

# **JBOD Enclosure**

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

## **USER Manual**

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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-92xx 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 12Gb/s SAS-to-SAS JBOD enclosures provides a 2U/3U/4U rack-mounted external storage chassis capable of accommodating up to 12/16/24 12Gb/s SAS drives or 6Gb/s SATA drives. The enclosure can support both 3.5-inch disk drives and 2.5-inch disk drives, each one contained in its individual hole on the disk carrier. The dual expander 12/16/24-bay SAS JBOD enclosure provides fault-tolerant links across separate SAS domains, while the single expander 12/16/24-bay SAS JBOD enclosure provides a single, straight-through data path. If your enclosure has two expander modules and you are installing SATA disk drives, an interposer board is required so that both expander modules can access the SATA disk drives.

The 12Gb/s SAS-to-SAS JBOD enclosures incorporate the latest enhancements in SAS along with new LSI DataBolt bandwidth optimizer technology. This 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 and backplanes. Using DataBolt, the SAS-to-SAS JBOD buffers 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.

Each SAS-to-SAS JBOD enclosure connects to the host system through one Min SAS HD SFF-8644 connector (In) and two Min SAS HD SFF-8644 connectors (In/Out and Out) to the next SAS-to-SAS JBOD enclosure. Configuration and environmental information is accessible either via in-band or out-of-band serial port. The enclosure can be daisy-chained with up to seven additional enclosures to provide up to 84 (2U-16)/112 (3U-16)/168 (2U-24)/168 (4U-24 bays) drives per Areca controller host connection. The total drive numbers depend on the RAID controller or the host adapter firmware. Host-based RAID configuration is supported via an external SAS/Fibre/iSCSI to SAS RAID controller, external series SAS RAID and SAS host adapters.

# INTRODUCTION

## 1.2 JBOD Naming Rule

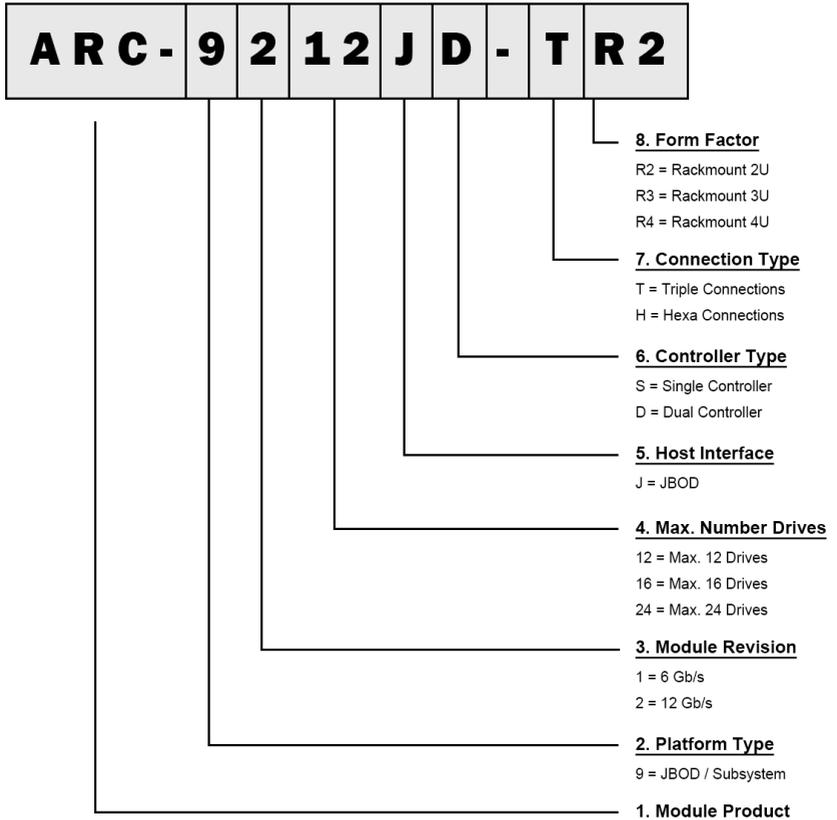


Figure 1-1. JBOD Naming Rule

# INTRODUCTION

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## 1.3 Locations of the Enclosure Component

The main components of the enclosure are shown in the below.

### 1.3.1 Enclosure Front View

- 2U-12 bays SAS JBOD Front View

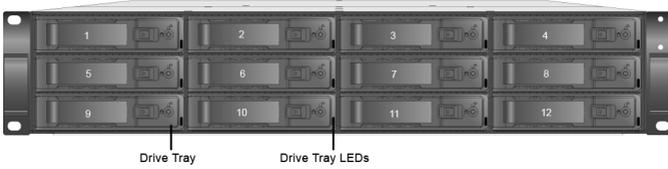


Figure 1-2. 2U-12-bays Front View

- 3U-16 bays SAS JBOD Front View



Figure 1-3. 3U-16-bays Front View

- 2U-24 bays SAS JBOD Front View

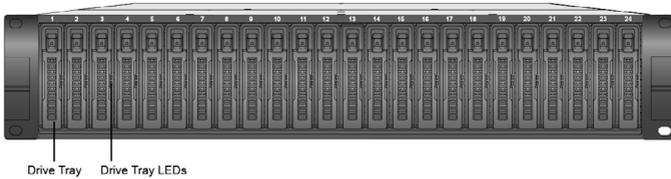


Figure 1-4. 2U-24-bays Front View

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- 4U-24 bays SAS JBOD Front View

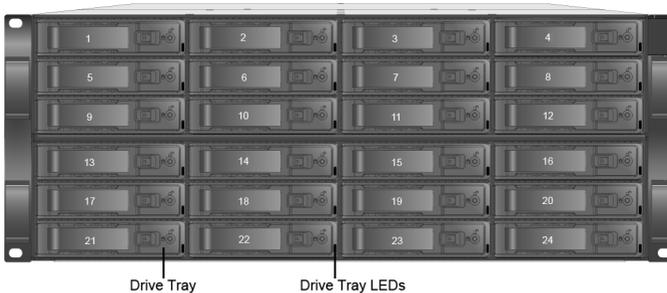


Figure 1-5. 4U-24-bays Front View

- **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 SAS JBOD enclosure disk slots are numbered. Disk slot number is reflected in the RAID manager interface.

