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Industry Standard, Flexible Architecture

GREEN

Less Heat, Less Power Consumption

STABLE

Robust Design, Quality Parts

Stable and
Reliable Solution

Barebone

2U4N-F Series



User Manual



Version 1.0

Published June 2015

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This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

CALIFORNIA, USA ONLY

The Lithium battery adopted on this motherboard contains Perchlorate, a toxic substance controlled in Perchlorate Best Management Practices (BMP) regulations passed by the California Legislature. When you discard the Lithium battery in California, USA, please follow the related regulations in advance.

“Perchlorate Material-special handling may apply, see www.dtsc.ca.gov/hazardouswaste/perchlorate”

Setting up the Server in a Restricted Access Location

- Access can only be gained by service persons or by users who have been instructed about the reasons for the restrictions applied to the location and about any precautions that shall be taken.
- Access is through the use of a tool or lock and key, or other means of security, and is controlled by the authority responsible for the location.
- Leave enough clearance (25 inches in the front and 30 inches in the back of the rack) to allow the front door to be opened completely and to allow for sufficient airflow.
- This product is for installation merely in a Restricted Access Location.
- This product is not suitable for use with visual display work place devices according to §2 of the the German Ordinance for Work with Visual Display Units.

Replaceable Batteries

CAUTION

**RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE.
DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS**

Warning

When removal of the chassis lid required for servicing:

- Turn off power and unplug any power cords/cables, and
- Reinstall the chassis lid before restoring power.

Important Safety Instructions

Pay close attention to the following safety instructions before performing any of the operation. Basic safety precautions should be followed to protect yourself from harm and the product from damage:

- Operation of the product should be carried out by suitably trained, qualified, and certified personnel only to avoid risk of injury from electrical shock or energy hazard.
- Disconnect the power cord from the wall outlet when installing or removing main system components, such as the motherboard and power supply unit.
- Place the system on a stable and flat surface.
- Use extreme caution when working with high-voltage components.
- When handling parts, use a grounded wrist strap designed to prevent static discharge.
- Keep the area around the system clean and clutter-free.
- Keep all components and printed circuit boards (PCBs) in their antistatic bags when not in use.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or contacts.

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Chapter 1 Introduction

Thank you for purchasing 2U4N-F Series, a reliable system produced under our consistently stringent quality control. It delivers excellent performance with robust design conforming to our commitment to quality and endurance.



Because the hardware specifications might be updated, the content of this documentation will be subject to change without notice.



The illustrations shown in this manual are examples only, the actual system may differ slightly .

1.1 Shipping Box Contents

Item	Quantity (per node)	Total Quantity
2U4N-F Series Barebone (2U form factor)	1	1
System Fans	4	16
System Boards (MB)	1	4
HDD Backplanes (BPB)	1	4
Front Panel Boards (FPB)	1	4
Right Interposer Boards (RIPB)	1	2
Left Interposer Boards (LIPB)	1	2
PSU Interposer Boards (PSU-IPB)	1	4
Right Power Distribution Boards (RPDB)		1
Left Power Distribution Boards (LPDB)		1
Chassis Management Board (CM)		1
Power Supply Units (PSU)		2
Mini SAS HD Cables (L), MB to BPB, 760 mm	1	2
Mini SAS HD Cables (R), MB to BPB, 630 mm	1	2
HDD Power Cables (L), 12Pin, BPB to IPB, 230mm	1	2
HDD Power Cables (R), 12Pin, BPB to IPB, 350mm	1	2
Front Panel USB Cables, 10Pin, IPB to FPB, 270mm	1	4
SMB Cables (L), 5Pin, MB to BPB, 670 mm	1	2
SMB Cables (R), 5Pin, MB to BPB, 890 mm	1	2
Power Cables (CM), ATX 20Pin, IPB to PSU-IPB, 190mm	1	4
Power Cables, ATX 16Pin, IPB to PSU-IPB, 150mm	1	4
Accessory Box		1
Support CD		1
User Manual		1
Quick Installation Guide		1



If any items are missing or appear damaged, contact your authorized dealer.

1.2 Specifications

2U4N-F Series	
System Physical Status	
Form Factor	2U Rackmount
Dimension (D x W x H)	29.6" x 17.7" x 3.4" (750 x 441 x 86 mm) <i>*Chassis ears excluded</i>
Support MB Size	Half Width, 18.6" x 6.5" (472 mm x 165 mm)
Front Panel (per node)	
Buttons	<ul style="list-style-type: none"> • Power button • System reset button
LEDs	<ul style="list-style-type: none"> • Power LED • UID LED • Hard drive activity LED
I/O Port	1 x USB 2.0 port
Drive Bay	
External	16 x 2.5" SATA HDDs (6Gb/s) (4 per node)
System Cooling (per node)	
Fan	16 x 40*56 mm system fans (4 per node)
Power Supply	
Capacity	2 (1+1), Redundant
Output Watts	1000W @ 90Vac~132Vac 1200W @ 200Vac~264Vac
Efficiency	Platinum

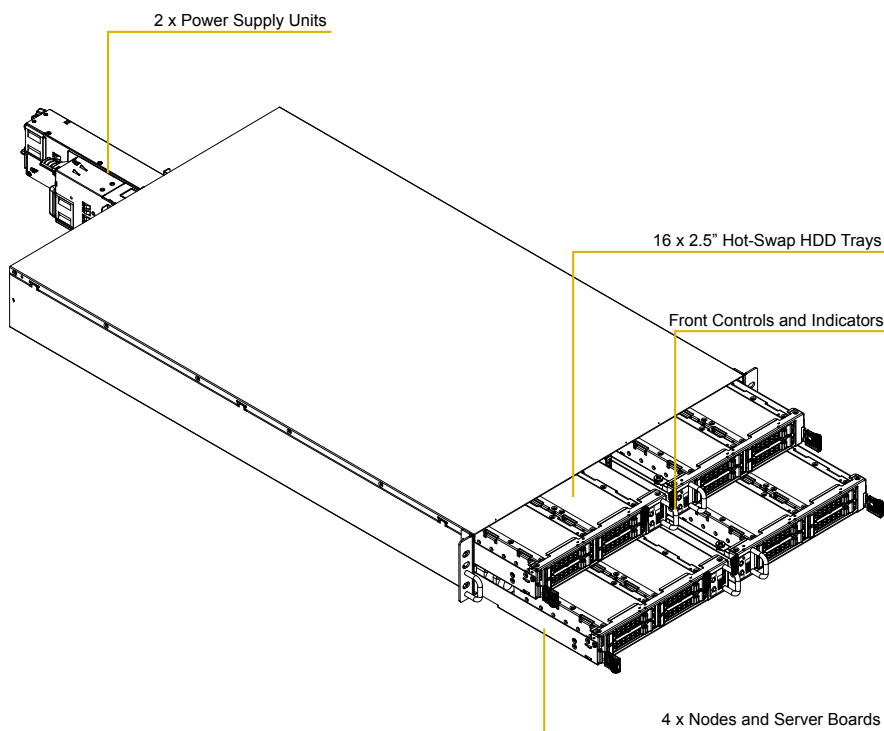


1. CPU support up to 120W (without add on card)
2. 145W CPU support with 1600W PSU is Build To Order
3. Please contact ASRock Rack sales for target system configuration.
4. Please refer to the user manual of the motherboard you use for detailed information about motherboard components and features.

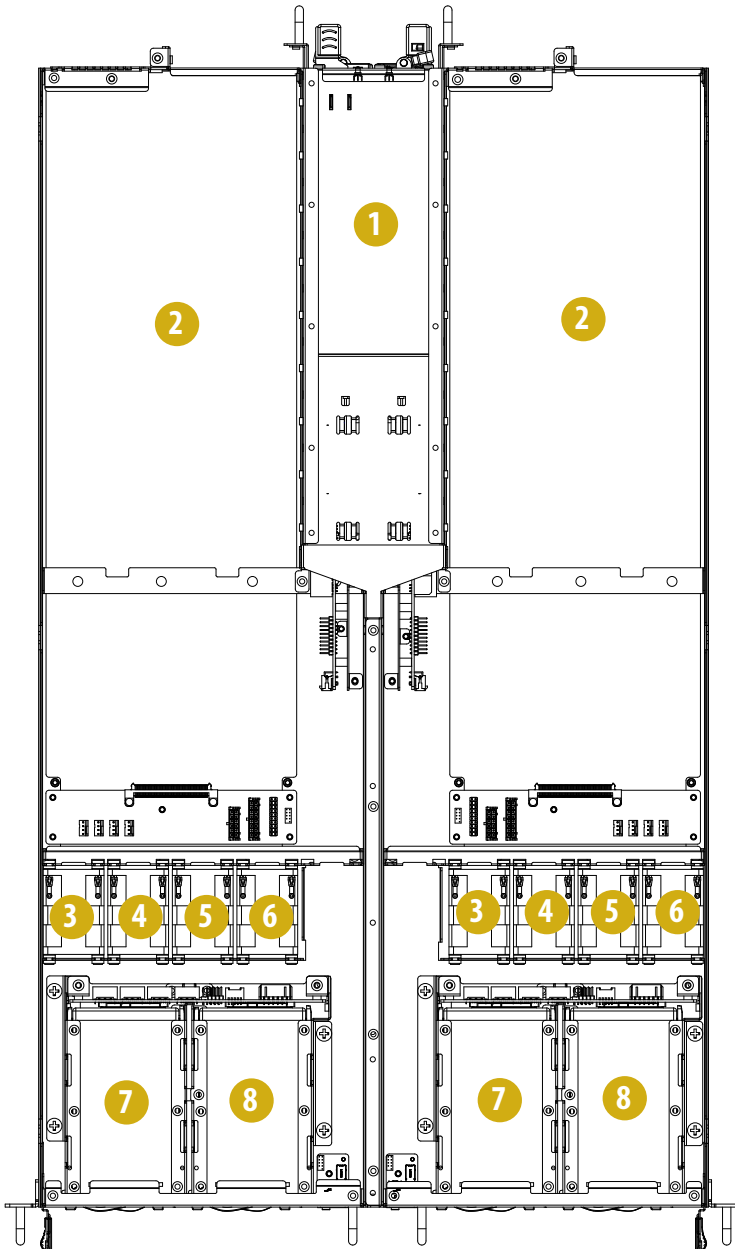
Chapter 2 Server System Overview

This chapter provides diagrams showing the location of important components of the server system.

