

SUPER ●[®]



SAS2-213EL1 BACKPLANE

USER'S GUIDE

Rev. 1.0

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.**

Super Micro Computer, Inc. ("Supermicro") reserves the right to make changes to the product described in this manual at any time and without notice. This product, including software and documentation, is the property of Supermicro and/or its licensors, and is supplied only under a license. Any use or reproduction of this product is not allowed, except as expressly permitted by the terms of said license.

IN NO EVENT WILL SUPERMICRO BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, SPECULATIVE OR CONSEQUENTIAL DAMAGES ARISING FROM THE USE OR INABILITY TO USE THIS PRODUCT OR DOCUMENTATION, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN PARTICULAR, SUPERMICRO SHALL NOT HAVE LIABILITY FOR ANY HARDWARE, SOFTWARE, OR DATA STORED OR USED WITH THE PRODUCT, INCLUDING THE COSTS OF REPAIRING, REPLACING, INTEGRATING, INSTALLING OR RECOVERING SUCH HARDWARE, SOFTWARE, OR DATA.

Any disputes arising between manufacturer and customer shall be governed by the laws of Santa Clara County in the State of California, USA. The State of California, County of Santa Clara shall be the exclusive venue for the resolution of any such disputes. Super Micro's total liability for all claims will not exceed the price paid for the hardware product.

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.

Manual Revision 1.0
Release Date: May 3, 2011

Unless you request and receive written permission from Super Micro Computer, Inc., you may not copy any part of this document.

Information in this document is subject to change without notice. Other products and companies referred to herein are trademarks or registered trademarks of their respective companies or mark holders.

Copyright © 2011 by Super Micro Computer, Inc.
All rights reserved.

Printed in the United States of America

Table of Contents

| | |
|---|-----|
| Contacting Supermicro..... | iv |
| Returning Merchandise for Service..... | v |
| Overview of the SAS2-213EL1 Backplane Assembly..... | vi |
| Chapter 1 Safety Guidelines | |
| 1-1 ESD Safety Guidelines | 1-1 |
| 1-2 General Safety Guidelines | 1-1 |
| 1-3 An Important Note to Users | 1-2 |
| 1-4 Introduction to the SAS2-213EL1 Backplane | 1-2 |
| Chapter 2 Connectors, Jumpers and LEDs | |
| 2-1 Connectors | 2-1 |
| 2-2 Front Connector and Pin Definitions..... | 2-2 |
| 2-3 Jumper Locations and Settings..... | 2-3 |
| Explanation of Jumpers | 2-3 |
| 2-4 Front Connectors and LED Indicators | 2-6 |
| Chapter 3 Dual Port and Cascading Configurations | |
| 3-1 Single and Dual Port Expanders..... | 3-1 |
| Single Ports..... | 3-1 |
| 3-2 Chassis Power Card and Support Cables | 3-2 |
| Chassis Power Card | 3-2 |
| Connecting an Internal HBA to the Backplane | 3-3 |
| Supported Internal HBA Cables..... | 3-3 |
| Connecting an External HBA to the Backplane | 3-4 |
| Single External Host Bus Adapter | 3-4 |
| Connecting Multiple Backplanes in a Single Channel Environment..... | 3-5 |
| Single HBA Configuration Cables | 3-6 |
| 3-3 Supported Cascading Configurations | 3-7 |
| Server System with Single SAS HBA | 3-8 |

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)

Web Site: 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)

Asia-Pacific

Address: Super Micro Computer, Inc.
4F, No. 232-1, Liancheng Rd.
Chung-Ho 235, Taipei County
Taiwan, R.O.C.

Tel: +886-(2) 8226-3990
Fax: +886-(2) 8226-3991
Web Site: www.supermicro.com.tw

Technical Support:
Email: support@supermicro.com.tw
Tel: 886-2-8226-1900

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.

