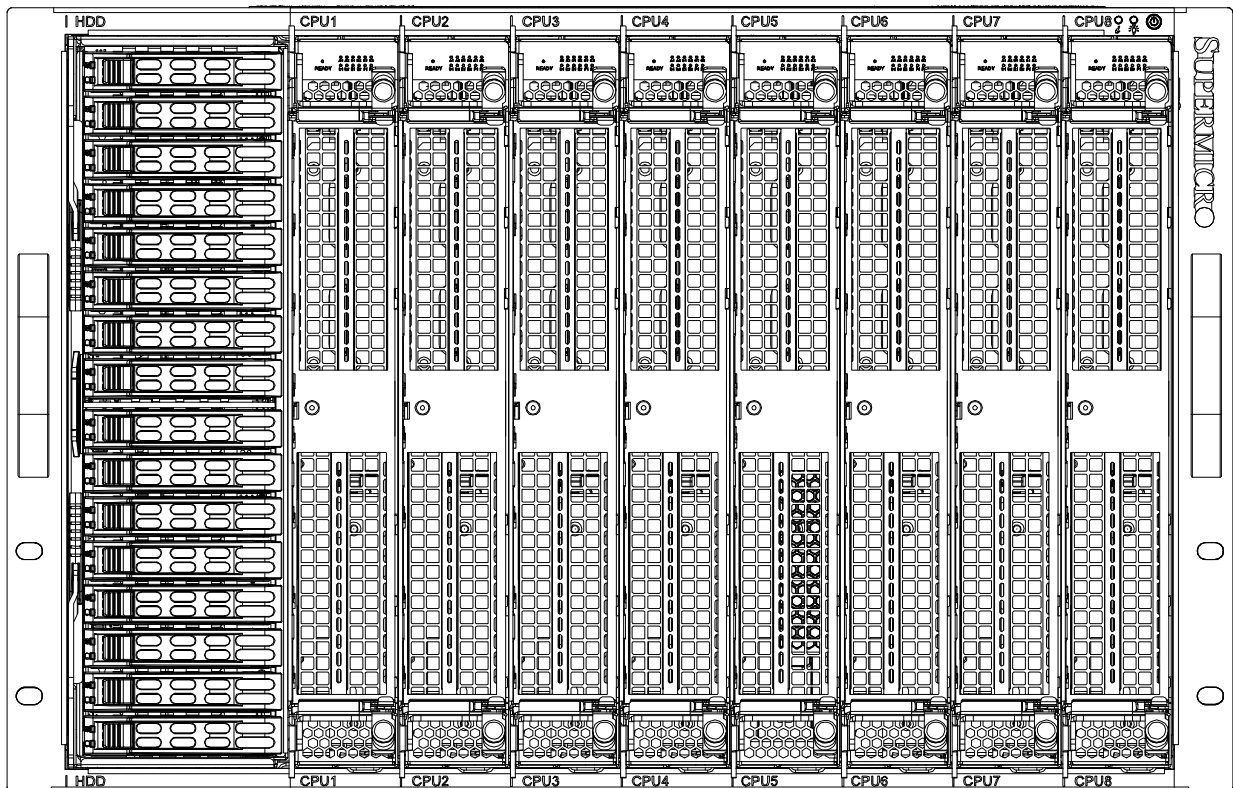




SuperServer[®] 7089P-TR4T



USER'S MANUAL

Revision 1.0c

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Manual Revision 1.0c

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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 7089P-TR4T. Installation and maintenance should be performed by experienced technicians only.

Please refer to the 7089P-TR4T server specifications page on our website for updates on supported memory, processors and operating systems (<http://www.supermicro.com>).

Notes

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

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

If you have any questions, please contact our support team at:
support@supermicro.com

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

Secure Data Deletion

A secure data deletion tool designed to fully erase all data from storage devices can be found on our website: https://www.supermicro.com/about/policies/disclaimer.cfm?url=/wdl/utility/Log9_Secure_Data_Deletion_Utility/

Warnings

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



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



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

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Appendix C System Specifications

Appendix D UEFI BIOS Recovery

Appendix E CPU-Based RAID for NVMe

Appendix F BSMI Chinese Safety Warnings

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Chapter 1

Introduction

1.1 Overview

This chapter provides a brief outline of the functions and features of the 7089P-TR4T. The 7089P-TR4T is a 7U 8-way server based on the X11OPi board family and the SC718SAC-R4800 chassis.

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

Main Parts List		
Description	Part Number	Quantity
Heatsink (passive)	SNK-P0067PS	8
SIOM 4-port 10GBase-T, X550-AT2 in PCH module	AOC-MTG-I4TM	1
SAS/SATA Backplane in Storage Module	BPN-SAS3-213A	1
Storage Board in Storage Module (HDD board)	AOM-X11OPi-HDD	1
PCH/BMC Board in PCH Module (PCH Board)	AOM-X11OPi-LBG	1
PCI-E Slot Board in PCIE Module (PCIE Board)	RSC-X11OPi-PCIE	5
CPU/MEM Board in CPU Module (CPU Board)	MBD-X11OPi-CPU	8
Midplane in Enclosure	BPN-X11OPi	1
KVM Board for the System	AOM-X11OPi-KVM	1

Note: the following safety models associated with the 7089P-TR4T have been certified as compliant with UL or CSA: 718-16, 718S-16.

1.2 Unpacking the System

Inspect the box the SuperServer 7089P-TR4T was shipped in and note if it was damaged in any way. If any equipment appears damaged, please file a damage claim with the carrier who delivered it.

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

1.3 System Specifications

The following table provides you with an overview of the main features and specifications of the 7089P-TR4T. Please refer to Appendix C for additional specifications.

System Specifications
Motherboard
X11OPi
Chassis
SC718SAC-R4800
CPU
The 7089P-TR4T system includes eight X11OPi-CPU boards, and supports up to eight Intel® Xeon Intel® Intel® 82xx/62xx/52xx/42xx series processors, which offers three full-width Intel UltraPath Interconnect (UPI) links with the data transfer rates of up to 10.4 GT/s in each direction among eight CPUs.
Socket Type
Socket P
Memory
Each CPU board supports up to 3TB DCPMM or up to 3TB 3DS Load Reduced (3DS LRDIMM)/Load Reduced (LRDIMM)/3DS Registered (RDIMM)/Registered (RDIMM) DDR4 memory of 2933*/2666/2400/2133MHz in 12 DIMM slots. It also supports up to 4.5TB DCPMM & DDR4 combined memory of up to 2933MHz in 12 slots per CPU board. With eight X11OPi boards built-in, the X11OPi Platform provides up to 24TB of DCPMM/DDR4 memory or up to 36TB of DCPMM & DDR4 combined memory in 96 DIMM slots..
Note: 1. For your system memory to work properly, please use memory modules of the same type and the same speed on the motherboard. For more information on CPU, memory support, please refer to the X11OPi board section in this chapter. 2. Memory speed support depends on the processors used on the motherboard. 3. 2933 MHz memory and DCPMM memory are supported by Second Generation Intel® Xeon® Platinum 82XX processors only. 4. Populating DDR4 memory modules in a two-DIMMs per-channel (2DPC) configuration on this motherboard will affect memory bandwidth and performance.
Note 2: Supported DIMM memory sizes are:
<ul style="list-style-type: none"> • DDR4: 1GB, 32GB, 64GB, 128 GB, and 256 GB • DCPMM: 128 GB, 256 GB and 512 GB
Chipset
Intel C621 chipset
Expansion Slots
CPU modules: 16 FHFL PCI-e 3.0 x16 slots, two PCI-E 3.0x16 slots (CPU Slot1/Slot2) on each X11OPi-CPU board. PCIE modules: five FHHL PCI-e 3.0 x16 slots, one PCI-E 3.0 x16 slot on each RSC-X11OPi-PCIE board. Storage module: two (2) PCI-E 3.0x8 in x16 slots (Slot1/Slot2) on the AOM-X11OPi-HDD board. PCH module: two M.2 PCI-e 3.0 x4 slots (Slot1/Slot2) on the AOM-X11OPi-LBG board.
Note: FHHL = full-height, half-length; FHFL = full-height, full-length; LP = low-profile
I/O Module Slot
One SIOM PCI-E 3.0x16 slot on the AOM-X11OPi-LBG board
Hard Drives
Storage module: Default setup is eight hot-swap 2.5" HDDs to on-board SATA 3.0 ports with RAID card options. Total capacity is sixteen hot-swap 2.5" HDDs and six 3.5" or eight 2.5" internal fixed HDDs PCH module: two SATA 3.0 ports for SATA DOMs

System Specifications	
Graphics	
ASPEED AST2500 BMC video controller via the BMC on the AOM-X11OPi-LBG card	
Power	
Five 1600W Titanium Level power supplies	
Form Factor	
7U rackmount	
Dimensions	
(WxHxD) 17.63 x 12.2 x 28.87-in. / 310 x 448 x 733-cm	

Note: For IPMI configuration Instructions, please refer to the "Embedded IPMI Configuration User's Guide" available at <http://www.supermicro.com/support/manuals/>.

1.4 Server Chassis Features

Control Panel/CPU Module Indicators

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

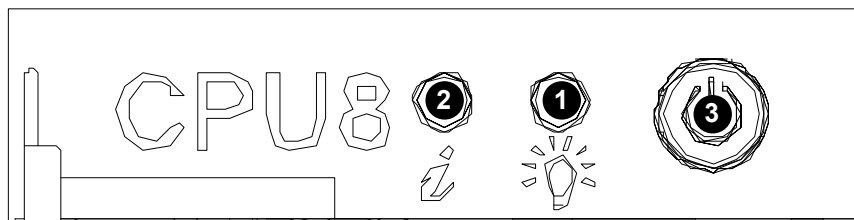


Figure 1-1. Chassis Control Panel



Figure 1-1. CPU Module LED Indicators

Control Panel/CPU Module LED Indicators		
Item	Feature	Description
1	Power LED	Indicates power is being supplied to the system power supply. This LED is green when the system is operating and amber when in standby mode.
2	Information LED	See table below.
3	Power Button	Used to apply or remove power to the system. Turning off system power with this button removes the main power but maintains standby power. To perform most maintenance tasks, you should also unplug the AC power cords before servicing.
4	CPU Module Connection LED	When illuminated, this green LED indicates a CPU module is properly installed and functioning.
5	Memory Error LEDs	This array of LEDs is provided to indicate a memory slot on the CPU board that has failed. If illuminated red, the designations (A1, A2, etc.) correspond to the failed slot on the CPU board.

Information LED	
Status	Description
Continuously on and red	An overhear condition has occurred (this may be caused by cable congestion).
Blinking red (1Hz or 1/sec.)	Fan failure, check for an inoperative fan.
Blinking red (.25Hz or 4/sec.)	Indicates a power supply module has failed.

Front Features

The SC718SAC-R4800 is a 7U chassis. See the illustration below for the features included on the front of the chassis.

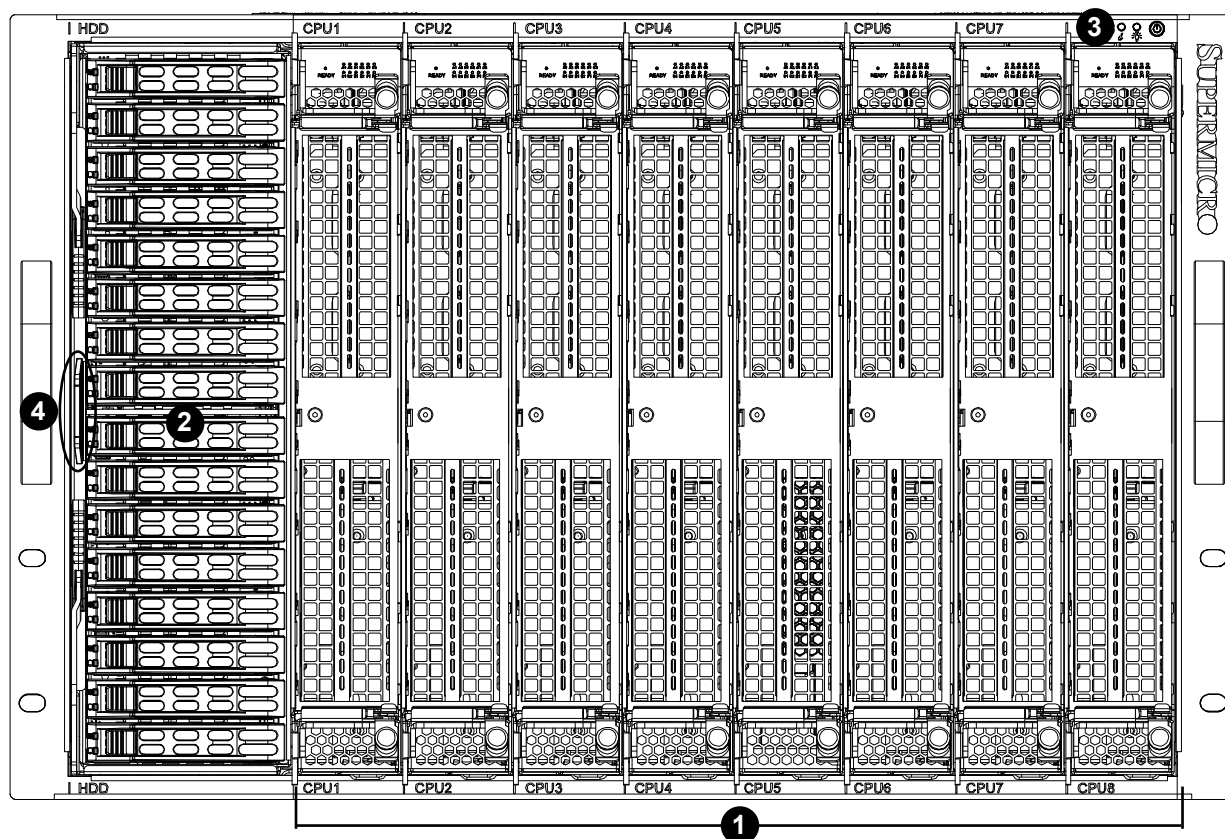


Figure 1-2. Chassis Front View

Front Chassis Features		
Item	Feature	Description
1	CPU Modules	Eight CPU modules (designated CPU1-CPU8) for CPU, memory, NVMe, PCI-E card and GPU.
2	Storage Module	Storage module for sixteen 2.5" hot-swap HDDs, optional RAID cards, and optional fixed HDDs
3	Control Panel	Control panel with LEDs and buttons
4	Service Tag	Hidden tag for the information label

Rear Features

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

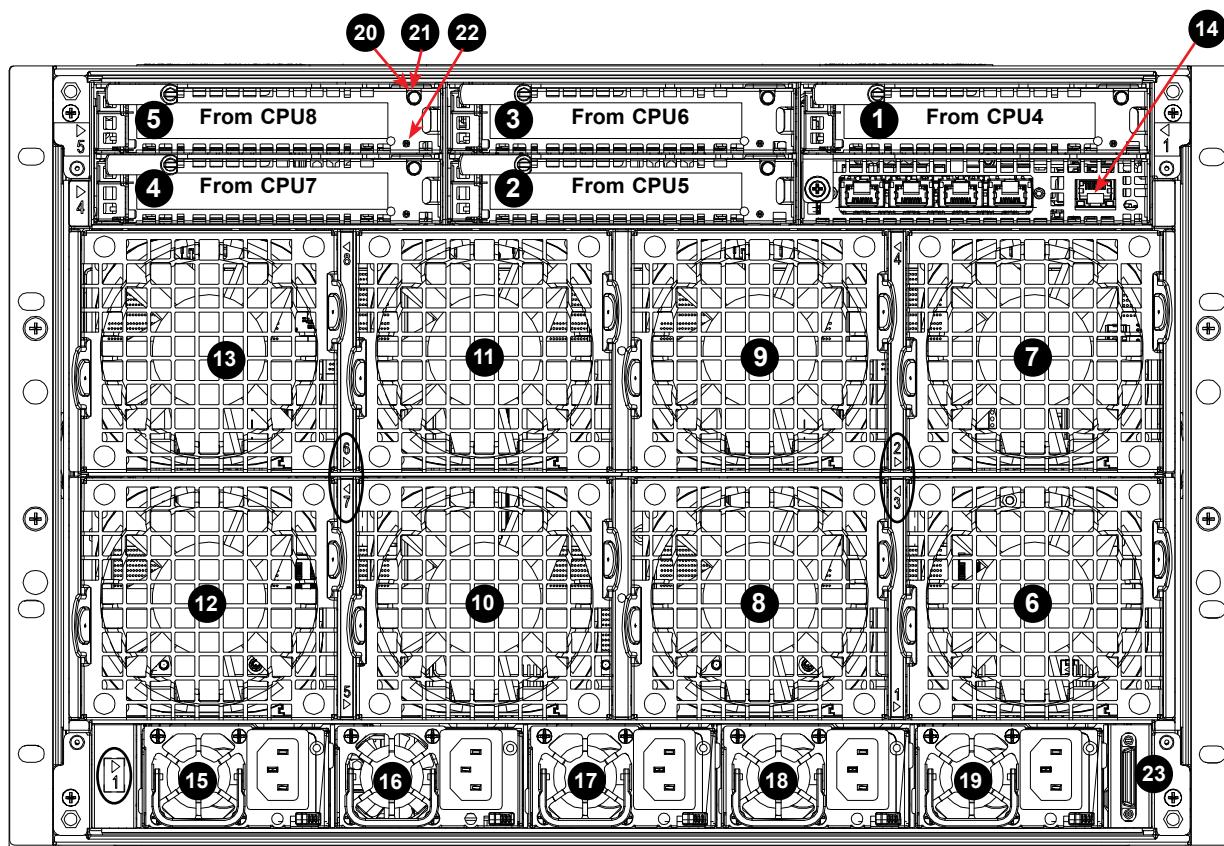


Figure 1-3. Chassis Rear View

Rear Chassis Features		
Item	Feature	Description
1-5	PCI-E Modules	Hot-plug* PCI-E modules 1 through 5 (#1 = PCIE module 1, etc.)
6-13	Hot-swap Fans	9-cm counter-rotating fans (#6 = FAN1, etc.)
14	PCH Module	PCH module for system PCH chip, IPMI port, SATA-DOM, M.2, TPM, RAID key. Also includes a SIOM from CPU3 (default 4x 10G RJ45 LAN ports)
15-19	Power Supplies	5x Titanium Level 1600W power supplies (#15 = PS1, etc.)
20	Attention Button	Used to remove or apply power to the PCIE module
21	PCI-E Power LED	Green LED indicating power is present on the PCI-E module.
22	Attention LED	Amber LED indicating an operational problem on the PCI-E module.
23	I/O Ports	VGA, COM and two USB ports in KVM port

*Must be supported by the OS.

Note: the numbers embedded in the illustrations in Figure 1-3 and Figure 1-4 refer to the logical number of the individual modules (e.g. Fan7, Power Supply1, etc.). These are not the same as item numbers in the tables above.

1.5 CPU Board

This section covers details about the CPU board.

Location of the X11OPi Board

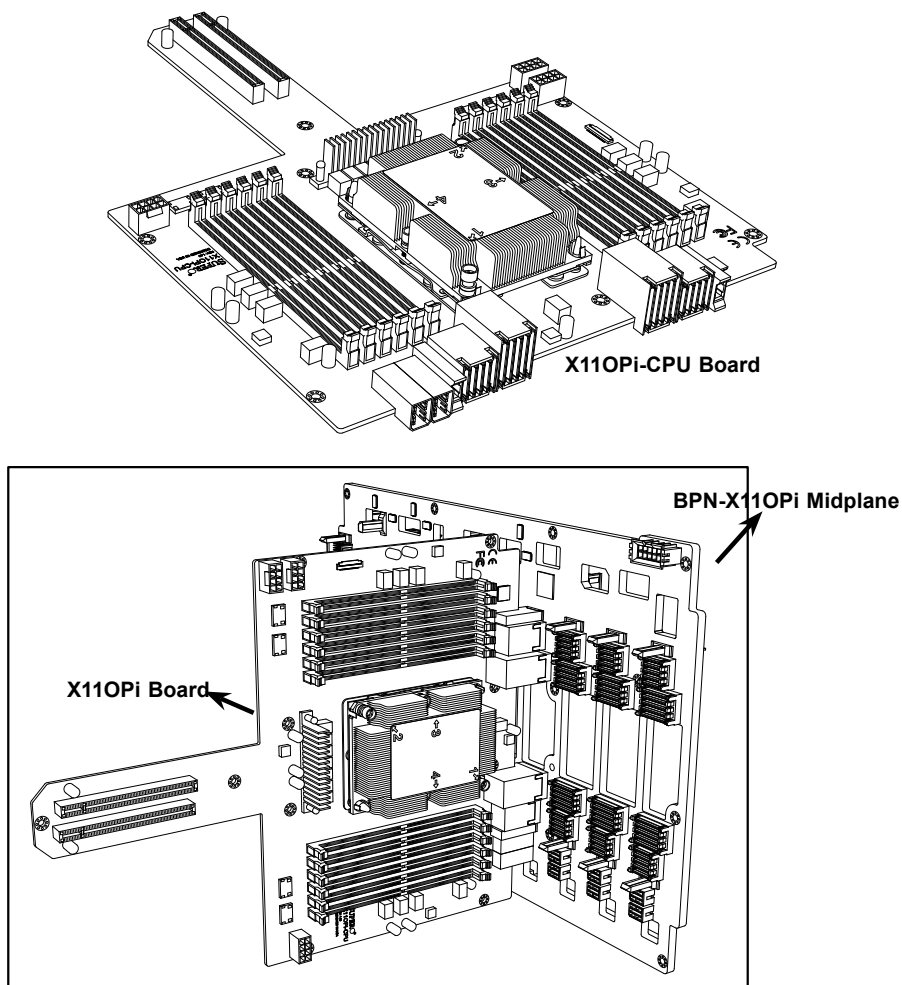


Figure 1-4. One CPU Board on the Front Side of the 7089P-TR4T Midplane

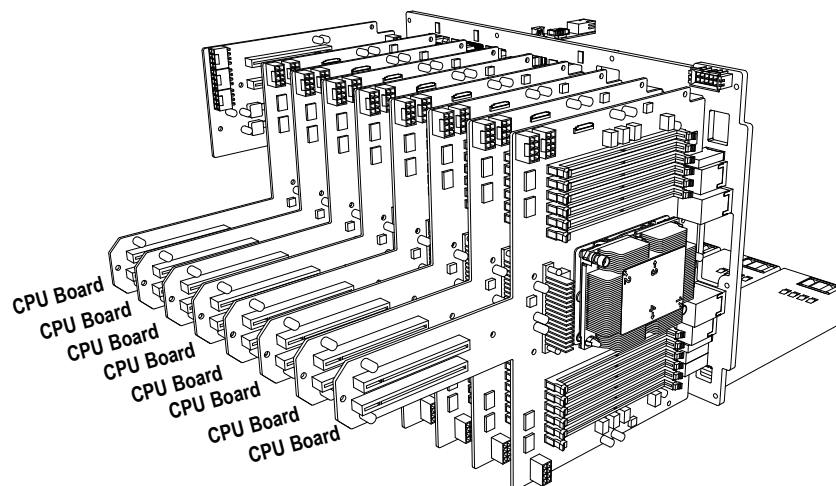
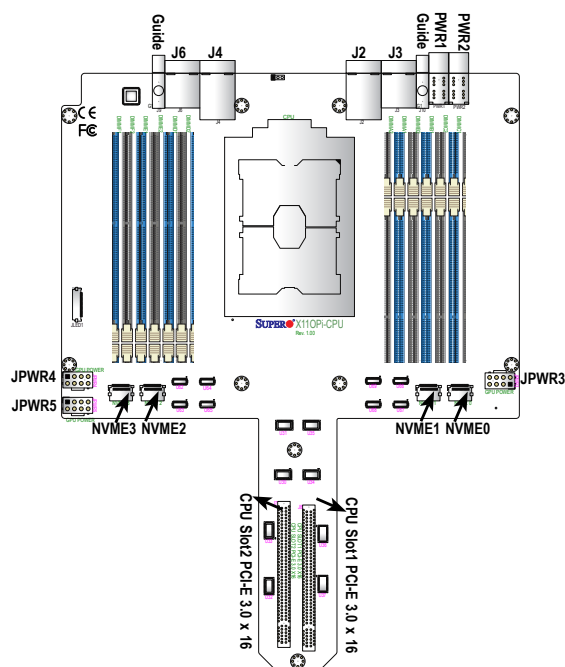


Figure 1-5. Eight CPU Boards (max.) on the Front Side of the 7089P-TR4T Midplane

Major Components on the X11OPi Board



Connectors on the X11OPi

Connector	Description
J3/J6	High speed interconnect
J2/J4	High speed interconnect
J7	PCI-E 3.0 x16 slot supported by the CPU (Slot1)
J8	PCI-E 3.0 x16 slot supported by the CPU (Slot2)
J9/J10	CPU card guides (to be used to attach the CPU cards to the midplane board)
JLED1	Memory error LED connector
JPWR3/JPWR4/JPWR5	GPU power connectors 3/4/5
PWR1/PWR2	12-pin CPU power connectors 1/2
NVME0-NVME3	Non-Volatile Memory Express (NVME) connectors 1/2/3/4
DIMMA1-F2	DIMM memory modules (DIMMA1/A2/B1/B2/C1/C2/D1/D2/E1/E2/F1/F2)

Notes:

- See Chapter 4 for detailed information on jumpers, I/O ports, and JF1 front panel connections.
- "1" indicates the location of pin 1.
- Components/jumpers/LED indicators not documented are reserved for internal testing only.

Processor and Memory Support on the X11OPi Board

CPU & Memory Support on the X11OPi Board	
Component	Description
CPU	Intel® Xeon® Platinum 8XXX processor with UPI up to 10.4GT/s
DIMM Slots: DIMMA1/A2, DIMMB1/B2, DIMMC1/C2, DIMMD1/D2, DIMME1/E2, DIMMF1/F2	<p>1. Each X11OPi board supports up to 3 TB 3DS LRDIMM/LRDIMM/3DS RDIMM/RDIMM DDR4 memory of 2933*/2666/2400 MHz in 12 slots. 2933 MHz memory is supported by Second Generation Intel® Xeon® Platinum 82XX processors only.</p> <p>2. Each X11OPi board supports up to 3 TB DCPMM memory of up to 2933 MHz in 12 slots. DCPMM memory is supported by Second Generation Intel® Xeon® Platinum 82XX processors only.</p> <p>3. Each X11OPi board supports up to 4.5 TB DCPMM & DDR4 combined memory of up to 2933 MHz in 12 slots.</p> <p>4. With eight (8) X11OPi boards built-in, this platform supports up to 24 TB of DCPMM/DDR4 memory or up to 36 TB of DCPMM & DDR4 combined memory in 96 DIMM slots.</p> <p>Notes: 1. Memory speed support depends on the CPUs used in the motherboard. For the latest CPU/memory updates, please refer to our website at http://www.supermicro.com/products/motherboard. 2. Please refer to the memory configuration & population tables to maximize memory performance.</p>

1.6 AOM-X11OPi-LBG Layout

Your system comes with the AOM-X11OPi-LBG card, which is to be installed on the BPN-X11OPi midplane. This section provides the information on the Intel C621 chipset add-on module.

For more detailed descriptions and pinout information, refer to Chapter 4.

Location of the AOM-X11OPi-LBG Card

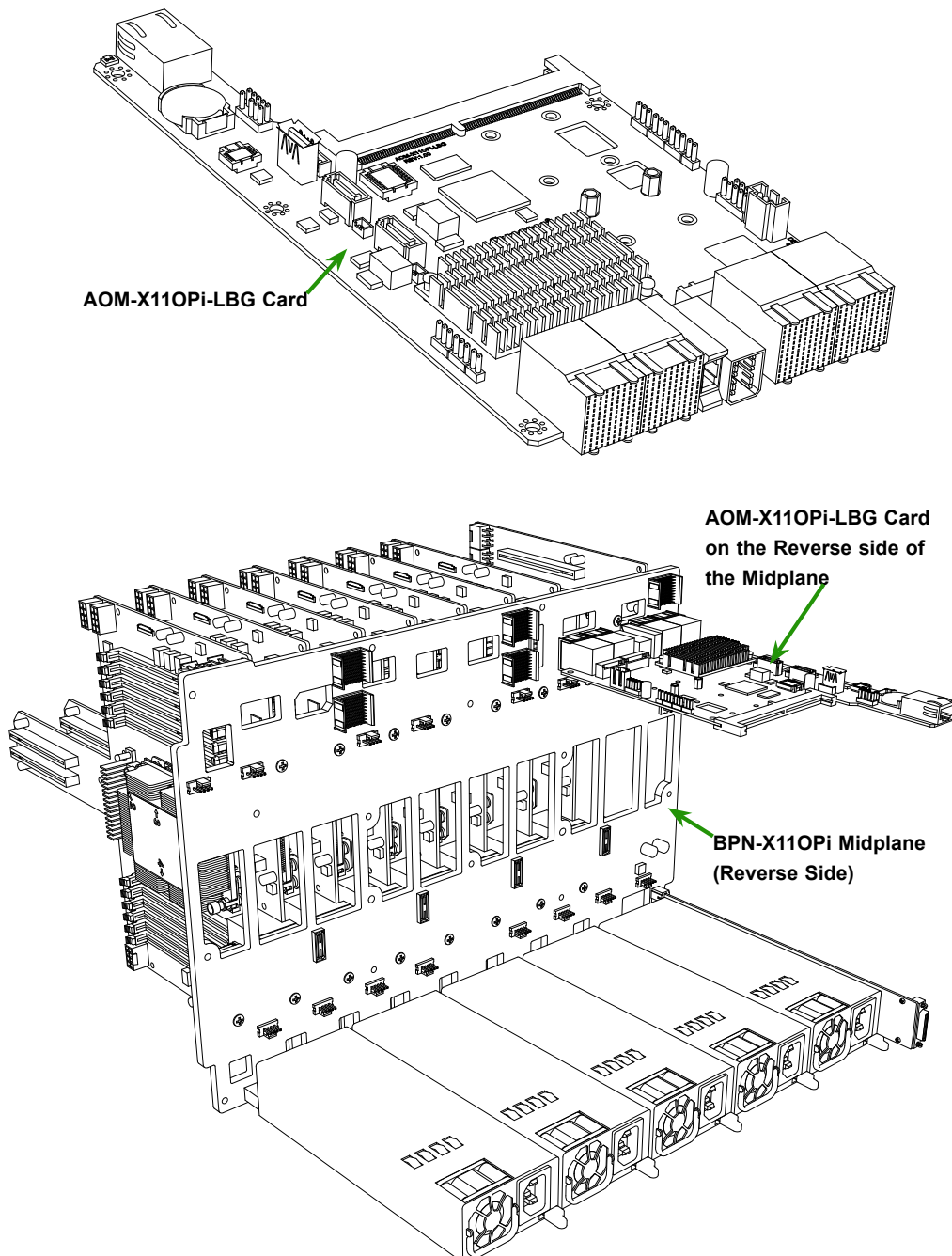


Figure 1-6. AOM-X11OPi-LBG Card on the Reverse Side of the 7089P-TR4T Midplane

Major Components on the AOM-X11OPi-LBG Card

This section provides detailed information of the major components on the AOM-X11OPi-LBG card.

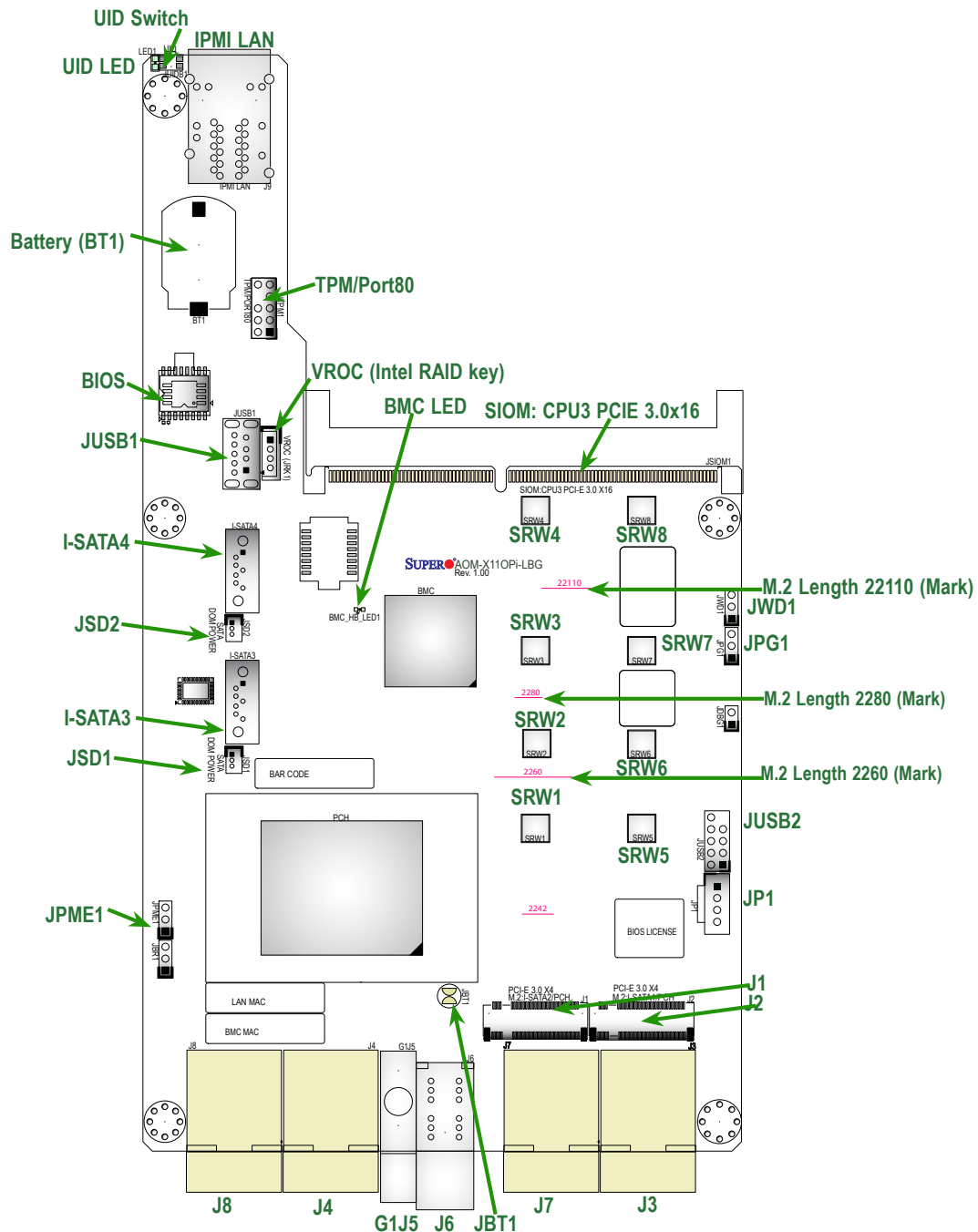


Figure 1-7. AOM-X11OPi-LBG I/O Connectors

Note: M.2 modules come with 3 sizes in length. Horizontal lines marked "2260", "2280", "22110" on the layout above indicate the locations where M.2 modules should be installed depending on the sizes in length.

