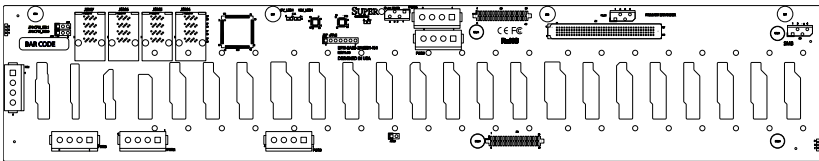




BPN-SAS3-216EL1-N4 BACKPLANE



USER'S GUIDE

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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Contents

Contacting Supermicro.....	iv
Returning Merchandise for Service.....	v
Chapter 1 Guidelines	
1-1 ESD Safety Guidelines	1-1
1-2 General Safety Guidelines	1-1
1-3 Version Information	1-2
Chapter 2 Connectors, Jumpers and LEDs	
2-1 Rear Connector Locations	2-1
2-2 Rear Connector Definitions	2-2
2-3 Rear Jumpers.....	2-3
Explanation of Jumpers	2-3
2-4 Rear LED Indicators	2-4
2-5 Front Connectors and LED Indicators	2-5
Chapter 3 Cascading Configurations	
3-1 Expander.....	3-1
3-2 JBOD Control Board and Support Cables.....	3-2
JBOD Control Board	3-2
Connecting Internal HBAs to the Backplane	3-3
Supported Internal HBA Cables.....	3-4
Connecting an External HBA to the Backplane	3-5
Single External Host Bus Adapter	3-5
Connecting Multiple Backplanes in a Single Channel Environment.....	3-6
Single HBA Configuration Cables	3-7
3-3 Supported Cascading Configurations	3-8

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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.

Notes

Chapter 1

Guidelines

This chapter offers guidelines for personal and equipment safety, and notes about the BPN-SAS3-216EL1-N4 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 mounting frame in the chassis to prevent damage to the system due to power shortage.

1-3 Version Information

The BPN-SAS3-216EL1-N4 backplane has been designed to utilize the most up-to-date technology available, providing your system with reliable, high-quality performance.

The BPN-SAS3-216EL1-N4 is composed of the backplane model BPN-SAS3-216EB1-N4, Rev 1.01, and the daughter board model BPN-SAS3-216EL1, Rev 1.01. These are the most current releases 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

Connectors, Jumpers and LEDs

This manual covers BPN-SAS3-216EL1-N4 with NVMe capabilities.

2-1 Rear Connector Locations

The following connectors are on the side of the backplane that faces the rear of the chassis. They are marked by silkscreen labels.

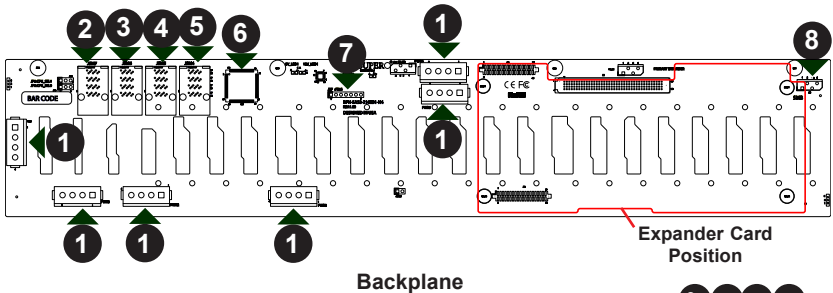
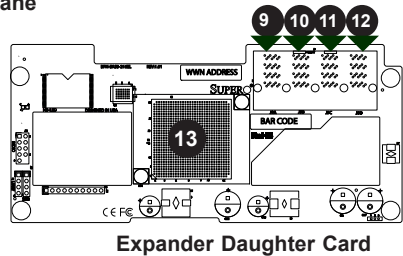


Figure 2-1. Rear Connector Locations

1. Power Connectors: PWR1-PWR6 (4-pin)
2. NVMe #4 Connector: JSM7
3. NVMe #3 Connector: JSM6
4. NVMe #2 Connector: JSM5
5. NVMe #1 Connector: JSM4
6. CPLD chip
7. CPLD upgrade: J27 (7-pin)
8. SMB: J38 (4-pin)



9. Cascade In/Out: J9A
10. Cascade In/Out: J9B
11. Cascade In/Out: J9C
12. Expander In/Out: J9D
13. LSI SAS3X40

2-2 Rear Connector Definitions

1. Main Power Connectors

The 4-pin connectors, designated PWR1 through PWR6, provide power to the backplane.

