

SAS to SAS/SATA JBOD Subsystem

User Manual

Revision 1.0

Table of Contents

Chapter 1 Introduction.....	3
1.1 Features.....	4
1.2 Technical Specifications.....	5
1.3 Terminologies.....	6
Chapter 2 Getting Started	7
2.1 Unpacking the JBOD Subsystem	7
2.2 Identifying Parts of the JBOD Subsystem.....	8
2.2.1 Front View	8
2.2.2 Rear View.....	9
2.2.3 JBOD Controller Module	10
2.2.3.1 JBOD Controller Panel.....	10
2.3 Power Supply Fan Module (PSFM)	11
2.3.1 PSFM Panel.....	12
2.4 LCD Display Panel.....	13
2.4.1 LCD Panel LED.....	13
2.4.2 LCD Panel Function Buttons.....	14
2.5 Drive Carrier Module	15
2.5.1 Disk Drive Status Indicators.....	15
2.5.2 Drive Carrier Lock Indicator.....	16
Chapter 3 Installation of JBOD Subsystem.....	17
3.1 Powering On	17
3.2 Disk Drive Installation.....	18
3.2.1 Installing a SAS Disk Drive in a Disk Tray.....	18
3.2.2 Installing a SATA Disk Drive (Dual JBOD Controller Mode) in a Disk Tray	21
3.3 Connecting the JBOD Subsystem.....	25
3.3.1 Connecting to RAID Subsystem.....	25
Chapter 4 Quick Setup.....	26
4.1 Management Interfaces.....	26
4.1.1 LCD Control Module (LCM)	26
4.2 Connecting JBOD to RAID Controller.....	28

Chapter 1 Introduction



The 16 bays EPICa JBOD Subsystem

The EPICa EP-3164J1/JD1-S6S6 is a 19-inch 3U 16 bays rackmount JBOD unit. It features the latest SAS II (6Gb/s) interface. It designed to fit in with the environments which needed highly reliable and relentless data growth. The EP-3164J1/JD1-S6S6 is also a versatile SAS / SATA Disk Expansion system, ideal for high capacity and scalability storage in IT demands. Based on the 6G SAS technology, the EP-3164J1/JD1-S6S6 supports the choice of SAS and SATA drive configurations to deliver the best cost-performance index with higher bandwidth.

1.1 Features

- 16 hot-swappable drive bays in a rackmount 3U chassis
- Simultaneously support SAS or SATA disks
- Each SAS JBOD controller module consist of two 6G mini SAS (4x) port
- Power Supply and cooling system contained in 1 module for efficient cooling
- Two 460W redundant hot swappable power supplies
- Incorporates a cableless design for maximum signal integrity
- Utilizes industry-standard SCSI Enclosure Services 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

1.2 Technical Specifications

Model	EP-3164J1/JD1-S6S6
RAID Controller	JBOD
Controller	Single/Dual
Host Interface	One / Two 4x mini SAS (6Gb/s)
Disk Interface	SAS 3Gb/6Gb or SATA II/III *
SAS expansion	One / Two 4x mini SAS (6Gb/s)
S.M.A.R.T. support	Yes
Platform	Rackmount
Form Factor	3U
# of Hot Swap Trays	16
Tray Lock	Yes
Disk Status Indicator	Access / Fail LED
Backplane	SAS / SATA Single BP
# of PS/Fan Modules	460W x 2 w/PFC
# of Fans	2
Power requirements	AC 90V ~ 264V Full Range, 10A ~ 5A, 47Hz ~ 63Hz
Relative Humidity	10% ~ 85% Non-condensing
Operating Temperature	10°C ~ 40°C (50°F ~ 104°F)
Physical Dimension	555(L) x 482(W) x 131(H) mm
Weight (Without Disk)	19/20.5 Kg

* Request optional dongle board for SATA II/III hard drive

1.3 Terminologies

The document uses the following terms:

- **Part 1: Common**

RAID	Redundant Array of Independent Disks. There are different RAID levels with different degree of data protection, data availability, and performance to host environment.
JBOD	The abbreviation of “ Just a Bunch Of Disks ”. JBOD needs at least one hard drive.
SCSI	Small Computer Systems Interface.
SAS	Serial Attached SCSI.
S.M.A.R.T.	Self-Monitoring Analysis and Reporting Technology.
WWN	World Wide Name.
HBA	Host Bus Adapter.





- **Part 2: Dual controller**

SBB	Storage Bridge Bay. The objective of the Storage Bridge Bay Working Group (SBB) is to create a specification that defines mechanical, electrical and low-level enclosure management requirements for an enclosure controller slot that will support a variety of storage controllers from a variety of independent hardware vendors (“IHVs”) and system vendors.
Dongle Board	SATA Dongle board is for SATA II disk connection to the dual controller backplane.
Bridge Board	SAS-SATA Bridge board is for SATA II disk connection to the dual JBOD backplane.

Chapter 2 Getting Started

2.1 Unpacking the JBOD Subsystem

The shipping package contains the following:

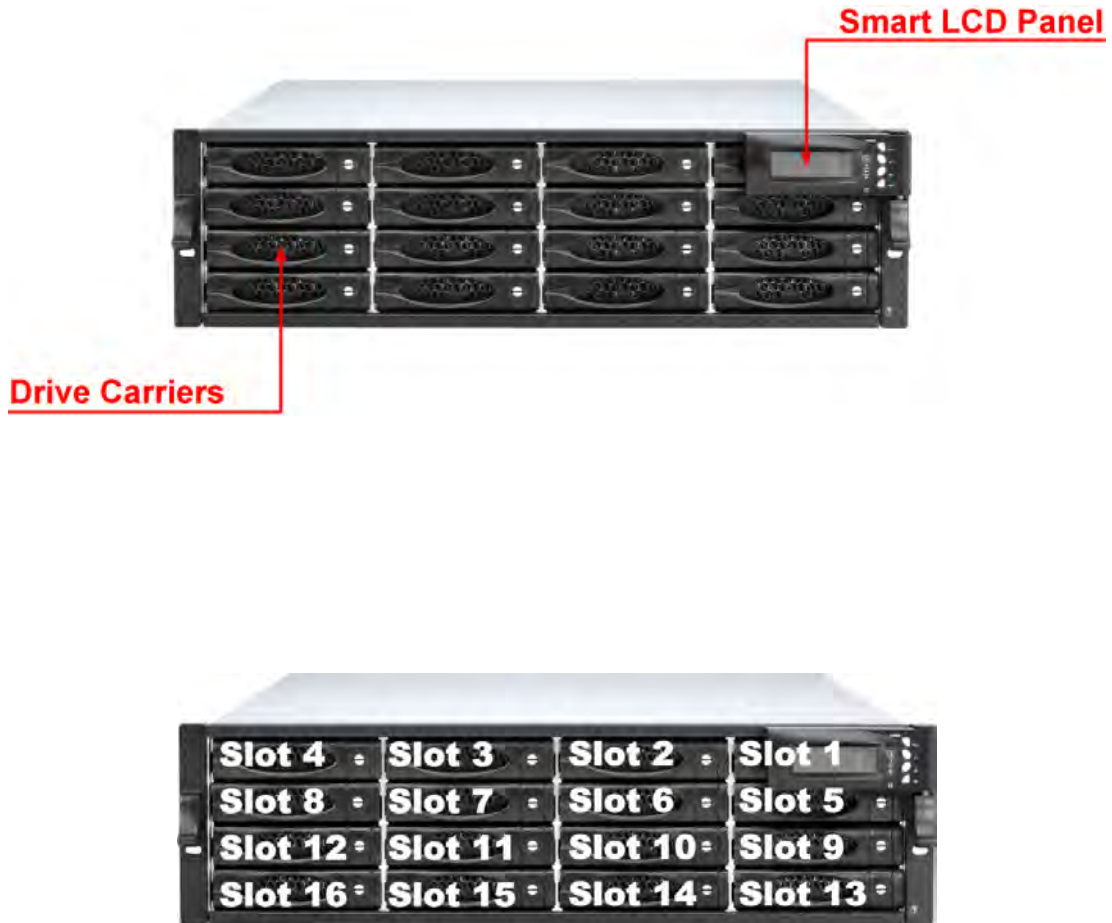
	JBOD Subsystem Unit
	Two (2) power cords
	One (1) external Mini SAS cable SFF-8088 to SFF-8088 for single controller Note: Two (2) external Mini SAS cables SFF-8088 to SFF-8088 for dual controller
	User Manual

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

2.2 Identifying Parts of the JBOD Subsystem

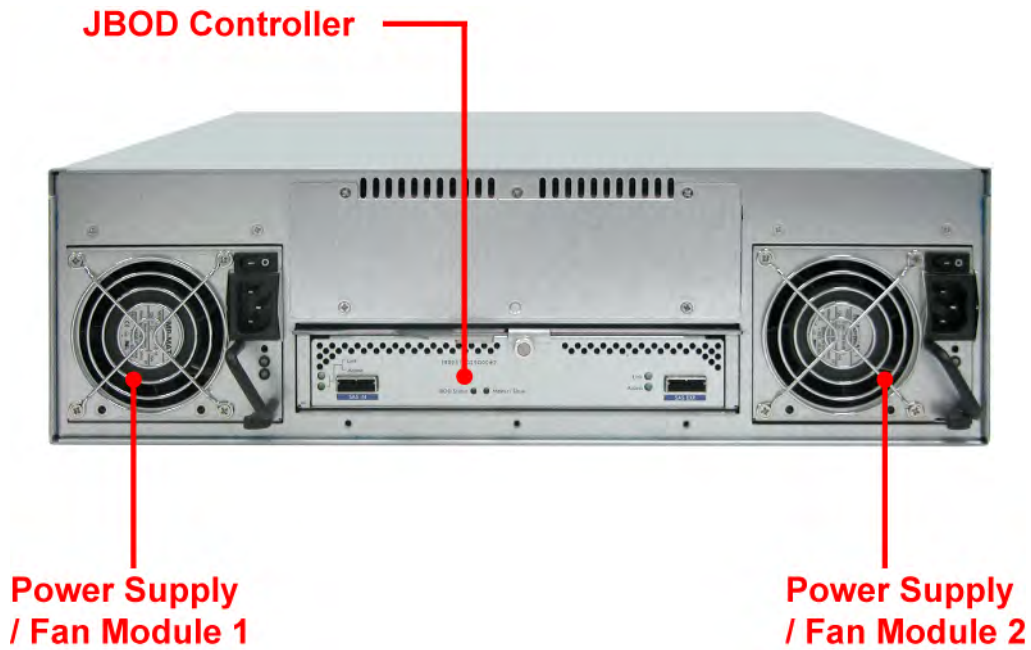
The illustrations below identify the various parts of the expansion chassis.