- **Drive Tray LED Indicators**

Each drive tray in your enclosure 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

# INTRODUCTION

<p>Green/Red LED (Power/Fault)</p>	<ol style="list-style-type: none"> <li>1. When the fault LED is lit, there is no disk present.</li> <li>2. When the link LED is lit, there is a disk present.</li> </ol>	<ol style="list-style-type: none"> <li>1. When the fault LED is off, the disk is present and status is normal.</li> <li>2. When the fault LED is blinking (2 times/sec.), the disk drive has failed and should be hot-swapped immediately.</li> <li>3. When the activity LED is lit and fault LED is fast blinking (10 times/sec.) there is rebuilding activity on that disk drive.</li> </ol>
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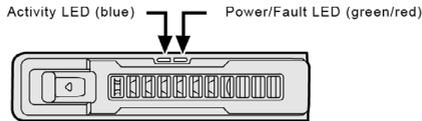


Figure 1-6. 2.5-inch SAS/SATA Drive Tray LED

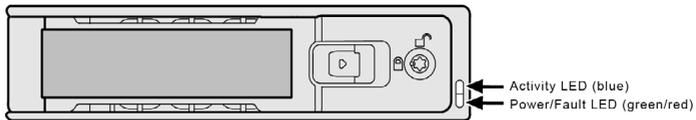


Figure 1-7. 3.5-inch SAS/SATA Drive Tray LED

## 1.3.2 Enclosure Rear View

- 2U-12 bays SAS JBOD Rear View

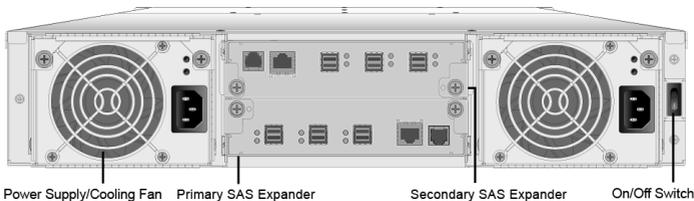


Figure 1-8. 12-bays Rear View

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- 3U-16 bays SAS JBOD Rear View

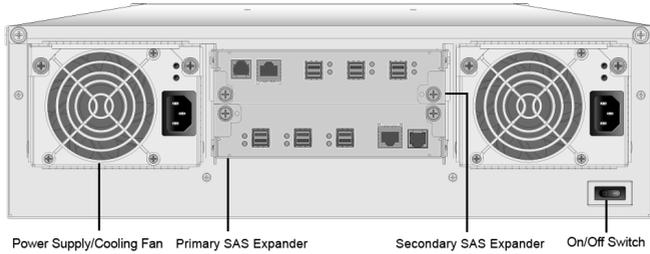


Figure 1-9. 16-bays Rear View

- 2U-24 bays SAS JBOD Rear View

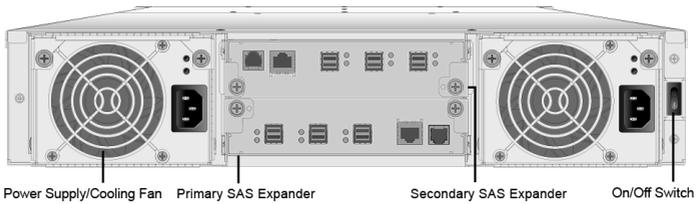


Figure 1-10. 24-bays Rear View

- 4U-24 bays SAS JBOD Rear View

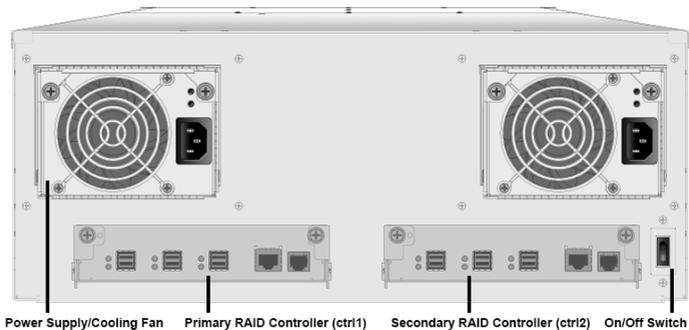


Figure 1-11. 24-bays Rear View

# INTRODUCTION

## 1.4 SAS Expander

Each SAS expander provides data path and enclosure management functions for the enclosure, including:

- Monitoring and controlling enclosure environment elements (temperature, cooling fans, power supplies, and enclosure LEDs)
- Controlling access to the drives
- Communicating enclosure attributes and states to the host server

A rear of SAS expander panel is shown as below:

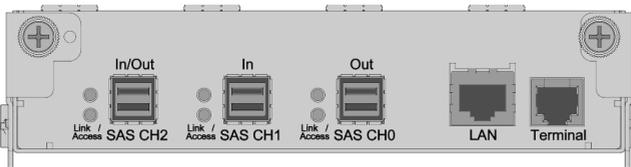


Figure 1-12. Expander I/O Shield

There has one 6-pin UART RJ-11 connector (for CLI manager), one RJ-45 LAN connector (manufacture manager only) and three SAS channel ports. 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 accesses 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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## 1.5 Power Supply/Cooling Fan Modules

The enclosure supports two separate power modules. Each of them contains an integrated power supply and two cooling fans. The LEDs on the JBOD enclosure's power supplies indicate status of the power supply: one for AC\_OK (green) and other FAULT (red). The following figure is shown LEDs on the power supply module.

