

BPN-SAS3-846EL Backplane

USER'S GUIDE

Rev. 1.0a

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Contacting Supermicro

Headquarters

Address: Super Micro Computer, Inc.
980 Rock Ave.
San Jose, CA 95131 U.S.A.

Tel: +1 (408) 503-8000

Fax: +1 (408) 503-8008

Email: marketing@supermicro.com (General Information)
support@supermicro.com (Technical Support)

Website: www.supermicro.com

Europe

Address: Super Micro Computer B.V.
Het Sterrenbeeld 28, 5215 ML
's-Hertogenbosch, The Netherlands

Tel: +31 (0) 73-6400390

Fax: +31 (0) 73-6416525

Email: sales@supermicro.nl (General Information)
support@supermicro.nl (Technical Support)
rma@supermicro.nl (Customer Support)

Website: www.supermicro.nl

Asia-Pacific

Address: Super Micro Computer, Inc.
3F, No. 150, Jian 1st Rd.
Zhonghe Dist., New Taipei City 235
Taiwan (R.O.C)

Tel: +886-(2) 8226-3990

Fax: +886-(2) 8226-3992

Email: support@supermicro.com.tw

Website: www.supermicro.com.tw

Returning Merchandise for Service

A receipt or copy of your invoice marked with the date of purchase is required before any warranty service will be rendered. You can obtain service by calling your vendor for a Returned Merchandise Authorization (RMA) number. When returning to the manufacturer, the RMA number should be prominently displayed on the outside of the shipping carton, and mailed prepaid or hand-carried. Shipping and handling charges will be applied for all orders that must be mailed when service is complete.

For faster service, RMA authorizations may be requested online (<http://www.supermicro.com/support/rma/>).

Whenever possible, repack the backplane in the original Supermicro box, using the original packaging materials. If these are no longer available, be sure to pack the backplane in an anti-static bag and inside the box. Make sure that there is enough packaging material surrounding the backplane so that it does not become damaged during shipping.

This warranty only covers normal consumer use and does not cover damages incurred in shipping or from failure due to the alteration, misuse, abuse or improper maintenance of products.

During the warranty period, contact your distributor first for any product problems.

Secure Data Deletion

A secure data deletion tool designed to fully erase all data from storage devices can be found on our website: https://www.supermicro.com/about/policies/disclaimer.cfm?url=/wftp/utility/Lot9_Secure_Data_Deletion_Utility/

Notes

Chapter 1

Safety Guidelines

To avoid personal injury and property damage, carefully follow all the safety steps listed below when accessing your system or handling the components.

1-1 ESD Safety Guidelines

Electrostatic Discharge (ESD) can damage electronic components. To prevent damage to your system, it is important to handle it very carefully. The following measures are generally sufficient to protect your equipment from ESD.

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing a component from the antistatic bag.
- Handle the backplane by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the card and peripherals back into their antistatic bags when not in use.

1-2 General Safety Guidelines

- Always disconnect power cables before installing or removing any components from the computer, including the BPN-SAS3-846EL series backplane.
- Make sure that the backplane is properly and securely on the motherboard to prevent damage to the system due to power outages.

1-3 An Important Note to Users

All images and layouts shown in this user's guide are based upon the latest backplane revision available at the time of publishing. The card you have received may or may not look exactly the same as the graphics shown in this manual.

1-4 Introduction to the BPN-SAS3-846EL Backplane

The BPN-SAS3-846EL backplane has been designed to utilize the most up-to-date technology available, providing your system with reliable, high-quality performance.

This manual reflects BPN-SAS3-846EL Revision 1.01, the most current release available at the time of publication. Always refer to the Supermicro website at www.supermicro.com for the latest updates, compatible parts and supported configurations.

1-5 Overview of the BPN-SAS3-846EL1/EL2 Backplanes

The BPN-SAS3-846EL1 and BPN-SAS3-846EL2 model backplanes are identical, except that the BPN-SAS3-846EL2 backplane has duplicate secondary components which are not found on the BPN-SAS3-846EL1. The BPN-SAS3-846EL2 is divided into a two sections, with the primary components on the right side of the board and the secondary components on the left. SAS3 backplanes are not compatible with legacy SAS (3 Gbps), SATA (1.5 Gbps) backplanes or lower.

