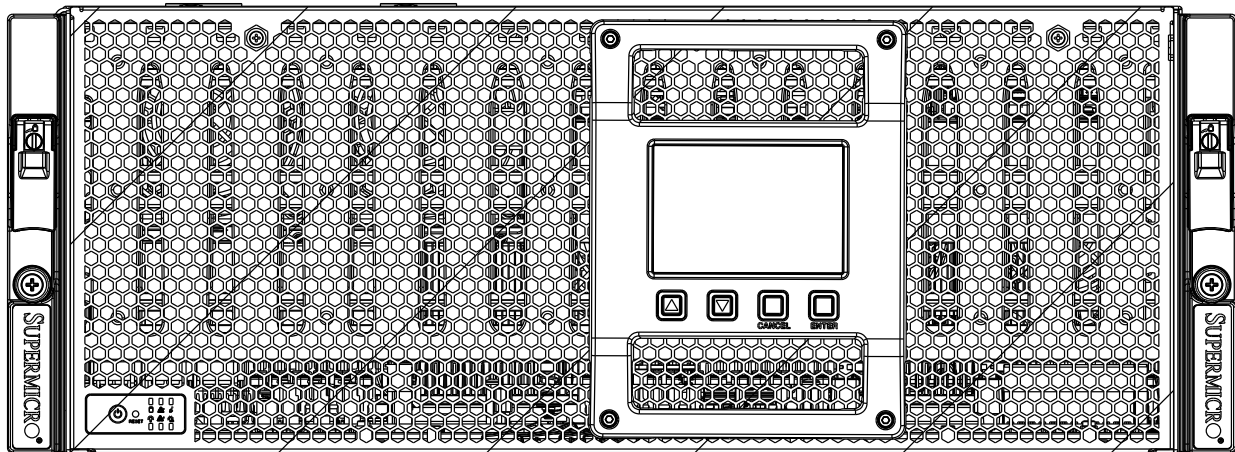




SuperServer[®]
6049P-E1CR45H
6049P-E1CR45L
6049P-E1CR45L+



USER'S MANUAL

Revision 1.0b

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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 SuperServer 6049P-E1CR45H/L/L+. Installation and maintenance should be performed by experienced technicians only.

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

Notes

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

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

If you have any questions, please contact our support team at:
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This manual may be periodically updated without notice. Please check the Supermicro website for possible updates to the manual revision level.

Warnings

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



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



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

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Appendix B Standardized Warning Statements for AC Systems

Appendix C System Specifications

Appendix D CPU-Based RAID for NVMe

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Chapter 1

Introduction

1.1 Overview

This chapter provides an outline of the functions and features of the 6049P-E1CR45H/L/L+ SuperStorage Server. This storage server is based on the X11DSC+ motherboard and the SC946LTS-R1K66P chassis.

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

Main Parts List		
Description	Part Number	Quantity
HDD/SDD Backplane	BPN-SAS3-946LEL1	1
Expander Backplane	BPN-SAS3-826TQ	1
Fans	FAN-0184L4	5
Passive Heatsink	SNK-P0068PS	2
HDD Drive Carriers	MCP-220-94601-0N	45
SAS3 ROC Mezzanine Card (6049P-E1CR45H)	AOM-S3108M-H8L-P	1
SAS3 HBA Mezzanine Card (6049P-E1CR45L)	AOM-S3008M-L8-P	1
SAS3 HBA Mezzanine Card (6049P-E1CR45L+)	AOM-S3616-L	1
Rackmount Rail Kit	MCP-290-00150-0N	1 set
Cable Management Arm	MCP-290-00133-0N	1

1.2 Unpacking the System

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

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

1.3 System Features

The following table provides an overview of the main features of the system.

System Features
Motherboard
X11DSC+
Chassis
SC946LTS-R1K66P
CPU
Dual Intel Xeon 81xx/61xx/51xx/41xx/31xx series or 82xx/62xx/52xx/42xx/32xx series processors (LGA 3647) processors, which offer three Intel® UltraPath Interconnect (UPI) of up to 10.4 GT/s. Note: Both CPUs need to be installed for full access to the PCI-E slots, DIMM slots, and onboard controllers. Refer to the block diagram on page 17 to determine which slots or devices may be affected.
Chipset
Intel C621
Memory
Up to 6TB 3DS ECC RDIMM/LRDIMM to speeds of DDR4-2933MHz in 24 DIMM slots (82xx/62xx/52xx/42xx/32xx series processors)
Expansion Slots
One PCI-E 3.0 x8 slot Two PCI-E 3.0 x16 slots One PCI-E 3.0 x8 slot for AOM (Add-on-Module)
Storage Drives
Up to forty-five 3.5" hot-swap drives as main storage (or 2.5" drives with included adapters) and two 2.5" hot-swap drives at the chassis rear. Optional six NVMe drives supported.
Power
1600W, redundant power supply (PWS-1K66P-1R)
Form Factor
4U rackmount
Dimensions
(WxHxD) 17.2 x 7 x 26 in. (437 x 178 x 660 mm)

1.4 Server Chassis Features

The SC946LTS-R1K66P is a 4U chassis.

Control Panel

The switches and LEDs located on the control panel are described below.

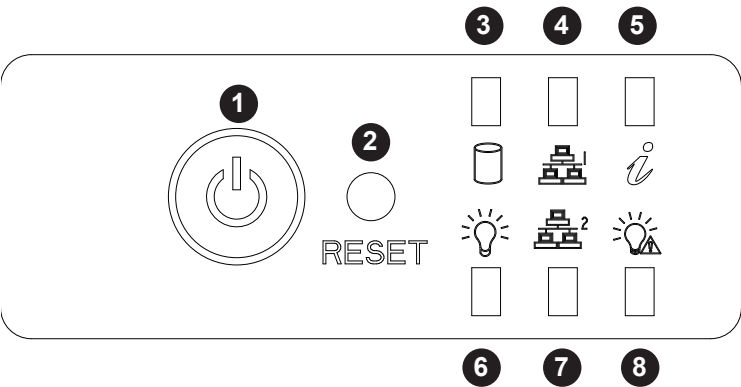


Figure 1-1. Control Panel View

Control Panel Features		
Item	Feature	Description
1	Power button	The main power switch applies or removes primary power from the power supply to the server but maintains standby power.
2	Reset button	Reboots the system.
3	HDD LED	Indicates hard drive activity when flashing.
4	NIC1 LED	Indicates network activity on the LAN1 port when flashing.
5	Information LED	See table below.
6	Power LED	Indicates power is being supplied to the system by the power supply units.
7	NIC2 LED	Indicates network activity on the LAN2 port when flashing.
8	Power Fail LED	Indicates a power supply module has failed.

Information LED	
Status	Description
Continuously on and red	An overheat condition has occurred. (This may be caused by cable congestion.)
Blinking red (1Hz)	Fan failure, check for an inoperative fan.
Blinking red (0.25Hz)	Power failure, check for a non-operational power supply.
Solid blue	Local UID has been activated. Use this function to locate the server in a rack mount environment.
Blinking blue	Remote UID is on. Use this function to identify the server from a remote location.

Front Features

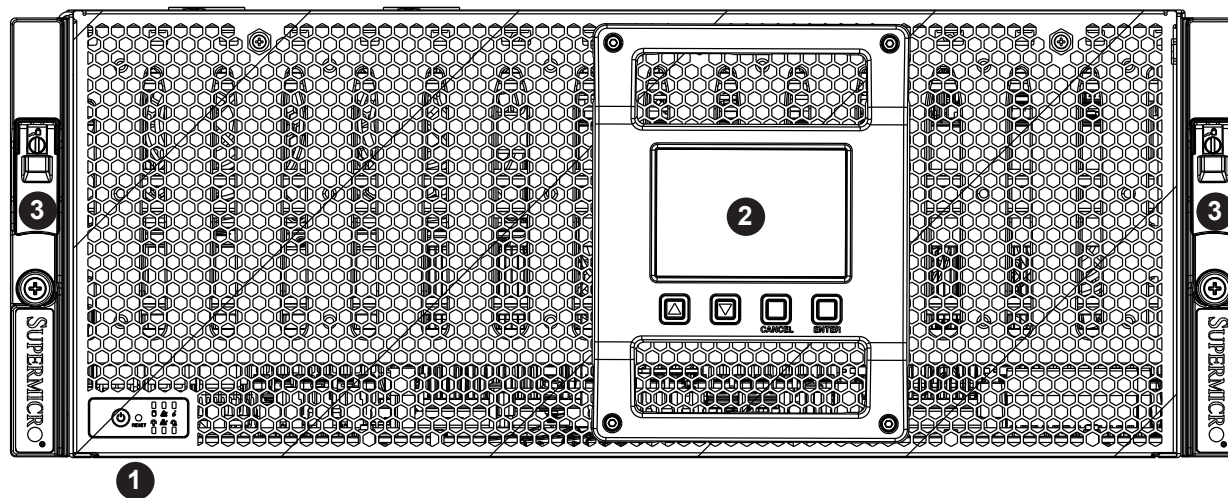


Figure 1-2. Chassis Front View

Front Chassis Features		
Item	Feature	Description
1	Control Panel	Described on the previous page
2	LCD Screen	Displays system information
3	Chassis Release Levers	To slide the system out of the rack

Rear Features

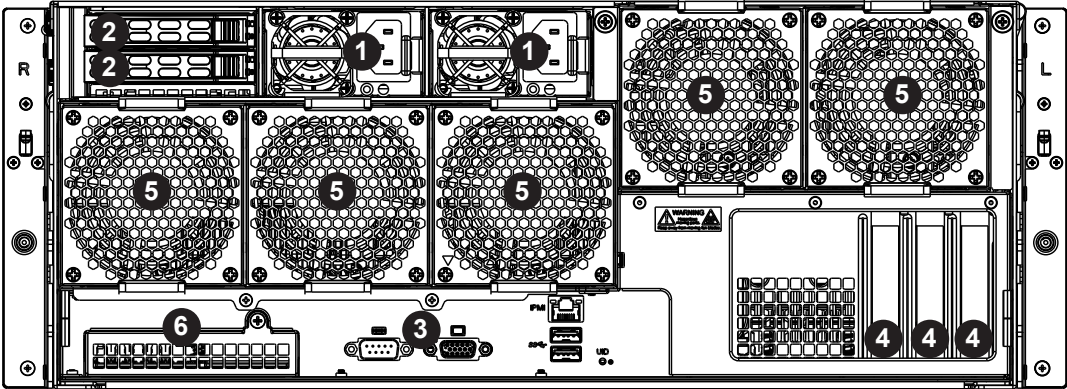


Figure 1-3. Chassis Rear View

Rear Chassis Features		
Item	Feature	Description
1	Power Supply Module	1600W power supply (redundant, with two power modules)
2	2.5" Drive Bays	Two rear mounted 2.5" hot-swap drive bays
3	I/O Ports	I/O ports (see Section 4.3 for details)
4	PCI Slots	Three low-profile PCI slots for add-on cards
5	Fan	8-cm exhaust fan
6	Network Ports	GbE LAN Ports

1.5 Motherboard Layout

Below is a layout of the X11DSC+ 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.

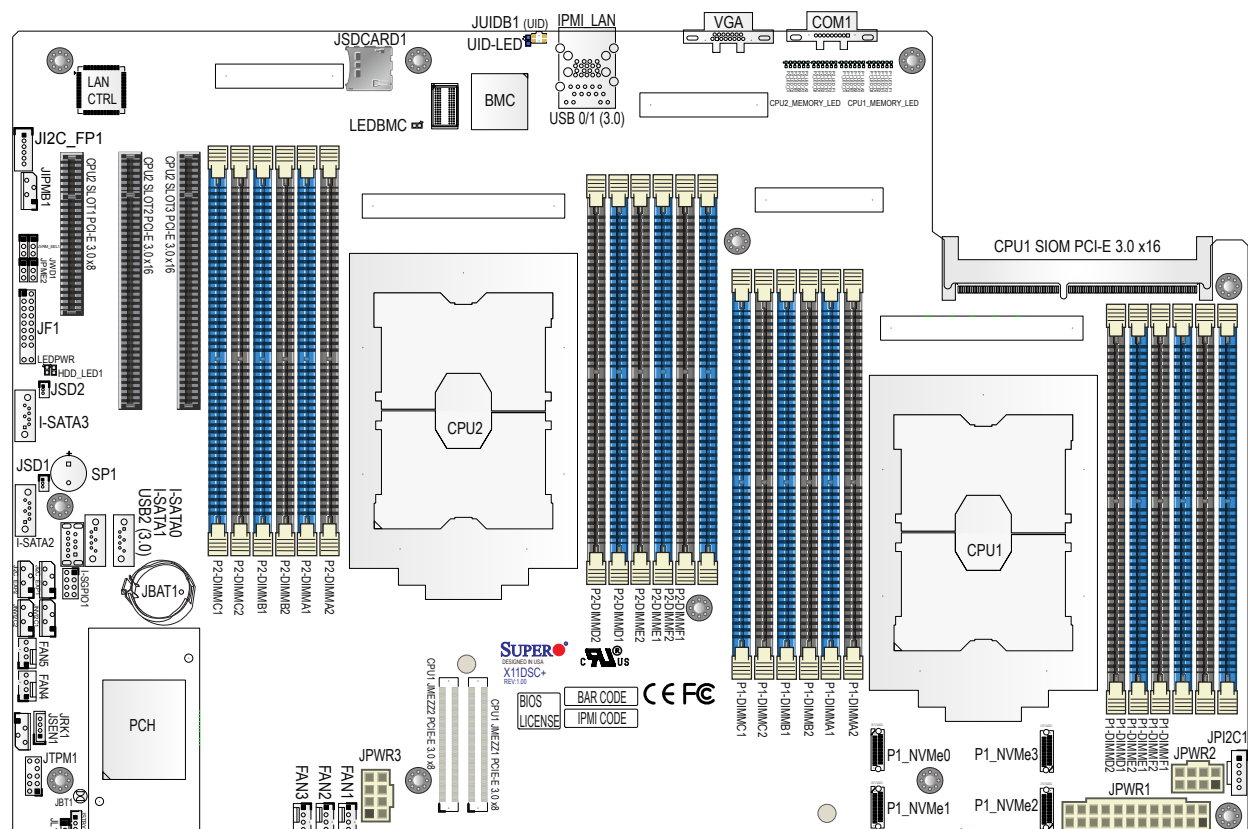


Figure 1-4. Motherboard Layout

Notes:

- See Chapter 4 for detailed information on jumpers, I/O ports, and JF1 connections.
- "1" indicates the location of pin 1.
- Jumpers/components/LED indicators not indicated are used for internal testing only.
- Use only the correct type of onboard CMOS battery, as specified by the manufacturer. In order to avoid possible explosion, do not install the onboard battery upside down.

Quick Reference Table

Jumper	Description	Default Setting
JBT1	CMOS Clear	Open (Normal)
JPME2	Manufacturing Mode Select	Pins 1-2 (Normal)
JVRM_SEL1	VRM SMBus Clock (to BMC or PCH)	Pins 1-2 (BMC, Normal)
JWD1	Watch Dog Timer Enable	Pins 1-2 (Enabled, Reset)
Connector	Description	
COM1	Back panel COM port	
FAN1-5	System cooling fan headers	
IPMI_LAN	Dedicated IPMI LAN port	
I-SATA0-3	SATA 3.0 connection header supported by the Intel® PCH	
I-SATA2/I-SATA3	I-SATA Ports with built-in power pins and with support of Supermicro SuperDOM (Disk On Module) devices	
I-SGPIO1	Serial Link General Purpose I/O Header	
JBAT1	Onboard CMOS battery socket	
JF1	Front Control Panel header	
JI2C_EXP1/2	System Management Bus (SMBus) I2C for SAS3 backplanes	
JI2C_FP1	System Management Bus (SMBus) I2C for LCD devices	
JIPMB1	4-pin BMC External I ² C header (for an IPMI-supported card)	
JL1	Chassis Intrusion header	
(CPU1) JMEZZ1/JMEZZ2 PCI-E	PCI-Express 3.0 x8 Add-On-Module (AOM) slot from CPU1 for mezzanine card support	
JNVI ² C1/JNVI ² C2	NVMe SMBus (I ² C) headers used for PCI-E hot-plug SMBus clock & data connections (an SMCI-proprietary NVMe add-on card and cable are required; available for a Supermicro complete system only)	
JPI ² C1	Power Supply SMBus I ² C header	
JPWR2/JPWR3	8-pin Power Supply connectors	
JPWR1	24-pin ATX main power supply connector	
JRK1	Intel® RAID Key header for NVMe SSD	
JSD1/JSD2	SATA DOM Power Connectors 1/2	
JSDCARD1	Micro SD Card Slot (reserved by manufacturer)	
JSEN1	Inlet Sensor Header	
JSTBY1	Standby power header	
JTPM1	Trusted Platform Module (TPM)/Port 80 connector	
P1_NVMe0-3	NVM Express PCI-E 3.0 x4 ports (ports 0-3) supported by CPU1	
(CPU1) SIOM PCI-E	PCI-Express 3.0 x16 slot from CPU1 for Supermicro SIOM add-on module support	
(CPU2) SLOT1	PCI-Express 3.0 x8 Slots supported by CPU2	
(CPU2) SLOT2/SLOT3	PCI-Express 3.0 x16 Slot supported by CPU2	
SP1	Internal Speaker/Buzzer	
UID	Unit Identifier (UID) Switch	
USB0/1	Back panel USB 3.0 Ports	

Connector	Description	
USB2	Type A USB 3.0 Header	
VGA	VGA Port	
LED	Description	Status
HDD_LED1	HDD LED	Green: On: HDD Normal
LEDBMC	BMC Heartbeat LED	Blinking Green: BMC normal
LEDPWR	Onboard Power LED	On: Onboard power on
UID-LED	UID (Unit Identifier) LED	Solid Blue: Unit identified
Memory LED	Description	Status
P1_LED_A1	CPU1_Memory_Fault_LED for DIMMs A1	Red On: Memory Failure
P1_LED_A2	CPU1_Memory_Fault_LED for DIMMs A2	Red On: Memory Failure
P1_LED_B1	CPU1_Memory_Fault_LED for DIMMs B1	Red On: Memory Failure
P1_LED_B2	CPU1_Memory_Fault_LED for DIMMs B2	Red On: Memory Failure
P1_LED_C1	CPU1_Memory_Fault_LED for DIMMs C1	Red On: Memory Failure
P1_LED_C2	CPU1_Memory_Fault_LED for DIMMs C2	Red On: Memory Failure
P1_LED_D1	CPU1_Memory_Fault_LED for DIMMs D1	Red On: Memory Failure
P1_LED_D2	CPU1_Memory_Fault_LED for DIMMs D2	Red On: Memory Failure
P1_LED_E1	CPU1_Memory_Fault_LED for DIMMs E1	Red On: Memory Failure
P1_LED_E2	CPU1_Memory_Fault_LED for DIMMs E2	Red On: Memory Failure
P1_LED_F1	CPU1_Memory_Fault_LED for DIMMs F1	Red On: Memory Failure
P1_LED_F2	CPU1_Memory_Fault_LED for DIMMs F2	Red On: Memory Failure
P2_LED_A1	CPU2_Memory_Fault_LED for DIMMs A1	Red On: Memory Failure
P2_LED_A2	CPU2_Memory_Fault_LED for DIMMs A2	Red On: Memory Failure
P2_LED_B1	CPU2_Memory_Fault_LED for DIMMs B1	Red On: Memory Failure
P2_LED_B2	CPU2_Memory_Fault_LED for DIMMs B2	Red On: Memory Failure
P2_LED_C1	CPU2_Memory_Fault_LED for DIMMs C1	Red On: Memory Failure
P2_LED_C2	CPU2_Memory_Fault_LED for DIMMs C2	Red On: Memory Failure
P2_LED_D1	CPU2_Memory_Fault_LED for DIMMs D1	Red On: Memory Failure
P2_LED_D2	CPU2_Memory_Fault_LED for DIMMs D2	Red On: Memory Failure
P2_LED_E1	CPU2_Memory_Fault_LED for DIMMs E1	Red On: Memory Failure
P2_LED_E2	CPU2_Memory_Fault_LED for DIMMs E2	Red On: Memory Failure
P2_LED_F1	CPU2_Memory_Fault_LED for DIMMs F1	Red On: Memory Failure
P2_LED_F2	CPU2_Memory_Fault_LED for DIMMs F2	Red On: Memory Failure

System Block Diagram

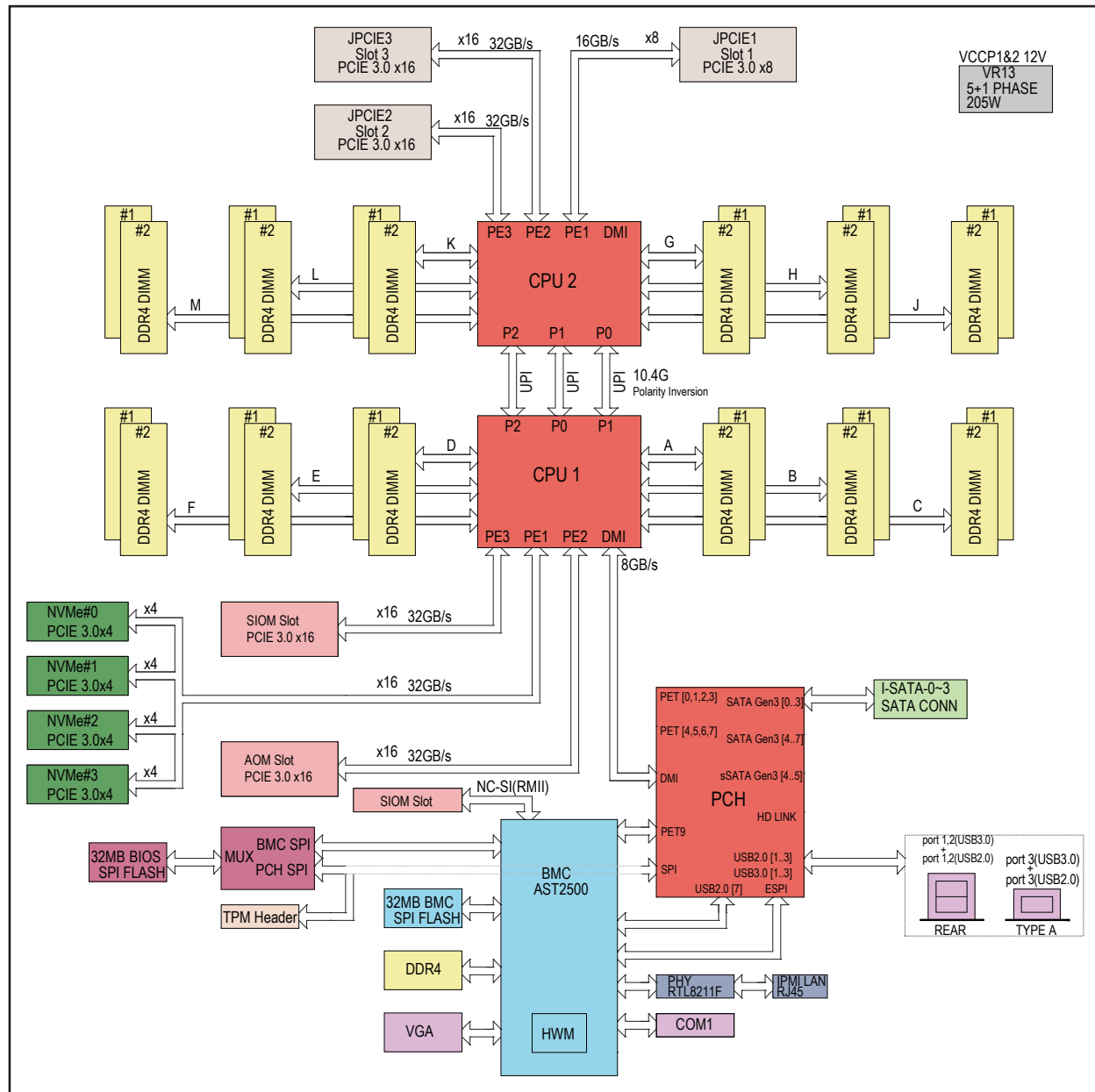


Figure 1-5. Intel C621 Chipset: System Block Diagram

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

Chapter 2

Server Installation

2.1 Overview

This chapter provides advice and instructions for mounting your system in a server rack. If your system is not already fully integrated with processors, system memory etc., refer to Chapter 4 for details on installing those specific components.

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

2.2 Preparing for Setup

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

Choosing a Setup Location

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

Rack Precautions

- Ensure that the leveling jacks on the bottom of the rack are extended to the floor so that the full weight of the rack rests on them.

- In single rack installations, stabilizers should be attached to the rack. In multiple rack installations, the racks should be coupled together.
- Always make sure the rack is stable before extending a server or other component from the rack.
- You should extend only one server or component at a time - extending two or more simultaneously may cause the rack to become unstable.

Server Precautions

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

Rack Mounting Considerations

Ambient Operating Temperature

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

Airflow

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

Mechanical Loading

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

Circuit Overloading

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

Reliable Ground

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



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

- This unit should be mounted at the bottom of the rack if it is the only unit in the rack.
- When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.
- Slide rail mounted equipment is not to be used as a shelf or a work space.
- In any instance of pulling the system from the rack, always use a rack lift and follow all associated safety precautions.

2.2 Installing the Rails

There are a variety of rack units on the market, which may require a slightly different assembly procedure. Do not use a two post "telco" type rack. This rail set fits a rack between 26.5" and 36.4" deep.