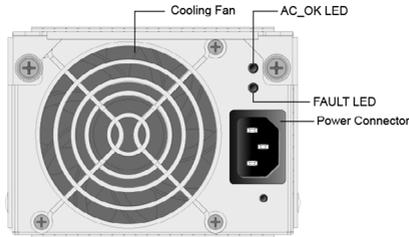


Figure 1-13. Power Supply Front View

The following table describes the power LEDs status.

Power LED Status	Indication
AC_OK (Green LED)	The AC_OK LED indicates that the AC line is present and above the minimum AC input voltage threshold.
FAULT (Red LED)	The FAULT LED is driven by the microprocessor and will indicate that a power supply fault has occurred.

The power supply cooling shall be provided by the internal tandem fans, powered by the common 12V rail voltage. Fan speed is controlled by PWM input signal. And the power supply firmware shall determine the fan RPM required to provide forced air cooling using data from a thermal sensor in the power supply that reflects the output loading.

The cooling fans included on the power supply run on separate control circuits from the power supply. Therefore, if one power supply fails, the failed power's fan continues to work on the power supplied from the other good power supply.

### **Note:**

A power supply/cooling fan module can be removed from a powered-on enclosure; however, the expander controller may automatically shut down the enclosure if overheating occurs.

# INTRODUCTION

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## 1.6 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.

## 1.7 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

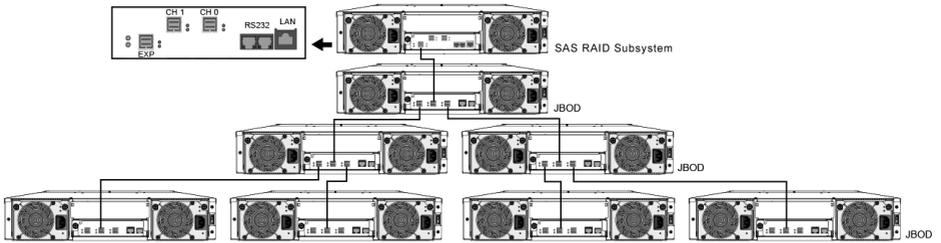


Figure 1-14. Single Module Daisy-chain

## (2). Dual Controller Mode

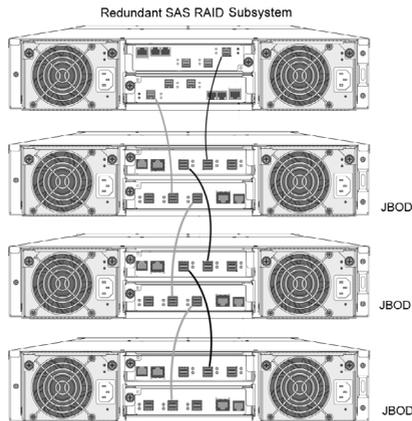


Figure 1-15. Dual Module Daisy-chain

- 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.

# INTRODUCTION

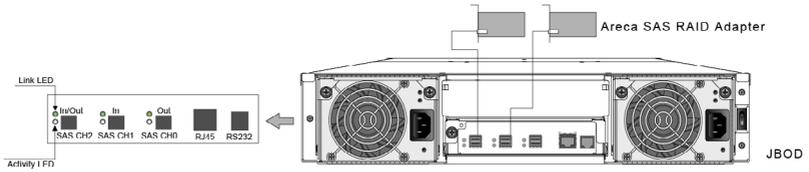


Figure 1-16. Zone Mode Example

## **Note:**

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

# HARDWARE INSTALLATION

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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)

# HARDWARE INSTALLATION

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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 2U-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.

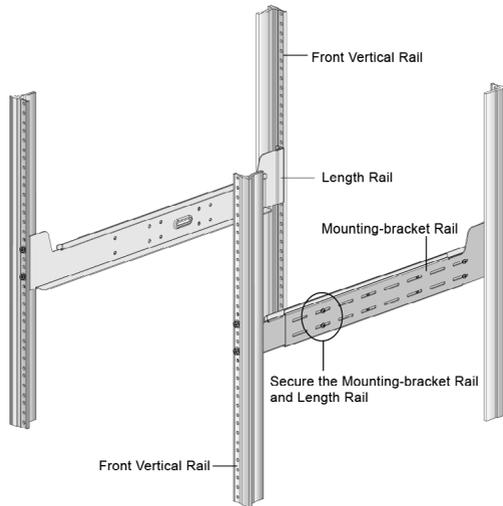


Figure 2-1. Attaching the Mounting Rails to the Cabinet

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

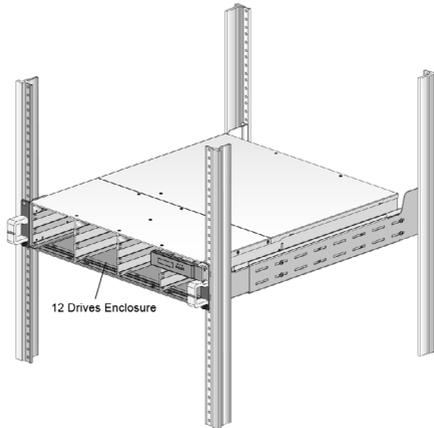


Figure 2-2. Sliding the Enclosure into the Rails

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

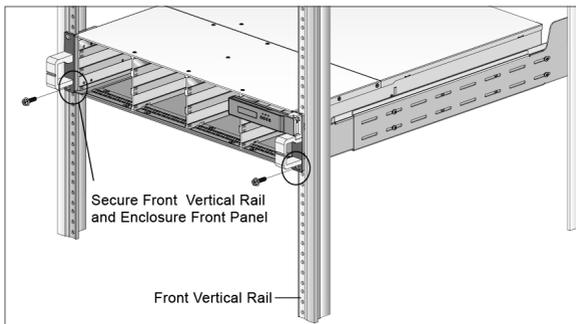


Figure 2-3. Attaching the Front of the Enclosure

## 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.

# HARDWARE INSTALLATION

## 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 2.5-inch or 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.

