ASRock Rack

OPEN
Industry Standard, Flexible Architecture

GREEN
Less Heat, Less Power Consumption

STABLE
Robust Design, Quality Parts

Stable and
Reliable Solution

# Barebone

# 1U2FH-4L

User Manual

Version 1.0
Published November 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"

**ASRockRack's Website: www.ASRockRack.com**

## 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.

## Contact Information

If you need to contact ASRockRack or want to know more about ASRockRack, you're welcome to visit ASRockRack's website at www.ASRockRack.com; or you may contact your dealer for further information.

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# Chapter 1 Introduction

Thank you for purchasing 1U2FH-4L, a reliable barebone system produced under ASRockRack's consistently stringent quality control. It delivers excellent performance with robust design conforming to ASRockRack's commitment to quality and endurance.

1. *Because the hardware specifications might be updated, the content of this documentation will be subject to change without notice. In case any modifications of this documentation occur, the updated version will be available on ASRockRack's website without further notice. If you require technical support related to this product, please visit our website for specific information about the model you are using.*
   *ASRockRack's Website: www.ASRockRack.com*
2. *The illustrations shown in this manual are examples only, the actual system may differ slightly .*

## 1.1 Shipping Box Contents

| Item | Quantity |
|---|---|
| 1U2FH-4L Barebone (1U form factor) | 1 |
| System Boards (MB) | 1 |
| Power Supply Units | 2 |
| System Fans | 5 |
| HDD Backplane (BPB) | 1 |
| Front Panel Board (FPB) | 1 |
| Power Distribution Boards (PDB) | 1 |
| Power Cable, ATX 8Pin, PDB to MB, 200mm | 1 |
| Power Cable, ATX 8Pin, PDB to MB, 700mm | 1 |
| Power Cable, ATX 24Pin, PDB to MB, 450mm | 1 |
| Power Cable, ATX 12Pin to 3*4Pin, PDB to BPB, 250/300/350mm | 1 |
| PMBus Cable, 1*5Pin, PDB to MB, 500mm | 1 |
| SMBus Cable, 1*5Pin, PDB to MB, 650mm | 1 |
| Front Panel Cable, 2*10Pin to 2*10Pin+1*5Pin, FPB to MB, 840+800mm | 1 |
| USB 2.0 Cable, FPB to MB, 2*5PIN, 850mm | 1 |
| VGA Cable, 2*8Pin, 850mm | 1 |
| BPB Cable, MiniSAS HD to 8087(L/A), 650mm | 1 |
| 2.5" HDD Cable, SATA 7+15 to 7Pin+1*4Pin, 800&120mm | 2 |
| Accessory Box | 1 |
| Support CD | 1 |
| User Manual | 1 |
| Quick Installation Guide | 1 |

*Note: Type and quantity of the cables vary depending on the server board that comes with your system.*

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

English

## 1.2 Specifications

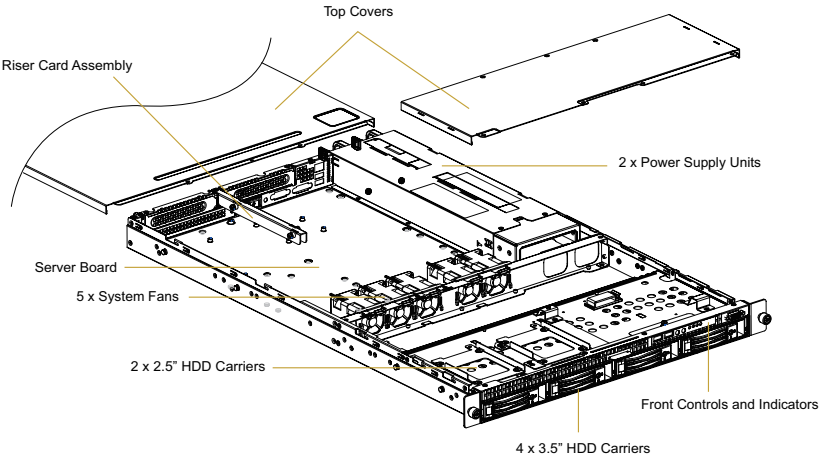
| 1U2FH-4L | |
|---|---|
| System | |
| Form Factor | 1U Rackmount |
| Chassis Model | 1U2FH-4L |
| Dimensions | 28" x 16.9" x 17" (710 mm X 430 mm X 43.5 mm) |
| Support MB | EEB, 12"x13" |
| Front Panel | |
| Buttons | • Power Button<br>• UID Button |
| LEDs | • POWER LED<br>• UID LED<br>• LAN LED<br>• HDD LED |
| I/O Ports | • 2 x USB 2.0 ports<br>• VGA port |
| External Drive Bay | |
| Front Side Drive Bay | 4 Bay 3.5" SATA HDD (6Gb/s) |
| Front Side Backplane | Backplane with 4 SATA ports |
| Internal Side Drive Bay | 2 Bay 2.5" SATA HDD |
| Power Supply | |
| Type | 1U, Redundant |
| Output Watts | 650W Platinum |
| System Fan | |
| Fan | 4056 mm Fan x5 |
| Riser Card Support | |
| Riser card Type | 2 x Symmetry Riser card(x8/x8) support 2 x Full High PCIE card |
| Other | |
| Support MB | FH-C612NM (SSI EEB, 12" x 13")<br>**Supports up to 120W CPU only; for higher Watt CPU support, please contact our sales representatives.* |

**Please be noted that the functions are supported depending on the type of the server board.*

# Chapter 2 Server System Overview

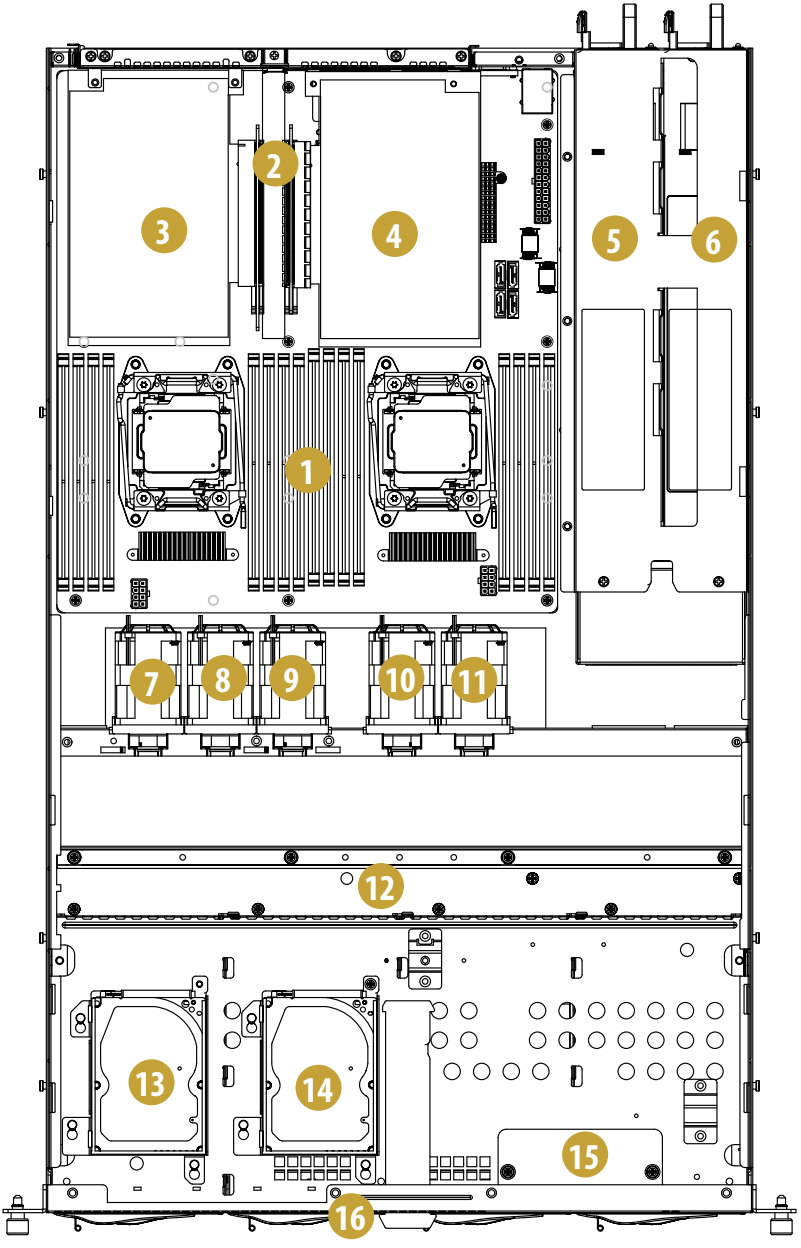
This chapter provides diagrams showing the location of important components of the server system.

