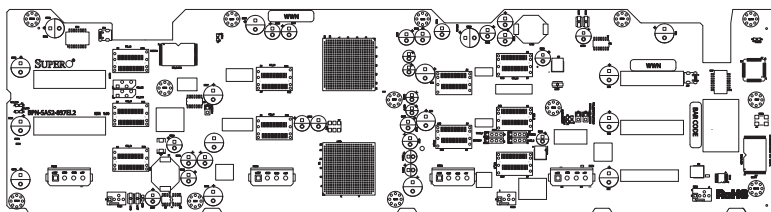


# SUPERO®



## SAS2-837EL BACKPLANE

### USER'S GUIDE

Rev. 1.0

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**WARNING: Handling of lead solder materials used in this product may expose you to lead, a chemical known to the State of California to cause birth defects and other reproductive harm.**

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Manual Revision 1.0  
Release Date: February 3, 2011

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## 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.

## 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 backplane 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 backplane.
- Disconnect the power cable before installing or removing any cables from the backplane.
- Make sure that the backplane is securely and properly installed on the motherboard to prevent damage to the system due to power shortage.

## **1-3 An Important Note to Users**

All images and layouts shown in this user's guide are based upon the latest PCB 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 SAS2-837EL Backplane**

The SAS2-837EL backplane has been designed to utilize the most up-to-date technology available, providing your system with reliable, high-quality performance.

This manual reflects SAS2-837EL1 and SAS2-837EL2 Revision 1.00, the most current release available at the time of publication. Always refer to the Supermicro Web site at [www.supermicro.com](http://www.supermicro.com) for the latest updates, compatible parts and supported configurations.

The SAS2-837EL1 backplane includes a primary expander chip and primary SAS connectors. The SAS2-837EL2 includes of both primary and secondary expander chips, as well as primary and secondary SAS connectors. The primary and secondary expanders are redundant, so that if one should fail, the other will take over.



## Chapter 2

### Connectors, Jumpers and LEDs

#### 2-1 Front Connectors

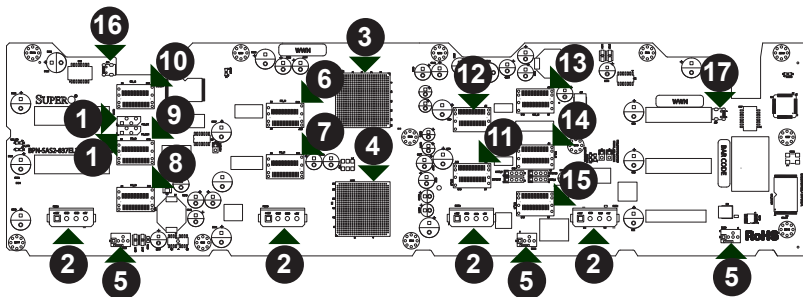


Figure 2-1: Front Connectors

#### Front Connectors

- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>1. Dual primary I<sup>2</sup>C connectors:<br/>PRI_I<sup>2</sup>C and PRI_I<sup>2</sup>C1</li> <li>2. Power connectors:<br/>PWR1, PWR2, PWR3 and PWR4</li> <li>3. Primary expander chip</li> <li>4. Secondary expander chip<br/>(Not present on the SAS2-837EL1 backplane)</li> <li>5. Fan connectors: FAN1, FAN2 and FAN3</li> <li>6. Primary SAS port: PRI_J0</li> <li>7. Primary SAS port: PRI_J1</li> <li>8. Primary SAS port: PRI_J2</li> <li>9. Primary SAS port: PRI_J3</li> <li>10. Primary SAS port PRI_J4</li> </ol> | <ol style="list-style-type: none"> <li>11. Secondary SAS port: SEC_J0<br/>(Not present on the SAS2-837EL1 backplane)</li> <li>12. Secondary SAS port SEC_J1<br/>(Not present on the SAS2-837EL1 backplane)</li> <li>13. Secondary SAS port SEC_J2<br/>(Not present on the SAS2-837EL1 backplane)</li> <li>14. Secondary SAS port SEC_J3<br/>(Not present on the SAS2-837EL1 backplane)</li> <li>15. Secondary SAS port SEC_J4<br/>(Not present on the SAS2-837EL1 backplane)</li> <li>16. Primary Ethernet port: J24</li> <li>17. Secondary Ethernet port: J25<br/>(Not present on the SAS2-837EL1 backplane)</li> </ol> |
|---|--|

## 2-2 Front Connector and Pin Definitions

### 1. Primary I<sup>2</sup>C Connector

The I<sup>2</sup>C connector is used to monitor the power supply status and to control the fans. See the table on the right for pin definitions.

I <sup>2</sup> C Connector Pin Definitions	
Pin#	Definition
1	Data
2	Ground
3	Clock
4	No Connection

### 2. Backplane Main Power Connectors

The 4-pin connectors, designated PWR1, PWR2 and PWR3 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

### 3. and 4. Primary and Secondary Expander Chips

The primary and secondary expander chips allow the SAS2-837EL2 backplane to support dual ports, cascading, and failover. SAS2-837EL1 supports cascading.

