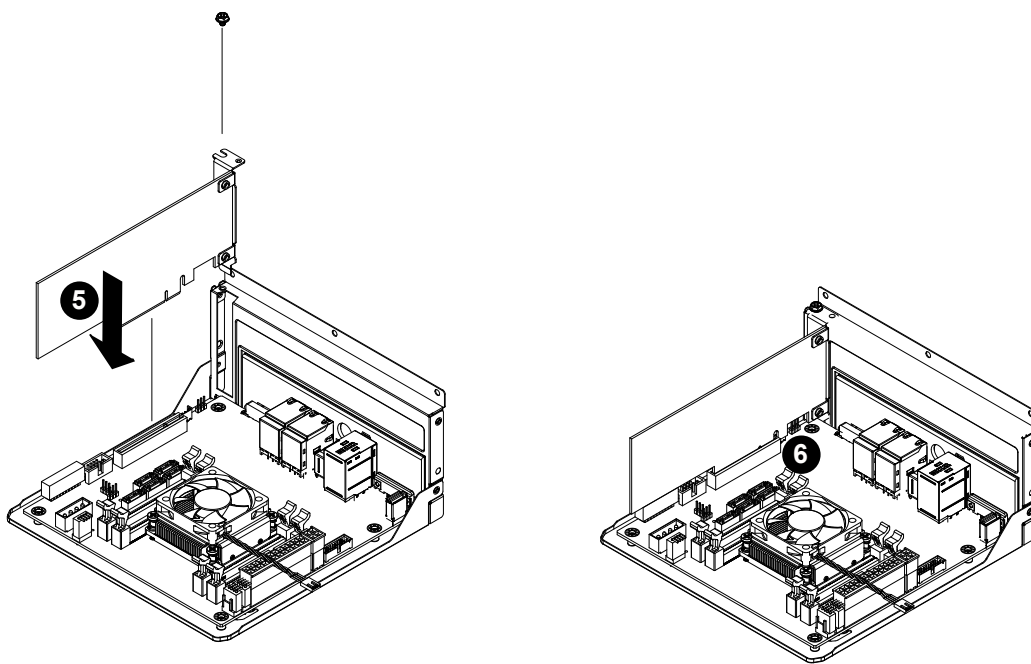
#### *Installing an Expansion Card*

1. Power down the system as described in Section 2.1 and remove the chassis cover.
2. Remove the three screws securing the rear tray to the rear of the chassis and set them aside for later use.
3. Pull the rear tray out from the chassis.



**Figure 2-7. Removing the Rear Tray from the Chassis**

4. Remove the screw that secures the PCI slot shield in the PCI slot at the rear of the tray and set it aside for later use.
5. Slide the PCI slot shield up and out of the PCI slot.
6. Insert the card into its slot on the motherboard while aligning its bracket into the slot on the chassis drawer.
7. Secure the bracket of the expansion card with the screw previously set aside.
8. Slide the rear tray into the chassis and secure it with the screws.
9. Replace the chassis cover and power up the system.



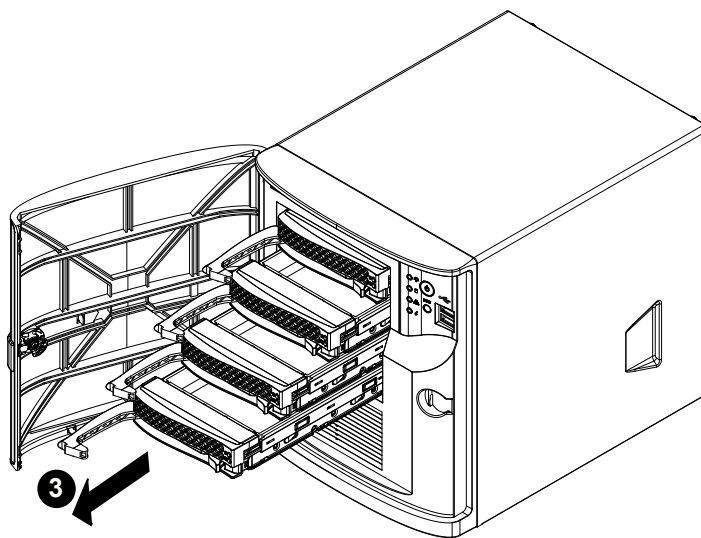
**Figure 2-8. Installing the Expansion Card**

## Front-Mounted Hot-Swap Drives

The CSE-721TS-350BP2 supports four hot-swap drives mounted in carriers that are accessible from the front of the chassis. These drives may be removed and installed without powering down the system.

### ***Removing 3.5" Hot-Swap Drives***

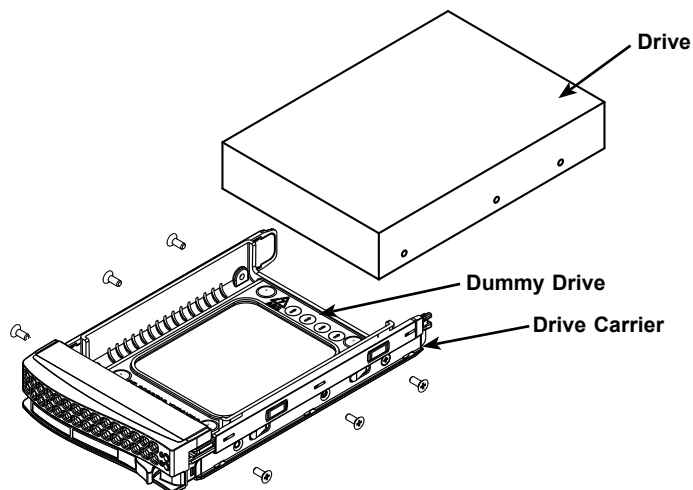
1. Unlock the front bezel and swing it open.
2. Press the release tab on the drive carrier; this will extend the drive carrier handle.
3. Use the handle to pull the drive out of the chassis.



**Figure 2-9. Installing the Drives**

### ***Installing a Drive into a Drive Carrier***

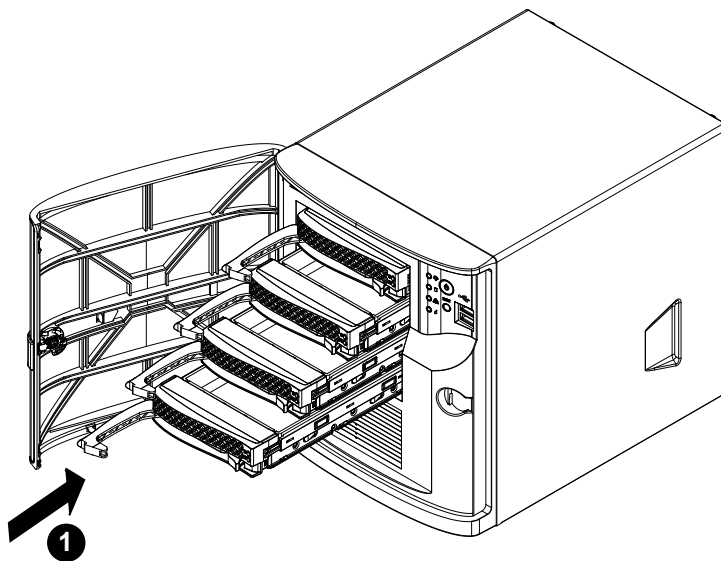
1. After removing a drive carrier, remove the six screws securing the dummy drive tray to the drive carrier. Lift the tray out.
2. Install the new drive into the carrier with the printed circuit board side facing down and with the mounting holes in the drive aligned with those in the carrier.
3. Secure the drive to the carrier by tightening all six screws. The logic and power connections to the drive will be supplied through the backplane.



**Figure 2-10. Installing a Drive into a Drive Carrier**

***Installing a Drive Carrier into the Drive Cage***

1. Insert the drive carrier into the drive bay, using the drive carrier handle to push it all the way into the drive cage until it stops.
2. Close the handle until the drive carrier clicks into the locked position.
3. Close and lock the front bezel.



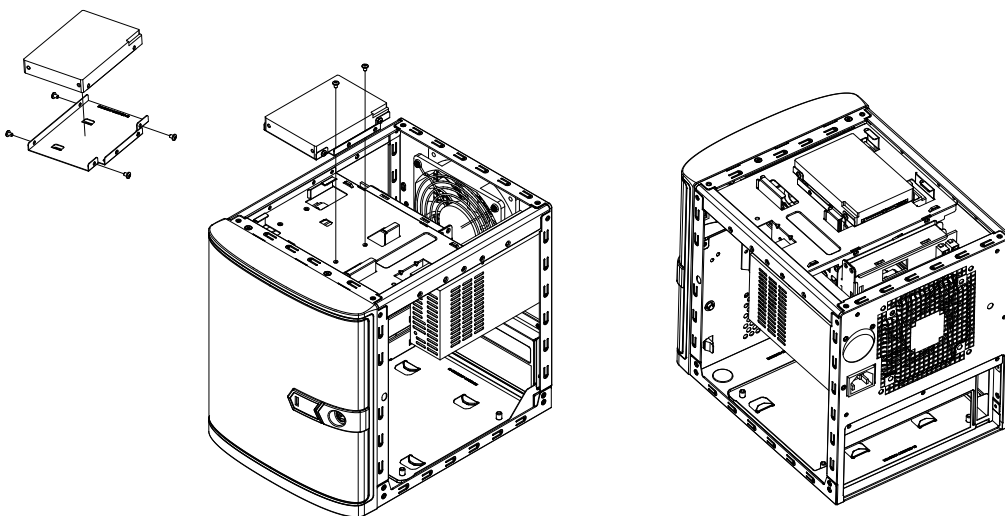
**Figure 2-11. Installing a Drive Carrier into the Drive Cage**

## Installing the Internal Fixed Drives

The CSE-721TS-350BP2 chassis supports two internal 2.5" fixed drives (one top-mounted drive and one side-mounted drive) and one DVD-ROM drive.

### *Installing a Top-Mounted Fixed Drive*

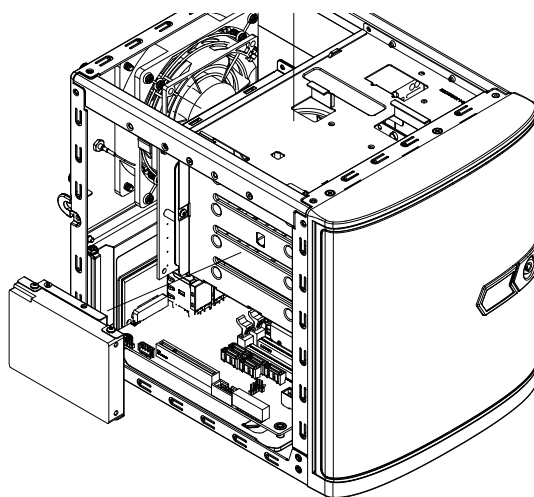
1. Power down the system as described in Section 2.1 and remove the chassis cover.
2. Place a 2.5" drive into the drive bracket and secure the drive to the bracket with the four screws provided.
3. Place the drive and bracket into the top mounting position of the chassis as illustrated below and secure it to the chassis with two screws.
4. Replace the chassis cover, plug the power cord into the rear of the power supply and power up the system.



