# 64 Bays
# SAS to SAS/SATA
# JBOD Subsystem

# User Manual

**Revision 1.1**

# Table of Contents

# Preface

## About this manual

This manual provides information regarding the hardware features and installation of the **64Bay JBOD subsystem**. Information contained in the manual has been reviewed for accuracy, but not for product warranty because of the various environment/OS/settings. Information and specifications will be changed without further notice.

This manual uses section numbering for every topic being discussed for easy and convenient way of finding information in accordance with the user's needs. The following icons are being used for some details and information to be considered in going through with this manual:

**NOTES:**
These are notes that contain useful information and tips that the user must give attention to in going through with the subsystem operation.

**IMPORTANT!**
These are the important information that the user must remember.

**WARNING!**
These are the warnings that the user must follow to avoid unnecessary errors and bodily injury during hardware and software operation of the subsystem.


**CAUTION:**
These are the cautions that user must be aware of to prevent damage to the subsystem and/or its components.

## Copyright



## Trademarks

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## Changes

The material in this document is for information only and is subject to change without notice.

# Before You Begin

Before going through with this manual, you should read and focus on the following safety guidelines. Notes about the subsystem's controller configuration and the product packaging and delivery are also included here.

## Safety Guidelines

To provide reasonable protection against any harm on the part of the user and to obtain maximum performance, user is advised to be aware of the following safety guidelines particularly in handling hardware components:

***Upon receiving of the product:***

- Place the product in its proper location.
- Do not try to lift it by yourself alone. Two or more persons are needed to remove or lift the product to its packaging. To avoid unnecessary dropping out, make sure that somebody is around for immediate assistance.
- It should be handled with care to avoid dropping that may cause damage to the product. Always use the correct lifting procedures.

***Upon installing of the product:***

- Ambient temperature is very important for the installation site. It must not exceed 30°C. Due to seasonal climate changes; regulate the installation site temperature making it not to exceed the allowed ambient temperature.
- Before plugging-in any power cords, cables and connectors, make sure that the power switches are turned off. Disconnect first any power connection if the power supply module is being removed from the enclosure.
- Outlets must be accessible to the equipment.
- All external connections should be made using shielded cables and as much as possible should not be performed by bare hand. Using anti-static hand gloves is recommended.
- In installing each component, secure all the mounting screws and locks. Make sure that all screws are fully tightened. Follow correctly all the listed procedures in this manual for reliable performance.

## Controller Configurations

This JBOD subsystem supports single JBOD controller configurations.

## Packaging, Shipment and Delivery

- Before removing the subsystem from the shipping carton, you should visually inspect the physical condition of the shipping carton.
- Unpack and verify that the contents of the shipping carton are complete and in good condition.
- Exterior damage to the shipping carton may indicate that the contents of the carton are damaged.
- If any damage is found, do not remove the components; contact the dealer where you purchased the subsystem for further instructions.

## Unpacking the Shipping Carton

The shipping carton contains the following:

| | |
|---|---|
|  | JBOD Subsystem Unit |
|  | 64 pairs of HDD side brackets |
|  | Two (2) Power cords |
|  | One (1) external SAS cable (mini SAS HD to mini SAS)<br><br>Note: Two (2) SAS cables for dual JBOD controllers |
|  | One (1) external serial cable RJ11-to-DB9 for single JBOD controller<br><br>Note: Two (2) serial cables for dual JBOD controllers |
|  | Key of Top Cover |
|  | Screws |
|  | User Manual |

**NOTE: If any damage is found, contact the dealer or vendor for assistance.**

# Chapter 1 Product Introduction

**The 64 bays JBOD Subsystem**

The JBOD subsystem is a 19-inch 4U rackmount JBOD unit. It is a versatile SAS2 / SATA3 disk expansion system, ideal for high capacity and scalability storage in IT demands. It offers high density storage, hardware redundancy and easily integrates into versatile applications that request high performance and high scalability.

This JBOD subsystem comes with either dual or single JBOD controller configuration for options. It features a modular architecture for all key components which ease system maintenance and management.

### Highest Density Available

- 4U chassis with 64 bays carriers
- Support the 2.5” / 3.5" enterprise class SAS2/SATA3 HDD drives

### High Availability

- Single or dual SAS JBOD controller module
- Each SAS JBOD controller module consist of three 4x mini SAS HD ports

### Power Supply

- Power supply and cooling system contained in 1 module for efficient cooling
- Two 1100W redundant hot swappable power supplies

### Enclosure

- Incorporates a cableless design for maximum signal integrity
- Utilizes industry-standard SCSI enclosure services (SES) to monitor enclosure and disk environmental conditions

### Enclosure monitoring

- S.E.S. support for standard enclosure management
- System LED indications
- Fan speed monitoring
- Power supply monitoring
- System voltage monitoring
- System temperature monitoring
- System alarm

## 1.1 Technical Specifications

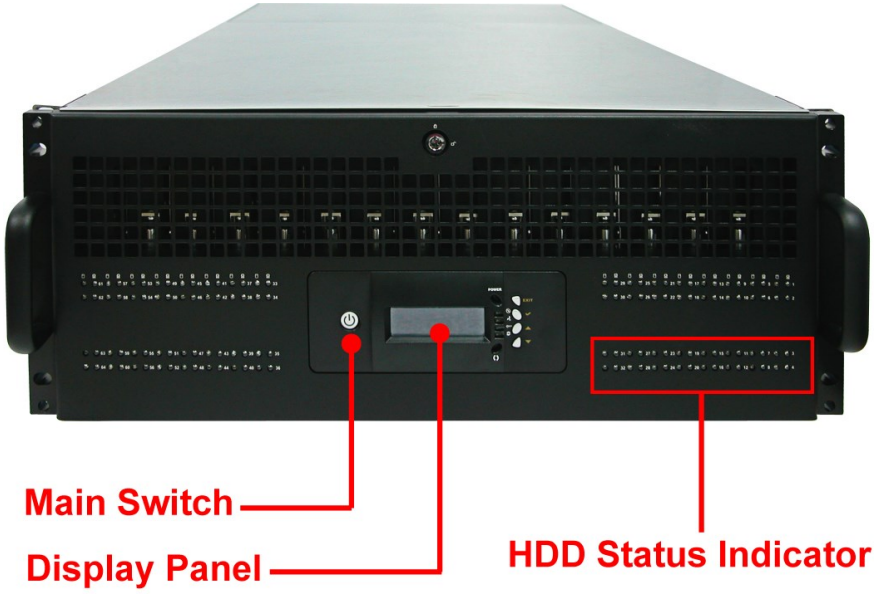
| | |
|---|---|
| JBOD Controller | Single / Redundant |
| Host Interface | One 4x mini SAS HD (12Gb/s) / Two 4x mini SAS HD (12Gb/s) |
| Disk Interface | 6Gb/s SAS, 6Gb/s SATA |
| SAS expansion | Two 4x mini SAS HD (12Gb/s) / Four 4x mini SAS HD (12Gb/s) |
| **Enclosure** | |
| Platform | Rackmount |
| Form Factor | 4U |
| # of Hot Swap Trays | 64 |
| Tray Lock | Yes |
| Disk Status Indicator | Access / Fail LED |
| Backplane | SAS / SATA Single BP |
| # of PS/Fan Modules | 1100W x 2 w/PFC |
| # of Fans | 15 |
| Monitor port support | Yes |
| Power requirements | AC 90V ~ 254V Full Range, 50Hz~60Hz |
| **Environmental** | |
| Relative Humidity | 10% ~ 85% Non-condensing |
| Operating Temperature | 10°C ~ 40°C (50°F ~ 104°F) |
| Physical Dimension | 880(L) x 482.6(W) x 177(H) mm |
| Weight (Without Disk) | 43.5 / 45 Kg |

Specification is subject to change without notice.

# Chapter 2 Identifying Parts of the JBOD Subsystem

## 2.1 Main Components

### 2.1.1 Front View




**IMPORTANT: When powering off the JBOD subsystem, turn off first the Main Switch and allow at least 3 minutes (during which each disk slot starting from slot #1 until slot #64 will be powered down) for the subsystem to shutdown properly. Then turn off the switches of the 2 Power Supply Fan Modules.**

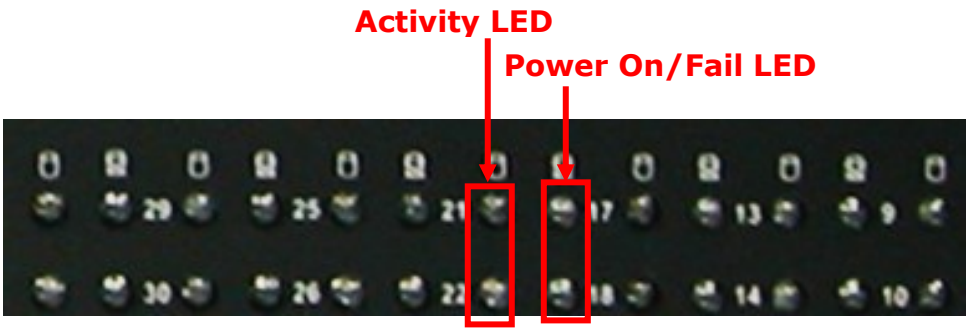
#### 2.1.1.1 LCD Display Panel LED


| Part | Function |
|---|---|
| **Power LED** | Green indicates power is ON. |

| Main Switch Button | |
|---|---|
| **Flashing Blue** | Indicates that the power cords are inserted and/or indicates the 2 power supply switches are turn on. |
| **Light Blue** | Indicates that the sytem is on. |
| **No Light** | Indicates that the whole system is power off. |

### 2.1.1.2 HDD Status LEDs

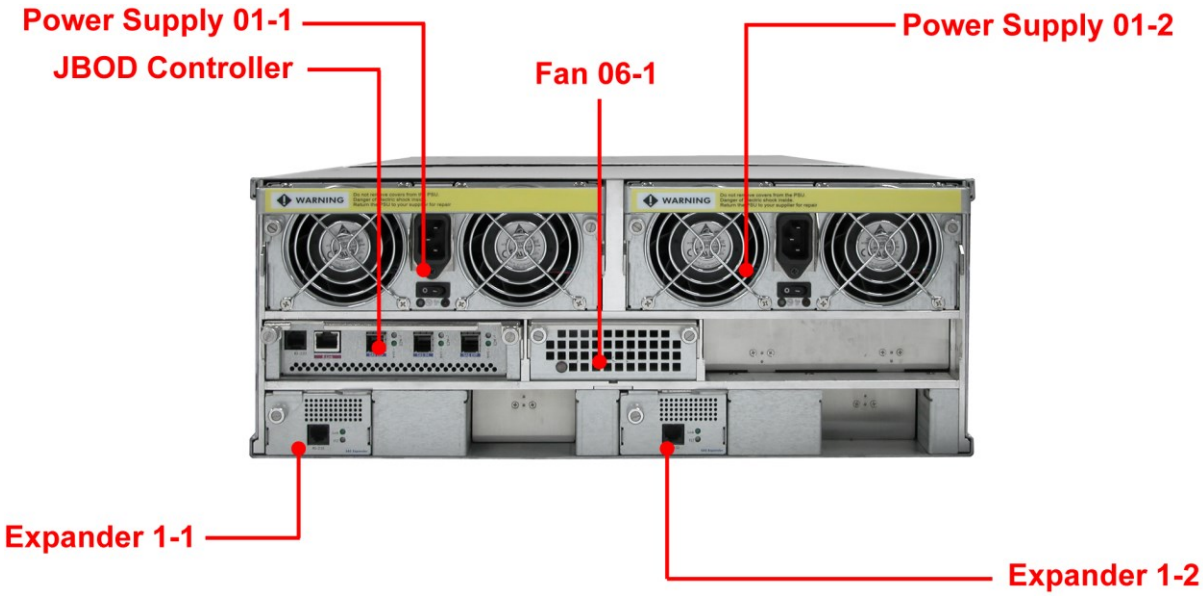
The Front Panel shows the disk drives status.