2.2.1 Front View

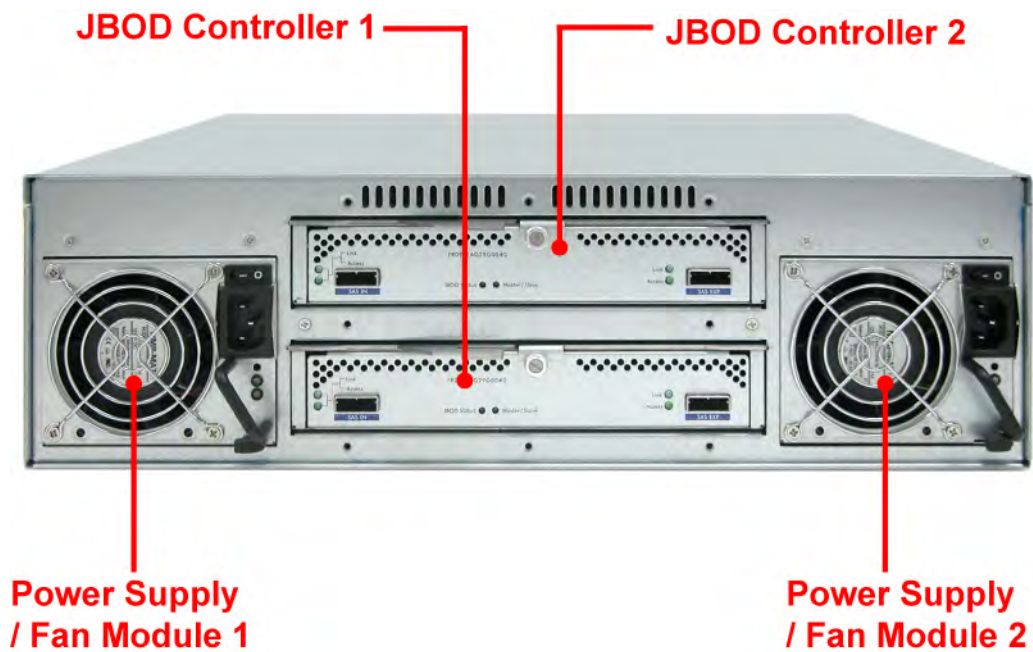


2.2.2 Rear View

Single Controller



Dual Controller

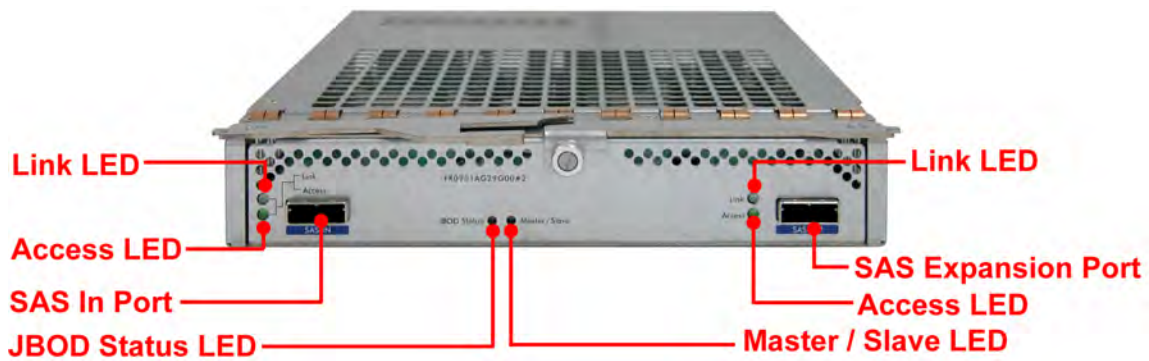


2.2.3 JBOD Controller Module



JBOD Controller Module

2.2.3.1 JBOD Controller Panel



Part	Description
SAS In Port	Use to connect to RAID subsystem's SAS Expansion Port.
SAS Expansion Port	Use to connect to the SAS In Port of another JBOD subsystem.

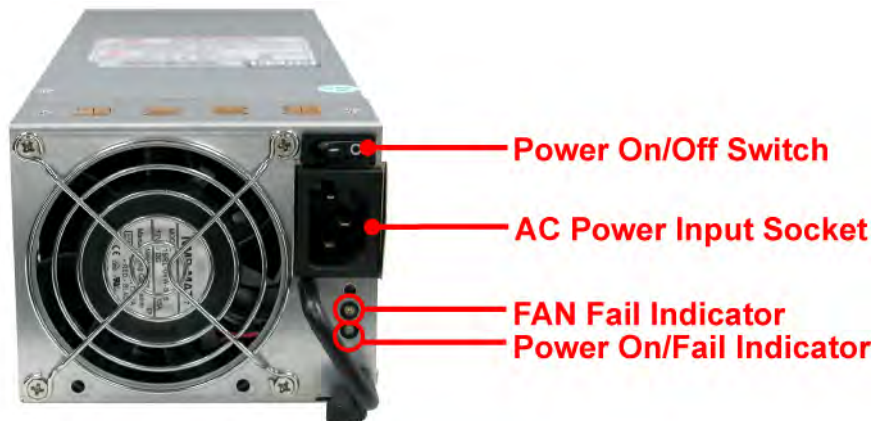
Indicator	Color	Description
Master/Slave LED	Green	Indicates the master controller; Off indicates the slave controller.
JBOD Status LED	Green	Indicates controller status normal or in the booting state.
Link LED	Blue	Indicates expander has connected or linked.
Access LED	Blinking Green	Indicates the expander is busy and being accessed.

2.3 Power Supply Fan Module (PSFM)

The RAID subsystem contains **two 460W Power Supply / Fan Modules**. All the Power Supply / Fan Modules (PSFM) are inserted into the rear of the chassis.



2.3.1 PSFM Panel



The panel of the Power Supply/Fan Module contains: the Power On/Off Switch, the AC Inlet Plug, FAN fail Indicator, and a Power On/Fail Indicator showing the Power Status LED, indicating ready or fail.

Each fan within a PSFM is powered independently of the power supply within the same PSFM. So if the power supply of a PSFM fails, the fan associated with that PSFM will continue to operate and cool the enclosure.

FAN Fail Indicator

If fan is failed, this LED will turn to **RED** and alarm will sound.

Power On/Fail Indicator

When the power cord connected from main power source is inserted to the AC Power Inlet, the power status LED becomes **RED**. When the switch of the PSFM is turned on, the LED will turn **GREEN**. When the Power On/Fail LED is **GREEN**, the PSFM is functioning normally.



NOTE: Each PSFM has one Power Supply and one Fan. The PSFM 1 has Power#1 and Fan#1. The PSFM 2 has Power#2 and Fan#2. When the Power Supply of a PSFM fails, the PSFM need not be removed from the slot if replacement is not yet available. The fan will still work and provide necessary airflow inside the enclosure.







NOTE: After replacing the Power Supply Fan Module and turning on the Power On/Off Switch of the PSFM, the Power Supply will not power on immediately. The Fans in the PSFM will spin-up until the RPM becomes stable. When Fan RPM is already stable, the RAID controller will then power on the Power Supply. This process takes more or less 30 seconds. This safety measure helps prevent possible Power Supply overheating when the Fans cannot work.

2.4 LCD Display Panel



2.4.1 LCD Panel LED



Parts	Function
Power LED	Green indicates power is ON.
Power Fail LED 	If one of the redundant power supply unit fails, this LED will turn to RED and alarm will sound.
Fan Fail LED 	Turn RED when fan fails.
Over Temperature LED 	If disk temperatures exceed 65°C, the Over Temperature LED will turn RED and alarm will sound.
Voltage Warning LED 	An alarm will sound if detected voltage in the controller is abnormal and LED will turn RED.

