

# **JBOD Enclosure**

**12/16/24 Bays SAS JBOD Enclosure**

## **USER Manual**

Version: 1.0

Issue Date: July 2023

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## FCC Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

## Manufacturer's Declaration for CE Certification

We confirm ARC-73xx series 12/16/24-bay 12Gb/s JBOD enclosure have been tested and found compliant with the requirements in the council directive relating to the EMC Directive 2004/108/EC. Regarding to the electromagnetic compatibility, the following standards were applied:

EN 55022: 2006, Class A  
EN 61000-3-2: 2006  
EN 61000-3-3: 1995+A1: 2001+A2: 2005

EN 55024:1998+A1:2001=A2:2003  
IEC61000-4-2: 2001  
IEC61000-4-3: 2006  
IEC61000-4-4: 2004  
IEC61000-4-5: 2005  
IEC61000-4-6: 2006  
IEC61000-4-8: 2001  
IEC61000-4-11: 2004

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# INTRODUCTION

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## 1. Introduction

### 1.1 Overview

The ARC-73xx JBOD enclosures provides a 2U/3U/4U rack-mounted external storage enclosure capable of accommodating up to 12, 16 or 24 12.0Gb/s, Serial-Attached SCSI (SAS) drives or 6.0Gb/s Serial ATA (SATA) drives. The ARC-73xx series JBODs support both 2.5" and 3.5" drives and offer a high-quality, cost-effective alternative for adding more storage to existing servers.

The ARC-73xx series JBOD incorporates LSI DataBolt bandwidth optimizer technology to buffer 6Gb/s data and then transfers it out to the host at 12Gb/s speeds in order to match the bandwidth between faster hosts and slower SAS or SATA devices. Applications can be optimized for cost/performance through the use of both SAS and SATA drive types. High performance architecture sets new boundaries of industry performance expectations: 12Gb/s SAS (1.2 GB/s bandwidth per physical link) 6.0Gb/s SATA (600MB/s bandwidth per physical link). Each ARC-73xx JBOD enclosure supports three 12Gb/s SFF-8644 connectors for SAS host and expansion connections. Configuration and environmental information is accessible either via in-band SAS or out-of-band serial port.

The ARC-73xx JBOD enclosures are designed with an integrated ARM Cortex-R4 processor for topology management functions such as discovery, enclosure and drive management, and LED management. Constant access to critical data is available with fully redundant, power supplies and cooling fans, which are all field replaceable by the customer. Also, with LED status on the expander module and each individual drive carrier, all system components are closely monitored to help your business continuity and running in the event of a component failure or disruption. An intuitive LCD control panel at ARC-73xx JBOD enclosures allow users and administrators to easily do enclosure monitoring, expander configuration, troubleshooting and maintenance.

This JBOD storage enclosure solution delivers industry-leading data performance, availability, storage density, and upgradeability to meet customers' demanding and growing storage needs. Daisy-chains longer than the limitation of subsystems are not supported

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even if it may be workable. And because these JBOD enclosures are managed by the SAS RAID controller or SAS host adapter in the primary server, they give IT administrators a flexible way to respond and meet their storage demands. The 12Gb/s SAS JBOS storage from Areca is always affordable for customers to scale up and down rapidly, handle rich data, and have always-on capability. Simply connect ARC-73xx JBODs to the external interface and offer the benefits of more storage. To scale further, cascade additional JBODs to your host controller to continue to increase storage capacity and performance, all without powering down your system. It is especially useful for large data applications, such as video surveillance, data archiving, and TV broadcast storage.

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## 1.2 Locations of the Enclosure Component

The main components of the ARC-73xx series JBOD are shown in the below figure.

### 1.2.1 RAID Enclosure Front View

- 2U-12 bays SAS JBOD Front View

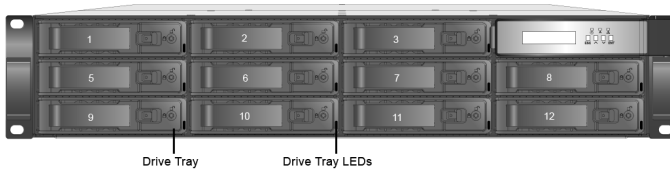


Figure 1-1. 2U-12 bays JBOD Enclosure Front View

- 3U-16 bays SAS JBOD Front View

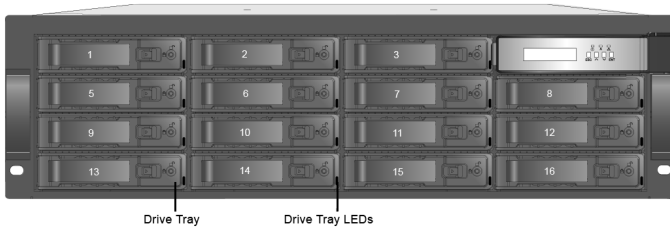


Figure 1-2. 3U-16 bays JBOD Enclosure Front View

- 4U-24 bays SAS JBOD Front View

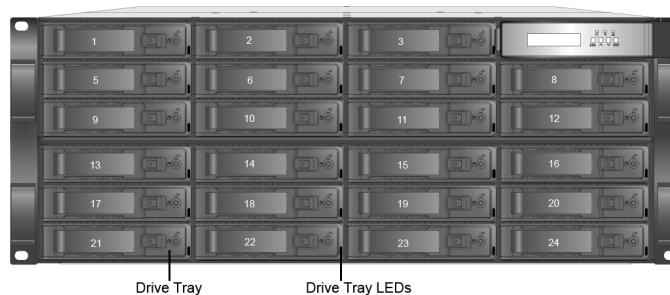


Figure 1-3. 4U-24-bays JBOD Enclosure Front View



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## • Disk Slot Numbers

To perform a disk hot-plug procedure, you must know the physical disk slot number for the drive that you want to install or remove. The number on the drive tray shows how JBOD enclosure disk slots are numbered. Disk slot number is reflected in the host manager interface.

## • Drive Tray LED Indicators

Each drive tray in your subsystem has two LEDs: an activity LED (blue) and one power/fault (two colors green/red) status LED. The activity LED flashes whenever the drive is accessed. The following table describes the SAS JBOD enclosure drive tray LED status.

LED	Normal status	Problem Indication
Blue LED (Activity)	<ol style="list-style-type: none"><li>1. When the activity LED is lit, there is I/O activity on that disk drive.</li><li>2. When the LED is not lit; there is no activity on that disk drive.</li></ol>	N/A
Green/Red LED (Power/Fault)	<ol style="list-style-type: none"><li>1. When the power LED (green) is lit and fault LED (red) is off, that disk is present and status normal.</li><li>2. When the fault LED is lit there is no disk present.</li></ol>	<ol style="list-style-type: none"><li>1. When the fault LED (red) is slow blinking (2 times/sec), that disk drive has failed and should be hot-swapped immediately.</li><li>2. When the activity LED (blue) is lit and fault LED (red) is fast blinking (10 times/sec) there is re-building activity on that disk drive.</li></ol>

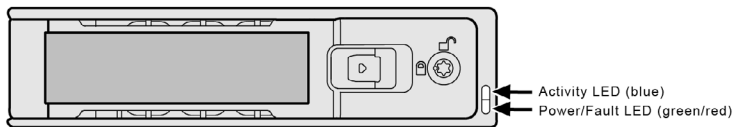


Figure 1-4. 3.5-inch Drive Tray LED

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## 1.2.2 JBOD Enclosure Rear View

ARC-71xx series enclosures include a mid-plane, expander controller, and power supply unit all in one cableless chassis design. Multiple fans and optional power supplies provide redundancy to ensure continued usage during component failure.

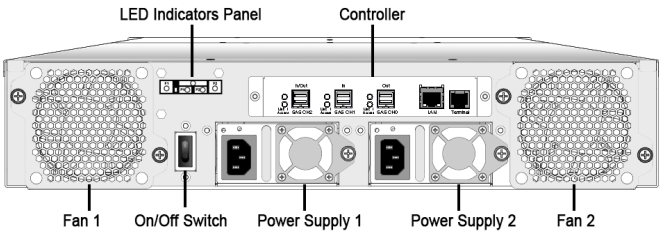


Figure 1-7. 2U-12 bays SAS JBOD Rear View

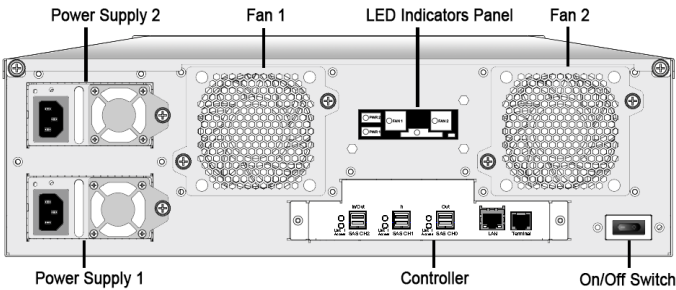


Figure 1-8. 3U-16 bays SAS JBOD Rear View

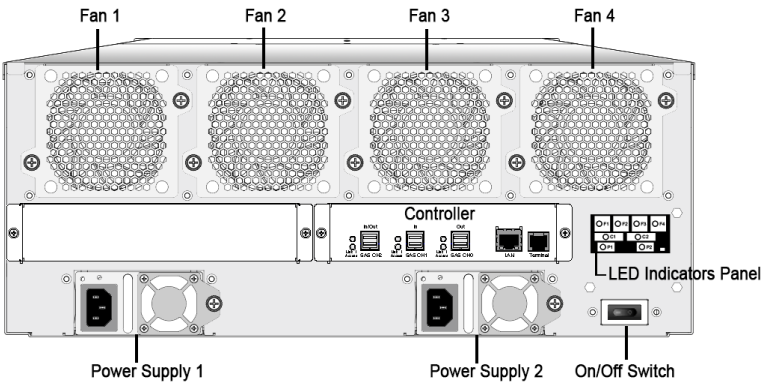


Figure 1-9. 4U-24 bays SAS JBOD Rear View

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## 1.2.2.1 Expander Controller Module Outline

The ARC-8011 SAS expander controller has one 6-pin UART RJ-11 connector (for CLI manager), one RJ-45 LAN connector (manufacture manager only) and three SAS channel ports.

ARC-8011 SAS controller box outline is shown as below:

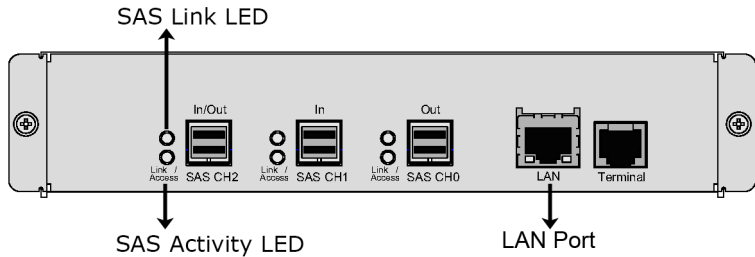


Figure 1-10, Rear View of ARC-8011 Expander Controller

The following table describes the SAS expander link/access LED.

SAS Port LED	Status
Link LED (Green light)	<ol style="list-style-type: none"><li>1. When SAS port link LED is lit for 1 second and turns off for 3 seconds that indicates the one link has connected.</li><li>2. When SAS port Link LED is lit for 2 seconds and turns off for 2 seconds that indicates the two links have connected.</li><li>3. When SAS port Link LED is lit for 4 seconds that indicates the four links have connected.</li></ol>
Access LED (Blue light)	When access LED is lit that indicates the SAS port access- es to the SAS enclosure.