Quick Reference to the Components on the AOM-X11OPi-LBG

Jumper	Description	Default Setting
JBT1	Clear CMOS	(See Note 1 below.)
JPME1	ME Manufacturing Mode Select	Pins 1-2 (Normal) (Note 1 below.)
JWD1	Watch Dog Timer Enable	Pins 1-2 (Reset) (Note 1 below.)

Connector	Description
Battery (BT1)	Onboard CMOS Battery (See Chpt. 3 for used battery disposal)
I-SATA3	Powered SATA 3.0 connector with a power pin built-in. (SuperDOM) supported by Intel PCH (See Note 2 below.)
I-SATA4	Powered SATA 3.0 connector with a power pin built-in. (SuperDOM) supported by Intel PCH (See Note 2 below.)
IPMI LAN	IPMI-dedicated LAN (J9) supported by the Baseboard Management Controller (BMC) (See Note 2 below.)
J1	M.2 connector used for SATA 3.0 or PCI-E 3.0 x4 support (Mounting hole locations: SWR1/SWR2/SWR3/SWR4) (See Note 3 below.)
J2	M.2 connector used for SATA 3.0 or PCI-E 3.0 x4 support (Mounting hole locations: SWR5/SWR6/SWR7/SWR8) (See Note 3 below.)
J5	Guide pin
J6	Power connector
JP1	DVD ROM power header (optional)
JSD1/JSD2	Power Connectors 1/2 for I-SATA DOM (Disk_on_Module) devices (See Note 2 below.)
JSIOM1	SIOM (Super I/O Module) PCI-E 3.0 x16 slot supported by CPU3 for use of a Supermicro-proprietary add-on card
JTPM1	TPM (Trusted Platform Module)/Port 80 header (See Note 2 below.)
JUSB1	Type A USB 3.0 header with support of USB 3.0 Port1, USB 2.0 Port2
JUSB2	USB 2.0 header with support of USB 5/USB 6
JUIDB1	UID (Unit Identification) button (See Note 2 below.)
VROC (JRK1)	Intel VROC RAID key header for NVMe SSD

LED	Description
BMC_HB_LED1	BMC Heartbeat LED indicator (Green Blinking: BMC Normal)
LED1	Unit Identifier LED indicator (Blue: Unit Identified) (See Note 2 below.)

Note 1: Please see next page for more jumper information.

Note 2: Please see the Connectors section for more information.

1.7 RSC-X11OPi-PCIE Card

This section provides the information on the RSC-X11OPi-PCIE add-on card.

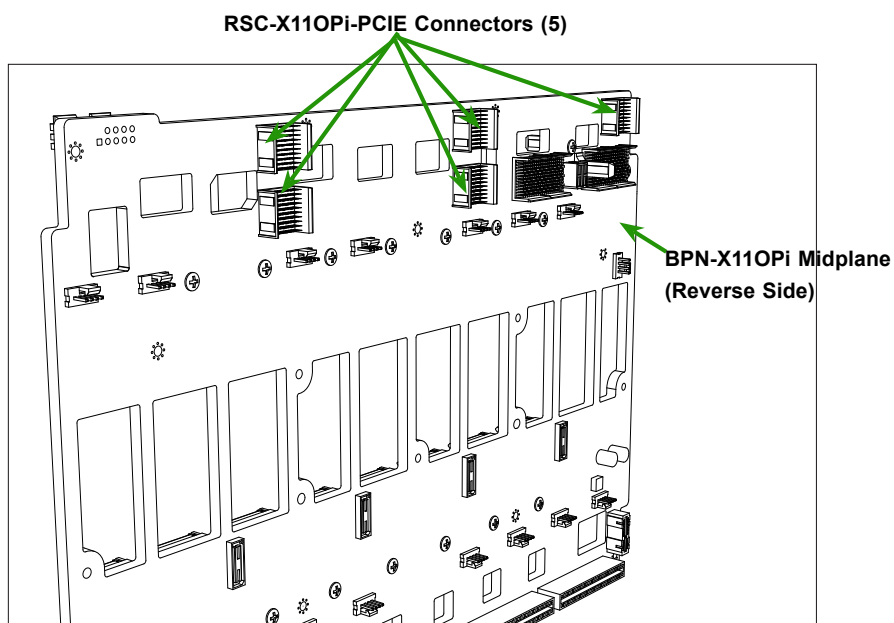


Figure 1-8. RSC-X11OPi-PCIE Card Layout (Reverse Side)

Location of the RSC-X11OPi-PCIE Cards

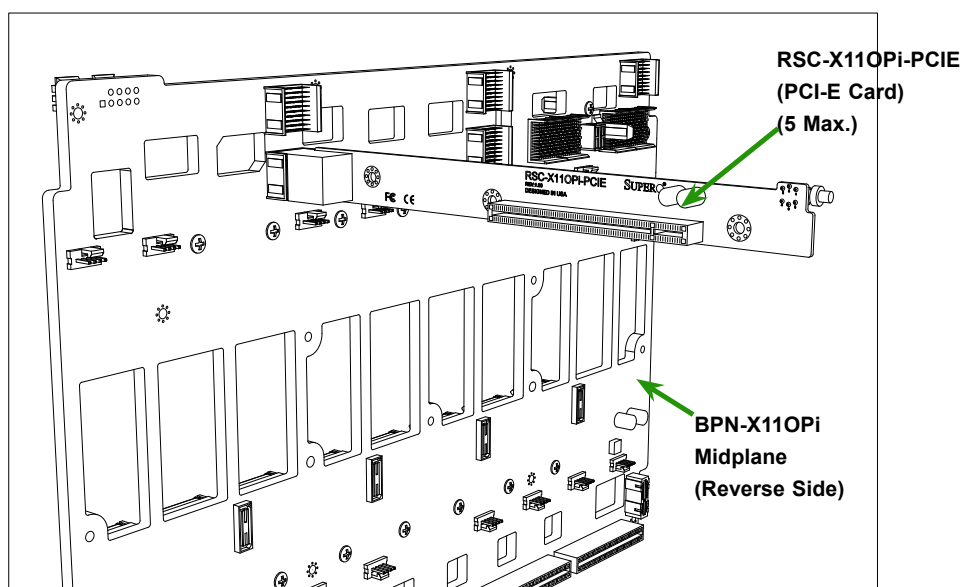


Figure 1-9. RSC-X11OPi-PCIE Card on the Reverse Side with PCI-E Card

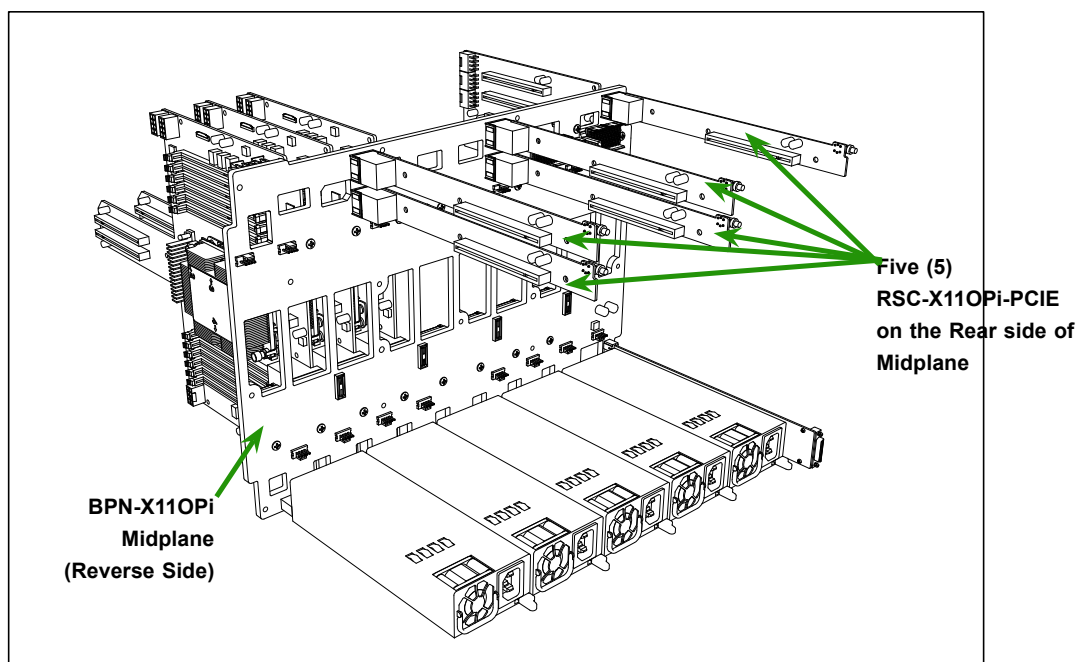


Figure 1-10. RSC-X11OPi-PCIE Card on the Reverse Side of the 7089P-TR4T Midplane (w/5 PCI-E Cards max.)

Major Components on the RSC-X11OPi-PCIE Card

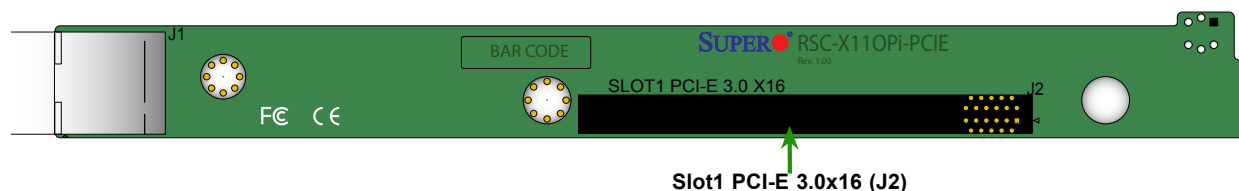


Figure 1-11. RSC-X11OPi-PCIE Card Layout (Front)

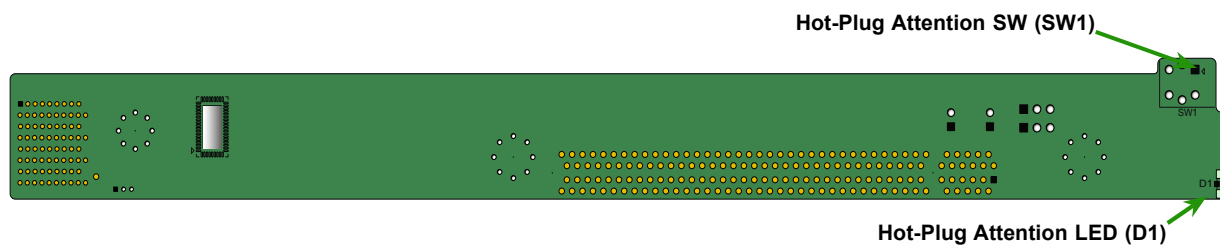


Figure 1-12. RSC-X11OPi-PCIE Card Layout (Reverse Side)

Major Components on the RSC-X11OPi-PCIE		
Location	Description	Detailed Description
Front Side	J2	PCI-E Slot1: PCI-E 3.0 x16 slot
Reverse Side	SW1	Hot-plug attention button
Reverse Side	D1	Hot-plug attention LED (Orange: Hot-plug support needs attention)

1.8 RSC-BLG-E16R Card

This section provides the information on the RSC-BLG-E16R add-on card.

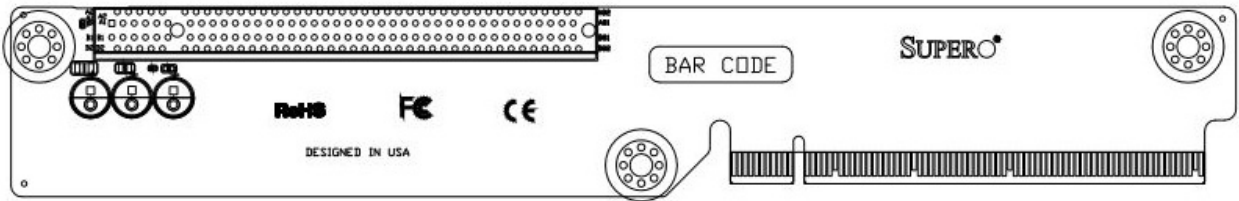


Figure 1-13. RSC-BLG-E16R Card Layout (Front)

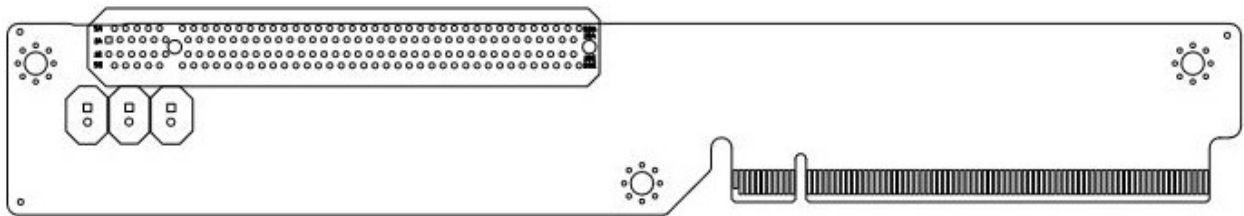


Figure 1-14. RSC-BLG-E16R Card Layout (Rear)

Major Components on the RSC-X11OPi-PCIE		
Location	Description	Detailed Description
Front Side	JPCIE1	PCI-E JPCIE1: PCI-E 3.0 x16 slot

1.9 RSC-S-6-OP Card

This section provides the information on the RSC-S-6-OP add-on card.

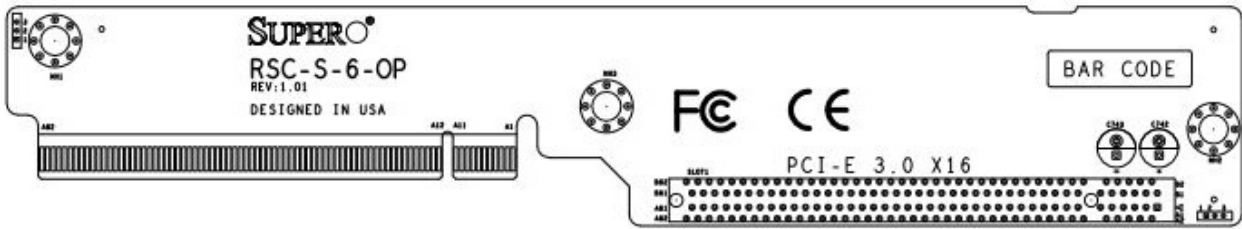


Figure 1-15. RSC-S-6-OP Card Layout (Front)

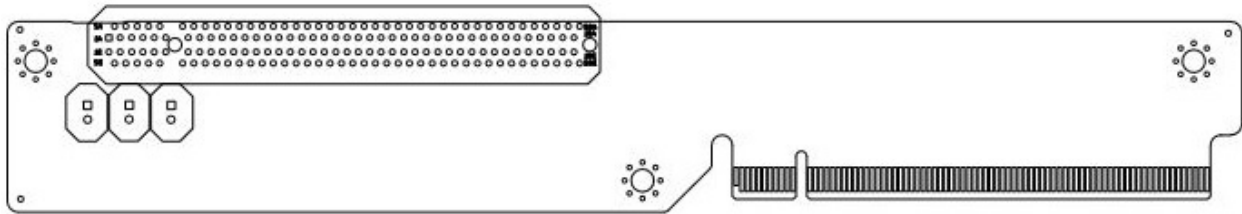


Figure 1-16. RSC-S-6-OP Card Layout (Rear)

Major Components on the RSC-X11OPi-PCIE		
Location	Description	Detailed Description
Front Side	SLOT1	PCI-E Slot1: PCI-E 3.0 x16 slot

1.10 AOM-X11OPi-HDD Card

This section provides the information on the AOM-X11OPi-HDD add-on card.

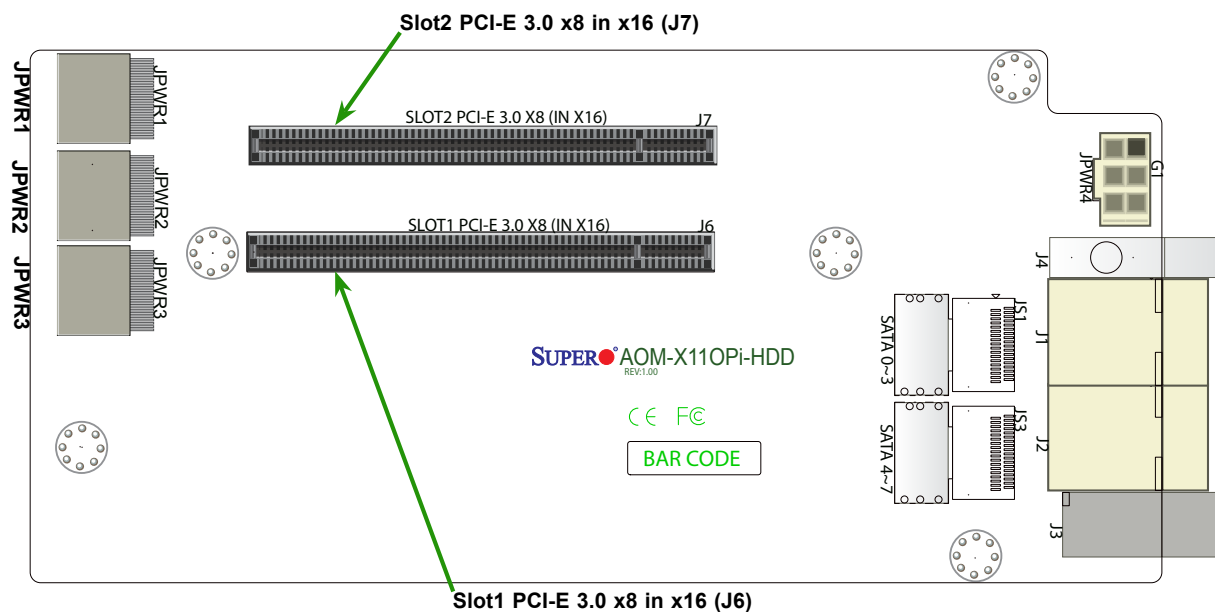


Figure 1-17 Major Components of the AOM-X11OPi-HDD Card

Major Components on the AOM-X11OPi-HDD Card	
Description	Default Setting
J1	High speed interconnect
J2	High Speed interconnect
J3	Guide pin
J4	Power connector
JPWR1/JPWR2/JPWR3/JPWR4	8-pin power connectors 1/2/3/4 for HDD use
Slot1/Slot2	PCI-E 3.0x8 in x16 slots (Slot1/Slot2)
SATA0-3, SATA4-7 (JS1/JS3)	SATA connections 0-3, 4-7

Note: Refer to Chapter 4 for more information on the power connectors and SATA 3.0 ports.

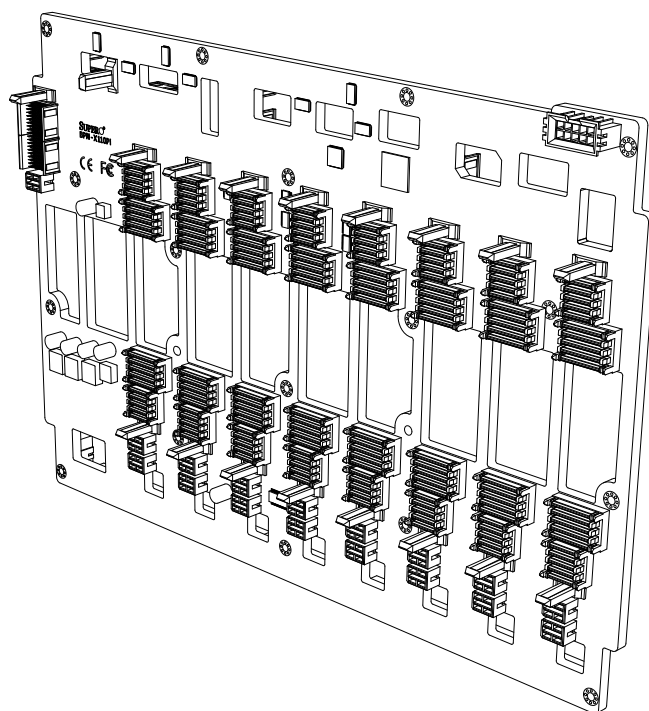


Figure 1-20 Front View of the BPN-X11OPi Midplane

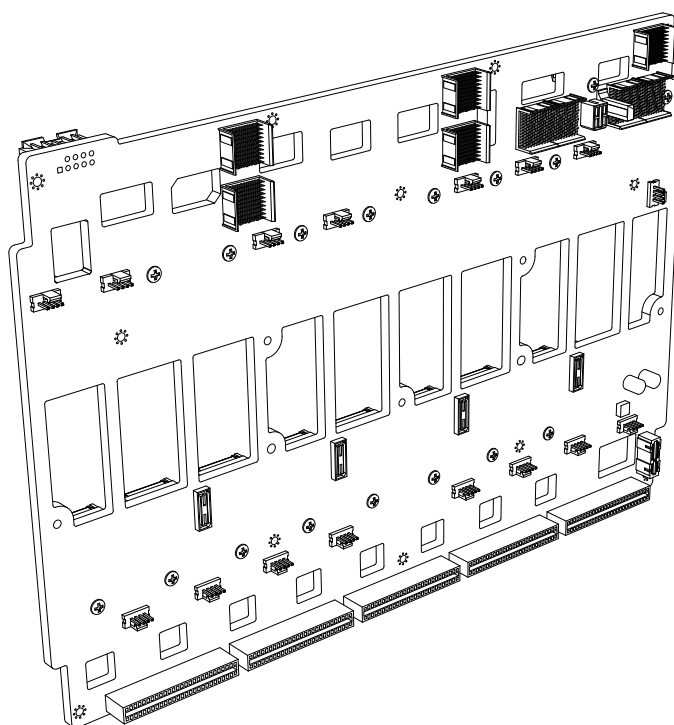


Figure 1-21. Rear View of the BPN-X11OPi Midplane

Location of the BPN-X11OPi Midplane

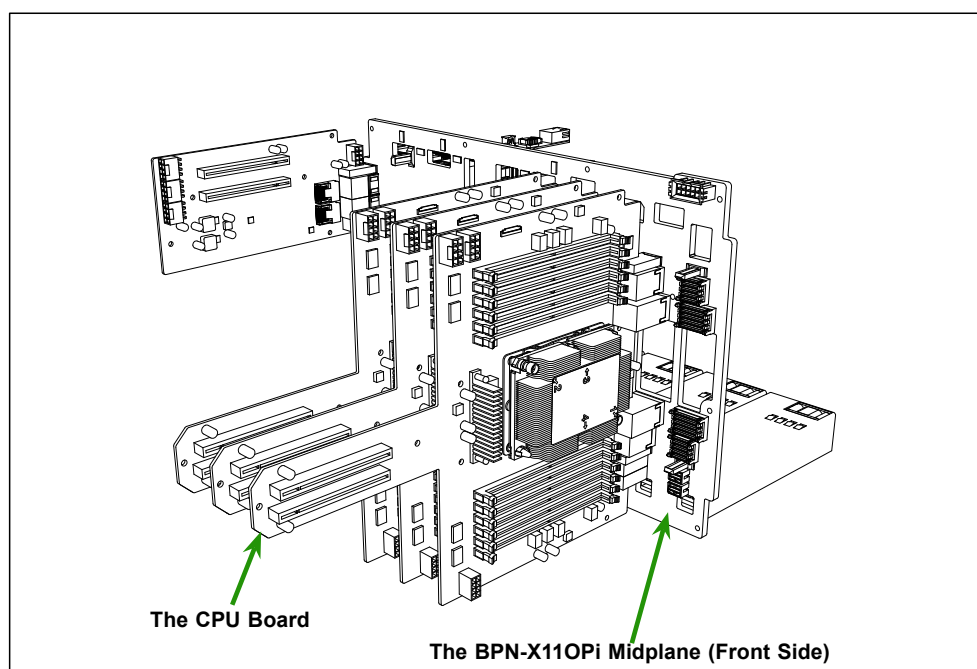


Figure 1-22. BPN-X11OPiMidplane (Front Side)

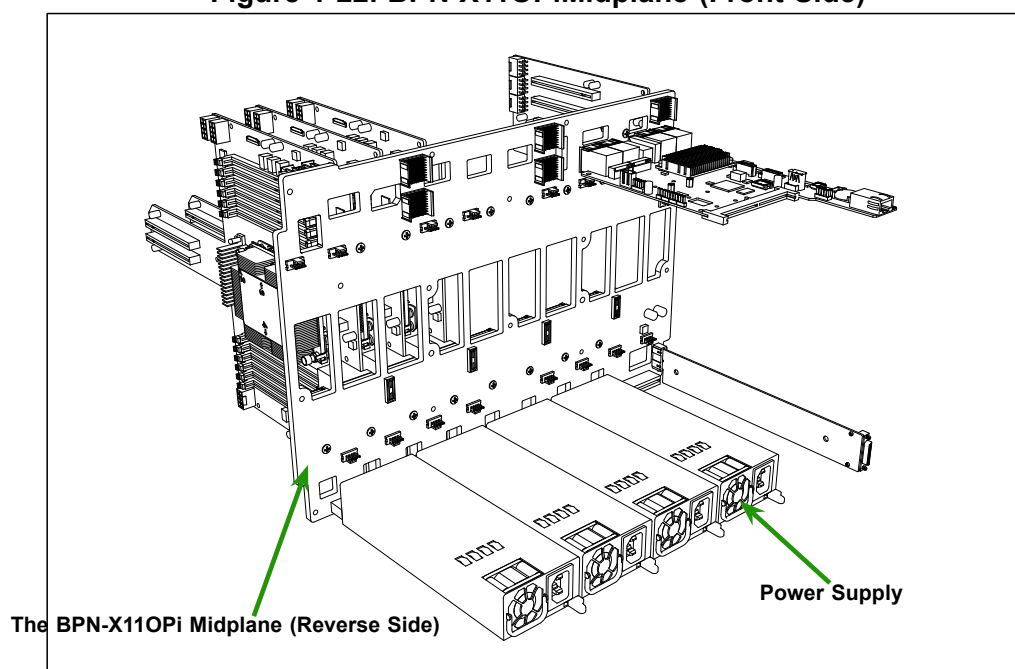


Figure 1-23. BPN-X11OPi Midplane (Rear Side)

Major Components on the BPN-X11OPi Midplane

Components on the Front Side of the Midplane

The following section provides detailed information of the major components on the front side of the BPN-X11OPi midplane. Please note that all CPU boards and HDD card are installed on the front side of the midplane, and can be accessed from the front side of your system.

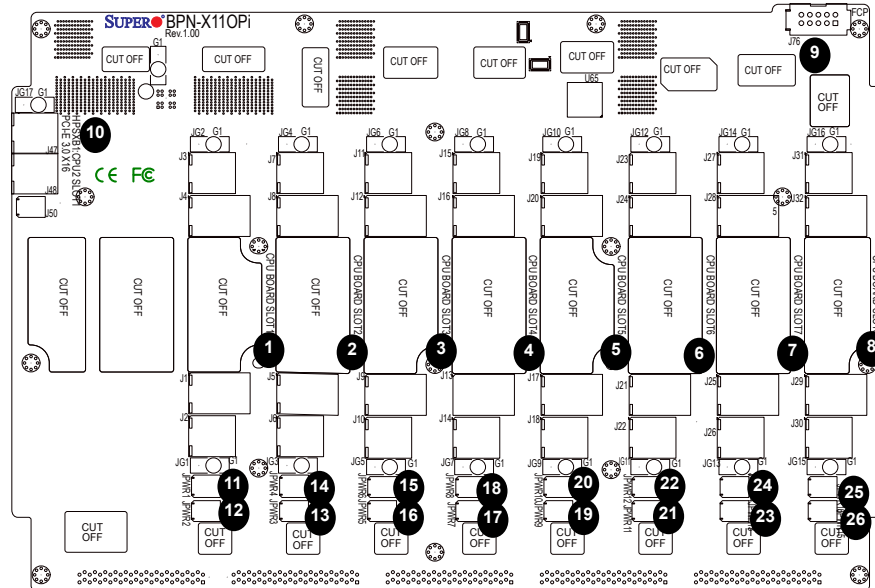


Figure 1-24 BPN-X11OPi Layout (Front)

Major Front Side Components of the BPN-X11OPi Midplane

Major Components on the Front Side of the BPN-X11OPi		
Item#	Description	Detailed Description
1	CPU BOARD SLOT1	CPU Board slot used for X11OPi Board 1
2	CPU BOARD SLOT2	CPU Board slot used for X11OPi Board 2
3	CPU BOARD SLOT3	CPU Board slot used for X11OPi Board 3
4	CPU BOARD SLOT4	CPU Board slot used for X11OPi Board 4
5	CPU BOARD SLOT5	CPU Board slot used for X11OPi Board 5
6	CPU BOARD SLOT6	CPU Board slot used for X11OPi Board 6
7	CPU BOARD SLOT7	CPU Board slot used for X11OPi Board 7
8	CPU BOARD SLOT8	CPU Board slot used for X11OPi Board 8
9	FCP (Front Control Panel)	Front Control Panel header
10	HPSXB1 (CPU2Slot1)	2 x PCI-E 3.0 x8 slot supported by CPU2 (for the AOM-X11OPi-HDD card)
11, 12	JPWR1/JPWR2	Power connectors 1/2 for X11OPi Board 1
13, 14	JPWR3/JPWR4	Power connectors 3/4 for X11OPi Board 2
15, 16	JPWR5/JPWR6	Power connectors 5/6 for X11OPi Board 3
17, 18	JPWR7/JPWR8	Power connectors 7/8 for X11OPi Board 4
19, 20	JPWR9/JPWR10	Power connectors 9/10 for X11OPi Board 5
21, 22	JPWR11/JPWR12	Power connectors 11/12 for X11OPi Board 6
23, 24	JPWR13/JPWR14	Power connectors 13/14 for X11OPi Board 7
25, 26	JPWR15/JPWR16	Power connectors 15/16 for X11OPi Board 8

Major Components on the Rear Side of the BPN-X11OPi Midplane

The following section provides the information of the major components on the reverse side of the BPN-X11OPi midplane. Please note that the PCH card, PCI-E card, power supply modules, and cooling fans are installed on the reverse side of the midplane, and can be accessed from the rear side of your system.

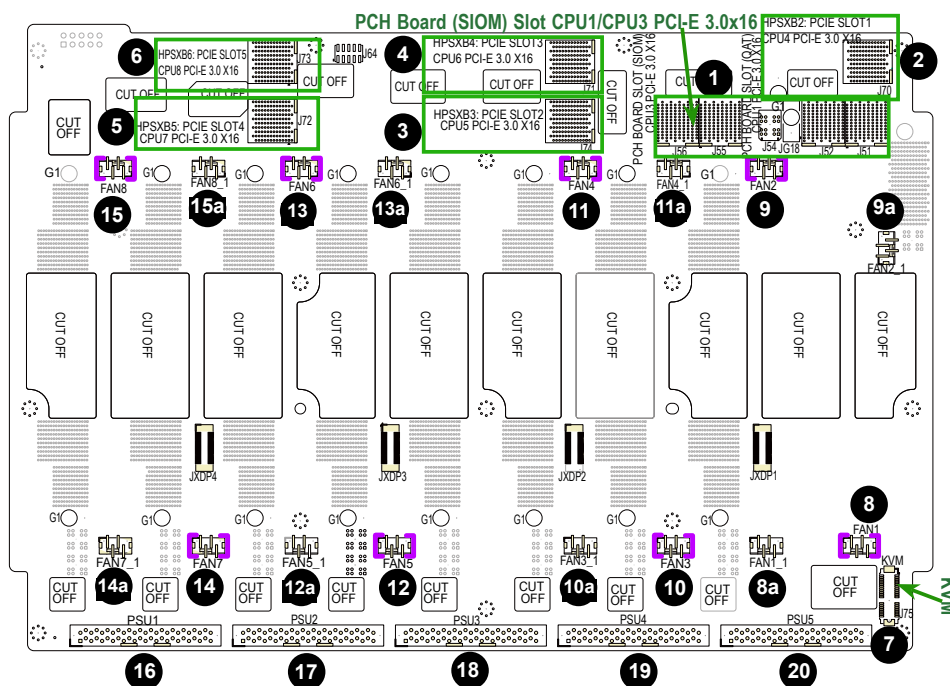


Figure 1-25. BPN-X11OPi Layout (Rear Side)

Major Reverse Side Components of the BPN-X11OPi Midplane

Major Components on the Reverse Side of the BPN-X11OPi		
Item#	Location	Detailed Description
1	J51/J52/J54/J55/J56	PCH Board Slot (SIOM) CPU1/CPU3 PCI-E 3.0 x16 Slot (for the AOM-X11OPi-LBG)
2	J70	HPSXB2: Slot1 CPU4 PCI-E 3.0 x 16
3	J74	HPSXB3: Slot2 CPU5 PCI-E 3.0 x 16
4	J71	HPSXB4: Slot3 CPU6 PCI-E 3.0 x 16
5	J72	HPSXB5: Slot4 CPU7 PCI-E 3.0 x 16
6	J73	HPSXB6: Slot5 CPU8 PCI-E 3.0 x 16
7	J75	KVM header for KVM (Keyboard/Video/Mouse) support
8	FAN1	Rear Fan Connector 1
8a	FAN1_1	Rear Fan Connector 1_1
9	FAN2	Rear Fan Connector 2
9a	FAN2_1	Rear Fan Connector 2_1
10	FAN3	Rear Fan Connector 3
10a	FAN3_1	Rear Fan Connector 3_1
11	FAN4	Rear Fan Connector 4
11a	FAN4_1	Rear Fan Connector 4_1
12	FAN5	Rear Fan Connector 5
12a	FAN5_1	Rear Fan Connector 5_1
13	FAN6	Rear Fan Connector 6
13a	FAN6_1	Rear Fan Connector 6_1
14	FAN7	Rear Fan Connector 7
14a	FAN7_1	Rear Fan Connector 7_1
15	FAN8	Rear Fan Connector 8
15a	FAN8_1	Rear Fan Connector 8_1
16	PSU1	Power Supply Unit 1
17	PSU2	Power Supply Unit 2
18	PSU3	Power Supply Unit 3
19	PSU4	Power Supply Unit 4
20	PSU5	Power Supply Unit 5

1.12 BPN-SAS3-213A Midplane

This section provides detailed information on the BPN-SAS3-213A midplane.