2.1 System Components

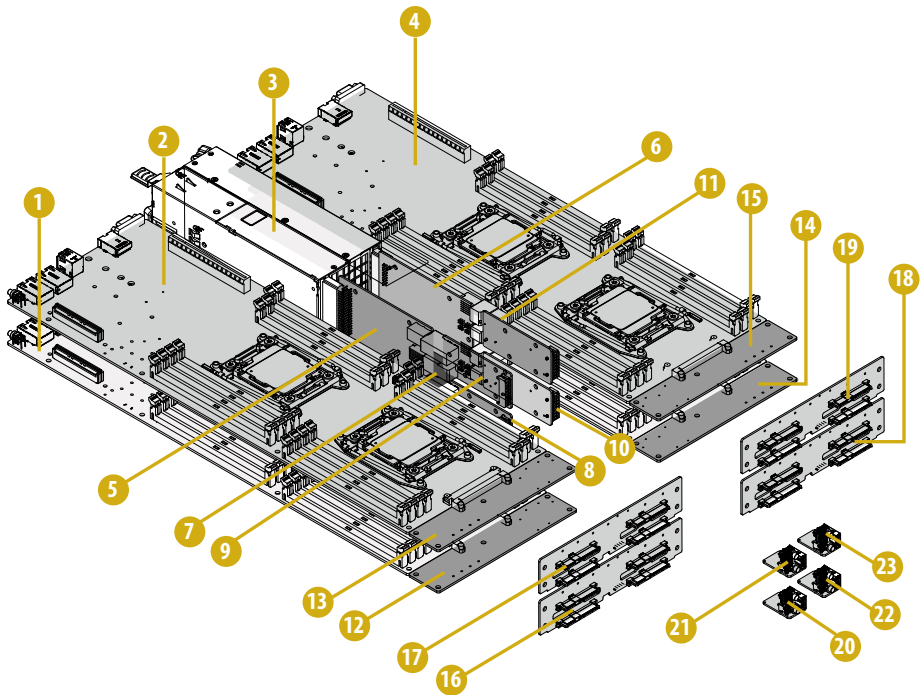


2.2 Internal Features



No.	From
1	Power Supply Bay (2 x Power Supply Units)
2	Server Board
3	System Fan 1
4	System Fan 2
5	System Fan 3
6	System Fan 4
7	2 x 2.5" SATA HDDs (Hot-swappable) (HDD0~HDD1)
8	2 x 2.5" SATA HDDs (Hot-swappable) (HDD2~HDD3)

2.3 Board Arrangement

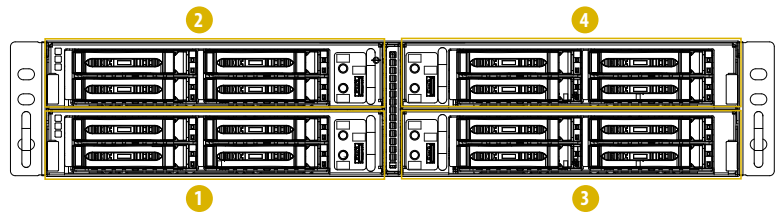


No.	Item
1	Server Board (Node 1)
2	Server Board (Node 2)
3	Server Board (Node 3)
4	Server Board (Node 4)
5	Left Power Distribution Board (LPDB)
6	Right Power Distribution Board (RPDB)
7	Chassis Management Board (CM)
8	PSU Interposer Board (PSU-IPB) (Node 1)
9	PSU Interposer Board (PSU-IPB) (Node 2)
10	PSU Interposer Board (PSU-IPB) (Node 3)
11	PSU Interposer Board (PSU-IPB) (Node 4)
12	Left Interposer Board (LIPB) (Node 1)

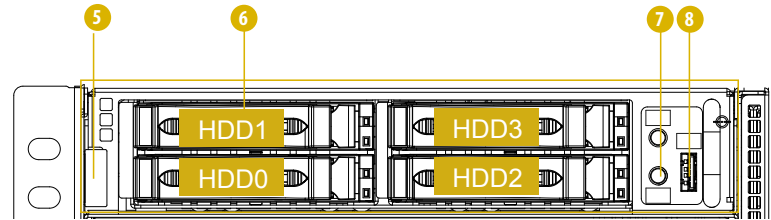
No.	Item
13	Left Interposer Board (LIPB) (Node 2)
14	Right Interposer Board (RIPB) (Node 3)
15	Right Interposer Board (RIPB) (Node 4)
16	2.5" HDD Backplane Board (BPB) (Node 1)
17	2.5" HDD Backplane Board (BPB) (Node 2)
18	2.5" HDD Backplane Board (BPB) (Node 3)
19	2.5" HDD Backplane Board (BPB) (Node 4)
20	Front Panel Boarde (FPB) (Node 1)
21	Front Panel Boarde (FPB) (Node 2)
22	Front Panel Boarde (FPB) (Node 3)
23	Front Panel Boarde (FPB) (Node 4)

2.4 System Front Panel

System

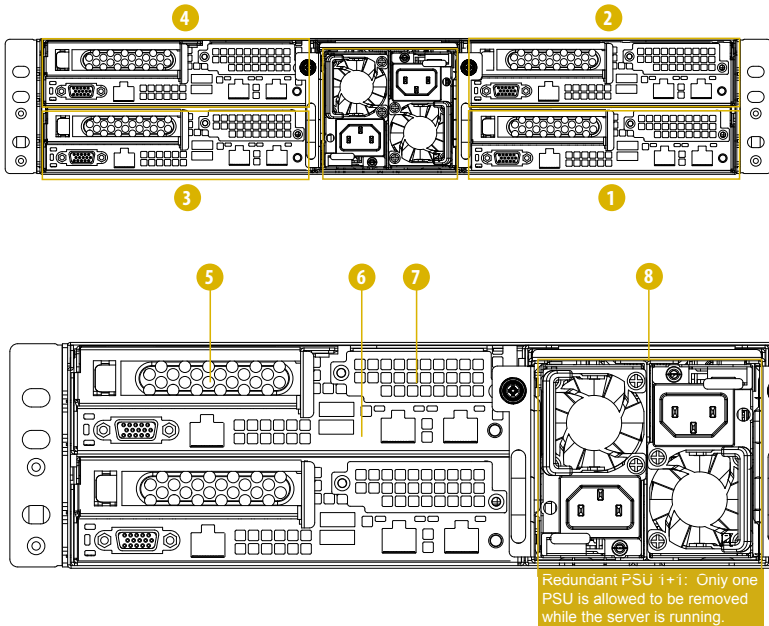


Node



No.	Description
1	Node 1
2	Node 2
3	Node 3
4	Node 4
5	Node Tray Handle
6	4 x 2.5" HDD Trays (per node)
7	Control Panel Buttons and LEDs
8	1 x USB 2.0 Port (per node)

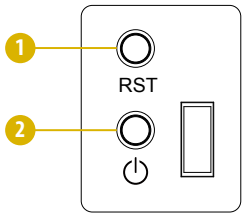
2.5 System Rear Panel



No.	Description
1	Node 1
2	Node 2
3	Node 3
4	Node 4
5	PCI Express Slot (for the riser card) <i>*Supports Low profile add-on cards only.</i>
6	I/O Shield (depends on the specification of the server board)
7	Mezzanine Card Support for 1GbE x 2, 10GbE x2 or SFP+ (Fiber) x2
8	2 x Power Supply Units (Redundant PSU 1+1) <i>*Server requires 1 working PSU, with 1 redundant PSU. You must have at least one active supply, installed, functioning and connected to AC. Only one of the PSUs is allowed to be removed while the server is running.</i>

2.6 Front Control Panel Buttons and LEDs

Front Control Panel (per node)



No.	Description
1	System Reset Button / UID LED
2	Power Button and LED

System Reset Button

When the system is completely unresponsive, press the system reset button to reboot the server without shutting it off and initialize the system.

UID Button

Press the UID button on the rear panel to toggle the front panel UID LED on and off. You are able to locate the server you're working on from behind a rack of servers.

Power Button

Press the power switch button to toggle the system power on and off modes.
To remove all power from the system completely, disconnect the power cord from the server.

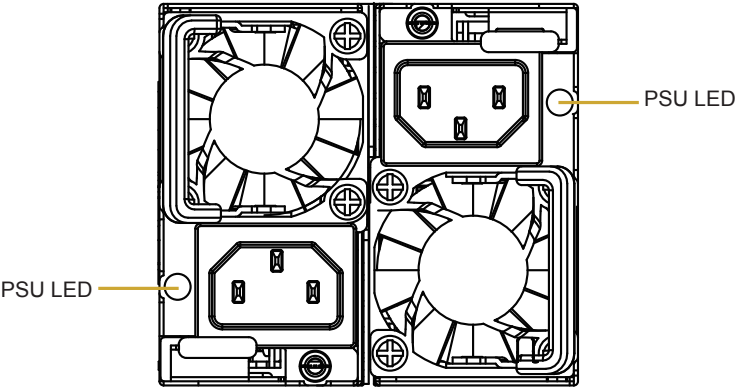
Status LED Definitions

NMI LED	
Status	Description
Blue	Nonmaskable interrupt occurs
Off	No nonmaskable interrupt

ID LED	
Status	Description
Blue	System identification is active.
Off	System identification is disabled.

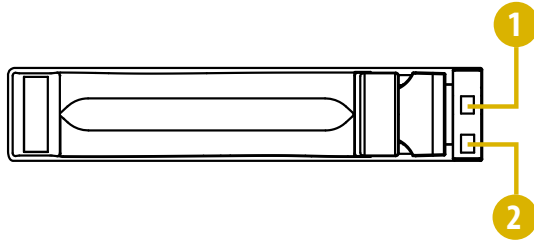
Power LED	
Status	Description
Green	Power on
Off	Power off

2.7 PSU LED



PSU Status LED	
Status	Description
Green	Normal work; output ON and OK
Amber	Module fault/protection in operating mode (failure, OCP, OVP, Fan Fail, OTP, UVP) AC cord unplugged
Amber blinking at 0.5Hz	Warning (high temp, high power, high current, slow fan)
Green blinking at 0.5Hz	AC Present Only 12VSB on (PS off) or PS in Smart Redundant state

2.8 Drive Tray LEDs



No.	Description
1	HDD Power LED
2	HDD Activity LED

Status LED Definitions

HDD Power LED	
Status	Description
Blue	HDD powered-on
Off	No power to HDD

HDD Activity LED	
Status	Description
Solid Green	HDD active
Blinking Green	HDD accessing or reading
Red	HDD failed
Off	HDD powered-off

Chapter 3 Hardware Installation and Maintenance

This chapter helps you assemble the chassis and install components.

Before You Begin

Before you work with the server, pay close attention to the “Important Safety Instructions” at the beginning of this manual.

1. Make sure the server is powered off.

Power down the server if it is still running.