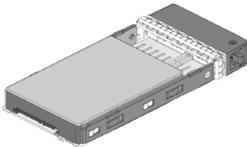


Figure 2-4. Put 2.5-inch SAS/SATA Drive into 2.5-inch Disk Tray

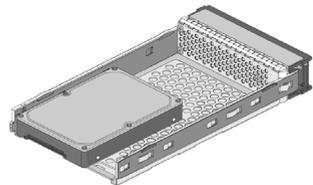


Figure 2-5. Put 2.5-inch SAS/SATA Drive into 3.5-inch Disk Tray

- 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 2-6. 2.5-inch drive Carrier with 2.5-inch SAS/SATA Drive



Figure 2-7. 3.5-inch Drive Carrier with 2.5-inch SAS/SATA Drive

# HARDWARE INSTALLATION

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.

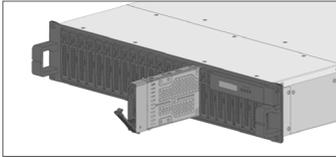


Figure 2-8. Installing 2.5-inch Drive into Enclosure

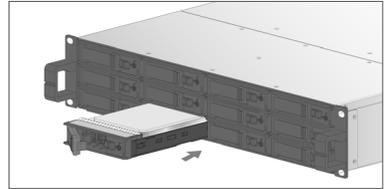


Figure 2-9. Installing 3.5-inch Drive into Enclosure

4. Click the drive tray latch into position, then continuing to slide the other drive tray into the slot.
5. Turn the key-lock to the proper position, using the "Star Wrench L-Handle" in the shipping box. The key-lock is unlock, if the dot on its face is in the unlock orientation.

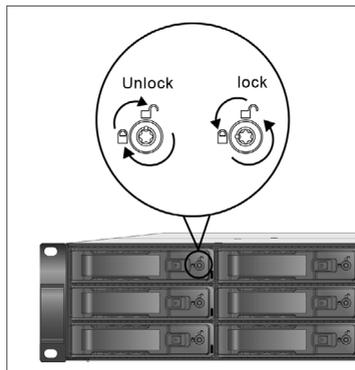


Figure 2-10. Locking Drive Tray

## **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.

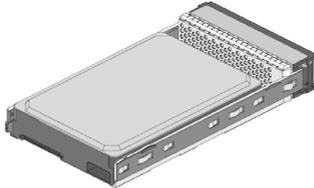


Figure 2-11. Putting Drive into Drive Tray

- 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.

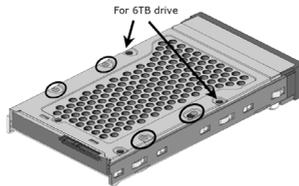


Figure 2-12. Securing Drive

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.

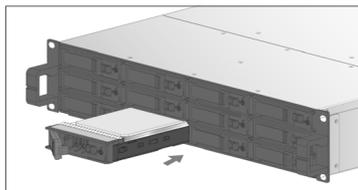


Figure 2-13. Installing Drive into Enclosure

# HARDWARE INSTALLATION

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4. Click the drive tray latch into position, then continuing to slide the other drive tray into the slot.
5. Turn the key-lock to the proper position, using the "Star Wrench L-Handle" in the shipping box. The key-lock is unlock, if the dot on its face is in the unlock orientation.

## 2.2.2 Installing SATA Drives with Interposer Board

The interposer board is for usage with SATA drives. It provides dual data path for dual controller. If your enclosure has two SAS expander module and you are installing SATA drives, an interposer board is required so that both expander modules can access the SATA drives. Follow the steps below to install the SATA drive with interposer board into the drive tray.

### 2.2.2.1 Installing 2.5-inch Drives into 3.5-inch Drive Tray

- 1-1. Prepare the interposer module.

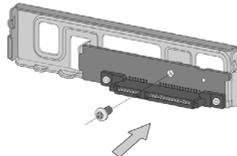


Figure 2-14. Fastening Interposer Board into Mounting Bracket

- 1-2. Clip the interposer board into the drive tray.

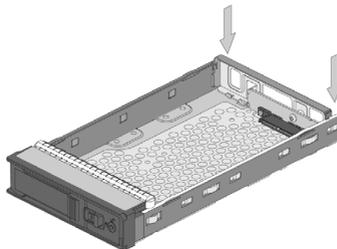


Figure 2-15. Installing Interposer Module

# HARDWARE INSTALLATION

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- 1-3. Carefully slide the 2.5-inch drive toward the interposer module.

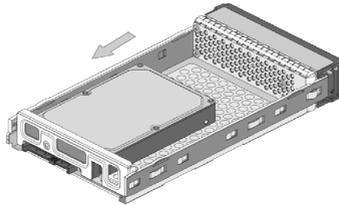


Figure 2-16. Sliding Drive into Drive Tray

- 1-4. 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 2-17. 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.
4. Click the drive tray latch into position, then continuing to slide the other drive tray into the slot.
5. Turn the key-lock to the proper position, using the "Star Wrench L-Handle" in the shipping box. The key-lock is unlock, if the dot on its face is in the unlock orientation.

# HARDWARE INSTALLATION

## 2.2.2.2 Installing 2.5-inch drives into 2.5-inch drive tray

- a. Slide the 2.5-inch drive toward the interposer module.

