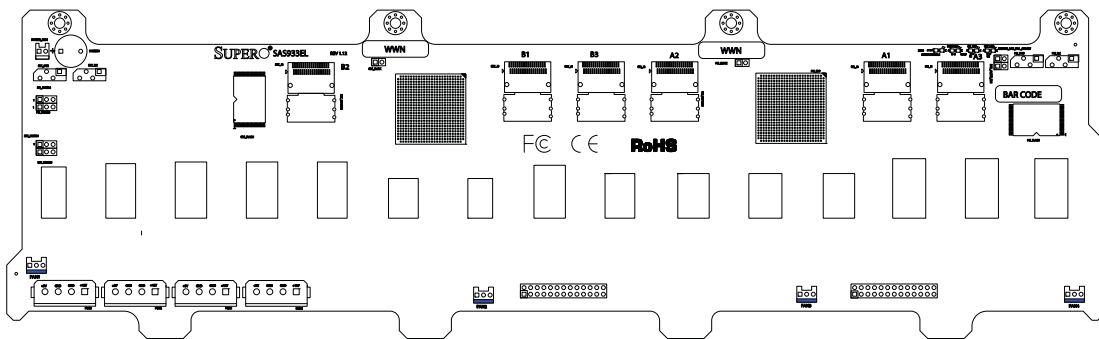


SUPERO®



SAS-933EL SERIES BACKPLANE

USER'S GUIDE

Rev. 1.0d

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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 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 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 SAS-933EL Backplane

The SAS-933EL backplane has been designed to utilize the most up-to-date technology available, providing your system with reliable, high-quality performance.

This manual reflects SAS-933EL Revision 1.12 the most current release available at the time of publication. Always refer to the Supermicro Web site at www.supermicro.com for the latest updates, compatible parts and supported configurations.

Chapter 2

Connectors, Jumpers and LEDs

2-1 Front Connectors and Jumpers

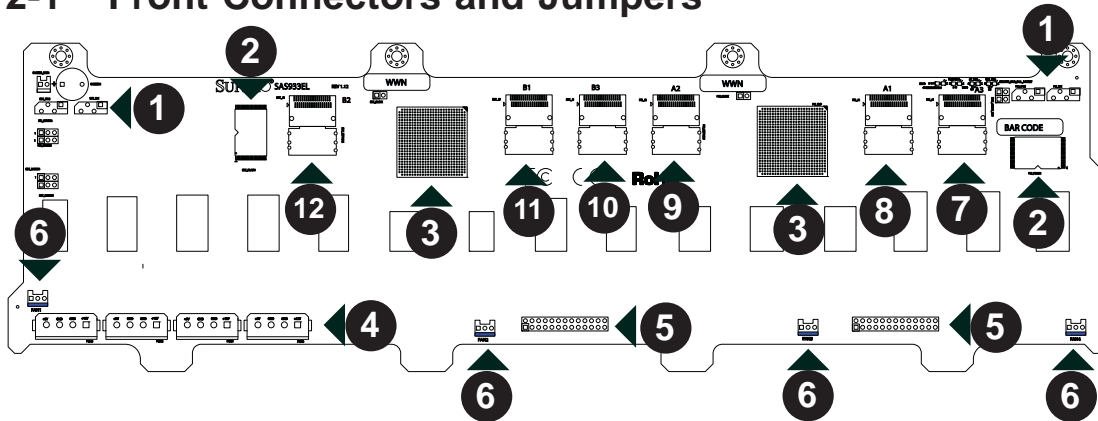


Figure 2-1: SAS-933EL2 Backplane

Front Connectors

- | | |
|---|---|
| 1. Primary and secondary I ² C connectors (optional) | 7. SAS connectors: PRI_A3 |
| 2. Primary and secondary flash chip | 8. SAS connectors: PRI_A1 |
| 3. Primary and secondary expander chip | 9. SAS connectors: PRI_A2 |
| 4. Power connectors: PWR0, PWR1, PWR2, and PWR3 | 10. SAS connectors: SEC_B3 (not available in EL1 single port backplane) |
| 5. EPP connectors: J15 and J16 | 11. SAS connectors: SEC_B1 (not available in EL1 single port backplane) |
| 6. Fan connectors: Fan1, Fan2, Fan3, and Fan4 | 12. SAS connectors: SEC_B2 (not available in EL1 single port backplane) |

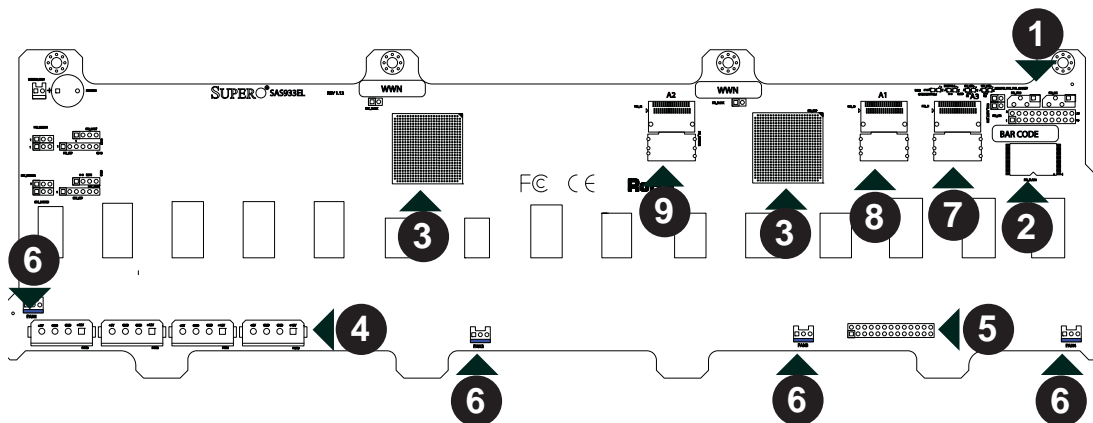


Figure 2-2: SAS-933EL1 Backplane

2-2 Front Connector and Pin Definitions

1. Primary and Secondary I²C Connectors

The I²C connectors are used to monitor the power supply and to control the fans. See the table on the right for pin definitions. There are two connectors, one primary and one secondary.

These connectors are optional and should only be used by qualified technicians.

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

2. Primary and Secondary Flash Chips

The primary and secondary flash chips enhance the backplane memory.

3. Primary and Secondary Expander Chips

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

4. Backplane Main Power Connectors

The 4-pin connectors, designated PWR0, PWR1, PWR2, and PWR3, provide power to the backplane. See the table on the right for pin definitions.

Backplane Main Power 4-Pin Connector (PWR0, PWR1, PWR2, and PWR3)	
Pin#	Definition
1	+12V
2 and 3	Ground
4	+5V

5. EPP Ports

The EPP ports are used for manufacturer diagnostic purposes only.

6. Fan Connectors

The 3-pin connectors, designated Fan1, Fan2, Fan3, and Fan4, provide power to the system fans. See the table on the right for pin definitions.

Fan Connectors (Fan1, Fan2, Fan3, and Fan4)	
Pin#	Definition
1	Ground
2	+12V
3	Tachometer

7 - 12. SAS Ports

Note that the primary and secondary sets of SAS ports are in different order. From right to left the ports are Primary A3, A1, and A2 and Secondary B3, B1, and B2.