- (1) Press the Power button to power off the server from full-power mode to off mode.
The Power LED at the front turns from solid green to blinking green.
- (2) Disconnect the power cord first from the AC outlet and then from the server.
The power LED turns off.



The server is not completely powered down when you press the Power button on the front panel. To remove all power from the system completely, be sure to disconnect the power cord from the server.

2. Ensure you have a clean and stable working environment. Avoid dust and dirt because contaminants may cause malfunctions.
3. Ground yourself properly before touching any system component. A discharge of static electricity may damage components. Wear a grounded wrist strap if available.



1. Some components are already pre-installed. Simply properly connect the relevant cables before or after installation. See the Quick Installation Guide for more details.
2. Refer to the user manual of the server board you use for instructions on how to install server board components.

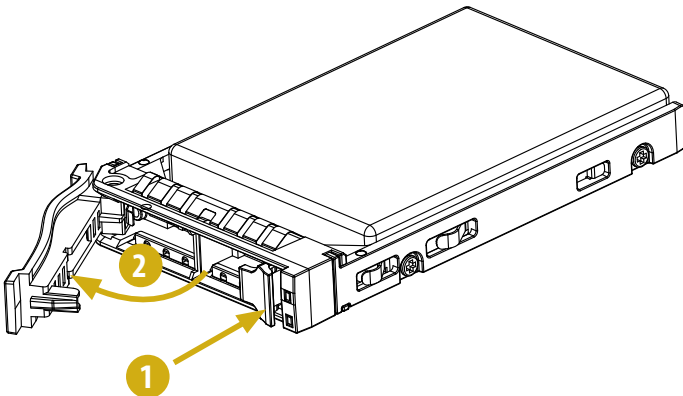
3.1 Hard Drive

Installing a Hard Disk Drive into 2.5" Hard Drive Tray

The 2U4N-F series chassis supports hot-swappable 2.5" hard drives. Four 2.5" hard drive trays are located on the front of each node.

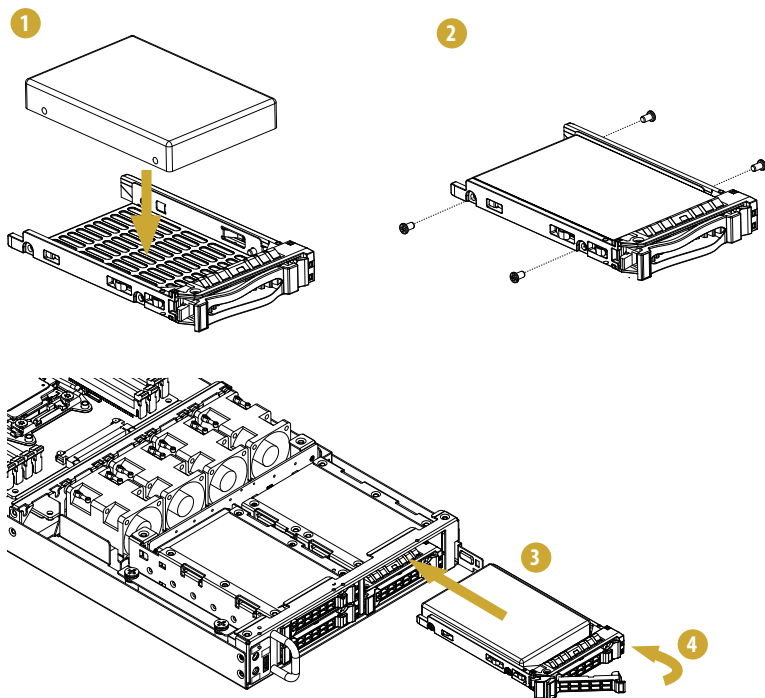
Removing 2.5" Hard Drive Trays from the Chassis

1. Press the locking lever latch on the drive tray to unlock the retention lever.
2. Rotate the lever out and away from the module bay and pull the hard drive out of the HDD tray.



Installing a 2.5" Hard Drive to the Hard Drive Tray

1. Place a 2.5" HDD into the tray with the printed circuit board side facing down.
Carefully align the mounting holes in the hard drive and the tray.
2. Secure the hard drive using the two screws.
3. Slide the drive tray into the HDD bay until the drive is fully seated.
4. Push in the locking lever to lock the HDD tray into place.



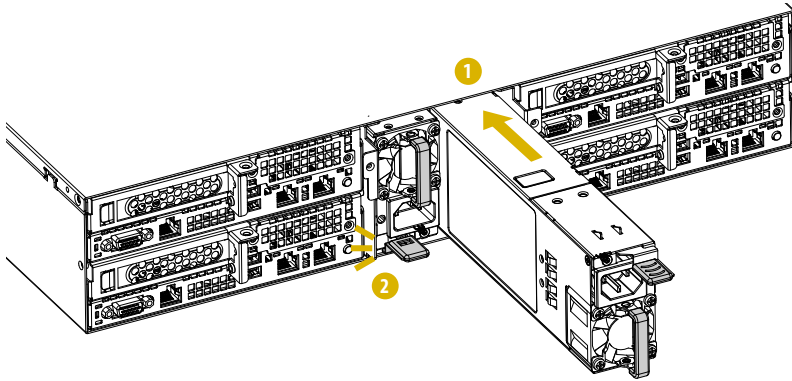
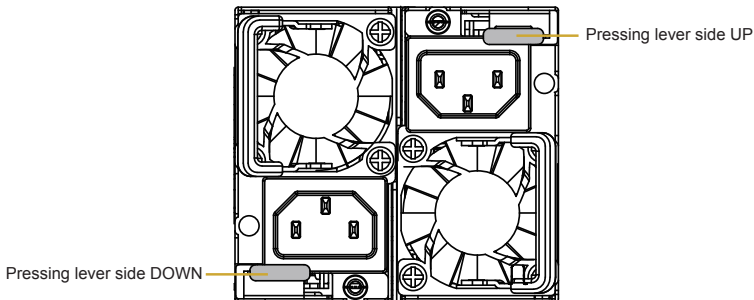
3.2 Power Supply

Installing and Removing the Power Supply

Installing the Power Supply Unit

The 2U4N-F Series can accommodate two AC or two DC power supplies in the bay at the rear of the chassis. Each unit provides up to 1200 Watts of power (180V to 264VAC input). One power supply is required for full load operation, with the other power supply purely as a redundant, load-sharing backup. It can be removed without affecting system operation.

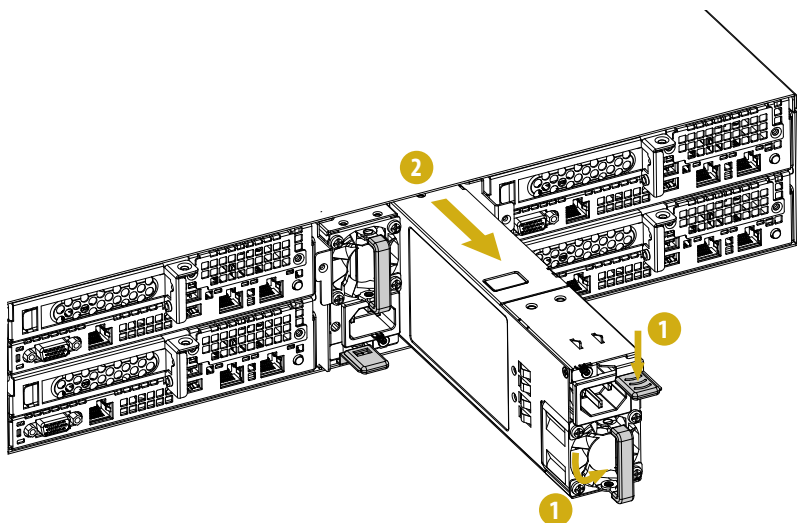
1. Align the power supply unit with the power supply slot.
2. Carefully slide the PSU all the way into the power supply bay until it clicks into place.



Removing the Power Supply Unit

To remove a failed power supply, identify the failed power supply by checking the power supply LED on the PSU.

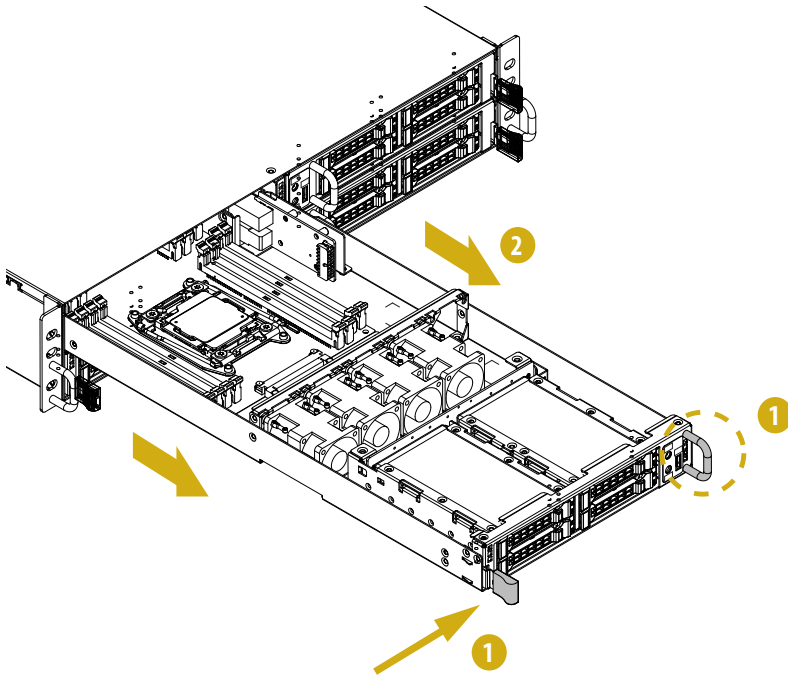
1. Hold onto the power supply handle while pressing the locking lever towards the power supply handle.
2. Pull to remove the power supply from the chassis.