### 5. Fan Connectors

The 4-pin connectors, designated FAN1, through FAN3, provide power to the fans. See the table on the right for pin definitions.

Fan Connectors	
Pin#	Definition
1	Ground
2	+12V
3	Tachometer
4	Empty

**6. - 15. SAS Ports**

The primary and secondary sets of SAS ports provide expander features including cascading and failover. The primary SAS ports are located on the left side of the board, and are designated Primary 0 through Primary 4. The secondary SAS ports are on the right side of the board and are designated Secondary 0 through Secondary 4. Note that secondary SAS ports are not present on the SAS2-837EL1 backplane.

**16. - 17. Primary and Secondary Ethernet Ports**

The primary and secondary Ethernet ports are designated J24 (primary) and J25 (secondary). The secondary Ethernet ports are not present on the SAS2-837EL1 backplane.

## 2-3 Front Jumper Locations and Pin Definitions

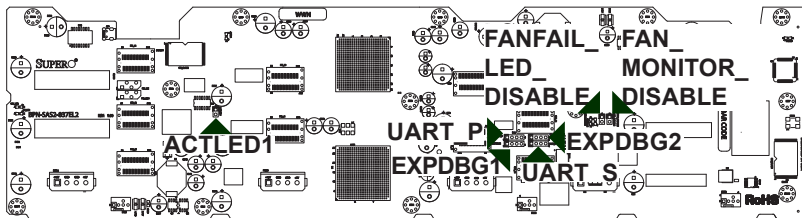
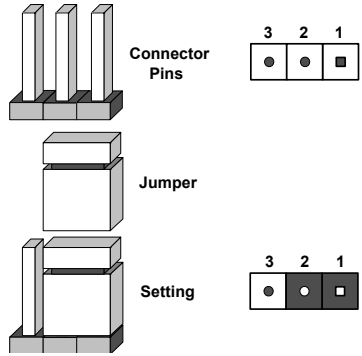


Figure 2-2: Front Jumpers

General Jumper Settings		
Jumper	Jumper Settings	Note
UART_P	No jumper required	Primary UART connector
UART_S	No jumper required	Secondary UART connector (Not present on SAS2-847E1)
ACTLED1	Open: Disable Closed: Enable	For manufacturing use only
FAN_MONITOR_DISABLE	Open: Enable Closed: Disable	Fan monitor settings
FANFAIL_LED_DISABLE	Open: Enable Closed: Disable	Disables the fan failure LED
EXPDBG1	N/A	For manufacturing use only.
EXPDBG2	N/A	For manufacturing use only (Not present on SAS2-847E1)

## 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.



## 2-4 Front LED Indicators

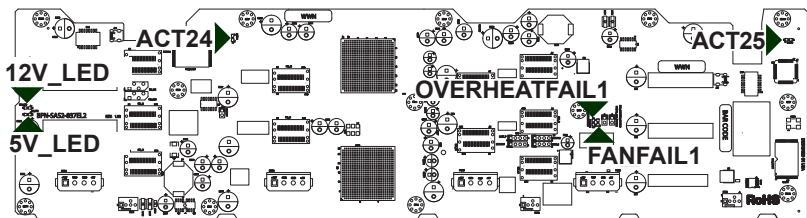


Figure 2-3: Front LED Indicators

Front LEDs		
LED	Default State	Specification
5V_LED1	On	Blue LED indicates backplane power activity. Light is on during normal operation
12V_LED2	On	Blue LED indicates backplane power activity. Light is on during normal operation.
ACT24	On	Indicates activity in the primary section of the backplane.
ACT25	On	Indicates activity in the secondary section of the backplane. (Not present on SAS2-837EL1 backplane)
OVERHEATFAIL1	Off	Red LED indicates an overheated condition. Light is off during normal operation
FANFAIL1	Off	Red LED indicates a fan failure. Light is off during normal operation

Activation of the OVERHEATFAIL1 and FANFAIL1 LEDs indicate that a condition requiring immediate attention has occurred.

***These LEDs are triggered by the following conditions:***

1. A fan failure triggers the FANFAIL1 LED.
2. A system temperature over 45° Celsius triggers the OVERHEATFAIL1 LED.

## 2-5 Rear Connectors and LED Indicators

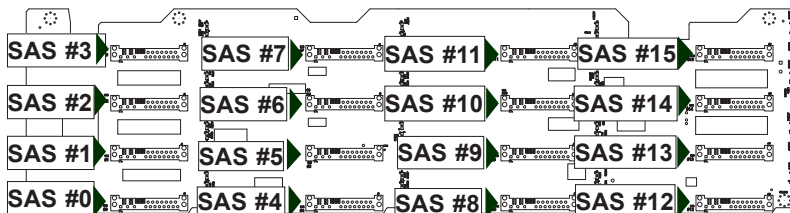


Figure 2-4: Rear Connectors

Rear SAS/SATA Connectors			
Rear Connector	SAS Drive Number	Rear Connector	SAS Drive Number
SAS #0	SAS/SATA HDD #0	SAS #8	SAS/SATA HDD #8
SAS #1	SAS/SATA HDD #1	SAS #9	SAS/SATA HDD #9
SAS #2	SAS/SATA HDD #2	SAS #10	SAS/SATA HDD #10
SAS #3	SAS/SATA HDD #3	SAS #11	SAS/SATA HDD #11
SAS #4	SAS/SATA HDD #4	SAS #12	SAS/SATA HDD #12
SAS #5	SAS/SATA HDD #5	SAS #13	SAS/SATA HDD #13
SAS #6	SAS/SATA HDD #6	SAS #14	SAS/SATA HDD #14
SAS #7	SAS/SATA HDD #7	SAS #15	SAS/SATA HDD #15