2-3 Front Jumper Locations and Pin Definitions

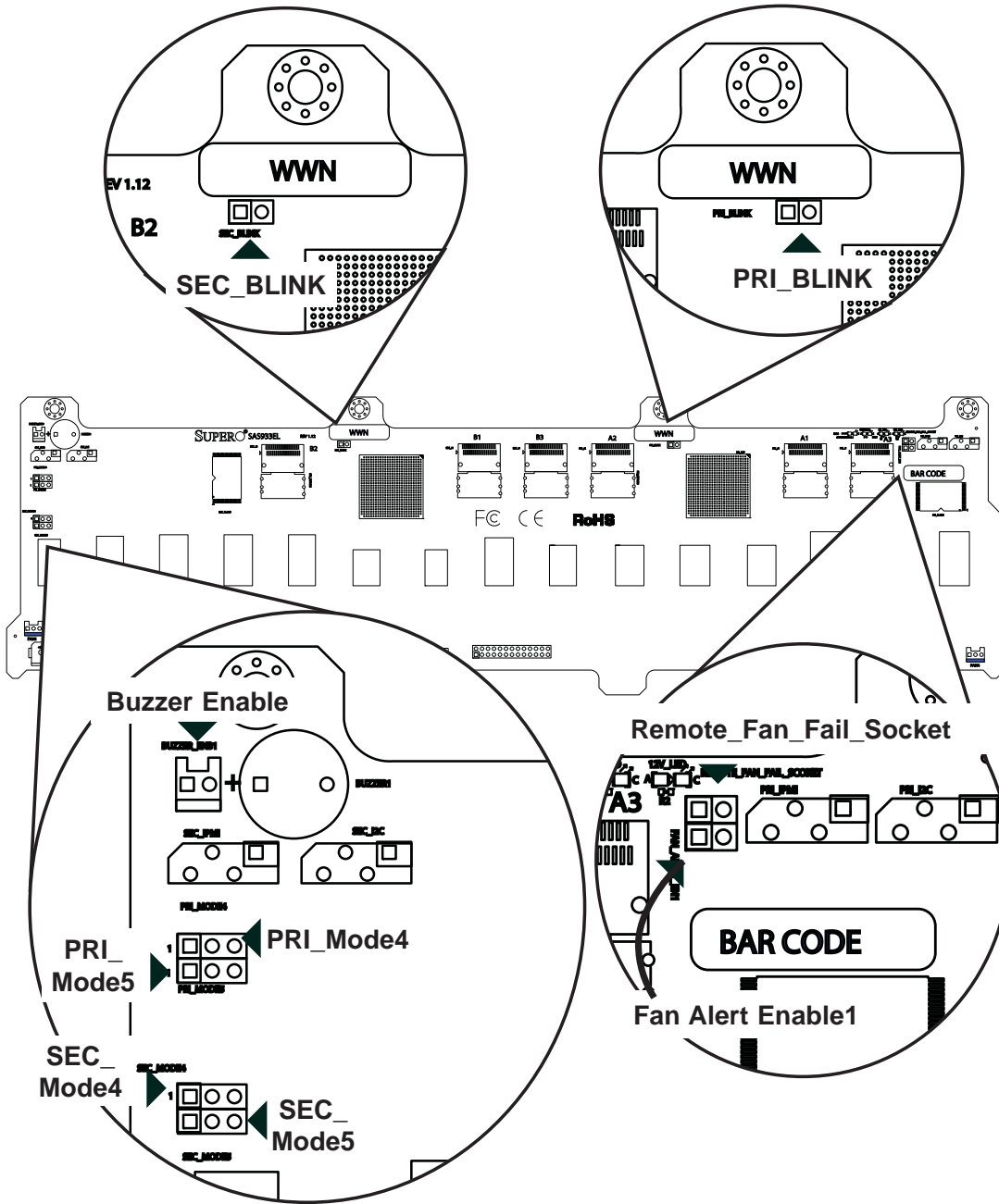


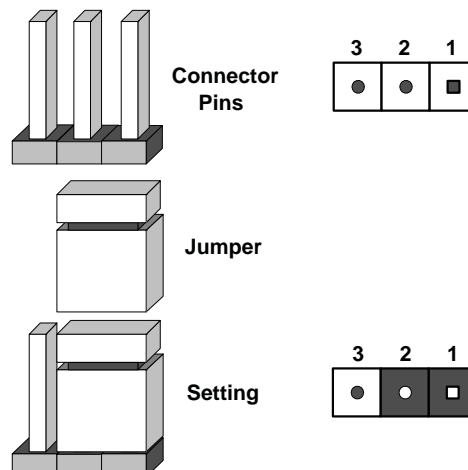
Figure 2-3: Front Jumpers

Socket Settings		
Socket	Socket Setting	Notes
REMOTE_FAN_FAIL_SOCKET	Connected	Front panel fan fail indicator (Optional)

General Jumper Settings		
Jumper	Jumper Settings	Note
PRI_MODE4	1-2	Factory setting Do not change
PRI_MODE5	2-3	Factory setting Do not change
PRI_BLINK	Open	Factory setting Do not change
SEC_MODE4	1-2	Factory setting Do not change
SEC_MODE5	2-3	Factory setting Do not change
SEC_BLINK	Open	Factory setting Do not change
BUZZER_ENB	Open: Disable Closed: Enable	Buzzer enable*
FAN_ALERT_ENI	Open: Disable Closed: Enable	Fan alert enable

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.



*The buzzer sound indicates that a condition requiring immediate attention has occurred.

The buzzer alarm is triggered by the following conditions:

1. Hard drive failure
2. Fan failure
3. System temperature over 45° Celsius.

Front LED Indicators

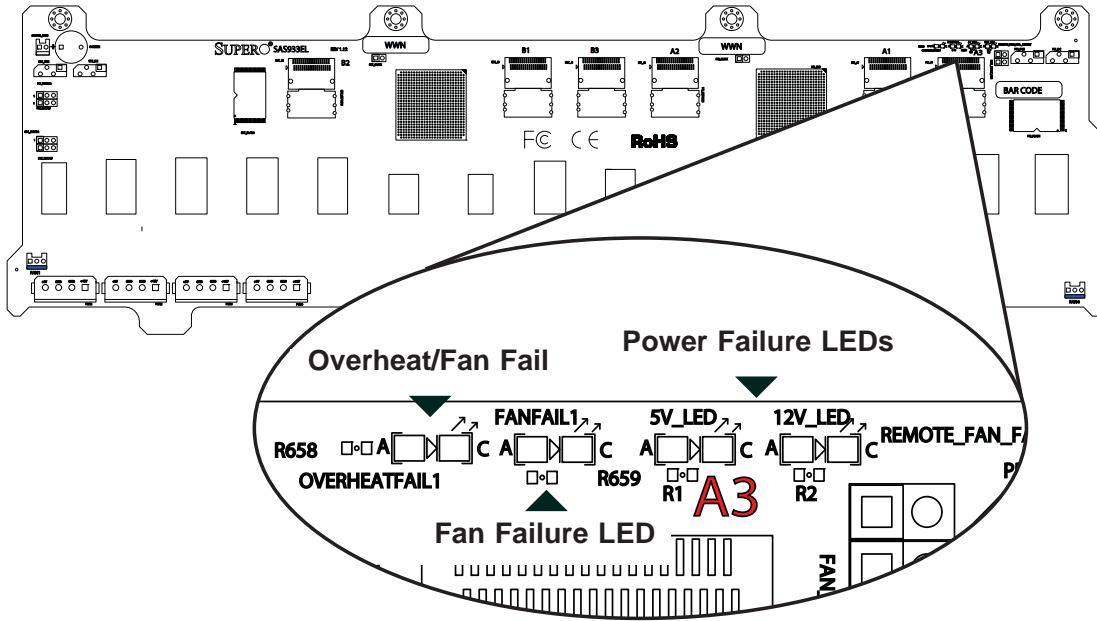


Figure 2-4: Front LED Indicators

Backplane LEDs		
LED	State	Specification
OVERHEATFAIL1	On	Overheat or drive failure
FANFAIL1	On	Failure in system fans
5V	Off	Backplane power failure. Light is on during normal operation.
12V	Off	Backplane power failure. Light is on during normal operation.

