



VTrak J5960 Series

High-Density Storage System

Product Manual

Version 1.0

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This manual includes are four levels of notices:



Warning

A Warning notifies you of probable equipment damage or loss of data, or the possibility of physical injury, and how to avoid them.



Caution

A Caution informs you of possible equipment damage or loss of data and how to avoid them.



Important

An Important message calls attention to an essential step or point required to complete a task, including things often missed.



Note

A Note provides helpful information such as hints or alternative ways of doing a task.

This document contains safety precautions and regulatory compliance notices for products.

Regulatory compliance identification numbers

For the purpose of regulatory compliance certifications and identification, this product has been assigned a unique regulatory model number. The regulatory model number can be found on the product nameplate label, along with all required approval markings and information. When requesting compliance information for this product, always refer to this regulatory model number. The regulatory model number is not the marketing name or model number of the product.

Consult PROMISE Technology, Inc. authorized service provider. <https://www.promise.com>

Manufacturing Dates of Products: <https://www.promise.com/Promotion/Manufacturing-Dates>

Compliance information

Global notice for Class A equipment

Operation of this equipment in a residential environment could cause radio interference.

Federal Communications Commission notice

Class A equipment

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 harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

For questions regarding this FCC SDoC, contact us by mail or telephone:

- PROMISE TECHNOLOGY USA
- 3241 Keller St., Santa Clara CA 95054
- Email: sales@promise.com

Industry Canada Regulatory Compliance Notices

Avis de conformité à la réglementation d'Industrie Canada

Class A equipment

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations. CAN ICES-3(A)/NMB-3(A)

Cet appareil numérique de la class A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada. CAN ICES-3(A)/NMB-3(A)

Safety precautions

Retain and follow all product safety and operating instructions. Always refer to the documentation (printed or electronic) supplied with your product. If there is a conflict between this document and the product documentation, the product documentation takes precedence. Observe all warnings on the product and in the operating instructions to reduce the risk of bodily injury, electric shock, fire, and damage to the equipment.

To reduce the risk of personal injury or damage to the product:

- Place the product away from radiators, heat registers, stoves, amplifiers, or other products that produce heat.
- Never use the product in a wet location.
- Avoid inserting foreign objects through openings in the product.
- Move products with casters carefully. Avoid quick stops and uneven surfaces.

The installation and maintenance of products must be carried out by qualified personnel.

If the product sustains damage requiring service, disconnect the product from all power sources and refer servicing to a PROMISE TECHNOLOGY INC. authorized service provider. Examples of damage requiring service include:

- The power cord, extension cord, or plug has been damaged.
- Liquid has been spilled on the product or an object has fallen into the product.
- The product has been exposed to rain or water.
- The product has been dropped or damaged.
- The product does not operate normally when you follow the operating instructions.

Precautions for power products**Power cords**

To reduce the risk of electric shock or damage to the equipment:

- Use an approved power cord. If you have questions about the type of power cord to use, contact your PROMISE TECHNOLOGY INC. authorized service provider.
- If you have not been provided with a power cord for your product or for any AC-powered option intended for your product, purchase a power cord that is approved for use in your country.
- You must use a power cord rated for your product and for the voltage and current marked on the electrical ratings label of the product. The voltage and current rating of the cord must be greater than the voltage and current rating marked on the product.
- Do not place objects on AC power cords or cables. Arrange them so that no one may accidentally step on or trip over them.
- Do not pull on a cord or cable. When unplugging from the electrical outlet, grasp the cord by the plug.
- Make sure that the total ampere rating of all products plugged into an extension cord or power strip does not exceed 80 percent of the ampere ratings limit for the extension cord or power strip.

Precautions for maintaining and servicing products

To reduce the risk of electric shock or damage to the equipment when installing, maintaining, or servicing products, observe the following precautions:

- Some products contain power supplies that are capable of producing hazardous energy levels. Refer to the documentation included with your product to determine whether it contains these power supplies. The installation of internal options and routine maintenance and service of this product should be performed by individuals who are knowledgeable about the procedures, precautions, and hazards associated with equipment containing hazardous energy levels.
- Allow the product to cool before removing covers and touching internal components.
- Do not use conductive tools that could bridge live parts.
- Remove all watches, rings, or loose jewelry when working in hot-plug areas of an energized server, storage, networking, or rack product.
- Some products have covers or doors to access hot-plug components and may allow access to hazardous energy circuits or moving fans.
- The doors should remain locked during normal operation.

OR

- The server, storage, networking, or rack product should be installed in a controlled access location where only qualified personnel have access.
- Power down the equipment and disconnect all power cords before removing any access covers for non-hot-plug areas.
- Do not replace non-hot-plug components while power is applied to the product. First, shut down the product and disconnect all power cords.
- Do not exceed the level of repair specified in the procedures in the product documentation. All troubleshooting and repair procedures are detailed to allow only subassembly or module-level repair. Because of the complexity of the individual boards and subassemblies, do not attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard.

**Warning**

Hazardous moving parts. Keep away from moving fan blades. To reduce the risk of injury from a hot component, allow the surface to cool before touching.

Power supplies

Hot-plug power supplies are not designed to be removed or installed with AC power connected to the power supply. To reduce the risk of electric shock or damage to the equipment when handling hot-plug power supplies:

- Install the power supply before connecting the power cord to the power supply.
- Unplug the power cord before removing the power supply from the product.
- If the system has multiple sources of power, you must unplug all AC power cords from the power supplies to completely disconnect power from the system.

**Warning**

To reduce the risk of injury from electric shock, remove all power cords to completely disconnect power from the system.

INTRODUCTION

This chapter provides an introduction to the VTrak J5960. You can also check out the PROMISE Technology YouTube channel for a video introduction to this and many other PROMISE products, as well as instructional videos useful for setting up and managing the VTrak J5960.

Please visit our YouTube channel at <https://www.youtube.com/user/PromiseTechnology>

Features

High-Density Storage, Expansion up to 8 Petabytes

- 60 Bay Enterprise Storage Platform
- Massive capacity, cascade up to eight 4U60 JBOD enclosures

Optimized for High-Performance Datacenter

- Huge bandwidth with six 12 Gb SAS ports per IOM; more than 14 GB/s aggregate transfer rate from

60pcs SAS HDDs

- Dual-port SAS drive for high availability or single-port SATA drive for low cost
- Six SFF-8644 ports per controller for connecting upstream or downstream multiple cascaded JBODs
- SCSI Enclosure Services (SES) enclosure management based on ANSI T10 standard

JBOD with Green DNA

- 80 Plus Platinum PSUs, superior power efficiency, Energy Star Ready

Maintainability

- Cable-less hot-swappable IOM, power supply, fans and drives
- Work-efficient modular cable-less design
- SCSI Enclosure Services (SES) management via in-band SAS, out-of-band Serial console or 1G network
- Auto sensing and auto optimizing for cable lengths and types
- Compatible with leading HBAs and RAID controllers
- Advanced diagnostics and reporting with persistent error log

Specifications

Form factor	4U60 Bays JBOD storage chassis
Drives	60 HDD (3.5" or 2.5") Dual IO Module : 12 Gb SAS HDD and SSD drives Single IO Module : 6 Gb SATA HDD and SSD drives
I/O Module	Dual or Single
Expansion	Up to 8 sets of J5960 4U60 JBODs
I/O Ports per controller	6 Mini SAS HD connectors (SFF-8644) for upstream or downstream each IOM 1 Gigabit Ethernet each IOM (management port) 1 RJ11 each IOM (management port)
Expander Management Features	<ul style="list-style-type: none"> • Self-configuring expander supports full SAS domain topology management • T-10 based zoning support • End Device Frame Buffering (aggregate bandwidth over multiple slow devices e.g. SAS 6G drive) • Smart cable support to detect cable type and tune PHY automatically for maximum reliability • SMP – SAS Management Protocol • In-band access to Expander and PHY information • Statistic counters • SES EM – SES Enclosure Management (ANSI T10 SES Compliant) • SCSI SES command set over virtual SSP device
Expander Protocol and Management	ANSI T10 SES, SMP (SES over in-band SAS) Persistence Error Logging with NVRAM, Extensive Service Report File, VPD (Vital Product Data) on Chassis and FRUs
Management Interfaces	Command Line Interface (CLI) via Serial Port, Ethernet Port (SSH, Telnet)
System Management	ANSI T10 SES, SMP (SES over in-band SAS) Persistence Error Logging with NVRAM, VPD (Vital Product Data) on Chassis and FRUs

General	Description
Power Supply	80 PLUS Platinum 1200W Redundant Power Supply
Voltage	100-127Vac, 200-240Vac
Current (Maximum)	<15A@100-127Vac @full load <10A@200-240Vac/160-340Vdc @full load
Power Conversion Efficiency	Load 10% Eff _c 86% , Load 20% Eff _c 91% , Load 50% Eff _c 94% , Load 100% Eff _c 91% Eff _c for 230Vac
Rear LED	<ul style="list-style-type: none"> • Fan status LED per FAN FRU (4 Fan sets per FRU, total two FAN FRU) • Ethernet pairs Link/Activity Led on Each IOM • 6 SAS Wide Port LED on Each IOM • PSU Status
Front LED	<ul style="list-style-type: none"> • System Power Status LED • Global Enclosure Status LED • IOM1 Activity LED, IOM1 Status LED, IOM1 Heart Beat LED • IOM2 Activity LED, IOM2 Status LED, IOM2 Heart Beat LED
Dimensions (Height, Width, Depth)	177mm x 445mm x 666mm
Weight (w/o drives) (w drives)	35 kg (estimate) 70 kg (estimate)

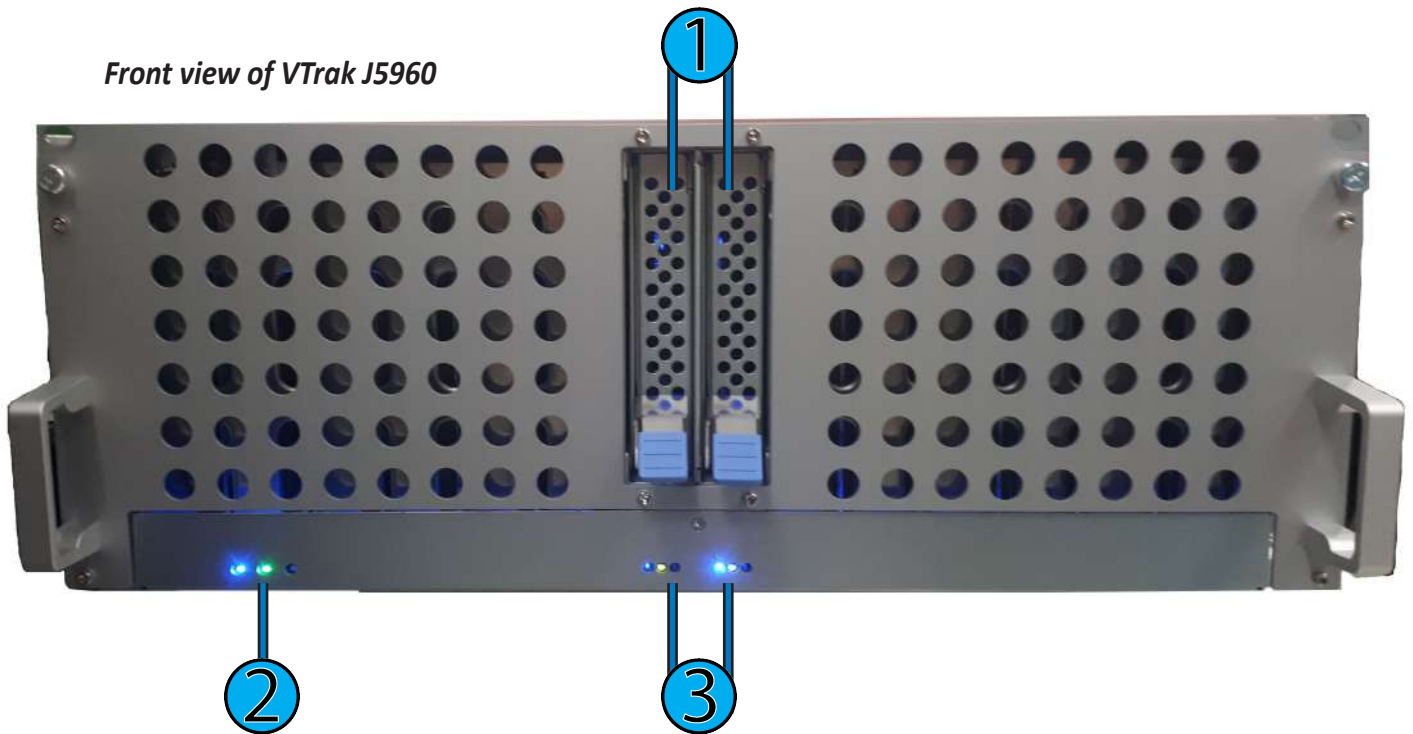
Safety & Environment	Description
EMI / RFI Statements	EMC Class A: CE, FCC Safety: CB
Environmental Standards	RoHS, WEEE
Temperature Range	Operational: 5° to 35°C (41° to 95°F) Non-Operational: -40° to 60°C (-40° to 140°F)
Humidity Range	Operational: 10% to 80% (Non-Condensing) Non-Operational: 10% to 95% (Non-Condensing)

Support & Warranty	Description
Support	<ul style="list-style-type: none"> • 24 hour, 7 days a week, 365 days a year e-mail and phone support (English only) • 24 hour, 7 days a week, 365 days a year access to PROMISE support site • Firmware and compatibility lists
Warranty	3-year full system limited warranty, optional extended warranty, on site parts replacement program

Hardware

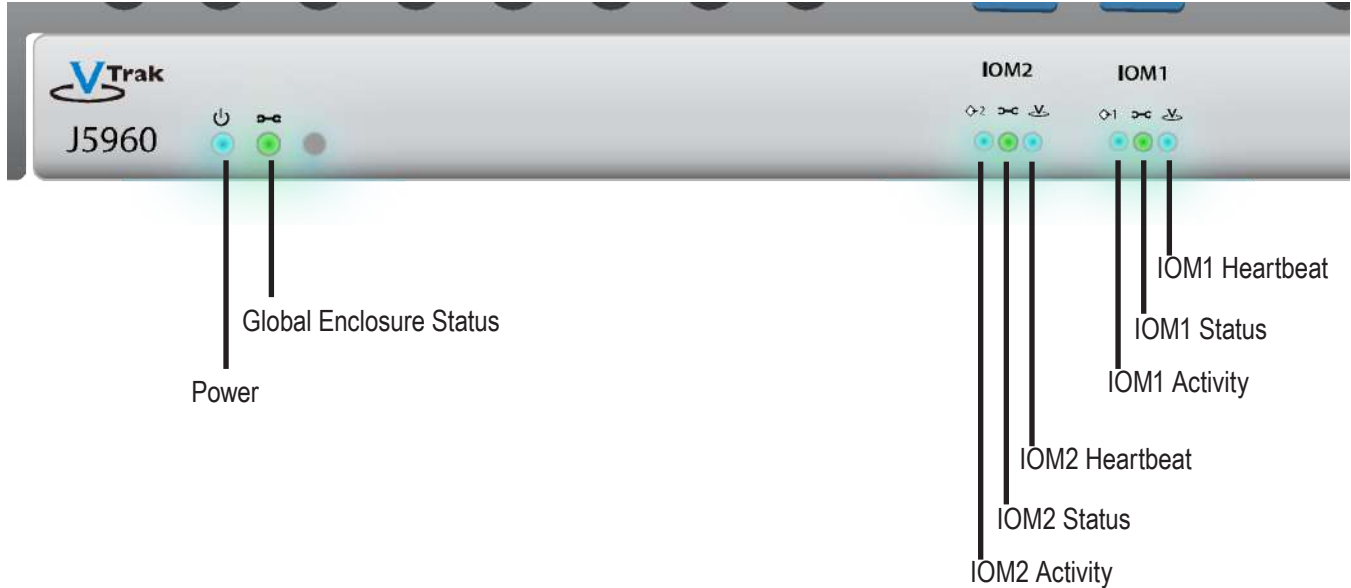
This section provides a summary of the external hardware features of the VTrak J5960 Series enclosures.

Front Panel Hardware



Front Panel	Description
1	I/O Modules
2	System LEDs
3	I/O Module LEDs

Front Panel LEDs

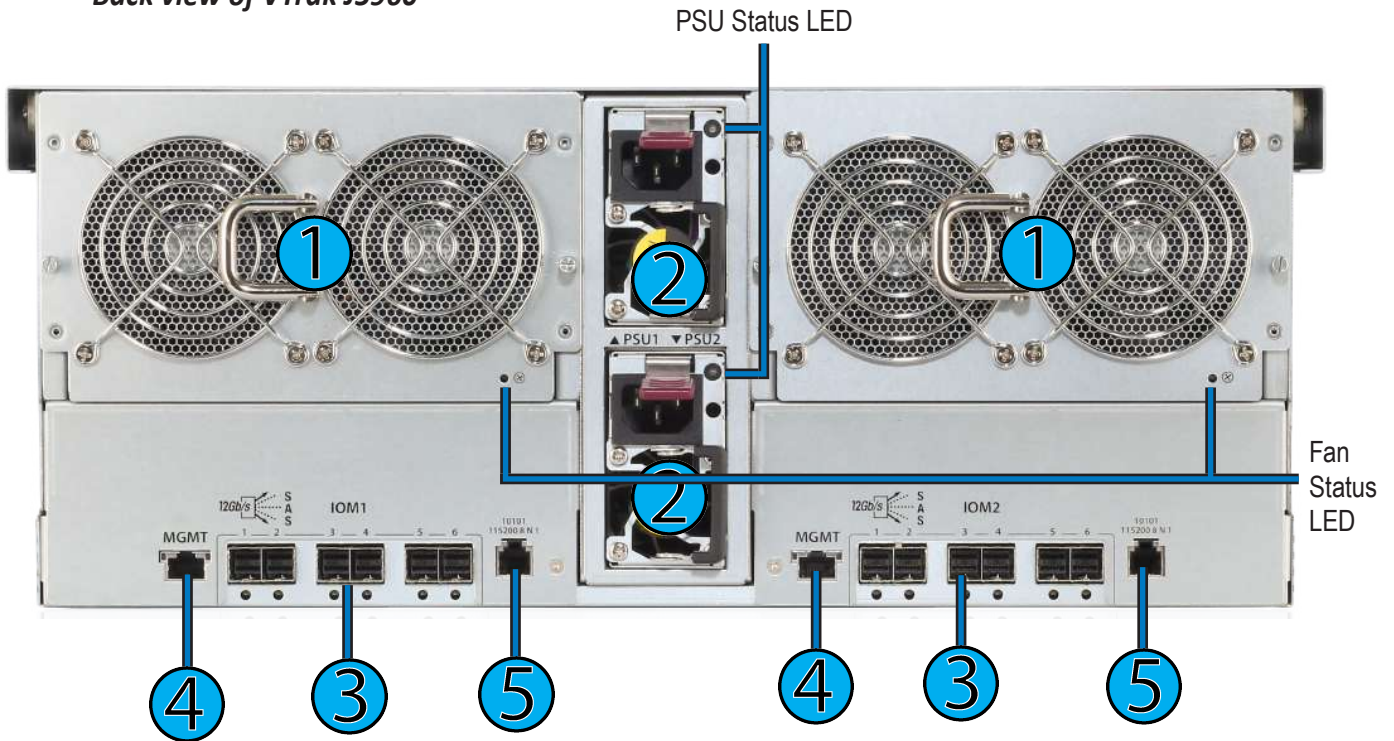


Front Panel LEDs

LED name	Status	Description
Power	OFF	System Power Off
	Blue	System Power On
Global Enclosure Status	Off	System Power Off
	Green	OK/Healthy
	Amber	Malfunction
	Red	Critical
I/O module activity	Off	SAS expansion port no link
	Steady Blue	No I/O and SAS expansion port is linked
	Blink Blue	I/O Running
I/O module status	Off	IOM is not powered up.
	Steady Green	IOM is powered up.
	Blink Green	IOM is located.
I/O module Heartbeat	Off	System Power Off
	Blink Blue	IOM FW works.(Dual IOM blink every 2 sec, single IOM blink every 4 sec)

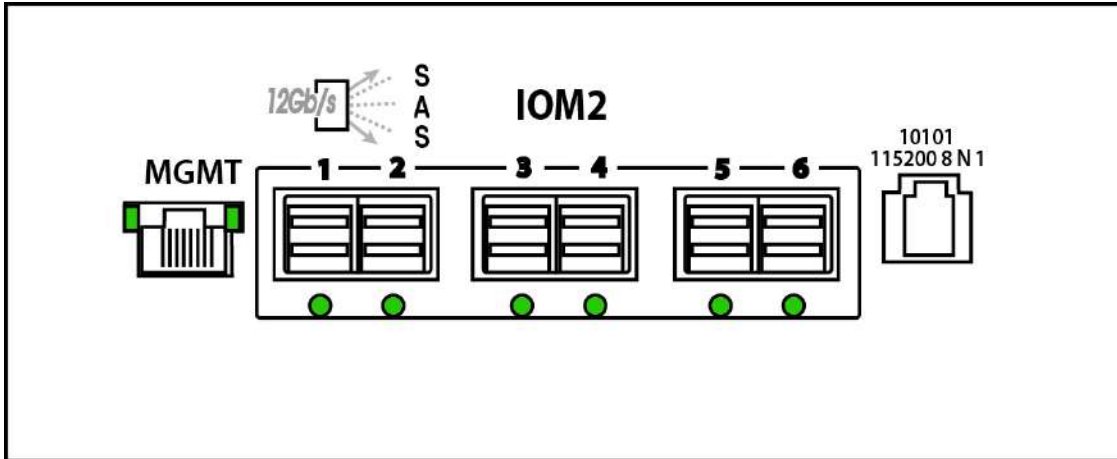
Back Panel Hardware

Back view of VTrak J5960



Back Panel	Description
1	System Fan Module (Dual Fan, 2 Modules)
2	Power Supply Unit (2 PSU)
3	SFF-8644 Ports (6 per I/O Module)
4	1G Network Port for in-band management (1 per I/O Module)
5	Serial Port for out-of-band management (1 per I/O Module)

Close up view of ports on back of VTrak J5960

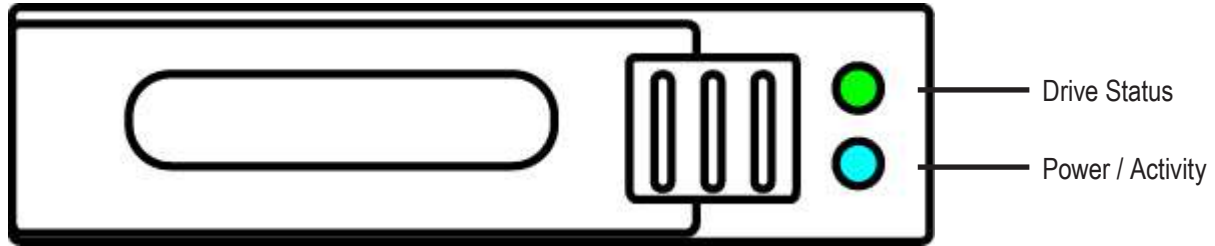


Back Panel LEDs

LEDs	Status	Description
SFF-8644 SAS Expansion Port Link status LED	Off	Link down
	On (Steady Green)	Link up
	Blinking Green	Activity
PSU Status LED	Off	PSU not inserted or system powered off
	On (Steady Green)	Normal
	Flashing Green	Standby mode
	Orange	Input voltage not detected
Fan Status LED	Off	Fan module not inserted.
	Green	Normal
	Red	Four Fans not rotating

MGMT LED		Status
Link/Activity	Port Speed	
Dark	Dark	No Link
Steady Green	Dark	10 Mbps without I/O
Steady Green	Steady Orange	100 Mbps without I/O
Steady Green	Steady Green	1 Gbps without I/O
Flash Green	Dark	10 Mbps with I/O
Flash Green	Steady Orange	100 Mbps with I/O
Flash Green	Steady Green	1 Gbps with I/O

Drive Carrier LEDs



Drive Carrier LEDs

LED name	Status	Description
Disk Status	OFF	Drive not configured
	Steady Green	Drive is configured
	Blinking Green	Locator feature
	Amber	Drive is rebuilding
	Red	Drive error or failure
Power / Activity	Off	No Drive
	Steady Blue	Drive Present
	Flashing Blue	Activity

Access to Internal Components

Complete access to the hard disk drive bays is provided from the top of the enclosure. After mounting the securing the device with the sliding rail rack system in an equipment rack, you can open the sliding top and populate the enclosure with hard disk drive carrier assemblies. Be sure to insert all disk carrier assemblies for proper air flow. If you do not want to use HDD for every carrier, you can substitute drive blanks.