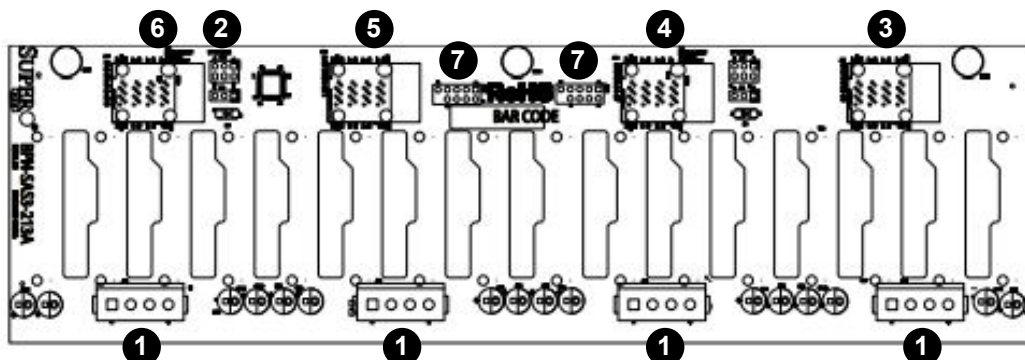


Figure 1-26. BPN-SAS3-213A Midplane Image (Front Side)

Major Front Side Components of the BPN-SAS3-213A Midplane

Major Components on the Front Side of the BPN-SAS3-213A		
Item#	Description	Detailed Description
1	JP3, JP4, JP5 and JP6	Power Connectors (4-pin)
2	JP1 and JP2	Upgrade Connectors
3	J17	SAS IN #0-#3
4	J18	SAS IN #4-#7
5	J19	SAS IN #8-#11
6	J20	SAS IN #12-#15
7	JP26 and JP27	For Manufacturers Use Only

1.13 System Block Diagram

This section provides a detailed block diagram of the system.

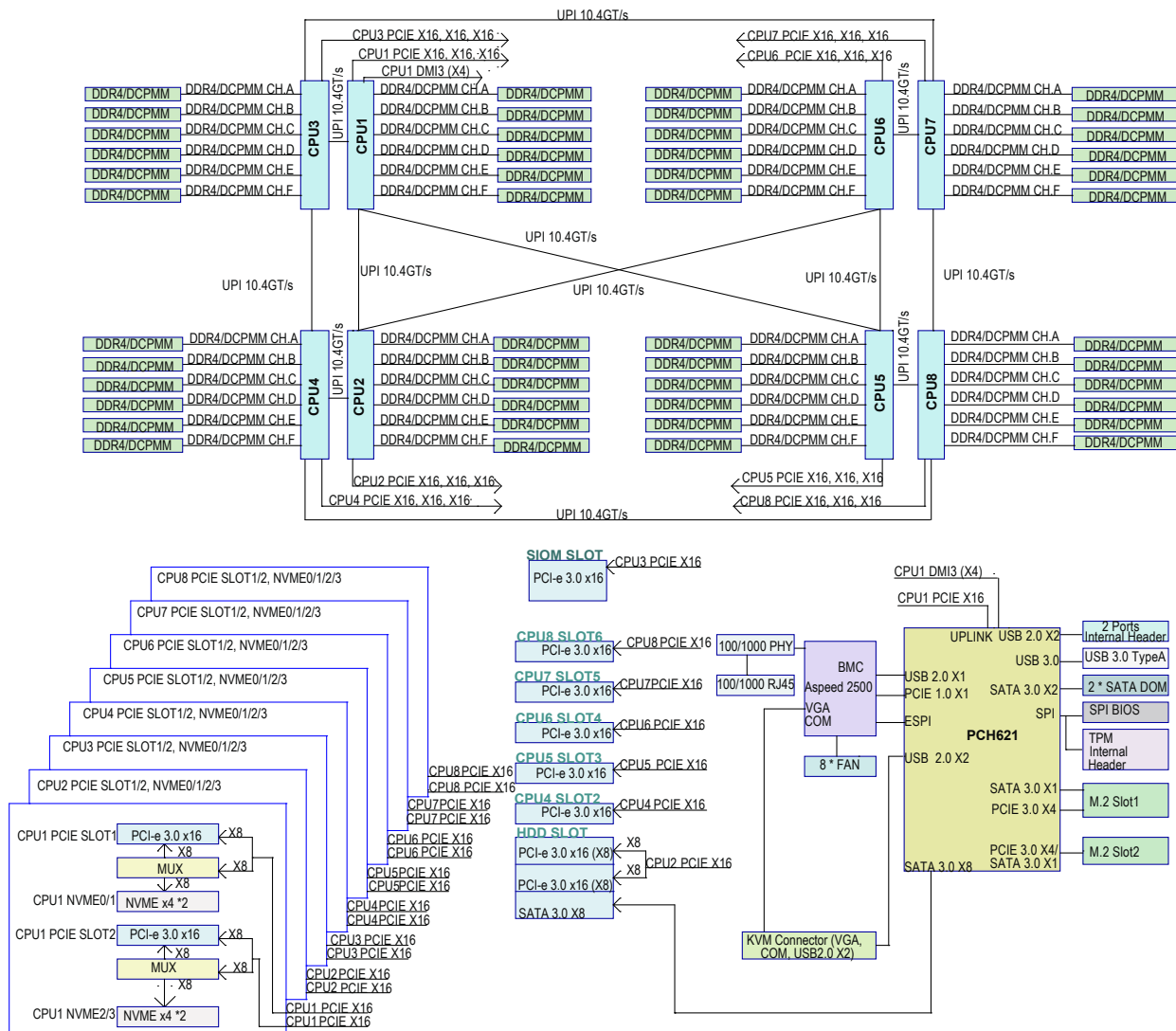


Figure 1-27. System Block Diagram

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

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 recommended 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.



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

2.3 Installing the System Into a Rack

This section provides information on installing the system into a rack. There are a variety of rack units on the market, meaning the procedure may differ slightly. Refer to the Enclosure Template that was included with the system for help.

Rack Mounting Hardware

The following is a list of rack mounting hardware you will need for rack setup and installation:

- Two rail assemblies (one for each side of the enclosure)
- Two handles
- Four roundhead screws for fastening the enclosure ears to the rack
- Eight flathead screws and washers for mounting the rails to the rack

Installation

Use the procedure below for installing the system into a rack.

Installing to a Rack

1. Decide where you want to place the system into the rack (see "Rack Mounting Considerations" in the previous section).
2. Position the Enclosure Template at the front of the enclosure to determine the locations of the screws for the chassis rails (see Figure 2-1).

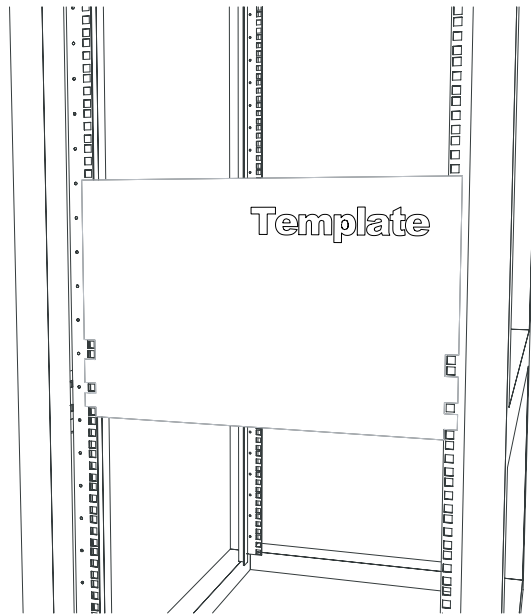


Figure 2-1. Positioning the Enclosure Template

3. The two rail sections are screwed together to keep them immobile during shipping. Release these screws just enough to allow the rails to slide apart. Note the arrow on the rail, which indicates the end that attaches to the front of the rack.
4. Slide the rails apart far enough to match the depth of the rack. Position the rails with the template and secure the front of each to the front of the rack with two flathead screws, then secure the back of each rail to the rear of the rack with two flathead screws (see Figure 2-2). Note that the rails are left/right specific and very heavy.

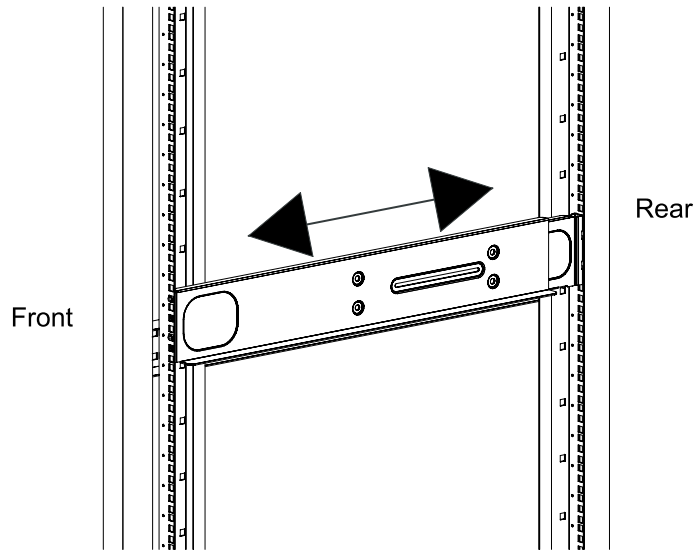


Figure 2-2. Securing the Rails to the Rack

5. (Optional step) Add the front left and right handles to the chassis using five screws to secure each handle. Install a thumbscrew through the bottom hole of each handle (see Figure 2-3).

Note: These handles are optional and need only be installed when mounting the system into a short rack. When mounting into a deep rack, they are unnecessary and regular screws should be used instead of thumbscrews.

Be aware that these handles are not to be used for lifting the system, they are only to be used to slide the system within the rack.

6. With one person on either side (see the descriptive label on the side of the chassis), lift the system and slide it into the installed rails.

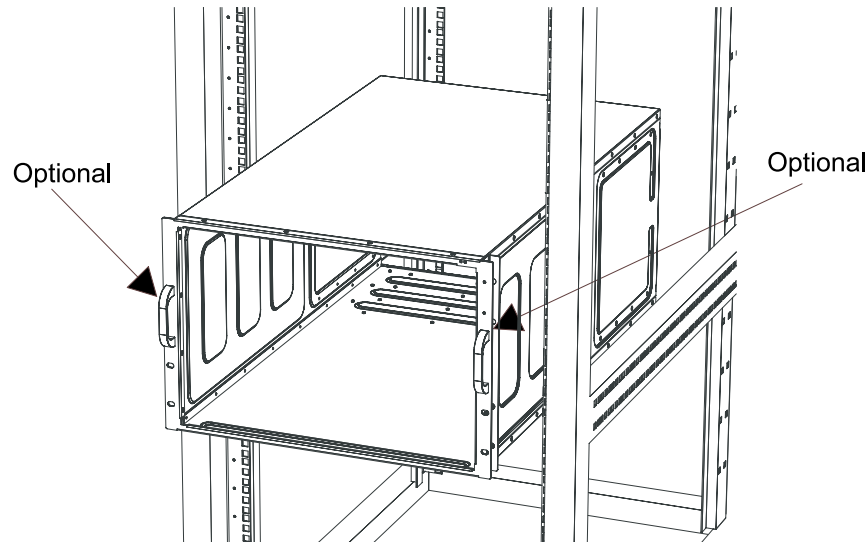


Figure 2-3. Attaching the Optional Handles

WARNING: Be sure that the system is empty of all CPU modules, storage modules, power supplies, PCI-E modules and the PCH module **BEFORE** lifting (as shown in the figure above with the chassis empty). These should be installed **AFTER** the system is mounted in the rack. Injury and damage may occur if components are not removed from the rack prior to installation.

7. After pushing the system all the way into the rack, use two roundhead screws on each side of the server to lock it into place.
8. With the system now secure in the rack, the CPU modules, storage modules, power supplies, PCI-E modules and the PCH module may all be installed in the chassis.

Note: Figures are for illustrative purposes only. Always install servers to the bottom of a rack first.



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

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

Removing power from the system is necessary when removing or installing non hot-swap components or when replacing a non-redundant power supply.

1. Use the operating system to power down the system.
2. After the system has completely shut-down, **disconnect the AC power cords from all power supply modules.**

3.2 Accessing the System

The 7089P-TR4T is a modular system with the motherboards, hard drives, fans and power supplies all accessible for servicing without the need to open the chassis.

Please refer to the relevant sections in this chapter for the correct procedures to use when servicing any of these subsystems.

3.3 CPU Modules

Removing/Installing a CPU Module

1. Begin by removing power from the system as described in Section 3-1.
2. Pull the top thumb lock outward while slightly lifting the top lever. Repeat this procedure for the bottom thumb lock and lever.
3. Lift the top lever up while simultaneously pushing the bottom lever down all the way until the CPU module pops out.
4. With both levers fully released, grasp them both and pull the module outward to remove it from the enclosure as shown in Figure 3-1.
5. Put the module on a flat, non-conductive surface before removing or installing any components.

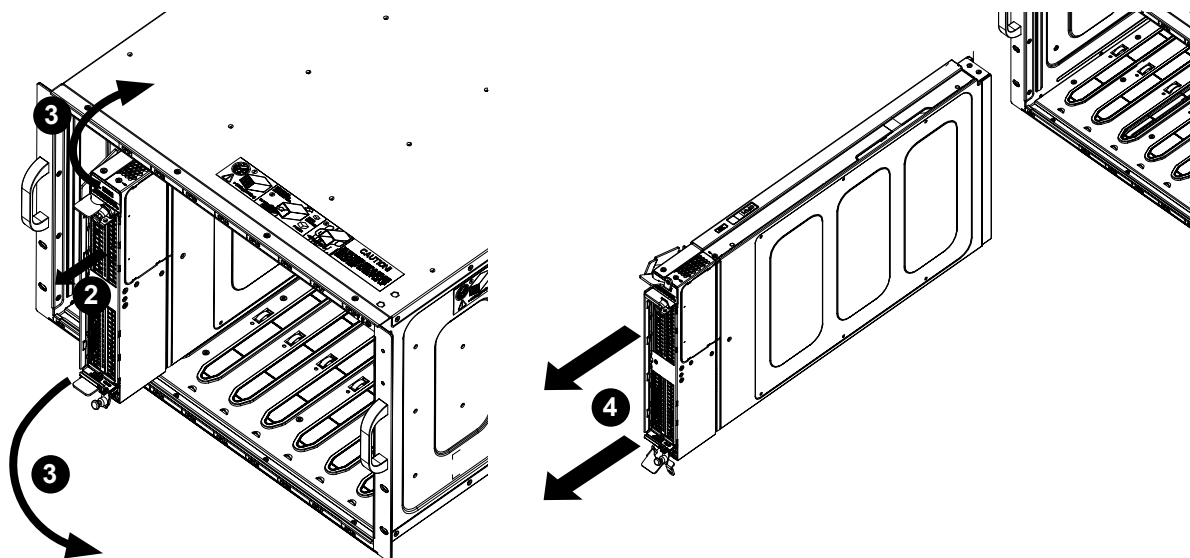


Figure 3-1. Removing a CPU Module

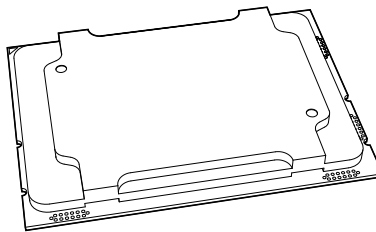
Installing the Xeon Intel® 82xx/62xx/52xx/42xx series Processor on the X11OPi-CPU Board

Warning! When handling the processor package, avoid placing direct pressure on the label area of the CPU or CPU socket. Also, improper CPU installation or socket misalignment can cause serious damage to the CPU or motherboard which may result in RMA repairs. Please read and follow all instructions thoroughly before installing your CPU. Electrostatic Discharge (ESD) can damage electronic components. To avoid damaging your system, it is crucial to follow the instructions given in the Static-Sensitive Devices section in Appendix C to protect your equipment from ESD.

Notes:

- Always connect the power cord last, and always remove it before adding, removing, or changing any hardware components. Please note that the processor and heatsink should be assembled together first to form the Processor Heatsink Module (PHM), and then install the entire PHM into the CPU socket.
- Please refer to Appendix C Standardized Warning Statements before installing or changing components of the system.
- If you buy a CPU separately, make sure that you use an Intel-certified multi-directional heatsink only.
- Make sure to install the processor and memory into the X11OPi-CPU board before you install the CPU board into the CPU board slot on the front side of the BPN-X11OPi midplane.
- When receiving a system without a processor pre-installed, make sure that the plastic CPU socket cap is in place and that none of the socket pins are bent; otherwise, contact your retailer immediately. Refer to the Supermicro website for updates on CPU support.

The Intel® 82xx/62xx/52xx/42xx series Processor



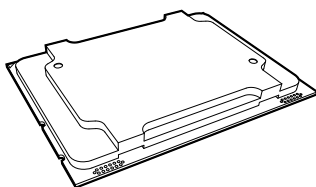
Note: All graphics shown in this manual were based upon the latest PCB revision available at the time of publishing this manual. The components installed in your system may or may not look exactly the same as the graphics shown in this manual.

Overview of the Processor Socket Assembly

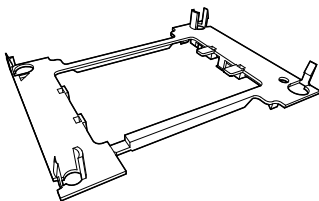
The processor socket assembly contains 1) Intel Xeon Intel® 82xx/62xx/52xx/42xx series processor (Note below), 2) the narrow processor clip, 3) the dust cover, and 4) the CPU socket.

Notes: Intel Intel® 82xx/62xx/52xx/42xx series series processors contain the F model and the non-F model processors. This motherboard only supports non-F model processors. This motherboard only supports non-F model processors.

1. Intel Xeon Intel® 82xx/62xx/52xx/42xx series Processor

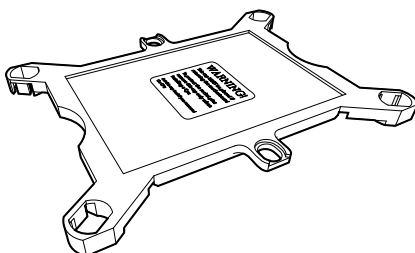


2. Narrow processor clip (the plastic processor package carrier used for the CPU)

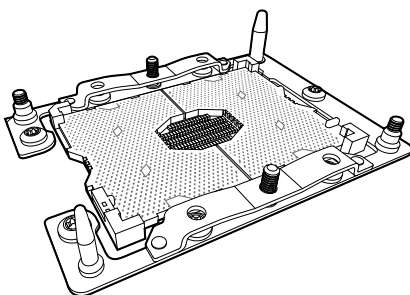


(for the non-F model processor - see the note above)

3. Dust Cover



4. CPU Socket

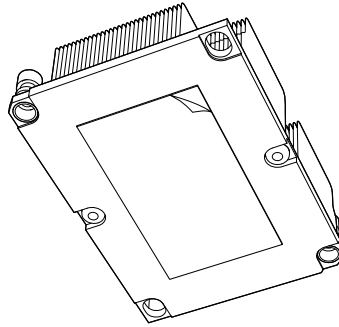


Note: All Be sure to cover the CPU socket with the dust cover when the CPU is not installed.

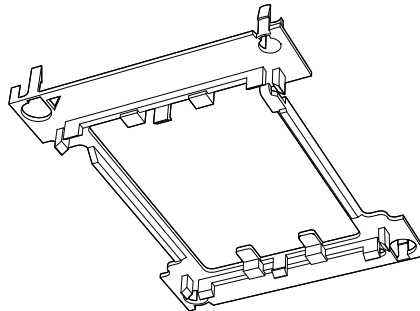
Overview of the Processor Heatsink Module (PHM)

The Processor Heatsink Module (PHM) contains 1) a heatsink, 2) a narrow processor clip, and 3) the Intel® 82xx/62xx/52xx/42xx series processor.

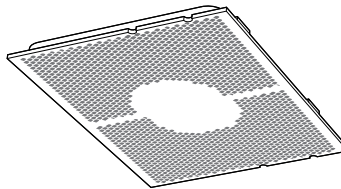
1. Heatsink



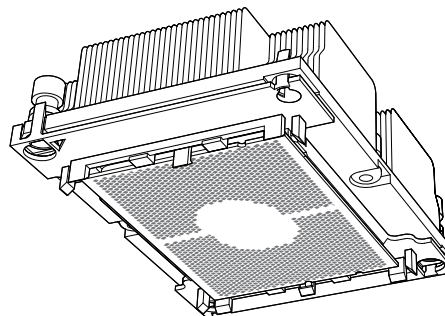
2. Narrow processor clip



3. Processor



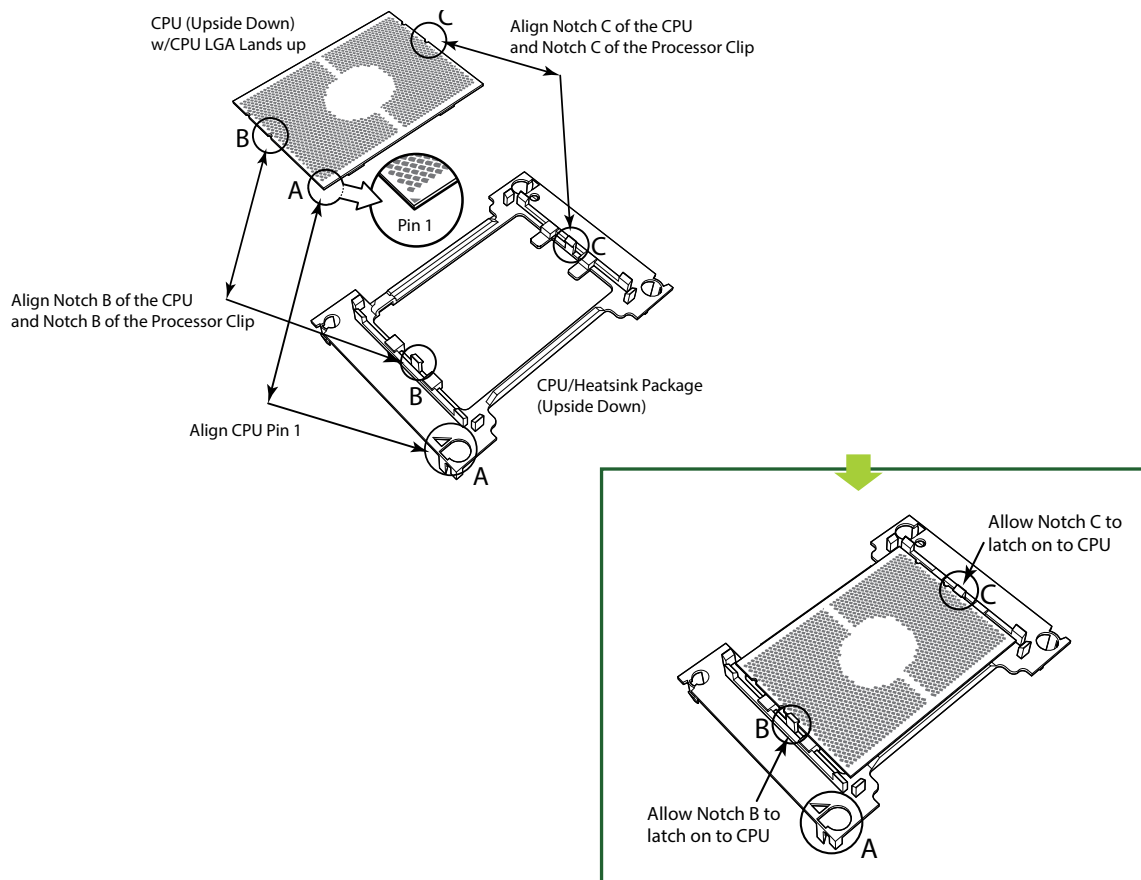
Processor Heatsink Module (PHM)



(Bottom View)

Attaching the Intel® Xeon® Platinum 8XXX Processor to the Narrow Processor Clip to Create the Processor Package Assembly

1. Locate pin 1 (notch A), which is the triangle located on the top of the narrow processor clip. Also locate notch B and notch C on the processor clip.
2. Locate pin 1 (notch A), which is the triangle on the substrate of the CPU. Also, locate notch B and notch C on the CPU as shown below.
3. Align pin 1 (the triangle on the substrate) of the CPU with pin 1 (the triangle) of the narrow processor clip. Once they are aligned, carefully insert the CPU into the processor clip by sliding notch B of the CPU into notch B of the processor clip, and sliding notch C of the CPU into notch C of the processor clip.
4. Examine all corners of the CPU to ensure that it is properly seated on the processor clip. Once the CPU is securely attached to the processor clip, the processor package assembly is created. (Note: Please exercise extreme caution when handling the CPU. Do not touch the CPU LGA-lands to avoid damaging the LGA-lands or the CPU. Be sure to wear ESD gloves when handling components.)

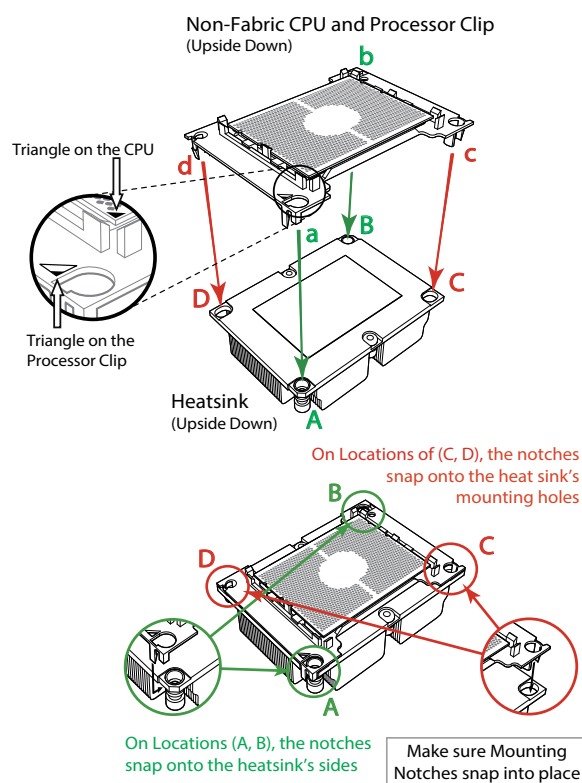


Processor Package Carrier (w/CPU mounted on the Processor Clip)

Attaching the Processor Package Assembly to the Heatsink to Form the Processor Heatsink Module (PHM)

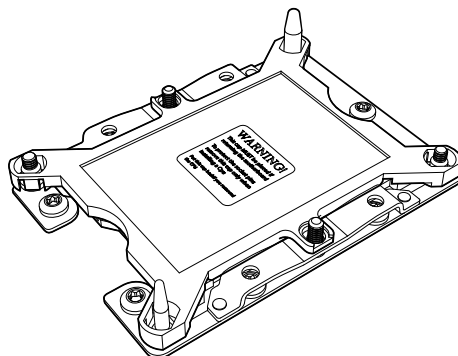
After you have made a processor package assembly by following the instructions on the previous page, please follow the steps below to mount the processor package assembly onto the heatsink to create the Processor Heatsink Module (PHM).

1. Locate "1" on the heatsink label and the triangular corner next to it on the heatsink. With your index finger pressing against the screw at this triangular corner, carefully hold and turn the heatsink upside down with the thermal-grease side facing up. Remove the protective thermal film if present, and apply the proper amount of the thermal grease as needed. (Skip this step if you have a new heatsink because the necessary thermal grease is pre-applied in the factory.)
2. Holding the processor package assembly at the center edge, turn it upside down. With the thermal-grease side facing up, locate the hollow triangle located at the corner of the processor carrier assembly ("a" in the graphic). Note a larger hole and plastic mounting clicks located next to the hollow triangle. Also locate another set of mounting clicks and a larger hole at the diagonal corner of the same (reverse) side of the processor carrier assembly ("b" in the graphic).
3. With the back of heatsink and the reverse side of the processor package assembly facing up, align the triangular corner on the heatsink ("A" in the graphic) against the mounting clips next to the hollow triangle ("a") on the processor package assembly.
4. Also align the triangular corner ("B") at the diagonal side of the heatsink with the corresponding clips on the processor package assembly ("b").
5. Once the mounting clips on the processor package assembly are properly aligned with the corresponding holes on the back of heatsink, securely attach the heatsink to the processor package assembly by snapping the mounting clips at the proper places on the heatsink to create the processor heatsink module (PHM).



Preparing the CPU Socket for Installation

This motherboard comes with the CPU socket pre-assembled in the factory. The CPU socket contains 1) a dust cover, 2) a socket bracket, 3) the CPU socket, and 4) a back plate. These components are pre-installed on the motherboard before shipping.

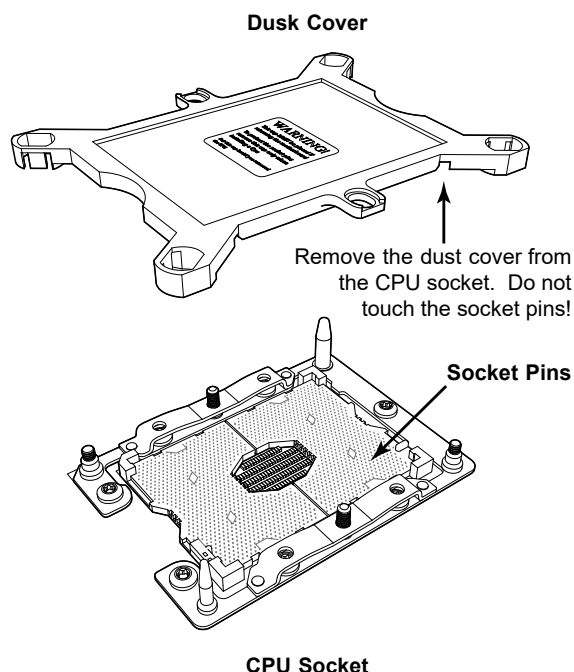


CPU Socket w/Dust Cover On

Removing the Dust Cover from the CPU Socket

Remove the dust cover from the CPU socket, exposing the processor socket and socket pins as shown on the illustration below.

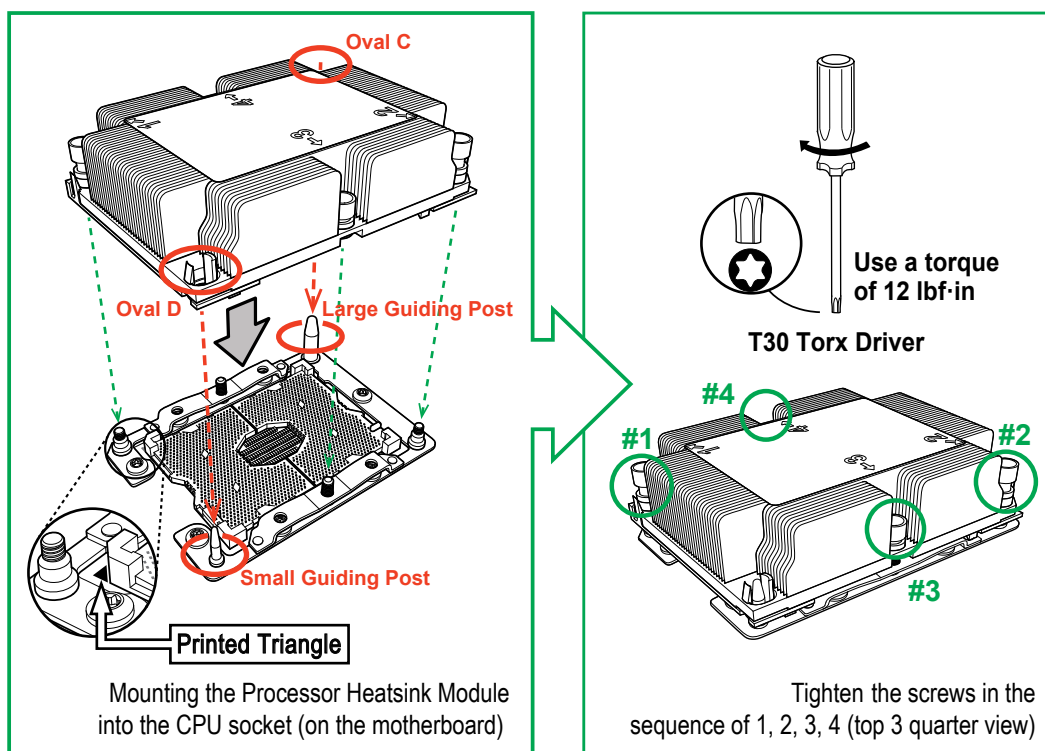
Note: Do not touch the socket pins to avoid damaging them, causing the CPU to malfunction.