Rear LED Indicators					
Rear Connector	Hard Drive Activity LED	Failure LED	Rear Connector	Hard Drive Activity LED	Failure LED
SAS #0	ACT #0	FAIL #0	SAS #8	ACT #8	FAIL #8
SAS #1	ACT #1	FAIL #1	SAS #9	ACT #9	FAIL #9
SAS #2	ACT #2	FAIL #2	SAS #10	ACT #10	FAIL #10
SAS #3	ACT #3	FAIL #3	SAS #11	ACT #11	FAIL #11
SAS #4	ACT #4	FAIL #4	SAS #12	ACT #12	FAIL #12
SAS #5	ACT #5	FAIL #5	SAS #13	ACT #13	FAIL #13
SAS #6	ACT #6	FAIL #6	SAS #14	ACT #14	FAIL #14
SAS #7	ACT #7	FAIL #7	SAS #15	ACT #15	FAIL #15

## Notes



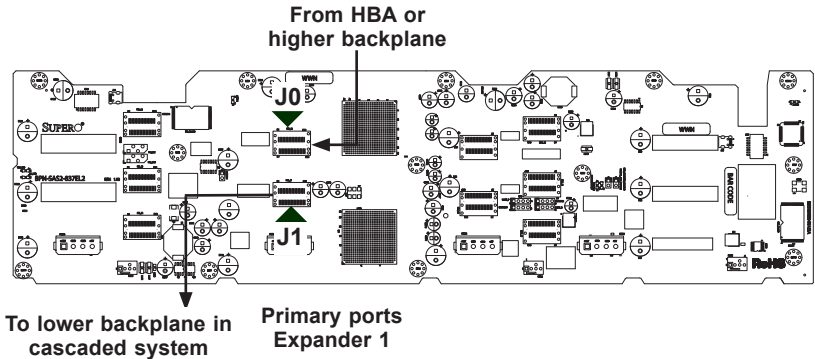
## Chapter 3

### Dual Port and Cascading Configurations

#### 3-1 Single and Dual Port Expanders

##### Single Ports

SAS2-837EL1 backplanes have a single-port expander that access all hard drives and supports cascading.



##### Dual Ports

SAS2-837EL2 backplanes have dual-port expanders that access all the hard drives. These dual-port expanders support cascading, failover, and multipath.

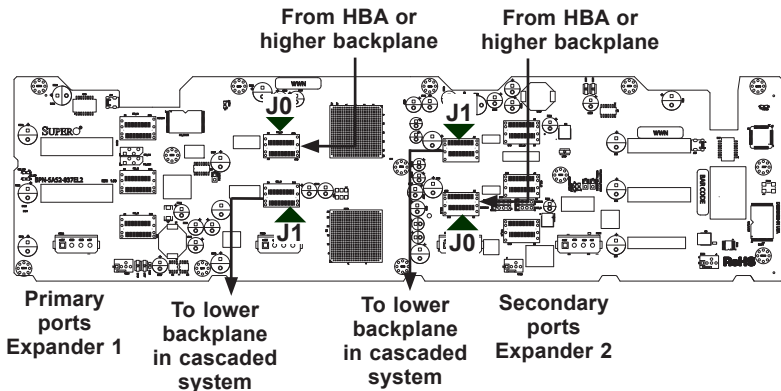


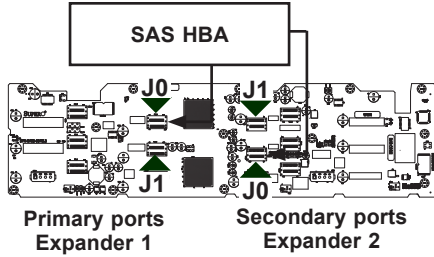
Figure 3-1: Single and Dual Port Cascading Configurations

### 3-2 Failover

The SAS2-837EL2 backplane has two expanders which allow effective failover.

#### Single Host Bus Adapter

In a single host bus configuration, the backplane connects to one Host Bus Adapter (HBA).



#### Single Host Bus Adapter Failover

If the expander or data path in the primary ports fails, the system automatically switches to the secondary ports.