WARRANTY AND SUPPORT

WARRANTY

- Three year complete system limited warranty
- Battery Backup Unit has a one year limited warranty
- Optional 2-year extended warranty
- Optional onsite parts replacement program

Promise Technology, Inc. ("Promise") warrants that for three (3) years from the time of the delivery of the product to the original end user except for one (1) year warranty on the battery backup unit:

- a) the product will conform to Promise's specifications;
- b) the product will be free from defects in material and workmanship under normal use and service.

This warranty:

- a) applies only to products which are new and in cartons on the date of purchase;
- b) is not transferable;
- c) is valid only when accompanied by a copy of the original purchase invoice;
- d) is not valid on spare parts.

This warranty shall not apply to defects resulting from:

- a) improper or inadequate maintenance, or unauthorized modification(s), performed by the end user;
- b) operation outside the environmental specifications for the product;
- c) accident, misuse, negligence, misapplication, abuse, natural or personal disaster, or maintenance by anyone other than a Promise or a Promise authorized service center.

HARDWARE INSTALLATION

The VTrak J5960 is a 4U form factor, high availability, high density, rack-mounted storage enclosure capable of hosting up to 60 SAS or SATA drives. For a full list of compatible drives and total storage capacities, see the List of Compatible Drives for this model at the PROMISE website.

Please visit the PROMISE YouTube channel for installation instructions and other information useful to operating the VTrak J5960 at <https://www.youtube.com/user/PromiseTechnology>.

It is designed to fit within a 4U rack space. A fully loaded system will add about 75 kg of static load when fully loaded with drives.

Setup Summary

The setup process is summarized as follows:

1. Unpack the VTrak J5960 and hardware
2. Remove the Install rack hardware and place chassis into approved rack system.
3. Insert Hard Disk Drives (HDD)

Packing List

The shipping package ensemble includes the following components, each packaged in their own nested packaging material:

1. One VTrak J5960 chassis assembled with all internal components except hard disk drives (HDD).
2. Hard Disk Drives (HDD)
3. Sliding rail system hardware and fasteners (components described in separate section below)
4. Two power cables (2m)
5. Two MiniSAS HD cables (2m)
6. One Cable Management Arm (CMA)

Unpacking

The VTrak J5960 is shipped in protective outer packaging that consists of cardboard caps on the top and bottom and an outer sleeve surrounding

the sides. Edge protectors reinforce the top cap, while plastic banding surrounds the packaging and secures it all to the shipping pallet.

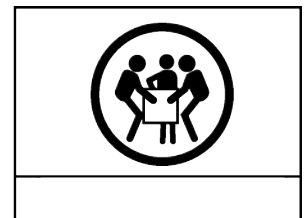
The inner contents of the VTrak J5960 packaging consists of three layers: the accessory tray (top), the chassis box (middle), and the drive boxes (bottom).

1. Make sure that all of the necessary parts and equipment are available, including any equipment necessary to support the enclosure during installation. To verify the list of necessary parts, see VTrak J5960 Packaging Overview.
2. Using a box cutter, cut the straps that secure the packaging to the pallet.
3. Remove and discard the top cap and the outer sleeve.
4. From the accessory tray, open the boxes for the rails, CMA, and top cover alignment brackets. Remove these parts and set them aside.
5. Open the chassis box and remove the top cushions from the front and rear of the chassis
6. With assistance, and without using the system handles, remove the chassis from the chassis box and set it aside.
7. Open the drive boxes and verify their contents. Depending on the version of the VTrak J5960 being unpacked, seven boxes should contain fourteen drive assemblies (in the form of HDDs, SSDs, or blanks), and one box should contain four drive assemblies. Once the contents are verified, leave them in the boxes. This will protect them from damage until they are installed in the enclosure.



CAUTION

The chassis weighs ~ 35 kilograms without drives installed. Three people are required to lift, mount and guide this 4U chassis into a rack enclosure when using the procedures in this document.



CAUTION

Do not lift the chassis by the system handles. The handles are designed only for sliding the enclosure out of the rack on its rails.

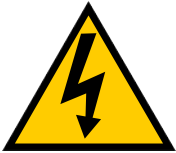
Safety Warnings and Cautions

To avoid personal injury or property damage, before you begin installing the product, read, observe, and adhere to all of the following safety instructions and information.



CAUTION

Electrostatic discharge can harm delicate components inside PROMISE products.



Electrostatic discharge (ESD) is a discharge of stored static electricity that can damage equipment and impair electrical circuitry. It occurs when electronic components are improperly handled and can result in complete or intermittent failures.

Wear an ESD wrist strap for installation, service and maintenance to prevent damage to components in the product. Ensure the antistatic wrist strap is attached to a chassis ground (any unpainted metal surface). If possible, keep one hand on the frame when you install or remove an ESD-sensitive part.

Before moving ESD-sensitive parts place them in ESD static-protective bags until you are ready to install the part.



CAUTION

Elevated Operating Ambient Temperature: If the server is installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment might be greater than room ambient temperature. Therefore, install the equipment only in an environment compatible with the maximum ambient temperature (T_{ma}) specified for the device.



CAUTION

Circuit Overloading: Do not overload the power supply circuits. Before connecting the server to the supply circuit, review the equipment nameplate power ratings and consider the effect that circuit overloading might have on overcurrent protection and supply wiring.

**CAUTION**

Reliable Grounding: Maintain reliable grounding of rackmounted equipment. Give particular attention to supply connections other than direct connections to the branch circuit (for example, use of power strips).

**CAUTION**

Equipment Loading: Always load equipment into a rack from the bottom up so that the rack does not become top-heavy and tip over. Deploy the rack's anti-tilt bar to prevent the rack from tipping during equipment installation.

**CAUTION**

Reduced Air Flow: Install the equipment in a rack so that the amount of air flow is adequate for the safe operation of the equipment.

**CAUTION**

Do not use slide rail mounted equipment as a shelf or a work space.

Restricted Access Location

The VTrak J5960 is intended for installation in a server room or computer room where at least one of the following conditions apply:

- access can only be gained by service persons or by users who have been instructed about the restrictions applied to the location and about any precautions that shall be taken and/or
- access is through the use of a tool or lock and key, or other means of security, and is controlled by the authority responsible for the location.

Optimizing Location

Failure to recognize the importance of optimally locating your product and failure to protect against electrostatic discharge (ESD) when handling your product can result in lowered system performance or system failure.

Do not position the unit in an environment that has extreme high temperatures or extreme low temperatures. Be aware of the proximity of the unit to heaters, radiators, and air conditioners.

Position the unit so that there is adequate space around it for proper cooling and ventilation. Consult the product documentation for spacing information.

Keep the unit away from direct strong magnetic fields, excessive dust, and electronic/electrical equipment that generate electrical noise.

Installation Procedure for Rack Mounting

Follow the instructions below to install the chassis in a 19" equipment rack.

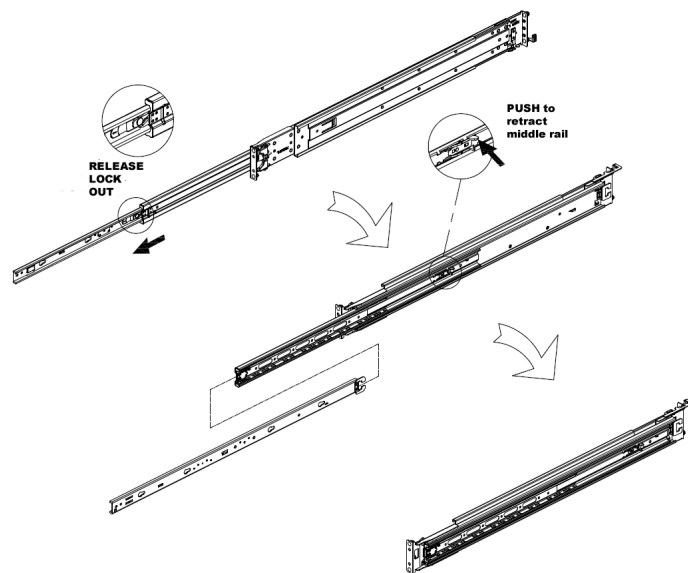
Step 1: Remove the inner rail that is nested inside the rack rails.



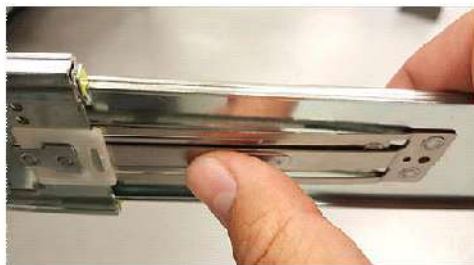
There are Right and Left rails and they must be installed as a set. Each inner rail will read "R" for the right or "L" for the left embossed on the inside. Each outer rail will read "R-Front" for the right or "L-Front" for the left. Right and Left refer to when you are facing the front of the rack.

- a. Start by sliding the inner rail out of the outer/rack rail until the safety latch engages and the inner rail will not extend further. It will only slide one way.

Slide Inner Rail Out



Rail Safety Latch

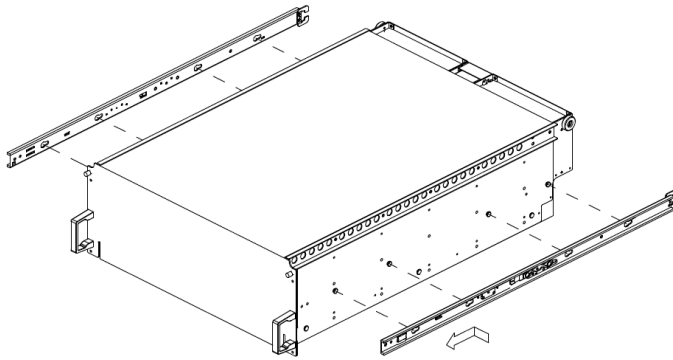


- b. Press on the safety latch release spring located on the side of the rail and slide the inner rail out the rest of the way.

Step 2: Install the inner rail onto the chassis making sure they are installed on the correct side. Each inner rail will read “R” for the right or “L” for the left embossed on the side that faces away from the chassis. Right and Left are with reference to looking at the front of the enclosure.

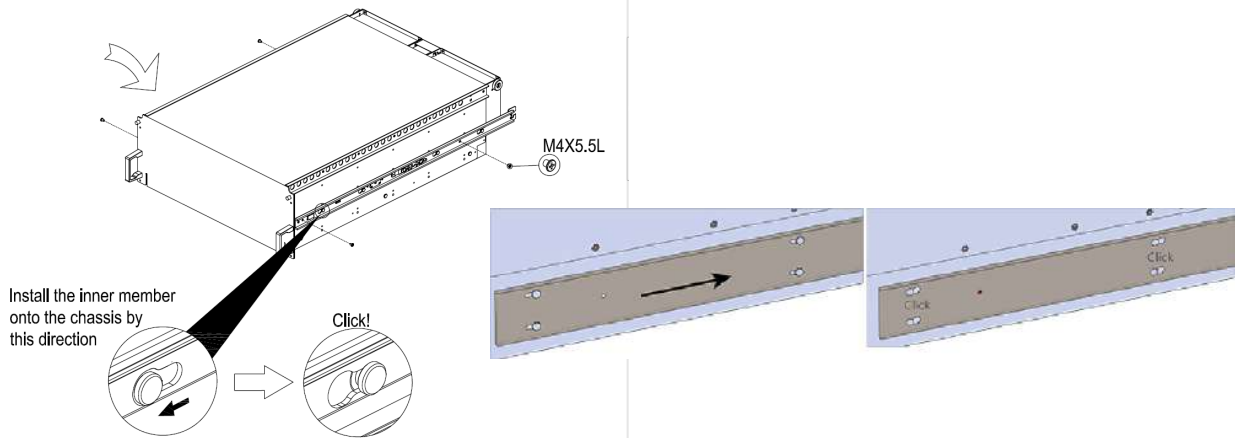
- a. Orient the inner rails so that the flat side is facing the enclosure and the side with the grooves is facing away from the enclosure.
- b. Align the keyholes on the inner rail to the mounting pegs on the side of the enclosure and press the inner rail flush against the chassis. If the keyholes don't line up with the pegs, flip the rail length-wise to see if this will align them.

Inner Rail Attachment



- c. Slide the inner rail toward the rear of the chassis to lock it in place. There will be an audible click and the mounting pegs will cover the front part of the keyhole.

Slide Inner Rail



- d. Install the three special screws provided in the rail hardware kit package to secure the inner rail to the chassis. **Use the screws provided for this purpose. Using the incorrect screw can damage the chassis.**
- e. Follow these steps for the second inner rail on the opposite side of the enclosure.

Step 3: Set the vertical rack rail depth to between 32" and 36".

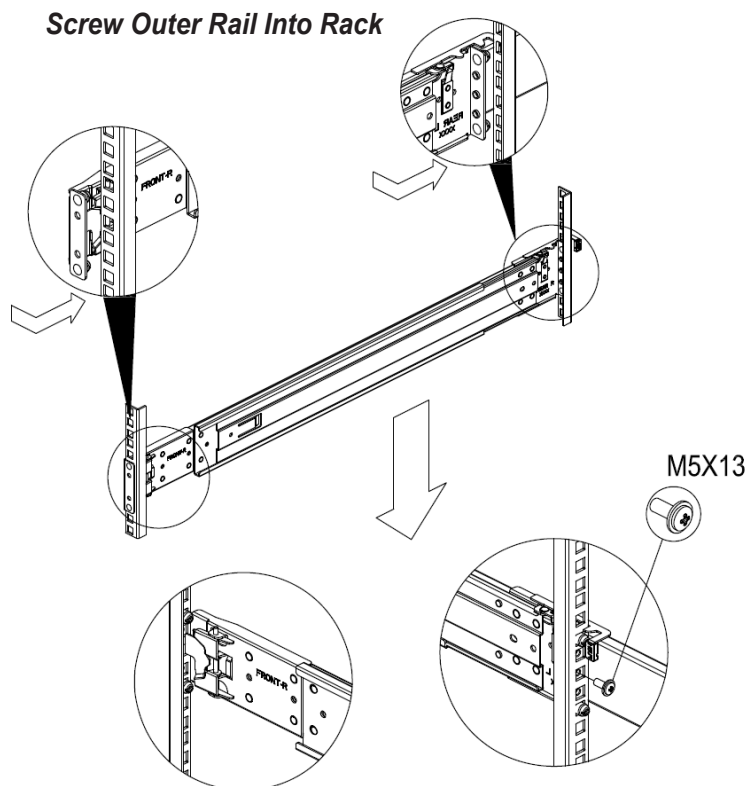


Ensure that all of the vertical rails are set to the same depth using a tape measure.

Step 4: Install the outer rails into the rack. Pay special attention to which side is being installed. The embossed R is for the right side and L is for the left side. Right and Left refer to when you are facing the front of the rack.

a. Move to the rear of the rack.

b. Orient the rail so that the word "REAR" that is embossed into the metal of the rail is at the rear end of the rack, and the release latch is facing the inside of the rack posts as shown in the following image.



c. Align the rail on the rack posts at the U-height desired for installation. The bottom of the rail will be the lower most U of the total 4U height.

d. Pull the rail toward the rack post until the latching mechanism engages the rack. The latching mechanism may need to be pulled open to get around the rack post.

e. Move to the front of the rack.

- f. Align the front of the rail with the holes on the rack posts that will receive the rails and pull the rail toward the holes until the latching mechanism engages the rack. If necessary, unscrew the rack post fasteners to enable the latching mechanism to engage. Screw the rack post fasteners back into the proper holes.
- g. Use a level to make sure that the rails are aligned properly.
- h. Follow these steps for the other outer rail.



CAUTION

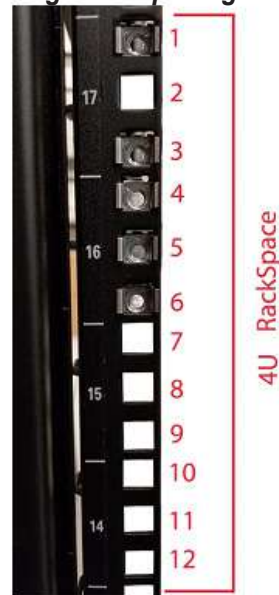
Always install the top cover onto the enclosure before installing the chassis into a rack. Not having the top cover installed may damage the alignment brackets.

Step 5: Install the rail mounting hardware, starting with the uppermost rack mounting hole of the 4U space on the front of the rack.

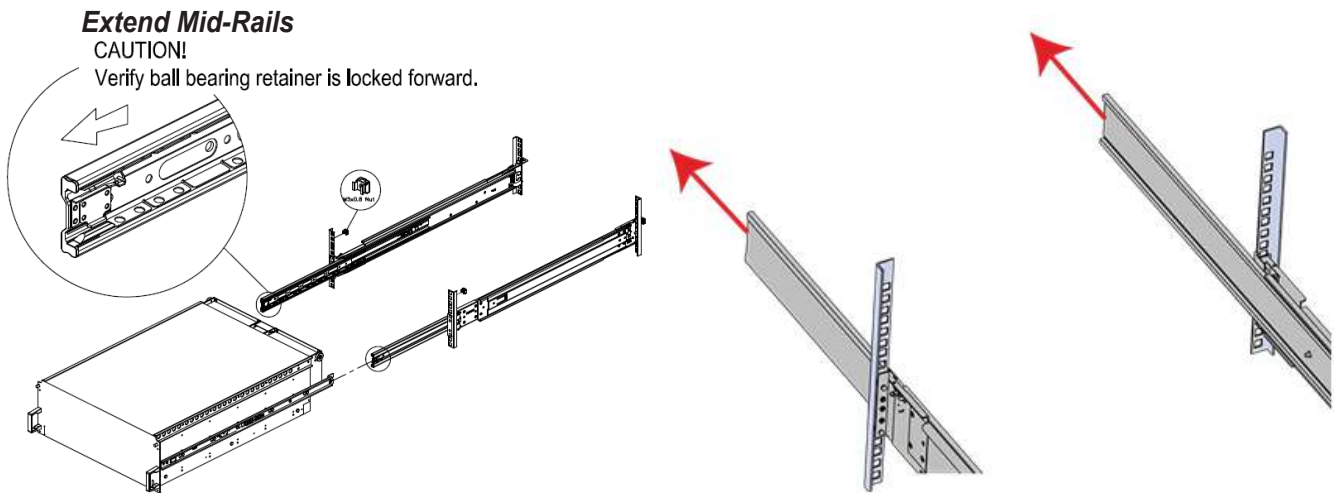
CMA Standard:

- a. Install one cagenut at the uppermost mounting hole of the 4U space that the enclosure will occupy.
- b. If the VTrak J5960 will be installed in a rack for shipping purposes, install four more M5 cage nuts in the holes 3-6 of the 4U space. These will receive the M5 x 12mm T15 Flat Head Torx screws that secure the enclosure to the rack with the shipping bracket.