## 2.1 System Components




English

## 2.2 Internal Features



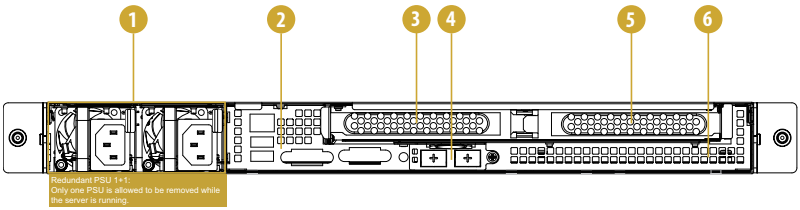
| No. | Item |
|---|---|
| 1 | Server Board (SB) |
| 2 | Riser Card Assembly |
| 3 | PCIE Add-in Card 1 (on the riser card assembly)* or<br>Storage Mezzanine Card (on the server board) |
| 4 | PCIE Add-in Card 2 (on the riser card assembly)* or<br>LAN Mezzanine Card (on the server board)** |
| 5 | Power Supply Unit (PSU2) |
| 6 | Power Supply Unit (PSU1) |
| 7 | System Fan (FAN1) |
| 8 | System Fan (FAN2) |
| 9 | System Fan (FAN3) |
| 10 | System Fan (FAN4) |
| 11 | System Fan (FAN5) |
| 12 | HDD Backplane Board (BPB) |
| 13 | 2.5” HDD Carrier (HDD0)*** |
| 14 | 2.5” HDD Carrier (HDD1)*** |
| 15 | Front Panel Board (FPB) |
| 16 | 4 x 3.5" Hot-Swap HDD Trays (HDD0~HDD3) |

**Supports Low profile and FHHL (Full High Half Length) PCIe cards*
***Supports 1GbE x 2, 10GbE x2 or SFP+ (Fiber) mezzaine cards (M350R/M540R/M599R/M599RS)*
****Supports 7mm 2.5-inch HDD only*

## 2.3 System Front Panel

| No. | Description |
|---|---|
| 1 | 4 x 3.5" Hot-Swap HDD Trays (HDD0~HDD3) |
| 2 | 2 x USB 2.0 Ports |
| 3 | Control Panel Buttons and LEDs |
| 4 | VGA Port |

## 2.4 System Rear Panel

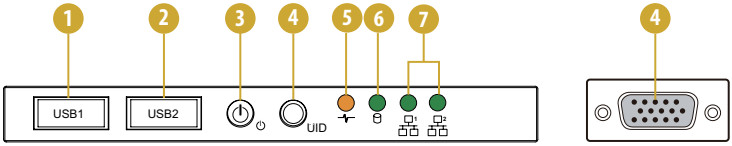



| No. | Description |
|---|---|
| 1 | 2 x Power Supply Units (Redundant PSU 1+1)<br>**Server requires 1 working PSU, with 1 redundant PSU. You must have at least one active supply, installed, functioning and connected to AC. Only one of the PSUs is allowed to be removed while the server is running.*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

**The locations of I/O shield and rear vent may vary depending on the system and server board models.*

## 2.5 Front Control Panel Buttons and LEDs

### Front Control Panel




| No. | Description |
|---|---|
| 1 | USB 2.0 Port (USB1) |
| 2 | USB 2.0 Port (USB2) |
| 3 | Power Button and LED |
| 4 | UID Button and LED* |
| 5 | System Health LED* |
| 6 | HDD Activity LED* |
| 7 | LAN1, LAN2 Activity LED* |

**Please be noted that the functions are supported depending on the type of the motherboard.*

### UID Button

Press the UID button to toggle the front panel UID LED and the baseboard 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 standby/sleep modes. To remove all power from the system completely, disconnect the power cord from the server.

### Status LED Definitions

| Power LED | |
|---|---|
| **Status** | **Description** |
| Green | Power on |
| Off | Power off |

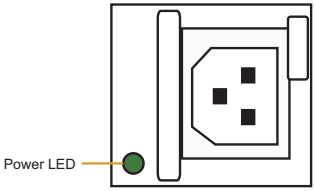
| UID LED | |
|---|---|
| **Status** | **Description** |
| Blue | System identification is active. |
| Off | System identification is disabled. |

| System Health LED | |
|---|---|
| **Status** | **Description** |
| Solid Red | There is a fault in the system. |
| Off | System is normally operating. |

| HDD Activity LED | |
|---|---|
| **Status** | **Description** |
| Blinking Green | At lease one of the HDDs is accessing data. |
| Solid Green | At lease one of the HDDs is connected. |
| Solid Red | At lease one of the HDDs fails. |
| Off | No HDD is present. |

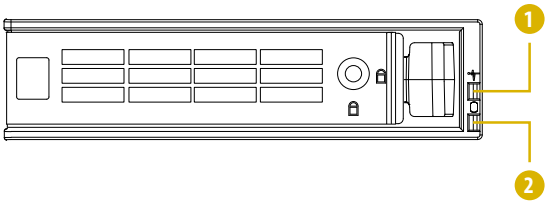
| LAN1, LAN2 LED | |
|---|---|
| **Status** | **Description** |
| Blinking Green | Network access |
| Solid Green | MEZZ LAN1/LAN2 is present. |
| Off | No MEZZ LAN1/LAN2 is present. |

## 2.6 PSU LED




| PSU Status LED | |
|---|---|
| **Status** | **Description** |
| Green | Normal work; output ON and OK |
| Amber | Module fault/protection in operating mode<br>(failure, OCP, OVP, Fan Fail, OTP, UVP)<br>AC cord unplugged |

## 2.7 3.5-inch Hard 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 standby-power (sleep) 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. The Power button lets the server toggle between Power On and Standby (Sleep) modes. Some internal circuitry remain active in the Standby mode. 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.

## Installing Procedures

The followings are prerequisite to be installed.

