SAS-936EL BACKPLANE

SAS-936EL1  SAS-936EL2

USER'S GUIDE

Rev. 1.0c
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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.
To avoid personal injury and property damage, carefully follow all of the safety steps listed below when handling the backplane or 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-936EL Backplane

The SAS-936EL 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-936EL Revision 1.00, 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, Jumper Settings and Pin Definitions

2-1 Front Connectors and Jumpers

Front Connectors

#1. Primary and secondary I²C connectors (optional)
#2. Primary and secondary flash chips
#3. Primary and secondary expander chips
#4. Power connectors: PWR3, PWR2, PWR1, PWR0
#5. EPP connectors, J16 and J15
#6. Fan connectors: Fan1, Fan2 and Fan3
#7. SAS connectors: PRI_J1
#8. SAS connectors: PRI_J0
#9. SAS connectors: PRI_J2
#10. SAS connectors: SEC_J1 (Not available in EL1 single port back-plane)
#11. SAS connectors: SEC_J0 (Not available in EL1 single port back-plane)
#12. SAS connectors: SEC_J2 (Not available in EL1 single port back-plane)

Figure 2-1: Front Connectors and Jumpers
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 a total of four connectors- two primary and two secondary.

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

2. Primary and Secondary Flash Chips
The primary and secondary flash chips enhance the backplane memory.

3. Primary and Secondary Expander Chips
These 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.

5. EPP Ports
The EPP ports are used for manufacturer diagnostic purposes only.

<table>
<thead>
<tr>
<th>I2C Connector Pin Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin#</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Backplane Main Power 4-Pin Connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin#</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2 and 3</td>
</tr>
<tr>
<td>4</td>
</tr>
</tbody>
</table>
6. Fan Connectors

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

<table>
<thead>
<tr>
<th>Pin#</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ground</td>
</tr>
<tr>
<td>2</td>
<td>+12V</td>
</tr>
<tr>
<td>3</td>
<td>Tachometer</td>
</tr>
</tbody>
</table>

7. -12. SAS Ports

Note that the primary and secondary sets of SAS ports are not in sequential order. From right to left the ports are primary SAS ports PRI_J1, PRI_J0, PRI_J2 and secondary SAS ports SEC_J1, SEC_J0 and SEC_J2.
## Figure 2-2: Front Sockets

### Socket Settings

<table>
<thead>
<tr>
<th>Socket</th>
<th>Socket Setting</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>REMOTE_FAN_FAIL_SOCKET</td>
<td>Connected</td>
<td>Front panel fan fail indicator (optional)</td>
</tr>
</tbody>
</table>
2-3 Front 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.

<table>
<thead>
<tr>
<th>Jumper</th>
<th>Jumper Settings</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRI_MODE4</td>
<td>1-2</td>
<td>Factory setting- do not change</td>
</tr>
<tr>
<td>PRI_BLINK</td>
<td>Open</td>
<td>Factory setting- do not change</td>
</tr>
<tr>
<td>SEC_MODE4</td>
<td>1-2</td>
<td>Factory setting- do not change</td>
</tr>
<tr>
<td>SEC_BLINK</td>
<td>Open</td>
<td>Factory setting- do not change</td>
</tr>
<tr>
<td>BUZZER_ENB</td>
<td>Open: Disable</td>
<td>Buzzer enable*</td>
</tr>
<tr>
<td></td>
<td>Closed: Enable</td>
<td></td>
</tr>
<tr>
<td>FAN_ALERT_ENI</td>
<td>Open: Disable</td>
<td>Fan alert enable</td>
</tr>
<tr>
<td></td>
<td>Closed: Enable</td>
<td></td>
</tr>
</tbody>
</table>

*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 2-3: Front LEDs

Front LEDs

<table>
<thead>
<tr>
<th>LED</th>
<th>State</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>OVERHEATFAIL1</td>
<td>On</td>
<td>Overheat or drive failure</td>
</tr>
<tr>
<td>FANFAIL1</td>
<td>On</td>
<td>System fan failure.</td>
</tr>
<tr>
<td>5V</td>
<td>Off</td>
<td>Backplane power failure. Light is on during normal operation.</td>
</tr>
<tr>
<td>12V</td>
<td>Off</td>
<td>Backplane power failure. Light is on during normal operation.</td>
</tr>
</tbody>
</table>
2-4 Rear Connectors and LED Indicators

<table>
<thead>
<tr>
<th>Rear Connector</th>
<th>SAS Drive Number</th>
<th>Rear Connector</th>
<th>SAS Drive Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAS #J0</td>
<td>SAS HDD #0</td>
<td>SAS #J9</td>
<td>SAS HDD #9</td>
</tr>
<tr>
<td>SAS #J1</td>
<td>SAS HDD #1</td>
<td>SAS #J10</td>
<td>SAS HDD #10</td>
</tr>
<tr>
<td>SAS #J2</td>
<td>SAS HDD #2</td>
<td>SAS #J11</td>
<td>SAS HDD #11</td>
</tr>
<tr>
<td>SAS #J3</td>
<td>SAS HDD #3</td>
<td>SAS #J12</td>
<td>SAS HDD #12</td>
</tr>
<tr>
<td>SAS #J4</td>
<td>SAS HDD #4</td>
<td>SAS #J13</td>
<td>SAS HDD #13</td>
</tr>
<tr>
<td>SAS #J5</td>
<td>SAS HDD #5</td>
<td>SAS #J14</td>
<td>SAS HDD #14</td>
</tr>
<tr>
<td>SAS #J6</td>
<td>SAS HDD #6</td>
<td>SAS #J17</td>
<td>SAS HDD #15</td>
</tr>
</tbody>
</table>