### **Note:**

At least one SAS expander must be installed in the enclosure. If only one SAS expander is installed, it must be in the primary SAS expander slot and the other one must contain a cover.

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## 1.2.2.2 Fan/Power/Controller LED Indicator

The following figures describe the LEDs which indicate the status of the SAS JBOD enclosure's fans, power supplies and controller.

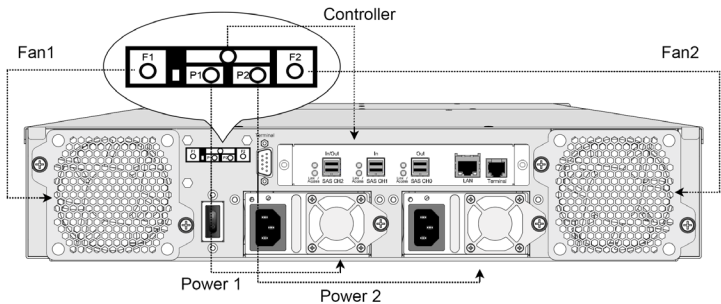


Figure 1-11. Fan/Power/Controller LED Indicator of ARC-7312

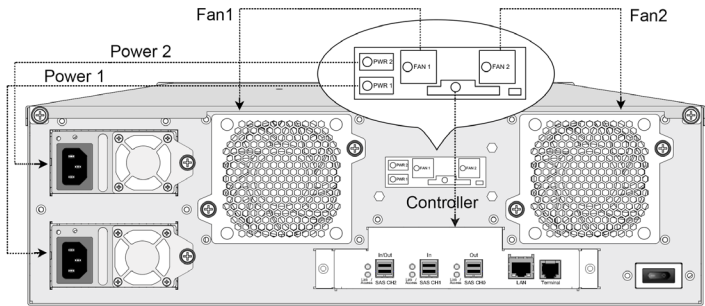


Figure 1-12. Fan/Power/Controller LED Indicator of ARC-7316

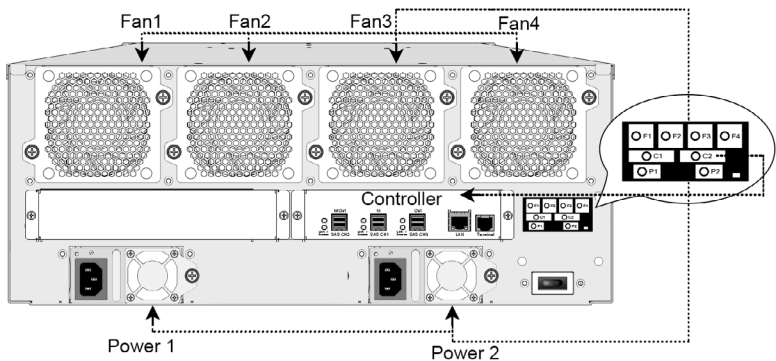


Figure 1-13. Fan/Power/Controller LED Indicator of ARC-7324

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The following table describes the Fan1/Fan2/Fan3/Fan4 LED status.

Fan LED Status	Indication
Fan_OK (Green light)	The green light indicates that the fan is working functionally.
Fault (Red light)	The red light indicates that a fan fault has occurred.

The following table describes the Power1/Power2/Power3 LED status.

Power LED Status	Indication
AC_OK (Green light)	The green light indicates that the AC cord is present and above the minimum AC input voltage threshold.
Fault (Red light)	The red light indicates that a power supply fault has occurred.

The following table describes the Controller LED status.

Controller LED status	Status
Working (Heartbeat/ Green light)	The green light with heartbeat indicates that the controller in working state, controller CPU access the subsystem resource.
Fault (Red light)	The red light indicates that a controller reset occurs on a controller.

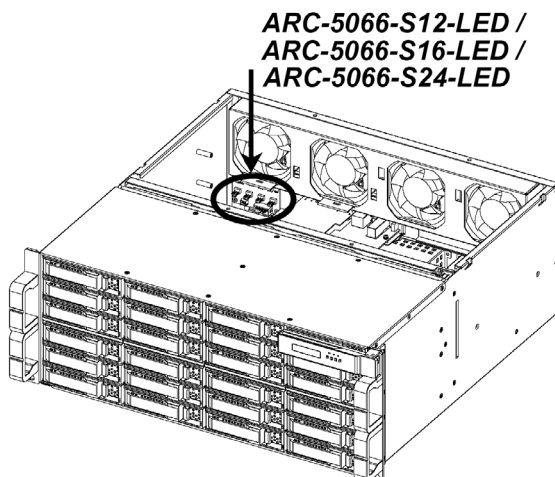


Figure 1-14, LED indicator board (ARC-5066-S12-LED /  
ARC-5066-S16-LED / ARC-5066-S24-LED)

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Depending on the controller installed, there are different default settings of **SW1/SW2** on LED indicator board (ARC-5066-S12-LED/ARC-5066-S16-LED/ARC-5066-S24-LED). If you replace the installation of the controller, please refer to the table below to reset **SW1/SW2** simultaneously. (Table 1-1 is also made into stickers affixed on the backplane frame.)

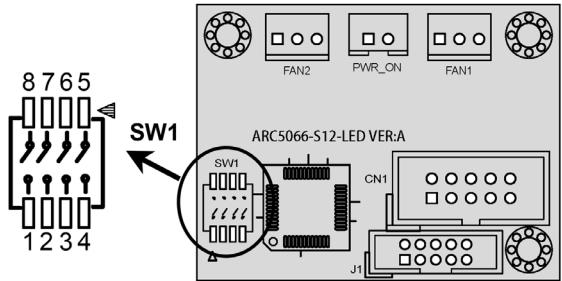


Figure 1-15, SW1 on ARC-5066-S12-LED

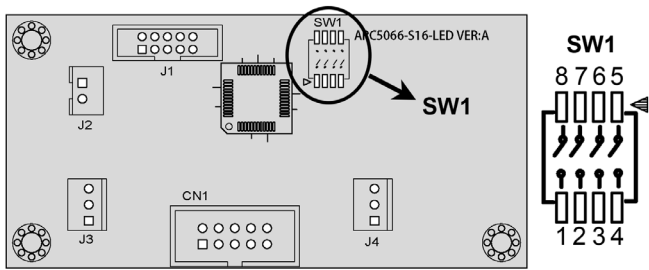


Figure 1-16, SW1 on ARC-5066-S16-LED

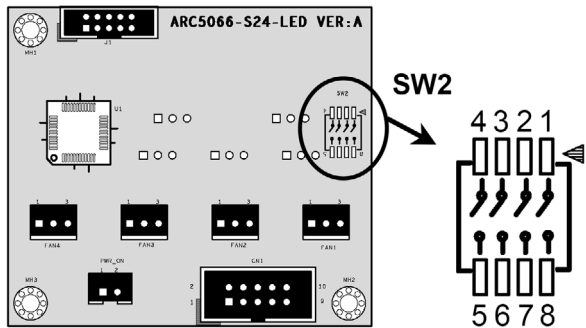


Figure 1-17, SW2 on ARC-5066-S24-LED

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SW1/SW2[4-1]				Controller
<i>pin4</i>	<i>pin3</i>	<i>pin2</i>	<i>pin1</i>	
OFF	OFF	OFF	OFF	ARC-71xx (ARC-5066BL)/ ARC-73xx-SAS (ARC-5088BL)
ON	OFF	OFF	OFF	ARC-8050T3-SAN/ ARC-73xx JBOD (ARC-8011)
OFF	ON	OFF	OFF	ARC-8050T3-24R

Table 1-1, SW1/SW2 Pin Settings

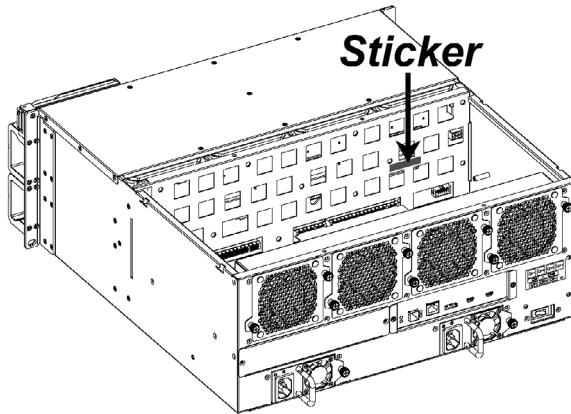


Figure 1-18, The Sticker Affixed on the Backplane Frame

## 1.3 Enclosure Alarm

An audible alarm is activated if any of the fault conditions occur, such as Voltage, Temperature, Fan, Power Supply or from SES2. The "BU command" on the CLI allows you to control the buzzer attributes that have been controlled by SAS expander H/W. There are four sound levels defined by the expander H/W. You can temporarily mute it with the "BU Command". The buzzer still can be activated by the next different event.

### **Note:**

It is rare for both expander modules to fail simultaneously. However, if this occurs, the JBOD enclosure can not issue critical or non-critical event alarms for any enclosure component.

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## 1.4 Enclosure Working Mode

The enclosure can run in one of two modes:

1. Normal Mode (default)
2. Zone Mode

You must select either mode using the CLI GROUP command and restart the enclosure again to take effect. Changing the mode while the enclosure is on will not affect enclosure operation until the enclosure is rebooted. The following example shows the 12 bays JBOD connection. A connection with the 16/24-bay JBOD is exactly the same.

- Normal Mode (default)

In normal mode (default), a SAS host can communicate with up to 12 drives in the enclosure via a single expander or dual expanders. The three external cable ports and all devices/phys slots will default associate with one zone group. SAS expander is a device that contains expander ports. Expander ports may support being attached to SAS initiator ports, SAS and/or SATA target ports, and to other expander ports. The SAS RAID controller or SAS host adapter can support daisy-chain how many enclosures which depend on the RAID controller or the host adapter firmware. The following figure shows how to connect the external Mini SAS HD cable from the SAS RAID controller that has external ports to the SAS JBOD external drive enclosures.

### (1). Single Controller Mode

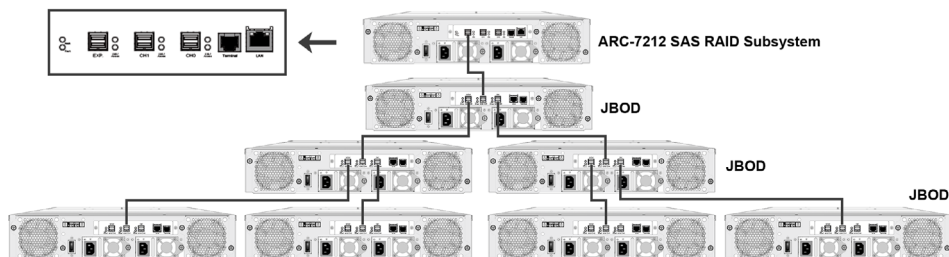


Figure 1-19. Single Module Daisy-chain



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- Zone Mode

In zone mode, the enclosure can be split into up to 8 virtual groups. Each group drive channels and external cable connectors are assigned by CLI GROUP command. The following figure is shown the enclosure which has split into 2 virtual groups. Each group drive channels are controlled by individual host adapter using SAS CH1 and SAS CH2.