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

Identifying the Rails

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

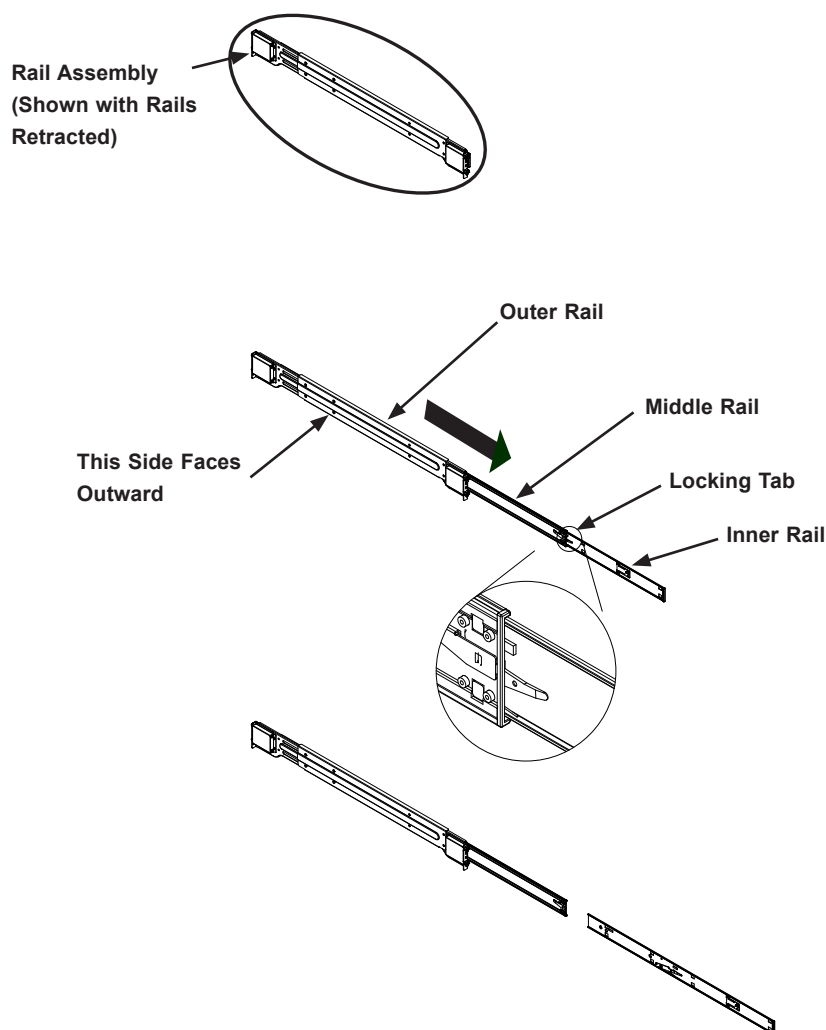


Figure 2-1. Identifying the Outer Rail, Middle Rail and Inner Rail
(Left Rail Assembly Shown)

Releasing the Inner Rail

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

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

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

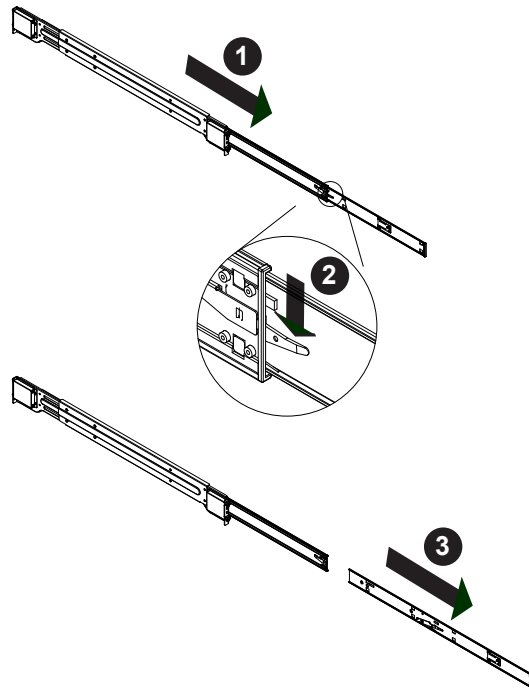


Figure 2-2. Extending and Releasing the Inner Rail

Installing the Inner Rails

Begin the rack mounting procedure by installing the inner rails to the chassis.

1. Identify the left and right inner rails. They are labeled.
2. Place the inner rail firmly against the side of the chassis, aligning the mushroom posts on the side of the chassis with the holes in the inner rail.
3. Slide the inner rail forward toward the front of the chassis and under the posts until the quick release bracket snaps into place, securing the rail to the chassis.
4. If desired, secure the rail with a locking screw.

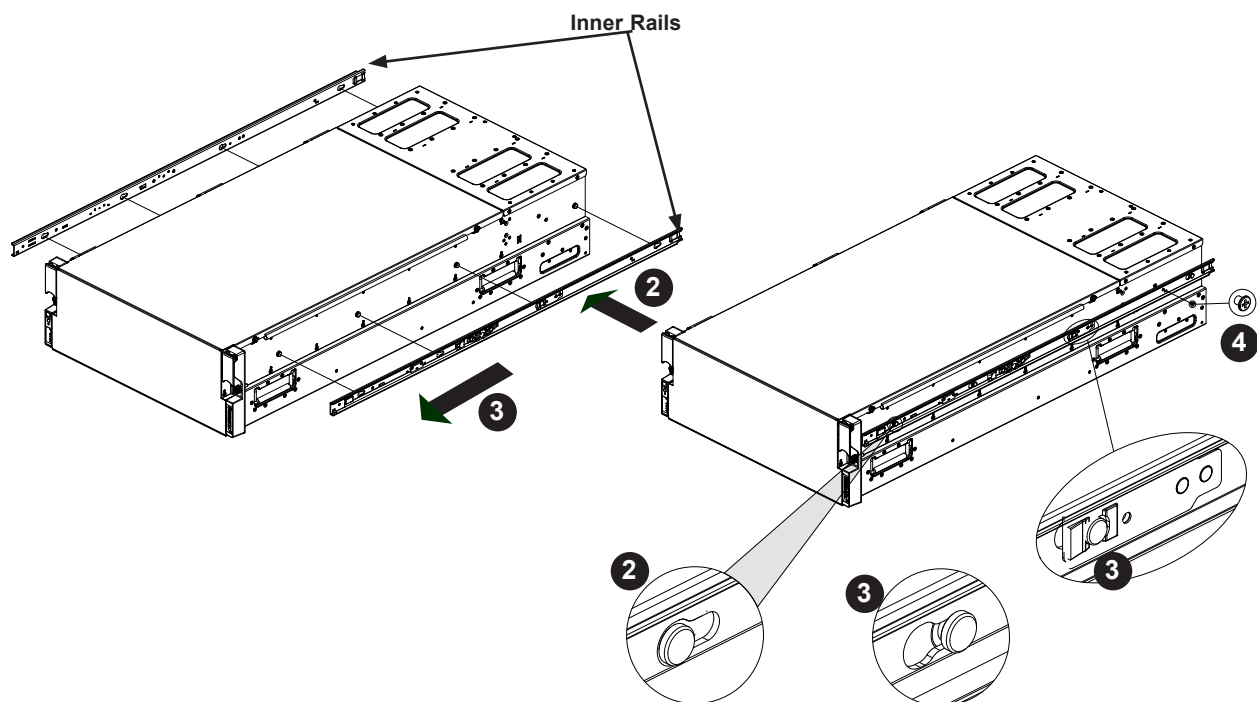


Figure 2-3. Installing the Rails



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

Installing the Outer Rails onto the Rack

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

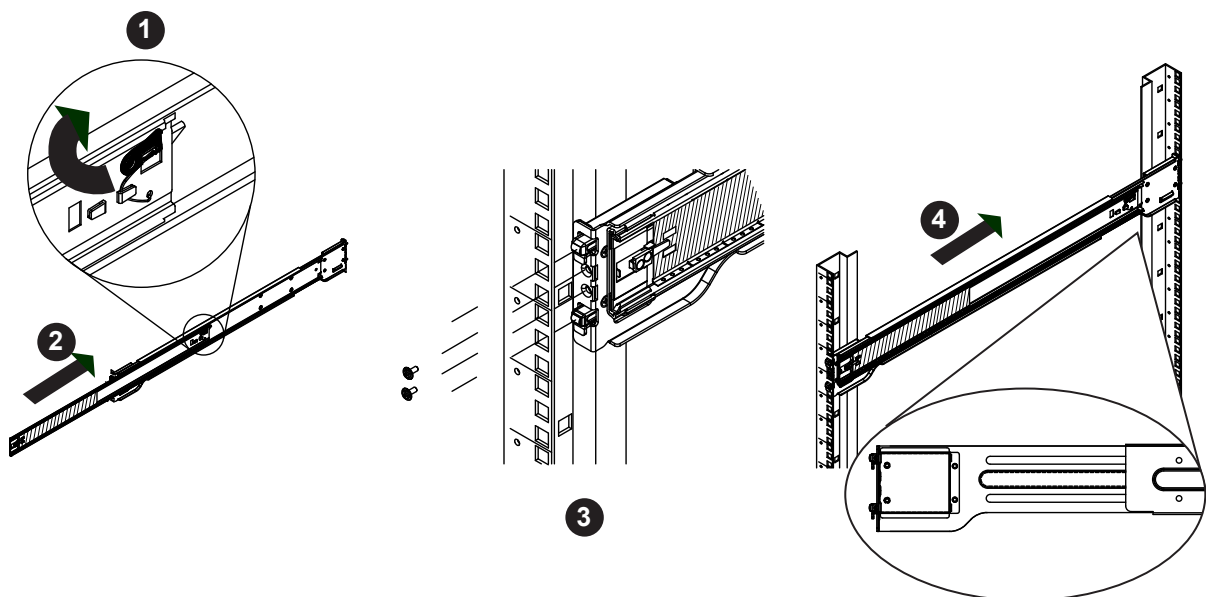


Figure 2-4. Extending and Mounting the Outer Rails

Adapters for Round and Threaded Hole Racks

The chassis includes adapter brackets for those customers using round hole racks or racks with threaded holes size M5 or larger.

Installing the Outer Rails with Adapter Brackets

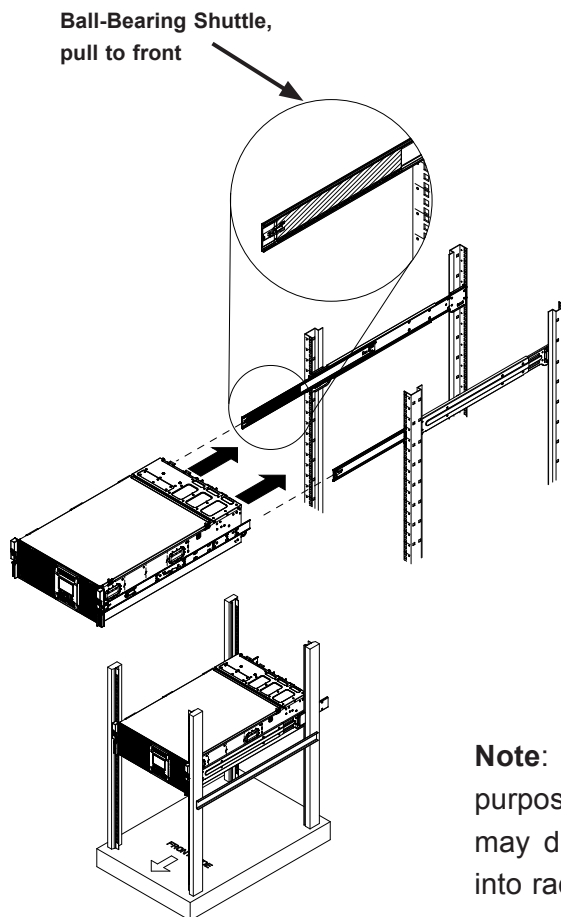
1. Place the hooks of the front of the outer rail into the square holes of one of the adapter brackets.
2. Place the hooks of the rear of the outer rail into the square holes of a second adapter bracket.
3. Adjust the length of the outer rail to fit within the rack uprights.
4. Secure the front adapter bracket to the front of the rack using the screws recommended by the rack manufacturer.
5. Secure the rear adapter bracket to the rear of the rack in the same manner.

2.3 Installing the Chassis into a Rack

After the rails are installed on the chassis and on the rack, the server can be installed in the rack. It is heavy and requires two to three people or a lift.

Installing the Chassis into a Rack

1. Pull both middle rails out the front of the outer rail until each clicks to a stop.
2. Align the inner rails on the chassis with the front of the middle rails.
3. Slide the inner rails on the chassis into the middle rails, keeping the pressure even on both sides. When partially in, the locking levers will stop further progress.
4. Press down the locking levers on the inside of the inner rails and push the chassis all the way into the rear of the rack. The front latches will click into place.



Note: Figures are for illustrative purposes only. Your actual chassis may differ. Always install servers into racks from the bottom up.

Figure 2-5. Installing the Chassis into the Rack



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

Removing the Chassis from the Rack



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

1. Lift the release levers and pull the chassis out the front of the rack until it stops.
2. Press the release latches on each of the inner rails downward simultaneously and continue to pull the chassis completely out of the rack.

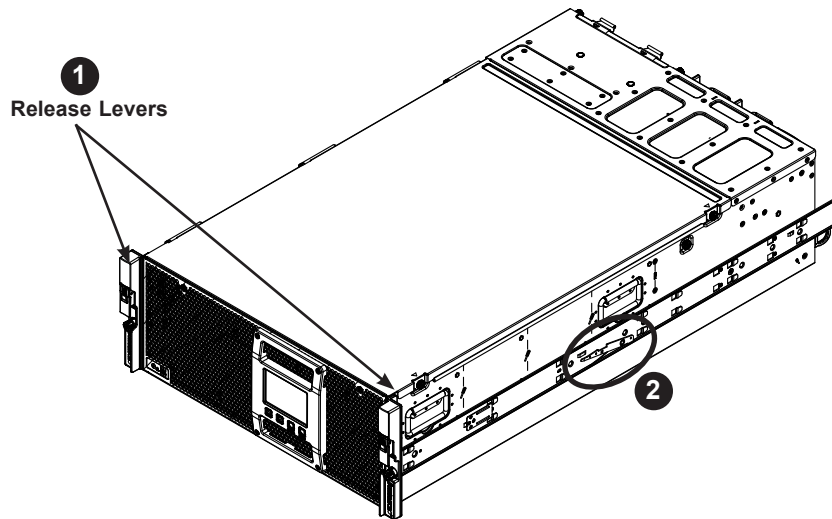


Figure 2-6. Removing the Chassis From the Rack



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

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

2.4 Optional Quick Installation Method

The following quick installation method may be used to install the chassis to a rack.

Installing the Chassis into a Rack

1. Install the whole rail assembly into the rack in a manner similar to that described in the previous section, "Installing the Outer Rails onto the Rack."
2. Fully extend the inner rails.
3. Using a lift, carefully align the chassis between the inner rails.
4. Install the inner rails on the chassis in a manner similar to that described in the previous section, "Installing the Inner Rails."

2.5 Installing the Cable Management Arm

The SC946LTS chassis supports a cable management arm (CMA) that keeps the rear cables organized and clear of the rail mechanisms when the system is extended out the front of the rack for maintenance. The kit includes six fabric Velcro cable ties.

The CMA attaches to the rack mounting rails by means of four connectors. They are labeled on the connectors 1, 2, 3, and 4.

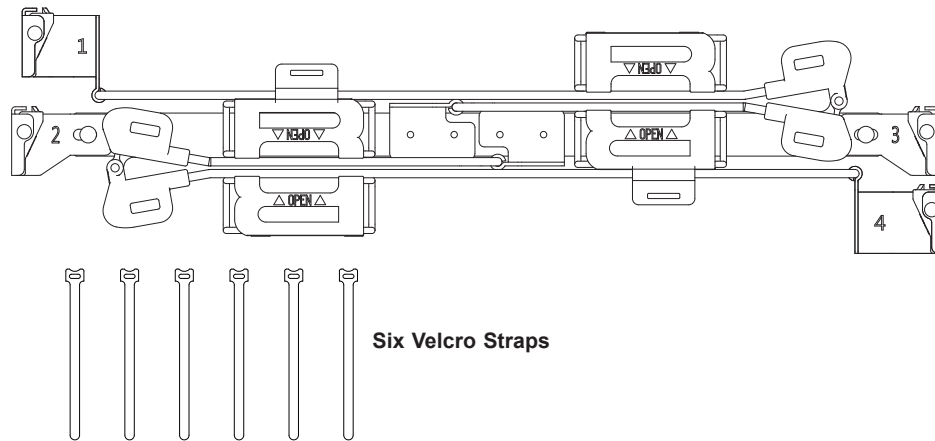


Figure 2-7. Cable Managment Arm and Velcro Straps

Installing the Cable Management Arm

1. Slide CMA connector #1 forward onto the two posts on the rear of the right inner rail (right side when viewed from the front). It snaps into place.
2. Slide CMA connector #2 forward onto the two posts on the rear of the right middle rail. It snaps into place.

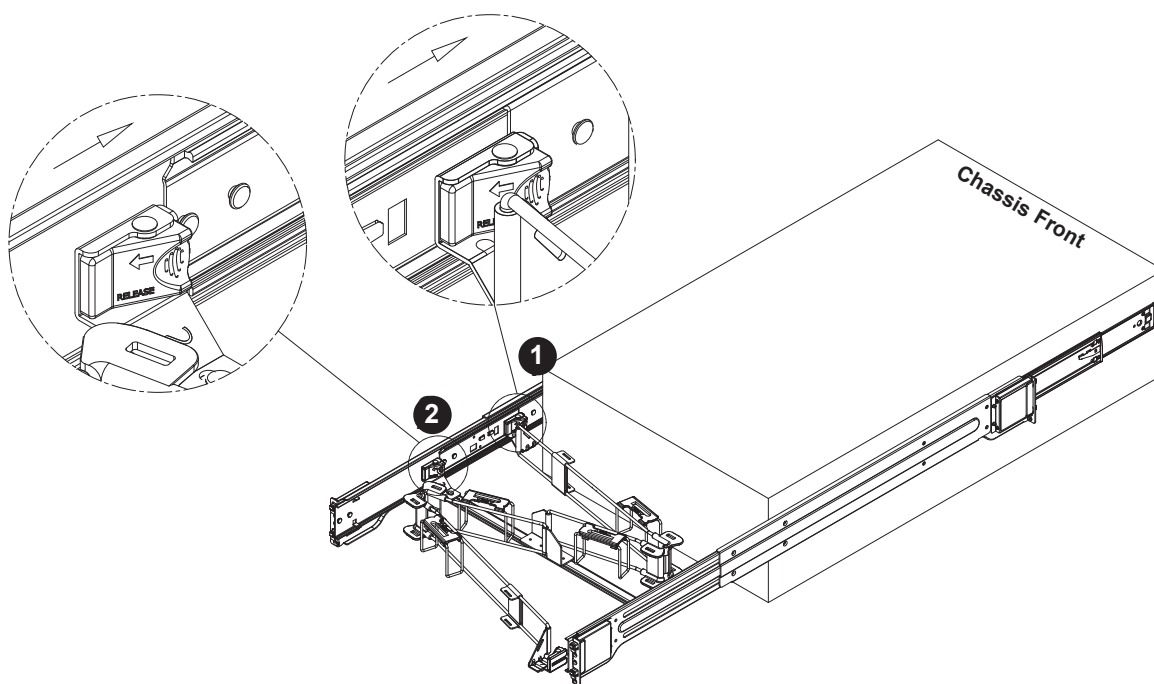


Figure 2-8. Installing the Connectors 1 and 2

3. Slide CMA connector #3 forward onto the two posts on the rear of the left middle rail. It snaps into place.
4. For CMA connector #4, align the metal tabs with the slots on the rear of the left outer rail and push it forward. It snaps into place.

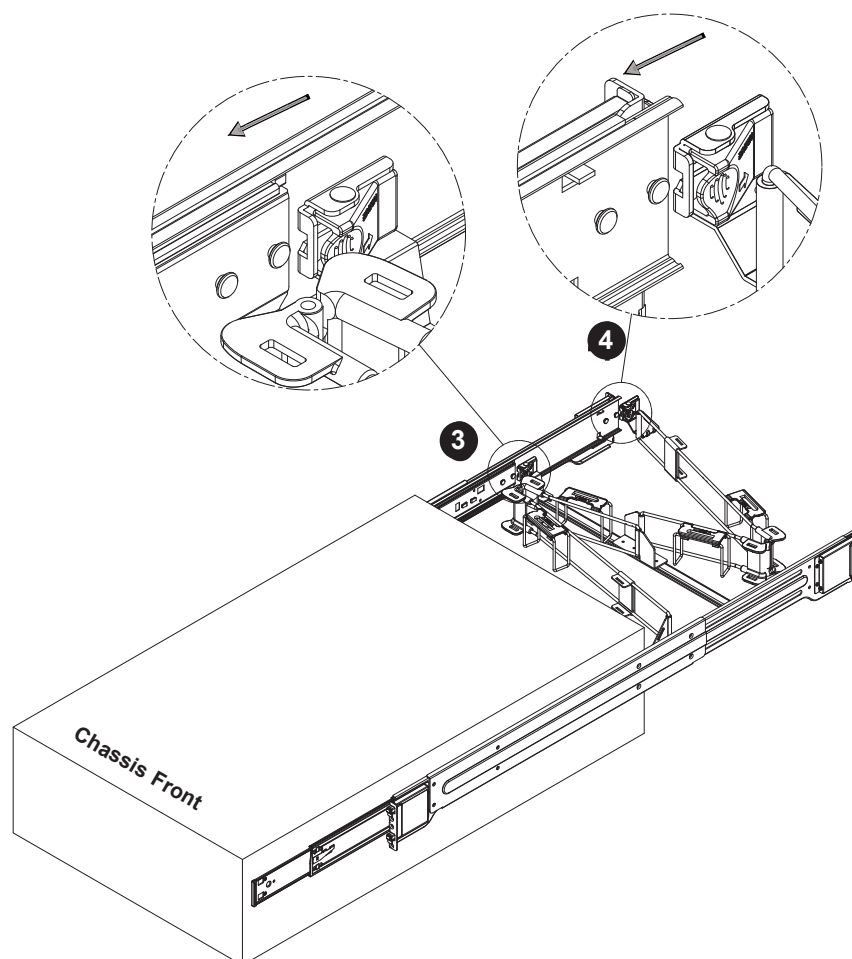


Figure 2-9. Intalling the Connectors 3 and 4

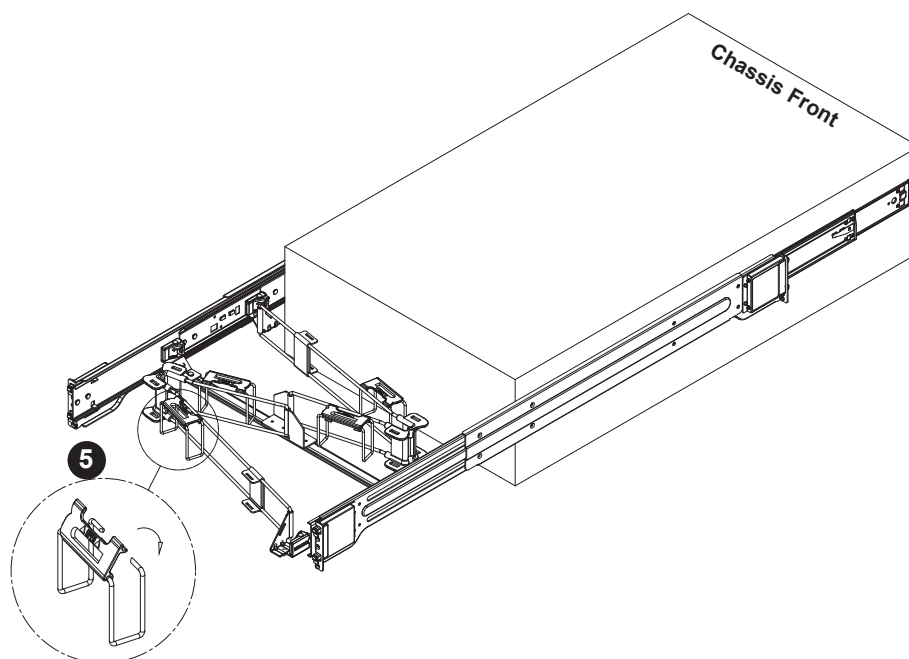


Figure 2-10. Routing the Cables

5. Open the four red plastic caps and route the cables into the wire carrier.
6. If necessary, adjust the U-brackets to clear chassis components.

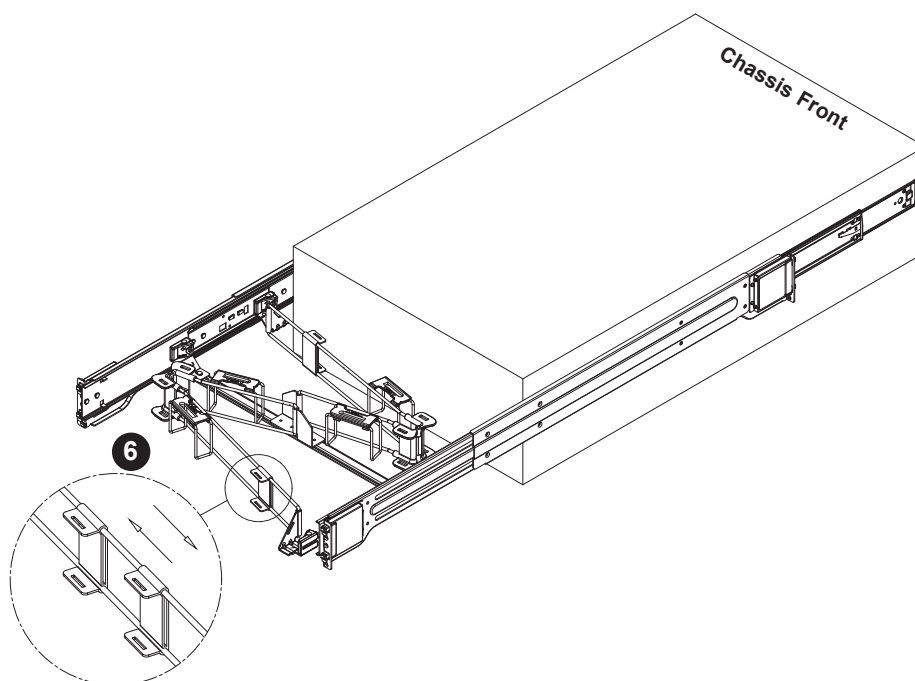


Figure 2-11. Adjusting the U-Brackets

7. Use the six Velcro straps to secure the cables to the CMA. Use a strap on either side of each joint and one on each U-bracket, inserting it through the slot on the bracket.
8. Slide the chassis forward and backward in the rack to confirm that the cable management arm is operating smoothly. If necessary, loosen the straps for smoother movement.

If at some time you must remove the cable management arm, follow this procedure.

Removing the Cable Management Arm

1. Remove cables from the CMA, releasing the Velcro straps and the red plastic caps.
2. For CMA connector #4, pull the metal release tab toward the center of the rack and slide the connector toward the rear to release it.
3. For CMA connectors #3, #2, and #1, depress the front edge of the yellow plastic rocker lock, and slide the connector toward the rear to release it.

Chapter 3

Maintenance and Component Installation

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

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

3.1 Removing Power

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

1. Use the operating system to power down the system.
2. After the system has completely shut-down, disconnect the AC power cord(s) from the power strip or outlet. (If your system has more than one power supply, remove the AC power cords from all power supply modules.)
3. Disconnect the power cord(s) from the power supply module(s).

3.2 Accessing the System

Accessing the Motherboard

After the system is assembled by the manufacturer, the motherboard tray can be extended no more than two inches, due to the internal cabling. Only approved Supermicro technicians should remove the tray.

To install or replace components, such as PCI expansion cards or memory, open the storage compartment cover, remove any fans that are in the way, and possibly remove the small top cover/air shroud assembly. Fan removal is described later in this chapter.

Accessing the Storage Drives

To access the storage drives, pull the system out of the rack, remove the two thumb screws on the right side of the chassis and lift. The cover is designed to open about 100 degrees and support itself in that position.

