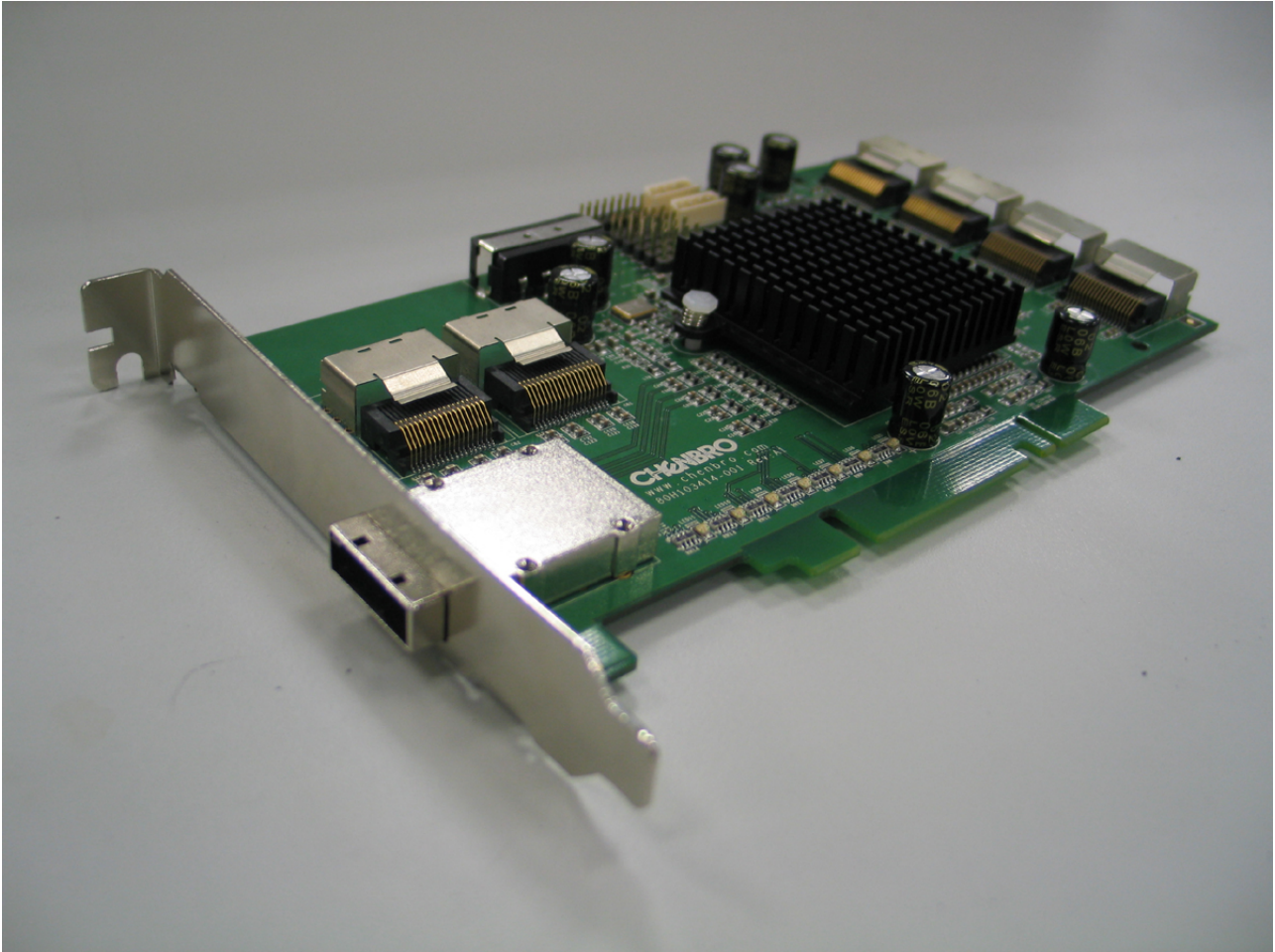


# CHENBRO



## SAS Expander Card User's Manual

April / 01 / 2007

## Copyright

Copyright © 2006 CHENBRO Micom Co., Ltd.. All rights reserved.

Unless otherwise indicated, all materials in this manual are copyrighted by CHENBRO Micom Co., Ltd.. All rights reserved. No part of this manual, either text or image may be used for any purpose other than internal use within purchasing company. Therefore, reproduction, modification in any form or by any means, electronic, mechanical or otherwise, for reasons other than internal use, is strictly prohibited without prior written permission.

CHENBRO Micom Co., Ltd. reserves the right to make improvement and modification to the products indicated in this manual at any time. Specifications are therefore subject to change without prior notice.

Information provided in this manual is intended to be accurate and reliable. However, CHENBRO Micom Co., Ltd., assumes no responsibility for its use, nor for any infringements upon the rights of third parties, which may result from its use.

## Technical Support

CHENBRO works hard to offer our customers maximum performance from our chassis. But in case you have any problem with our product you can find supports from the following resources.

