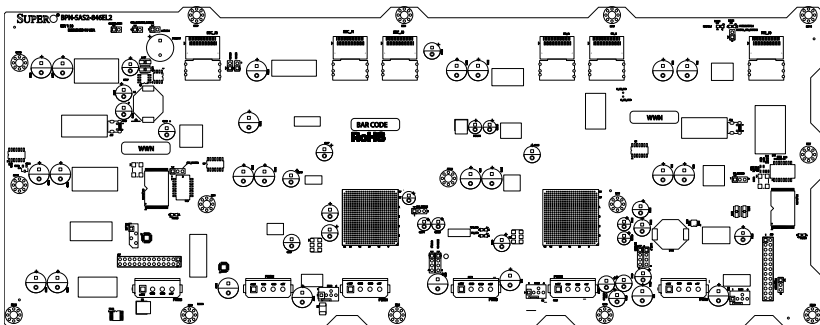# BPN-SAS2-846EL BACKPLANE

USER'S GUIDE

1.0c

The information in this User's Manual has been carefully reviewed and is believed to be accurate. The vendor assumes no responsibility for any inaccuracies that may be contained in this document, makes no commitment to update or to keep current the information in this manual, or to notify any person or organization of the updates. **Please Note: For the most up-to-date version of this manual, please see our web site at www.supermicro.com.**

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FCC Statement: This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the manufacturer's instruction manual, may cause harmful interference with radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case you will be required to correct the interference at your own expense.

California Best Management Practices Regulations for Perchlorate Materials: This Perchlorate warning applies only to products containing CR (Manganese Dioxide) Lithium coin cells. "Perchlorate Material-special handling may apply. See www.dtsc.ca.gov/hazardouswaste/perchlorate"

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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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

Guidelines

This chapter offers guidelines for personal and equipment safety, and notes about the BPN-SAS2-846EL version documented in this manual.

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 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   Version Information

The BPN-SAS2-846EL 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-SAS2-846EL, Revision 1.10, the most current release available at the time of publication. Refer to the Supermicro Web site at www.supermicro.com for the latest updates, compatible parts and supported configurations.

Chapter 2

Jumper Settings and Pin Definitions
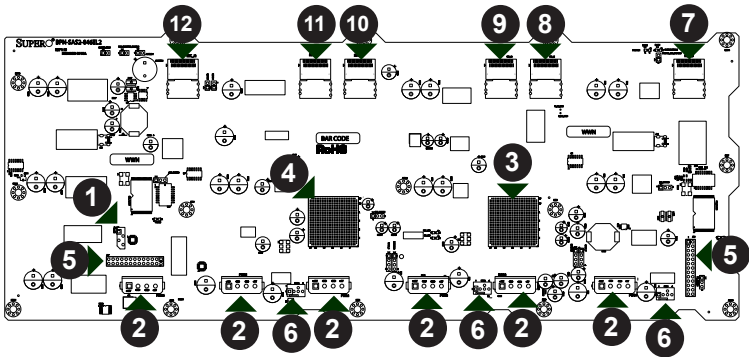
2-1   Rear Connectors and Jumpers

Figure 2-1. Rear Connectors

1. Primary I²C connector: PRI_I2C

2. Power connectors: PWR1, PWR2, PWR3, PWR4, PWR5, and PWR6

3. Primary expander chip

4. Secondary expander chip (Not available in EL1 backplane)

5. EPP connectors: J26 and J27

6. Fan connectors: FAN1, FAN2 and FAN3

7. Primary SAS connector: PRI_J0

8. Primary SAS connector: PRI_J1

9. Primary SAS connector: PRI_J2

10. Secondary SAS connector: SEC_J0 (Not available on EL1 backplane)

11. Secondary SAS connector SEC_J1 (Not available on EL1 backplane)

12. Secondary SAS connector SEC_J2 (Not available on EL1 backplane)

2-2   Rear Connector and Settings

1. Primary I²C Connector

The I²C connector is used to monitor the power supply status and to control the fans. See the table on the right for pin definitions.