- 3.5" or 2.5" HDD(s)
- Power Supplies (Pre-installed)
- Server Board (Pre-installed)
- Front Panel Board (Pre-installed)
- HDD Backplane (Pre-installed)
- Fans (Pre-installed)

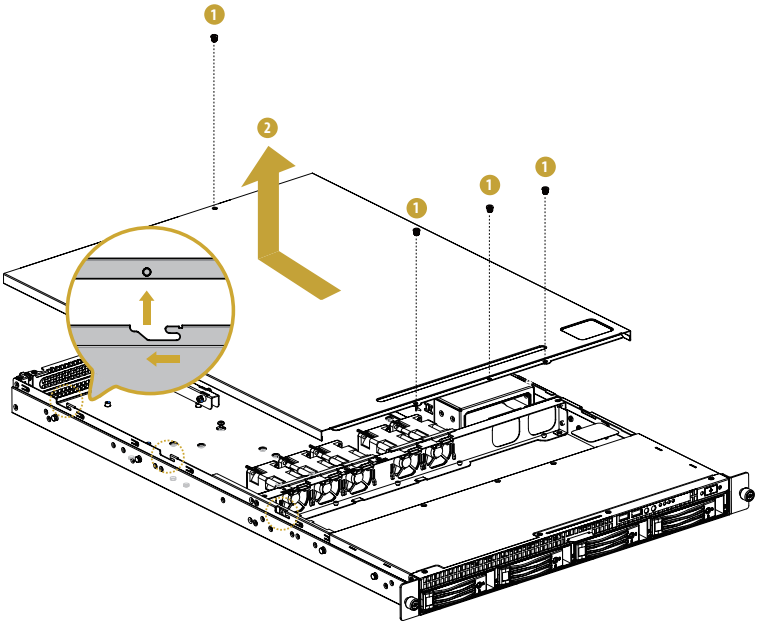
An add-in card is optional to be installed when you have a riser board installed on your server board.

> 1. *Some components are already pre-installed. Simply properly connect the relavant 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 Server Top Cover

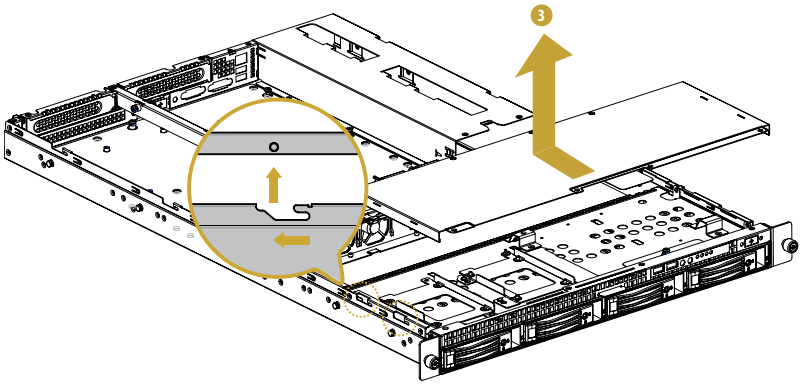
### Removing the Server Top Covers

*1. Before removing the top cover, power off the server and unplug the power cord.*
*2. The system must be operated with the chassis top cover installed to ensure proper cooling.*



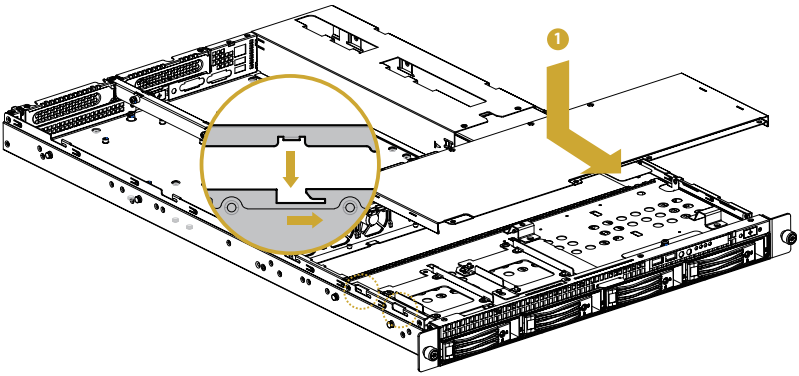

1. Remove the screws that secure the top rear cover to the chassis.
2. Push the top rear cover toward the rear of the chassis to remove the cover from the locked position. Lift up and remove the top rear cover.

3. When the top rear cover has been removed, you can also remove the top front cover by pushing the top front cover toward the rear side.

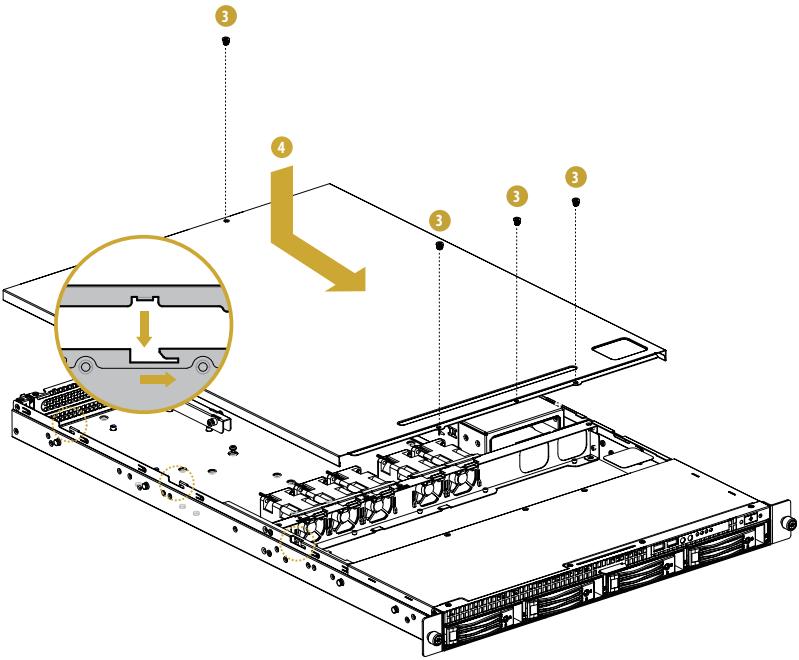


## Installing the Server Top Cover

1. Lower the top front cover on the chassis, making sure the side latches align with the cutouts. Slide the top front cover toward the front.




2. Lower the top rear cover on the chassis, making sure the side latches align with the cutouts. Slide the top rear cover toward the front.
3. Secure the both covers with the screws.



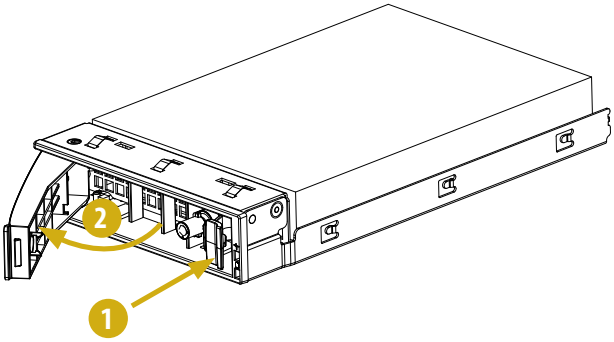
## 3.2 Hard Drive

### 3.2.1 Installing a Hard Disk Drive into 3.5" Hard Drive Tray

The system supports hot-swappable 3.5" hard drives.