### **Web Support**

Detail information of our products is in our website. You can find technical updates, installation guides, FAQs, technical specifications and more. Our web address is: [www.chenbro.com](http://www.chenbro.com).

### **Email Support**

You can also fill out the technical support form at our [Technical Support](#) page. Your technical issue inquiries will be sent directly to our support professionals.

### **Phone Support**

You can also contact CHENBRO HQ or branch office for immediate support; their contact information is as following:

|                          |                         |                          |
|--------------------------|-------------------------|--------------------------|
| CHENBRO HQ               | CHENBRO Europe B.V.     | CHENBRO Beijing          |
| Tel: 886-2-8226-5500     | Tel: 31-40-295-2045     | Tel: 86-10-8274-3036~ 39 |
| Fax: 886-2-8226-5423     | Fax: 31-40-295-2044     | Fax: 8610-8274-3035      |
| CHENBRO Micom (USA) Inc. | CHENBRO UK Office       |                          |
| Tel: 1-909-947-3200      | Tel: 44-(0)161-749-9015 |                          |
| Fax : 1-909-947-4300     | Fax: 44-(0)161-749-9219 |                          |

## Contents

|  |    |
|--|----|
| <b>Copyright</b> .....   | 2  |
| <b>Technical Support</b> .....   | 2  |
| <b>Contents</b> .....  | 3  |
| <b>Revision History</b> .....  | 4  |
| <b>Safety Information</b> .....  | 5  |
| <b>Conventions Used in this Manual</b> .....                             | 5  |
| <b>Getting Start with SAS (Serial Attached SCSI) Expander Card</b> ..... | 6  |
| <b>Unpacking and Checking the Contents</b> .....                         | 6  |
| <b>Technical Specifications</b> .....                                    | 6  |
| <b>Introduction</b> .....  | 7  |
| <b>About this Guide</b> .....  | 7  |
| <b>Introducing the SAS Expander Card</b> .....                           | 7  |
| <b>Features</b> .....  | 8  |
| <b>General</b> .....   | 8  |
| <b>High-Speed I/O</b> .....  | 8  |
| <b>Application</b> .....   | 8  |
| <b>CHENBRO SAS Expander Card Default Product Type</b> .....              | 8  |
| <b>SAS Expander Card Hardware</b> .....                                  | 9  |
| <b>SAS Expander Card Layout</b> .....                                    | 9  |
| <b>Mini-SAS Connectors Definition</b> .....                              | 10 |
| <b>HDD Failure LED Connector Definition</b> .....                        | 11 |
| <b>HDD Failure Signal Cable Connection (SAS Expander Card)</b> .....     | 11 |
| <b>HDD Failure Signal Cable Connection (SATA / SAS Backplane)</b> .....  | 11 |
| <b>Device LED Definition</b> .....                                       | 12 |
| <b>Mechanical Dimension</b> .....  | 12 |
| <b>Appendix</b> .....  | 13 |
| <b>SAS Expander &amp; RAID Card Application Example</b> .....            | 13 |
| <b>Supported SAS RIAD Card</b> .....                                     | 13 |

## Revision History



| Revision | Date             | Modifications        |
|----------|------------------|----------------------|
| A0       | Mar. / 01 / 2007 | ● First Release      |
| A1       | Apr. / 01 / 2007 | ● A1 Version Release |
|          |                  |                      |
|          |                  |                      |
|          |                  |                      |
|          |                  |                      |

## **Safety Information**

- Read the installation instructions before connecting to the power source.
- Only trained and qualified personnel should be allowed to install, replace or service this equipment.
- Never install this product in a wet environment.
- Position system cables and power cables carefully; route system cable and the power cable and plug so that they cannot be stepped on or tripped over. Be sure that nothing rests on your system component cables or power cable.

## **Conventions Used in this Manual**

The following conventions are used in this manual.

|  |  |
|--|--|
|   | <p><b>Note Icon:</b><br/>Provides more information on the current topic.</p>                                       |
|  | <p><b>Important Icon:</b><br/>Provides important information on the current topic that must not be overlooked.</p> |

## **Getting Start with SAS (Serial Attached SCSI) Expander Card**

Thank you for purchasing CHENBRO SAS Expander Card! This section covers unpacking and identifying components.

### ***Unpacking and Checking the Contents***

The complete package includes the following items:

| Item Description                               | Quantity | CHENBRO Part Number |
|--|----------|---------------------|
| SAS Expander Card, External Output             | 1        | 80H103414-001       |
| HDD Failure Signal Cable, 4 Pin - 4 Pin, 600mm | 4        | 26H113215-005       |
| Mini-SAS Cable, 200mm                          | 2        | 26H113215-014       |
| Quick Guide                                    | 1        | 71H013414-002       |