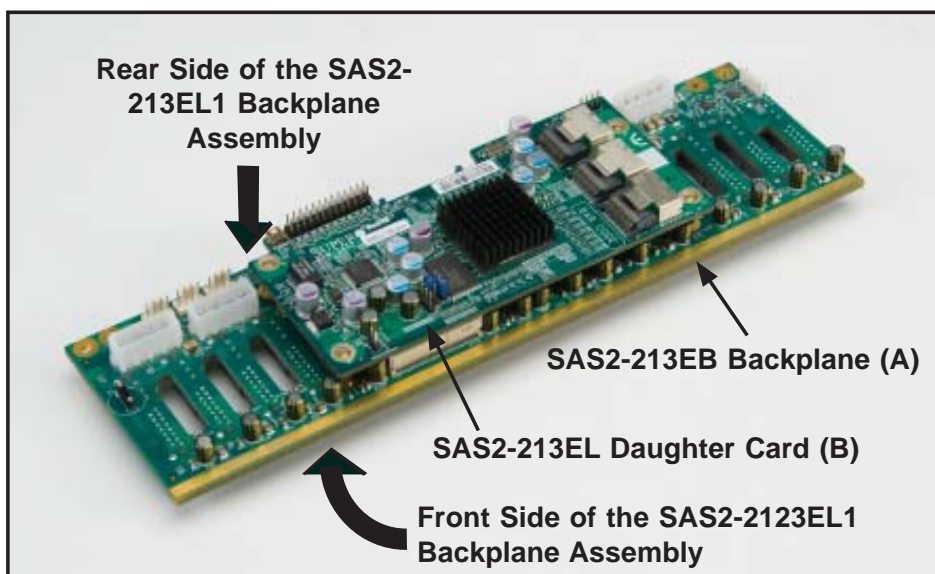
This warranty only covers normal consumer use and does not cover damages incurred in shipping or from failure due to the alteration, misuse, abuse or improper maintenance of products.

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

Overview of the SAS2-213EL1 Backplane Assembly

The SAS2-213EL1 backplane assembly consists of a SAS2-213EB backplane (A) with one SAS2-213EL daughter card (B) mounted on the rear of the backplane.

Components on the front side of the SAS2-213EB backplane include sixteen SAS connectors and their respective activity and failure LEDs. Components on the rear side of the backplane include jumpers and power and fan connectors. The daughter card's components include SAS ports, flash and expander chips, and mode select jumpers.



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 the backplane 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 and daughter cards by their edges only; do not touch the 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 backplane you have received may or may not look exactly the same as the graphics shown in this manual.

1-4 Introduction to the SAS2-213EL1 Backplane

The SAS2-213EL1 backplane has been designed to utilize the most up-to-date technology available, providing your system with reliable, high-quality performance.

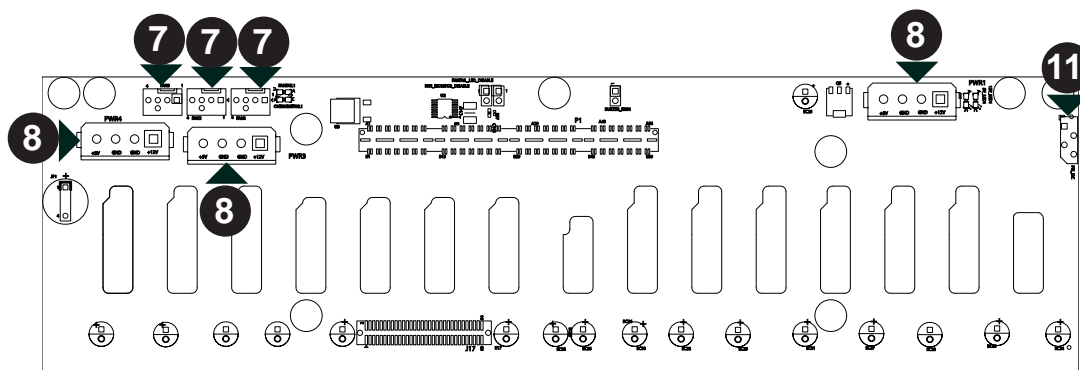
This manual reflects the SAS2-213EB Revision 1.01 backplane, the most current release available at the time of publication.

This manual also describes the SAS2-213EL daughter card, Revision 1.02, 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.

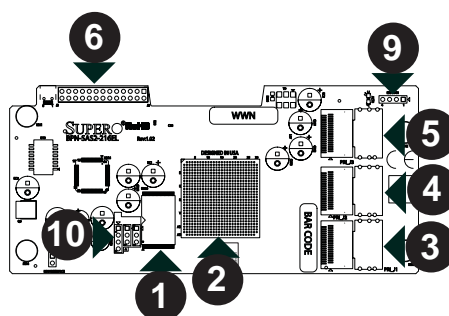
Chapter 2

Connectors, Jumpers and LEDs

2-1 Connectors



Rear of the SAS2-213EB Backplane



Front of the SAS2-213EL
Daughter Card

Figure 2-1: Connectors on the Backplane and Daughter Cards

Connectors

- | | |
|-----------------------|---|
| 1. Flash Chip | 7. Fan Connectors: Fan1, Fan2, and Fan3 |
| 2. Expander Chip | 8. Power Connectors: PWR1, PWR3 and PWR4. |
| 3. SAS Port: PRI_J1 | 9. Debug Connector: EXPDBG1 |
| 4. SAS Port: PRI_J2 | 10. UART Connector: SMART_UART |
| 5. SAS Port: PRI_J3 | 11. Primary I ² C Connector: PRI_I2C |
| 6. EPP Connectors: J2 | |

2-2 Front Connector and Pin Definitions

1. Flash Chips

The flash chip enhances the backplane memory.