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

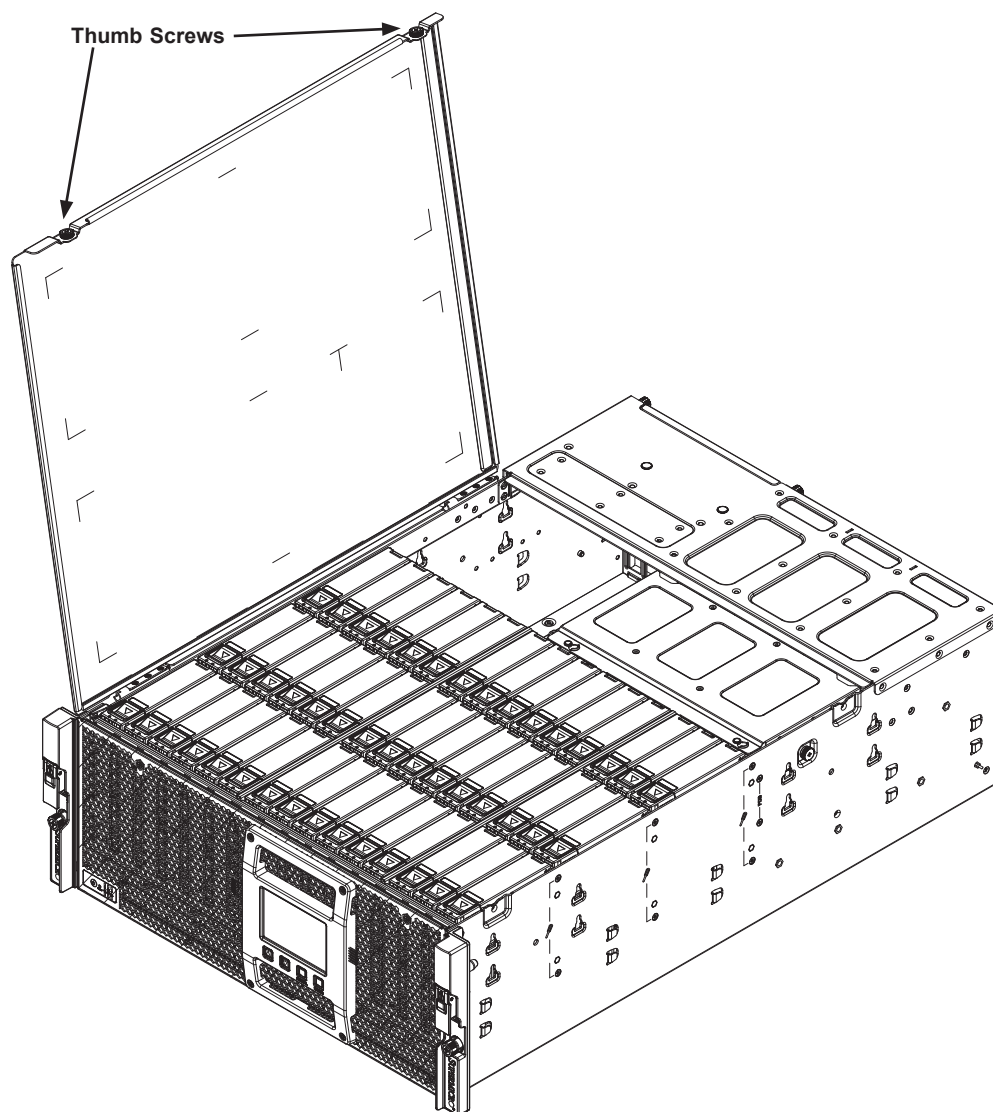


Figure 3-1. Opening the Storage Compartment Cover

Removing the Small Top Cover/Air Shroud Assembly

1. Open the storage compartment cover.
2. Remove both power supply modules.
3. Remove the thumb screw midway on the right side of the chassis.
4. Lift off the cover.

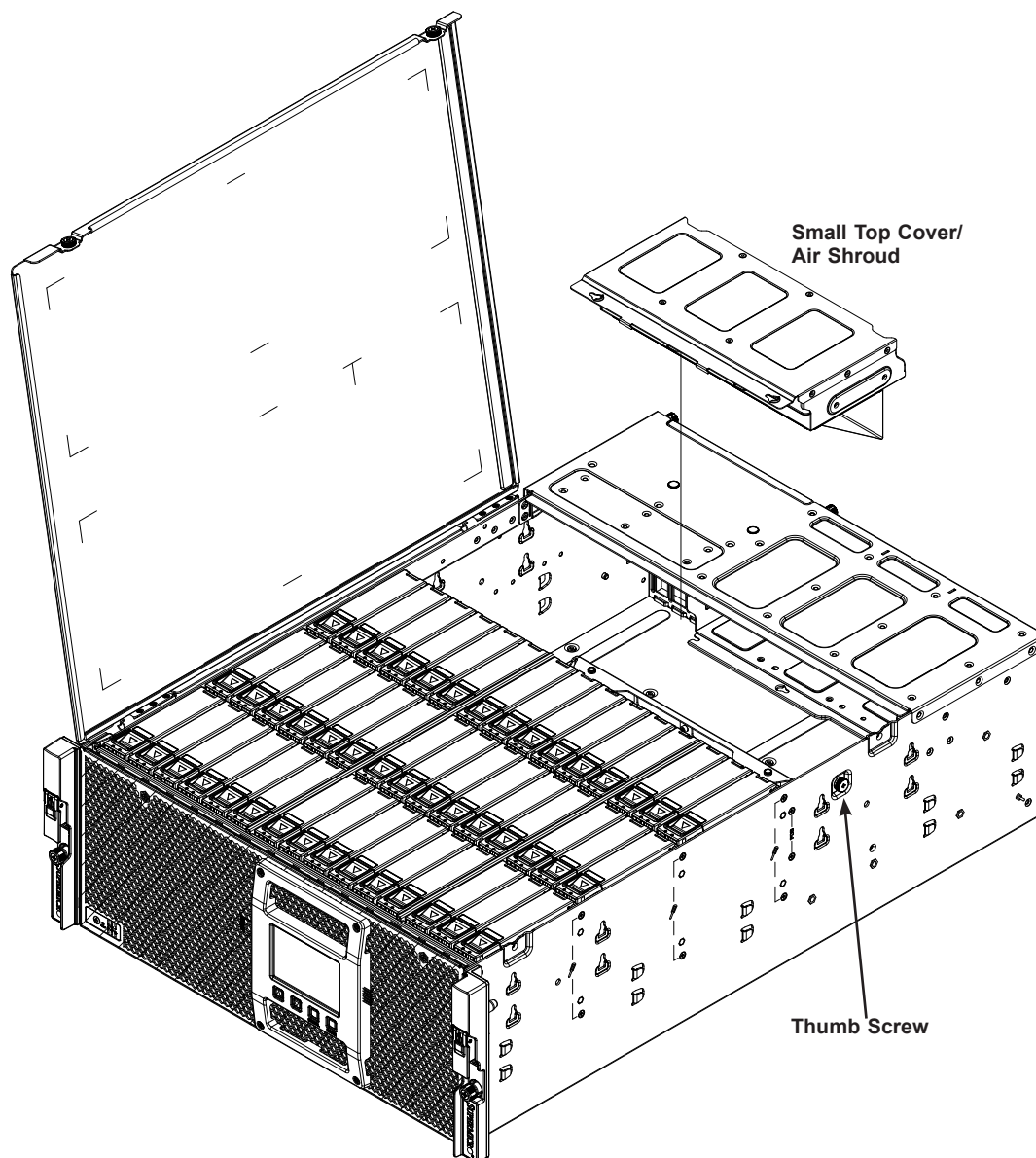


Figure 3-2. Removing the Small Top Cover/Air Shroud Assembly

3.3 Motherboard Components

Processor and Heatsink Installation

This server is sold with the CPU and heatsink installed. Only approved Supermicro technicians should perform maintenance.

Memory

Memory Support

The 6049P-E1CR45H/L/L+ supports up to 6TB 3DS ECC RDIMM/LRDIMM to speeds of DDR4-2933MHz in 24 DIMM slots (82xx/62xx/52xx/42xx/32xx series processors) or Non-Volatile DIMM (NVDIMM) modules in 24 slots.

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

DDR4 Memory Support for One Slot per Channel					
Type	Ranks Per DIMM and Data Width	DIMM Capacity (GB)		Speed (MT/s)	
				One Slot per Channel	
				One DIMM per Channel	
		4 Gb	8 Gb	1.2 Volts	
RDIMM	SRx4	8 GB	16 GB	2666	
	SRx8	4 GB	8 GB	2666	
	DRx8	8 GB	16 GB	2666	
	DRx4	16 GB	32 GB	2666	
RDIMM 3Ds	QRX4	N/A	2H-64GB	2666	
	8RX4	N/A	4H-128GB	2666	
LRDIMM	QRx4	32 GB	64 GB	2666	
LRDIMM 3Ds	QRX4	N/A	2H-64GB	2666	
	8Rx4	N/A	4H-128 GB	2666	

Memory Population Guidelines

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

Guidelines Regarding Mixing DIMMs

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

DIMM Construction

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

Memory Population Sequence

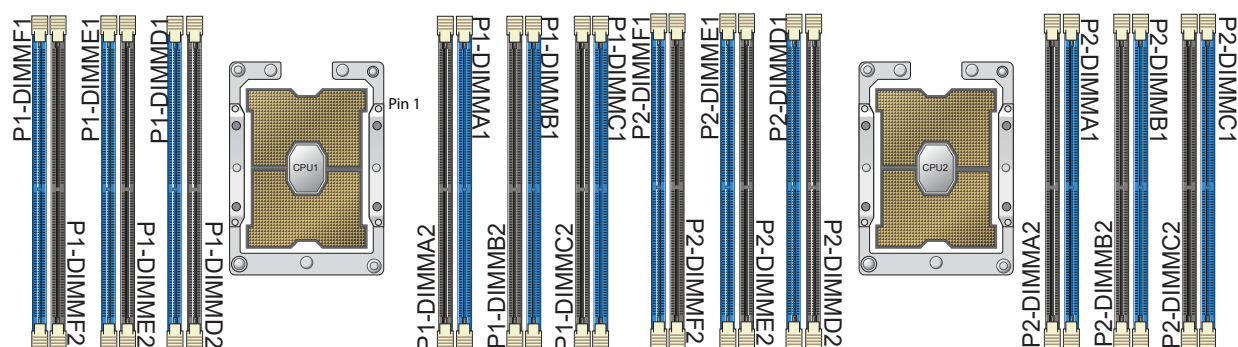
Blue slots versus black slots: Install the first DIMM in the blue memory slot, which is the first of a memory channel. Then, if using two DIMMs per channel, install the second DIMM in the black slot.

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

Check the Supermicro website for possible updates to memory support.

Memory Population for X11 DP Motherboard, 24 DIMM Slots	
When 1 CPU is used:	Memory Population Sequence
1 CPU & 1 DIMM	CPU1: P1-DIMMA1
1 CPU & 2 DIMMs	CPU1: P1-DIMMA1/P1-DIMMD1
1 CPU & 3 DIMMs	CPU1: P1-DIMMC1/P1-DIMMB1/P1-DIMMA1
1 CPU & 4 DIMMs	CPU1: P1-DIMMB1/P1-DIMMA1/P1-DIMMD1/P1-DIMME1
1 CPU & 5 DIMMs (Unbalanced: not recommended)	CPU1: P1-DIMMC1/P1-DIMMB1/P1-DIMMA1/P1-DIMMD1/P1-DIMME1
1 CPU & 6 DIMM	CPU1: P1-DIMMC1/P1-DIMMB1/P1-DIMMA1/P1-DIMMD1/P1-DIMME1/P1-DIMMF1
1 CPU & 7 DIMMs (Unbalanced: not recommended)	CPU1: P1-DIMMB1/P1-DIMMB2/P1-DIMMA1/P1-DIMMA2/P1-DIMMD1/P1-DIMME1/ P1-DIMMF1
1 CPU & 8 DIMMs	CPU1: P1-DIMMB1/P1-DIMMB2/P1-DIMMA1/P1-DIMMA2/P1-DIMMD2/P1-DIMMD1/ P1-DIMME2/P1-DIMME1
1 CPU & 9 DIMMs (Unbalanced: not recommended)	CPU1: P1-DIMMC1/P1-DIMMC2/P1-DIMMB1/P1-DIMMB2/P1-DIMMA1/P1-DIMMA2/ P1-DIMMD1/P1-DIMME1/P1-DIMMF1
1 CPU & 10 DIMMs (Unbalanced: not recommended)	CPU1: P1-DIMMC1/P1-DIMMB1/P1-DIMMB2/P1-DIMMA1/P1-DIMMA2/ P1-DIMMD2/P1-DIMMD1/P1-DIMME2/P1-DIMME1/P1-DIMMF1
1 CPU & 11 DIMMs (Unbalanced: not recommended)	CPU1: P1-DIMMC1/P1-DIMMC2/P1-DIMMB1/P1-DIMMB2/P1-DIMMA1/P1-DIMMA2/ P1-DIMMD2/P1-DIMMD1/P1-DIMME2/P1-DIMME1/P1-DIMMF1
1 CPU & 12 DIMMs	CPU1: P1-DIMMC1/P1-DIMMC2/P1-DIMMB1/P1-DIMMB2/P1-DIMMA1/P1-DIMMA2/ P1-DIMMD2/P1-DIMMD1/P1-DIMME2/P1-DIMME1/P1-DIMMF2/P1-DIMMF1
When 2 CPUs are used:	Memory Population Sequence
2 CPUs & 2 DIMMs	CPU1: P1-DIMMA1 CPU2: P2-DIMMA1
2 CPUs & 4 DIMMs	CPU1: P1-DIMMA1/P1-DIMMD1 CPU2: P2-DIMMA1/P2-DIMMD1
2 CPUs & 6 DIMMs	CPU1: P1-DIMMC1/P1-DIMMB1/P1-DIMMA1 CPU2: P2-DIMMC1/P2-DIMMB1/P2-DIMMA1
2 CPUs & 8 DIMMs	CPU1: P1-DIMMB1/P1-DIMMA1/P1-DIMMD1/P1-DIMME1 CPU2: P2-DIMMB1/P2-DIMMA1/P2-DIMMD1/P2-DIMME1
2 CPUs & 10 DIMMs	CPU1: P1-DIMMC1/P1-DIMMB1/P1-DIMMA1/P1-DIMMD1/P1-DIMME1/P1-DIMMF1 CPU2: P2-DIMMB1/P2-DIMMA1/P2-DIMMD1/P2-DIMME1
2 CPUs & 12 DIMMs	CPU1: P1-DIMMC1/P1-DIMMB1/P1-DIMMA1/P1-DIMMD1/P1-DIMME1/P1-DIMMF1 CPU2: P2-DIMMC1/P2-DIMMB1/P2-DIMMA1/P2-DIMMD1/P2-DIMME1/P2-DIMMF1
2 CPUs & 14 DIMMs	CPU1: P1-DIMMB1/P1-DIMMB2/P1-DIMMA1/P1-DIMMA2/P1-DIMMD2/P1-DIMMD1/ P1-DIMME2/P1-DIMME1 CPU2: P2-DIMMC1/P2-DIMMB1/P2-DIMMA1/P2-DIMMD1/P2-DIMME1/P2-DIMMF1
2 CPUs & 16 DIMMs	CPU1: P1-DIMMB1/P1-DIMMB2/P1-DIMMA1/P1-DIMMA2/P1-DIMMD2/P1-DIMMD1/ P1-DIMME2/P1-DIMME1 CPU2: P2-DIMMB1/P2-DIMMB2/P2-DIMMA1/P2-DIMMA2/P2-DIMMD2/P2-DIMMD1/ P2-DIMME2/P2-DIMME1
2 CPUs & 18 DIMMs	CPU1: P1-DIMMC1/P1-DIMMC2/P1-DIMMB1/P1-DIMMB2/P1-DIMMA1/P1-DIMMA2/ P1-DIMMD2/P1-DIMMD1/P1-DIMME2/P1-DIMME1/P1-DIMMF2/P1-DIMMF1 CPU2: P2-DIMMC1/P2-DIMMB1/P2-DIMMA1/P2-DIMMD1/P2-DIMME1/P2-DIMMF1

Memory Population for X11 DP Motherboard, 24 DIMM Slots	
2 CPUs & 20 DIMMs	CPU1: P1-DIMMC1/P1-DIMMC2/P1-DIMMB1/P1-DIMMB2/P1-DIMMA1/P1-DIMMA2/ P1-DIMMD2/P1-DIMMD1/P1-DIMME2/P1-DIMME1/P1-DIMMF2/P1-DIMMF1 CPU2: P2-DIMMB1/P2-DIMMB2/P2-DIMMA1/P2-DIMMA2/P2-DIMMD2/P2-DIMMD1/ P2-DIMME2/P2-DIMME1
2 CPUs & 22 DIMMs (Unbalanced: not recommended)	CPU1: P1-DIMMC1/P1-DIMMC2/P1-DIMMB1/P1-DIMMB2/P1-DIMMA1/P1-DIMMA2/ P1-DIMMD2/P1-DIMMD1/P1-DIMME2/P1-DIMME1/P1-DIMMF1 CPU2: P2-DIMMC1/P2-DIMMC2/P2-DIMMB1/P2-DIMMB2/P2-DIMMA1/P2-DIMMA2/ P2-DIMMD2/P2-DIMMD1/P2-DIMME2/P2-DIMME1/P2-DIMMF1
2 CPUs & 24 DIMMs	CPU1: P1-DIMMC1/P1-DIMMC2/P1-DIMMB1/P1-DIMMB2/P1-DIMMA1/P1-DIMMA2/ P1-DIMMD2/P1-DIMMD1/P1-DIMME2/P1-DIMME1/P1-DIMMF2/P1-DIMMF1 CPU2: P2-DIMMC1/P2-DIMMC2/P2-DIMMB1/P2-DIMMB2/P2-DIMMA1/P2-DIMMA2/ P2-DIMMD2/P2-DIMMD1/P2-DIMME2/P2-DIMME1/P2-DIMMF2/P2-DIMMF1



Installing Memory

ESD Precautions

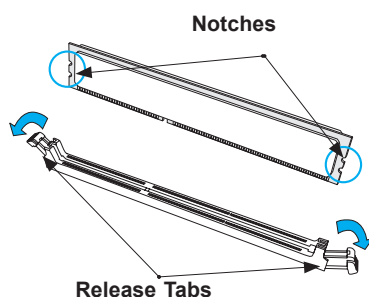
Electrostatic Discharge (ESD) can damage electronic components including memory modules. To avoid damaging DIMM modules, it is important to handle them carefully. The following measures are generally sufficient.

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

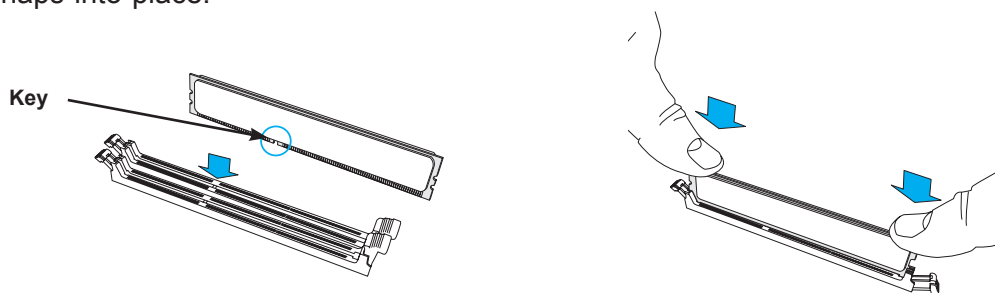
Installing Memory

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

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



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



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

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

Removing Memory

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

Installing Expansion Cards

The system can accommodate three PCI-E 3.0 expansion cards.

Installing an Expansion Card

1. Power down the system as described in Section 3.1.
2. Open the storage compartment top cover.
3. Remove the two-fan housing from the chassis rear (described in later section).
4. Remove the blank PCI shield from the chassis rear.
5. Plug the expansion card into the PCI slot on the motherboard while fitting card bracket into the rear chassis slot.
6. Secure the expansion card bracket into the chassis slot with a screw.
7. Replace the fans and covers.

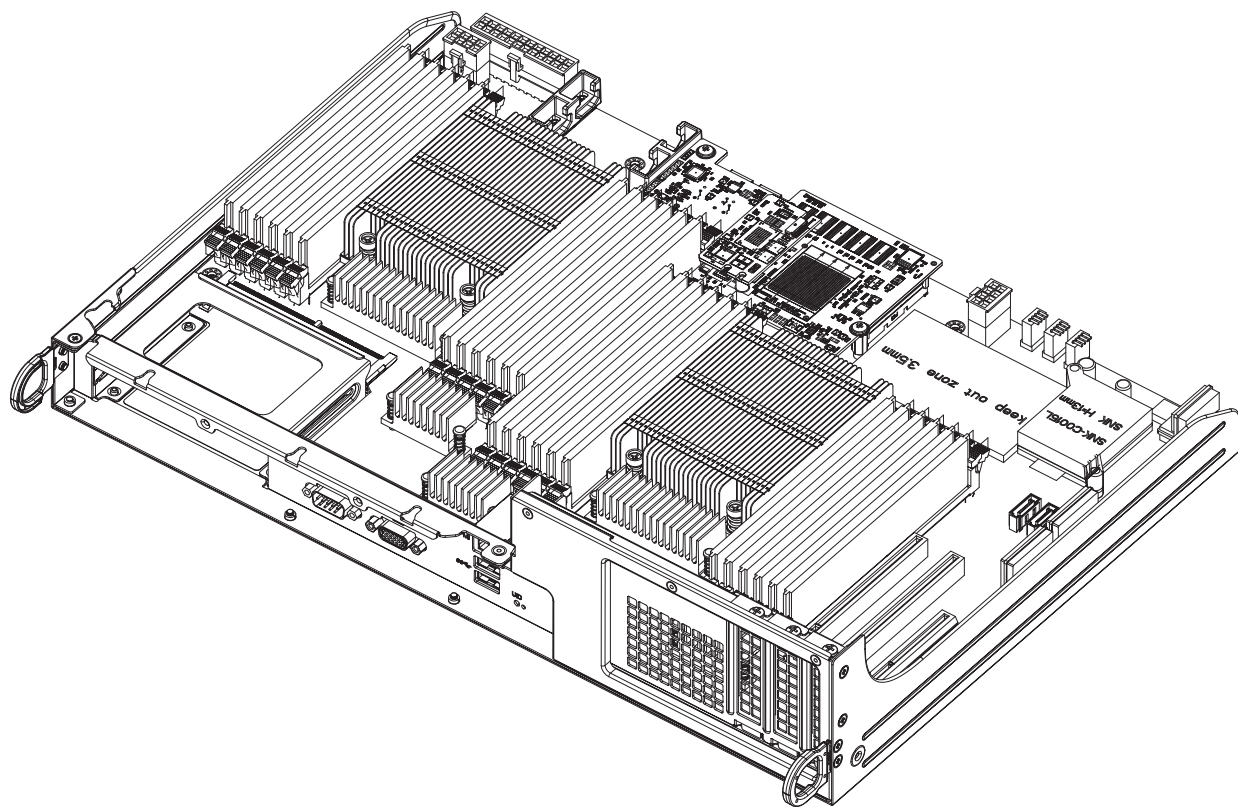


Figure 3-3. Motherboard Tray (shown without chassis for illustration only)

Motherboard Battery

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

Replacing the Battery

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

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

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

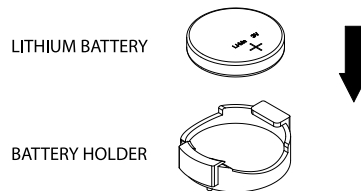


Figure 3-4. Installing the Onboard Battery

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

3.4 Chassis Components

Storage Drives

The 6049P-E1CR45H/L/L+ storage server supports forty-five 3.5" hot-swap drives as main storage. In addition, it supports two 2.5" hot-swap drives at the chassis rear. All drives are mounted in tool-less carriers to simplify their removal. These carriers also help promote proper airflow.

Drive Carrier Indicators

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

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

Note: Enterprise level hard disk drives are recommended for use in Supermicro chassis and servers. For information on recommended HDDs, see the Supermicro website.

Adding or Replacing Main Storage Drives

Removing a Hard Drive Carrier from the Storage Compartment

1. Open the storage compartment cover.
2. Slide the release button on the drive carrier, which opens the carrier handle.
3. Use the handle to pull the drive carrier up and out.

Caution: Except for short periods of time, such as while swapping hard drives, do not operate the server with the drive carriers removed from the bays. Even empty carriers help promote airflow.

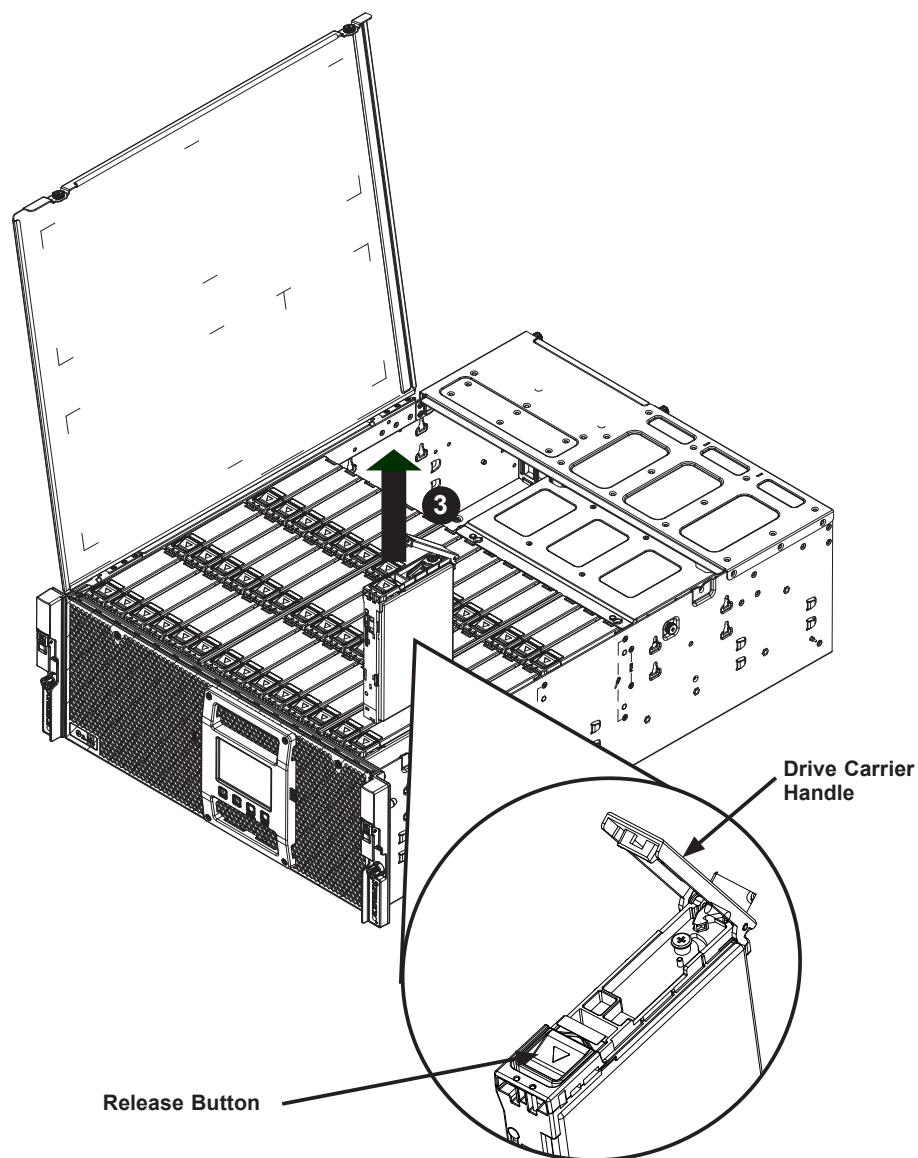


Figure 3-5. Removing a Hard Drive Carrier

3.3 Installing Hot-Swappable Optional NVMe Drives

The SC946S storage chassis supports the option for six 2.5" hot-swappable NVMe drives in tool less hard drive carriers, which are mounted in a fixed NVMe drive cage. The NVMe drive cage must be installed prior to removing the drives. Once installed, the drive cage permits the NVMe drives and their carriers to be removed without powering down the system.