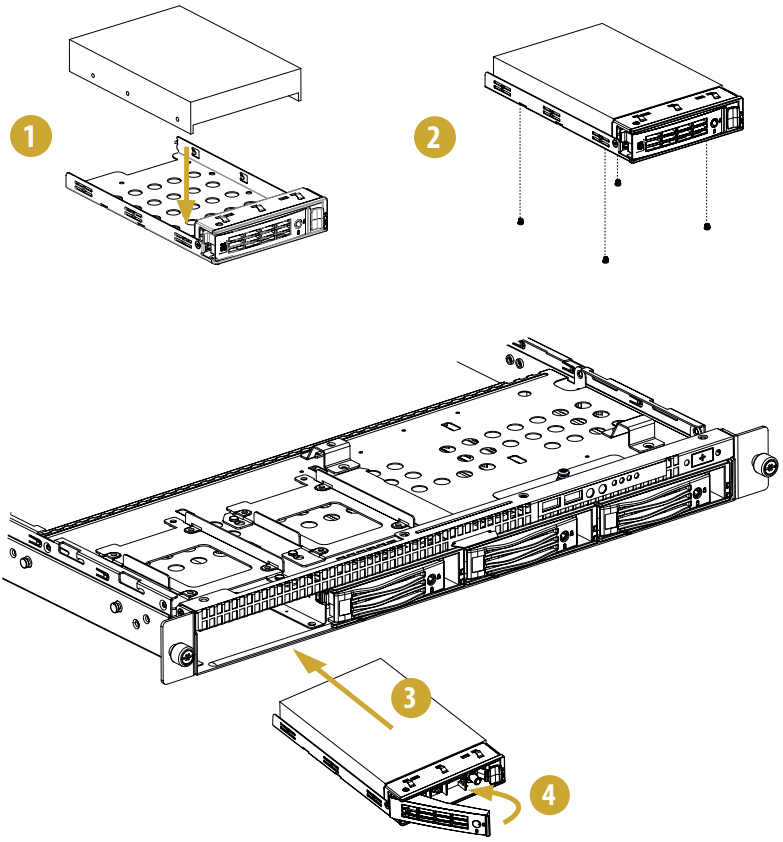
**Removing 3.5” Hard Drive Trays from the Chassis**

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 3.5” Hard Drive to the Hard Drive Tray

1. Place a 3.5" 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 four 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.

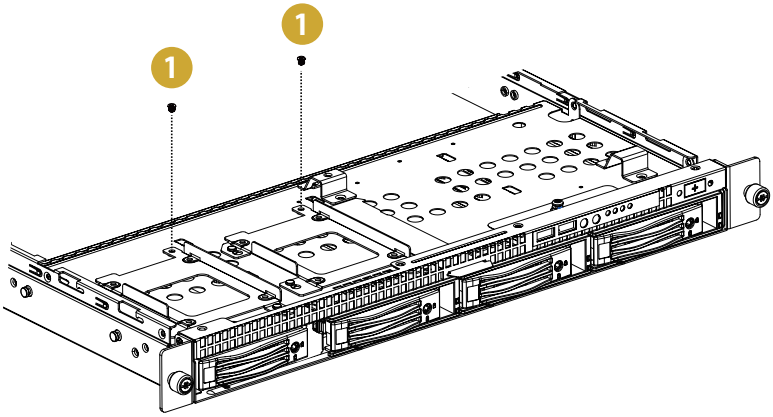


### 3.2.2 Installing a Hard Disk Drive into 2.5" Hard Drive Carrier

The system supports 2.5" hard drives (7mm).

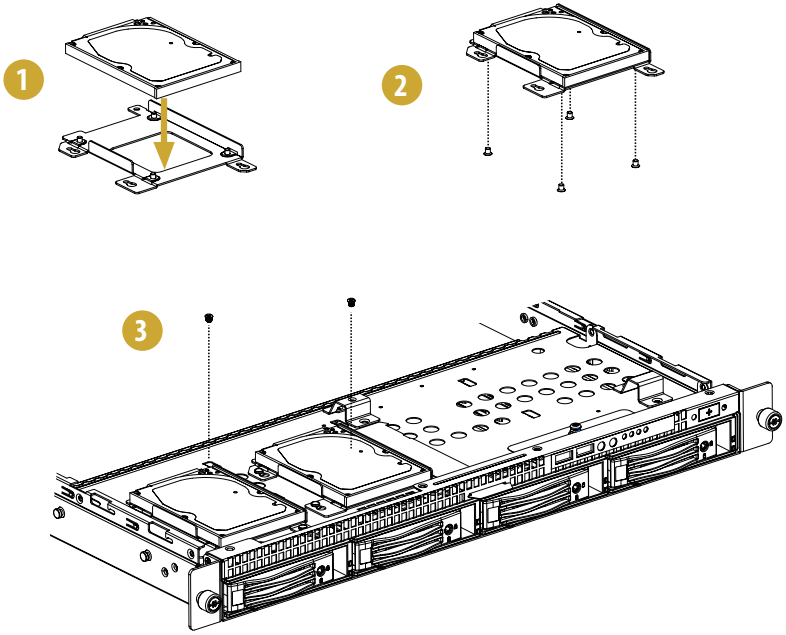
**Removing 2.5” Hard Drive Carriers from the Chassis**

1. Remove the screws that secures the hard drive carrier.



### Installing a 2.5” Hard Drive to the Hard Drive Carrier

1. Place the 2.5" HDD (7mm) into the carrier with the label facing up and the connector end toward the rear of the carrier where the mounting hole is located.
   Carefully align the mounting holes in the hard drive and the carrier.
2. Secure the hard drive using four screws.
3. Place the drive carrier back to the chassis with screw holes aligned.
   Secure each drive carrier with one screw.

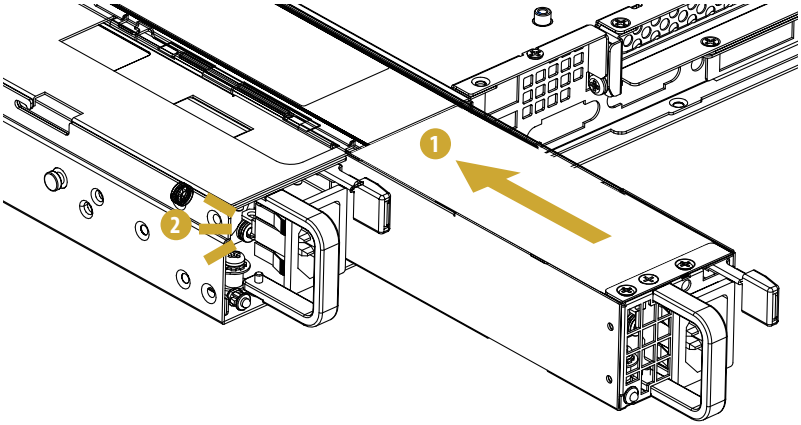


## 3.3 Power Supply

The system can accommodate two AC or two DC power supplies in the bay at the rear of the chassis. Each unit provides up to 650 Watts of power. Only a single power supply is required for operation, with the second power supply purely as a redundant, load-sharing backup. It can be removed without affecting system operation.