**Figure 2-12. Installing a Top-Mounted Fixed Drive**

### ***Installing a Side-Mounted Fixed Drive***

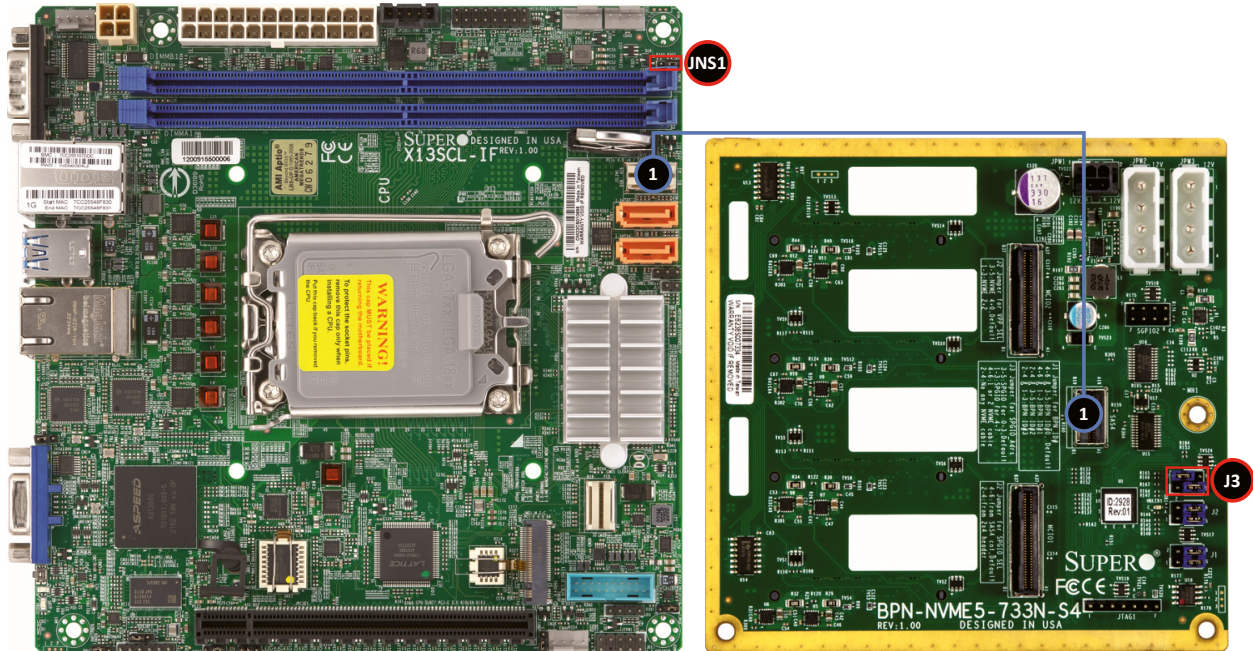
1. Power down the system as described in Section 2.1 and remove the chassis cover as described in Section 2.3.
2. Place a 2.5" drive into the drive bracket and secure the drive to the bracket with the four screws provided.
3. Place the drive and bracket into the side mounting position of the chassis by inserting the pin on the bracket into the mounting hole on the chassis as illustrated below.
4. Replace the chassis cover, plug the power cord into the rear of the power supply and power up the system.



**Figure 2-13. Installing a Side-Mounted Fixed Drive**

## System Configurations and Cable Routing Diagrams

### Configuration 1: SATA x4



Cable Connections				
Cable (shown above)	Drive Description	MB Port	BPN Port	Cable P/N
1	SATA0-3	JSLIM1 (STR)	SAS4 (R/A)	CBL-SAST-1269F-100

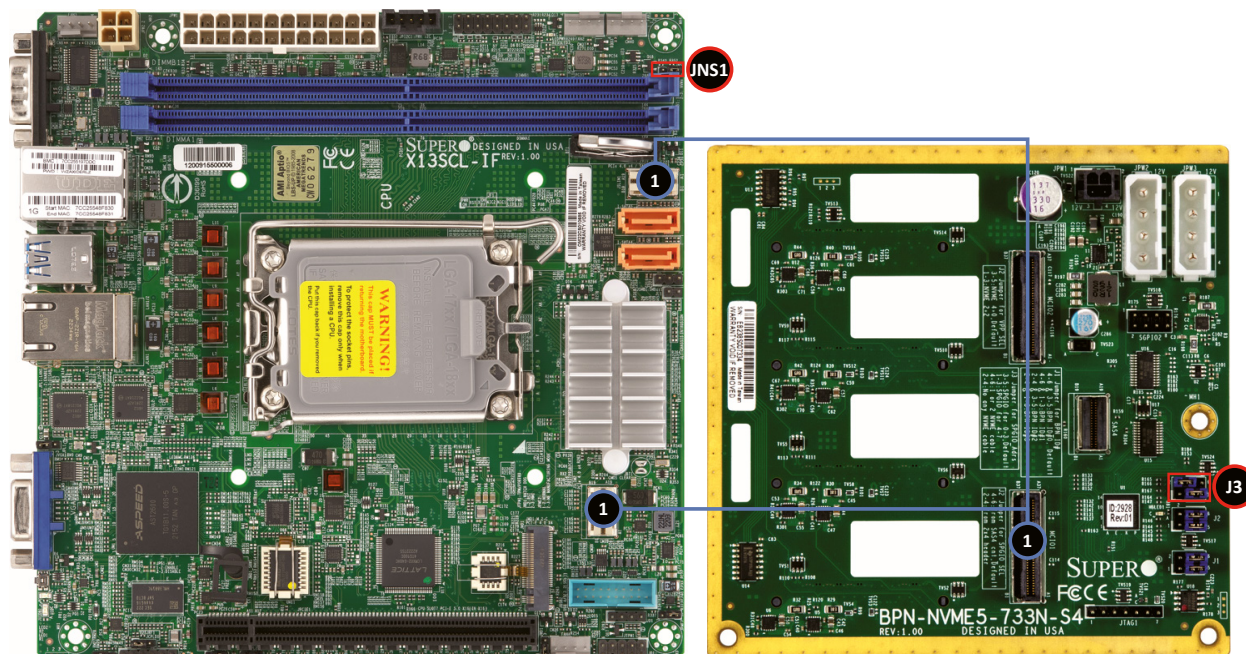
#### Motherboard (X13SCL-IF) Jumper Setting

Jumper	Setting
JNS1	Pins 1-2 (SATA x4)

#### Backplane (BPN-NVME5-733N-S4) Jumper Setting

Jumper	Setting
J3	Pins 2-4

**Configuration 2: NVMe Gen4 x2**

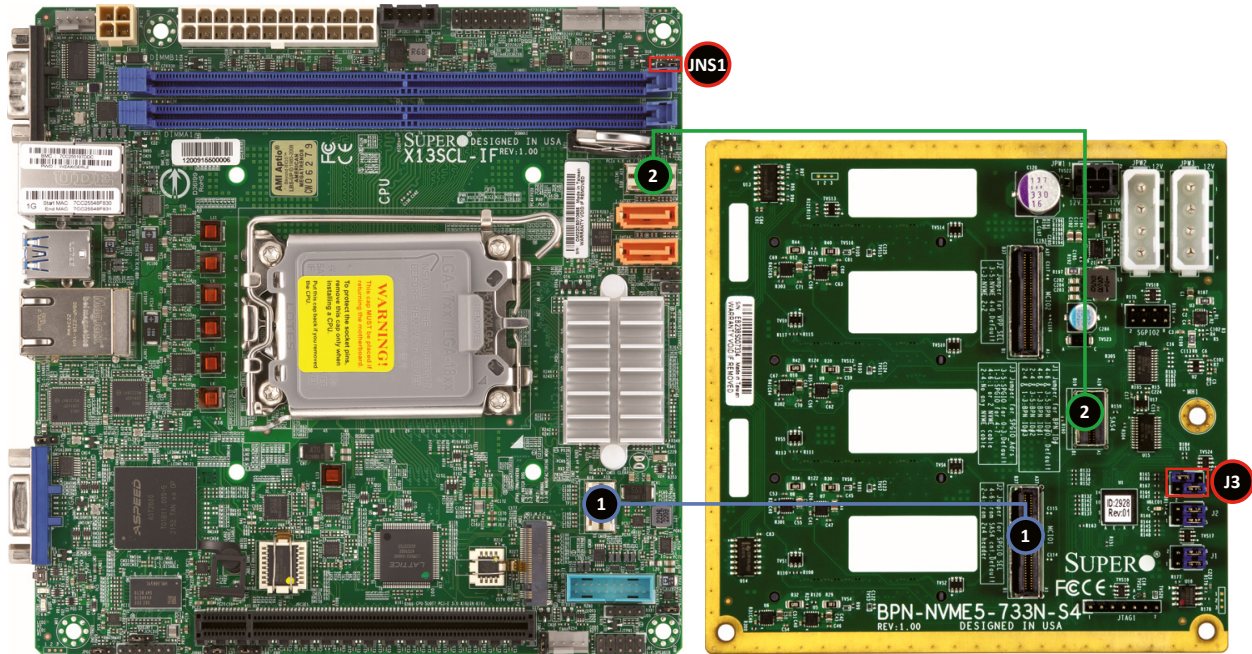


Cable Connections				
Cable (shown above)	Drive Description	MB Port	BPN Port	Cable P/N
1	NVMe0-1	JSLIM1 Cable P2 JSLIM2: Cable P1	MCIO1: Cable P0	CBL-MCIO-1243S4Y

Motherboard (X13SCL-IF) Jumper Setting	
Jumper	Setting
JNS1	Pins 2-3 (PCIe 4.0 x4)