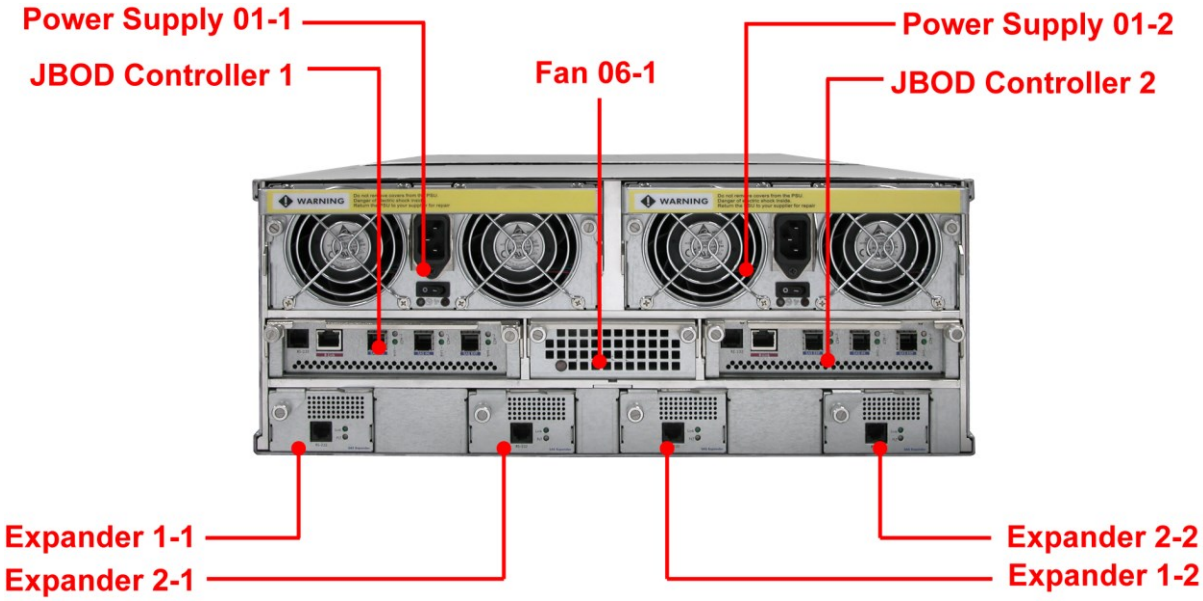

| Indicator | Color | Description |
|---|---|---|
| Activity LED | Blue Blinking | Indicates the disk drive is busy or being accessed. |
| Power On/Fail LED | Green | Indicates the disk drive in this slot is good. |
| | RED | Indicates the disk drive in this slot is defective or failed. |
| | LED is off | Indicates there is no disk drive in this slot. |

### 2.1.2 Rear View

**Single JBOD Controller**




**Dual JBOD Controller**

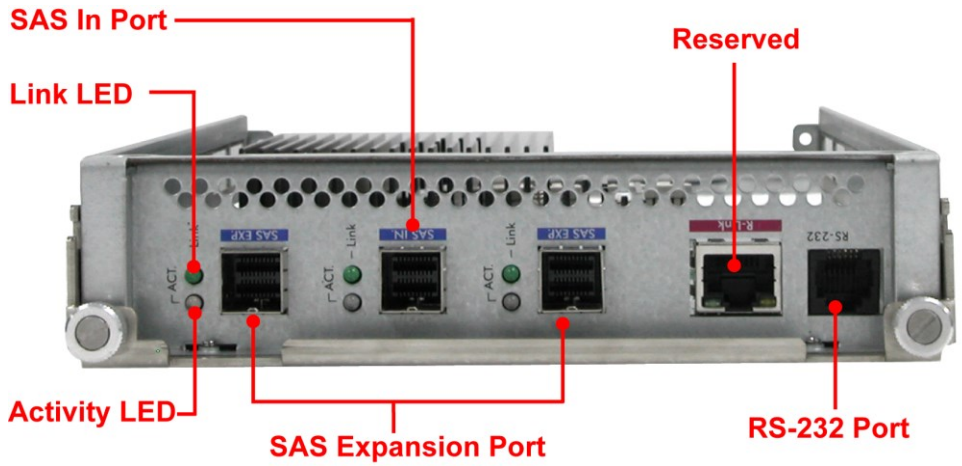



**NOTE: Each Power Supply Module has 1 Power Supply and 5 Fans. The JBOD subsystem is logically divided into two enclosures for hardware monitoring.**

**The functions of the Expander Modules are as follows:**

| Module: | Function/Description: |
|---|---|
| Expander Module 1-1 | Monitors Enclosure 1 (Disk slots 1 to 32, Power Supply 01-1, Fans 01-1, 02-1, 03-1, 04-1, and 05-1, 07-1, 08-1 and Turbo Fan 06-1). Note: "-1" means enclosure 1. |
| Expander Module 2-1 (for Controller 2) | Same function as Expander 1-1 |
| Expander Module 1-2 | Monitors Enclosure 2 (Disk slots 33 to 64, Power Supply 01-2, Fans 01-2, 02-2, 03-2, 04-2, 05-2, 06-2 and 07-2). Note: "-2" means enclosure 2. |
| Expander Module 2-2 (for Controller 2) | Same function as Expander 1-2 |

## 2.2 JBOD Controller Module




| Part | Description |
|---|---|
| SAS In Port | Use to connect to SAS HBA or to RAID subsystem's SAS Expansion Port. |
| SAS Expansion Port | Use to connect to the SAS In Port of another JBOD subsystem. |
| RS-232 Port | Use to upgrade the firmware of the JBOD controller. Connect the RJ11-to-DB9 serial cable to your system's serial port. |

| Indicator | Color | Description |
|---|---|---|
| Link LED | Green | Indicates expander has connected or linked. |
| Activity LED | Blinking Blue | Indicated the expander is busy and being accessed. |

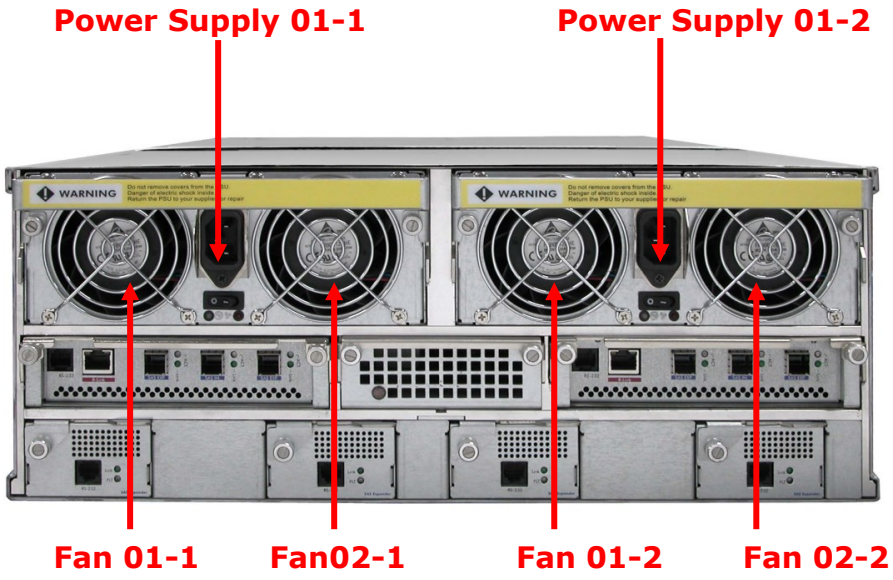
## 2.3 Power Supply Fan Module (PSFM)

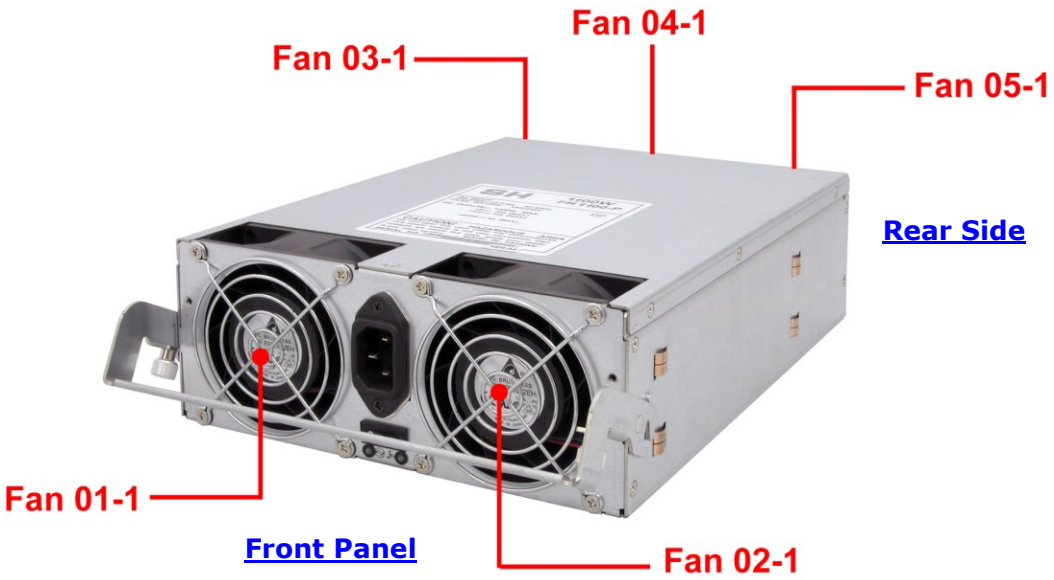
The 64bay RAID subsystem contains **two 1100W Power Supply/Fan Modules**. All PSFM are inserted at the rear of the chassis.

**Front Panel**

**Rear Side**

**NOTE: Each PSFM delivers Full-Range 100V ~ 240V (+/-10%) voltage AC electricity. Each PSFM consists of 1 power supply and 5 fans. Two Fans are located at the panel side, and three fans are located in rear side of the PSFM.**



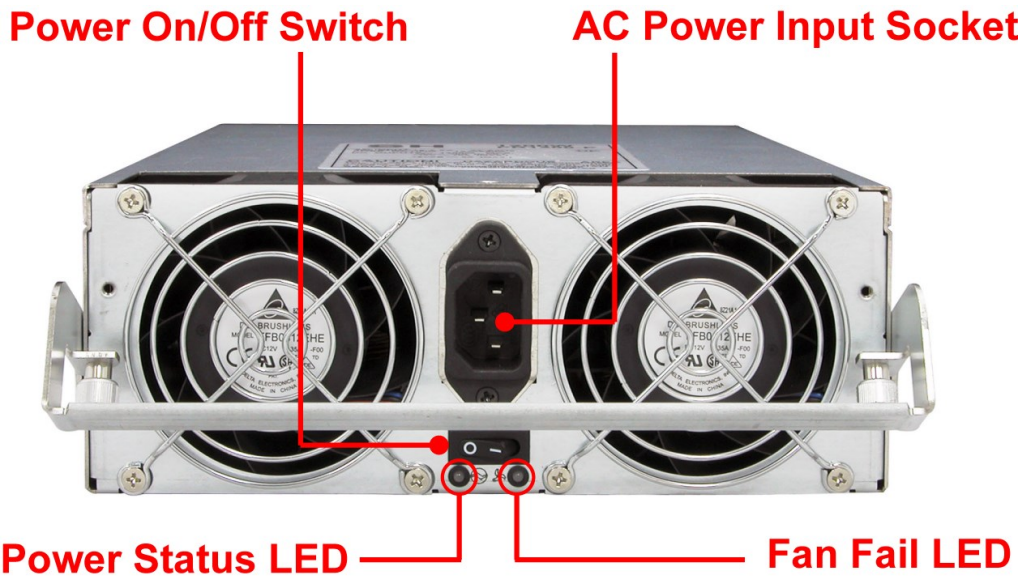




**NOTE: The first PSFM (01-1, on the left side of enclosure) has five fans: Fan 01-1 and Fan 02-1 on the front panel; and Fan 03-1, Fan 04-1 and Fan 05-1 on the rear side.**

**The second PSFM (01-2, on the right side) has five fans also: Fan 01-2 and Fan 02-2 on the front panel; and Fan 03-2, Fan 04-2 and Fan 05-2 on the rear side.**

**NOTE: "-1" means enclosure 1 and "-2" means enclosure 2.**

### 2.3.1 PSFM Panel




| Part | Description |
|---|---|
| **AC Power Input Socket** | **Use to connect the power cord from power source.** |
| **Power On/Off Switch** | **Use to power on or power off the PSFM.** |

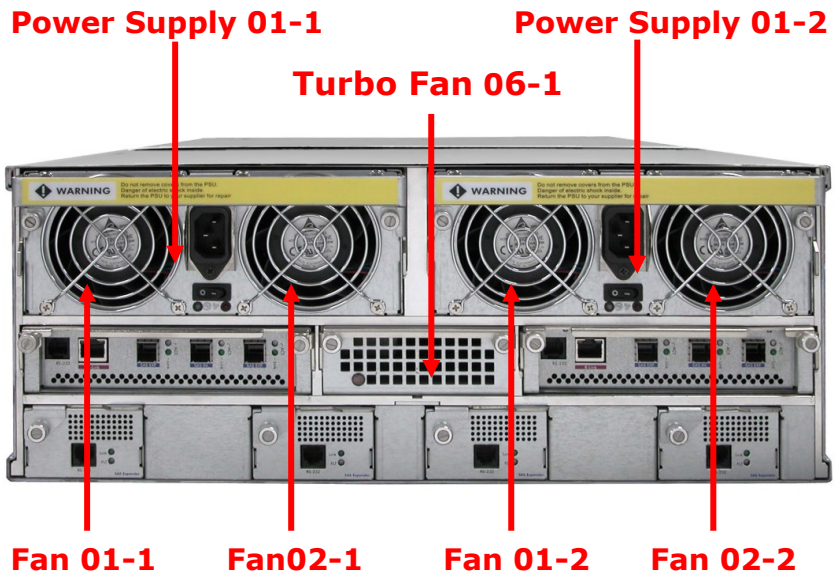
| Indicator | Color | Description |
|---|---|---|
| **Power Status LED** | **Green** | **Indicates the power supply module is good.** |
| | **Red** | **Indicates the power supply module is faulty.** |
| **Fan Fail LED** | **Red** | **Indicates one or more fans in the PSFM has failed.** |

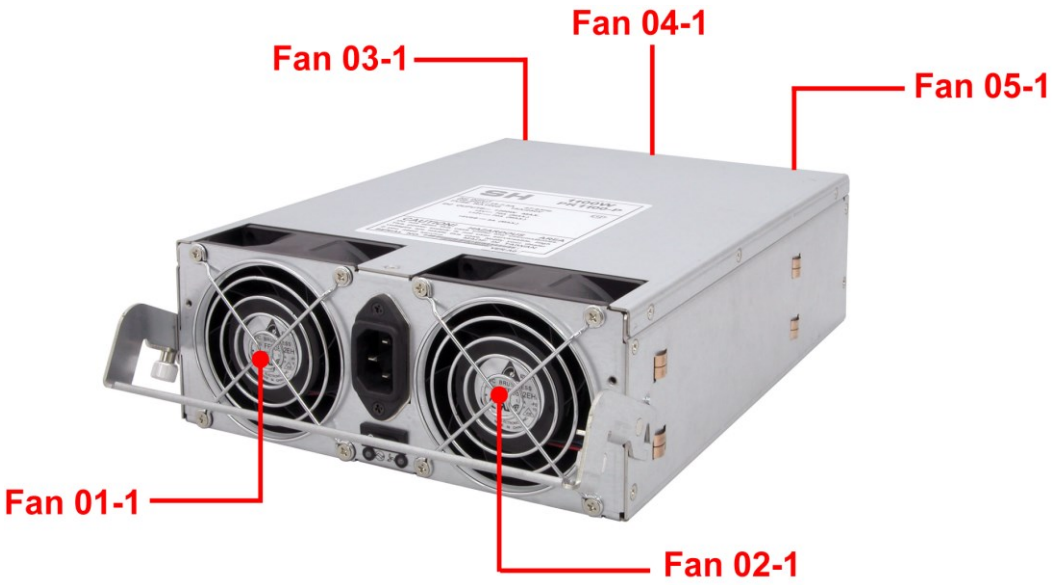
When the power cord connected from main power source is inserted to the AC Power Input Socket the Power Status LED becomes RED. When the switch of the PSFM is turned on, the LED still shows RED. After the main switch in front panel is turned on, the LED turns GREEN, which means it is functioning normally.