I²C 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, PWR3, PWR4, PWR5, and 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

3. and 4. Primary and Secondary Expander Chips

This primary and secondary expander chips allow the backplane to support dual ports, cascading, and failover.

5. EPP Ports

The EPP ports are used for manufacturer diagnostic purposes only.

6. 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	NC

7. - 12. SAS Connectors

The primary and secondary sets of SAS connectors provide expander features including cascading and failover. From right to left the ports are Primary 0, Primary 1, Primary 2 and Secondary 0, Secondary 1, Secondary 2. Note that secondary SAS ports are not present on the SAS2-846EL1 backplane.

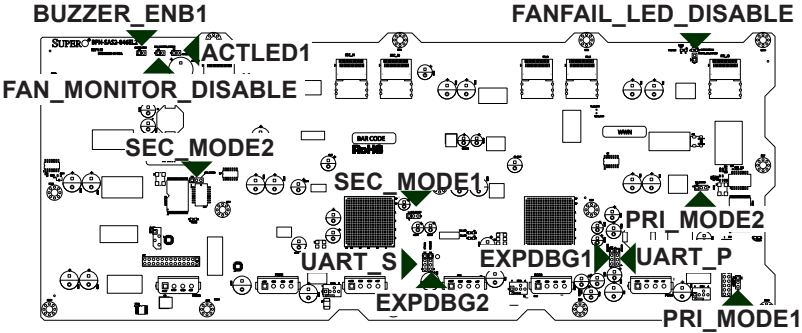## 2-3   Rear Jumper Locations and Settings and LEDs

Figure 2-2. Rear Jumper and LED Locations

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.
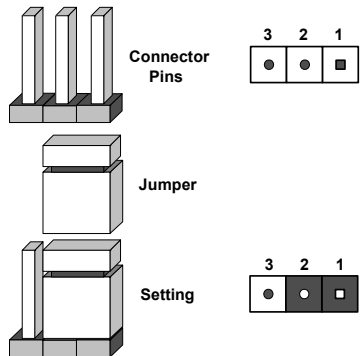
General Jumper Settings		
Jumper	**Jumper Settings**	**Note**
PRI_MODE1 and 2	Pins 2-3	Factory setting Do not change
SEC_MODE1 and 2	Pins 2-3	Factory setting Do not change
EXPDBG1 and 2	No jumper required	Debug, for Supermicro internal use only. (EXPDBG2 not present on SAS2-846EL1)
MDI01 and 02	No jumper required	Supermicro internal use only
UART_P1	No jumper required	Primary UART connector
UART_S1	No jumper required	Secondary UART connector (Not present on SAS2-847EL1)
BUZZER_ENB1*	Open: Disabled (Default) Closed: Enabled	Buzzer settings
ACTLED1	Open: Disabled (Default) Closed: Enabled	Activity LED settings
FAN_MONITOR_DIS-ABLE	Open: Disabled (Default) Closed: Enabled	Fan monitor LED settings

* Early versions of Supermicro SAS2 backplanes come equipped with a buzzer. New versions of these backplanes no longer support a buzzer. We recommend using the LSI MegaRAID Storage Manager or a similar management application to trigger an email alert instead.

The buzzer alarm is triggered by one of the following conditions:

- Hard drive failure.

- Fan failure.

- System temperature over 45º Celsius.