Backplane (BPN-NVME5-733N-S4) Jumper Setting	
Jumper	Setting
J3	Pins 4-6

**Configuration 3: NVMe Gen4 x1 + SATA x3**

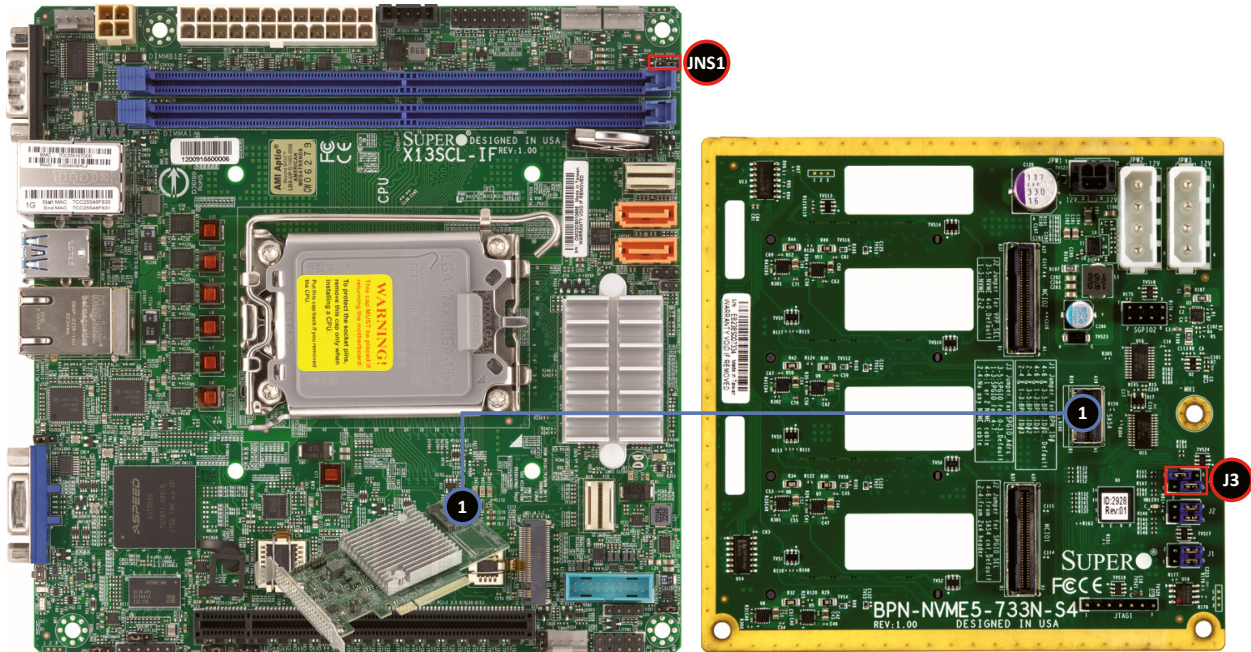


Cable Connections				
Cable (shown above)	Drive Description	MB Port	BPN Port	Cable P/N
1	NVMe0	JSLIM2: Cable P1	MCIO1: Cable P0	CBL-MCIO-1243S4Y
2	SATA1-3	JSLIM1 (STR)	SAS4 (R/A)	CBL-SAST-1269F-100

Motherboard (X13SCL-IF) Jumper Setting	
Jumper	Setting
JNS1	Pins 1-2 (SATA x4)

Backplane (BPN-NVME5-733N-S4) Jumper Setting	
Jumper	Setting
J3	Pins 4-6

**Configuration 4: SAS x4 (SAS AOC required)**



Cable Connections				
Cable (shown above)	Drive Description	AOC Port	BPN Port	Cable P/N
1	SAS0-3	SlimSAS (x8)	SAS4	CBL-SAST-1233F-100

Backplane (BPN-NVME5-733N-S4) Jumper Setting	
Jumper	Setting
J3	Pins 2-4

AOC Slot Location	
Description	Slot on Motherboard
SAS AOC	JPCIE1

## **Adding an M.2 Storage Card**

One M.2 SSD card (M-Key, 2280 form factor) may be installed on the motherboard.

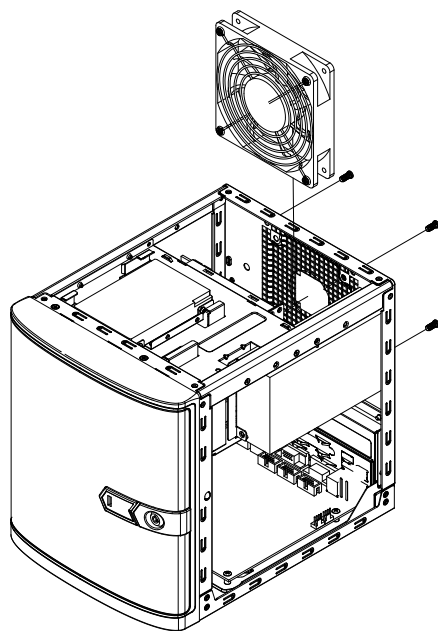
1. Remove power from the system as described in Section 2.1 and remove the chassis cover.
2. Find and pull out the plastic securing knob in one of the M.2 standoffs.
3. Holding the M.2 card nearly horizontal, insert it into the slot on the motherboard and lower the semi-circular notch onto the standoff.
4. Insert the plastic securing knob into the standoff.

## Installing a Fan

The chassis includes a single 12-cm rear exhaust fan. The chassis also features a set of mounting holes that will support a standard 9-cm exhaust fan (not included).

### *Installing the Exhaust Fan*

1. Power down the system as described in Section 2.1 and remove the chassis cover.
2. Place the fan on top of the fan grill, aligning the mounting holes of the fan grill with the mounting holes of the system fan.
3. Secure the fan to the chassis with four screws.
4. Connect the fan cable to the motherboard.
5. Replace the chassis cover, plug the power cord into the rear of the power supply and power up the system.



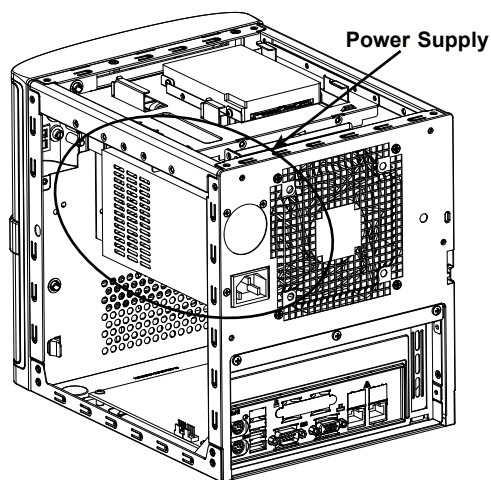
**Figure 2-14** Installing the Exhaust Fan

## Replacing the Power Supply

The CSE-721TS-350BP2 includes a single (non-hot-swap) 350W power supply. If it is necessary to replace the power supply, follow the instructions below.

### ***Changing the Power Supply***

1. Power down the system as described in Section 2.1 and remove the chassis cover.
2. Remove all power cables from the motherboard, storage drives, and backplane.
3. Remove the screws securing the power supply to the chassis, which are located on the rear of the chassis. Set these screws aside for later use.
4. Remove the power supply from the chassis.
5. Replace the failed power supply with the same model power supply (p/n: PWS-353-1H).
6. Secure the new power supply using the screws previously set aside.
7. Reattach the power cables to the motherboard, storage drives, and backplane.
8. Replace the chassis cover, plug the power cord into the rear of the power supply and power up the system.



**Figure 2-15. Removing the Power Supply**

## Chapter 3

# Motherboard Connections

## 3.1 Power Connections

### ATX Power Supply Connector

The primary 24-pin power supply connector (JPW1) meets the ATX SSI EPS 12V specification. The 4-pin (JPW2) processor power connector must also be connected to your power supply.

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

4-pin Power Pin Definitions	
Pin#	Definition
1	GND
2	GND
3	+12 V
4	+12 V

## 3.2 Headers and Connectors

### Chassis Intrusion

A Chassis Intrusion header is located at JL1 on the motherboard. Attach the appropriate cable from the chassis to be informed 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

### Fan Headers

There are four 4-pin fan headers (FAN1–FAN3, FANA) on the motherboard. All these 4-pin fan headers are backwards compatible with the traditional 3-pin fans. However, fan speed control is available for 4-pin fans only by Thermal Management via the Hardware Monitoring through the BMC. Refer to the table below for pin definitions.

Fan Header Pin Definitions	
Pin#	Definition
1	Ground (Black)
2	+12 V (Red)
3	Tachometer
4	PWM_Control

### M.2 Slot

This motherboard has one M.2 slot. M.2 was formerly known as Next Generation Form Factor (NGFF) and serves to replace mini PCIe. M.2 allows for increased functionality and spatial efficiency. The M.2 slot on the motherboard supports PCIe 4.0 x4 SSD cards in the 2280 form factor.

### 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	+3.3 V

### SATA 3.0 Ports

This motherboard has two SATA 3.0 ports. I-SATA4/5 can be used with Supermicro SuperDOMs that are yellow SATA DOM connectors with power pins built in and do not require external power cables. Supermicro SuperDOMs are backwards compatible with regular SATA HDDs or SATA DOMs that need external power cables.

### SlimSAS Connectors

JSLIM1 and JSLIM2 are backplane SlimSAS connectors that support PCIe 4.0 x4 slots. JSLIM1 supports PCIe 4.0 x4 or SATA x4.

### Speaker

On the JD1 header, pins 1–4 are for the speaker. If you wish to use an external speaker, connect its cable to pins 1–4.

Speaker Connector Pin Definitions	
Pin #	Definition
1–4	Speaker

### System Management Bus Header

A System Management Bus header for additional slave devices or sensors is located at JSMB1. Refer to the table below for pin definitions.

SMBus Header Pin Definitions	
Pin#	Definition
1	Data
2	Ground
3	Clock

## TPM/Port 80 Header

A Trusted Platform Module (TPM)/Port 80 header is located at JTPM1 to provide TPM support and Port 80 connection. Use this header to enhance system performance and data security. Refer to the table below for pin definitions. Go to the following link for more information on the TPM: <http://www.supermicro.com/manuals/other/TPM.pdf>.

Trusted Platform Module/Port80 Header Pin Definitions			
Pin#	Definition	Pin#	Definition
1	P3V3	2	SPI_TPM_CS_N
3	TPM_RST_N	4	SPI_TPM_MISO
5	SPI_TPM_CLK	6	GND
7	SPI_TPM_MOSI	8	
9	P3V3_AUX	10	IRQ_JTPM1_SPI_N

## Front Control Panel

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

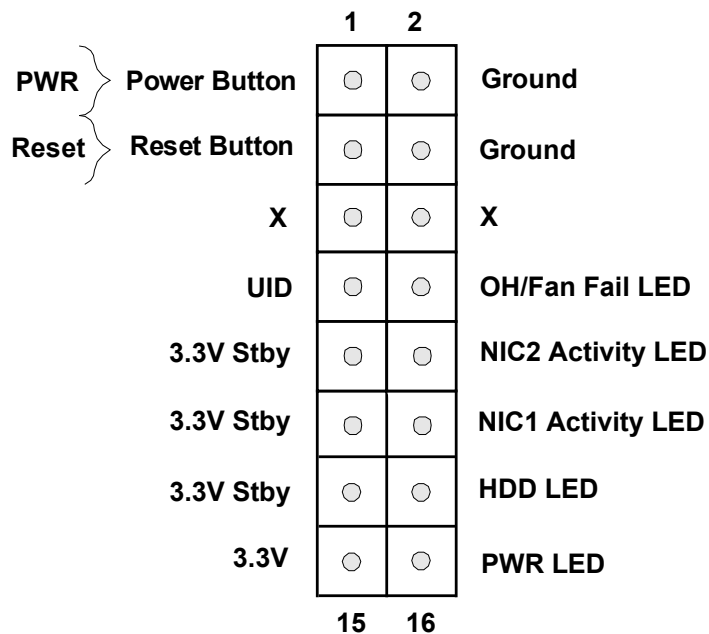


Figure 3-1. JF1 Header Pins

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

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

## Reset Button

The Reset Button connection is located on pins 3 and 4 of JF1. Attach it to a hardware reset switch on the computer case to reset the system. Refer to the table below for pin definitions.