Installing the Processor Heatsink Module (PHM)

1. Once you have assembled the processor heatsink module (PHM), you are ready to install the processor heatsink module (PHM) into the CPU socket on the motherboard. To install the PHM into the CPU socket, follow the instructions below.
2. Locate the triangle (pin 1) on the CPU socket, and locate the triangle (pin 1) at the corner of the PHM that is closest to "1." (If you have difficulty locating pin 1 of the PHM, turn the PHM upside down. With the LGA-lands side facing up, you will note the hollow triangle located next to a screw at the corner. Turn the PHM right side up, and you will see a triangle marked on the processor clip at the same corner of hollow triangle.)
3. Carefully align pin 1 (the triangle) on the PHM against pin 1 (the triangle) on the CPU socket.
4. Once they are properly aligned, insert the two diagonal oval holes on the heatsink into the guiding posts.
5. Using a T30 Torx-bit screwdriver, install four screws into the mounting holes on the socket to securely attach the PHM onto the motherboard starting with the screw marked "1" (in the sequence of 1, 2, 3, and 4).

Note: Do not use excessive force when tightening the screws to avoid damaging the LGA-lands and the processor.

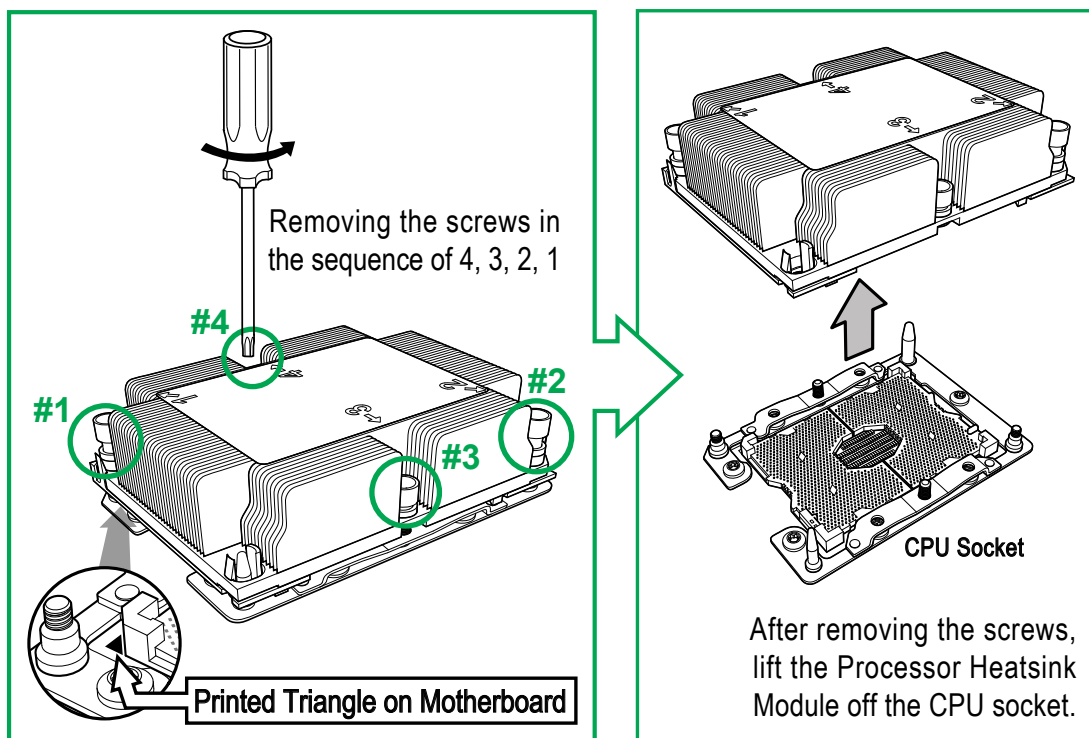


Removing the Processor Heatsink Module (PHM) from the Motherboard

Before removing the processor heatsink module (PHM), unplug power cord from the power outlet.

1. Using a T30 Torx-bit screwdriver, turn the screws on the PHM counterclockwise to loosen them from the socket, starting with screw marked #4 (in the sequence of 4, 3, 2, 1).
2. After all four screws are removed, wiggle the PHM gently and pull it up to remove it from the socket.

Note: To properly remove the processor heatsink module, be sure to loosen and remove the screws on the PHM in the sequence of 4, 3, 2, 1 as shown below.



Memory Support and Installation

Note: Check the Supermicro website for recommended memory modules.

ESD Precautions

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

Precautions

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

Introduction to Intel® Optane DC Persistent Memory

Intel® 82xx/62xx/52xx/42xx supports new DCPMM (Optane™ DC Persistent Memory Modules) technology. DCPMM offers data persistence with higher capacity at lower latencies than the existing memory modules and provides hyper-speed storage capability for high performance computing platforms with flexible configuration options.

Memory Support

Each CPU board supports up to 3TB DCPMM* or 3DS LRDIMM (Load Reduced)/LRDIMM/3DS RDIMM (Registered)/RDIMM DDR4 memory of 2933*/2666/2400/2133 MHz in 12 DIMM slots. It also supports up to 4.5TB DCPMM and DDR4 combined memory of up to 2933 MHz in 12 DIMM slots. With eight CPU boards installed, your system will support up to 24TB of DCPMM/DDR4 memory or up to 36TB DCPMM & DDR4 combined memory in 96 memory slots.

Notes: **1.** 2933 MHz memory and DCPMM Memory are supported by Second Generation Intel® Xeon® Platinum 82XX processors only. **2.** Populating DDR4 memory modules in a two-DIMMs per-channel (2DPC) configuration on this motherboard will affect memory bandwidth and performance. **3.** Mixing of memory modules of different types and speeds is not allowed. **4.** Memory speed support is dependent on the processors used in the system. For the latest CPU/memory updates, please refer to our website at <http://www.supermicro.com/products/motherboard>.

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

Memory Slots

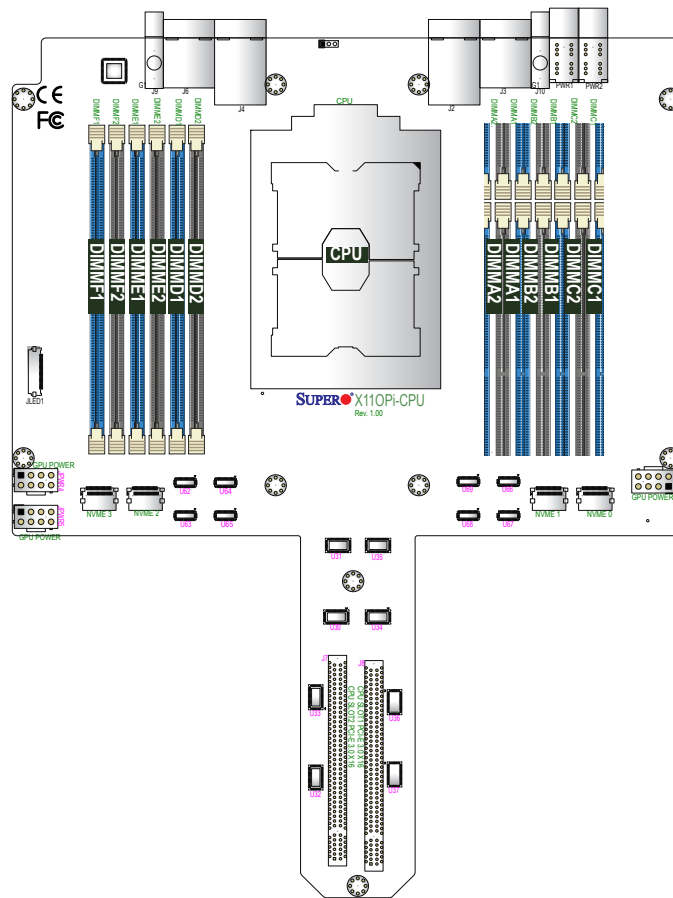


Figure 3-2. Memory Slots

DDR4 Memory Support for Intel® Xeon® Platinum 8XXX Processors

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

DDR4 Memory Support for 2nd Gen Intel® Xeon® Platinum 82XX Processors

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

Notes: 1. 2933 MHz memory support in two-DIMMs per-channel (2DPC) configuration can be achieved by using memory purchased from Supermicro. 2. 2933 MHz memory is supported by the Second Generation Intel® Xeon® Platinum 82XX processor only.

DIMM Population Guidelines for Optimal Performance

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

Key Parameters for DIMM Configuration

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

DIMM Mixing Guidelines

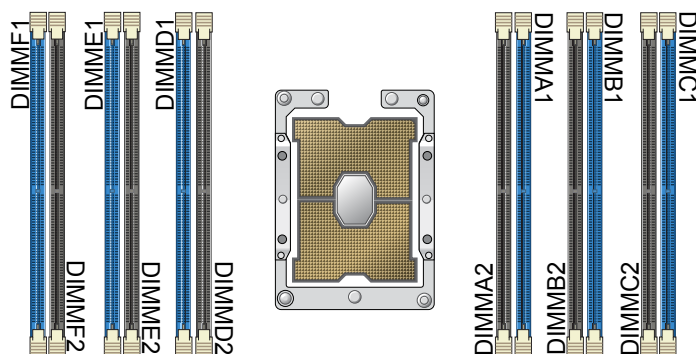
General DIMM Mixing Guidelines
DIMM Mixing Rules
<ul style="list-style-type: none"> • All DIMMs must be all DDR4 or DCPMM DIMMs. • x4 and x8 DIMMs can be mixed in the same channel. • Mixing of LRDIMMs and RDIMMs is not allowed in the same channel, across different channels, and across different sockets. • Mixing of non-3DS and 3DS LRDIMM is not allowed in the same channel, across different channels, and across different sockets.

Mixing of DIMM Types within a Channel			
DIMM Types	RDIMM	LRDIMM	3DS LRDIMM
RDIMM	Allowed	Not Allowed	Not Allowed
LRDIMM	Not Allowed	Allowed	Not Allowed
3DS LRDIMM	Not Allowed	Not Allowed	Allowed

Note: The drawing above shows DIMM module population for each CPU Board installed in your system. Please install your processors starting with CPU Board #1.

Memory Population Table

DCPMM Population Table (X11OPi+ w/8 CPU Boards & 96 DIMMs Installed)	
8 CPU boards & 96 DIMMs (12 DIMMs per CPU board)	Memory Population Sequence
CPU Board 1 + 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
CPU Board 2 + 12 DIMMs	CPU2: P2-DIMMC1/P2-DIMMC2/P2-DIMMB1/P2-DIMMB2/P2-DIMMA1/P2-DIMMA2/ P2-DIMMD2/P2-DIMMD1/P2-DIMME2/P2-DIMME1/P2-DIMMF2/P2-DIMMF1
CPU Board 3 + 12 DIMMs	CPU3: P3-DIMMC1/P3-DIMMC2/P3-DIMMB1/P3-DIMMB2/P3-DIMMA1/P3-DIMMA2/ P3-DIMMD2/P3-DIMMD1/P3-DIMME2/P3-DIMME1/P3-DIMMF2/P3-DIMMF1
CPU Board 4 + 12 DIMMs	CPU4: P4-DIMMC1/P4-DIMMC2/P4-DIMMB1/P4-DIMMB2/P4-DIMMA1/P4-DIMMA2/ P4-DIMMD2/P4-DIMMD1/P4-DIMME2/P4-DIMME1/P4-DIMMF2/P4-DIMMF1
CPU Board 5 + 12 DIMMs	CPU5: P5-DIMMC1/P5-DIMMC2/P5-DIMMB1/P5-DIMMB2/P5-DIMMA1/P5-DIMMA2/ P5-DIMMD2/P5-DIMMD1/P5-DIMME2/P5-DIMME1/P5-DIMMF2/P5-DIMMF1
CPU Board 6 + 12 DIMMs	CPU6: P6-DIMMC1/P6-DIMMC2/P6-DIMMB1/P6-DIMMB2/P6-DIMMA1/P6-DIMMA2/ P6-DIMMD2/P6-DIMMD1/P6-DIMME2/P6-DIMME1/P6-DIMMF2/P6-DIMMF1
CPU Board 7 + 12 DIMMs	CPU7: P7-DIMMC1/P7-DIMMC2/P7-DIMMB1/P7-DIMMB2/P7-DIMMA1/P7-DIMMA2/ P7-DIMMD2/P7-DIMMD1/P7-DIMME2/P7-DIMME1/P7-DIMMF2/P7-DIMMF1
CPU Board 8 + 12 DIMMs	CPU8: P8-DIMMC1/P8-DIMMC2/P8-DIMMB1/P8-DIMMB2/P8-DIMMA1/P8-DIMMA2/ P8-DIMMD2/P8-DIMMD1/P8-DIMME2/P8-DIMME1/P8-DIMMF2/P8-DIMMF1



Note: The drawing above shows DIMM module population for each CPU board installed in your system. Please install your processors starting with CPU board #1.

Symmetric Population												
2-2-2	(For Channel Configuration: 2-2-2)											
Modes												
CPU1	P1-DIMMF1	P1-DIMMF2	P1-DIMME1	P1-DIMME2	P1-DIMMD1	P1-DIMMD2	P1-DIMMA2	P1-DIMMA1	P1-DIMMB2	P1-DIMMB1	P1-DIMMC2	P1-DIMMC1
AD	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
MM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
AD + MM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3
CPU2	P2-DIMMF1	P2-DIMMF2	P2-DIMME1	P2-DIMME2	P2-DIMMD1	P2-DIMMD2	P2-DIMMA2	P2-DIMMA1	P2-DIMMB2	P2-DIMMB1	P2-DIMMC2	P2-DIMMC1
AD	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
MM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
AD + MM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3
CPU3	P3-DIMMF1	P3-DIMMF2	P3-DIMME1	P3-DIMME2	P3-DIMMD1	P3-DIMMD2	P3-DIMMA2	P3-DIMMA1	P3-DIMMB2	P3-DIMMB1	P3-DIMMC2	P3-DIMMC1
AD	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
MM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
AD + MM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3
CPU4	P4-DIMMF1	P4-DIMMF2	P4-DIMME1	P4-DIMME2	P4-DIMMD1	P4-DIMMD2	P4-DIMMA2	P4-DIMMA1	P4-DIMMB2	P4-DIMMB1	P4-DIMMC2	P4-DIMMC1
AD	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
MM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
AD + MM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3
CPU5	P5-DIMMF1	P5-DIMMF2	P5-DIMME1	P5-DIMME2	P5-DIMMD1	P5-DIMMD2	P5-DIMMA2	P5-DIMMA1	P5-DIMMB2	P5-DIMMB1	P5-DIMMC2	P5-DIMMC1
AD	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
MM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
AD + MM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3
CPU6	P6-DIMMF1	P6-DIMMF2	P6-DIMME1	P6-DIMME2	P6-DIMMD1	P6-DIMMD2	P6-DIMMA2	P6-DIMMA1	P6-DIMMB2	P6-DIMMB1	P6-DIMMC2	P6-DIMMC1
AD	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
MM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
AD + MM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3
CPU7	P7-DIMMF1	P7-DIMMF2	P7-DIMME1	P7-DIMME2	P7-DIMMD1	P7-DIMMD2	P7-DIMMA2	P7-DIMMA1	P7-DIMMB2	P7-DIMMB1	P7-DIMMC2	P7-DIMMC1
AD	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
MM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
AD + MM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3
CPU8	P8-DIMMF1	P8-DIMMF2	P8-DIMME1	P8-DIMME2	P8-DIMMD1	P8-DIMMD2	P8-DIMMA2	P8-DIMMA1	P8-DIMMB2	P8-DIMMB1	P8-DIMMC2	P8-DIMMC1
AD	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
MM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
AD + MM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3

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

Note: DDR4 single rank DIMMs based on x8 devices are not compatible with any DCPMM operating mode.

Legend	
Capacity	
DCPMM	Any Capacity (Uniformly for all channels for a given configuration)

- For MM, general NM/FM ratio is between 1:4 and 1:16. Excessive capacity for FM can be used for AD. (NM = Near Memory; FM = Far Memory)
- For each individual population, rearrangements between channels are allowed as long as the resulting population is compliant with the X11 memory population rules for the 2nd Gen Intel® Xeon® Platinum 82XX processors.
- For each individual population, please use the same DDR4 DIMM in all slots.
- For each individual population, sockets are normally symmetric with exceptions for 1 DCPMM per socket and 1 DCPMM per node case.
- No mixing of DCPMM and NVMDIMMs within the same platform is allowed.
- This DCPMM population guide targets a balanced DCPMM-to-DRAM-cache ratio in MM and MM + AD modes.

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

Memory Rank Sparing Tables

Dual Rank Memory Rank Sparing (16GB DIMM)		
Memory Population	Total RAM Detected	
	One Rank Configuration	Two Rank Configuration
A1	8GB	8GB
A1+B1	16GB	16GB
A1+B1+C1	24GB	24GB
A1+B1+C1+D1	32GB	32GB
A1+B1+C1+D1+E1	40GB	40GB
A1+B1+C1+D1+E1+F1	49GB	49GB

Quad Rank Memory Rank Sparing (64GB DIMM)		
Memory Population	Total RAM Detected	
	One Rank Configuration	Two Rank Configuration
A1	48GB	32GB
A1+B1	96GB	64GB
A1+B1+C1	144GB	96GB
A1+B1+C1+D1	192GB	128GB
A1+B1+C1+D1+E1	240GB	160GB
A1+B1+C1+D1+E1+F1	288GB	192GB

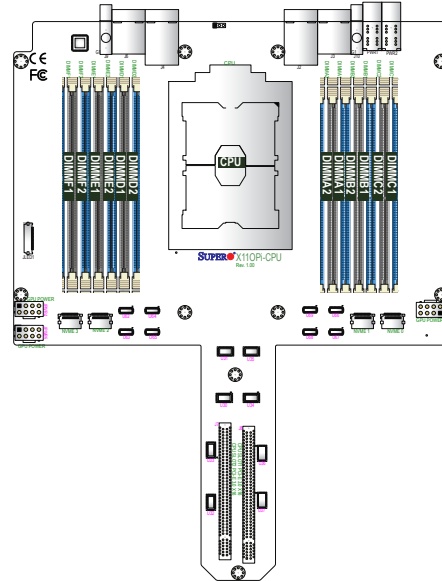
Installing DIMM Modules on the X110Pi-CPU Board

CAUTION

Exercise extreme care when installing or removing DIMM modules to prevent any possible damage. Check Supermicro's website for recommended memory modules.

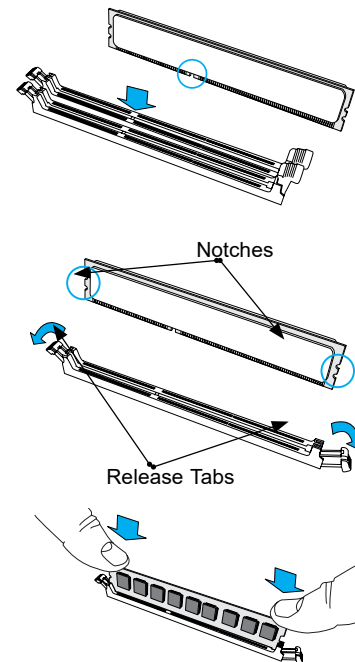
1. Install the desired number of DIMM modules on the CPU board; each board supports up to 12 DIMMs. When installing memory, be sure to always populate the blue slots first, starting with DIMMA1, DIMMB1, DIMMC1, DIMMD1, DIMME1, and DIMMF1. For best performance, please use the memory modules of the same type and same speed in

X110Pi-CPU Memory Support	
DIMMA1/A2, DIMMB1/B2	
DIMMC1/C2, DIMMD1/D2	
DIMME1/E2, DIMMF1/F2	



the same bank. For DIMM module locations, please refer to the layout below.

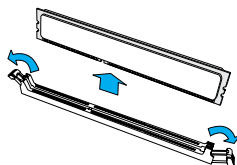
2. Push the release tabs outwards on both ends of the DIMM slot to unlock it.
3. Align the key of the DIMM module with the receptive point on the memory slot.
4. Align the notches on both ends of the module with the receptive points on the ends of the slot. Use two thumbs together to press module straight down into the slot until the module snaps into place.
5. Press the release tabs to the lock positions to lock the DIMM module into the slot.



Note: Press the memory straight down into the slot until it is properly seated.

DIMM Module Removal

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



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

3.4 PCI-E Expansion Card Installation

The 7089P-TR4T supports up to 23 PCI-E 3.0 slots: five are in the rear five PCI-E modules, sixteen are in the eight front CPU modules, two are inside the storage module.

The Rear Five PCI-E Modules

Each module can support one FHHL PCI-E 3.0 x16 card, which features a hot-plug* capability for adding and removing PCI-E cards.

The Front Eight CPU Modules

Each CPU module has two PCI-E bays, and together to support the one of the following configurations:

- Up to sixteen full-height (FH) PCI-E 3.0 x16 cards
- Up to eight GPUs plus 16 U.2 NVMe drives or eight full-height (FH) PCI-E 3.0 x16 cards
- Up to thirty-two U.2 NVMe drives

Inside the Storage Module

The storage module supports two low-profile (LP) PCI-E 3.0 x8 (in x16 slot) internal cards, or one full-height (FH) PCI-E 3.0 x8 (in x16 slot) internal cards via riser for OEM.

Alternately, the system can have up to thirty-nine PCI-E 3.0 slots via customized risers for OEM.

PCIE Module

Perform the following steps to replace a PCI-E card in one of five hot-plug PCI-E modules at the rear of the system while the system is on.

*Both the OS and PCI-E card must support the hot-plug feature.

Removing a Hot-Plug PCI-E Card

1. Initiate a hot-removal request by pushing the Attention Button on the corresponding slot. The green power LED will blink to indicate the module is in a transition state. (To cancel the hot-plug removal operation, press the Attention Button again within five seconds.)
2. The power LED will turn off, showing that it is safe to remove the module. If not, it indicates the request has failed (possibly due to client's software unwilling to relinquish the device).
3. Push the red release tab located at the top left of the module to the right in order to pull out the lever.
4. Use the lever to pull the PCI-E module out of the chassis.
5. Press and rotate the silver locking tab to fully release the PCI-E card.

6. Pull the card out of the PCI-E board.

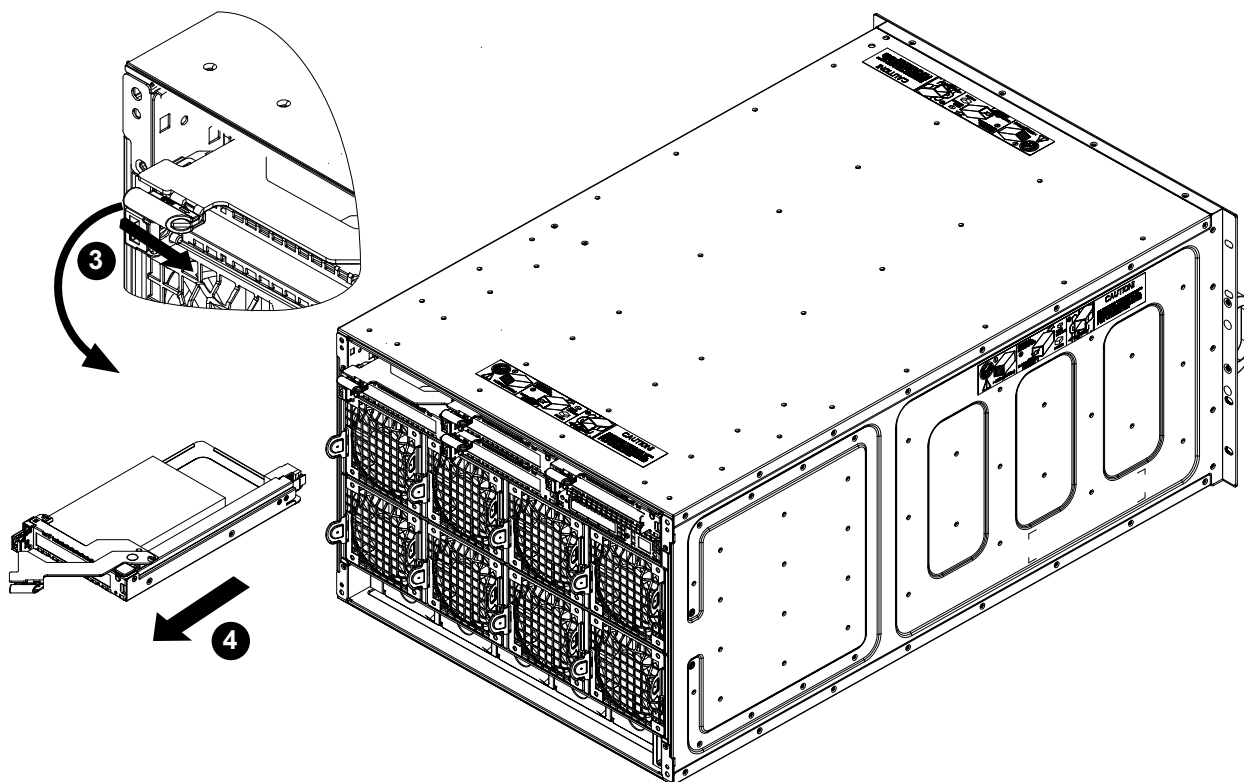


Figure 3-3. Removing a PCI-E Module

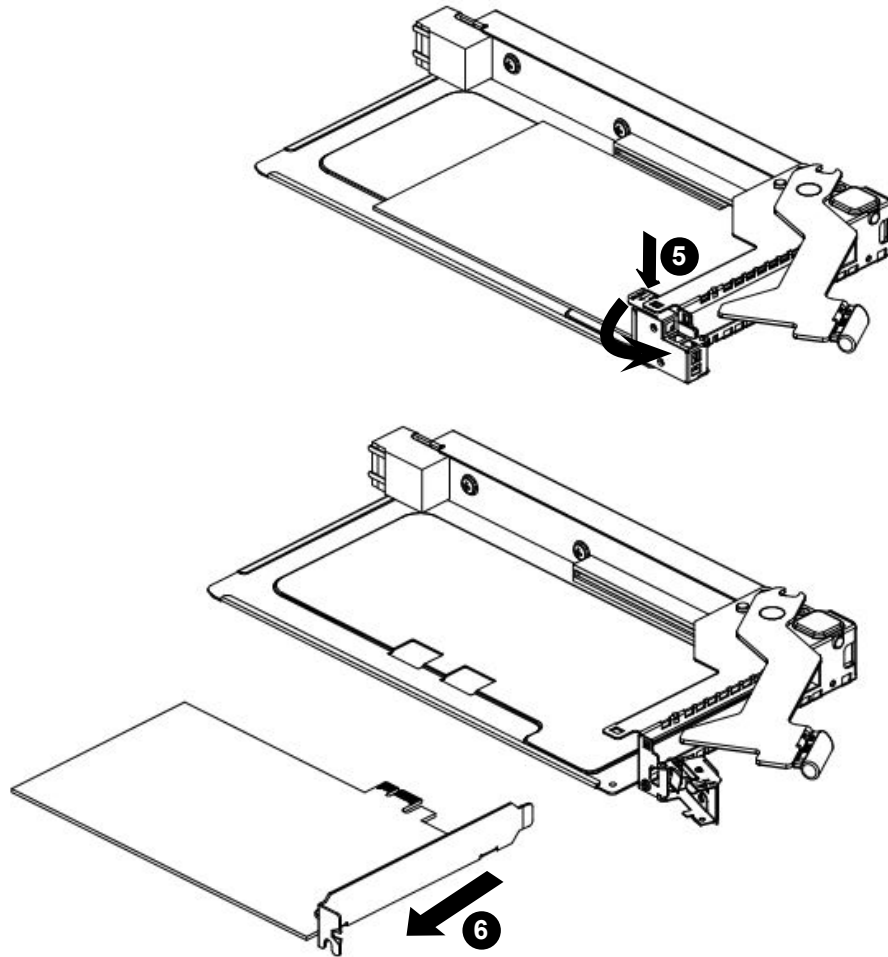


Figure 3-4. Removing a PCI-E Card from a PCIE Module

Adding a Hot-Plug PCI-E Card

1. Insert the PCI-E card into the PCIE board, making sure the card bracket aligns with the optional screw hole.
2. Secure the PCI-E card by locking the silver locking tab. Insert the PCI-E module back to the chassis and fully close the lever before locking it by pushing the red release tab to left.
3. A hot-plug addition request is made by pushing the Attention Button on the corresponding slot. The green power LED will blink to indicate the module is in a transition state. (To cancel the hot-plug removal operation, press the Attention Button again within five seconds.)
4. The power LED will change from blinking to solid on to indicate that the device to be added has been found, configured and has the driver loaded.
5. If the request fails, the power LED will stop blinking and the slot will remain disabled. The hot-plug software should activate the Attention LED to indicate an operational problem.

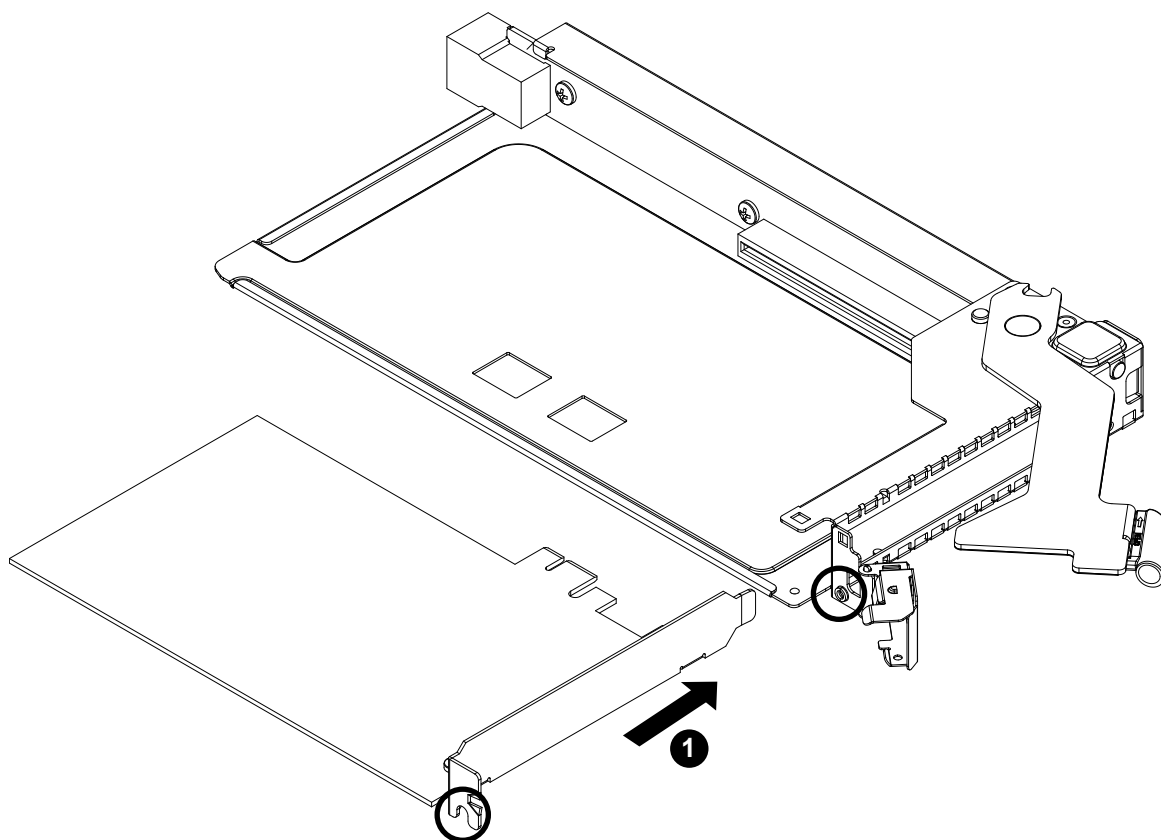


Figure 3-5. Adding a PCI-E Card to a PCI-E Module

CPU Module

Perform the following steps to install a PCI-E card in any of the eight CPU modules at the front of the system. Power must be removed from the system (as described in Section 3.1) when performing this procedure.

1. Begin by removing the corresponding CPU module, as described in Section 3.3.
2. Open the top cover after removing the screw that secures it to the chassis.
3. Remove the five screws on the front riser cover and lift it up. If a GPU card is installed in the CPU module you must also remove two additional screws and the GPU power cable.
4. Release the latch and pull the dummy cover or existing PCI-E card out of the front slot.
5. Insert the PCI-E card to the riser card.
6. Reverse the steps above to secure the PCI-E card and replace the CPU module back into the chassis. Make sure the four front hooks have been completely inserted.
7. Power up the system.