Chapter 2

Connectors, Jumpers and LEDs

2-1 Front Connectors

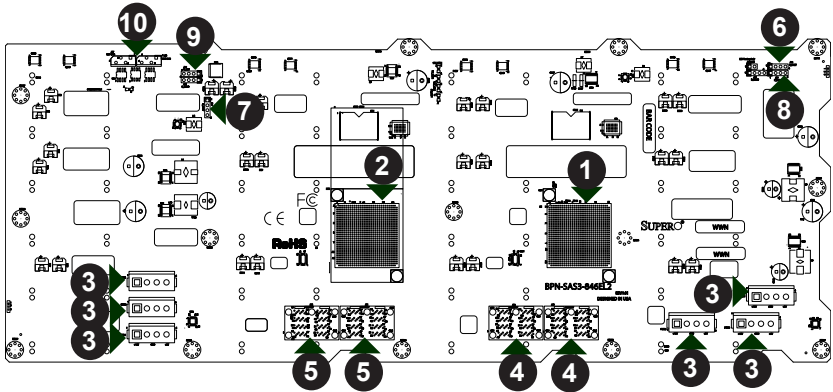


Figure 2-1: BPN-SAS3-846EL1/EL2 Connectors and Components

- | | |
|--|--|
| <p>1. Primary Expander Chip.</p> <p>2. Secondary Expander Chip (not present on EL1 single port backplanes).</p> <p>3. Backplane Power Connectors: PWR1 through PWR6.</p> <p>4. Primary SAS Ports: J49, J50.</p> <p>5. Secondary SAS Ports: J51, J52. (not present on EL1 single port backplanes).</p> <p>6. Primary UART Connector: PRI-
UART (J30) for manufacturer's
use only.</p> | <p>7. Secondary UART Connector: SEC-
UART(J24) for manufacturer's
use only, not present on
EL1 backplanes.</p> <p>8. Primary SDB Connector: PRI-
SDB (J31), for manufacturer's
use only.</p> <p>9. Secondary SDB Connector: SEC-
SDB (J29), for manufacturer's
use only, not present on EL1
backplanes.</p> <p>10. I²C Connector, EXP I2C0 (J48).</p> |
|--|--|

2-2 Front Connector and Pin Definitions

1. - 2. Primary and Secondary Expander Chips

The primary and secondary expander chips allow the backplane to support dual port, cascading, and failover configurations.

3. Backplane Power Connectors

The 4-pin connectors, designated PWR1 - PWR6 provide power to the backplane. See the table on the right for pin definitions.

Backplane Main Power 4-Pin Connector	
Pin#	Definition
1	+12V
2 and 3	Ground
4	+5V

4. - 5. Primary and Secondary SAS Ports

The primary SAS connectors are designated J49 and J50. The secondary SAS Ports are designated J51 through J52 and are not present on EL1 single port backplanes.

6. - 7. Primary and Secondary UART Connectors

The primary UART connector is designated PRI-UART and J30. The secondary UART connector is designated SEC-UART and J24 and is not present on BPN-SAS3-846EL1. UART connectors are used for manufacturer's diagnostic purposes only.

8. - 9. SDB Connectors

The Primary SDB connector is designated PRI-SDB and J31. The secondary SDB connector is designated SEC-SDB and J29. (Not present on BPN-SAS3-846EL1 backplanes) These are debug connectors used for the manufacturer's diagnostic purposes only.

10. I²C Connectors

The I²C connector. is designated EXP I2C0 and J48.

2-3 Front Jumper Locations and Settings

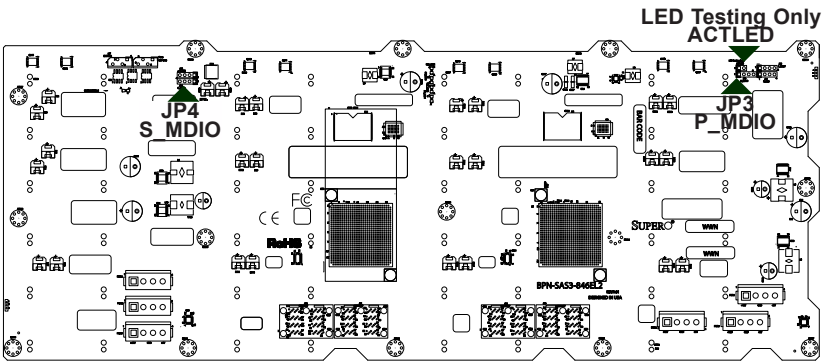
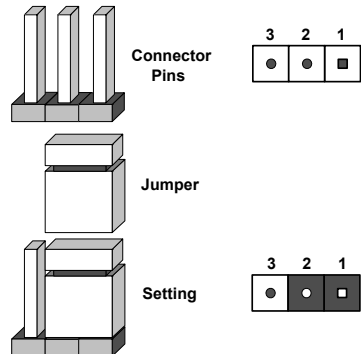