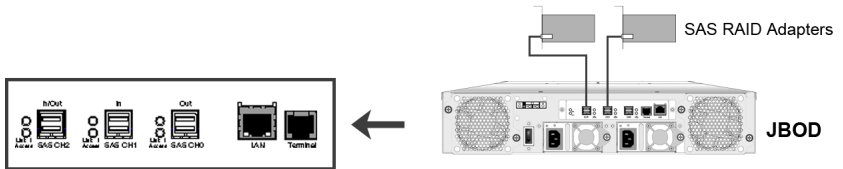


Figure 1-20. Zone Mode Example

## **Note:**

Please refer to chapter 3 CLI Features of GROUP command which is used to associate the external port and the devices/phys slot.

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## 2. Hardware Installation

This chapter explains how to install the following components:

- Rack installation guide
- Drives and drive carriers
- SAS expander modules
- Power supplies

### Unpack

Unpack and install the hardware in a static-free environment. The SAS JBOD enclosure is packed inside an anti-static bag between two sponge sheets. Remove it and inspect it for damage. If the SAS JBOD enclosure appears damaged, or if any items of the contents listed below are missing or damaged, please contact your dealer or distributor immediately.

### Checklist

The SAS JBOD enclosure kit may have included the following items in the shipping package:

- SAS JBOD enclosure
- RAID rack kit
- Mounting hardware (attachment rails, screws, etc.)
- SFF-8644 to SFF-8644 cable (optional)
- Power cords
- RJ11 to DB9 serial communications null-modem cable
- User manual

### Installing into a Enclosure Rack

Before you install the rack for your SAS JBOD enclosure, please make sure you have these rack kit components:

- One pair of mounting-bracket rail
- One pair of length rail
- 10-32 x 0.5-inch flange-head Phillips screws (8)

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## 2.1 Installing an Enclosure into the Rack or Tower (Optional)

The following sections show the 2U-12 bays installation. An installation with the 3U-16 bays and 4U-24 bays are exactly the same.

1. Using supplied screws to secure the mounting-bracket rail and length rail and then secure them on the front vertical rail and rear vertical rail, as shown below. Make sure that all connections are tightened before continuing.

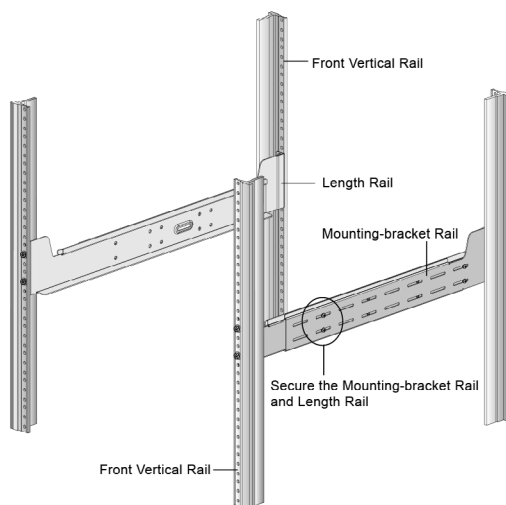


Figure 2-1. Attaching the Mounting Rails to the Cabinet

2. Slide the rear side of enclosure fully onto the rack until the enclosure front panel touched the front vertical rails. Align the mounting holes of the enclosure on the front vertical rail holes. The enclosure is too heavy; it needs some assistance from other people to lift it onto the rack together.

# HARDWARE INSTALLATION

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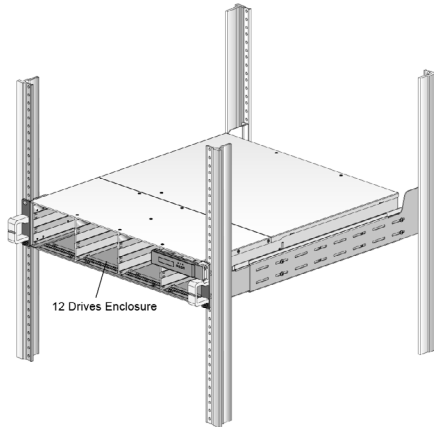


Figure 2-2. Sliding the Enclosure into the Rails

3. Secure the enclosure to the front vertical rail and mounting-bracket rail on both sides.

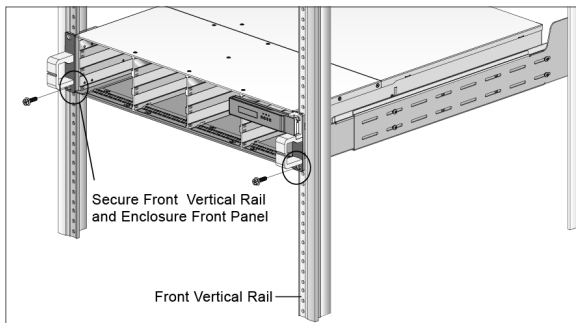


Figure 2-3. Attaching the Front of the Enclosure

## 2.2 Installing or Removing SAS/SATA Drives in the Enclosure

Your enclosure supports up to 12/16/24 3.5-inch disk drives or 12/16/24 2.5-inch 12Gb/s SAS or 6Gb/s SATA drives, each one contained in its individual drive carrier. Each drive is hot-pluggable, allowing you to remove and insert drives without shutting down your enclosure.

This section describes how to install or remove drives in your enclosure.

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## **Note:**

Be careful when handling and storing the drives. The tray provides some protection, but the drives and tray connectors can be damaged by rough handling. When removing the drives from the enclosure, place them on a padded surface. Do not drop the drives.

## **2.2.1 Installing SAS/SATA Drives in the Enclosure**

Follow the steps below to install the drives into drive tray.

### **2.2.1.1 Installing 2.5-inch Drives into 3.5-inch Drive Tray**

- 1-1. Install the drives into the drive tray and make sure the holes of the disk trays align with the holes of the drive.

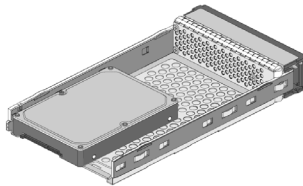


Figure 2-4. Put 2.5-inch SAS/SATA Drive into 3.5- inch Disk Tray

- 1-2. Turn the drive tray upside down and using a screwdriver to secure the drive to the drive tray by four of the mounting screws.



Figure 2-5. 3.5-inch Drive Carrier with 2.5-inch SAS/SATA Drive

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2. After installing the drive into the drive tray completely, make sure the drive tray latch is open, then slide the drive tray with the attached drive into the enclosure drive slot.
3. Gently slide the drive tray back of the enclosure drive slot until the bottom of the open carrier handle makes contact with the enclosure face plate.

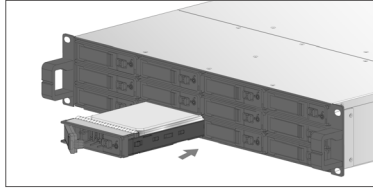


Figure 2-6. Installing 3.5-inch Drive into Enclosure

4. Click the drive tray latch into position, then continuing to slide the other drive tray into the slot.

## **Note:**

To ensure proper airflow for enclosure cooling, each slot should contain a drive tray.

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## 2.2.1.2 Installing 3.5-inch Drives into 3.5-inch Drive Tray

- 1-1. Install the drives into the drive tray and make sure the holes of the drive trays align with the holes of the drive.

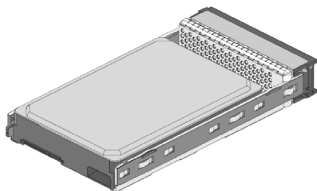


Figure 2-7. Putting Drive into Drive Tray

- 1-2. Turn the drive tray upside down and using a screwdriver to secure the drive to the drive tray by four of the mounting screws.

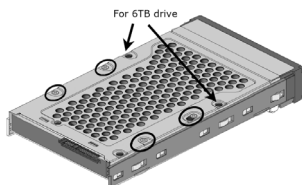


Figure 2-8. Securing Drive

2. After installing the drive into the drive tray completely, make sure the drive tray latch is open, then slide the drive tray with the attached drive into the enclosure drive slot.
3. Gently slide the drive tray back of the enclosure drive slot until the bottom of the open carrier handle makes contact with the enclosure face plate.

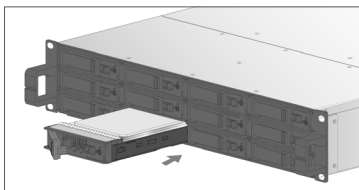


Figure 2-9. Installing Drive into Enclosure

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4. Click the drive tray latch into position, then continuing to slide the other drive tray into the slot.

## **2.2.2 Removing Drives from the Enclosure**

1. Don't power the system off until the LED indicator on the drive tray stop flashing.
2. For 3.5-inch drive tray, turn the key-lock to the unlock position.
3. Open the drive tray latch, then gently but firmly pull the drive tray out from the slot.

## **2.3 Installing and Removing the Power Supply Modules**

The redundant power supplies on the ARC-73xx models are designed as field-replaceable units. You can replace a power supply without removing the RAID enclosure from the rack. The ARC-7324 subsystem is equipped with three power modules and ARC-7312/7316 are two power modules.

### **2.3.1 Installing the Power Supply Modules**

1. Carefully slide the power supply into the empty slot.
2. Push the module back of the slot until it is firmly seated in the backplane connector.
3. Tighten the retaining screw to secure the power supply modules.
4. Connect the AC power cords to a grounded electrical outlet and to the power supply. Turn on the AC power switch from JBOD enclosure.

### **2.3.2 Removing a Power Supply Modules**

1. Verify that the power LED is red. Please refer to Figure 1-11, 1-12 and 1-13.



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2. Turn off the power supply and unplug the AC power cords.
3. Loosen and remove the retaining screw on the right side of the power module then gently but firmly pull the power supply modules out from the slot.

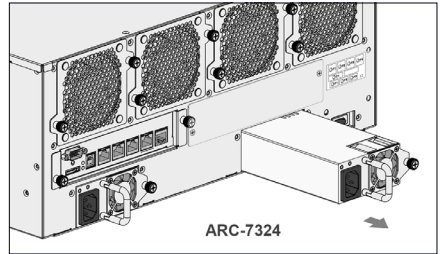
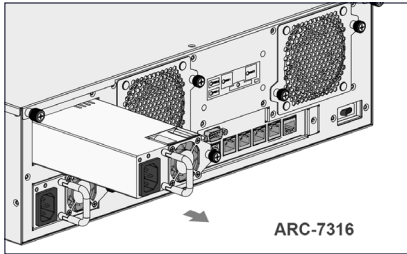


Figure 2-10, Pulling Power Module

## **Note:**

The power supply modules are hot-pluggable. If one power supply module is functioning normally, you can hot-swap the other one while the subsystem is powered on.

# HARDWARE INSTALLATION

## 2.4 Removing and Installing the Fan Modules

The ARC-73xx models have externally mounted fans that you can replace without shutting down the subsystem.

1. Verify that the Fan LED is red. Please refer to Figure 1-11, 1-12 and 1-13.
2. Remove the two fan module mounting screws.
3. Draw the fan module away from the I/O module.
4. Disconnect the fan cable from its connector on the I/O module.
5. Remove the four attaching plastic screws.
6. Place the new fan onto the fan module and install the four attaching plastic screws.
7. Connect the new fan's cable.
8. Push the fan module into the I/O module until it is firmly seated in the backside
9. Install the two mounting screws.