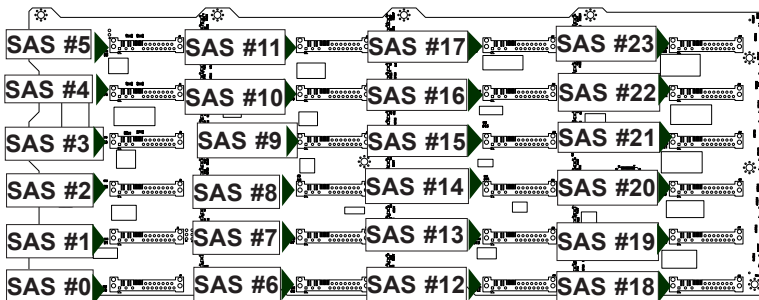| Rear LEDs		
LED	**State**	**Specification**
FANFAIL1	On	Failure in fans
OVERHEATFAIL1	On	Overheat/Drive Failure LED Indicator (Red light: Flashing. Buzzer: On)

2-4   Front Connectors and LED Indicators

Figure 2-3. FrontConnectors

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

Front LED Indicators		
Connector	**Hard Drive Activity LED**	**Failure LED**
SAS #0	ACT #0	FAIL #0
SAS #1	ACT #1	FAIL #1
SAS #2	ACT #2	FAIL #2
SAS #3	ACT #3	FAIL #3
SAS #4	ACT #4	FAIL #4
SAS #5	ACT #5	FAIL #5
SAS #6	ACT #6	FAIL #6
SAS #7	ACT #7	FAIL #7
SAS #8	ACT #8	FAIL #8
SAS #9	ACT #9	FAIL #9
SAS #10	ACT #10	FAIL #10
SAS #11	ACT #11	FAIL #11
SAS #12	ACT #12	FAIL #12
SAS #13	ACT #13	FAIL #13
SAS #14	ACT #14	FAIL #14
SAS #15	ACT #15	FAIL #15
SAS #16	ACT #16	FAIL #16
SAS #17	ACT #17	FAIL #17
SAS #18	ACT #18	FAIL #18
SAS #19	ACT #19	FAIL #19
SAS #20	ACT #20	FAIL #20
SAS #21	ACT #21	FAIL #21
SAS #22	ACT #22	FAIL #22
SAS #23	ACT #23	FAIL #23

Notes

Chapter 3

Dual Port and Cascading Configurations

3-1   Single and Dual Port Expanders

Single Ports

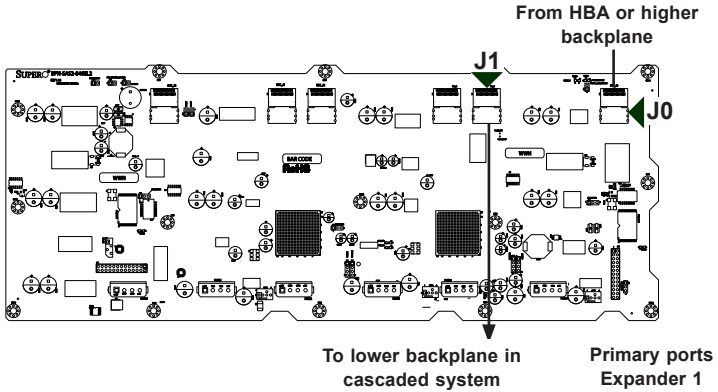SAS2-846EL1 backplanes have a single-port expander that accesses all hard drives and supports cascading.

Figure 3-1: Single Port Cascading Configurations

Dual Ports

SAS2-846EL2 backplanes have dual-port expanders that access all the hard drives. These dual-port expanders support cascading, failover, and multipath.
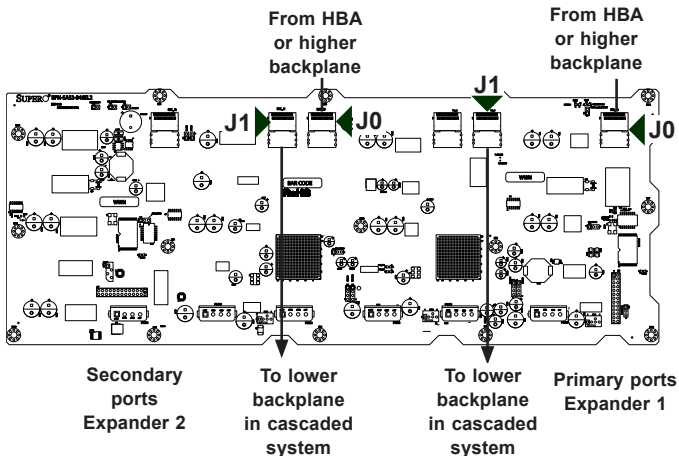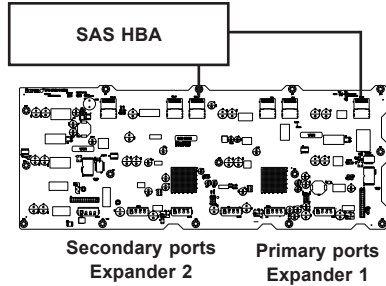