3.3 Node / Server Board Tray

Installing and Removing the Node / Server Board Tray

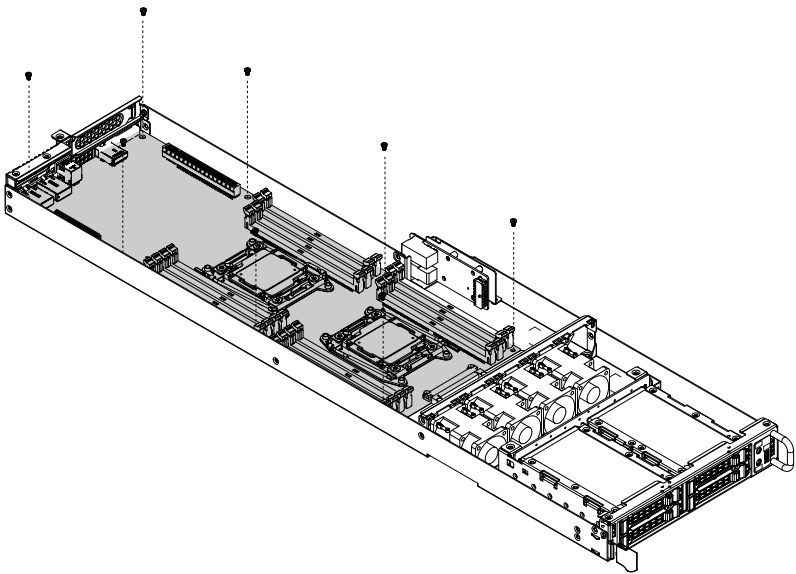
1. Press the locking tab on the side of the server board tray, and then gently pull it out about an inch.
2. Grasp the handle on the other side of the server board tray, and gently pull it out of the chassis.
3. Place the server board tray on a stable and antistatic surface.
4. Reverse the procedures to install the server board tray.



3.4 Server Board

Installing and Removing the Server Board

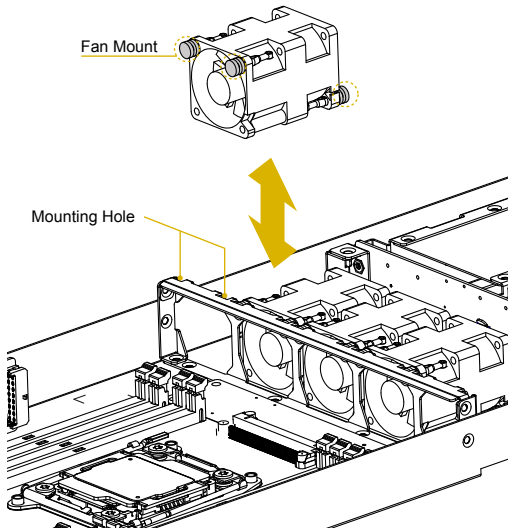
1. Remove the node tray completely out of the chassis.
2. Disconnect all cables attached to the server board.
3. Remove eight screws on the server board.
4. Lift the server board up from the node.
5. Hold the server board only by the edges and on a stable and antistatic surface.
6. Reverse the procedures to install the server board.



3.5 System Fan

Replacing the System Fan

1. Unplug the fan connector and remove the failed fan.
2. Align the mounting holes on the fan bar with the fan mounts on the replacement fan corners.
3. Gently place the fan on the fan bar. Make sure the fan is well seated.
4. Connect the end of the fan cable to the fan connector.



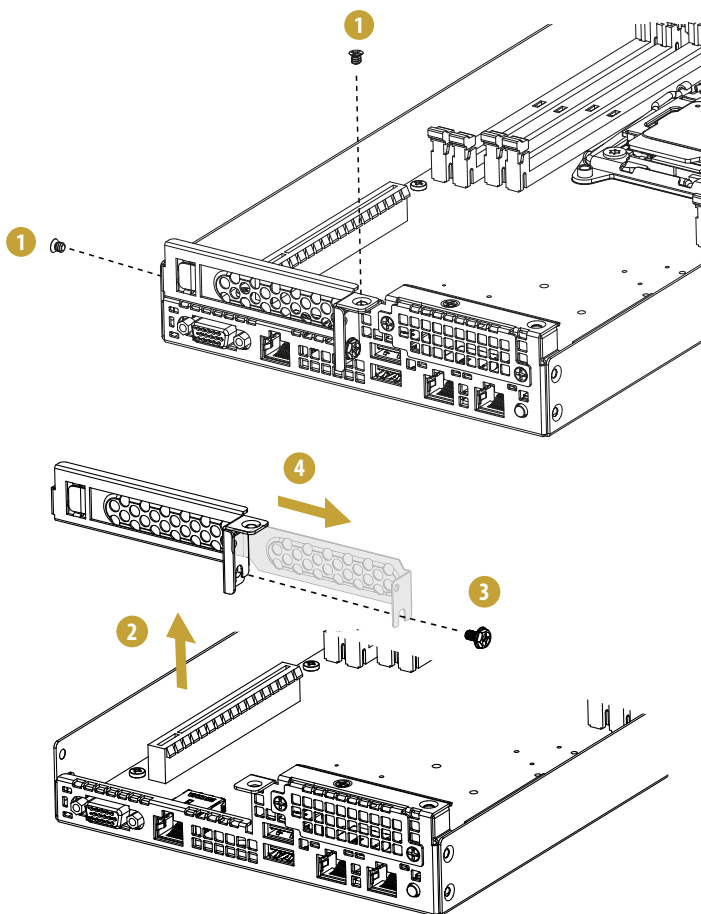
3.6 Add-on Card (Low Profile)



1. You can install an add-on card to the chassis only when you have a riser card installed on the server board.
2. Before installing the add-on card, power off the server and unplug the power cord.

Removing the Blanking Plate from the Chassis

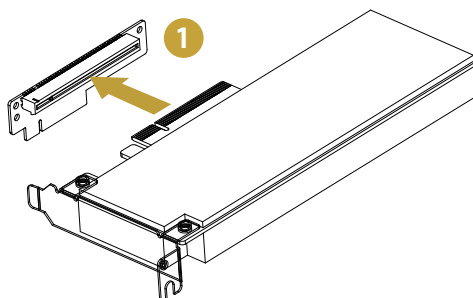
1. Remove the screws securing the blanking plate assembly on the chassis. Keep the screws for later use.
2. Lift up the blanking plate assembly.
3. Remove the screw securing the blanking plate on the assembly.
4. Slide the blanking plate out sideways.



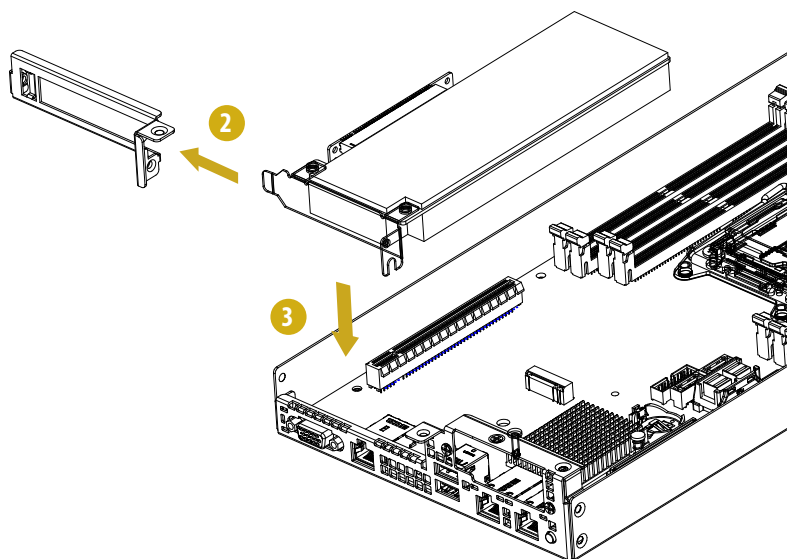
Installing the Add-on Card

Before installing an add-on card, you need to install a mezzanine card and a riser card first. Please refer to the followings for instructions.

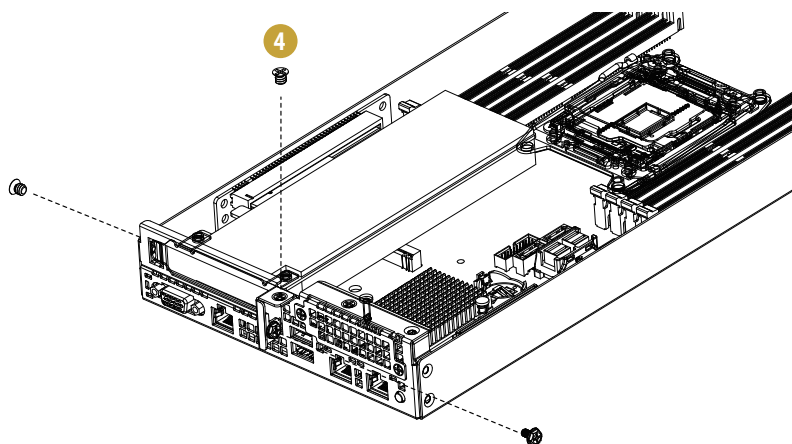
1. Install the add-on card to the riser card.



2. Insert the assembly into the PCIE slot module.
3. Install the riser card assembly to the PCIE slot on the server board.



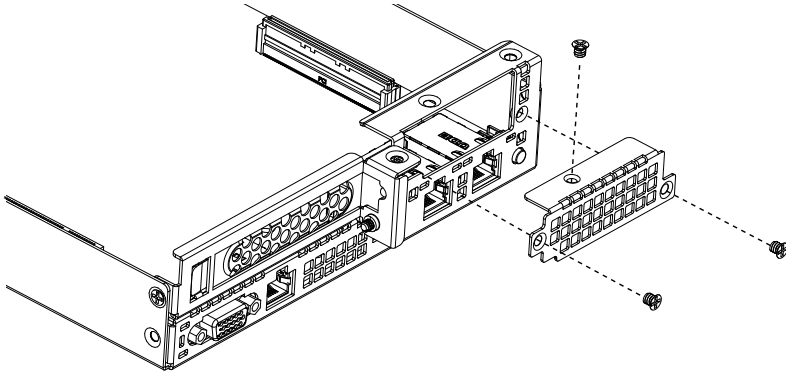
4. Align the plate of the add-on card with the openings in the back of the chassis. Attach the add-on card to the chassis with the screw that was previously set aside.



3.7 LAN Mezzanine Card

Removing the Blanking Plate for a LAN Mezzanine Card

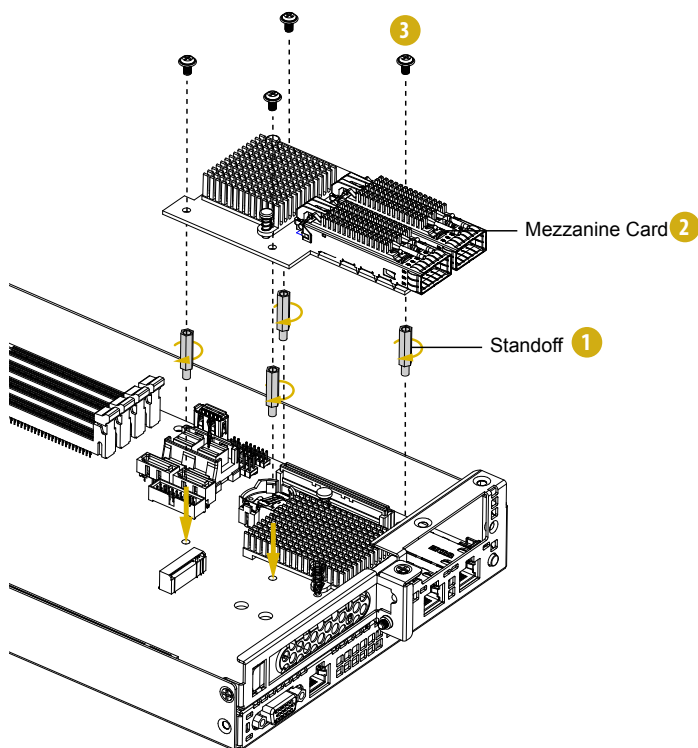
Remove the screws that secure the blanking plate on the chassis. Keep the screws for later use.