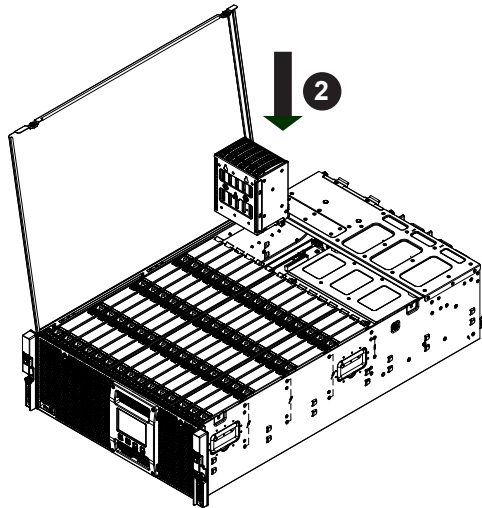


Figure 3-3. Installing the NVMe Drive Cage

Installing the NVMe Drive Cage

Installing NVMe Drive Cage

1. Power down the system as described in Section 3.1 and open the storage chassis cover as described in Section 3-2.
2. Place the NVMe drive cage into the storage chassis as illustrated above.
3. Press the NVMe drive cage into the storage chassis until it clicks into the locked position.

Installing NVMe Drive Carriers into the NVMe Drive Cage

NVMe drives are hot-swappable and once the NVMe drive cage has been installed as described in the beginning of this section, the NVMe drives can be added to or removed from the NVMe cage without powering down the system.

Installing NVMe Drives and Carriers into the Storage Chassis

4. Grasp the drive carrier handle.
5. Push the hard drive carrier into the hard drive bay until it clicks into the locked position.

Removing NVMe Drives and Carriers from the NVMe Drive Cage

1. Push the release button on the drive carrier. This will extend the drive carrier handle.
2. Grasp the drive carrier handle and pull the carrier up and out of the NVMe cage.

Warning: Enterprise level hard disk drives are recommended for use in Supermicro storage chassis and servers. For information on recommended HDDs, visit the Supermicro website at www.supermicro.com.

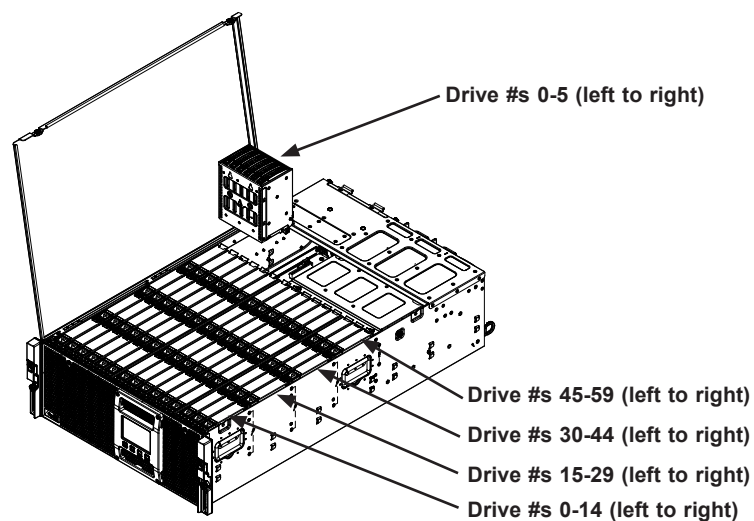


Figure 3-4. Logical Numbering of Hard Drive Layout

Hot-Swap for NVMe Drives

An NVMe drive can be inserted and replaced using IPMI.

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

Ejecting a Drive

1. IPMI > Server Health > NVMe SSD

2. Select Device, Group and Slot, and click **Eject**. After ejecting, the drive Status LED indicator turns green.
3. Remove the drive.

Note that *Device* and *Group* are categorized by the CPLD design architecture. The 6049P-E1CR45H/L/L+ server has one Device and one Group.

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

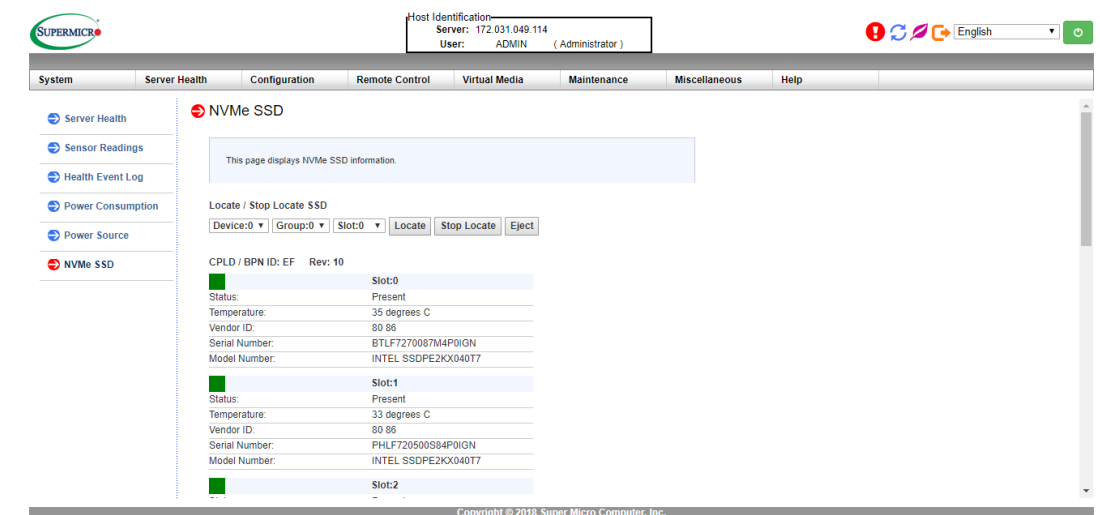


Figure 3-5. IPMI Screenshot

Replacing the Drive

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

Checking the Temperature of an NVMe Drive

There are two ways to check using IPMI.

Checking a Drive

- **IPMI > Server Health > NVMe SSD** – Shows the temperatures of all NVMe drives, as in Figure 3-4.
- **IPMI > Server Health > Sensor Reading > NVME_SSD** – Shows the single highest temperature among all the NVMe drives.

Installing a 3.5" Storage Drive

With the drive carrier removed from the storage compartment:

1. Under the main carrier handle, find and lift the breakout lever and pull out the side of the carrier.

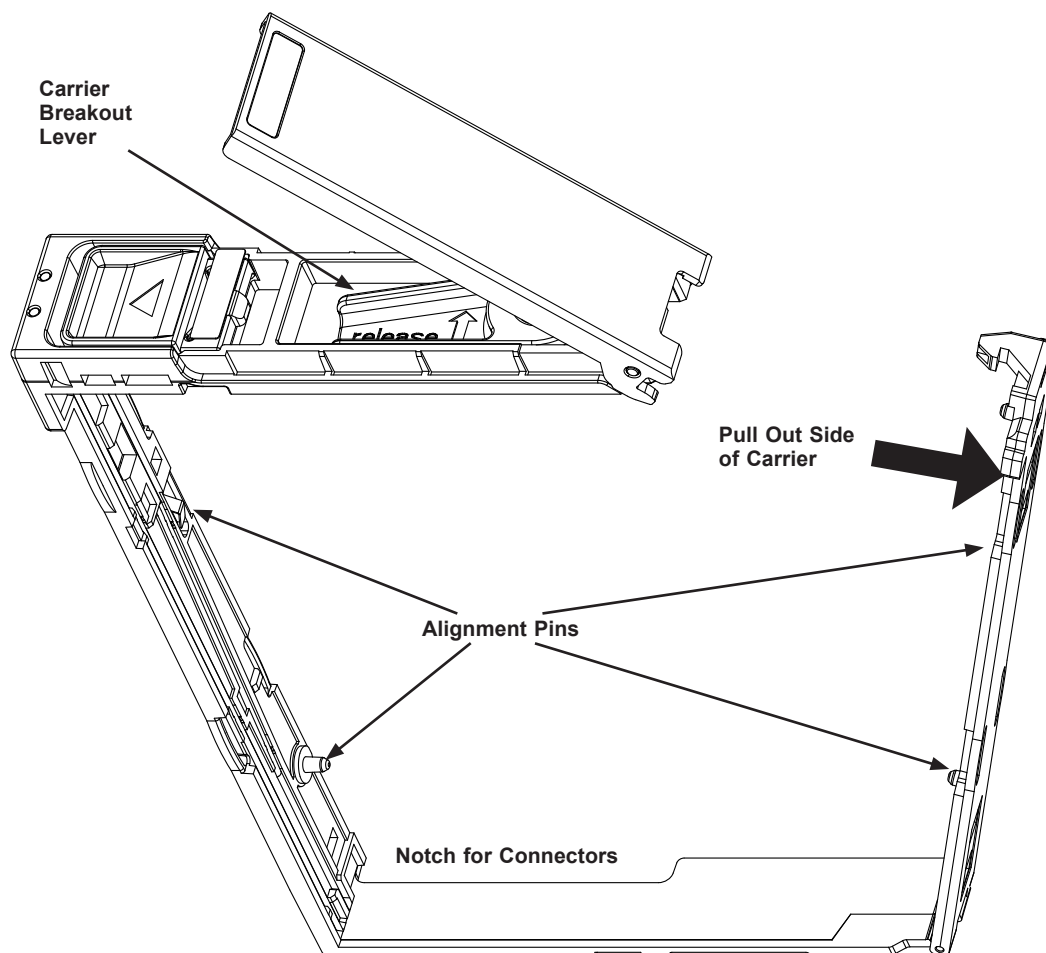


Figure 3-6. Opening the Drive Carrier

2. Remove the dummy drive from the carrier.
3. Insert the hard drive into the drive carrier. Orient the drive by matching the two alignment pins on the side and by noting the notch in the carrier for the drive connectors. Close the side of the carrier until it snaps in place.
4. Slide the carrier assembly into its spot in the chassis until it clicks into locked position.

Storage Drives at the Chassis Rear

There is room for two optional hot-swap 2.5" drives in the rear of the chassis.

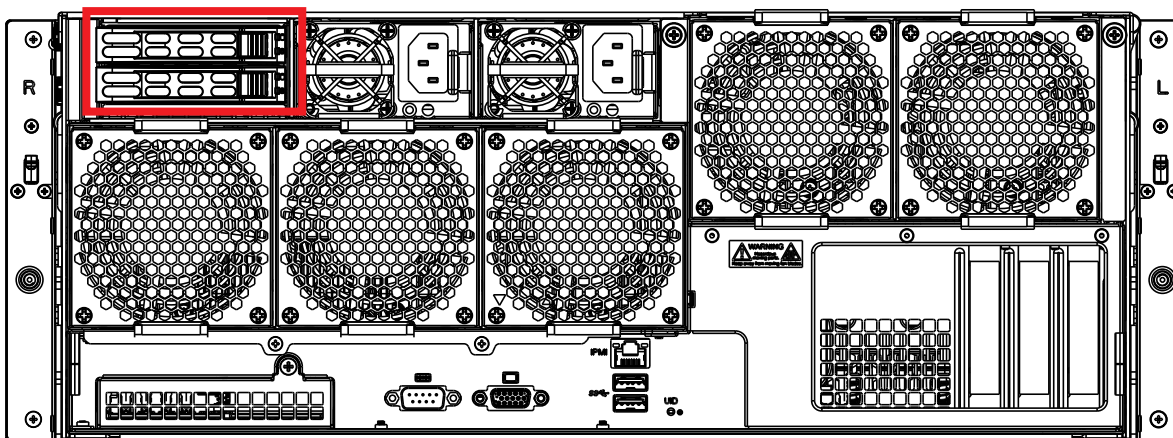


Figure 3-7. Drives at Chassis Rear

Installing 2.5" Drives at the Chassis Rear

1. Press the release button and the carrier lever pops out. Pull out the carrier by the lever.
2. Remove the dummy drive and insert drive into the carrier.
3. Push the carrier assembly into the bay until it clicks into place.

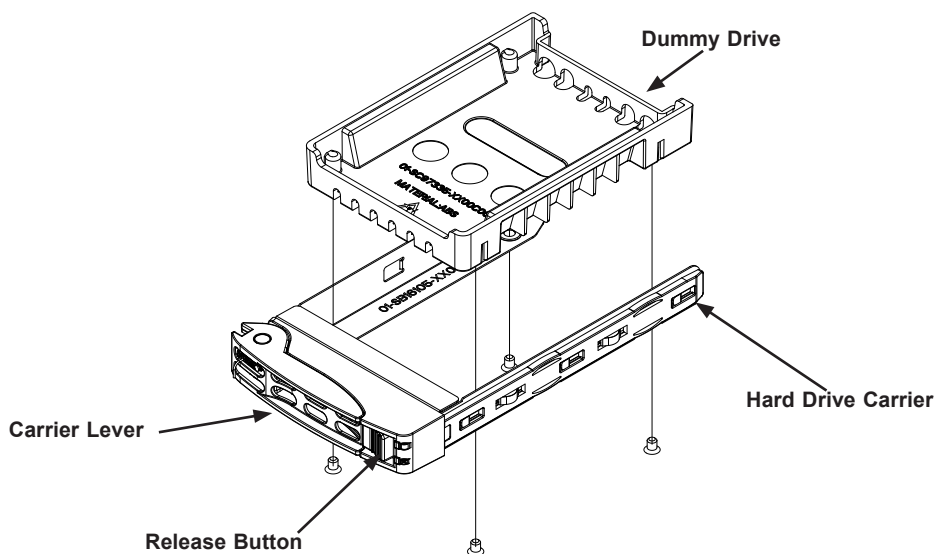


Figure 3-8. Removing the Carrier and Dummy Drive

Fans

The system has five hot-swap 8-cm exhaust fans accessible from the rear of the chassis. They can be removed or replaced individually by pinching the top and bottom release tabs.

One or two fans should be removed to install or replace memory or PCI expansion cards.

Fan speed is controlled by a system temperature setting in IPMI. If a fan fails, the remaining fans will ramp up to full speed, and the system can continue to operate. Replace any failed fan at your earliest convenience with the same type and model.

Removing or Replacing a System Fan

1. While the system is running, examine the fans to determine which fan has failed.
2. Pinch together the upper and lower release tabs and pull the fan out of the bay.

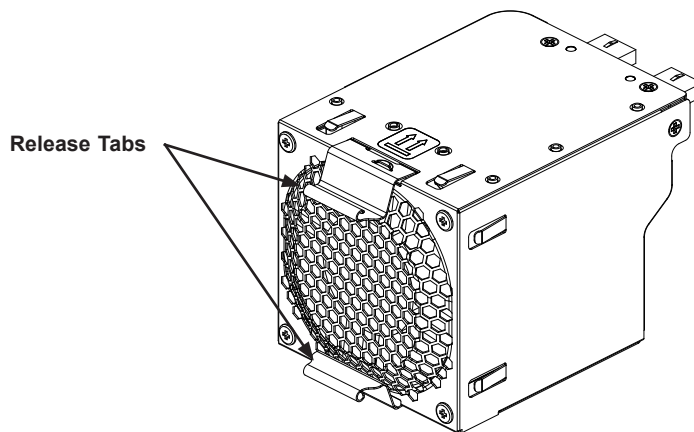


Figure 3-9. Fan Release Tabs

Caution: Fans will continue to rotate for a brief time after removing them from the chassis. To avoid injury, keep fingers clear of the rotating fan blades.

3. Slide the new fan into the vacant bay. Confirm that the fan is fully seated in the bay and functioning.

Removing the Dual Fan Housing

The housing should be removed to install PCI expansion cards. Remove the two thumb screws and pull the housing.

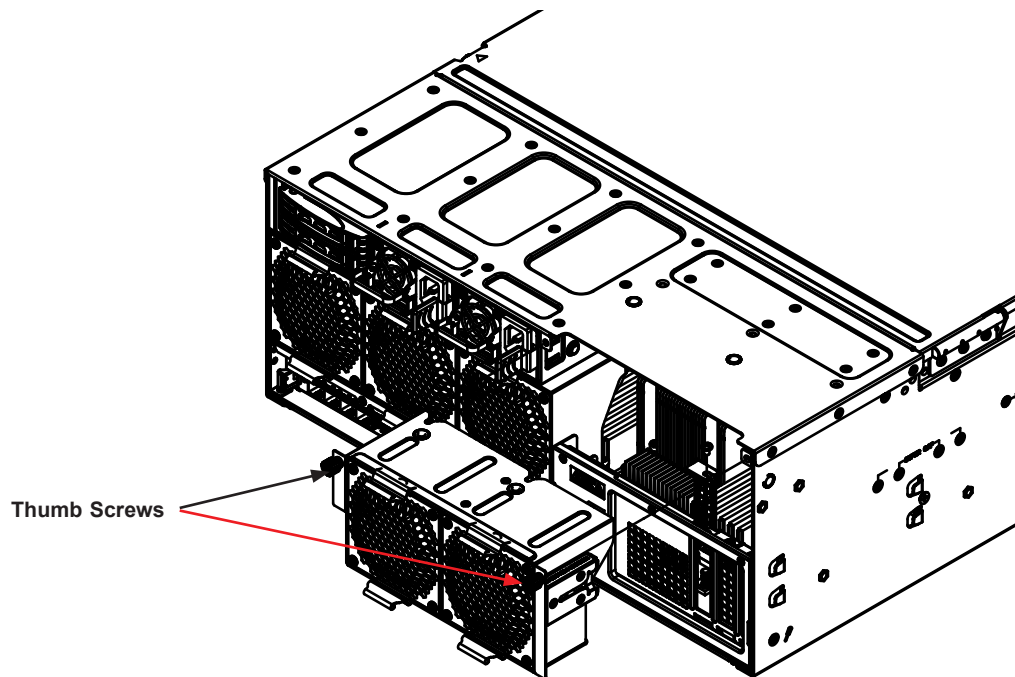


Figure 3-10. Removing the Dual Fan Housing

Checking the Server Air Flow

- Make sure there are no objects to obstruct airflow in and out of the server.
- Do not operate the server for long without drive carriers in the drive bays.
- Use only recommended server parts.
- Make sure no wires or foreign objects obstruct air flow through the chassis. Pull all excess cabling out of the airflow path or use shorter cables.

The control panel LEDs display system heat status. See “Control Panel” in Chapter 1 for details.

Power Supply Modules

The chassis features redundant power supplies. The power modules can be changed without powering down the system. New units can be ordered directly from Supermicro or authorized distributors.

The power supplies are auto-switching capable. This feature enables them to automatically sense the input voltage and operate at a 100-120v or 180-240v. An amber light will be illuminated on the power supply when the power is off. An illuminated green light indicates that the power supply is operating.

Replacing the Power Supply

1. Unplug the AC cord from the module to be replaced.
2. Push the release tab on the back of the power module as illustrated.

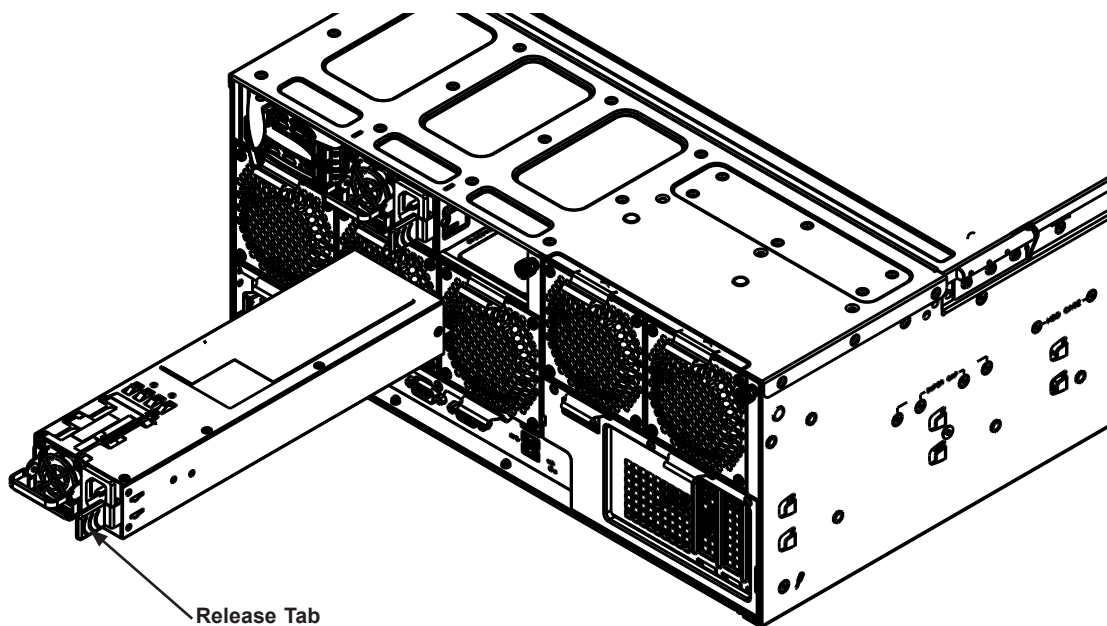


Figure 3-11. Replacing the Power Supply Module

3. Pull the power module out using the handle provided.
4. Push the new power module into the bay until it clicks into place.
5. Plug the AC power cord back into the module.

3.4 System Status LCD Screen

The 6049P-E1CR45H/L/L+ offers an optional LCD screen on the front of the chassis that shows the status of many system components. The functions are described in this section.

Introduction

This feature gives the user the ability to monitor drives, power supplies, fans, and connections. It shows temperature, events, and errors. The LCD display is activated as the system powers on.

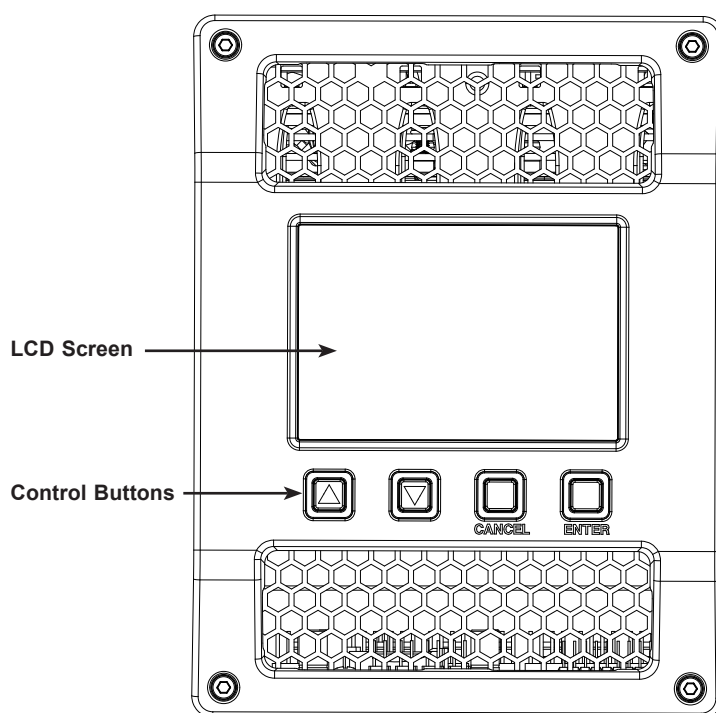
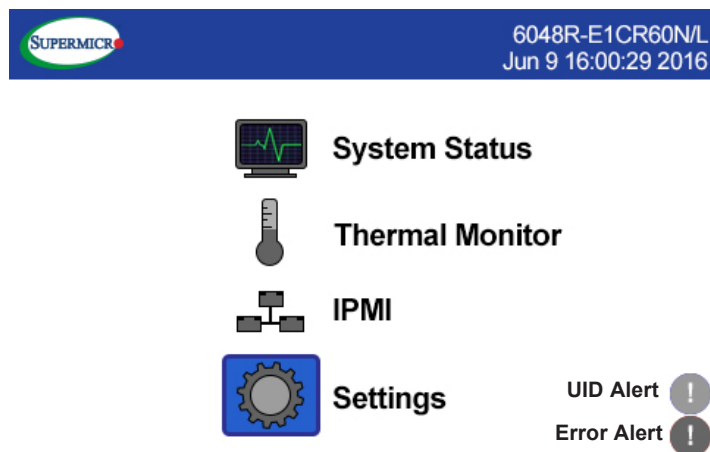


Figure 3-12. LCD Screen

The user can navigate the menus using the four control buttons: Scroll Up, Scroll Down, Cancel, and Enter.

Main Screen

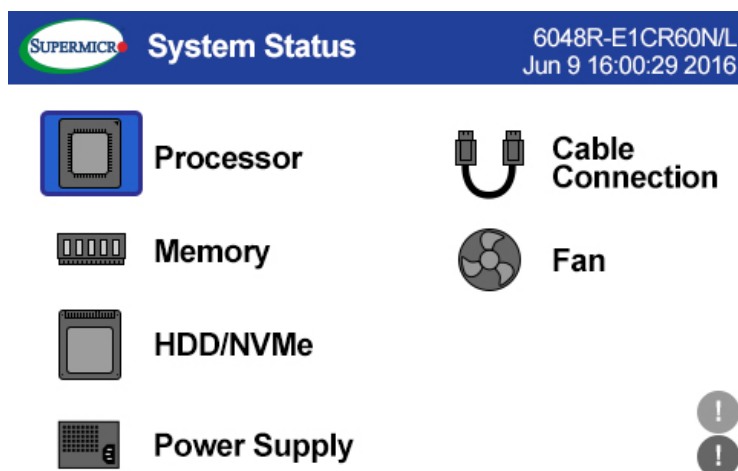
After a welcome page, the Main screen appears.



Throughout the GUI, component status is displayed in color where green indicates normal operation, red indicates a problem, and gray indicates the component is not installed. The UID Alert is blue when active; the Error Alert is red when active.

System Status Submenu

Main Page > System Status



Processor Status

Main Page > System Status > Processor

This page displays CPU information including model (SKU), temperature and status. The status may be operational (good, green), failed (bad, red), or not installed (gray).

Memory Status

Main Page > System Status > Memory

This page shows each DIMM slot as operational, failed, or not installed.

Hard Disk Drive Status

Main Page > System Status > Hard Disk Drive

This page displays all drive bays. The drive may be operational, failed, or not installed.

Power Supply Status

Main Page > System Status > Power Supply

This page shows the status and temperature of each power supply unit.

Cable Connection Status

Main Page > System Status > Cable Connection

The Cable Connection page shows the status of connections to the backplanes.

Fans Status

Main Page > System Status > Fan

The Fan page shows whether each fan is operational, failed or not installed.