### **Technical Specifications**

|  |  |
|--|--|
| Mini-SAS Ports   | <p>Input from RAID Card : 8-port (2x Mini-SAS)</p> <p>Internal Output to Backplane : 16-port (4x Mini-SAS)</p> <p>External Output to Storage Center : 4-port (1x Mini-SAS)</p> |
| Number of Supported SAS / SATA in directly connection of HDD | 16 HDDs (Internal connection)  |
| HDD Failure LED Connector                                    | 16 Pins<br>(4x4, 2.54mm pitch, Discrete Connection Pin Headers)  |
| Mechanical Dimension   | Refer to Page 12   |
| Power Connector Type   | 4-Pin Connector  |
| Power Dissipation  | 12 Watts   |

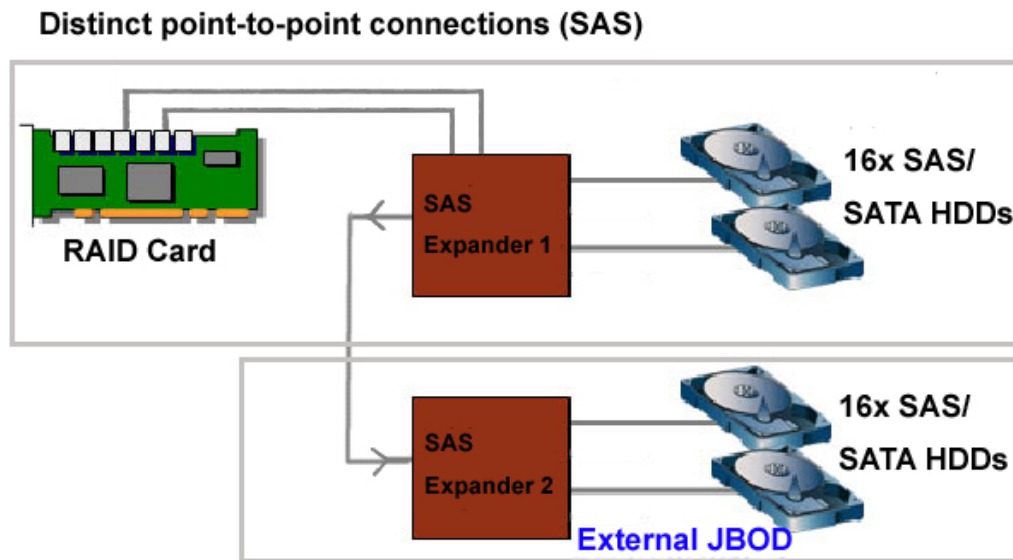
## Introduction

### **About this Guide**

The SAS expander card user's manual provides the information for functions, capabilities, configuring and maintaining RAID arrays hosted by the expander card.

### **Introducing the SAS Expander Card**

SAS expander card expands one SAS address to a number of additional ports. It is an optimal device for usage in data centers



The CHENBRO 16-port SAS expander card provides high performance, high disk drive connectivity, scalability and flexibility in various storage environments. It is a valuable solution to other expansive and complex topologies. The SAS expander is ideal for high availability, scalable server clustering environments, front-end storage subsystems used in clusters, SANs and NAS environments.

The CHENBRO SAS expander is based on LSI SASX28 IC that enables the connection of multiple drive devices in directly attached SAS or SATA. Each expander PHY performs SAS and SATA transfer rate at 3.0 Gbit/s or 1.5 Gbit/s with individual configurations.

The SAS expander IC supports the Serial SCSI Protocol (SSP), SATA Tunneled Protocol (STP) and Serial Management Protocol (SMP). Those are based on SAS protocol and described in the SAS standard v1.0 and V1.1.

## Features

### **General**


- Flexible 16-port SAS Expander Card
- Factory setting for different requirement of Mini-SAS connector Input / Output definition
- HDD failure LED support
- Compatible with all motherboard PCI-Express 4X, 8X, 16X & PCI slots
- Integrated non-blocking cross bar switch allowing port to port connections

### **High-Speed I/O**

- 1.5 Gbit/s or 3.0 Gbit/s operation
- Automatic negotiation of linking speed

### **Application**

- SAS / SATA HDD NAS storage sever or enclosure
- Security system
- Video streaming / editing workstation

|  |  |
|--|--|
|  | SAS expander card must be used only with SAS HBA / RAID card such as Adaptec ASC-48300 |
|--|--|