### Installing and Removing the Power Supply

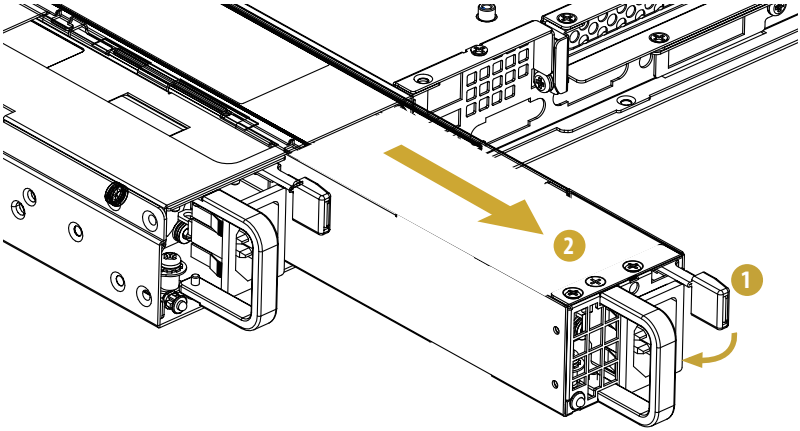
1. Align the power supply unit with the power supply slot. Ensure that the LED appears on the left when you are installing the power supply unit.
2. Carefully slide the PSU all the way into the power supply bay until it clicks into place.



### Removing the Power Supply Unit

To remove a failed power supply, please first identify the failed power supply .

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.



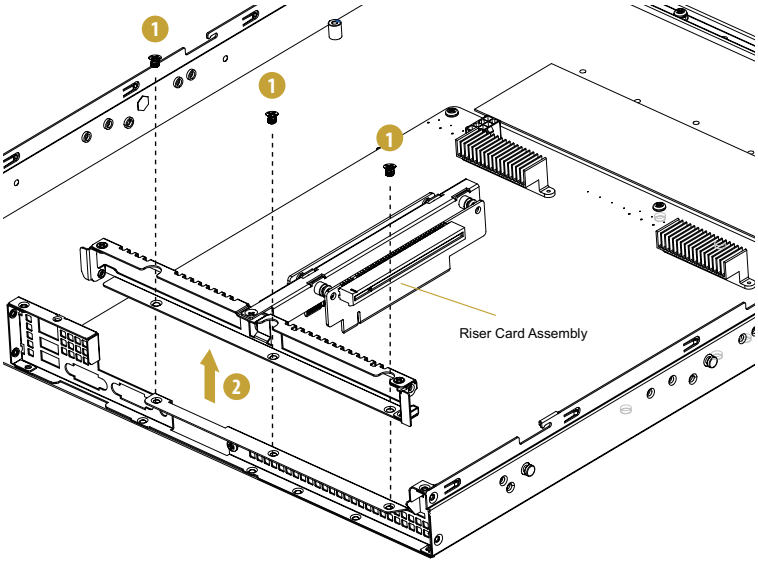

*1. Before replacing the power supply, power off the server, unplug the power cord, and disconnect all wiring from the power supply.*
*2. In a redundant system, you do not need to power down the server.*

## 3.4 Add-In Card

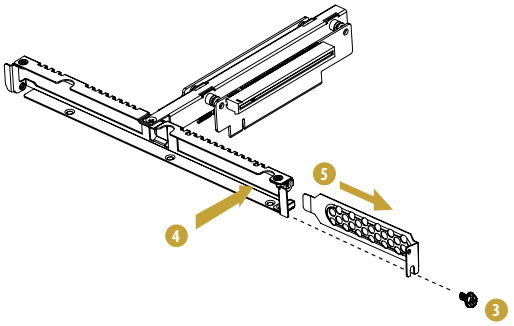
1. *You can install up to two PCIE add-in cards to the chassis when they are installed on the provided riser card assembly.*
2. *Please be noted that you can install either a PCIE add-in card or a mezzanine card at one time only. When Add-in Card 1 is installed, the storage mezzanine card cannot be installed; when Add-in Card 2 is installed, the LAN mezzanine card cannot be installed.*
3. *Before installing an add-on card, power off the server and unplug the power cord.*

### Installing an add-in card

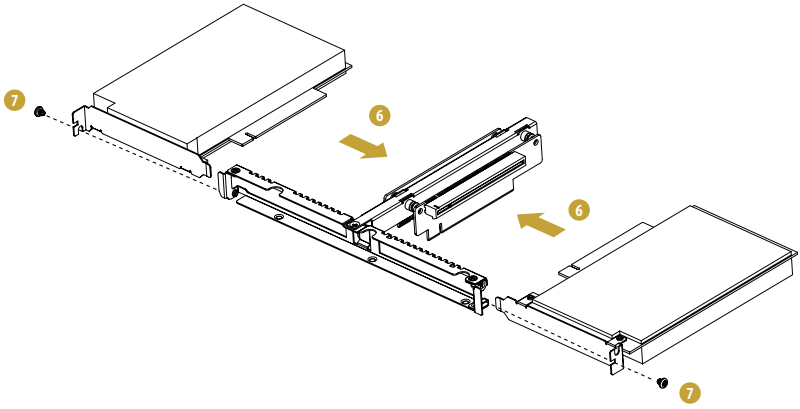
1. Remove the screws securing the riser card assembly on the chassis. Keep this screw for later use.
2. Lift up and remove the riser card assembly from the chassis.



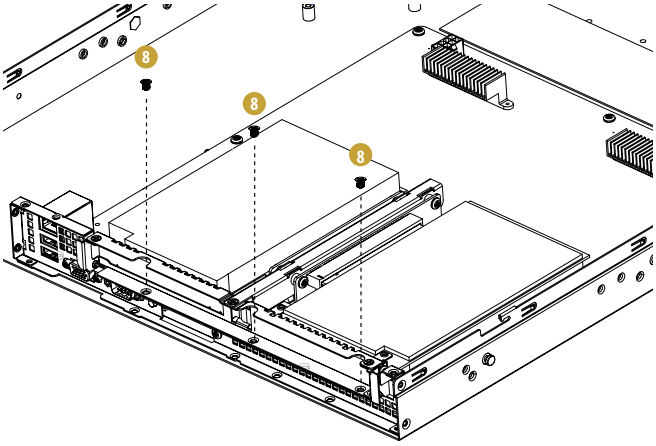
3. Remove the screw securing the filler plate.
4. Push to release the the filler plate from the assembly.
5. Slide the filler plate out sideways.




6. Install an add-in card into the retainer plate and into the connector on the riser card assembly.
7. Secure the card to the assembly with a screw.



8. Place the assembly back into the chassis and secure it with screws.

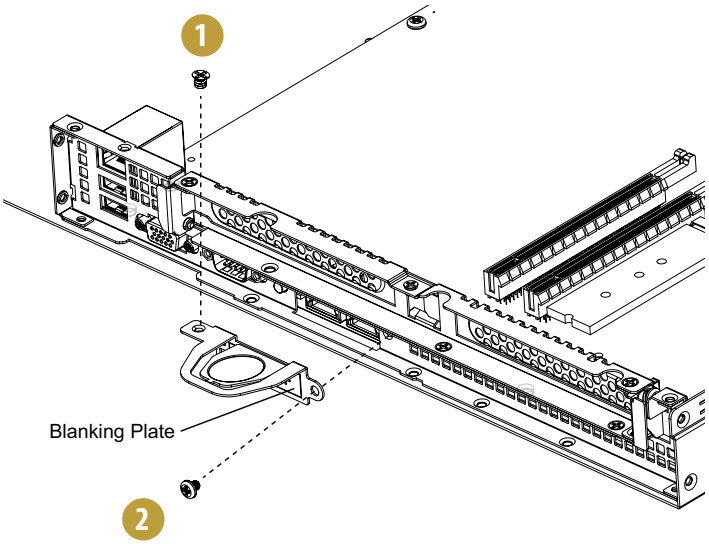


## 3.7 LAN Mezzanine Card

### Removing the Blanking Plate for a LAN Mezzanine Card

If you need to remove the blanking plate, please remove the screws that secure the blanking plate on the chassis. Keep the screws for later use.

