

# LSISAS6160 SAS Switch

## User Guide

Version 1.8  
December 2012

DB15-000636-10

## Revision History

Version and Date	Description of Changes
Version 1.8, December 2012	<ul style="list-style-type: none"><li>■ Reformatted all notes and clarified that the switch uses an external power supply in <a href="#">Section 1.2, SAS and the LSISAS6160 Switch</a>.</li></ul>
Version 1.7, April 2012	<ul style="list-style-type: none"><li>■ Added new graphics to Chapter 3.</li><li>■ Added new text to Chapter 3.</li><li>■ Added new text to Chapter 4.</li></ul>
Version 1.6, March 2012	<ul style="list-style-type: none"><li>■ Replaced Figures 18 and 20.</li><li>■ Added Figures 49, 50, 51, and 52.</li></ul>
Version 1.5, January 2012	<ul style="list-style-type: none"><li>■ Added new Graphical View information.</li><li>■ Added information about device icons, including new SAS Non-Save Zoning Expander icon.</li><li>■ Removed the domain command, which is obsolete.</li><li>■ Applied low-level editing to the entire document.</li></ul>
Version 1.4, September 2011	<ul style="list-style-type: none"><li>■ Added graphics.</li><li>■ Converted document to new template.</li></ul>
Version 1.3, April 2011	Added information about new features.
Version 1.2, December 2010	Added information about new features.
Version 1.1, September 2010	Initial release of this document.

LSI and the LSI & Design logo are registered trademarks of LSI Corporation or its subsidiaries. All other brand and product names may be trademarks of their respective companies.

LSI Corporation reserves the right to make changes to the product(s) or information disclosed herein at any time without notice. LSI Corporation does not assume any responsibility or liability arising out of the application or use of any product or service described herein, except as expressly agreed to in writing by LSI Corporation; nor does the purchase, lease, or use of a product or service from LSI Corporation convey a license under any patent rights, copyrights, trademark rights, or any other of the intellectual property rights of LSI Corporation or of third parties. LSI products are not intended for use in life-support appliances, devices, or systems. Use of any LSI product in such applications without written consent of the appropriate LSI officer is prohibited.

**Corporate Headquarters**  
Milpitas, CA  
800-372-2447

**Email**  
globalsupport@lsi.com

**Website**  
www.lsi.com

Document Number: DB15-000636-10  
Copyright © 2012 LSI Corporation  
All Rights Reserved

# Table of Contents

1 Overview .....	5
1.1 LSISAS6160 Switch Features .....	5
1.2 SAS and the LSISAS6160 Switch .....	5
1.3 SAS Phys, Ports, and Connectors .....	9
1.4 SAS Connectors and Cabling .....	10
1.5 SAS Routing and Zoning .....	11
1.5.1 SAS Zoning Overview .....	11
1.5.2 Creating SAS Zones .....	12
1.5.3 Configuring SAS Zones .....	13
1.6 Connecting Devices to the LSISAS6160 Switch .....	14
2 Installation and Hardware Setup .....	21
2.1 Unpacking the Switch .....	21
2.2 Identifying Switch Components .....	21
2.2.1 LSISAS6160 Connectors .....	22
2.2.2 LSISAS6160 LEDs .....	22
2.2.3 LSISAS6160 Power Supply .....	22
2.3 Installing the LSISAS6160 Switch .....	22
2.3.1 Installing the LSISAS6160 Shelf .....	23
2.4 Connecting to a Host .....	25
2.5 Changing the IP Address .....	26
2.5.1 Setting a Static IP Address .....	26
2.5.2 Setting a Dynamic IP Address .....	26
2.6 Connecting SAS and SATA Hardware .....	27
2.7 Safety Notices .....	27
2.7.1 FCC .....	28
2.7.2 Canada Mark .....	28
2.7.3 VCCI .....	28
2.7.4 BSMI .....	29
2.7.5 CCC .....	29
3 SAS Domain Manager Graphical User Interface .....	30
3.1 SDM-GUI Accounts .....	30
3.2 Starting SDM-GUI .....	30
3.3 Summary Tab and Menu Options .....	31
3.4 File, Server, and Help Menu Options .....	32
3.5 Views Tab .....	34
3.5.1 View End Device Table .....	34
3.5.2 View Alias Table .....	35
3.5.3 View Zone Groups .....	36
3.5.4 View Zone Sets .....	37
3.6 Domain Tab .....	38
3.6.1 Alias Management .....	38
3.6.2 Automatically Configure Zone Groups and Zone Sets .....	40
3.6.3 Manually Configure Zone Groups .....	42
3.6.4 Manually Configure Zone Sets .....	44
3.7 Devices Tab .....	49
3.7.1 Properties Tab .....	50
3.7.2 Environmentals Tab .....	51
3.7.3 Attached Devices Tab .....	54
3.7.4 Phys Tab .....	55
3.7.5 Phy Counters Tab .....	56

3.7.6 Zone Group Tab .....	57
3.7.7 Operations Tab .....	58
3.7.8 SNMP/SMTP Tab .....	67
3.8 Configuration Backup and Restore .....	73
3.8.1 Restore .....	73
3.8.2 Smart Restore .....	74
4 SAS Domain Manager Command Line Interface .....	75
4.1 Command Usage and Syntax .....	75
4.2 SDM-CLI Commands .....	75
4.2.1 Help Command .....	76
4.2.2 Passwd Command .....	76
4.2.3 Quit Command .....	76
4.2.4 Alias Command .....	76
4.2.5 Device Command .....	77
4.2.6 Show Command .....	78
4.2.7 Zonegroup Command .....	79
4.2.8 Zoneset Command .....	80
4.2.9 SES Threshold .....	81
4.2.10 Get Date .....	81
4.2.11 Set Date .....	82
4.2.12 Performance Monitoring .....	82
4.2.13 Get SNMP .....	83
4.2.14 Set SNMP .....	83
4.2.15 Get SMTP .....	84
4.2.16 Set SMTP .....	84
4.2.17 Configuration Backup .....	85
4.2.18 Configuration Smart Restore .....	85
4.2.19 Configuration Restore .....	85
4.2.20 Display SDM Event Log .....	86
4.2.21 Query and Display Switch/Expander Firmware Event Log .....	86
4.3 Sample Output for Show Command .....	86
4.3.1 show alias .....	86
4.3.2 show alias <alias> .....	86
4.3.3 show device .....	87
4.3.4 show device <alias> .....	88
4.3.5 show domain .....	89
4.3.6 show phy .....	89
4.3.7 show phy <alias> .....	90
4.3.8 show phy <alias>: <phy> .....	92
4.3.9 show version .....	92
4.3.10 show zonegroup <name> .....	93
4.3.11 show zoneset active .....	93
4.3.12 show zoneset data <name> .....	93
5 Troubleshooting .....	94

---

## Chapter 1: Overview

This document is the primary reference for the LSISAS6160 Serial Attached SCSI (SAS) switch. It describes the features of the switch and explains how to install and physically configure the switch. The document also explains how to use both the web-based interface and the command-driven interface of the SAS Domain Manager (SDM) utility to create storage configurations in the SAS domain. It also includes troubleshooting information.

This document assumes that you are familiar with SAS devices and SAS hardware configuration. The following people are the intended audience of this document:

- Engineers and managers who are evaluating the LSISAS6160 switch for possible use in a system
- System administrators and users who are installing and using the LSISAS6160 switch

### 1.1 LSISAS6160 Switch Features

The LSISAS6160 switch has the following features:

- A total of 16 connectors that support passive copper cables
  - Fourteen external SAS connectors for SAS initiators and targets that use passive cables
  - Two external active Mini SAS connectors for SAS initiators and targets that use active or passive cables
- Connectors support SAS link rates of 6.0Gb/s, 3.0Gb/s, or 1.5Gb/s
- Connectors support Serial ATA (SATA) link rates of 6.0Gb/s, 3.0Gb/s, or 1.5Gb/s
- 10/100 Base-T Ethernet for enclosure management
- Nonblocking feature provides simultaneous access of any port to any port at full port bandwidth

### 1.2 SAS and the LSISAS6160 Switch

SAS replaces Ultra320 SCSI as the next phase in the evolution of the SCSI standard. The SAS interface addresses enterprise data storage and retrieval requirements with features such as point-to-point topology, 6.0Gb/s transfer rate, minimum arbitration overhead, native support for both SAS and SATA drives, and smaller cables and connectors.

In SAS storage environments, the LSISAS6160 switch allows connection of multiple targets and initiators through a switched device for manageable scalability. The integrated SDM application provides a central management point to view the SAS topology, manage other switches or expanders in the domain, and configure zoning to provide exclusive access between endpoints in the domain. The LSISAS6160 switch allows data centers to benefit from the improved performance, minimum arbitration overhead, simplified cabling, and lower system implementation costs of SAS and SATA, while easing migration from Direct Attached Storage.

The LSISAS6160 switch is a half rack width and uses an external power supply. The following figure shows the LSISAS6160 switch.

**Figure 1 LSISAS6160 Switch**



The LSISAS6160 switch uses two LSISAS2x36 6Gb/s SAS expanders, which are compliant with the ANSI Serial Attached SCSI specification and support SATA as defined in the *Serial ATA: High Speed Serialized AT Attachment* and the *Serial ATA II: Port Selector Specification*.

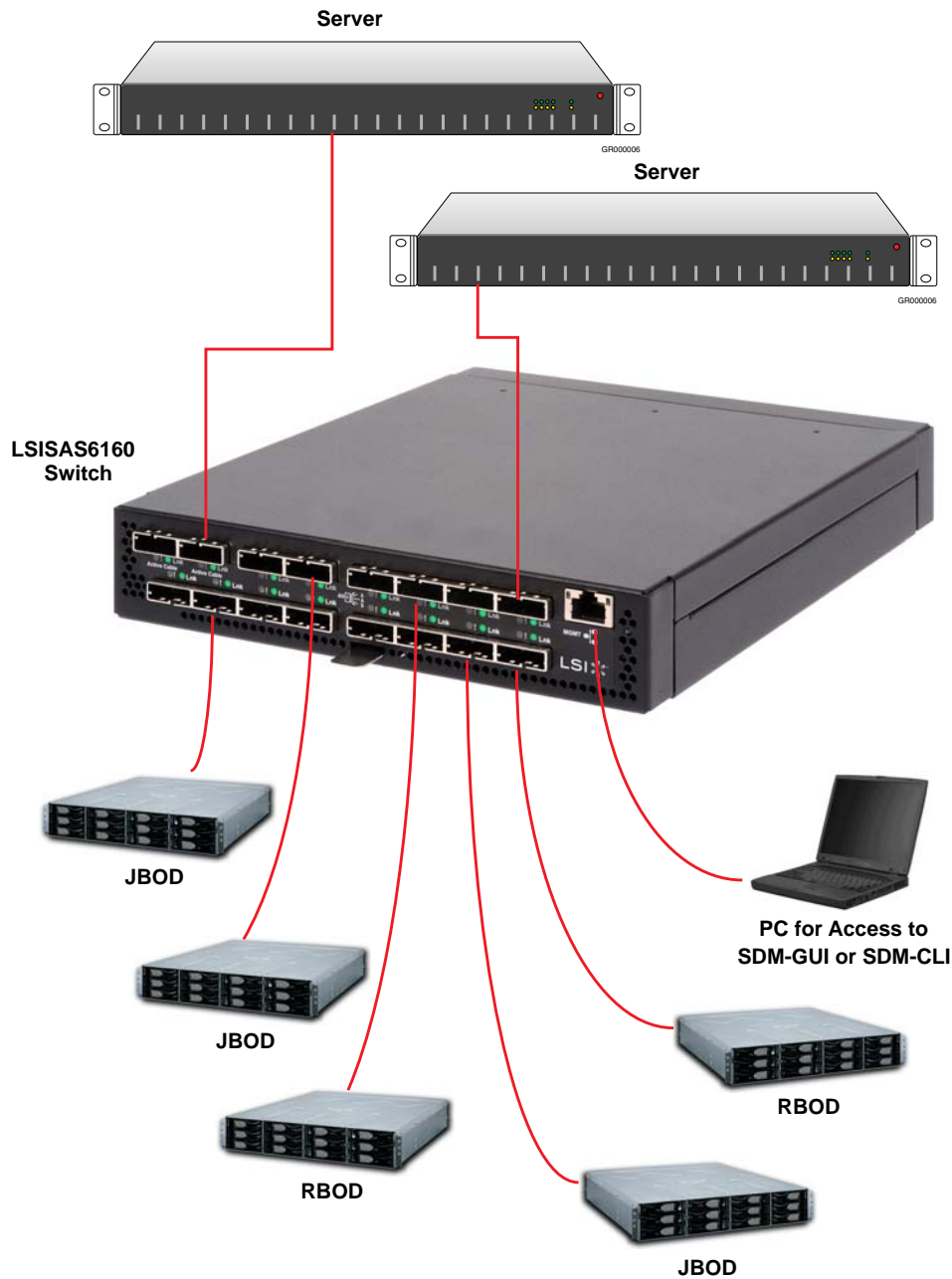
The LSISAS6160 switch functions as a single expander and offers advanced hardware management with an external power supply module, two enclosure fans, and temperature and power supply voltage sensing and alerts. The switch is housed in a compact chassis for easy shelf placement in rack-mounted server clusters.

**NOTE**

The two connectors on the upper left of the face plate (Port 0 and Port 2) support active cabling for longer cable runs. Passive cables can also be connected to these ports for normal cable runs.

The following figure shows how the LSISAS6160 switch centralizes management of all application servers and data storage devices in the SAS domain.

**Figure 2 LSISASS6160 Resource Management**

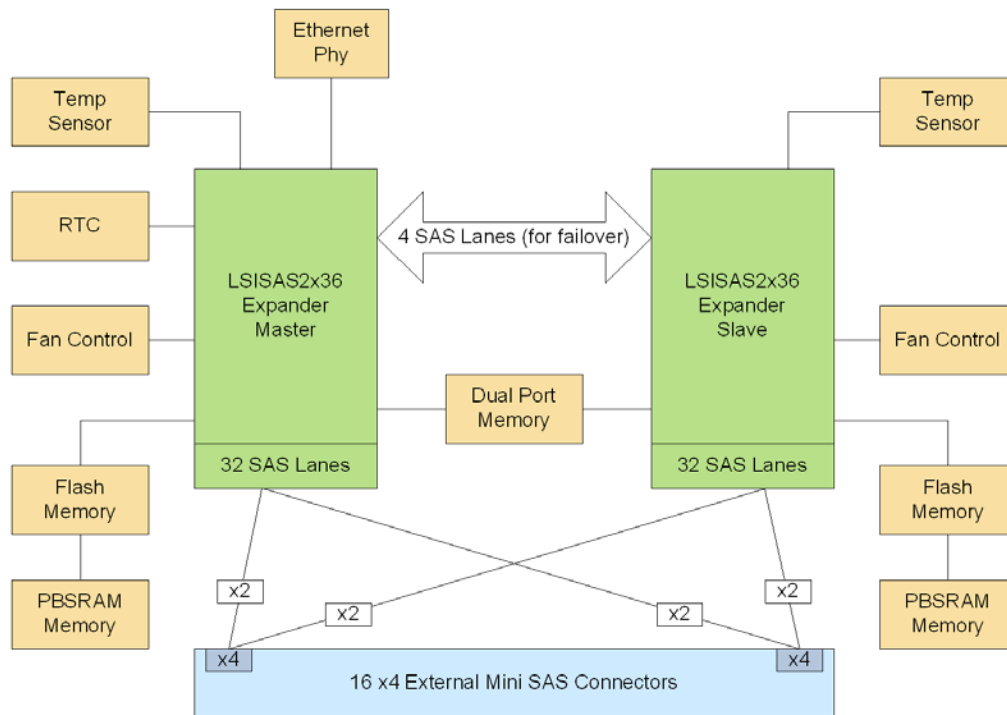


In this simplified representation, the servers at the top of the figure must access data on the storage devices in the lower part of the figure. The LSISAS6160 switch manages the SAS configuration, allowing both servers to access all storage devices. Or, if zoning is used, single application servers can access specific storage devices exclusively.

You can connect multiple LSISAS6160 switches in various topologies to provide failover support and to increase the number of connected devices in the SAS domain. The theoretical upper limit of SAS devices in a domain is 16,000. The upper limit of SAS addresses in an LSISAS6160 switch topology is 1000.

The following figure shows a high-level block diagram of the LSISAS6160 switch.