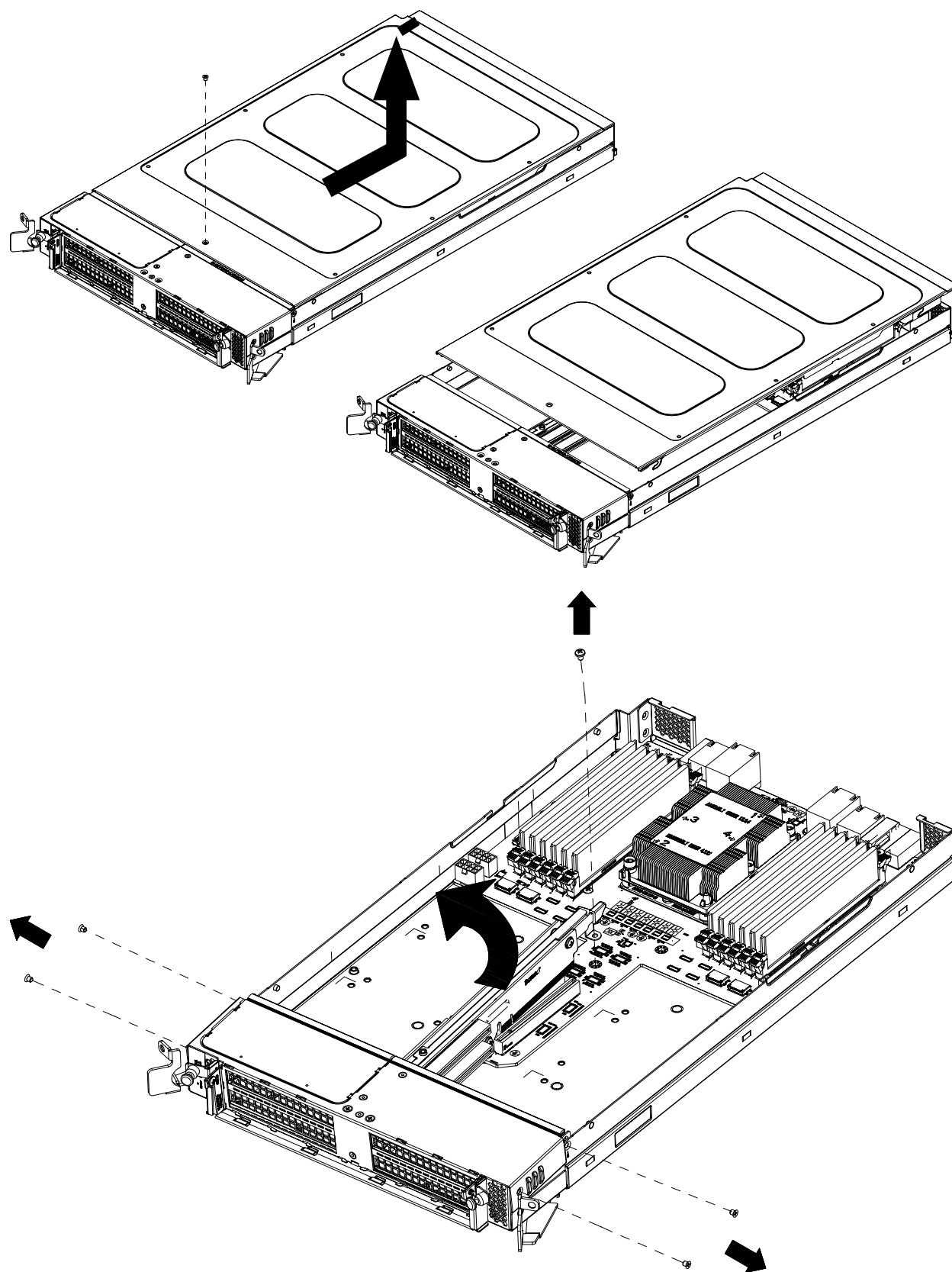


Figure 3-6. Installing a PCI-E Card in a CPU Module

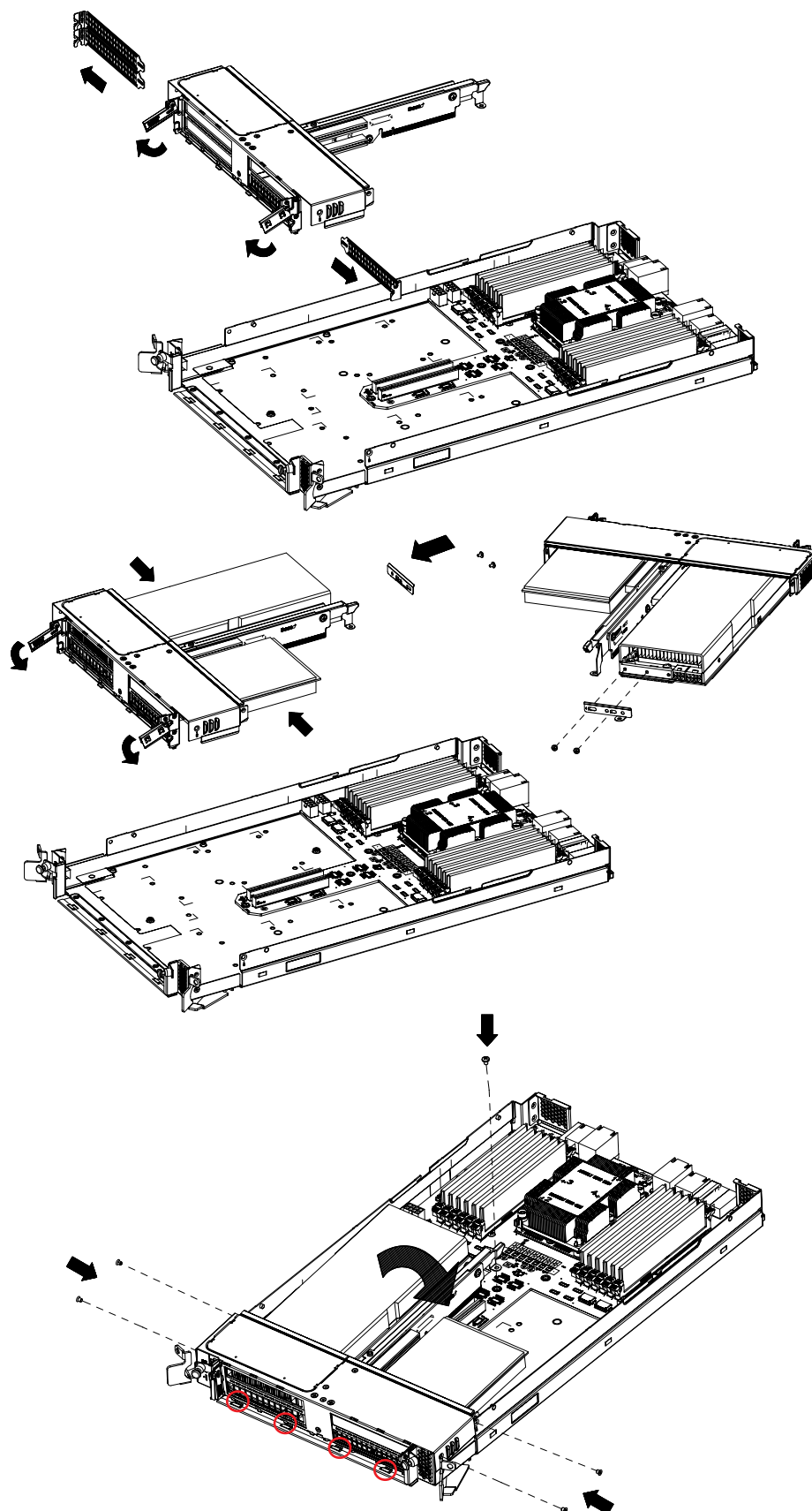


Figure 3-7. Installing a PCI-E Card in a CPU Module (cont.)

Storage Module

Perform the following steps to install a PCI-E card in the HDD storage module at the front of the system. Power must be removed from the system as described in Section 3.1 when performing this procedure.

1. Begin by removing the storage module as described in Section 3.6.
2. Open the top cover of the storage module as shown in Figure 3-14.
3. Remove the screw that secures the card adapter on the card cage. Lift and then forward the card adapter (with existed PCI-E card if any) to disengage from card cage.
4. Remove the card adapter from the existed PCI-E card (if any is present).
5. Replace the original PCI-E bracket of the card with card adapter and secure with a screw.
6. Reverse the steps above to secure the card and replace the storage module back into the chassis.
7. Power up the system.

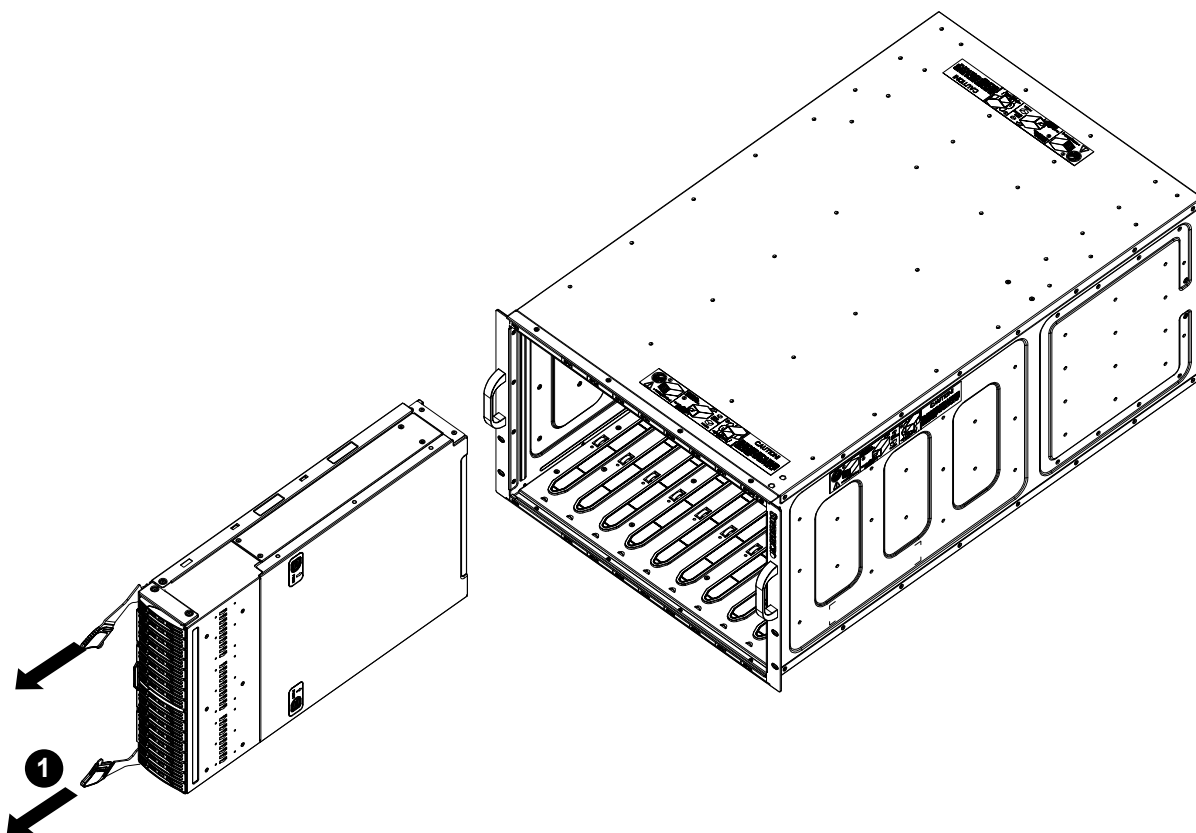


Figure 3-8. Removing a Storage Module

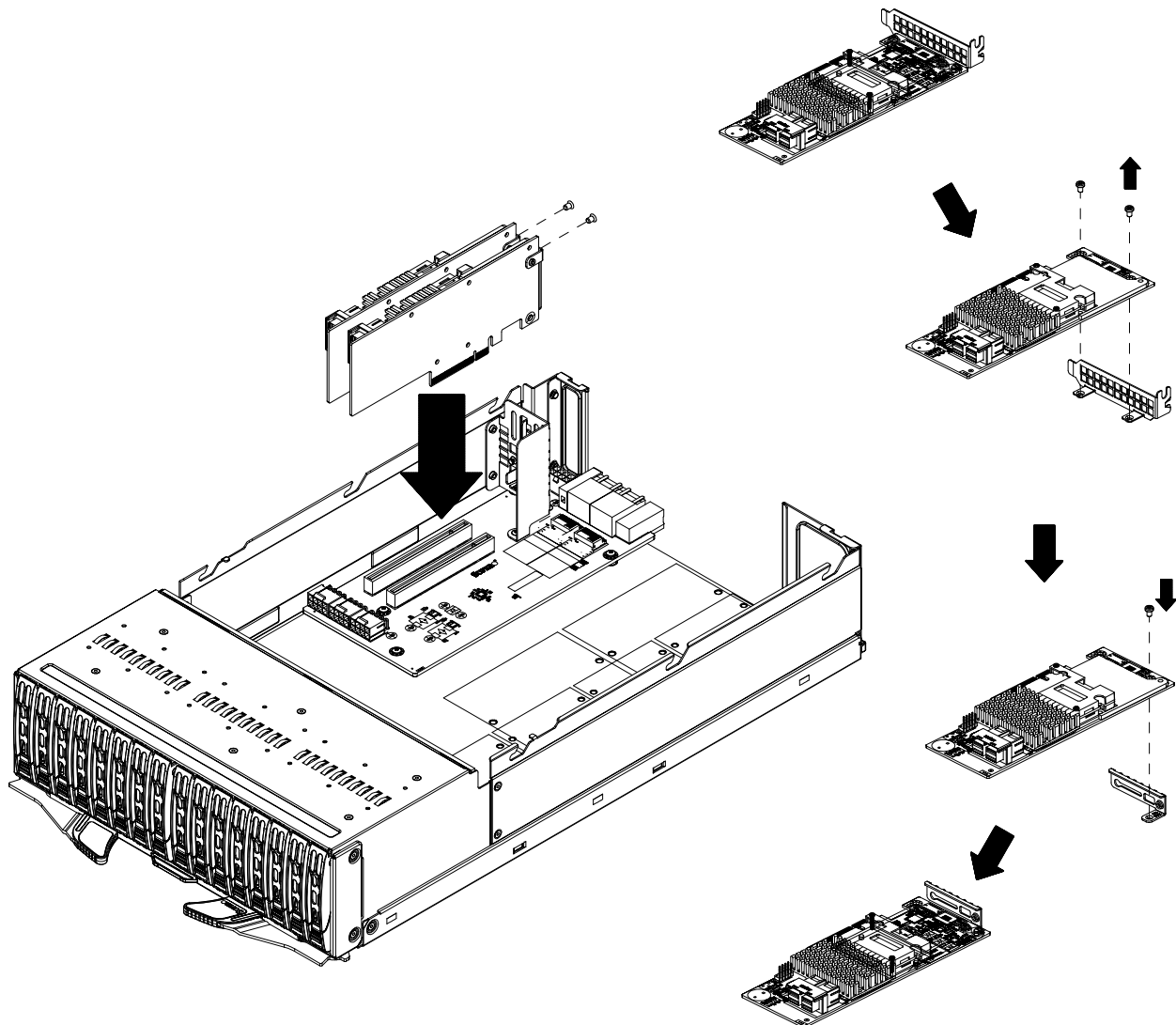


Figure 3-9. Installing a PCI-E Card in a Storage Module

3.5 Onboard Battery

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

Replacing the Battery

1. Begin by removing power from the system as described in Section 3-1.
2. Rotate the black thumb screw counterclockwise in order to pull out the lever.
3. Use the lever to pull the PCH module out of the chassis.
4. Push aside the small clamp that covers the edge of the battery. When the battery is released, lift it out of the holder.
5. 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.
6. Insert the PCH module back to the chassis and fully close the lever before locking it by rotating the red black thumb screw clockwise.

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

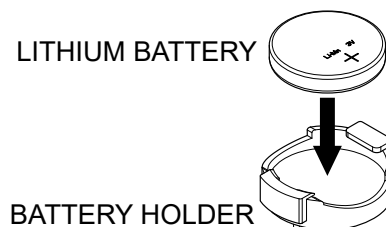


Figure 3-10. Installing the Onboard Battery

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

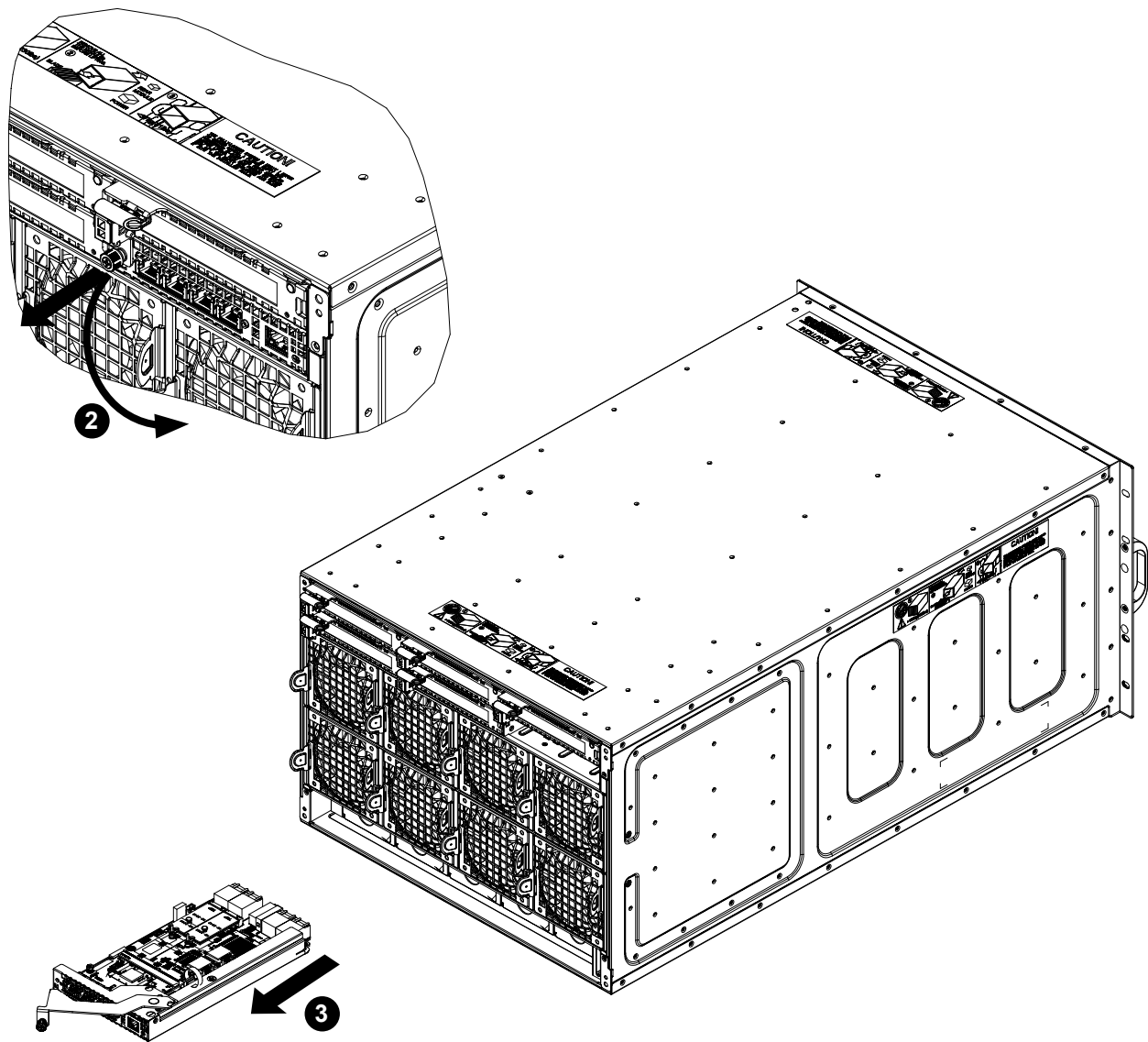


Figure 3-11. Installing the Battery

3.6 Chassis Components

Hot-Swap Hard Drives

The 7089P-TR4T includes one storage module that supports 16 2.5" drives, which can be removed without powering down the system. Only enterprise level SAS or SATA HDDs are recommended.

Removing Hard Drive Carriers from the Chassis

1. Press the release button on the drive tray. This extends the drive bay handle.
2. Use the handle to pull the tray out of the chassis.

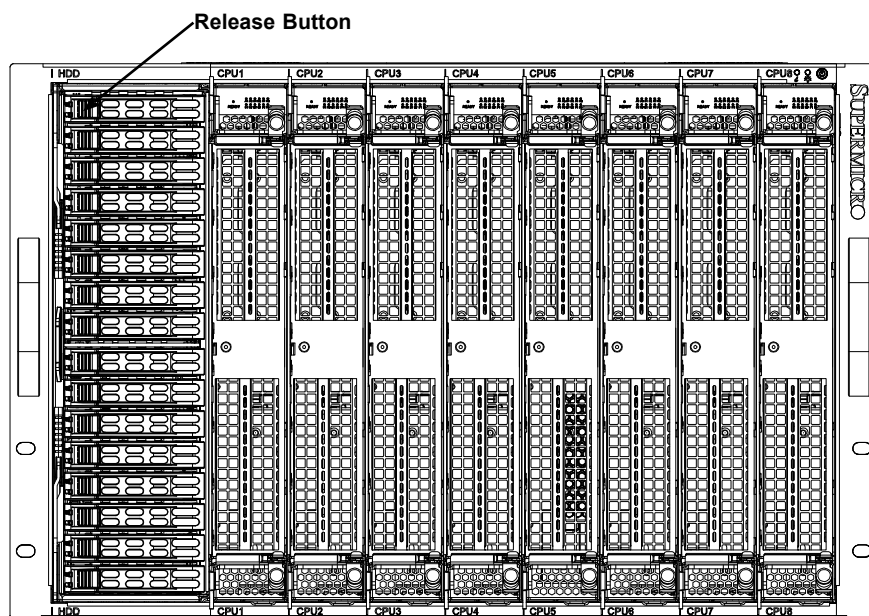


Figure 3-12. Removing a Drive Carrier

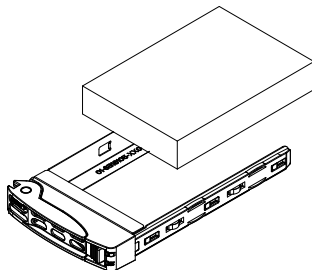


Figure 3-13. Mounting a Drive in a Carrier

Installing a Hard Drive into a Drive Carrier

1. Insert a drive into the carrier with the PCB side facing down and the connector end toward the rear of the carrier.
2. Align the drive in the carrier so that the mounting holes of both are aligned. Note that there are holes in the carrier marked "SAS" or "SATA" to aid in correct installation.
3. Secure the drive to the carrier with four screws as illustrated above. Use the four M3 flat-head screws included in the HDD bag of the accessory box. Note that the screws used to secure the dummy drive to the carrier cannot be used to secure the hard drive.
4. Insert the hard drive and drive carrier into its bay, the release handle will retract.
5. Using the thumb, push against the upper part of the hard drive handle. Push the hard drive into the hard drive bay as illustrated below, until the hard drive clicks into the locked position.

Hard Drive Carrier Indicators

Each hard 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		
LED	State/Condition	Indication
Blue	Blinking	Drive activity
Red	Solid on	Drive failure

Internal Hard Drives

The storage module in the 7089P-TR4T supports up to six 3.5" or eight 2.5" fixed HDDs. Installing or removing these drives requires the module to be removed from the chassis.

Removing a Storage Module

1. Begin by removing power from the system as described in Section 3-1.
2. Each release lever on the module has a locking latch. Push both latches to unlock the levers.
3. Grasp the release levers on both ends of the module and pull outward as shown below.
4. The module should disengage, allowing you to pull it completely out of the chassis.
5. Put the module on a flat, non-conductive surface before removing or installing the internal hard drives.

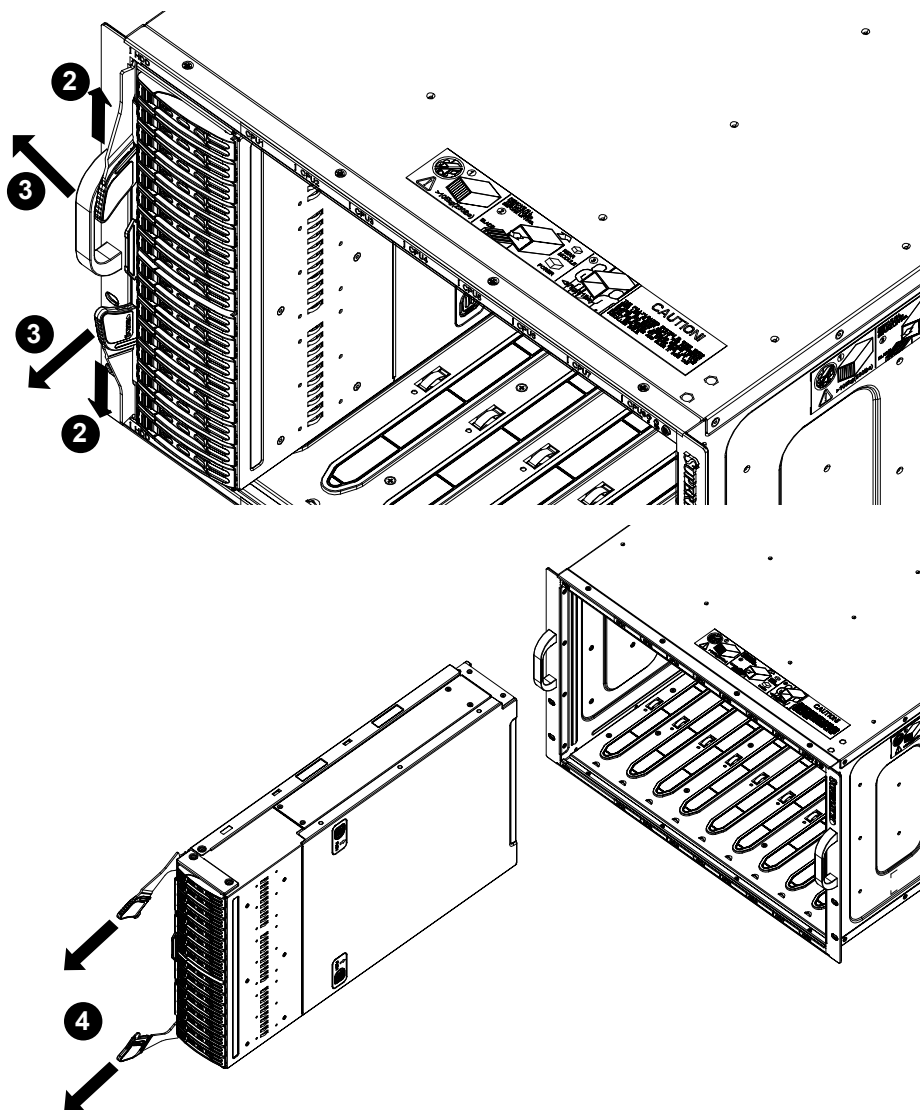


Figure 3-14. Removing a Storage Module

Removing/Installing Internal Hard Drives

To remove the cover of the storage module, depress the two release buttons and push the cover toward the rear of the module as shown below.

2.5" HDDs

The 2.5" hard drives are mounted in brackets or directly secured to the bottom of the storage module tray. See Figure 3-16 below for the case with brackets.

1. Remove the bracket (if any) holding the drive you wish to replace by unscrewing from the bottom of the storage module.
2. Each drive is held in place in the bracket (if any) with four screws. Remove these as well as the SATA power and data cables then take out the hard drive.
3. Install a new hard drive into the bracket (if needed), reconnect the power and data cables and secure the drive with the four screws.
4. Repeat the steps above as necessary.
5. With all brackets and their drives installed in the module, replace the cover and slide the storage module back into its bay in the chassis.
6. Depress the power button to boot up the system.

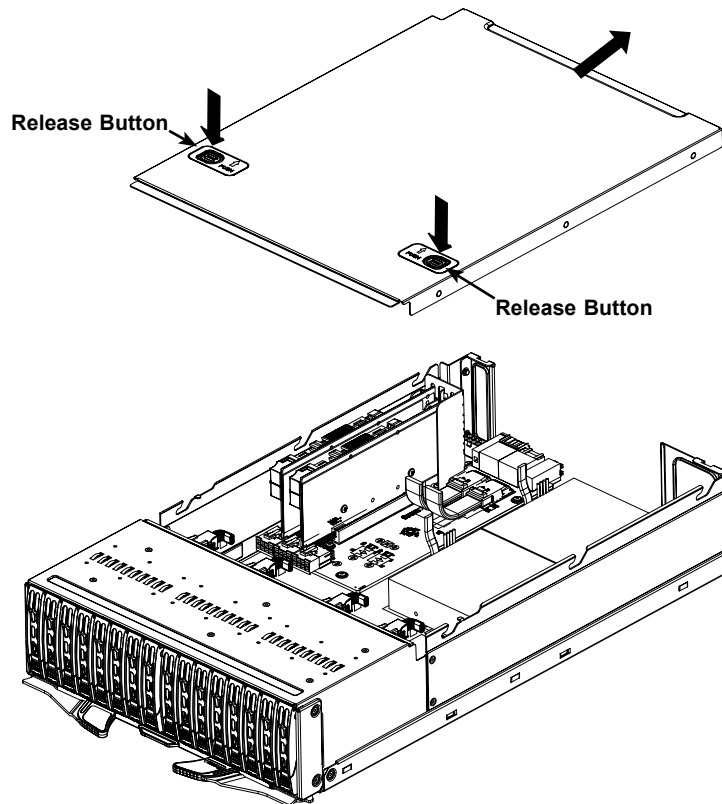


Figure 3-15. Removing the Storage Module Cover

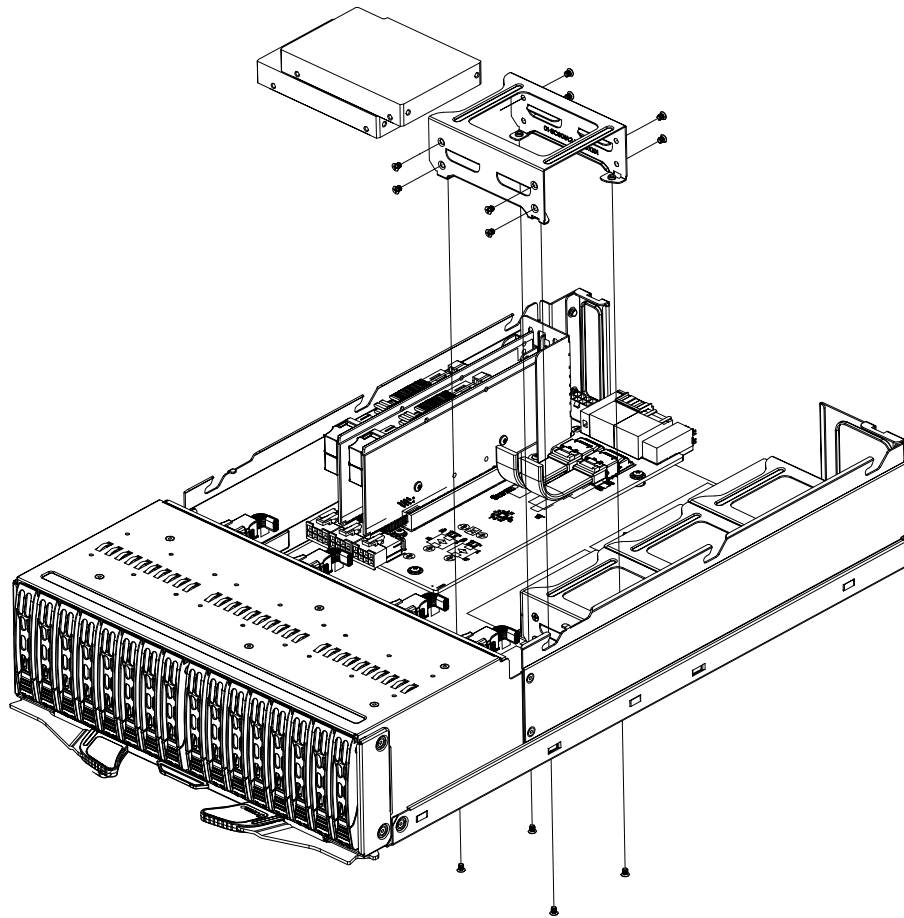


Figure 3-16. Installing/Removing 2.5" HDDs with bracket

3.5" HDDs

The 3.5" hard drives are mounted in brackets or directly secured to the bottom of the storage module tray. See Figure 3-17 for the case without brackets.

1. Remove the bracket (if any) holding the drive you wish to replace by unscrewing from the bottom of the storage module.
2. Each drive is held in place in the bracket (if any) with four screws. Remove these as well as the SATA power and data cables then take out the hard drive.
3. Install a new hard drive into the bracket (if needed), reconnect the power and data cables and secure the drive with the four screws.
4. Repeat the steps above as necessary.
5. With all brackets and their drives installed in the module, replace the cover and slide the storage module back into its bay in the chassis.
6. Depress the power button to boot up the system.