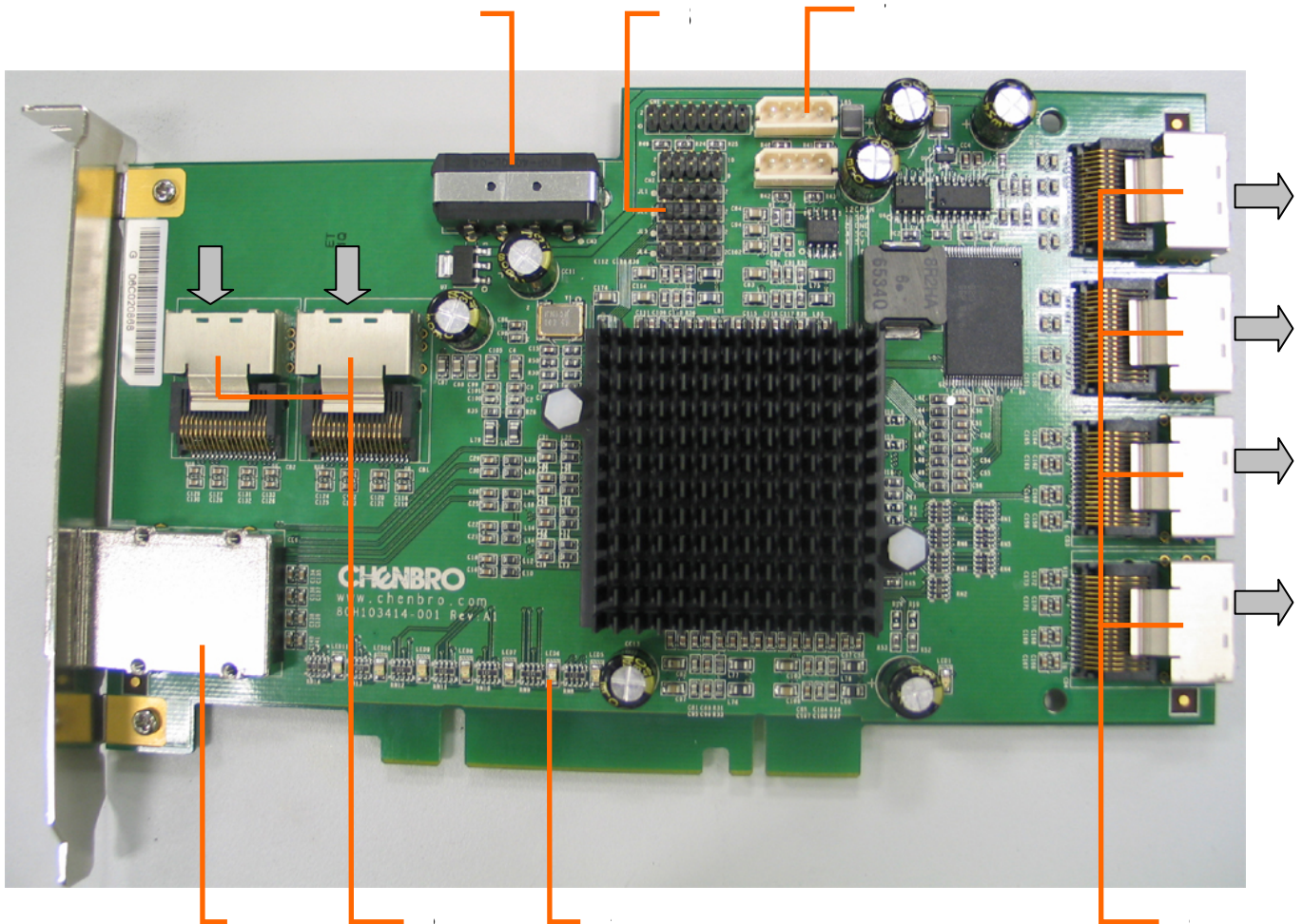
## **CHENBRO SAS Expander Card Default Product Type**

| Product Type   | Mini-SAS Port Function            | Mini-SAS Port Number  | Card Function           | Part Number   |
|--|-----------------------------------|-----------------------|-------------------------|---------------|
| SAS Expander Card with one OUTPUT connector on bracket (CE1 connector) | Input from RAID Card              | 8-port (2x Mini-SAS)  | General purpose use     | 84H341410-022 |
|  | Internal Output to Backplane      | 16-port (4x Mini-SAS) |                         |               |
|  | External Output to Storage Center | 4-port (1x Mini-SAS)  |                         |               |
| SAS Expander Card with one INPUT connector on bracket (CE1 connector)  | Input from Host                   | 4-port (1x Mini-SAS)  | For Storage Center only | 80H103414-002 |
|  | Internal Output to Backplane      | 16-port (4x Mini-SAS) |                         |               |
|  | Input                             | 8-port (2x Mini-SAS)  |                         |               |