Figure 3-2: Dual Port Cascading Configurations

3-2   Failover

The SAS2-846EL2 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).

Secondary ports
Expander 2   **Primary ports**
Expander 1

Single Host Bus Adapter Failover

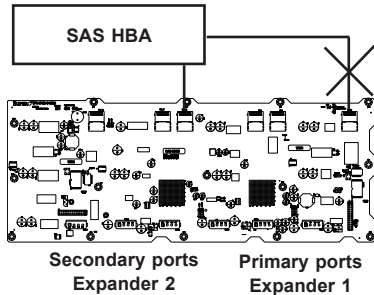If the expander or data path in the primary ports fails, the system automatically switches to secondary ports.

Secondary ports
Expander 2   **Primary ports**
Expander 1

Figure 3-3: Failover Configurations

3-3   Failover with RAID Cards and Multiple HBAs

The SAS2-846EL backplane may be configured for failover with multiple HBAs using either RAID controllers or HBAs to acheive 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, **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.
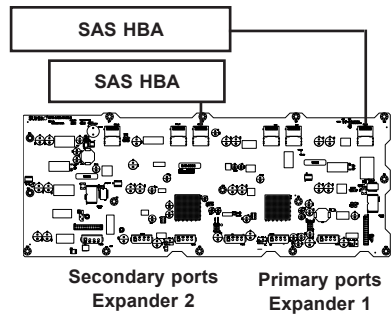
Secondary ports
Expander 2

Primary ports
Expander 1

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.
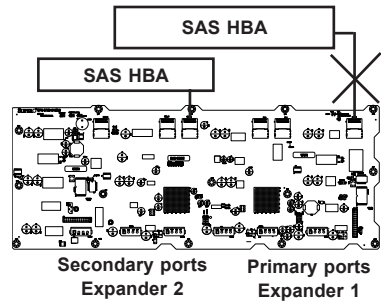

Secondary ports
Expander 2

Primary ports
Expander 1

Figure 3-4: Failover Configurations

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

3-4 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, include a power card. This section describes the supported power card for the SAS2-846EL series backplanes.
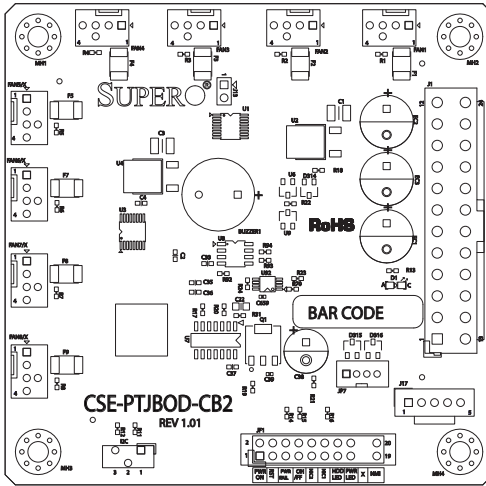

Figure 3-5: Chassis Power Card (Sold Separately)