This completes the fan replacement procedure. Please refer to the figure below.

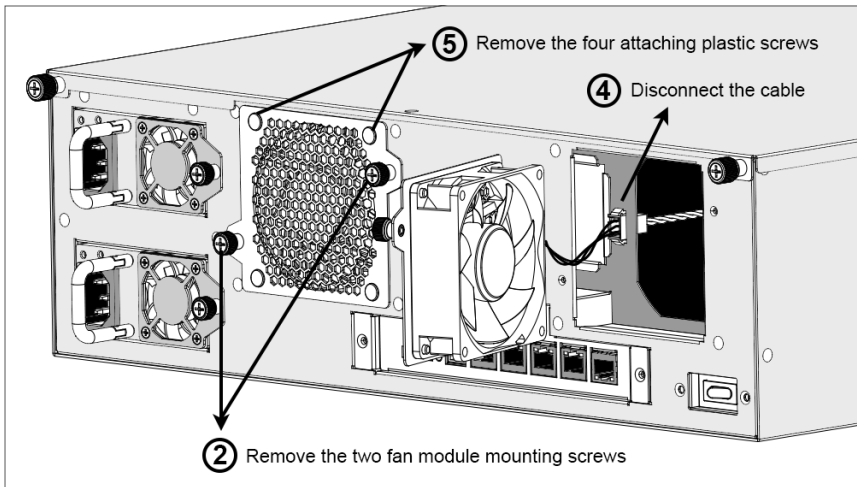


Figure 2-11. Removing and Installing the Fan Module

# HARDWARE INSTALLATION

## 2.5 Connecting the SAS JBOD Enclosure

Following below instructions to connect your SAS JBOD enclosure.

### 2.5.1 Connecting the Host System

Once the SAS JBOD enclosure has finished the hardware component installations, then you can connect it to a host. The SAS JBOD enclosure can be connected to a host which may have a Mini SAS HD SFF-8644 interface through the Mini SAS HD SFF-8644 cable. The host can be a SAS host adapter, SAS RAID controller or other SAS JBOD.

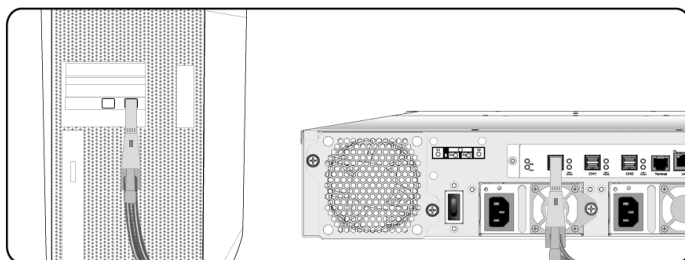


Figure 2-13. Connecting the Host

### 2.5.2 Connecting Additional Enclosure

You can connect many SAS expander enclosures (Depended on the host capability) to a single host system. Enclosures installed with SATA or SAS can be included in the same daisy-chain. Use a Min SAS HD SFF-8644 cable to connect the SAS Exp. Out port on the first enclosure to the SAS Exp. In port on a second enclosure. Please refer to section 1.6 on this manual.

### 2.5.3 Power Up the Enclosure

ARC-73xx series SAS JBOD enclosures are equipped with two or three power supplies for each unit. Using the included power cords, connect each power supply to a suitable AC power source.

There is one main power on/off switch located on the rear side of the JBOD enclosure. This on/off power switch is used to apply or

# HARDWARE INSTALLATION

---

remove power from the power supply to the SAS JBOD enclosure. Turning off subsystem power with this switch removes the main power but keeps standby power supplied to the SAS JBOD enclosure. Therefore, you must unplug the power cord before enclosure servicing.

The installation is completed. You can use your SAS JBOD enclosure. You can also through the RJ11 port for JBOD enclosure management.

Turn on the AC power from main power on/off switch on the rear side of the SAS JBOD enclosure.

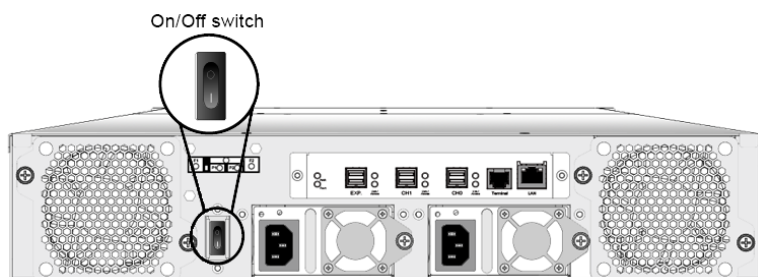


Figure 2-14. Turning AC Power

If you enable the “Connector Power Down Control” function, press the power on/off switch off does not turn off until no link status from the host side. The default is “enabled”.

The following condition is no link from the host side.

- (1). The host to which it is attached power down or
- (2). The SAS cable is disconnected from host.

## 2.6 Configuring the Enclosure

The SAS JBOD enclosure’s functions can also be managed via a VT-100 compatible terminal or a PC running a VT-100 terminal emulation program. You can attach a serial (Character-Based) terminal or server com port to the SAS JBOD enclosure for accessing the text-based setup menu. Please refer to Chapter 3 CLI Features.

## 3. LCD Configuration Manager

---

The SAS JBOD LCD configuration utility is a character-based utility that you can run after powering the unit. Use LCD configuration utility to see and configure:

- Alarm Device,
- Temperature,
- Fan Speed,
- Power Supply,
- Voltage,
- Set TEMP,
- Set Link,
- Set Fan,
- Set Alarm,
- Set Password,
- Save Config, and
- System Reset

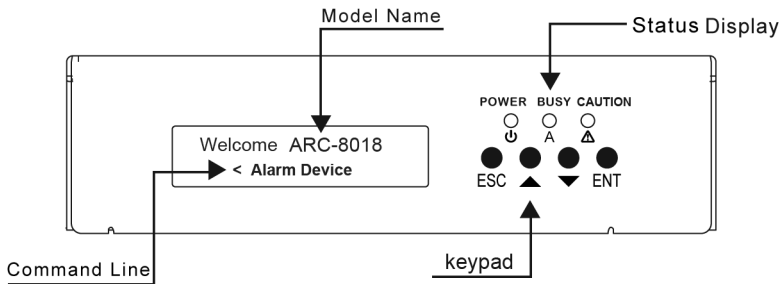
### 3.1 Using Local Front Panel Touch-Control Keypad

The front panel keypad and liquid crystal display (LCD) is the primary user interface for the SAS JBOD enclosure. The front panel keypad and LCD is connected to the SAS JBOD enclosure to access the built-in configuration that resides in the SAS expander controller's firmware.

The LCD provides a system of screens with areas for information, status indication, or menus. The LCD screen displays up to two lines at a time of menu items or other information.

# LCD Configuration Manager

The initial screen is shown as following:



## Function Key Definitions:

The four function keys at the right of the front panel perform the following functions:

Key	Function
Up Arrow	Use to scroll the cursor Upward / Rightward
Down Arrow	Use to scroll the cursor Downward / Leftward
ENT Key	Submit selected icon function (Confirm a selected item)
ESC Key	Return to previous screen (Exit a selection configuration)

There are a variety of failure conditions that cause the SAS JBOD enclosure monitoring LED to light. Below table provides a summary of the front panel LED.

Panel LED	Normal Status	Problem Indication
Power LED	Bright green	This LED does not light up after power switched on
Busy LED (Host Access)	Blink green during host computer accessing the expander box	LED never flickers
Caution LED	Unlit	Solid red

# LCD Configuration Manager

## 3.2 Navigation Map of the LCD

The password option allows user to set or clear the SAS JBOD enclosure's password protection feature. Once the password has been set, the user can only monitor and configure the SAS JBOD enclosure by providing the correct password. The SAS JBOD enclosure will check the password only when entering the main menu from the initial screen. Always go back to the initial screen when it does not receive any command in 5 minutes. The password is default setting at 0000 by the manufacture.

There has four function buttons on the LCD panel. Below tables show three kinds of their action types.

Action Type 1 (A1)	
Button	Action
ESC	Back to upper level
Up Arrow	Up at same level
Down Arrow	Down at same level
ENT	Enter to lower level

Action Type 2 (A2)	
Button	Action
ESC	Cancel operation
Up Arrow	Number Selection
Down Arrow	Alphabet selection
ENT	Confirm

Action Type 3 (A3)	
button	Action
ESC	Cancel operation
Up Arrow	Up to select next item
Down Arrow	Down to select next item
ENT	Confirm

The following flow is an expansion of LCD setup option items hierarchical menu. There also mark "A1", "A2" and "A3" to show the LCD buttons' action types in each function item.

# LCD Configuration Manager

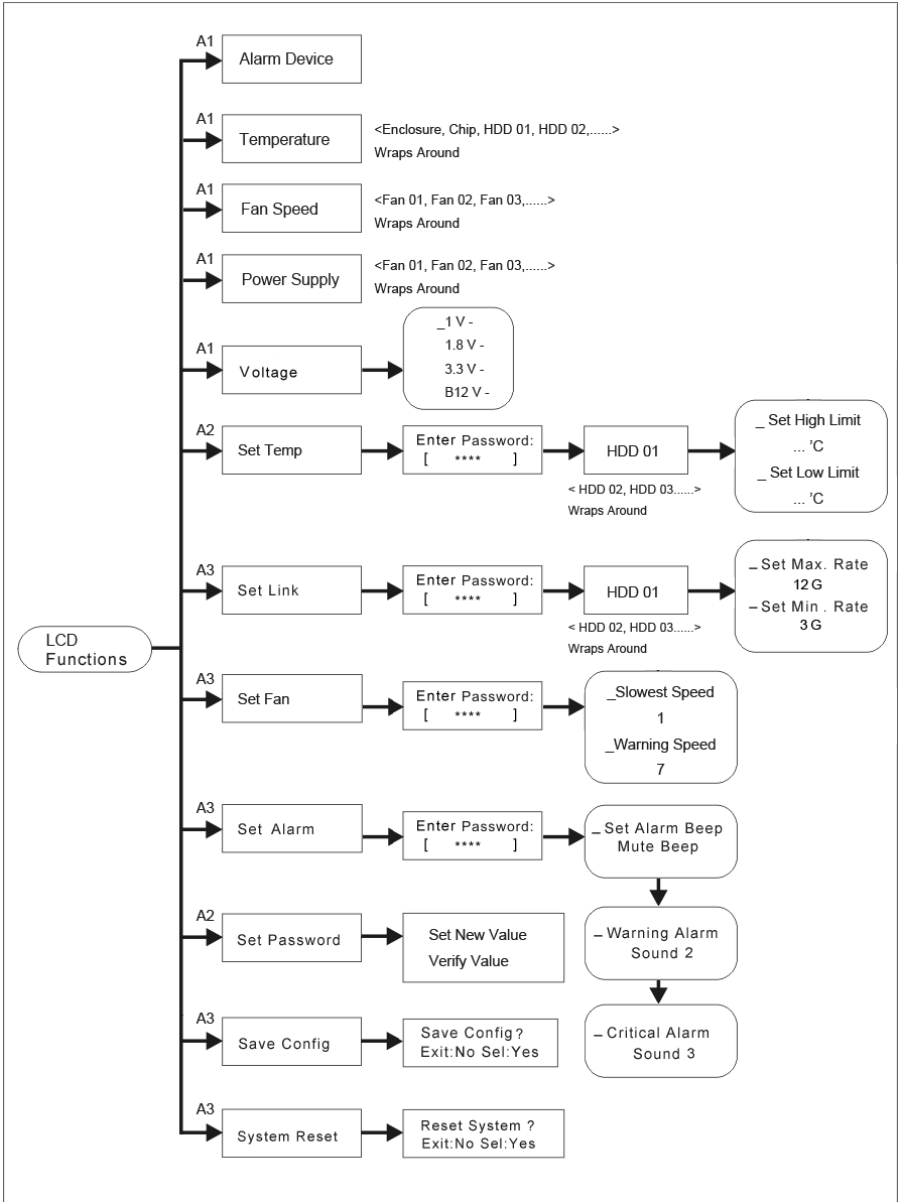


Figure 3.2-1 LCD Hierarchical Menu



# LCD Configuration Manager

---

- **Alarm Device**

Show which device that fail to work.