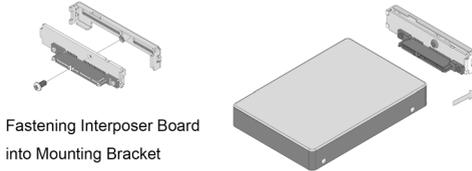


Figure 2-18.  
Preparing and  
Sliding Interposer  
Module

- b. Position interposer module with drive toward the interposer module slot with the latch point in the interposer module aligned with the interposer module slot. Gently press down the module until it snaps into place in the interposer module slot on the tray.

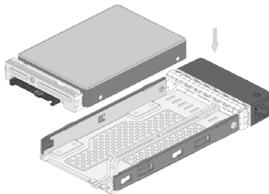


Figure 2-19.  
Installing Drive into Drive Tray

- c. 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 2-20. Securing Drive

1. 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.
2. 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.
3. Click the drive tray latch into position, then continuing to slide the other drive tray into the slot.

# HARDWARE INSTALLATION

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

1-1. Slide the 3.5-inch drive toward the interposer module.

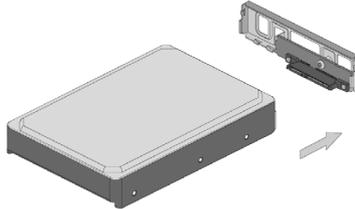


Figure 2-21. Sliding Interposer Module

1-2. Position interposer module with drive toward the interposer module slot with the latch point in the interposer module aligned with the interposer module slot. Gently press down the module until it snaps into place in the interposer module slot on the tray.

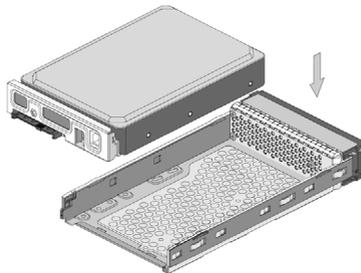


Figure 2-22. Installing Drive into Drive Tray

1-3. Turn the drive tray upside down and using a screwdriver to secure the drive to the drive tray by four of the mounting screws.

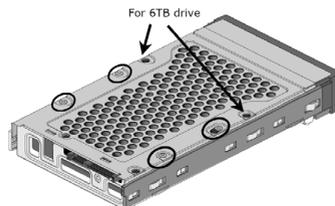


Figure 2-23. Securing Drive

# HARDWARE INSTALLATION

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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.
4. Click the drive tray latch into position, then continuing to slide the other drive tray into the slot.
5. Turn the key-lock to the proper position, using the "Star Wrench L-Handle" in the shipping box. The key-lock is unlock, if the dot on its face is in the unlock orientation.

## 2.2.3 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 or Removing the Expander in the Enclosure

An enclosure with redundant enclosure management contains two SAS expander module. An enclosure with non-redundant enclosure management only has one SAS expander module. If only one SAS expander module is installed, it must be in the primary expander bay and a blank module cover must be installed in the secondary expander bay.

### 2.3.1 Installing the Expander into the Enclosure

Follow the steps below to install the SAS JBOD expander in the enclosure:

# HARDWARE INSTALLATION

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1. Carefully slide the SAS JBOD expander into the empty slot.
2. Push the SAS JBOD expander back of the slot until it is firmly seated in the backplane connector.
3. Put the lever toward the enclosure and tighten the thumbscrew which located on the left side of lever of the SAS JBOD expander.

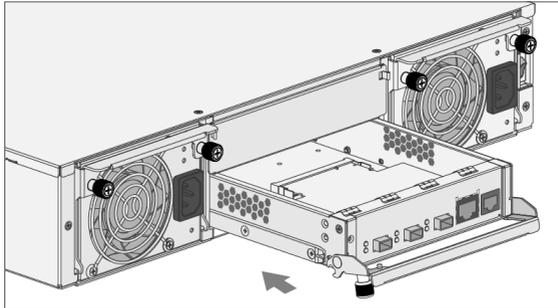


Figure 2-24. Installing Expander Module

## 2.3.2 Removing the Expander from the Enclosure

Follow the steps below to remove the SAS JBOD expander from the enclosure:

1. Loosen the thumbscrew on left side of the lever, then gently but firmly pull the SAS JBOD expander out from the slot.
2. After removed the SAS JBOD expander from the enclosure, place the cover in the empty slot.

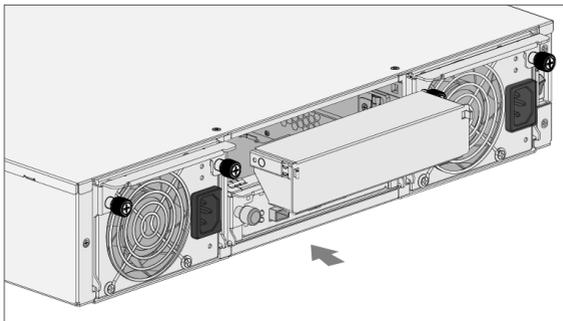


Figure 2-25. Installing the Cover

# HARDWARE INSTALLATION

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**Note:**

There are two slots for your SAS JBOD expander. If you only installed one in your enclosure, the other empty slot must place a cover. To remove the cover, pull out on the thin tabs on each end of the cover and slide the cover out of the slot.

## 2.4 Installing and Removing the Power Supply/Cooling Fan Modules

The enclosure supports two separate power modules. Each of them contains an integrated power supply and two cooling fans.

### 2.4.1 Installing the Power Supply/Cooling Fan Modules

1. Carefully slide the power supply/cooling fan modules into the empty slot.
2. Push the module back of the slot until it is firmly seated in the backplane connector.
3. Tighten the two thumbscrews to secure the power supply/cooling fan 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. (Please refer to section 2.5 Installing the Power Cord Clamp)

**Note:**

The power supply/cooling fan modules are heavy. Be careful when you lift it up into the slot.