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

Connecting an Internal Host Bus Adapter to the Backplane

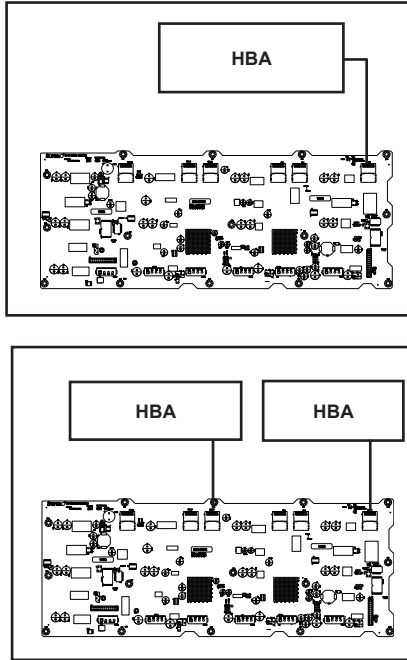The following section lists the most common cables used to connect the host bus adapter to the backplane.

Figure 3-6: 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 SAS2-846EL backplane. The cables required depend on the HBA connector.

Cable Name: iPass (Mini-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 with 36 pins at each end. It connects from the HBA to the SAS2-846EL backplane.

Supported External HBA to Backplane Cable

Use the following cable if your external HBA has an InfiniBand connector.

Figure 3-7: SAS InfiniBand to Mini SAS X4 1M cable, PBF Cable

Cable Name: SAS InfiniBand to Mini SAS X4 1M cable, PBF

**Part #:** CBL-0200L   **Length:** 1 meter

Description: This cable has an InfiniBand connector (SFF-8470) on one end and an SFF-8088-1X (26-pins) at the other end.

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
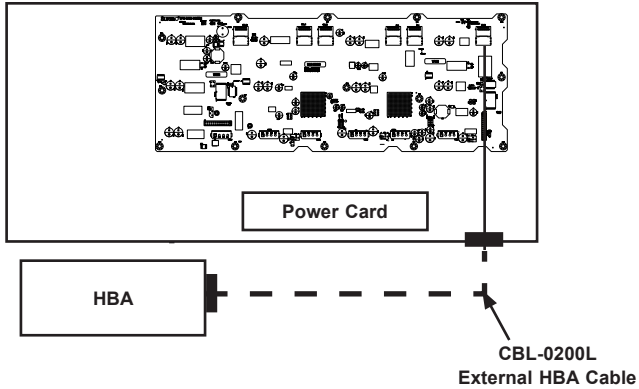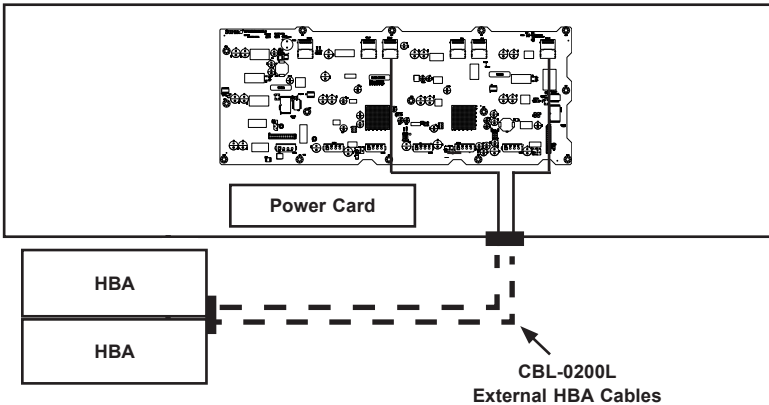

Dual External Host Bus Adapter

Figure 3-8: Connecting Single and Dual HBAs 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 External HBA to Backplane Cable

Use the following cable if your external HBA has an InfiniBand connector.

Figure 3-9: External Cascading Cable (CBL-0166L)

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

Part #: CBL-0166L (SFF-8088 1x to SFF-8088 x1)
Ports: Single or Dual
Placement: External cable

Description: External cascading cable. Connects ports between servers. With most connectors, use one cable for single port connections and two cables for dual port connections.