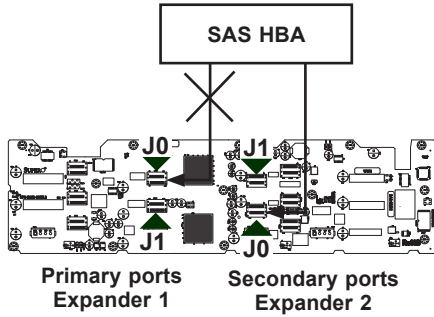


Figure 3-2: Single HBA Failover Configurations

### 3-3 Failover with RAID Cards and Multiple HBAs

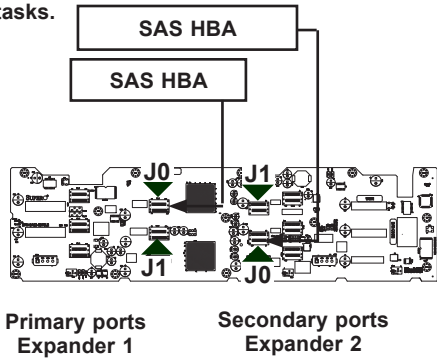
The SAS-837EL2 backplane may be configured for failover with multiple HBAs using either RAID controllers or HBAs to achieve failover protection.

**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 Host Bus Adapters.



#### Dual Host Bus Adapter Failover

If the expander or data path in the primary ports fails, the system automatically switches to the secondary ports. This maintains a full connection to all drives. Note that this configuration requires additional MPIO software. Contact your Supermicro authorized repre-

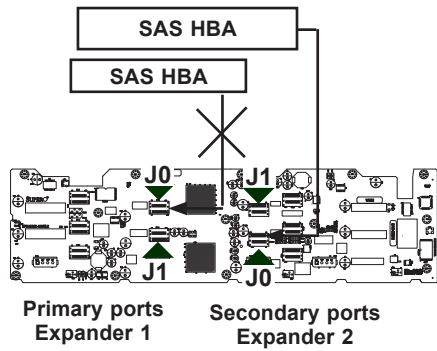


Figure 3-3: Dual HBA Failover Configurations



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

### 3-3 Chassis Power Card and Support Cables

#### Chassis Power Card

In a cascaded configuration, the first chassis includes a motherboard and at least one host bus adapter. Other servers in this enclosed system should include a power card. This section describes the supported power card for the SAS-837EL backplane.

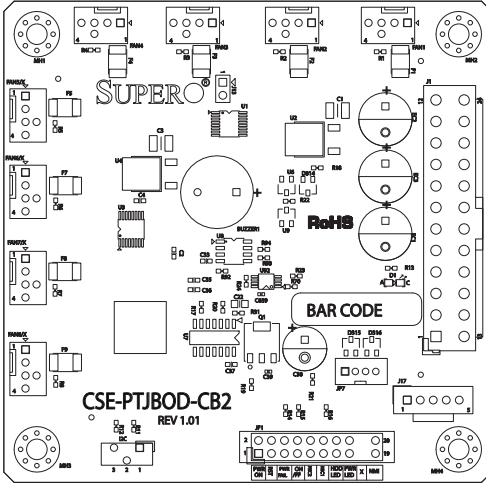


Figure 3-4: Chassis Power Card (Sold Separately)

Power Card		
Part Number	Part Type	Where Used
CSE-PTJBOD-CB2	Power card	Allows the chassis to be used in a JBOD (Just a Bunch of Drives) system.

## Connecting an Internal Host Bus Adapter to the Backplane

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

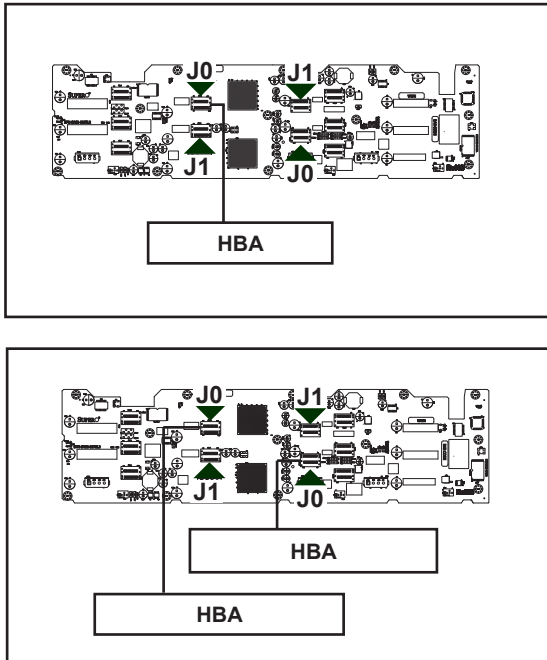


Figure 3-5: Connecting an Internal HBA to the Backplane

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

## Supported Internal HBA Cables

Use the following listed cables to create connections between the internal HBA and SAS2-837EL backplane. The cables required depend on the HBA connector.

**Cable Name:** iPass to 4-lane

**Part #:** CBL-0117L

**Length:** 46 cm (18 inches)

**Description:** This cable has one SFF-8484 (32-pin) connector on one end and an iPass (SFF-8087/Mini-SAS) connector (36-pin) at the other. This cable connects from the HBA to the SAS2-837EL backplane.