### 2.4.2 Removing a Power Supply/Cooling Fan Modules

1. Turn off the power supply and unplug the AC power cords.

# HARDWARE INSTALLATION

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2. Loosen the thumbscrews on power supply/cooling fan module then gently but firmly pull the power supply/cooling fan modules out from the slot.

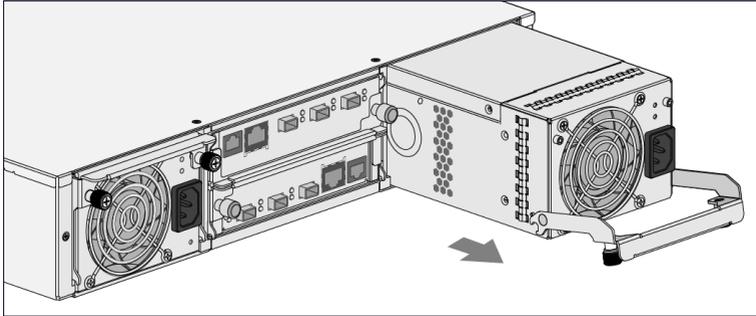


Figure 2-26. Pulling Power Module

## **Note:**

1. The power supply/cooling fan modules are hot-pluggable. If one power supply/cooling fan module is functioning normally, you can hot-swap the other one while the enclosure is powered on.
2. If you remove a power supply/cooling fan module, the fan speed on the existing module will increase significantly to provide adequate cooling. The fan speed will decrease gradually when a new power supply/cooling fan module is inserted into the enclosure.

## 2.5 Installing the Power Cord Clamp

Using the included power cords, connect each power supply and cooling fan unit to an AC power source. The cable clamp prevents the power cord from being accidentally unplugged.

1. Connect the cable clamp to the cable strap. Opening the release tab then insert the angled end of cable strap through the cable tie frame. Facing up of cable strip smooth side and the other side facing down.

# HARDWARE INSTALLATION

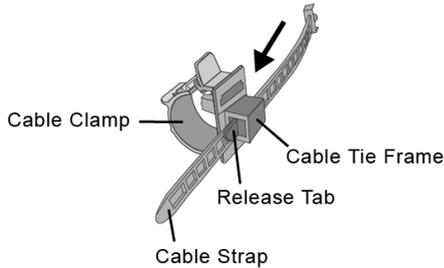


Figure 2-27. Power Cord Clamp

2. Connect the power cord and connect the cable strap with opening cable clamp to the power module. Using the release tab to adjust the cable clamp to the suitable place.

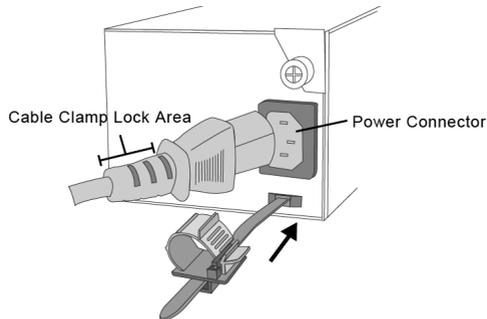


Figure 2-28. Adjusting Power Cord Clamp

3. Using cable clamp wrap the power cord and clip lock it. Repeat step 1 to 3 procedures to install the power cord clamp on the other power side.

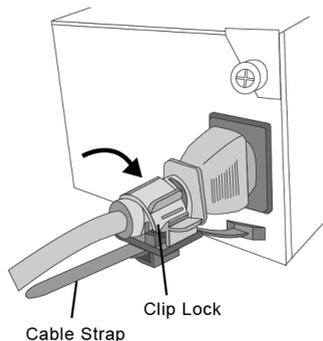


Figure 2-29. Clipping Lock

# HARDWARE INSTALLATION

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## 2.6 Connecting the SAS JBOD Enclosure

Following below instructions to connect your SAS JBOD enclosure.

### 2.6.1 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.

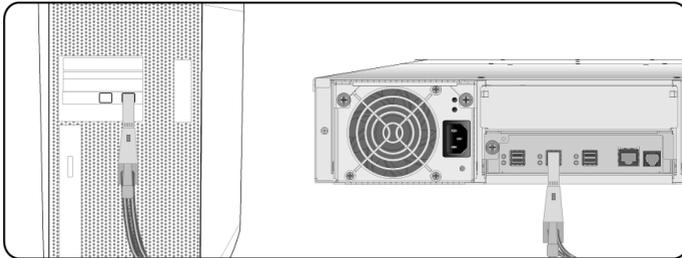


Figure 2-30. Connecting the Host

### 2.6.2 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.

### 2.6.3 Power Up the Enclosure

There is one main power on/off switch located on the rear side of the SAS JBOD enclosure.

The on/off power switch is used to apply or remove power from the power supply to SAS JBOD enclosure. Turning off enclosure

# HARDWARE INSTALLATION

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power with this switch removes the main power but keeps stand-by power supplied to the SAS JBOD enclosure. Therefore, you must unplug the power cord before enclosure servicing.

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

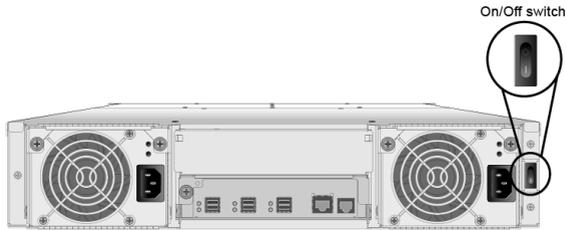


Figure 2-31. Turning AC Power

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.