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.
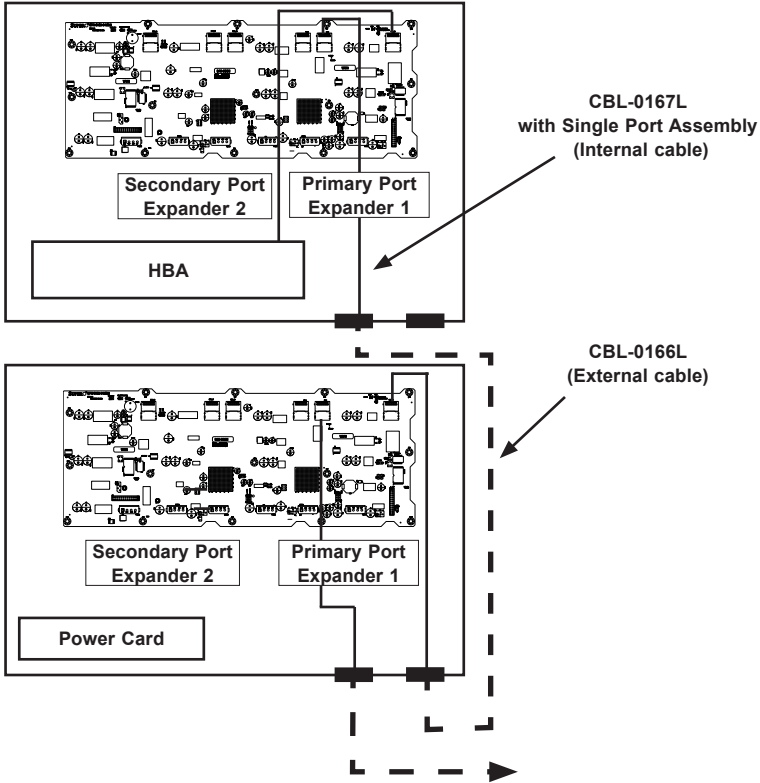
Figure 3-10: Single HBA Configuration

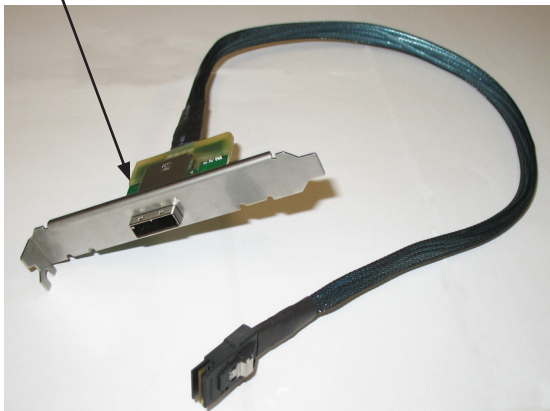## Single HBA Configuration Cables

Single Port Cable Assembly

Figure 3-11: 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 Host Bus Adapter (HBA) or external port. Used in single port environments.

Figure 3-12: External Cable (CBL-0166L)

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

Part #: CBL-0166L (SFF-8088 1x to SFF-8088 x1)
Ports: Single or Dual
Placement: External cable

> **Description:** External cascading cable. Connects ports between servers. With most connectors, use one cable for single port connections and two cables for dual port connections.