2.4.2 LCD Panel Function Buttons



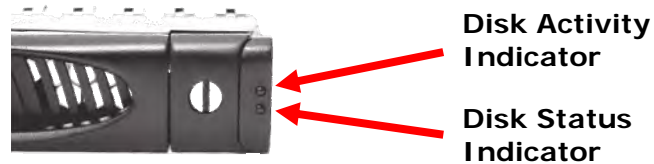
Parts		Function
Up and Down Arrow buttons	▲ ▼	Use the Up or Down arrow keys to go through the information on the LCD screen. This is also used to move between each menu.
Select button	✓	This is used to enter the option you have selected.
Exit button	EXIT	Press this button to return to the previous menu.

2.5 Drive Carrier Module

The Drive Carrier Module houses a 3.5 inch hard disk drive. It is designed for maximum airflow and incorporates a carrier locking mechanism to prevent unauthorized access to the HDD.



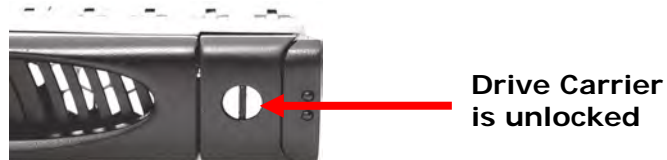
2.5.1 Disk Drive Status Indicators



Part	Function
Disk Activity Indicator	This LED will blink blue when the hard drive is being accessed.
Disk Status Indicator	Green LED indicates power is on and hard drive status is good for this slot. If hard drive is defective or failed, the LED is Red. LED is off when there is no hard drive.

2.5.2 Drive Carrier Lock Indicator

Every Drive Carrier is lockable and is fitted with a lock indicator to indicate whether or not the carrier is locked into the chassis or not. Each carrier is also fitted with an ergonomic handle for easy carrier removal.



When the Lock Groove is vertical, then the Drive Carrier is unlocked.



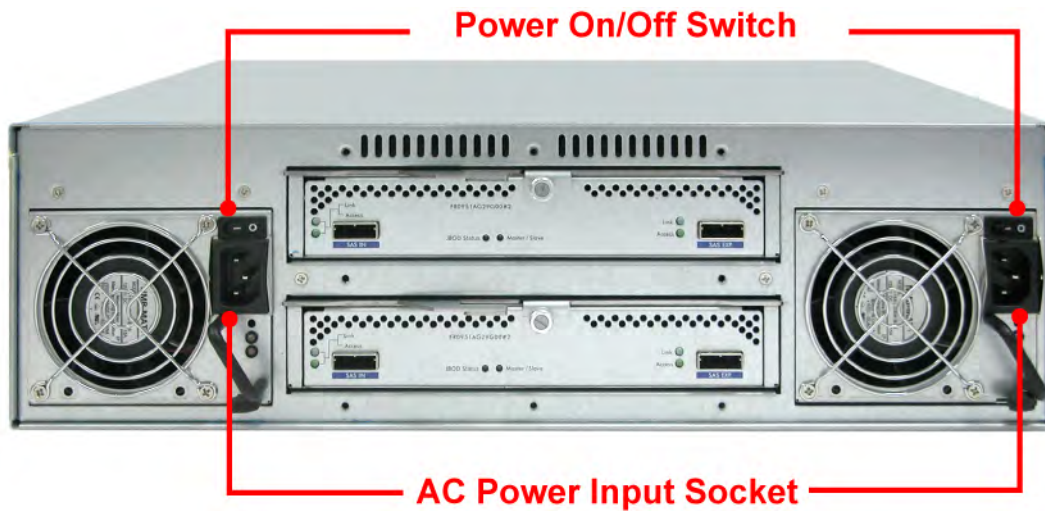
When the Lock Groove is horizontal, this indicates that the Drive Carrier is locked.

Lock and unlock the Drive Carriers by using a flat-head screw driver.

Chapter 3 Installation of JBOD Subsystem

3.1 Powering On

1. Plug in the power cords into the AC Power Input Socket located at the rear of the subsystem.



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

2. Turn on each Power On/Off Switch to power on the subsystem.
3. The Power LED on the front panel will turn green.

3.2 Disk Drive Installation

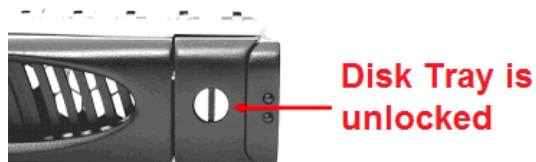
This section describes the physical locations of the hard drives supported by the subsystem and give instructions on installing a hard drive. The subsystem supports hot-swapping allowing you to install or replace a hard drive while the subsystem is running.

3.2.1 Installing a SAS Disk Drive in a Disk Tray

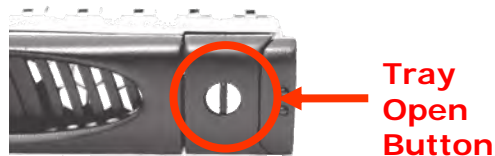


NOTE: These steps are the same when installing SATA disk drive in Single Controller Mode.

1. Unlock the Disk Trays using a flat-head screw driver by rotating the Lock Groove.



2. Press the Tray Open button and the Disk Tray handle will flip open.



3. Pull out an empty disk tray.



4. Place the hard drive in the disk tray. Turn the disk tray upside down. Align the four screw holes of the SAS disk drive in the four Hole A of the disk tray. To secure the disk drive into the disk tray, tighten four screws on these holes of the disk tray. Note in the picture below where the screws should be placed in the disk tray holes.



NOTE: All the disk tray holes are labelled accordingly.




5. Slide the tray into a slot.
6. Press the lever in until you hear the latch click into place. The HDD Fault LED will turn green when the subsystem is powered on and HDD is good.
7. If necessary, lock the Disk Tray by turning the Lock Groove.