The PSFM has a **5V standby** DC voltage. When the power cord(s) is/are connected to the AC Power Input Socket, after 1 second, all Activity LEDs will flash once. When the power cord(s) is/are disconnected from AC Power Input Socket, after 3 seconds, all Activity LEDs will flash twice.

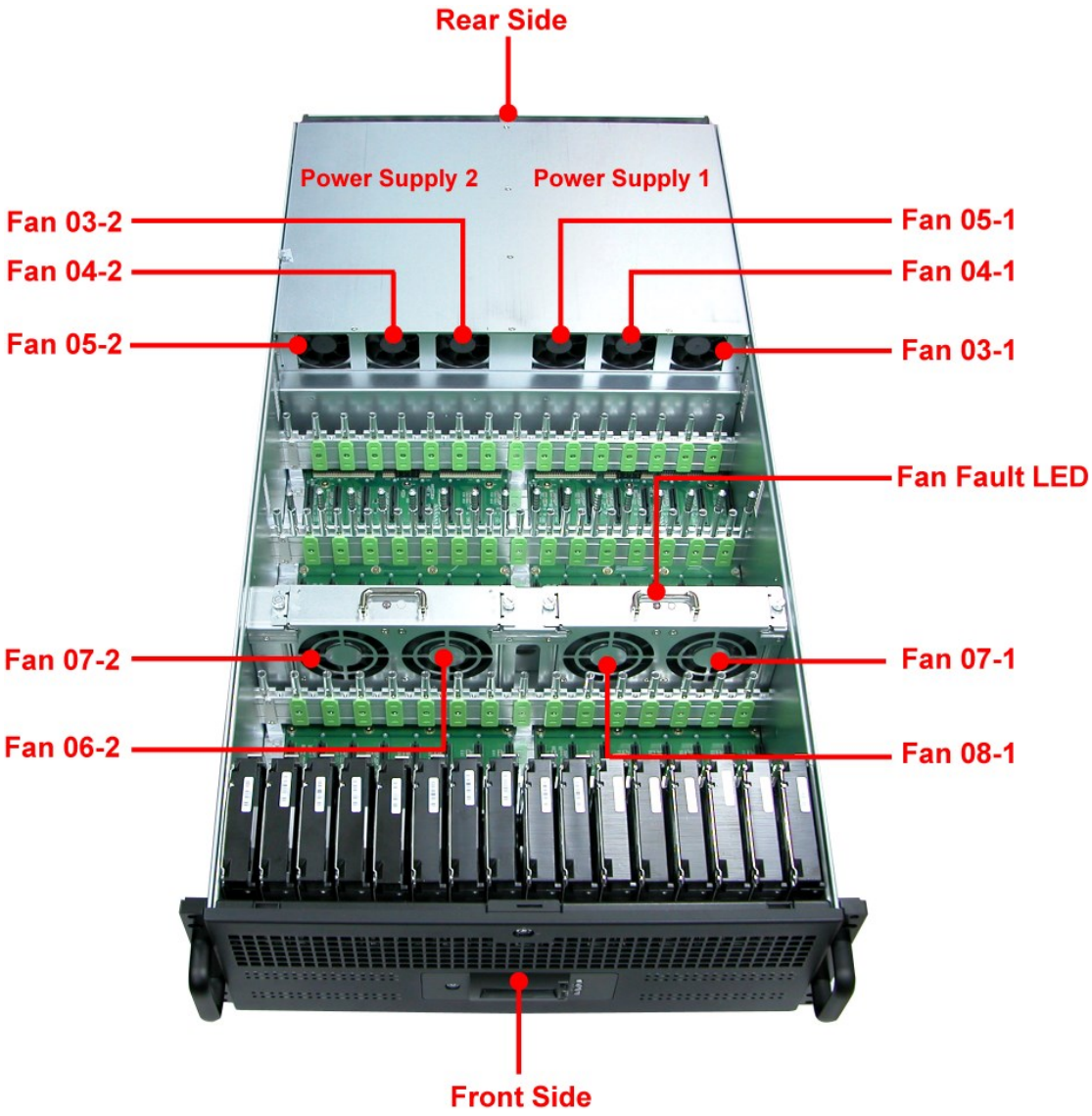
## 2.4 Fan Module

The 64bay RAID subsystem contains 15 fans.




**NOTE: "-1" means enclosure 1 and "-2" means enclosure 2.**

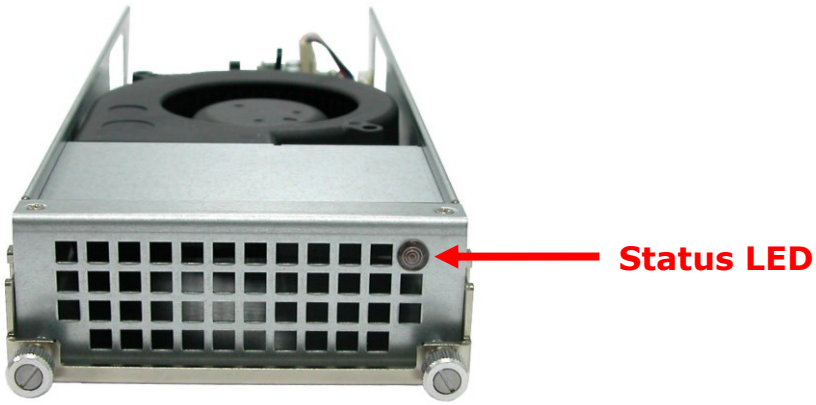



| Indicator | Color | Description |
|---|---|---|
| Fan Fault LED | No light | Indicates the fan is normal. |
| | Red | Indicates the turbo fail is faulty. |

### 2.4.1 Turbo Fan

The turbo fan (Fan 06-1) provides additional airflow inside the enclosure.

**Turbo Fan LED**




| Indicator | Color | Description |
|---|---|---|
| Status LED | Red | Indicates the turbo fail is faulty. |

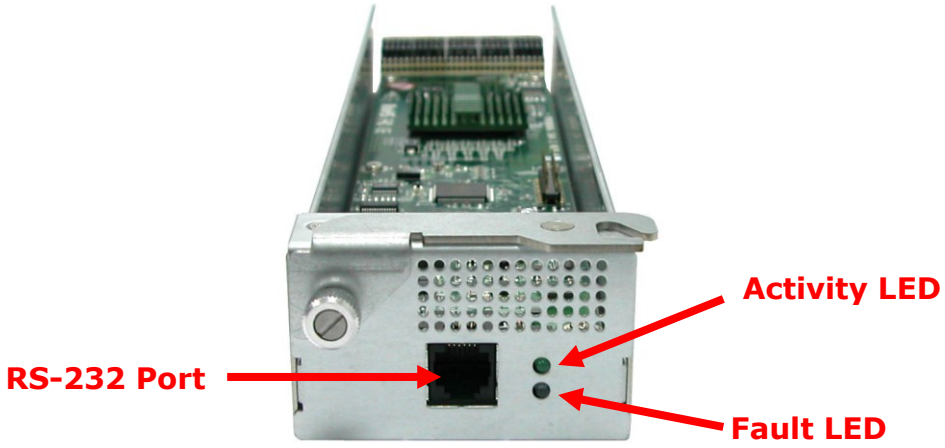
**NOTE: The status of Turbo Fan (Fan 06-1) is monitored by Expander Module 1.**

## 2.5 Expander Module

The Expander Module contains the SAS expander. It can be used to upgrade the SAS expander firmware. It also contains the SES module (SCSI Enclosure Services). SES is the protocol used for enclosure environmental control.

The SES module monitors the following enclosure conditions: temperature, power supply voltage, and fan speed.

### 2.5.1 Expander Module Panel



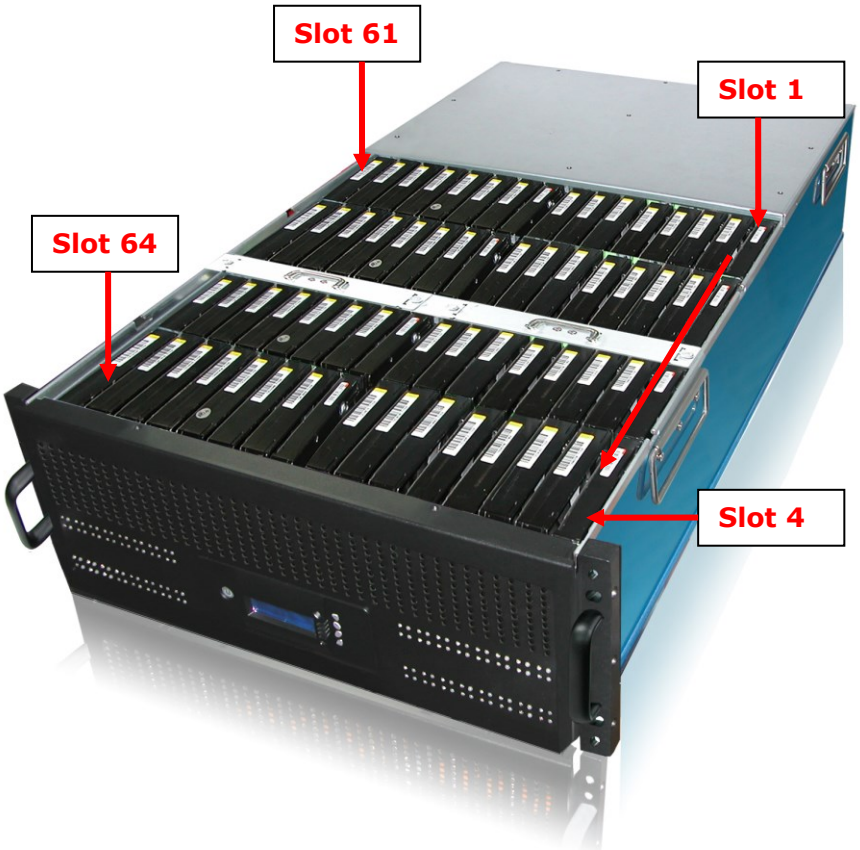

| Part | Description |
|---|---|
| RS-232 Port | Use to upgrade the firmware of the expander module. Connect the serial cable RJ11-to-DB9 to your system's serial port. |

| Indicator | Color | Description |
|---|---|---|
| Activity LED | Blinking Green | Indicates the expander module is busy or active. |
| Fault LED | Binking Blue | Indicates the expander module is faulty or has failed. |

## 2.6 Disk Drive Installation into the Disk Slot

This section describes the physical locations of the hard drives supported by the subsystem and give instructions on installing a hard drive.