**The pre-installed blanking plate is also the RJ-45 plug release module.*

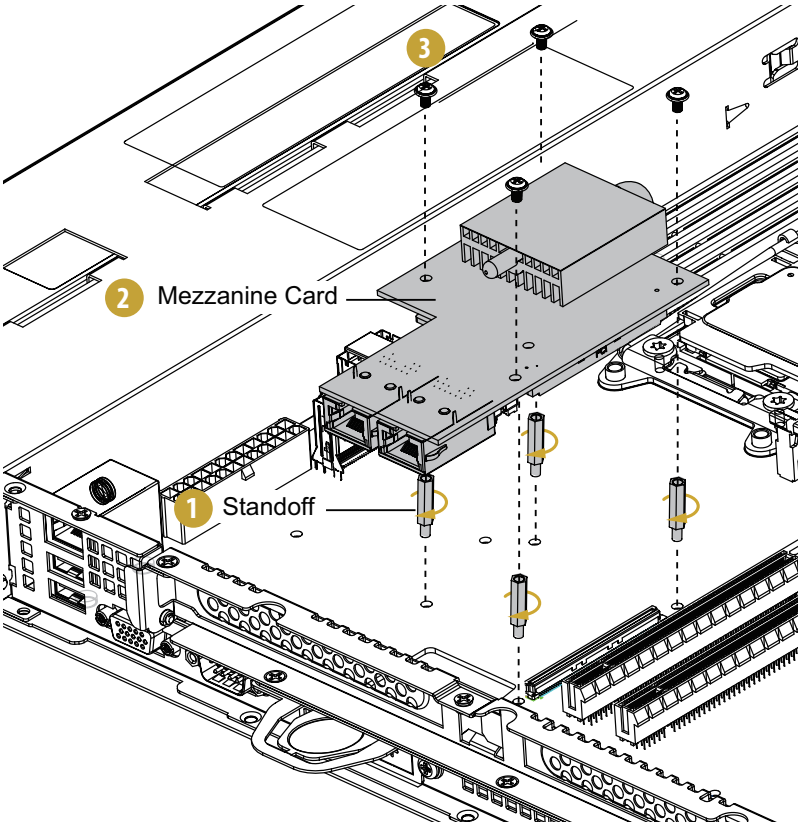


## Installing a LAN Mezzanine Card

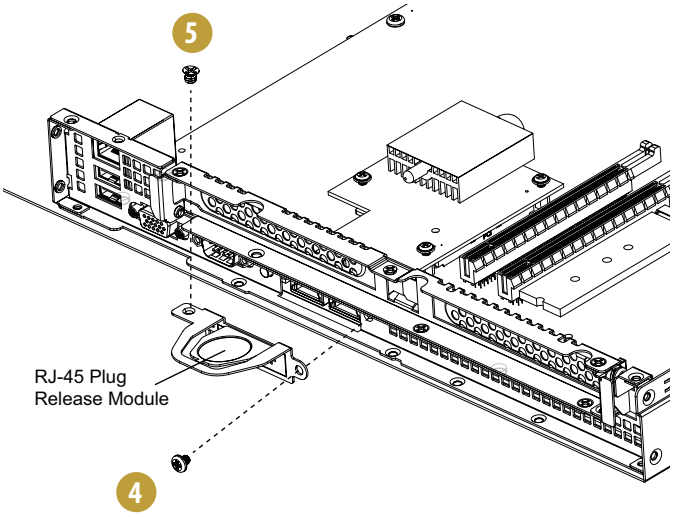
You can use an optional Ethernet mezzanine card for additional LAN ports. Please be aware that the mezzanine card must be used in conjunction with a matching I/O module.

**For M540R mezzanine card, you need to install the RJ-45 plug release module instead of a regular I/O module.*

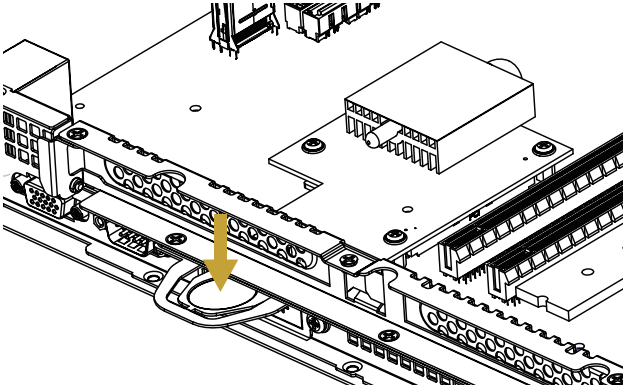
1. Install the four standoffs into the motherboard around the mezzanine card slot. Hand-tighten the standoffs.
2. Gently insert the mezzanine card into the mezzanine card slot on the motherboard.
3. Use screws to secure the mezzanine card to the motherboard standoffs.



4. Tighten the screws to secure the matching I/O module to the chassis. Install the RJ-45 plug release module instead for the M540 mezzanine card.



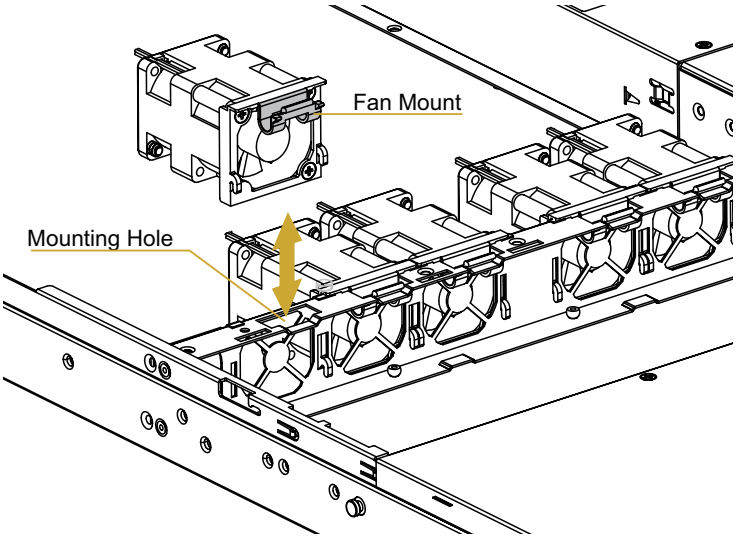

5. If you use the RJ-45 plug release module, simply press it to release plugs.



## 3.5 System Fan

### Replacing the System Fan

1. Unplug the fan connecter and remove the failed fan.
2. Align the mounting holes on the fan bar with the fan mounts on the replacement fan.
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 Backplane

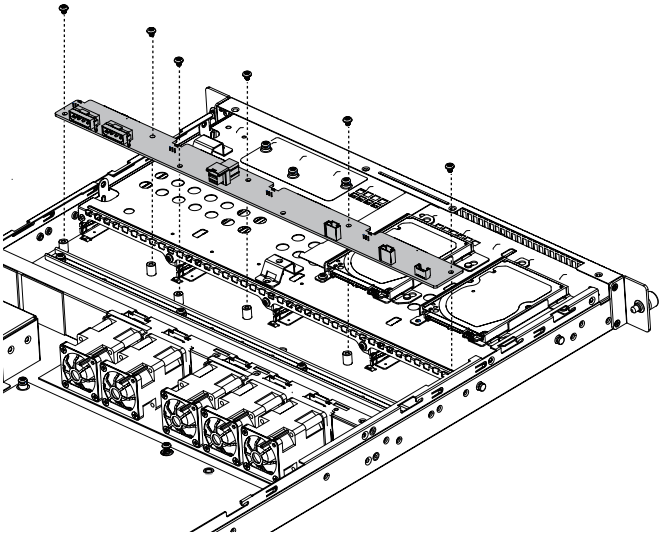
The backplanes serve as the interfaces between the server board and the HDDs.