3.2.2 Installing a SATA Disk Drive (Dual JBOD Controller Mode) in a Disk Tray

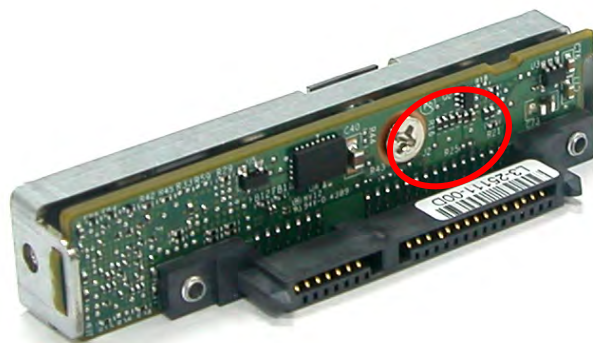
1. Remove an empty disk tray from the subsystem.



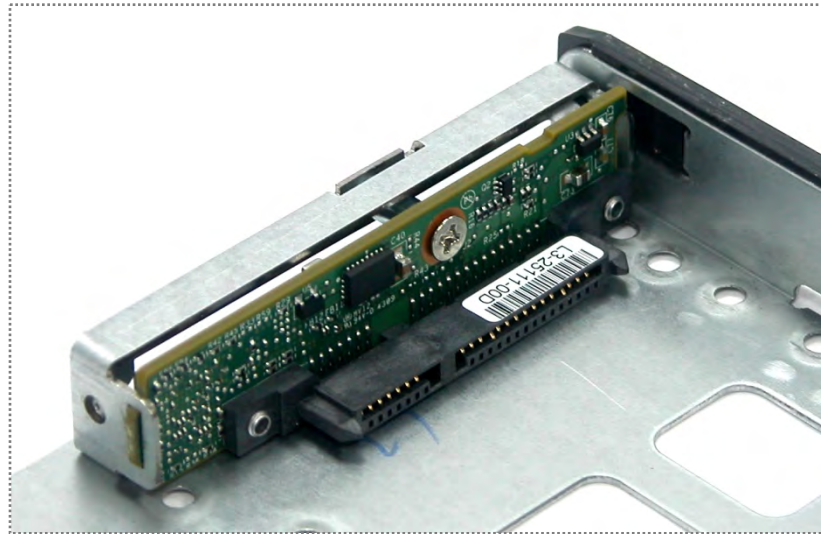
2. Prepare the dongle board the Fixed Bracket, and screws.

	Fixed Bracket
	6G Dongle Board
	Screws

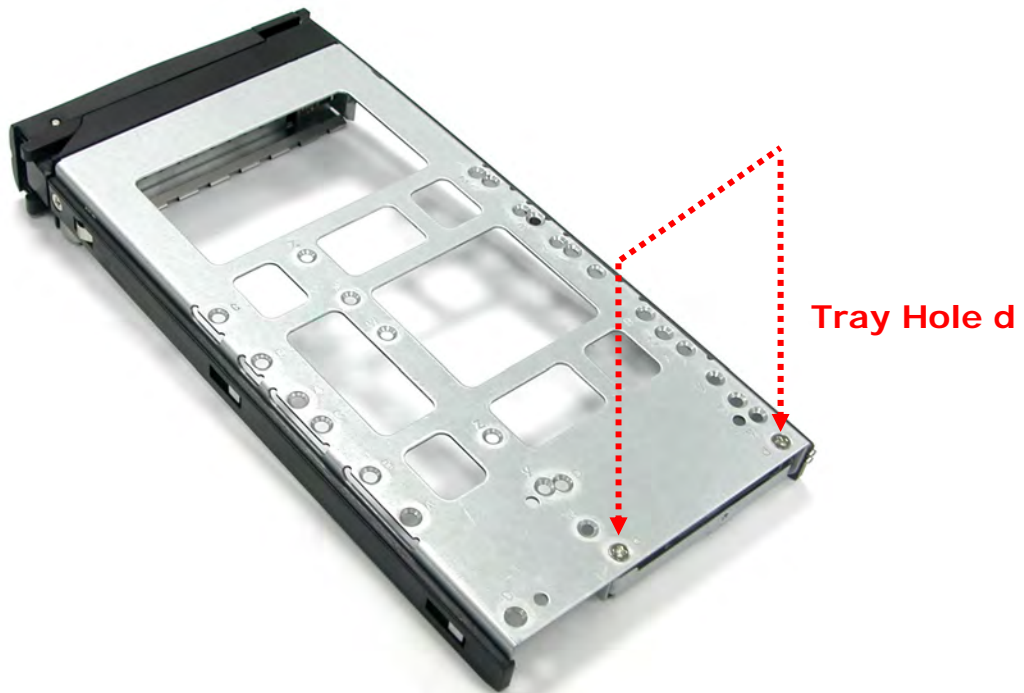
3. Attach the dongle board in the Fixed Bracket with a screw.



4. Place the Fixed Bracket with the dongle board in the disk tray as shown.



5. Turn the tray upside down. Align the holes of the Fixed Bracket in the two *Hole d* of the disk tray. Tighten two screws to secure the Fixed Bracket into the disk tray.