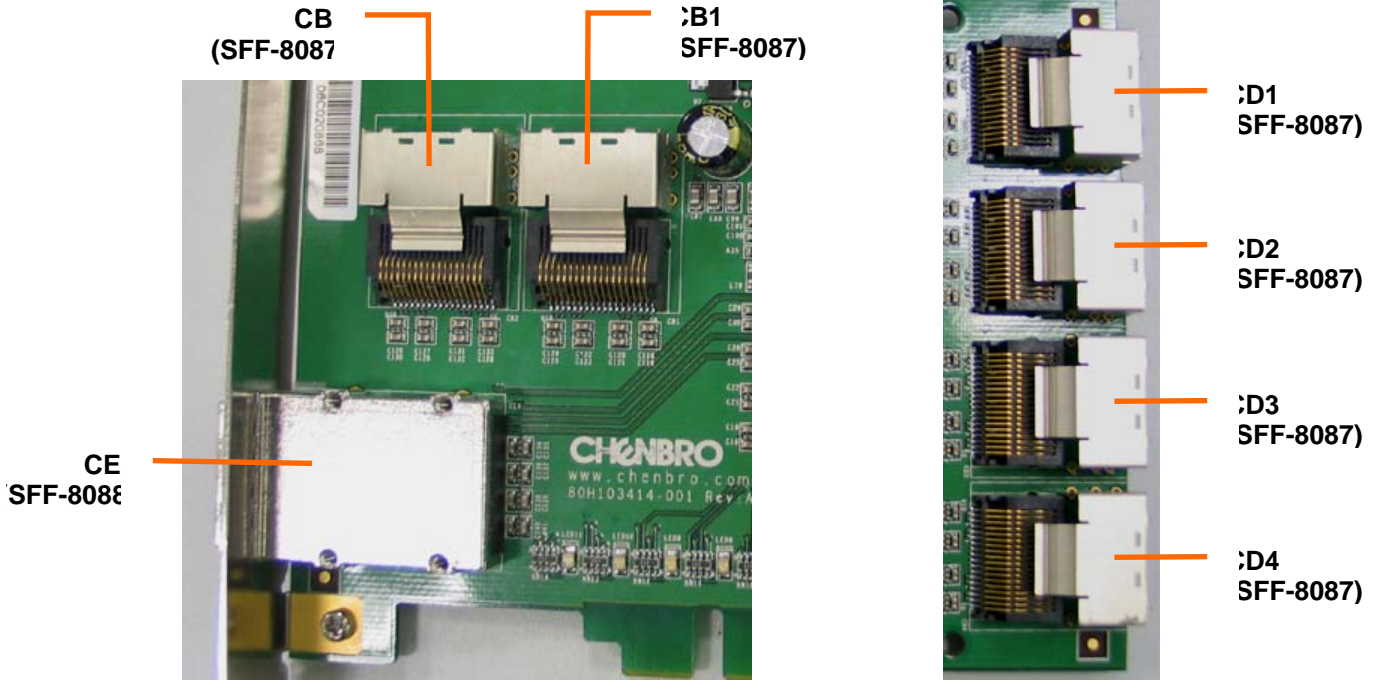
# SAS Expander Card Hardware

## SAS Expander Card Layout



|   | Components | Description                                 | Function                       |
|---|------------|---|--------------------------------|
| 1 | CE1        | 84H341410-022 : Mini-SAS Connector - Output | To Storage Center              |
|   |            | 84H341410- : Mini-SAS Connector - Input     | From Host                      |
| 2 | CB1~CB2    | Mini-SAS Connectors - Input                 | From 4 / 8 ports SAS RAID Card |
| 3 | CD1~CD4    | Mini-SAS Connectors - Output                | To SAS / SATA-II Backplane     |
| 4 | CN3        | DC in, 4-Pin Connector                      | From Power Supplier            |
| 5 | JL1~JL4    | HDD Failure LED Connectors                  | Refer to page 11               |
| 6 | LED5~LED11 | Device LEDs                                 | Refer to page 12               |
| 7 | JC1~JC2    | I2C Connectors                              | Reserved                       |