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

## Power Fail LED

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

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

## Overheat (OH)/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.

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

OH/Fan Fail LED Pin Definitions (JF1)	
Pin#	Definition
7	+3.3 V
8	OH/Fan Fail LED

### NIC1/NIC2 (LAN1/LAN2)

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

LAN1/LAN2 LED Pin Definitions (JF1)	
Pin#	Definition
9/11	3.3 VStby
10/12	NIC Activity LED

### Drive Activity LED

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

Drive Activity LED Pin Definitions (JF1)	
Pins	Definition
13	3.3 V
14	Drive Activity LED

### 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	+3.3 VStby
16	PWR LED

### 3.3 Rear I/O Ports

See Figure 3-2 below for the locations and descriptions of the various I/O ports on the rear of the motherboard.

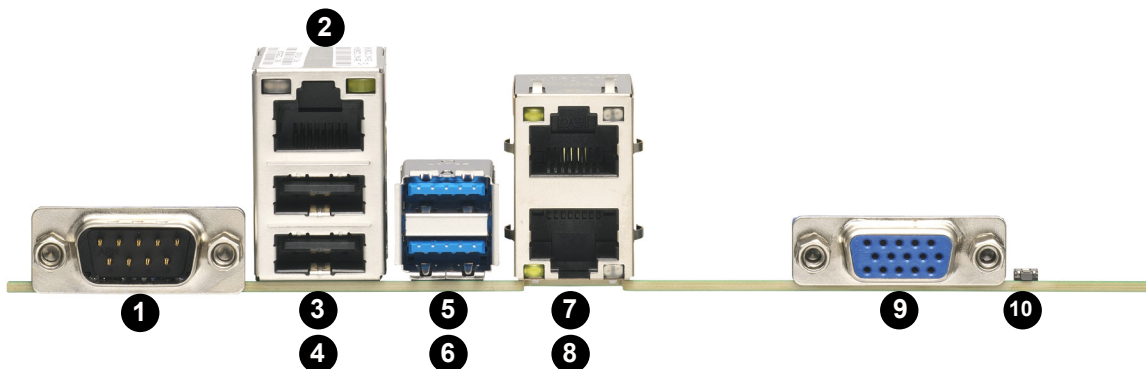


Figure 3-2. I/O Port Locations and Definitions

Rear I/O Ports			
#	Description	#	Description
1	COM1	6	USB2
2	BMC LAN Port	7	LAN2
3	USB1	8	LAN1
4	USB0	9	VGA
5	USB3	10	UID Switch

#### COM Port

There is one COM port on the I/O back panel.

COM Port (COM1) 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

#### VGA Port

A video (VGA) port is located on the I/O back panel.

## LAN Ports

Two Gigabit Ethernet ports (LAN1/2) are located on the I/O back panel. In addition to the LAN ports, a dedicated BMC LAN on the back panel. All of these ports accept RJ45 cables. Refer to the LED Indicator section for LAN LED information.

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

BMC LAN Pin 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		

## Universal Serial Bus (USB) Ports

There are two USB 2.0 ports (USB0/1) and two USB 3.2 ports (USB2/3) on the I/O back panel. The motherboard also has one front access USB 3.2 header (USB4/5). The onboard headers can be used to provide front side USB access with a cable (not included).

Back Panel USB0/1 (2.0) Pin Definitions			
Pin#	Definition	Pin#	Definition
1	+5 V	5	+5V
2	USB_N	6	USB_N
3	USB_P	7	USB_P
4	Ground	8	Ground

Back Panel USB2/3 (3.2 Gen 1) 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

Front Panel USB4/5 (3.2 Gen 1) Header 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	GND	x	

### 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 JUIDB1, which is next to the VGA port on the back panel. The UID LED (LED2) is located next to the UID switch. When you press the switch, the LED will be turned on, which provides easy identification of a system unit that may be in need of service. Press the switch again to turn off the LED indicator.

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

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

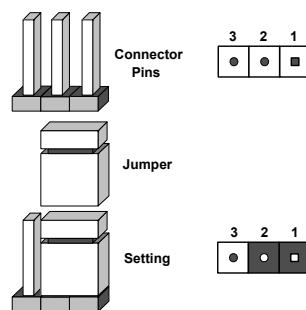
**Note:** After pushing and holding the UID-SW for 12 seconds, all BMC settings including username and password will revert back to the factory default. Only the network settings and FRU are retained.

## 3.4 Jumper Settings

### How Jumpers Work

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

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



### CMOS Clear

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

#### To Clear CMOS

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

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



JBT1 contact pads

### CPU PCIe Bifurcation

Set the JRF1 jumper to set the PCIe lanes to either x16 or two x8 for Slot 7.

PCIe Bifurcation Jumper Settings	
Jumper Setting	Definition
Pins 1–2	x16
Pins 2–3	Two x8

### LAN1 Enable/Disable

Use jumper JPL1 to enable or disable LAN port 1 and jumper JPL2 to enable or disable LAN port 2.

LAN1 and LAN2 Enable/Disable Jumper Settings	
Jumper Setting	Definition
Pins 1–2	Enabled (Default)
Pins 2–3	Disabled

### 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 allows you to flash the system firmware from a host server for system setting modifications. Refer to the table below for jumper settings.

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

### SATA 3.0 or PCIe 4.0 Selection

Use JNS1 to switch between SATA or PCIe interface for storage. Refer to the table below for lane options.

SATA 4.0 or PCIe 4.0 Selection Jumper Settings	
Jumper Setting	Definition
Pins 1–2	4x SATA
Pins 2–3	PCIe x4

### VGA Enable/Disable

JPG1 allows you to enable or disable the VGA port using the onboard graphics controller.

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

### Watch Dog Timer

Watch Dog (JWD1) is a system monitor that can reboot the system when a software application hangs. Close pins 1-2 to reset the system if an application hangs. Close pins 2-3 to generate a non-maskable interrupt (NMI) signal for the application that hangs. Refer to the table below for jumper settings. The Watch Dog must also be enabled in the BIOS.

Watch Dog Jumper Settings	
Jumper Setting	Definition
Pins 1–2	Reset (Default)
Pins 2–3	NMI
Open	Disabled

## 3.5 LED Indicators

### BMC Heartbeat LED

LEDM1 is the BMC Heartbeat LED. When the LED is blinking green, BMC is working. Refer to the table below for the LED status.

BMC Heartbeat LED	
LED Color	Definition
Blinking Green	BMC Normal

### Onboard Power LED

The Onboard Power LED is located at LED3. When this LED is on, the system is on. 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

## LAN LEDs

Two LAN ports (LAN1/2) are located on the I/O back panel. Each LAN port has two LEDs. The green LED indicates activity, while the other Link LED may be yellow, amber, or off to indicate the speed of the connection. Refer to the tables below for more information.

LAN Activity LED (Left) LED State		
Color	Status	Definition
Yellow	Flashing	LAN Connected

LAN Link LED (Right) LED State	
LED Color	Definition
Amber, Solid	1000 Mbps
Green, Solid	100 Mbps

## Overheat/Power Fail/Fan Fail LED

The Overheat/Power Fan/Fan Fail LED is located at LED1. Refer to the table below for more information.

Overheat/Power Fail/Fan Fail LED State	
LED Color	Definition
Solid Red	System Overheat
Blinking Red	Power Fail or Fan Fail

## Chapter 4

### Software

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

#### 4.1 Microsoft Windows OS Installation

##### *Installing the OS*

1. Create a method to access the Microsoft Windows installation ISO file. That can be a USB flash or media drive.
2. 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 or media 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.

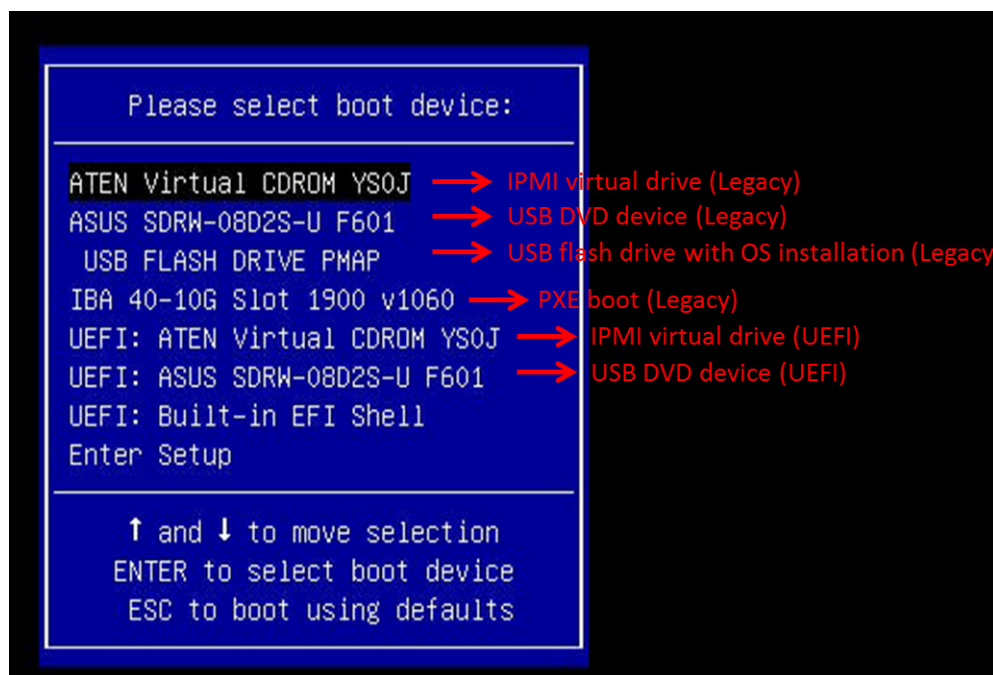
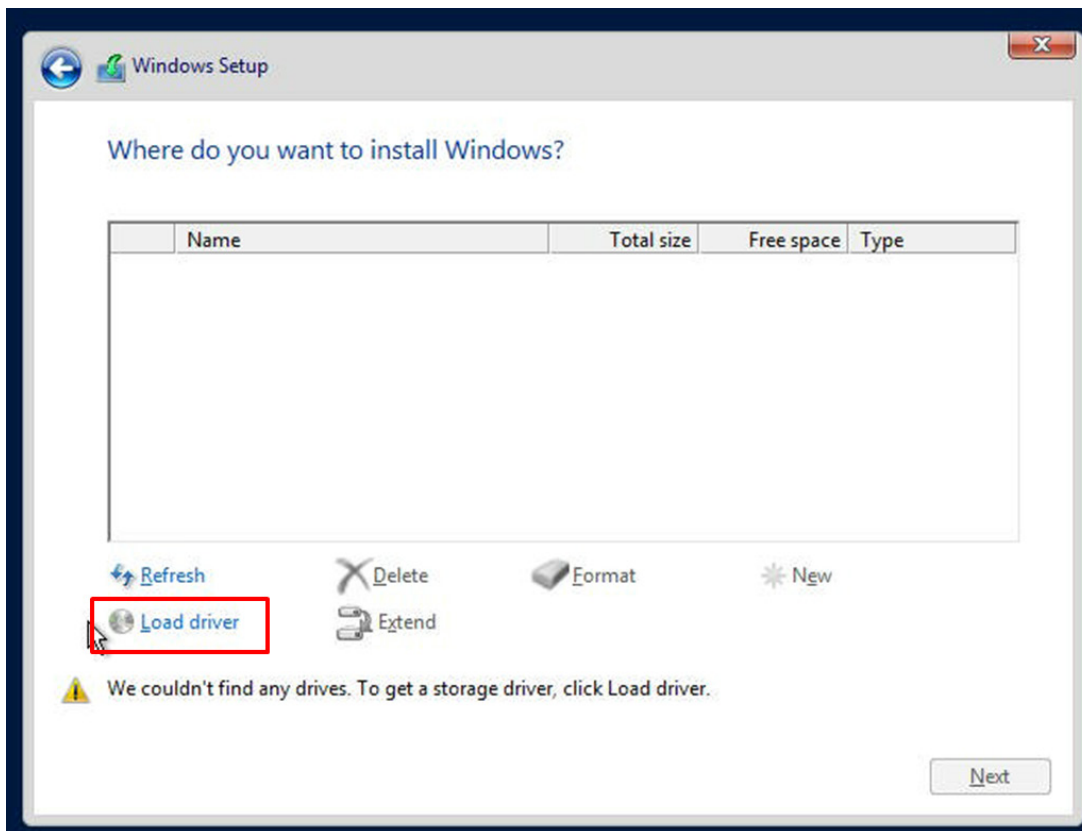