**Figure 3 Block Diagram of the LSISAS6160 Switch**



Brief descriptions of the LSISAS6160 functional blocks follow:

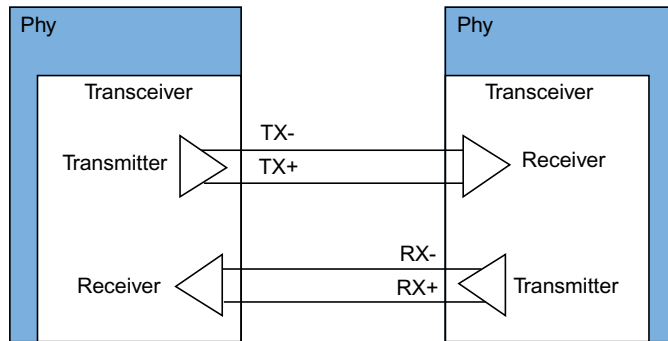
- **LSISAS2x36 Expander** – This block includes management functions such as routing, device discovery, and zoning. It also includes the SDM firmware. This block controls the flow of data through the SAS connectors.
- **SAS Connectors** – The LSISAS6160 switch has 16 x4 Mini SAS connectors, numbered 0 through 15. It supports connection to SAS devices at link rates of 6.0Gb/s, 3.0Gb/s, and 1.5Gb/s.
- **Ethernet Phy** – The external 10/100 Ethernet port provides access to the browser-based SDM management application, which sets up storage configurations in the SAS domain, monitors the status of the switch, and runs diagnostic tests. It also provides access to the SDM command line interface (CLI).
- **Real-Time Clock** – The battery-powered real-time clock is set at the factory.
- **Fans** – The LSISAS6160 switch enclosure contains two fans. The fan speed is regulated based on the temperature inside the enclosure. You can monitor the status of the fans with the SDM utility.
- **Flash Memory** – Each LSISAS2x36 expander connects to a parallel flash memory through the expander's external memory interface. This flash memory is used for firmware storage and execution, as well as nonvolatile data such as Ethernet MAC address and SAS World Wide Identifier (WWID).
- **PBSRAM Memory** – The pipelined burst SRAM (PBSRAM) attached to each expander's external memory interface is used for the capture buffer, the run-time stack, the heap, and other information.
- **Dual Port Memory** – The dual port SRAM provides shared memory space between the master and slave expanders.
- **Temperature Sensors** – The temperature sensors inputs control the speed of the fans.



## 1.3 SAS Phys, Ports, and Connectors

Phys and ports are a basic concept of SAS. A phy is the basic physical connection point for a SAS device. A phy contains a single transmitter and receiver, which communicate across a SAS link to a single transmitter and receiver in another phy, as the following figure shows.

**Figure 4 Link between Two Single SAS Phys**

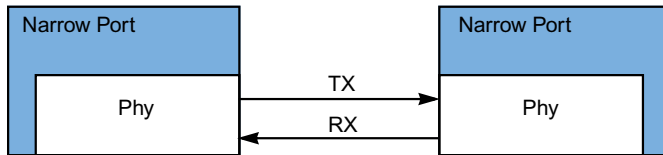


Each single-phy link (also called a *narrow port*) supports a maximum bandwidth of 600 MB/s (6.0 Gb/s) per direction, with a total bandwidth of 1200 MB/s full duplex in both directions.

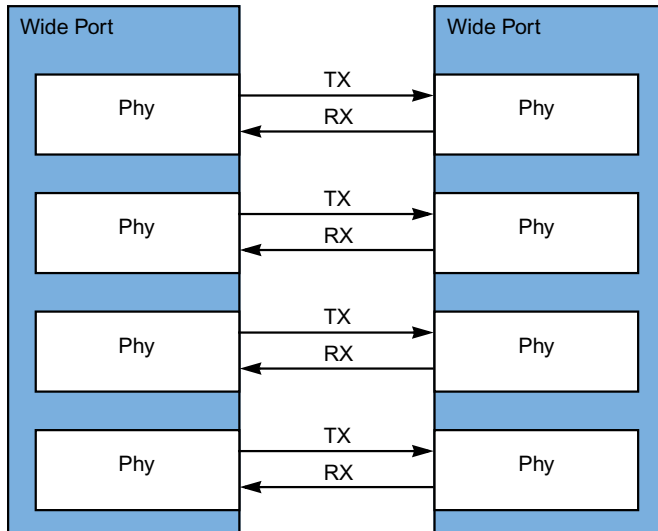
A wide SAS port consists of more than one SAS phy (an 8-phy SAS port is also possible). A wide SAS port transmits and receives data by using the same SAS address when connected to another SAS wide port. In other words, the port is created dynamically when the connection is made. The following figure shows both a narrow SAS port and a wide SAS port.

**Figure 5 Narrow and Wide SAS Ports**

a. Narrow SAS Port with One Phy in Each Port



b. Wide SAS Port with Four Phys in Each Port



The LSISAS6160 switch has 64 phys, numbered 0 through 63. Each of the 16 SAS connectors on the switch case (numbered 0 through 15 in this document) contains four phys, making them wide ports.

During normal operation, the SAS connectors on the switch are cabled to SAS connectors on initiator devices or target devices. This connection creates a wide SAS port through which data is transmitted and received.

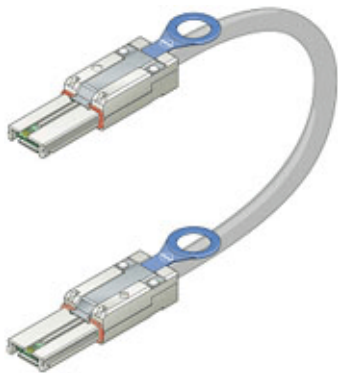
## 1.4 SAS Connectors and Cabling

Use a crossover cable to connect the LSISAS6160 switch to a server or to another host device. Use 4x Mini SAS connectors (also called SFF-8088 connectors) on both ends of the crossover cable to connect the switch to the device.

The keyed connectors at port 0 and port 2, located at the upper left on the LSISAS6160 switch, support active cabling. Active cabling permits longer cable lengths and requires a special cable type. These cables are keyed so that they do not attach to a passive connector. However, you can attach a passive cable to a connector that supports active cabling. [Chapter 2, Installation and Hardware Setup](#), has information about recommended cable lengths.

The following figure shows a crossover cable with 4x Mini SAS connectors on both ends.

**Figure 6 Mini SAS 4x Cable**



All cables used with the LSISAS6160 switch must comply with the SAS 2.1 standard.

## 1.5 SAS Routing and Zoning

SAS is a connection-oriented, point-to-point technology. When a host (initiator) issues a request to read or write data, the LSISAS6160 switch automatically determines how to route the connection request from the initiator to the correct data storage device (target). By default, any SAS initiator or target connected to the LSISAS6160 switch can access any other connected initiator or target in the SAS domain, without restrictions. However, because the SAS domain grows to include multiple hosts and multiple storage volumes, you can segregate one host from another host, or restrict one host from accessing storage owned by another host.

SAS zoning partitions the SAS topology to isolate selected hosts from each other, or to permit selected hosts to access only selected storage volumes. The LSISAS6160 switch supports the full SAS 2.0 T10 zoning model.

Zoning provides several benefits:

- **Security** – Zoning prevents users from accessing information that is not available to them.
- **Manageability** – Zoning reflects operational categories, such as marketing or engineering. Zoning also can partition hosts that run different operating systems to minimize conflicts.
- **Performance** – Zoning enables faster boot time because the host must discover only the storage within its zone or zones.

### 1.5.1 SAS Zoning Overview

SAS zoning access control is implemented by linked switch and expander devices, with zoning enabled. These devices define a Zoned Portion of a Service Delivery System (ZPSDS). No host device intervention is required. Each zoning switch and expander device maintains an identical zone permission table, so zone access control is maintained across the entire ZPSDS.

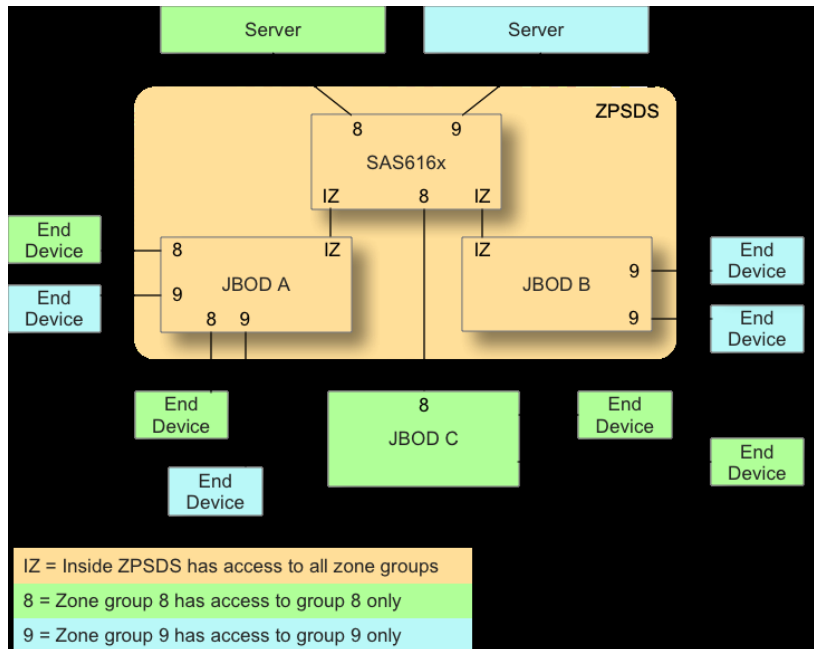
To be part of the ZPSDS, the switch requires a SAS expander that supports saving the zone configuration, as explained in the *T-10 SAS Specification*. Any expander that does not support saving of the zone configuration is treated as a nonzoning expander and is not included in the ZPSDS.

Initiators and targets see only the portions of the ZPSDS to which they are assigned in the zone permission table. These zoned portions are called *zone groups*. Zone groups are activated when they belong to a set. When the set is enabled, the zoning is enforced. When the set is disabled, the zoning disappears. More than one set can exist in a ZPSDS, and initiators and targets can belong to more than one set. However, only one set can be active. In addition, more than one ZPSDS can exist in a SAS domain.

A ZPSDS has a zone manager for its configuration and management. The SDM utility (see [Chapter 3, SAS Domain Manager Graphical User Interface](#)) configures the zone manager.

The following figure shows a simple example of zoning.

**Figure 7 Simple Zoning Example**



## 1.5.2 Creating SAS Zones

To create SAS zones, start by creating zone groups that include hosts or storage devices that share common access privileges, and zone sets that connect the zone groups together. Use the SDM utility to create zones. The SDM-GUI utility includes zoning wizards to create zone groups and zone sets automatically. You also can use the SDM utility to create zone groups and zone sets.

The following rules apply to zone groups and zone sets:

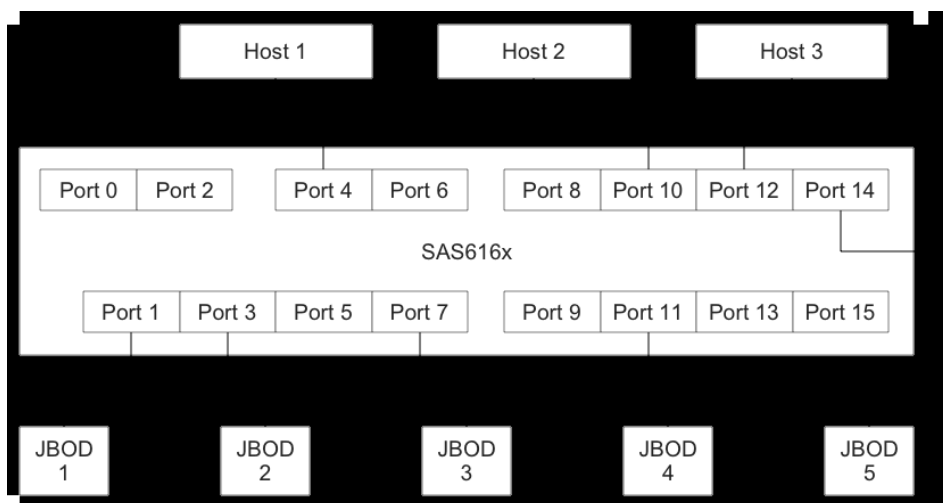
- Only phys on the edge of the ZPSDS can be grouped into administrator-defined zone groups. Phys that interconnect zoning expanders are automatically placed into Zone Group 1.
- An administrator defines zone group permissions. This procedure permits end devices attached to, or downstream of, the zoned phy to communicate with one another.
- Zoning limits a host's access to only the targets downstream of zoned phys in which its zone phy is granted zoning access permission. A host can access all logical unit numbers (LUNs) behind the SAS phy, and it does not restrict access to individual storage LUNs.
- You can create up to 248 zone groups within a single zone set.
- SAS phys within a zone group cannot automatically access each other, but you can grant them access privileges.
- You can grant a zone group permission to access multiple zone groups, if required.
- A zone group can be a member of more than one zone set.

- A phy can be a member of only one zone group per zone set.
- A zone set must be active for its definitions to be applied to the SAS domain. Zone sets are activated in the SDM utility.
- Only one zone set can be active at one time. When no zone set is active, zoning is disabled and domain access is unrestricted.
- Changes to the active zone set (for example, a change to zone group or zone set membership, or a change to zone group permissions) do not take effect until the next zone set activate command.
- When the SAS topology changes (for example, when you move a host or storage attachment from one switch connection to another) you must manually redefine zone group permissions within the active zone set. The switch does not do this task automatically. Changes to the active zone set do not take effect until the zone set is updated and reactivated.
- Zoning is managed throughout the ZPSDS formed around the LSISAS6160 switch, used to manage zoning, and any SAS 2.0 zoning expanders that can be linked back to it without crossing a nonzoning expander. When zoning is enabled, zone group and permission data are migrated automatically between the LSISAS6160 switches and the SAS 2.0 zoning-enabled expanders throughout the ZPSDS. If a storage configuration includes a legacy expander that is not zoning-enabled, that expander and its attached devices inherit the zone group and permissions of the zone phy to which it is connected.
- To create a high-availability (failover) configuration, use one LSISAS6160 switch for each data path between the host and the shared storage. SAS allows for only a single path between endpoints. See [Figure 13](#) for more information.

### 1.5.3 Configuring SAS Zones

The following figure shows a sample configuration with three hosts and five JBODs.

**Figure 8 Configuration for Zoning Example**

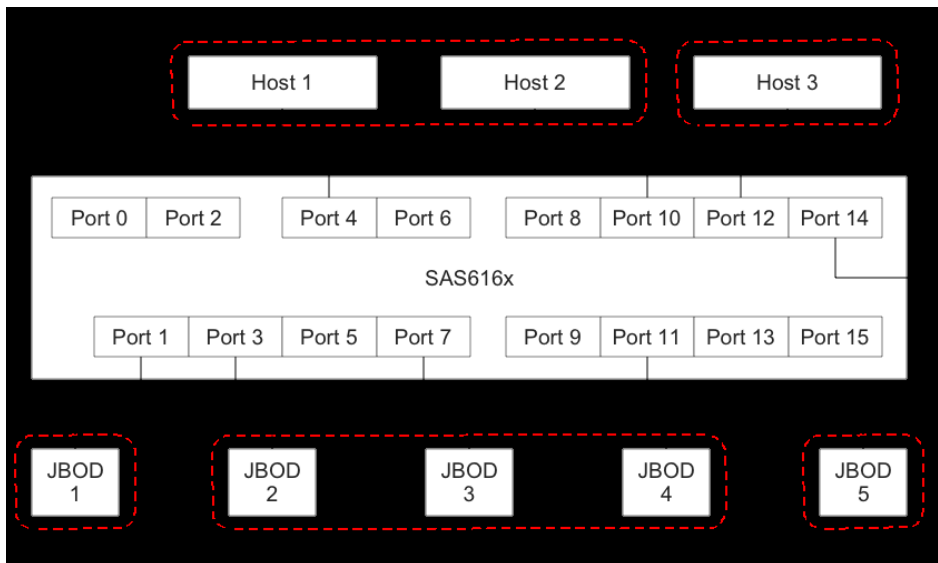


- Host 1 belongs to a local work group and accesses JBOD 1 as its primary resource. But Host 1 also accesses JBOD 2, JBOD 3, and JBOD 4 as a backup resource.
- Host 2, a backup server, has JBOD 2, JBOD 3, and JBOD 4 as its primary resource. It also accesses JBOD 1.
- Host 3, a web server, has exclusive access to JBOD 5. It also accesses JBOD 2, JBOD 3, and JBOD 4 for backup.

Because Host 1 and Host 2 have the same JBOD access requirements, you can define them as a single zone group. You can define JBOD 2, JBOD 3, and JBOD 4 as a zone group because they are always used together as a backup resource.

To create a suitable configuration, run the SDM utility and create the zone groups shown in the following figure.

**Figure 9 Creating Zone Groups**



Next, use the SDM utility to assign the following permissions, by creating zone sets:

- Zone Group 6 accesses Zone Groups 8 and 9, and vice versa.
- Zone Group 7 accesses Zone Groups 9 and 10, and vice versa.