Figure 2-3: Front Jumpers

Explanation of Jumpers

To modify the operation of the backplane, jumpers can be used to choose between optional settings. Jumpers create shorts between two pins to change the function of the connector. Pin 1 is identified with a square solder pad on the printed circuit board. Note: On two pin jumpers, "Closed" means the jumper is on and "Open" means the jumper is off the pins.



General Jumper Settings		
Jumper	Jumper Settings	Note
LED Testing Only ACTLED	Open: Disabled (Default) Closed: Enabled	Activity LED test.
JP3 P_MDIO	Open: Disabled (Default) Closed: Enabled	Primary management data in/out. For manufacturer's use only.
JP4 S_MDIO	Open: Disabled (Default) Closed: Enabled	Secondary management data in/out. For manufacturer's use only.

2-4 Front LED Indicators

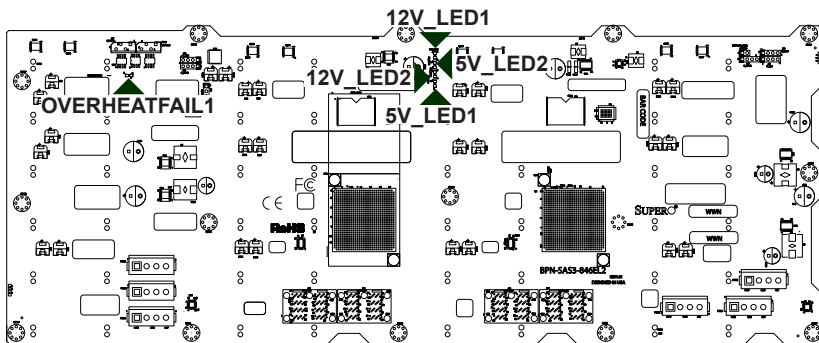


Figure 2-4: Front LEDs

Front LEDs			
LED	Normal State	Abnormal State	Specification
12V_LED1	On	Off	12V power status.
12V_LED2	Blinking	Steady on, or off	Primary expander heartbeat indicator.
5V_LED1	On	Off	5V power status.
5V_LED2	Blinking	Steady on, or off	Secondary expander heartbeat indicator (not present on BPN-SAS3-846EL1 backplanes).
OVERHEATFAIL1	Off	On	System overheat/failure LED.