**NOTE: When the Disk Array is shipped, the disk trays are not placed in the disk slots. If all disk trays will be used to install all 64 disk drives, for quicker and easier installation of disk drives in the Disk Array, it is recommended to attach first each disk drive with HDD side brackets.**




**DISK SLOT NUMBERS**

**Rear side**

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 61 | 57 | 53 | 49 | 45 | 41 | 37 | 33 | 29 | 25 | 21 | 17 | 13 | 9 | 5 | 1 |
| 62 | 58 | 54 | 50 | 46 | 42 | 38 | 34 | 30 | 26 | 22 | 18 | 14 | 10 | 6 | 2 |
| 63 | 59 | 55 | 51 | 47 | 43 | 39 | 35 | 31 | 27 | 23 | 19 | 15 | 11 | 7 | 3 |
| 64 | 60 | 56 | 52 | 48 | 44 | 40 | 36 | 32 | 28 | 24 | 20 | 16 | 12 | 8 | 4 |

**Front Side**

**IMPORTANT: In dual controller mode, the installation of SATA disk drive in a disk tray is done differently. In single controller mode, the installation of SATA disk in a disk tray is the same with SAS disk.**

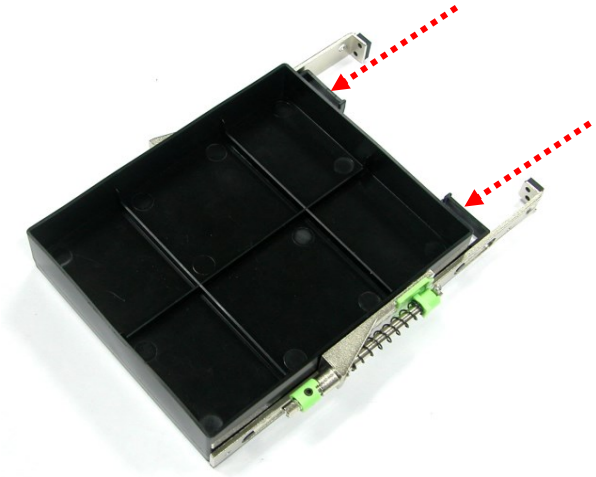
| HDD | Single Controller | Dual Controller |
|---|---|---|
| SATA | No need dongle board | Need dongle board |
| SAS | No need dongle board | No need dongle board |

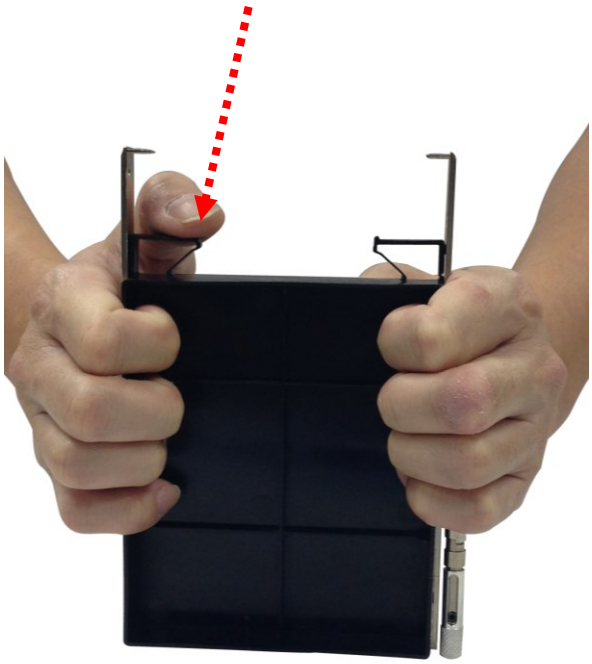
**NOTE: In this model, it is recommended to use 6Gb hard drive disks.**

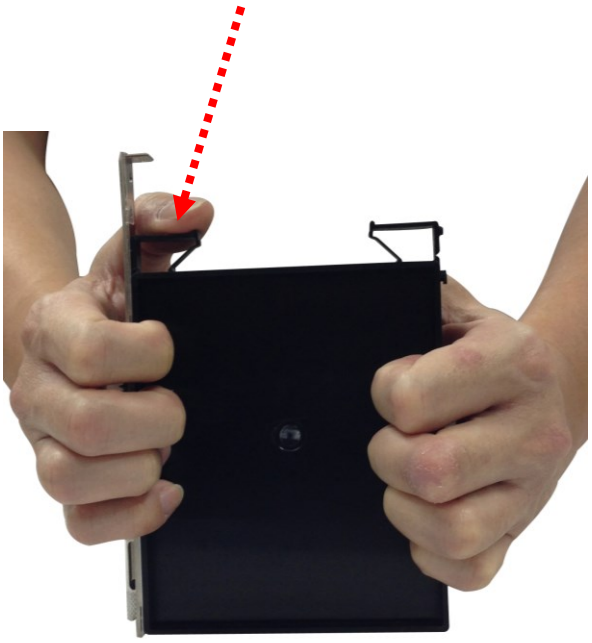
### 2.6.1 To install a SATA disk drive (Dual Controller Mode) in a disk tray:

#### A. HDD side brackets without dongle boards

1. Prepare the HDD side brackets. Remove them from the dummy disk by pushing the upper sides of the dummy disk as shown below:



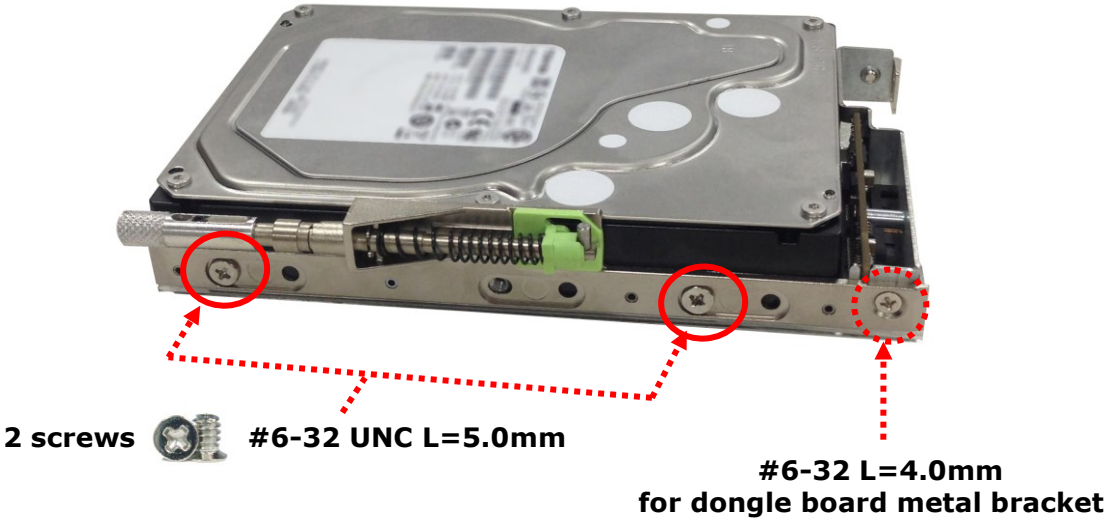


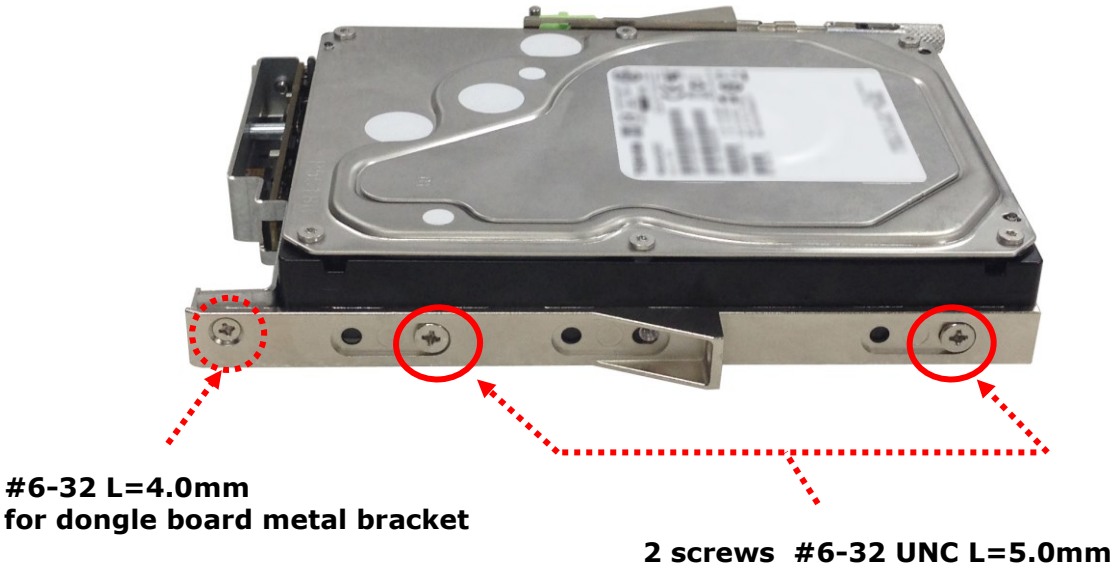


2. Prepare the dongle board with metal bracket.

3. Connect the dongle board into the SATA disk drive.

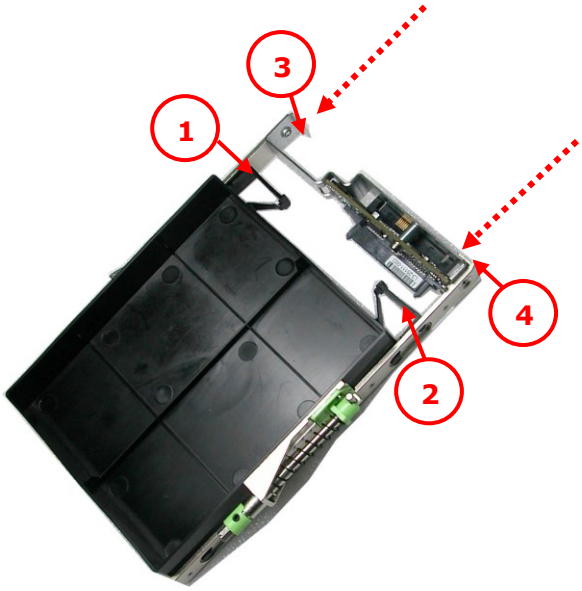
4. Place the brackets on both sides of the disk drive and secure them with screws.

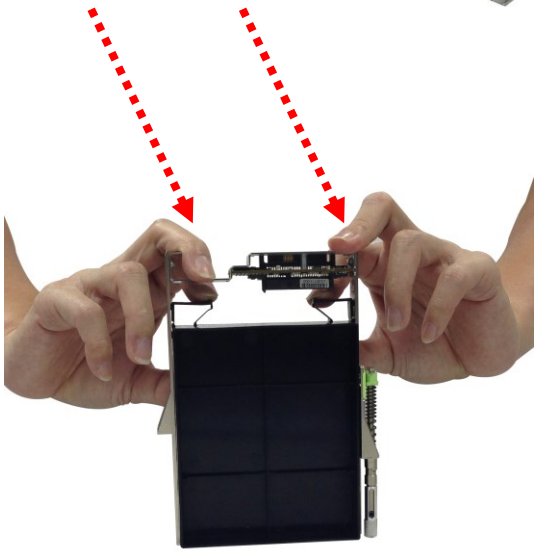


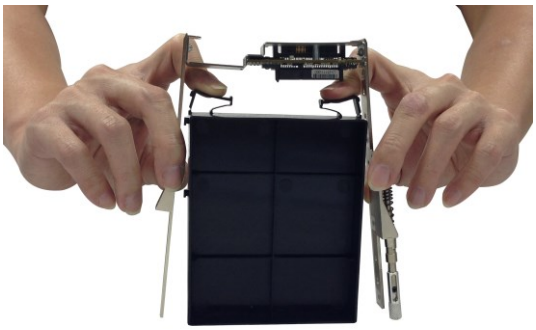



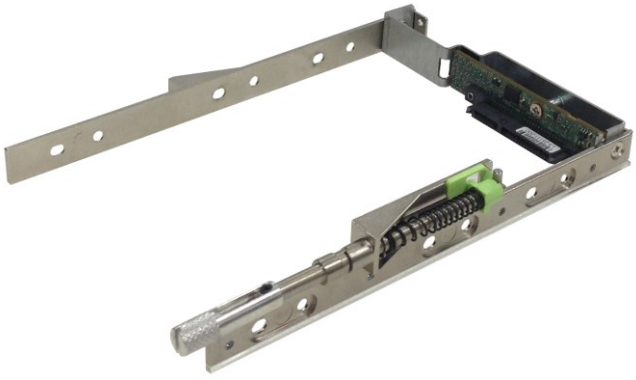
## B. HDD side brackets with dongle boards

1. Prepare the HDD side brackets. Remove them from the dummy disk by pushing the upper sides of the dummy disk as shown below:



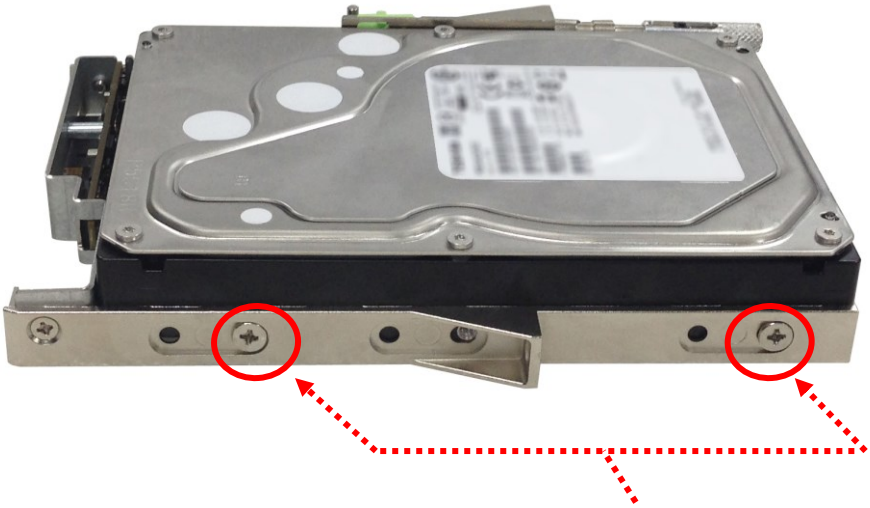







2. Place the brackets on both sides of the disk drive and secure them with screws.

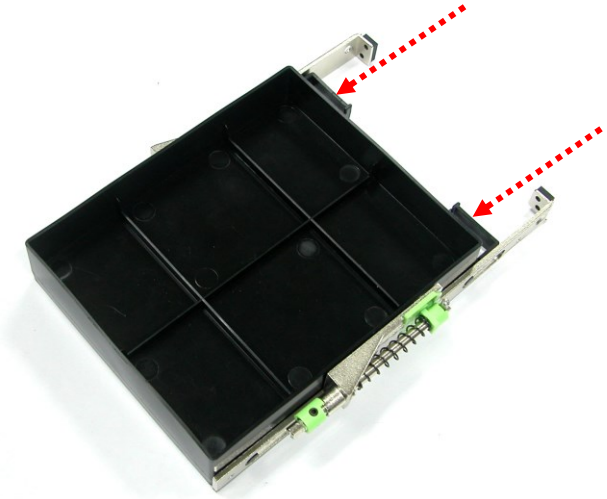
**2 screws**  **#6-32 UNC L=5.0mm**

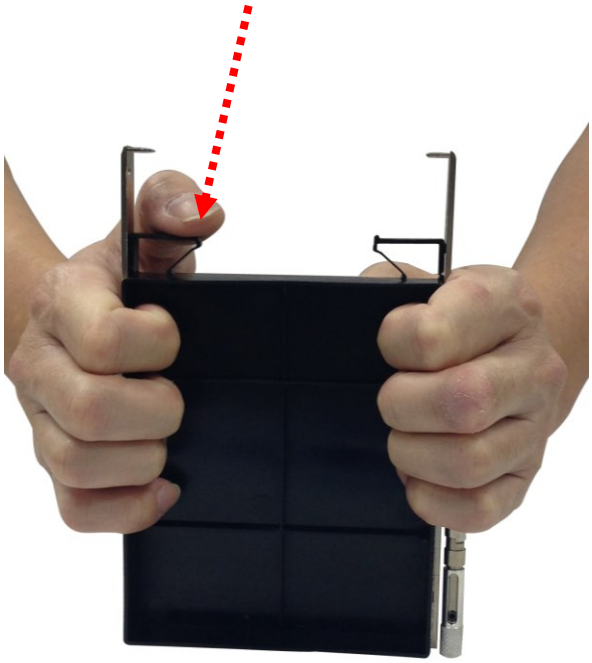


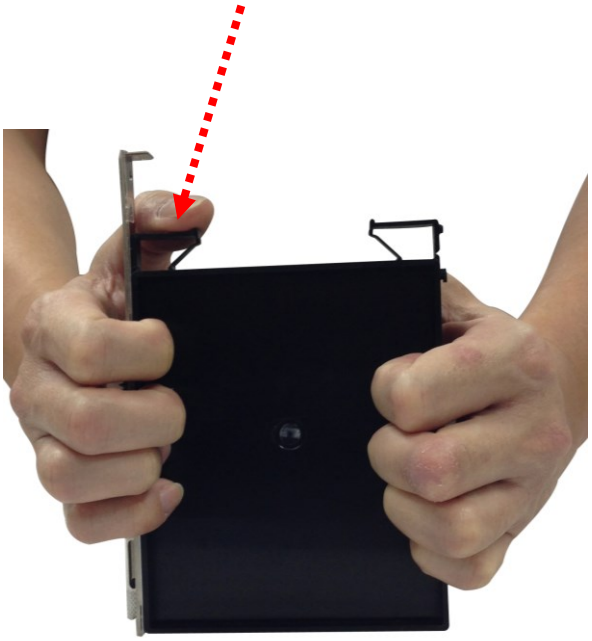
**2 screws #6-32 UNC L=5.0mm**

### 2.6.2 To install a SAS disk drive (Single or Dual Controller Mode) or SATA disk drive (Single Controller Mode) in a disk tray:

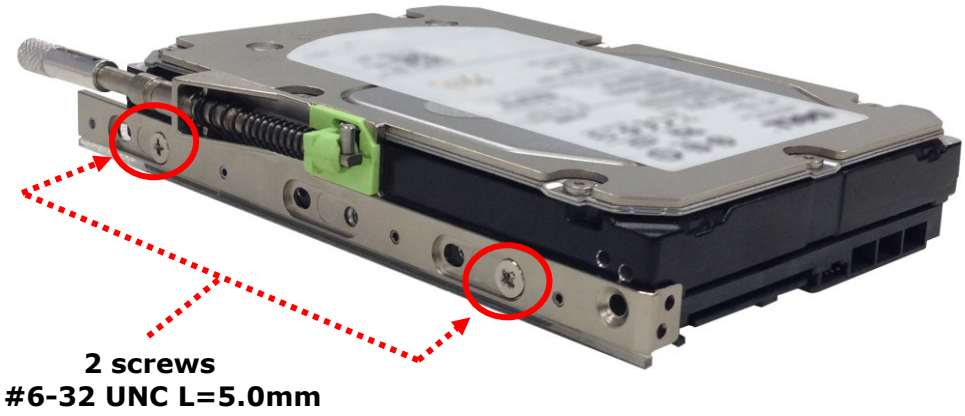
1. Prepare the HDD side brackets. Remove them from the dummy disk by pushing the upper sides of the dummy disk as shown below:







2. Place the brackets on both sides of the disk drive and secure them with screws.




3. Place the drive carefully in the disk slot.

4. Fix the disk drive using the disk tool that is included in the package.

# Chapter 3 Getting Started with the Subsystem

## 3.1 Installing the Rails and Mounting into Rack

**NOTE: At least two persons are needed to lift the Disk Array. To reduce the weight of the Disk Array, remove the power supply modules from the rear of Disk Array. If disk drives are already installed in the disk trays, remove also the disk trays. Refer to appropriate sections on how to remove the power supply modules and how to remove the disk trays/disk drives.**

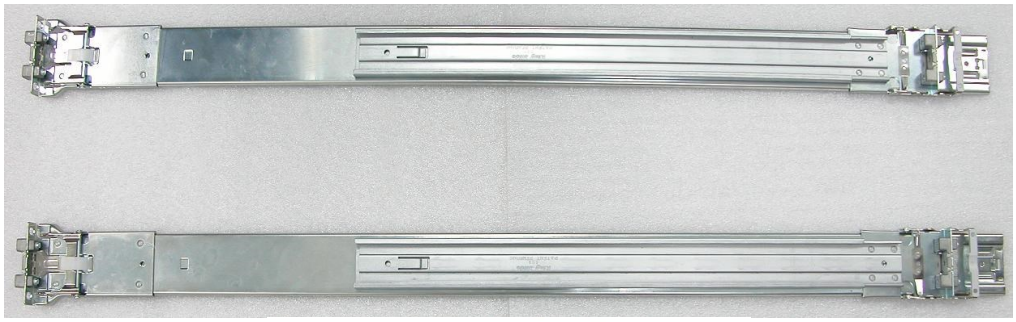
**NOTE: The sample model used in the following installation might not be the actual model for this manual.**

**NOTE: The Disk Array must be installed near the Disk Array or host system where it will be connected. A Phillips screwdriver is needed in installation.**

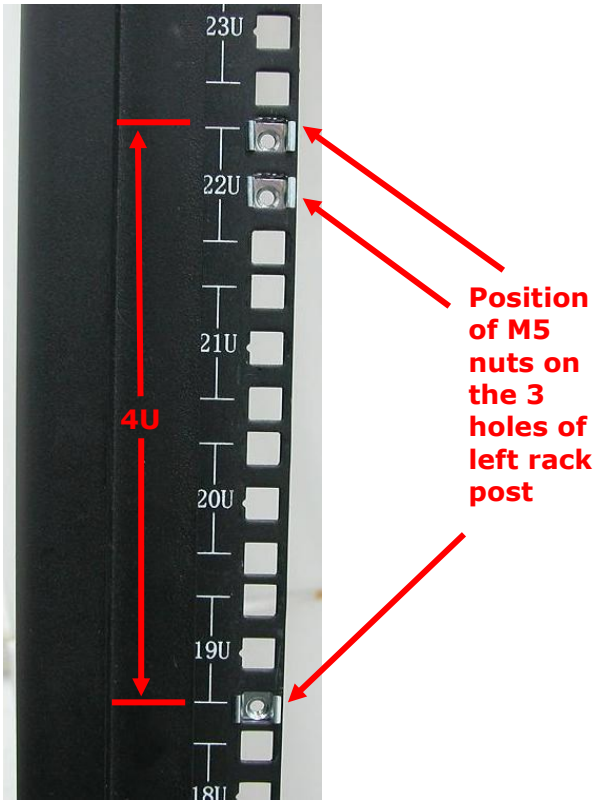
**WARNING! It is prohibited to put other enclosures on top of the 64-bay Disk Array because the total weight will not be supported by the rails.**