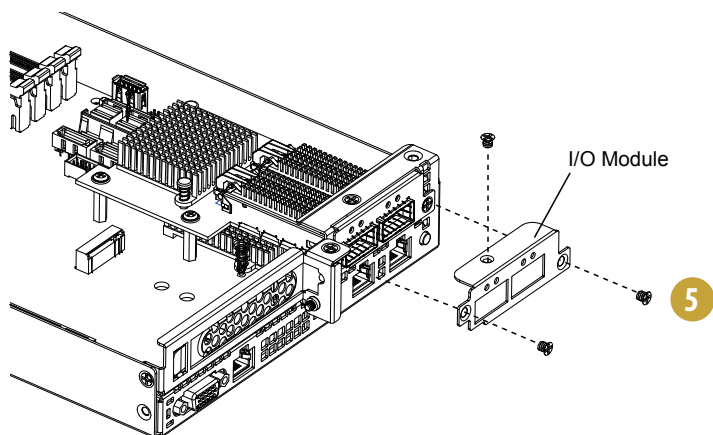
Installing a LAN Mezzanine Card

You can use an optional Ethernet mezzanine card for additional LAN ports. Please be aware that the mezzanine card must be used in conjunction with a matching I/O module.

1. Install the four standoffs into the motherboard around the mezzanine card slot. Hand-tighten the standoffs.
2. Gently insert the mezzanine card into the mezzanine card slot on the motherboard.
3. Use screws to secure the mezzanine card to the motherboard standoffs.



4. Tighten the screws to secure the matching I/O module to the chassis.



3.8 HDD Backplane

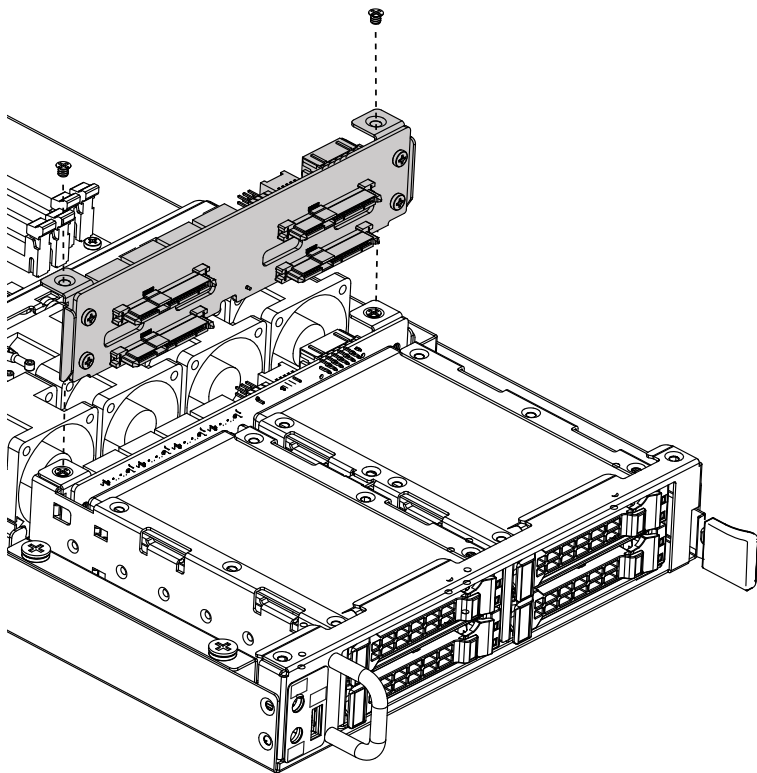
Each node supports one 2.5-inch HDD backplane. The HDD backplanes serve as the interfaces between the server board and the node drives.



Before removing and installing the backplanes, power off the server and unplug the power cord and make sure all 2.5" HDD trays have been removed.

Removing the Backplanes

1. Remove all of cables connected to the backplane.
2. Loosen the securing screws on the backplane.
3. Lift the backplanes up from the chassis. Hold the backplanes only by the edges.

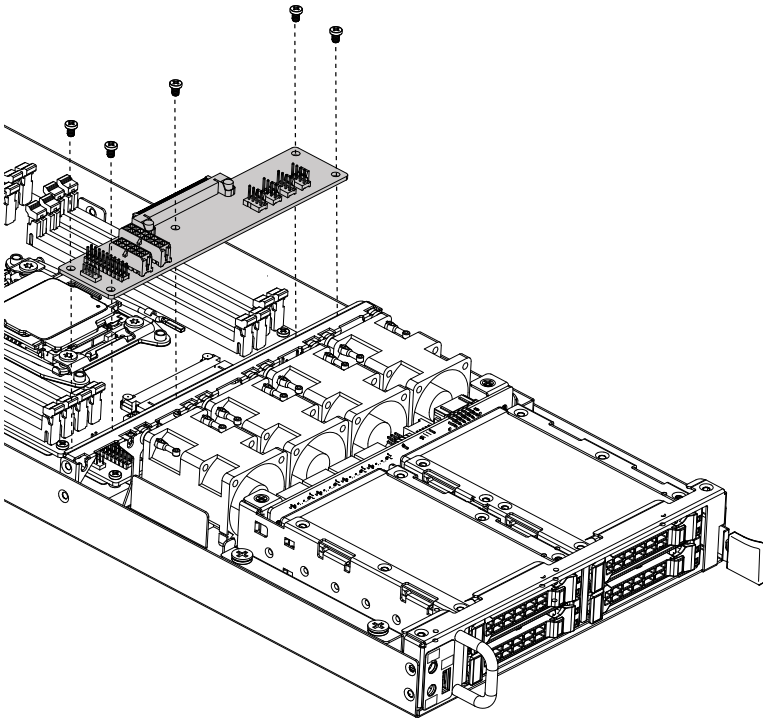


3.9 Interposer Board

Each node supports one node interposer board.

Removing the Interposer Board

1. Remove all of cables connected to the interposer board.
2. Loosen the securing screws on the interposer board.
3. Lift the interposer board up from the chassis. Hold the interposer board only by the edges.

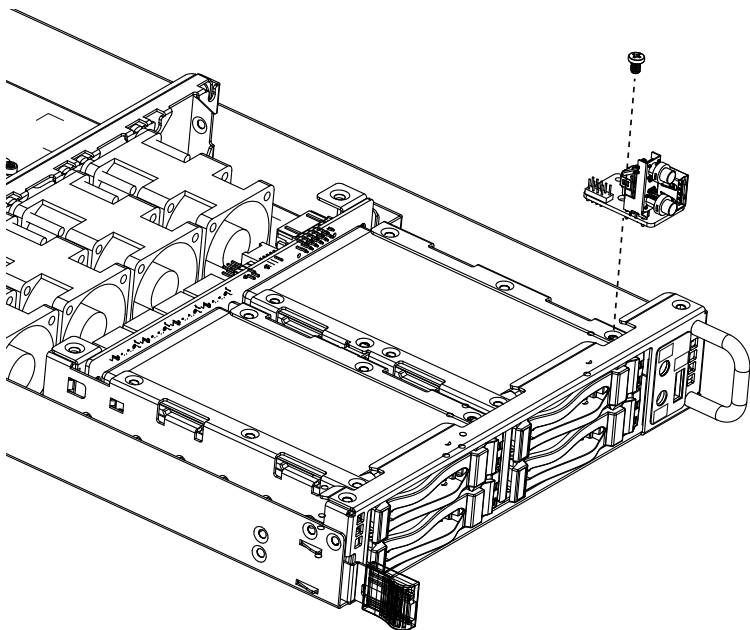


3.10 Front Panel Board

Each node system supports one front panel board.

Removing the Front Panel Board

1. Remove all of cables connected to the front panel board.
2. Loosen the securing screws on the front panel board.
3. Lift the front panel board up from the chassis. Hold the front panel board only by the edges.

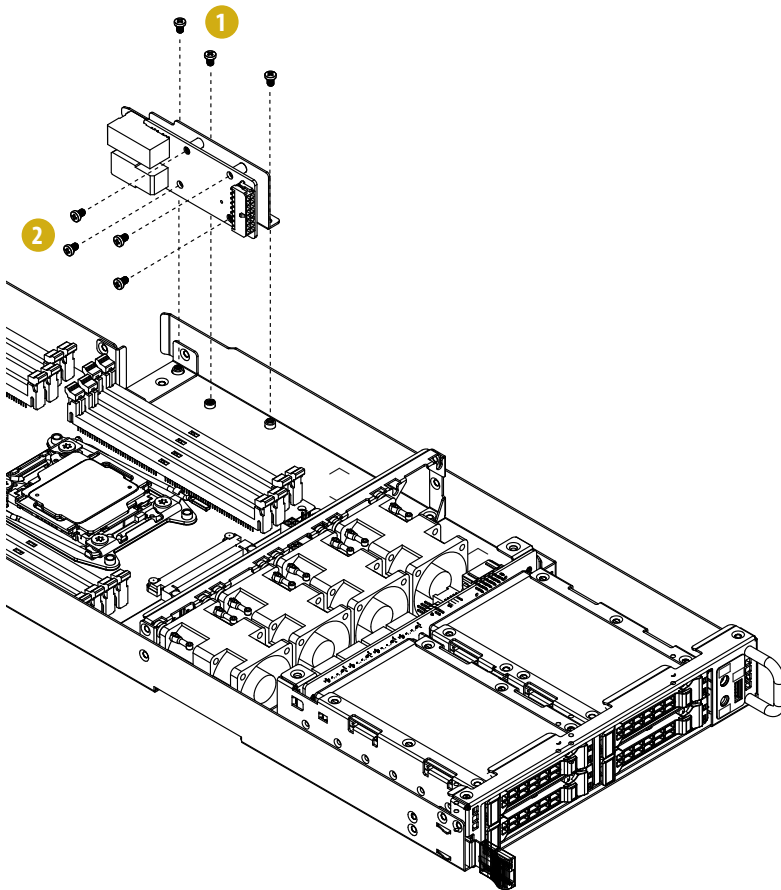


3.11 Interposer Board (Power Supply Unit)

Each node supports one PSU interposer board.