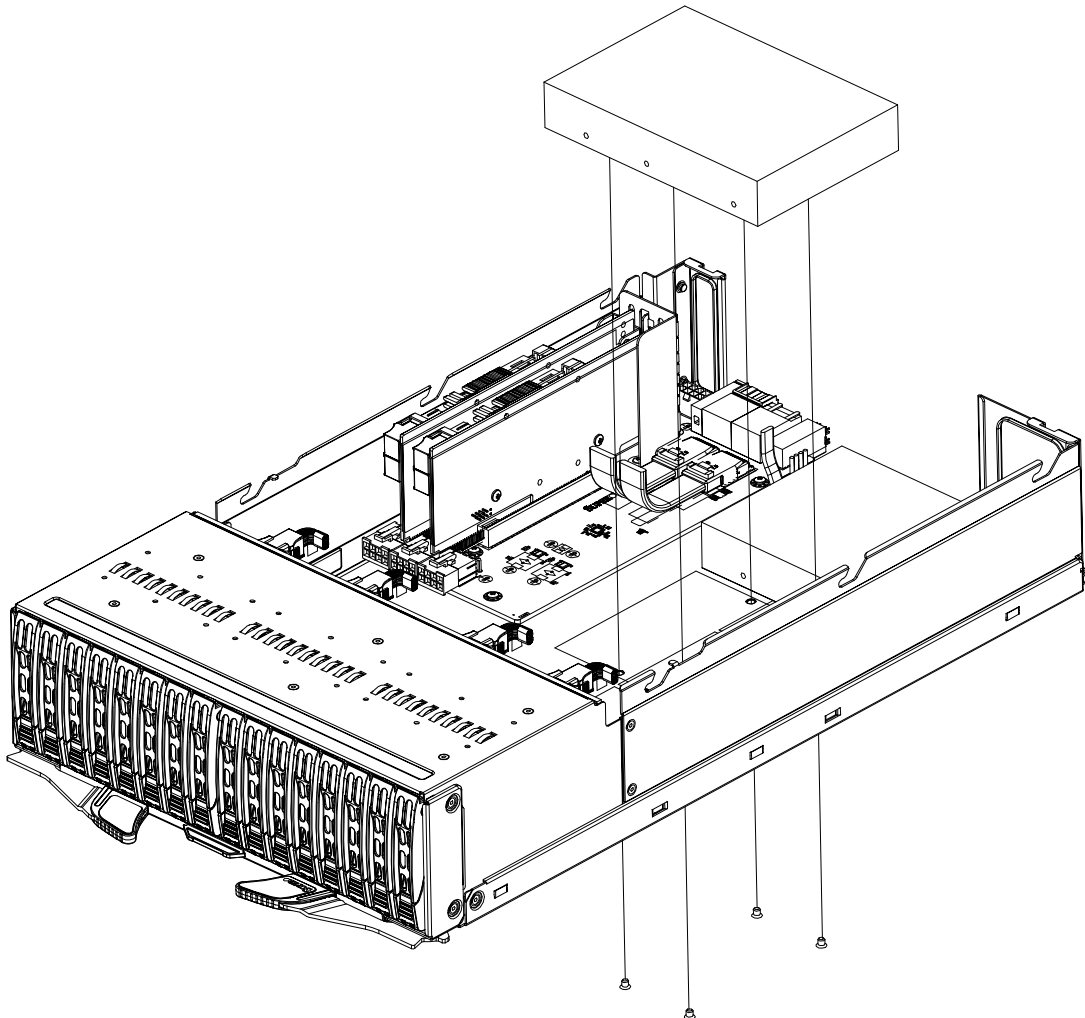


Figure 3-17. Installing/Removing 3.5" HDDs without bracket

Drive Carrier Indicators

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

Drive Carrier LED Indicators			
	Color	Blinking Pattern	Behavior for Device
Activity LED	Blue	Solid On	SAS/NVMe drive installed
	Blue	Blinking	I/O activity
Status LED	Red	Solid On	Failure of drive with RSTe support
	Red	Blinking at 1 Hz	Rebuilding drive with RSTe support
	Red	Blinking with two blinks and one stop at 1 Hz	Hot spare for drive with RSTe support (not supported in VMD mode)
	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 (not supported in VMD mode)
	Amber	Blinking at 1 Hz	Attention state—do not remove NVMe device (not supported in VMD mode)

Note: Enterprise level hard disk drives are recommended for use in Supermicro chassis and servers. For information on recommended HDDs, visit the Supermicro website at <https://www.supermicro.com/products/nfo/Ultra.cfm>.

Hot-Swap for NVMe Drives

An NVMe drive can be inserted and replaced using IPMI.

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

Ejecting a Drive

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

Note that *Device* and *Group* are categorized by the CPLD design architecture. The 7089P-TR4T server has one Device and one Group, except the 2029U-TN24 server which has one Device and two Groups.

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

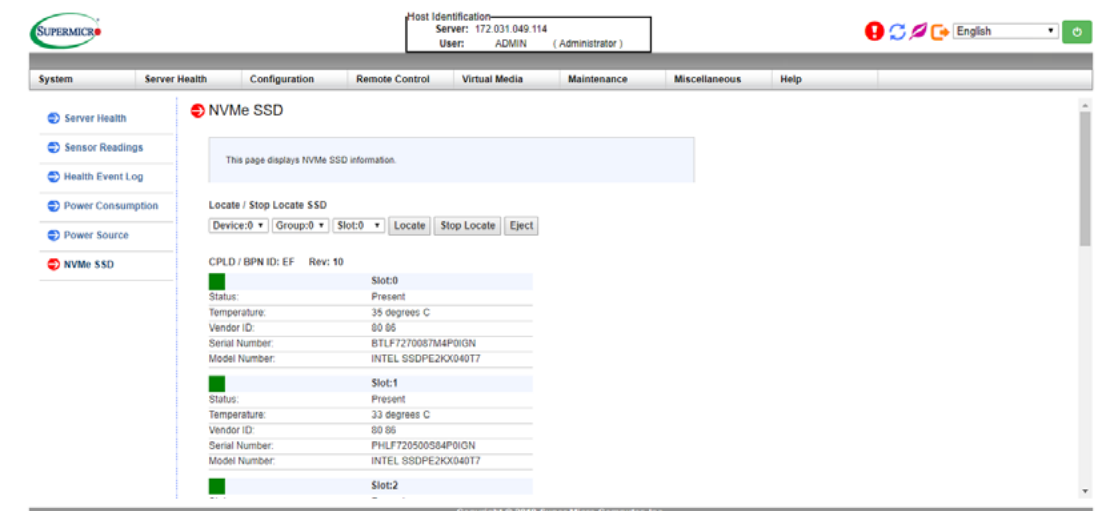


Figure 3-18. IPMI Screenshot

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.

System Cooling

Eight hot-swappable 9-cm counter-rotating fans at the rear of the chassis provide the cooling for the system. Each fan unit is made up of two fans joined back-to-back, which rotate in opposite directions. This counter-rotating action generates exceptional airflow and is effective in dampening vibration levels.

Replacing Fans

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

Replacing a System Fan

1. Inspect the rear of the chassis to determine which fan requires changing.
2. Squeeze both release tabs on the fan simultaneously and gently pull the fan from the housing (see figure below). The fan's wiring will automatically detach.
3. Place the new fan into the vacant fan space and push in until it clicks into place.

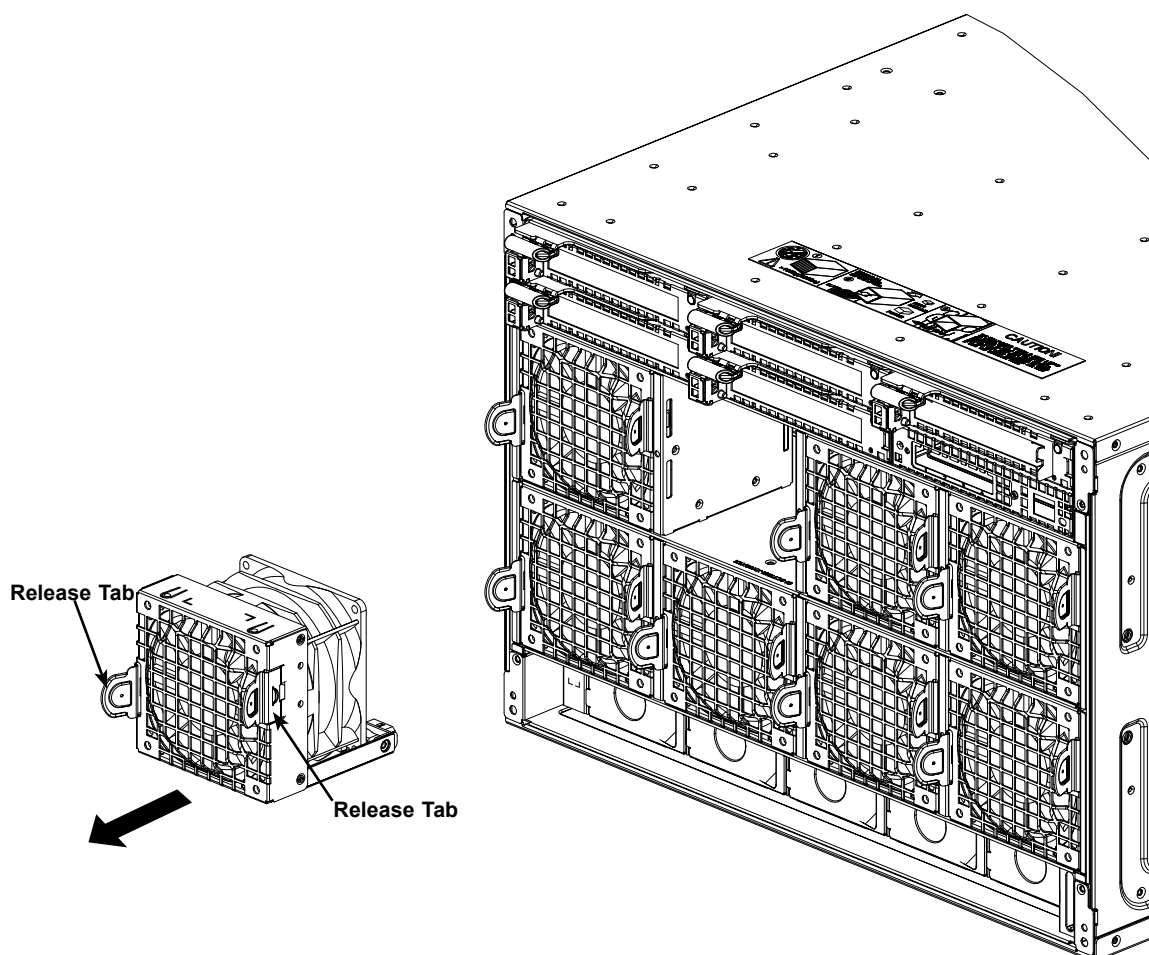


Figure 3-19. Replacing a System Fan

Power Supply

The 7089P-TR4T has a redundant power system composed of five Titanium level 1600W power supplies.

Power Supply Failure

If a power supply unit fails, the others will take on the load to allow the system to continue operation without interruption. The amber Power Fail LED will illuminate and remain on until the failed unit has been replaced. Replacement units can be ordered directly from Supermicro (see contact information in the Preface).

Removing the Power Supply

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

1. Unplug the AC power cord from the power supply to be replaced.
2. Push the release tab on the back of the power supply.
3. Grasp the unit's handle to pull the power supply out from its bay.

Installing a New Power Supply

1. Replace the failed power module with the same model (PWS-1K62A-1R).
2. Push the new power supply module into the power bay until you hear a click.
3. Plug the AC power cord back into the module.

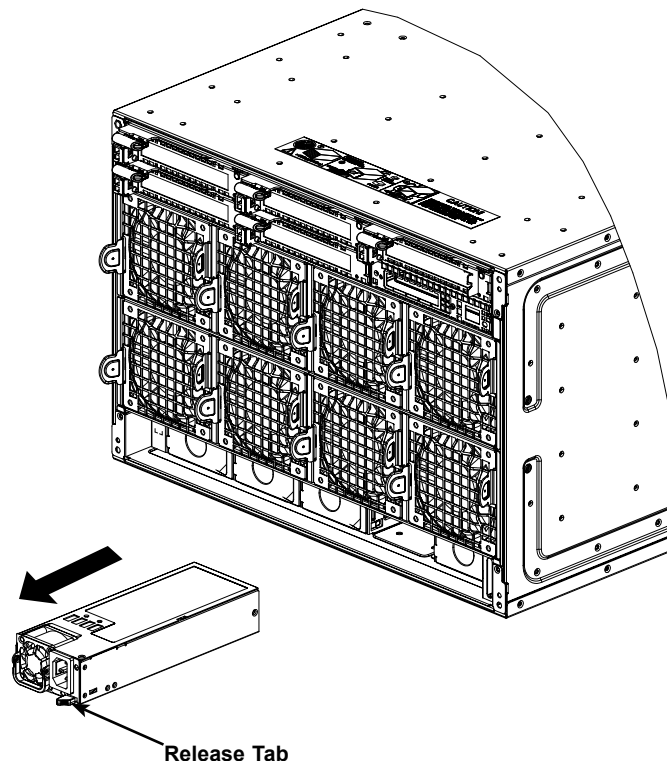


Figure 3-20. Replacing a Power Supply

Chapter 4

Board Connections

This section describes the connections on the various boards in the system and provides pinout definitions. The LEDs on the motherboard are also described here. A severboard layout indicating component locations may be found in Appendix B.

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

4.1 X11OPi Connectors and LEDs

Power Connections

Two power connections on the X11OPi must be connected to the power supply. The wiring is included with the power supply.

- 12-pin Primary CPU Power (PWR1/PWR2)
- 8-pin GPU Power Connections (JPWR3/JPWR4/JPWR5)

12-pin CPU Power Connectors

PWR1/PWR2 are the 12-pin power inputs for 12V power from the power supply to the CPU Board.

+12V 12-pin Power Pin Definitions	
Pin#	Definition
1 - 4	Ground
5 - 8	+12V
9-12	

GPU Power Connectors

Three 8-pin 12V GPU power connectors (JPWR3/JPWR4/JPWR5) may also be connected to the power supply for GPU cards.

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

NVMe Connections

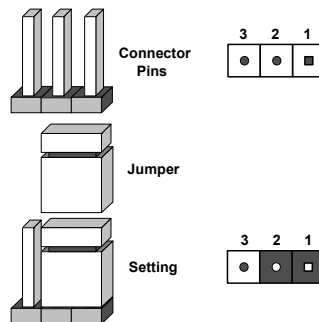
Two NVMe ports are located on the serverboard. JNVME ports 1/2 provide high-speed, low-latency PCI-Exp. 3.0 x4 connections directly from the CPU to NVMe Solid State (SSD) drives. This greatly increases SSD data-throughput performance and significantly reduces PCI-E latency by simplifying driver/software requirements resulted from direct PCI-E interface from the CPU to the NVMe SSD drives.

4.2 AOM-X11OPi-LBG Connections, Jumpers and LEDs

How Jumpers Work

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

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



CMOS Clear

JBT1 is used to clear the CMOS. Instead of pins, this "jumper" consists of contact pads to prevent the accidental clearing of the CMOS. To clear the CMOS, use a metal object such as a small screwdriver to touch both pads at the same time to short the connection. Always remove the AC power cord from the system before clearing the CMOS.

Note 1: For an ATX power supply, you must completely shut down the system, remove the AC power cord, and then short JBT1 to clear the CMOS.

Note 2: Be sure to remove the onboard CMOS Battery before you short JBT1 to clear the CMOS. Clearing the CMOS will also clear any passwords.

Do not use the PW_ON connector to clear CMOS.



JBT1 contact pads

Manufacturer Mode Select

Close pin 2 and pin 3 of Jumper JPME1 to bypass SPI flash security and force the system to operate in the Manufacturer mode, allowing the user to flash the system firmware from a host server for system-setting modifications. Refer to the table below for jumper settings.

ME Mode Select Jumper Settings	
Jumper Setting	Definition
1-2	Normal (Default)
2-3	Manufacturer Mode

Watch Dog Enable/Disable

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

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

Headers and Connectors

I-SATA 3/I-SATA 4 & Disk-on-Module Connectors

Two yellow SATA 3.0 compatible connectors (I-SATA 3 & I-SATA 4), driven by Intel C621 chipset, support two DOM storage devices. These modified SATA connectors have two power pins that allow Supermicro supplied DOM devices to operate without any extra power cables. For DOM devices that require external power, two extra two pin headers placed right next to I-SATA ports, are available. They are labeled JSD1 and JSD2.

For more information on the SATA HostRAID configuration, please refer to the Intel SATA HostRAID user's guide posted on our website at <http://www.supermicro.com>.

SATA 3.0 Pin Definitions	
Pin#	Definition
1	Ground
2	TX_P
3	TX_N
4	Ground
5	RX_N
6	RX_P
7	Ground
8	Power
9	Ground

Unit Identifier Switch/LED

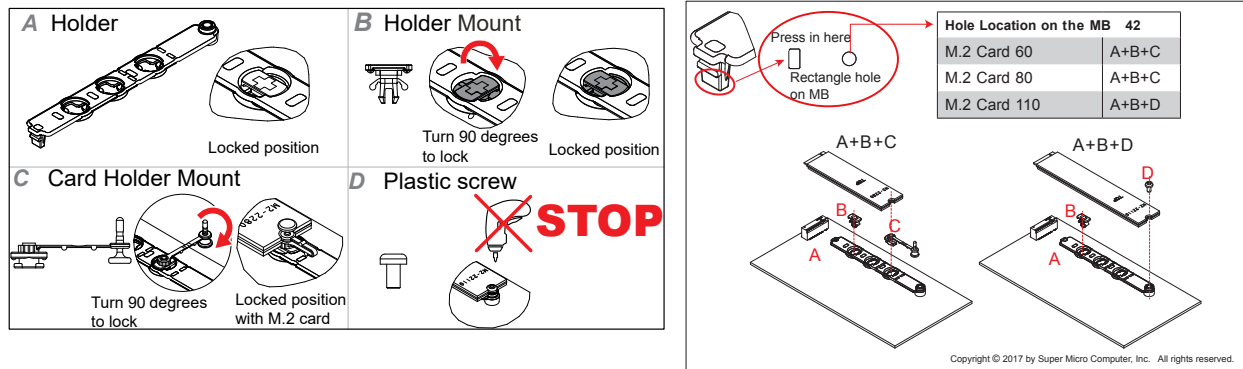
A Unit Identifier (UID) switch (JUIDB1) and an UID LED (indicator are located on the AOM-X11OPi-LBG. The UID LED (LED1) is located next to the UID switch. When you press the UID switch, the UID LED will be turned on. Press the UID switch again to turn it off. These UID indicator provide easy identification of a system unit that may be in need of service.

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

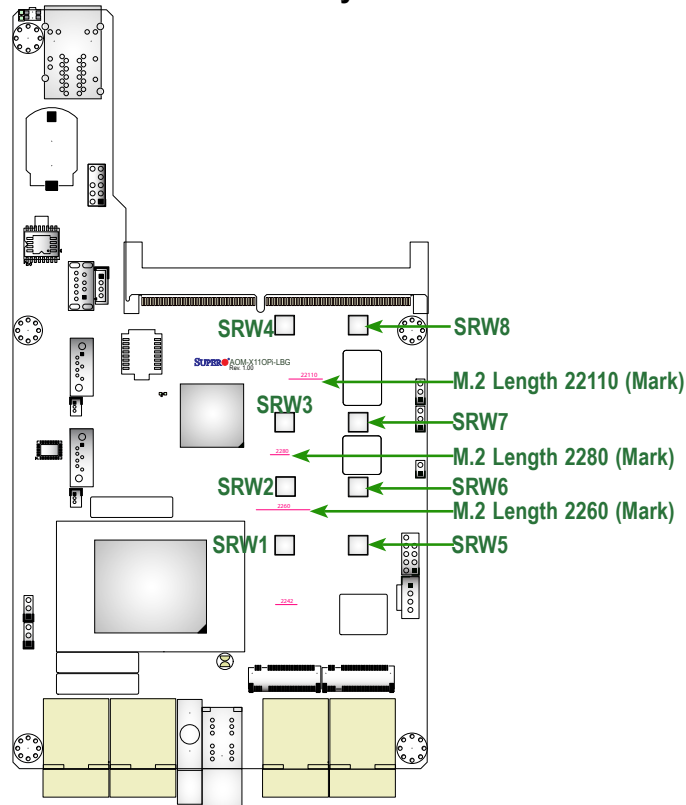
UID Switch Pin Definitions	
Pin#	Definition
1	Ground
2	Ground
3	Button In
4	Button In

J1/J2 & M.2 Storage Module Connectors

Two M.2 connectors (J1/J2) provide support for two M.2 SSD storage modules. These connectors are keyed for PCIe 3.0 x4 and SATA 3.0 connectivity. The X110Pi-LBG provides mounting holes for three lengths of M2 modules: 2260, 2280 and 22110 standards. Typically, these connectors are populated with the M.2 SSD in a RAID 1 configuration containing a bootable Operating System. These connectors comply with PCI Express M.2 Specification rev 1.1, maintained by the PCI-SIG. Refer to the drawings below for installation information.



AOM-X110Pi-LBG Layout



Note 1: Mounting holes: SWR1 to SWR4 are used for the M.2 module located at J1.

Note 2: Mounting holes: SWR5 to SWR8 are used for the M.2 module located at J2.

Note 3: M.2 modules come in three sizes. Horizontal lines marked "2260", "2280", "22110" on the LBG layout indicate the locations where M.2 modules should be installed depending on their size. Please refer to the drawings above for M.2 installation instructions.

Universal Serial Bus (USB)

An internal USB header, located at JUSB1, provides two USB 2.0 connections (USB 5/USB6) for your system. In addition, a Type A 3.0 header (JUSB2) also provides USB 3.0 Port 1 and USB 2.0 Port 2 connections for internal access. (Cables are not included). See the tables below for pin definitions.

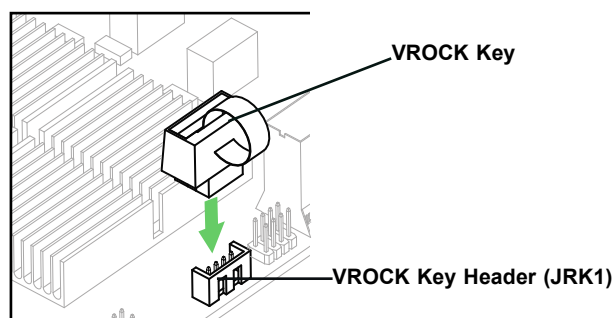
Type A USB 3.0 (USB1)/USB 2.0 (USB2) Pin Definitions	
Pin#	Definition
1	VBUS
2	USB_PN1
3	USB_PP1
4	Ground
5	SSRX_N
6	SSRX_P
7	Ground
8	SSTX_N
9	SSTX_P

Front Panel USB (2.0) (USB 5/6) Pin Definitions			
Pin#	Definition	Pin#	Definition
1	+5V	6	USB_PP6
2	+5V	7	Ground
3	USB_PN5	8	Ground
4	USB_PN6	9	Key
5	USB_PP5	10	OC

VROC RAID Key Header

A VROC RAID Key header is located at JRK1 on the motherboard. Install a VROC RAID Key on JRK1 for NVMe RAID support as shown in the illustration below. Please refer to the layout below for the location of JRK1.

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



Note: The graphics contained in this user's manual are for illustration only. The components installed in your system may or may not look exactly the same as the graphics shown in the manual.

TPM/Port 80 Header

A Trusted Platform Module (TPM)/Port 80 header is located at JTPM1 to provide TPM support and a Port 80 connection. Use this header to enhance system performance and data security. See the table below for pin definitions.

TPM/Port 80 Header Pin Definitions			
Pin#	Definition	Pin#	Definition
1	+3.3V	6	Ground
2	SPI_CS_N	7	SPI_MOSI
3	TPM_REST		
4	SPI_MISO	9	+3V STBY
5	SPI_CLK	10	TPM_IRQ3.3

IPMI LAN

An IPMI_dedicated LAN, located on the AOM-X11OPi-LBG, provides KVM support for IPMI 2.0. This port accepts an RJ45_type cable.

IPMI LAN Activity LED (Right) LED State		
LED Color	Status	Definition
Yellow	Blinking	Active

IPMI LAN LED Indicators

The IPMI LAN has two LED indicators. The yellow LED on the right indicates activity, while the green LED on the left indicates the speed of the connection. Refer to the table below for LED settings.



IPMI LAN Link LED (Left) LED State	
LED Color	Definition
Off	10 Mbps
Green	100 Mbps
Amber	1 Gbps

DOM Power Connectors

Two power connectors for SATA DOM (Disk_On_Module) devices are located at JSD1/JSD2. Connect appropriate cables here to provide power support for your Serial Link DOM devices.

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

LED Indicators

BMC Heartbeat LED

A BMC Heartbeat LED is located at BMC_HB_LED1 on the motherboard. When this LED is blinking, BMC functions normally. See the table below for more information.

BMC Heartbeat LED Status	
LED Color/State	Definition
Green: Blinking	BMC: Normal

UID LED

For UID LED (LED1), please refer to the UID Switch/LED section.

IPMI LAN LED Indicators

For IPMI LAN LED indicators, please refer to the IPMI LAN section.

4.3 AOM-X11OPi-HDD Connections and Jumpers

HDD Power Connectors

Three 8-pin 12V power connectors (JPWR1/JPWR2/JPWR3/JPWR4) are located on the AOM-X11OPi-HDD to provide power supply for HDDs.

+12V 8-pin Power Pin Definitions	
Pin#	Definition
1 - 4	Ground
5, 6	+12V
7, 8	+5V

SATA Ports

Two Serial ATA (SATA) 3.0 headers (JS1/JS3) support eight (8) SATA 3.0 connections (SATA0 ~3, 4~7) on the AOM-X11OPi-HDD card.

Note: For more information on SATA HostRAID configuration, please refer to the Intel SATA HostRAID User's Guide posted on our website at <http://www.supermicro.com>.

4.4 BPN-X11OPi Connections

Fan Headers

There are 16 system/CPU fan headers (Fans 1-8_1) on the reverse side of the BPN-X11OPi midplane. All these 4-pin fans headers are backward-compatible with the traditional 3-pin fans. However, fan speed control is available for 4-pin fans only by Thermal Management via the IPMI 2.0 interface. See the table below for pin definitions.

Fan Header Pin Definitions	
Pin#	Definition
1	Ground
2	+12V
3	Tachometer
4	PWM (Power Width Modulation)

Chapter 5

Software

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

5.1 Microsoft Windows OS Installation

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

Installing the OS

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

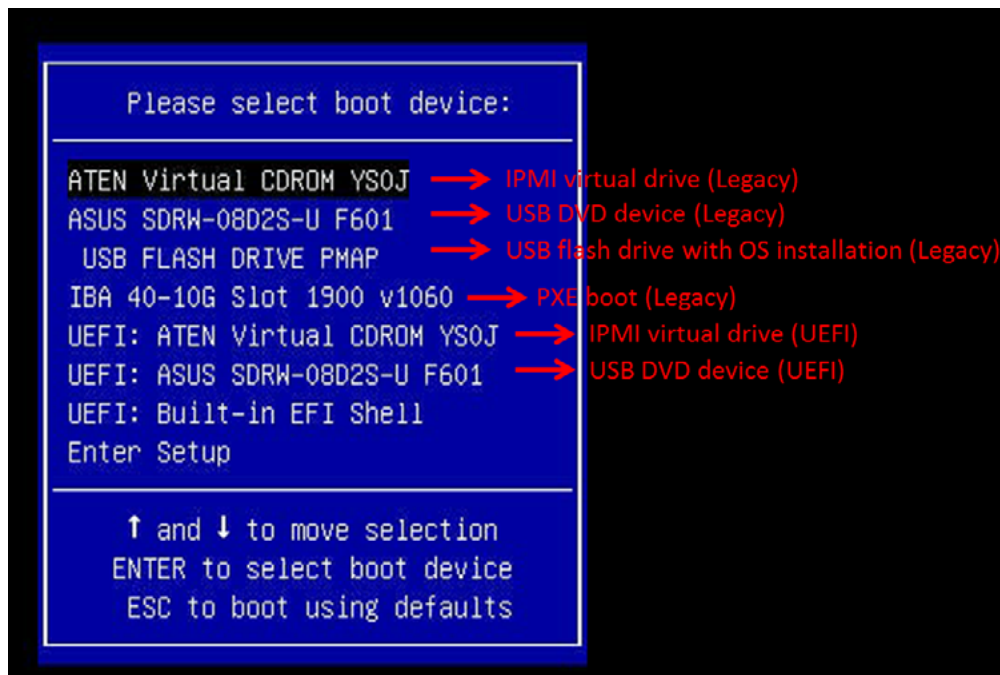


Figure 5-1. Select Boot Device

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

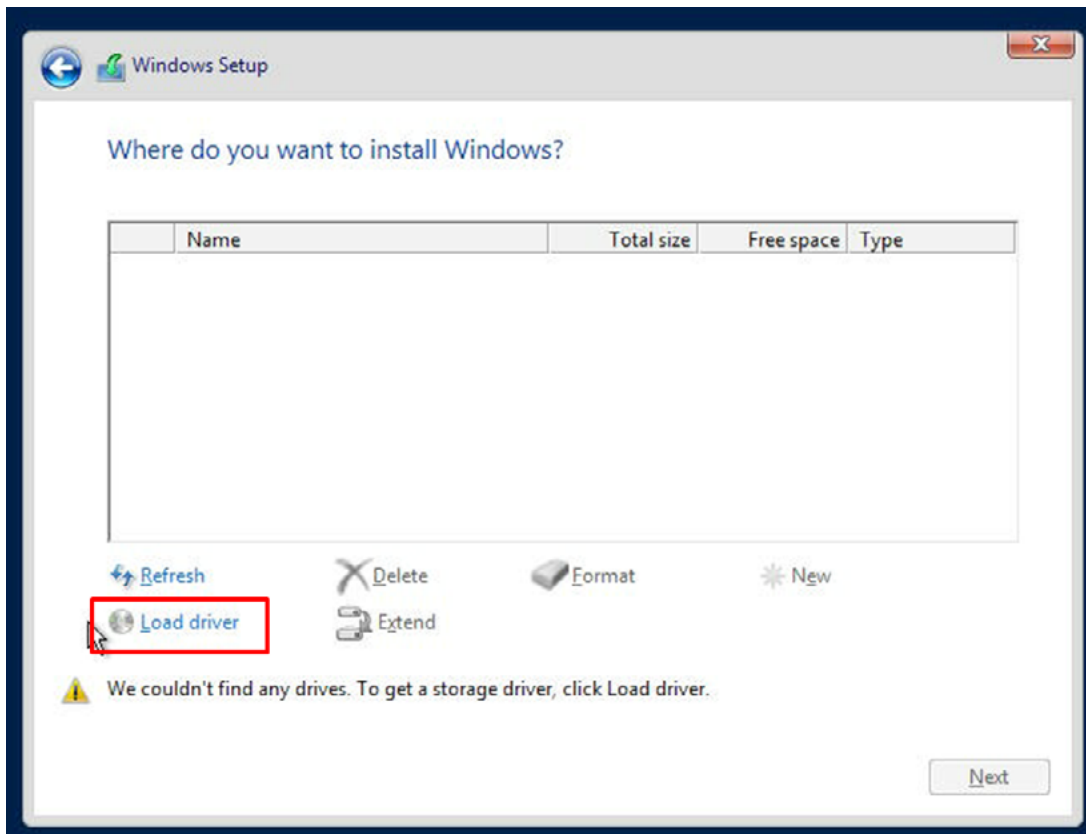


Figure 5-2. Load Driver Link

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

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

5.2 Driver Installation

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

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

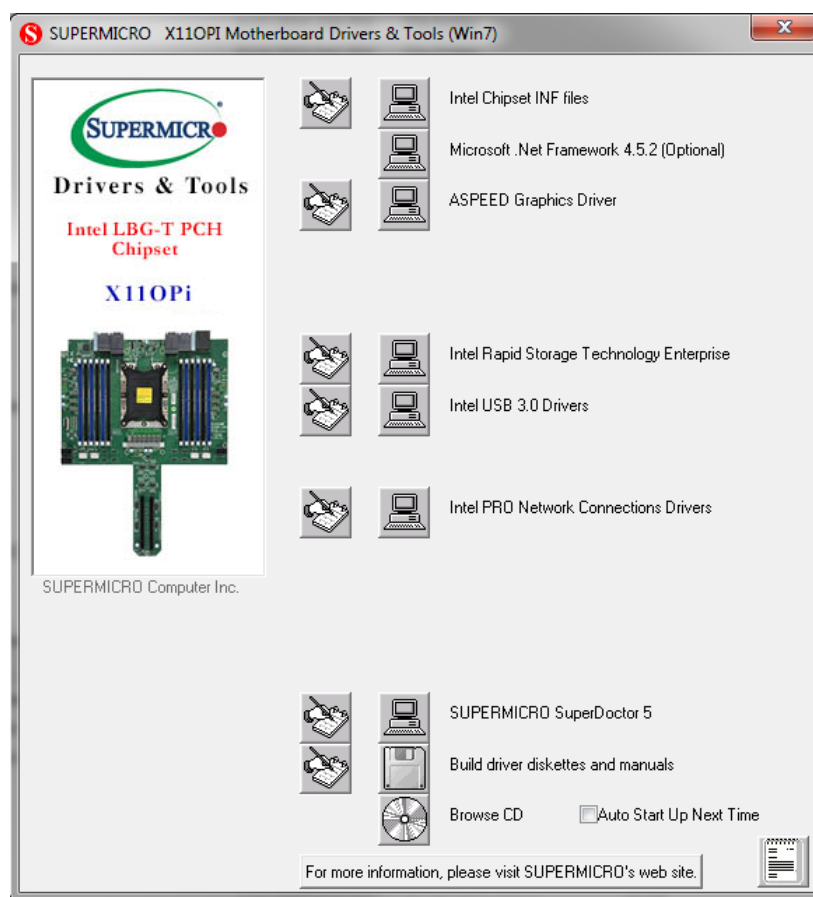


Figure 5-3. Driver & Tool Installation Screen

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.

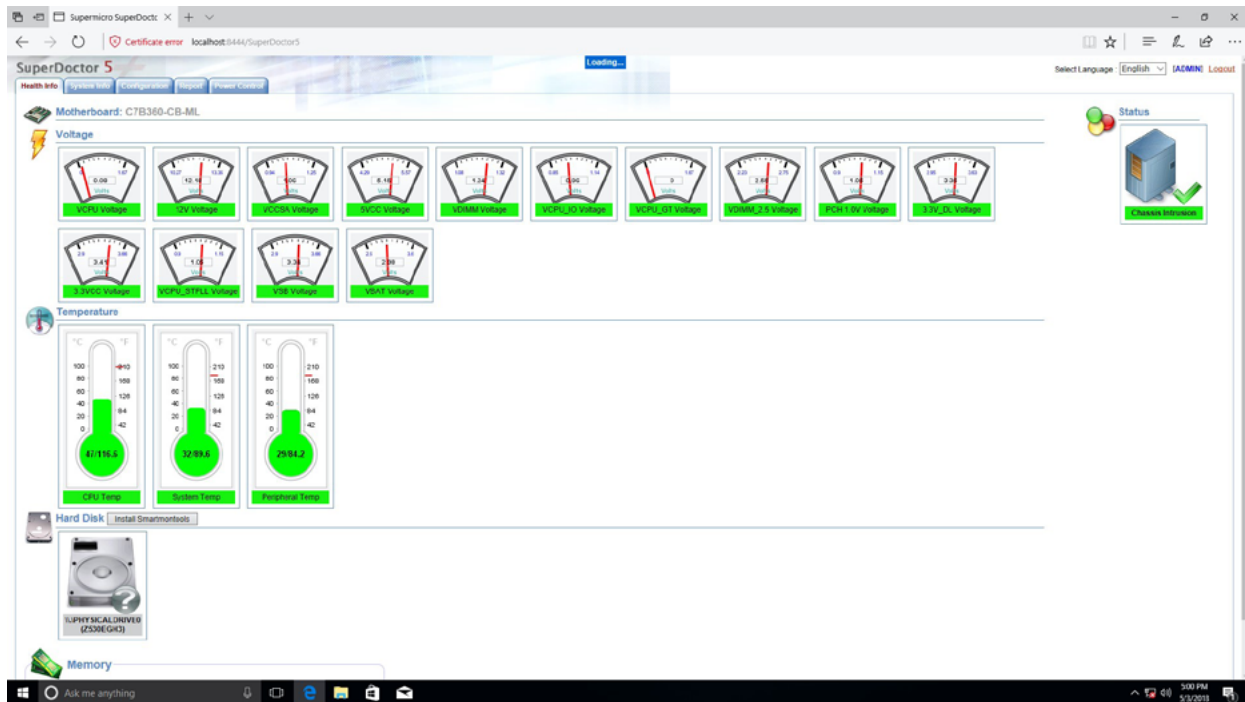


Figure 5-4. SuperDoctor 5 Interface Display Screen (Health Information)

5.4 IPMI

The X11OPi 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.