Cage Nut Spacing



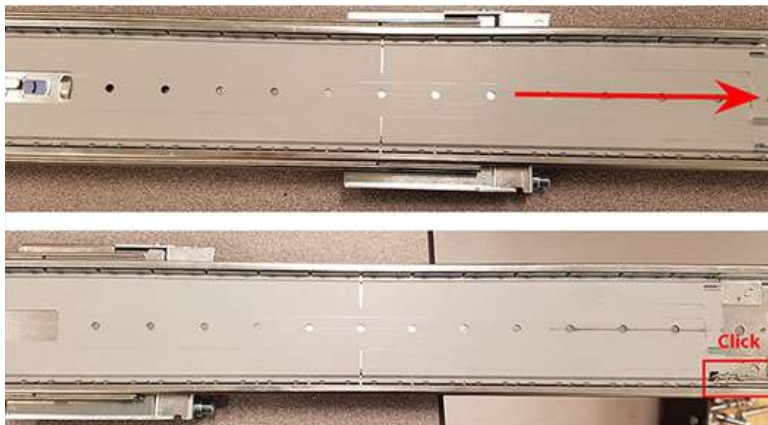
Step 5: Extend the mid-rails out of the rack so that they are protruding from the front of the rack and the safety latches engage.



Step 6: Install the chassis into the rails.

a. Extend the bearing plates on the inside of the mid-rails until they are fully forward (detent has engaged). This prevents potential damage due to improper mating of the rails.

Bearing Plate





CAUTION

This step in the installation requires a minimum of 3 individuals to install safely, two to lift and one to guide the others who may have difficulty seeing because the enclosure is in the way. Ensure that the appropriate measures are taken to safely support the enclosure during installation. The enclosure **MUST** have no drives installed and requires a two person team lift to install. Do not attempt to lift the system if it is fully populated with drives. The only case in which the system may be installed or removed with the drives populated is if the facility has a lift that is rated to handle the maximum weight of the fully loaded system.

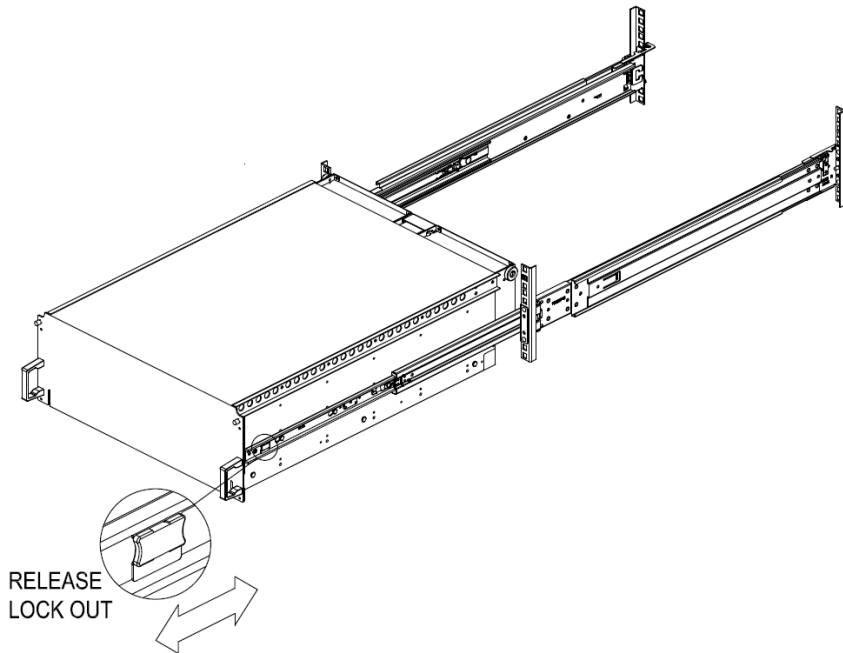


WARNING

The handles on the front of the chassis are not intended to be used to support the weight of the VTrak J5960. Lifting the unit by the chassis handles or trying to support the unit on the handles can cause them to fail. This can cause serious damage to the unit or serious bodily harm to those handling the unit. Always team lift the chassis by gripping the underside of the unit, and never try to lift a chassis that is filled with drives.

- b. In preparation to perform a team lift, position one individual on each side of the enclosure (to lift) and a third individual standing at the protruding rack rails (to guide the chassis to mate with rack rails).
- c. Team-lift the enclosure until the inner rails (which are attached to the chassis) align with the extended mid-rails (which are attached to the rack), and guide the inner rails on the chasis to mate with the rack rails.

Installing the Chassis



- d. Once the rails are mated properly, slide the enclosure into the rack until it is stopped by the safety catch on the rails. Push the release lever on the safety latch (located on the side of each of the rails), and push the enclosure the rest of the way into the rack.

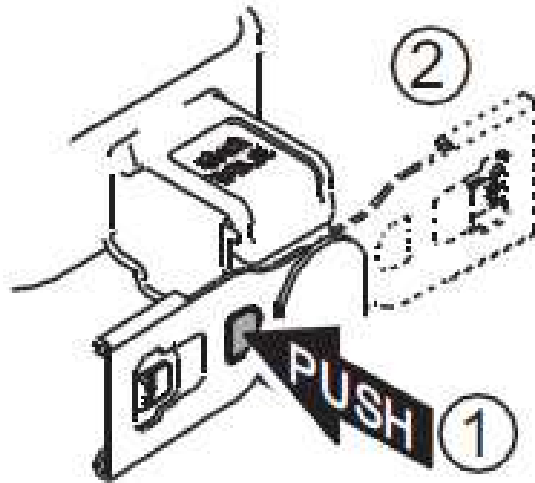
Rail Safety Latch



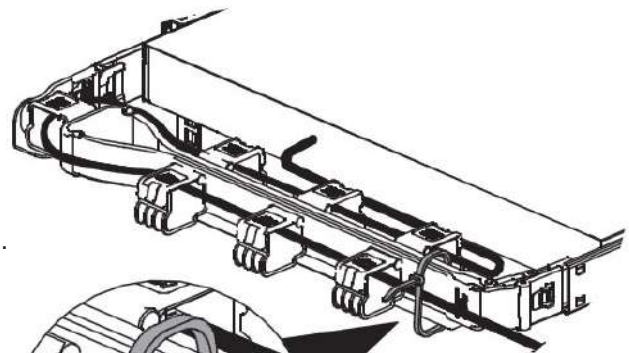
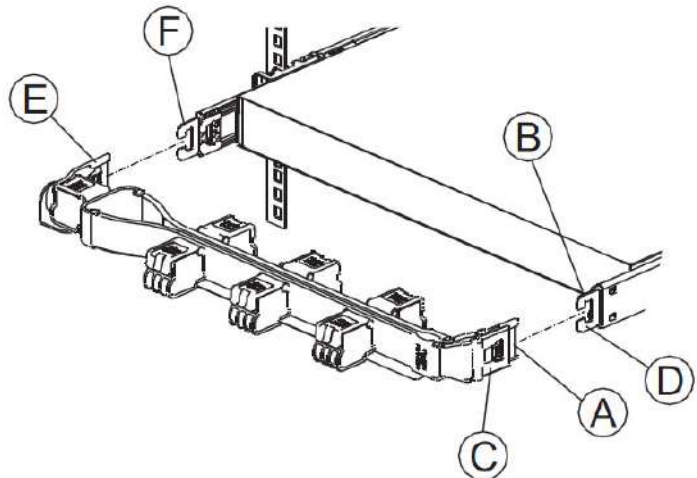
- e. As the chassis is slid into the rack, position one installer at the rear of the rack to ensure that the pegs on the sides of the cover will slide correctly into the rear cover alignment brackets on both sides of the rack. If the chassis does not install smoothly or snags, check that the rear cover alignment brackets are not interfering with the chassis sidewalls, and try again.

Before installation, check the Cable Management Arm (CMA) direction and switch the CMA connector.

1. Press PUSH button.
2. Spin 180 degrees to change direction.



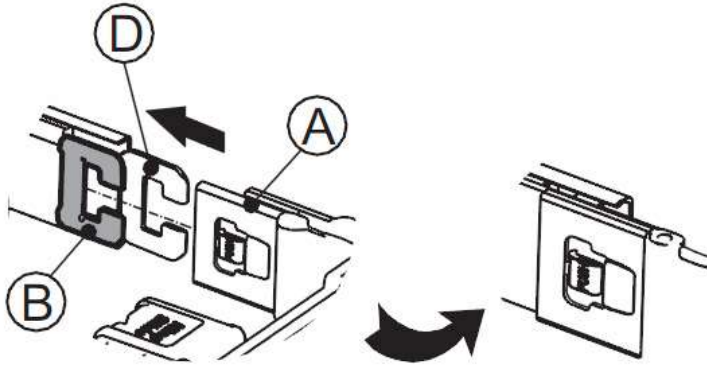
- A = CMA connector
- B = CMA connector base on inner member
- C = CMA connector
- D = CMA connector base on outer member
- E = CMA connector beside the center CMA body
- F = CMA connector base on outer member



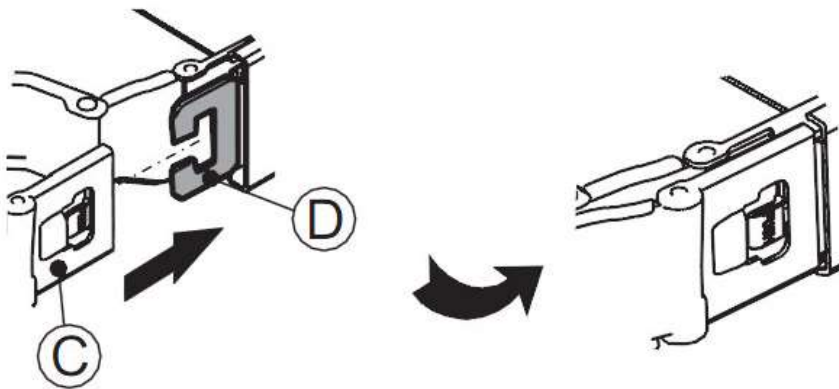
The loop strap is tied to the CMA crossbar when shipped.
Remove this strap for installation.

Cable Management Arm Installation

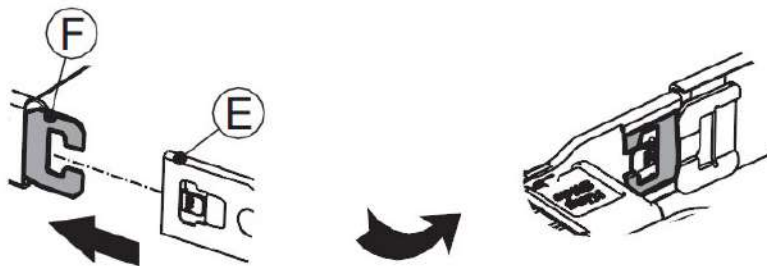
1. Install the inner member A onto B



2. Install the outer member C onto D.



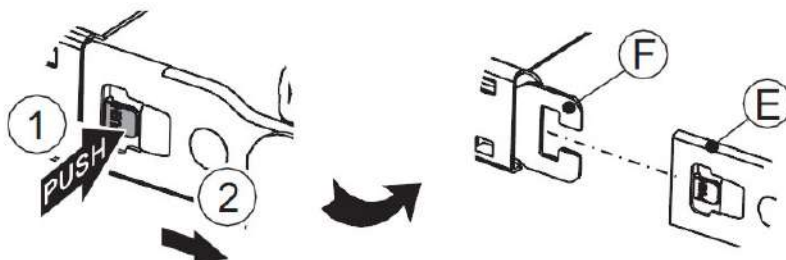
3. Install outer member E onto F.



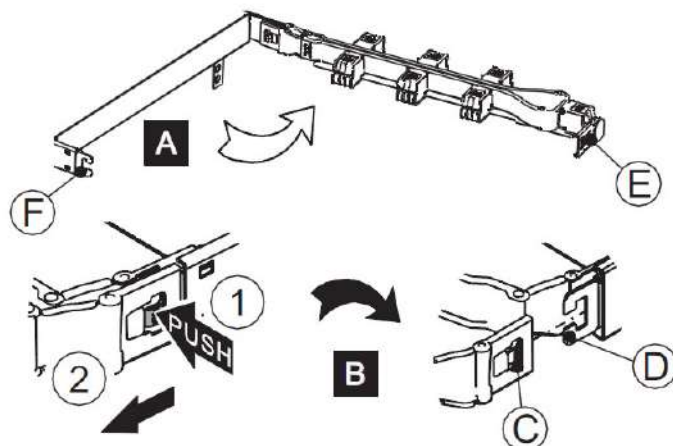
Cable Management Arm Release

1. Release the outer member.

Press PUSH button on the CMA plug-in part to draw it out.

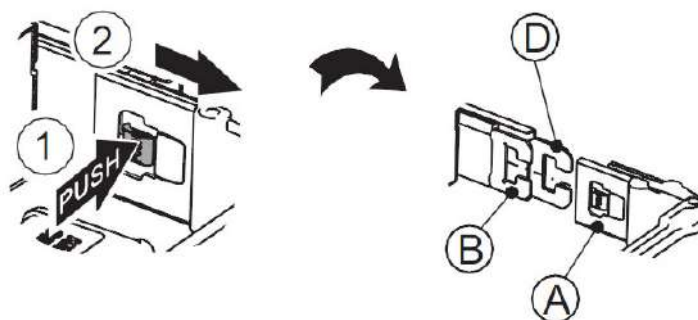


2. Release the outer member.
 - a. Turn CMA 90 degrees to the right hand side to maintain the chassis or resume the removal.
 - b. Press PUSH button on the CMA plug-in part to draw out.



3. Release the inner member

Press the PUSH button on the CMA plug-in part to draw it out.



Step 8: Cable the CMA(s).

- a. Unlatch the elbow side of the arm(s) by pressing the blue button labeled “push,” and then swing the arm(s) open.
- b. Gather the SAS, power, and Ethernet cables for installation. Before cabling, note the following routing patterns for best results:



Step 9: Now that the chassis is installed, test the installation by sliding the enclosure in and out of the rack a minimum of three times. If the enclosure binds, catches, or displays any incorrect motion or behavior repeat the installation.

Step 10: Grasp both handles at the front of the enclosure and pull with even pressure to extend the chassis out of the rack until it is stopped by the safety latches. The safety latches will prevent the enclosure from coming out of the rack completely and the cover will remain in the rack attached to the rear alignment brackets.

Step 11: Perform this same action two more times without the drives loaded to make sure the rail kits are installed properly.

Disk Carrier Assembly

The hard disk drives (HDD) must first be secured to the disk drive carriers before inserting the assembled drive carriers into the drive slots. The Drive carriers are shipped in place in the enclosure. It is necessary to slide the top cover to expose the drive carriers, then remove them for assembly.

Follow the instructions below to perform this task. The drive carriers support 3.5 HDD and 2.5" drives.

Be sure to take precautions against electrostatic discharge before unwrapping the HDD.



CAUTION

Electrostatic discharge can harm delicate components inside PROMISE products.

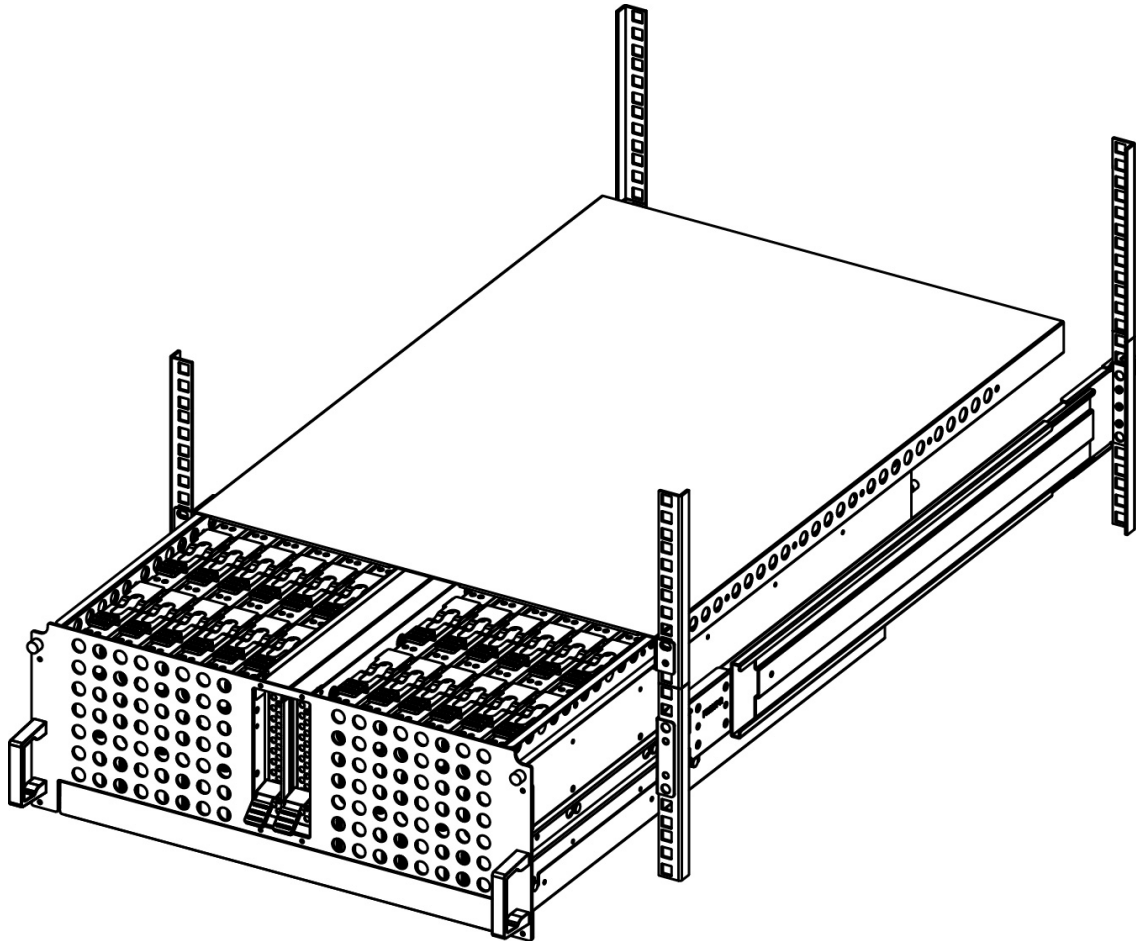
Electrostatic discharge (ESD) is a discharge of stored static electricity that can damage equipment and impair electrical circuitry. It occurs when electronic components are improperly handled and can result in complete or intermittent failures.

Wear an ESD wrist strap for installation, service and maintenance to prevent damage to components in the product. Ensure the antistatic wrist strap is attached to a chassis ground (any unpainted metal surface). If possible, keep one hand on the frame when you install or remove an ESD-sensitive part.

Before moving ESD-sensitive parts place them in ESD static-protective bags until you are ready to install the part.

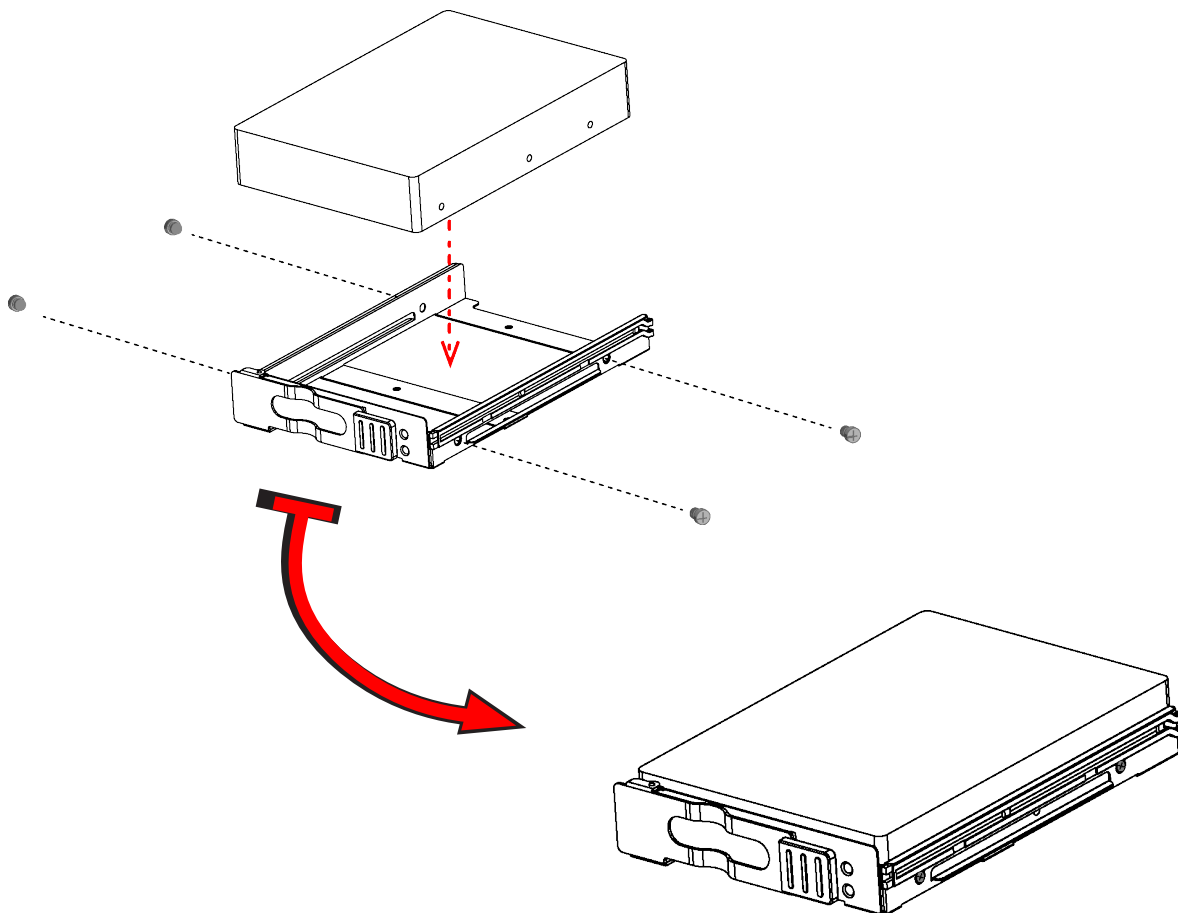
To remove the disk drive carriers:

1. Slide the top cover back to expose the empty carriers.
2. Pull the lever handle up to release the catch, use two hands to pull the drive carrier out grabbing the corners. **DO NOT pull the carrier by the lever handle.** This mechanism is only intended for securing the catch that holds the carrier in place.
3. Install an HDD into the drive carrier.