**Cable Name:** iPass (Min-SAS) to iPass (Mini-SAS)

**Part #:** CBL-0108L-02

**Length:** 39 cm (15 inches)

**Part #:** CBL-0109L-02

**Length:** 22 cm (9 inches)

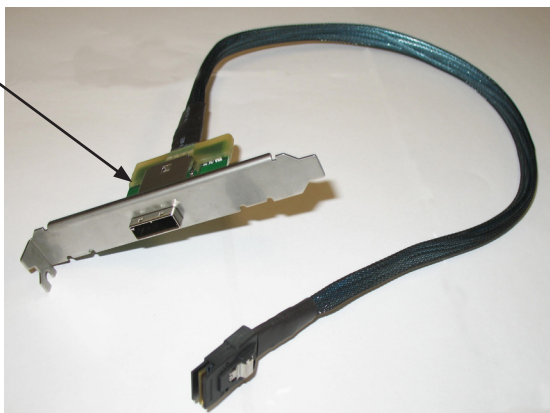
**Part #:** CBL-0110L-02

**Length:** 18 cm (7 inches)

**Description:** This cable has an iPass (SFF-8087/Mini-SAS) connector (36-pin) at each end. It connects from the HBA to the SAS2-837EL backplane.

## Single HBA Configuration Cables

Single  
Port Cable  
Assembly



**Figure 3-6: Single Port Internal Cable (CBL-0167L)**

**Cable Name:** SAS EL2/EL1 Backplane Cable (Internal) with 2-port Cascading Cable, 68 cm

**Part #:** CBL-0167L (SFF-8087 to SFF-8088 x1)

**Ports:** Single

**Placement:** Internal cable

**Description:** Internal cable. Connects the backplane to the HBA or external port. Used in single port environments.

## Dual HBA Configuration Cables

Dual Port Cable  
Assembly



Figure 3-7: Dual Port Internal Cable (CBL-0168L)

**Cable Name:** SAS Dual-port Cable Assembly, 68/76 cm

**Part #:** CBL-0168L

**Placement:** Internal cable

**Ports:** Dual

**Description:** Internal cascading cable. Connects the backplane to the HBA or external port. Used in dual port environments.



Figure 3-8: External Cable (CBL-0166L)

**Cable Name:** SAS EL2/EL1 Cascading Cable (External), 68 cm

**Part #:** CBL-0166L

**Placement:** External cable

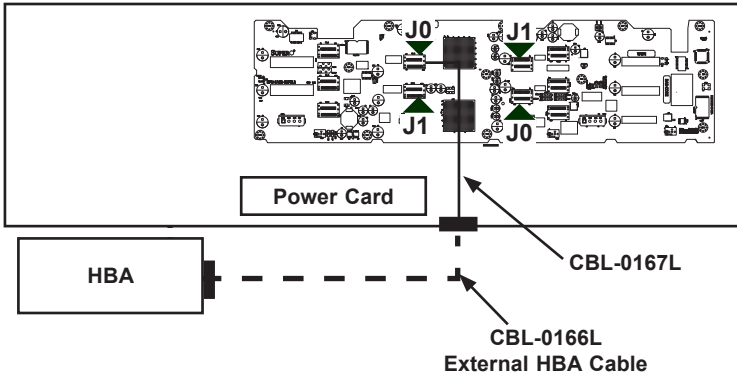
**Ports:** Single or Dual

**Description:** External cascading cable. Connects ports between servers. Use one cable for single port connections and two cables for dual port connections.

## Connecting an External Host Bus Adapter 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 configuration system to connect to the other system that has a HBA.

### Single External Host Bus Adapter



### Dual External Host Bus Adapter

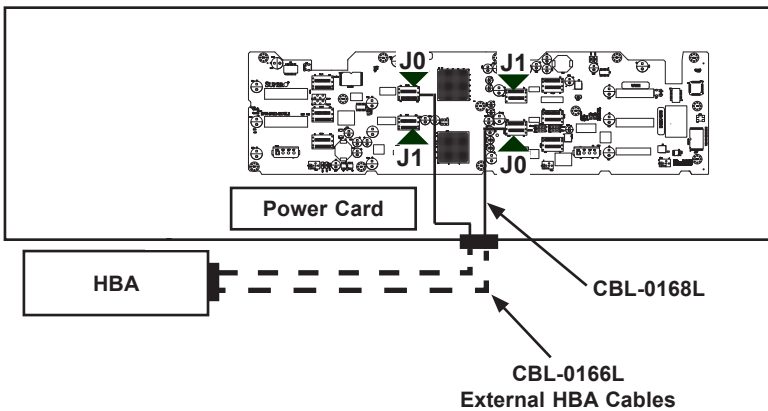


Figure 3-9: Connecting Single and Dual HBAs to the Backplane



## Connecting Multiple Backplanes in a Single Channel Environment

This section describes the cables used when cascading from a single HBA. These connections use CBL-0167L internal cables and CBL-0166L external cables.