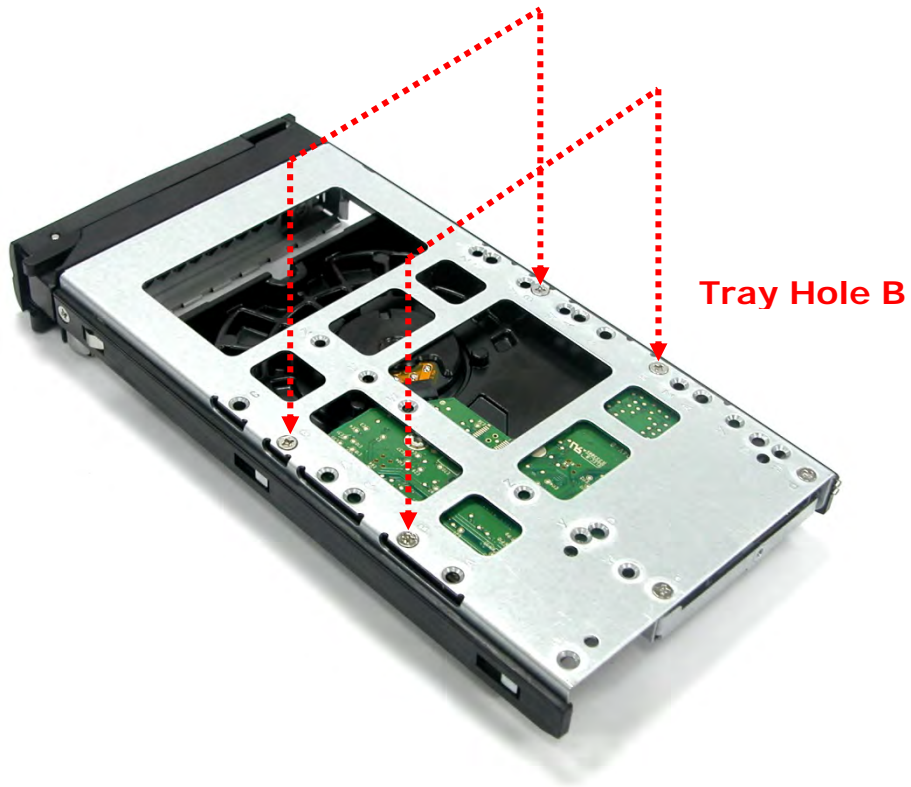


NOTE: All the disk tray holes are labelled accordingly.

6. Place the SATA disk drive into the disk tray. Slide the disk drive towards the dongle board.



7. Turn the disk tray upside down. Align the four screw holes of the SATA disk drive in the four *Hole B* of the disk tray. To secure the disk drive into the disk tray, tighten four screws on these holes of the disk tray. Note in the picture below where the screws should be placed in the disk tray holes.



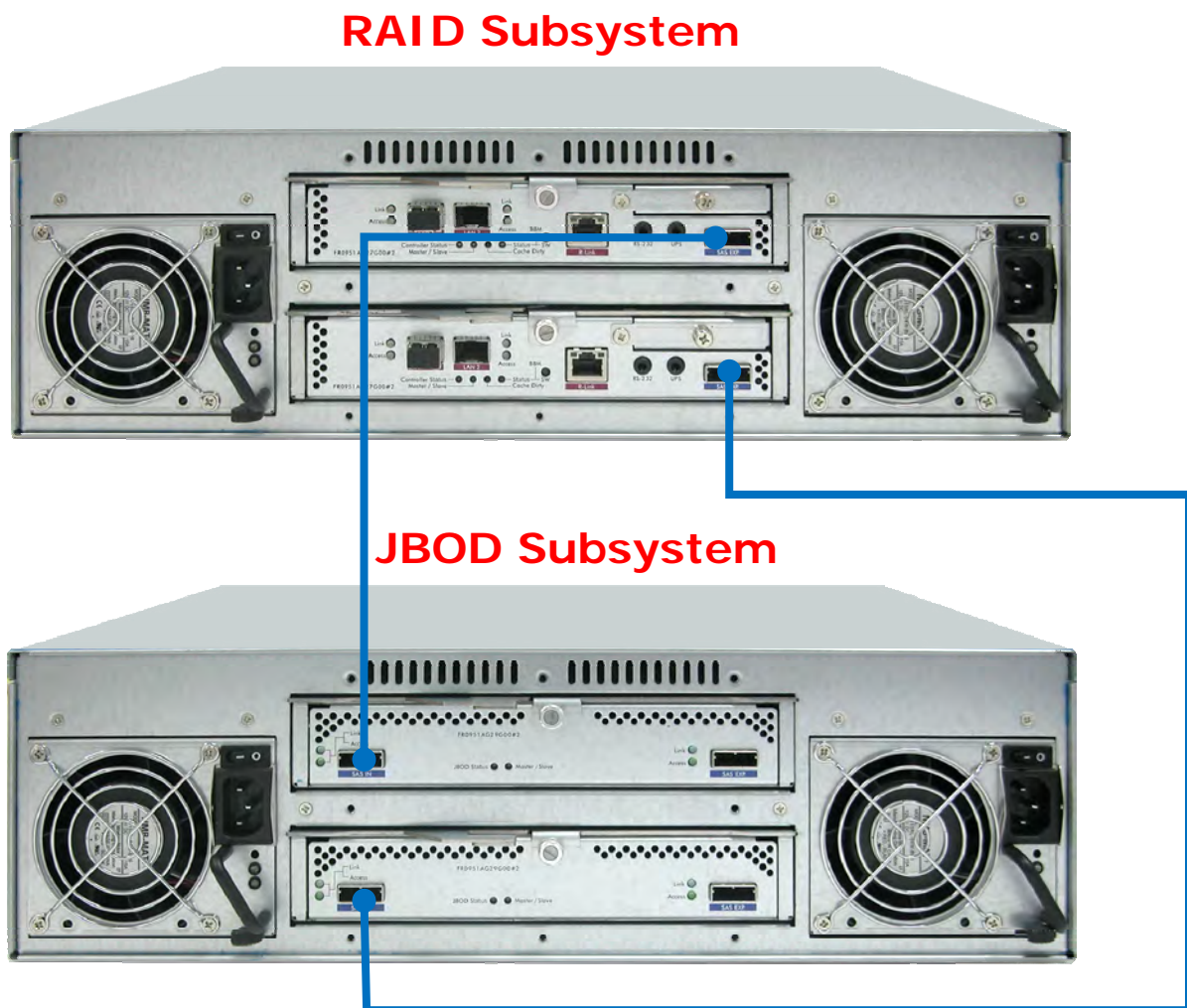
NOTE: All the disk tray holes are labelled accordingly.

8. Insert the disk tray into the subsystem.

3.3 Connecting the JBOD Subsystem

3.3.1 Connecting to RAID Subsystem

Attach one end of the SAS cable to the SAS IN Port of the JBOD controller module and the other end to the SAS Expansion Port on the RAID controller of RAID subsystem. If configured in redundant mode, connect the other SAS cable to the SAS IN Port of the other JBOD controller, and the other end to the SAS Expansion Port on the other RAID controller of RAID subsystem.



An Example of JBOD Subsystem Connection

Chapter 4 Quick Setup

4.1 Management Interfaces

There is only one management method to manage the dual JBOD controller, described as follows:

4.1.1 LCD Control Module (LCM)

After booting up the system, the LCD display will show the JBOD subsystem model name and WWN (World Wide Name or SAS address):

Model Name WWN

Press **"ENT"**, the LCM functions **"Alarm From"**, **"Alarm Mute"**, **"Enclosure"**, and **"System Reset"** will rotate by pressing **▲** (up) and **▼** (down).