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

2-5. NVMe Connectors

JSM4 through JSM7 provide connections for the NVMe drive cables. Pins are defined according to the NVMe standard.

6-7. Complex Programmable Logic Device (CPLD) and Upgrade Header

This programmable chip allows the backplane to support NVMe devices.

8. Primary SMB Connector

This header provides for a connection with an optional JBOD control board.

9-12. SAS Cable Sockets

Cascade in or out: J9A - J9D

13. LSI SAS3X40 Expander chip

Note: Connectors not described are for engineering or manufacturing diagnostics only.

2-3 Rear Jumpers

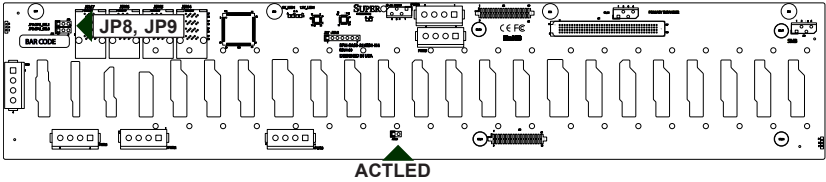


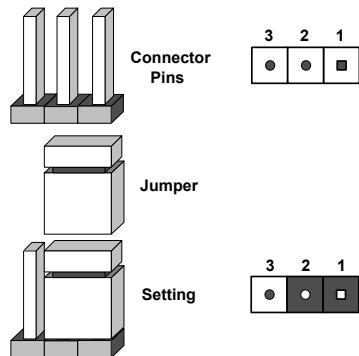
Figure 2-2. Rear Jumpers

Jumper Settings		
Jumper	Settings	Note
JP8: CPU_SEL0 JP9: CPU_SEL1	see table below	NVMe mapping to CPU

Jumpers		NVMe to CPU Connection	NVMe Cables	
CPU_SEL0	CPU_SEL1	NVMe Drive Slots	VPP to CPU1	VPP to CPU2
Open	Open	Slot 1-4 connected to one CPU (CPU1 or CPU2)	NVMe #1	NVMe #1
Open	Closed	Slot 1-3 connected to CPU 1 Slot 4 connected to CPU 2	NVMe #1	NVMe #4
Closed	Open	Slot 1-2 connected to CPU 1 Slot 3-4 connected to CPU 2	NVMe #1	NVMe #3
Closed	Closed	Slot 1 connected to CPU 1 Slot 2-4 connected to CPU 2	NVMe #1	NVMe #2

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 Rear LED Indicators

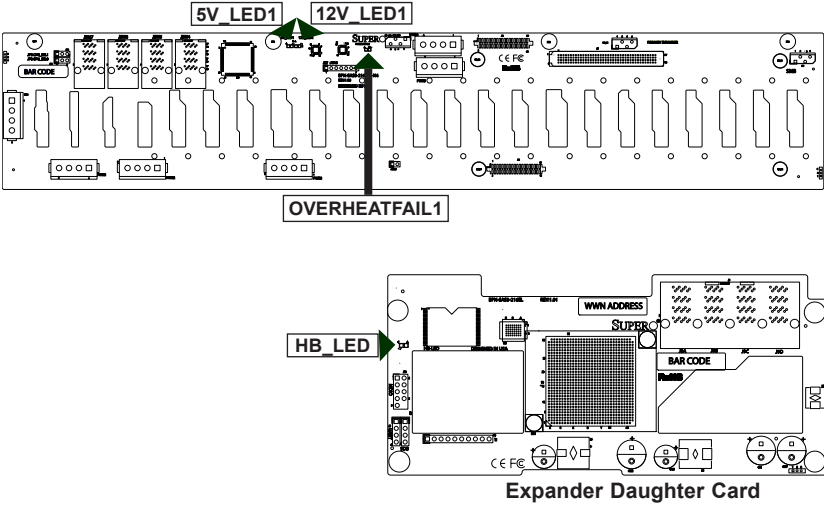
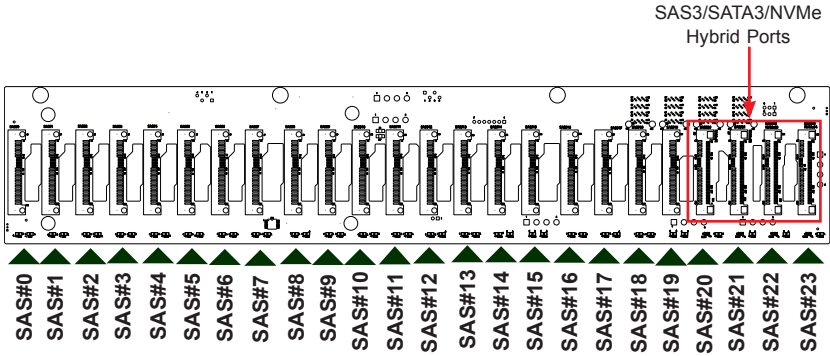