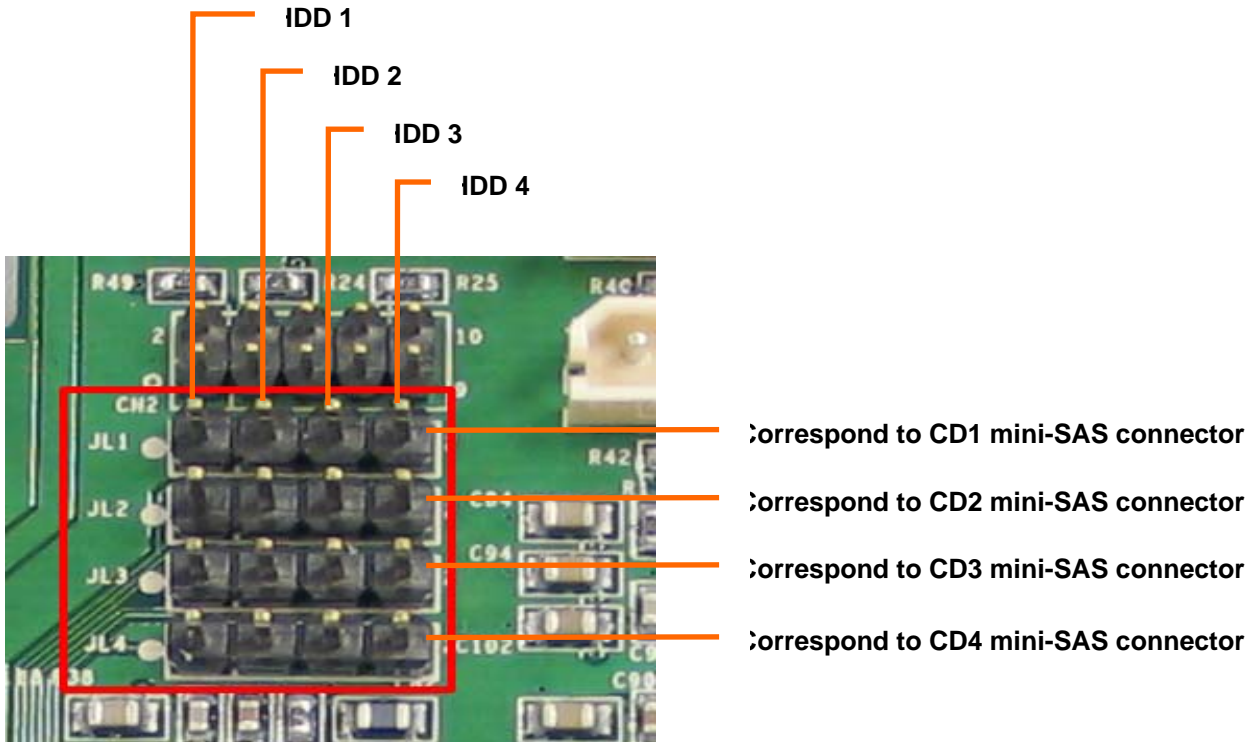
## Mini-SAS Connectors Definition



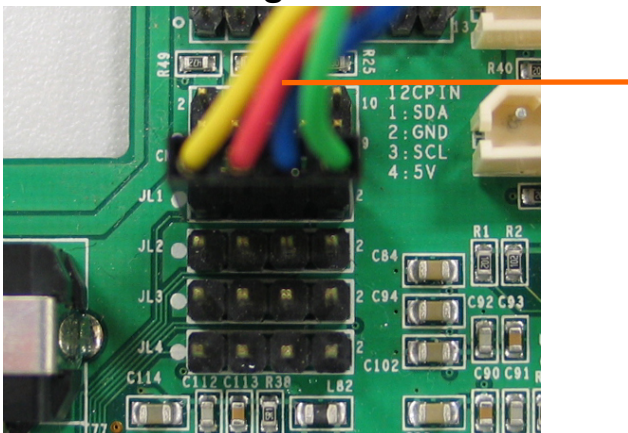
| Mini-SAS Connector Type |              |              |
|-------------------------|--------------|--------------|
|                         | <br>SFF-8087 | <br>SFF-8088 |

|  |   |
|--|---|
|  | <p>There are two default factory settings for CE1 connector as output and input.</p> <p>Output setting is for general purpose use.</p> <p>Input setting is for storage center such as JBOD.</p> |
|--|---|