Figure 4-1. Select Boot Device

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 4-2. Load Driver Link**

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

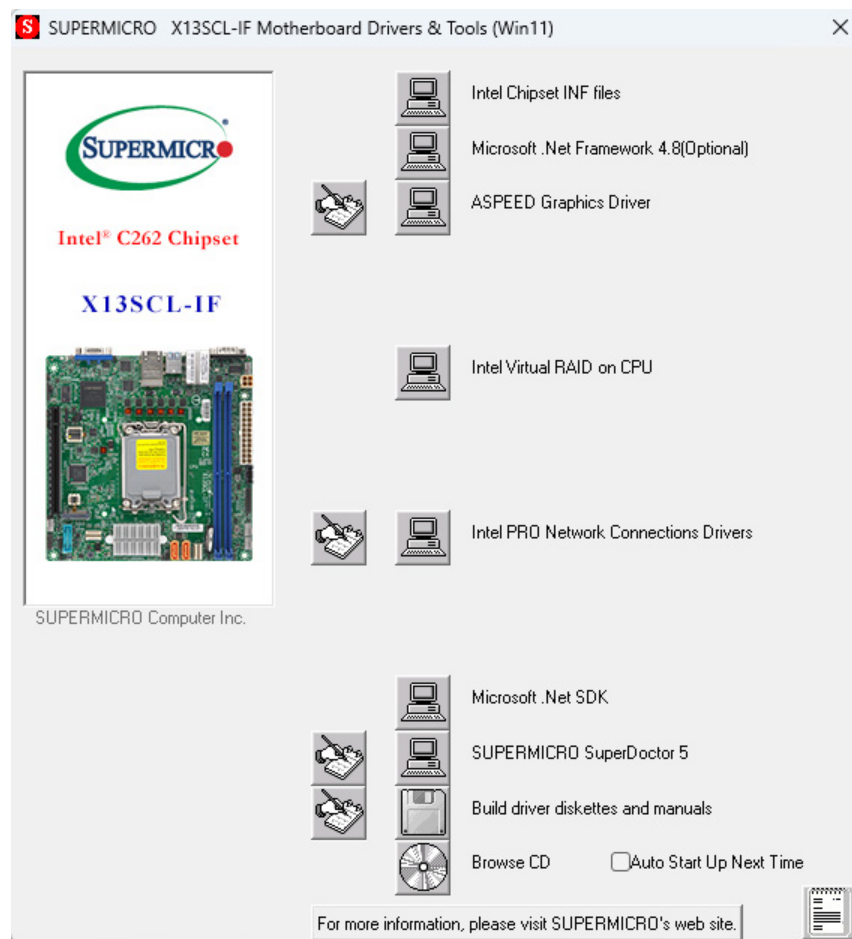
- For non-RAID, choose the SATA/sATA AHCI driver indicated then choose the storage drive on which you want to install it.
5. Once all devices are specified, continue with the installation.
  6. After the Windows OS installation has completed, the system will automatically reboot multiple times.

## 4.2 Driver Installation

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

After accessing the website, go into the CDR\_Images (in the parent directory of the above link) and locate the ISO file for your motherboard. Download this file to a USB flash or media drive. (You may also use a utility to extract the ISO file if preferred.)

Another option is to go to the Supermicro website at <http://www.supermicro.com/products/>. Find the product page for your motherboard, and "Download the Latest Drivers and Utilities". Insert the flash or media drive and the screenshot shown below should appear.



**Figure 4-3. Driver and 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.

## 4.3 SuperDoctor<sup>®</sup>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.

[SuperDoctor<sup>®</sup> Manual and Resources](#)

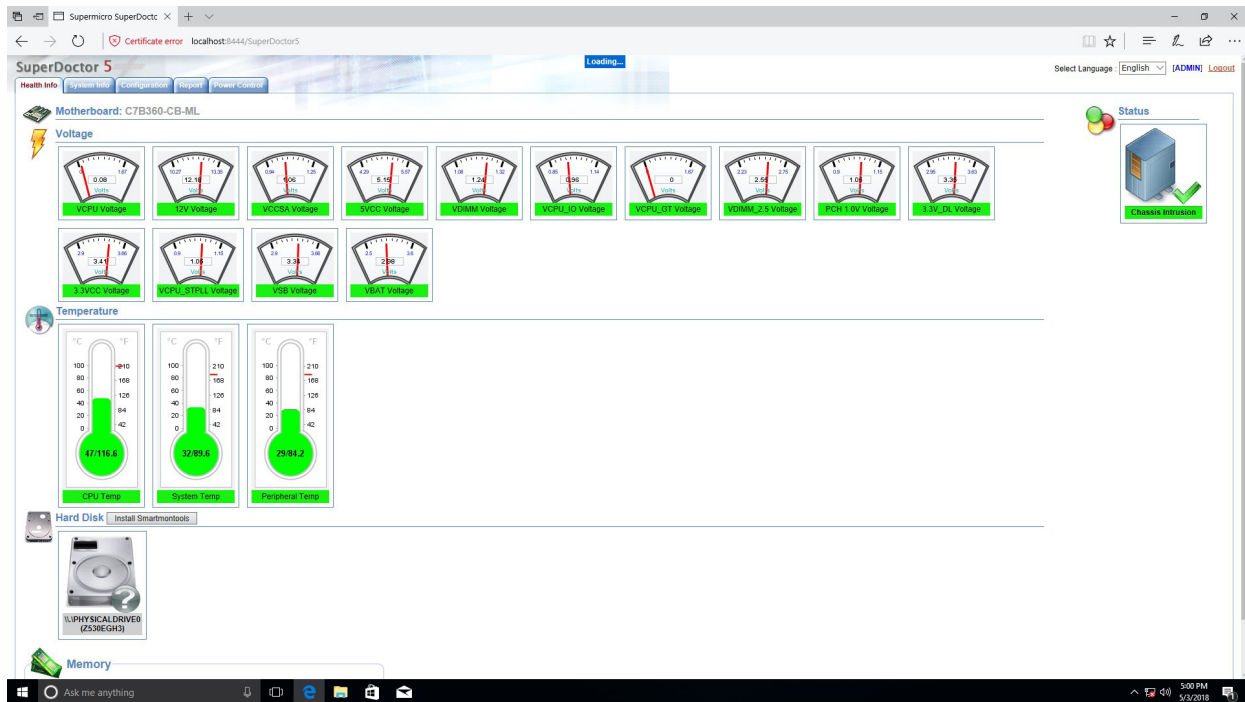


Figure 4-4. SuperDoctor 5 Interface Display Screen (Health Information)

## 4.4 IPMI

The X13SCL-IF supports the Intelligent Platform Management Interface (IPMI). IPMI provides remote access, monitoring and management through the baseboard management controller (BMC) and other management controllers distributed among different system modules. There are several BIOS settings that are related to IPMI. For general documentation and information on IPMI, visit our website at: <http://www.supermicro.com/products/nfo/IPMI.cfm>.

### BMC ADMIN User Password

For security, each system is assigned a unique default BMC password for the ADMIN user. This can be found on a sticker on the chassis and a sticker on the motherboard. The sticker also displays the BMC MAC address.



**Figure 4-5. BMC Password Label**

See [Chapter 1](#) for the location of the label.

## Chapter 5

# Optional Components

This chapter describes optional system components and installation procedures.

### 5.1 Optional Parts List

Optional Parts List		
Description	Part Number	Quantity (Max.)
MCIO x8 to 2 SlimSAS x4 (cable)	CBL-MCIO-1243S4Y	1
Slimline x8 to Slimline x4 (cable)	CBL-SAST-1233F-100	1
2U Active CPU Heatsink for Intel Socket LGA-1700	SNK-P0092AP4	1
Black Gen-5.5 tool-less 3.5-to-2.5 drive tray converter	MCP-220-00118-0B	4

### 5.2 Storage Protocols

The storage drive bays can be configured to support either SATA, SAS, or NVMe drives by adding optional parts to the system.

**SATA** – The system supports up to four SATA drives through an onboard connector. Additional cables are required.

**SAS** – The system can support up to four SAS drives with supported add-on storage controller card(s).

**NVMe** – The system supports two NVMe drives with an onboard connector. Additional cables are required.

## Chapter 6

# Troubleshooting and Support

## 6.1 Information Resources

### Website

A great deal of information is available on the Supermicro website, [supermicro.com](http://supermicro.com).