2-4 Rear Connectors and LED Indicators

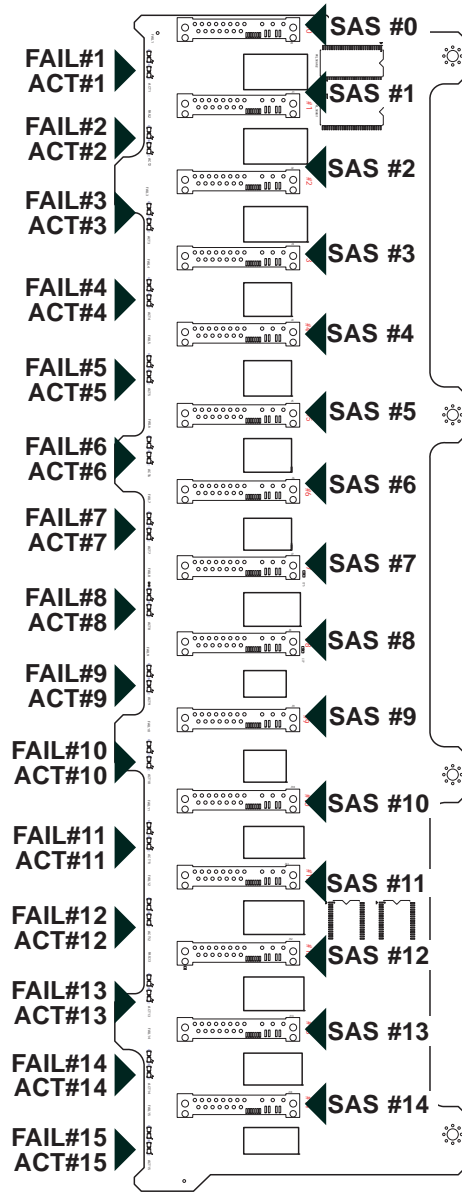


Figure 2-5: Rear Connectors and LEDs

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

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

Chapter 3

Dual Port and Cascading Configurations

3-1 Single and Dual Port Expanders

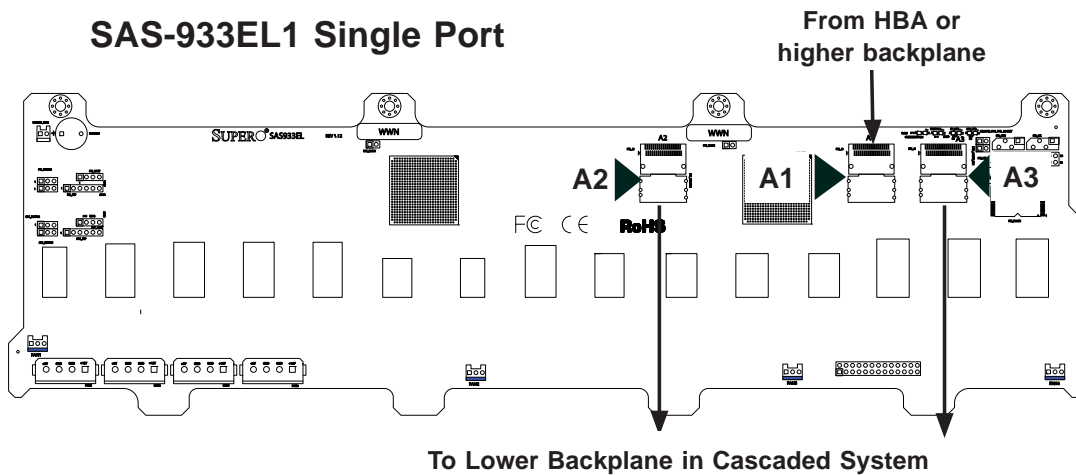
Single Ports

SAS-933EL1 backplanes have a single port expander that access all fifteen drives and supports cascading.

Dual Ports

SAS-933EL2 backplanes have dual port expanders that access all fifteen drives. These dual port expanders support cascading, failover, and recovery.

SAS-933EL1 Single Port



SAS-933EL2 Dual Port Backplane

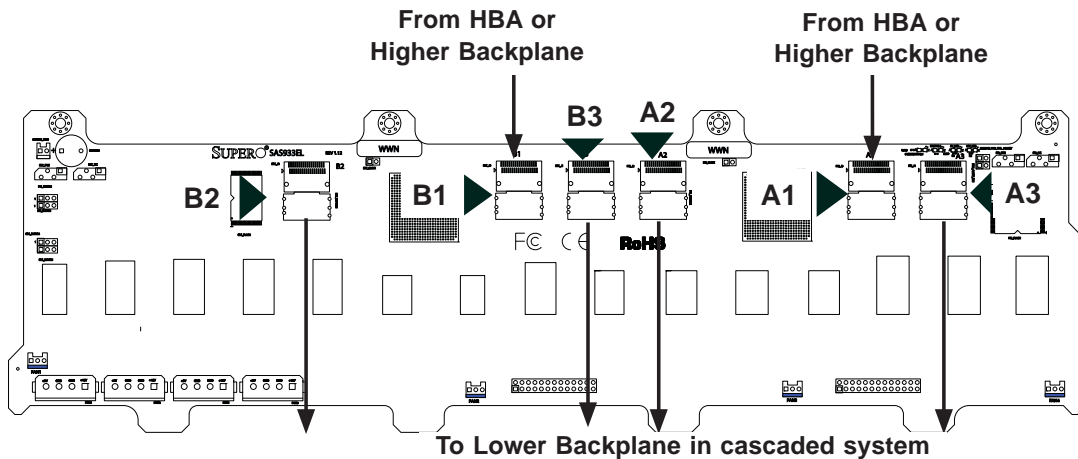


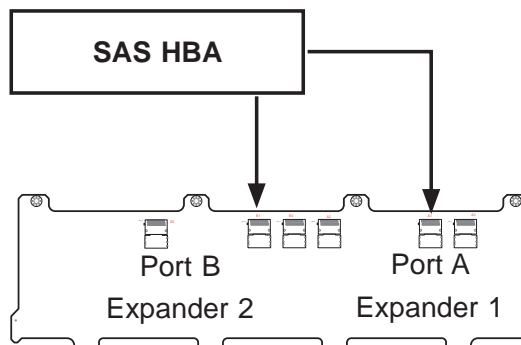
Figure 3-1: Single and Dual Port Backplanes

3-2 Failover

The SAS-933EL2 backplane has two expanders which allow effective failover and recovery.