2. Expander Chips

This expander chip allows the backplane to support dual ports, cascading, and failover.

3. - 5. SAS Ports

SAS ports provide expander features including cascading. From bottom to top, ports are PRI_J1, PRI_J2 and PRI_J3.

6. EPP Port

The EPP port is used for manufacturer's diagnostic purposes only.

7. Fan Connectors

The 4-pin connectors, designated FAN1, FAN2, and FAN3, provide power to the fans. See the table on the right for pin definitions.

| Fan Connectors | |
|----------------|------------|
| Pin# | Definition |
| 1 | FB |
| 2 | +12V |
| 3 | Tachometer |
| 4 | NC |

8. Backplane Main Power Connectors

The 4-pin connectors are designated PWR1, PWR3 and PWR4. They 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 |

9. Debug Connector

The debug connector is designated EX-PDBG1 and is used for manufacturer's diagnostic purposes only.

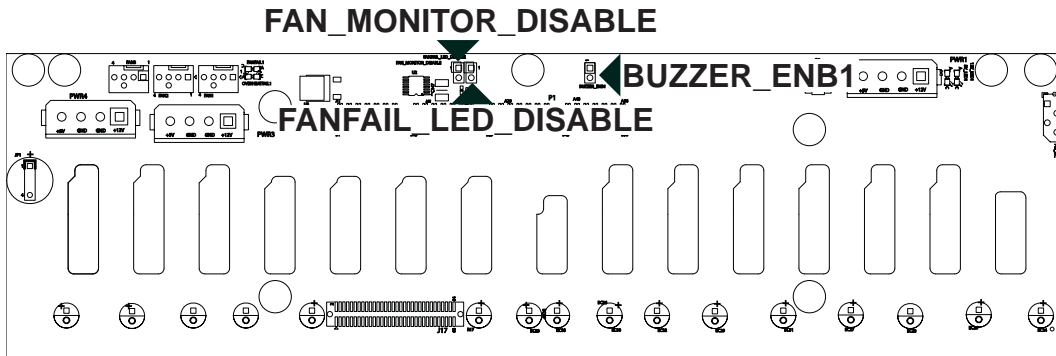
10. UART Connector

The UART connector is designated SMART_UART and is used for manufacturer's diagnostic purposes only.

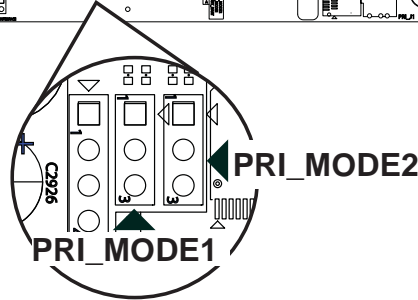
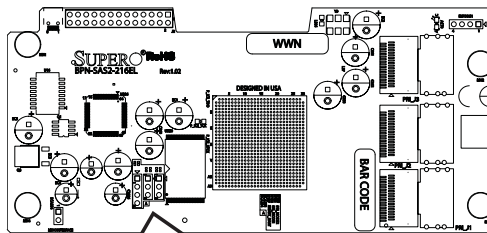
11. I²C Connector

The I²C connector is designated PRI_I2C.

2-3 Jumper Locations and Settings



Rear of the SAS2-213EB Backplane

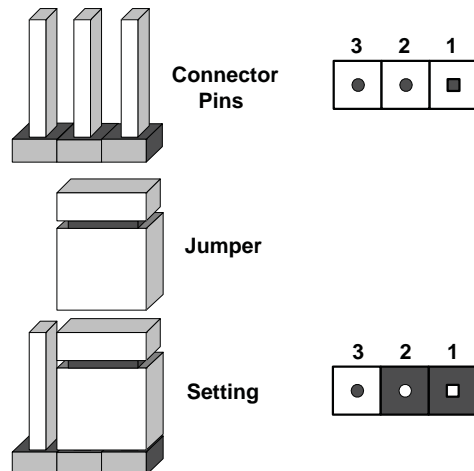


Front of SAS2-213EL
Daughter Card

Figure 2-2: Jumper Locations and Pin Definitions

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 | Pins 2-3 | Factory setting, do not change |
| PRI_MODE2 | Pins 2-3 | Factory setting do not change |
| FAN_MONITOR_DISABLE | Open: Enable (Default) Closed: Disable | Enables/disables the fan speed reporting. |
| FANFAIL_LED_DISABLE | Open: Enable (Default) Closed:Disable | Enables/disables the fan failure LED |
| BUZZER_ENB1 | Open: Disable Closed: Enable | Enables/disables buzzer* |