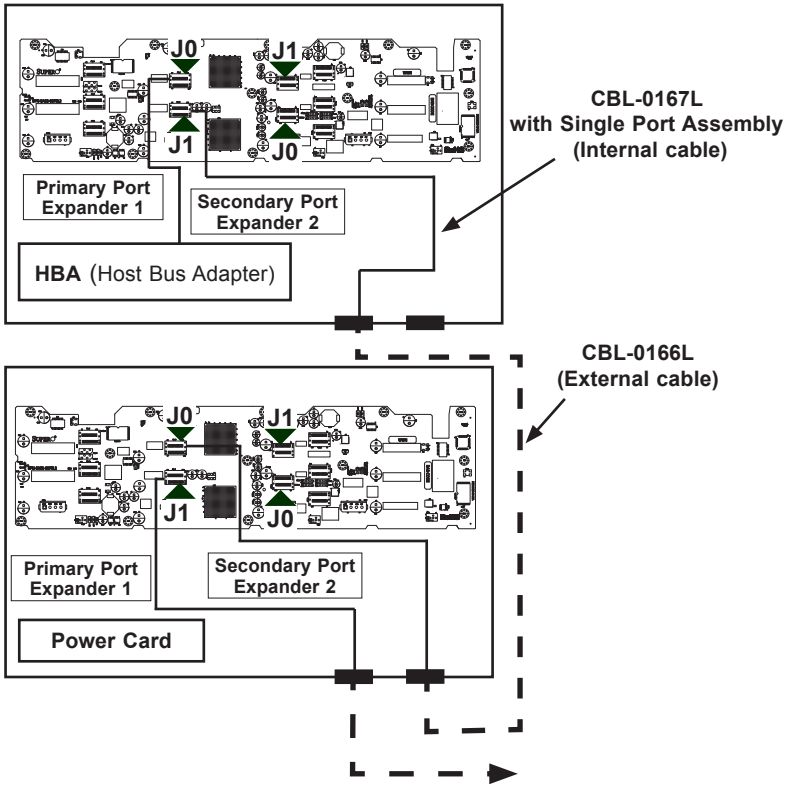


Figure 3-10: Single HBA Configuration

## Connecting Multiple Backplanes in a Dual Channel Environment

This section describes the cables used when cascading from dual HBAs. These connections use CBL-0168L internal cables and CBL-0166L external cables.

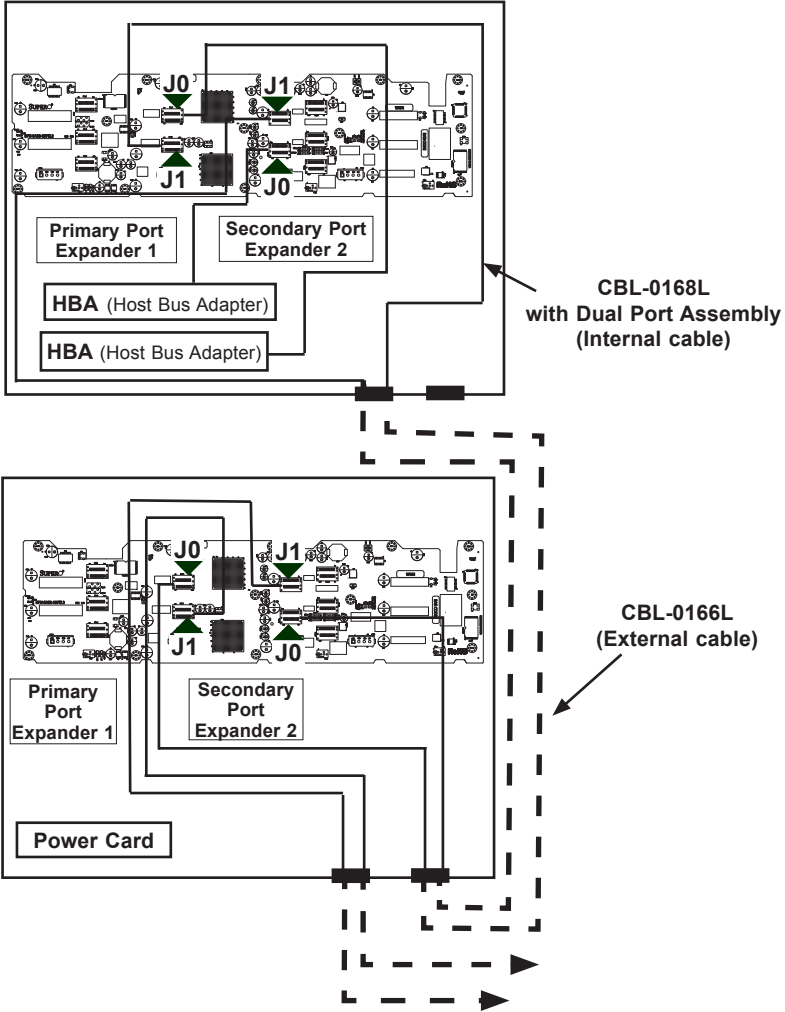


Figure 3-11: Multiple Backplanes in a Dual Channel Environment

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

### 3-4 Supported Cascading Configurations

Cascading allows the system to access data at a faster rate by allowing several backplanes to share resources to reduce latency time.