For each 3/5" HDD to assemble:

1. Carefully remove the HDD from the protective packaging.
2. Place the HDD in the drive carrier so the mounting screws can align with the screw holes, and the contacts are exposed at the open end of the drive carrier. When inserted into the VTrak J5960, the open end will be positioned on the downward end.
3. Secure the HDD in the drive carrier using the mounting screws provided for this purpose.



Installing Hard Disk Drives

Step 12: Install the 3.5in HDD Assembly.

- a. Ensure that the enclosure has been pulled out of the rack until the rail latches engage.
- b. Find the LED indicators on the top of the drive carrier. Orient the drive carrier so the LEDs are on the front of the enclosure.

Installing a 3.5 in HDD Assembly



- c. Align the drive with the empty slot that will receive it. Lower it into the slot, making sure it stays level and does not snag.
- d. Carefully press the top of the carrier assembly carefully downward to seat the 3.5 in HDD Assembly the rest of the way.
- e. Fasten the latch to secure the carrier assembly in place.

Step 13: Repeat the preceding steps to install each subsequent HDD using the same method as the first, populating the enclosure from left-to-right, rear-to-front.

Step 14: Now that the drives are installed into the chassis, test the installation by sliding the enclosure in and out of the rack a minimum of three times. If the enclosure binds, catches, or displays any incorrect motion or behavior retry the installation of the drives and chassis.

Step 15: If the chassis is being installed into a rack that will be shipped fully assembled, you must install eight (four per side) of the included Flat Head Torx screws into the two brackets at the front of the chassis in the following locations. These screws should be tightened to 3.38-3.61 Nm / 30-32 in-lbf using a Long T15 Torx Screwdriver. If this chassis will not be installed into a rack for shipping purposes, skip this step and move on to the next one.



CAUTION

To ensure proper airflow for enclosure cooling, all drive slots must be populated with either drives or drive blanks.

Step 16: Plug the enclosure power cords into a PSU to power the enclosure.

Step 17: Double check the power indicators and other LEDs to ensure that the system is booting.

Result: The enclosure is now installed.

Maintenance

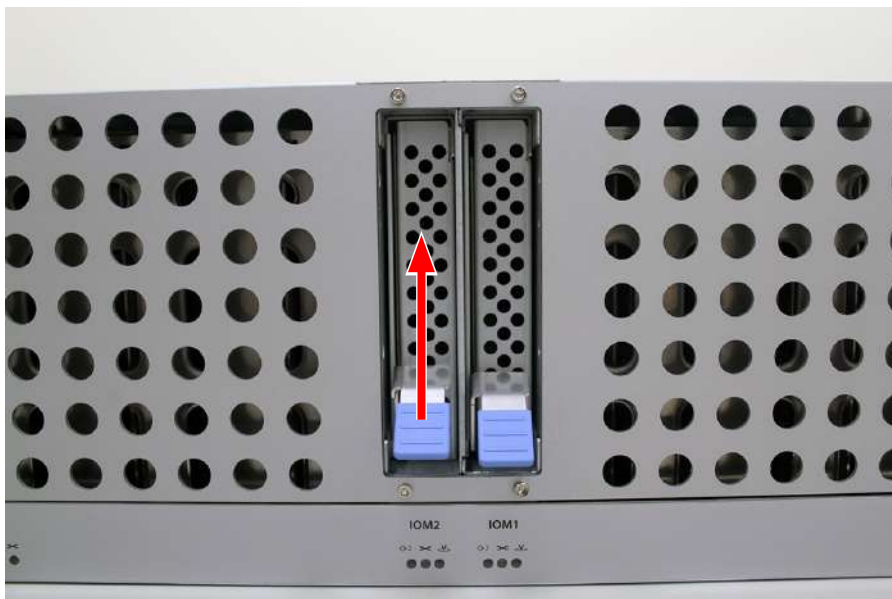
VTrak J5960 uses a modular design with placement of the various modules intended to make hardware module replacement easy to accomplish with the enclosure remaining in the rack. With the exception of the carrier disks, hardware module replacement can be accomplished without even sliding the device out from the rack. PSU, Fan and IO Modules are accessible from the front and back. Disk carriers require that the top be slid to expose the interior, which in most cases will require that the enclosure to slide out from the rack. In no circumstance will it be necessary to remove the enclosure from the sliding rail system. The Fan and PSU modules are situated above the Cable Management Arm, so these are easily accessible without adjusting the CMA.

As with all replacement components, please contact your PROMISE reseller for information on how to purchase replacement parts.

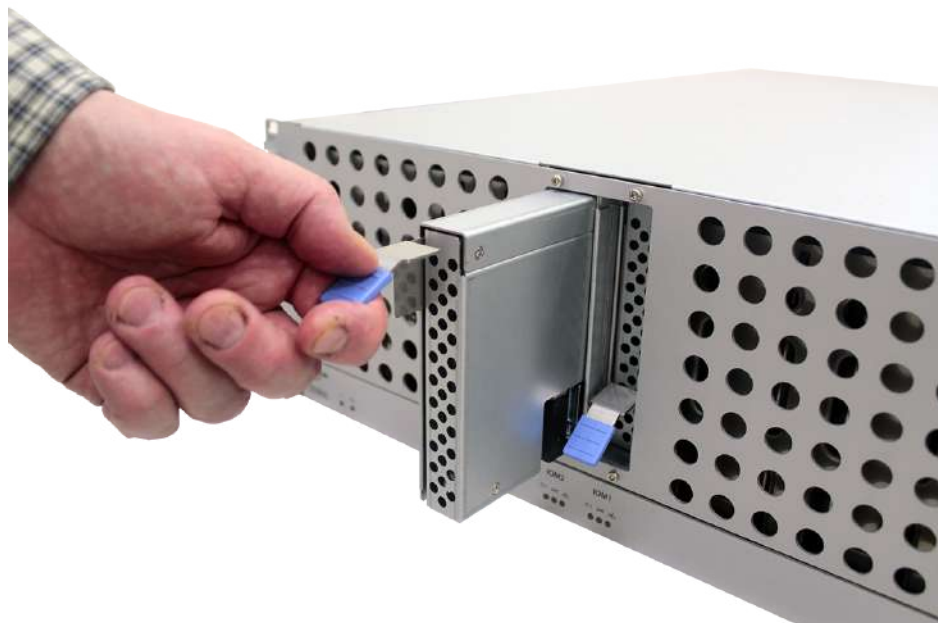
Replacing an IO Module

IO Modules are hot swappable. You will need access to the front of the VTrak J5960 to replace an IO module.

IO Modules on front of device



To remove the IO Module, lift the lever up to unseat the module and pull it toward you. It should slide out easily.

Lift lever on front of IO Module***Pull module straight out***

To replace the IO Module, simply perform the task in the reverse order. Align the module in the empty bay, slide in until it makes contact, press down on the lever to seat the unit. Check the LEDs for the new module to make sure it is working.

Replacing a Fan Module

Fan modules are hot swappable. To remove a Fan Module, loosen the screws on each side, grasp the handle and pull the unit straight out.

Fan Module replacement



To replace the fan module, perform the task in reverse. Align the Fan module in the empty bay, push in until it is flush with the back of the enclosure, tighten the screws to secure it in place. Check the Fan status LED to make sure it is functioning properly.

Replacing a PSU Module

PSU modules are hot swappable. To remove a PSU module, first disconnect and remove the power cable. Then press down on the release lever and pull on the handle, sliding the unit straight back.

PSU Module replacement



To install the new PSU, repeat the procedure in reverse order. Align the module in the empty bay and push straight in until the catch snaps. Check the PSU status LED after

SFF-8644 Connection

The setup description below references the illustration on the next page. In this example, a VTrak D5000 is used as the RAID head. Other compatible systems will be similarly connected using SFF-8644 Mini-SAS ports and cabling.

1. Connect the SFF-8644 expansion port (SFF-8644 port to the right) on the left controller of the RAID subsystem to the SFF-8644 port 1 on the left I/O module of the first VTrak J5960 unit.
2. Connect the SFF-8644 expansion port (SFF-8644 port to the right) on the right controller of the RAID subsystem to the SFF-8644 data port 1 on the right I/O module of the first VTrak J5960 unit.
3. Connect the SFF-8644 data port 2 on left I/O module of the first VTrak J5960 unit to the SFF-8644 data port 1 on the left I/O module of the second VTrak J5960 unit.
4. Connect the SFF-8644 data port 2 on right I/O module of the first VTrak J5960 unit to the SFF-8644 data port 1 on the right I/O module of the second VTrak J5960 unit.
5. Connect any remaining VTrak J5960 units in the same manner. Up to eight VTrak J5960 JBODs can be connected to a RAID head.

Note that it is possible to connect two or three SFF-8644 SAS cables to connect a RAID head or host to aggregate throughput. In this case, connect the additional SAS ports in the same manner described above using the remaining available ports.

It is also possible to use SAS zone configuration to connect directly to different hosts, where each host would have an SAS zone assigned only to that host.

VTrak J5960 SFF-8644 connection to a VTrak RAID head



MANAGING THE VTRAK J5960

The VTrak J5960 provides following two methods for management:

- a. SCSI Enclosure Services (SES) management via in-band SAS
- b. Command Line Interface (CLI) via out-of-band Serial console (RJ11), or out-of-band 1G network (RJ45) by SSH or Telnet.

The system includes a 1G network port in each IOM for management. The default network configuration for the management network port is DHCP disabled, the IP address 0.0.0.0; network settings must be configured for the management port(s) before the system can be managed via network interface.

The SSH and Telnet connection are password protected. Users must enter account and password when logging in with SSH or Telnet. The user name is “administrator” or “Administrator”, this cannot be changed; the default password is “password” the password can be changed using the “net” command. If an invalid password is entered 3 times, the VTrak J5960 will disconnect and not allow another login attempt for 30 seconds. The Telnet or SSH management connection can be terminated using the command “exit” or closing the interface.

This guide describes how to modify network configurations for the VTrak J5960. For first time setup, network settings must be changed using CLI via serial console or by SES commands via in-band SAS.

Network Settings

To modify network settings using CLI via out-band serial console:

Follow the steps listed below to change VTrak J5960 IOM network management port settings:

1. Connect an RS-232 cable between the VTrak J5960 IOM serial port and the host ULTRA port, then launch a serial console utility and set baud rate parameters to 115200,8,N,1 for a successful serial port connection.
2. Use the CLI net command to check current network configuration settings:

```
cli> net
=====
Physical Address. . . . . : 00-01-55-00-00-01
DHCP Enabled. . . . . : No
IP Address. . . . . : 10.10.10.2
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 10.10.10.254
Ethernet Link Status . . . . . : Up
Ethernet Link Speed . . . . . : 1000 Mbps
Ethernet Link Duplex Mode . . . . . : Full
=====
cli> █
```

3. Use “help” (-h) after the net command to view the command options:

```
cli> net -h

Usage:
  net
  net -m -d 1

Summary:
  The net command allows user to change static IP and show IP status.

Option:
  -?/-h          Help
  -l             List
  -m            Modify
  -p            Ping
  -a            ARP (List ARP table)

Sub-option (-m):
  -d 1          Enable DHCP
  -d 0          Disable DHCP
  -i <IP Address> -s <Subnet Mask> -g <Gateway> Set Static IP address.
  -i <IP Address> Set Static IP address
  -g <Gateway> Set Gateway address
  -s <Subnet Mask> Set Subnet Mask
  -pw -s       Set password used to login by SSH or Telnet
  -pw -c       Clear password used to login by SSH or Telnet

Sub-option (-p):
  -i <IP Address> -w <timeout> Ping with specific waiting time(default is 4000ms)

Examples:
  net -m -d 1
  net -m -i 10.0.10.10 -s 255.255.255.0
  net -m -i 10.0.10.10 -s 255.255.255.0 -g 10.0.10.254
  net -p -i 10.0.10.10
  net -p -i 10.0.10.10 -w 4000
  net -a
  net -m -pw -s
  net -m -pw -c

cli>
```

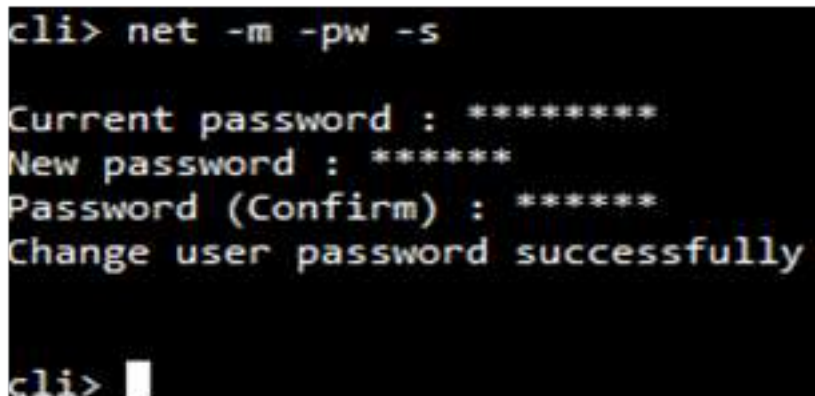
4. Example, to enable DHCP for network settings on the IOM network management port:

```
cli> net -m -d 1
```

5. Example, to set a static IP settings for the IOM network management port:

```
cli> net -m -i 10.10.10.3 -s 255.255.255.0 -g 10.10.10.254
```

- The default password “password” used for login can be changed with the net command `net -m -pw -s`



```
cli> net -m -pw -s
Current password : *****
New password : *****
Password (Confirm) : *****
Change user password successfully
cli>
```

- To restore the factory default password with the net command `net -m -pw -c`

To modify network settings using SES commands via in-band SAS:

VTrak J5960 supports 0xAF SES page for network configuration. The 0xAF is a vendor specific SES page used to query and set network configuration on the VTrak J5960.

I. To check the IOM management port network configuration using 0xAF SES page:

Use the table below for details of the IOM management port network configurations.

For example, assume the status of network is the following:

- MAC : 00-01-05-00-00-00
- DHCP : Disable
- IP : 10.92.54.101
- Subnet Mask : 255.255.255.0
- Gateway : 10.92.54.254
- Link Status : Up
- Link speed : 100 Mbps
- Duplex Mode : Full

The picture below is an example of the listed details about current network configurations.

```

00 af 00 00 fc 00 00 00 00 00 00 00 00 00 00 00 .....
10 4d 41 43 20 3a 20 30 30 2d 30 31 2d 35 35 2d 30 MAC : 00-01-55-0
20 30 2d 30 30 2d 30 30 00 00 00 00 00 00 00 00 00-00-00.....
30 44 48 43 50 20 3a 20 44 69 73 61 62 6c 65 00 00 DHCP : Disable..
40 49 50 20 3a 20 31 30 2e 39 32 2e 35 34 2e 31 30 IP : 10.92.54.10
50 31 00 00 00 00 00 00 00 00 00 00 00 00 00 00 1.....
60 53 75 62 6e 65 74 20 4d 61 73 6b 20 3a 20 32 35 Subnet Mask : 25
70 35 2e 32 35 35 2e 32 35 35 2e 30 00 00 00 00 00 5.255.255.0.....
80 47 61 74 65 77 61 79 20 3a 20 31 30 2e 39 32 2e Gateway : 10.92.
90 35 34 2e 32 35 34 00 00 00 00 00 00 00 00 00 00 54.254.....
a0 4c 69 6e 6b 20 53 74 61 74 75 73 20 3a 20 55 70 Link Status : Up
b0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
c0 4c 69 6e 6b 20 53 70 65 65 64 20 3a 20 31 30 30 Link Speed : 100
d0 30 20 4d 62 70 73 00 00 00 00 00 00 00 00 00 00 0 Mbps.....
e0 44 75 70 6c 65 78 20 4d 6f 64 65 20 3a 20 46 75 Duplex Mode : Fu
f0 6c 6c 00 00 00 00 00 00 00 00 00 00 00 00 00 ll.....
    
```

II. To change IOM management port network configuration using the 0xAF SES page:

The table below lists the format of 0xAF SES page.

The detailed definitions for set operation of network configurations are listed below:

- 1. DHCP Enable
 - a. Enable DHCP: 0x01
 - b. Disable DHCP: 0x02
 - c. Reserved: All values except for 0x01 and 0x02.
- 2. IP Value#1 ~ IP Value#4
 - a. Keep original configuration of IP: 0x00 0x00 0x00 0x00
 - b. Modify configuration of IP: Any values except 0x00 0x00 0x00 0x00.
- 3. Subnet Mask#1 ~ Subnet Mask#4
 - a. Keep original configuration of subnet mask: 0x00 0x00 0x00 0x00
 - b. Modify configuration of subnet mask: Any values except 0x00 0x00 0x00 0x00.
- 4. Gateway#1 ~ Gateway#4
 - a. Keep original configuration of gateway: 0x00 0x00 0x00 0x00
 - b. Modify configuration of gateway: Any other values except 0x00 0x00 0x00 0x00.

The following is an example to enable DHCP:

The following is an example to configure a static IP address for the IOM management port:

1. IP: 10.92.54.99
2. Subnet: 255.255.255.0
3. Gateway: 10.92.54.254

The following is another example (without setting Gateway IP) to set a static IP address for the IOM management port:

- IP: 10.92.54.99
- Subnet: 255.255.255.0

III. The following is an example to get IOM management port network configuration via SAS in-band by sg3 utility in a Linux Host.

- a. Execute lsscsi and then find Promise enclosure from the sg device list.

lsscsi -g

Note: If the user connects an SAS cable between the VTrak J5960 dual IOMs to the Host SAS HBA, then two enclosure devices (sg31 and sg122) will be found. The reversion "1013" is an abbreviation from VTrak J5960 FW version 01.00.0000.13

```
[0:0:676:0] enclosu Promise 4U-SAS-60-D BP 1013 - /dev/sg1
[0:0:687:0] enclosu Promise 4U-SAS-60-D BP 1013 - /dev/sg12
```

```
root@localhost ~]# lsscsi -g
[0:0:676:0] enclosu Promise 4U-SAS-60-D BP 1013 - /dev/sg1
[0:0:677:0] disk WDC WUH721818AL5204 C120 /dev/sdb /dev/sg2
[0:0:678:0] disk WDC WUH721818AL5204 C120 /dev/sdc /dev/sg3
[0:0:679:0] disk WDC WUH721818AL5204 C120 /dev/sdd /dev/sg4
[0:0:680:0] disk WDC WUH721818AL5204 C120 /dev/sde /dev/sg5
[0:0:681:0] disk WDC WUH721818AL5204 C120 /dev/sdf /dev/sg6
[0:0:682:0] disk WDC WUH721818AL5204 C120 /dev/sdg /dev/sg7
[0:0:683:0] disk WDC WUH721818AL5204 C120 /dev/sdh /dev/sg8
[0:0:684:0] disk WDC WUH721818AL5204 C120 /dev/sdi /dev/sg9
[0:0:685:0] disk HGST HUH721212AL5200 A3D0 /dev/sdj /dev/sg10
[0:0:686:0] disk HGST HUH721212AL5200 A3D0 /dev/sdk /dev/sg11
[0:0:687:0] enclosu Promise 4U-SAS-60-D BP 1013 - /dev/sg12
[0:0:688:0] disk WDC WUH721818AL5204 C120 /dev/sdl /dev/sg13
[0:0:689:0] disk WDC WUH721818AL5204 C120 /dev/sdm /dev/sg14
```


b. The following is an example to enable DHCP:

- Execute `sg_senddiag sg3` utility to issue SEND DIAGNOSTIC (0x1C) SCSI commands to set 0xAF SES page to J5960 IOM.

The following is sequence of hex bytes to form diag page to send

af,00,00,0e,01,00,00,00,00,00,00,00,00,00,00,00

- Execute `sg_ses sg3` utility to issue RECEIVE DIAGNOSTIC (0x1D) SCSI commands to get 0xAF SES page for the VTrak J5960 IOM network configuration. This command is used to query current network settings from the VTrak J5960 IOM.

```
[root@localhost ~]# sg_senddiag --pf -vv --raw=af,00,00,0e,01,00,00,00,00,00,00,00,00,00,00,00,
open /dev/sg1 with flags=0x802
Send diagnostic cmd: 1d 10 00 00 12 00
Send diagnostic parameter list:
af 00 00 0e 01 00 00 00 00 00 00 00 00 00 00 00
00 00
[root@localhost ~]#
[root@localhost ~]# sg_ses -p 0xaf /dev/sg1
Promise 4U-SAS-60-D-BP 1013
Cannot decode response from diagnostic page: <unknown>
00 af 00 00 fc 00 00 00 00 00 00 00 00 00 00 00 00
10 4d 41 43 20 3a 20 30 30 2d 30 31 2d 35 35 2d 30 MAC : 00-01-55-0
20 30 2d 30 30 2d 30 30 00 00 00 00 00 00 00 00 0-00-00
30 44 48 43 50 20 3a 20 45 6e 61 62 6c 65 00 00 00 DHCP : Enable..
40 49 50 20 3a 20 31 30 2e 39 32 2e 35 33 2e 31 31 IP : 10.92.53.11
50 30 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0
60 53 75 62 6e 65 74 20 4d 61 73 6b 20 3a 20 32 35 Subnet Mask : 25
70 35 2e 32 35 35 2e 32 35 35 2e 30 00 00 00 00 00 5.255.255.0
80 47 61 74 65 77 61 79 20 3a 20 31 30 2e 39 32 2e Gateway : 10.92.
90 35 33 2e 32 35 34 00 00 00 00 00 00 00 00 00 00 53.254
a0 4c 69 6e 6b 20 53 74 61 74 75 73 20 3a 20 55 70 Link Status : Up
b0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
c0 4c 69 6e 6b 20 53 70 65 65 64 20 3a 20 31 30 30 Link Speed : 100
d0 30 20 4d 62 70 73 00 00 00 00 00 00 00 00 00 00 0 Mbps
e0 44 75 70 6c 65 78 20 4d 6f 64 65 20 3a 20 46 75 Duplex Mode : Fu
f0 6c 6c 00 00 00 00 00 00 00 00 00 00 00 00 00 00 11.....
[root@localhost ~]#
```

c. The following is an example to set a static IP (IP addr: 10.92.54.99, Subnet: 255.255.255.0, Gateway: 10.92.54.254) for the VTrak J5960 IOM.