Supermicro ships standard products with a unique password for the BMC ADMIN user. This password can be found on a label on the motherboard. For general documentation and information on IPMI, please visit our website at: <http://www.supermicro.com/products/nfo/IPMI.cfm>.

Chapter 6

UEFI BIOS

6.1 Introduction

This chapter describes the AMIBIOS™ setup utility for the X11OPi motherboard. The BIOS is stored on a chip and can be easily upgraded using a flash program.

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

Starting the Setup Utility

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

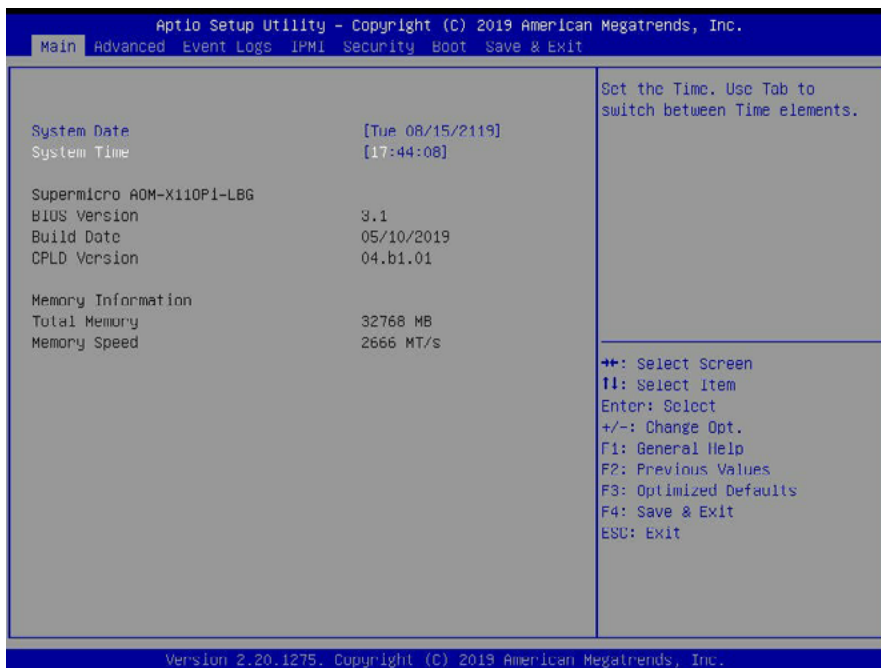
The Main BIOS screen has two main frames. The left frame displays all the options that can be configured. "Grayed-out" options cannot be configured. The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is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

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

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

6.2 Main Setup

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



System Date/System Time

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

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

Supermicro X110Pi

BIOS Version

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

Build Date

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

CPLD Version

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

Memory Information**Total Memory**

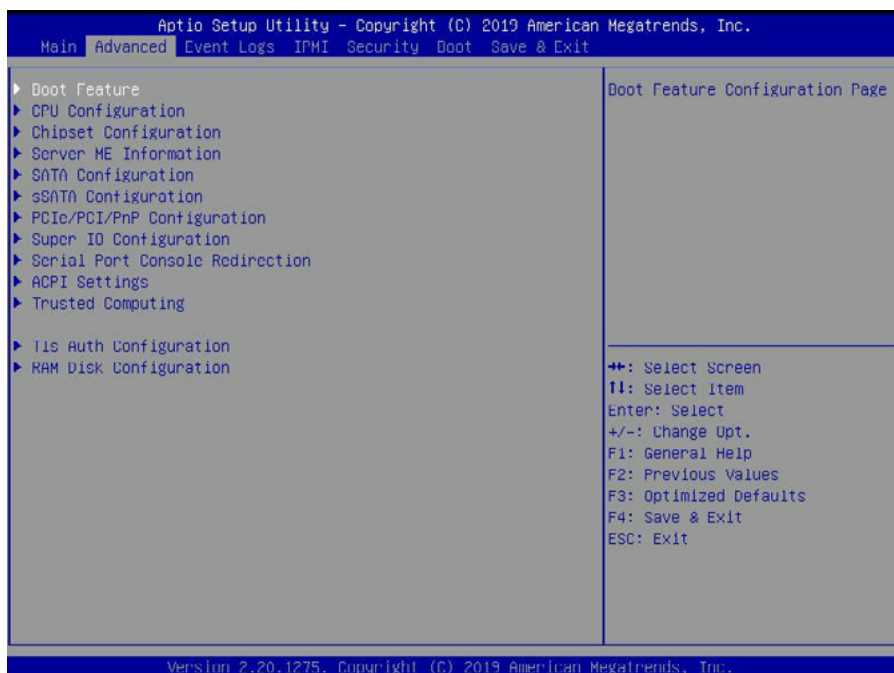
This feature displays the total size of memory available in the system.

Memory Speed

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

6.3 Advanced Setup Configurations

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



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

► Boot Configuration

Quiet Boot

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

Note: POST message will always display regardless of the setting of this feature.

Option ROM Messages

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

Bootup NumLock State

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

Wait For 'F1' If Error

Select Enabled to force the system to wait until the <F1> key is pressed if an error occurs. The options are Disabled and **Enabled**.

Interrupt 19 Capture

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

Re-try Boot

When EFI (Extensible Firmware Interface) Boot is selected, the system BIOS will automatically reboot the system from an EFI boot device after an initial boot failure. Select Legacy Boot to allow the BIOS to automatically reboot the system from a Legacy boot device after an initial boot failure. The options are **Disabled**, Legacy Boot, and EFI Boot.

Power Configuration**Watch Dog Function**

Select Enabled to allow the Watch Dog timer to reboot the system when it is inactive for more than 5 minutes. The options are Enabled and **Disabled**.

Power Button Function

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

Restore on AC Power Loss

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

►CPU Configuration

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

►Processor Configuration

The following CPU information will display:

- Processor BSP Revision
- Processor Socket
- Processor ID
- Processor Frequency
- Processor Max Ratio
- Processor Min Ratio
- Microcode Revision
- L1 Cache RAM
- L2 Cache RAM
- L3 Cache RAM
- Processor 1 Version through Processor 8 Version

Hyper-Threading (ALL)

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

Core Enabled

Use this feature to enable or disable CPU cores in the processor specified by the user. Use the <+> key and the <-> key on the keyboard to set the desired number of CPU cores you want to enable in a processor. Please note that the maximum of 28 CPU cores are currently available in each CPU package. The default setting is **0**.

Monitor/Mwait

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

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

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

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

Select Enable to use Intel Virtualization Technology which will allow multiple workloads to share the same set of common resources. On shared virtualized hardware, various workloads (or tasks) can co-exist, sharing the same resources, while functioning in full independence from each other, and migrating freely across multi-level infrastructures and scale as needed. The settings are **Enable** and Disable.

PPIN Control

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

Hardware Prefetcher (Available when supported by the CPU)

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

Adjacent Cache Prefetch (Available when supported by the CPU)

Select Enable for the CPU to prefetch both cache lines for 128 bytes as comprised. Select Disable for the CPU to prefetch both cache lines for 64 bytes. The options are Disable and **Enable**.



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

DCU Streamer Prefetcher (Available when supported by the CPU)

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

DCU IP Prefetcher

This feature allows the system to use the sequential load history, which is based on the instruction pointer of previous loads, to determine whether the system will prefetch additional lines. The options are **Enable** and Disable.

LLC Prefetch

If this feature is set to Enable, LLC (hardware cache) prefetching on all threads will be supported. The options are **Disable** and Enable.

Extended APIC (Extended Advanced Programmable Interrupt Controller)

Based on the Intel Hyper-Threading technology, each logical processor (thread) is assigned 256 APIC IDs (APIDs) in 8-bit bandwidth. When this feature is set to Enable, the APIC ID will be expanded from 8 bits to 16 bits to provide 512 APIDs to each thread to enhance CPU performance. The options are **Enable** and Disable.

Force x2APIC (Extended Advanced Programmable Interrupt Controller)

Select Enable to force the BIOS to use the x2 APIC mode which will allow the operating system to perform more efficiently on high-core CPU configurations and optimize interrupt distribution in virtualization. The options are **Disable** and Enable.

AES-NI

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

►Advanced Power Management Configuration**Power Technology**

Select Energy Efficient to support power-saving mode. Select Custom to customize system power settings. Select Disabled to disable power-saving settings. The options are Disable, **Energy Efficient**, and Custom.

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

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

Energy Performance BIOS Setting (Available when "Power Performance Tuning" is set to BIOS Controls EPB)

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

Super Performance Mode (Available when "Power Technology" is set to Custom)

Select Enable to support Super Performance to enhance system performance. The options are Enable and **Disable**.

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

SpeedStep (PStates)

EIST (Enhanced Intel SpeedStep Technology) allows the system to automatically adjust processor voltage and core frequency in an effort to reduce power consumption and heat dissipation. Please refer to Intel's website for detailed information. The options are Disable and **Enable**.

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

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

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

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

Turbo Mode (Available when SpeedStep is set to Enable)

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

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

Hardware P-States

If this feature is set to Disable, hardware will choose a P-States setting for the system based on an OS request. If this feature is set to Native Mode, hardware will choose a P-States setting based on OS guidance. If this feature is set to Native Mode with No Legacy Support, hardware will choose a P-States setting independently without OS guidance. The options are **Disable**, Native Mode, Out of Band Mode, and Native Mode with No Legacy Support.

►CPU C State Control

Autonomous Core C-State

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

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

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

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

Select Enable to enable "Enhanced Halt State" support, which will significantly reduce the CPU's power consumption by minimizing CPU's clock cycles and reduce voltage during a "Halt State." The options are **Disable** and **Enable**.

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

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

►CPU T State Control Available when "Power Technology" is set to Custom)**Software Controlled T-States**

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

►Chipset Configuration

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

►North Bridge

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

►UPI (Ultra Path Interconnect) Configuration

This section displays the following UPI General Configuration information:

- Number of CPU
- Number of Active UPI Link
- Current UPI Link Speed
- Current UPI Link Frequency

- UPI Global MMIO Low Base/Limit
- UPI Global MMIO High Base/Limit
- UPI PCI-E Configuration Base/Size

Degrade Precedence

Use this feature to select the degrading precedence option for Ultra Path Interconnect (UPI) connections. Select Topology Precedent to degrade UPI features if system options are in conflict. Select Feature Precedent to degrade UPI topology if system options are in conflict. The options are **Topology Precedence** and Feature Precedence.

Link L0p Enable

Select Enable to enable Link L0p. The options are Disable, Enable, and **Auto**.

Link L1 Enable

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

IO Directory Cache (IODC)

Select Enable for the IODC (I/O Directory Cache) to generate snoops instead of generating memory lockups for remote IIO (InvlToM) and/or WCiLF (Cores). Select Auto for the IODC to generate snoops (instead of memory lockups) for WCiLF (Cores). The options are Disable, **Auto**, Enable for Remote InvltoM Hybrid Push, InvltoM AllocFlow, Enable for Remote InvltoM Hybrid AllocNonAlloc, and Enable for Remote InvltoM and Remote WViLF.

SNC

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

XPT Prefetch

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

KTI Prefetch

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

Local/Remote Threshold

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

Stale AtoS (A to S)

The in-memory directory has three states: I, A, and S states. The I (-invalid) state indicates that the data is clean and does not exist in the cache of any other sockets. The A (-snoop All) state indicates that the data may exist in another socket in an exclusive or modified state. The S state (-Shared) indicates that the data is clean and may be shared in the caches across one or more sockets. When the system is performing "read" on the memory and if the directory line is in A state, we must snoop all other sockets because another socket may have the line in a modified state. If this is the case, a "snoop" will return the modified data. However, it may be the case that a line "reads" in an A state, and all the snoops come back with a "miss". This can happen if another socket reads the line earlier and then has silently dropped it from its cache without modifying it. If the "Stale AtoS" feature is enabled, a line will transition to the S state when the line in the A state returns only snoop misses. That way, subsequent reads to the line will encounter it in the S state and will not have to snoop, saving the latency and snoop bandwidth. Stale "AtoS" may be beneficial in a workload where there are many cross-socket reads. The options are Disable, Enable, and **Auto**.

LLC Dead Line Alloc

Select Enable to opportunistically fill the deadlines in the LLC. The options are **Enable**, Disable, and Auto.

Isoc Mode

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

►Memory Configuration

Enforce POR (Plan of Record)

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

PPR Type

Post Package Repair (PPR) is a new feature available for the DDR4 Technology. PPR provides additional spare capacity within a DDR4 DRAM module that is used to replace faulty cell areas detected during system boot. PPR offers two types of memory repairs. Soft Post Package Repair (sPPR) provides a quick, temporary fix on a raw element in a bank group of a DDR4 DRAM device, while hard Post Package Repair (hPPR) will take a longer time to provide a permanent repair on a raw element. The options are **Auto**, Enable, Soft PPR, and Disable.

Memory Frequency

Use this feature to set the maximum memory frequency for onboard memory modules. The options are **Auto**, 1866, 2000, 2133, 2400, 2666, and 2933. (**Note**: 2933 MHz memory is supported by the Intel® 81xx and 82xx series only.)

Data Scrambling for DDR4

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

tCCD_L Relaxation

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

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

Select Enable to use the same tRWSR DDR timing setting among all memory channels, and in which case, the worst case value among all channels will be used. Select Disable to use different values for the tRWSR DDR timing settings for different channels as trained. The options are Auto, **Disable**, and Enable.

Enable ADR

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

Data Scrambling for NVDIMM

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

Erase-Arm NVDIMMs

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

Restore NVDIMMs

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

Interleave NVDIMMs

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

Reset Trigger ADR (Async DIMM Self-Refresh)

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

S5 Trigger ADR

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

2X Refresh

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

Page Policy

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

IMC Interleaving

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

►Memory Topology

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

- P1 DIMMA1/DIMMA2/DIMMB1/DIMMB2/DIMMC1/DIMMC2/DIMMD1/DIMMD2/DIMME1/DIMME2/DIMMF1/DIMMF2
- P2 DIMMA1/DIMMA2/DIMMB1/DIMMB2/DIMMC1/DIMMC2/DIMMD1/DIMMD2/DIMME1/DIMME2/DIMMF1/DIMMF2
- P3 DIMMA1/DIMMA2/DIMMB1/DIMMB2/DIMMC1/DIMMC2/DIMMD1/DIMMD2/DIMME1/DIMME2/DIMMF1/DIMMF2
- P4 DIMMA1/DIMMA2/DIMMB1/DIMMB2/DIMMC1/DIMMC2/DIMMD1/DIMMD2/DIMME1/DIMME2/DIMMF1/DIMMF2
- P5 DIMMA1/DIMMA2/DIMMB1/DIMMB2/DIMMC1/DIMMC2/DIMMD1/DIMMD2/DIMME1/DIMME2/DIMMF1/DIMMF2
- P6 DIMMA1/DIMMA2/DIMMB1/DIMMB2/DIMMC1/DIMMC2/DIMMD1/DIMMD2/DIMME1/DIMME2/DIMMF1/DIMMF2

- P7 DIMMA1/DIMMA2/DIMMB1/DIMMB2/DIMMC1/DIMMC2/DIMMD1/DIMMD2/DIMME1/DIMME2/DIMMF1/DIMMF2
- P8 DIMMA1/DIMMA2/DIMMB1/DIMMB2/DIMMC1/DIMMC2/DIMMD1/DIMMD2/DIMME1/DIMME2/DIMMF1/DIMMF2

►Memory Map

Use this submenu to configure the following Memory Map settings.

Volatile Memory Mode

Select 1LM to use 1LM memory mode for volatile memory modules installed in the system. Select 2LM to use 2LM memory mode for volatile memory modules installed in the system. The options are **Auto**, 1LM, and 2LM.

AppDirect Cache

Select Enable to support memory caching for the memory region. The options are **Disable**, Enable, and Auto.

eADR Support

Select Enable to utilize eADR capability in the platform. The options are **Disable**, Enable, and Auto.

1LM Memory Interleave Granularity

Use this feature to select 1LM memory interleave granularity setting to improve memory performance. The options are **Auto**, 256B Target, 256B Channel, and 64B Target, 64B Channel.

Channel Interleaving

Use this feature to configure interleave settings for memory channels to enhance memory performance. The options are **Auto**, 1-way Interleave, 2-way Interleave, and 3-way Interleave.

Rank Interleaving

Use this feature to configure interleave settings for memory ranks to enhance memory performance. The options are **Auto**, 1-way Interleave, 2-way Interleave, 4-way Interleave, and 8-way Interleave.

Socket Interleave Below 4GB

If this feature is set to Enable, memory located at 0-4GB address will be split between two sockets for memory interleaving. The options are **Disable** and Enable.

►Memory RAS (Reliability_Availability_Serviceability) Configuration

Use this submenu to configure the following Memory RAS settings.

Static Virtual Lockstep Mode

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

Mirror Mode

Use this feature to configure the mirror mode settings for all 1LM/2LM memory modules installed in the system which will create a duplicate copy of data stored in the memory to increase memory security, but it will reduce the memory capacity into half. The options are **Disable**, Mirror Mode 1LM, and Mirror Mode 2LM.

UEFI ARM Mirror

If this feature is set to Enable, mirror mode configuration settings for UEFI-based Address Range memory will be enabled upon system boot. This will create a duplicate copy of data stored in the memory to increase memory security, but it will reduce the memory capacity into half. The options are **Disable** and Enable.

Memory Rank Sparing

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

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

Correctable Error Threshold

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

Intel Run Sure

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

SDDC Plus One (Available when supported by the CPUs installed)

Select Enable for SDDC (Single Device Data Correction) Plus One support, which will activate memory ECC mode for memory error checking and correction. It will also protect against memory failures caused by 'single-bit' errors in the same memory rank. The options are **Disable** and Enable.

ADDDC (Adaptive Double Device Data Correction) Sparing (Available when Intel Run Sure is set to Enable and when supported by the CPUs installed)

Select Enable for Adaptive Double Device Data Correction (ADDDC) support, which will not only provide memory error checking and correction but will also prevent the system

from issuing a performance penalty before a device fails. Please note that virtual lockstep mode will only start to work for ADDDC after a faulty DRAM module is spared. The options are Disable and **Enable**.

Patrol Scrub

Patrol Scrubbing is a process that allows the CPU to correct correctable memory errors detected in a memory module and send the corrections to the requestor (the original source). When this feature is set to Enable, the IO hub will read and write back one cache line every 16K cycles if there is no delay caused by internal processing. By using this method, roughly 64 GB of memory behind the IO hub will be scrubbed every day. The options are **Enable** and Disable.

Patrol Scrub Interval (Available when Patrol Scrub is set to Enable)

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

► IIO Configuration

EV DFX (Device Function On-Hide) Features

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

► Socket1 Configuration - Socket8 Configuration

IOU0 (IIO PCIe Br1)

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

IOU1 (IIO PCIe Br2)

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

IOU2 (IIO PCIe Br3)

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

MCP0 (IIO PCIe Br4)

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

MCP1 (IIO PCIe Br5)

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

► Socket 1 PCI-E Br0D00F0 - Port 0/DMI (Available for Socket 1 Configuration)

Link Speed

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

The following information will display:

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

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

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

► IOAT Configuration

► Socket1 IOAT Configuration - Socket8 IOAT Configuration

IOAT Function 0 Items - IOAT Function 7 Items

DMA

Select Enable to enable DMA (Direct Memory Access) support for the CB device specified by the user. The options are **Enable** and Disable.

No Snoop

Select Enable for No Snoop support for the CB device specified by the user. The options are **Disable** and Enable.

Disable TPH (TLP Processing Hint)

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

Prioritize TPH (TLP Processing Hint)

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

Relaxed Ordering

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

►Intel VT for Directed I/O (VT-d)

Intel® VT for Directed I/O (VT-d)

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

ACS (Access Control Services) Control

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

Interrupt Remapping

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

PassThrough DMA

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

ATS

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

Posted Interrupt

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

Coherency Support (Non-Isoch)

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

►Intel® VMD Technology

Use this feature to configure Intel Volume Management Device (VMD) Technology settings.

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

►Intel® VMD for Volume Management Device on CPU1 BPN1 through Intel® VMD for Volume Management Device on CPU8 BPN2

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

►IIO-PCIE Express Global Options

IIO-PCIE Express Global Options

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

PCI-E Hot Plug

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

PCI-E Completion Timeout (Global) Disable

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

►South Bridge

The following South Bridge information will display:

- USB Module Version
- USB Devices

Legacy USB Support

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

XHCI Hand-Off

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

Port 60/64 Emulation

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

PCIe PLL SSC

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

Port 61h Bit-4 Emulation

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

Install Windows 7 USB Support

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

►Server ME (Management Engine) Configuration

This feature displays the following system ME configuration settings.

General ME Configuration

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

►SATA Configuration

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

SATA Controller

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

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

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

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

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

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

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

Aggressive Link Power Management

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

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

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

SATA Port 0 - SATA Port 7**Hot Plug**

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

Spin Up Device

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

SATA Device Type

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

►sSATA Configuration

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

sSATA Controller

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

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

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

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

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

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

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

Aggressive Link Power Management

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

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

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

sSATA Port 0 - sSATA Port 5

Hot Plug

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

Spin Up Device

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

sSATA Device Type

Use this feature to specify if the device installed on the sSATA port specified by the user should be connected to a Solid State drive or a Hard Disk Drive. The options are **Hard Disk Drive** and Solid State Drive.

►PCIe/PCI/PnP Configuration

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

The following PCI information will be displayed:

- PCI Bus Driver Version
- PCI Devices Common Settings

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

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

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

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

MMIOHBase

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

MMIO High Granularity Size

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

Maximum Read Request

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

MMCFG Base

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

VGA Priority

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

Onboard Devices Option ROM Setting

Use this feature to configure the Option ROM setting for an onboard device specified by the user to be used for system boot.

Onboard Video OPROM (Option ROM)

Use this feature to set the type of the onboard video device specified by the user for system boot. The options are Do Not Launch, **Legacy**, and UEFI.

SIOM Module OPROM (Option ROM)

Use this feature to set the type of the SIOM (Super I/O Module) specified by the user for system boot. The options are Disabled, **Legacy**, and UEFI.

NVMe Module OPROM (Option ROM)

Use this feature to set the type of the NVMe module specified by the user for system boot. The options are Disabled, **Legacy**, and UEFI.

GPU Module OPROM (Option ROM)

Use this feature to set the type of the GPU module specified by the user for system boot. The options are Disabled, **Legacy**, and UEFI.

HDD Module OPROM (Option ROM)

Use this feature to set the type of the GPU module specified by the user for system boot. The options are Disabled, **Legacy**, and UEFI.

PCIE Module SLOT1 x16 OPROM/PCIE Module SLOT2 x16 OPROM/PCIE Module SLOT3 x16 OPROM/ PCIE Module SLOT4 x16 OPROM/PCIE Module SLOT5 x16 OPROM

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

► Network Stack Configuration

Network Stack

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

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

Ipv4 PXE Support

Select Enabled to enable Ipv4 PXE boot support. If this feature is disabled, it will not create the Ipv4 PXE boot option. The options are Disabled and **Enabled**.

Ipv4 HTTP Support

Select Enabled to enable Ipv4 HTTP boot support. If this feature is disabled, it will not create the Ipv4 HTTP boot option. The options are Enabled and **Disabled**.

Ipv6 PXE Support

Select Enabled to enable Ipv6 PXE boot support. If this feature is disabled, it will not create the Ipv6 PXE boot option. The options are Disabled and **Enabled**.

Ipv6 HTTP Support

Select Enabled to enable Ipv6 HTTP boot support. If this feature is disabled, it will not create the Ipv6 HTTP boot option. The options are Enabled and **Disabled**.

IPSEC Certificate

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

PXE Boot Wait Time

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

Media Detect Time

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

► Super IO Configuration**Super IO Chip AST2500****► Serial Port 1 Configuration****Serial Port**

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

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

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

Change Settings

This feature specifies the base I/O port address and the Interrupt Request address of Serial Port 1. Select **Auto** for the BIOS to automatically assign the base I/O and IRQ address to a serial port specified.

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

► Serial Port 2 Configuration

Serial Port

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

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

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

Change Settings

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

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

Serial Port 2 Attribute

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

► Serial Port Console Redirection

COM 1

Console Redirection

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

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

► Console Redirection Settings (for COM 1)

Terminal Type

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

Bits Per second

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

Data Bits

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

Parity

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

Stop Bits

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

Flow Control

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

VT-UTF8 Combo Key Support

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

Recorder Mode

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

Resolution 100x31

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

Putty KeyPad

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

COM2/SOL (Serial-Over-LAN)

Console Redirection (for SOL/COM2)

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

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

►Console Redirection Settings (for SOL/COM2)

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

Terminal Type

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

Bits Per second

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

Data Bits

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

Parity

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

Stop Bits

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

Flow Control

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

VT-UTF8 Combo Key Support

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

Recorder Mode

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

Resolution 100x31

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

Putty KeyPad

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

► Legacy Console Redirection Settings

Legacy Console Redirection Settings

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

Legacy OS Redirection Resolution

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

Redirection After BIOS Post

Use this feature to enable or disable Legacy Console Redirection after BIOS POST. When the option-Bootloader is selected, Legacy Console Redirection is disabled before booting the OS. When the option-Always Enable is selected, Legacy Console Redirection remains enabled upon OS bootup. The options are **Always Enable** and Bootloader.

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

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

Console Redirection (for EMS)

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

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

► Console Redirection Settings (for EMS)

Out-of-Band Management Port

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

Terminal Type

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

Bits Per Second

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

Flow Control

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

The setting for each these features is displayed:

Data Bits, Parity, Stop Bits

►ACPI Settings

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

NUMA Support (Available when the OS supports this feature)

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

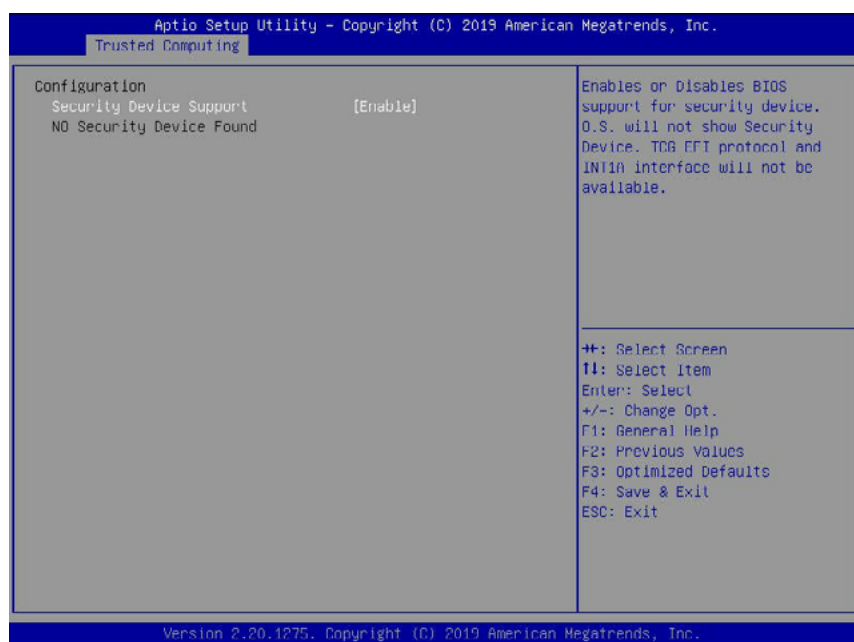
WHEA Support

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

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

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

- TPM2.0 Device Found
- Firmware Version
- Vendor



Security Device Support

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

- Active PCR Banks
- Available PCR Banks

SHA-1 PCR Bank

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

SHA256 PCR Bank

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

Pending Operation

Use this feature to schedule a TPM-related operation to be performed by a security (TPM) device at the next system boot to enhance system data integrity. The options are **None** and TPM Clear.

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

Platform Hierarchy (for TPM Version 2.0 and above)

Select Enabled for TPM Platform Hierarchy support which will allow the manufacturer to utilize the cryptographic algorithm to define a constant key or a fixed set of keys to be used for initial system boot. These early boot codes are shipped with the platform and are included in the list of "public keys". During system boot, the platform firmware uses the trusted public keys to verify a digital signature in an attempt to manage and control the security of the platform firmware used in a host system via a TPM device. The options are **Enabled** and Disabled.

Storage Hierarchy

Select Enabled for TPM Storage Hierarchy support that is intended to be used for non-privacy-sensitive operations by the platform owner such as an IT professional or the end user. Storage Hierarchy has an owner policy and an authorization value, both of which can be set and are held constant (-rarely changed) through reboots. This hierarchy can be cleared or changed independently of the other hierarchies. The options are **Enabled** and Disabled.

Endorsement Hierarchy

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

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

Select Enabled for Platform Hierarchy Randomization support, which is used only during the platform developmental stage. This feature cannot be enabled in the production platforms. The options are **Disabled** and Enabled.

TXT Support

Select Enabled to enable Intel Trusted Execution Technology (TXT) support to enhance system security and data integrity. The options are **Disabled** and Enabled.

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

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

► TLS Authenticate Configuration

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

► Server CA Configuration

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

► Enroll Certification

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

► Enroll Cert (Certification) Using File

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

Cert (Certification) GUID (Global Unique Identifier)

This feature displays the GUID for this system.

►Commit Changes and Exit

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

►Discard Changes and Exit

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

►Delete Certification

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

►Client Certification Configuration

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

►Enroll Certification

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

►Enroll Cert (Certification) Using File

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

Cert (Certification) GUID (Global Unique Identifier)

This feature displays the GUID for this system.

►Commit Changes and Exit

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

►Discard Changes and Exit

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

►Delete Certification

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

►RAM Disk Configuration

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

Disk Memory

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

►Create Raw

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

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

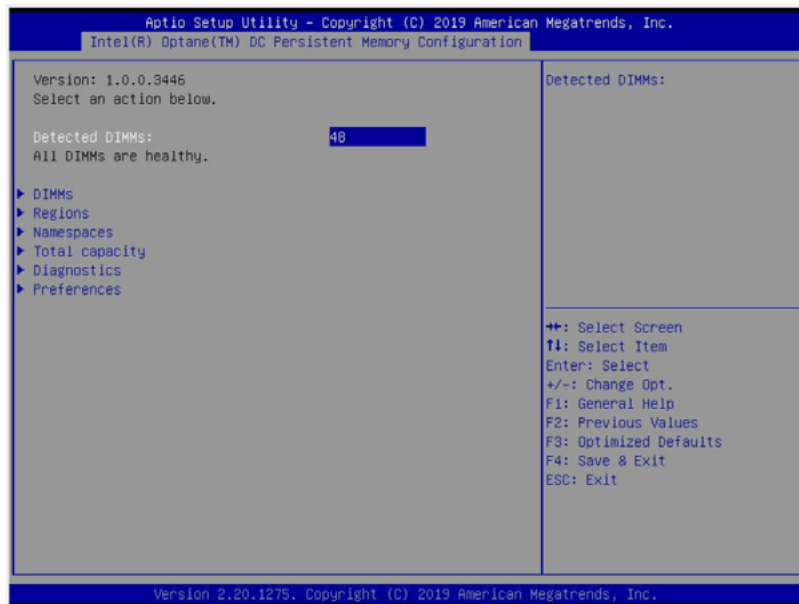
►Create from File

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

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

► Intel® Optane® DC Persistent Memory Configuration

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



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

► DIMMs

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

Select a specific DIMM that you want to view.

DIMMs on Socket 0x0000:/DIMMs on Socket 0x0001:/DIMMs on Socket 0x0002:/
DIMMs on Socket 0x0004:/DIMMs on Socket 0x0005:/DIMMs on Socket 0x0006:/
DIMMs on Socket 0x0007:

► DIMM ID 0x0011 - DIMM ID 0x7101

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

- **DIMM UID:** This feature displays the unique ID of the DCPMM module.
- **DIMM Handle:** This feature displays the unique handle that the CPU assigns to the DCPMM module.