## 1.6 Connecting Devices to the LSISAS6160 Switch

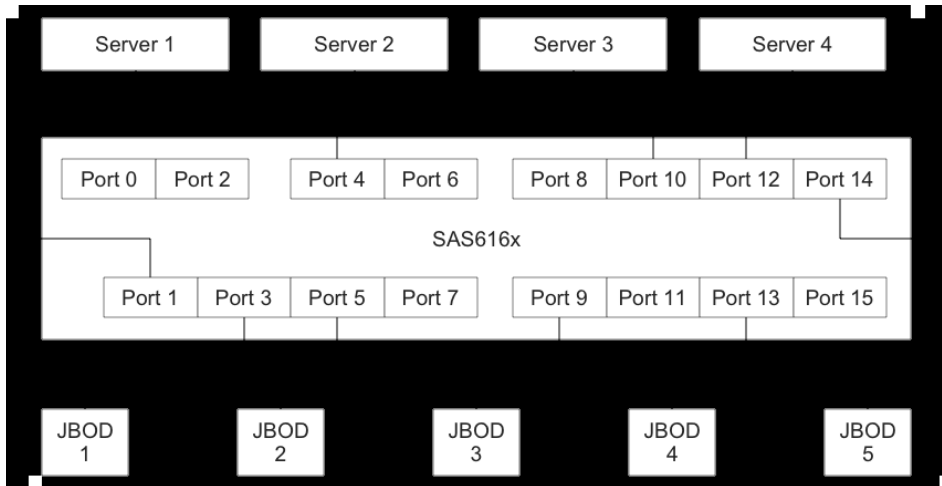
The rules for connecting devices to the 16 SAS connectors on the LSISAS6160 switch are as follows:

- Any SAS initiator can be connected to any SAS connector on the switch.
- Any SAS target can be connected to any SAS connector on the switch. A target can be a RAID array, a JBOD, or another switch. Individual SAS drives or SATA drives cannot be connected to the switch.
- Switches can be cascaded by connecting any SAS connector of the downstream switch to any SAS connector on the upstream switch.
- When SAS zoning is used, and multiple LSISAS6160 switches are used in the domain, the switches can be cabled directly to one another.
- Two switches can be connected with more than one cable to increase bandwidth between switches.
- All SAS connectors on the switch are Mini SAS, wide port-style connectors. In addition, Connector 0 and Connector 2 are keyed for active cables (see Section 1.4, [SAS Connectors and Cabling](#)).
- All connections must be x4. For any other configuration, contact your field applications engineer.
- The maximum connections permitted are as follows:
  - Six cascaded expanders, with each switch counting as one expander
  - Four cascaded switches
  - A total of 64 total expanders in the topology

The following examples show several ways in which you can connect devices to the LSISAS6160 switch.

Example 1 shows four servers (host bus adapters) and five JBODs connected to the LSISAS6160 switch.

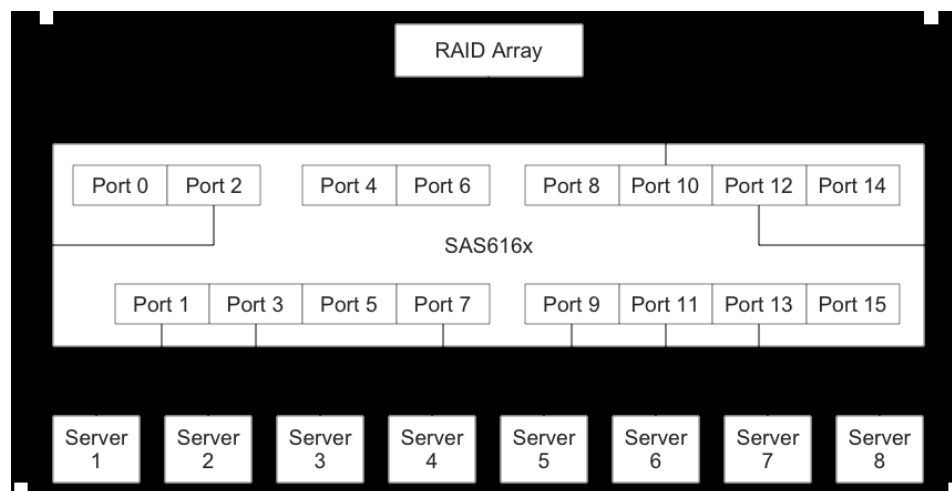
**Figure 10 Example 1, Multiple Servers and JBODs**



A single rack can contain the switch and all the other devices. The configuration requires nine SAS cables with a Mini SAS connector on each end. Depending on how you set up zoning for the devices, all servers could access data on all the JBODs, or servers could be restricted to accessing a subset of the JBODs.

Example 2 shows eight servers and one RAID array connected to the LSISAS6160 switch.

**Figure 11 Example 2, Multiple Servers and One RAID**

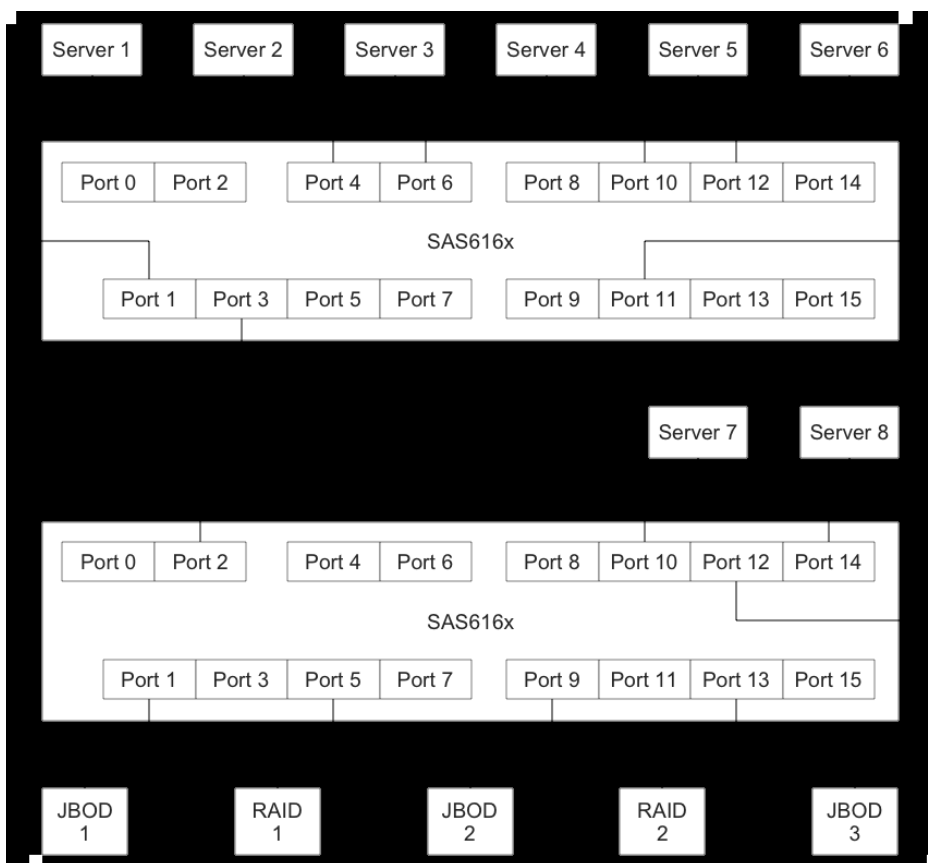


Each connection uses a separate cable with a Mini SAS connector on each end. All eight servers can access data on the RAID array. If more storage capacity is required, you can expand the RAID array, or you can create a configuration with a second cascading switch, as shown in the next example.

Example 3 shows eight servers and one cascading switch connected to the LSISAS6160 switch. Several JBODs and RAID arrays connect to the other switch.

**NOTE** Example 5 and Example 6 also show configurations with cascading switches.

**Figure 12 Example 3, Multiple Servers and a Cascading Switch**

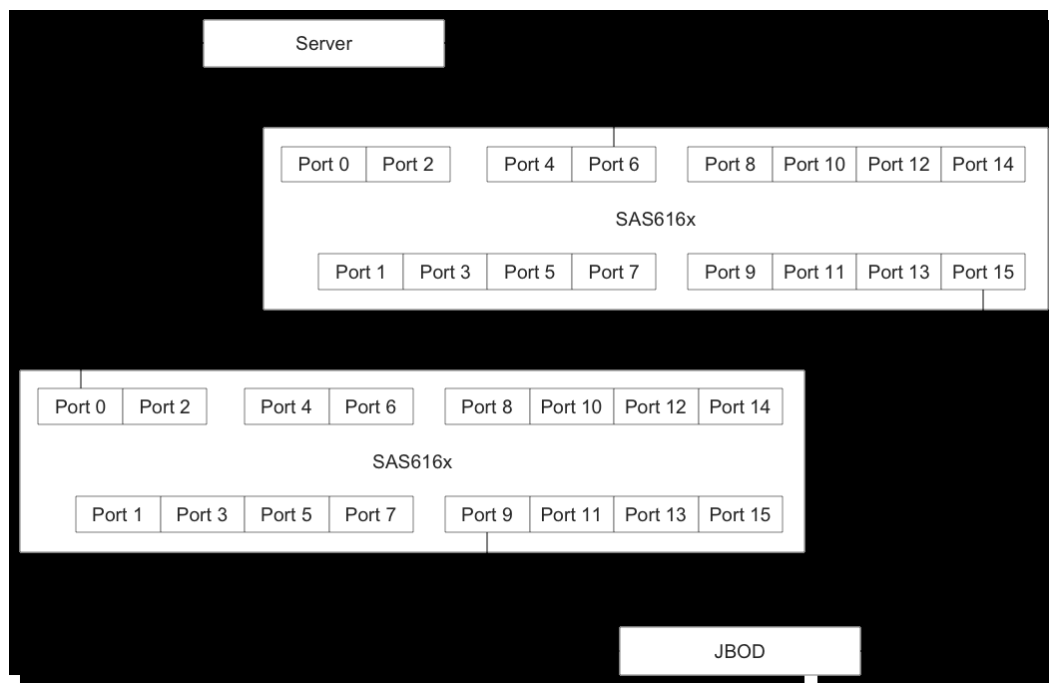


Example 3 shows how you can cascade two LSISAS6160 switches to increase the number of devices in the SAS domain. As in Example 1, all of the servers can access all the data storage devices, or you can implement a zoning configuration to restrict the access.



Example 4 shows a high-availability configuration in which a server is connected through two LSISAS6160 switches to two input connectors on a JBOD.

**Figure 13 Example 4, High Availability Configuration**



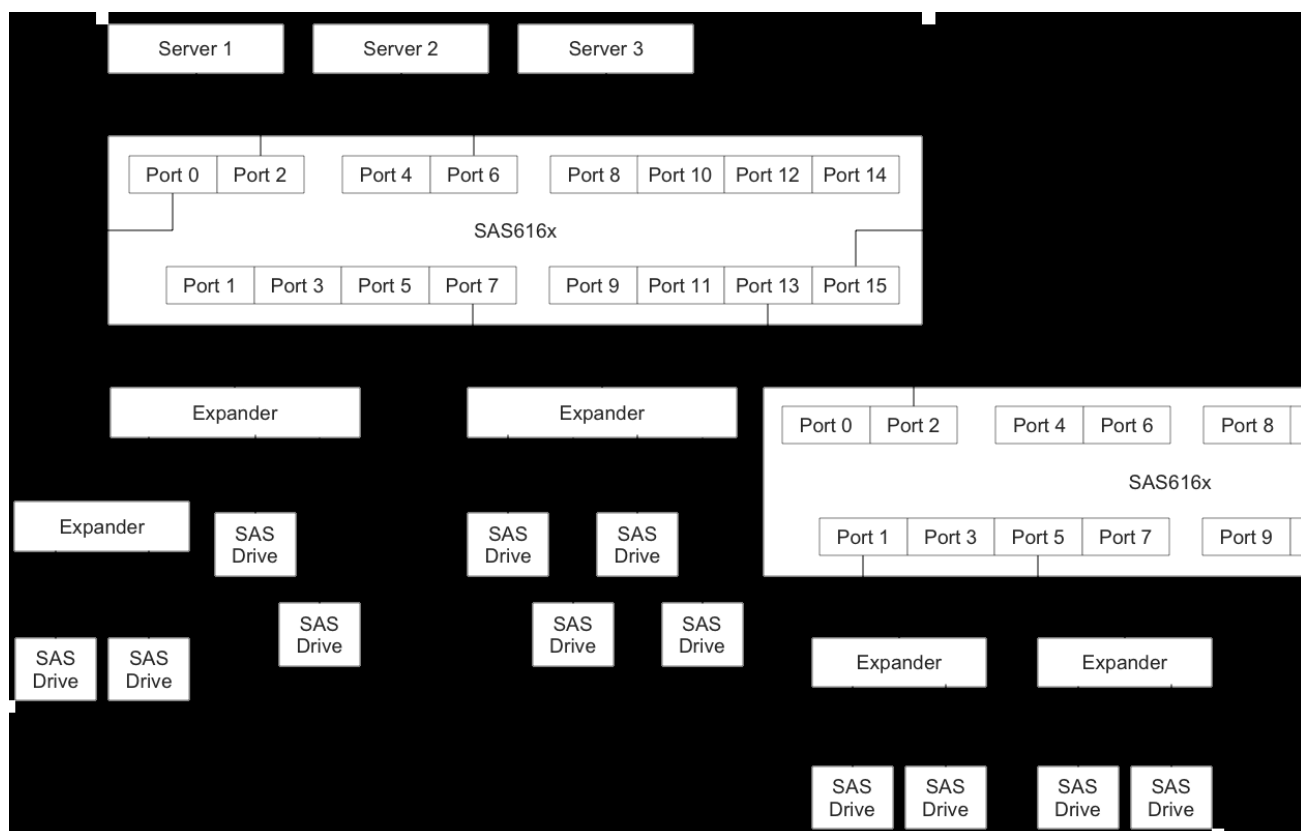
This dual porting configuration gives the server a redundant path through the switches for high availability. If one switch or connection fails, the server can still access the JBOD through the other connection.

Example 5 shows a large data storage network that includes two LSISAS6160 switches and several expanders.

**NOTE**

Expanders are either zoning expanders or nonzoning expanders. When SAS drives are attached to a zoning expander, each drive can be zoned individually and each drive can be placed in its own zone group. When SAS drives are attached to a nonzoning expander, they cannot be zoned individually. All the drives behind a nonzoning expander must be in the same zone group as the expander.

**Figure 14 Example 5, Large Data Storage Topology**

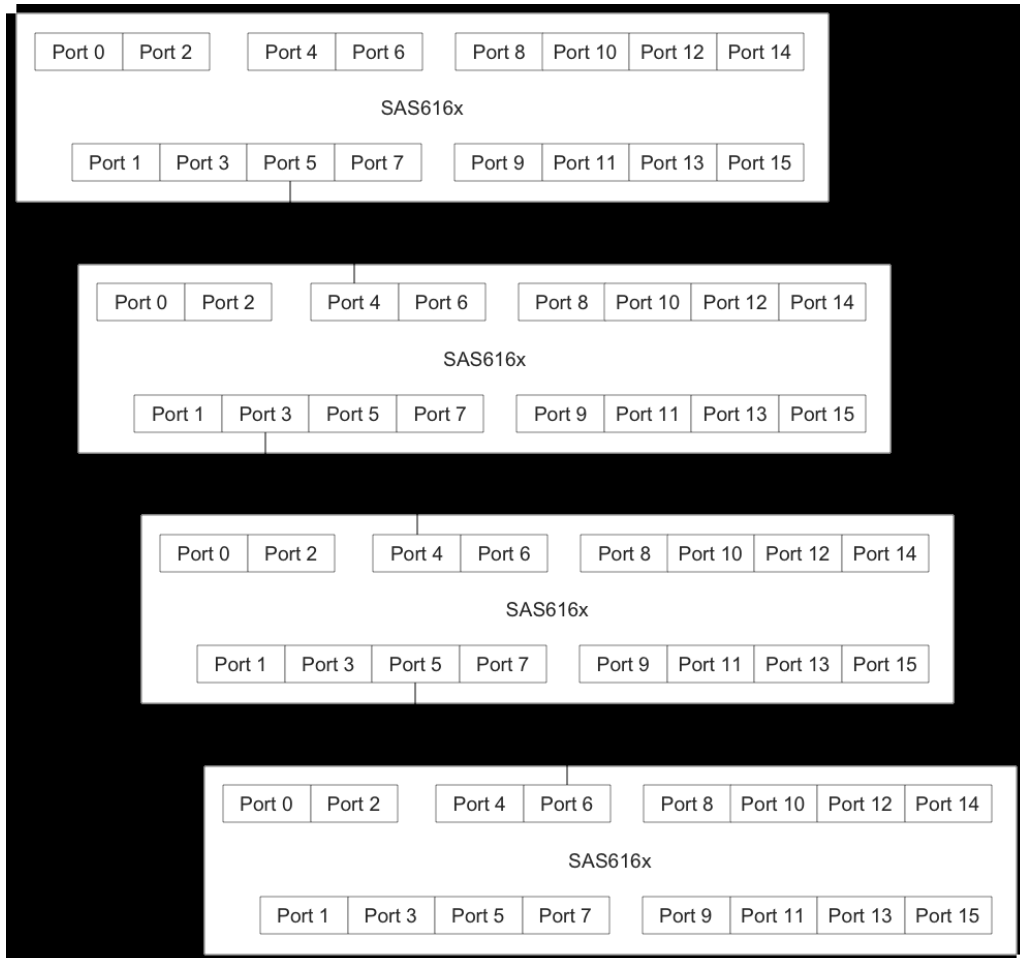


A complex zoning configuration like the one shown in Example 5 could potentially include hundreds of SAS initiators and targets. This flexible arrangement can easily be expanded without extensive cabling changes. The SDM utility detects newly added SAS devices during device discovery. You can use the SDM utility to modify and expand the storage configuration.