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 Port A fails, the system will automatically switch over to Port B.

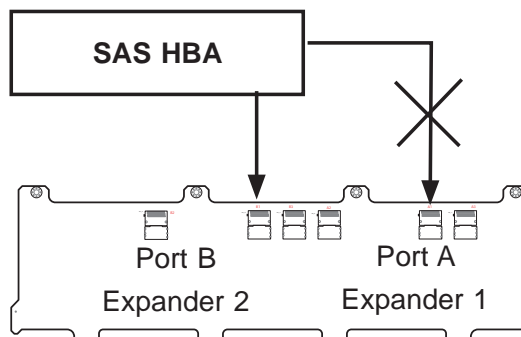


Figure 3-2: Failover with a Single HBA

3-3 Failover with RAID Cards and Multiple HBAs

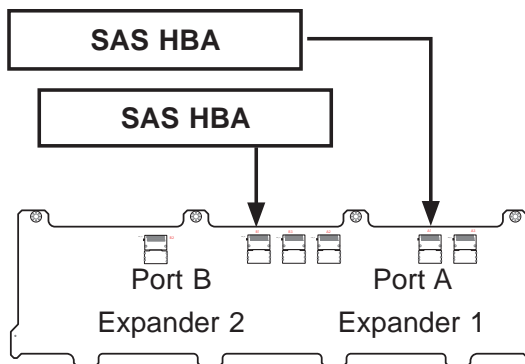
The SAS-933EL backplane may be configured for failover with multiple HBAs using either RAID controllers or HBAs to achieve failover protection.

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 Port A fails, the system will automatically fail over to Port B. This maintains a full connection to all drives.

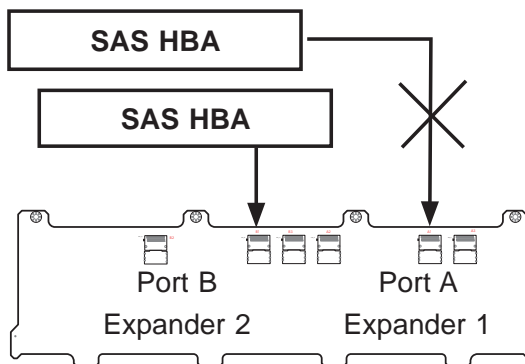


Figure 3-3: Failover with Dual HBAs



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

3-4 Cables and Chassis Power Card

Chassis Power Card

In a cascaded configuration, the first chassis includes a motherboard and, at least one, HBA. Other servers in this enclosed system, include a power card. This section describes the supported power card for the SAS-933 backplane system.

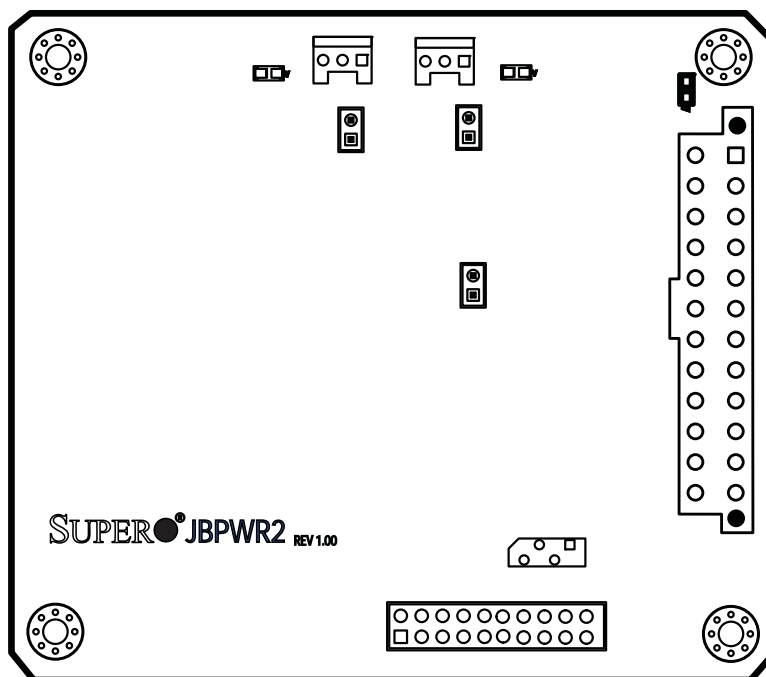
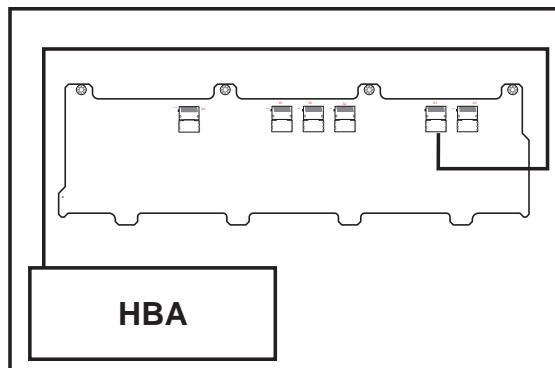


Figure 3-4: Power Card

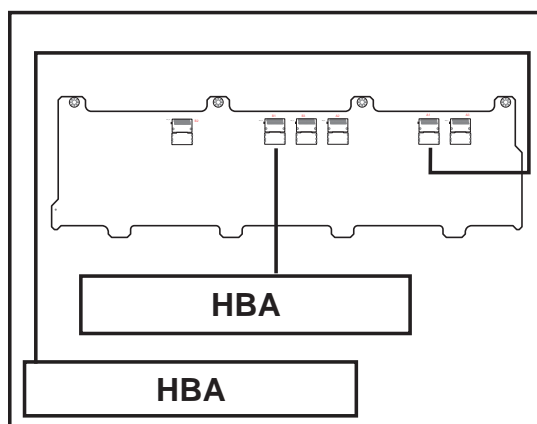
Power Card		
Part Number	Part Type	Where Used
CSE-PTJBOD-CB1	Power Card	Allows the chassis to be in a JBOD (Just a Bunch of Drives) system.

Connecting an Internal Host Bus Adapter to the Backplane

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



Single Internal Host Bus Adapter



Dual Internal Host Bus Adapter

Figure 3-5: Single and Dual HBAs

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

Supported Internal HBA to Backplane Cables

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



Figure 3-6: iPass to 4-lane Cable (CBL-0117)

Cable Name: iPass to 4-Lane

Part #: CBL-0117

Length: 46 cm (18 inches)

Description: This cable has one SFF-8484 (32-pin) connector on one end and iPass (SFF-8087/Mini-SAS) connector (36-pin) at the other. This cable connects from the HBA to the SAS-933EL backplane.



Figure 3-7: iPass (Mini-SAS) to iPass (Mini-SAS) (CBL-0110L-2)

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 (36-pin) at each end. It connects from the HBA to the 933 EL backplane.

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 (Just a Bunch Of Drives) configuration from an existing system.