2-5 Rear Connectors and LED Indicators

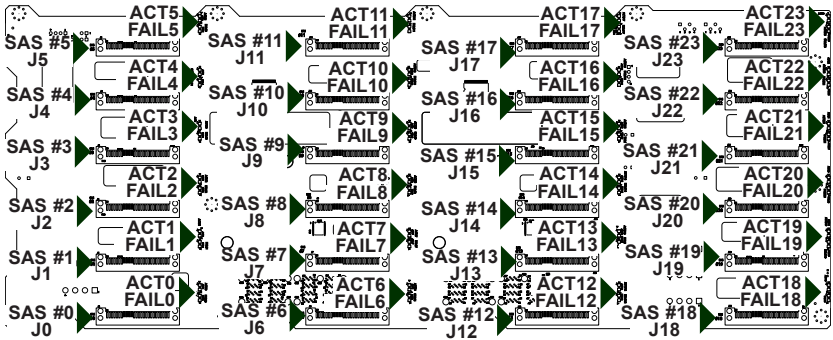


Figure 2-5: Rear Connectors and LEDs

Rear SAS Connectors			
Rear Connector	SAS Drive Number	Rear Connector	SAS Drive Number
SAS #0	SAS HDD #0	SAS #12	SAS HDD #12
SAS #1	SAS HDD #1	SAS #13	SAS HDD #13
SAS #2	SAS HDD #2	SAS #14	SAS HDD #14
SAS #3	SAS HDD #3	SAS #15	SAS HDD #15
SAS #4	SAS HDD #4	SAS #16	SAS HDD #16
SAS #5	SAS HDD #5	SAS #17	SAS HDD #17
SAS #6	SAS HDD #6	SAS #18	SAS HDD #18
SAS #7	SAS HDD #7	SAS #19	SAS HDD #19
SAS #8	SAS HDD #8	SAS #20	SAS HDD #20
SAS #9	SAS HDD #9	SAS #21	SAS HDD #21
SAS #10	SAS HDD #10	SAS #22	SAS HDD #22
SAS #11	SAS HDD #11	SAS #23	SAS HDD #23

Rear LED Indicators		
Rear LED	Hard Drive Activity	Failure LED
SAS #0	ACT0	FAIL0
SAS #1	ACT1	FAIL1
SAS #2	ACT 2	FAIL2
SAS #3	ACT3	FAIL3
SAS #4	ACT4	FAIL4
SAS #5	ACT5	FAIL5
SAS #6	ACT6	FAIL6
SAS #7	ACT7	FAIL7
SAS #8	ACT8	FAIL8
SAS #9	ACT 9	FAIL9
SAS #10	ACT10	FAIL10
SAS #11	ACT11	FAIL11
SAS #12	ACT12	FAIL12
SAS #13	ACT13	FAIL13
SAS #14	ACT14	FAIL14
SAS #15	ACT15	FAIL15
SAS #16	ACT16	FAIL16
SAS #17	ACT17	FAIL17
SAS #18	ACT18	FAIL18
SAS #19	ACT19	FAIL19
SAS #20	ACT20	FAIL20
SAS #21	ACT21	FAIL21
SAS #22	ACT22	FAIL22
SAS #23	ACT23	FAIL23

Chapter 3

Dual Port and Cascading Configurations

3-1 Single and Dual Port Expanders

SAS primary connectors J49 to J50 and secondary connectors J51 to J52 are bidirectional and can be treated as input or output.

Single Ports

BPN-SAS3-846EL1 backplanes have a single port expander that accesses all of the drives and supports cascading.

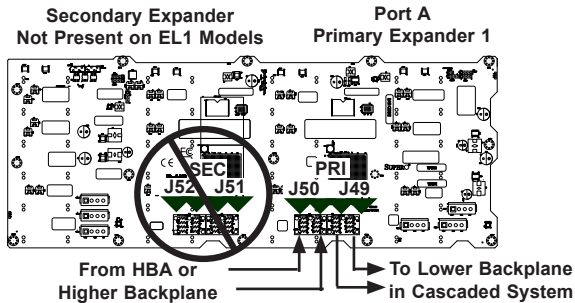


Figure 3-1: BPN-SAS3-846EL1 Single Port Configuration

Dual Ports

BPN-SAS3-846EL2 model backplanes have dual-port expanders that access all of the hard drives. These dual-port expanders support cascading, failover, and recovery.

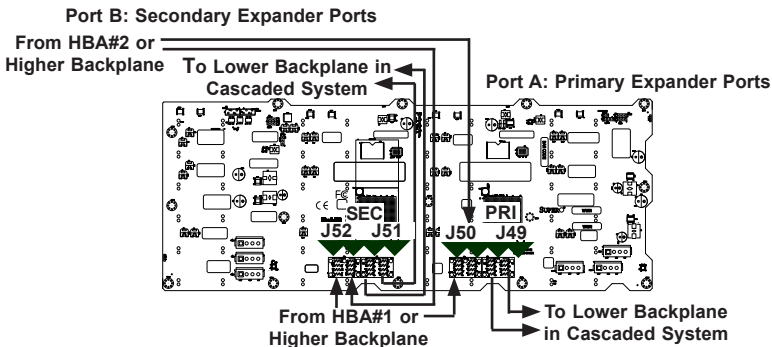


Figure 3-2: BPN-SAS3-846EL2 Dual Port Configuration

3-2 Failover

The BPN-SAS3-846EL2 model backplane has two expanders which enable effective failover and recovery.

Single Host Bus Adapter

In a single host bus configuration, the backplane connects to one host bus adapter.