The first backplane in a cascaded system requires a motherboard and an HBA. Other servers require a power control card but no motherboard and no HBA.

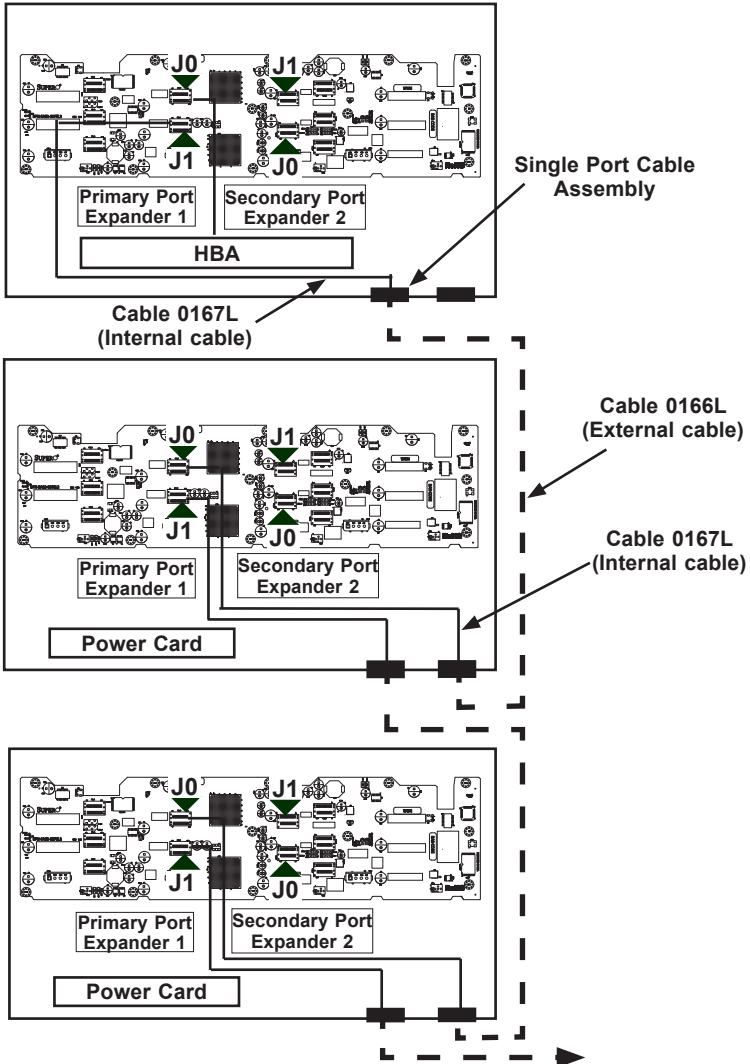


Figure 3-12: Simple Cascaded Configurations

### Dual SAS HBA and Cascaded Configuration

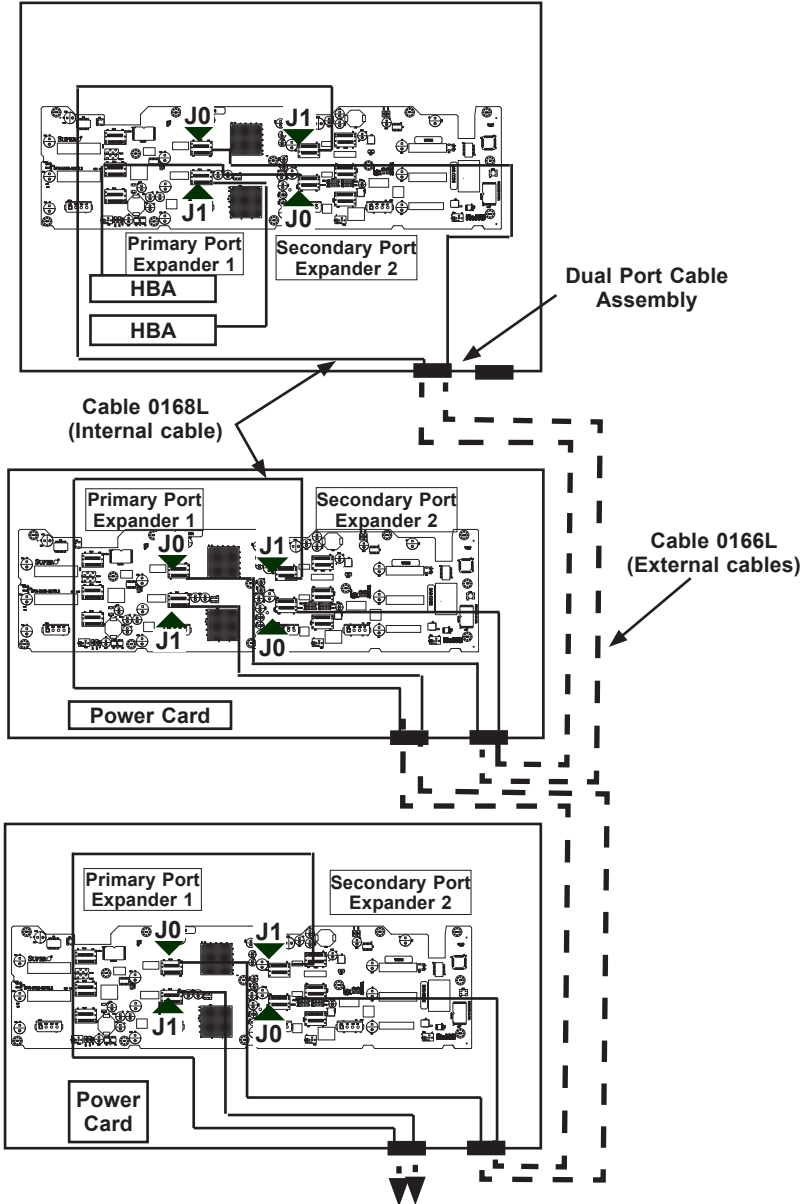


Figure 3-13: Dual SAS HBA with Cascaded Configuration

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

## Chapter 4

# Connecting the SAS2-837A and SAS-837EL Backplanes

### 4-1 Connecting Dual Backplanes

The SAS2-837EL and SAS-837A backplanes are designed to work together. The following configurations show how the SAS2-837EL and SAS-837A may be connected together.

#### Identifying the Backplanes

Examine the diagrams below and identify the SAS2-837EL and SAS-837A backplanes. Identify the locations of the SAS ports on each board. Also note the location of the primary I<sup>2</sup>C connectors, if the optional I<sup>2</sup>C configuration is desired.



Figure 3-1: SAS2-837EL Backplane