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

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

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

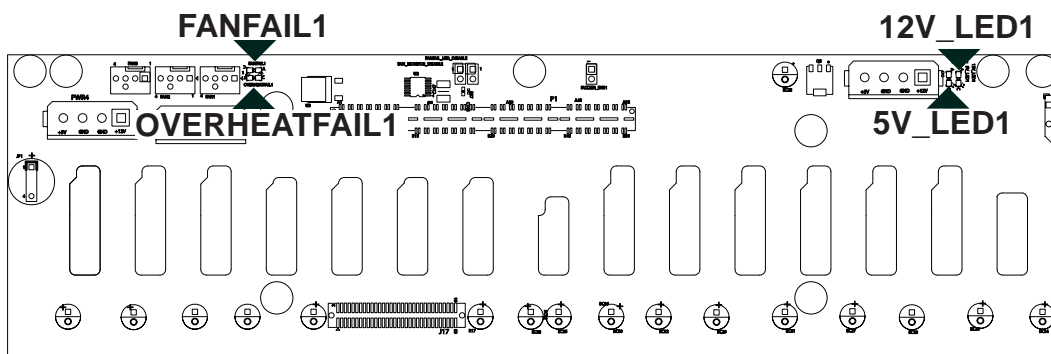


Figure 2-3: Rear LEDs

| Rear LEDs | | |
|---------------|------------|---|
| LED | Fail State | Specification |
| 12V_LED1 | Off | Green LED indicates backplane 12V power. Light is on during normal operation. |
| 5V_LED1 | Off | Blue LED indicates backplane 5V power. Light is on during normal operation. |
| FANFAIL1 | On | Red LED indicates a fan failure. Light is off during normal operation |
| OVERHEATFAIL1 | On | Red LED indicates an overheat condition. Light is off during normal operation |