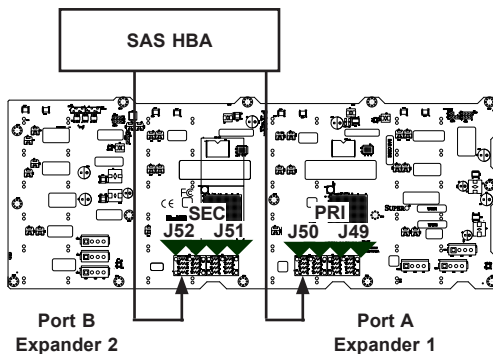


Figure 3-3: Single HBA

Single Host Bus Adapter Failover

If the expander or data path in Port A fails, the system automatically switches to Port B with application software or failover support.

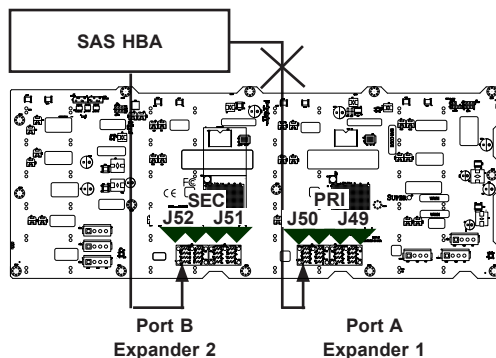


Figure 3-4: Single HBA Failover

3-3 Failover with RAID Cards and Multiple HBAs

The BPN-SAS3-846EL backplane may be configured for failover with multiple HBAs using either RAID controllers or HBAs to achieve failover protection.

RAID Controllers: If RAID controllers are used, then the failover is accomplished through port failover on the same RAID card.

HBAs: If multiple HBAs are used to achieve failover protection and load balancing, **Linux MPIO software must be installed and correctly configured to perform the load balancing and failover tasks.**

Dual Host Bus Adapter

In a dual host bus configuration, the backplane connects to two HBA's.

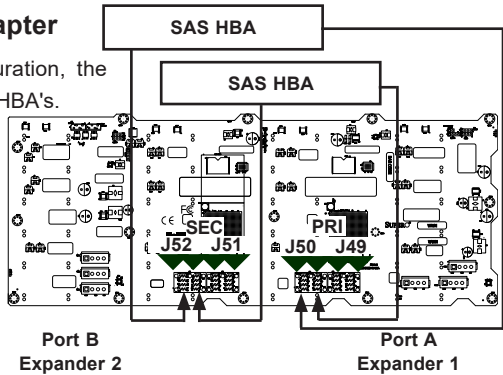


Figure 3-5: Dual HBA

Dual Host Bus Adapter Failover

If the expander or data path in Port A fails, the system automatically switches to Port B. This maintains a full connection to all drives.

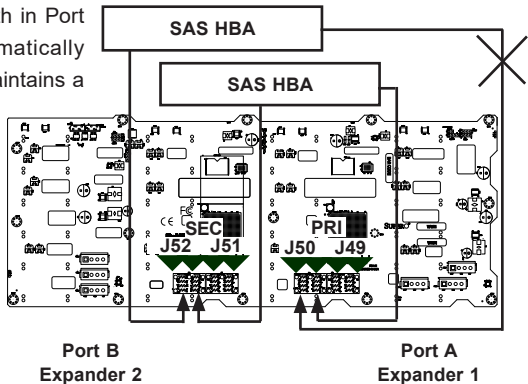


Figure 3-6: Dual HBA Failover

IMPORTANT: For RAID controllers, redundancy is achieved through port failover. For multiple HBAs MPIO software is required to achieve failover protection.

3-4 Connecting HBAs to the Backplane

Connecting an Internal HBA to the Backplane

The following section lists the most common cables used to connect the HBA to the backplane.