**NOTE** For zoning to function correctly, you must cable LSISAS6160 switches directly to one another, or you must cable them through SAS 2.0 zoning expanders.

Example 6 shows a daisy chain, or cascaded, switch, configuration with four LSISAS6160 switches. This example assumes that various SAS targets and SAS initiators are attached to the other connectors on the switches.

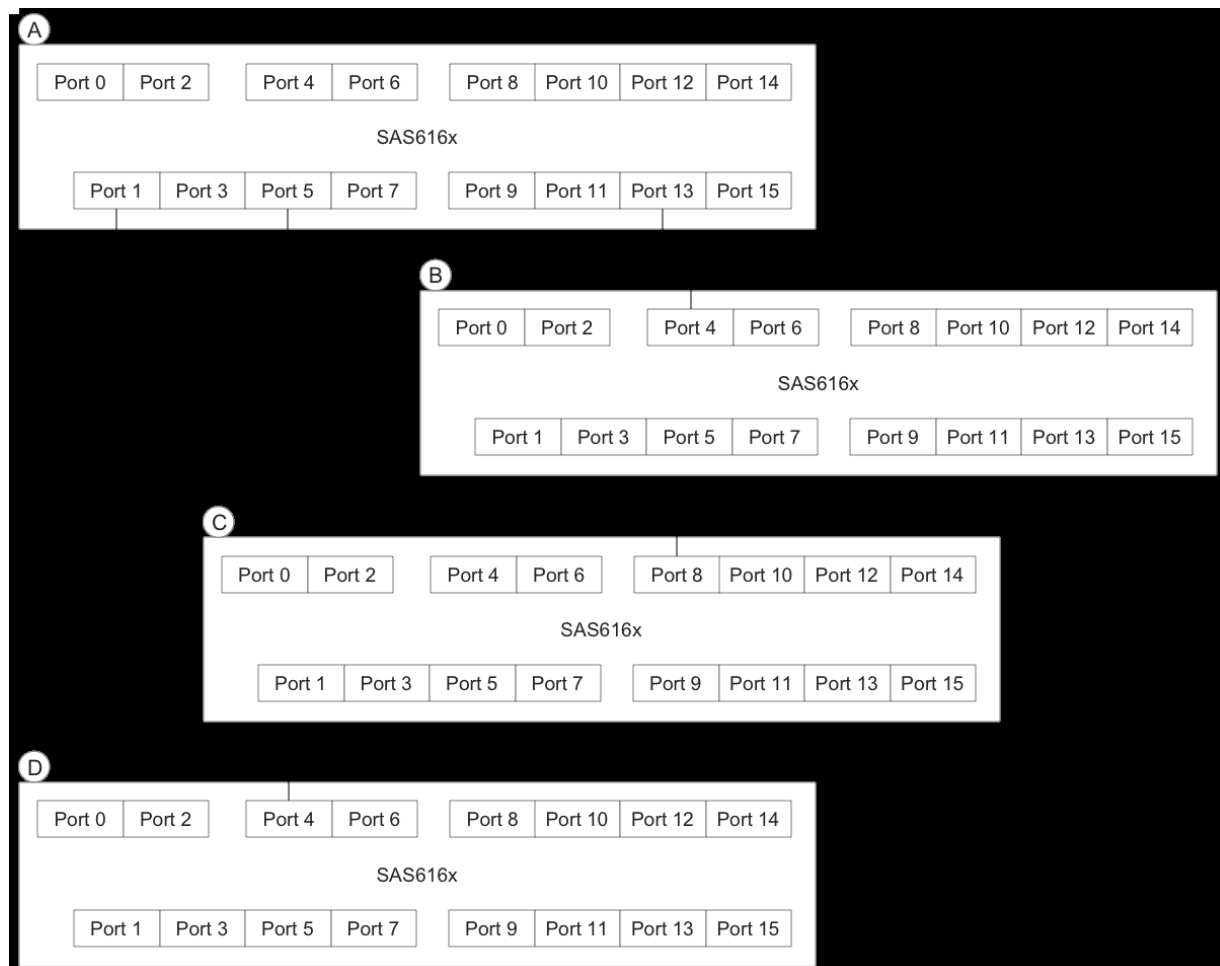
**Figure 15 Example 6, Cascaded Switch Configuration**



As in Example 3 (Figure 12), the cables in this example can run from any connector of the downstream switch to any connector in the switch above it. The cascade sequence is limited to four switches.

Example 7 shows a star (tree) configuration of four switches, with Switch B, Switch C, and Switch D connected directly to Switch A. As in Example 6 (Figure 15), this example assumes that various SAS targets and SAS initiators are attached to the other connectors on the switches.

**Figure 16 Example 7, Switches in a Star (Tree) Configuration**



**NOTE**

The cables can run from any connectors on Switch B, Switch C, and Switch D to any connectors on the central Switch A. You can attach more switches to the other connectors on Switch A. You also can attach additional switches to Switch B, Switch C, or Switch D.

## Chapter 2: Installation and Hardware Setup

This chapter explains how to unpack the LSISAS6160 SAS switch, install it on an optional rack shelf, connect power cables and other cables to it, change the default static IP address, and connect SAS storage devices to it. This chapter also explains how to interpret the LEDs on the switch.

### 2.1 Unpacking the Switch

Place the LSISAS6160 switch shipping carton on a grounded surface before opening the carton. Open the shipping carton and carefully unpack its contents. The carton contains the following items:

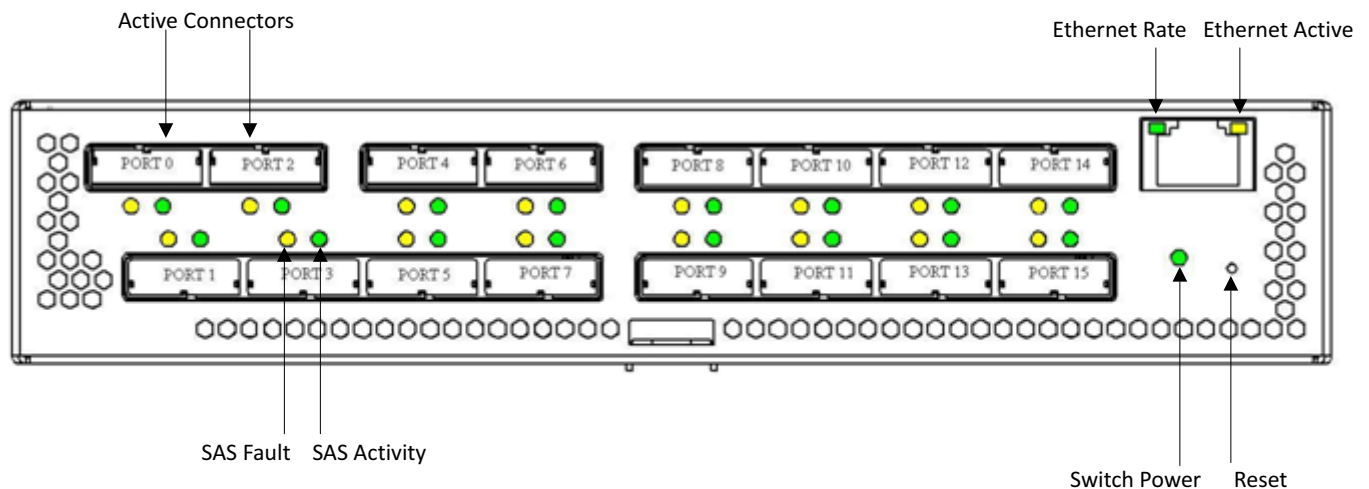
- One LSISAS6160 SAS switch
- One AC power cord with inline power supply
- One CD-ROM that contains this document

If any item is missing or damaged, contact your local reseller for replacement.

### 2.2 Identifying Switch Components

The following figure shows the connectors and LEDs on the LSISAS6160 switch. Each of the 16 SAS connectors has a corresponding fault status LED and an activity LED. The switch also includes a power status LED, and a rate LED and activity LED for the Ethernet connector. A reset pinhole allows reloading the factory defaults, which also requires power cycling the switch (see [Chapter 5, Troubleshooting](#)).

**Figure 17 Switch Components**



## 2.2.1 LSISAS6160 Connectors

All 16 connectors on the LSISAS6160 switch accept standard passive SAS cabling. The connectors at Port 0 and Port 2 are active, which permits longer cable lengths when using active SAS cabling. See [Chapter 1, Overview](#), for an explanation of SAS connectors and cables.

**Table 1 SAS Cable Lengths**

Connectors	Cable Type	Minimum Length	Maximum Length
1 and 3 to 15	Passive	0.5 m	10 m
0 and 2 only	Active	—	25 m
	Passive	0.5 m	10 m

## 2.2.2 LSISAS6160 LEDs

The following table shows how to interpret the LEDs for the system, the phys, the power supply module, and the Ethernet (RJ-45) connector. The LEDs in the RJ-45 connector are built into the left and right corners of the connector.

**Table 2 LED Modes**

LED Name	Color	Meaning
Power (P12V)	Green	12-V power is present on the board.
SAS Activity	Green	Blinks with activity on at least one of the four phys in the x4 SAS port.
SAS Fault	Amber - solid	At least one of the phys in the x4 SAS port is down.
SAS Fault	Amber - blinking	All amber LEDs blinking indicates an enclosure fault.
Ethernet Link/Activity	Amber	Link is active. Blinks with activity.
Ethernet Link Rate	Green	Rate of link. <ul style="list-style-type: none"><li>■ Off = 10 Mb/s.</li><li>■ On = 100 Mb/s.</li></ul>

## 2.2.3 LSISAS6160 Power Supply

The power supply provided with the LSISAS6160 switch includes an IEC320 C5-to-North American standard (NEMA) 5 connector, 18AWG SVT 60 °C, 300-V cable.

You can interchange an international power cord with the supplied power cord if the international power cord includes an IEC320 C5 connection to the power supply, has an equivalent cable construction, and is certified by UL®, CUL, CE, or an equivalent local agency.

## 2.3 Installing the LSISAS6160 Switch

### CAUTION

To prevent the LSISAS6160 switch from overheating, do not operate it in an environment that exceeds the maximum recommended ambient temperature of 50 °C (122 °F).

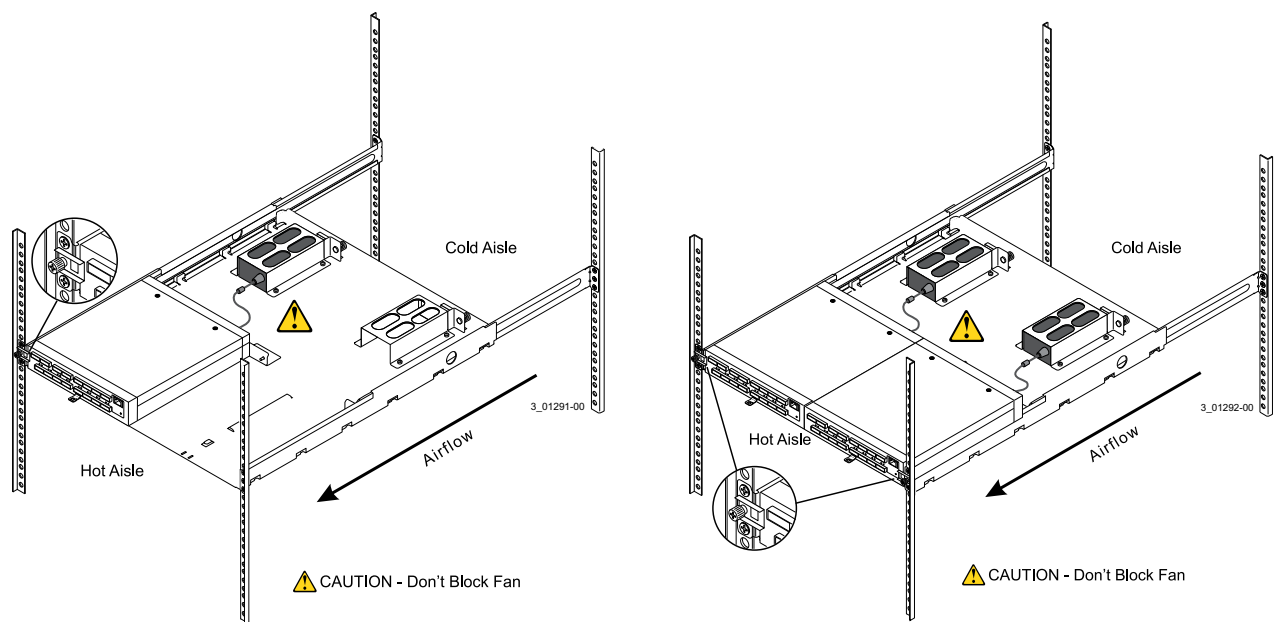
When installing the switch, consider the following information:

- The acceptable temperature and humidity operating ranges for installation and operation of the switch are as follows:
  - Temperature range: 5 °C to 50 °C (dry bulb)
  - Relative humidity range: 5 percent to 90 percent noncondensing
  - Maximum dew point temperature: 32 °C
- Install the LSISAS6160 switch in a site free from strong electromagnetic field generators (such as motors), vibration, and dust.
- Allow some space for proper ventilation at the back of the switch, where the fans draw air into the switch for cooling.
- The AC power adapter is rated at 100 V to 240 V, and 50 Hz to 60 Hz.

### 2.3.1 Installing the LSISAS6160 Shelf

A special shelf is available for mounting one or two LSISAS6160 switches in a standard rack. The following figure shows these options.

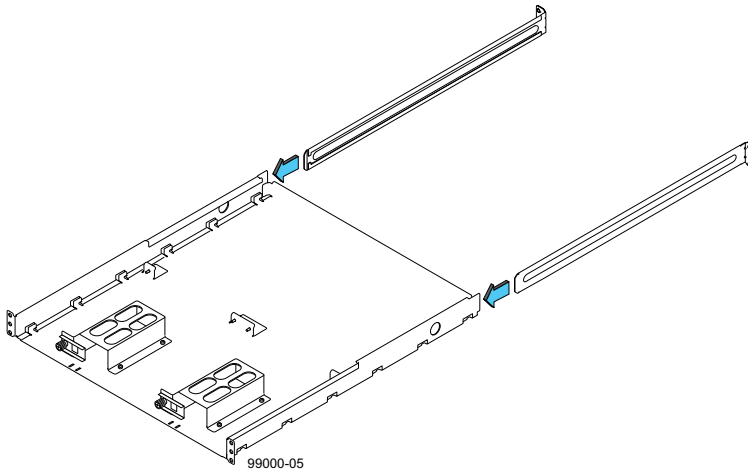
**Figure 18 Mounting LSISAS6160 Switches on a Rack-Mounted Shelf**



To assemble and mount the shelf in a rack, follow these steps:

1. Unpack the shelf unit. Make sure that it contains a shelf and two shelf rails along with eight screws.
2. Insert the two side rails from the back of the shelf, as shown in the following figure.

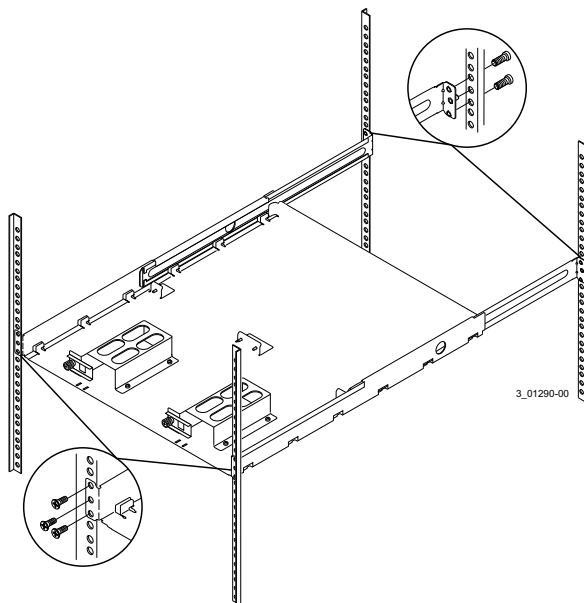
**Figure 19 Inserting Side Rails into the Shelf**



These rails allow you to adjust the shelf to fit different rack depths. Make sure the mounting ears on the rails are turned outward as shown in the figure.

3. Bolt the shelf to the vertical rails in the rack, as shown in the following figure.

**Figure 20 Mounting the Shelf in a Rack**



The mounting ears on the shelf rails are threaded, so place them on the inside of the vertical rack rails and insert the bolts from the outside, as shown in the previous figure.

The mounting ears on the shelf itself are not threaded, so mount them with clip nuts.

4. Place the LSISAS6160 switch and its inline power supply on the shelf. The switch enclosure fits onto a raised rib on the shelf to hold it securely in place. Slide the power supply into the enclosure.



5. Attach the holding clips to the outside corners, as shown in [Figure 18](#).  
The clips hold the switch and the power supply firmly in place.
6. When power is available at the connector side of the switch, route power cords along the enclosure on the far left or far right of the shelf.