Figure 2-3. Rear LEDs

Rear LEDs		
LED	State	Specification
5V_LED1	On	Indicates normal operation. Light off indicates a 5V power failure
12V_LED1	On	Indicates normal operation. Light off indicates a 12V power failure
OVERHEATFAIL1	On	Indicates the temperature exceeds normal operation.
HB_LED	Blinking	Blinking heart beat indicates the expander is running normally with firmware loaded.

2-5 Front Connectors and LED Indicators

The drive slots labeled SAS#0 through SAS#19 are for SAS3 or SATA3 storage devices. Drive slots labeled SAS#20 through SAS#23 are hybrid ports that support SAS3, SATA3 or NVMe.



48 LEDs, two per receptacle, indicate activity and failure.
(along the bottom of the backplane)

Figure 2-4. Front Connectors and LEDs

(table on following page)

Note: For the hybrid ports, SAS#20 to SAS#23, when using NVMe, it is best to have all four NVMe cables connected all the time, even if some slots do not have NVMe devices. This is particularly true for the slot that provides the VPP connections, otherwise the other NVMe devices connected to the same CPU will not work.

Front SAS/SATA Connectors and LED Indicators			
Drive Number	Label	HDD Activity LED (blue)	Failure LED (red)
SAS#0	J0	ACT0	FAIL0
SAS#1	J1	ACT1	FAIL1
SAS#2	J2	ACT2	FAIL2
SAS#3	J3	ACT3	FAIL3
SAS#4	J4	ACT4	FAIL4
SAS#5	J5	ACT5	FAIL5
SAS#6	J6	ACT6	FAIL6
SAS#7	J7	ACT7	FAIL7
SAS#8	J8	ACT8	FAIL8
SAS#9	J9	ACT9	FAIL9
SAS#10	J10	ACT10	FAIL10
SAS#11	J11	ACT11	FAIL11
SAS#12	J12	ACT12	FAIL12
SAS#13	J13	ACT13	FAIL13
SAS#14	J14	ACT14	FAIL14
SAS#15	J15	ACT15	FAIL15
SAS#16	J16	ACT16	FAIL16
SAS#17	J17	ACT17	FAIL17
SAS#18	J18	ACT18	FAIL18
SAS#19	J19	ACT19	FAIL19
SAS#20/NVMe#1*	J20	ACT20	FAIL20**
SAS#21/NVMe#2*	J21	ACT21	FAIL21**
SAS#22/NVMe#3*	J22	ACT22	FAIL22**
SAS#23/NVMe#4*	J23	ACT23	FAIL23**

*Hybrid ports; NVMe, SAS, or SATA

**For hybrid ports, this failure LED is multi-color, as described in the table below.

Color and State	Indication
Red, solid	Failure
Red, blinking at 1Hz	Rebuild
Red, blinking at 4Hz	Identify
Amber, blinking**	Attention! Do not remove NVMe device
Green**	NVMe device ready be removed

Chapter 3

Cascading Configurations

3-1 Expander

BPN-SAS3-216EL1 model backplanes have a single expander on the daughter card that accesses all of the 24 SAS ports supporting drives connected through the slots on the baseboard and also 16 ports of SAS up-links or down-links through four mini-SAS HD cable sockets.

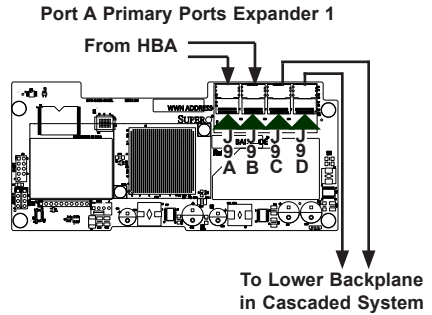


Figure 3-1. Port Configuration
(for 8 SAS up-links and 8 SAS down-links)

3-2 JBOD Control Board and Support Cables

JBOD Control Board

In a cascaded configuration, the first chassis includes a motherboard and at least one host bus adapter (HBA). Other "Just a Bunch Of Disks" (JBOD) chassis in the system must be equipped with a JBOD Control Board (such as CSE-PTJBOD-CB3). This board is available as a separate product and is used to manage the power and IPMI (in place of a motherboard) for the JBOD chassis. For more information, see the Supermicro website (www.supermicro.com).