2-4 Front Connectors and LED Indicators

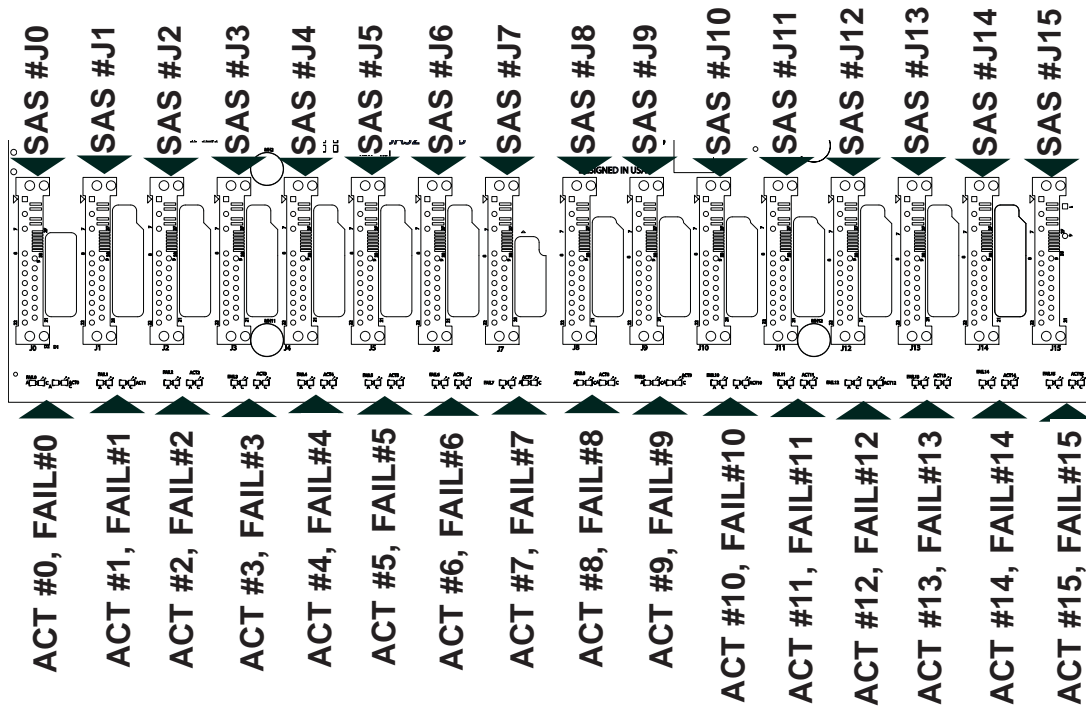


Figure 2-4: Front Connectors and LEDs

| Front SAS/SATA Connectors | | | |
|---------------------------|------------------|-----------------|------------------|
| Front Connector | SAS Drive Number | Front Connector | SAS Drive Number |
| SAS #J0 | SAS/SATA HDD #1 | SAS #J8 | SAS/SATA HDD #9 |
| SAS #J1 | SAS/SATA HDD #2 | SAS #J9 | SAS/SATA HDD #10 |
| SAS #J2 | SAS/SATA HDD #3 | SAS #J10 | SAS/SATA HDD #11 |
| SAS #J3 | SAS/SATA HDD #4 | SAS #J11 | SAS/SATA HDD #12 |
| SAS #J4 | SAS/SATA HDD #5 | SAS #J12 | SAS/SATA HDD #13 |
| SAS #J5 | SAS/SATA HDD #6 | SAS #J13 | SAS/SATA HDD #14 |
| SAS #J6 | SAS/SATA HDD #7 | SAS #J14 | SAS/SATA HDD #15 |
| SAS #J7 | SAS/SATA HDD #8 | SAS #J15 | SAS/SATA HDD #16 |

| Front LED Indicators | | |
|-----------------------------|----------------------------|--------------------|
| Front LED | Hard Drive Activity | Failure LED |
| SAS #J0 | ACT #0 | FAIL #0 |
| SAS #J1 | ACT #1 | FAIL #1 |
| SAS #J2 | ACT #2 | FAIL #2 |
| SAS #J3 | ACT #3 | FAIL #3 |
| SAS #J4 | ACT #4 | FAIL #4 |
| SAS #J5 | ACT #5 | FAIL #5 |
| SAS #J6 | ACT #6 | FAIL #6 |
| SAS #J7 | ACT #7 | FAIL #7 |
| SAS #J8 | ACT #8 | FAIL #8 |
| SAS #J9 | ACT #9 | FAIL #9 |
| SAS #J10 | ACT #10 | FAIL #10 |
| SAS #J11 | ACT #11 | FAIL #11 |
| SAS #J12 | ACT #12 | FAIL #12 |
| SAS #J13 | ACT #13 | FAIL #13 |
| SAS #J14 | ACT #14 | FAIL #14 |
| SAS #J15 | ACT #15 | FAIL #15 |

Notes

Chapter 3

Dual Port and Cascading Configurations

3-1 Single and Dual Port Expanders

Single Ports

SAS2-213EL1 model backplanes have a single-port expander on the daughter card that accesses all of the drives and supports cascading.

Port A Primary Ports Expander 1

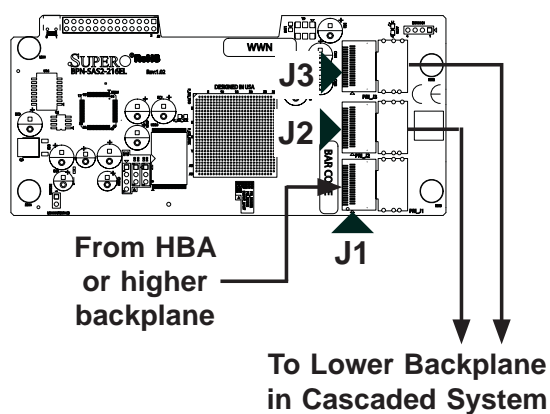


Figure 3-1: SAS2-213EL1 Single Port Configuration

Connecting an Internal HBA to the Backplane

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

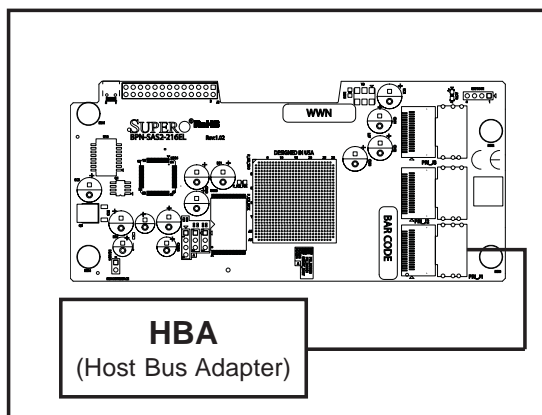


Figure 3-3: Single Internal Host Bus Adapter

Supported Internal HBA Cables

Use the following cables to create connections between the internal HBA and SAS2-213EL model backplane. The cables required depend upon 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 (36-pin) at each end. It connects from the HBA to the SAS2-213EL 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