- **Temperature**

Show devices' temperature.

- **Fan Speed**

Show the enclosure's fan speed in RPM.

- **Power Supply**

Show the status of enclosure's power supply.

- **Voltage**

Show enclosure chip voltage in status data, represent in V.

- **Set TEMP**

Set "Enclosure", "Chip" and "HDD" devices' high limit/low limit warning temperature. Each has sub-items are "Set High Limit" and "Set Low Limit".

- **Set Link**

Set HDD devices maximum/minimum link speed rate. The value could be 12G, 6G or 3G each of HDD devices link speed will have the sub-items are shown as below:

\_Set Max. Rate  
12G  
\_Set Min. Rate  
3.0G

- **Set Fan**

Set all fans speed rate. The value code could be 1 to 7. When over temperature occurred all fans to warning speed. The sub-items are shown as below:

\_Slowest Speed  
1  
\_Warning Speed  
7

# LCD Configuration Manager

---

- **Set Alarm**

Set enclosure buzzer warning/critical error beep style or mute the current beep. The value could be "Sound 1", "Sound 2", "Sound 3", "Sound 4" and "Sound none". Sound 1 to 4 means different frequency sound. "Sound none" means disable the sound beep. The sub-items are shown below:

\_Set Alarm Beep  
Mute beep

\_Warning Alarm  
Sound 2

\_Critical Alarm  
Sound 3

- **Set Password**

Change the enclosure LCD/UART CLI password. The sub-item is "Set New Value" and "Verify Value".

- **Save Config**

Save all the updated option value into non-volatile memory area.

- **System Reset**

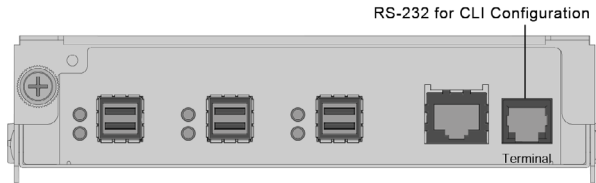
Reboot the system.

## 4. CLI Features

This Command Line Interface (CLI) is provided for you to configure the 12, 16 or 24 bays SAS JBOD enclosure functions. The CLI is useful in environments where a graphical user interface (GUI) is not available.

### • Locations of RS-232C Port

The SAS JBOD enclosure uses the RJ11 port as the serial port interface. Please use the cable included on the shipping box to configure the expander controller.



### • Establishing the Connection for RS-232 Port

The CLI function can be done by using an ANSI/VT-100 compatible terminal emulation program. You must complete the appropriate installation procedure before proceeding with the CLI function. Whichever terminal emulation program is used must support the 1K XMODEM file transfer protocol.

The serial port on the SAS expander controller's back panel can be used in VT100 mode. The provided interface cable converts the RS-232 signal of the RJ11 connector on the SAS expander controller into a 9-pin D-Sub male connector. The firmware-based terminal SAS expander management interface can access the expander through this RS-232 port. You can attach a VT-100 compatible terminal or a PC running a VT-100 terminal emulation program to the serial port for accessing the text-based setup menu.

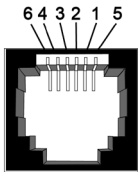
# CLI FEATURES

## 4.1 Expander RS-232C Port Pin Assignment

To ensure proper communications between the SAS expander controller and the VT-100 Terminal Emulation, Please configure the VT100 terminal emulation settings to the values shown below:

Terminal Requirement	
Connection	Null-modem Cable
Baud Rate	115,200
Data bits	8
Stop	1
Flow Control	None

The RJ11 connector pin assignments are defined as below.

RS-232C Port Configuration (RJ11 Connector)				
Pin	Descriptions	Pin	Descriptions	
1	RTS (RS232)	4	GND	
2	RXD (RS232)	5	GND	
3	TXD (RS232)	6	GND	

## 4.2 Start-up VT100 Screen

By connecting a VT100 compatible terminal, or a PC operating in an equivalent terminal emulation mode, all CLI administration functions can be exercised from the VT100 terminal.

There are a wide variety of Terminal Emulation packages, but for the most part they should be very similar. The following setup procedure is an example setup VT100 Terminal in Windows XP system using Hyper Terminal use Version 3.0 or higher.

**Step 1.** Open the "Taskbar Start"/"Programs"/"Accessories"/"Communications"/"Hyper Terminal". (Hyper Terminal requires version 3.0 or higher) (Figure 3.2-1)

**Step 2.** Open "HYPERTRM.EXE". (Figure 3.2-2)

# CLI FEATURES

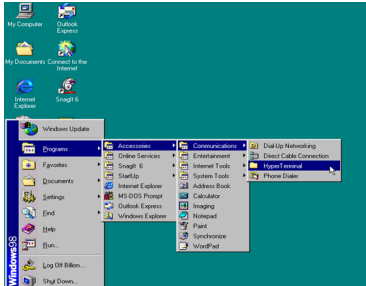


Figure 4.2-1

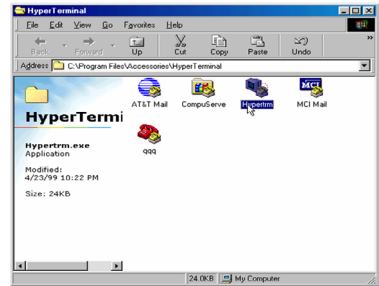


Figure 4.2-2

**Step 3.** Enter a name you prefer and then click "OK". (Figure 3.2-3)

**Step 4.** Select an appropriate connecting port and then click "OK". (Figure 3.2-4)

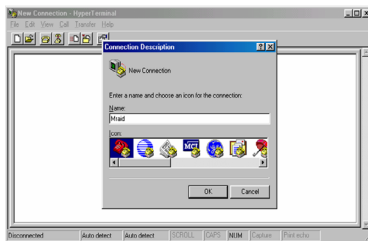


Figure 4.2-3

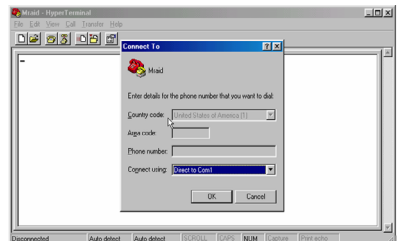


Figure 4.2-4

**Step 5.** Configure the port parameter settings and then click "OK".  
Bits per second: 115200  
Data bits: 8  
Parity: None  
Stop bits: 1  
Flow control: None (Figure 3.2-5)

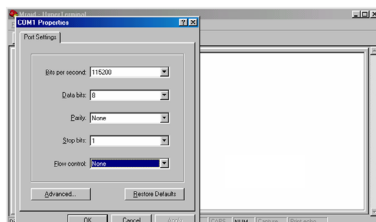


Figure 4.2-5

# CLI FEATURES

**Step 6.** Open the file menu and select "Properties". (Figure 3.2-6)

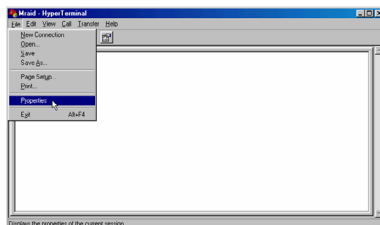


Figure 4.2-6

**Step 7.** Configure the "Connect To" setting. (Figure 3.2-7)

**Step 8.** Configure the "Settings" items and then click "OK".  
Function, arrow and ctrl keys act as: Terminal keys  
Backspace key sends: Ctrl+H  
Emulation: VT100  
Telnet terminal: VT100  
Back scroll buffer lines: 500 (Figure 3.2-8)

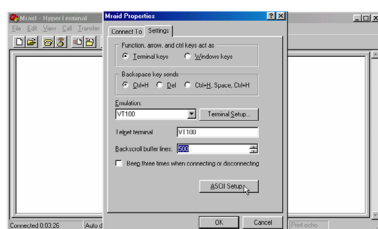


Figure 3.2-7

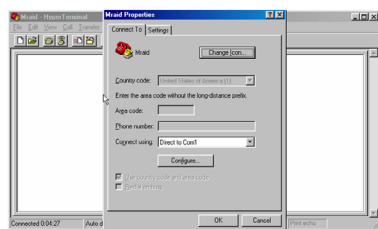


Figure 3.2-8

Now, The VT100 is ready to be used. After you finished the VT100 Terminal setup, you may press " X " key (in your Terminal) to link the expander CLI setup screen and Terminal together.

Press "X" key to display the expander CLI utility screen on your VT100 Terminal. The CLI prompt is displayed in a DOS console window. Press "H" to display the sub-manual.

## 4.3 Command

This section provides detailed information about the 12-bays 12Gb/s SAS JBOD enclosure CLI function. All the commands please type in lower case. About CLI function for the 16 or 24-bays JBOD enclosure is similar as those contents.

### ● Help Command

This command provides an on-line table of contents, providing brief descriptions of the help sub-commands. You can use the <CLI> help to get detail information about the CLI commands summary.

#### **Syntax**

CLI>help[Enter]

Example:

CLI>help

pass	- Set Password
lo	- Logout CLI Shell
link	- Link Rate Control
edfb	- Bandwidth Optimizer
th	- Temperature Control
group	- Set the PHY Group
sys	- System Information
bu	- Alarm Control
fan	- Fan Speed Control
spin	- Drive SpinUp Control
st	- Store System Setting
lsd	- List Devices Status
showlogs	- Show the Current Logs
fld	- File Download
counters reset (optional)	- Display/Reset all phy counters
sasaddr	- Display expander SAS address

### ● PASS Command

The pass command allows user to set or clear the expander box password protection feature. Once the password has been set,

# CLI FEATURES

---

the user can only monitor and access the expander box setting by providing the correct password. The password can accept max. 8 chars and min. 4 chars. The manufacture default password is "0000".

## **Syntax**

CLI>pass

Example:

CLI>pass

Old Password:\*\*\*\*

New Password:\*\*\*\*

Verify New Password:\*\*\*\*

Password Changed But Not Save Permanently!

Note, use CLI command "st" to keep permanently.

## ● **LO Command**

To exit the selected expander box CLI shell, use the lo command.