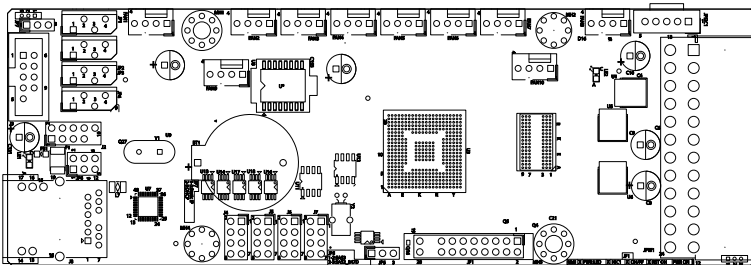


Figure 3-7. JBOD Control Board (Sold Separately)

Power Card		
Part Number	Part Type	Where Used
CSE-PTJBOD-CB3	JBOD Control Board	Allows the chassis to be used as a JBOD system; supports IPMI for remote power control.

Connecting Multiple Internal HBAs to the Backplane

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

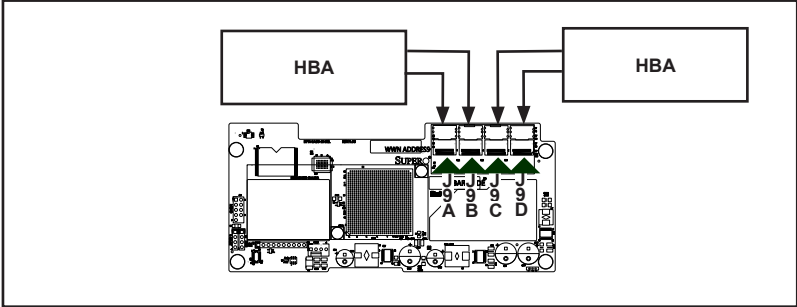


Figure 3-8. Internal Host Bus Adapters

Supported Internal HBA Cables

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

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-SAS3-216EL 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-SAS2-216EL 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

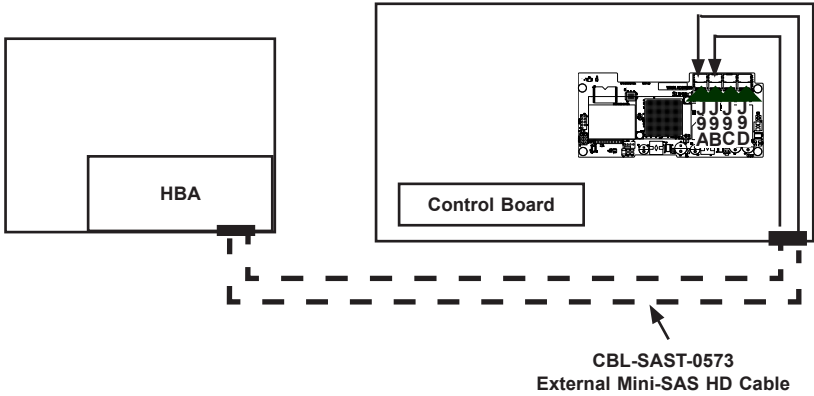


Figure 3-10. Single External Host Adapter

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.