**Steps:**

1. Open the rail box.
2. Remove the 2 rail assemblies and the screws/accessories from the box. Check its contents.

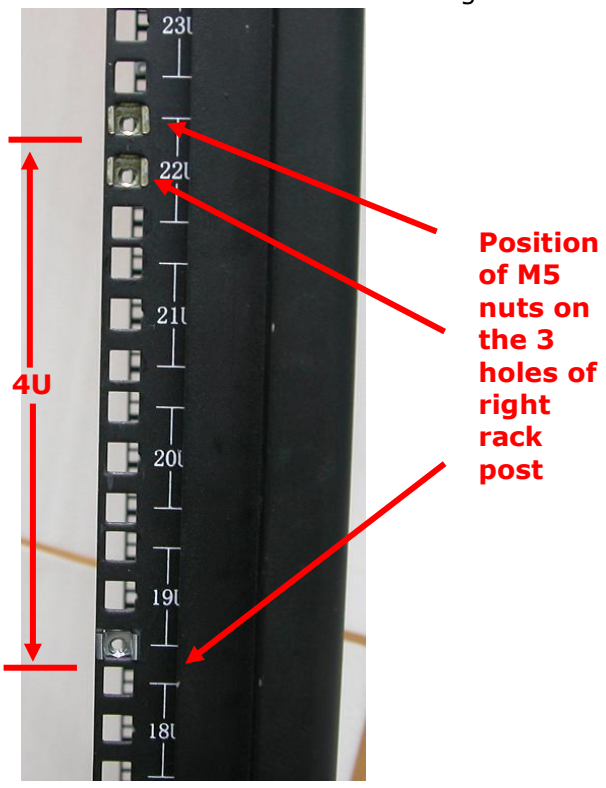


3. Insert three (3) M5 nuts on the 2 holes of the front left side of the rack post.



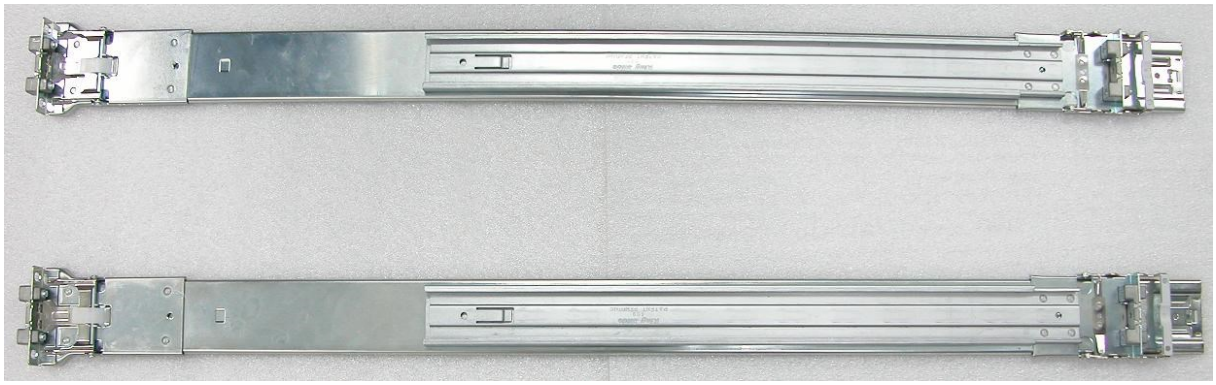

**Rack Post – Front Left Side**

4. Insert three (3) M5 nuts on the 2 holes of the front right side of the rack post.



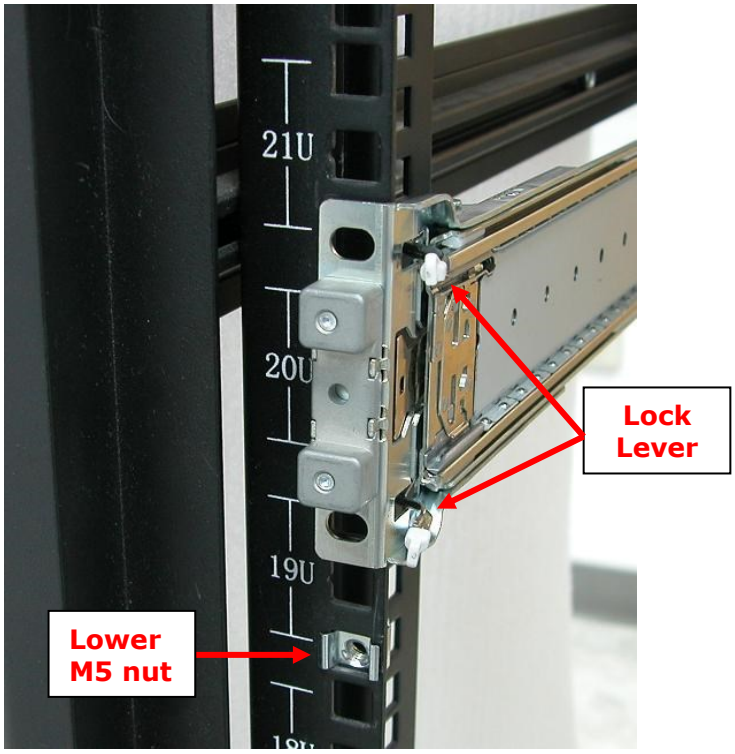

**Rack Post – Front Right Side**

5. Prepare the 2 rail assemblies.

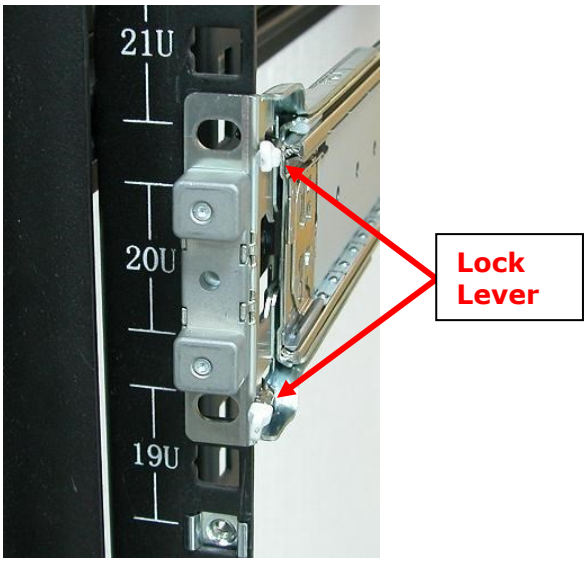


**Front Side of Rail Assembly** **Rear Side of Rail Assembly**

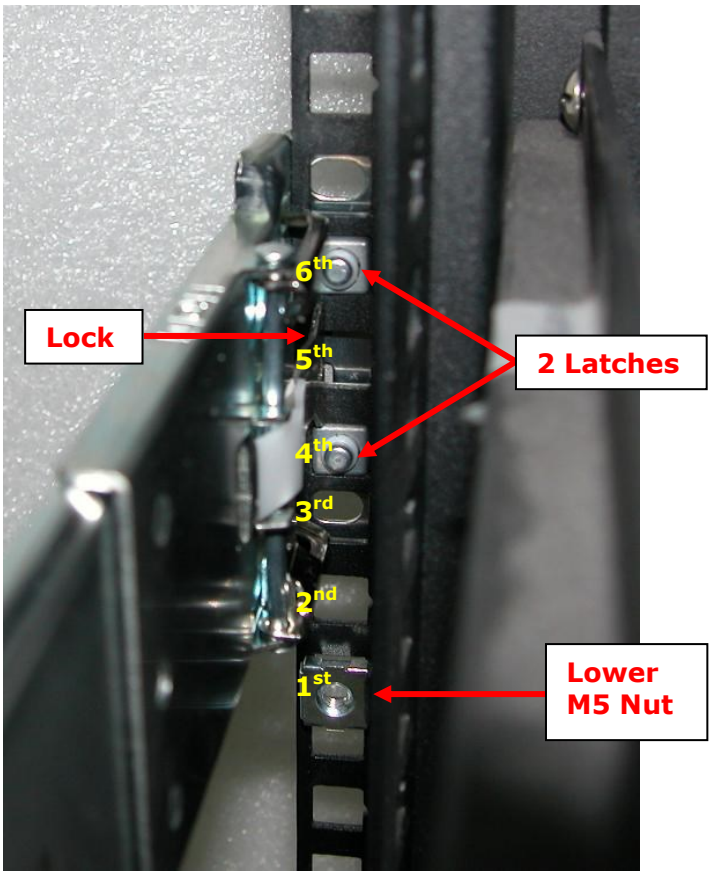
6. Hold one rail assembly and install in the front left side of rack. To install, align and insert the 2 latches of the rail into the 2 holes on the rack post. Use the Lock Lever to lock the rail assembly in the left rack post.




**View from Front Side of Front Left Rack Post**
**Lock Lever is Not Locked**

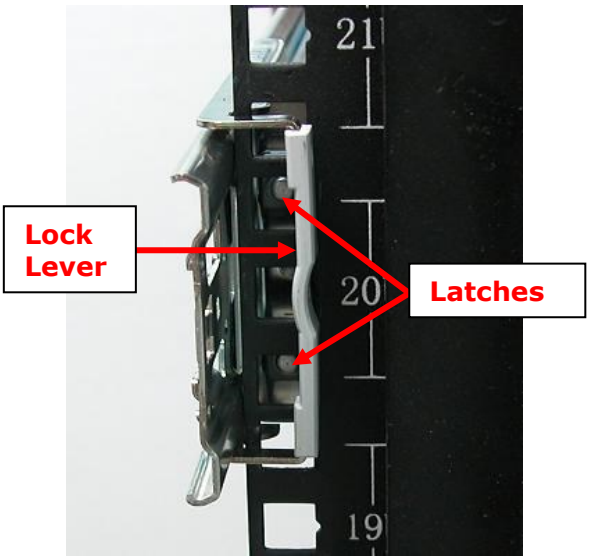



**View from Front Side of Front Left Rack Post**
**Lock Lever is Locked**

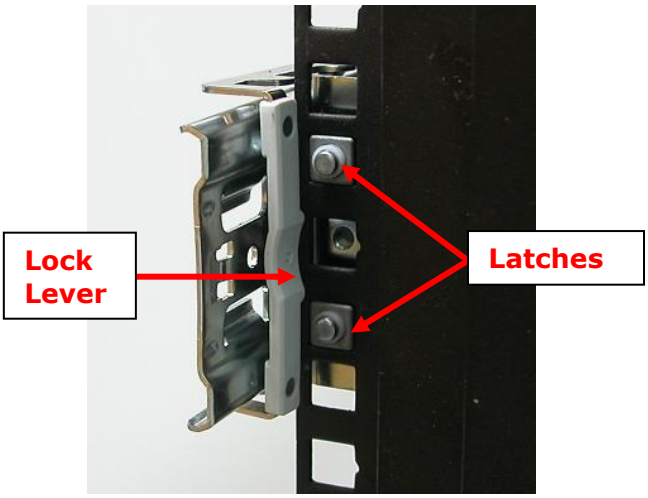



**View from Rear Side of Front Left Rack Post**
**2 Latches are inserted in the 4th and 6th holes from bottom (M5 nut)**

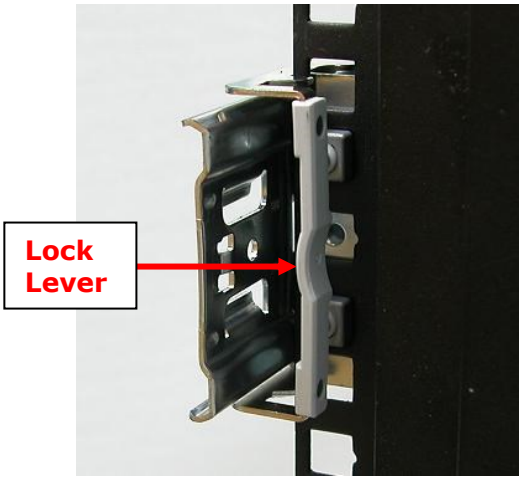
7. Install the other end of rail assembly to the left rear side. Align and insert the 2 latches on the 2 holes on the rear rack post, and then push the rail a little towards the rear side and lock the lock lever on the rack post.




**View from Rear Side of Rear Left Rack Post**

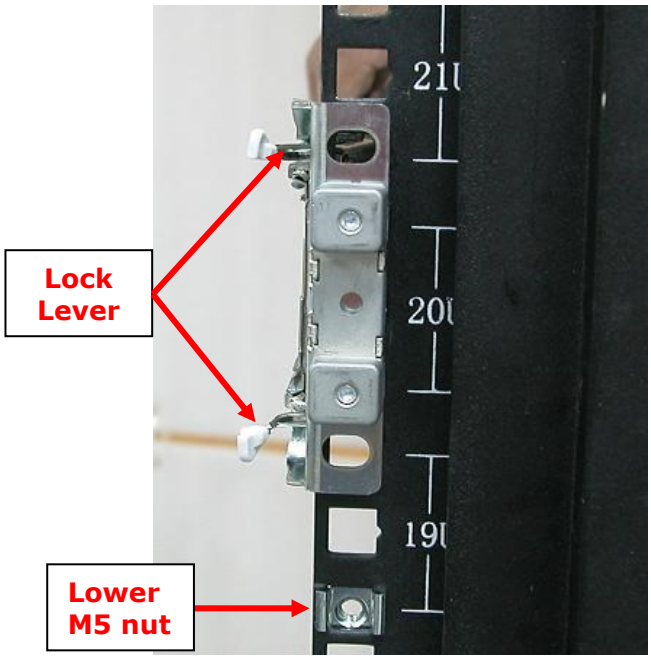



**View from Rear Side of Rear Left Rack Post**

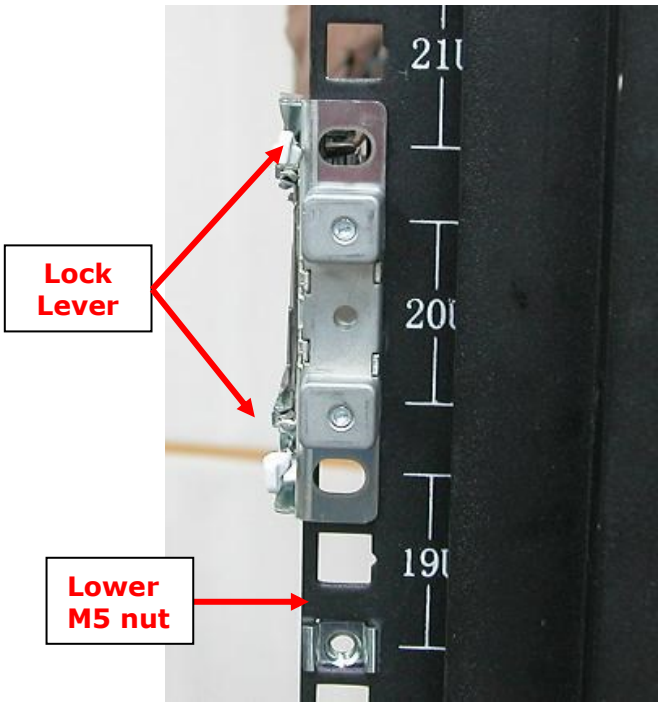



**View from Rear Side of Rear Left Rack Post**

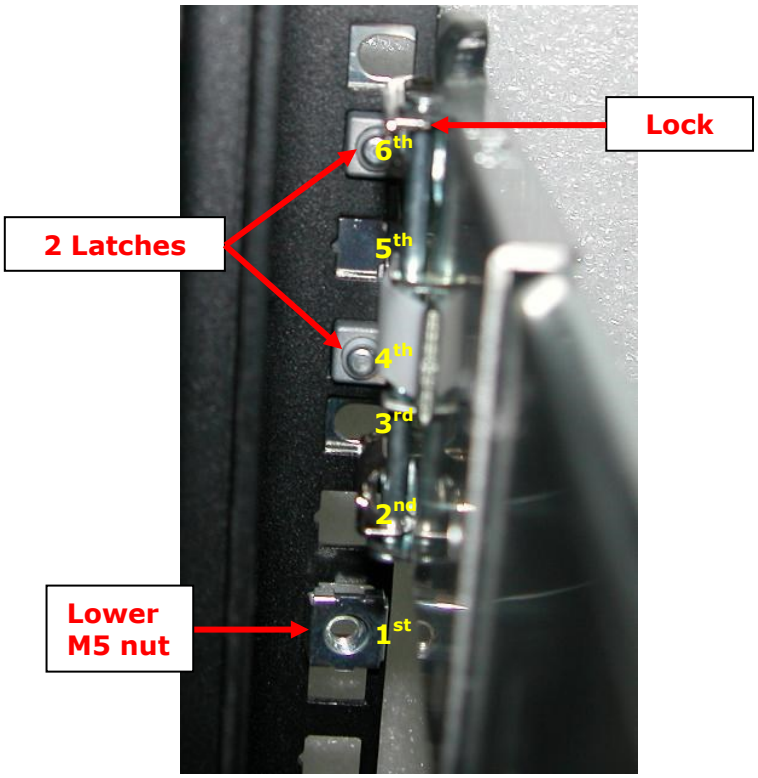
8. Repeat step 6 to install the other rail assembly into the right front side.