The LSISAS6160 switch is now ready to connect to a host.

## 2.4 Connecting to a Host

To connect the LSISAS6160 switch to a host, follow these steps:

1. Attach one end of a cable to the 10/100 Ethernet connector (RJ-45 connector) on the connector side of the switch to gain access to the SDM utility, which you use to configure and manage the switch.
  - Use a standard RJ-45 cable to connect to an external Ethernet hub or switch.
  - Use a crossover RJ-45 cable to connect directly to a computer.
2. Plug the other end of the RJ-45 cable into an Ethernet hub, a switch, or a computer. Use a web browser (Microsoft® Internet Explorer®, or Mozilla® Firefox®) on the host. By default, the switch supports the configuration parameters listed in the following table, which provides a point-to-point (non-network) Ethernet connection between the switch and the host.

**WARNING** Provide the LSISAS6160 switch with an AC-protective earth-ground connection. Never defeat the ground conductor or operate the LSISAS6160 switch without a suitably installed ground conductor.

The following table lists the switch configuration defaults.

**Table 3 Switch Configuration Defaults**

Parameter	Default
Name	SAS6160
POST	Regular
Active Zone Set	None
IP Address Assignment	Static
IP Address	192.168.1.100
IP Subnet Mask	255.255.255.0
IP Gateway	192.168.1.1

You can reconfigure the switch to connect to an Ethernet network.

---

## 2.5 Changing the IP Address

The default IP address initially identifies the LSISAS6160 switch on a network. To change the IP address, use either the SDM-GUI application (see [Chapter 3, SAS Domain Manager Graphical User Interface](#)) or the SDM-CLI application (see [Chapter 4, SAS Domain Manager Command Line Interface](#)).

### 2.5.1 Setting a Static IP Address

Follow these steps to set a static IP address for the LSISAS6160 switch.

#### 2.5.1.1 Using SDM-GUI

1. Log on to SDM-GUI using the *admin* account.
2. Select the switch from the **Devices** tab.
3. Click the **Operations** tab.
4. Click the **Configure IP** link to open the Configure IP box.
5. Click the **Static IP** radio button.
6. Configure the static IP address, DNS, and gateway provided by your network administrator.
7. Exit SDM-GUI and power-cycle the switch.

#### 2.5.1.2 Using SDM-CLI

1. Log on to SDM-CLI using the *admin* account.
2. Enter the following command:  
device <sasaddress> ip static <ipaddress> <netmask> <defaultgateway>  
An example of the command follows:  
device 500605b0002453ff ip static 172.21.25.204 255.255.255.0 172.21.25.1
3. Exit SDM-CLI and power-cycle the switch.

### 2.5.2 Setting a Dynamic IP Address

#### 2.5.2.1 Using SDM-GUI

1. Log on to SDM-GUI using the *admin* account.
2. Select the switch from the **Devices** tab. Record the switch SAS address for possible reference and identification later.
3. Click the **Operations** tab.
4. Click the **Configure IP** link to open the Configure IP box.
5. Click the **DHCP IP** radio button.
6. Power off the switch.
7. Connect the switch to the network.
8. Power on the switch, which now receives an IP address assignment.
9. Run the provided Xip utility with these options to see the SAS address and IP information for all attached devices.  
xip -i get avail

For network management, contact your system administrator to create a static reservation for this IP address.

### 2.5.2.2 Using SDM-CLI

1. Log on to SDM-CLI using the *admin* account.
2. Enter the following command:  
device <sasaddress> ip dhcp  
An example of the command follows:  
device 500605b0002453ff ip dhcp
3. Exit SDM-CLI and power-cycle the switch.
4. Run the provided Xip utility with these options to see the SAS address and IP information for all attached devices.  
xip -i get avail

## 2.6 Connecting SAS and SATA Hardware

The LSISAS6160 switch centralizes management for all SAS initiators and SAS targets in the SAS domain. The SAS ports on the switch are, by default, both input ports and output ports. Depending on the requirements, you can attach each port to a SAS host bus adapter, a SAS or SATA JBOD, a RAID array, or a SAS expander. You cannot connect the LSISAS6160 switch to individual SAS HDD drives or SATA HDD drives, but you can connect one direct attach tape drive to any odd-numbered port (the lower row). You can use any SAS port on the LSISAS6160 switch to cascade to any port on another LSISAS6160 switch to increase the size of the storage configuration.

[Chapter 1, Overview](#), shows examples of various kinds of hardware configurations and explains the types of SAS connectors and cables that are needed for these configurations.

## 2.7 Safety Notices

The LSISAS6160 switch uses a 3-V coin cell lithium battery for the real-time clock. The battery is not user-replaceable. The following warning and caution apply if you must dispose of a LSISAS6160 switch for some reason.

### CAUTION

**Potentially hazardous material** – The lithium coin cell battery contains perchlorate that might be considered hazardous material. If the used battery is physically damaged and is leaking, do not ship the battery to a recycling center. Handling a damaged battery exposes you and others to potentially hazardous material. Dispose of the damaged battery according to all applicable regulations. If you recycle a used battery that is not damaged, use the proper facilities. Handle the battery according to all applicable regulations.

### WARNING

**Risk of fire or chemical burn** – The battery used in this device might present a risk of fire or chemical burn if mistreated. Do not disassemble, heat above 60 °C (140 °F), crush or puncture, short-circuit external contacts, or dispose of the battery in fire or water.

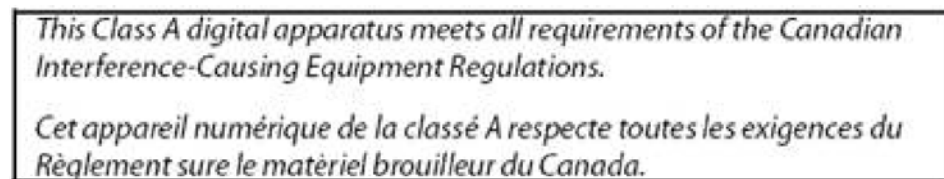
---

### 2.7.1 FCC

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the Federal Communications Commission (FCC) Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case you must correct the interference at your own expense.

LSI Corporation is not responsible for any radio or television interference caused by unauthorized modification of this equipment or the substitution or attachment of connecting cables and equipment other than those specified by LSI. It is your responsibility to correct interference caused by such unauthorized modification, substitution, or attachment.

### 2.7.2 Canada Mark



### 2.7.3 VCCI

この装置は、クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。 VCCI-A

## 2.7.4 BSMI

### 台灣BSMI認證

#### 警告使用者：

這是甲類的資訊產品，居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

### 電池警示認證

注意事項：如果電池未正確安裝，可能有爆炸的危險。請選用與制造商所推薦相同或相等型式的電池來進行替換。請依據制造商的指示處理使用過的電池。

## 2.7.5 CCC

### China CCC Notification

#### 声 明

此为 A 级产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对其干扰采取切实可行的措施。

### 電池警示认证

#### 注意事项:

如果电池未正确安装，可能有爆炸的危險。请选用与制造商所推荐相同或相等型式的电池来进行替换。请依据制造商的指示处理使用过的电池。

---

## Chapter 3: SAS Domain Manager Graphical User Interface

This chapter explains how to use the SAS Domain Manager Graphical User Interface (SDM-GUI) application to configure and monitor storage configurations with the LSISAS6160 switch. The SDM-GUI utility is a Java® Web Start® application, and the LSISAS6160 functions as an HTTP server that launches the utility. To run SDM-GUI from a browser, point the browser to the switch's IP address. SDM-GUI uses TCP/IP port 5573 to communicate with the LSISAS6160 switch. Therefore, the 5573 port must be available for communication between the management station and the switch.

SDM-GUI has an easy-to-use graphical interface that enables you to manage the host switch and other switches or expanders within the domain in which the host switch resides. Use the interface to view domain information, create and modify aliases, and manage zone groups and zone sets.

### 3.1 SDM-GUI Accounts

You can run SDM-GUI from a *user* account or from an *admin* account.

- The *user* account allows you to view the domain topology, configuration, and operating environment. The default password for this account is **user**.
- The *admin* account allows you to view the same information as the *user* account. In addition, you can change the configuration of the domain and of the managed devices within the domain. The default password for this account is **admin**.
- The LSISAS6160 switch's zone manager password is handled separately. Its default password is **lynx**.

### 3.2 Starting SDM-GUI

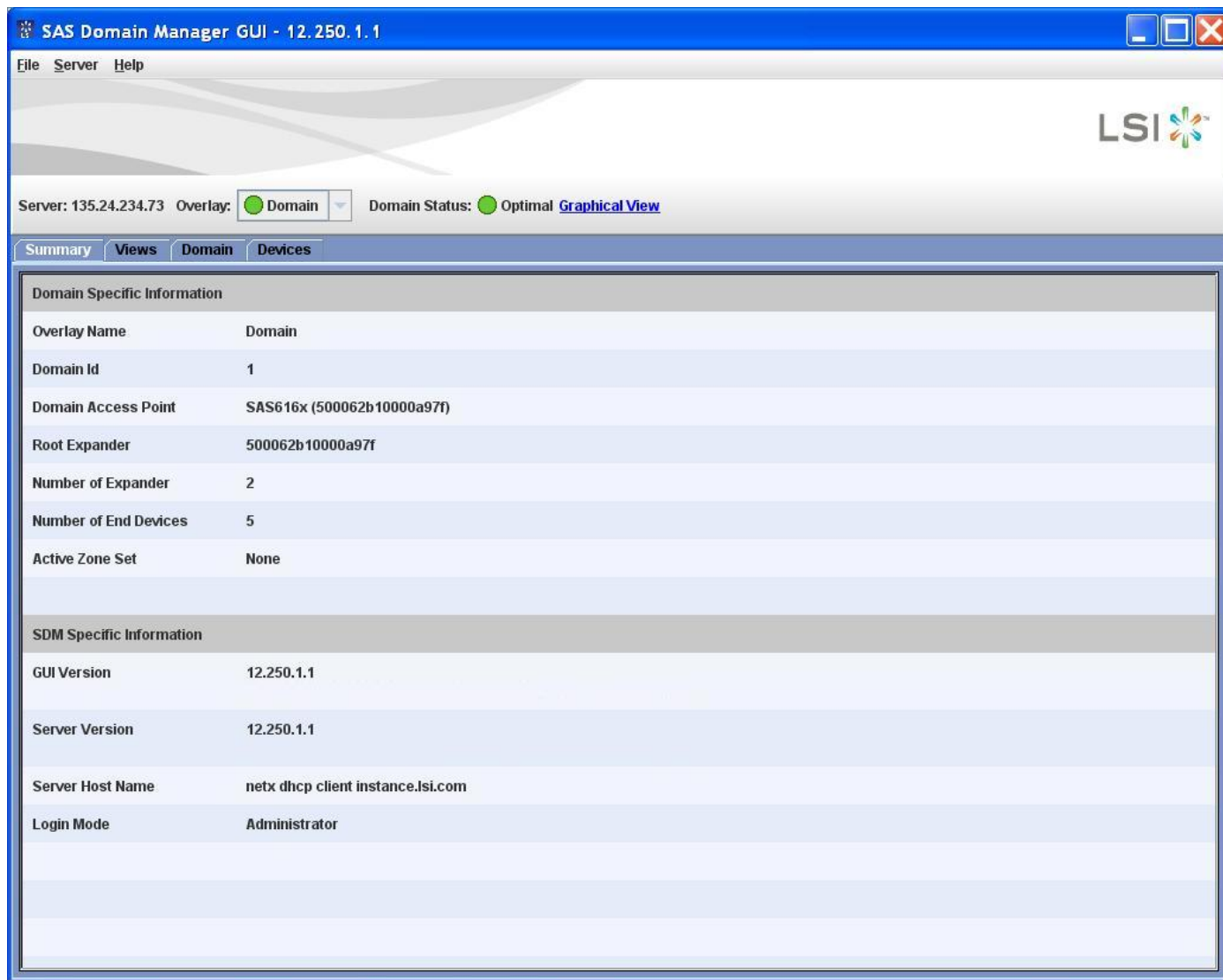
Follow these steps to start SDM-GUI:

1. Open a web browser and point it to the switch's IP address or host name.  
The Java Web Start application downloads and launches SDM-GUI automatically.  
The Password window appears.
2. Enter your user name and password.
3. Click **Login**.  
The main window and Summary tab appear.

### 3.3 Summary Tab and Menu Options

The following figure shows the SDM main window, with the menu bar and Summary tab.

**Figure 21 SDM-GUI Main Window**



The Summary tab lists the Server Host Name (the IP address of the switch on which SDM-GUI is running), the domain status and domain ID, the overlay name, and other information. The bottom section of the window lists information about SDM, including the software version, the host name of the current server, and the login mode (*admin* or *user*).

SDM only supports a single domain.

## 3.4 File, Server, and Help Menu Options

The menu bar at the top of the SDM-GUI window provides several options for managing the server. The available commands are as follows:

- Select **File > Refresh** to scan the domain for topology or status changes. (SDM automatically scans the domain once per minute.)
- Select **File > Exit** to exit SDM.
- Select **Server > Connect** to return to the login screen.
- Select **Server > Change Password** to change passwords for either the *admin* account or the *user* account. To change either password, you must know the current *admin* password.
- Select **Server > Event Log** to see the event log, which you can filter by domain and by severity (optimal, failed, or critical).
- Select **Server > Configure > SDM Settings** to enable or disable discovery and polling. The following table describes these settings and the resulting actions:

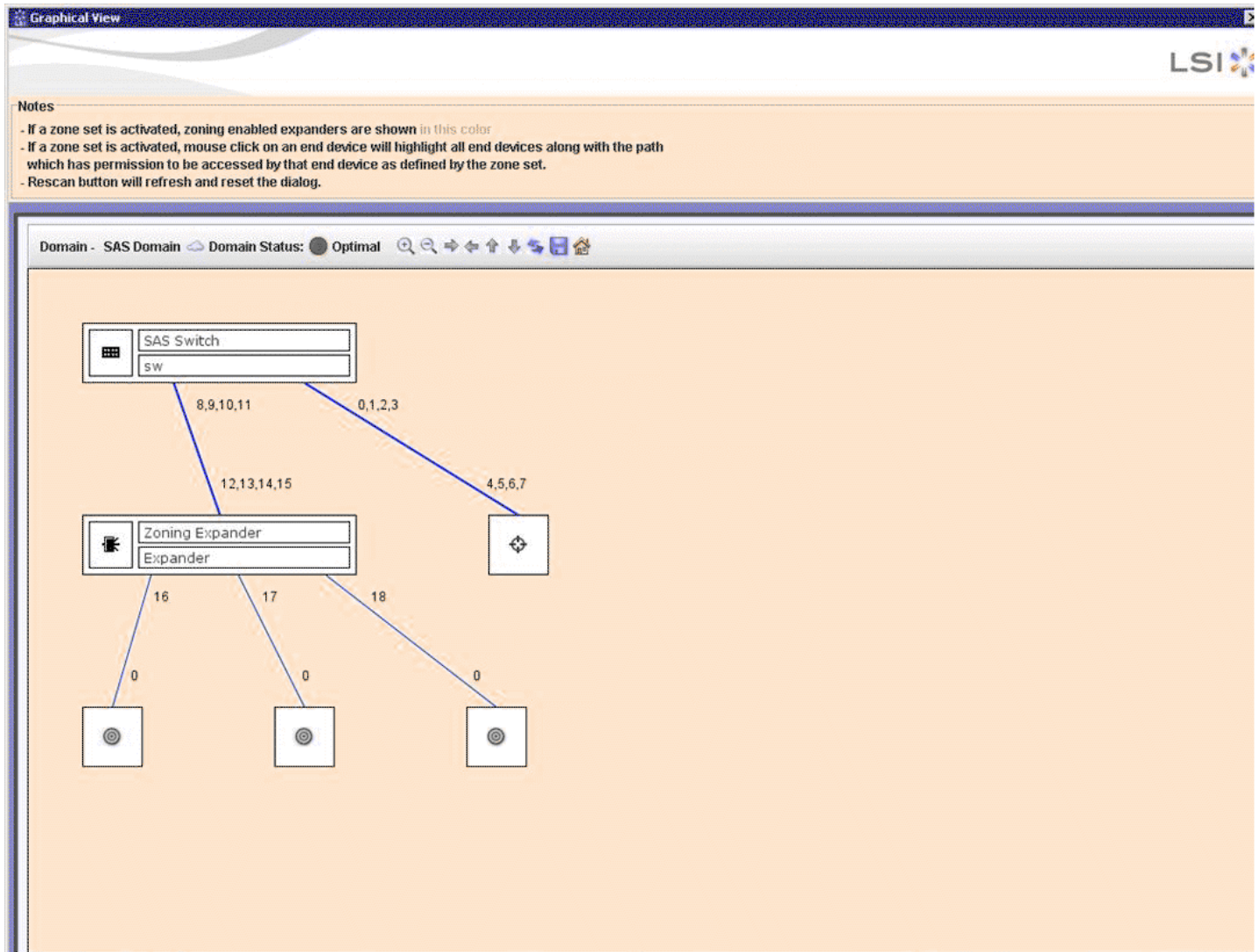
**Table 4 Discovery and Polling States and Actions**

Discovery Flag	Polling Interval	Resulting Action
Disabled (0)	Halted (0)	Discovery is not initiated. Commands that trigger discovery are blocked.
Disabled	Value between 10 and 300	The client prompts you to enable discovery because it was disabled. If you enable discovery, the polling interval is set to the value that you enter, and it takes effect immediately.  If you do not enable discovery, the polling interval is set to the value that you enter, but it does not take effect until discovery is enabled. The commands that trigger discovery are blocked.
Enabled	Halted (0)	Polling is disabled but discovery is triggered if you try to activate a Zone Set or perform any phy operation.
Enabled	Value between 11 and 300	Polling is done with a set value, and other operations run normally.