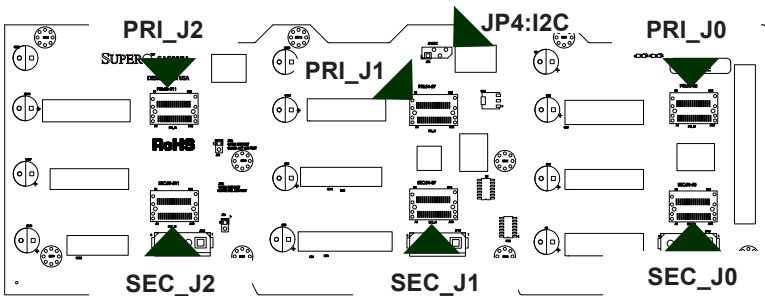


Figure 4-2: SAS-837A Backplane

## Configuring Dual Backplanes

Configure the SAS2-837EL2 and SAS-837A as shown in the chart below. Connect the port in Column A to the port in the Column B using the cable in Column C.

Dual Backplane Configuration Chart		
Column A SAS2-837EL Port	Column B SAS-837A Port	Column C Cable Name
Primary SAS port PRI_J2	Primary SAS port PRI_J0	CBL-0421L
Primary SAS port PRI_J3	Primary SAS port PRI_J1	CBL-0421L
Primary SAS port PRI_J4	Primary SAS port PRI_J2	CBL-0421L
Secondary SAS port SEC_J2	Secondary SAS port SEC_J0	CBL-0421L
Secondary SAS port SEC_J3	Secondary SAS port SEC_J1	CBL-0421L
Secondary SAS port SEC_J4	Secondary SAS port SEC_J2	CBL-0421L
Primary I <sup>2</sup> C connector PRI_I2C1 (optional)	I <sup>2</sup> C connector JP4:I2C (optional)	CBL-0102L

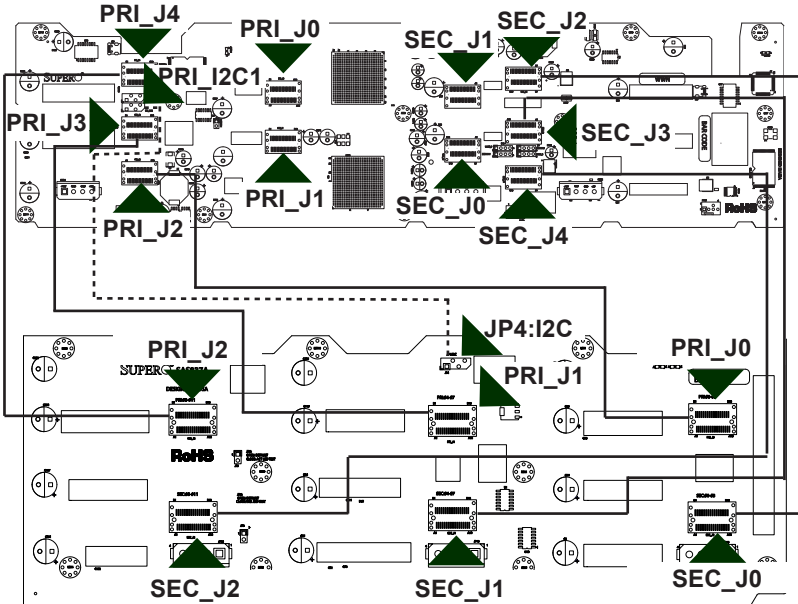


Figure 4-3: SAS2-827EL Above, SAS-837A Backplane Below

## Notes

Disclaimer (cont.)

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