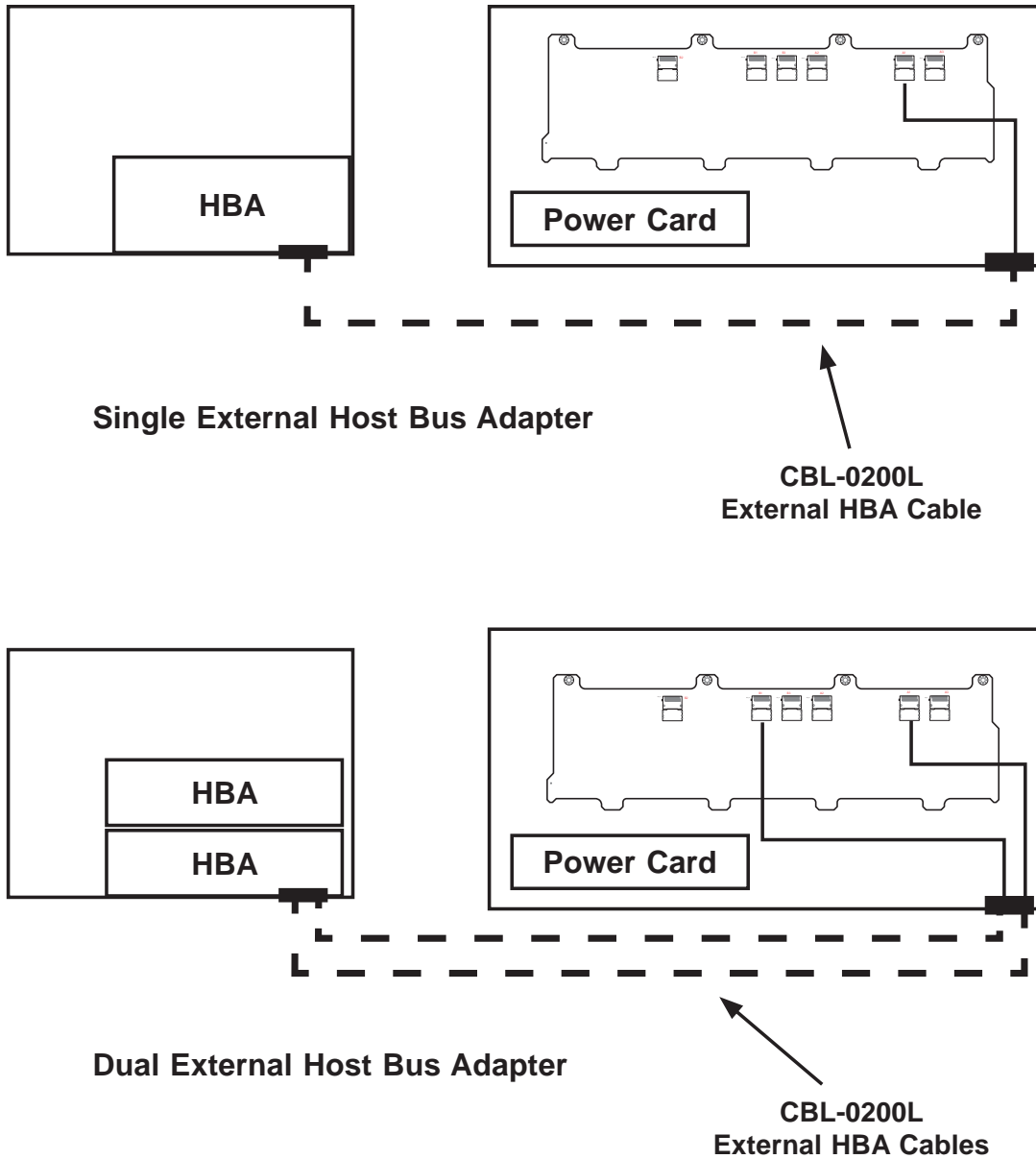


Figure 3-8: Connecting an External HBA

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: SAS InfiniBand to Mini-SAS (CBL-0200L)

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 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.