Removing the PSU Interposer Board

1. Remove all of cables connected to the PSU interposer board. --Loosen the securing screws on the PSU interposer board.
2. Lift the PSU interposer board up from the chassis. Hold the PSU interposer board only by the edges.

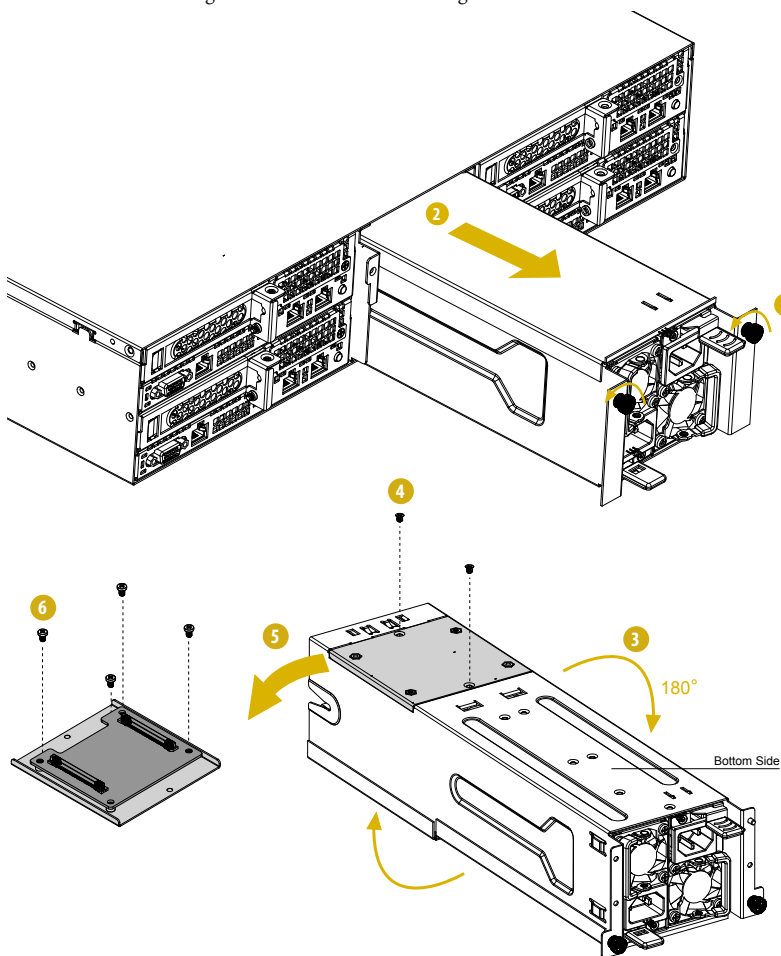


3.12 Chassis Management Board (Power Supply Unit)

Each barebone system supports one chassis management board.

Removing the Chassis Management Board

1. Release the screws on the power supply bay.
2. Pull the power supply bay out of the chassis.
3. Turn the power supply bay 180 degrees around with its bottom side up.
4. Loosen the securing screws on the chassis management board assembly.
5. Lift the chassis management board assembly up from the power supply bay.
6. Loosen the securing screws on the chassis management board.

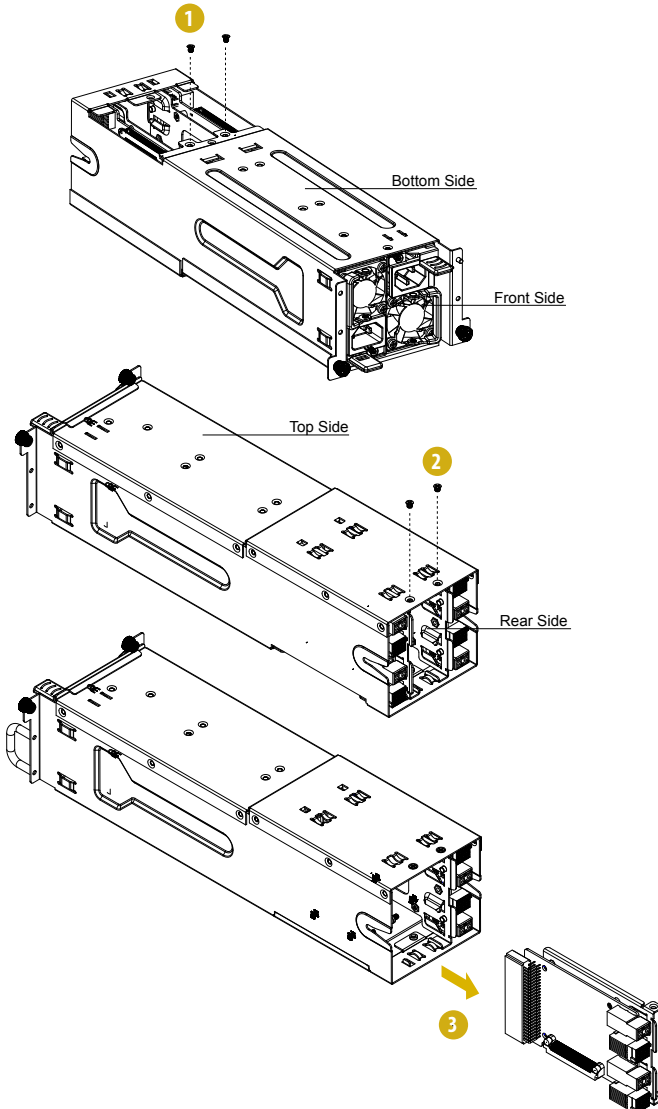


3.13 Power Distribution Board

Each barebone system supports two power distribution boards.

Removing the Power Distribution Board

1. Remove the screws on the BOTTOM side of the power supply bay.
2. Remove the screws on the TOP side of the power supply bay.
3. Carefully pull the power distribution board out of the bay from the rear side.



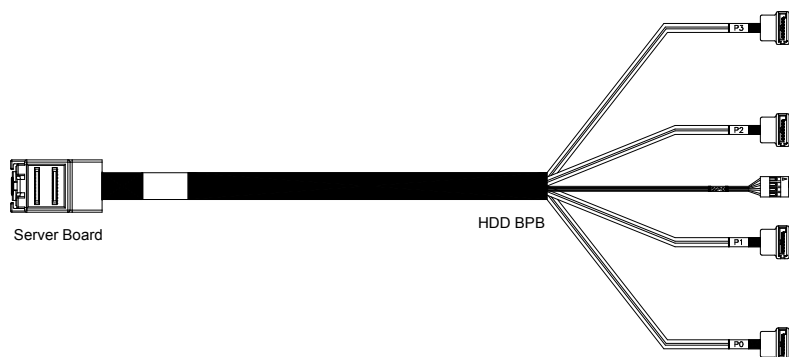
Chapter 4 Chassis Cables

This section lists supported cables for your chassis system.

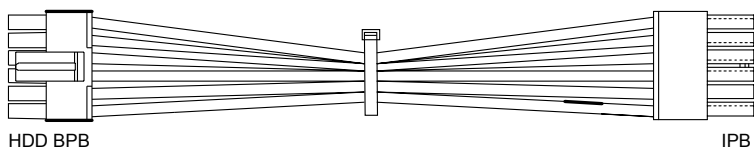


Cable type and quantity vary depending on the server board that comes with your system.

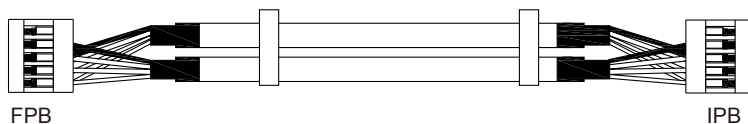
1. MiniSAS HD Cable (L, L=760mm, Quantity: 2) (R, L=630mm, Quantity: 2)



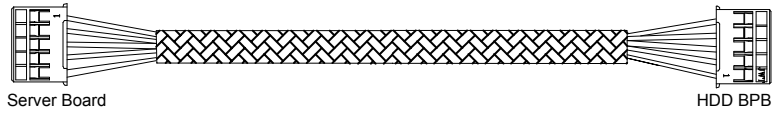
2. HDD Power Cable (2*6PIN) (L, L=230mm, Quantity: 2) (R, L=350mm, Quantity: 2)



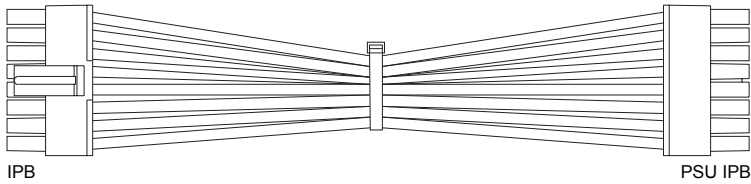
3. Front Panel USB Cable (2*5PIN, L=270mm) (Quantity: 4)



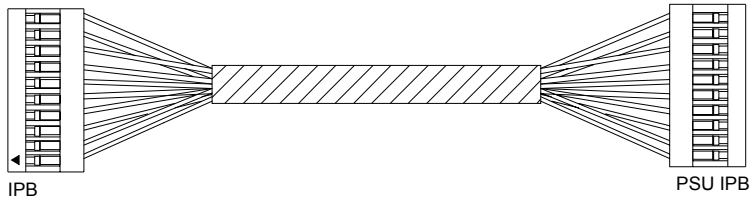
4. SMB Cable (1*5PIN) (L, L=670mm, Quantity: 2) (R, L=890mm, Quantity: 2)