- Execute `sg_senddiag sg3` utility to issue SEND DIAGNOSTIC (0x1C) SCSI commands to set 0xAF SES page to J5960 IOM.

The following is a sequence of hex bytes to form diag page to send

af,00,00,0e,00,0a,5c,36,63,ff,ff,ff,00,0a,5c,36,fe,00

- Execute `sg_ses sg3` utility to issue RECEIVE DIAGNOSTIC (0x1D) SCSI commands to get 0xAF SES page for VTrak J5960 IOM network configurations. Use this command to query current network settings from the VTrak J5960 IOM.

SAS Zones

The concept of SAS zones for grouping disks drives has been developed and implemented in the SAS 3 standard. In VTrak J5960, SAS Zone Configuration enables users to configure data hosts to access a specified group of hard disk drives via SAS (Serial Attached SCSI). Zone configuration hard disk drive access control is used for the traffic segregation, resource flexibility, improved security, and topology control functionality.

VTrak J5960 provides following two methods for SAS Zone management.

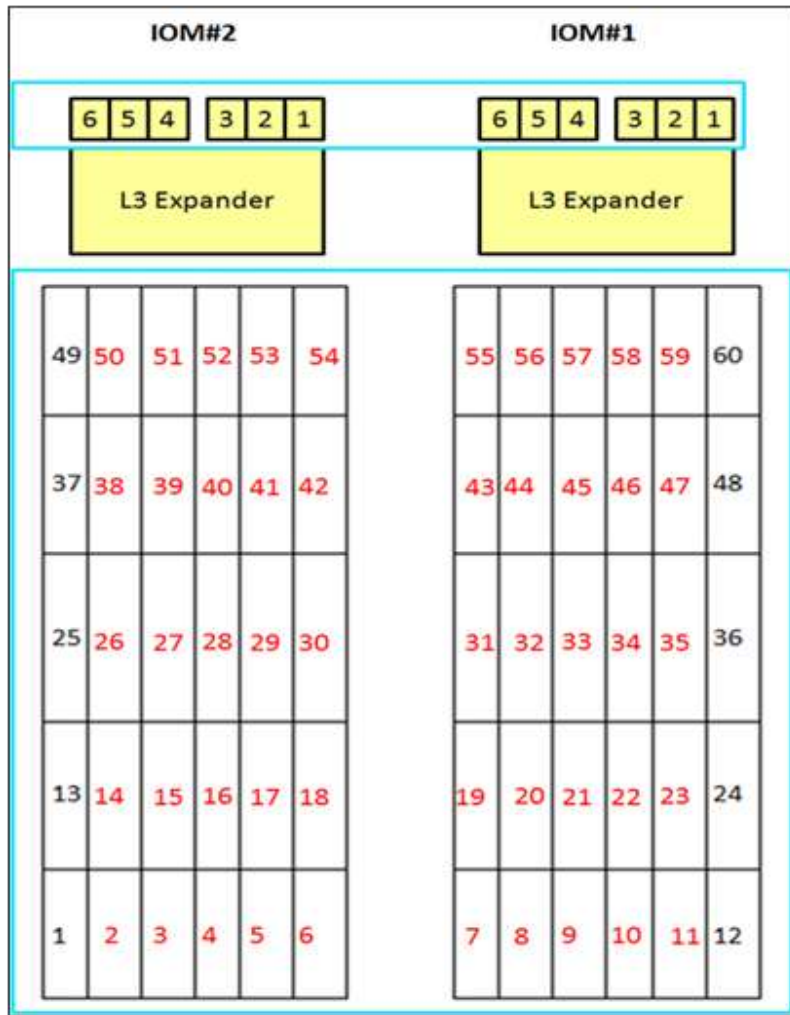
1. SES (SCSI Enclosure Services) management by 0xAD SES page via in-band SAS.
2. CLI (Command Line Interface) enclosure command via out-of-band Serial console (RJ11), or out-of-band 1G network (RJ45) by SSH or Telnet.

SAS Zone Configuration

VTrak J5960 offers six zone configuration options, including no zoning. These options are listed in the descriptions below. By default, SAS access configuration is disabled, which means all hosts can access all disks.

Zoning Configuration 0: No Zoning

As the name itself implies, in “No Zoning” configuration each Hard Disk Drive can be accessed from any uplink connector. There is no restriction or access control from the Expander. As depicted in diagram below:



Zoning Configuration 1

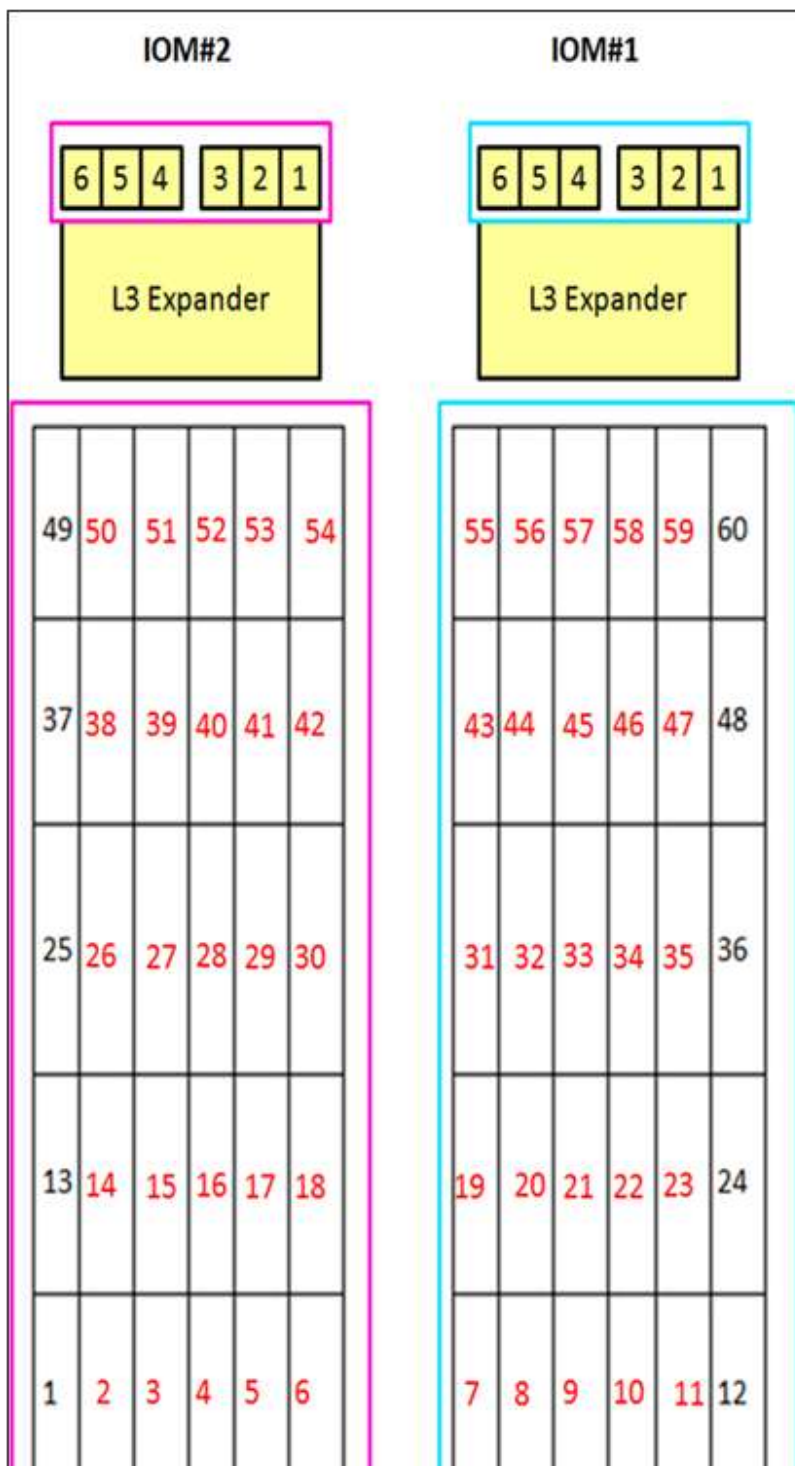
In Zoning Configuration 1, the Hard Disk Drive pool is divided evenly into two groups.

To make the allocation user friendly and easy identify; drive slots are divided right at the middle of the enclosure.

Zoning configuration allocates Disk Group 1 to IOM1 and Disk Group 2 to IOM2.

IOM1 cannot access any disk drive within Disk Group 2 and vice-versa.

Disk Groups	Disk Drive Slots
Disk Group 1	7, 8, 9, 10, 11, 12, 19, 20, 21, 22, 23, 24, 31, 32, 33, 34, 35, 36, 43, 44, 45, 46, 47, 48, 55, 56, 57, 58, 59, 60
Disk Group 2	1, 2, 3, 4, 5, 6, 13, 14, 15, 16, 17, 18, 25, 26, 27, 28, 29, 30, 37, 38, 39, 40, 41, 42, 49, 50, 51, 52, 53, 54

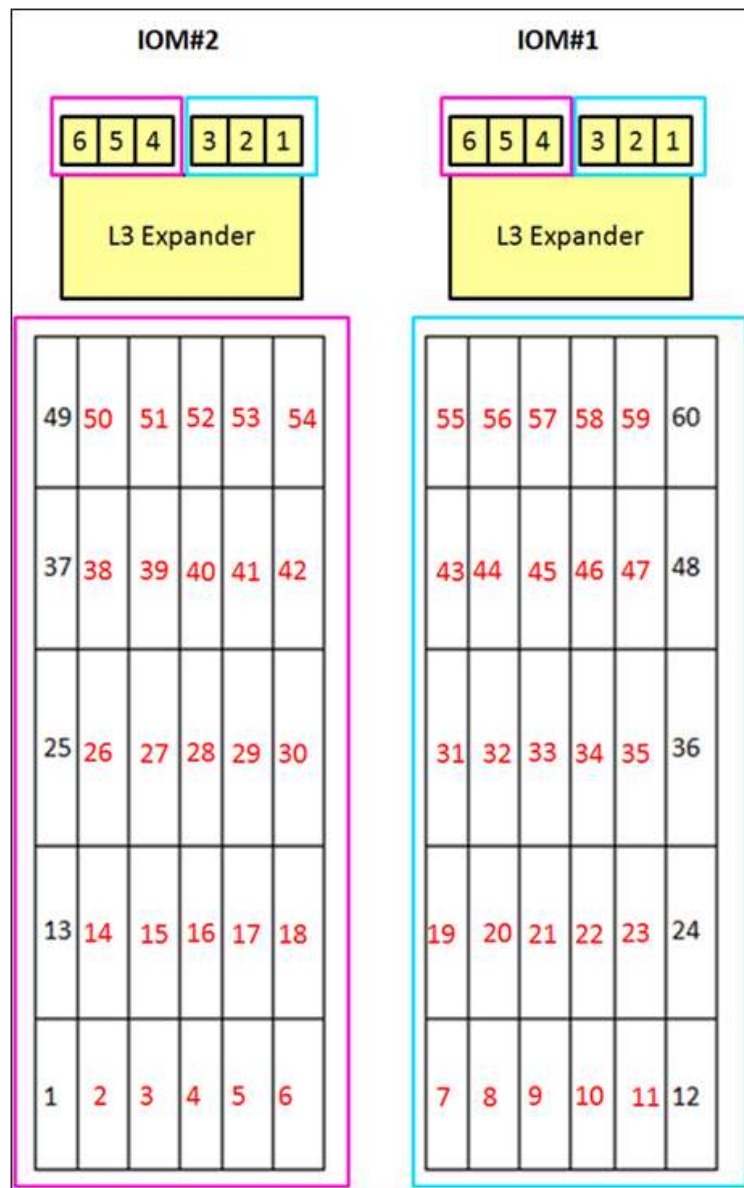


Zoning Configuration 2

In Zoning Configuration 2, the Hard Disk Drive pool is divided evenly into two groups of 30 drives. Access is divided between uplinks on both IOMs.

Disk Groups	Disk Drive Slots
Disk Group 1	7, 8, 9, 10, 11, 12, 19, 20, 21, 22, 23, 24, 31, 32, 33, 34, 35, 36, 43, 44, 45, 46, 47, 48, 55, 56, 57, 58, 59, 60
Disk Group 2	1, 2, 3, 4, 5, 6, 13, 14, 15, 16, 17, 18, 25, 26, 27, 28, 29, 30, 37, 38, 39, 40, 41, 42, 49, 50, 51, 52, 53, 54

- SAS ports 1, 2 and 3 of both IOMs, can access Disk Group 1
- SAS ports 4, 5 and 6 of both IOMs, can access Disk Group 2

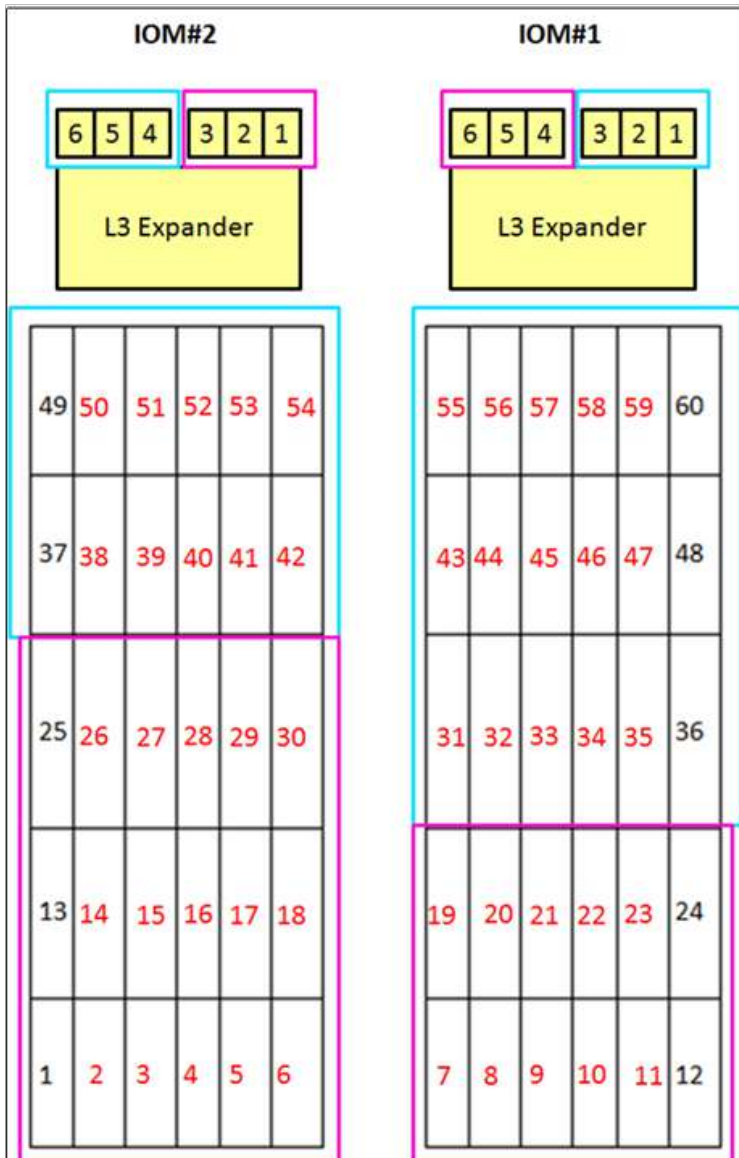


Zoning Configuration 3

In Zoning Configuration 3, the Hard Disk Drive pool is divided evenly into two groups of 30 drives. Access is divided between uplinks on both IOMs.

Disk Groups	Disk Drive Slots
Disk Group 1	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30,31
Disk Group 2	32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60

- In IOM1 position, SAS ports 1, 2, 3 can access Disk Group 2, and SAS ports 4, 5, 6 can access Disk Group 1.
- In IOM2 position, SAS ports 1, 2, 3 can access Disk Group 1, and SAS ports 4, 5, 6 can access Disk Group 2.

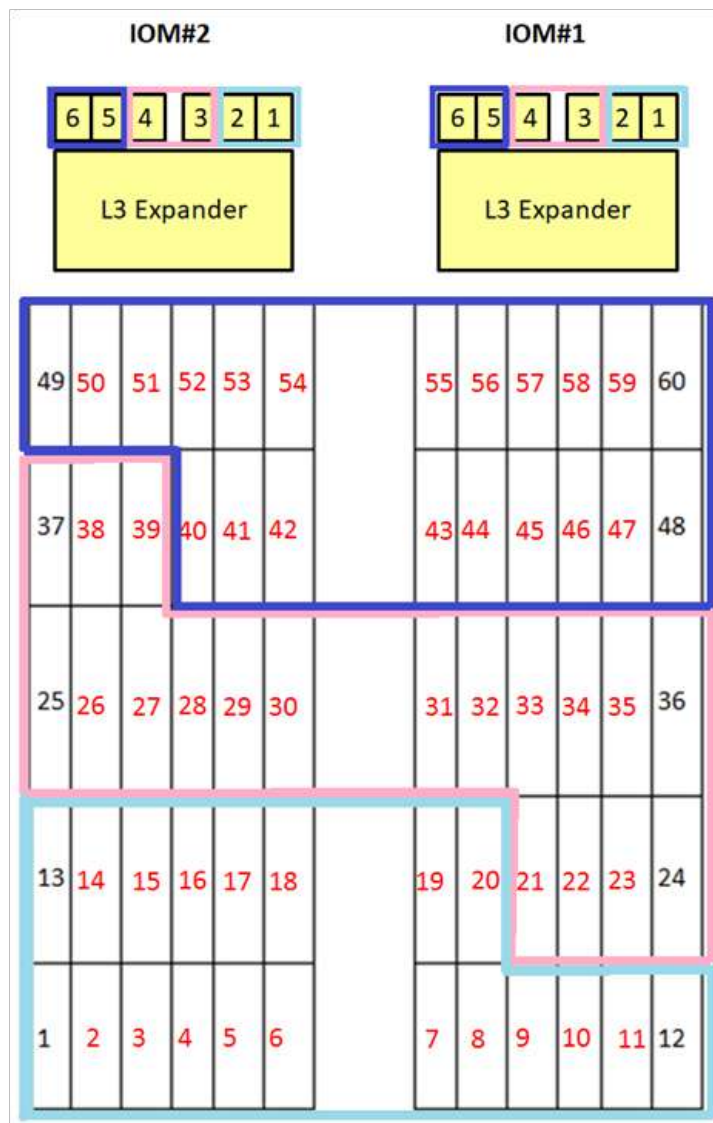


Zoning Configuration 4

In Zoning Configuration 4, the Hard Disk Drive pool is divided evenly into three groups of 20 drives. Access is divided between uplinks on both IOMs.

Disk Groups	Disk Drive Slots
Disk Group 1	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20
Disk Group 2	21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40
Disk Group 3	41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60

- SAS ports 1 and 2 of both IOMs, can access Disk Group 1
- SAS ports 3 and 4 of both IOMs, can access Disk Group 2
- SAS ports 5 and 6 of both IOMs, can access Disk Group 3

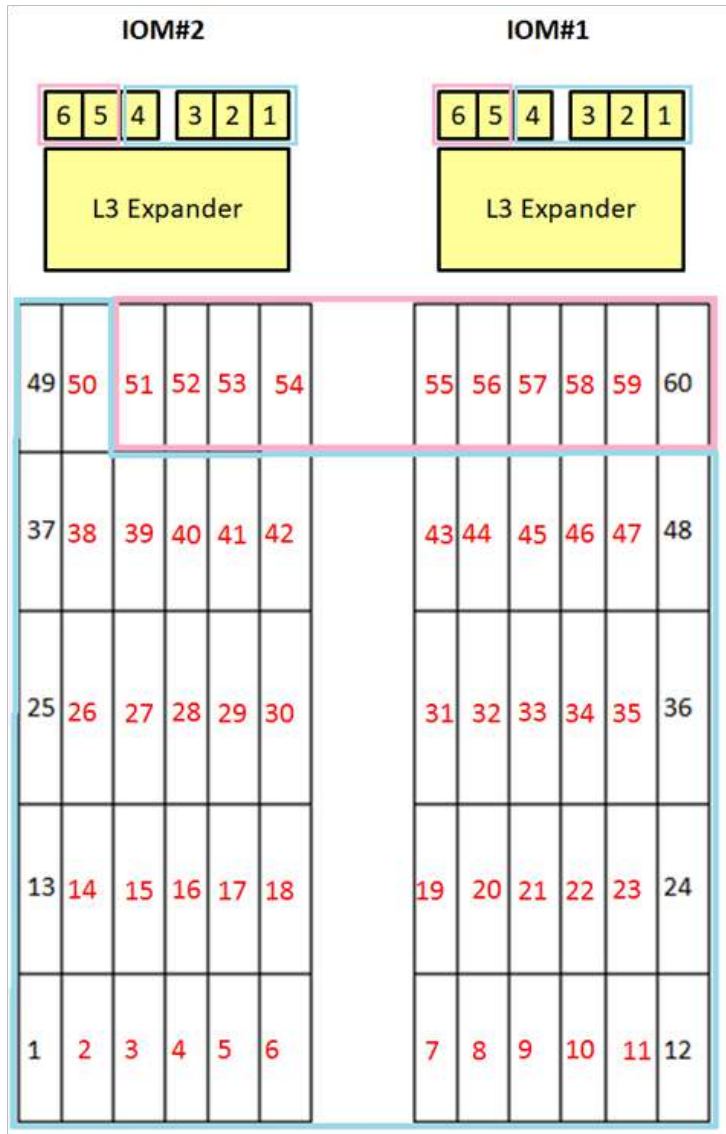


Zoning Configuration 5

In Zoning Configuration 5, the Disk Drive pool is divided evenly into two groups. The disk group 1 includes 50 hard disks, the disk group 2 includes 10 SSDs for high bandwidth or high IOPS applications. Access is divided between uplinks on both IOMs.