Single HBA Conguration

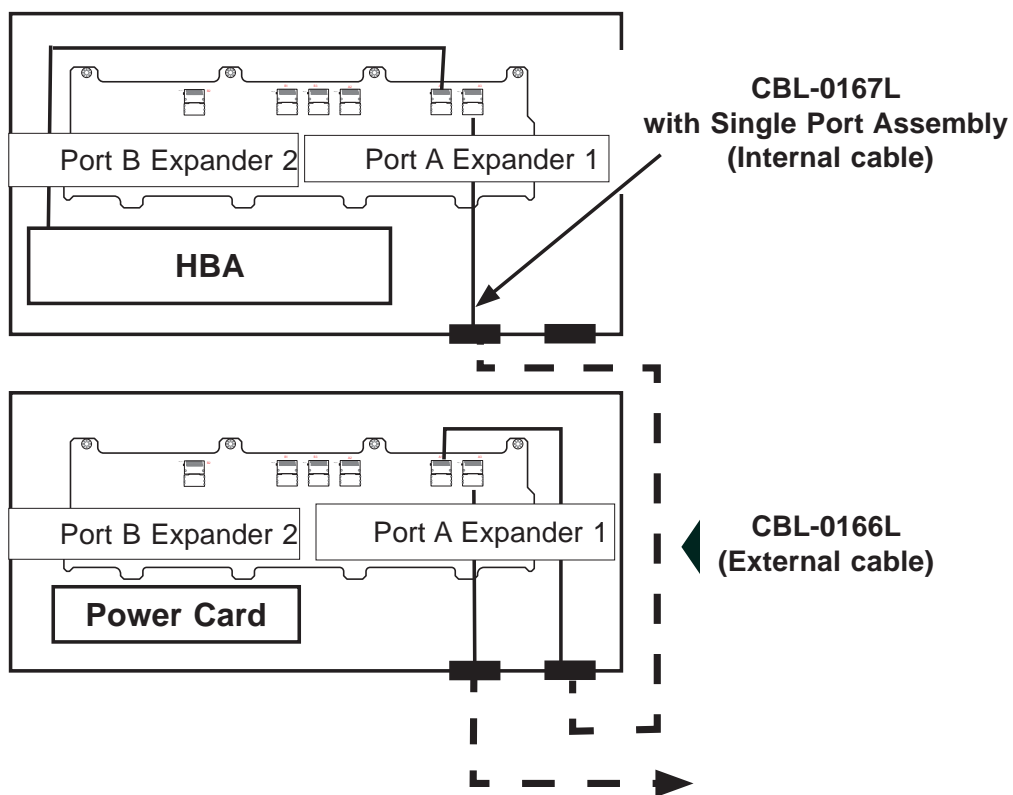


Figure 3-10: Multiple Backplanes in a Single Channel Environment

Single HBA Configuration Cables

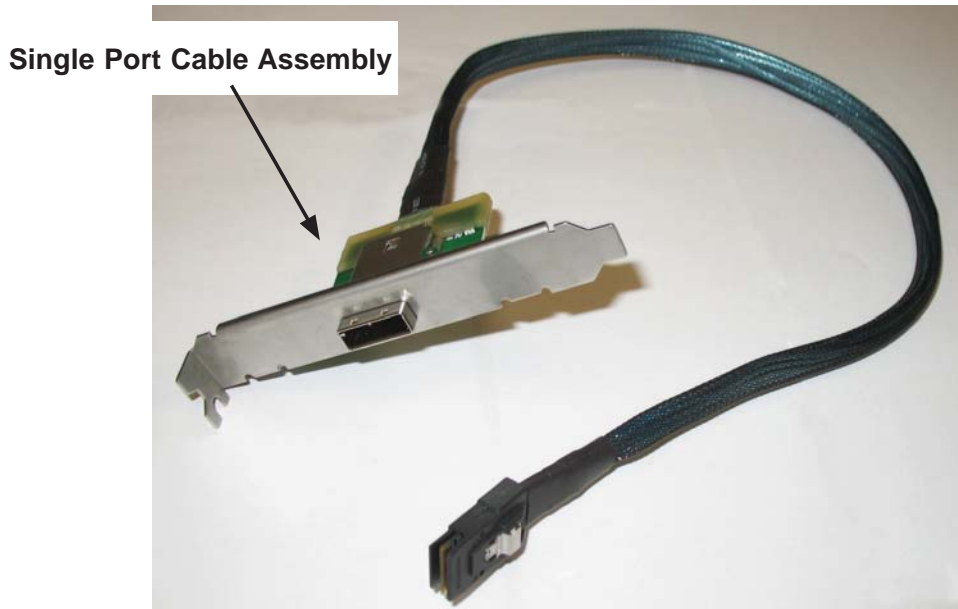


Figure 3-11: SAS Internal Backplane Cable (CBL-0167L)

Cable Name: SAS EL2/EL1 Backplane Cable (Internal) w/ 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: SAS Cascading Cable External (CBL-0166L)

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

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 a single HBA. These connections use CBL-0168L internal cables and CBL-0166L external cables.

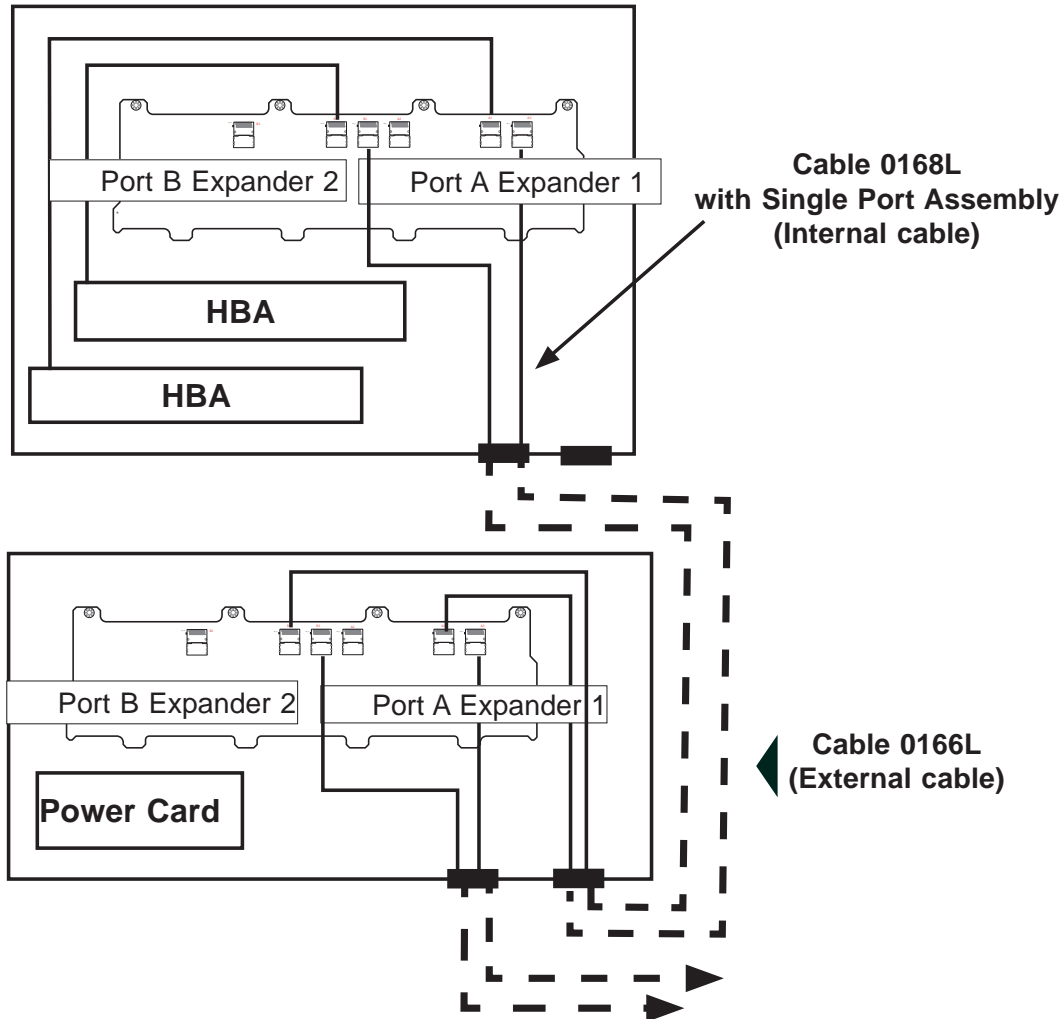


Figure 3-13: Multiple Backplanes in a Dual Channel Environment

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

Dual HBA Conguration Cables

Dual Port Cable
Assembly



Figure 3-14: SAS Cascading Cable Internal (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 3-15: SAS Cascading Cable External (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.

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 HBA. Other servers require a power control card, but not a motherboard and HBA together.