5. Power Cable (2*8PIN, L=150mm) (Quantity: 4)

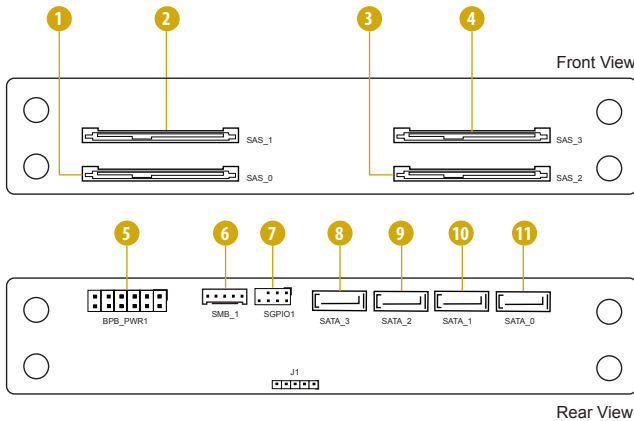


6. Power Cable (CM) (2*10PIN, L=190mm) (Quantity: 4)



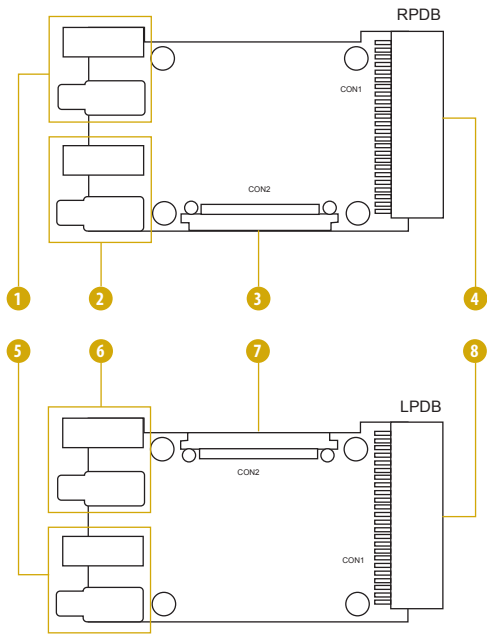
Chapter 5 Board Specifications

5.1 Hard Drive Backplanes (BPB)



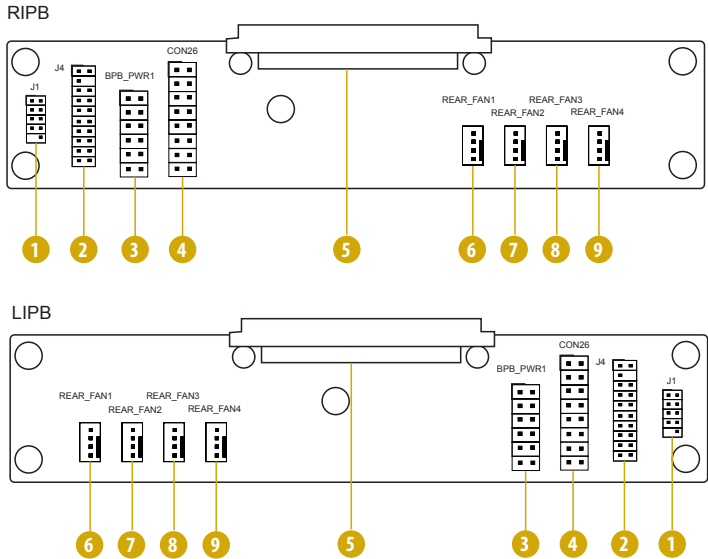
No.	Description
1	SAS Hot-swap Connector 0 (SAS_0) (for HDD0)
2	SAS Hot-swap Connector 1 (SAS_1) (for HDD1)
3	SAS Hot-swap Connector 2 (SAS_2) (for HDD2)
4	SAS Hot-swap Connector 3 (SAS_3) (for HDD3)
5	HDD Backplane Power Connector (BPB_PWR1)
6	BMC SMBus Connector (SMB_1)
7	SGPIO Code Programming Pin (SGPIO1)
8	SATA3 Connector (SATA_3)
9	SATA3 Connector (SATA_2)
10	SATA3 Connector (SATA_1)
11	SATA3 Connector (SATA_0)

5.2 Right / Left Power Distribution Board (RPDB / LPDB)



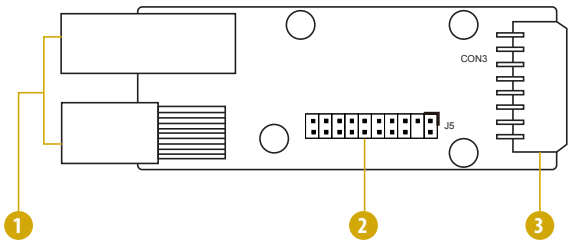
No.	Description
1	Connectors to PSU IPB (Node 4)
2	Connectors to PSU IPB (Node 3)
3	Connector to CM Board
4	Connector to PSU
5	Connectors to PSU IPB (Node 2)
6	Connectors to PSU IPB (Node 1)
7	Connector to CM Board
8	Connector to PSU

5.3 Right / Left Interposer Board (RIPB/LIPB)



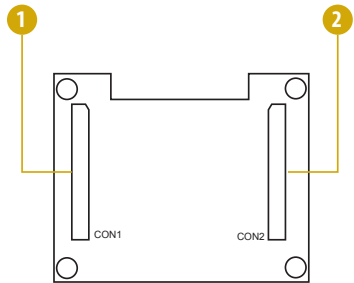
No. Description	
1	USB 2.0 Header to FPB (J1)
2	Power Header to PSU IPB (J4)
3	HDD Backplane Power Connector (BPB_PWR1)
4	ATX 16 Power Connector to PSU IPB (CON26)
5	Connector to Server Board
6	Node Fan Connector 1 (REAR_FAN1)
7	Node Fan Connector 2 (REAR_FAN2)
8	Node Fan Connector 3 (REAR_FAN3)
9	Node Fan Connector 4 (REAR_FAN4)

5.4 Power Supply Unit Interposer Board (PSU-IPB)



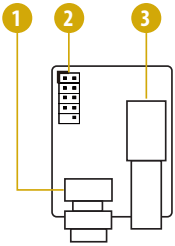
No.	Description
1	Connectors to LPDB or RPDB
2	Power Header to IPB (J5)
3	ATX 16 Power Connector to IPB (CON3)

5.5 Chassis Management Board (CM)



No.	Description
1	Connector to RPDB
2	Connector to LPDB

5.6 Front Panel Board (FPB)



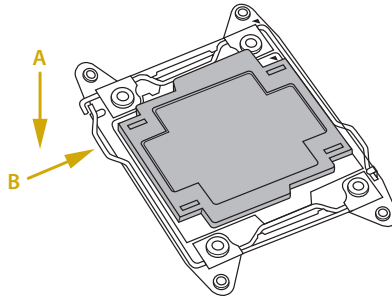
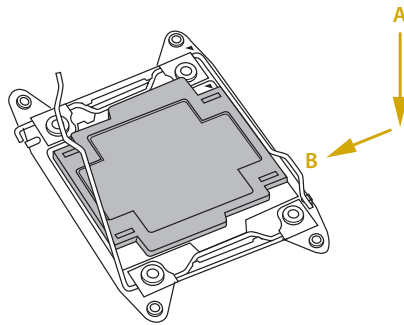
No.	Description
1	Reset and Power Buttons
2	USB 2.0 Header to IPB
3	USB 2.0 Port

Appendix A

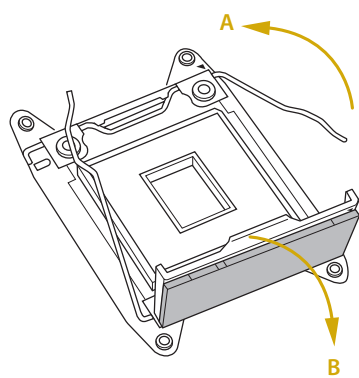
Installing the CPU (Socket: LGA2011 R3)



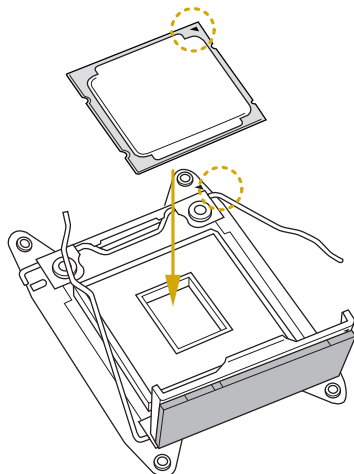
1. Before you insert the 2011-3-Pin CPU into the socket, please check if the PnP cap is on the socket, if the CPU surface is unclean, or if there are any bent pins in the socket. Do not force to insert the CPU into the socket if above situation is found. Otherwise, the CPU will be seriously damaged.
2. Unplug all power cables before installing the CPU.