**Figure 6-1. Supermicro Website**

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

### ***Direct Links for the SYS-521R-T System***

[SYS-521R-T](#) specifications page

[X13SCL-IF](#) web page for links to the Quick Reference Guide, User Manual, validated storage drives, etc.

### ***Direct Links for General Support and Information***

[Frequently Asked Questions](#)

[Add-on card descriptions](#)

[TPM User Guide](#)

[SuperDoctor5 Large Deployment Guide](#)

For validated memory, see our [Product Resources](#) page

## Direct Links (continued)

[Product Matrices](#) page for links to tables summarizing specs for systems, motherboards, power supplies, riser cards, add-on cards, etc.

[Security Center](#) for recent security notices

[Supermicro Phone and Addresses](#)

## 6.2 Baseboard Management Controller Interface

The system supports the Baseboard Management interface. BMC is used to provide remote access, monitoring and management. There are several BIOS settings that are related to BMC.

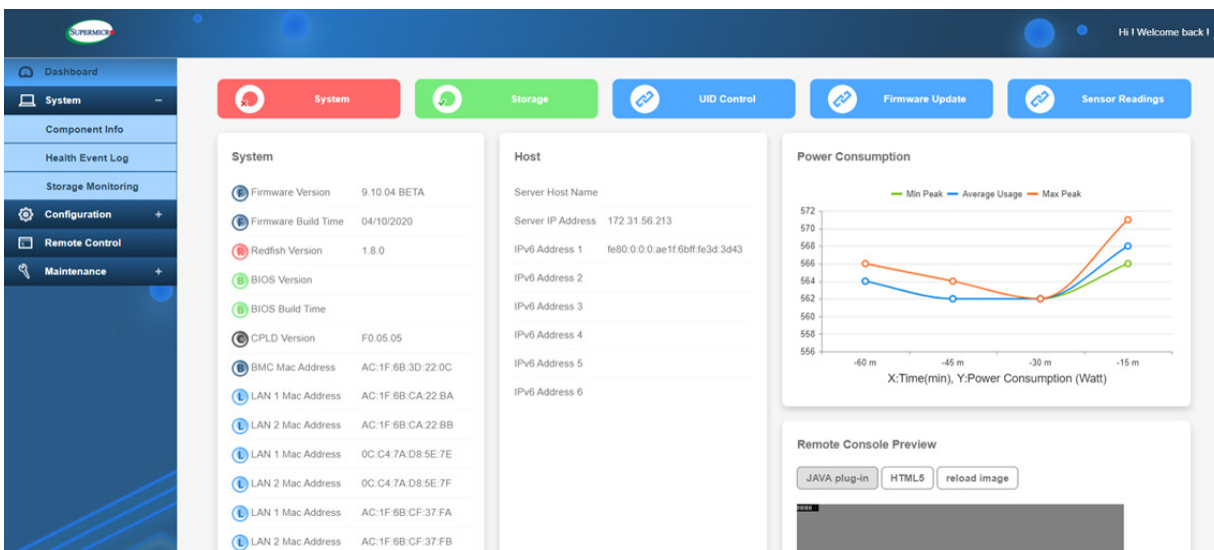


Figure 6-2. BMC Sample

## 6.3 Troubleshooting Procedures

Use the following procedures to troubleshoot your system. If you have followed all of the procedures below and still need assistance, refer to the [Technical Support Procedures](#) or [Returning Merchandise for Service](#) section(s) in this chapter. [Power down](#) the system before changing any non hot-swap hardware components.

### No Power

1. Make sure that there are no short circuits between the motherboard and the chassis.
2. Make sure that the power connectors are properly connected.
3. Check that the 115 V/230 V switch, if available, on the power supply is properly set.
4. Turn the power switch on and off to test the system, if applicable.
5. Check the CPU socket for bent pins and make sure the CPU is fully seated.
6. The battery on your motherboard may be old. Check to verify that it still supplies approximately 3 VDC. If it does not, replace it with a new one.

## No Video

If the power is on but you have no video, remove all the add-on cards and cables. Then power up the system again to see if you then have video.

## System Boot Failure

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

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

## Memory Errors

1. Make sure that the DIMM modules are properly and fully installed.
2. Confirm that you are using the correct memory. Also, it is recommended that you use the same memory type and speed for all DIMMs in the system. See [Chapter 2](#) for memory details.
3. Check for bad DIMM modules or slots by swapping modules between slots and noting the results.
4. Check the power supply voltage 115 V/230 V switch.

## Losing the System's Setup Configuration

1. Always replace power supplies with the exact same model that came with the system. A poor quality power supply may cause the system to lose the CMOS setup configuration.
2. The battery on your motherboard may be old. Check to verify that it still supplies approximately 3 VDC. If it does not, replace it with a new one.
3. If the above steps do not fix the setup configuration problem, contact your vendor for repairs.

## When the System Becomes Unstable

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

1. CPU/BIOS support: Make sure that your CPU is supported and that you have the latest BIOS installed in your system.
2. Memory support: Make sure that the memory modules are supported by testing the modules using memtest86 or a similar utility.

**Note:** Refer to the product page on our website at <http://www.supermicro.com> for memory and CPU support and updates.

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

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

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

## 6.4 Crash Dump Using BMC

In the event of a processor internal error (IERR) that crashes your system, you may want to provide information to support staff. You can download a crash dump of status information using BMC.

### Check BMC Error Log

1. Access the BMC web interface.
2. Click the **Server Health** tab, then **Event Log** to verify an IERR error.

<input type="checkbox"/>	Severity	Date/Time	Sensor Type	Description	Event Type
<input type="checkbox"/>	✔	2023-05-16 10:56:05	Power Supply	[PWR-0000] PS2 Status, Power Supply Installed - Assertion	Sensor-specific
<input type="checkbox"/>	✔	2023-05-16 10:56:05	Power Supply	[PWR-0000] PS1 Status, Power Supply Installed - Assertion	Sensor-specific
<input type="checkbox"/>	⚠	2023-05-16 10:54:41	AC Power On	[PWR-0020] First AC Power on - Assertion	Sensor-specific
<input type="checkbox"/>	✔	2023-05-16 10:54:22	System NIC	[LAN-0005] Dedicated LAN Link Up - Assertion	Sensor-specific

Figure 6-3. BMC Event Log

In the event of an IERR, the BMC executes a crash dump. You must download the crash dump and save it.

## 6.5 UEFI BIOS Recovery

**Warning:** Do not upgrade the BIOS unless your system has a BIOS-related issue. Flashing the wrong BIOS can cause irreparable damage to the system. In no event shall Supermicro be liable for direct, indirect, special, incidental, or consequential damages arising from a BIOS update. If you do update the BIOS, do not shut down or reset the system while the BIOS is updating to avoid possible boot failure.

### 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.

### Recovering the UEFI BIOS Image

A UEFI BIOS flash chip consists of a recovery BIOS block and a main BIOS block (a main BIOS image). The recovery block contains critical BIOS codes, including memory detection and recovery codes for the user to flash a healthy BIOS image if the original main BIOS image is corrupted. When the system power is turned on, the recovery block codes execute first. Once this process is complete, the main BIOS code will continue with system initialization and the remaining POST (Power-On Self-Test) routines.

**Note 1:** Follow the BIOS recovery instructions below for BIOS recovery when the main BIOS block crashes.

**Note 2:** When the BIOS recovery block crashes, you will need to follow the procedures to make a Returned Merchandise Authorization (RMA) request. Also, you may use the Supermicro Update Manager (SUM) Out-of-Band ([https://www.supermicro.com.tw/products/nfo/SMS\\_SUM.cfm](https://www.supermicro.com.tw/products/nfo/SMS_SUM.cfm)) to reflash the BIOS.

### Recovering the Main BIOS Block with a USB Device

This feature allows the user to recover the main BIOS image using a USB-attached device without additional utilities used. A USB flash device such as a USB Flash Drive, or a USB CD/DVD ROM/RW device can be used for this purpose. However, a USB storage drive cannot be used for BIOS recovery at this time.

The file system supported by the recovery block is FAT (including FAT12, FAT16, and FAT32) which is installed on a bootable or non-bootable USB-attached device. However, the BIOS might need several minutes to locate the SUPER.ROM file if the media size becomes too large due to the huge volumes of folders and files stored in the device.

To perform UEFI BIOS recovery using a USB-attached device, follow the instructions below.

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

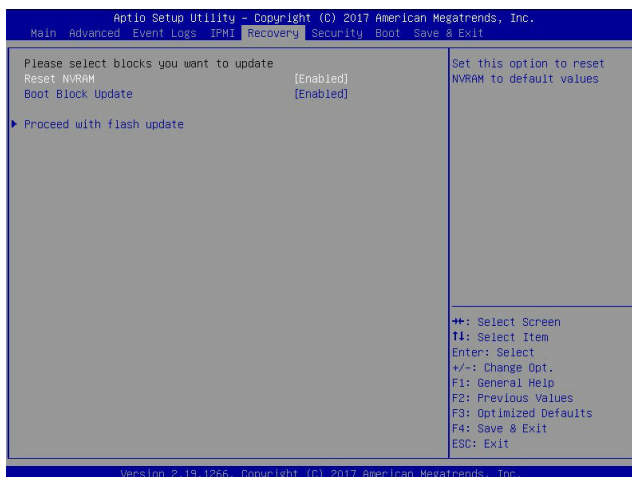
**Note 1:** If you cannot locate the "Super.ROM" file in your drive disk, visit our website at [www.supermicro.com](http://www.supermicro.com) to download the BIOS package. Extract the BIOS binary image into a USB flash device and rename it "Super.ROM" for the BIOS recovery use.

**Note 2:** Before recovering the main BIOS image, confirm that the "Super.ROM" binary image file you download is the same version or a close version meant for your motherboard.

2. Insert the USB device that contains the new BIOS image ("Super.ROM") into your USB drive and reset the system when the following screen appears.
3. After locating the healthy BIOS binary image, the system will enter the BIOS Recovery menu as shown below.



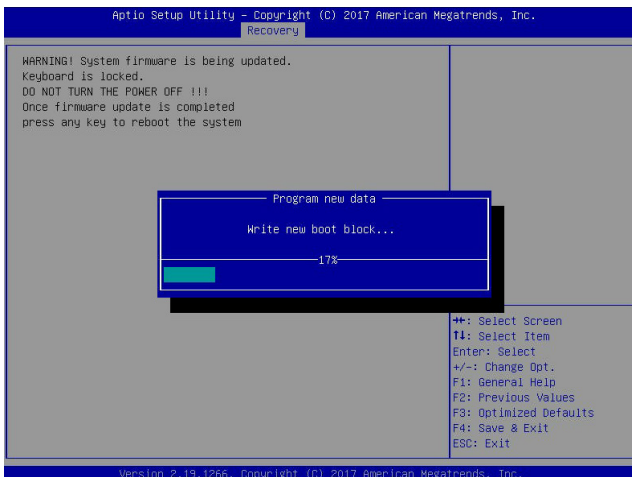
**Note:** At this point, you may decide if you want to start the BIOS recovery. If you decide to proceed with BIOS recovery, follow the procedures below.