## 2.7 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.

# LCD Configuration Manager

---

## 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

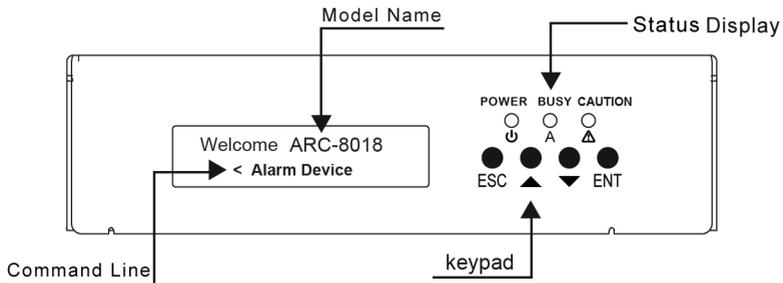
### 3.1 Using Local Front Panel Touch-Control Keypad

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

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## 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.

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

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

<b>Action Type 3 (A3)</b>	
<b>button</b>	<b>Action</b>
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

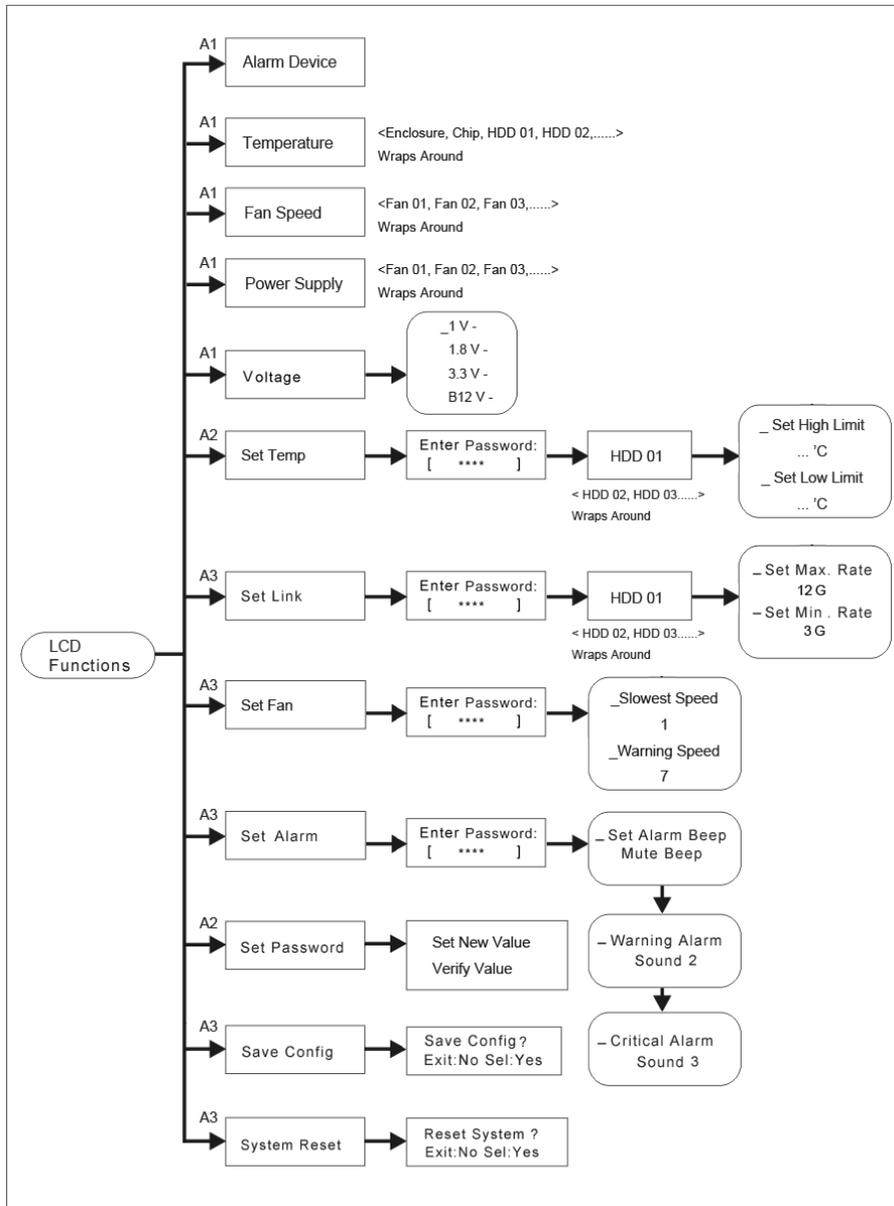


Figure 3.2-1 LCD Hierarchical Menu

# LCD Configuration Manager

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- **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.

# CLI FEATURES

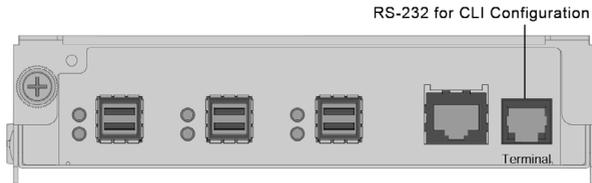
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## 4. CLI Features

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

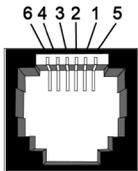
## 4.1 Expander RS-232C Port Pin Assignment