*Before removing and installing the backplanes, power off the server and unplug the power cord and make sure all 3.5" HDDs have been removed.*

*For the specification of the backplane, please refer to the Chapter 4.*

### Removing the Backplane

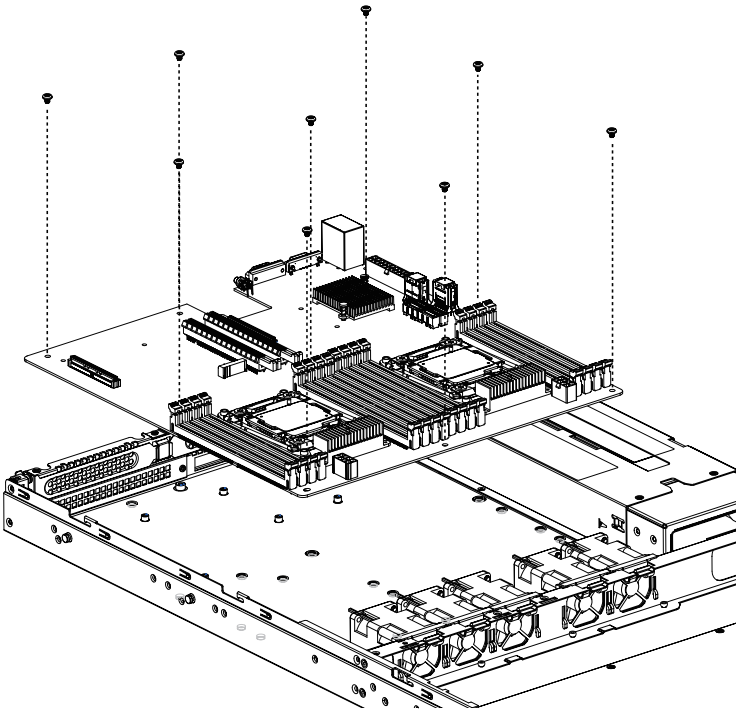
1. Remove all of cables connected to the backplane.
2. Loosen the securing screws on the backplane.
3. Lift the backplanes up from the chassis. Hold the backplane only by the edges.



## 3.7 Server Board

Follow the steps below to install the server board to the chassis.

1. Hold the server board only by the edges.
2. Gently place the server board into the chassis. Sit the server board on the server board tray.
3. Position the server board in the server system. Align mounting holes of the server board to the standoff on the chassis.
4. Affix the screws clockwise into the mounting holes in all of the corners of the server board.



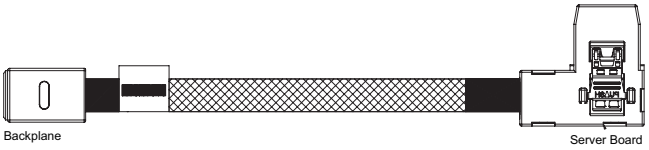
*1. Do not over-tighten the screws! Doing so may damage the server board.*
*2. Refer to the user manual of the server board you use for instructions on how to install and remove the server board components and how to use its setup utility.*

## 3.8 Chassis Cables

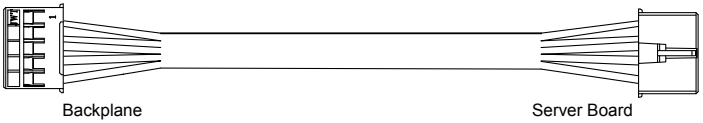
This section lists supported cables for your chassis system.

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

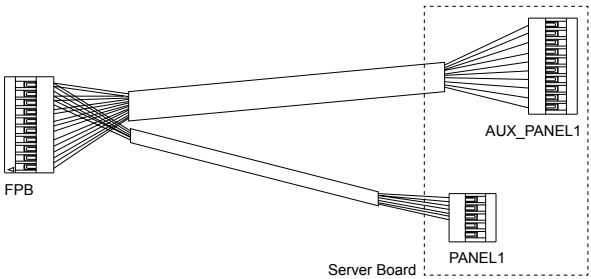
1. BPB Cable, MiniSAS HD to 8087(L/A) (650mm) (Quantity: 1)



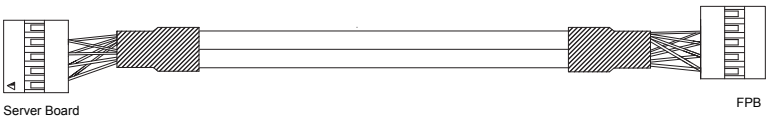

2. SMBus Cable, 1*5Pin, PDB to MB (650mm) (Quantity: 1)




3. Front Panel Cable (840+800mm) (Quantity: 1)*

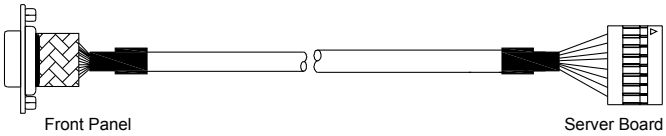



4. USB Cable (850mm) (Quantity: 5)

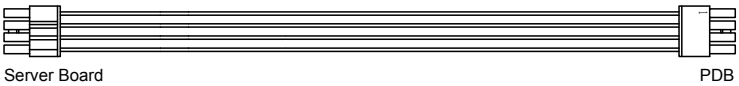



English

5. VGA Cable (850mm) (Quantity: 1)

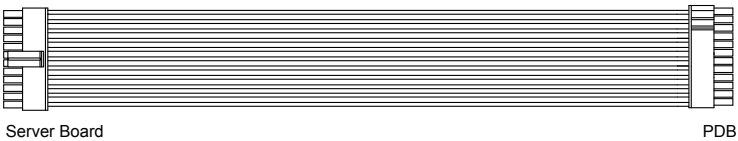



6. Power Cable, ATX 8Pin (200mm) (Quantity: 1)

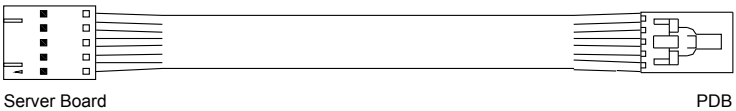



7. Power Cable, ATX 8Pin (700mm) (Quantity: 1)

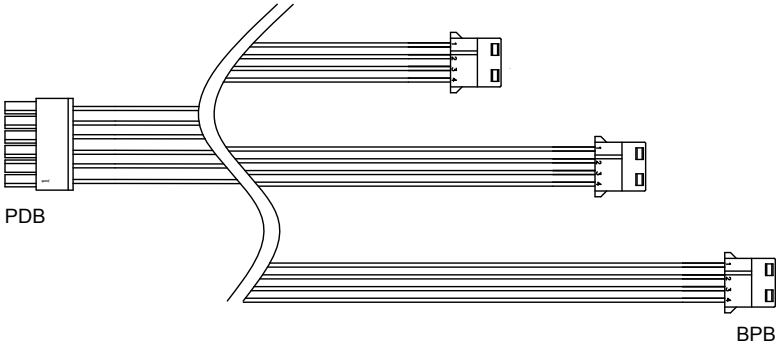
8. Power Cable, ATX 24Pin (450mm) (Quantity: 1)