The following table is function description of each item.

- **LCM operation description:**

FW Version	Firmware version of controller.
Alarm From	Alarm from power supply, cooling fan, thermal sensor or voltage sensor.
Enclosure	Status of power supply, cooling fan, thermal sensor and voltage sensor.
System Reset	Reset controller.
Shutdown	Shutdown controller.

- LCM menu hierarchy:

Model Name / WWN	FW Version	x.x.x	
	[Alarm From]	[Alarm From] xxxxxx	
	[Enclosure]	[Power Supply] Good/Fail	[▼PSU1] [O/X] [▲PSU2] [O/X]
		[Cooling Fan] Good/Fail	[▼Fan 1] xxxx rpm [O/X] [▲Fan 2] xxxx rpm [O/X]
		[Thermal Sensor] Good/Fail	[▼Temperature 1] xx °C [O/X] [▼▲Temperature 2] xx °C [O/X] [▼▲Temperature 3] xx °C [O/X] [▲Temperature 4] xx °C [O/X] ...
		[Voltage Sensor] Good/Fail	[▼Voltage 1] x.xx V [O/X] [▼▲Voltage 2] x.xx V [O/X] [▼▲Voltage 3] x.xx V [O/X] [▼▲Voltage 4] x.xx V [O/X] [▼▲Voltage 5] x.xx V [O/X] [▼▲Voltage 6] x.xx V [O/X] [▲Voltage 7] x.xx V [O/X]
	[System Reset]	[▼Yes No▲]	
	[Shutdown]	[▼Yes No▲]	

4.2 Connecting JBOD to RAID Controller

iSCSI RAID controller supports SAS JBOD expansion to connect extra SAS dual JBOD controller. When connecting a dual JBOD controller which can be detected in RAID Subsystem management GUI, it will be displayed in **“Show PD for:”** under **“/ Volume configuration / Physical disk”** menu. For example, Local, JBOD 1, JBOD 2, ...etc. Local means disks located in local RAID subsystem, JBOD 1 means disks located in first JBOD subsystem, and so on. The hard drives in JBOD can be used as local disks.

Physical disk														
RAID group		Virtual disk		Snapshot		Logical unit		QReplica						
Show PD for: - JBOD 1 (proIPS EP-3164JD-S6S6 v1.0.1) 5001378004B50190 - - Local - - JBOD 1 (proIPS EP-3164JD-S6S6 v1.0.1) 5001378004B50190 - - JBOD 2 (proIPS EP-3164JD-S6S6 v1.0.1) 5001378004B50380 - - JBOD 3 (proIPS EP-3164JD-S6S6 v1.0.1) 5001378004B501E0 -														
										Show size unit as: (GB)				
OP	Slot	Size	RAID group	Virtual disk	Status	Health	RAID type	WDC	Serial	Type	Write cache	Standby	Readahead	Command queuing
OP	1	558	r50-1	Online	Good	RAID disk	WDC	WD-WXM1E60RW203	SATA2	Enabled	Disabled	Enabled	Disabled	
OP	3	465	r6-3	Online	Good	RAID disk	WDC	WD-WCASY3223587	SATA2	Enabled	Disabled	Enabled	Disabled	
OP	4	465	r6-3	Online	Good	RAID disk	WDC	WD-WMAYP0015736	SATA2	Enabled	Disabled	Enabled	Disabled	
OP	5	558	r50-1	Online	Good	RAID disk	WDC	WD-WXM1E6070999	SATA2	Enabled	Disabled	Enabled	Disabled	
OP	7	232		Online	Good	Free disk	Seagate	9QE6T6DW	SATA2	Enabled	Disabled	Enabled	Disabled	
OP	8	465	r6-3	Online	Good	RAID disk	WDC	WD-WMAYP0015949	SATA2	Enabled	Disabled	Enabled	Disabled	
OP	9	558	r50-1	Online	Good	RAID disk	WDC	WD-WXM1E6070513	SATA2	Enabled	Disabled	Enabled	Disabled	
OP	12	465	r6-3	Online	Good	RAID disk	WDC	WD-WMAYP0014684	SATA2	Enabled	Disabled	Enabled	Disabled	
OP	13	558	r50-1	Online	Good	RAID disk	WDC	WD-WXM1E6071038	SATA2	Enabled	Disabled	Enabled	Disabled	
OP	15	232		Online	Good	Free disk	Seagate	5QE6FK6D	SATA2	Enabled	Disabled	Enabled	Disabled	
OP	16	465	r6-3	Online	Good	RAID disk	WDC	WD-WMAYP0015624	SATA2	Enabled	Disabled	Enabled	Disabled	

“/ Enclosure management / Hardware monitor” can display the hardware status of SAS JBODs.

Hardware monitor UPS SES S.M.A.R.T.

Show information for: - JBOD 1 (proIPS EP-3164JD-S6S6 v1.0.1) 5001378004B50190 -

Controller 1 (50013780049007BD)

<< first < prev 1 2 next > last >>

Type	Item	Value	Status
Voltage	PSU +3.3V(R6R)	3.36 V	OK
Voltage	PSU +5V(R6R)	5.10 V	OK
Voltage	PSU +12V(R6R)	12.31 V	OK
Voltage	+1.0V (Onboard)	0.99 V	OK
Voltage	+1.8V (Onboard)	1.84 V	OK
Voltage	+3.3V (Onboard)	3.34 V	OK
Voltage	+5V (Onboard)	5.10 V	OK
Voltage	+12V (Onboard)	12.27 V	OK
Temperature	Location 1(R6R)	26.0 (C)	OK
Temperature	Location 2(R6R)	25.0 (C)	OK
Temperature	Location 3(R6R)	26.0 (C)	OK
Temperature	Location 4(R6R)	26.0 (C)	OK
Temperature	Location 5(R6R)	26.0 (C)	OK
Temperature	Location 6(R6R)	24.0 (C)	OK
Temperature	Location 7(R6R)	26.0 (C)	OK
Temperature	Location 8(R6R)	27.0 (C)	OK
Temperature	Location 9(R6R)	26.0 (C)	OK
Temperature	Location 10(R6R)	24.0 (C)	OK
Temperature	Location 11(R6R)	26.0 (C)	OK
Temperature	Location 12(R6R)	28.0 (C)	OK