Figure 2-4: Rear Connectors and LEDs
### Rear LED Indicators

<table>
<thead>
<tr>
<th>Rear LED</th>
<th>Hard Drive Activity</th>
<th>Failure LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAS #0</td>
<td>ACT #1</td>
<td>FAIL #1</td>
</tr>
<tr>
<td>SAS #1</td>
<td>ACT #2</td>
<td>FAIL #2</td>
</tr>
<tr>
<td>SAS #2</td>
<td>ACT #3</td>
<td>FAIL #3</td>
</tr>
<tr>
<td>SAS #3</td>
<td>ACT #4</td>
<td>FAIL #4</td>
</tr>
<tr>
<td>SAS #4</td>
<td>ACT #5</td>
<td>FAIL #5</td>
</tr>
<tr>
<td>SAS #5</td>
<td>ACT #6</td>
<td>FAIL #6</td>
</tr>
<tr>
<td>SAS #6</td>
<td>ACT #7</td>
<td>FAIL #7</td>
</tr>
<tr>
<td>SAS #7</td>
<td>ACT #8</td>
<td>FAIL #8</td>
</tr>
<tr>
<td>SAS #8</td>
<td>ACT #9</td>
<td>FAIL #9</td>
</tr>
<tr>
<td>SAS #9</td>
<td>ACT #10</td>
<td>FAIL #10</td>
</tr>
<tr>
<td>SAS #10</td>
<td>ACT #11</td>
<td>FAIL #11</td>
</tr>
<tr>
<td>SAS #11</td>
<td>ACT #12</td>
<td>FAIL #12</td>
</tr>
<tr>
<td>SAS #12</td>
<td>ACT #13</td>
<td>FAIL #13</td>
</tr>
<tr>
<td>SAS #13</td>
<td>ACT #14</td>
<td>FAIL #14</td>
</tr>
<tr>
<td>SAS #14</td>
<td>ACT #15</td>
<td>FAIL #15</td>
</tr>
<tr>
<td>SAS #15</td>
<td>ACT #16</td>
<td>FAIL #16</td>
</tr>
</tbody>
</table>
Chapter 3

Dual Port and Cascading Configurations

3-1 Single and Dual Port Expanders

Single Ports

SAS-936EL1 backplanes have a single-port expander that access all sixteen drives and supports cascading.

Dual Ports

SAS-936EL2 backplanes have dual-port expanders that access all sixteen drives. These dual-port expanders support cascading, failover, and recovery.

SAS-936EL1 Single-Port Backplane

From HBA or higher backplane

To Lower Backplane in Cascaded System

SAS-936EL2 Dual-Port Backplane

From HBA or Higher Backplane

To Lower Backplane in Cascaded System
3-2 Failover

The SAS-936EL2 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).

If the expander or data path in Port A fails, the system will automatically fail over to Port B.
3-3 Failover with RAID Cards and Multiple HBAs

The SAS-936EL 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.

---

**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 host bus adapter. Other servers in this enclosed system, include a power card. This section describes the supported power card for the SAS-936EL backplane system.

For more information, see the PCC-JBPWR2 power card manual. This manual can be found at http://www.supermicro.com.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Part Type</th>
<th>Where Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSE-PTJBOD-CB1</td>
<td>Power Card</td>
<td>Allows the chassis to be used as a JBOD (Just a Bunch of Drives) system.</td>
</tr>
</tbody>
</table>
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**

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

**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-936EL backplane.
iPass (Mini-SAS) to iPass (Mini-SAS) (CBL-0110L-2)

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

<table>
<thead>
<tr>
<th>Part #</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBL-0108L-02</td>
<td>39 cm (15 inches)</td>
</tr>
<tr>
<td>CBL-0109L-02</td>
<td>22 cm (9 inches)</td>
</tr>
<tr>
<td>CBL-0110L-02</td>
<td>18 cm (7 inches)</td>
</tr>
</tbody>
</table>

Description: This cable has an iPass (SFF-8087/Mini-SAS) connector (36-pin) at each end. It connects from the HBA to the SAS-936EL 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.

**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.

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-pin) 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 Configuration

CBL-0167L with Single Port Assembly (internal cable)

CBL-0166L (external cable)
Single HBA Configuration Cables

**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 or external port. Used in single port environments.

**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.

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

SAS Cascading Cable Internal (CBL-0168L)

- **Cable Name**: SAS Dual-port Cable Assembly, 68/76 cm
- **Part #**: CBL-0168L
- **Ports**: Dual
- **Placement**: Internal cable
- **Description**: Internal cascading cable. Connects the backplane to the host bus adapter or external port. Used in dual port environments.

SAS Cascading Cable External (CBL-0166L)

- **Cable Name**: SAS EL2/EL1 Cascading Cable (External), 68 cm
- **Part #**: CBL-0166L
- **Ports**: Single or Dual
- **Placement**: External cable
- **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, not a motherboard and HBA.

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.
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

**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)
Disclaimer (cont.)
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