## **Syntax**

CLI>lo

Example:

CLI>lo

Password:

## ● **LINK Command**

The link command allows you to set the operate device link rate that has been connected on expander. Typical parameters include: Max and Min disk speed connected the SAS expander box and High and Low external cable link speed connected the SAS expander box.

1. Set external cable link speed rate

## **Syntax**

CLI>link c[0|1|2|3] High Low]

Index: c[0|1|2|3] External Cable Index

The cable c0, c1, or c2 is view from right to left or start from



top to bottom.

High-Rate, Low-Rate: [11|10|9] or [12g|6g|3g]

PS. Pls. Save Config. & Reboot To Take Effect

CLI>st

Example:

CLI> link c0,c1 6g 3g ;;;; set cable0 and cable1 link speed range [ 6G(10), 3G(9)]

CLI>st

CLI>

Reboot to take effect.

## 2. Set all slots with same link speed rate

### Syntax

CLI>link [Index(D)| 255] High-Rate(D) Low-Rate(D)

Index: Slot Index

High-Rate(D), Low-Rate(D): [11|10|9] or [12g|6g|3g]

PS. Pls. Save Config. & Reboot To Take Effect

CLI>st

Example:

CLI>link 255 12g 3g ;;;; set all slots with same link speed rate, max=11(12G), min=9(3G)

CLI>st

CLI>

Reboot to take effect.

## 3. Set internal slot link speed rate

### Syntax

CLI>link [Index Max Min]

Index: Slot Index

High-Rate, Low-Rate: [11|10|9] or [12g|6g|3g]

PS. Pls. Save Config. & Reboot To Take Effect

CLI>st

Example:

CLI>link

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ArrayDevice Element (0x17):

=====							
NAME	PHY	ORG	NLR	MAX	MIN	TYPE	ADDRESS
SLOT 01	13	6G	6G	12G	3G	SATA	5001B469-189AE00D
SLOT 02	12	6G	6G	12G	3G	SAS	5011B469-189AE00C
SLOT 03	14	6G	6G	12G	3G	SATA	5011B469-189AE00E
SLOT 04	15	6G	6G	12G	3G	SATA	5011B469-189AE00F
SLOT 05	9	6G	6G	12G	3G	SATA	5011B469-189AE009
SLOT 06	8	6G	<b>6G</b>	<b>12G</b>	3G	SATA	5011B469-189AE008
SLOT 07	10	6G	6G	12G	3G	SATA	5011B469-189AE00A
SLOT 08	11	6G	6G	12G	3G	SATA	5011B469-189AE00B
SLOT 09	5	6G	6G	12G	3G	SATA	5011B469-189AE005
SLOT 10	4	6G	6G	12G	3G	SATA	5011B469-189AE004
SLOT 11	6	3G	3G	12G	3G	SAS	500000E0-168F8E92
SLOT 12	7	3G	3G	12G	3G	SAS	500000E0-168F8E99

//Set the slot 0x6 max. speed to 3G

CLI>link 6 3g 3g

CLI>st

CLI>

Reboot to take effect.

CLI>link

ArrayDevice Element (0x17):

=====							
NAME	PHY	ORG	NLR	MAX	MIN	TYPE	ADDRESS
SLOT 01	13	6G	6G	12G	3G	SATA	5001B469-189AE00D
SLOT 02	12	6G	6G	12G	3G	SAS	5011B469-189AE00C
SLOT 03	14	6G	6G	12G	3G	SATA	5011B469-189AE00E
SLOT 04	15	6G	6G	12G	3G	SATA	5011B469-189AE00F
SLOT 05	9	6G	6G	12G	3G	SATA	5011B469-189AE009
SLOT 06	8	<b>3G</b>	<b>3G<sup>1</sup></b>	<b>3G</b>	3G	SATA	5011B469-189AE008
SLOT 07	10	6G	6G	12G	3G	SATA	5011B469-189AE00A

SLOT 08	11	6G	6G	12G	3G	SATA	5011B469-189AE00B
SLOT 09	5	6G	6G	12G	3G	SATA	5011B469-189AE005
SLOT 10	4	6G	6G	12G	3G	SATA	5011B469-189AE004
SLOT 11	6	3G	3G	12G	3G	SAS	500000E0-168F8E92
SLOT 12	7	3G	3G	12G	3G	SAS	500000E0-168F8E99

NOTE: 1. If EDFB is enabled, it will keep NLR=12G.

## ● EDFB Command (Same as "DHPM")

From FW 1.26 version, EDFB default only supports for SATA drive (from Chip vendor suggestion). Once user update this FW, the EDFB "on" mode is translated to EDFB "sata" mode. That means 3G/6G SAS drive won't support EDFB. Use for 3G/6G SATA drive speed up as 12G drive performance. DataBolt™ Bandwidth Optimizer is designed to help facilitate the industry transition to 12Gb/s SAS-enabled systems by allowing users to take advantage of 12Gb/s speeds while utilizing existing 6Gb/s drives or back-planes.

### Syntax

CLI>edfb [sata | off] [i,j,..]

on - turn on all drive slot as 12G performance mode.

off - turn off all drive slot 12G performance mode.

i,j,.. - turn on/off drive slot i,j, ...12G performance mode.

Example:

CLI>help edfb

Drive High Performance                      edfb { [sata | off] [i,j,..] }

CLI>link

ArrayDevice Element (0x17):

=====							
NAME	PHY	ORG	NLR	MAX	MIN	TYPE	ADDRESS
SLOT 01	13	6G	6G	12G	3G	SATA	5001B469-189AE00D
SLOT 02	12	6G	<b>6G</b>	12G	3G	SATA	5011B469-189AE00C
SLOT 03	14	6G	6G	12G	3G	SATA	5011B469-189AE00E
SLOT 04	15	6G	6G	12G	3G	SATA	5011B469-189AE00F

# CLI FEATURES

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SLOT 05	9	6G	6G	12G	3G	SATA	5011B469-189AE009
SLOT 06	8	6G	6G	12G	3G	SATA	5011B469-189AE008
SLOT 07	10	6G	6G	12G	3G	SATA	5011B469-189AE00A
SLOT 08	11	6G	6G	12G	3G	SATA	5011B469-189AE00B
SLOT 09	5	6G	6G	12G	3G	SATA	5011B469-189AE005
SLOT 10	4	6G	6G	12G	3G	SATA	5011B469-189AE004
SLOT 11	6	3G	3G	12G	3G	SATA	500000E0-168F8E92
SLOT 12	7	3G	<b>3G</b>	12G	3G	SATA	500000E0-168F8E99

CLI>edfb sata 2,12 ;;;; set drive slot 2,12 on

CLI>st

Reset or PowerCycle

CLI>link

ArrayDevice Element (0x17):

=====							
NAME	PHY	ORG	NLR	MAX	MIN	TYPE	ADDRESS
SLOT 01	13	6G	6G	12G	3G	SATA	5001B469-189AE00D
SLOT 02	12	6G	<b>12G</b>	12G	3G	SATA	5011B469-189AE00C
SLOT 03	14	6G	6G	12G	3G	SATA	5011B469-189AE00E
SLOT 04	15	6G	6G	12G	3G	SATA	5011B469-189AE00F
SLOT 05	9	6G	6G	12G	3G	SATA	5011B469-189AE009
SLOT 06	8	6G	6G	12G	3G	SATA	5011B469-189AE008
SLOT 07	10	6G	6G	12G	3G	SATA	5011B469-189AE00A
SLOT 08	11	6G	6G	12G	3G	SATA	5011B469-189AE00B
SLOT 09	5	6G	6G	12G	3G	SATA	5011B469-189AE005
SLOT 10	4	6G	6G	12G	3G	SATA	5011B469-189AE004
SLOT 11	6	3G	3G	12G	3G	SATA	500000E0-168F8E92
SLOT 12	7	3G	<b>12G</b>	12G	3G	SATA	500000E0-168F8E99

CLI>edfb sata ;;;; set all drives on

CLI>st

Reset or PowerCycle

.....

## • TH Command

The th command allows you to set the operate device temperature warning limit. Typical parameters include: High-Warn and Low-Warn are warning temperature in Celsius.

### Syntax

CLI>th Index High-Warn Low-Warn

Example:

CLI>th

Temperature Element (0x04):

NAME	ID	CT(°C)	HTW	LTW	OTWarn
ENC. Temp	01	30	60	5	No
Chip Temp	02	64	85	5	No
Slot01 Temp	03	31	60	5	No
Slot02 Temp	04	32	60	5	No
Slot03 Temp	05	30	60	5	No
Slot04 Temp	06	31	60	5	No
Slot05 Temp	07	36	60	5	No
Slot06 Temp	08	32	60	5	No
Slot07 Temp	09	32	60	5	No
Slot08 Temp	10	35	60	5	No
Slot09 Temp	11	34	60	5	No
Slot10 Temp	12	32	60	5	No
Slot11 Temp	13	32	60	5	No
Slot12 Temp	14	32	60	5	No

CLI>th 2 79 0

Temperature Element (0x04):

NAME	ID	CT(°C)	HTW	LTW	OTWarn
ENC. Temp	01	30	60	5	No

# CLI FEATURES

---

Chip Temp	02	64	79	0	No
Slot01 Temp	03	31	60	5	No
Slot02 Temp	04	32	60	5	No
Slot03 Temp	05	30	60	5	No
Slot04 Temp	06	31	60	5	No
Slot05 Temp	07	36	60	5	No
Slot06 Temp	08	32	60	5	No
Slot07 Temp	09	32	60	5	No
Slot08 Temp	10	35	60	5	No
Slot09 Temp	11	34	60	5	No
Slot10 Temp	12	32	60	5	No
Slot11 Temp	13	32	60	5	No
Slot12 Temp	14	33	60	5	No

CLI>st

CLI>

Reboot to take effect.

CLI>th

Temperature Element (0x04):

=====

NAME	ID	CT(°C)	HTW	LTW	OTWarn
ENC. Temp	01	30	60	5	No
Chip Temp	02	64	79	0	No
Slot01 Temp	03	31	60	5	No
Slot02 Temp	04	32	60	5	No
Slot03 Temp	05	30	60	5	No
Slot04 Temp	06	31	60	5	No
Slot05 Temp	07	36	60	5	No
Slot06 Temp	08	32	60	5	No
Slot07 Temp	09	32	60	5	No
Slot08 Temp	10	35	60	5	No
Slot09 Temp	11	34	60	5	No
Slot10 Temp	12	32	60	5	No

Slot11 Temp	13	32	60	5	No
Slot12 Temp	14	33	60	5	No

## ● GROUP Command

The group command is used to associate the external port with the devices/phys as one zone group. The three external cable ports and all devices/phys slots will default associate with one zone group.