<< first < prev 1 2 next > last >>

Controller 2 (500137800490057D)

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Type	Item	Value	Status
Voltage	PSU +3.3V(R6R)	3.36 V	OK
Voltage	PSU +5V(R6R)	5.10 V	OK
Voltage	PSU +12V(R6R)	12.31 V	OK
Voltage	+1.0V (Onboard)	1.01 V	OK
Voltage	+1.8V (Onboard)	1.84 V	OK
Voltage	+3.3V (Onboard)	3.36 V	OK
Voltage	+5V (Onboard)	5.12 V	OK
Voltage	+12V (Onboard)	12.27 V	OK
Temperature	Location 1(R6R)	26.0 (C)	OK
Temperature	Location 2(R6R)	25.0 (C)	OK
Temperature	Location 3(R6R)	26.0 (C)	OK
Temperature	Location 4(R6R)	26.0 (C)	OK
Temperature	Location 5(R6R)	26.0 (C)	OK
Temperature	Location 6(R6R)	24.0 (C)	OK
Temperature	Location 7(R6R)	26.0 (C)	OK
Temperature	Location 8(R6R)	27.0 (C)	OK
Temperature	Location 9(R6R)	26.0 (C)	OK
Temperature	Location 10(R6R)	24.0 (C)	OK
Temperature	Location 11(R6R)	26.0 (C)	OK
Temperature	Location 12(R6R)	28.0 (C)	OK

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Hardware monitor UPS SES S.M.A.R.T.

Show information for: - JBOD 1 (proIPS EP-3164JD-S6S6 v1.0.1) 5001378004850190 -

Controller 1 (50013780049007BD)

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Type	Item	Value	Status
Temperature	Location 13(R6R)	26.0 (C)	OK
Temperature	Location 14(R6R)	24.0 (C)	OK
Temperature	Location 15(R6R)	26.0 (C)	OK
Temperature	Location 16(R6R)	28.0 (C)	OK
Temperature	Onboard 1	71.0 (C)	OK
Temperature	Onboard 2	40.0 (C)	OK
Temperature	Onboard 3	37.0 (C)	OK
Power Supply	PSU 1	N/A	OK
Power Supply	PSU 2	N/A	OK
Cooling	FAN 1	4380 RPM	OK
Cooling	FAN 2	4380 RPM	OK
Cooling	FAN 3	4440 RPM	OK
Cooling	FAN 4	3970 RPM	OK

<< first < prev 1 2 next > last >>

Controller 2 (500137800490057D)

<< first < prev 1 2 next > last >>

Type	Item	Value	Status
Voltage	PSU +3.3V(R6R)	3.38 V	OK
Voltage	PSU +5V(R6R)	5.10 V	OK
Voltage	PSU +12V(R6R)	12.31 V	OK
Voltage	+1.0V (Onboard)	1.01 V	OK
Voltage	+1.8V (Onboard)	1.84 V	OK
Voltage	+3.3V (Onboard)	3.36 V	OK
Voltage	+5V (Onboard)	5.12 V	OK
Voltage	+12V (Onboard)	12.27 V	OK
Temperature	Location 1(R6R)	26.0 (C)	OK
Temperature	Location 2(R6R)	25.0 (C)	OK
Temperature	Location 3(R6R)	26.0 (C)	OK
Temperature	Location 4(R6R)	26.0 (C)	OK
Temperature	Location 5(R6R)	26.0 (C)	OK
Temperature	Location 6(R6R)	24.0 (C)	OK
Temperature	Location 7(R6R)	26.0 (C)	OK
Temperature	Location 8(R6R)	27.0 (C)	OK
Temperature	Location 9(R6R)	26.0 (C)	OK
Temperature	Location 10(R6R)	24.0 (C)	OK
Temperature	Location 11(R6R)	26.0 (C)	OK
Temperature	Location 12(R6R)	27.0 (C)	OK

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“ / Enclosure management / S.M.A.R.T.” can display S.M.A.R.T. information of all PDs, including Local and all SAS JBODs.

Hardware monitor		UPS		SES		S.M.A.R.T.		
Self-Monitoring Analysis and Reporting Technology(S.M.A.R.T).								
A diagnostic tool for hard drives to deliver warning of drive failures in advance. S.M.A.R.T. provides users chances to take actions before possible drive failure.								
Show information for: - JBOD 1 (proIPS EP-3164JD-S6S6 v1.0.1) 5001378004B50190 -								
- Local -								
- JBOD 1 (proIPS EP-3164JD-S6S6 v1.0.1) 5001378004B50190 -								
- JBOD 2 (proIPS EP-3164JD-S6S6 v1.0.1) 5001378004B50380 -								
- JBOD 3 (proIPS EP-3164JD-S6S6 v1.0.1) 5001378004B501E0 -								
Slot	HDD type	Reallocated sectors	Bad sectors	Unclassified	Seek error (rate)	Spin up (retries)	Calibration (retries)	Temperature (C)
1	SATA2	200(51)	160(21)	200(140)	200(0)	100(0)	100(0)	28
3	SATA2	200(51)	141(21)	200(140)	200(0)	100(0)	100(0)	33
4	SATA2	200(51)	141(21)	200(140)	200(0)	100(0)	100(0)	29
5	SATA2	200(51)	100(21)	200(140)	200(0)	100(0)	100(0)	27
7	SATA2	114(6)	97(0)	100(36)	83(30)	100(97)	N/A	33
8	SATA2	200(51)	141(21)	200(140)	200(0)	100(0)	100(0)	30
9	SATA2	200(51)	100(21)	200(140)	200(0)	100(0)	100(0)	28
12	SATA2	200(51)	137(21)	200(140)	200(0)	100(0)	100(0)	29
13	SATA2	200(51)	100(21)	200(140)	200(0)	100(0)	100(0)	28
15	SATA2	108(6)	97(0)	100(36)	87(30)	100(97)	N/A	33
16	SATA2	200(51)	137(21)	200(140)	200(0)	100(0)	100(0)	30