**View from Front Side of Front Right Rack Post**
**Lock Lever is Not Locked**

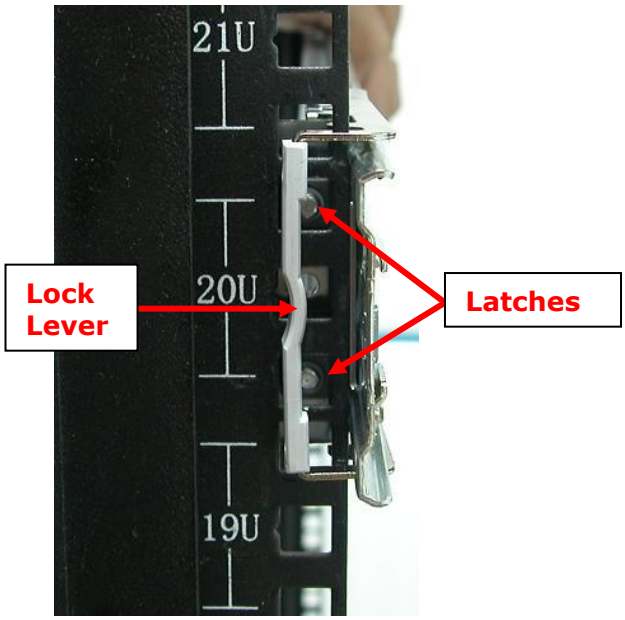



**View from Front Side of Front Right Rack Post**
**Lock Lever is Locked**

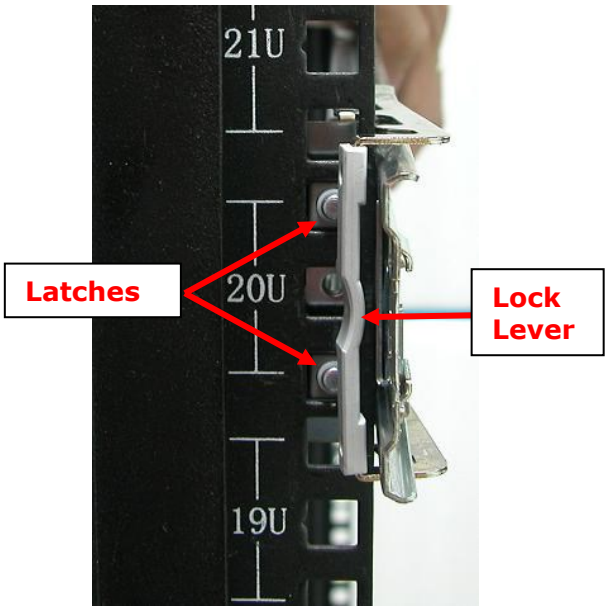



**View from Rear Side of Front Right Rack Post**
**2 Latches are inserted in the 4th and 6th holes from bottom (M5 nut)**

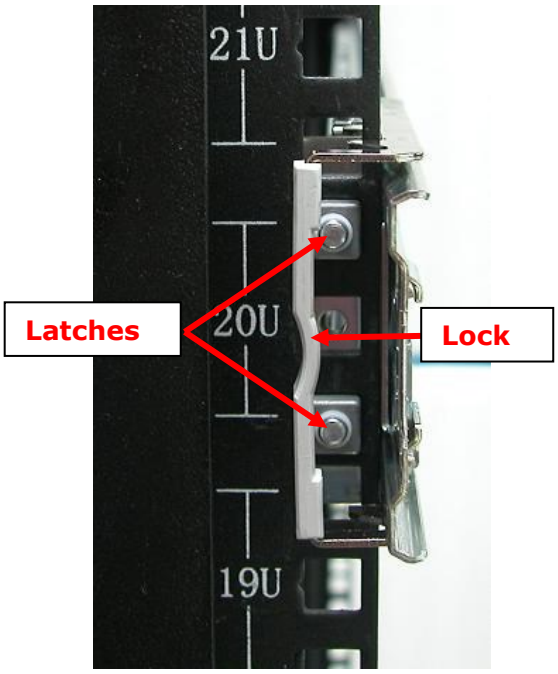
9. Repeat step 7 to install the other end of rail assembly to the rack post of rear right side.




**View from Rear Side of Rear Right Rack Post**

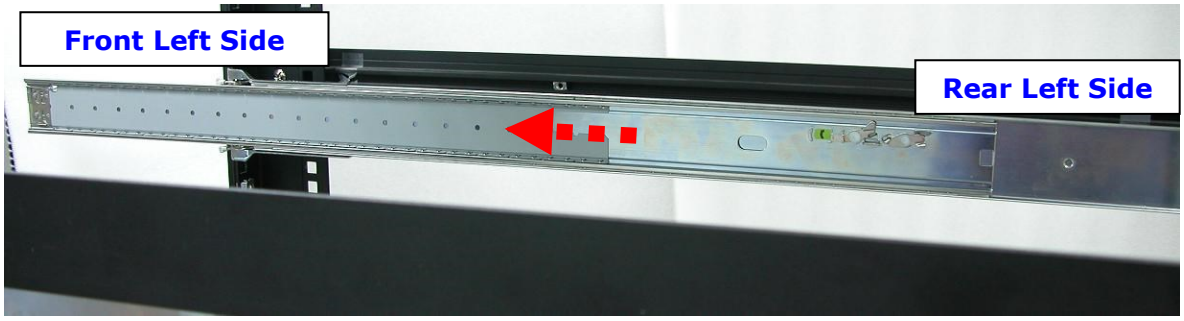



**View from Rear Side of Rear Right Rack Post**

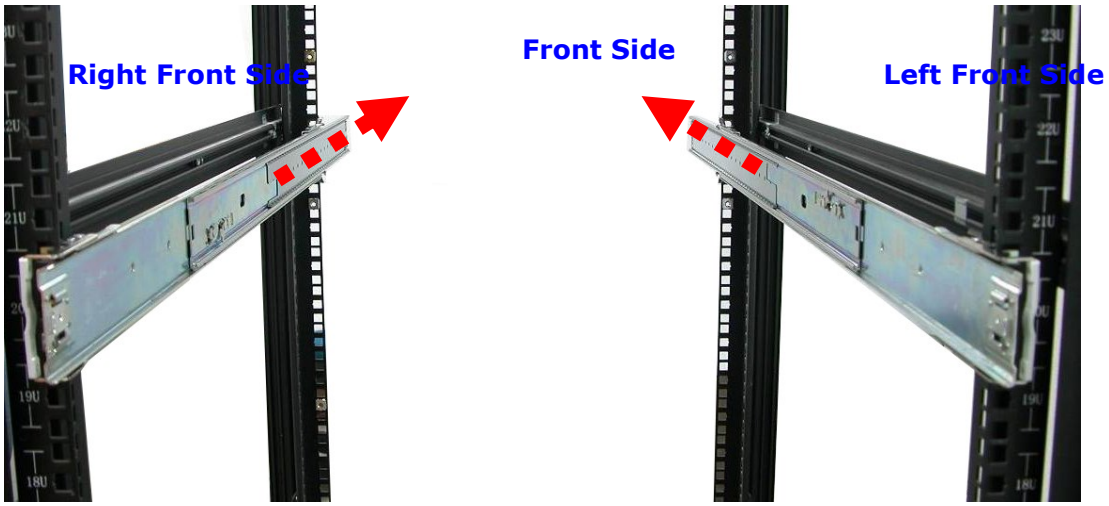



**View from Rear Side of Rear Right Rack Post**

10. Pull the 2 middle rail members out from the rail assembly.



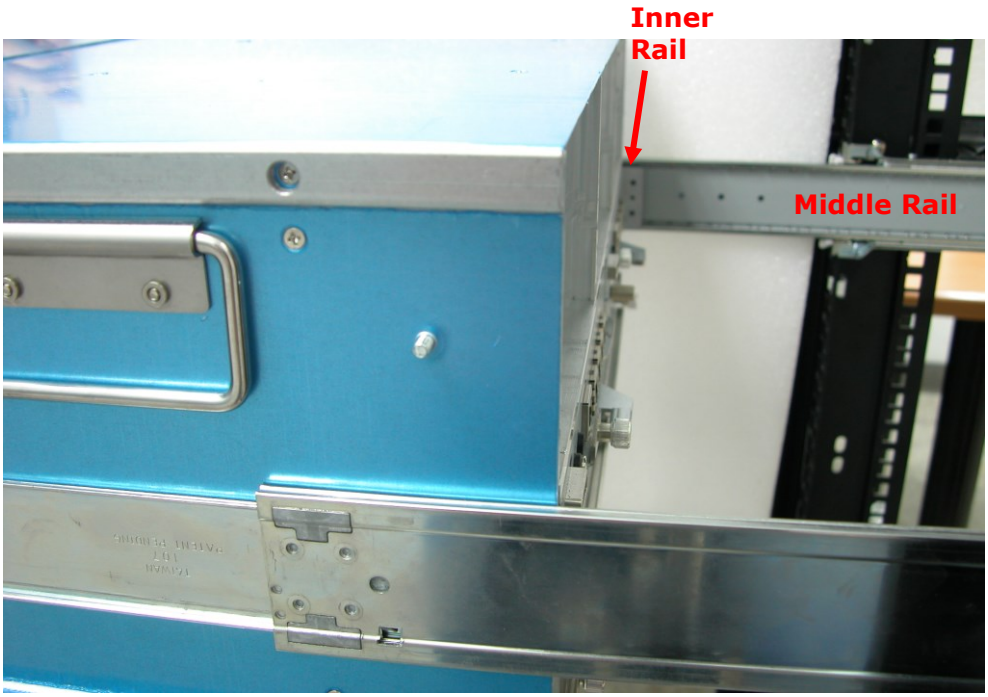

**Middle Rail Member of Rail Assembly on Left Side of Rack**




**View from Rear Side**

11. With at least 4 persons carrying the enclosure, insert the 2 inner rails (attached to the sides of the enclosure) into the middle rails. Slide the enclosure until it stops or about half way through.

**NOTE: Be careful when inserting the 2 inner rails into the middle rails. The 2 inner rails must be parallel with the 2 middle rails so that 2 inner rails will insert and slide easily. Use hands to guide the inner rails when inserted into the middle rails.**

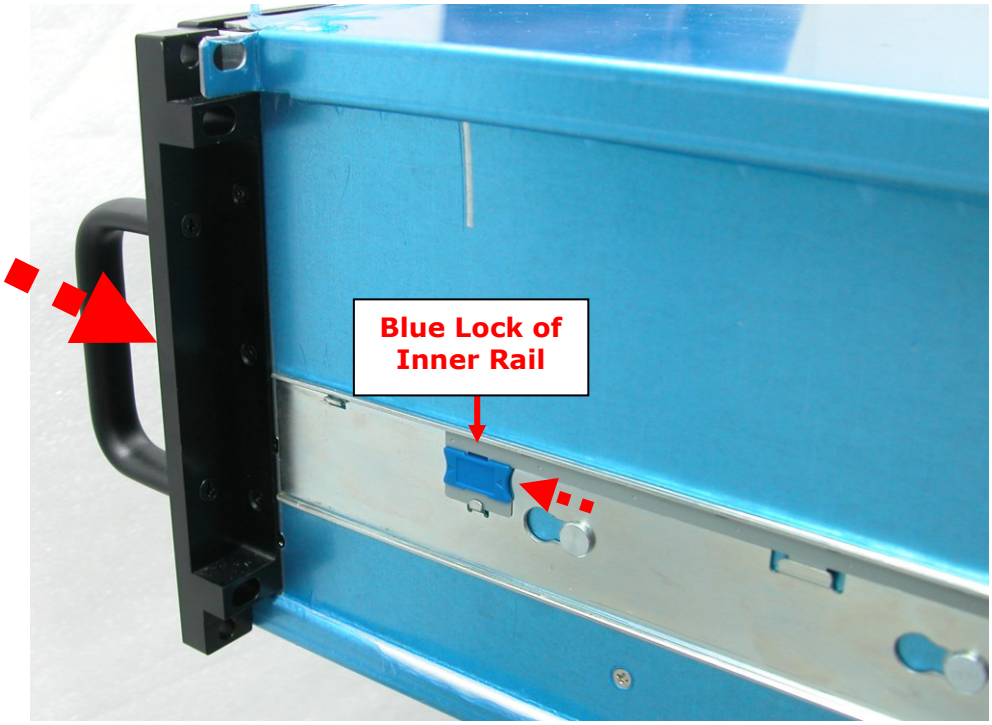



**Inner Rail Aligned with and Inserted into the Middle Rail**

**Important: Make sure to hold the enclosure firmly in level position while inserting the enclosure in the rail. Keep holding the enclosure moved inside the rack. When the half rear side is inside the rack, you can put down the two rear handles but support in the bottom part of the enclosure is still needed so that the enclosure will not drop down.**

**View from Rear Side**

12. Press outwards the blue locks on both sides of the inner rail members at the same time. Then push the enclosure inwards (or backwards) until it goes inside the rack.

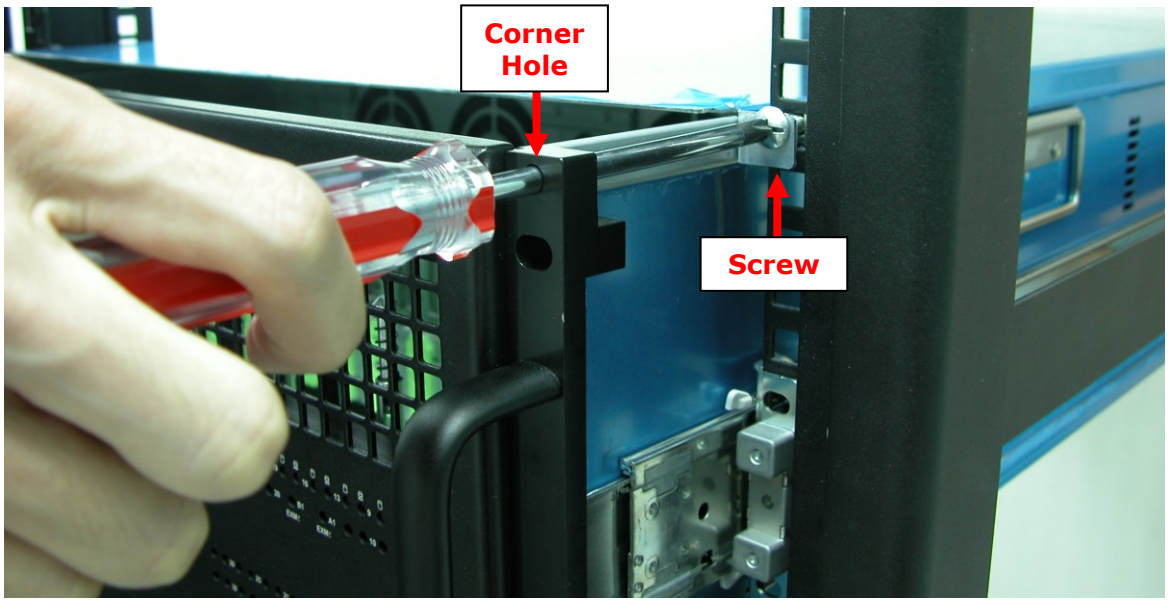



**View from Right Side of Enclosure**
**Blue Lock of Inner Rail is Pushed a Little Outwards and Enclosure is Pushed Inwards**

**View from Rear Side of Rack Cabinet**
**Enclosure is Pushed Inwards**

13. Insert the power supply modules.

14. Use six (6) M5 screws to lock the enclosure into the rack post, one screw in each corner. Note that the screw driver will need to pass through the corner hole of front panel for the two upper corner holes on both sides.