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.
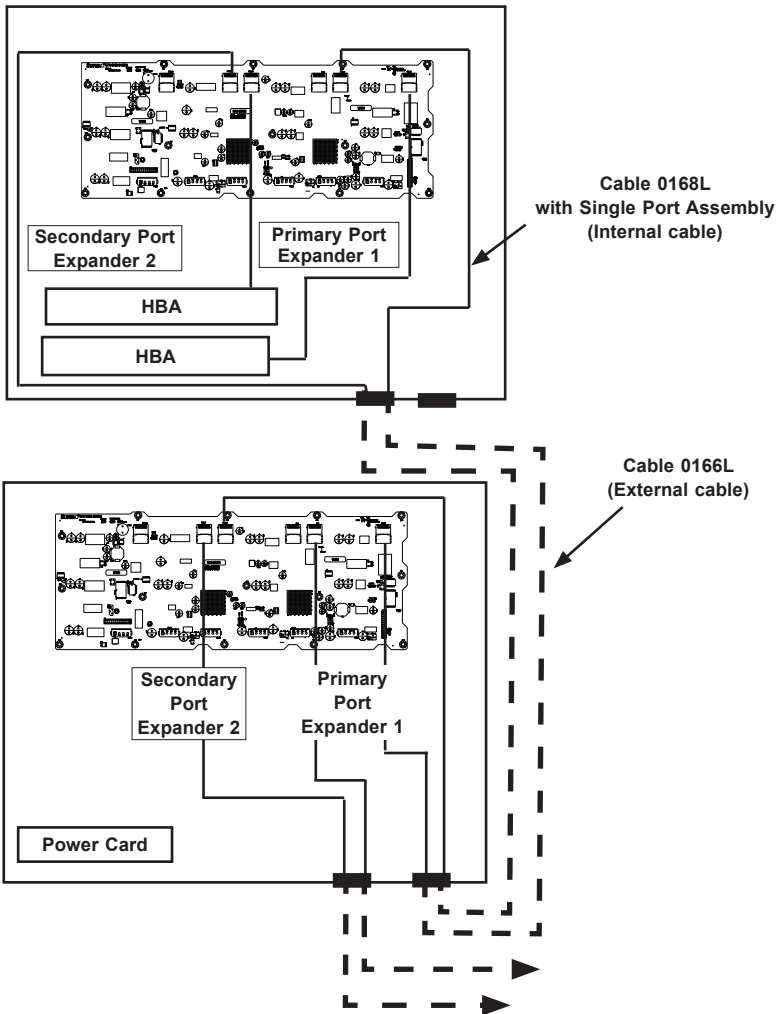

Figure 3-13: Multiple Backplanes in a Dual Channel Environment

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

Dual HBA Configuration Cables

**Dual Port Cable
Assembly**

Figure 3-14: Dual Port Internal Cable (CBL-0168L)

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

Part #: CBL-0168L   **Placement:** Internal cable
Ports: Dual

Description: Internal cascading cable. Connects the backplane to the Host Bus
Adapter (HBA) or external port. Used in dual port environments.