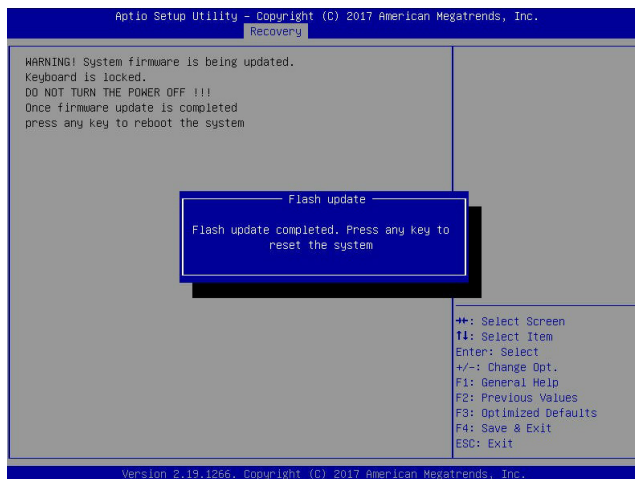
4. When the screen as shown above displays, use the arrow keys to select the item "Proceed with flash update" and press the <Enter> key. You will see the BIOS recovery progress as shown in the screen below.

**Note:** Do not interrupt the BIOS flashing process until it has completed.

5. After the BIOS recovery process is complete, press any key to reboot the system.
6. Using a different system, extract the BIOS package into a USB flash drive.

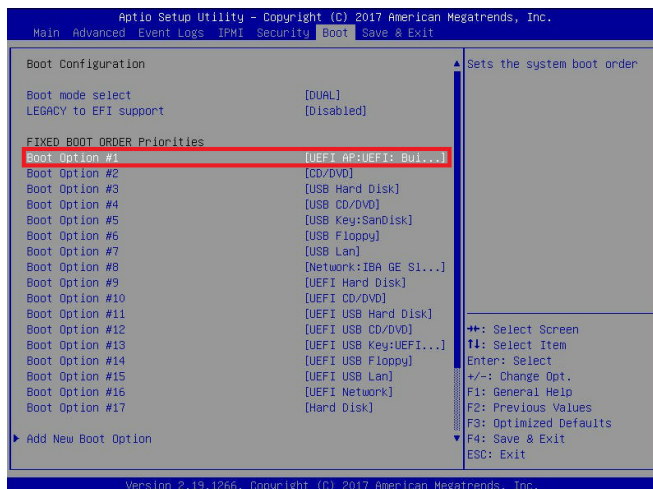


7. Press <Del> continuously during system boot to enter the BIOS Setup utility. From the top of the tool bar, select Boot to enter the submenu. From the submenu list, select Boot



Option #1 as shown below. Then, set Boot Option #1 to [UEFI AP:UEFI: Built-in EFI Shell]. Press <F4> to save the settings and exit the BIOS Setup utility.

8. When the UEFI Shell prompt appears, type `fs#` to change the device directory path. Go to the directory that contains the BIOS package you extracted earlier from Step 6. Enter `flash.nsh BIOSname.###` at the prompt to start the BIOS update process.



**Note:** Do not interrupt this process until the BIOS flashing is complete.

```

UEFI Interactive Shell v2.1
EDK II
UEFI v2.50 (American Megatrends, 0x0005000C)
Mapping table
  FS0: Alias(s):HD0:0B:BLK1:
      PciRoot(0x0)/Pci(0x14,0x0)/USB(0x11,0x0)/HD(1,MBR,0x37901D72,0x800,0x1
CR9592)
  BLK0: Alias(s):
      PciRoot(0x0)/Pci(0x14,0x0)/USB(0x11,0x0)
Press F8 in 1 seconds to skip startup.nsh or any other key to continue.
Shell: fs0:
FS0:\> cd \AFUDOS
FS0:\AFUDOS> cd SNIJPM2_03162017
FS0:\AFUDOS\SNIJPM2_03162017> flash.nsh X110PU7_314

```

9. The screen above indicates that the BIOS update process is complete. When you see the screen above, unplug the AC power cable from the power supply, clear CMOS, and plug

```

Done.
[ Access Cmos Port Ex ]
<Read>
Index 0x51: 0x10

Done.
*****
*
* Program BIOS and ME (including FDT) regions...
*
*****
| AMT Firmware Update Utility v5.09.01.1917 |
| 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)

```

the AC power cable in the power supply again to power on the system.

10. Press <Del> continuously to enter the BIOS Setup utility.

```

Verifying NDB Block ..... done
- Update success for FDR
- Update success for IE
- Successful Update Recovery Loader to OPR!!
- Successful Update MFSBI!
- Successful Update FPR!!
- Successful Update MFS, IVBI and IVB2!!
- Successful Update FLOG and UTDK!!
- ME Entire Image update success !!
WARNING : System must power-off to have the changes take effect!
Moving FS0:\AFUDOS\SNIJPM2_03162017\Fdtv64.efi -> FS0:\AFUDOS\SNIJPM2_03162017\
d1.smc
- [ok]
Moving FS0:\AFUDOS\SNIJPM2_03162017\afuef1x64.efi -> FS0:\AFUDOS\SNIJPM2_0316201
7\afuef1.smc
- [ok]
*****
* Please ignore this 'Shell: Cannot read from file - Device Error'
* warning message due to it does not impact flashing process.
*
*****
Deleting "afuef1.smc"
Delete successful.
FS0:\>

```

11. Press <F3> to load the default settings.
12. After loading the default settings, press <F4> to save the settings and exit the BIOS Setup utility.

## 6.6 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 completely.
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 cords and power on the system.

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

*Do not use the PW\_ON connector to clear CMOS.*



## 6.7 Where to Get Replacement Components

If you need replacement parts for your system, to ensure the highest level of professional service and technical support, purchase exclusively from our Supermicro Authorized Distributors/System Integrators/Resellers. A list can be found at: <http://www.supermicro.com>. Click the "Where to Buy" tab.

## 6.8 Reporting an Issue

### Technical Support Procedures

Before contacting Technical Support, please take the following steps. If your system was purchased through a distributor or reseller, please contact them for troubleshooting services. They have the best knowledge of your specific system configuration.

1. Please review the [Troubleshooting Procedures](#) in this manual and [Frequently Asked Questions](#) on our website before contacting Technical Support.
2. BIOS upgrades can be downloaded from our website. **Note:** Not all BIOS can be flashed depending on the modifications to the boot block code.
3. If you still cannot resolve the problem, include the following information when contacting us for technical support:
  - System, motherboard, and chassis model numbers and PCB revision number
  - BIOS release date/version (this can be seen on the initial display when your system first boots up)
  - System configuration

An example of a Technical Support form is posted on our [website](#). Distributors: For immediate assistance, please have your account number ready when contacting our technical support department by email.

### Returning Merchandise for Service

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

For faster service, RMA authorizations may be requested online (<http://www.supermicro.com/support/rma/>).

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

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

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

### **Vendor Support Filing System**

For issues related to Intel, use the Intel IPS filing system:

<https://www.intel.com/content/www/us/en/design/support/ips/training/welcome.html>

For issues related to Red Hat Enterprise Linux, since it is a subscription based OS, contact your account representative.

## **6.9 Feedback**

Supermicro values your feedback as we strive to improve our customer experience in all facets of our business. Please email us at [techwriterteam@supermicro.com](mailto:techwriterteam@supermicro.com) to provide feedback on our manuals.

## 6.10 Contacting Supermicro

### Headquarters

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[Government\\_Sales-USA@supermicro.com](mailto:Government_Sales-USA@supermicro.com) (Gov. Sales Inquiries)  
[support@supermicro.com](mailto:support@supermicro.com) (Technical Support)  
[RMA@supermicro.com](mailto:RMA@supermicro.com) (RMA Support)  
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[Support@supermicro.com.tw](mailto:Support@supermicro.com.tw) (Technical Support)  
[RMA@supermicro.com.tw](mailto:RMA@supermicro.com.tw) (RMA Support)

Website: [www.supermicro.com.tw](http://www.supermicro.com.tw)

## Appendix A

# Standardized Warning Statements for AC Systems

### About Standardized Warning Statements

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

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

These warnings may also be found on our website at [http://www.supermicro.com/about/policies/safety\\_information.cfm](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 الزهز عْ خطر! تحذُرُ .  
 قبل اَي تعول على اَي هعدات، كي على علن بالوخاطز ال اُجوة عي الذوائر  
 الكهزبائِة  
 وكي على دراةُ بالووارسات النقااِة لو عْ وقع اَي حادث  
 استخدم رقن الب اِى الو صُص ف هاةُ كل تحذُرُ 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 (except for hot-swap components).



### 電源切断の警告

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

### 警告

在你打开机箱并安装或移除内部器件前,必须将系统完全断电,并移除电源线。

### 警告

在您打開機殼安裝或移除內部元件前，必須將系統完全斷電，並移除電源線。

### Warnung

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

### ¡Advertencia!

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

### Attention

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

انصل إلى امناطق انداخييت نههيكم نشييج 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 authorized personnel and qualified service persons 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

Nur autorisiertes Personal und qualifizierte Servicetechniker dürfen dieses Gerät installieren, austauschen oder warten..

¡Advertencia!

Sólo el personal autorizado y el personal de servicio calificado deben poder instalar, reemplazar o dar servicio a este equipo.

**Attention**

Seul le personnel autorisé et le personnel de maintenance qualifié doivent être autorisés à installer, remplacer ou entretenir cet équipement..

אזהרה!

יש לאפשר רק צוות מורשה ואנשי שירות מוסמכים להתקין, להחליף או לטפל בציוד זה.

ينبغي السماح فقط للموظفين المعتمدين وأفراد الخدمة المؤهلين بتركيب هذا الجهاز أو استبداله أو صيانته.

**경고!**

승인된 직원과 자격을 갖춘 서비스 담당자만이 이 장비를 설치, 교체 또는 서비스할 수 있습니다.

**Waarschuwing**

Alleen geautoriseerd personeel en gekwalificeerd onderhoudspersoneel mag deze apparatuur installeren, vervangen of onderhouden..

**Restricted Area**

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

**アクセス制限区域**

このユニットは、アクセス制限区域に設置されることを想定しています。

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

**警告**

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

**警告**

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

**Warnung**

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

**¡Advertencia!**

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

**Attention**

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

אזור עם גישה מוגבלת

אזהרה!

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

تخصيص هذه انحدة نترك بها ف مناطق محظورة تم .