### Syntax

```
gr {dev GroupNo[1..] {ci, cj, ck,..} Start-Index(D) End-Index(D)
}
gr {off | [t10 off] }
dev          : use drive slot index
GroupNo      : groupno start from 1, max 8 groups ci, cj, ck,..:
external cable connector. i, j, k,.. is the index which range from 0
to 3. According to view from connector side, index start from
right to left or top to bottom. The cable c0, c1, or c2 is view
from right to left or start from top to bottom.
Start-Index  : Start slot index of zone range, [1.. max drive]
End-Index    : End slot index of zone range, [1.. max drive]
off          : clear the zone group setting.
t10 off      : turn T10 mode off.
```

Example:

```
CLI>gr
Current PHY Group Mode: T10
Group-1: C0, C1, C2, Slot: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12,
13, 14, 15, 16
Value: 0x00000000FFFFFFFF
```

```
//Set the cable0 and slot 1 to slot 6 as group 1
CLI>gr dev 1 c0 1 6
```

```
New PHY Group Mode: T10
Group-1: C0, Slot: 1, 2, 3, 4, 5, 6
Value: 0x000000000000FFC00
Current PHY Group Mode: T10
Group-1: C0, C1, C2 Slot: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13,
14, 15, 16
```

# CLI FEATURES

---

Value: 0x00000000FFFFFFFF

//Set the cable1 and cable2 and slot 7 to slot 16 as group 2  
CLI>gr dev 2 c1,c2 7 16

New PHY Group Mode: T10

Group-1: C0, Slot: 1, 2, 3, 4, 5, 6

Value: 0x000000000000FFC00

Group-2: C1, C2, Slot: 7, 8, 9, 10, 11, 12, 13, 14, 15, 16

Value: 0x0000000000FF003FF

Current PHY Group Mode: T10

Group-1: C0, C1, C2 Slot: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16

Value: 0x00000000FFFFFFFF

CLI>gr t10 off

New PHY Group Mode:

Group-1: C0, Slot: 1, 2, 3, 4, 5, 6

Value: 0x000000000000FFC00

Group-2: C1, C2, Slot: 7, 8, 9, 10, 11, 12, 13, 14, 15, 16

Value: 0x0000000000FF003FF

Current PHY Group Mode: T10

Group-1: C0, C1, C2 Slot: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16

Value: 0x00000000FFFFFFFF

CLI>st

Power Cycle to reboot

CLI>gr

Current PHY Group Mode:

Group-1: C0, Slot: 1, 2, 3, 4, 5, 6

Value: 0x000000000000FFC00

Group-2: C1, C2, Slot: 7, 8, 9, 10, 11, 12, 13, 14, 15, 16

Value: 0x0000000000FF003FF



```
//Clear the Zone group Setting  
CLI>gr off
```

```
New PHY Group Mode: T10  
Group-1: C0, C1, C2 Slot: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13,  
14, 15, 16  
Value: 0x00000000FFFFFFFF
```

```
Current PHY Group Mode: T10  
Group-1: C0, Slot: 1, 2, 3, 4, 5, 6  
Value: 0x000000000000FFC00  
Group-2: C1, C2, Slot: 7, 8, 9, 10, 11, 12, 13, 14, 15, 16  
Value: 0x0000000000FF003FF
```

## ● SYS Command

The sys command is used to view the expander's information. Typical information includes: vendor, model name, serial/unit number, expander port number, product revision, chip name/chip revision, customer code, manufacture data revision and work time.

### Syntax

```
CLI>sys
```

Example:

```
CLI>sys
```

```
=====
```

Hardware Revision Information:-

```
=====
```

Vendor ID	: Areca Technology Co Ltd. Taiwan, R.O.C
Model ID	: ARC-8018
Serial No.	: 00000000000000000
Unit Serial No.	:
Expander SAS Address	: 0x5001B469189AE03F
Product Revision	: 0
Expander Chip ID	: 0x0233 (Ports : 36)

---

# CLI FEATURES

---

Expander Chip Revision : C0  
Customer Code : 0x35 (R01)  
Manufacturer Data Revision : 0x01 12/12/13  
Working Time : Day00000-00:00:06  
Dual Mode : Single

=====  
Firmware Revision Information:-  
=====

Boot Image:

Revision: 100.BD.00.0A 12/05/13  
Firmware Family: 0 OemFamily: 0  
Fast Boot: Yes Image Address: 0x10000000

Firmware Copy 1:

Revision: 100.BD.01.0A 01/06/14  
Firmware Family: 0 OemFamily: 0  
Fast Boot: Yes Image Address: 0x10100000

Firmware Copy 2: [Active]

Revision: 100.BD.01.0A 01/06/14  
Firmware Family: 0 OemFamily: 0  
Fast Boot: Yes Image Address: 0x10200000

HAL Revision: 0.1.0.0 SES Revision: 0.1.0.0 SCE Revision:  
0.1.0.0

## ● BU Command

The BU command allows you to control the buzzer attributes that have been controlled by SAS expander H/W. There are four sound levels defined by the expander H/W.

The default warning is sound level 2 and critical: sound level 3.

### Syntax

CLI>BU [Warning Critical] [MUTE]

Example:

CLI>BU

Buzzer Attribute:

Warning Beep: Sound 2

Critical Beep: Sound 3

CLI>BU 0x1 0x3

CLI>BU

Buzzer Attribute:

Warning Beep: Sound 1

Critical Beep: Sound 3

CLI>

When expander alarm with buzzer, you can temporarily mute it with the following command. The buzzer still can be activated by the next different event.

CLI>BU MUTE

When expander alarm with buzzer, you can disable it completely by command "bu 0 0". If you would like to enable beeper, the command for default settings will be "bu 2 3".

## ● FAN Command

The fan command allows you to set the operate fan speed. Typical parameters include: LowestSpeed and WarningSpeed are fan speed in speed code from level 1 to 7.

The LowestSpeed is the speed code that fan operate in normal state, and the WarningSpeed is the speed code that fan operate in warning state; like as detect a device in over-temperature.

### **Syntax**

CLI> fan LowestSpeed WarningSpeed

Example:

CLI>fan

# CLI FEATURES

---

Cooling Element (0x03):

=====

	SPEED		
NAME	CODE	RPM	STATUS
Fan 01	2	3690	OK
Fan 02	2	4090	OK
Fan 03	2	3650	OK
Fan 04	2	4050	OK

Current FAN Speed Attribute:

Lowest SpeedCode: 2

Warning SpeedCode: 5

CLI>fan 3 7

New FAN Speed Attribute:

Lowest SpeedCode: 3

Warning SpeedCode: 7

Current FAN Speed Attribute:

Lowest SpeedCode: 2

Warning SpeedCode: 5

CLI>st

CLI>

Reboot to take effect.

CLI>fan

Cooling Element (0x03):

=====

	SPEED		
NAME	CODE	RPM	STATUS
Fan 01	3	4140	OK
Fan 02	3	4630	OK
Fan 03	3	4140	OK
Fan 04	3	4490	OK

Current FAN Speed Attribute:

Lowest SpeedCode: 3

Warning SpeedCode: 7

Fan internal command for different fan speed type:

fan -t [high | normal | low | vlow]

high : 6000 - 10000 rpm

normal : 1800 - 7000 rpm

low : 1000 - 2000 rpm

vlow : below 1000 rpm

The above is a rough value, user can set different to fit the fan speed type.

Default is normal.

## ● SPIN Command

The spin command defines the mode of staggering SATA drive spin-up function connected on the expander box. This command gives expander box the ability to spin up the disk drives sequentially or in groups, allowing the drives to come ready at the optimum time without straining the system power supply. Staggering drive spin-up in a multiple drive environment also avoids the extra cost of a power supply designed to meet short-term startup power demand as well as:

### Syntax

CLI>spin [Delay(D)][ms] Num(D)]

Expander issues the spin up the drives by [Num] drives with [Delay] ms.

Example:

CLI>spin

Current SpinUp Attribute:

Drive Number: 1

Delay: 1024 ms

CLI>spin 512 3

New SpinUp Attribute:

Drive Number: 3

Delay: 512 ms

Current SpinUp Attribute:

Drive Number: 1

Delay: 1024 ms

# CLI FEATURES

---

## ● ST Command

The st command stores system configurations or factory default configurations in flash. Since all the revised parameter setting is temporarily stored in the working RAM, the ST command saves those parameters permanently in flash ROM.

1. Store temporarily configurations in flash

### Syntax

CLI>st

Example:

CLI>st

CLI>

2. Store factory default configurations in flash

### Syntax

CLI>st [default]

Example:

CLI>st default

;;;;; restore the setting to default

CLI>

## ● LSD Command

The lsd command is use for show the element devices status in the expander controller. With parameter, this command only show the seletct device status.

### Syntax

CLI>lsd [ hdd | temp | volt | pwr | con | ..]

Show SES elements information:

Example:

CLI>lsd

ArrayDevice Element (0x17):

=====

NAME	PHY	ORG	NLR	MAX	MIN	TYPE	ADDRESS
------	-----	-----	-----	-----	-----	------	---------

# CLI FEATURES

SLOT 01	13	6G	6G	12G	3G	SATA	5001B469-189AE00D
SLOT 02	12	6G	<b>12G</b>	12G	3G	SAS	5011B469-189AE00C
SLOT 03	14	6G	6G	12G	3G	SATA	5011B469-189AE00E
SLOT 04	15	6G	6G	12G	3G	SATA	5011B469-189AE00F
SLOT 05	9	6G	6G	12G	3G	SATA	5011B469-189AE009
SLOT 06	8	6G	6G	12G	3G	SATA	5011B469-189AE008
SLOT 07	10	6G	6G	12G	3G	SATA	5011B469-189AE00A
SLOT 08	11	6G	6G	12G	3G	SATA	5011B469-189AE00B
SLOT 09	5	6G	6G	12G	3G	SATA	5011B469-189AE005
SLOT 10	4	6G	6G	12G	3G	SATA	5011B469-189AE004
SLOT 11	6	3G	3G	12G	3G	SAS	500000E0-168F8E92
SLOT 12	7	3G	<b>12G</b>	12G	3G	SAS	500000E0-168F8E99

Connector Element (0x19):

=====						
NAME	PHY	NLR	TYPE	ROUTE	CONNECTED-ADDRESS	
Connector00	0		05			
Connector00	1		05			
Connector00	2		05			
Connector00	3		05			
Connector01	4	12G	3F	S	50004D9F-74992000	
Connector01	5	12G	3F	S	50004D9F-74992000	
Connector01	6	12G	3F	S	50004D9F-74992000	
Connector01	7	12G	3F	S	50004D9F-74992000	
Connector02	8	12G	3F	S	50004D9F-74992000	
Connector02	9	12G	3F	S	50004D9F-74992000	
Connector02	10	12G	3F	S	50004D9F-74992000	
Connector02	11	12G	3F	S	50004D9F-74992000	

Cooling Element (0x03):

=====			
SPEED			
NAME	CODE	RPM	STATUS
Fan 01	5	2100	OK
Fan 02	5	2200	OK
Fan 03	Not-Installed		
Fan 04	Not-Installed		

# CLI FEATURES

---

Temperature Element (0x04):

=====					
NAME	ID	CT(°C)	HTW	LTW	OTWarn
ENC. Temp	01	32	60	5	No
Chip Temp	02	42	85	0	No

Voltage Element (0x12):

=====				
NAME	VOLT(V)	OVLMT	UVLMT	STATUS
1V	0.99	1.07	0.94	None
5V	4.96	5.32	4.63	None

PowerSupply Element (0x02):

=====	
NAME	STATUS
PowerSupply01	OK
PowerSupply02	OK

AudibleAlarm Element (0x06):

=====		
NAME	STATUS	ALMSTATE
Audible-Alarm	Normal	0

CLI>

## ● SHOWLOGS Command

The showlogs command allows you to display system event notifications that have been generated event by the SAS expander box.