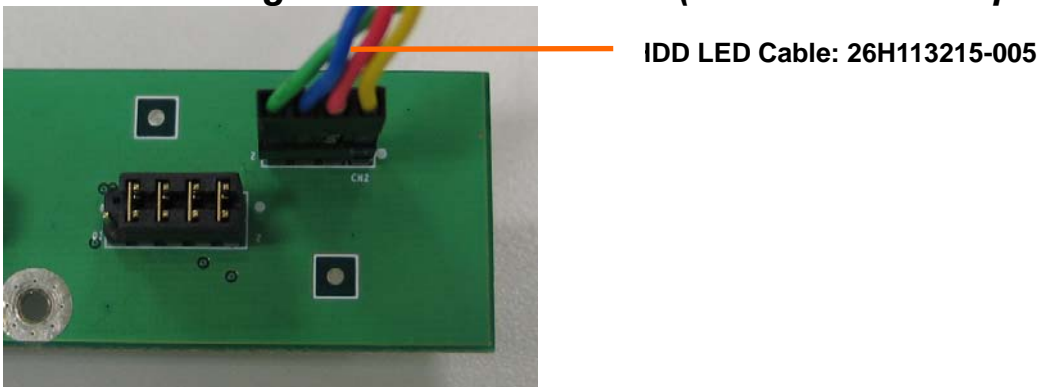
## HDD Failure LED Connector Definition



## HDD Failure Signal Cable Connection (SAS Expander Card)



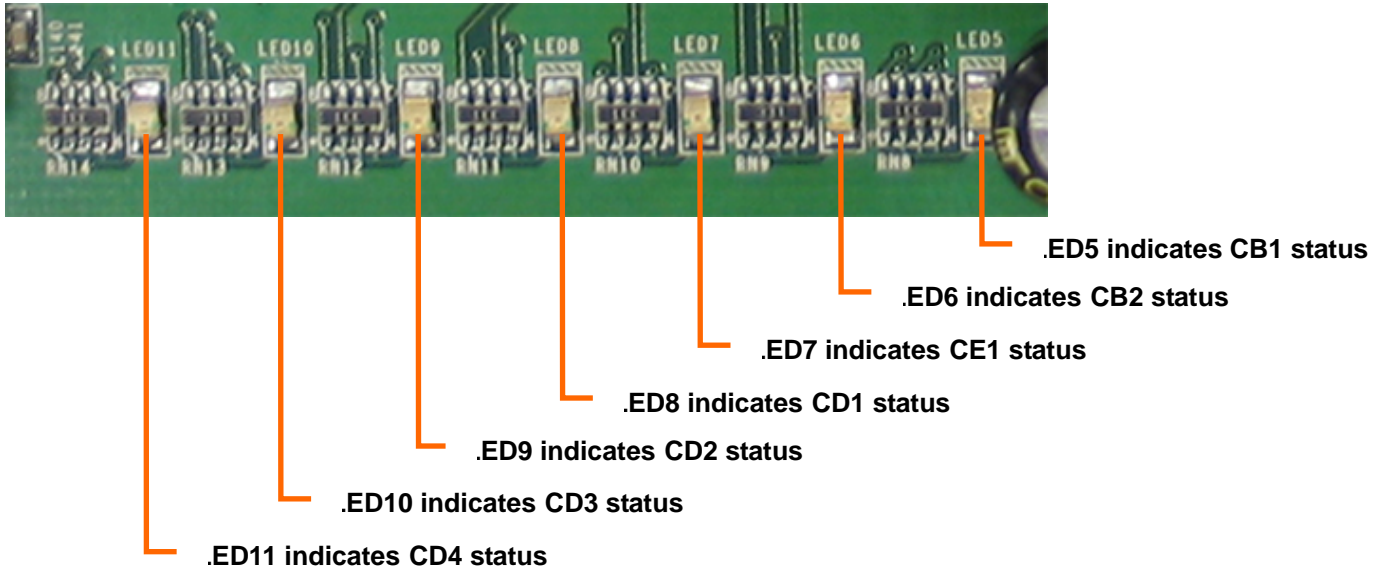
## HDD Failure Signal Cable Connection (SATA / SAS Backplane)



Connect the 4-pin HDD LED cable to the CATHODE of the HDD failure connector on backplane. Refer to your backplane user's manual for the detail pin definition.

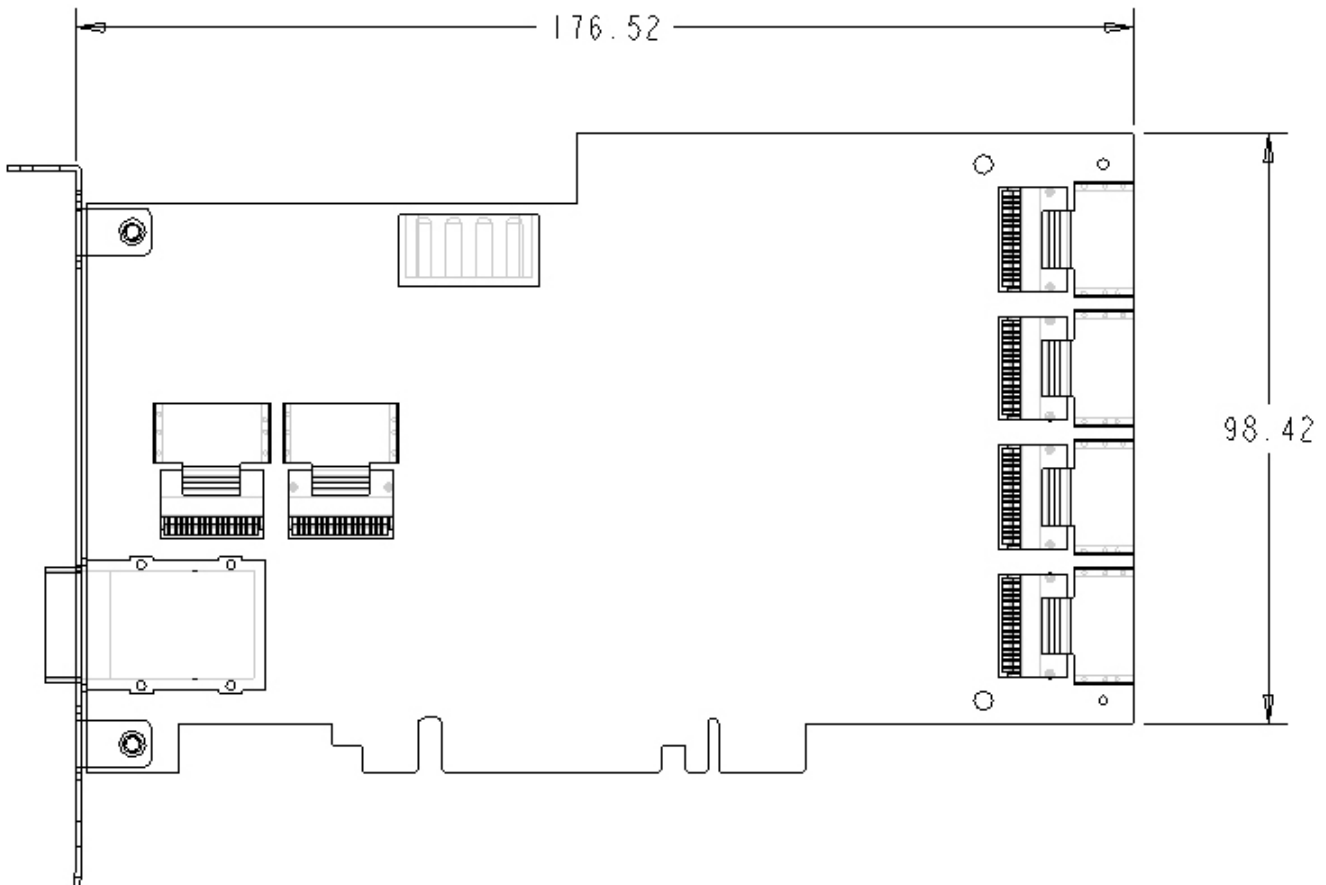
## Device LED Definition

The following picture shows the relations between LED and device connector.