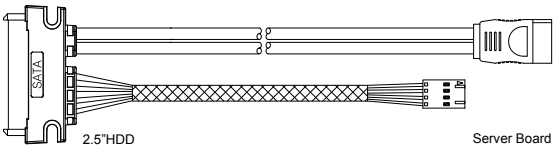

9. PMBus Cable (500mm) (Quantity: 1)



10. Power Cable, ATX 12Pin to 3*4Pin, (250/300/350mm) (Quantity: 1)




11. 2.5" HDD Cable, SATA 7+15 to 7Pin+1*4Pin (800&120mm) (Quantity: 2)

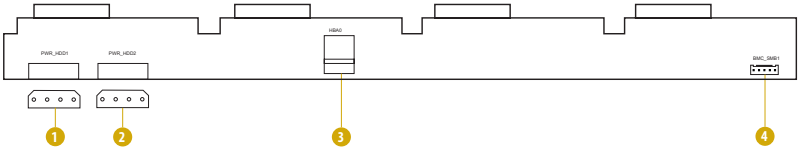



*Connections and cable routing may differ depending on various server boards. Please refer to the Quick Installation Guide to know the exact headers or connectors to be connected on the server board you purchase. For more detailed information about server board components, refer to the manual that comes with your server board.*

# Chapter 4 Backplane Specifications

## 4.1 Hard Drive Backplanes (BPB)

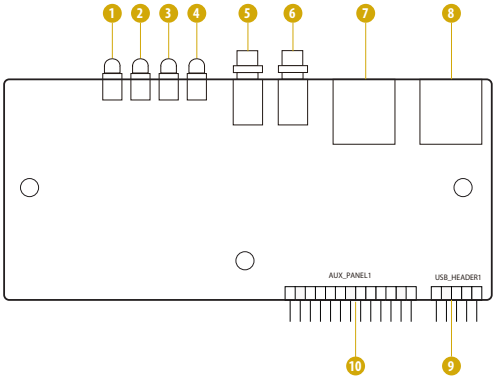
**Top View**




| No. | Description |
|---|---|
| 1 | HDD Power Connector (PWR_HDD1) |
| 2 | HDD Power Connector (PWR_HDD2) |
| 3 | Mini-SAS HD Connector (HBA0) |
| 4 | BMC SMBus Connector (BMC_SMB1) |

## 4.2 Front Panel Board (FPB)

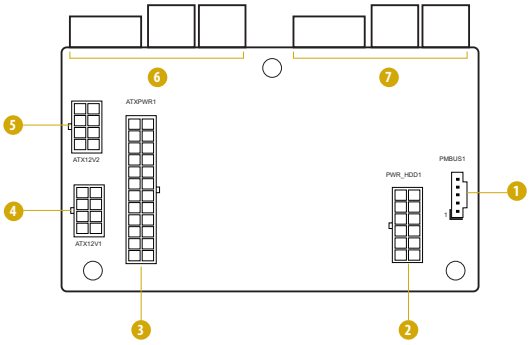
**Top View**




| No. | Description |
|---|---|
| 1 | LAN 2 Activity LED (LAN2_LED1) |
| 2 | LAN 1 Activity LED (LAN1_LED1) |
| 3 | HDD LED (HDD_LED1) |
| 4 | System Health LED (SYS_LED1) |
| 5 | UID Button and LED (UID_BTN1) |
| 6 | Power Button and LED (PWR_BTN1) |
| 7 | Front USB 2.0 Connector (USB_2) |
| 8 | Front USB 2.0 Connector (USB_1) |
| 9 | USB Header (USB_HEADER1) |
| 10 | Front and Auxiliary Panel Header (AUX_PANEL1) |

## 4.3 Power Distribution Board (PDB)

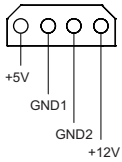
**Top View**




| No. | Description |
|---|---|
| 1 | PMBus Connnector (PMBUS1) |
| 2 | HDD Power Connector (PWR_HDD1) |
| 3 | ATX 24pin Power Connector (ATXPWR1) |
| 4 | ATX 8pin Power Connector (ATX12V1) |
| 5 | ATX 8pin Power Connector (ATX12V2) |
| 6 | Power Supply Connector (PSU2) |
| 7 | Power Supply Connector (PSU1) |

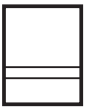
## 4.4 Pin Definitions

HDD Power Connectors
(PWR_HDD1)
(PWR_HDD2)
(see p.33, No. 1, 2)



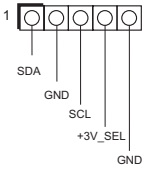

The 4-pin connectors provide power to the backplane.

MiniSAS HD Connector
(see p.33, No. 3)



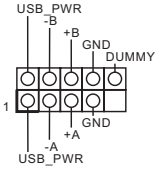
This connector is used to connect a mini-SAS HD cable to the motherboard.

SMB Connector
(5-pin BMC_SMB1)
(see p.33, No. 4)



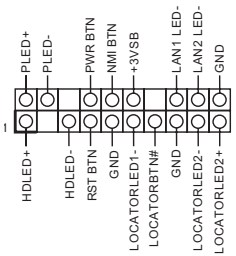

The SMB (SubMiniature version B) connector provides a communication interface between the backplane and the motherboard.

USB 2.0 Header
(9-pin USB_HEADER1)
(see p.34, No. 9)

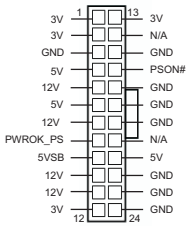
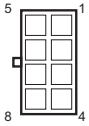
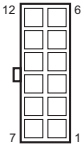
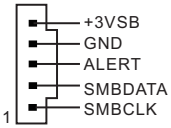



The header supports two USB 2.0 ports on the front panel.

Front and Auxiliary Panel Header
(17-pin AUX_PANEL1)
(see p.34, No. 10)




This header supports multiple functions on the front panel.

| | | |
|---|---|---|
| ATX Power Connector<br>(24-pin ATXPWR1)<br>(see p.35, No. 3) |  | The PDB provides a 24-pin ATX power connector. To use a 20-pin ATX power supply, please plug it along Pin 1 and Pin 13. |
| ATX 12V Power Connector<br>(8-pin ATX12V1)<br>(8-pin ATX12V2)<br>(see p.35, No. 4, 5) |  | The PDB provides two 8-pin ATX 12V power connectors.. |
| HDD Power Connector<br>(12-pin PWR_HDD1)<br>(see p.35, No. 2) |  | This connector is used to connect BPB and the power connector on the power distribution board. |
| PMBus Connector<br>(5-pin PSU_SMB1)<br>(see p.35, No. 1) |  | PSU SMBus monitors the status of the power supply. |