- Select **Server > Configure > Backup** to create a backup of the configuration. See [Section 3.8, Configuration Backup and Restore](#), for more details.
- Select **Server > Configure > Smart Restore** to restore a backup of the configuration. See [Section 3.8, Configuration Backup and Restore](#), for more details.
- Select **Server > Graphical View** to view a graphical representation of the devices in the domain. As shown in the following figure, the Graphical View option displays a representation of the switch and the other devices in the domain.



**Figure 22 Graphical View**



To view a list of device properties, position the mouse on top of a device icon. To view a pop-up menu of possible actions, right-click the mouse on a device icon.

**NOTE**

You can also open the Graphical View window by clicking the blue words *Graphical View* at the top of the main window.

- Select **Help > About** to view information about SDM-GUI and the server on which it is running. The information includes the version, host name, and operating system.

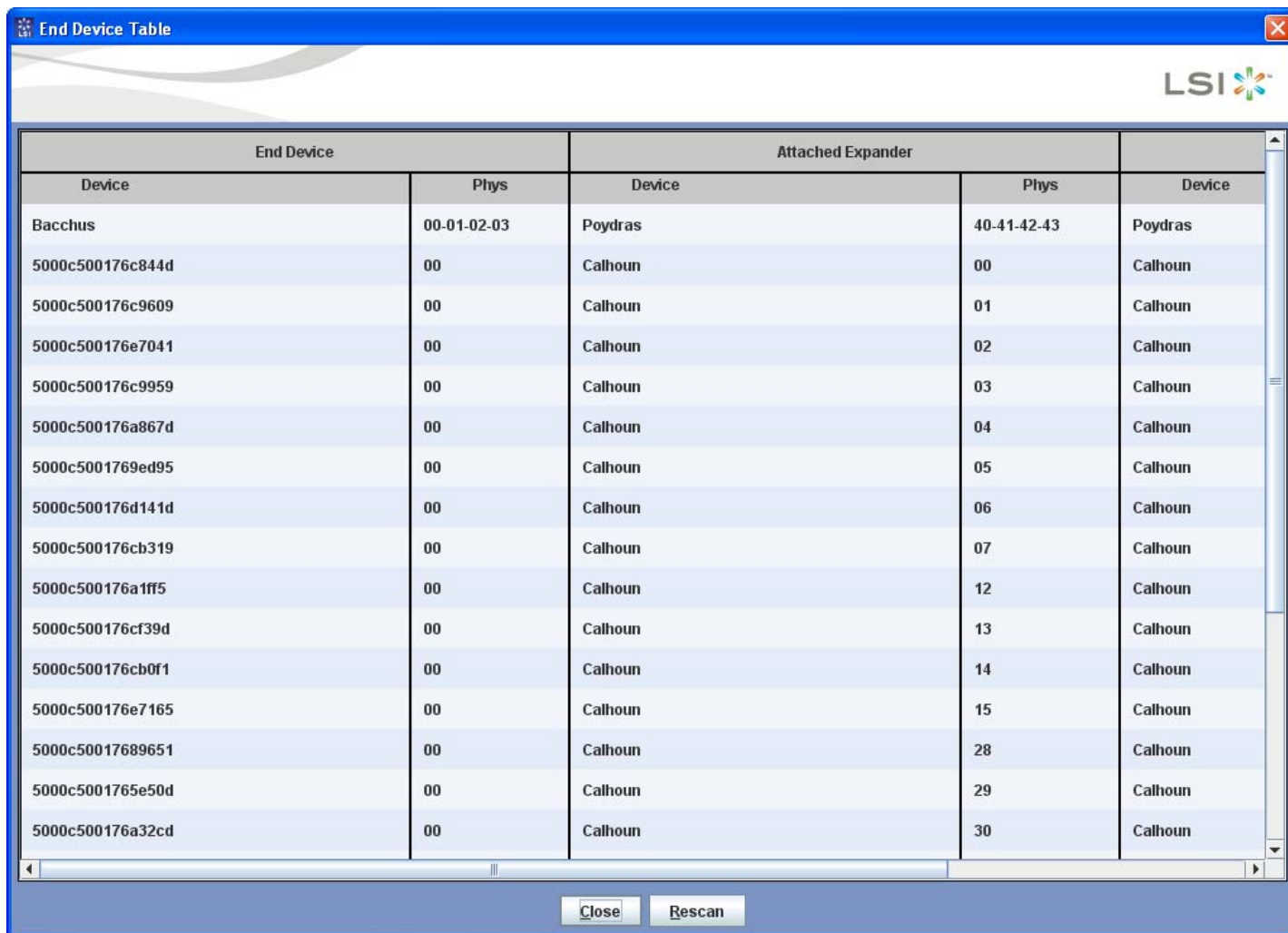
## 3.5 Views Tab

The Views tab displays information about the domain, including the end device table, the alias table, zone groups, and zone sets. This information is available to both *admin* and *user* accounts.

### 3.5.1 View End Device Table

As shown in the following figure, the View End Device Table option displays a list of end devices in the domain, the expanders to which they attach, and their entry point into the ZPSDS, which is useful for zoning.

Figure 23 End Device Table

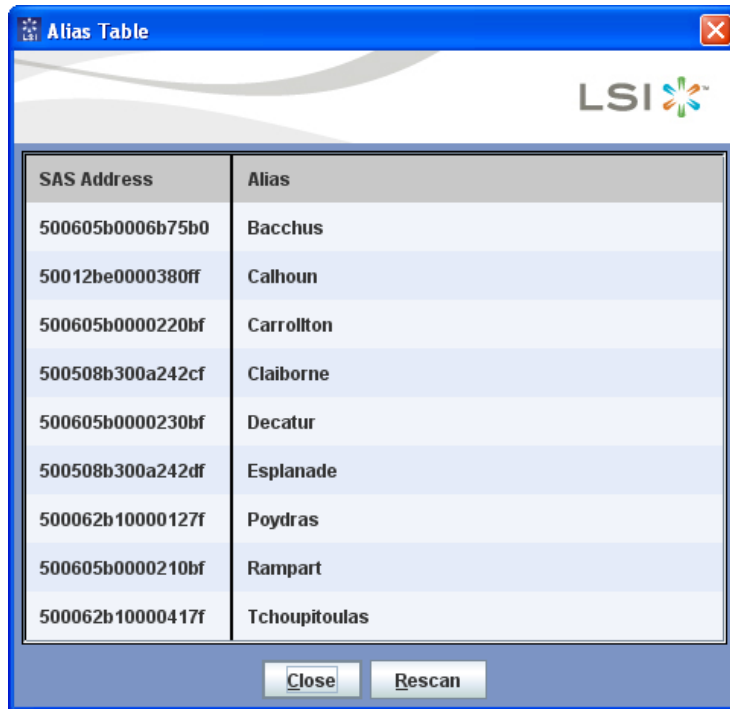


End Device		Attached Expander		
Device	Phys	Device	Phys	Device
Bacchus	00-01-02-03	Poydras	40-41-42-43	Poydras
5000c500176c844d	00	Calhoun	00	Calhoun
5000c500176c9609	00	Calhoun	01	Calhoun
5000c500176e7041	00	Calhoun	02	Calhoun
5000c500176c9959	00	Calhoun	03	Calhoun
5000c500176a867d	00	Calhoun	04	Calhoun
5000c5001769ed95	00	Calhoun	05	Calhoun
5000c500176d141d	00	Calhoun	06	Calhoun
5000c500176cb319	00	Calhoun	07	Calhoun
5000c500176a1ff5	00	Calhoun	12	Calhoun
5000c500176cf39d	00	Calhoun	13	Calhoun
5000c500176cb0f1	00	Calhoun	14	Calhoun
5000c500176e7165	00	Calhoun	15	Calhoun
5000c50017689651	00	Calhoun	28	Calhoun
5000c5001765e50d	00	Calhoun	29	Calhoun
5000c500176a32cd	00	Calhoun	30	Calhoun

### 3.5.2 View Alias Table

As shown in the following figure, the View Alias Table option displays a list of all aliases.

**Figure 24 Alias Table**



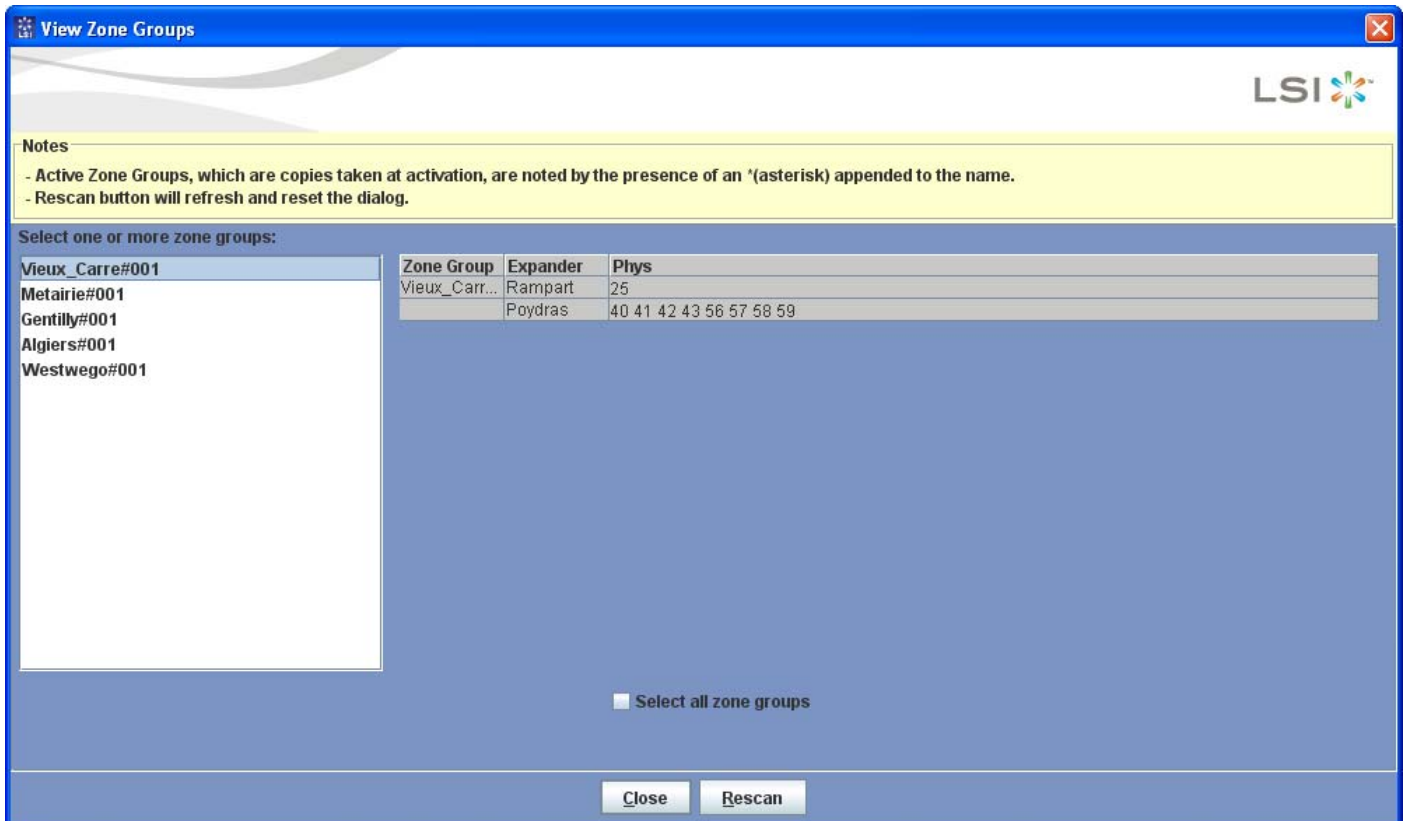
The screenshot shows a window titled "Alias Table" with the LSI logo in the top right corner. The window contains a table with two columns: "SAS Address" and "Alias". The table lists ten entries, each with a unique SAS address and a corresponding alias name. At the bottom of the window, there are two buttons: "Close" and "Rescan".

SAS Address	Alias
500605b0006b75b0	Bacchus
50012be0000380ff	Calhoun
500605b0000220bf	Carrollton
500508b300a242cf	Claiborne
500605b0000230bf	Decatur
500508b300a242df	Esplanade
500062b10000127f	Poydras
500605b0000210bf	Rampart
500062b10000417f	Tchoupitoulas

### 3.5.3 View Zone Groups

As shown in the following figure, the View Zone Groups option displays a list of zone groups. To view details about any zone group, select it from the list on the left of the window. An asterisk following a zone group name indicates that the zone group is currently active.

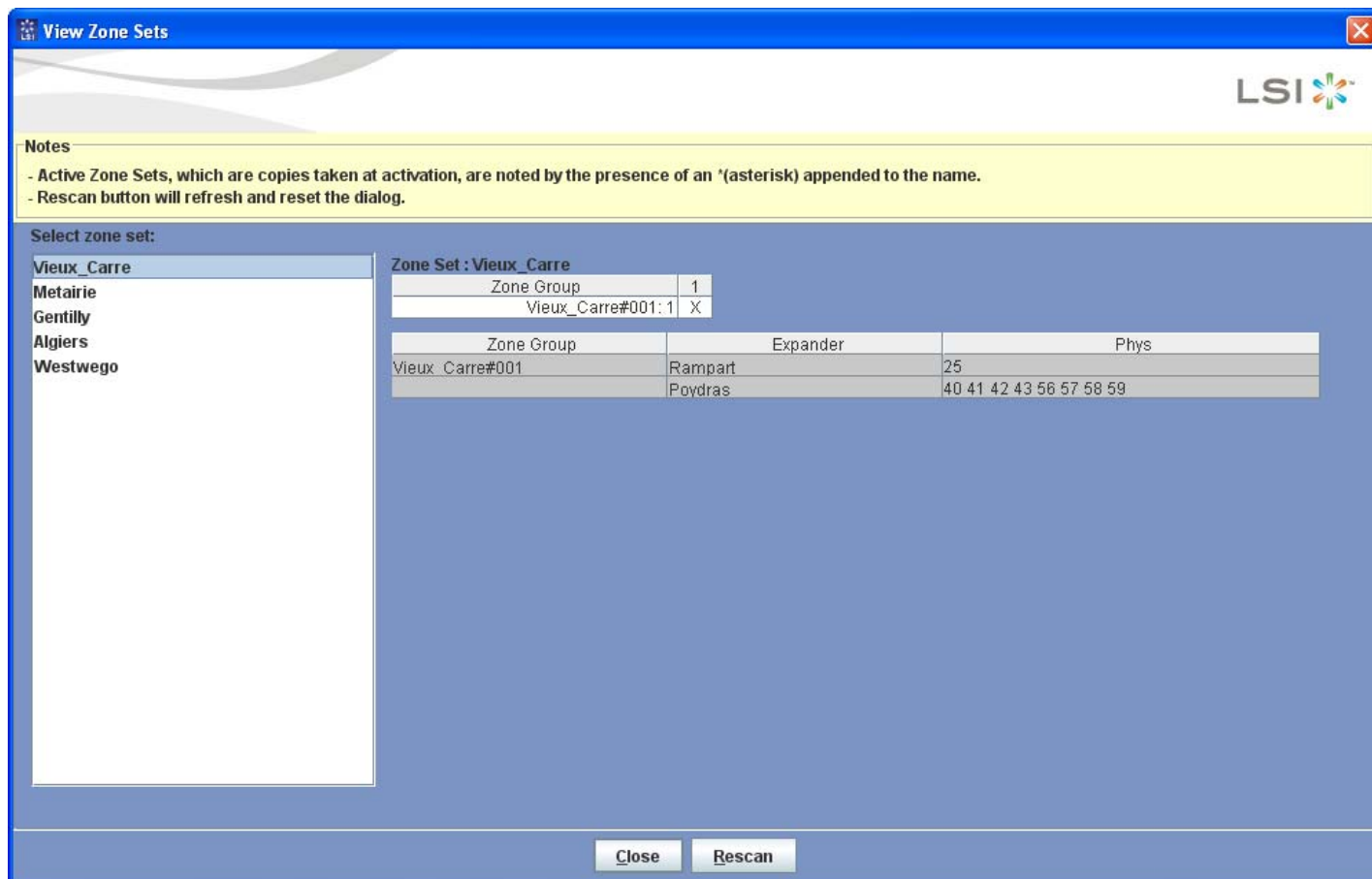
Figure 25 View Zone Groups



### 3.5.4 View Zone Sets

As shown in the following figure, the View Zone Sets option displays a list of zone sets. To view details about any zone set, select it from the list on the left of the window. An asterisk at the end of a zone set name indicates that the zone set was active at the time of activation.