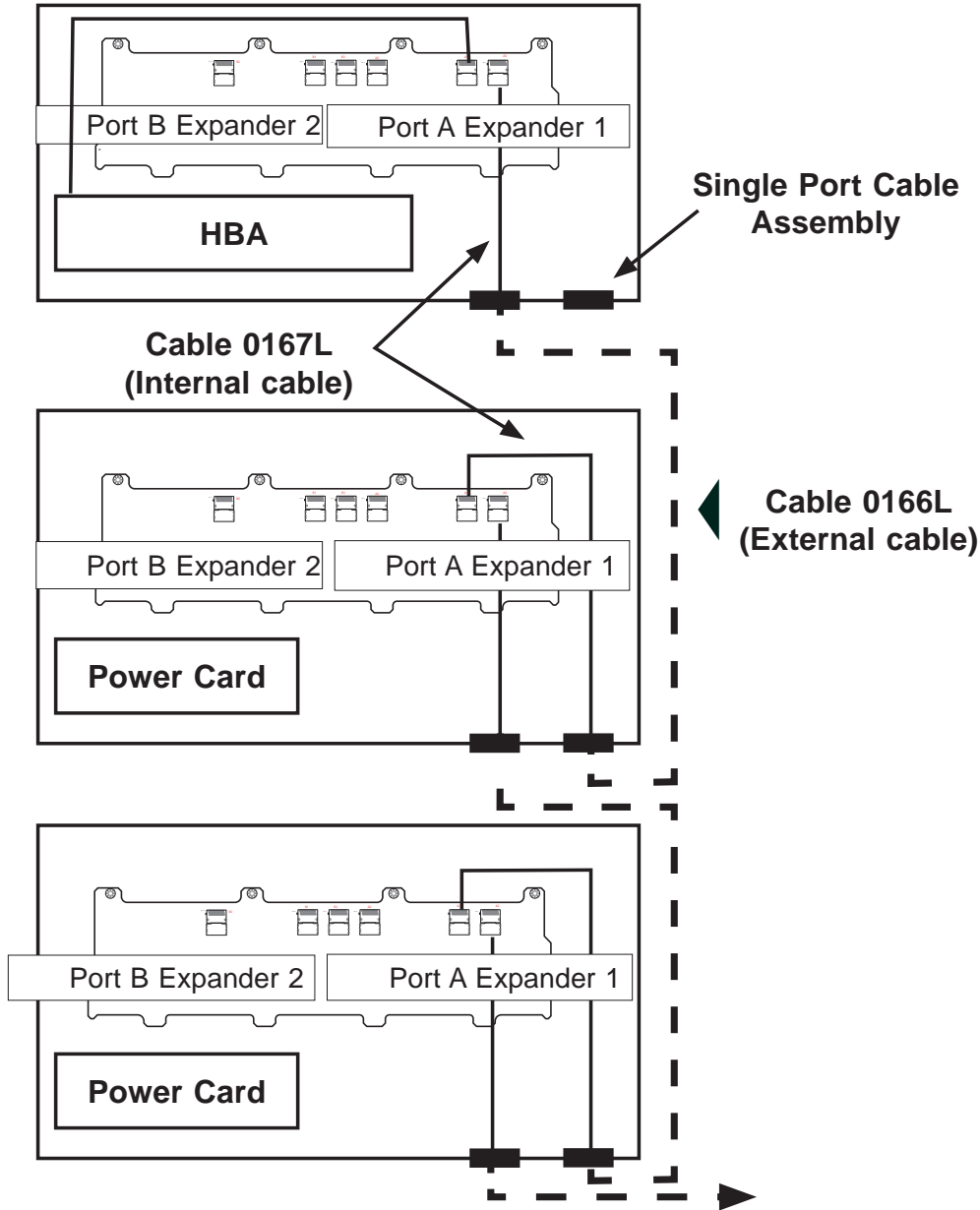


Figure 3-16: Supported Cascading Configurations

Other Considerations:

- Cascading supports up to one hundred twenty-two hard drives
- Use the same cables for all single port configurations

Server System with Single SAS HBA

The expanders allow horizontal branching. This configuration also applies to dual ports.