،مكن انصلل إن منطقت محظورة فقط من خلال استخذاو أداة خاصت أو أ وس هُت أخري نلالأمما 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



**CAUTION:** There is risk of explosion if the battery is replaced by an incorrect type. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions

### 電池の取り扱い

バッテリーを間違ったタイプに交換すると爆発の危険があります。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

如果更换的电池类型不正确，则存在爆炸危险。请只使用同类电池或制造商推荐的功能相当的电池更换原有电池。请按制造商的说明处理废旧电池。

### 警告

如果更換的電池類型不正確，則有爆炸危險。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

Es besteht Explosionsgefahr, wenn die Batterie durch einen falschen Typ ersetzt wird. Ersetzen Sie die Batterie nur durch den gleichen oder vom Hersteller empfohlenen Batterietyp. Entsorgen Sie die benutzten Batterien nach den Anweisungen des Herstellers.

### ATTENTION

Il existe un risque d'explosion si la batterie est remplacée par un type incorrect. 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 riesgo de explosión si la batería se reemplaza por un tipo incorrecto. 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 אם הסוללה תוחלף בסוג שגוי. יש להחליף את הסוללה בסוג התואם מחברת יצרן מומלצת. סילוק הסוללות המשומשות יש לבצע לפי הוראות היצרן.

هناك خطر الانفجار إذا تم استبدال البطارية بنوع غير صحيح.  
 اسحبذال البطارية  
 فقط بنفس النوع أو ما يعادلها مما أوصت به الشركة المصنعة  
 جخلص من البطاريات المسحمة وفقا لعمليات الشركة الصانعة

경고!

배터리를 잘못된 종류로 교체하면 폭발의 위험이 있습니다. 기존 배터리와 동일하거나 제조사에서 권장하는 동등한 종류의 배터리로만 교체해야 합니다. 제조사의 안내에 따라 사용된 배터리를 처리하여 주십시오.

#### WAARSCHUWING

Er bestaat explosiegevaar als de batterij wordt vervangen door een verkeerd type. 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

此装置连接的电源可能不只一个，必须切断所有电源才能停止对该装置的供电。

Warnung

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

## ¡Advertencia!

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

## Attention

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

אם קיים יותר מספק אחד

אזהרה!

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

قد يكون لهذا الجهاز عدة اتصالات بوحدات امداد الطاقة .

يجب إزالة كافة الاتصالات لعسل الوحدة عن الكهرباء

## 경고!

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

## Waarschuwing

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

## Backplane Voltage



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

バックプレーンの電圧

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

修理する際には注意ください。

警告

当系统正在进行时，背板上有很危险的电压或能量，进行维修时务必小心。

警告

當系統正在進行時，背板上危險的電壓或能量，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 من التيار الكهربائي أو الطاقة المتجددة على اللوحة  
عندما يكون 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 instalación 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.

## 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 adaptors. Using any other cables and adaptors could cause a malfunction or a fire. Electrical Appliance and Material Safety Law prohibits the use of UL or CSA -certified cables (that have UL/CSA shown on the cord) for any other electrical devices than products designated by Supermicro only.

### 電源コードとACアダプター

製品を設置する場合、提供または指定および購入された接続ケーブル、電源コードとACアダプターを該当する地域の条例や安全基準に適合するコードサイズやプラグと共に使用下さい。他のケーブルやアダプタを使用すると故障や火災の原因になることがあります。

電気用品安全法は、ULまたはCSA認定のケーブル(UL/CSAマークがコードに表記)を Supermicro が指定する製品以外に使用することを禁止しています。

### 警告

安装此产品时,请使用本身提供的或指定的或采购的连接线,电源线和电源适配器。包含遵照当地法规和安全要求的合规的电源线尺寸和插头。使用其它线材或适配器可能会引起故障或火灾。除了Supermicro所指定的产品,电气用品和材料安全法律规定禁止使用未经UL或CSA认证的线材。(线材上会显示UL/CSA符号)。

### 警告

安裝此產品時,請使用本身提供的或指定的或採購的連接線,電源線和電源適配器。包含遵照當地法規和安全要求的合規的電源線尺寸和插頭。使用其它線材或適配器可能會引起故障或火災。除了Supermicro所指定的產品,電氣用品和材料安全法律規定禁止使用未經UL或CSA認證的線材。(線材上會顯示UL/CSA符號)。

### Warnung

Nutzen Sie beim Installieren des Produkts ausschließlich die von uns zur Verfügung gestellten Verbindungskabeln, Stromkabeln und/oder Adapter, die Ihre örtlichen Sicherheitsstandards einhalten. Der Gebrauch von anderen Kabeln und Adapter können Fehlfunktionen oder Feuer verursachen. Die Richtlinien untersagen das Nutzen von UL oder CAS zertifizierten Kabeln (mit UL/CSA gekennzeichnet), an Geräten oder Produkten die nicht mit Supermicro gekennzeichnet sind.

### ¡Advertencia!

Cuando instale el producto, utilice la conexión provista o designada o procure cables, Cables de alimentación y adaptadores de CA que cumplan con los códigos locales y los requisitos de seguridad, incluyendo el tamaño adecuado del cable y el enchufe. El uso de otros cables y adaptadores podría causar un mal funcionamiento o un incendio. La Ley de Seguridad de Aparatos Eléctricos y de Materiales prohíbe El uso de cables certificados por UL o CSA (que tienen el certificado UL / CSA en el código) para cualquier otros dispositivos eléctricos que los productos designados únicamente por Supermicro.

### Attention

Lors de l'installation du produit, utilisez les cables de connection fournis ou désigné ou achetez des cables, cables de puissance et adaptateurs respectant les normes locales et les conditions de securite y compris les tailles de cables et les prises electriques appropries. L'utilisation d'autres cables et adaptateurs peut provoquer un dysfonctionnement ou un incendie. Appareils électroménagers et la Loi sur la Sécurité Matériel interdit l'utilisation de câbles certifiés- UL ou CSA (qui ont UL ou CSA indiqué sur le code) pour tous les autres appareils électriques sauf les produits désignés par Supermicro seulement.

AC ימאתמו מיילמשח מילבכ

!הרהזא

ךרוצל ומאתוה וא ושכרנ רשא AC מימאתמו מיקפס, מילבכב שמתשהל שי, רצומה תא מיניקתמ רשאכ לכב שומיש . עקתהו לבכה לש הנוכח הדימ ללוכ, תוימוקמה תוחיטבה תושירדל ומאתוה רשאו, הנקתהה למשחה ירישכמב שומישה יקוחל מאתהב. ילמשח רצק וא הלקתל מורגל לולע, רחא גוסמ מאתמ וא לבכ לש דוק מהילע עיפומ רשאכ) UL-ב או CSA-ב -ב מיכמומה מילבכב שמתשהל רוסיא מייק, תוחיטבה יקוחו דבלב Supermicro י"ע מאתוה רשא רצומב קר אלא, רחא ילמשח רצומ לכ רובע (UL/CSA)

תאלבאלא אארשב מץ וא ענדחמלא וא ערפוטמלא תאליצוולא מאדחטסאב מץ, גתנמלא בייקרת דנע לכלז יפ אמב עילחמלא עמאלסלא תאבלטתמו נינאוץב מאזתלאלא עמ דדרתמלא ראיטלא תאלוחמו עיזאברמלא קיירח וא לטע יפ בבסטטי דץ ירזא תאלוחמו תאלבאלא יא מאדחטסא. מילסלא סבאלאו לטוולא מץ ח CSA וא UL לביק נמ ענדחמלא תאלבאלא מאדחטסא תאדעמלא עיזאברמלא עזחאלל עמאלסלא נונאק רזחי Supermicro לביק נמ ענדחמלא עינעמלא תאגתנמלא ריזא ירזא תאדעמ יא עמ (UL/CSA) עמאלע למחתיטלאו

### 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 B

## System Specifications

### Processor Support

Single Intel Xeon E-2400 and 12th Generation Pentium (V0 - LGA1700) processor with up to eight cores

### Chipset

Intel C262 PCH

### BIOS

256Mb SPI AMI® BIOS

### Memory

Up to 64 GB of DDR5 ECC UDIMM memory with speeds of up to 4800 MT/s in two DIMM slots

### Storage Drives

Four front hot-swappable 3.5" drive bays

Two internal fixed 2.5" drive bays

Two SlimSAS x4 connectors (2x PCIe 4.0 x4 or 1x PCIe 4.0 x4 + 4x SATA 6 Gb/s)

One M.2 socket (one M-key 2280 PCIe 4.0 x4)

### Motherboard

X13SCL-IF: 6.7" x 6.7" (193.04 x 193.04 mm)

### Chassis

CSE-721TS-350BP2; compact Mini-Tower, 9.45 x 8.27 x 11 in. / 240 x 210 x 279 mm (H x W x D)

### Backplane

BPN-NVME5-733N-S4: 4-port backplane supports up to 4x3.5" NVMe5/SATA3/SAS4 (this backplane sku is only available with the 2024H2 system version)

### System Cooling

One 12-cm rear exhaust fan

### PCI Expansion Slots

One PCIe 5.0 x16 slot (for one low-profile expansion card)

### Input/Output

One VGA port

One COM port

Two 1 GbE LAN ports (Intel i210)

One Dedicated IPMI LAN port

Two USB 3.2 Gen1 (5 Gbps) Type A ports (front)

Two USB 3.2 Gen1 (5 Gbps) Type A ports (rear)

Two USB 2.0 ports (rear)

### Power Supply

Model: PWS-353-1H (single 350 Watt power module, 80+ Gold level)

AC Input Voltages: 100-240 VAC

Rated Input Current:

Rated Input Frequency: 50-60 Hz

-12V: Max: 0.3A / Min: 0.05 A

+12V: Max: 28A / Min: 0.1 A

+5V: Max: 15A / Min: 0.2A

### Operating Environment

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

Non-operating Temperature: -30° to 60° C (-22° to 140° F)

Operating Relative Humidity: 8% to 80% (non-condensing)

Non-operating Relative Humidity: 8% to 90% (non-condensing)

**Regulatory Compliance**

FCC, ICES, CE, VCCI, RCM, NRTL, CB, UKCA

**Applied Directives, Standards**

Electromagnetic Compatibility Regulations 2016

FCC Part 15

ICES-003

VCCI-CISPR 32

AS/NZS CISPR 32

BS/EN 55032

BS/EN 55035

CISPR 32

CISPR 35

BS/EN 61000-3-2

BS/EN 61000-3-3

BS/EN 61000-4-2

BS/EN 61000-4-3

BS/EN 61000-4-4

BS/EN 61000-4-5

BS/EN 61000-4-6

BS/EN 61000-4-8

BS/EN 61000-4-11

Product Safety: 2014/35/EU (LVD Directive)

UL/CSA 62368-1 (USA and Canada)

Electrical Equipment (Safety) Regulations 2016

IEC/BS/EN 62368-1

Environment:

2011/65/EU (RoHS Directive)

EC 1907/2006 (REACH)

2012/19/EU (WEEE Directive)

Warning! This product can expose you to chemicals including lead, known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

**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)