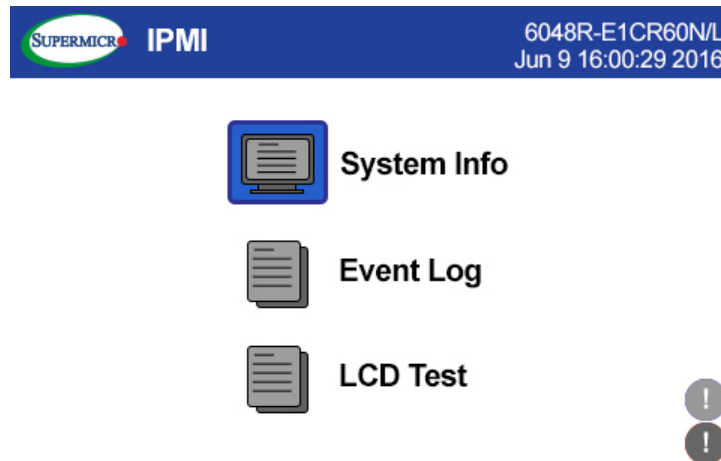
Thermal Monitor

Main Page > Thermal Monitor

The Thermal Monitor shows the temperature of the backplane, motherboard, processor, and ambient chassis temperature.

IPMI Submenu

Main Page > IPMI



System Info

Main Page > IPMI > System Info

The IPMI System Info pages show:

- LCD firmware version
- IPMI firmware version
- BMC IP Address
- MAC Address
- Motherboard serial number
- Product serial number
- Chassis serial number
- Power supplies 1 and 2 serial numbers

IPMI Event Log

Main Page > IPMI > Event Log

Event Log page will show the latest 100 critical errors:

- /*CPU OverHeating*/
- /*MEM OverHeating*/
- /*PSU FAIL*/
- /*MEM ECC Error*/

- /*MEM MRC Error*/
- /*Fan Error*/
- HDD activity

LCD Test

Main Page > IPMI > LCD Test

Settings Submenu

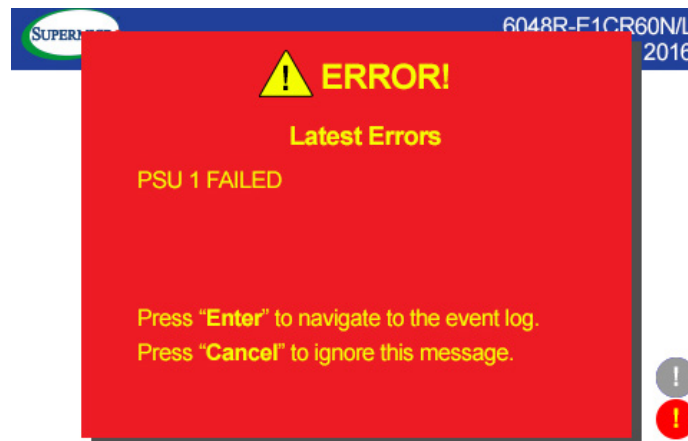
Main Page > Settings > Brightness

This item allows the user to adjust the LCD brightness.

Error Message

An error message pops up whenever critical error occurs. It shows the latest three critical errors. The user can choose to navigate to event log or ignore message.

Also, there will be an error icon on the bottom right of the page to remind user that there are critical errors that require attention.



UID Message

A message pops up whenever the user activates UID. The UID icon (blue circle with a white exclamation mark) in the bottom right corner remains active until the user turns off UID.

Chapter 4

Motherboard Connections

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

Please review the Safety Precautions in Chapter 3 before installing or removing components.

4.1 Power Connections

ATX and CPU Power Connectors

JPWR1 is the 24-pin ATX main power supply connector. This primary power supply connector meets the ATX SSI EPS 24-pin specification. You must also connect the 8-pin (JPWR2/JPWR3) CPU power connectors to your power supply.

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

12V 8-pin CPU Power Connectors

JPWR2 and JPWR3 are the 8-pin 12V DC power input for the CPU. Refer to the table below for pin definitions.

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

4.2 Headers and Connectors

Onboard Fan Header

Five 4-pin fan headers (FAN1~5) are located on the motherboard to provide CPU/system cooling. These fan headers support both 3-pin fans and 4-pin fans; however, onboard fan speed control is available only when all 4-pin fans are used in the motherboard. Fan speed control is supported by a thermal management setting in the BMC (Baseboard Management Controller). See the table below for pin definitions.

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

TPM Header

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

Trusted Platform Module/Port 80 Header Pin Definitions			
Pin#	Definition	Pin#	Definition
1	P3V3	2	SPI_TPM_CS_N
3	PCIE_RESET_N#	4	SPI_PCH_MISO
5	SPI_PCH_CLK#	6	Ground
7	SPI_PCH_MOSI	8	N/A
9	JTPM1_P3V3A	10	IRQ_TPM_SPIN_N

Standby Power

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

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

Chassis Intrusion

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

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

SATA Power Connectors

The SATA power connectors at JSD1 and JSD2 provide 5V power to onboard SATA devices. Refer to the table below for pin definitions.

SATA Power Pin Definitions	
Pin#	Definition
1	5V
2	Ground
3	Ground

I-SATA 3.0 and S-SATA 3.0 Ports

The X11DSC+ has eight I-SATA 3.0 ports (I-SATA0-3, I-SATA4-7) and six S-SATA ports (S-SATA0-3, S-SATA4, S-SATA5) on the motherboard. The I-SATA ports are supported by the Intel PCH C621 chipset, and the S-SATA ports are supported by Intel SCU. S-SATA4/S-SATA5 can be used with Supermicro SuperDOMs which are yellow SATA DOM connectors with power pins built in, and do not require external power cables.

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

NVMe Connectors

Use the NVMe connectors (P1_NVMe0/P1_NVMe1/P1_NVMe2/P1_NVMe3) to attach high-speed PCI-E storage devices (supported by CPU1).

NVMe SMBus Headers

NVMe SMBus (I2C) headers (JNVI2C1/2), used for PCI-E SMBus clock and data connections, provide hot-plug support via a dedicated SMBus interface. This feature is only available for a Supermicro complete system with a Supermicro-proprietary NVMe add-on card and cable installed.

RAID Key Header

A RAID Key header is located at JRK1 on the motherboard. The RAID key is used to support NVMe SSD.

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

Internal Speaker/Buzzer

The Internal Speaker/Buzzer (SP1) is used to provide audible indications for various beep codes. See the table below for pin definitions.

Internal Buzzer Pin Definitions		
Pin#	Definition	
1	Pos (+)	Beep In
2	Neg (-)	Alarm Speaker

SGPIO Header

The I-SGPIO1 (Serial General Purpose Input/Output) header is used to communicate with the enclosure management chip on the backplane.

SGPIO Header Pin Definitions			
Pin#	Definition	Pin#	Definition
1	NC	2	NC
3	Ground	4	DATA Out
5	Load	6	Ground
7	Clock	8	NC

NC = No Connection

Power SMBus (I2C) Header

The Power System Management Bus (I2C) header at JPI2C1 monitors the power supply input/output voltages, fans, temperatures, and status. Refer to the table below for pin definitions.

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

4-pin BMC External I2C Header

A System Management Bus header for IPMI 2.0 is located at JIPMB1. Connect the appropriate cable here to use the IPMB I2C connection on your system. Refer to the table below for pin definitions.

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

SMB (I2C) for LCD Connector

The connector used for System Management Bus (I2C) for LCD devices is located at JI2C_FP1. Connect a cable here to provide health monitoring and management for LCD devices.

SMB (I2C) for SAS3 Backplanes Connectors

JI2C_EXP1/2 connectors are used for System Management Bus (I2C) for the devices installed on the SAS3 backplanes. Connect appropriate cables to these connectors for SAS3 health monitoring and system management.

Disk-On-Module Power Connector

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

DOM Power Pin Definitions	
Pin#	Definition
1	5V
2	Ground
3	Ground

Inlet Sensor Header

This header (JSEN1) allows BMC to monitor thermal inlet temperature. A special module is required. Please contact Supermicro at www.supermicro.com to purchase the module for this header. Refer to the table below for pin definitions.

Inlet Sensor Header Pin Definitions	
Pin#	Definition
1	SMBDAT
2	Ground
3	SMBCLK
4	3.3V STBY

4.3 Ports

Rear I/O Ports

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

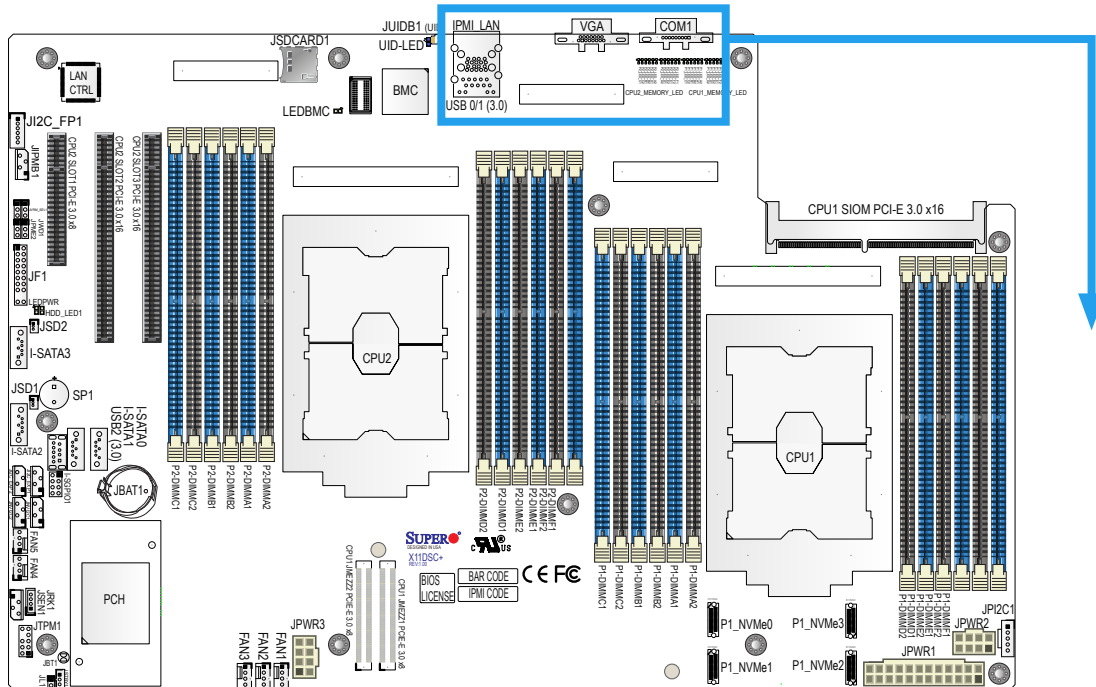


Figure 4-1. Rear I/O Port Locations and Definitions

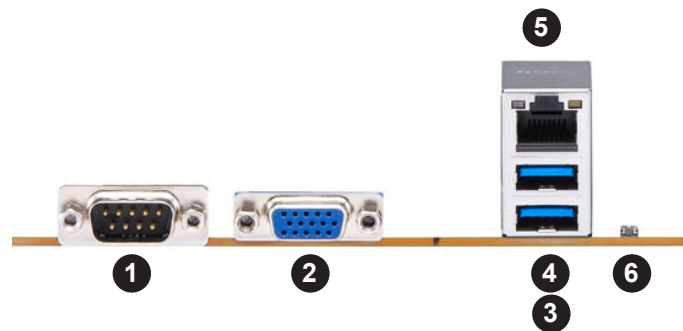


Figure 4-2. Rear I/O Port Locations and Definitions

Back Panel I/O Ports			
No.	Description	No.	Description
1.	COM Port	4.	USB 1 (USB 3.0)
2.	VGA Port	5.	IPMI LAN Port
3.	USB 0 (USB 3.0)	6.	Unit Identifier Switch (UID)

VGA Port

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

Serial Port

There is one COM port (COM1) on the I/O back panel. The COM port provides serial communication support.

Universal Serial Bus (USB) Ports

There are two USB 3.0 ports (USB0/1) on the I/O back panel. USB2 is a Type A USB 3.0 header on the motherboard to provide front access USB connection. The onboard headers can be used to provide front side USB access with a cable (not included).

Back Panel USB 0/1 (3.0) Pin Definitions			
Pin#	Definition	Pin#	Definition
A1	VBUS	B1	Power
A2	D-	B2	USB_N
A3	D+	B3	USB_P
A4	GND	B4	GND
A5	Std_a_SSRX-	B5	USB3_RN
A6	Std_a_SSRX+	B6	USB3_RP
A7	GND	B7	GND
A8	Std_a_SSTX-	B8	USB3_TN
A9	Std_a_SSTX+	B9	USB3_TP

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

Unit Identifier Switch/UID LED Indicator

A Unit Identifier (UID) switch and a rear UID LED (UID-LED) are located on the I/O back panel. A front UID switch is located on pins 7 & 8 of the front panel control (JF1). When you press the front or the rear UID switch, both front and rear UID LEDs will be turned on. Press the UID switch again to turn off the LED indicators. The UID indicators provide easy identification of a system that may be in need of service. (**Note:** UID can also be triggered via IPMI on the motherboard. For more information, please refer to the IPMI User's Guide posted on our website at <http://www.supermicro.com>.)

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

4.4 Front Control Panel

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

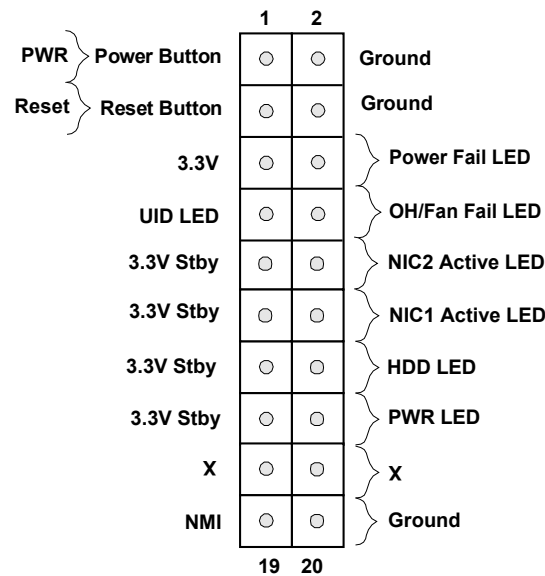


Figure 4-3. JF1 Header Pins

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

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

Reset Button

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

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

Power Fail LED

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

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

Fan Fail and UID LED

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 overheat 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	Blue LED
8	OH/Fan Fail LED

NIC1/NIC2 (LAN1/LAN2)

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

LAN1/LAN2 LED Pin Definitions (JF1)	
Pin#	Definition
9	NIC 2 Activity LED
10	3.3V Stby
11	NIC 1 Activity LED
12	3.3V Stby

HDD LED

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

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

Power LED

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

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

NMI Button

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

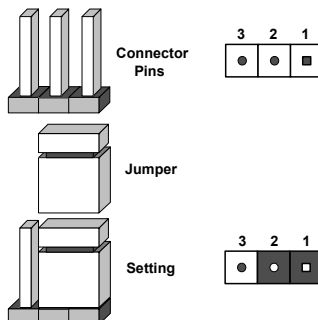
NMI Button Pin Definitions (JF1)	
Pins	Definition
19	Control
20	Ground

4.5 Jumpers

Explanation of Jumpers

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

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



CMOS Clear

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

To Clear CMOS

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

Notes: Clearing CMOS will also clear all passwords.

Do not use the PW_ON connector to clear CMOS.



JBT1 contact pads

Watch Dog

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

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

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

Manufacturing Mode Select

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

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

I2C Bus for VRM

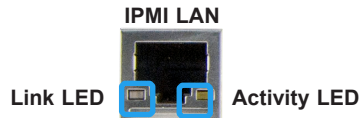
Jumpers JVRM_SEL1 allows the BMC or the PCH to access CPU and memory VRM controllers. See the table below for jumper settings.

VRM Jumper Settings	
Jumper Setting	Definition
Pins 1-2	BMC (Normal)
Pins 2-3	PCH

4.6 LED Indicators

IPMI-Dedicated LAN LEDs

A dedicated IPMI LAN is located on the I/O Backplane of the motherboard. The amber LED on the right indicates activity, while the green LED on the left indicates the speed of the connection. See the tables below for more information.



IPMI LAN Connection LED	
LED Color	Definition
Off	No Connection, 10 Mbps or 100 Mbps
Green	10 Gbps
Amber	1 Gbps

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

BMC Heartbeat LED

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

Onboard Power LED

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

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

Unit ID LED

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

HDD LED

An HDD LED indicator, located at HDD_LED1 on the motherboard, indicates the status of onboard hard drive disks including SATA devices. When HDD_LED1 is blinking, all onboard HDDs are functioning normally. See the table below for more information.

Onboard Memory_Fault LED Indicators

The memory-fault LED indicators are located at P1_LED_A1 - P2_LED_F2 on the motherboard. Each memory LED indicates the status of the DIMM module installed on the memory slot that carries the same name. For example, if P1_LED_A1 is on, it indicates that an error has occurred to the DIMM module installed on the P1-DIMMA1 memory slot. See the tables below for more information.

Memory-Fault LED Indicators & Corresponding Memory Modules	
LED Indicator	Corresponding DIMM Module
P1_LED_A1 / P1_LED_A2	P1-DIMMA1 / P1-DIMMA2
P1_LED_B1 / P1_LED_B2	P1-DIMMB1 / P1-DIMMB2
P1_LED_C1 / P1_LED_C2	P1-DIMMC1 / P1-DIMMC2
P1_LED_D1 / P1_LED_D2	P1-DIMMD1 / P1-DIMMD2
P1_LED_E1 / P1_LED_E2	P1-DIMME1 / P1-DIMME2
P1_LED_F1 / P1_LED_F2	P1-DIMMF1 / P1-DIMMF2
P2_LED_A1 / P2_LED_A2	P2-DIMMA1 / P2-DIMMA2
P2_LED_B1 / P2_LED_B2	P2-DIMMB1 / P2-DIMMB2
P2_LED_C1 / P2_LED_C2	P2-DIMMC1 / P2-DIMMC2
P2_LED_D1 / P2_LED_D2	P2-DIMMD1 / P2-DIMMD2
P2_LED_E1 / P2_LED_E2	P2-DIMME1 / P2-DIMME2
P2_LED_F1 / P2_LED_F2	P2-DIMMF1 / P2-DIMMF2

Memory-Fault LED LED Indicator	
LED Color	Definition
LED On: Red	Corresponding DIMM Module: Bad

Chapter 5

Software

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

5.1 Microsoft Windows OS Installation

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

Installing the OS

1. Create a method to access the MS Windows installation ISO file. That might be a DVD, perhaps using an external USB/SATA DVD drive, or a USB flash drive, or the IPMI KVM console.
2. Retrieve the proper RST/RSTe driver. Go to the Supermicro web page for your motherboard and click on "Download the Latest Drivers and Utilities", select the proper driver, and copy it to a USB flash drive.
3. Boot from a bootable device with Windows OS installation. You can see a bootable device list by pressing **F11** during the system startup.

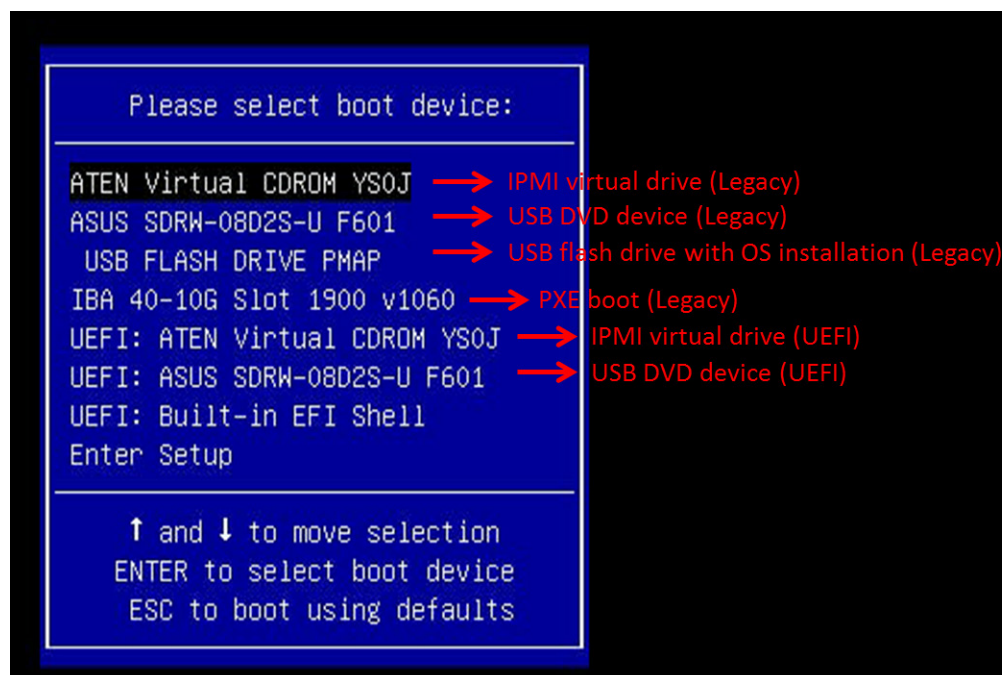


Figure 5-1. Select Boot Device

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

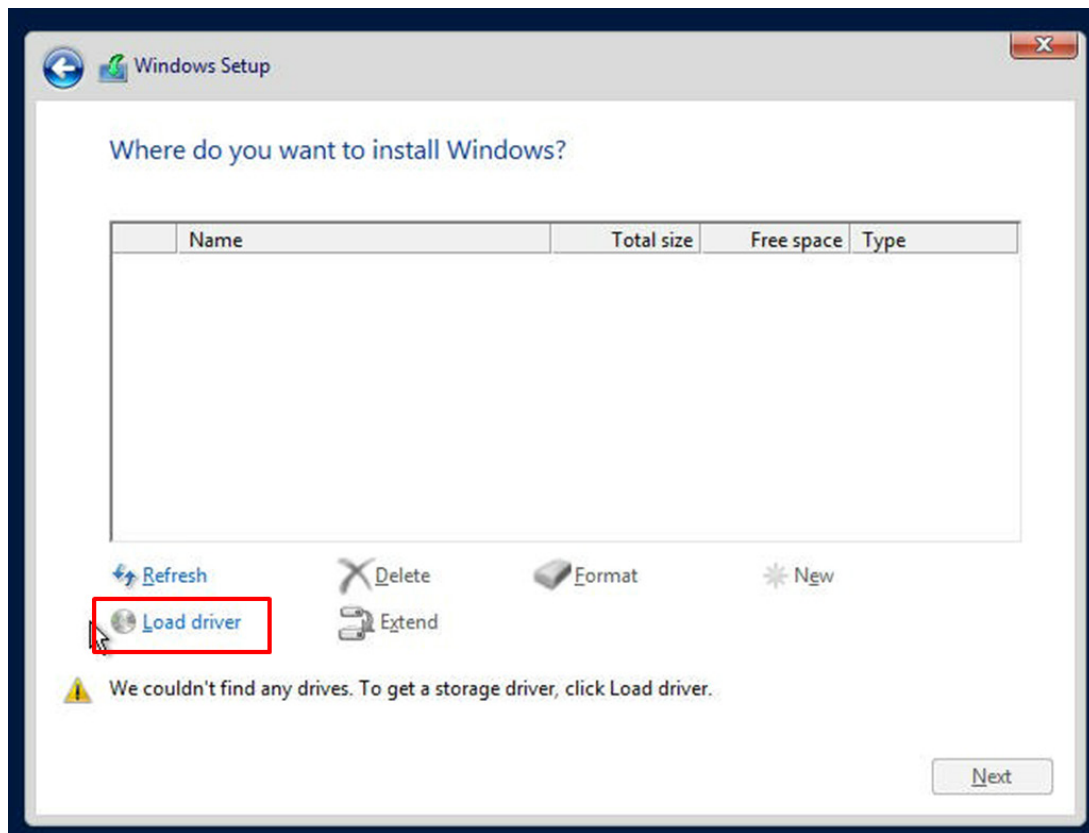


Figure 5-2. Load Driver Link

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

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

5.2 Driver Installation

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

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

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

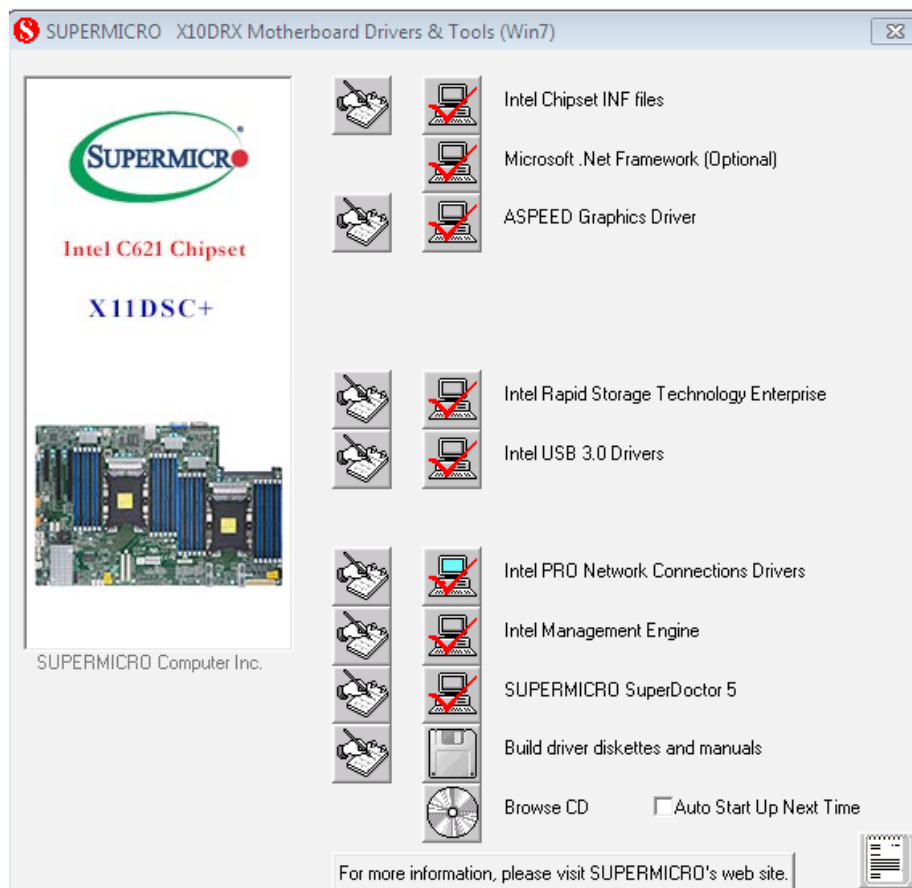


Figure 5-3. Driver & Tool Installation Screen

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

5.3 SuperDoctor® 5

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

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

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

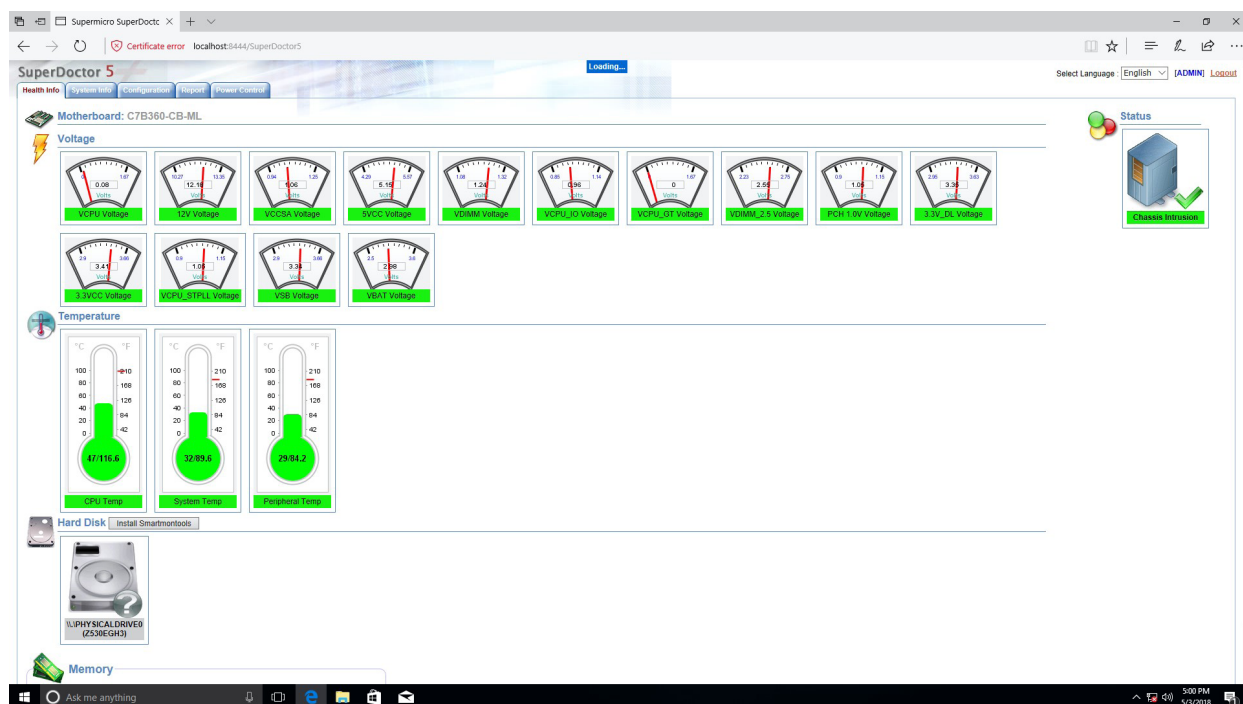


Figure 5-4. SuperDoctor 5 Interface Display Screen (Health Information)

5.4 IPMI

The X11DSC+ supports the Intelligent Platform Management Interface (IPMI). IPMI is used to provide remote access, monitoring and management. There are several BIOS settings that are related to IPMI.