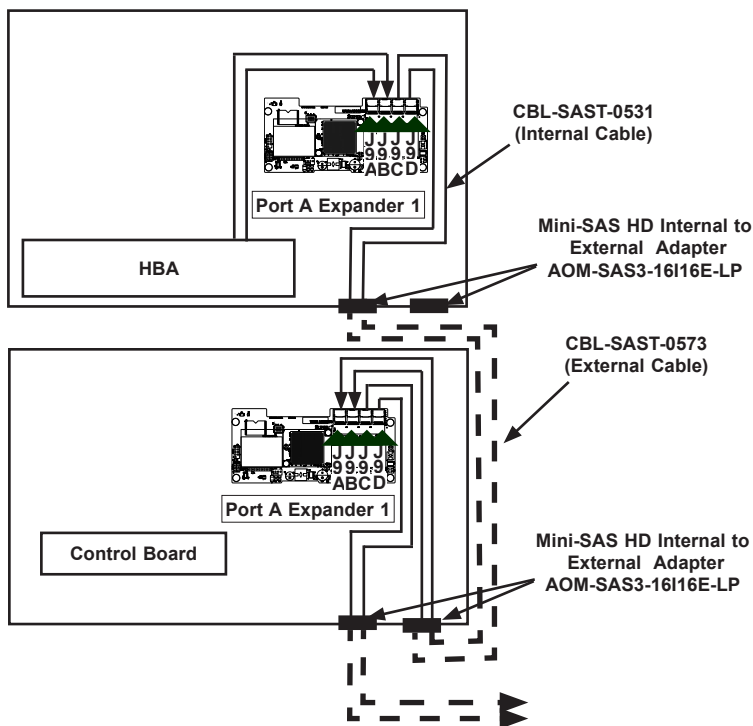


Figure 3-12. Single HBA Configuration

Single HBA Configuration Cables



Figure 3-13. 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.

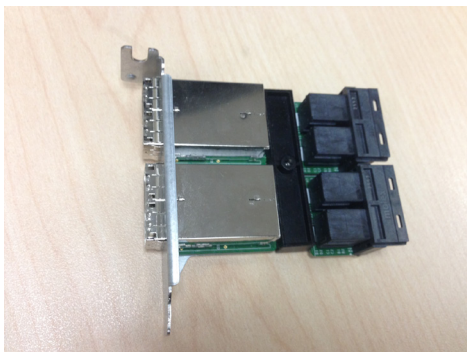


Figure 3-14. Mini-SAS HD Internal to External Adapter

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.

3-3 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 JBOD Control Board, but no motherboard and no HBA. For more information, specific chassis manuals are available at www.supermicro.com.

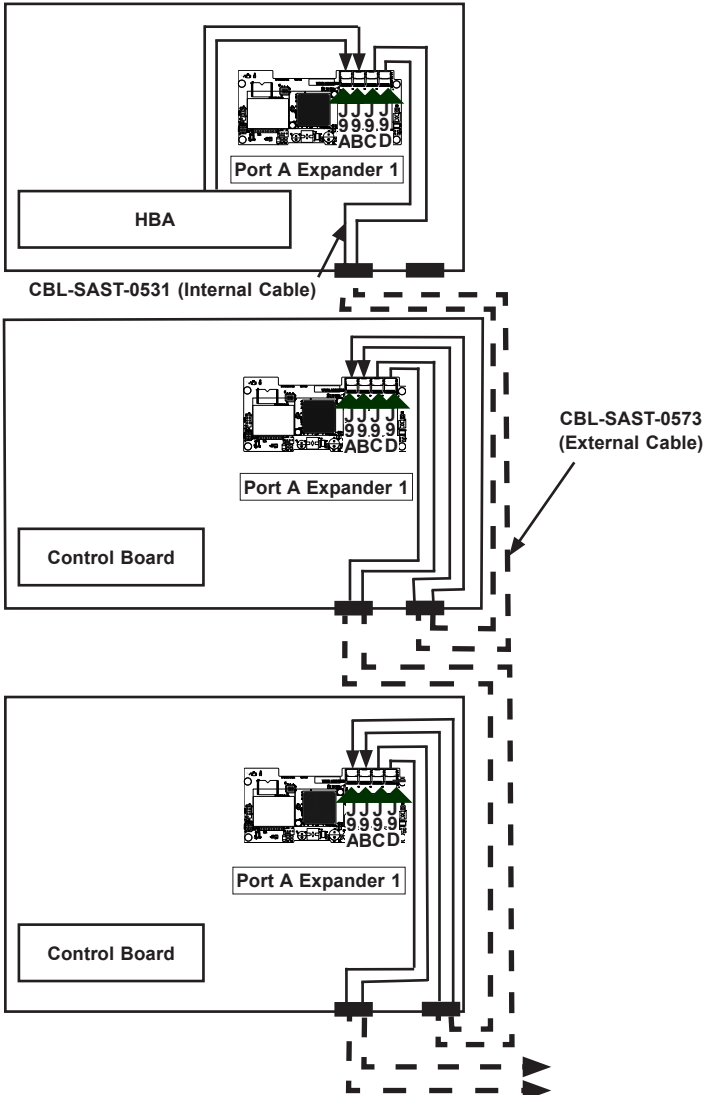


Figure 3-16. Simple Cascaded Configuration

Notes

Disclaimer (cont.)

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