Disk Groups	Disk Drive Slots
Disk Group 1	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50
Disk Group 2	51, 52, 53, 54, 55, 56, 57, 58, 59, 60

- SAS ports 1, 2, 3 and 4 of both IOMs, can access Disk Group 1
- SAS ports 5 and 6 of both IOMs, can access Disk Group 2



I. To set SAS zone configuration using CLI command via out-of-band serial console, SSH or Telnet:

Follow the procedure below for CLI operations by serial console:

1. Connect an RS-232 cable between the VTrak J5960 IOM serial port and the host ULTRA port, then launch a serial console utility and set baud rate related parameters (115200,8,N,1) to connect the VTrak J5960 IOM serial port before begin CLI operations.
2. Check current SAS zone configuration with CLI enclosure command:

```
cli> enclosure

System Information:
-----
Time since system powerup: 0 day 0 hour 0 minute 22 seconds
Enclosure      : VtrakJBOD 4U-60
Serial Number  :
I/O Module ID : 1           I/O Module Role   : Primary
Firmware Version : 01.00.0000.17  Max I/O Module Cnt : 2
Max HDD Slot   : 60         Max Connectors    : 6/6
Zone Type      : 0         NVSRAM            : 128K Bytes

Disk spin up management: Enabled

Pending SES command: 0
```

3. On-line help for the enclosure command:

```
cli> enclosure -h

Usage:
  enclosure -?/-h
  enclosure -l
  enclosure -m -r <option>
  enclosure -m -t <option>
  enclosure -m -z <zoning config>
  enclosure -m -c <sensor_id> <threshold_value>
  enclosure -m -w <sensor_id> <threshold_value>
  enclosure -m -f <min_fan_lvl>
  enclosure -m -i <action>

Summary:
  The enclosure command allows user to view/modify enclosure
  information and settings.

Option:

  -?/-h      Help
  -l         List
  -m         Modify

Sub-option:

  -r <option> System restart or shutdown
              <option> = 1 : Restart the controller.
              <option> = 2 : Restart the system.
              <option> = 3 : Restart the primary controller.

  -t <option> Enable or disable thermal manager function.
              <option> = 0 : Disable thermal manager function.
              <option> = 1 : Enable thermal manager function.

  -z <zoning config> Set Zoning configuration.
                    Zoning Config = 0~5
                    0: No zone.
                    1: Zone Config One.
                    2: Zone Config Two.
                    3: Zone Config Three.
                    4: Zone Config Four.
                    5: Zone Config Five.
```


4. Set SAS zone configuration (an example to set SAS zone configuration 2):

```
cli> enclosure -m -z 2

Wait for a few seconds to do synchronization...

Set Zoning Configuration to Zone 2

Setting successful, Please reboot system

cli>
```

5. Power cycle VTrak J5960 or execute CLI enclosure command (enclosure -m -r 2) to restart the VTrak J5960.

After the boot procedure is completed, check the current SAS zone configuration with the **enclosure** command.

```
cli> enclosure -m -r 2
```

If the user queries or sets SAS zoning configuration by SSH (or Telnet) via out-of-band 1G network (RJ45), then connect and login to VTrak J5960 IOM by SSH or Telnet utility first, then follow same procedure #2 ~ #5 to query and set SAS zone configuration with the enclosure command.

II. To set SAS zone configuration SES command via in-band SAS:

VTrak J5960 supports 0xAD SES page to query and set SAS Zone configuration. The page 0xAD is a vendor specific SES page for SAS zoning application.

Byte\Bit	7	6	5	4	3	2	1	0
0	Page Code 0xAD							
1	Reserved							
2	Page Length 0x00 0x0C							
3								
4	Configure Type							
5	Zone Type							
6	Reserved							
15								

The following is detailed definitions for SES page 0xAD.

1. Configure Type

- Valid value: 0, 1
- Set Configure Type to 1 when set any Zone Type by 0xAD SES control page.
- When query SAS Zone configuration and check Configure Type from returned 0xAD SES status page, 0 means no Zone, 1 means any Zone configuration be set.

2. Zone Type

Valid value: 0 ~ 5 (0 means no Zone, 1 ~ 5 means specific Zone configuration be set)

The following page 0xA1 is a vendor specific SES control page to restart VTrak J5960, user can power cycle VTrak J5960 directly or send SES page 0xA1 to VTrak J5960 IOM to restart dual IOMs and activate the new SAS Zone configuration.

Caution: Before sending SES control page 0xA1 to restart VTrak J5960 IOMs, make sure to wait until the previous executing command is completed and there are no read/write I/Os from the Host. Otherwise, a forced restart of VTrak J5960 IOMs can cause data loss or other detrimental results.

Byte\Bit	7	6	5	4	3	2	1	0
0	Page Code 0xA1							
1	Reserved							
2	Page Length 0x00 0x04							
3								
4	Reserved	RQST WOS POWER OFF	FORCE SPS (AAMUX) RST	RQST RSET SPS (AAMUX)	RQST RST IOM	RQST RST DUAL IOM	RQST POWER OFF	
5	Reserved							
7								

The following are detailed definitions for SES page 0xA1.

1. (1). The RQST RST DUAL IOM bit set to 1 specifies the enclosure services to reset both IOMs, which can be used after IOM firmware download.
2. (2). The RQSR RST IOM bit set to 1 specifies the enclosure services to reset this IOM, which can be used after IOM firmware download.
3. *The RQST RSET SPSc is not supported in J5960 product.*
4. *The FORCE SPS RST is not supported in J5960 product.*
5. *The RQST WOS POWER OFF is not supported in J5960 product.*
6. *The RQST POWER OFF is not supported in J5960 product.*

The following is an example to query and set the SAS Zone configuration via SAS in-band by sg3 utility in a Linux Host.

1. Execute lsscsi to list sg devices and then locate Promise enclosure device.

lsscsi -g

Note: If the SAS cable connected between VTrak J5960 dual IOMs to the Host SAS HBA, then two enclosure devices will be found (in this case the Promise enclosure is named to sg11 and sg34). The reversion "1017" is abbreviation from VTrak J5960 FW version 01.00.0000.17

```
[0:0:254:0] enclosu Promise J5960 4U60 IOM1 1017 - /dev/sg11
```

```
[0:0:277:0] enclosu Promise J5960 4U60 IOM2 1017 - /dev/sg34
```

```
[root@win-ohvjl1susds2 ~]# lsscsi -g
[0:0:244:0] disk WDC WUH721818AL5204 C120 /dev/sdb /dev/sg1
[0:0:245:0] disk WDC WUH721818AL5204 C120 /dev/sdc /dev/sg2
[0:0:246:0] disk WDC WUH721818AL5204 C120 /dev/sdd /dev/sg3
[0:0:247:0] disk HGST HUH721212AL5200 A3D0 /dev/sde /dev/sg4
[0:0:248:0] disk WDC WUH721818AL5204 C120 /dev/sdf /dev/sg5
[0:0:249:0] disk WDC WUH721818AL5204 C120 /dev/sdg /dev/sg6
[0:0:250:0] disk WDC WUH721818AL5204 C120 /dev/sdh /dev/sg7
[0:0:251:0] disk WDC WUH721818AL5204 C120 /dev/sdi /dev/sg8
[0:0:252:0] disk WDC WUH721818AL5204 C120 /dev/sdj /dev/sg9
[0:0:253:0] disk HGST HUH721212AL5200 A3D0 /dev/sdk /dev/sg10
[0:0:254:0] enclosu Promise J5960 4U60 IOM1 1017 - /dev/sg11
[0:0:255:0] disk WDC WUH721818AL5204 C120 /dev/sdl /dev/sg12
[0:0:256:0] disk WDC WUH721818AL5204 C120 /dev/sdm /dev/sg13
[0:0:257:0] disk WDC WUH721818AL5204 C120 /dev/sdn /dev/sg14
[0:0:258:0] disk WDC WUH721818AL5204 C120 /dev/sdo /dev/sg15
[0:0:259:0] disk HGST HUH721212AL5200 A3D0 /dev/sdp /dev/sg16
[0:0:260:0] disk HGST HUH721212AL5200 A3D0 /dev/sdq /dev/sg17
[0:0:261:0] disk HGST HUH721212AL5200 A3D0 /dev/sdr /dev/sg18
[0:0:262:0] disk HGST HUH721212AL5200 A3D0 /dev/sds /dev/sg19
[0:0:263:0] disk HGST HUH721212AL5200 A3D0 /dev/sdt /dev/sg20
[0:0:264:0] disk HGST HUH721212AL5200 A3D0 /dev/sdu /dev/sg21
[0:0:265:0] disk HGST HUH721212AL5200 A3D0 /dev/sdv /dev/sg22
[0:0:266:0] disk HGST HUH721212AL5200 A3D0 /dev/sdw /dev/sg23
[0:0:267:0] disk HGST HUH721212AL5200 A3D0 /dev/sdx /dev/sg24
[0:0:268:0] disk HGST HUH721212AL5200 A3D0 /dev/sdy /dev/sg25
[0:0:269:0] disk HGST HUH721212AL5200 A3D0 /dev/sdz /dev/sg26
[0:0:270:0] disk HGST HUH721212AL5200 A3D0 /dev/sdaa /dev/sg27
[0:0:271:0] disk HGST HUH721212AL5200 A3D0 /dev/sdab /dev/sg28
[0:0:272:0] disk HGST HUH721212AL5200 A3D0 /dev/sdac /dev/sg29
[0:0:273:0] disk HGST HUH721212AL5200 A3D0 /dev/sdad /dev/sg30
[0:0:274:0] disk HGST HUH721212AL5200 A3D0 /dev/sdae /dev/sg31
[0:0:275:0] disk HGST HUH721212AL5200 A3D0 /dev/sdaf /dev/sg32
[0:0:276:0] disk HGST HUH721212AL5200 A3D0 /dev/sdaa /dev/sg33
[0:0:277:0] enclosu Promise J5960 4U60 IOM2 1017 - /dev/sg34
[0:0:278:0] disk WDC WUH721818AL5204 C120 /dev/sdah /dev/sg35
[0:0:279:0] disk WDC WUH721818AL5204 C120 /dev/sdai /dev/sg36
[0:0:280:0] disk WDC WUH721818AL5204 C120 /dev/sdaj /dev/sg37
[0:0:281:0] disk WDC WUH721818AL5204 C120 /dev/sdak /dev/sg38
```

- 2. Check current SAS Zone configuration from SES page 0xAD.

Execute `sg_ses sg3` utility to issue RECEIVE DIAGNOSTIC (0x1D) SCSI command to get 0xAD SES page for J5960 IOM's SAS Zone configuration. Use this command to query current SAS Zone settings from the VTrak J5960 IOM.

```
[root@win-ohvjlsusds2 ~]# sg_ses sg3
00 00 00 00 0c 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
b2b02e 7d hex t Low nUKUOMU qTsaUozfTc b2ae [0x9q]
bLowt2e 722e0 4ne0 IOWT IOTI
[root@win-ohvjlsusds2 ~]# sg_ses sg3 -b 0xAD \q6\v2ajT -H
```

- 3. Set SAS Zone configuration for VTrak J5960 IOM.

Execute `sg_senddiag sg3` utility to issue SEND DIAGNOSTIC (0x1C) SCSI command to set to J5960 IOM by 0xAD SES page.

Below is an example to set Zone configuration to 3

Note the "Configure Type" should set to 0x01 and "Zone Type" should set to 0x03.

The following is the sequence of hex bytes to form SES page 0xAD to send
 ad,00,00,0c,01,03,00,00,00,00,00,00,00,00,00,00

```
[root@win-ohvjlsusds2 ~]# sg_senddiag --pf -vv --raw=ad,00,00,0c,01
open /dev/sg11 with flags=0x802
Send diagnostic cmd: 1d 10 00 00 10 00
Send diagnostic parameter list:
ad 00 00 0c 01 03 00 00 00 00 00 00 00 00 00 00
[root@win-ohvjlsusds2 ~]#
```

- Restart VTrak J5960 to activate the new SAS Zone configuration.

User can power cycle the VTrak J5960, or send 0xA1 SES page to the VTrak J5960 IOM to request a restart.

Below is an example to restart a VTrak J5960 dual IOM using in-band SAS interface, user could send 0xA1 SES page by SEND DIAGNOSTIC (0x1C) SCSI command via `sg_senddiag sg3` utility.

The following is the sequence of hex bytes to form SES page 0xA1 to send

A1,00,00,04,02,00,00,00

```
[root@win-ohvj1susds2 ~]# sg_senddiag --pf -vv --raw=a1,00,00,04,0
open /dev/sg1 with flags=0x802
Send diagnostic cmd: 1d 10 00 00 08 00
Send diagnostic parameter list:
a1 00 00 04 02 00 00 00
[root@win-ohvj1susds2 ~]#
```

- Verify SAS Zone configuration from VTrak J5960 IOM.

Rescan rhw SCSI bus, check multipath topology and locate Promise enclosure sg device after the VTrak J5960 restart is completed, then execute `sg_ses sg3` utility to issue RECEIVE DIAGNOSTIC (0x1D) SCSI command to get 0xAD SES page for the VTrak J5960 IOM SAS Zone configuration.

```
rescan-scsi-bus.sh -r
multipath -ll
lsscsi -g
sg_ses -p 0xAD /dev/sg1 -H
```

```
[root@win-ohvj1susds2 ~]# sg_ses -p 0xAD /dev/sg1 -H
Promise J5960 4U60 IOM1 I017
Response in hex from unknown diagnostic page [0xad]
00 ad 00 00 0c 01 03 00 00 00 00 00 00 00 00 00 ..
[root@win-ohvj1susds2 ~]#
```

Refer to VTrak J5960 IOM returned page data, byte 5 Zone Type = 0x03 means the VTrak J5960 has zone setting in Zone configuration 3.

6. The following is the command sequence to change SAS Zone Configuration from Zone 3 to no Zone.

```
sg_senddiag --pf -vv --raw=ad,00,00,0C,01,00,00,00,00,00,00,00,00,00 /dev/sg1
```

```
sg_senddiag --pf -vv --raw=a1,00,00,04,02,00,00,00 /dev/sg1
```

```
rescan-scsi-bus.sh -r
```

```
multipath -ll
```

```
lsscsi -g
```

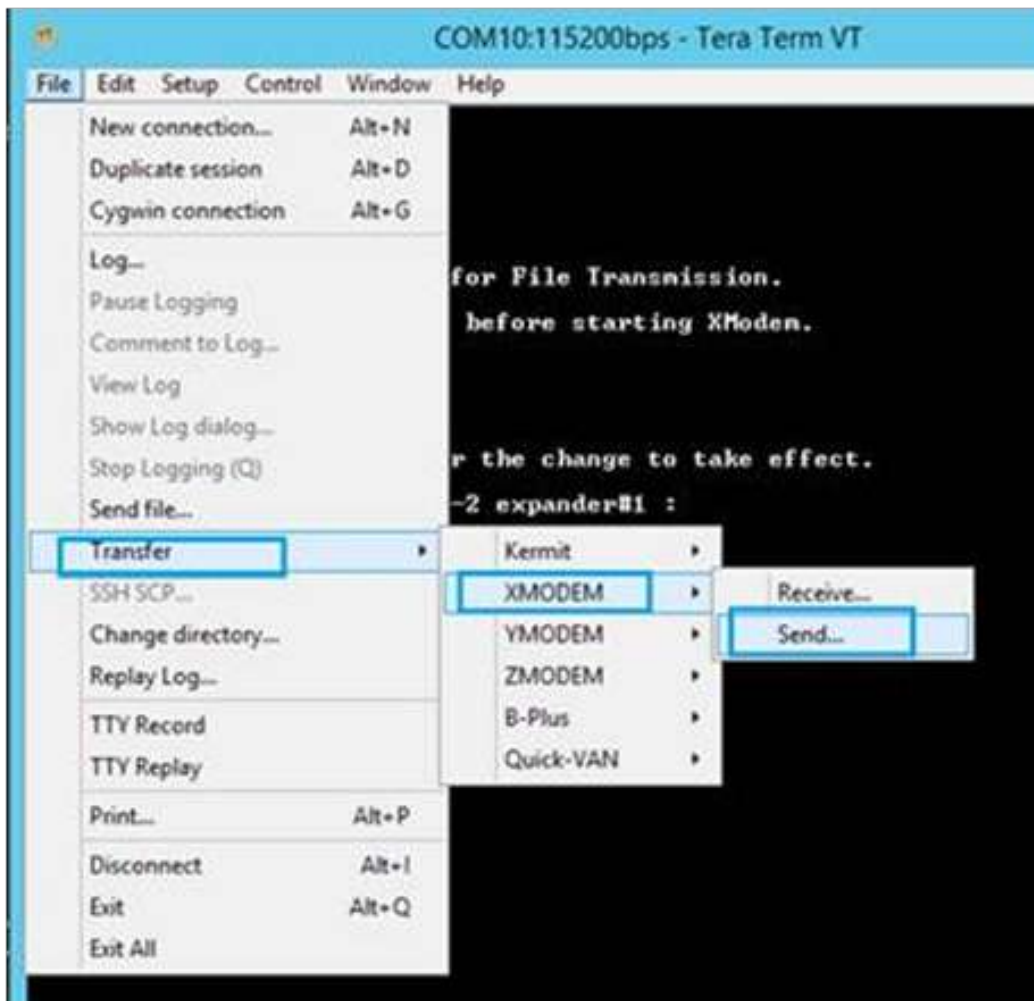
```
sg_ses -p 0xAD /dev/sg1 -H
```

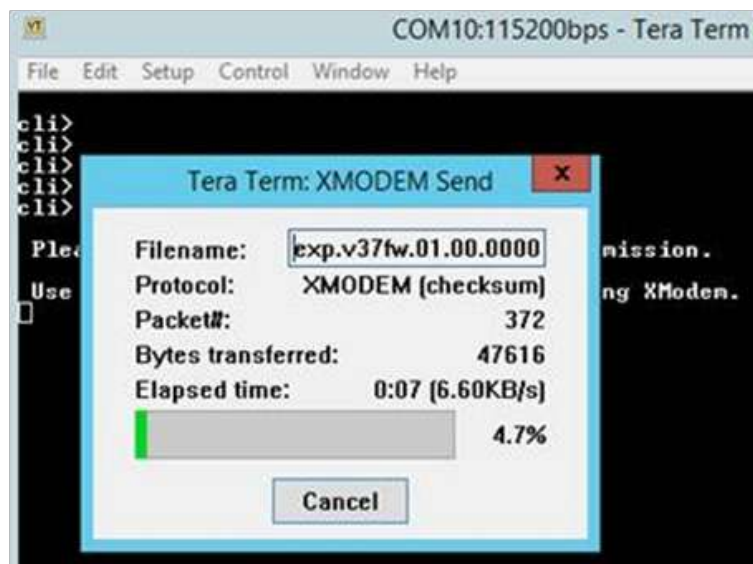
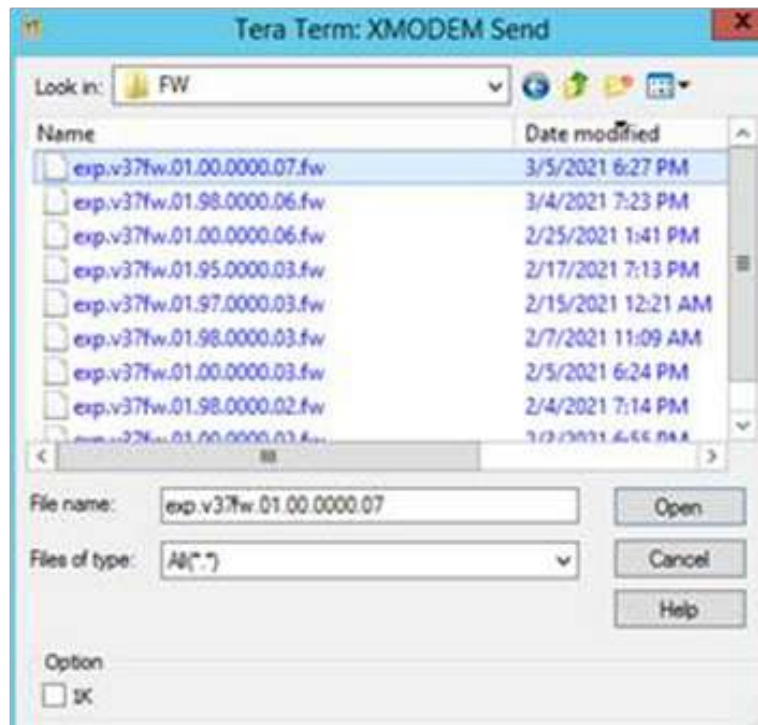

Firmware Upgrade via Serial Cable

Follow the procedure below to upgrade VTrak J5960 firmware:

1. Connect serial console from a Windows Host to the VTrak J5960 IOM1.
2. Use Tera Term in Windows (serial port setting: 115200,8,n,1,n).
3. Power on the VTrak J5960 and execute following CLI command in Tera Term console: **ptiflash -x**
4. Use Tera Term to select XMODEM and send the firmware file to IOM.