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

Chapter 6

BIOS

6.1 Introduction

This chapter describes the AMIBIOS™ Setup utility for the X11DSC+ motherboard(s). The is stored in a flash chip and can be easily upgraded using a floppy disk-based program.

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

Starting the Setup Utility

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

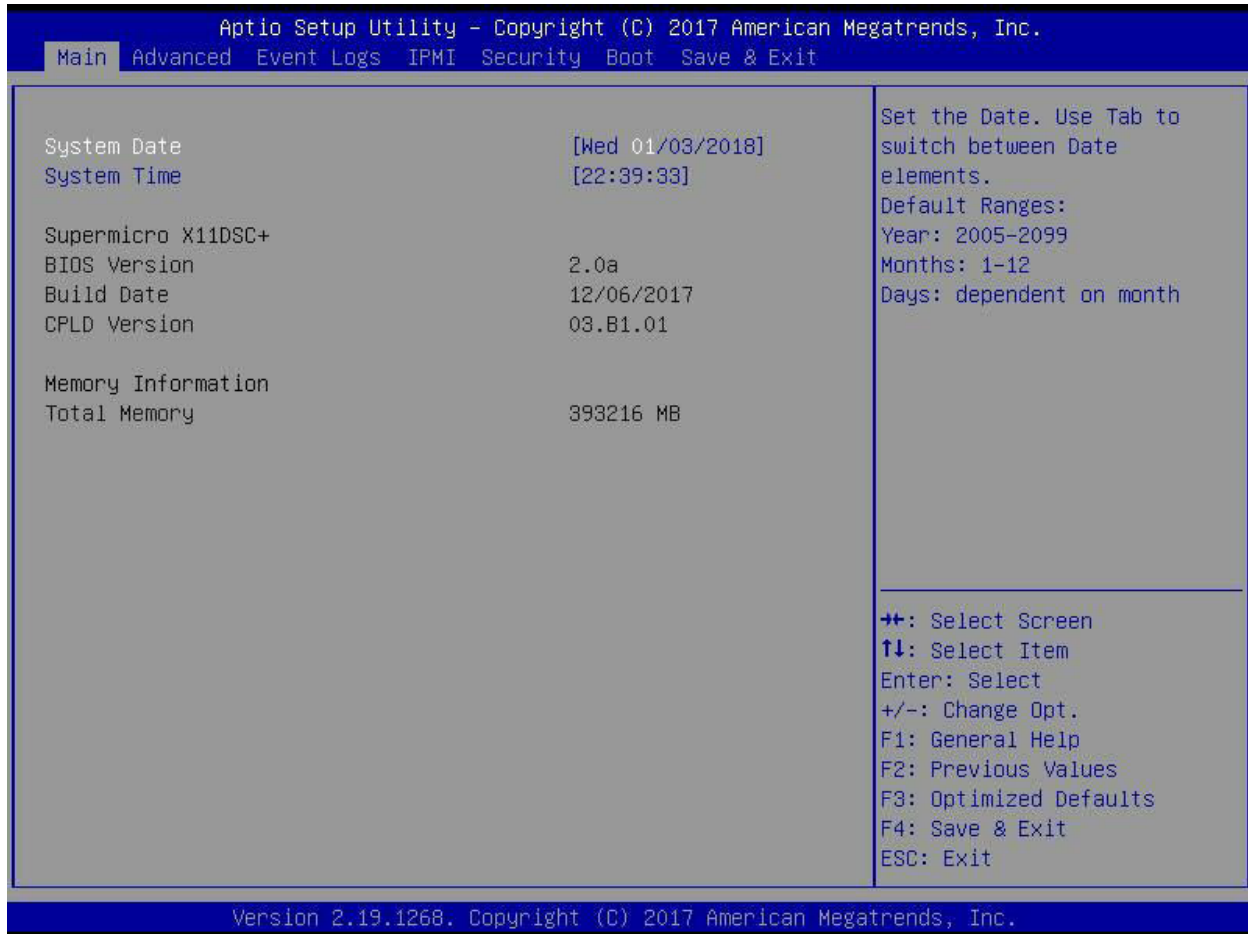
The Main BIOS screen has two main frames. The left frame displays all the options that can be configured. "Grayed-out" options cannot be configured. The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is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

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

The BIOS setup utility uses a key-based navigation system called hot keys. Most of these hot keys (<F1>, <F10>, <Enter>, <ESC>, <Arrow> keys, etc.) can be used at any time during the setup navigation process.

6.2 Main Menu

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



System Date/System Time

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

Note: The time is in the 24-hour format. For example, 5:30 P.M. appears as 17:30:00. The date's default value is 01/01/2014 after RTC reset.

Supermicro X11DSC+

BIOS Version

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

Build Date

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

CPLD Version

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

Memory Information

Total Memory

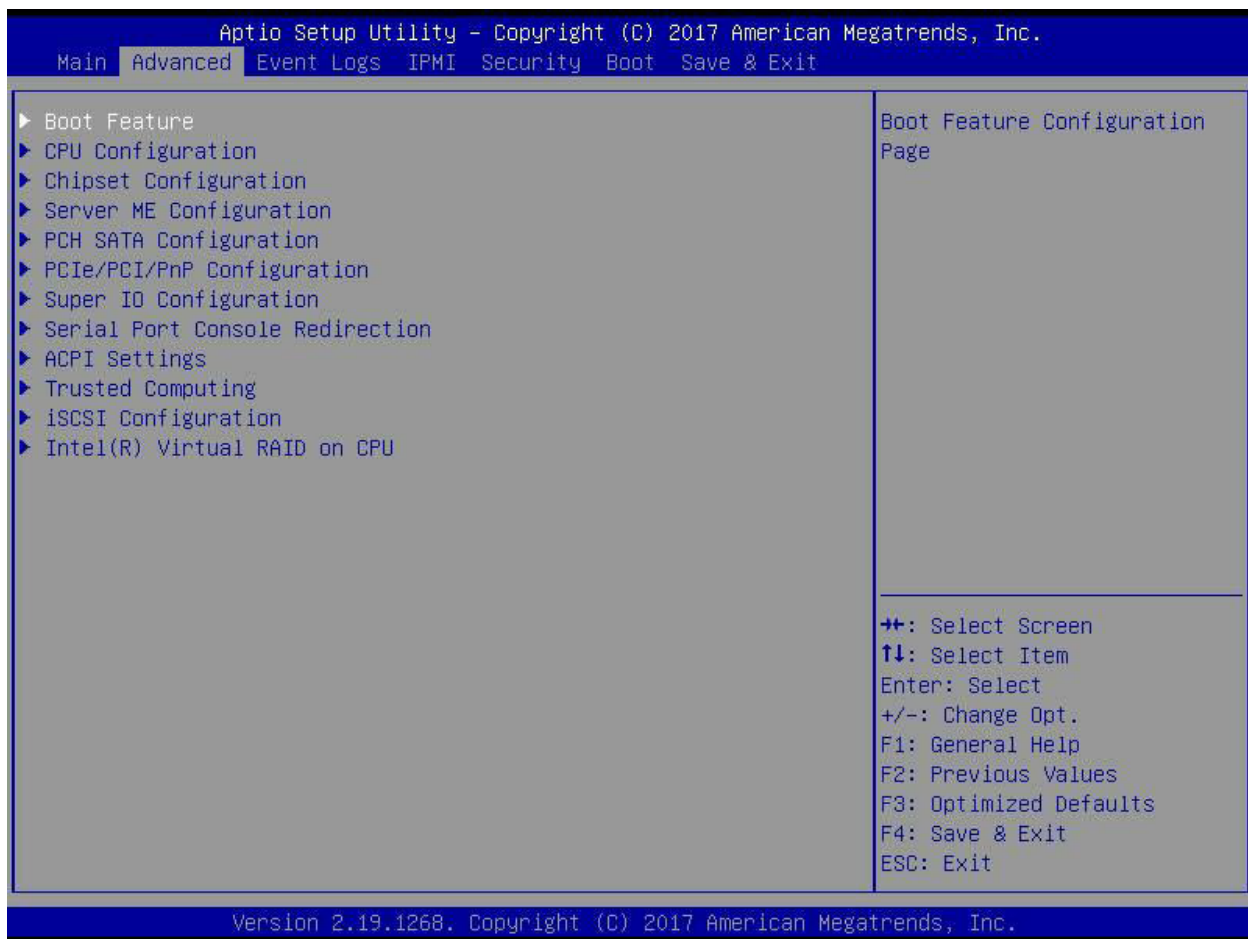
This item displays the total size of memory available in the system.

Memory Speed

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

6.3 Advanced Settings Menu

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



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

► Boot Feature

Quiet Boot

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

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

Option ROM Messages

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

Bootup NumLock State

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

Wait For "F1" If Error

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

INT19 Trap Response

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

Re-try Boot

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

Install Windows 7 USB support

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

Port 61h Bit-4 Emulation

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

Power Configuration

Watch Dog Function

If enabled, the Watch Dog Timer will allow the system to reset or generate NMI based on jumper settings when it is expired for more than 5 minutes. The options are **Disabled** and **Enabled**.

Restore on AC Power Loss

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

Power Button Function

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

Throttle on Power Fail

Throttling improves reliability and reduces power consumption in the processor via automatic voltage control during processor idle states. Select Enabled to decrease the system power by throttling CPU frequency when one power supply is failed. The options are **Disabled** and **Enabled**.

►CPU Configuration

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

Processor Configuration

The following CPU information will be displayed:

- Processor BSP Revision
- Processor Socket
- Processor ID
- Processor Frequency
- Processor Max Ration

- Processor Min Ration
- Microcode Revision
- L1 Cache RAM
- L2 Cache RAM
- L3 Cache RAM
- Processor 0 Version
- Processor 1 Version

Hyper-Threading [All] (Available when supported by the CPU)

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

Cores Enabled

This feature allows the user to determine the number of CPU cores to be enabled. Enter "0" to enable all cores. The default setting is 0, which enables all CPU cores in the system.

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

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

Intel Virtualization Technology (Available when supported by the CPU)

Select Enable to use Intel® Virtualization Technology so that I/O device assignments will be reported directly to the VMM (Virtual Memory Management) through the DMAR ACPI Tables. This feature offers fully-protected I/O resource-sharing across the Intel® platforms, providing the user with greater reliability, security and availability in networking and data-sharing. The options are Disable and **Enable**.

Note: If a change is made to this setting, you will need to reboot the system for the change to take effect. Refer to Intel's website for detailed information.

PPIN Control

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

Hardware Prefetcher (Available when supported by the CPU)

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

Adjacent Cache Prefetch (Available when supported by the CPU)

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

DCU Streamer Prefetcher (Available when supported by the CPU)

Select Enabled to enable Intel® CPU Advanced Encryption Standard (AES) Instructions for CPU to enhance data integrity. The options are **Enable** and Disable.

DCU IP Prefetcher (Available when supported by the CPU)

If this feature is set to Enable, the DCU (Data Cache Unit) IP prefetcher will prefetch IP addresses in advance to improve network connectivity and system performance. The options are **Enable** and Disable.

LLC Prefetch

Select Enable to support the LLC prefetch on all threads. The options are **Disable** and Enable.

Extended APIC

Select Enable to use the extended APIC (Advanced Programmable Interrupt Control) support to enhance power management. The options are **Disable** and Enable.

AES-NI

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

► Advanced Power Management Configuration**Power Technology**

Use this item to enable power management features. The options are Disable, **Energy Efficient**, and Custom. Select Energy Efficient to support power-saving mode. Select Custom to customize system power settings. Select Disable to disable power-saving settings.

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

This feature allows the user to set whether the operating system or the BIOS controls the Energy Performance BIAS (EPB). The options are **OS Controls EPB** and BIOS Controls EPB.

ENERGY_PERF_BIAS_CFG Mode (Available when Power Performance Tuning is set to BIOS Controls EPB)

The Energy Performance BIAS (EPB) feature allows the user to configure CPU power and performance settings. Select Maximum Performance to set the highest performance. Select Performance to optimize performance over energy efficiency. Select Balanced Performance to prioritize performance optimization while conserving energy. Select Balanced Power to prioritize energy conservation while maintaining good performance. Select Power to optimize energy efficiency over performance. The options are Maximum Performance, Performance, **Balanced Performance**, Balanced Power, and Power.

►CPU P State Control (Available when Power Technology is set to Custom)**SpeedStep (Pstates)**

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

EIST PSD Function

This feature allows the user to change the P-State (Power-Performance State) coordination type. P-State is also known as "SpeedStep" for Intel® processors. Select HW_ALL to change the P-State coordination type for all hardware components only. Select SW_ALL to change the P-State coordination type for all software installed in the system. Select SW_ANY to change the P-State coordination type for a particular software program specified by the user in the system. The options are **HW_ALL**, SW_ALL, and SW_ANY.

Turbo Mode (Available when Intel® EIST Technology is enabled)

Select Enable to use the Turbo Mode to boost system performance. The options are Disable and **Enable**.

►Hardware PM State Control (Available when Power Technology is set to Custom)**Hardware P-States**

This feature enables the hardware P-States support. The options are **Disable**, Native Mode, Out of Band Mode, and Native Mode with No Legacy Support.

► **CPU C State Control (Available when Power Technology is set to Custom)**

Autonomous Core C-State

Use this feature to enable the autonomous core C-State control. The options are **Disable** and **Enable**.

CPU C6 report

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

Enhanced Halt State (C1E)

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

► **Package C State Control (Available when Power Technology is set to Custom)**

Package C State

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

► **CPU T State Control (Available when Power Technology is set to Custom)**

Software Controlled T-States

This feature enables the software controlled T-States support. The options are **Disable** and **Enable**

► Chipset Configuration

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

► North Bridge

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

► UPI Configuration

UPI Configuration

This section displays the following UPI General Configuration information:

- Number of CPU
- Number of Active UPI Link
- Current UPI Link Speed
- Current UPI Link Frequency
- UPI Global MMIO Low Base/Limit
- UPI Global MMIO High Base/Limit
- UPI Pci-e Configuration Base/Size

Degrade Precedence

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

Link L0p Enable

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

Link L1 Enable

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

IO Directory Cache (IODC)

Use this feature to enable the IO Directory Cache (IODC) support. The options are Disable, Auto, Enable for Remote Invltom Hybrid Push, Invltom AllocFlow, Enable for Remote Invltom Hybrid AllocNonAlloc, and Enable for Remote Invltom and Remote WViLF.

SNC

Sub NUMA Clustering (SNC) is a feature that breaks up the Last Level Cache (LLC) into clusters based on address range. Each cluster is connected to a subset of the memory controller. Enabling SNC improves average latency and reduces memory access congestion to achieve higher performance. Select Auto for 1-cluster or 2-clusters depending on IMC interleave. Select Enable for Full SNC (2-clusters and 1-way IMC interleave). The options are Disable, Enable, and Auto.

XPT Prefetch

XPT Prefetch is a feature that speculatively makes a copy to the memory controller of a read request being sent to the LLC. If the read request maps to the local memory address and the recent memory reads are likely to miss the LLC, a speculative read is sent to the local memory controller. The options are **Disable** and Enable.

KTI Prefetch

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

Local/Remote Threshold

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

Stale AtoS

This feature optimizes A to S directory. When all snoop responses found in directory A are found to be Rspl, then all data is moved to directory S and is returned in S-state. The options are **Disable**, Enable, and Auto.

LLC Dead Line Alloc

Select Enable to optimally fill dead lines in LLC. Select Disable to never fill dead lines in LLC. The options are Disable, **Enable**, and Auto.

Isoc Mode

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

►Memory Configuration**Integrated Memory Controller (iMC)****Enforce POR**

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

Memory Frequency

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

Data Scrambling for NVMDIMM

Select Enable to enable data scrambling to enhance system performance and data integrity. The options are **Auto**, Disable, and Enable.

Data Scrambling for DDR4

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

tCCD_L Relaxation

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

Memory tRWSR Relaxation

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

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

2X Refresh Options

Use this item to select the 2X refresh mode. The options are **Auto** and Enable.

Page Policy

This feature allows the user to determine the desired page mode for IMC. When Auto is selected, the memory controller will close or open pages based on the current operation. Closed policy closes that page after reading or writing. Adaptive is similar to open page policy, but can be dynamically modified. The options are **Auto**, Closed, and Adaptive..

IMC Interleaving

This feature allows the user to configure Integrated Memory Controller (IMC) Interleaving settings. The options are **Auto**, 1-way Interleave, and 2-way Interleave.

►Memory Topology

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

►Memory RAS (Reliability_Availability_Serviceability) Configuration

Memory RAS Configuration Setup

Use this submenu to configure the following Memory RAS settings.

Static Virtual Lockstep Mode

Select Enable to support the static virtual lockstep mode. The options are **Disable** and Enable.

Mirror Mode

Use this item to select the mirror mode. The options are **Disable**, Mirror Mode 1LM, and Mirror Mode 2LM. If this item is set to Mirror Mode 1LM or Mirror Mode 2LM, the available memory capacity will be reduced by 50 percent.

UEFI ARM Mirror

Select Enable to support the UEFI-based address range mirroring with setup option. The options are **Disable** and Enable.

Memory Rank Sparing

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

****If the item above "Memory Rank Sparing" is set to Enable, the following item, "Multi Rank Sparing", will be available:***

Multi Rank Sparing

Use this feature to set the multiple rank sparing number. The default setting and the maximum is two ranks per channel. The options are One Rank and **Two Rank**.

Correctable Error Threshold

Use this item to enter the threshold value for correctable memory errors. The default setting is **10**.

Run Sure

Use this item to enable the Intel® Run Sure Technology. The options are **Disable** and Enable.

Patrol Scrub

Patrol Scrubbing is a process that allows the CPU to correct correctable memory errors detected on a memory module and send the correction to the requestor (the original source). When this item is set to Enable, read-and-write will be performed every 16K cycles per cache line if there is no delay caused by internal processing. The options are Disable and **Enable**.

Patrol Scrub Interval

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

► IIO Configuration

IIO Configuration

EV DFX Features

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

► CPU1 Configuration

IOU0 (IIO PCIe Br1)

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

IOU1 (IIO PCIe Br2)

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

IOU2 (IIO PCIe Br3)

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

► P1_NVMe0

Link Speed

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

PCI-E Port Link Status

PCI-E Port Link Max

PCI-E Port Link Speed

PCI-E Port Clocking

The options are Distinct and **Common**. If this item is set to Distinct, this component and the component at the opposite end of the Link are operating with separate reference clock sources. If this item is set to Common, this component and the component at the opposite end of the Link are operating with a common clock source.

PCI-E Port Max Payload Size

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

►P1_NVMe2**Link Speed**

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

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

The options are Distinct and **Common**. If this item is set to Distinct, this component and the component at the opposite end of the Link are operating with separate reference clock sources. If this item is set to Common, this component and the component at the opposite end of the Link are operating with a common clock source.

PCI-E Port Max Payload Size

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

►CPU1 JMEZZ1 PCI-E 3.0 x8**Link Speed**

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

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

The options are Distinct and **Common**. If this item is set to Distinct, this component and the component at the opposite end of the Link are operating with separate reference clock sources. If this item is set to Common, this component and the component at the opposite end of the Link are operating with a common clock source.

PCI-E Port Max Payload Size

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

►CPU2 Configuration

IOU0 (IIO PCIe Br1)

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

IOU1 (IIO PCIe Br2)

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

IOU2 (IIO PCIe Br3)

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

►CPU2 SLOT1 PCI-E 3.0 x8

Link Speed

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

PCI-E Port Link Status

PCI-E Port Link Max

PCI-E Port Link Speed

PCI-E Port Clocking

The options are Distinct and **Common**. If this item is set to Distinct, this component and the component at the opposite end of the Link are operating with separate reference clock sources. If this item is set to Common, this component and the component at the opposite end of the Link are operating with a common clock source.

PCI-E Port Max Payload Size

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

►CPU2 SLOT3 PCI-E 3.0 x16**Link Speed**

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

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

The options are Distinct and **Common**. If this item is set to Distinct, this component and the component at the opposite end of the Link are operating with separate reference clock sources. If this item is set to Common, this component and the component at the opposite end of the Link are operating with a common clock source.

PCI-E Port Max Payload Size

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

►CPU2 SLOT2 PCI-E 3.0 x16**Link Speed**

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

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

The options are Distinct and **Common**. If this item is set to Distinct, this component and the component at the opposite end of the Link are operating with separate reference clock sources. If this item is set to Common, this component and the component at the opposite end of the Link are operating with a common clock source.

PCI-E Port Max Payload Size

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

►CPU2 PcieBr3D02F0 - Port 3C**Link Speed**

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

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

The options are Distinct and **Common**. If this item is set to Distinct, this component and the component at the opposite end of the Link are operating with separate reference clock sources. If this item is set to Common, this component and the component at the opposite end of the Link are operating with a common clock source.

PCI-E Port Max Payload Size

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

►IOAT (Intel® IO Acceleration) Configuration

Disable TPH

Select Yes to deactivate TLP Processing Hint support. The options are **No** and Yes.

Prioritize TPH

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

Relaxed Ordering

Select Enable to enable Relaxed Ordering support which will allow certain transactions to violate the strict-ordering rules of PCI bus for a transaction to be completed prior to other transactions that have already been enqueued. The options are **Disable** and Enable.

►Intel® VT for Directed I/O (VT-d)

Intel® VT for Directed I/O (VT-d)

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

****If the item above is set to Enable, the following items will be available:***

Interrupt Remapping

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

PassThrough DMA

Select Enable to use the Non-Isoch VT_D engine pass through DMA support. The options are **Enable** and Disable.

ATS

Select Enable to use the Non-Isoch VT_D engine ATS support. The options are **Enable** and Disable.

Posted Interrupt

Use this feature to enable VT_D posted interrupt. The options are **Enable** and Disable.

Coherency Support (Non-Isoch)

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

►Intel® VMD technology

The Intel® Volume Management Device (VMD) is a host bridge to a secondary PCIe domain to provide more bus resources.

►Intel® VMD for Volume Management Device on CPU1

VMD Config for PStack0

Intel® VMD for Volume Management Device

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

****If the item above "Intel® VMD for Volume Management Device" is set to Enable, the following items will be displayed:***

P1_NVMe0 VMD (Available when the device is detected by the system)

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

P1_NVMe1 VMD (Available when the device is detected by the system)

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

P1_NVMe2 VMD (Available when the device is detected by the system)

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

P1_NVMe3 VMD (Available when the device is detected by the system)

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

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

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

► Intel® VMD for Volume Management Device on CPU2**VMD Config for PStack0****Intel® VMD for Volume Management Device**

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

****If the item above "Intel® VMD for Volume Management Device" is set to Enable, the following items will be displayed:***

CPU2 SLOT1 PCI-E 3.0 x8 VMD (Available when the device is detected by the system)

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

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

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

VMD Config for PStack1**Intel® VMD for Volume Management Device**

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

****If the item above "Intel® VMD for Volume Management Device" is set to Enable, the following items will be displayed:***

CPU2 SLOT3 PCI-E 3.0 x16 VMD (Available when the device is detected by the system)

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

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

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

VMD Config for PStack2

Intel® VMD for Volume Management Device

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

****If the item above "Intel® VMD for Volume Management Device" is set to Enable, the following items will be displayed:***

CPU2 SLOT2 PCI-E 3.0 x16 VMD (Available when the device is detected by the system)

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

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

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

IIO-PCIE Express Global Options

PCI-E Completion Timeout Disable

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

► South Bridge

The following South Bridge information will be displayed:

- USB Module Version
- USB Devices

Legacy USB Support

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

XHCI Hand-off

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

Port 60/64 Emulation

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

PCIe PLL SSC

Use this feature to enable PCI-E Phase-locked Loop (PLL) Spread Spectrum Clocking (SSC). The options are **Disable** and Enable.

►Server ME Configuration

This feature displays the following system ME configuration settings.

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

►PCH SATA Configuration**SATA Controller**

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

Configure SATA as

Select AHCI to configure a SATA drive specified by the user as an AHCI drive. Select RAID to configure a SATA drive specified by the user as a RAID drive. The options are **AHCI** and RAID.

SATA HDD Unlock

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

Aggressive Link Power Management

When this item is set to Enable, the SATA AHCI controller manages the power usage of the SATA link. The controller will put the link to a low power state when the I/O is inactive for an extended period of time, and the power state will return to normal when the I/O becomes active. The options are **Disable** and Enable.

****If the item above "Configure SATA as" is set to AHCI, the following items will be displayed:***

SATA Port 0~ Port 3

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

- Model number of drive and capacity
- Software Preserve Support

Hot Plug (SATA Port 0~ Port 3)

Select Enabled to enable a SATA port specified by the user. The options are Disable and **Enable**.

Spin Up Device (SATA Port 0~ Port 3)

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

SATA Device Type (SATA Port 0~ Port 3)

Use this item to specify if the SATA port specified by the user should be connected to a Solid State drive or a Hard Disk Drive. The options are **Hard Disk Drive** and Solid State Drive.

****If the item above "Configure SATA as" is set to RAID, the following items will be displayed:***

SATA HDD Unlock

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

SATA RSTe Boot Info

Select Enable to provide the full int13h support for SATA controller attached devices. The options are Disable and **Enable**.