Front Left Side

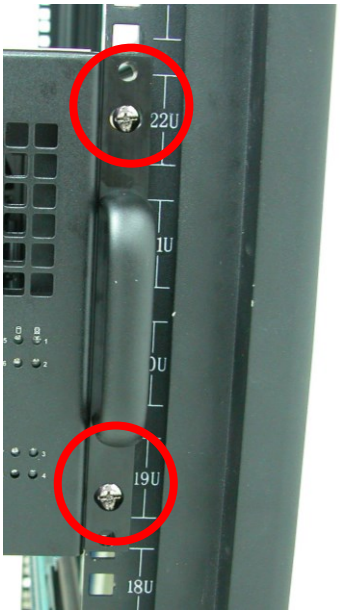

Front Right Side

15. Open the top cover and re-insert the disk drives / disk trays, if disk drives/disk trays were previously removed. Then close the top cover.

## 3.2 Removing the Disk Array from the Rack

1. Remove the six screws in the front corner.


**Front Left Side**

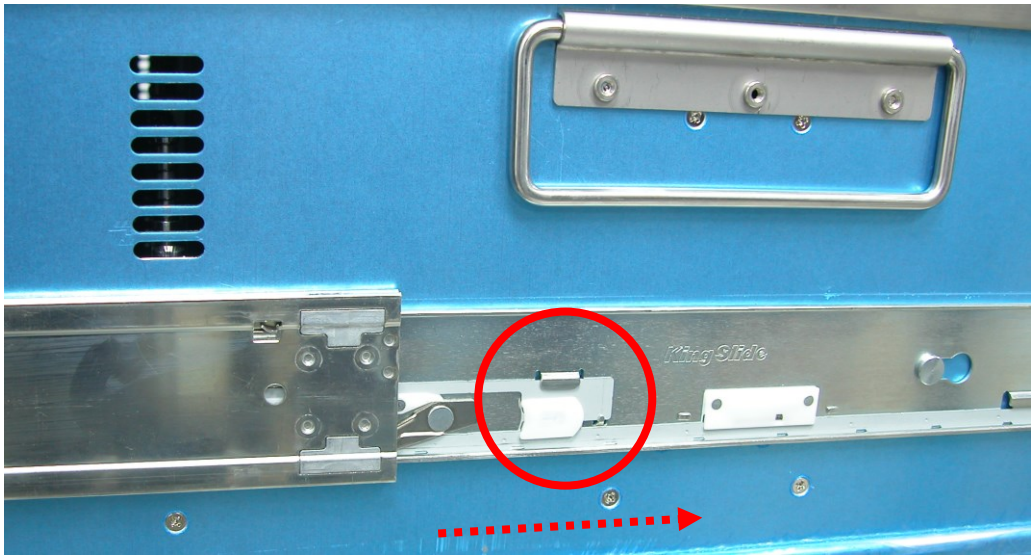



**Front Right Side**

2. Remove the power supplies in the rear and the disk drives from the disk slots.

3. Carefully pull the subsystem.

4. Push the white lock to release the subsystem from the rail.



## 3.3 Preparing the JBOD and Connecting to RAID Subsystem

1. Install the disk drives, if not yet installed. Refer to Section 2.6 Disk Drive Installation for detailed information.
2. Connect one end of SAS cable to the **SAS In Port** of the JBOD subsystem enclosure and the other end to the **SAS Expansion Port** of the RAID subsystem enclosure.

## 3.4 Preparing the JBOD and Connecting to SAS HBA in Host System

1. Install the disk drives, if not yet installed. Refer to Section 2.6 Disk Drive Installation for detailed information.
2. Connect one end of SAS cable to the **SAS In Port** of the JBOD subsystem enclosure and the other end to the SAS HBA on the Host system.

## 3.5 Powering On

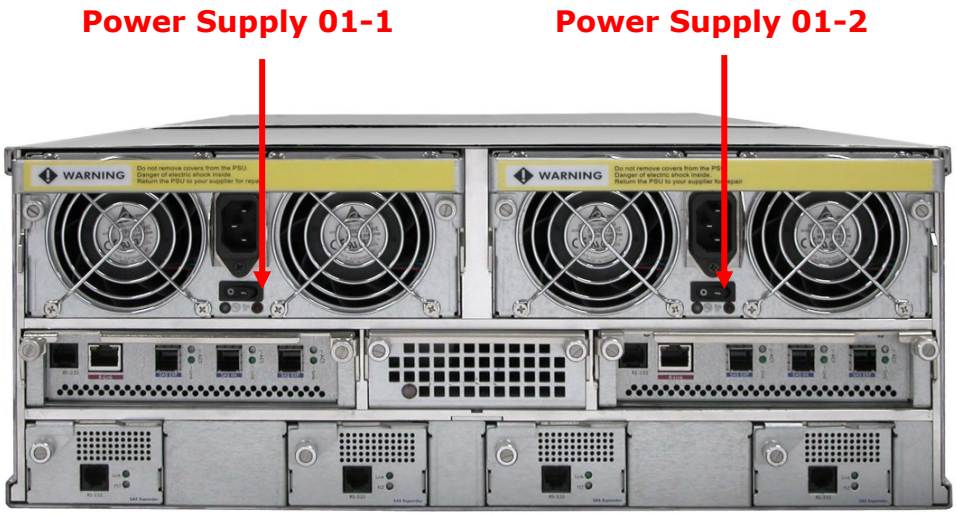
1. Plug in all the power cords into the AC Power Input Socket located at the PSFM.

**NOTE: The subsystem is equipped with redundant, full range power supplies with PFC (power factor correction). The system will automatically select voltage.**

**NOTE: The PSFM has a 5V standby DC voltage. When the power cord(s) is/are connected to the AC Power Input Socket, after 1 second, all Activity LEDs will flash once. When the power cord(s) is/are disconnected from AC Power Input Socket, after 3 seconds, all Activity LEDs will flash twice.**

2. Turn on each Power On/Off Switch of the PSFM. The main switch button in the front panel will still flashing blue.

**NOTE: When the power cord connected from main power source is inserted to the AC Power Input Socket, the Power Status LED becomes RED. When the switch of the PSFM is turned on, the LED still shows RED. After the main switch in front panel is turned on, the LED turns GREEN, which means it is functioning normally.**



3. Push the main switch button in the front panel to power on.


4. Allow the machine a few moments to initialize before using it. The main switch button will continue flashing blue until the system is finished checking each disk slot.

**NOTE: The system will initialize after turning on the Main Switch. Each disk slot will be checked during subsystem initialization.**

5. Configure RAID using the utility options described in the next chapter.

## 3.6 Powering Off

**IMPORTANT: When powering off the Disk Array, turn off first the Main Switch in the front panel and allow at least 3 minutes for the subsystem to shutdown properly. During this time, each disk slot starting from slot #1 until slot #64 will be powered down. The main switch button in the front panel will flash blue.**

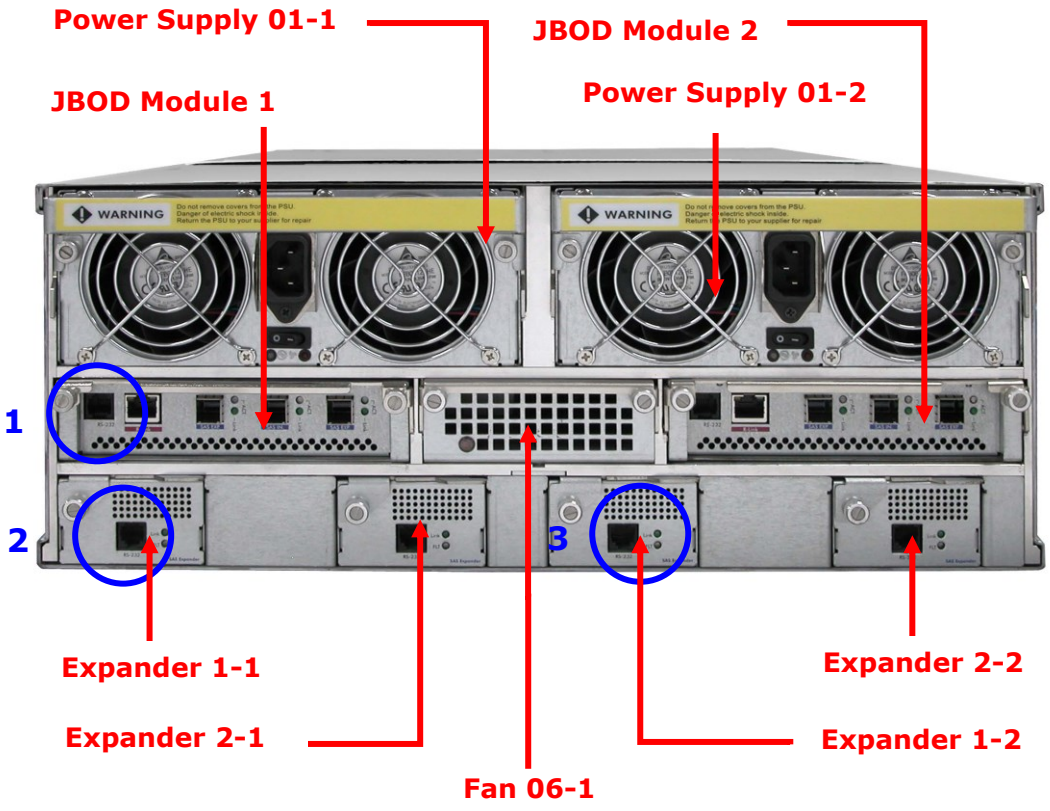
**When Disk Array has totally powered down, turn off the switches of the 2 Power Supply Fan Modules at the rear. The main switch button in the front panel will still flash blue until the power cords are pulled out from the sockets.**

# Chapter 4 Maintenance

## 4.1 Upgrading the JBOD Controller Firmware

**NOTE: The JBOD firmware upgrade procedure must be done three times. First is on the JBOD Controller, next is on the Expander Module 1-1, then last on the Expander Module 1-2.**

**NOTE: There must be no I/O in the disk drives in the JBOD subsystem (RAID volumes should not be accessed) during firmware upgrade.**



**NOTE: It is important to stop I/O access to JBOD subsystem during firmware upgrade.**

**NOTE: Upgrading the firmware must be done from Master JBOD Controller if the JBOD Subsystem has redundant JBOD Controllers.**

1. Please use the RS232 cable (RJ11 to DB9) to JBOD Controller #1 and to connect JBOD RS232 Port and PC COM1 Port (or change to other COM Port as necessary).
2. Open Windows HyperTerminal Program. Connect using COM1 (COM Port used in Step1), Baud Rate: 115200, n, 8, 1, Flow Control: None.
3. Press the Enter key and the password prompt will be displayed.
4. Key in the password (Default password: 00000000) to login to CLI.
5. At CLI prompt, input the command to update firmware.

   a. **CLI> mo**

   Operation Mode: Master, CLI Dual, M.Sensor, I2C
   Operation Mode: Backup
   Operation Mode: Single

   **NOTE:**
   **If Operation Mode is "Master, CLI Dual, M.Sensor, I2C", it means you are connected to Master Expander and you can continue with next steps.**
   **If Operation Mode is "Backup", it means you are connected to Backup Expander. Remove RS232 serial cable and insert to other JBOD RS232 Port.**
   **If Operation Mode is "Single", it means this JBOD subsystem has only one controller, please skip to step D.**

   b. **CLI> mo fdl both**

   c. **CLI> mo**

   Operation Mode: Master, CLI Dual, M.Sensor, I2C, fdl both

d. **CLI>**

**NOTE:**

**"fdl code" is the command to update flash firmware code (.fw file).**

**"fdl mfgb" is the command to update CFG data code (.rom file)**

**Make sure you have both files before updating.**

e. **CLI> fdl mfgb**

Please Use XModem Protocol for File Transmission.

Use Q or q to quit Download before starting XModem.

f. Select Function menu to transfer CFG data .rom file: "Function" ➔ "Transfer" ➔ "Send File" ➔ "Browse" ➔ "Open" and select the .rom file (for example: **8018-mfgdat12-20140822.rom)** firmware folder location. Select "Xmodem" Protocol to send firmware file (**Only need about 60 seconds to finish sending firmware file. If not, please repeat steps E again**).

Note. If won't to transfer CFG data .rom file, Press Q or q to quit Download before starting data transfer.

g. **CLI>fdl code**

Please Use XModem Protocol for File Transmission.

Use Q or q to quit Download before starting XModem.

h. Select Functon menu to transfer firmware file: "Function" ➔ "Transfer" ➔ "Send File" ➔ "Browse" ➔ "Open" and select the .fw file (for example: **8018-03.B0.00.1F-20140822.fw)** from firmware folder location. Select "Xmodem" Protocol to send firmware file (**Only need about 60 seconds to finish sending firmware file. If not, please repeat steps G again**).

Note. If won't to transfer firmware data .fw file, Press Q or q to quit Download before starting data transfer.

i. Use "reset" command to Restart JBOD or power cycle

j. Re-login to JBOD CLI.

k. Use "sys" command to verify JBOD firmware version.
**CLI>sys**

l. If needed, the "reset" command can also be used to restart the JBOD controller. (Normally used in single JBOD Controller mode, If already to connect to Controller )

**CLI>reset**