### Syntax

CLI>showlogs [DisplayMode(hex, detail, default)]

Example:

CLI>showlogs

00000000-00000000:PLATFORM:Firmware initialization started

Day000000-00:00:00 ENCLOSURE-Fan 01 Failed



## ● FDL Command

The box has added the expander firmware update through the CLI on the external RS-232 port. Before you process the firmware update, there are two block regions that you can update expander microcode on SAS expander box.

1. CODE region - for FW file : sas3xfwYYMMDD.fw
2. MFGB region - for Data file : mfg12gYYMMDD.dat

To update the expander controller firmware, follow the procedure below:

**Syntax:** all the commands please type in lower case  
CLI>fdl { code | mfgb }

Then use XModem/(Checksum) protocol transmit file to update ROM Region. The following procedures is used to update firmware through the RS-232:

1. Open any UART communication tools like HyperTerminal(115200,n,8,1).
2. Press any key on HyperTerminal window, the window will show "CLI>" prompt.
3. Type help will show help screen.
4. One command to update firmware. Step as follow.
5. Issue download & update command under "CLI>".  
CLI>fdl code  
Please Use XModem Protocol for File Transmission.  
Use Q or q to quit Download before starting XModem.  
<-----expander prompt for ready to receive file to update.
6. Then under HyperTerminal program, use the pull down menu item transfer "Send" -> send files when dialog box prompt, choose "Xmodem" and the file in the directory then press "send".
  - (a). If the expander receive the file under the timeout limit (60s), the process starts.
  - (b). If time out, please retry the step 5 again.

# CLI FEATURES

---

7. You can also cancel the program step by type 'q'.
8. If transfer OK, the transferred data is updated. Cold-start expander (Power cycle again) to take effect.

Example:

Update procedure, use Xmodem to transfer, refer to "fdl" command for detail operation.

```
CLI>fdl { code | mfgb }
```

Use HyperTerminal or TeraTerm utility with Xmodem mode to transfer and update files.

If transfer OK, the transferred data is updated. Cold-start expander (Power cycle again) to take effect.

The following firmware and data are available in the following filename format.

1. FW file (CODE) : sas3xfwYYMMDD.fw
2. Data file (MFGB) : mfg12gYYMMDD.dat

Update SAS expander firmware:

```
CLI>fdl code
```

Use HyperTerminal or TeraTerm utility with Xmodem mode to transfer sas3xfwYYMMDD.fw.

If transfer OK, the transferred data is updated. Cold-start expander (Power cycle again) to take effect.

Update SAS expander data file:

```
CLI>fdl mfgb
```

Use HyperTerminal or TeraTerm utility with Xmodem mode to transfer mfg12gYYMMDD.dat.

If transfer OK, the transferred data is updated. Cold-start expander (Power cycle again) to take effect.

## ● Counters Reset Command

Display/Reset all phy counters    counters reset (optional).

```
CLI>counters reset
```

Phy counters successfully reset.

# CLI FEATURES

---

CLI>counters

Phy Layer Error Counters=====

== InvWrdrCnt ==DispErrCnt ==LossSyncCnt ==RstSeqFailCnt=

Phy 00	0x00000000	0x00000000	0x00000000	0x00000000
Phy 01	0x00000000	0x00000000	0x00000000	0x00000000
Phy 02	0x00000000	0x00000000	0x00000000	0x00000000
Phy 03	0x00000000	0x00000000	0x00000000	0x00000000
Phy 04	0x00000000	0x00000000	0x00000000	0x00000000
Phy 05	0x00000000	0x00000000	0x00000000	0x00000000
Phy 06	0x00000000	0x00000000	0x00000000	0x00000000
Phy 07	0x00000000	0x00000000	0x00000000	0x00000000
Phy 08	0x00000000	0x00000000	0x00000000	0x00000000
Phy 09	0x00000000	0x00000000	0x00000000	0x00000000
Phy 10	0x00000000	0x00000000	0x00000000	0x00000000
Phy 11	0x00000000	0x00000000	0x00000000	0x00000000
Phy 12	0x00000000	0x00000000	0x00000000	0x00000000
Phy 13	0x00000000	0x00000000	0x00000000	0x00000000
Phy 14	0x00000000	0x00000000	0x00000000	0x00000000
Phy 15	0x00000000	0x00000000	0x00000000	0x00000000
Phy 16	0x00000000	0x00000000	0x00000000	0x00000000
Phy 17	0x00000000	0x00000000	0x00000000	0x00000000
Phy 18	0x00000000	0x00000000	0x00000000	0x00000000
Phy 19	0x00000000	0x00000000	0x00000000	0x00000000
Phy 20	0x00000000	0x00000000	0x00000000	0x00000000
Phy 21	0x00000000	0x00000000	0x00000000	0x00000000
Phy 22	0x00000000	0x00000000	0x00000000	0x00000000
Phy 23	0x00000000	0x00000000	0x00000000	0x00000000
Phy 24	0x00000000	0x00000000	0x00000000	0x00000000
Phy 25	0x00000000	0x00000000	0x00000000	0x00000000
Phy 26	0x00000000	0x00000000	0x00000000	0x00000000
Phy 27	0x00000000	0x00000000	0x00000000	0x00000000

Link Layer Event Counters

Phy Event Counter Not Configured.

Generic Broadcast Counter

Broadcast Counter Not Configured.

Generic Broadcast Counter

Broadcast Counter Not Configured.

# CLI FEATURES

---

## ● Sasaddr Command

CLI>sasaddr

Expander New SAS Address: 0x5001B4690400083F  
Expander Current SAS Address:  
EXP Port SAS Address: 0x5001B4690400083F  
SXP Port SAS Address: 0x5001B4690400083D  
STP Port SAS Address: Disabled

## ● Sub Command

The subtractive command allows you to set the subtractive ports on expander.

### 1. Set external cable link ports

#### **Syntax**

CLI>sub [{c0..c3} | def]

Index: c0..c3 External Cable Index

The cable c0, c1, c2, or c3 is view from right to left or start from top to bottom.

Example:

CLI>sub c0,c1 ;;;; set cable0 and cable1 as subtractive ports

CLI>st

CLI>

Reboot to take effect.

### 2. Set internal slot link ports

#### **Syntax**

CLI>sub [0..47]

Index:0..47 Internal Slot Index

Example:

CLI>sub 8,9,10,11 ;;;; set phy 8/9/10/11 as subtractive ports

CLI>st

CLI>

Reboot to take effect.

## Appendix

### Technical Specifications

#### **Controller Architecture**

- Quad Core ARM V7 1.2 GHz processor
- 2GB on-board DDR3-1200 SDRAM with ECC protection
- Support up to 24 internal 6.0Gbps SATA ports
- LAN with MPIO, MC/S, Trunking and LACP support
- Battery backup module ready (optional)

#### **RAID Features**

- 0, 1, 10(1E), 3, 5, 6, 30, 50, 60, Single Disk or JBOD
- Automatic drive failover and detection and rebuild using multiple Global, Dedicated or Enclosure hot-spare drives
- Multiple RAID 0 and RAID 10(1E) support (RAID 00 and RAID 100)
- Multiple pairs SSD/HDD disk clone function
- SSD automatic monitor clone (AMC) support
- Multiple RAID selection
- Configurable stripe size up to 1024KB
- eSATA host: 8 volumes(with port multiplier), iSCSI host:128 volumes and USB 3.0 host: 8 volumes
- Support for native 4K and 512 byte sector SATA devices
- Support HDD firmware update

#### **Monitors/Notification**

- Environment and drive failure indication through LCD, LED and alarm buzzer
- Keep silent and adequate air flow and cooling by intelligent cooling fan speed control
- SMTP support for email notification
- SNMP support for remote manager

#### **Drive Interface**

- 12/16/24 x 12.0Gbps SAS ports

#### **RAID Management**

- Field-upgradeable firmware in flash ROM via RS-232 and LAN port
- Push Buttons and LCD for setup and status

# APPENDIX

---

- Firmware-embedded manager via RS-232 port
- Firmware-embedded Browser-based RAID manager, SMTP manager, SNMP agent and Telnet function via LAN port
- Support Out-of-Band API with sample and functional code for customer quickly customizing its AP

## **Software Drivers**

- OS Independent

## **Physical/Electrical**

### SAS hard drives

- up to 12/16/24 2.5-inch or 3.5-inch SAS hot-plug hard drives (12 Gb/s) at speeds of 7.2K, 10K or 15K rpm

### SATA hard drives

- up to 12/16/24 2.5-inch or 3.5-inch SATA hot-plug hard drives (6 Gb/s) at speeds of 7.2K or 10K rpm. Connectivity to the JBOD system backplane is provided through an interposer assembly for dual module.

## **Subsystem Controller Modules**

- Controller board 1 module
- Sensors 2 sensor per controller Board

## **Backplane Board**

### Connectors

- 12/16/24 x SAS hard-drive connectors
- 2/3 x power supply AC cord connectors

### Sensors

- 12/16/24 x temperature sensors (one for each slot)

## **Controller Back-Panel Connectors**

SAS connectors (per expander board) - 3 x Min SAS HD SFF-8644

- 1 x SAS "Exp. In" SFF-8644 connector for connection to the host
- 2 x SAS "Exp. Out" SFF-8644 connectors for expansion to an additional JBOD enclosure

Management connector (per controller board)

- 1 x 6-pin UART RJ-11 connector
- 1 x LAN RJ-45 connector

## **LED Indicators**

Hard-drive carrier

- 1 x single-color activity LED status indicator
- 1 x dual-color fault/power LED status indicator

Controller board

- 2 x single-color LED status indicators for each eSATA host port, one for link and one for the activity status
- 2 x single-color LED status indicators per iSCSI host

Fan / Power supply / Controller LED indicator panel

- 1 x dual-color LED status indicators for the status of "working" and "fault" on each fan LED
- 1 x dual-color LED status indicators for the status of "AC\_OK" and "fault" on each power supply LED
- 1 x dual-color LED status indicators for the status of "working" and "fault" on each controller LED

## **Power Supplies**

Dual/Triple hot swap and redundant with PFC, N+1 design

- Wattage 400 W maximum continuous;
- Voltage 100–240 V rated
- Frequency 50–60 Hz
- Amperage (Max) 6.18A (120 VAC), 3.23A (230 VAC)

## **Dimensions**

2U 12 bays 19-inch rackmount chassis (H x W x D)

- Without handles 88.2 x 445 x 448 mm(3.5 x 17.5 x 17.6 in)
- With handles 88.2 x 482 x 484 mm(3.5 x 18.9 x 19.0 in)

3U 16 bays 19-inch rackmount chassis (H x W x D)

- Without handles 132.6 x 445 x 448 mm(5.2 x 17.5 x 17.6 in)
- With handles 132.6 x 482 x 484 mm(5.2 x 18.9 x 19.0 in)

4U 24 bays 19-inch rackmount chassis (H x W x D)

- Without handles 176.4 x 445 x 448 mm(6.9 x 17.5 x 17.6 in)
- With handles 176.4 x 482 x 484 mm(6.9 x 18.9 x 19.0 in)

## **Subsystem Net Weight (Without Drives)**

- 12/16/24 bays 27 kg/31 kg/34 kg

# APPENDIX

---

## **Environmental**

Temperature:

- Operating 0° to 40°C
- Storage -40° to 60°C

Relative humidity:

- Operating 10% to 80% (non-condensing)
- Storage 5% to 95% (non-condensing)