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

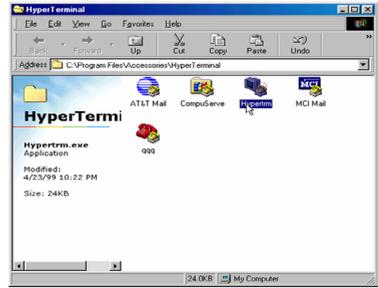


Figure 4.2-2

**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)

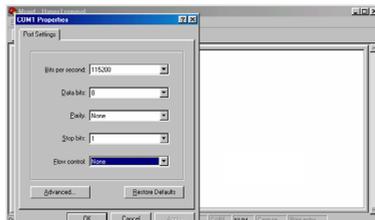


Figure 4.2-5

# CLI FEATURES

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

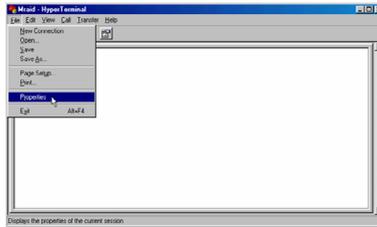


Figure 4.2-6

**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)

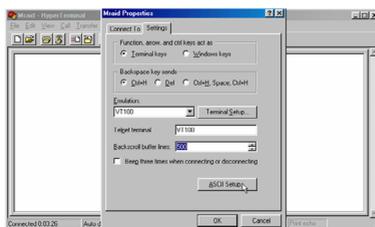


Figure 3.2-7

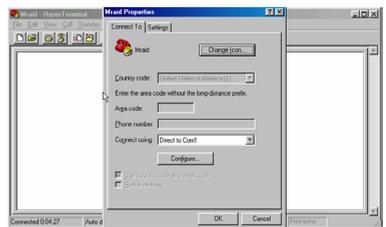


Figure 3.2-8

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.

# CLI FEATURES

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## 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,

---

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
```

# CLI FEATURES

---

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

# CLI FEATURES

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

# CLI FEATURES

---

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

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
```

```
.....
```

# CLI FEATURES

---

## ● 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

---

# CLI FEATURES

---

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: 0x0000000FFFFFFFFF
```

```
//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: 0x00000000000FFC00
```

```
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: 0x0000000FFFFFFFFF

//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: 0x00000000000FFC00

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

Value: 0x00000000FF003FF

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: 0x0000000FFFFFFFFF

CLI>gr t10 off

New PHY Group Mode:

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

Value: 0x00000000000FFC00

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

Value: 0x00000000FF003FF

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: 0x0000000FFFFFFFFF

CLI>st

Power Cycle to reboot

CLI>gr

Current PHY Group Mode:

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

Value: 0x00000000000FFC00

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

Value: 0x00000000FF003FF

//Clear the Zone group Setting

# CLI FEATURES

---

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: 0x0000000FFFFFFFFF

Current PHY Group Mode: T10

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

Value: 0x0000000000FFC00

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

Value: 0x00000000FF003FF

## ● 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.	: 0000000000000000
Unit Serial No.	:
Expander SAS Address	: 0x5001B469189AE03F
Product Revision	: 0
Expander Chip ID	: 0x0233 (Ports : 36)
Expander Chip Revision	: C0

# CLI FEATURES

---

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]

# CLI FEATURES

---

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):

=====

NAME	SPEED		STATUS
	CODE	RPM	
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):

=====

NAME	SPEED		STATUS
	CODE	RPM	
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

# CLI FEATURES

---

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

## ● 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
```

# CLI FEATURES

## 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	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):

```
=====
```

NAME	SPEED CODE	RPM	STATUS
Fan 01	5	2100	OK
Fan 02	5	2200	OK

# CLI FEATURES

Fan 03 Not-Installed  
Fan 04 Not-Installed

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
Day00000-00:00:00 ENCLOSURE-Fan 01 Failed
```

# CLI FEATURES

---

## ● 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 HypeTerminal(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.

7. You can also cancel the program step by type `q`.

8. If transfer OK, the transfered 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 transfered 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 transfered 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 transfered 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=====

== InvWrdCnt ==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.

## ● 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

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## Technical Specifications

### Drives

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.

### Enclosure Controller Modules

Expander board            1 or 2 modules

Sensors                    1 sensor per expander board

### Backplane Board

Connectors

- 12/16/24 SAS hard-drive connectors
- 2 power supply/cooling fan module connectors
- 2 sets of expander board connectors (3 connectors each expander board)

Sensors

- 12/16/24 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

Manager connector (per expander board)

- 1 x 6-pin UART RJ-11 connector
- 1 x RJ-45 LAN connector (manufacture manager only)

### LED Indicators

Hard-drive carrier

- 1 blue single-color activity LED
- 1 two-color LED status indicator per drive

## Expander board

- 2 one-color LED status indicators for each SAS port, one for SAS port link and one for the activity status

## Power supply/cooling fan module

- 2 single-color LED status indicators for AC\_OK and FAULT on each power supply/cooling fan module

## Power Supplies

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

- Wattage 595 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 506 mm(3.2 x 17.5 x 19.9 in)
- With handles 88.2 x 482 x 542 mm(3.2 x 22.9 x 21.3 in)

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

- Without handles 132.6 x 445 x 506 mm(5.2 x 17.5 x 19.9 in)
- With handles 132.6 x 482 x 542 mm(5.2 x 22.9 x 21.3 in)

2U 24 bays 19-inch rackmount chassis (H x W x D)

- Without handles 88.2 x 445 x 470 mm(3.2 x 17.5 x 18.5 in)
- With handles 88.2 x 482 x 506 mm(3.2 x 22.9 x 19.9 in)

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

- Without handles 176.4 x 445 x 506 mm(6.4 x 17.5 x 19.9 in)
- With handles 176.4 x 482 x 542 mm(6.4 x 22.9 x 21.3 in)

## Enclosure Net Weight (Without Drives)

- Single 12/16/24(2U)/24(4U) bays 26.5 kg/30.5 kg/27.5kg/34kg
- Dual 12/16/24(2U)/24(4U) bays 27 kg/31 kg/28 kg/35kg

## Environmental

Temperature:

- Operating 0° to 40°C
- Storage -40° to 70°C

# APPENDIX

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Relative humidity:

- Operating
- Storage

10% to 80% (non-condensing)

5% to 95% (non-condensing)