Aggressive Link Power Management

When this item is set to Enable, the SATA Raid controller manages the power usage of the SATA link. The controller will put the link to a low power state when the I/O is inactive for an extended period of time, and the power state will return to normal when the I/O becomes active. The options are **Disable** and Enable.

SATA RAID Option ROM/UEFI Driver

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

SATA Port 0~ Port 3

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

- Model number of drive and capacity
- Software Preserve Support

Hot Plug (SATA Port 0~ Port 3)

Select Enabled to enable a SATA port specified by the user. The options are Disable and **Enable**.

Spin Up Device (SATA Port 0~ Port 3)

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

SATA Device Type (SATA Port 0~ Port 3)

Use this item to specify if the SATA port specified by the user should be connected to a Solid State drive or a Hard Disk Drive. The options are **Hard Disk Drive** and Solid State Drive.

►PCIe/PCI/PnP Configuration

The following information will be displayed:

- PCI Bus Driver Version

PCI Devices Common Settings:

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

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

SR-IOV Support

Use this feature to enable or disable Single Root IO Virtualization support. The options are **Disabled** and Enabled.

MMIO High Base

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

MMIO High Granularity Size

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

Maximum Read Request

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

MMCFG Base

Use this feature to select the default value for the PCI MMIO (Memory-Mapped IO) base address. The options are 1G, 1.5G, 1.75G, **2G**, 2.25G, and 3G.

NVMe Firmware Source

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

VGA Priority

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

CPU2 SLOT1 PCI-E 3.0 x8 OPROM, CPU2 SLOT2 PCI-E 3.0 x16 OPROM, CPU2 SLOT3 PCI-E 3.0 x16 OPROM, CPU1 JMEZZ1 PCI-E 3.0 x8 OPROM

Select Disabled to deactivate the selected slot, Legacy to activate the slot in legacy mode, and EFI to activate the slot in EFI mode. The options are Disabled, **Legacy**, and EFI.

Bus Master Enable

This item allows PCI bus driver enable/disable the bus master bit. The options are Enabled and **Disabled**.

Onboard LAN1 Option ROM

Use this item to select the type of device to be installed in LAN port1 used for system boot. The options are Disabled, **Legacy**, and EFI.

Onboard LAN2 Option ROM

Use this item to select the type of device to be installed in LAN port2 used for system boot. The options are **Disabled**, Legacy, and EFI.

Onboard NVMe1 Option ROM, Onboard NVMe2 Option ROM, Onboard NVMe3 Option ROM, Onboard NVMe4 Option ROM

Select Disabled to deactivate the selected slot, Legacy to activate the slot in legacy mode, and EFI to activate the slot in EFI mode. The options are Disabled, Legacy, and **EFI**.

Onboard Video Option ROM

Select Legacy to boot the system using a legacy video device installed on the motherboard. The options are Disabled, **Legacy**, and EFI.

► Network Stack Configuration

Network Stack

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

****If the item above "Network Stack" is set to Enabled, the following items will be displayed:***

Ipv4 PXE Support

Select Enabled to enable Ipv4 PXE boot support. The options are Disabled and **Enabled**.

Ipv4 HTTP Support

Select Enabled to enable Ipv4 HTTP boot support. The options are **Disabled** and Enabled.

Ipv6 PXE Support

Select Enabled to enable Ipv6 PXE boot support. The options are Disabled and **Enabled**.

Ipv6 HTTP Support

Select Enabled to enable Ipv6 HTTP boot support. The options are **Disabled** and Enabled.

PXE boot wait time

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

Media detect count

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

► Super IO Configuration

Super IO Configuration

The following Super IO information will be displayed:

- Super IO Chip AST2500

► Serial Port 1 Configuration

Serial Port 1 Configuration

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

Serial Port 1

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

Device Settings

This item displays the status of a serial port specified by the user.

Change Settings

This feature specifies the base I/O port address and the Interrupt Request address of a serial port specified by the user. Select Auto to allow the BIOS to automatically assign the base I/O and IRQ address. The options are **Auto**, (IO=3F8h; IRQ=4;), (IO=3F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;), (IO=2F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;), (IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;), and (IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;).

► Serial Port Console Redirection

COM1

Console Redirection

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

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

► Console Redirection Settings

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

COM1

Console Redirection Settings

Terminal Type

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

Bits Per second

Use this feature to set the transmission speed for a serial port used in Console Redirection. Make sure that the same speed is used in the host computer and the client computer. A lower transmission speed may be required for long and busy lines. The options are 9600, 19200, 38400, 57600, and **115200** (bits per second).

Data Bits

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

Parity

A parity bit can be sent along with regular data bits to detect data transmission errors. Select Even if the parity bit is set to 0, and the number of 1's in data bits is even. Select Odd if the parity bit is set to 0, and the number of 1's in data bits is odd. Select None if you do not want to send a parity bit with your data bits in transmission. Select Mark to add a mark as a parity bit to be sent along with the data bits. Select Space to add a Space as a parity bit to be sent with your data bits. The options are **None**, Even, Odd, Mark, and Space.

Stop Bits

A stop bit indicates the end of a serial data packet. Select 1 Stop Bit for standard serial data communication. Select 2 Stop Bits if slower devices are used. The options are **1** and **2**.

Flow Control

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

VT-UTF8 Combo Key Support

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

Recorder Mode

Select Enabled to capture the data displayed on a terminal and send it as text messages to a remote server. The options are **Disabled** and Enabled.

Resolution 100x31

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

Legacy OS Redirection Resolution

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

Putty KeyPad

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

Redirection After BIOS POST

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

SOL

Console Redirection

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

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

► Console Redirection Settings

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

SOL

Console Redirection Settings

Terminal Type

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

Bits Per second

Use this feature to set the transmission speed for a serial port used in Console Redirection. Make sure that the same speed is used in the host computer and the client computer. A lower transmission speed may be required for long and busy lines. The options are 9600, 19200, 38400, 57600, and **115200** (bits per second).

Data Bits

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

Parity

A parity bit can be sent along with regular data bits to detect data transmission errors. Select Even if the parity bit is set to 0, and the number of 1's in data bits is even. Select Odd if the parity bit is set to 0, and the number of 1's in data bits is odd. Select None if you do not want to send a parity bit with your data bits in transmission. Select Mark to add a mark as a parity bit to be sent along with the data bits. Select Space to add a Space as a parity bit to be sent with your data bits. The options are **None**, Even, Odd, Mark, and Space.

Stop Bits

A stop bit indicates the end of a serial data packet. Select 1 Stop Bit for standard serial data communication. Select 2 Stop Bits if slower devices are used. The options are **1** and 2.

Flow Control

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

VT-UTF8 Combo Key Support

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

Recorder Mode

Select Enabled to capture the data displayed on a terminal and send it as text messages to a remote server. The options are **Disabled** and Enabled.

Resolution 100x31

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

Legacy OS Redirection Resolution

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

Putty KeyPad

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

Redirection After BIOS POST

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

Legacy Console Redirection**Legacy Serial Redirection Port**

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

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

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

Console Redirection

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

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

► Console Redirection Settings

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

Out-of-Band Management Port

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

Terminal Type

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

Bits Per second

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

Flow Control

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

The settings below are displayed:

Data Bits, Parity, Stop Bits

►ACPI Settings

NUMA (Available when the OS supports this feature)

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

WHEA Support

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

High Precision Event Timer

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

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

Security Device Support

If a Trusted Platform Module (TPM) device is connected to the TPM header (JTPM1) on the motherboard and this feature is set to Enable, onboard security devices will be available for the TPM support to enhance data integrity and network security. Please reboot the system for a change on this setting to take effect. The options are Disable and **Enable**.

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

The following Platform Configuration Register information will be displayed:

- **Active PCR banks**
- **Available PCR banks**

SHA256 PCR Bank

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

Pending operation

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

Platform Hierarchy

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

Storage Hierarchy

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

Endorsement Hierarchy

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

PH Randomization

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

SMC BIOS -Based TPM Provision Support

Use this feature to enable TPM Provision Support. Enabling this feature will lock your TPM. Once locked, the NV indexes will not be able to be deleted. The options are **Disabled** and Enabled.

TXT Support

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

► iSCSI Configuration (refer to Appendix G for more information)

iSCSI Initiator Name

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

► Add an Attempt

► Delete Attempts

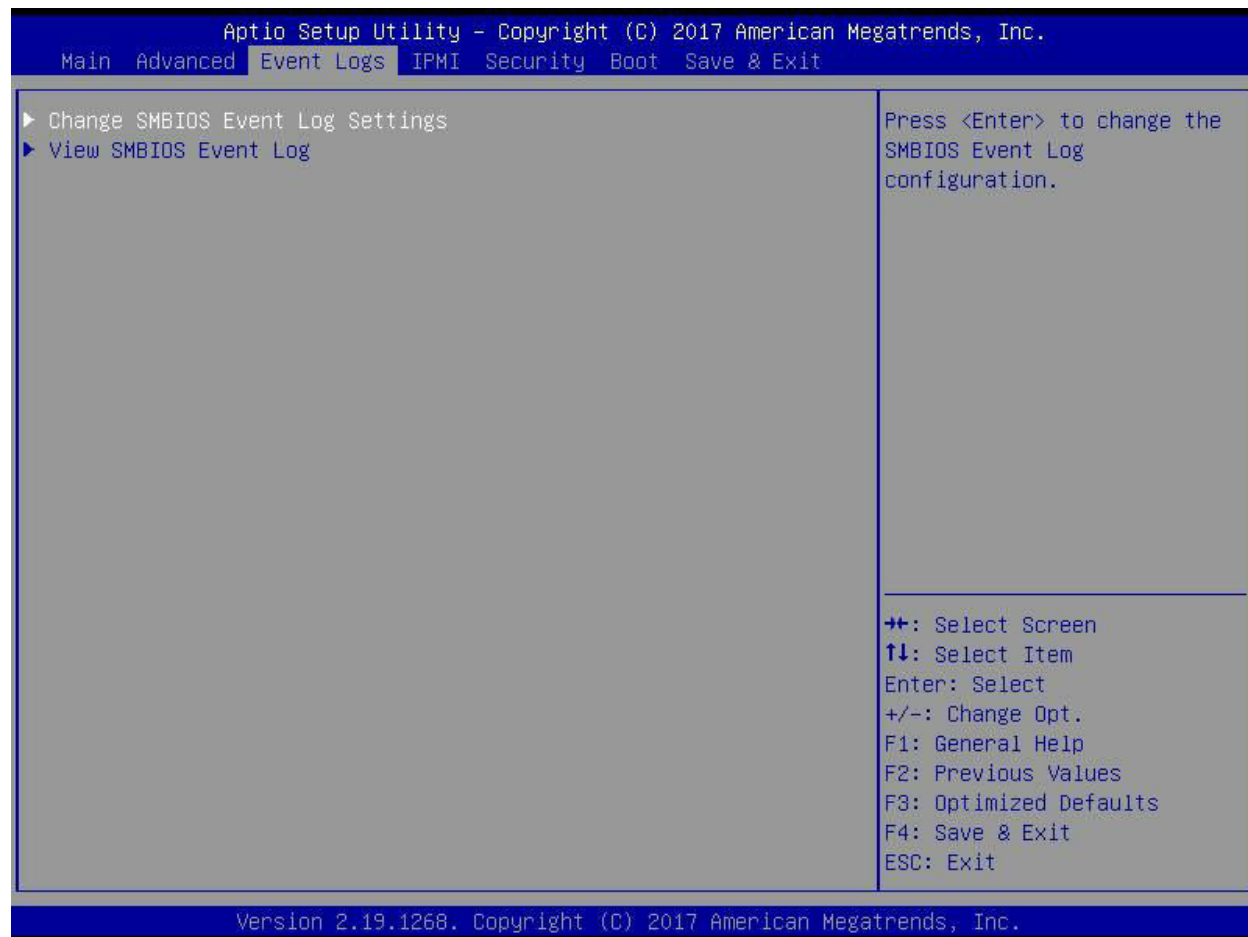
► Change Attempt order

► Intel® Virtual RAID on CPU (refer to Appendix E for more information)

This submenu displays the information of the Intel® VMD controllers as detected by the BIOS.

6.4 Event Logs

Use this feature to configure Event Log settings.



► Change SMBIOS Event Log Settings

Enabling/Disabling Options

SMBIOS Event Log

Change this item to enable or disable all features of the SMBIOS (System Management BIOS) Event Logging during system boot. The options are Disabled and **Enabled**.

Erasing Settings

Erase Event Log

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

When Log is Full

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

SMBIOS Event Log Standard Settings**Log System Boot Event**

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

MECI

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

METW

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

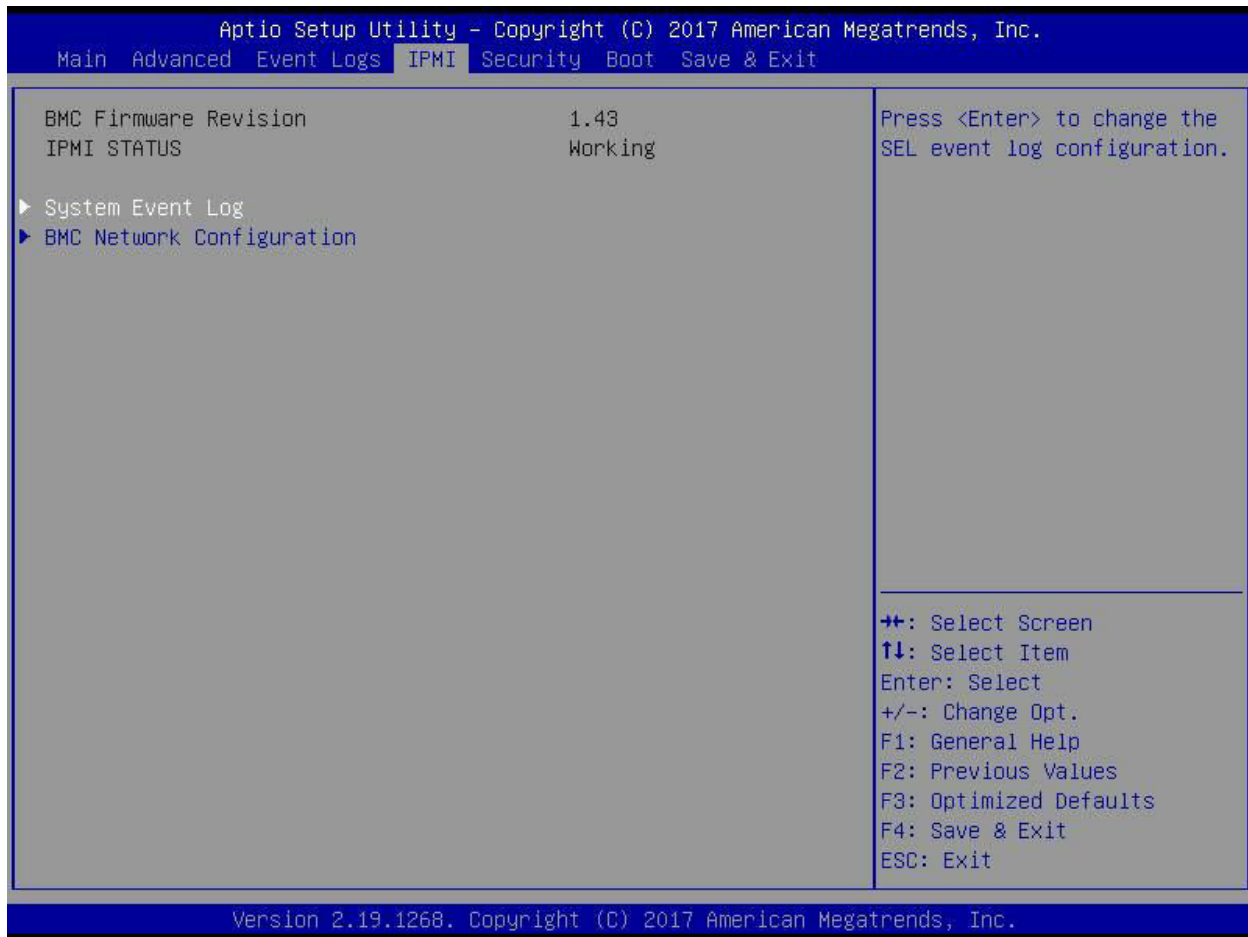
Note: After making changes on a setting, be sure to reboot the system for the changes to take effect.

►View SMBIOS Event Log

This section displays the contents of the SMBIOS Event Log.

6.5 IPMI

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



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

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

► System Event Log

Enabling/Disabling Options

SEL Components

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

Erasing Settings

Erase SEL

Select Yes, On next reset to erase all system event logs upon next system reboot. Select Yes, On every reset to erase all system event logs upon each system reboot. Select No to keep all system event logs after each system reboot. The options are **No**, Yes, On next reset, and Yes, On every reset.

When SEL is Full

This feature allows the user to determine what the BIOS should do when the system event log is full. Select Erase Immediately to erase all events in the log when the system event log is full. The options are **Do Nothing** and Erase Immediately.

Custom EFI Logging Options

Log EFI Status Codes

Select EFI (Extensible Firmware Interface) Status Codes to log EFI status codes. Select Error Codes to log EFI error codes. Select Progress Code to log the EFI progress code. Select both to log both EFI error codes and progress codes. The options are Disabled, Both, **Error code** and Progress code.

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

►BMC Network Configuration

The following items will be displayed:

- IPMI LAN Selection: This feature displays the IPMI LAN setting. The default setting is **Failover**.
- IPMI Network Link Status: This item displays the IPMI Network Link status. The default setting is **Dedicated LAN**.
- Current Configuration Address Source: This feature displays the source of the current IPMI LAN address. The default setting is **DHCP (Dynamic Host Configuration Protocol)**.
- Station IP Address: This feature displays the Station IP address for this computer. This should be in decimal and in dotted quad form (i.e., 192.168.10.253).
- Subnet Mask: This feature displays the sub-network that this computer belongs to. The value of each three-digit number separated by dots should not exceed 255.
- Station MAC Address: This feature displays the Station MAC address for this computer. Mac addresses are 6 two-digit hexadecimal numbers.

- Gateway IP Address: This feature displays the Gateway IP address for this computer. This should be in decimal and in dotted quad form (i.e., 192.168.10.253).
- VLAN: Select Enabled to enable IPMI VLAN support. The options are **Enabled** and Disabled.

Update IPMI LAN Configuration

Select Yes for the BIOS to implement all IP/MAC address changes at the next system boot. The default setting is **Yes**.

IPMI LAN Selection

Use this feature to configure the IPMI LAN mode setting. The options are Dedicated, Shared, and **Failover**.

VLAN Support

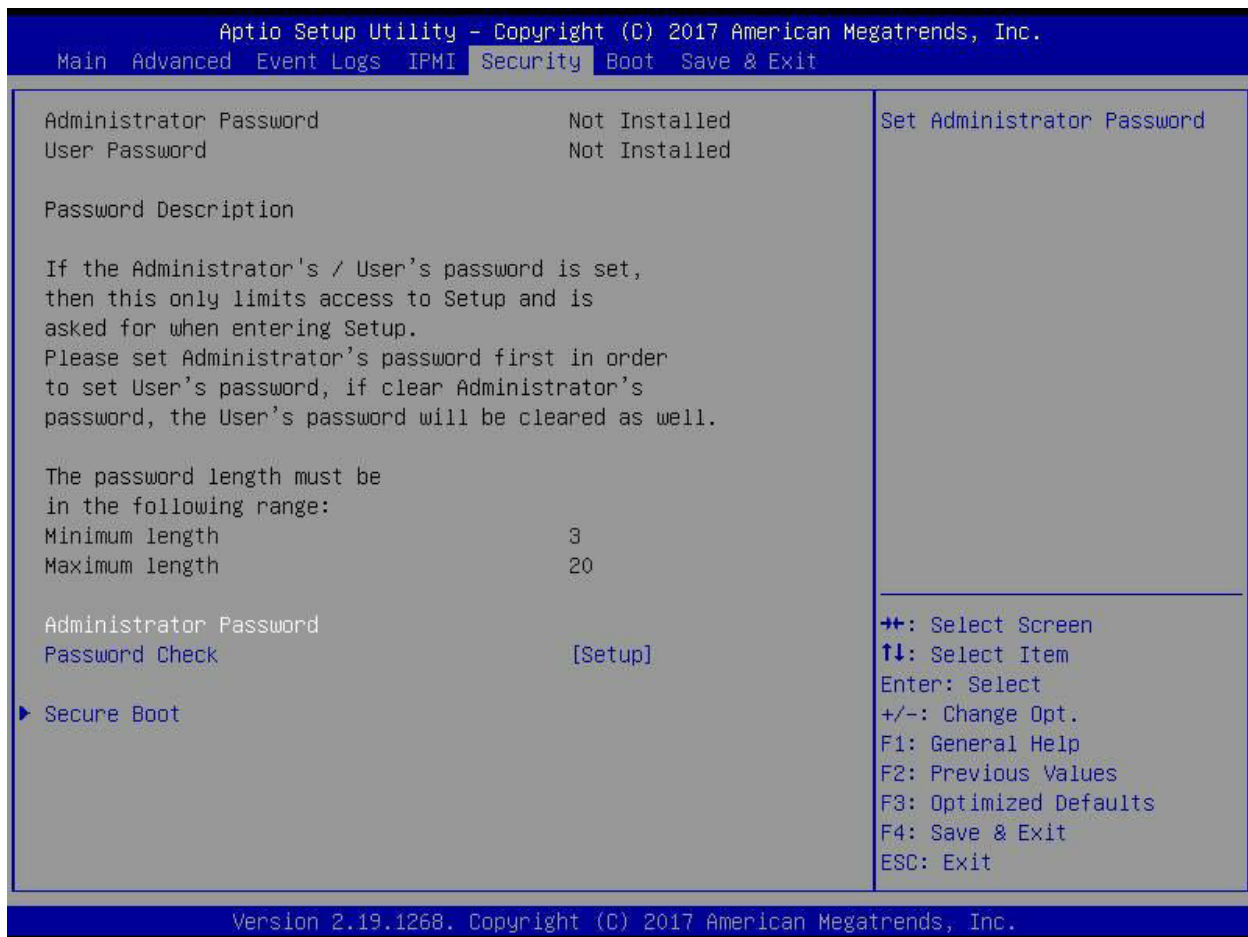
Select Enabled for IPMI VLAN support. The options are **Disabled** and Enabled.

Configuration Address Source

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

6.6 Security Settings

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



Administrator Password

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

Password Check

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

► Secure Boot

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

- System Mode
- Secure Boot
- Vendor Keys

Secure Boot

This feature is available when the platform key (PK) is pre-registered where the platform operates in the user mode and compatibility support module (CSM) support is disabled in the BIOS Setup utility. Select Enabled for secure boot flow control. The options are **Disabled** and **Enabled**.

Secure Boot Mode

This feature allows selection of the secure boot mode. The options are Standard and **Custom**. Select Standard to load manufacturer's default secure variables. Selecting Custom allows users to change the image execution policy and to manage secure boot keys.

CSM Support

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

► Key Management

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

Provision Factory Defaults

This feature allows provisioning the default secure boot keys set by the manufacturer when system is in the setup mode. The options are **Disabled** and **Enabled**.

► Enroll all Factory Default Keys

Select Yes to install all default secure keys set by the manufacturer. The options are **Yes** and **No**.

► Enroll Efi Image

This feature allows the image to run in the secure boot mode and the enroll of SHA256 hash of the binary into the Authorized Signature Database (DB).

► Save all Secure Boot variables

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

Secure Boot variable: Size/ Key#/ Key Source

►Platform Key (PK)

The Platform Key (PK), which is pre-installed in firmware during manufacturing, provides full control of the secure boot key hierarchy. The options are **Save to File**, Set New, and Erase.

►Key Exchange Keys (KEK)

The Key Exchange Key (KEK), which is held by the operating system vendor, can be updated by the holder of the PK and be used by secure boot to protect access to signatures databases. The options are **Save to File**, Set New, Append, and Erase.

►Authorized Signatures

Authorized Signature Database (DB) contains authorized signing certificates and digital signatures. The options are **Save to File**, Set New, Append, and Erase.

►Forbidden Signatures

Forbidden Signature Database (DBX), which is the inverse of DB, contains forbidden certificates and digital signatures. The options are **Save to File**, Set New, Append, and Erase

►Authorized TimeStamps

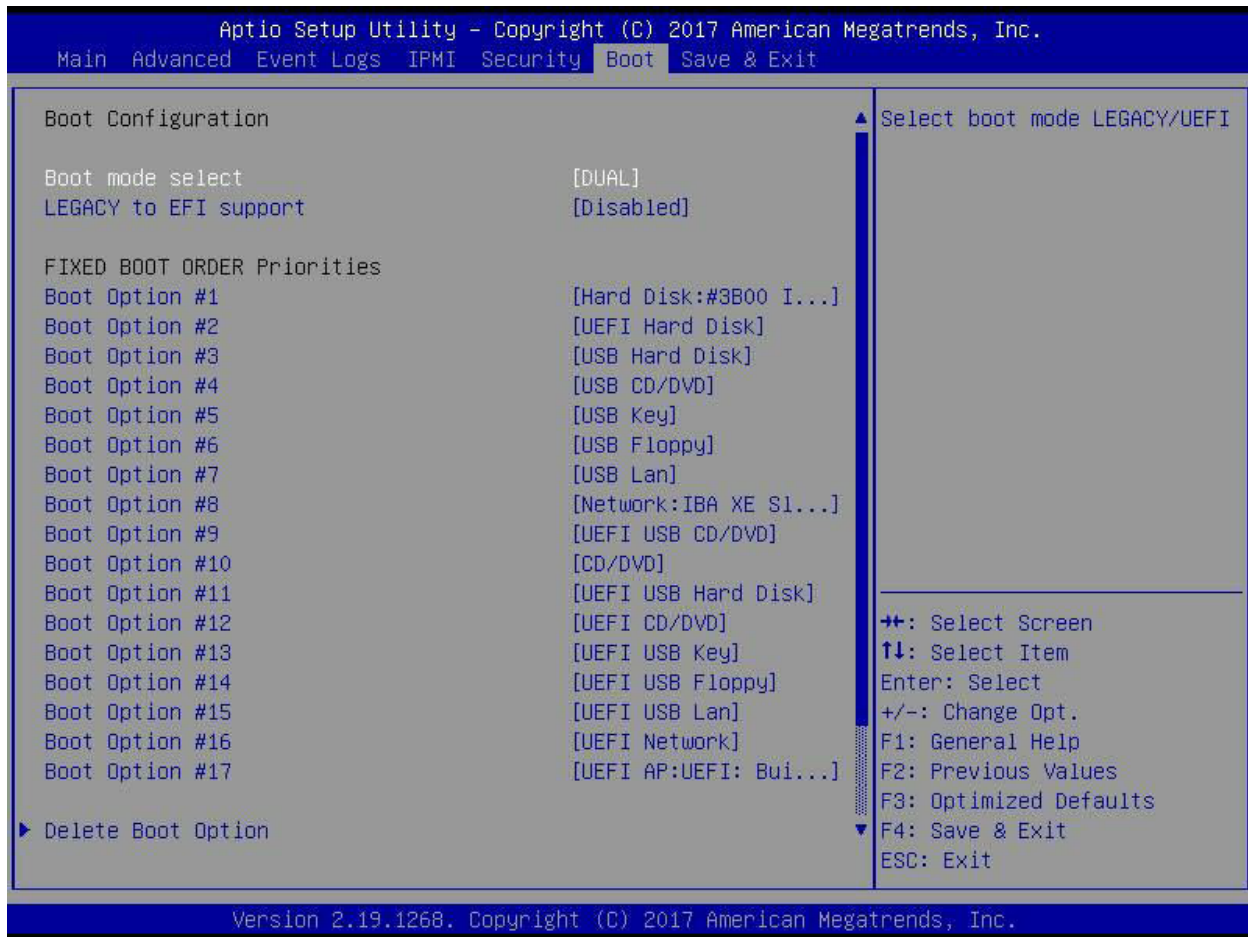
Authorized Timestamp Database (DBT) is used to issue and check signed time stamp certificates. The options are Save to File, Set New, Append, and Erase

►OsRecovery Signatures

OsRecovery Signatures Database (DBR) contains secure boot authorized recovery variables. The options are **Save to File**, Set New, Append, and Erase

6.7 Boot Settings

Use this feature to configure Boot Settings:



Use this feature to configure Boot Settings:

Boot mode select

Use this item to select the type of device that the system is going to boot from. The options are LEGACY, UEFI, and **DUAL**. The default setting is **DUAL**.