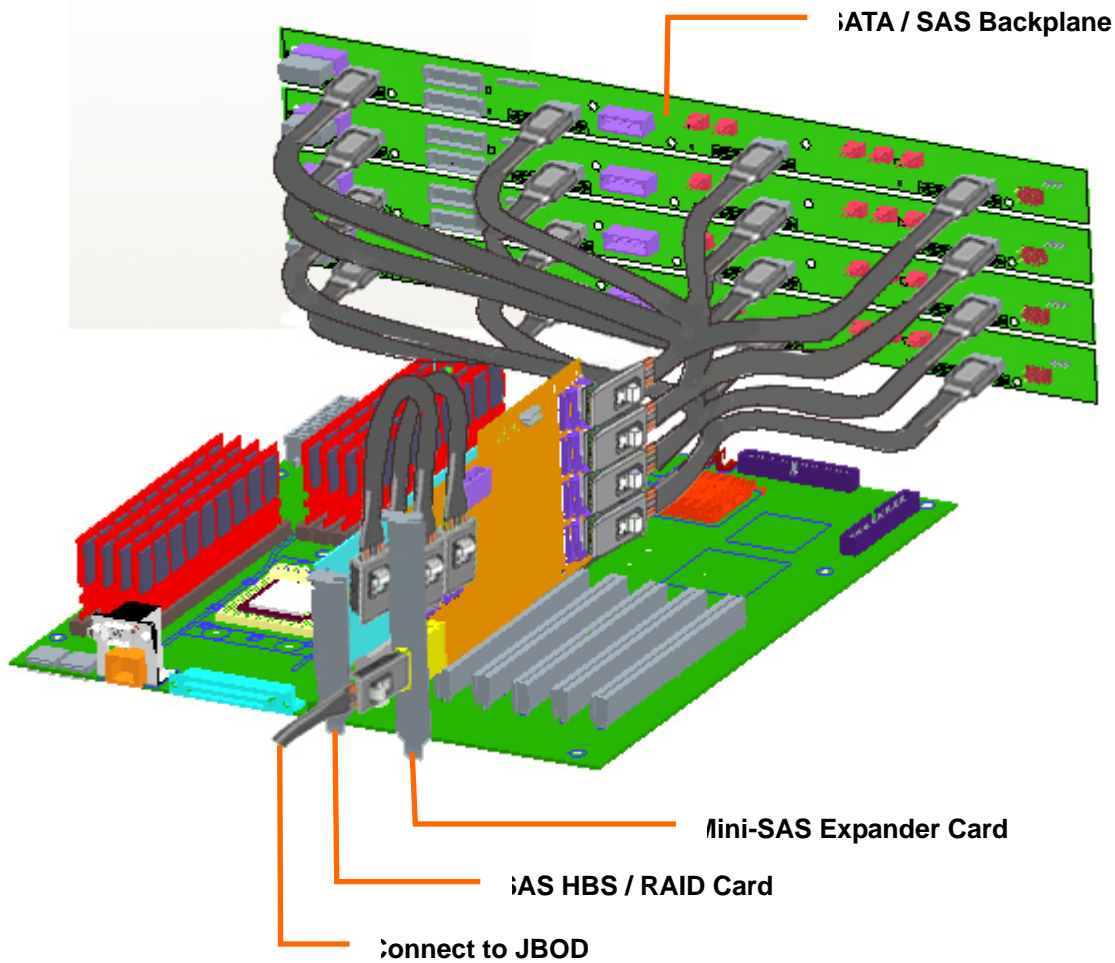
 Green LED blinking indicate the data transferring

## Mechanical Dimension



## Appendix

### SAS Expander & RAID Card Application Example



Specified JBOD with 2nd level SAS expander card such as RM32515J

### Supported SAS RAID Card

| Manufacture | Model Number         | Manufacture | Model Number         |
|-------------|----------------------|-------------|----------------------|
| Adaptec     | ASC-44300            | LSI Logic   | MegaRAID SAS 8204ELP |
|             | ASC-48300            |             | MegaRAID SAS 8204XLP |
|             | ASC-4805SAS          |             | MegaRAID SAS 8208ELP |
|             | ASC-4800SAS          |             | MegaRAID SAS 8208XLP |
| LSI Logic   | MegaRAID SAS 8308ELP |             | MegaRAID SAS 8708ELP |
|             | MegaRAID SAS 8344ELP |             | MegaRAID SAS 8888ELP |