File > Transfer > XMODEM > Send





The following example is the command execution and logs for ptiflash:

```
cli> ptiflash -x

Please Use XModem Protocol for File Transmission.
Use Q Or q to quit Download before starting XModem.
Received 1095936Bytes
Buffer Download Complete
Please reboot the system for the change to take effect.
Do image download for level-2 expander :
0% is complete
10% is complete
20% is complete
30% is complete
40% is complete
50% is complete
60% is complete
70% is complete
80% is complete
90% is complete
100% is complete
Successful

Do image download for level-3 expander :
0% is complete
10% is complete
20% is complete
30% is complete
40% is complete
50% is complete
60% is complete
70% is complete
80% is complete
90% is complete
100% is complete
Successful

cli>
```

5. When the IOM1 firmware upgrade is Successful, connect the serial console to IOM2 and then repeat step 4 to upgrade Expander FW to IOM2.

6. Execute the following command to restart a dual IOM system when you have completed the IOM2 firmware upgrade.

```
enclosure -m -r 2
```

The following example is the message after restarting a dual IOM system:

```
cli> enclosure -m -r 2
```

```
Rebooting the system
```

```
Send SES page to level-2 expander OK!dsk_cnt = 60, board  
Performing POST for Smart Serial
```

```
Boot Cause: Internal Register Reset  
NVSRM installed  
System Internal Register Reset on
```

```
*****  
    Promise 4U-SAS-60-D BP v1.00.0000.07  
*****
```

```
cli>
```

7. Reset to the factory default settings and restart a dual IOM again.

```
factorydefaults
enclosure -m -r 2
```

The following example is a message after restarting a dual IOM:

```
cli> factorydefaults
```

```
Please reboot the system for the change to take effect.
```

```
cli> enclosure -m -r 2
```

```
Rebooting the system
```

```
Send SES page to level-2 expander OK!
Send SES page to level-3 expander OK!NVSRM installed
dsk_cnt = 60, board
Performing POST for Smart Serial
```

```
Boot Cause: Internal Register Reset
System Internal Register Reset on
```

```
*****
      Promise 4U-SAS-60-D BP v1.00.0000.13
*****
```

```
cli>
```

Firmware Upgrade via Serial Cable

Use the procedure below to upgrade VTrak J5960 firmware with Linux sg utility.

1. Power on VTrak J5960 and connect any IOM1 SAS port and any IOM2 SAS port to the Linux Host. Since there are two SAS connections from VTrak J5960 IOM1 and IOM2 to the Host's SAS HBA, Linux Host will recognize them as two devices.
2. Execute **lsscsi**, then check Promise enclosure from the sg device list.

```
lsscsi -g
```

Note: two enclosure devices (sg31 and sg122) are found, the vendor/product is

"Promise 4U-SAS-60-D BP", the reversion "1012" is an abbreviation from VTrak J5960 FW version 01.00.0000.12:

```
[0:0:30:0]   enclosu Promise  4U-SAS-60-D BP   1012  -
/dev/sg31
[0:0:121:0]  enclosu Promise  4U-SAS-60-D BP   1012  -
/dev/sg122
```

3. Place the new VTrak J5960 firmware 1.00.0000.13 image (file name: exp.v37fw.01.00.0000.13.fw) on the Linux Host, then flash it using sg write buffer command:

```
sg_write_buffer --in exp.v37fw.01.00.0000.13.fw -m2 /dev/sg31
-v
sg_write_buffer --in exp.v37fw.01.00.0000.13.fw -m2 /dev/
sg122 -v
```

```
[root@localhost J5960_FW]# sg_write_buffer --in exp.
v37fw.01.00.0000.13.fw -m2 /dev/sg31 -v
tried to read 8388608 bytes from exp.v37fw.01.00.0000.13.fw,
got 1010480 bytes
will write 1010480 bytes
Write buffer cmd: 3b 02 00 00 00 00 0f 6b 30 00
[root@localhost J5960_FW]#
[root@localhost J5960_FW]#
[root@localhost J5960_FW]#
[root@localhost J5960_FW]# sg_write_buffer --in exp.
v37fw.01.00.0000.13.fw -m2 /dev/sg122 -v
tried to read 8388608 bytes from exp.v37fw.01.00.0000.13.fw,
got 1010480 bytes
```

```
will write 1010480 bytes
Write buffer cmd: 3b 02 00 00 00 00 0f 6b 30 00
[root@localhost J5960_FW]#
```

4. Power cycle the Vtrak J5960, then execute lsscsi to find the Promise enclosure, and check reversion again.

```
lsscsi -g

The discovered Promise enclosure at sg61 and sg92, the reversion "1013" means J5960 FW version 01.00.0000.13:

[0:0:182:0]   enclosu Promise   4U-SAS-60-D BP   1013   -
/dev/sg61
[0:0:213:0]   enclosu Promise   4U-SAS-60-D BP   1013   -
/dev/sg92
```

User can check the VTrak J5960 firmware version again using sginfo command:

```
sginfo /dev/sg61
sginfo /dev/sg92

[root@localhost J5960_FW]# sginfo /dev/sg61
INQUIRY response (cmd: 0x12)
-----
Device Type                               13
Vendor:                                   Promise
Product:                                  4U-SAS-60-D BP
Revision level:                           1013

[root@localhost J5960_FW]#
[root@localhost J5960_FW]# sginfo /dev/sg92
INQUIRY response (cmd: 0x12)
-----
Device Type                               13
Vendor:                                   Promise
Product:                                  4U-SAS-60-D BP
Revision level:                           1013
```

Please check messages below for detailed instructions and results.

```
root@localhost ~]#
[root@localhost ~]# lsscsi
[0:0:0:0]    disk      HGST      HUH721212AL5200  A3D0  /dev/sdb
[0:0:1:0]    disk      HGST      HUH721212AL5200  A3D0  /dev/sdc
```

[0:0:2:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/sdd
[0:0:3:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/sde
[0:0:4:0]	disk	HGST	HUH721010AL5200	A384	/dev/sdf
[0:0:5:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/sdg
[0:0:6:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/sdh
[0:0:7:0]	disk	HGST	HUH721010AL5200	A384	/dev/sdi
[0:0:8:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/sdj
[0:0:9:0]	disk	HGST	HUH721010AL5200	A384	/dev/sdk
[0:0:10:0]	disk	HGST	HUH721010AL5200	A384	/dev/sdl
[0:0:11:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/sdm
[0:0:12:0]	disk	HGST	HUH721010AL5200	A384	/dev/sdn
[0:0:13:0]	disk	HGST	HUH721010AL5200	A384	/dev/sdo
[0:0:14:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/sdp
[0:0:15:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/sdq
[0:0:16:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/sdr
[0:0:17:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/sds
[0:0:18:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/sdt
[0:0:19:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/sdu
[0:0:20:0]	disk	HGST	HUH721010AL5200	A384	/dev/sdv
[0:0:21:0]	disk	HGST	HUH721010AL5200	A384	/dev/sdw
[0:0:22:0]	disk	HGST	HUH721010AL5200	A384	/dev/sdx
[0:0:23:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/sdy
[0:0:24:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/sdz
[0:0:25:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdaa					
[0:0:26:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdab					
[0:0:27:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdac					
[0:0:28:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdad					
[0:0:29:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdae					
[0:0:30:0]	enclosu	Promise	4U-SAS-60-D BP	1012	-
[0:0:31:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdaf					
[0:0:32:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdag					
[0:0:33:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdah					
[0:0:34:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdai					
[0:0:35:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdaj					
[0:0:36:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdak					
[0:0:37:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdal					
[0:0:38:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdam					
[0:0:39:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/

sdan						
[0:0:40:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdao						
[0:0:41:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdap						
[0:0:42:0]	disk	HGST	HUH721010AL5200	A384	/dev/	
sdaq						
[0:0:43:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdar						
[0:0:44:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdas						
[0:0:45:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdatt						
[0:0:46:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdau						
[0:0:47:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdav						
[0:0:48:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdaw						
[0:0:49:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdax						
[0:0:50:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdax						
[0:0:51:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdax						
[0:0:52:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdax						
[0:0:53:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdax						
[0:0:54:0]	disk	HGST	HUH721010AL5200	A384	/dev/	
sdax						
[0:0:55:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdax						
[0:0:56:0]	disk	HGST	HUH721010AL5200	A384	/dev/	
sdax						
[0:0:57:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdax						
[0:0:58:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdax						
[0:0:59:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdax						
[0:0:60:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdax						
[0:0:61:0]	disk	HGST	HUH721010AL5200	A384	/dev/	
sdax						
[0:0:62:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdax						
[0:0:63:0]	disk	HGST	HUH721010AL5200	A384	/dev/	
sdax						
[0:0:64:0]	disk	HGST	HUH721010AL5200	A384	/dev/	
sdax						

[0:0:65:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdbn					
[0:0:66:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdbo					
[0:0:67:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdbp					
[0:0:68:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdbq					
[0:0:69:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdbrr					
[0:0:70:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdbss					
[0:0:71:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdbtt					
[0:0:72:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdbuu					
[0:0:73:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdbvv					
[0:0:74:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdbww					
[0:0:75:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdbxx					
[0:0:76:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdbyy					
[0:0:77:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdbzz					
[0:0:78:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdcaa					
[0:0:79:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdccb					
[0:0:80:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdccc					
[0:0:81:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdccd					
[0:0:82:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdcee					
[0:0:83:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdccf					
[0:0:84:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdccg					
[0:0:85:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdchh					
[0:0:86:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdcci					
[0:0:87:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdccj					
[0:0:88:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdckk					
[0:0:89:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdcll					
[0:0:90:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/

sdcn						
[0:0:91:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdcn						
[0:0:92:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdco						
[0:0:93:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdcp						
[0:0:94:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdcq						
[0:0:95:0]	disk	HGST	HUH721010AL5200	A384	/dev/	
sdcr						
[0:0:96:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdc						
[0:0:97:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdct						
[0:0:98:0]	disk	HGST	HUH721010AL5200	A384	/dev/	
sdcu						
[0:0:99:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdcv						
[0:0:100:0]	disk	HGST	HUH721010AL5200	A384	/dev/	
sdcw						
[0:0:101:0]	disk	HGST	HUH721010AL5200	A384	/dev/	
sdcx						
[0:0:102:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdcy						
[0:0:103:0]	disk	HGST	HUH721010AL5200	A384	/dev/	
sdcz						
[0:0:104:0]	disk	HGST	HUH721010AL5200	A384	/dev/	
sdda						
[0:0:105:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sddb						
[0:0:106:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sddc						
[0:0:107:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sddd						
[0:0:108:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdde						
[0:0:109:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sddf						
[0:0:110:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sddg						
[0:0:111:0]	disk	HGST	HUH721010AL5200	A384	/dev/	
sddh						
[0:0:112:0]	disk	HGST	HUH721010AL5200	A384	/dev/	
sddi						
[0:0:113:0]	disk	HGST	HUH721010AL5200	A384	/dev/	
sddj						
[0:0:114:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sddk						
[0:0:115:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sddl						

```

[0:0:116:0] disk HGST HUH721212AL5200 A3D0 /dev/
sddm
[0:0:117:0] disk HGST HUH721212AL5200 A3D0 /dev/
sddn
[0:0:118:0] disk HGST HUH721010AL5200 A384 /dev/
sddo
[0:0:119:0] disk HGST HUH721010AL5200 A384 /dev/
sddp
[0:0:120:0] disk HGST HUH721212AL5200 A3D0 /dev/
sddq
[0:0:121:0] enclosu Promise 4U-SAS-60-D BP 1012 -
[3:0:0:0] disk ATA OWC Mercury EXTR BBF0 /dev/sda
[root@localhost ~]#
[root@localhost ~]#
[root@localhost ~]#
[root@localhost ~]# lsscsi -g
[0:0:0:0] disk HGST HUH721212AL5200 A3D0 /dev/sdb
/dev/sg1
[0:0:1:0] disk HGST HUH721212AL5200 A3D0 /dev/sdc
/dev/sg2
[0:0:2:0] disk HGST HUH721212AL5200 A3D0 /dev/sdd
/dev/sg3
[0:0:3:0] disk HGST HUH721212AL5200 A3D0 /dev/sde
/dev/sg4
[0:0:4:0] disk HGST HUH721010AL5200 A384 /dev/sdf
/dev/sg5
[0:0:5:0] disk HGST HUH721212AL5200 A3D0 /dev/sdg
/dev/sg6
[0:0:6:0] disk HGST HUH721212AL5200 A3D0 /dev/sdh
/dev/sg7
[0:0:7:0] disk HGST HUH721010AL5200 A384 /dev/sdi
/dev/sg8
[0:0:8:0] disk HGST HUH721212AL5200 A3D0 /dev/sdj
/dev/sg9
[0:0:9:0] disk HGST HUH721010AL5200 A384 /dev/sdk
/dev/sg10
[0:0:10:0] disk HGST HUH721010AL5200 A384 /dev/sdl
/dev/sg11
[0:0:11:0] disk HGST HUH721212AL5200 A3D0 /dev/sdm
/dev/sg12
[0:0:12:0] disk HGST HUH721010AL5200 A384 /dev/sdn
/dev/sg13
[0:0:13:0] disk HGST HUH721010AL5200 A384 /dev/sdo
/dev/sg14
[0:0:14:0] disk HGST HUH721212AL5200 A3D0 /dev/sdp
/dev/sg15
[0:0:15:0] disk HGST HUH721212AL5200 A3D0 /dev/sdq
/dev/sg16
[0:0:16:0] disk HGST HUH721212AL5200 A3D0 /dev/sdr
/dev/sg17
[0:0:17:0] disk HGST HUH721212AL5200 A3D0 /dev/sds

```

/dev/sg18						
[0:0:18:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/sdt	
/dev/sg19						
[0:0:19:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/sdu	
/dev/sg20						
[0:0:20:0]	disk	HGST	HUH721010AL5200	A384	/dev/sdv	
/dev/sg21						
[0:0:21:0]	disk	HGST	HUH721010AL5200	A384	/dev/sdw	
/dev/sg22						
[0:0:22:0]	disk	HGST	HUH721010AL5200	A384	/dev/sdx	
/dev/sg23						
[0:0:23:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/sdy	
/dev/sg24						
[0:0:24:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/sdz	
/dev/sg25						
[0:0:25:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdaa /dev/sg26						
[0:0:26:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdab /dev/sg27						
[0:0:27:0]	disk	HGST	HUH721010AL5200	A384	/dev/	
sdac /dev/sg28						
[0:0:28:0]	disk	HGST	HUH721010AL5200	A384	/dev/	
sdad /dev/sg29						
[0:0:29:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdae /dev/sg30						
[0:0:30:0]	enclosu	Promise	4U-SAS-60-D BP	1012	-	
/dev/sg31						
[0:0:31:0]	disk	HGST	HUH721010AL5200	A384	/dev/	
sdaf /dev/sg32						
[0:0:32:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdag /dev/sg33						
[0:0:33:0]	disk	HGST	HUH721010AL5200	A384	/dev/	
sdah /dev/sg34						
[0:0:34:0]	disk	HGST	HUH721010AL5200	A384	/dev/	
sdai /dev/sg35						
[0:0:35:0]	disk	HGST	HUH721010AL5200	A384	/dev/	
sdaj /dev/sg36						
[0:0:36:0]	disk	HGST	HUH721010AL5200	A384	/dev/	
sdak /dev/sg37						
[0:0:37:0]	disk	HGST	HUH721010AL5200	A384	/dev/	
sdal /dev/sg38						
[0:0:38:0]	disk	HGST	HUH721010AL5200	A384	/dev/	
sdam /dev/sg39						
[0:0:39:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdan /dev/sg40						
[0:0:40:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdao /dev/sg41						
[0:0:41:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdap /dev/sg42						
[0:0:42:0]	disk	HGST	HUH721010AL5200	A384	/dev/	
sdaq /dev/sg43						

[0:0:43:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdar	/dev/sg44				
[0:0:44:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdas	/dev/sg45				
[0:0:45:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdatt	/dev/sg46				
[0:0:46:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdau	/dev/sg47				
[0:0:47:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdav	/dev/sg48				
[0:0:48:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdaw	/dev/sg49				
[0:0:49:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdax	/dev/sg50				
[0:0:50:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sday	/dev/sg51				
[0:0:51:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdaz	/dev/sg52				
[0:0:52:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdba	/dev/sg53				
[0:0:53:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdbb	/dev/sg54				
[0:0:54:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdbc	/dev/sg55				
[0:0:55:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdbd	/dev/sg56				
[0:0:56:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdbe	/dev/sg57				
[0:0:57:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdbf	/dev/sg58				
[0:0:58:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdbg	/dev/sg59				
[0:0:59:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdbh	/dev/sg60				
[0:0:60:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdbi	/dev/sg61				
[0:0:61:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdbj	/dev/sg62				
[0:0:62:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdbk	/dev/sg63				
[0:0:63:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdbl	/dev/sg64				
[0:0:64:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdbm	/dev/sg65				
[0:0:65:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdbn	/dev/sg66				
[0:0:66:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdbo	/dev/sg67				
[0:0:67:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdbp	/dev/sg68				
[0:0:68:0]	disk	HGST	HUH721010AL5200	A384	/dev/

sdbq /dev/sg69					
[0:0:69:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdb r /dev/sg70					
[0:0:70:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdb s /dev/sg71					
[0:0:71:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdb t /dev/sg72					
[0:0:72:0] disk	HGST	HUH721010AL5200	A384	/dev/	
sdb u /dev/sg73					
[0:0:73:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdb v /dev/sg74					
[0:0:74:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdb w /dev/sg75					
[0:0:75:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdb x /dev/sg76					
[0:0:76:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdb y /dev/sg77					
[0:0:77:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdb z /dev/sg78					
[0:0:78:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdca /dev/sg79					
[0:0:79:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdcb /dev/sg80					
[0:0:80:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdcc /dev/sg81					
[0:0:81:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdcd /dev/sg82					
[0:0:82:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdce /dev/sg83					
[0:0:83:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdcf /dev/sg84					
[0:0:84:0] disk	HGST	HUH721010AL5200	A384	/dev/	
sdcg /dev/sg85					
[0:0:85:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdch /dev/sg86					
[0:0:86:0] disk	HGST	HUH721010AL5200	A384	/dev/	
sdci /dev/sg87					
[0:0:87:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdcj /dev/sg88					
[0:0:88:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdck /dev/sg89					
[0:0:89:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdcl /dev/sg90					
[0:0:90:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdcm /dev/sg91					
[0:0:91:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdcn /dev/sg92					
[0:0:92:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdco /dev/sg93					
[0:0:93:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdcp /dev/sg94					

[0:0:94:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdcq	/dev/sg95				
[0:0:95:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdcr	/dev/sg96				
[0:0:96:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdcs	/dev/sg97				
[0:0:97:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdct	/dev/sg98				
[0:0:98:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdcu	/dev/sg99				
[0:0:99:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdcv	/dev/sg100				
[0:0:100:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdcw	/dev/sg101				
[0:0:101:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdcx	/dev/sg102				
[0:0:102:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdcy	/dev/sg103				
[0:0:103:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdcz	/dev/sg104				
[0:0:104:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdda	/dev/sg105				
[0:0:105:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sddb	/dev/sg106				
[0:0:106:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sddc	/dev/sg107				
[0:0:107:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sddd	/dev/sg108				
[0:0:108:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdde	/dev/sg109				
[0:0:109:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sddf	/dev/sg110				
[0:0:110:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sddg	/dev/sg111				
[0:0:111:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sddh	/dev/sg112				
[0:0:112:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sddi	/dev/sg113				
[0:0:113:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sddj	/dev/sg114				
[0:0:114:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sddk	/dev/sg115				
[0:0:115:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sddl	/dev/sg116				
[0:0:116:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sddm	/dev/sg117				
[0:0:117:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sddn	/dev/sg118				
[0:0:118:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sddo	/dev/sg119				
[0:0:119:0]	disk	HGST	HUH721010AL5200	A384	/dev/

```

sddp /dev/sg120
[0:0:120:0] disk HGST HUH721212AL5200 A3D0 /dev/
sddq /dev/sg121
[0:0:121:0] enclosu Promise 4U-SAS-60-D BP 1012 -
/dev/sg122
[3:0:0:0] disk ATA OWC Mercury EXTR BBF0 /dev/sda
/dev/sg0
[root@localhost ~]#
[root@localhost ~]#
[root@localhost ~]# sginfo /dev/sg31
INQUIRY response (cmd: 0x12)
-----
Device Type 13
Vendor: Promise
Product: 4U-SAS-60-D BP
Revision level: 1012

[root@localhost ~]#
[root@localhost ~]# sginfo /dev/sg122
INQUIRY response (cmd: 0x12)
-----
Device Type 13
Vendor: Promise
Product: 4U-SAS-60-D BP
Revision level: 1012

[root@localhost ~]#
[root@localhost ~]# cd /home/J5960_FW/
[root@localhost J5960_FW]# ls -al
total 1972
drwxr-xr-x. 2 root root 74 Mar 19 18:20 .
drwxr-xr-x. 4 root root 37 Mar 19 18:08 ..
-rwxr--r--. 1 root root 1010480 Mar 19 18:20 exp.
v37fw.01.00.0000.13.fw
[root@localhost J5960_FW]#
[root@localhost J5960_FW]# sg_write_buffer --in exp.
v37fw.01.00.0000.13.fw -m2 /dev/sg31 -v
tried to read 8388608 bytes from exp.v37fw.01.00.0000.13.fw,
got 1010480 bytes
will write 1010480 bytes
Write buffer cmd: 3b 02 00 00 00 00 0f 6b 30 00
[root@localhost J5960_FW]#
[root@localhost J5960_FW]#
[root@localhost J5960_FW]# sg_write_buffer --in exp.
v37fw.01.00.0000.13.fw -m2 /dev/sg122 -v
tried to read 8388608 bytes from exp.v37fw.01.00.0000.13.fw,
got 1010480 bytes
will write 1010480 bytes
Write buffer cmd: 3b 02 00 00 00 00 0f 6b 30 00
[root@localhost J5960_FW]#
[root@localhost J5960_FW]#