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

Show More Details

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

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

- Serial Number
- Part Number
- Socket
- Memory Controller ID
- Vendor ID
- Device ID
- System Vendor ID
- Subsystem Vendor ID
- Subsystem Device ID
- Device Locator
- Subsystem Revision ID

- Interface Format Code
- Manufacturing Information Valid
- Manufacturing Date
- Manufacturing Location
- Memory Type
- Memory Bank Label
- Data Width Label [b]
- Total Width [b]
- Speed [MHz]
- Channel ID
- Channel Position
- Revision ID
- Form Factor
- Manufacturer ID
- Controller Revision ID
- IS New
- Memory Capacity
- APP Direct Capacity
- Unconfigured Capacity
- Inaccessible Capacity
- Reserved Capacity
- Peak Power Budget [mW]
- Avg (Average) Power Budget [mW]
- Max Average Power Budget [mW]
- Package Sparring Capable

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

►Monitor Health

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

- **Sensor Type:** This feature displays the type of health items that are being monitored.
- **Value:** This feature displays the value of the monitor sensor mentioned above.
- **Non-critical Thresholds:** This feature displays the normal threshold value for the DCPMM module to maintain normal operations.
- **Critical Lower Threshold:** This feature displays the lowest threshold value for the DCPMM module to maintain normal operations.
- **Critical Upper Threshold:** This feature displays the higher threshold value for the DCPMM module to maintain normal operations.
- **Fatal Threshold:** This feature indicates the highest value allowed for the DCPMM module to remain functional. Beyond this value, the DCPMM selected will become non-operational.
- **State:** This feature indicates the health state of the DCPMM module.
- **Alarm Enabled State:** This feature indicates the status of the non-critical threshold alarm for the DCPMM module specified by the user.
- **Modify Non-critical Thresholds:** Use this feature to modify non-critical thresholds.
- **Controller Temperature:** This feature displays the controller temperature in Celsius.
- **Media Temperature:** This feature displays the media temperature in Celsius.
- **Percentage Remaining**

►Apply Changes

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

►Back to Main Menu

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

►Update Firmware

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

- **Current Firmware Version:** This feature displays the current firmware version.
- **Selected Firmware Version:** This feature allows the user to select a new firmware version to use.

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

►Update

Select this feature to update the firmware settings.

►Back to Main Menu

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

►Configure Security

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

State

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

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

►Back to Main Menu

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

►Configure Data Policy

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

First Fast Fresh State

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

►Enable First Fast Fresh State

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

►Disable First Fast Fresh State

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

►Back to Main Menu

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

►Regions

Current Configuration

►Region ID 1/Region ID 2/Region ID 3

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

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

Persistent Memory Type

Capacity

Free Capacity

► Create Goal Configuration

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

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

Persistent Memory Type

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

Namespace Label Version

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

► Back to Regions Menu

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

► Back to Main Menu

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

► Namespaces

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

Namespace ID/Name/Health Status

► 0x00000101/0x00000201/0x00000301/0x00000401/0x00000501/0x00000601/
0x00000701

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

- UUID
- ID
- Name
- Region
- Health

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

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

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

► **Back to Namespaces**

► **Back to Main Menu**

► **Create Namespace**

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

Name

Region ID

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

Mode

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

Capacity Input

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

Units

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

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

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

►Back to Namespace

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

►Back to Main Menu

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

►Total Capacity

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

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

►Back to Main Menu

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

►Diagnostics

Perform Diagnostic Tests on DIMMs

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

Choose Diagnostics Type:

Quick Diagnostics

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

**DIMM ID 0x0101/DIMM ID 0x0111/DIMM ID 0x0121/DIMM ID 0x0131/DIMM ID 0x0141/
DIMM ID 0x0151/DIMM ID 0x0161/DIMM ID 0x0171**

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

Config (Configure) Diagnostics

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

FW (Firmware) Diagnostics

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

Security Diagnostics

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

►Execute Tests

Select this feature and press <Enter> to execute the selected diagnostic tests. The following items will display:

- TestName
- State
- Message

►Back to Main Menu

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

►Preferences

View and/or modify user preferences

Default DIMM ID

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

Capacity Units

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

App Direct Settings

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

App Direct Granularity

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

► Back to Main Menu

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

6.4 Event Logs

Use this feature to configure Event Log settings.

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



► Change SMBIOS Event Log Settings

Enabling/Disabling Options

SMBIOS Event Log

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

Erasing Settings

Erase Event Log

Select "No" to keep the event log without erasing it upon next system bootup. Select "Yes, Next Reset" to erase the event log upon next system reboot. The options are **"No"**, "Yes, Next Reset", and "Yes, Every Reset".

When Log is Full

Select Erase Immediately to immediately erase all errors in the SMBIOS event log when the event log is full. Select Do Nothing for the system to do nothing when the SMBIOS event log is full. The options are **Do Nothing** and Erase Immediately.

SMBIOS Event Log Standard Settings

Log System Boot Event

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

MECI (Multiple Event Count Increment)

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

METW (Multiple Event Count Time Window)

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

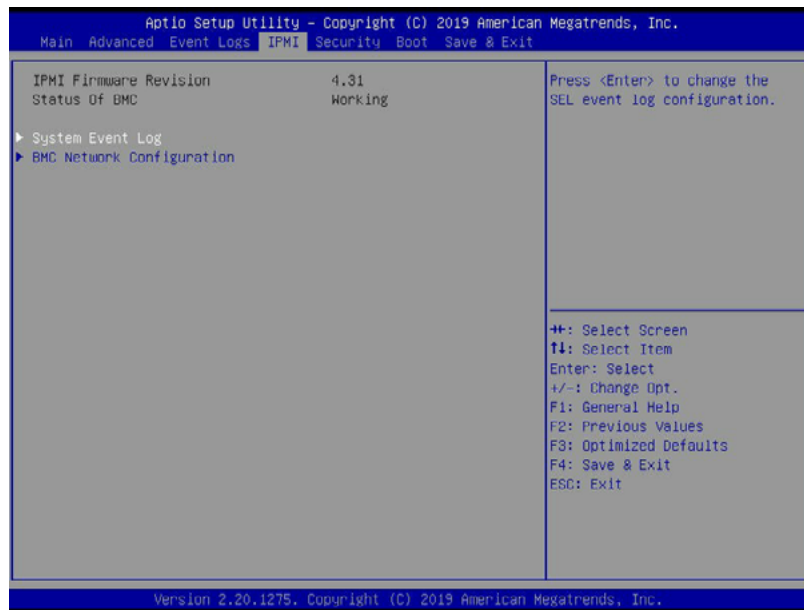
►View System Event Log

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

Date/Time/Error Code/Severity

6.5 IPMI

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



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

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

► System Event Log

Enabling/Disabling Options

SEL Components

Select Enabled to enable all system event logging upon system boot. The options are **Enabled** and Disabled.

Erasing Settings

Erase SEL

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

When SEL is Full

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

►BMC Network Configuration

The following items will be displayed:

- IPMI LAN Selection: This feature displays the IPMI LAN setting. The default setting is **Dedicated**.
- IPMI Network Link Status: This feature displays the IPMI Network Link status. The default setting is **Dedicated LAN**.
- Station MAC Address: This feature displays the Station MAC address for this computer. Mac addresses are 6 two-digit hexadecimal numbers.
- VLAN: This feature displays the status of VLAN support. The default setting is **Disabled**.
- IPv4 Address Source: This feature displays the source of IPv4 addresses. The default setting is **DHCP**.
- Station IP Address: This feature displays the Station IP address for this computer. This should be in decimal and in dotted quad form (i.e., 192.168.10.253).
- Subnet Mask: This feature displays the sub-network that this computer belongs to. The value of each three-digit number separated by dots should not exceed 255.
- Gateway IP Address: This feature displays the Gateway IP address for this computer. This should be in decimal and in dotted quad form (i.e., 192.168.10.253).
- IPv6 Address Status: This feature displays the IPv6 address status. The default setting is **Disabled**.
- Station IPv6 Address: This feature displays the station IPv6 address.
- Prefix Length: This item displays the prefix length.
- IPv6 Router IP Address: This feature displays the IPv6 router IP address.

Update IPMI LAN Configuration

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

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

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

VLAN

Select Enabled to enable IPMI VLAN function support. The 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.

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

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

6.6 Security Settings

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



Administrator Password

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

User Password

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

Password Check

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

►Secure Boot

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

- System Mode

Secure Boot

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

Secure Boot Mode

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

CMS Support

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

►Restore Factory Keys

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

►Reset to Setup Mode

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

►Key Management**Vendor Keys****Factory Key Provision**

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

►Restore Factory Keys

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

►Reset to Setup Mode

This feature resets the system to Setup Mode.

►Export Secure Boot Variables

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

►Enroll EFI Image

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

Device Guard Ready**►Remove 'UEFI CA' from DB**

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

►Restore DB defaults

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

Secure Boot Variable/Size/Keys/Key Source

►Platform Key (PK)

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

►Key Exchange Keys

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

►Authorized Signatures

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

►Forbidden Signatures

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

►Authorized TimeStamps

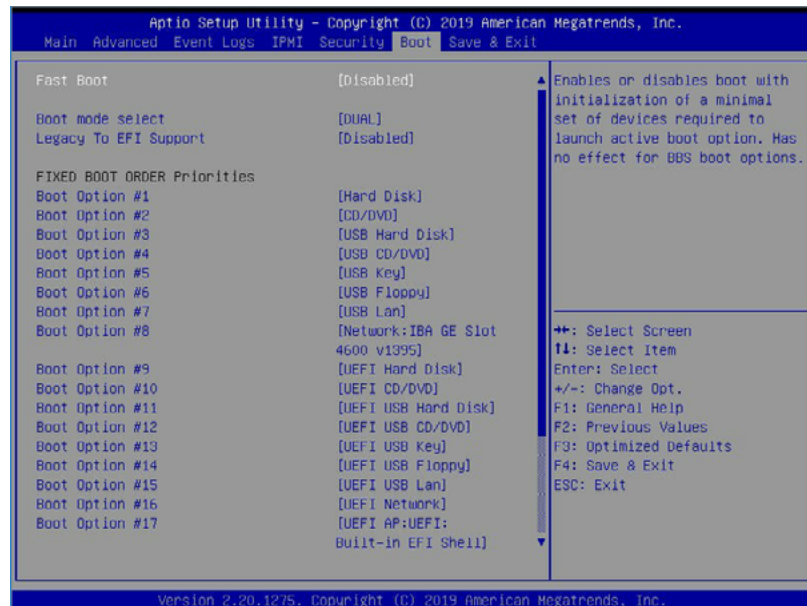
This feature allows the user to set and save the timestamps for the authorized signatures which will indicate the time when these signatures are entered into the system. Select Update to update your "Authorized TimeStamps". Select Append to append your "Authorized TimeStamps". The settings are Update,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

►Os Recovery Signatures

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

6.7 Boot Settings

Use this feature to configure Boot Settings:



Fast Boot

Select Enabled to support fast boot by initializing a minimal set of devices that are required to boot up the system. The options are Enabled and **Disabled**.

Boot Mode Select

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

Legacy to EFI Support

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

Fixed Boot Order Priorities

This feature prioritizes the order of a bootable device from which the system will boot. Press <Enter> on each item sequentially to select devices.

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

- Boot Option #1 - Boot Option #17

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

- Boot Option #1 - Boot Option #8

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

- Boot Option #1 - Boot Option #9

Add New Boot Option

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

Add Boot Option

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

Path for Boot Option

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

Boot Option File Path

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

Create

After the name and the file path for the boot option are set, press <Enter> to create the new boot option in the boot priority list.

►Delete Boot Option

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

Delete Boot Option

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

►Add New Driver Option

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

Add Driver Option

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

Path for Drover Option

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

Driver Option File Path

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

Create

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

►Delete Driver Option

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

Delete Drive Option

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

►Hard Disk Drive BBS Priorities

- Boot Option #1 - #5

►USB Key Drive BBS Priorities

- Boot Option #1

►UEFI Application Boot Priorities

- Boot Option #1

►Network Drive BBS Priorities

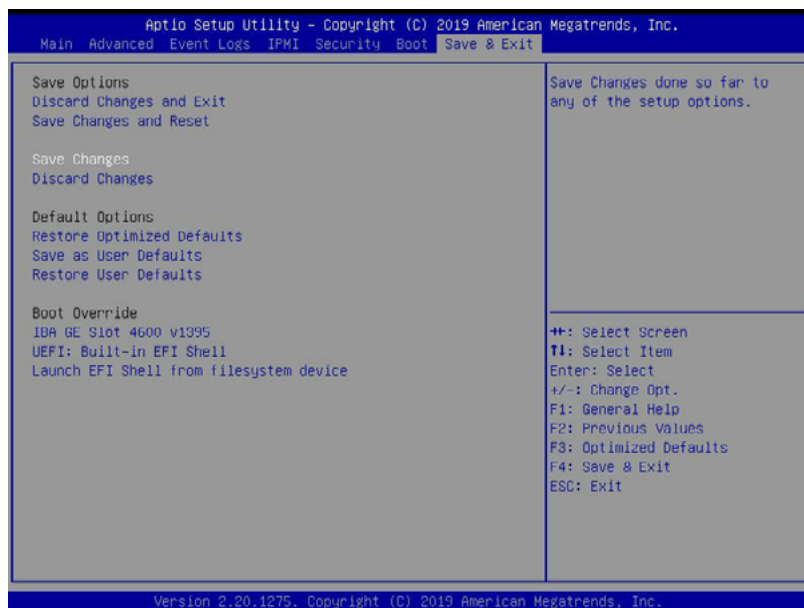
- Boot Option #1

►UEFI Application Boot Priorities

- UEFI Boot Order #1 - This feature sets the system boot order of detected devices. The options are **UEFI: Built-in EFI Shell** and Disabled.

6.8 Save & Exit

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



Save Options

Discard Changes and Exit

Select this option to exit from the BIOS setup utility without making any permanent changes to the system configuration and reboot the computer.

Save Changes and Reset

When you have completed the system configuration changes, select this option to leave the BIOS setup utility and reboot the computer for the new system configuration parameters to become effective.

Save Changes

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

Discard Changes

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

Default Options

Restore Optimized Defaults

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

Save As User Defaults

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

Restore User Defaults

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

Boot Override

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

Appendix A

BIOS Error Codes

A.1 BIOS Error Beep (POST) Codes

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

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

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

These fatal errors are usually communicated through a series of audible beeps. The numbers on the fatal error list (on the following page) correspond to the number of beeps for the corresponding error.

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

A.2 Additional BIOS POST Codes

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

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

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

Appendix B

Standardized Warning Statements for AC Systems

B.1 About Standardized Warning Statements

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

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

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

Warning Definition



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

警告の定義

この警告サインは危険を意味します。

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

此警告符号代表危險。

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

此警告符號代表危險。

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

Warnung

WICHTIGE SICHERHEITSHINWEISE

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

BEWAHREN SIE DIESE HINWEISE GUT AUF.

INSTRUCCIONES IMPORTANTES DE SEGURIDAD

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

GUARDE ESTAS INSTRUCCIONES.

IMPORTANTES INFORMATIONS DE SÉCURITÉ

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

CONSERVEZ CES INFORMATIONS.

תקנון הזהרות אזהרה

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

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



電源切断の警告

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

警告

在你打开机箱并安装或移除内部器件前,必须将系统完全断电,并移除电源线。

警告

在您打開機殼安裝或移除內部元件前，必須將系統完全斷電，並移除電源線。

Warnung

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

¡Advertencia!

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

Attention

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

אזהרה מפני ניתוק חשמלי

אזהרה!

יש לנתק את המערכת מכל מקורות החשמל ויש להסיר את כבל החשמל 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 انمناطق انداخييت نههيكم نثبيح أو إزانت مكناث الجهاز

경고!

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

Waarschuwing

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

Equipment Installation



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

機器の設置

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

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 قفم ومفتاح

경고!

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

Waarschuwing

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

Battery Handling



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

電池の取り扱い

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

警告

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 اللوحة
عندما يكون النظام يعمل كهذا عند خدمة هذا الجهاز

경고!

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

Waarschuwing

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

Comply with Local and National Electrical Codes



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

地方および国の電気規格に準拠

機器の取り付けはその地方および国の電気規格に準拠する必要があります。

警告

设备安装必须符合本地与本国电气法规。

警告

設備安裝必須符合本地與本國電氣法規。

Warnung

Die Installation der Geräte muss den Sicherheitsstandards entsprechen.

¡Advertencia!

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

Attention

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

תיאום חוקי החשמל הארצי

אזהרה!

התקנת הציוד חייבת להיות תואמת לחוקי החשמל המקומיים והארציים.

تركيب المعدات الكهربائية يجب أن يمتثل للقوايه المحلية والبطية المتعلقة
بالكهرباء

경고!

현 지역 및 국가의 전기 규정에 따라 장비를 설치해야 합니다.

Waarschuwing

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

Product Disposal



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

製品の廃棄

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

警告

本产品的废弃处理应根据所有国家的法律和规章进行。

警告

本產品的廢棄處理應根據所有國家的法律和規章進行。

Warnung

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

¡Advertencia!

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

Attention

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

סילוק המוצר

אזהרה!

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

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

경고!

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

Waarschuwing

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

Hot Swap Fan Warning



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

ファン・ホットスワップの警告

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

警告!

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

警告

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

Warnung

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

¡Advertencia!

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

Attention

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

אזהרה!

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

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

경고!

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

Waarschuwing

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

Power Cable and AC Adapter



Warning! When installing the product, use the provided or designated connection cables, power cables and AC 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/CSAマークがコードに表記)を Supermicro が指定する製品以外に使用することを禁止しています。

警告

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

警告

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

Warnung

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

¡Advertencia!

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

Attention

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

AC כבלים חשמליים ומתאמי

אזהרה!

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

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

전원 케이블 및 AC 어댑터

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

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

Stroomkabel en AC-Adapter

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

Appendix C

System Specifications

Processors

Eight Intel® 81xx and 82xx series in an Socket P type socket*

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

Chipset

Intel C621 chipset

BIOS

16MB AMI® Flash ROM (on AOM-X11OPi-LBG)

Memory

Each CPU board supports up to of 12 DDR4 3DS Load Reduced (3DS LRDIMM), Load Reduced (LRDIMM), or Registered (RDIMM) ECC 2933/2666/2400/2133 Mhz MHz

SATA Controller

On-chip (Intel C621) controller

Drive Bays

Sixteen 2.5" hot-swap 2.5" SAS3 drive bays (w/RAID cards); eight 2.5" or six 3.5" internal drive bays (w/RAID cards)

PCI Expansion Slots

Two PCI-E 3.0x16 slots (CPU Slot1/Slot2) on each X11OPi board (w/8 CPU boards max in the system)

One PCI-E 3.0 x16 slot on the RSC-X11OPi-PCIE card (w/five PCI-E cards max. in the system)

Two PCI-E 3.0x8 in x16 slots (Slot1/Slot2) on the AOM-X11OPi-HDD card, (w/one HDD-card in the system)

CPU Board

AOM-X11OPi-CPU

PCH (Platform Controller Hub) Board

AOM-X11OPi-PCH

PCIE Board

AOM-X11OPi-PCIE

HDD (Hard Disk Drive) Board

AOM-X11OPi-HDD

Chassis

SC718SAC-R4800; 7U Rackmount, 17.63 x 12.2 x 28.87-in. / 310 x 448 x 733-cm (W x H x D)

System Cooling

Eight 9-cm hot-swap, counter-rotating fans

Power Supply

Model: PWS-1K62A-1R (five total in system)

AC Input Voltages: 100-240 VAC

Rated Input Current: 13-9A (100-127V) to 10-8A (200-240V)

Rated Input Frequency: 50-60 Hz

Rated Output Power: 1600W

Rated Output Voltages: +12Vsb (2.1A max.)

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)

*Quantity shown is for a complete system.

Regulatory Compliance

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

Applied Directives, Standards

EMC/EMI: 2014/30/EU (EMC Directive)

FCC Part 15 Subpart B

ICES-003

VCCI-CISPR 32

AS/NZS CISPR 32

EN/BS EN55032

EN/BS EN55035

EN/BS 61000-3-2

EN/BS 61000-3-3

EN/BS 61000-4-2

EN/BS 61000-4-3

EN/BS 61000-4-4

EN/BS 61000-4-5

EN/BS 61000-4-6

EN/BS 61000-4-8

EN/BS 61000-4-11

Green Environment:

2011/65/EU (RoHS Directive)

EC 1907/2006 (REACH)

2012/19/EU (WEEE Directive)

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

UL/CSA 62368-1 (USA and Canada)

IEC/EN 62368-1

Perchlorate Warning

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

Appendix D

UEFI BIOS Recovery

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

D.1 Overview

The Unified Extensible Firmware Interface (UEFI) provides a software-based interface between the operating system and the platform firmware in the pre-boot environment. The UEFI specification supports an architecture-independent mechanism that will allow the UEFI OS loader stored in an add-on card to boot the system. The UEFI offers clean, hands-off management to a computer during system boot.

D.2 Recovering the UEFI BIOS Image

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

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

Note 2: When the BIOS recovery block crashes, you will need to follow the procedures to make a Returned Merchandise Authorization (RMA) request. (For a RMA request, please see section 3.5 for more information). Also, you may use the Supermicro Update Manager (SUM) Out-of-Band (OOB) (https://www.supermicro.com.tw/products/nfo/SMS_SUM.cfm) to reflash the BIOS.

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

This feature allows the user to recover the main BIOS image using a USB-attached device without additional utilities used. A USB flash device such as a USB Flash Drive, or a USB

CD/DVD ROM/RW device can be used for this purpose. However, a USB Hard Disk drive cannot be used for BIOS recovery at this time.

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

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

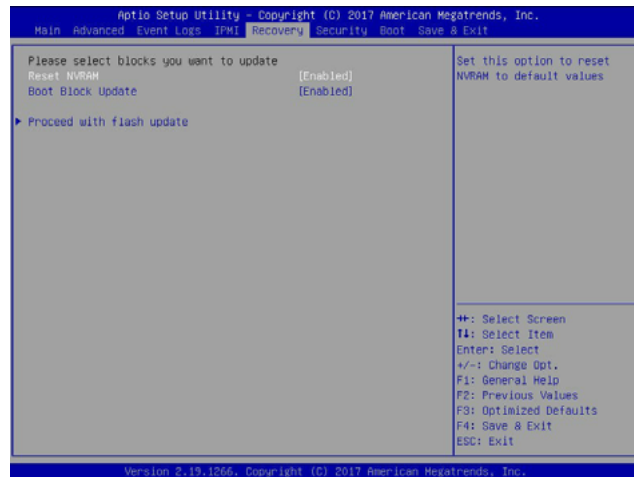
1. Using a different machine, copy the "Super.ROM" binary image file into the Root "\" directory of a USB device or a writable CD/DVD.

Notes: 1. If you cannot locate the "Super.ROM" file in your drive disk, visit our website at www.supermicro.com to download the BIOS package. Extract the BIOS binary image into a USB flash device and rename it "Super.ROM" for the BIOS recovery use. 2. Before recovering the main BIOS image, confirm that the "Super.ROM" binary image file you download is the same version or a close version meant for your motherboard.

2. Insert the USB device that contains the new BIOS image ("Super.ROM") into your USB drive and reset the system when the following screen appears.

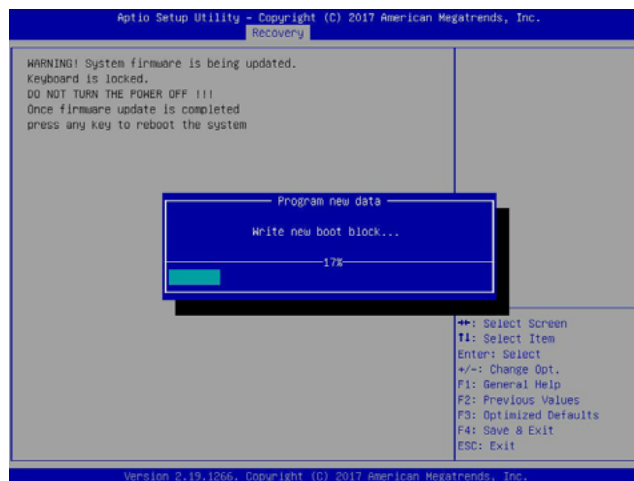


- After locating the healthy BIOS binary image, the system will enter the BIOS Recovery menu as shown below.

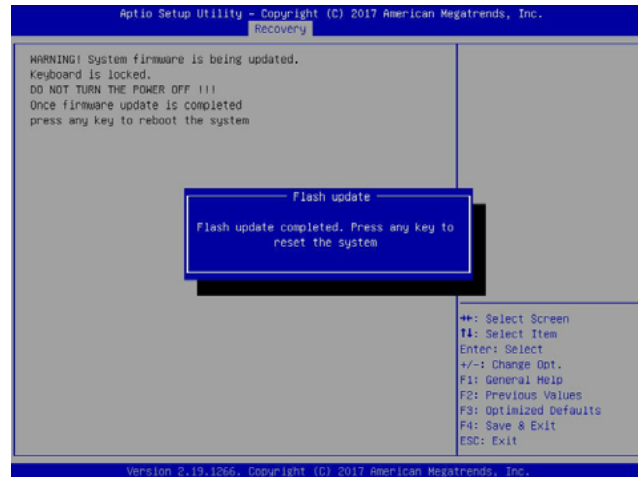


Note: At this point, you may decide if you want to start the BIOS recovery. If you decide to proceed with BIOS recovery, follow the procedures below.

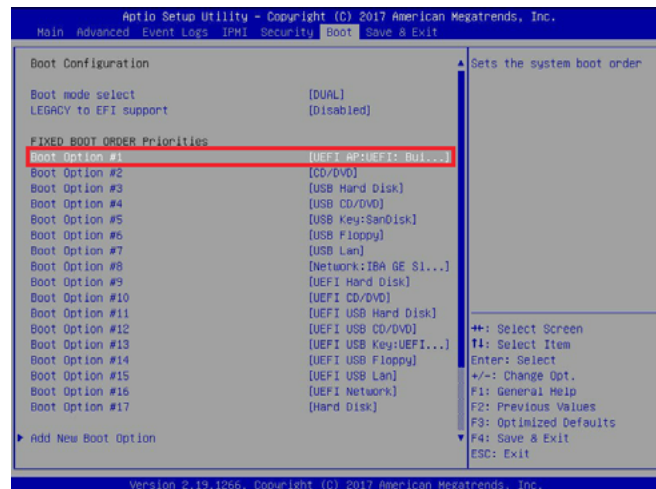
- When the screen as shown above displays, use the arrow keys to select the item "Proceed with flash update" and press the <Enter> key. You will see the BIOS recovery progress as shown in the screen below.



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



5. After the BIOS recovery process is complete, press any key to reboot the system.
6. Using a different system, extract the BIOS package into a USB flash drive.
7. Press continuously during system boot to enter the BIOS Setup utility. From the top of the tool bar, select Boot to enter the submenu. From the submenu list, select Boot Option #1 as shown below. Then, set Boot Option #1 to [UEFI AP:UEFI: Built-in EFI Shell]. Press <F4> to save the settings and exit the BIOS Setup utility.



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

```
UEFI Interactive Shell v2.1
EDK II
UEFI v2.50 (American Megatrends, 3x0005000C)
Mapping 1801:
FS0: Alias(s): HD0:0B:1BK1:
    PciRoot(0x0)/Pci(0x14,0x0)/USB(0x11,0x0)/HD(1,MBR,3x37501072,0x000,3x1
    CK592)
    BK0: Alias(s):
    PciRoot(0x0)/Pci(0x14,0x0)/USB(0x11,0x0)
Press F8C in 1 seconds to skip startup.nsh or any other key to continue.
Shell> fs0:
FS0:\> cd \FUD05
FS0:\FUD05> cd SHJPM2_03162017
FS0:\FUD05\SHJPM2_03162017> flash.nsh X115PU7.314
```

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

```
Done.
[ Access CMOS Port Ex ]
doneb
Index 0x51: 0x1B

Done.
*****
* Program BIOS and ME (including FDT) regions...
*****
| AMI Firmware Update Utility v5.05.01.1517 |
| Copyright (C)2017 American Megatrends Inc. All Rights Reserved. |
*****
CPUID = 50652

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

9. The screen above indicates that the BIOS update process is complete. When you see

```
Verifying MBR Block ..... done
- Update success for F0B
- Update success for IE -
- Successful Update Recovery Loader to OPRx!!
- Successful Update MFB!!
- Successful Update FTRx!!
- Successful Update MFS, IVB1 and IVB2!!
- Successful Update FLOG and UTRx!!
- ME Entire Image update success !!
WARNING: System must power-off to have the changes take effect!
Moving FS0:\FUD05\SHJPM2_03162017\fdt64.efi -> FS0:\FUD05\SHJPM2_03162017\
fdt64.smc
- [ok]
Moving FS0:\FUD05\SHJPM2_03162017\atuefi64.efi -> FS0:\FUD05\SHJPM2_0316201
7\atuefi64.smc
- [ok]
*****
* Please ignore this "Shell: Cannot read from file - Device Error"
* warning message due to it does not impact flashing process.
*****
Deleting "FS0:\FUD05\SHJPM2_03162017\atuefi64.smc"
Delete successful.
FS0:\>
```

the screen above, unplug the AC power cable from the power supply, clear CMOS, and plug the AC power cable in the power supply again to power on the system.

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

Appendix E

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

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

E.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 7089P-TR4T	
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.

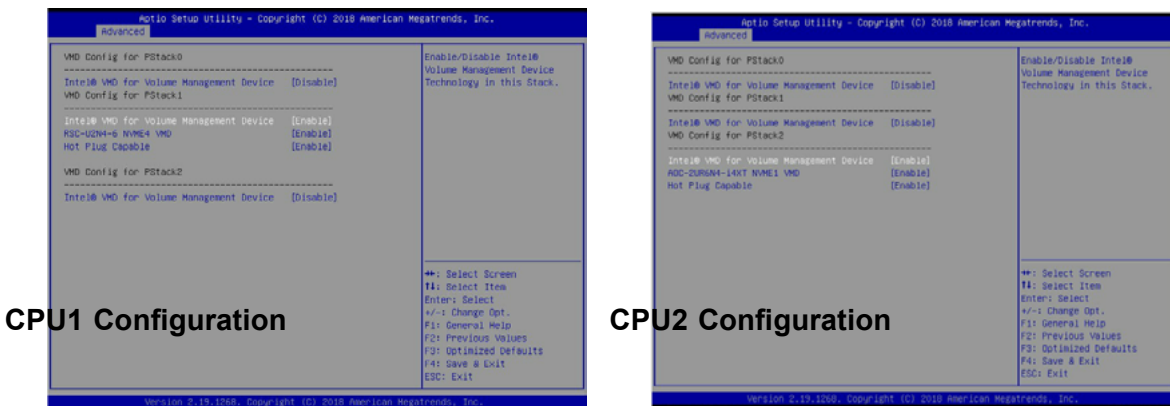


Figure E-2. BIOS VMD Setting Example for 24 Drives

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 E-4.

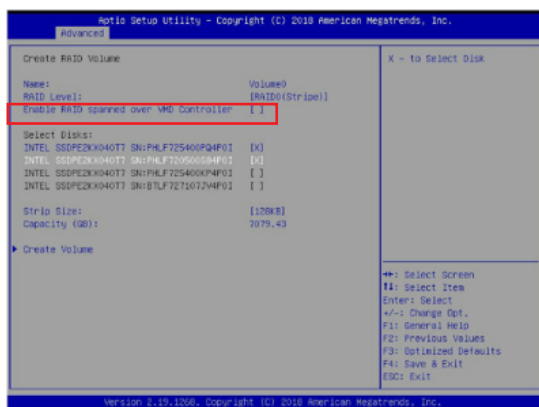


Figure E-3. Created Volume *without* enabling RAID spanned over VMD controller

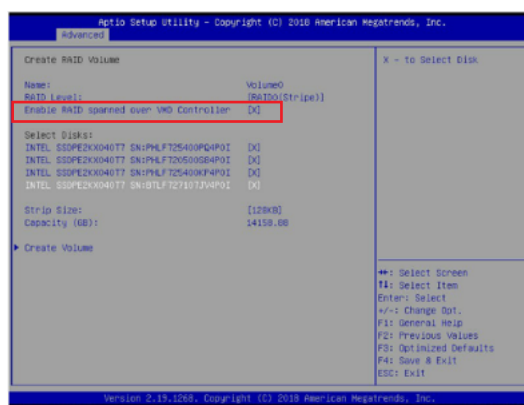


Figure E-4. Created Volume *with* enabling RAID spanned over VMD controller

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.

E.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

E.4 Hot Swap Drives

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

Hot-unplug

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

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

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

Hot-plug

- Physically install the device.

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

Related Information Links

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

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

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

Appendix F

BSMI Chinese Safety Warnings

限用物質含有情況標示聲明書

Declaration of the Presence Condition of the Restricted Substances Marking

設備名稱: 伺服器/Server Equipment name						
型號 (型式) : 718S-16 , (系列型號: 718-16、SYS-7089P-TR4T) Type designation (Type)						
單元 Unit	Restricted substances and its chemical symbols 限用物質及其化學符號					
	鉛Lead (Pb)	汞Mercury (Hg)	鎘Cadmium (Cd)	六價鉻 Hexavalent chromium (Cr ⁺⁶)	多溴聯苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
機殼 (Chassis)	○	○	○	○	○	○
機殼風扇 (Chassis Fan)	-	○	○	○	○	○
線材 (Cable)	○	○	○	○	○	○
主機板 (Motherboard)	-	○	○	○	○	○
電源供應器 (Power Supply)	-	○	○	○	○	○
電源背板 (PDB)	-	○	○	○	○	○
硬碟 (HDD)	-	○	○	○	○	○
附加卡 (Add-on Card)	-	○	○	○	○	○
<p>備考1. “超出0.1 wt %” 及 “超出0.01 wt %” 係指限用物質之百分比含量超出百分比含量基準值。 Note 1 : “Exceeding 0.1 wt %” and “exceeding 0.01 wt %” indicate that the percentage content of the restricted substance exceeds the reference percentage value of presence condition.</p> <p>備考2. “○” 係指該項限用物質之百分比含量未超出百分比含量基準值。 Note 2 : “○” indicates that the percentage content of the restricted substance does not exceed the percentage of reference value of presence.</p> <p>備考3. “-” 係指該項限用物質為排除項目。 Note 3 : The “-” indicates that the restricted substance corresponds to the exemption.</p>						

警告使用者：

此為甲類資訊技術設備，於居住環境中使用時，可能會造成射頻擾動，在此種情況下，使用者會被要求採取某些適當的對策。

輸入額定：

100-127V ~, 60-50Hz, 12-9A (x5)

200-240V ~, 60-50Hz, 10-8A (x5)

*使用者不能任意拆除或替換內部配備

*報驗義務人之姓名或名稱：美超微電腦股份有限公司