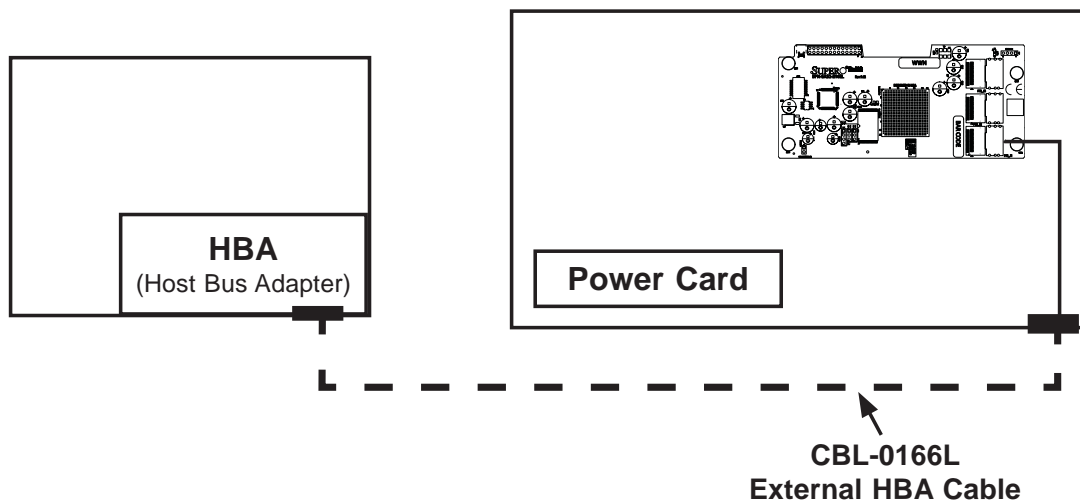


Figure 3-4: Single External Host Adapter

Connecting Multiple Backplanes in a Single Channel Environment

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

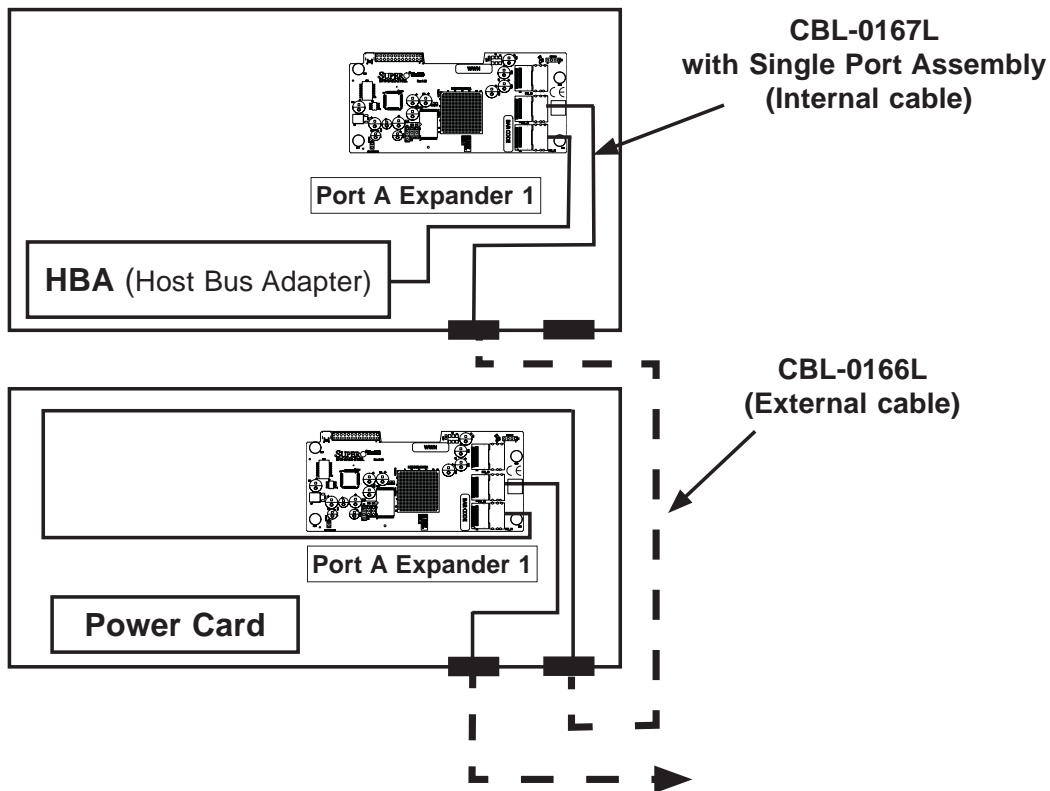


Figure 3-5: Single HBA Configuration

Single HBA Configuration Cables

Single Port Cable Assembly

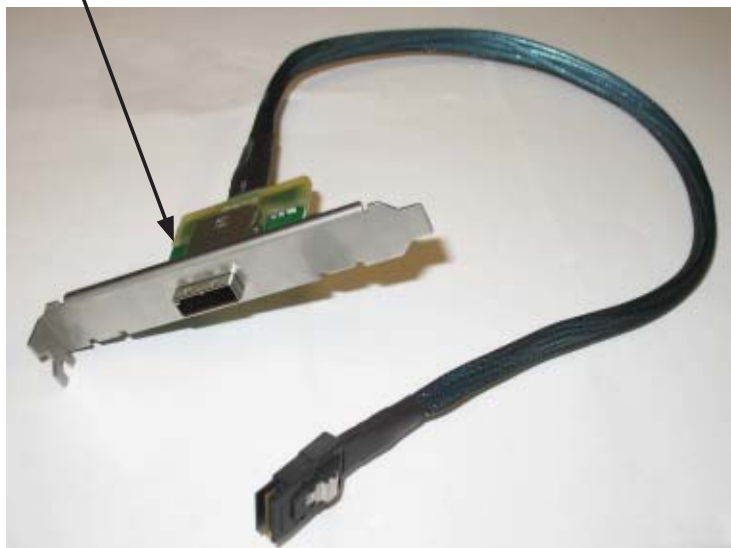


Figure 3-6: Single Port Internal Cable (CBL-0167L)

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.



Figure 3-7: External Cable (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.

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 power control card with no motherboard and no HBA. For more information, specific chassis manuals are available at www.supermicro.com.