3-5   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 with no motherboard and no HBA. For more information, see the SC846 Chassis Manual available at www.supermicro.com.
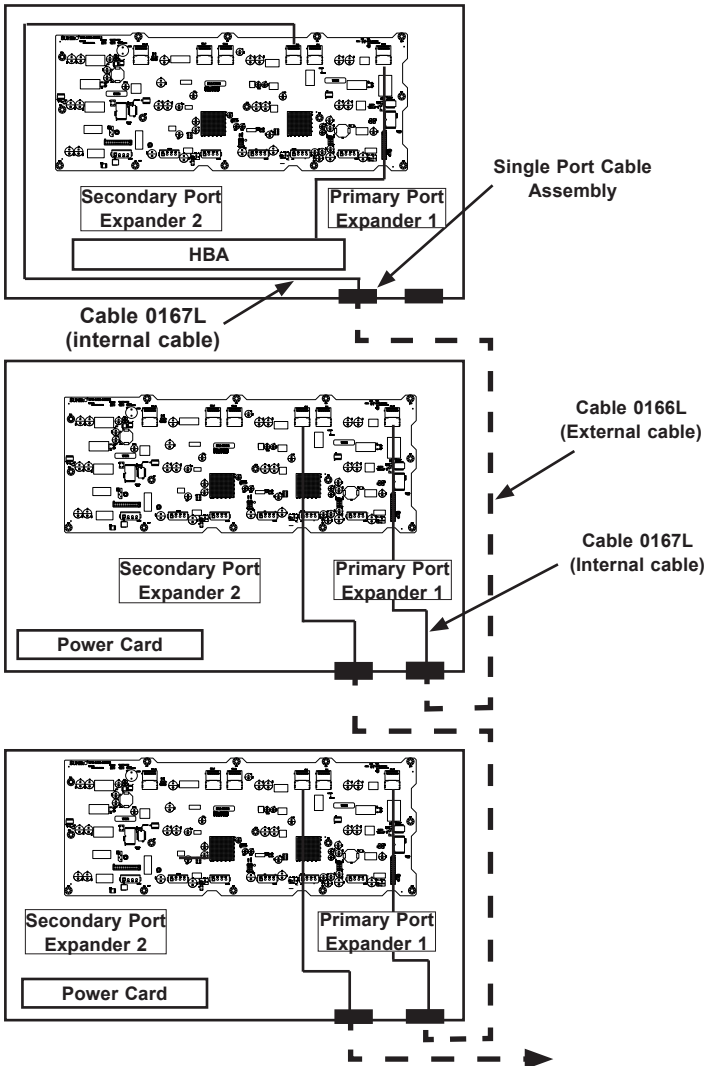
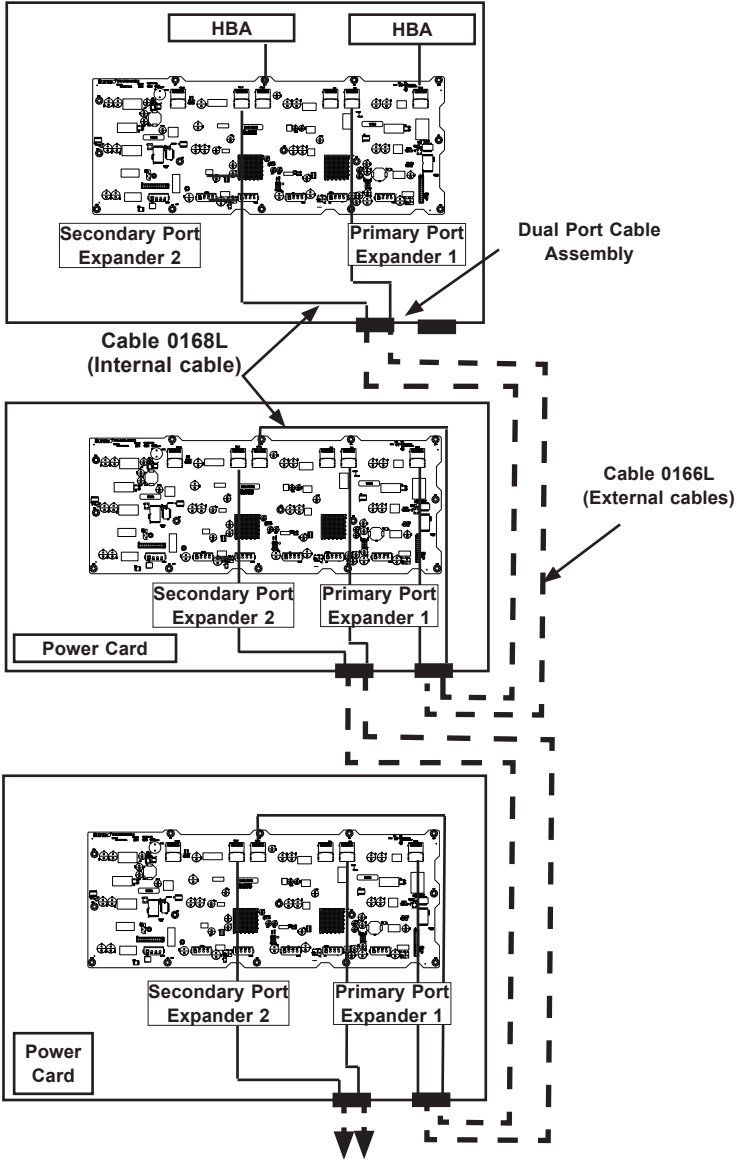**Figure 3-15: Simple Cascaded Configurations**

Dual SAS HBA and Cascaded Configuration

Figure 3-16: 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.

Notes

Disclaimer (cont.)