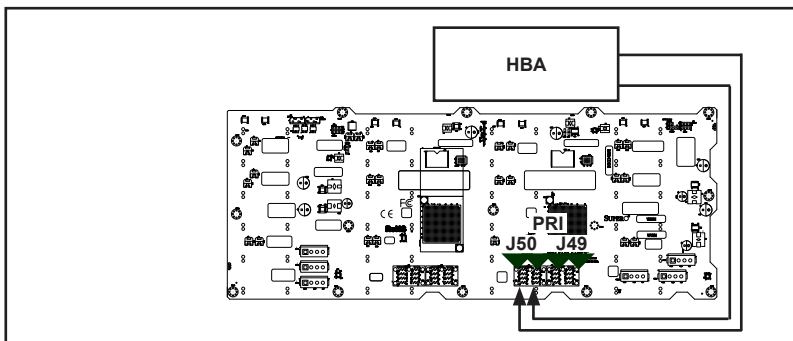


Figure 3-7: Single Internal Host Bus Adapter

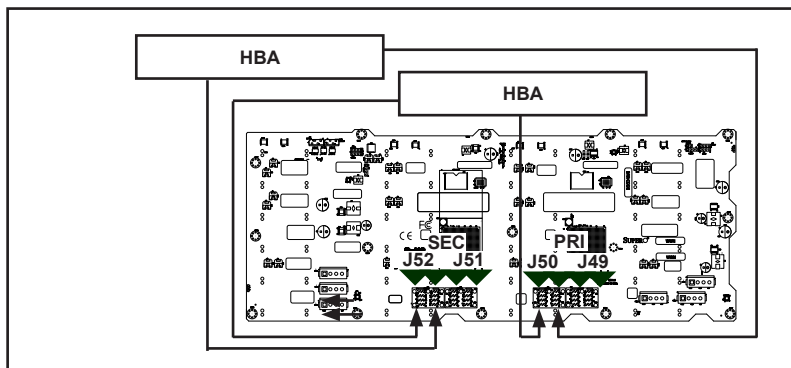


Figure 3-8: Dual Internal Host Bus Adapter

Supported Internal HBA Cables

Use the following cables to create connections between the internal HBA and BPN-SAS3-846EL model backplane. The cables required depend upon the HBA connector.

IMPORTANT: See Section 3-3 of this manual, *Failover with RAID Cards and Multiple HBAs* for important information on supported configurations.

Cable Name: Internal iPass (Mini-SAS) to HD (Mini-SAS)

Part #: CBL-SAST-0508-01 **Length:** 50 cm (19 inches)

Part #: CBL-SAST-0507-01 **Length:** 80 cm (31 inches)

Description: This cable has an iPass (SFF-8087/Mini-SAS) connector (36-pin) at one end and a Mini-SAS HD (SFF-8643) connector at the other end. It connects from the SAS2 HBA to the BPN-SAS3-846EL model backplane.

Cable name: Internal HD (Mini-SAS) to HD (Mini-SAS)

Part #: CBL-SAST-0568 **Length:** 35 cm (13 inches)

Part #: CBL-SAST-0593 **Length:** 60 cm (23 inches)

Part #: CBL-SAST-0531 **Length:** 80 cm (31 inches)

Description: This cable has a Mini-SAS HD (SFF-8643) connector at both ends. It connects from the SAS3 HBA to the BPN-SAS3-846EL model backplane.

Connecting an External HBA to the Backplane

This backplane supports external host bus adapters. In this configuration, the HBA and the backplane are in different physical chassis. This allows a JBOD (Just a Bunch Of Drives) configuration from an existing system.