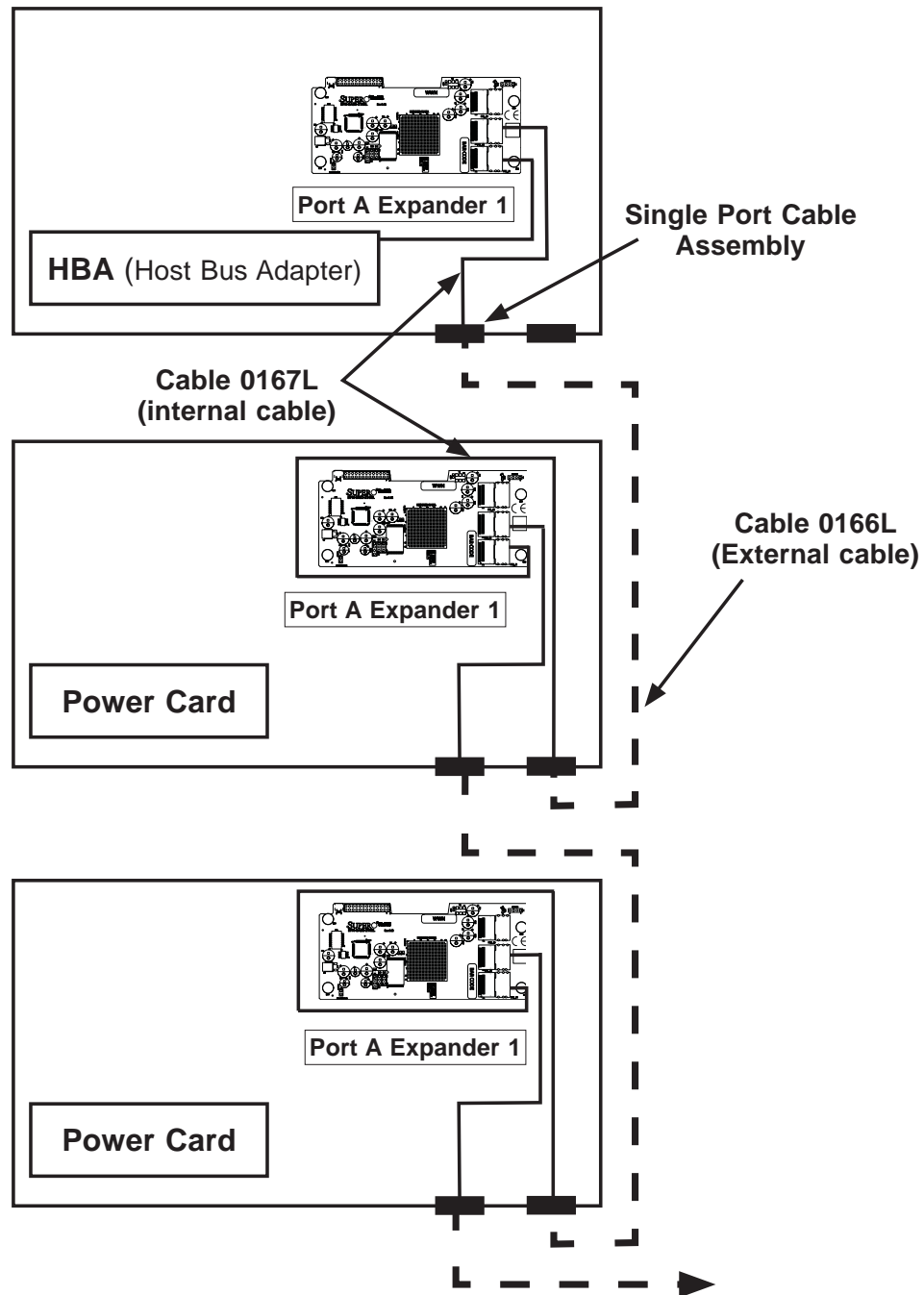


Figure 3-8: Simple Cascaded Configuration

Server System with Single SAS HBA

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

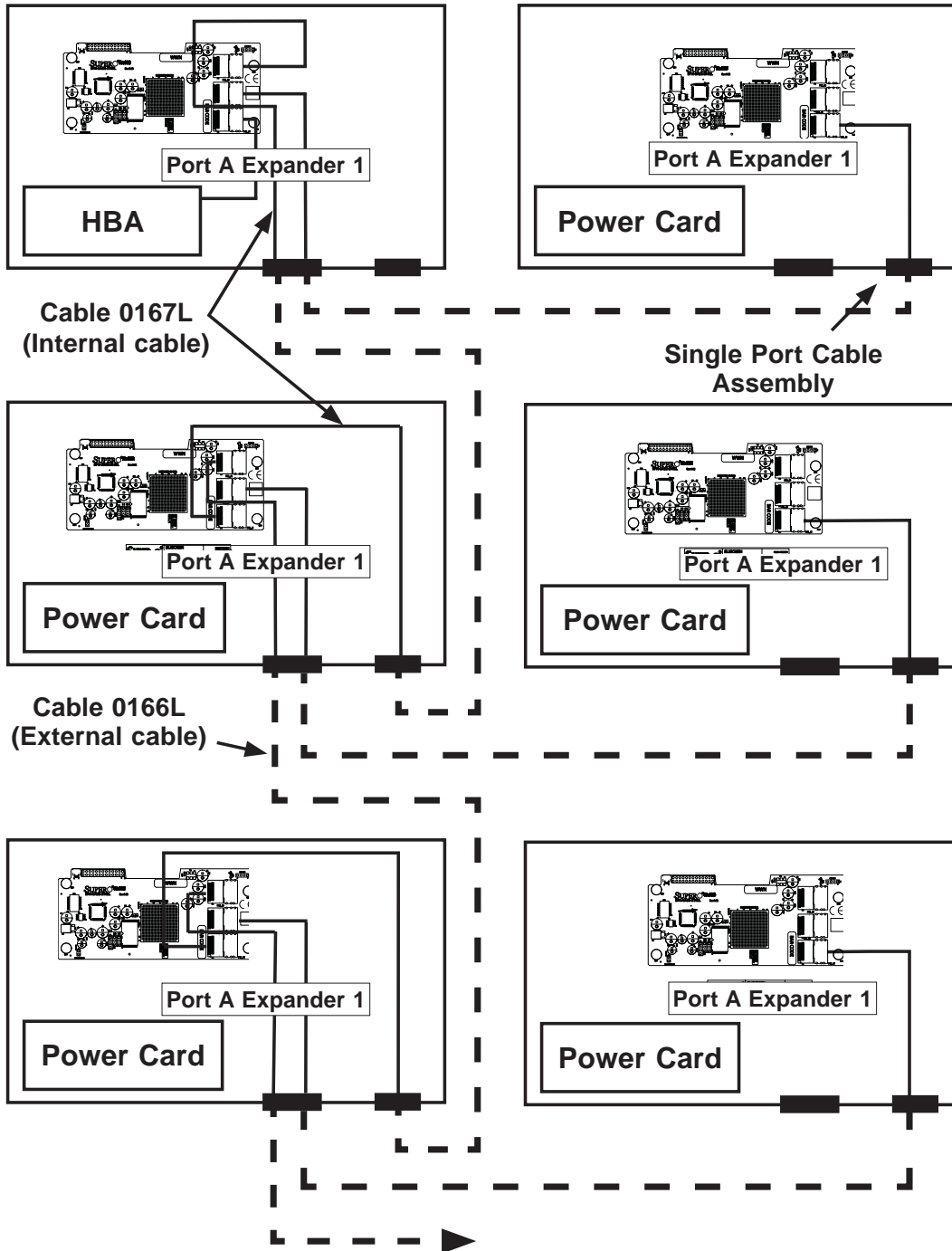


Figure 3-9: Cascaded Configuration with Horizontal Branching

Notes

Disclaimer (cont.)

The products sold by Supermicro are not intended for and will not be used in life support systems, medical equipment, nuclear facilities or systems, aircraft, aircraft devices, aircraft/emergency communication devices or other critical systems whose failure to perform be reasonably expected to result in significant injury or loss of life or catastrophic property damage. Accordingly, Supermicro disclaims any and all liability, and should buyer use or sell such products for use in such ultra-hazardous applications, it does so entirely at its own risk. Furthermore, buyer agrees to fully indemnify, defend and hold Supermicro harmless for and against any and all claims, demands, actions, litigation, and proceedings of any kind arising out of or related to such ultra-hazardous use or sale.