**Figure 26 View Zone Sets**



## 3.6 Domain Tab

The Domain tab, which is available only in the *admin* account, has commands that manage aliases, zone groups, and zone sets. In addition, it has several wizards for domain configuration and management tasks. To use the specific commands described in this section, click the hyperlinks on the Domain tab.

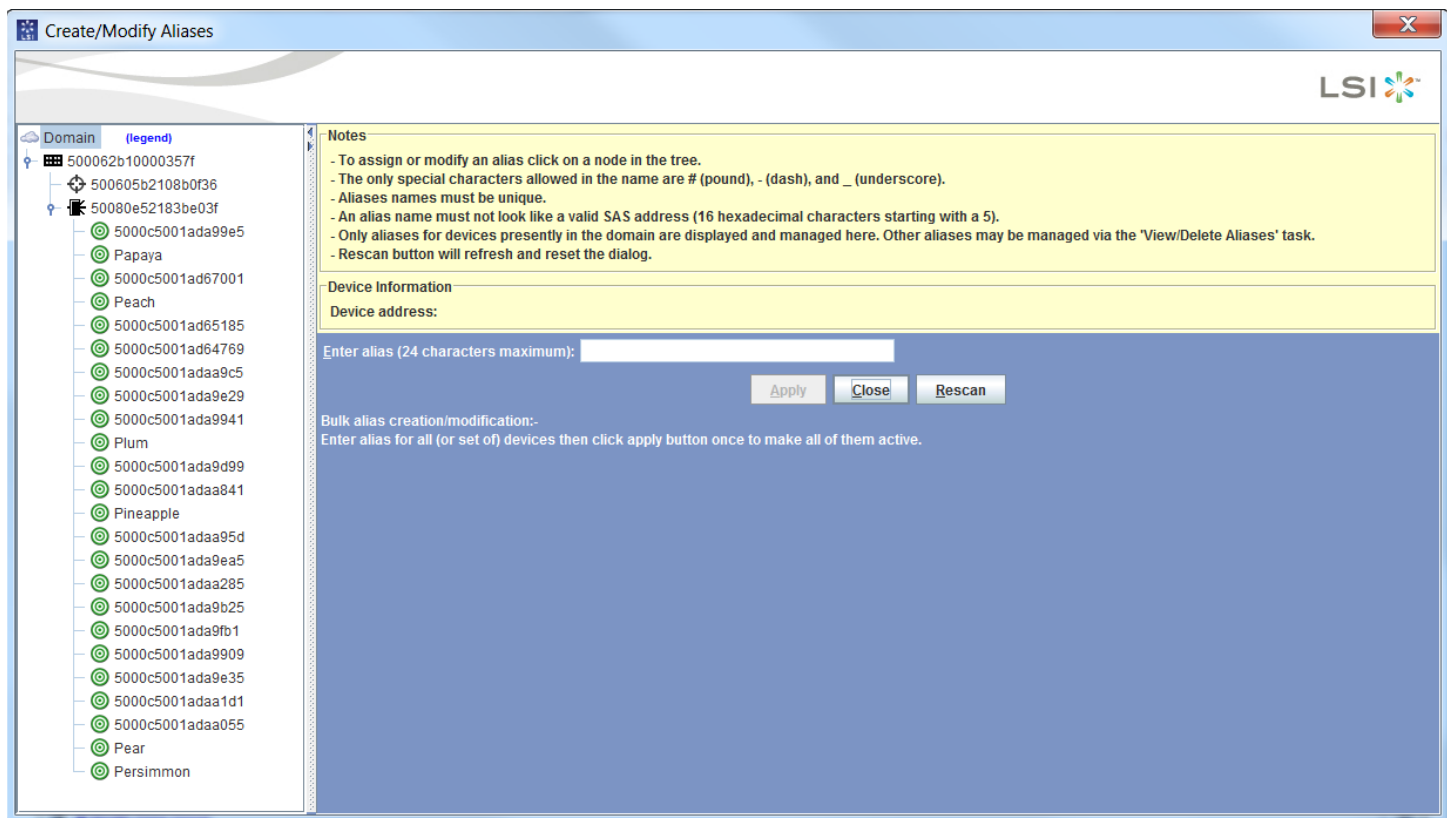
### 3.6.1 Alias Management

The Alias Management options enable you to create, modify, and delete aliases.

#### 3.6.1.1 Create/Modify Aliases

The Create/Modify Aliases option enables you to create or modify aliases. An alias is a user-defined name that is bound to a specific SAS address. After you create an alias, you can use it anywhere that you would normally use a SAS address. Aliases can be easily remembered names such as *Summit*, *Turbo*, or *Node100*.

**Figure 27 Create/Modify Aliases**



To assign an alias, click a node in the tree on the left of the window and type an alias of up to 24 characters in the **Enter alias** field. Click **Apply** to assign the alias. You can change existing aliases in addition to assigning new aliases.

#### NOTE

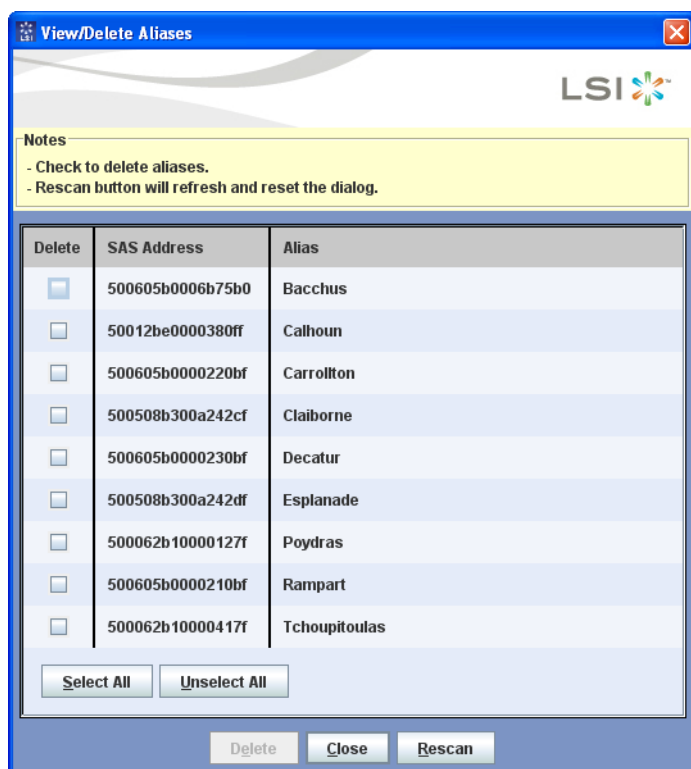
To assign or modify multiple aliases, select each node and enter an alias for it. After you enter all the aliases, click **Apply**.

Select alias names that are unique and that do not resemble valid SAS addresses (16 hexadecimal characters that start with the number 5). The only special characters you can use in an alias are # (pound), - (dash), and \_ (underscore). The tree displays aliases only for the devices presently in the domain. To see aliases for other devices, use the View/Delete Aliases command.

### 3.6.1.2 View/Delete Aliases

The View/Delete Aliases command enables you to display a list of all aliases associated with the focused domain, including aliases assigned to devices that are not presently in the domain. You also can use this command to delete aliases.

**Figure 28 View/Delete Aliases**



To delete an alias, select the check box next to it and click **Delete**.

---

## 3.6.2 Automatically Configure Zone Groups and Zone Sets

Zoning wizards simplify zone set creation. The Automatically Configure Zone Groups command and Zone Sets command include three wizards that automate the configuration of zone groups and zone sets.

### 3.6.2.1 Initiator Isolation Wizard

The Initiator Isolation Wizard creates a zone set that isolates initiators from one another, while exposing all targets to each other. Use the Initiator Isolation Wizard to automatically configure a zone set and two associated zone groups based on a snapshot of the domain. Each window of the wizard includes instructions to guide you through the configuration process.

After it prompts you to type the zone set name (maximum of 28 characters), the wizard checks the domain to determine if any initiators or targets are attached to the ZPSDS at the same point and share a common ZPSDS entry point. If so, the topology cannot support this zoning configuration, and the wizard terminates with an error message.

If the topology supports the configuration, the wizard builds two zone groups: one group for the initiators, and one group for the targets. The groups have the names `<zone set name> + #001` and `<zone set name> + #002`. The wizard scans through the domain and assigns to one zone group all the ZPSDS entry point phys that are upstream from initiators. The wizard assigns to another zone group all the ZPSDS entry point phys that are upstream from targets. The wizard then sets up permissions to allow the two zone groups to communicate with each other, but it prevents phys in one zone group from making connections to each other. When you click **Apply**, the wizard creates the zone set and the two associated zone groups.

### 3.6.2.2 Connector Wizard

The Connector Wizard automatically configures a zone set and associated zone groups by grouping connectors on the edge of the ZPSDS. The wizard includes instructions to guide you through the configuration process.

The wizard uses a snapshot of the domain to identify the connectors on the edge of the ZPSDS and then displays a list of these connectors. (The list does not include connectors that link expanders within the ZPSDS.) Type the zone set name (maximum of 28 characters) and bundle the connectors into zones by selecting one or more connectors from the list. You can define multiple zones as needed to meet your zoning requirements. Zones can overlap, but the wizard removes zones that are subsets of larger zones. You can delete the defined zones by selecting the check box and clicking **Delete**.

After you define all the zones, the wizard uses the zone definitions to create the minimal number of zone groups and to configure their permissions. The wizard creates one zone group per defined zone, populating the zone group with the phys associated with the connectors in that zone, and setting up permission for the phys in the zone group to communicate with each other.

The wizard then compares each zone group to all other zone groups, including zone groups created during this process, searching for phys that are in both zone groups. If it finds any such phys (parents), it creates a new zone group (child) and moves the identified phys to the child. The wizard then grants permission for the child's phys to communicate with each other, as well as with the phys of the two parent zone groups.

If one of the parent zone groups is emptied in this process, the wizard transfers all permissions from the parent to the child. Empty zone groups are later ignored and are not transferred to the zone manager.

The wizard creates the zone set and associated zone group when you click **Apply**. It assigns to zone groups the names `<zone set name> + #001`, `<zone set name> + #002`, and so on. If the number of generated zone groups exceeds the maximum number of 248, the wizard displays an error message.



---

**NOTE**

If phys on the edge of the ZPSDS are associated with connectors, their connectors are displayed in the selection list. If phys on the edge of the ZPSDS are not associated with connectors, but they have formed into ports (they are connected to a device), ports appear in the selection list. If phys on the edge of the ZPSDS are not associated with connectors and have not formed into ports, individual phys are displayed in the selection list.

### 3.6.2.3 End Device Wizard

Use the End Device Wizard to automatically configure a zone set and associated zone groups by grouping end devices. Each window of the wizard includes instructions to guide you through the configuration process.

This wizard uses a snapshot of the domain to determine the available end devices and then displays lists of initiators and targets. Type the zone set name (maximum of 28 characters) and bundle one or more initiators with one or more targets into a zone by selecting them from these lists. You can define multiple zones as needed to meet your zoning requirements. Zones can overlap, but zones that are subsets of larger zones are removed. The wizard forces devices that share the same ZPSDS entry point (siblings) into the same zone by automatically selecting all siblings when you select a single sibling. You can delete the defined zones by selecting the check box and clicking **Delete**.

After you define all the zones, the wizard uses the zone definitions to create the minimal number of zone groups and to configure their permissions. The wizard creates one zone group per defined zone, populating the zone group with the ZPSDS entry point phys of the end devices in that zone, and setting up permission for the phys in the zone group to communicate with each other.

The wizard then compares each zone group to all other zone groups, including zone groups created during this process, searching for phys that are in both zone groups. If it finds any such phys (parents), it creates a new zone group (child) and moves the identified phys to the child. The wizard then grants permission for the child's phys to communicate with each other, as well as with the phys of the two parent zone groups.

If one of the parent zone groups is emptied in this process, the wizard transfers all permissions from the parent to the child. Empty zone groups are later ignored and are not transferred to the zone manager.

The wizard creates the zone set and associated zone group when you click **Apply**. The wizard assigns to zone groups the names *<zone set name> + #001*, *<zone set name> + #002*, and so on. If the number of generated zone groups exceeds the maximum number of 248, the wizard displays an error message.

## 3.6.3 Manually Configure Zone Groups

The Manually Configure Zone Groups commands enable you to manually create, view, modify, and delete zone groups. These commands provide greater control of zone set creation, and permit an administrator to edit an existing zone set or zone group.

### 3.6.3.1 Create Zone Group

The Create Zone Group command enables you to manually create zone groups. As the following figure shows, you create a zone group by typing a zone group name and then selecting members for the zone group from the list on the left of the window.

**Figure 29 Create Zone Group**

**Create Zone Group**

LSI

**Notes**

- The only special characters allowed in the name are # (pound), - (dash), and \_ (underscore).
- ZoneGroup names must be unique.
- Zonegroup name (32 characters maximum).
- Unselected members and Selected Members List box will contain the entries as  
<sas address/alias>: <phy number>[ > <attached sas address/alias>]
- Rescan button will refresh and reset the dialog.

Zone Group Name (32 characters maximum):

Unselected zone group members filter:

All

**Unselected Members:**

- Calhoun: 00 > 5000c500176c844d
- Calhoun: 01 > 5000c500176c9609
- Calhoun: 02 > 5000c500176e7041
- Calhoun: 03 > 5000c500176c9959
- Calhoun: 04 > 5000c500176a867d
- Calhoun: 05 > 5000c5001769ed95
- Calhoun: 06 > 5000c500176d141d
- Calhoun: 07 > 5000c500176cb319
- Calhoun: 08
- Calhoun: 09
- Calhoun: 10
- Calhoun: 11
- Calhoun: 12 > 5000c500176a1ff5

**Selected Members:**

Add >

< Remove

Apply Close Rescan

Zone group names must be unique and must be no longer than 32 characters. The only special characters you can use in a zone group name are # (pound), - (dash), and \_ (underscore).

The list of unselected zone group members contains only the expanders that are inside the ZPSDS boundary. The unselected members list box contains only the phys that are inside the ZPSDS boundary.

### 3.6.3.2 View Zone Groups

The View Zone Groups command displays information about zone groups. To view details about any zone group, select the group from the pull-down list on the left of the window. An asterisk at the end of a zone group name indicates that the zone group was active at the time of activation. Figure 25 shows the View Zone Groups window.

### 3.6.3.3 Modify Zone Group

Use the Modify Zone Group command to modify existing zone groups by adding or removing phys or renaming an existing zone group. The list of unselected zone group members contains only the expanders and phys that are inside the ZPSDS boundary. As the following figure shows, you rename a zone group by selecting the zone group from the pull-down list at the upper left of the window, typing a new name, and clicking **Apply**.

Figure 30 Modify Zone Group

**Modify Zone Group**

LSI

**Notes**

- The only special characters allowed in the name are # (pound), - (dash), and \_ (underscore).
- ZoneGroup names must be unique.
- Zonegroup name (32 characters maximum).
- Unselected members and Selected Members List box will contain the entries as  
<sas address/alias>: <phy number>[ > <attached sas address/alias>]
- Rescan button will refresh and reset the dialog.

Select a zone group: **Vieux\_Carre#001**

Rename (32 characters maximum): **Vieux\_Carre#001**

Unselected zone group members filter: **All**

**Unselected Members:**

- Calhoun: 00 > 5000c500176c844d
- Calhoun: 01 > 5000c500176c9609
- Calhoun: 02 > 5000c500176e7041
- Calhoun: 03 > 5000c500176c9959
- Calhoun: 04 > 5000c500176a867d
- Calhoun: 05 > 5000c5001769ed95
- Calhoun: 06 > 5000c500176d141d
- Calhoun: 07 > 5000c500176cb319
- Calhoun: 08
- Calhoun: 09
- Calhoun: 10
- Calhoun: 11
- Calhoun: 12 > 5000c500176a1ff5

**Selected Members:**

- Poydras: 40 > Bacchus
- Poydras: 41 > Bacchus
- Poydras: 42 > Bacchus
- Poydras: 43 > Bacchus
- Poydras: 56 > Claiborne
- Poydras: 57 > Claiborne
- Poydras: 58 > Claiborne
- Poydras: 59 > Claiborne
- Rampart: 25 > 500000e0159518f2

**Buttons:** Add > < Remove Apply Close Rescan

### 3.6.3.4 Delete Zone Group

Use the Delete Zone Group command to delete an existing zone group. You can delete any zone group that is not currently a member of any zone set. Select the zone group name from the pull-down list in the upper left of the window and click **Delete**.

---

## 3.6.4 Manually Configure Zone Sets

Use the Manually Configure Zone Sets commands to manually create, view, activate, deactivate, and delete zone sets.

### 3.6.4.1 Synchronize Zone Manager Password

Before you can activate zoning, you must use the Synchronize Zone Manager Password command to synchronize the zone manager password of all the zoning expanders and switches in the domain, for example, in JBODs and other switches. If many expanders use different passwords, you must use this command many times, requiring multiple password entries for each expander.