```

Power cycle J5960

```
[root@localhost J5960_FW]#  
[root@localhost J5960_FW]#  
[root@localhost J5960_FW]# lsscsi -g  
[0:0:122:0] disk HGST HUH721010AL5200 A384 /dev/sdb  
/dev/sg1  
[0:0:123:0] disk HGST HUH721010AL5200 A384 /dev/sdc  
/dev/sg2  
[0:0:124:0] disk HGST HUH721010AL5200 A384 /dev/sdd  
/dev/sg3  
[0:0:125:0] disk HGST HUH721212AL5200 A3D0 /dev/sde  
/dev/sg4  
[0:0:126:0] disk HGST HUH721212AL5200 A3D0 /dev/sdf  
/dev/sg5  
[0:0:127:0] disk HGST HUH721010AL5200 A384 /dev/sdg  
/dev/sg6  
[0:0:128:0] disk HGST HUH721212AL5200 A3D0 /dev/sdh  
/dev/sg7  
[0:0:129:0] disk HGST HUH721212AL5200 A3D0 /dev/sdi  
/dev/sg8  
[0:0:130:0] disk HGST HUH721212AL5200 A3D0 /dev/sdj  
/dev/sg9  
[0:0:131:0] disk HGST HUH721212AL5200 A3D0 /dev/sdk  
/dev/sg10  
[0:0:132:0] disk HGST HUH721212AL5200 A3D0 /dev/sdl  
/dev/sg11  
[0:0:133:0] disk HGST HUH721212AL5200 A3D0 /dev/sdm  
/dev/sg12  
[0:0:134:0] disk HGST HUH721212AL5200 A3D0 /dev/sdn  
/dev/sg13  
[0:0:135:0] disk HGST HUH721212AL5200 A3D0 /dev/sdo  
/dev/sg14  
[0:0:136:0] disk HGST HUH721212AL5200 A3D0 /dev/sdp  
/dev/sg15  
[0:0:137:0] disk HGST HUH721212AL5200 A3D0 /dev/sdq  
/dev/sg16  
[0:0:138:0] disk HGST HUH721010AL5200 A384 /dev/sdr  
/dev/sg17  
[0:0:139:0] disk HGST HUH721010AL5200 A384 /dev/sds  
/dev/sg18  
[0:0:140:0] disk HGST HUH721212AL5200 A3D0 /dev/sdt  
/dev/sg19  
[0:0:141:0] disk HGST HUH721212AL5200 A3D0 /dev/sdu  
/dev/sg20  
[0:0:142:0] disk HGST HUH721212AL5200 A3D0 /dev/sdv  
/dev/sg21  
[0:0:143:0] disk HGST HUH721010AL5200 A384 /dev/sdw  
/dev/sg22  
[0:0:144:0] disk HGST HUH721212AL5200 A3D0 /dev/sdx
```

```

/dev/sg23
[0:0:145:0] disk HGST HUH721010AL5200 A384 /dev/sdy
/dev/sg24
[0:0:146:0] disk HGST HUH721212AL5200 A3D0 /dev/sdz
/dev/sg25
[0:0:147:0] disk HGST HUH721212AL5200 A3D0 /dev/
sdaa /dev/sg26
[0:0:148:0] disk HGST HUH721010AL5200 A384 /dev/
sdab /dev/sg27
[0:0:149:0] disk HGST HUH721010AL5200 A384 /dev/
sdac /dev/sg28
[0:0:150:0] disk HGST HUH721010AL5200 A384 /dev/
sdad /dev/sg29
[0:0:151:0] disk HGST HUH721010AL5200 A384 /dev/
sdae /dev/sg30
[0:0:152:0] disk HGST HUH721212AL5200 A3D0 /dev/
sdaf /dev/sg31
[0:0:153:0] disk HGST HUH721212AL5200 A3D0 /dev/
sdag /dev/sg32
[0:0:154:0] disk HGST HUH721212AL5200 A3D0 /dev/
sdah /dev/sg33
[0:0:155:0] disk HGST HUH721212AL5200 A3D0 /dev/
sdai /dev/sg34
[0:0:156:0] disk HGST HUH721212AL5200 A3D0 /dev/
sdaj /dev/sg35
[0:0:157:0] disk HGST HUH721212AL5200 A3D0 /dev/
sdak /dev/sg36
[0:0:158:0] disk HGST HUH721212AL5200 A3D0 /dev/
sdal /dev/sg37
[0:0:159:0] disk HGST HUH721010AL5200 A384 /dev/
sdam /dev/sg38
[0:0:160:0] disk HGST HUH721010AL5200 A384 /dev/
sdan /dev/sg39
[0:0:161:0] disk HGST HUH721212AL5200 A3D0 /dev/
sdao /dev/sg40
[0:0:162:0] disk HGST HUH721212AL5200 A3D0 /dev/
sdap /dev/sg41
[0:0:163:0] disk HGST HUH721212AL5200 A3D0 /dev/
sdaq /dev/sg42
[0:0:164:0] disk HGST HUH721212AL5200 A3D0 /dev/
sdar /dev/sg43
[0:0:165:0] disk HGST HUH721010AL5200 A384 /dev/
sdas /dev/sg44
[0:0:166:0] disk HGST HUH721212AL5200 A3D0 /dev/
sdat /dev/sg45
[0:0:167:0] disk HGST HUH721212AL5200 A3D0 /dev/
sdau /dev/sg46
[0:0:168:0] disk HGST HUH721010AL5200 A384 /dev/
sdav /dev/sg47
[0:0:169:0] disk HGST HUH721212AL5200 A3D0 /dev/
sdaw /dev/sg48

```

[0:0:170:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdax	/dev/sg49				
[0:0:171:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sday	/dev/sg50				
[0:0:172:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdaz	/dev/sg51				
[0:0:173:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdba	/dev/sg52				
[0:0:174:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdbb	/dev/sg53				
[0:0:175:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdbc	/dev/sg54				
[0:0:176:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdbd	/dev/sg55				
[0:0:177:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdbe	/dev/sg56				
[0:0:178:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdbf	/dev/sg57				
[0:0:179:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdbg	/dev/sg58				
[0:0:180:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdbh	/dev/sg59				
[0:0:181:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdbi	/dev/sg60				
[0:0:182:0]	enclosu	Promise	4U-SAS-60-D BP	1013	-
/dev/sg61					
[0:0:183:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdbj	/dev/sg62				
[0:0:184:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdbk	/dev/sg63				
[0:0:185:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdbl	/dev/sg64				
[0:0:186:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdbm	/dev/sg65				
[0:0:187:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdbn	/dev/sg66				
[0:0:188:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdbo	/dev/sg67				
[0:0:189:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdbp	/dev/sg68				
[0:0:190:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdbq	/dev/sg69				
[0:0:191:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdbr	/dev/sg70				
[0:0:192:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdfs	/dev/sg71				
[0:0:193:0]	disk	HGST	HUH721010AL5200	A384	/dev/
sdbt	/dev/sg72				
[0:0:194:0]	disk	HGST	HUH721212AL5200	A3D0	/dev/
sdbu	/dev/sg73				
[0:0:195:0]	disk	HGST	HUH721010AL5200	A384	/dev/

sdbv /dev/sg74					
[0:0:196:0] disk	HGST	HUH721010AL5200	A384	/dev/	
sdbw /dev/sg75					
[0:0:197:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdbx /dev/sg76					
[0:0:198:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdbz /dev/sg77					
[0:0:199:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdbz /dev/sg78					
[0:0:200:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdca /dev/sg79					
[0:0:201:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdcab /dev/sg80					
[0:0:202:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdcc /dev/sg81					
[0:0:203:0] disk	HGST	HUH721010AL5200	A384	/dev/	
sdcd /dev/sg82					
[0:0:204:0] disk	HGST	HUH721010AL5200	A384	/dev/	
sdce /dev/sg83					
[0:0:205:0] disk	HGST	HUH721010AL5200	A384	/dev/	
sdcf /dev/sg84					
[0:0:206:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdcg /dev/sg85					
[0:0:207:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdch /dev/sg86					
[0:0:208:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdci /dev/sg87					
[0:0:209:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdcj /dev/sg88					
[0:0:210:0] disk	HGST	HUH721010AL5200	A384	/dev/	
sdck /dev/sg89					
[0:0:211:0] disk	HGST	HUH721010AL5200	A384	/dev/	
sdcl /dev/sg90					
[0:0:212:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdcm /dev/sg91					
[0:0:213:0] enclosu	Promise	4U-SAS-60-D BP	1013	-	
/dev/sg92					
[0:0:214:0] disk	HGST	HUH721010AL5200	A384	/dev/	
sdcn /dev/sg93					
[0:0:215:0] disk	HGST	HUH721212AL5200	A3D0	/dev/	
sdco /dev/sg94					
[0:0:216:0] disk	HGST	HUH721010AL5200	A384	/dev/	
sdcp /dev/sg95					
[0:0:217:0] disk	HGST	HUH721010AL5200	A384	/dev/	
sdcq /dev/sg96					
[0:0:218:0] disk	HGST	HUH721010AL5200	A384	/dev/	
sdcr /dev/sg97					
[0:0:219:0] disk	HGST	HUH721010AL5200	A384	/dev/	
sdcs /dev/sg98					
[0:0:220:0] disk	HGST	HUH721010AL5200	A384	/dev/	
sdct /dev/sg99					

```

[0:0:221:0] disk HGST HUH721010AL5200 A384 /dev/
sdcu /dev/sg100
[0:0:222:0] disk HGST HUH721212AL5200 A3D0 /dev/
sdcv /dev/sg101
[0:0:223:0] disk HGST HUH721212AL5200 A3D0 /dev/
sdcw /dev/sg102
[0:0:224:0] disk HGST HUH721212AL5200 A3D0 /dev/
sdcx /dev/sg103
[0:0:225:0] disk HGST HUH721010AL5200 A384 /dev/
sdcy /dev/sg104
[0:0:226:0] disk HGST HUH721212AL5200 A3D0 /dev/
sdcz /dev/sg105
[0:0:227:0] disk HGST HUH721212AL5200 A3D0 /dev/
sdda /dev/sg106
[0:0:228:0] disk HGST HUH721212AL5200 A3D0 /dev/
sddb /dev/sg107
[0:0:229:0] disk HGST HUH721212AL5200 A3D0 /dev/
sddc /dev/sg108
[0:0:230:0] disk HGST HUH721212AL5200 A3D0 /dev/
sddd /dev/sg109
[0:0:231:0] disk HGST HUH721212AL5200 A3D0 /dev/
sdde /dev/sg110
[0:0:232:0] disk HGST HUH721212AL5200 A3D0 /dev/
sddf /dev/sg111
[0:0:233:0] disk HGST HUH721212AL5200 A3D0 /dev/
sddg /dev/sg112
[0:0:234:0] disk HGST HUH721212AL5200 A3D0 /dev/
sddh /dev/sg113
[0:0:235:0] disk HGST HUH721212AL5200 A3D0 /dev/
sddi /dev/sg114
[0:0:236:0] disk HGST HUH721212AL5200 A3D0 /dev/
sddj /dev/sg115
[0:0:237:0] disk HGST HUH721010AL5200 A384 /dev/
sddk /dev/sg116
[0:0:238:0] disk HGST HUH721212AL5200 A3D0 /dev/
sddl /dev/sg117
[0:0:239:0] disk HGST HUH721010AL5200 A384 /dev/
sddm /dev/sg118
[0:0:240:0] disk HGST HUH721212AL5200 A3D0 /dev/
sddn /dev/sg119
[0:0:241:0] disk HGST HUH721212AL5200 A3D0 /dev/
sddo /dev/sg120
[0:0:242:0] disk HGST HUH721212AL5200 A3D0 /dev/
sddp /dev/sg121
[0:0:243:0] disk HGST HUH721212AL5200 A3D0 /dev/
sddq /dev/sg122
[3:0:0:0] disk ATA OWC Mercury EXTR BBF0 /dev/sda
/dev/sg0
[root@localhost J5960_FW]#
[root@localhost J5960_FW]#
[root@localhost J5960_FW]# sginfo /dev/sg61

```

```
INQUIRY response (cmd: 0x12)
```

```
-----
```

```
Device Type                13
Vendor:                    Promise
Product:                   4U-SAS-60-D BP
Revision level:            1013
```

```
[root@localhost J5960_FW]#
```

```
[root@localhost J5960_FW]# sginfo /dev/sg92
```

```
INQUIRY response (cmd: 0x12)
```

```
-----
```

```
Device Type                13
Vendor:                    Promise
Product:                   4U-SAS-60-D BP
Revision level:            1013
```

```
[root@localhost J5960_FW]#
```

```
[root@localhost ~]#
```

CONTACTING TECHNICAL SUPPORT

PROMISE Technical Support provides several support options for PROMISE users to access information and updates. We encourage you to use one of our electronic services, which provide product information updates for the most efficient service and support.

PROMISE E-Support: <https://support.promise.com>

PROMISE web site: <http://www.promise.com//>

When you contact us, please have the following information available:

- Product model and serial number
- Firmware version
- A description of the problem / situation
- System configuration information, including: motherboard and CPU type

Please refer to “Export Service Report” on page 153 to create a service report with the needed information.

United States

3241 Keller St.

Santa Clara CA 95054, USA

Technical Support (E-Support): <https://support.promise.com>

Web site: <http://www.promise.com/>

Australia

Technical Support (E-Support): <https://support.promise.com>

Web site: <http://www.promise.com/>

EMEA

Netherlands

Science Park Eindhoven 5228

5692 EG Son, The Netherlands

Technical Support (E-Support): <https://support.promise.com>

Web site: <http://www.promise.com/>

Austria

Technical Support (E-Support): <https://support.promise.com>

Web site: <http://www.promise.com/>

France

Technical Support (E-Support): <https://support.promise.com>

Web site: <http://www.promise.com/>

Germany

Europaplatz 9

44269 Dortmund, Germany

Technical Support (E-Support): <https://support.promise.com>

Web site: <http://www.promise.com/>

Sweden

Technical Support (E-Support): <https://support.promise.com>

Web site: <http://www.promise.com//>

Switzerland ITF

Technical Support (E-Support): <https://support.promise.com>

Web site: <http://www.promise.com//>

Norway ITF

Technical Support (E-Support): <https://support.promise.com>

Web site: <http://www.promise.com//>

Belgium

Technical Support (E-Support): <https://support.promise.com>

Web site: <http://www.promise.com//>

Luxembourg

Technical Support (E-Support): <https://support.promise.com>

Web site: <http://www.promise.com//>

United Kingdom

Technical Support (E-Support): <https://support.promise.com>

Web site: <http://www.promise.com//>

Taiwan

Technical Support (E-Support): <https://support.promise.com>

Web site: <http://www.promise.com//>

China

Room 1108, West Wing, Shi Chuang Plaza, 22 Information Road

Shangdi IT Park, Haidian District, Beijing 100085

Fax: 86-10-8857-8015

Technical Support (E-Support): <https://support.promise.com>

Web site: <http://www.promise.com//>

Korea

Technical Support (E-Support): <https://support.promise.com>

Web site: <http://www.promise.com/>

Hong Kong

Technical Support (E-Support): <https://support.promise.com>

Web site: <http://www.promise.com/>

Singapore

Technical Support (E-Support): <https://support.promise.com>

Web site: <http://www.promise.com/>

Japan

3F, Mura Matsu Bldg, 3-8-5, Hongo Bunkyo-ku

Tokyo 113-0033, Japan

Technical Support (E-Support): <https://support.promise.com>

Web site: <http://www.promise.com/>

Limited Warranty

PROMISE Technology, Inc. (“PROMISE”) warrants that this product, from the time of the delivery of the product to the original end user:

- a) all components, except the cache backup battery, for a period of three (3) years;
- b) the cache backup battery, for a period of one (1) year;
- c) will conform to PROMISE’s specifications;
- d) will be free from defects in material and workmanship under normal use and service.

This warranty:

- a) applies only to products which are new and in cartons on the date of purchase;
- b) is not transferable;
- c) is valid only when accompanied by a copy of the original purchase invoice.
- d) Is not valid on spare parts.

This warranty shall not apply to defects resulting from:

- a) improper or inadequate maintenance, or unauthorized modification(s), performed by the end user;
- b) operation outside the environmental specifications for the product;
- c) accident, misuse, negligence, misapplication, abuse, natural or personal disaster, or maintenance by anyone other than a PROMISE or a PROMISE-authorized service center.

Disclaimer of other warranties

This warranty covers only parts and labor, and excludes coverage on software items as expressly set above.

Except as expressly set forth above, PROMISE disclaims any warranties, expressed or implied, by statute or otherwise, regarding the product, including, without limitation, any warranties for fitness for any purpose, quality, merchantability, non-infringement, or otherwise. PROMISE makes no warranty or representation concerning the suitability of any product for use with any other item. You assume full responsibility for selecting products and for ensuring that the products selected are compatible and appropriate for use with other goods with which they will be used.

PROMISE does not warrant that any product is free from errors or that it will interface without problems with your computer system. It is your responsibility to back up or otherwise save important data before installing any product and continue to back up your important data regularly.

No other document, statement or representation may be relied on to vary the terms of this limited warranty.

PROMISE's sole responsibility with respect to any product is to do one of the following:

- a) replace the product with a conforming unit of the same or superior product;
- b) repair the product.

PROMISE shall not be liable for the cost of procuring substitute goods, services, lost profits, unrealized savings, equipment damage, costs of recovering, reprogramming, or reproducing of programs or data stored in or used with the products, or for any other general, special, consequential, indirect, incidental, or punitive damages, whether in contract, tort, or otherwise, notwithstanding the failure of the essential purpose of the foregoing remedy and regardless of whether PROMISE has been advised of the possibility of such damages. PROMISE is not an insurer. If you desire insurance against such damage, you must obtain insurance from another party.

Some states do not allow the exclusion or limitation of incidental or consequential damages for consumer products, so the above limitation may not apply to you.

This warranty gives specific legal rights, and you may also have other rights that vary from state to state. This limited warranty is governed by the State of California.

Your Responsibilities

You are responsible for determining whether the product is appropriate for your use and will interface with your equipment without malfunction or damage. You are also responsible for backing up your data before installing any product and for regularly backing up your data after installing the product. PROMISE is not liable for any damage to equipment or data loss resulting from the use of any product.

Returning the Product For Repair

If you suspect a product is not working properly, or if you have any questions about your product, contact our Technical Support staff, and be ready to provide the following information:

- Product model and serial number (required)
- Return shipping address
- Daytime phone number
- Description of the problem
- Copy of the original purchase invoice

The technician helps you determine whether the product requires repair. If the product needs repair, the technician issues an RMA (Return Merchandise Authorization) number.

Important

Obtain an RMA number from Technical Support **before** you return the product and write the RMA number on the label. The RMA number is essential for tracking your product and providing the proper service.

Return **ONLY** the specific product covered by the warranty. Do not ship cables, manuals, CDs, etc.

USA and
Canada: PROMISE Technology, Inc.
Customer Service Dept.
Attn.: RMA # _____
47654 Kato Road
Fremont, CA 94538

Other
Countries: Return the product to your dealer or retailer.
Contact them for instructions before shipping the product.

You must follow the packaging guidelines for returning products:

- Use the original shipping carton and packaging
- Include a summary of the product's problem(s)
- Write an attention line on the box with the RMA number
- Include a copy of your proof of purchase

You are responsible for the cost of insurance and shipment of the product to PROMISE. Note that damage incurred due to improper transport or packaging is not covered under the Limited Warranty.

When repairing returned product(s), PROMISE may replace defective parts with new or reconditioned parts, or replace the entire unit with a new or reconditioned unit. In the event of a replacement, the replacement unit is under warranty for the remainder of the original warranty term from purchase date, or 30 days, whichever is longer.

PROMISE pays for standard return shipping charges only. You must pay for any additional shipping options, such as express shipping.

Information for China RoHS



部件名稱 Products Description	Toxic or Hazardous Substances					
	鉛 (Pb)	汞 (Hg)	鎘 (Cd)	六價鉻 (Cr6+)	多溴聯苯 (PBB)	多溴二苯醚 (PBDE)
PCBA	X	○	○	○	○	○
Metal parts	X	○	○	○	○	○
Plastic parts	○	○	○	○	○	○
Cable	○	○	○	○	○	○
Power Supply	X	○	○	○	○	○
Battery	X	○	○	○	○	○
Package	○	○	○	○	○	○

本表格依據 SJ/T 11364 的規定編制。
This table is prepared in accordance with the provisions of SJ/T 11364.
○：表示該有害物質在該部件所有均質材料中的含量均在 GB/T 26572 規定的限量要求以下。
○: Indicates that said hazardous substance contained in all of the homogeneous materials for this part is under the limitation requirement of GB/T 26572.
X：表示該有害物質至少在該部件的某一均質材料中的含量超出 GB/T 26572 規定的限量要求。
X: Indicates that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572.
此產品符合 EU RoHS 指令 2011/65/EU
The product complies with EU RoHS Directive 2011/65/EU

生產日期代碼參考路徑：<http://www.promise.com/Manufacturing-Dates-of-Products>