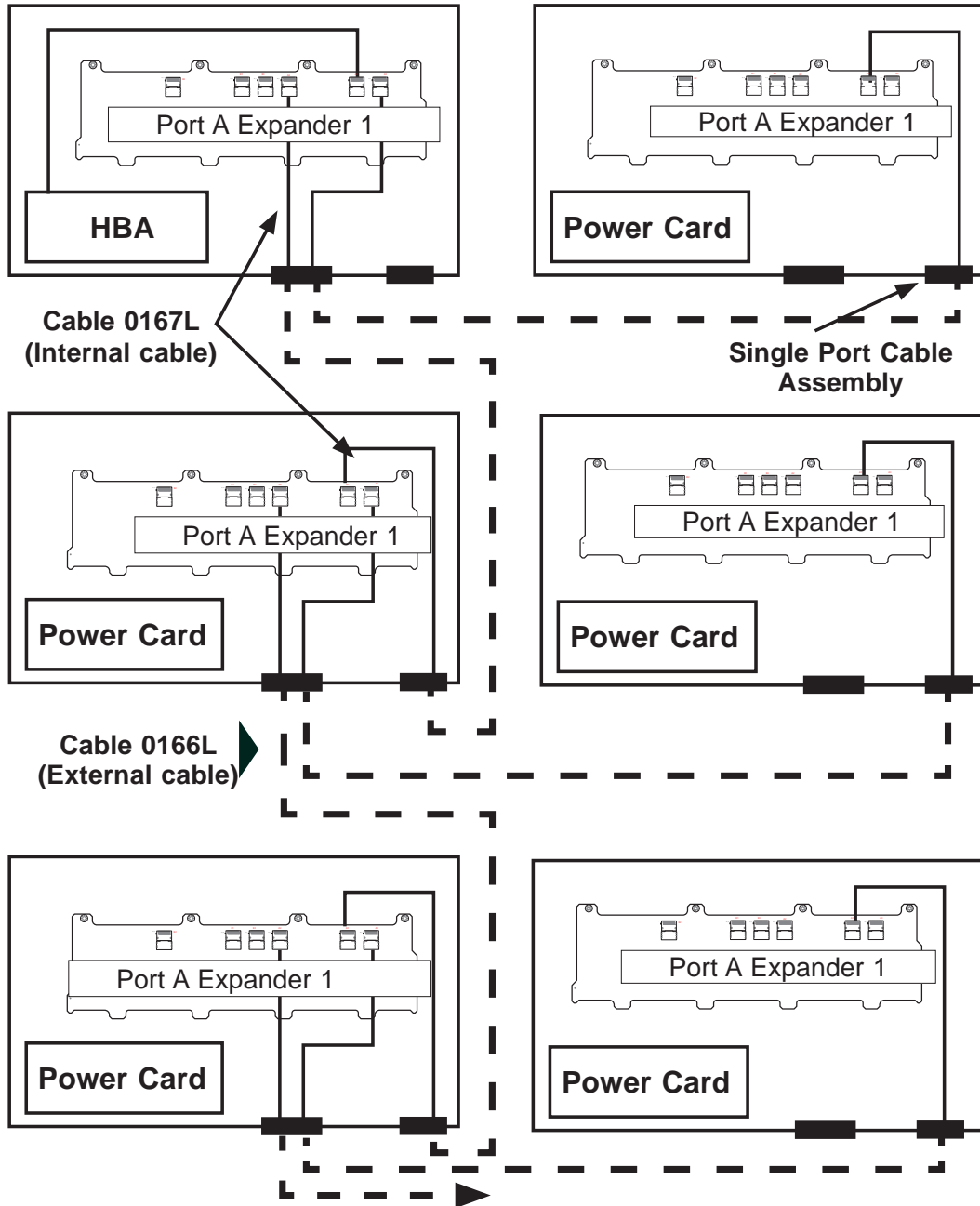


Figure 3-17: Server System with Single SAS HBA

Server System with Dual SAS HBA and Cascading Configuration

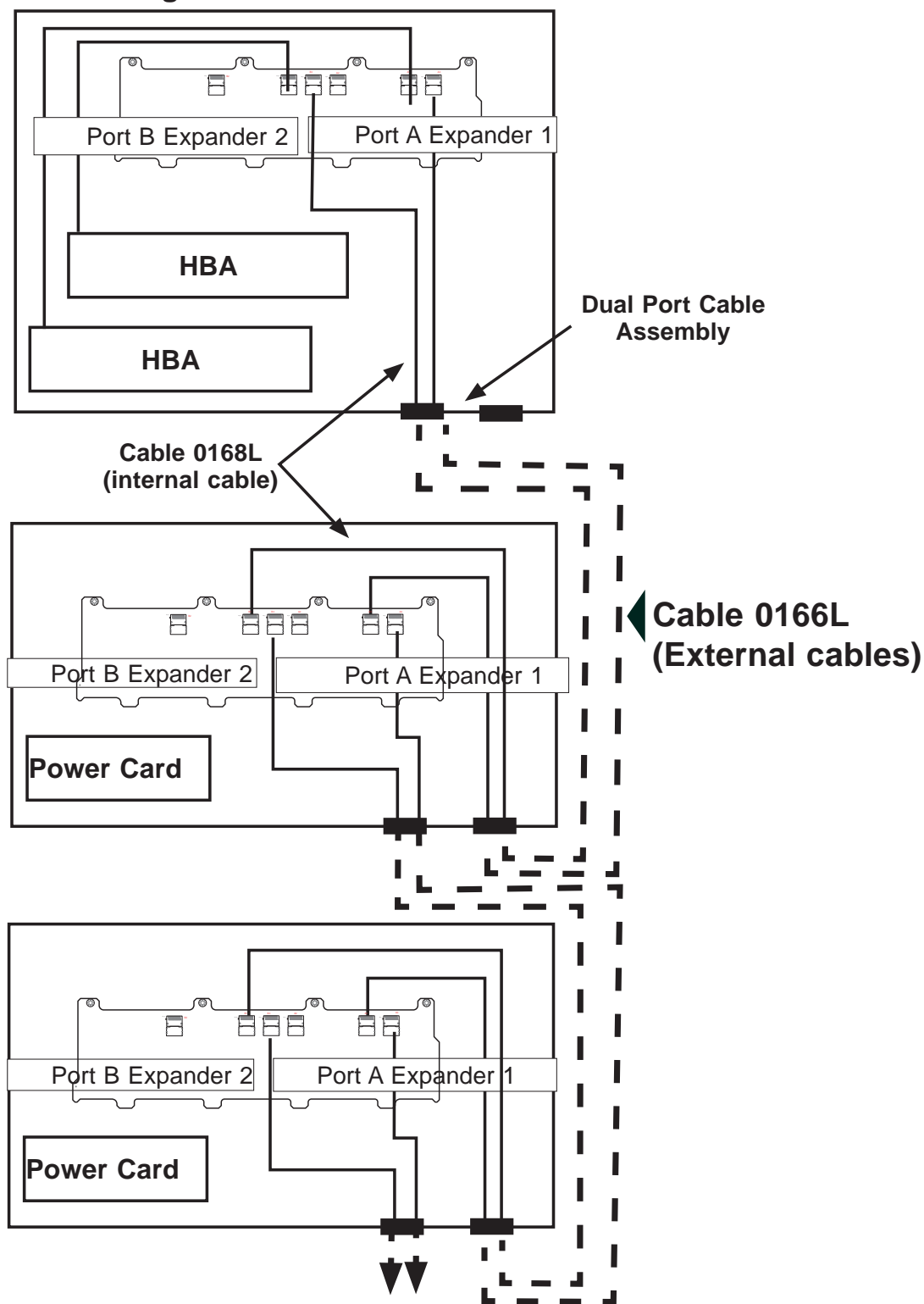


Figure 3-18: Server System with Dual SAS HBA and Cascading Configuration

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

Server System with Dual SAS HBA

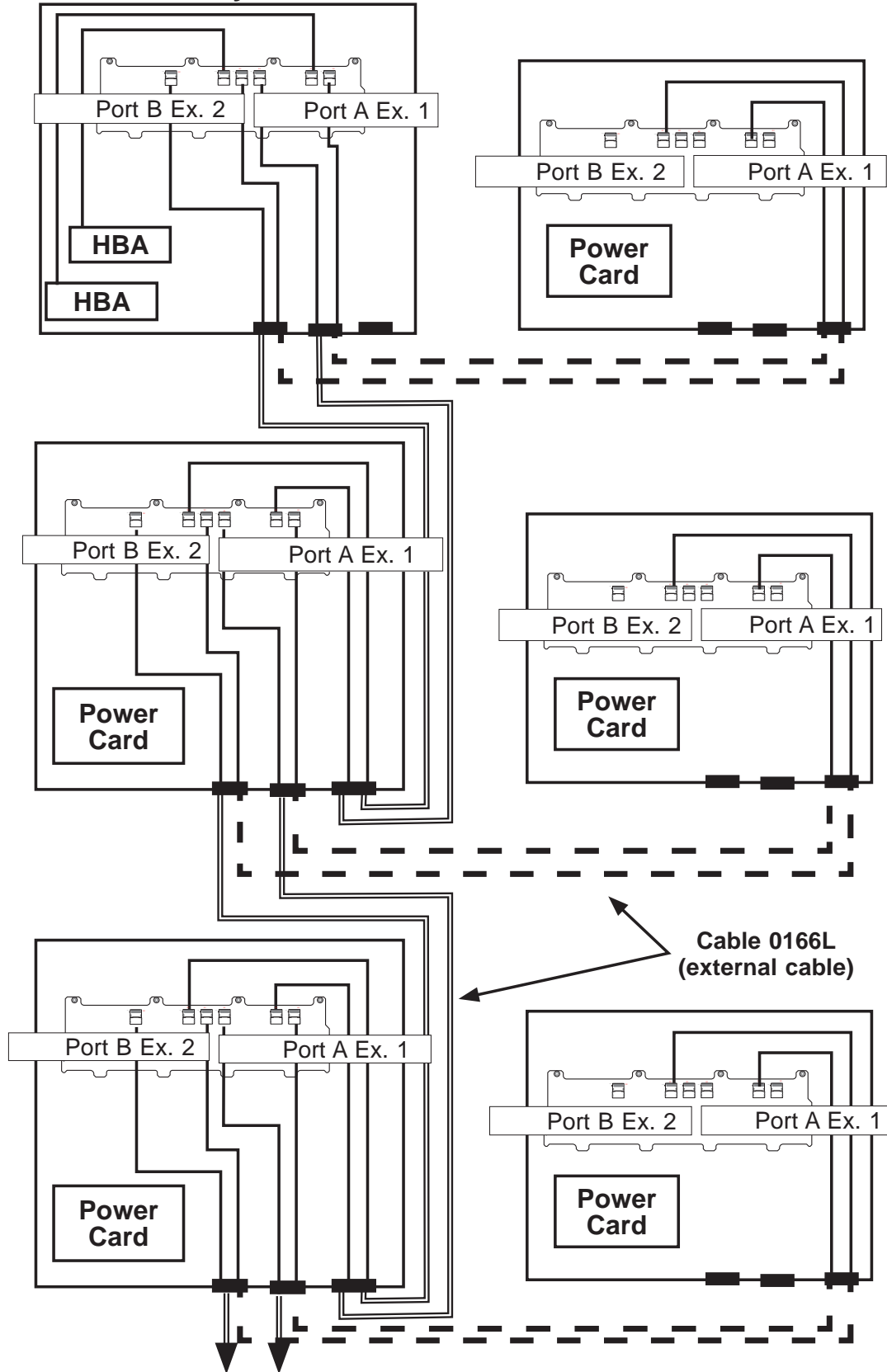


Figure 3-19: Server System with Dual SAS HBA

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

Dual Cable Routing

External Cables

In the previous diagrams external cables are represented with two different line patterns. These cables are both CBL-0166L external cables. Different lines help the user determine cable routing.



CBL-0166L
(external cable)

Notes

Disclaimer (cont.)

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