1**2**

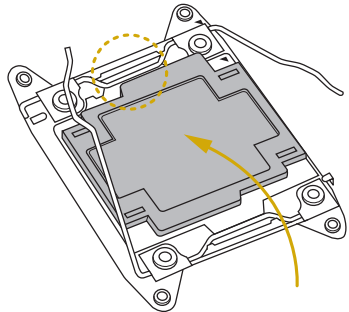
3



4



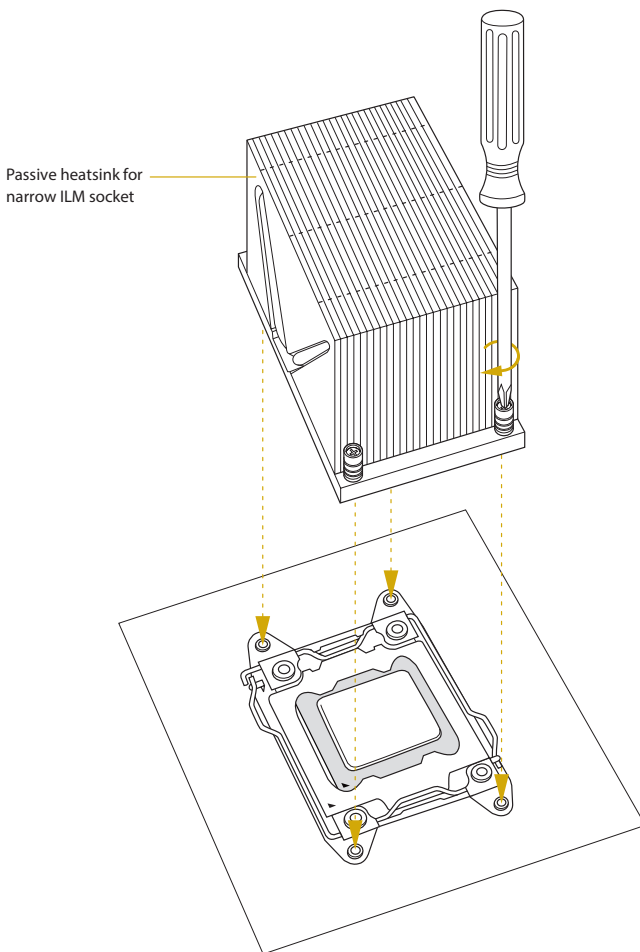
5



Installing the CPU Fan and Heatsink



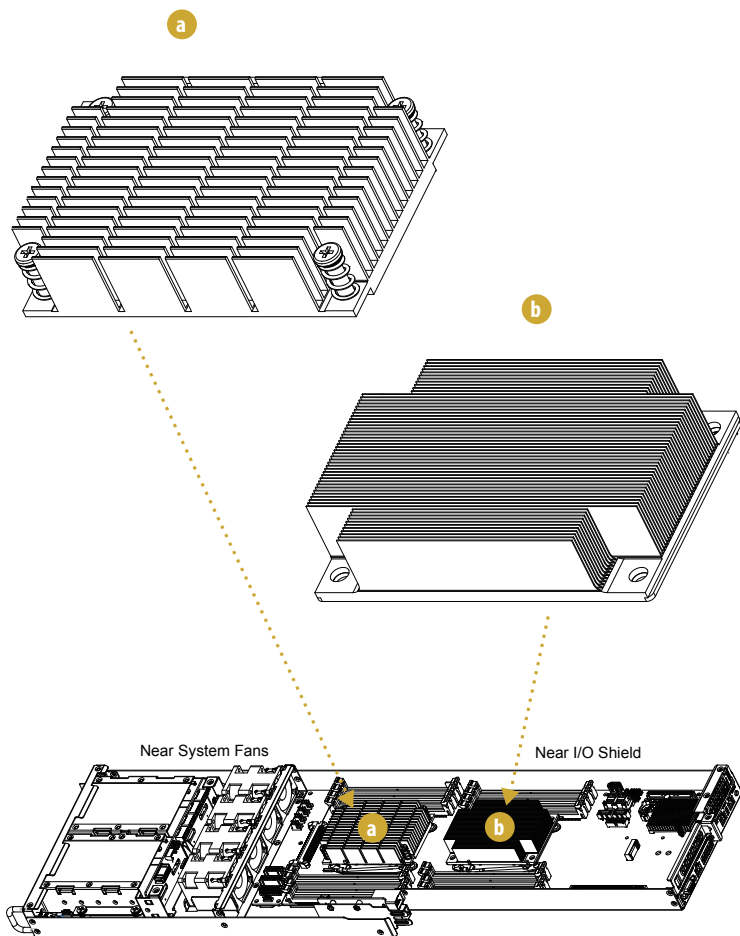
Before you installed the heatsink, you need to spray thermal interface material between the CPU and the heatsink to improve heat dissipation.



Two types of heatsink, Type (a) and Type (b), are provided with the system. Please refer to the instructions and picture shown below for where to install them respectively.

- Type (a), the Aluminum Extruded Heat Sink, with larger gaps between fins, allows more air flow to pass through. Please install the Type (a) heatsink to the CPU socket near the system fans.
- Type (b), the Copper Skived Fin Heat Sink, with higher fin density, can dissipate more heat in a limited area. Please install the Type (b) heatsink to the CPU socket near the I/O shield.

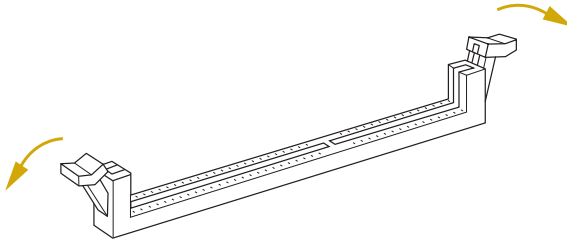
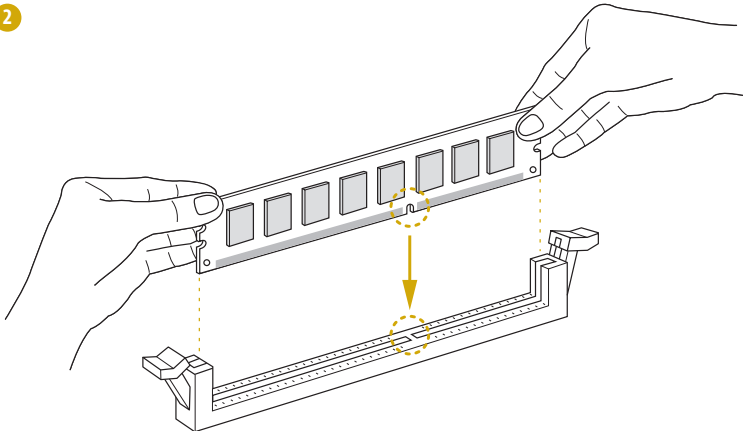
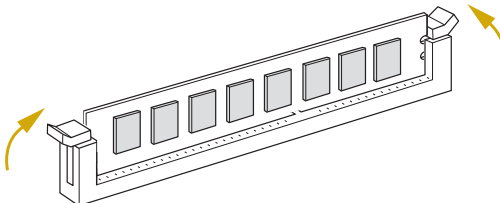
Heatsink Type



Installation of Memory Modules (DIMM)



The DIMM only fits in one correct orientation. It will cause permanent damage to the motherboard and the DIMM if you force the DIMM into the slot at incorrect orientation. For more information about DIMM installation, please refer to the User Manual that comes with the serverboard you use.

1**2****3**

Appendix B

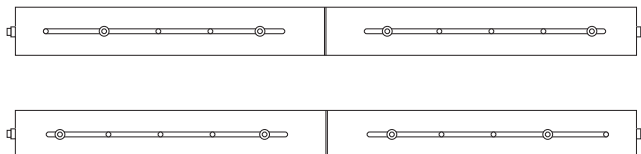
Installing the Server in a Rack

This section describes how to rackmount the server with slide rail assembly.



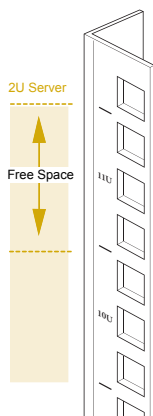
1. The rails installation instructions in this manual are example only, your actual rail assembly procedure may differ slightly .
2. Please purchase the rail assembly seperately if needed.

The slide rail assembly consists of two slide rails.

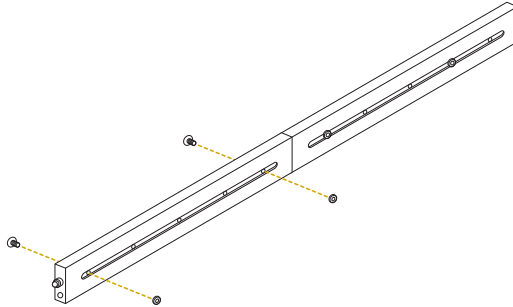


Attaching the Slide Rail Assemblies to the Rack

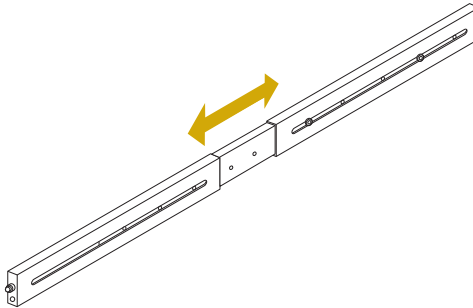
1. Determine where to attach the slide rails. Make sure you have enough free space above the slide rail bracket for the chassis.



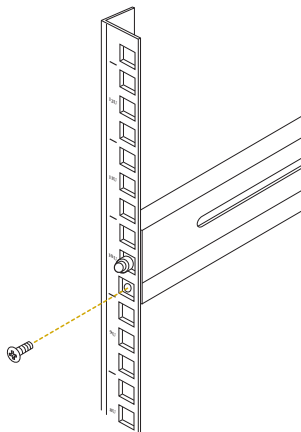
2. Remove the screws to on the bracket. Keep the screws for later use.



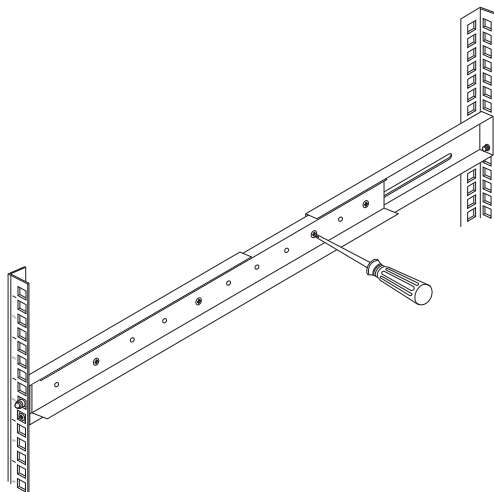
3. Extend the pre-attached front and rear adjustable brackets on the slide.
4. Adjust the brackets to accommodate the depth of the rack.



5. Align the holes on the brackets with the mounting holes you selected on the rack.
6. Tighten the screw to secure the slide rails to the rack.



7. Make sure the rear bracket meets the rear vertical rail of the rack. Use the screws you previously keep to secure the rear bracket.

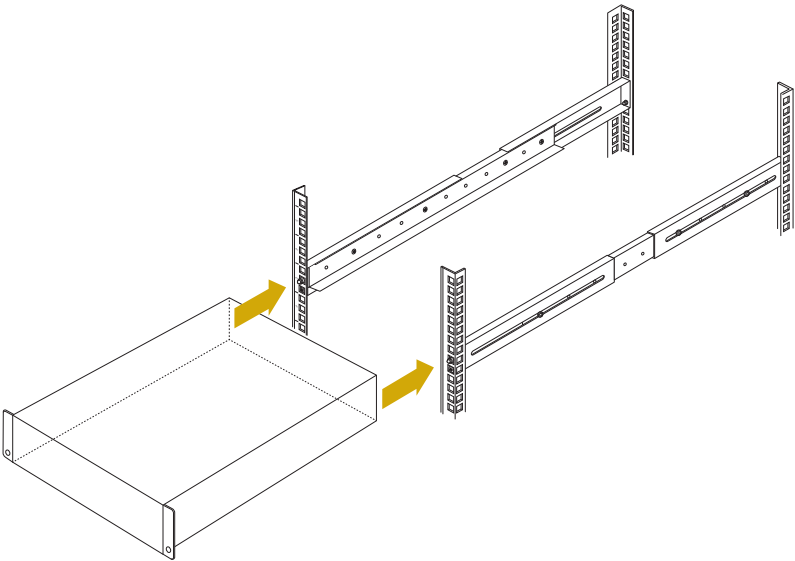


Sliding the Server into the Rack

- 1. Ensure that the slide rails are properly and securely attached to the rack.
- 2. Slide the server slowly and evenly all the way into the cabinet to ensure that the slide assemblies are working correctly.



The server is heavy. For safe lifting, two or more persons are required to install the server into the rack.



- 3. To remove the server from the rack, reverse these instructions.



When connecting cables to the server, make sure there is enough cable slack so you can slide the server in and out of the rack without accidentally unplugging a cable.

Optional Accessory

Please purchase the following optional accessory seperately if needed.

Rail Assembly Kit	
Vendor	Model Name
ASROCK RACK	2U4N-F Fixed Rail