Single External Host Bus Adapter

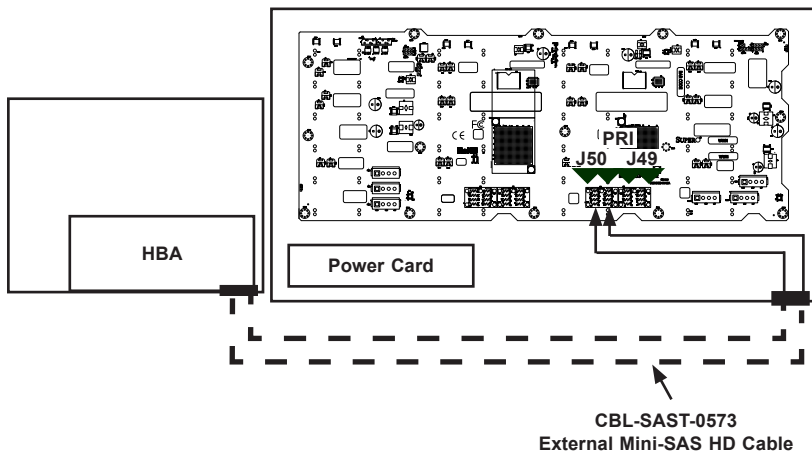


Figure 3-9: Single External Host Adapter

Dual External Host Bus Adapter

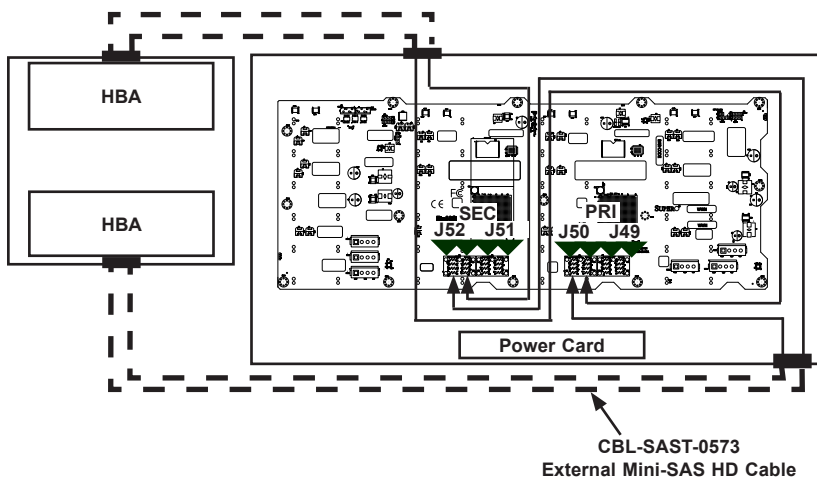


Figure 3-10: Dual External Host Bus Adapter

IMPORTANT: See Section 3-3 of this manual, *Failover with RAID Cards and Multiple HBAs* for important information on supported configurations.

Connecting Multiple Backplanes in a Single Channel Environment

This section describes the cables used when cascading from a single HBA. These connections use CBL-SAST-0531 internal cables and CBL-SAST-0573 external cables.

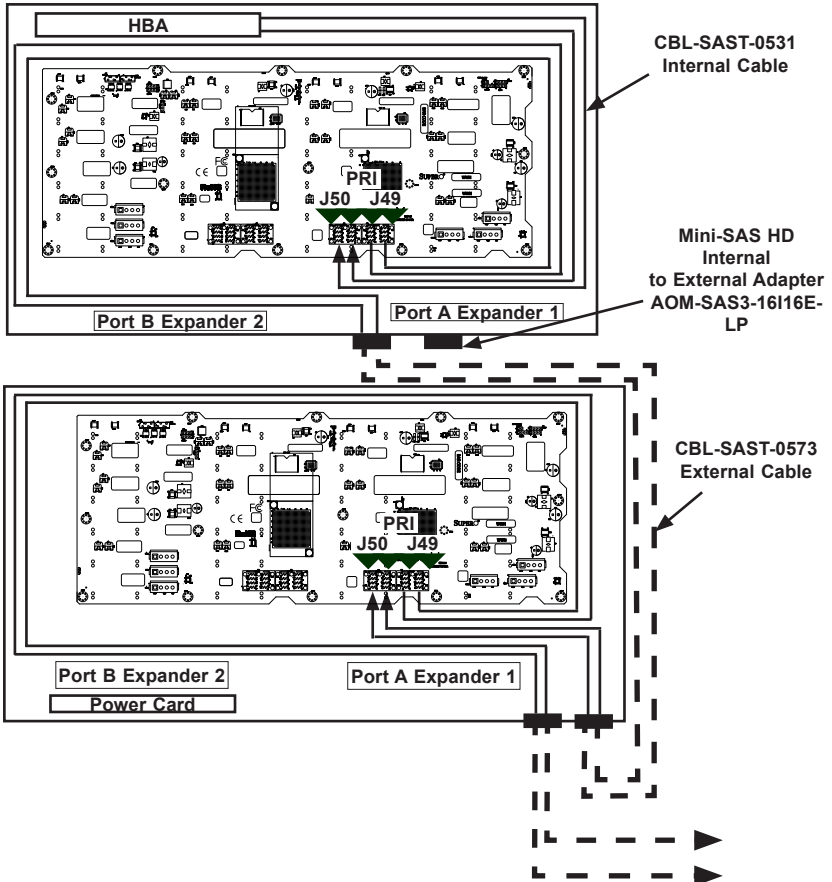


Figure 3-11: Single HBA Configuration

Single HBA Configuration Cables



Figure 3-12: External Mini-SAS HD to External Mini-SAS HD Cable

Cable Name: 1 Meter External Mini-SAS HD to External Mini-SAS HD Cable

Part #: CBL-SAST-0573

Ports: Single

Placement: External Cable

Description: External cascading cable, connects ports between servers and JBODs.