LEGACY to EFI support

Use this item to enable the EFI boot support. The options are **Disabled** and Enabled.

FIXED BOOT ORDER Priorities

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

****If the item above, "Boot mode select", is set to Legacy/UEFI/Dual, the following items will be displayed:***

- Legacy/UEFI/Dual Boot Order #1
- Legacy/UEFI/Dual Boot Order #2

- Legacy/UEFI/Dual Boot Order #3
- Legacy/UEFI/Dual Boot Order #4
- Legacy/UEFI/Dual Boot Order #5
- Legacy/UEFI/Dual Boot Order #6
- Legacy/UEFI/Dual Boot Order #7
- Legacy/UEFI/Dual Boot Order #8
- UEFI/Dual Boot Order #9
- Dual Boot Order #10
- Dual Boot Order #11
- Dual Boot Order #12
- Dual Boot Order #13
- Dual Boot Order #14
- Dual Boot Order #15
- Dual Boot Order #16
- Dual Boot Order #17

►Delete Boot Option

Use this feature to remove a pre-defined boot device from which the system will boot during startup. The options are **Select one to Delete**, UEFI: Built-in EFI Shell, and CentOS.

►UEFI Application Boot Priorities

This feature allows the user to specify which UEFI devices are boot devices.

Boot Option #1

The options are **UEFI: Built-in EFI Shell** and Disabled.

►Hard Disk Drive BBS Priorities

This feature allows the user to specify the boot device priority from the available hard disk drives.

Boot Option #1

The options are **(the available hard disk drive)** and Disabled.

►Network Drive BBS Priorities

This feature allows the user to specify which available network drives are boot devices.

Boot Option #1

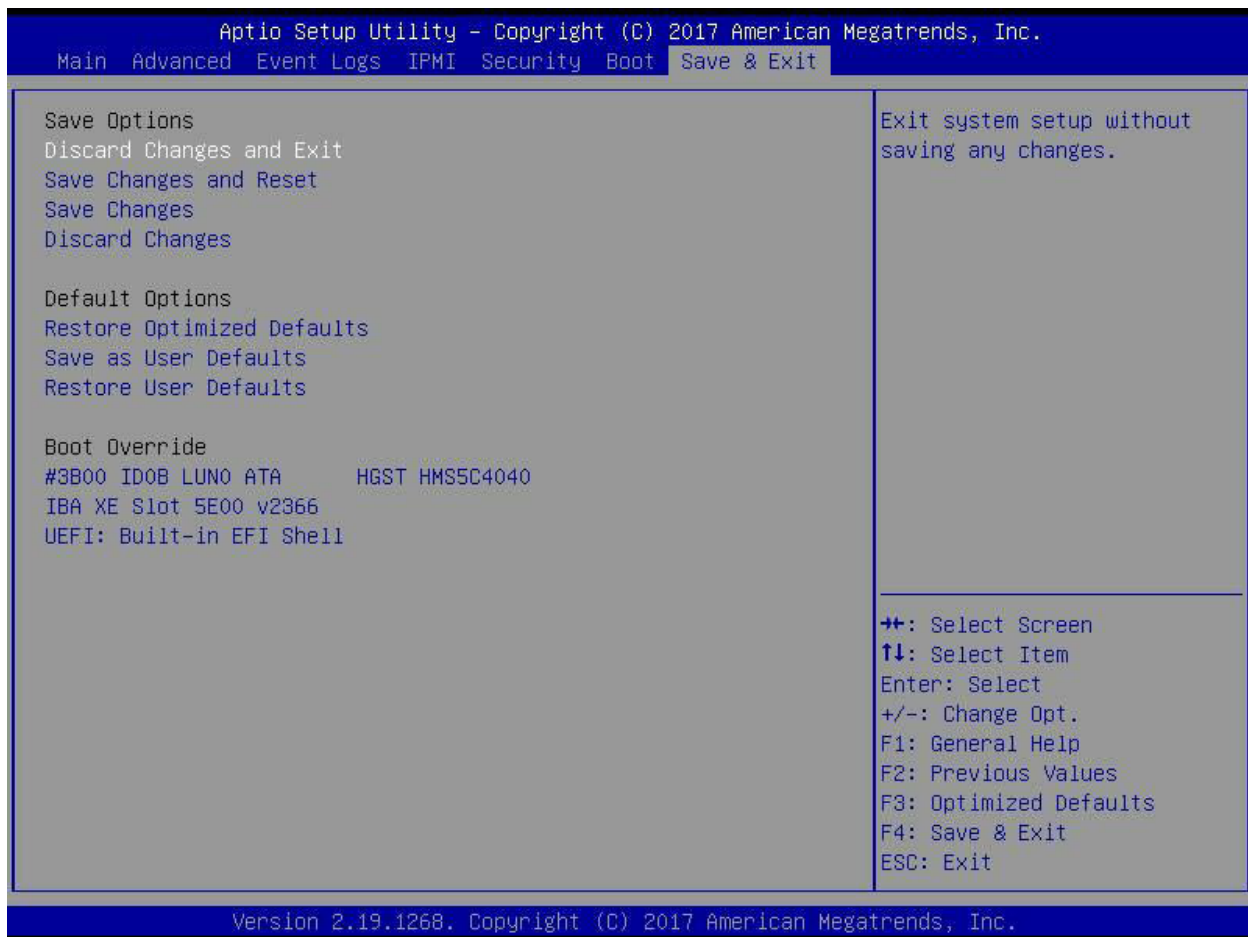
The options are **IBA XE Slot 0100 v2398** and Disabled.

►UEFI Application Boot Priorities

- Boot Option #1

6.8 Save & Exit

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



Save Options

Discard Changes and Exit

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

Save Changes and Reset

After completing the system configuration changes, select this option to save the changes you have made. This will reset (reboot) the system.

Save Changes

When you have completed the system configuration changes, select this option to save all changes made. This will not reset (reboot) the system.

Discard Changes

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

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

Default Options

Restore Optimized Defaults

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

Save As User Defaults

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

Restore User Defaults

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

Boot Override

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

Appendix A

BIOS Error Codes

A.1 BIOS Error POST (Beep) Codes

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

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

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

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

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

A.2 Additional BIOS POST Codes

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

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

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

Appendix B

Standardized Warning Statements for AC Systems

B.1 About Standardized Warning Statements

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

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

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

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。

您目前所處的工作環境可能讓您受傷。在您使用任何設備之前，請注意觸電的危險，並且要熟悉預防事故發生的標準工作程序。請依照每一注意事項後的號碼找到相關的翻譯說明內容。

Warnung

WICHTIGE SICHERHEITSHINWEISE

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

BEWAHREN SIE DIESE HINWEISE GUT AUF.

INSTRUCCIONES IMPORTANTES DE SEGURIDAD

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

GUARDE ESTAS INSTRUCCIONES.

IMPORTANTES INFORMATIONS DE SÉCURITÉ

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

CONSERVEZ CES INFORMATIONS.

תקנון הזהרות אזהרה

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

اَكْ فِ حَالَةٍ وُكِي اَيُّ تَتَسَبَّبُ فِ اَصَابَةِ جَسَدٍ هَذَا الزَّهْرُ عُ خَطَرٌ! تَحْذَرُ .
 قَبْلَ اَيُّ تَعْوَلُ عَلَى اَيُّ هَعْدَاتٍ، كِي عَلَى عِلْنِ بِالْوَحَاظِ اِلْ اُجُوَّةِ عِي الذَّوَائِرِ
 الْكَهْزِبَائِيَّةِ
 وَكِي عَلَى دَرَاةٍ بِالْوَوَارِسَاتِ النِّقَائِيَّةِ لَوْ عُ وَقَعَ اَيُّ حَادَثٍ
 اسْتَخْدَمَ رَقْنِ الْبِ اِيَّ الْوَصُصِ فَ هَآءُ كُلُّ تَحْذَرُ لِلْعَشْرِ تَزْجُوتَهَا

안전을 위한 주의사항

경고!

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

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

BELANGRIJKE VEILIGHEIDSINSTRUCTIES

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

BEWAAR DEZE INSTRUCTIES

Installation Instructions



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

設置手順書

システムを電源に接続する前に、設置手順書をお読み下さい。

警告

将此系统连接电源前,请先阅读安装说明。

警告

將系統與電源連接前，請先閱讀安裝說明。

Warnung

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

¡Advertencia!

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

Attention

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

יש לקרוא את הוראות התקנה לפני חיבור המערכת למקור מתח.

اقرأ إرشادات التركيب قبل توصيل النظام إلى مصدر للطاقة

시스템을 전원에 연결하기 전에 설치 안내를 읽어주십시오.

Waarschuwing

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

Circuit Breaker

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

サーキット・ブレーカー

この製品は、短絡(過電流)保護装置がある建物での設置を前提としています。

保護装置の定格が250 V、20 Aを超えないことを確認下さい。

警告

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

警告

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

Warnung

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

¡Advertencia!

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

Attention

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

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

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

경고!

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

Waarschuwing

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

Power Disconnection Warning



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

電源切斷の警告

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

警告

在你打开机箱并安装或移除内部器件前,必须将系统完全断电,并移除电源线。

警告

在您打開機殼安裝或移除內部元件前，必須將系統完全斷電，並移除電源線。

Warnung

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

¡Advertencia!

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

Attention

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

אזהרה מפני ניתוק חשמלי

אזהרה!

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

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

경고!

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

Waarschuwing

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

Equipment Installation



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

機器の設置

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

警告

只有经过培训且具有资格的人员才能进行此设备的安装、更换和维修。

警告

只有經過受訓且具資格人員才可安裝、更換與維修此設備。

Warnung

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

¡Advertencia!

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

Attention

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

אזהרה!

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

والمدربيه لتزكيب واستبدال أو خدمة هذا الجهاز يجب أن يسمح فقط للموظفيه المؤهليه

경고!

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

Waarschuwing

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

Restricted Area

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

アクセス制限区域

このユニットは、アクセス制限区域に設置されることを想定しています。

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

警告

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

警告

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

Warnung

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

¡Advertencia!

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

Attention

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

אזור עם גישה מוגבלת

אזהרה!

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

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

경고!

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

Waarschuwing

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

Battery Handling



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

電池の取り扱い

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

警告

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

警告

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

Warnung

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

Attention

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

¡Advertencia!

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

אזהרה!

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

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

경고!

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

Waarschuwing

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

Redundant Power Supplies



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

冗長電源装置

このユニットは複数の電源装置が接続されている場合があります。

ユニットの電源を切るためには、すべての接続を取り外さなければなりません。

警告

此部件连接的电源可能不止一个，必须将所有电源断开才能停止给该部件供电。

警告

此裝置連接的電源可能不只一個，必須切斷所有電源才能停止對該裝置的供電。

Warnung

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

¡Advertencia!

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

Attention

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

אם קיים יותר מספק אחד

אזהרה!

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

قد يكون لهذا الجهاز عدة اتصالات بوحدات امداد الطاقة .

يجب إزالة كافة الاتصالات لعسل الوحدة عن الكهرباء

경고!

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

Waarschuwing

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

Backplane Voltage



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

バックプレーンの電圧

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

修理する際には注意ください。

警告

当システム正在进行时，背板上有很危险的电压或能量，进行维修时务必小心。

警告

當系統正在進行時，背板上有危險的電壓或能量，進行維修時務必小心。

Warnung

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

¡Advertencia!

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

Attention

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

מתח בפנל האחורי

אזהרה!

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

هناك خطر من التيار الكهربائي أو الطاقة المبددة على الساحة
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 instalacion del equipo debe cumplir con las normas de electricidad locales y nacionales.

Attention

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

תיאום חוקי החשמל הארצי

אזהרה!

התקנת הציוד חייבת להיות תואמת לחוקי החשמל המקומיים והארציים.

تركيب المعدات الكهربائية يجب أن يمثل للقوايه المحلية والبطية المتعلقة
بالكهرباء

경고!

현 지역 및 국가의 전기 규정에 따라 장비를 설치해야 합니다.

Waarschuwing

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

Product Disposal



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

製品の廃棄

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

警告

本产品的废弃处理应根据所有国家的法律和规章进行。

警告

本產品的廢棄處理應根據所有國家的法律和規章進行。

Warnung

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

¡Advertencia!

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

Attention

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

סילוק המוצר

אזהרה!

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

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

경고!

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

Waarschuwing

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

Hot Swap Fan Warning



Warning! Hazardous moving parts. Keep away from moving fan blades. The fans might still be turning when you remove the fan assembly from the chassis. Keep fingers, screwdrivers, and other objects away from the openings in the fan assembly's housing.

ファン・ホットスワップの警告

警告!回転部品に注意。運転中は回転部(羽根)に触れないでください。シャーシから冷却ファン装置を取り外した際、ファンがまだ回転している可能性があります。ファンの開口部に、指、ドライバー、およびその他のものを近づけないで下さい。

警告!

警告! 危险的可移动性零件。请务必与转动的风扇叶片保持距离。当您从机架移除风扇装置，风扇可能仍在转动。小心不要将手指、螺丝起子和其他物品太靠近风扇

警告

危险的可移动性零件。请务必与转动的风扇叶片保持距离。当您从机架移除风扇装置，风扇可能仍在转动。小心不要将手指、螺丝起子和其他物品太靠近风扇。

Warnung

Gefährlich Bewegende Teile. Von den bewegenden Lüfterblätter fern halten. Die Lüfter drehen sich u. U. noch, wenn die Lüfterbaugruppe aus dem Chassis genommen wird. Halten Sie Finger, Schraubendreher und andere Gegenstände von den Öffnungen des Lüftergehäuses entfernt.

¡Advertencia!

Riesgo de piezas móviles. Mantener alejado de las aspas del ventilador. Los ventiladores podran dar vuelta cuando usted quite el montaje del ventilador del chasis. Mantenga los dedos, los destornilladores y todos los objetos lejos de las aberturas del ventilador

Attention

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

אזהרה!

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

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

경고!

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

Waarschuwing

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

Power Cable and AC Adapter



Warning! When installing the product, use the provided or designated connection cables, power cables and AC adaptors. Using any other cables and adaptors could cause a malfunction or a fire. Electrical Appliance and Material Safety Law prohibits the use of UL or CSA -certified cables (that have UL/CSA shown on the code) for any other electrical devices than products designated by Supermicro only.

電源コードとACアダプター

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

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

警告

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

警告

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

Warnung

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

¡Advertencia!

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

Attention

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

AC ימאתמו מילמשח 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 או CSA-ב וא UL -ב מיכמסומה 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 ענדחמל וא ערפוטמל תאליצוטל מודחטסאב מץ, גתנמל ביגרת דנע כלז יפ אמב עילחמל עמאלסל תאבלטתמו נינאוץב מאזתלל עמ דדרתמל ראיטל תאלוחמו עיזאברמלל קיירח וא לטע יפ בבסטטי דץ ירזא תאלוחמו תאלבאלא יא מודחטסא. מילסל סבאלל ולסומל מץ ח CSA וא UL לבק נמ ענדחמל תאלבאלא מודחטסא תאדעמל עיזאברמלל עזגאלל עמאלסל נונאק רזחי Supermicro לבק נמ ענדחמל עינעמל תאגתנמל ריזג ירזא תאדעמ יא עמ (UL/CSA) עמאלע למחתיטלל

전원 케이블 및 AC 어댑터

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

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

Stroomkabel en AC-Adapter

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

Appendix C

System Specifications

Processors

Dual Intel Xeon 81xx/61xx/51xx/41xx/31xx series or 82xx/62xx/52xx/42xx/32xx series processors in an LGA 3647 type socket

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

Chipset

Intel C621

BIOS

256 Mb AMI BIOS® SPI Flash ROM

Memory

Up to 6TB 3DS ECC RDIMM/LRDIMM to speeds of DDR4-2933MHz in 24 DIMM slots (82xx/62xx/52xx/42xx/32xx series processors)

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

Storage

Forty-five top-loaded hot-swap 3.5" drives, with 2.5" option

Two hot-swap 2.5" drives (rear)

Optional six NVMe drives supported.

PCI Expansion Slots

Three PCI-E 3.0 x8 slots for Add-On-Module (AOM)

Motherboard

X11DSC+; 12" ATX (W) x 9.6" (L) (305 mm x 244 mm)

Chassis

SC946LTS-R1K66P; 4U Rackmount, 17.2 x 7.0 x 26 in. / 437 x 178 x 660 mm. (W x H x D)

System Cooling

Five 8-cm 14.4K RPM PWM fans, two CPU heatsinks

Power Supply

Model: PWR-1K66A-1R, 80 Plus Titanium level (redundant power modules)

Total Output Power: 1000/1600W

Input:

100-127Vac / 12.9A Max / 50-60Hz

200-240Vac / 9.5A Max / 50-60Hz

Rated Output Power:

+12 V

Max: 82A / Min: 0.1A (100-127Vac)

Max: 132A / Min: 0.1A (200-240Vac)

12 V Standby

Max: 2A / Min: 0.2A

Operating Environment

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

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

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

Non-operating Relative Humidity: 5% to 95% (non-condensing)

Regulatory Compliance

Electromagnetic Emissions: FCC Class A, EN 55032 Class A, EN 61000-3-2/3-3, CISPR 32 Class A

Electromagnetic Immunity: EN 55024/CISPR 24, (EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11)

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

Other: VCCI-CISPR 32 and AS/NZS CISPR 32

Environmental: Directive 2011/65/EU, Delegated Directive (EU) 2015/863 and Directive 2012/19/EU

Perchlorate Warning

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

Appendix D

CPU-Based RAID for NVMe

Intel® Virtual RAID on CPU (Intel VROC) is an enterprise RAID solution for NVMe SSDs directly attached to Intel Xeon Scalable processors. Intel Volume Management Device (VMD) is an integrated controller inside the CPU PCI-E root complex.

- A single processor supports up to 12 NVMe SSDs and up to 6 RAID arrays.
- A dual processor system supports up to 24 NVMe SSDs and 12 RAID arrays.

Strip sizes are 4K, 8K, 16K, 32K, 64K, 128K.

Requirements and Restrictions

- **Intel VROC is only available when the system is configured for UEFI boot mode.**
- To enable the **mdadm** command and support for RSTe, install the patch from
 - Linux: <https://downloadcenter.intel.com/download/28158/Intel-Virtual-RAID-on-CPU-Intel-VROC-and-Intel-Rapid-Storage-Technology-enterprise-Intel-RSTe-Driver-for-Linux->
 - Windows: <https://downloadcenter.intel.com/download/28108/Intel-Virtual-RAID-on-CPU-Intel-VROC-and-Intel-Rapid-Storage-Technology-enterprise-Intel-RSTe-Driver-for-Windows->
- To enable Intel VROC, a hardware key must be inserted on the motherboard, and the appropriate processor's Virtual Management Devices must be enabled in the BIOS setup.
- It is possible to enable Intel VROC without a hardware key installed, but only RAID0 will be enabled.
- Intel VROC is not compatible with secure boot. This feature must be disabled.
- When creating bootable OS RAID1 devices, you must have both devices on the same CPU, and a VMD on that CPU.
- Spanning drives when creating RAID devices is not recommended due to performance issues, even though it is supported.

Supported SSDs and Operating Systems

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

Additional Information

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

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

D.1 Hardware Key

The Intel VROC hardware key is a license key that detects the Intel VROC SKU and activates the function accordingly. The key must be plugged into the Supermicro motherboard (connector JRK1). The key options are:

Intel® VROC Keys			
VROC Package	Description	Part Number	Intel MM Number
Standard	RAID 0, 1, 10 Supports 3rd party SSDs	AOC-VROCSTNMOD	951605
Premium	RAID 0, 1, 5, 10 Supports 3rd party SSDs	AOC-VROCPREMOD	951606
Intel SSD only	RAID 0, 1, 5, 10 Supports Intel SSDs only	AOC-VROCINTMOD	956822



Figure D-1. Intel® VROC RAID Key and Motherboard Connector JRK1

D.2 Enabling NVMe RAID

RAID for NVMe SSDs must be enabled through the UEFI BIOS.

1. Install the patch as described in the Restrictions and Requirements section on a previous page.
2. Reboot the server.
3. Press [DEL] key to enter BIOS.
4. Switch to **Advanced > Chipset Configuration > North Bridge > IIO Configuration > Intel® VMD Technology > CPU1 & CPU2**.
5. **Enable** the VMD according to the following rules.
 - For U.2 NVMe, enable all the sub-items under each PStack, based on the your model server:

VMD BIOS Setting for 6049P-E1CR45H/L/L+	
CPU1	CPU2
VMD Config for PStack0	VMD Config for PStack1

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

An example U.2 configuration follows.

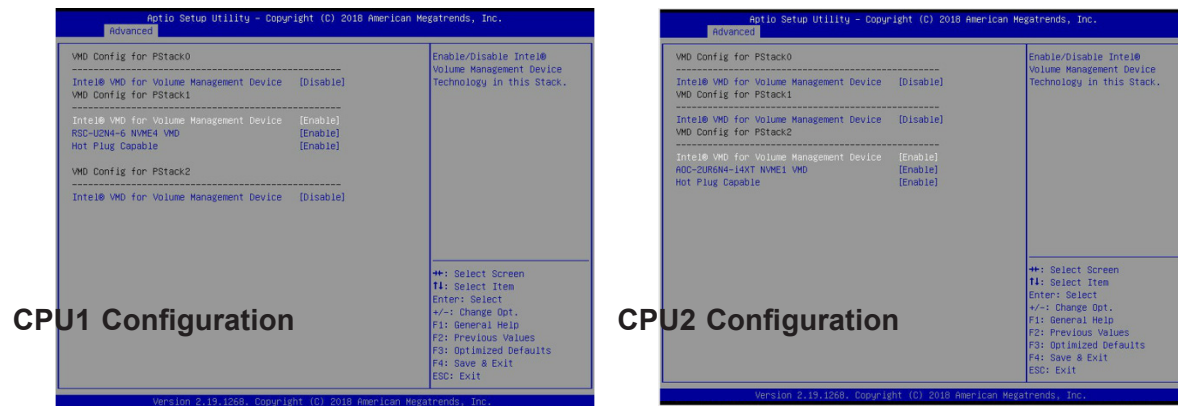


Figure D-2. BIOS VMD Setting Example for 24 Drives

6. Press [F4] to save the configuration and reboot the system.
7. Press [DEL] to enter BIOS.
8. Switch to **Advanced > Intel® Virtual RAID on CPU > All Intel VMD Controllers > Create RAID Volume**.
9. Set **Name**.
10. Set **RAID Level**.
11. If cross-controller RAID is required, select **Enable RAID spanned over VMD Controller** as shown in Figure F-4.

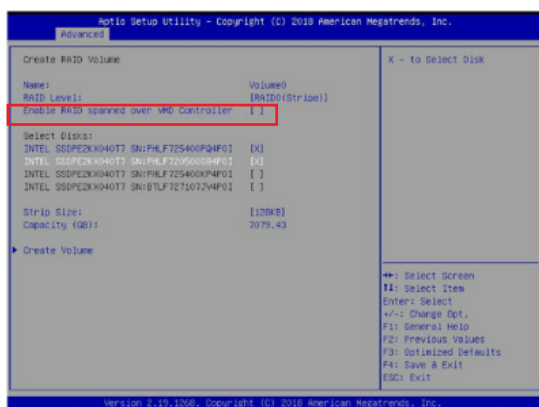


Figure D-3. Created Volume *without* enabling RAID spanned over VMD controller

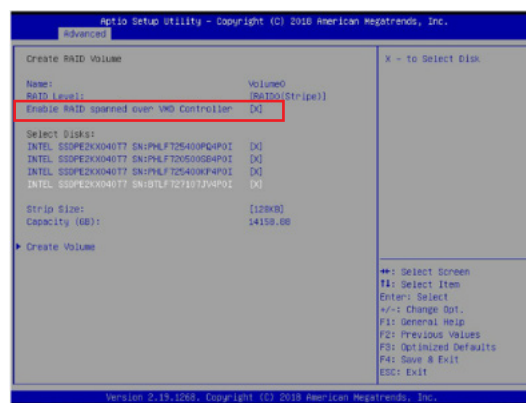


Figure D-4. Created Volume *with* enabling RAID spanned over VMD controller

12. Select specific disks for RAID with an [X].
 - RAID0: Select at least two [2 - 24] disks
 - RAID1: Select only two disks
 - RAID5: Select at least three [3 - 24] disks
 - RAID10: Select only four disks
13. Select **Strip Size** (Default 64KB).
14. Select **Create Volume**.
15. If another RAID is needed, start again at step 6.
16. Press [F4] to save and reboot.

D.3 Status Indications

An LED indicator on the drive carrier shows the RAID status of the drive.

Drive Carrier Status LED Indicator	
Status	State (red)
Normal function	Off
Locating	4 Hz blink
Fault	Solid on
Rebuilding	1 Hz Blink

IBPI SFF 8489 Defined Status LED States

D.4 Hot Swap Drives

Intel VMD enables hot-plug and hot-unplug for NVMe SSDs, whether from Intel or other manufacturers. Under vSphere ESXi, several steps are necessary to avoid potential stability issues. See the information at link [1] below.

Hot-unplug

1. Prevent devices from being re-detected during rescan:

```
esxcli storage core claiming autoclaim --enabled=false
```

2. Unmount the VMFS volumes on the device. Check [2] for details.
3. Detach the device. Check [3] for details.
4. Physically remove the device.

Hot-plug

- Physically install the device.

ESXi will automatically discover NVMe SSDs, but a manual scan may be required in some cases.

Related Information Links

[1] <https://kb.vmware.com/s/article/2151404>

[2] <https://docs.vmware.com/en/VMware-vSphere/6.5/com.vmware.vsphere.storage.doc/GUID-1B56EF97-F60E-4F21-82A7-8F2A7294604D.html>

[3] <https://docs.vmware.com/en/VMware-vSphere/6.5/com.vmware.vsphere.storage.doc/GUID-F2E75F67-740B-4406-9F0C-A2D99A698F2A.html>