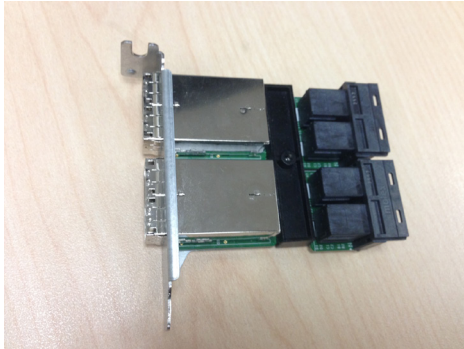


Figure 3-13: Mini-SAS HD Internal to External Adapter

Cable Name: 16-port Mini-SAS HD Internal to External Cable Adapter with LP Bracket

Part #: AOM-SAS3-16I16E-LP

Ports: Four wide ports (sixteen ports total)

Placement: Internal cable with adapter

Description: Internal cable, connects the SAS3 backplane to external ports.

Connecting Multiple Backplanes in a Dual Channel Environment

This section describes the cables used when cascading from dual HBAs. These connections use CBL-SAST-0531 internal cables and CBL-SAST-0573 external cables.

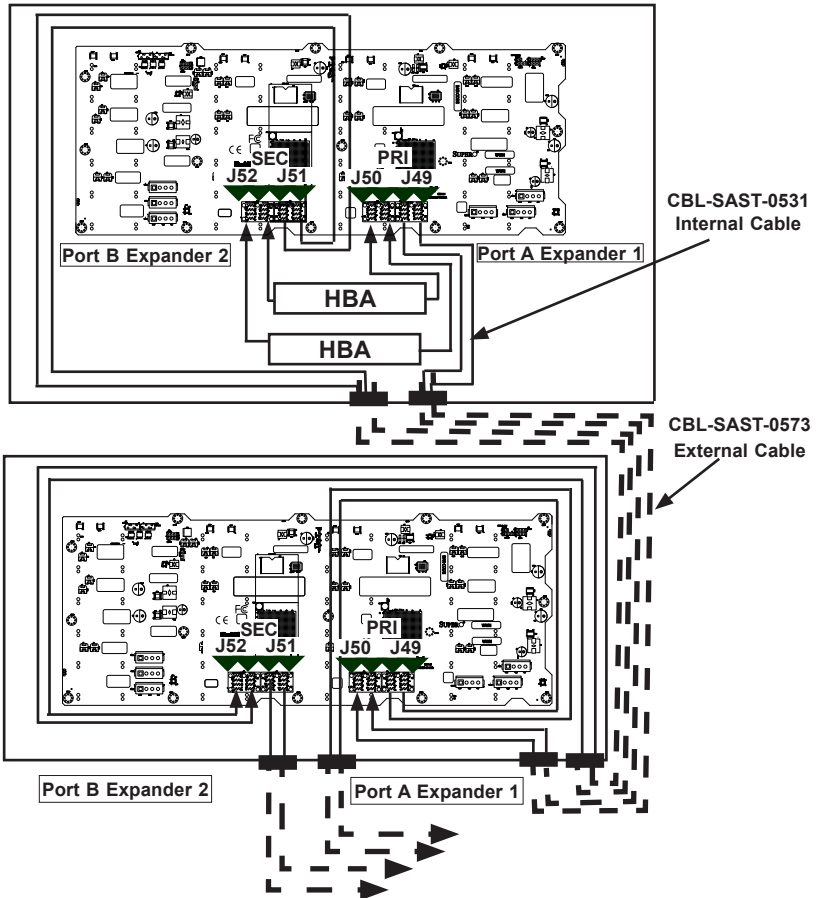


Figure 3-14: Dual HBA Configuration

IMPORTANT: See Section 3-3 of this manual, *Failover with RAID Cards and Multiple HBAs* for important information on supported configurations.

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