When the window appears, type the current password for any expander or switch in the indicated field. Then type the new password and type it again to confirm it. Repeat this process until all the zoning passwords for all expanders and switches are changed to the new password. The new password can be one of the current passwords for any switch or expander, or it can be a new one. All expanders and switches must have the same password. Passwords are text strings that consist of any valid ASCII character. The maximum password length is 32 characters. If you enter a null string, the password is set to ZERO (32 bytes of binary 0), as defined by the SAS 2.0 specification.

If all the zoning expanders and switches inside the ZPSDS do not have same zone manager password, you receive a zoning password error when you activate the zoning.

### 3.6.4.2 Create Zone Set

Use the Create Zone Set command to create a new zone set. You can click on the matrix to indicate that both zone groups in the associated row/column can communicate with one another. A blank cell indicates that the two zone groups are not allowed to communicate. A dash in a cell indicates an illegal selection caused by a phy conflict between zone groups. A phy can be a member of one zone group per zone set.

To see the details of a particular zone group, click the Zone Group link in the left column of the matrix.

**Figure 31 Create Zone Set**

**Notes**

- The only special characters allowed in the name are # (pound), - (dash), and \_ (underscore).
- Click in the matrix to indicate that both zone groups in the associated row/column have permission to communicate with one another.
- A blank cell indicates that the two zone groups do not have permission to communicate.
- A -(dash) in a cell indicates an illegal selection because of a phy conflict between zone groups. A phy can only be a member of one zone group per zone set.
- ZoneSet name must be unique.
- ZoneSet name (32 characters maximum).
- Rescan button will refresh and reset the dialog.

Zone Set Name (32 characters maximum):

Zone Group	1	2	3	4	5
<a href="#">Vieux_Carre#001 : 1</a>	-	-	-	-	-
<a href="#">Metairie#001 : 2</a>	-	-	-	-	-
<a href="#">Gentilly#001 : 3</a>	-	-	-	-	-
<a href="#">Algiers#001 : 4</a>	-	-	-	-	-
<a href="#">Westwego#001 : 5</a>	-	-	-	-	-

Apply Close Rescan

### 3.6.4.3 View Zone Set

Use the View Zone Set command to view information about zone sets. To view details about any zone set, select it from the list on the left of the window. An asterisk at the end of a zone set name indicates that the zone set was active at the time of activation. [Figure 26](#) shows the View Zone Sets window.

### 3.6.4.4 Modify Zone Set

Use the Modify Zone Set command to modify existing zone sets. As shown in the following figure, the Modify Zone Set window lets you give or revoke the permission to communicate among the zone groups. You also can rename an existing zone set.

**Figure 32 Modify Zone Set**

**Notes**

- The only special characters allowed in the name are # (pound), - (dash), and \_ (underscore).
- Click in the matrix to indicate that both zone groups in the associated row/column have permission to communicate with one another.
- A blank cell indicates that the two zone groups do not have permission to communicate.
- A -(dash) in a cell indicates an illegal selection because of a phy conflict between zone groups. A phy can only be a member of one zone group per zone set.
- ZoneSet name must be unique.
- ZoneSet name (32 characters maximum).
- Rescan button will refresh and reset the dialog.

Select a zone set: Vieux\_Carre

Rename (32 characters maximum): Vieux\_Carre

Zone Group	1	2	3	4	5
<a href="#">Vieux_Carre#001 : 1</a>	X	-	-	-	-
<a href="#">Metairie#001 : 2</a>	-	-	-	-	-
<a href="#">Gentilly#001 : 3</a>	-	-	-	-	-
<a href="#">Algiers#001 : 4</a>	-	-	-	-	-
<a href="#">Westwego#001 : 5</a>	-	-	-	-	-

Apply Close Rescan

### 3.6.4.5 Activate/Deactivate Zone Set

Use the Activate/Deactivate Zone Set command to activate or deactivate a zone set. Only one zone set can be active at a time, and a zone set must be active for its definitions to be applied to the domain. Changes to the active zone set or zone group permissions do not take effect until the next zone set activation. When all zone sets are inactive, zoning is disabled and domain access is unrestricted.

As shown in the following figure, the Activate/Deactivate Zone Set window lists the currently active zone set. To deactivate all zone sets, click the button on the left of the window, and click **Apply**.

**NOTE** The default password for the zone manager is **lynx**.

**Figure 33 Activate/Deactivate Zone Set**

**Notes**

- A zone set must be activated for its definitions to be applied to the domain. Only one zone set can be active at a time.
- When no zone set is active, zoning is disabled and domain access is unrestricted.
- Changes to the active zone set, or zone group permissions, do not take effect until the next zone set activation.
- A zone set deactivation is not required prior to activating a different zone set.
- Reactivating the current zone set will apply any outstanding changes made to that zone set to the domain.
- Depending on the zoning configuration and how SDM accesses a domain, a valid Zone Manager Password may not always be required to modify or disable zoning once it is enabled.
- Rescan button will refresh and reset the dialog.

Current active zone set :

Select a zone set:

☐ Deactivate all zone sets

☒ Activate a zone set

Vieux\_Carre

Zone manager password:

Zone Set : Vieux\_Carre

Zone Group	Expander	Phys
Vieux_Carre#001: 1		X

Zone Group	Expander	Phys
Vieux_Carre#001	Rampart	25
	Poydras	40 41 42 43 56 57 58 59

Apply Close Rescan

To activate a zone set, select it from the pull-down list, type the zone manager password, and click **Apply**.

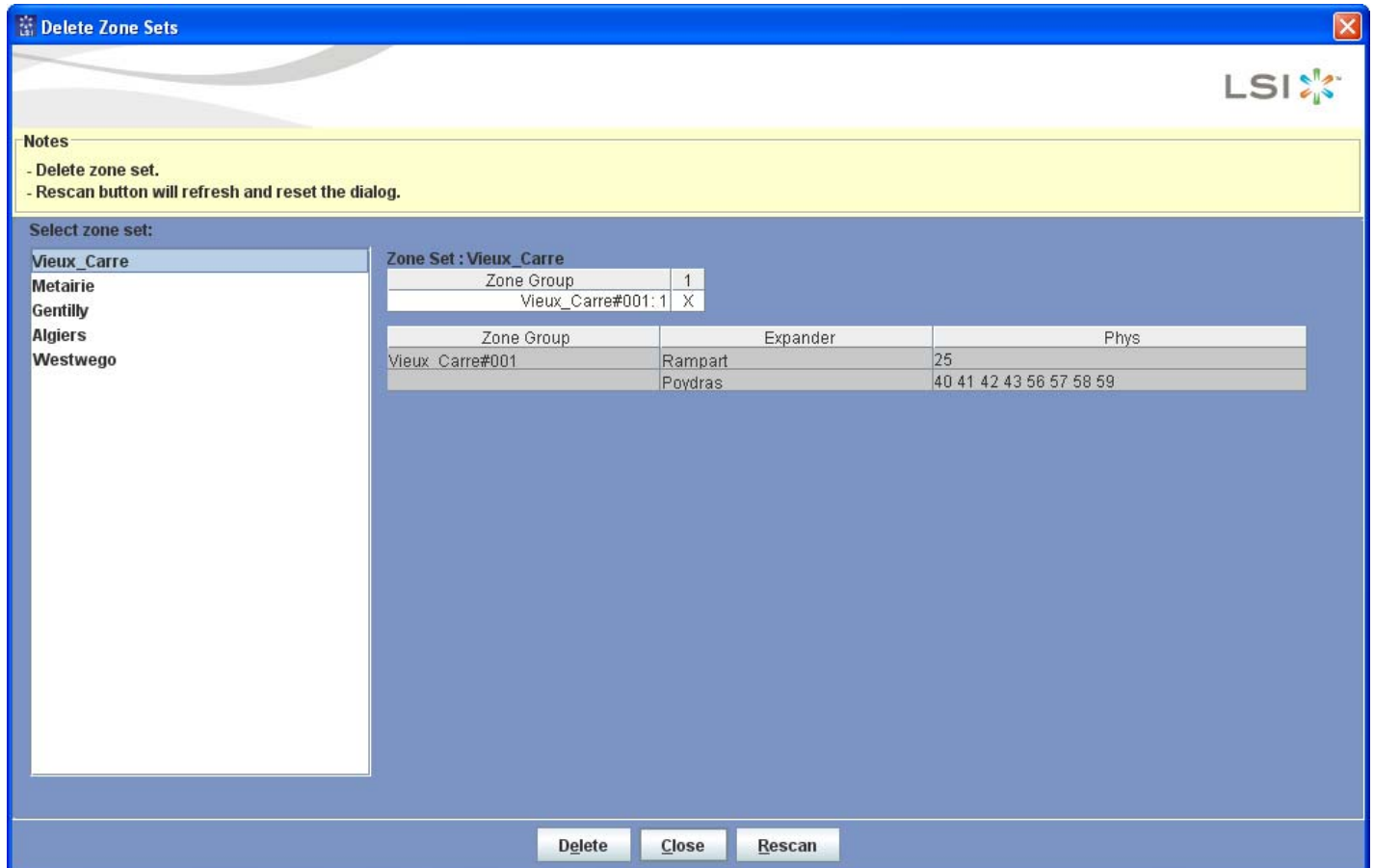
When activated, copies of the zone set and component zone groups are made. An asterisk at the end of a zone group name indicates that the zone group is currently active.



### 3.6.4.6 Delete Zone Set

Use the Delete Zone Set command to delete an existing zone set. As shown in the following figure, you delete a zone set by selecting the zone set from the list on the left of the window and then clicking **Delete**.

**Figure 34 Delete Zone Set**





## 3.7 Devices Tab

The Devices tab displays the domain topology in the form of a tree. Select items in the tree to access a secondary set of tabs that can include Properties, Environmental, Attached Devices, Phys, Operations, and SNMP. The tabs displayed on this row depend on both the account type and the device selected in the tree. You can access an Operations tab if you select an edge expander on the tree while using an *admin* account.

The following figure shows a device tree on the Devices tab. The Properties tab appears on the right side of the window.

**Figure 35 Device Tree and Properties Tab**

The screenshot shows the SAS Domain Manager GUI - 8.0.0.0. The interface includes a menu bar (File, Server, Help) and a status bar (Server: 135.15.230.59, Overlay: Domain, Domain Status: Optimal). The main area is divided into two panes. The left pane displays a device tree under the 'Domain' tab, showing a hierarchy: Lynx6160 > Initiator > Expander > JBOD > test. The right pane displays the 'Properties' tab for the selected device 'test'.

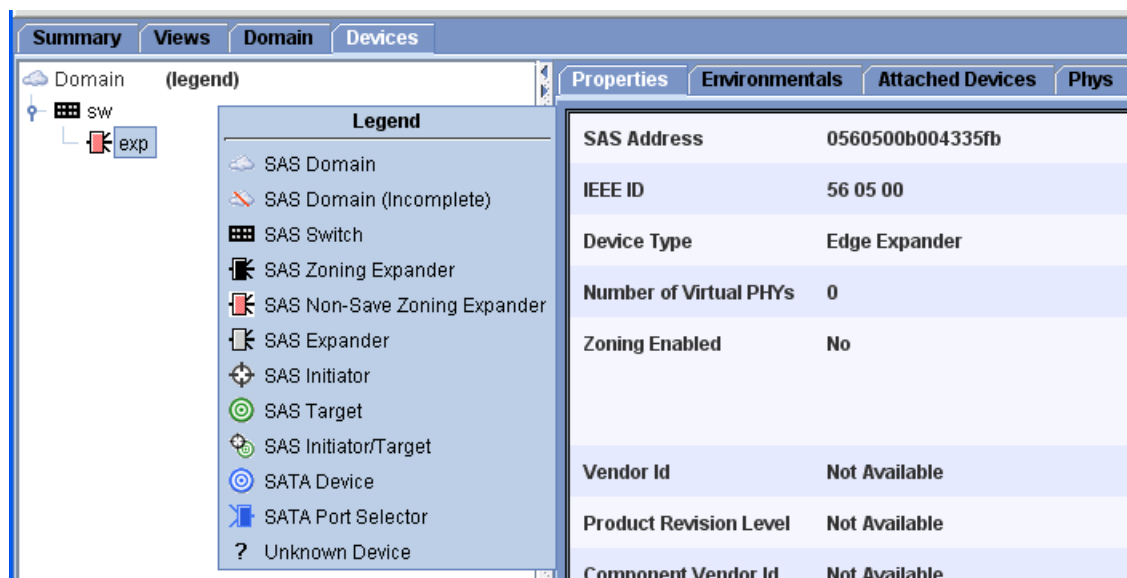
Properties		Attached Devices		Zone Group	
SAS Address	5000c500176e6de1	Company Name	Unknown		
IEEE ID	00 0c 50	Alias	test		
Device Type	End Device	Link Speed	6.0 Gb/s		
Vendor Id	SEAGATE	Product Id	ST9146803SS		
Product Revision Level	0006	Device Phys	00		
Parent SAS Address	50012be000037b7f	Parent Alias	JBOD		
Parent Phys	00	Capabilities	SAS Target		
Capacity	136 GB				

**NOTE**

If there is an active zone set, and if you click on an end device, all other end devices with which it has permission to communicate appear in blue.

To view a list of the symbols used to represent devices in the domain, click the blue word *legend* in the upper left of the window. The following figure shows the list of symbols.

**Figure 36 List of Symbols**



Note the red symbol that represents a SAS expander that does not support saving zone configurations.

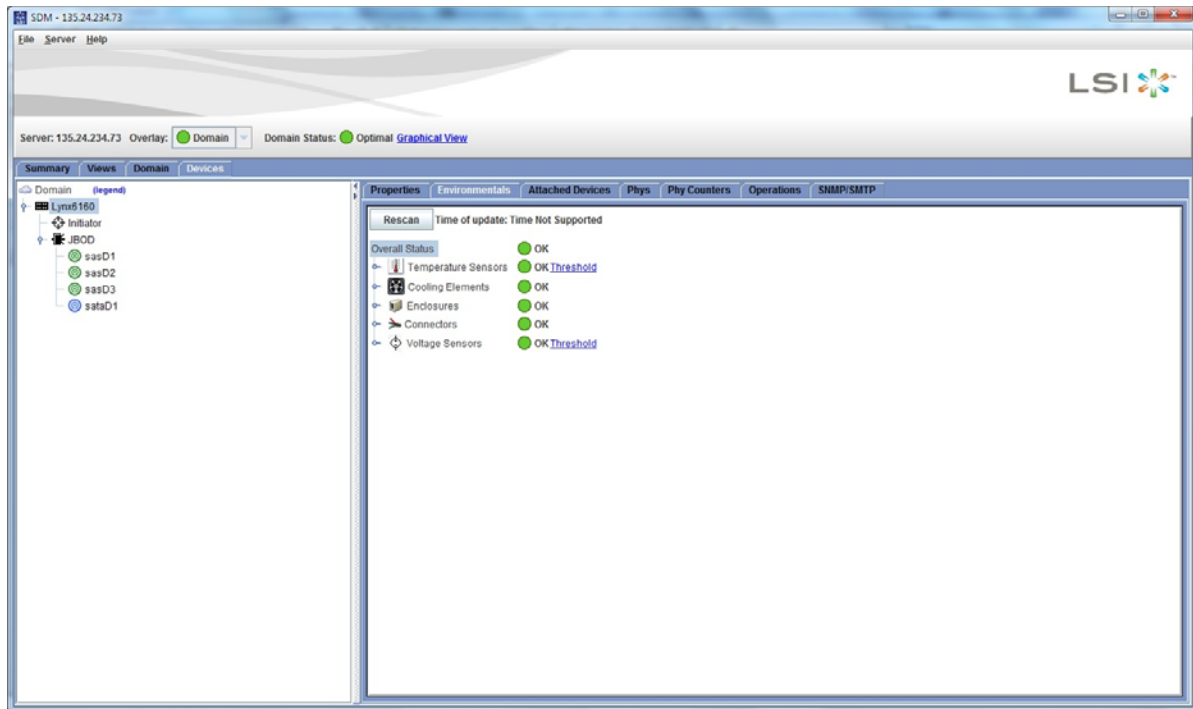
### 3.7.1 Properties Tab

The Properties tab displays information about the device that is currently selected in the left panel. Properties information includes SAS Address, Vendor ID, and Device Type. The rest of the displayed information varies, depending on the type device that is selected.

## 3.7.2 Environmentals Tab

The Environmentals tab appears for devices that contain SCSI Enclosure Services (SES) targets. The following figure shows an example of the type of data that appears on this tab. Environmental data for each device that supports an SES target is polled in a background loop.

**Figure 37 Environmentals Tab**



### 3.7.2.1 Set SES Thresholds

In SDM-GUI you can set four types of thresholds for temperature elements and voltage elements. Two threshold types for each range can be set.

- **High Range** – High critical threshold and high warning threshold
- **Low Range** – Low critical threshold and low warning threshold

When the temperature or voltage falls or rises to meet a set threshold value, the element enters either a noncritical *warning* state or a *critical* state.

#### Temperature Threshold

The temperature threshold range for the LSISAS6160 switch is 1 °C to 79 °C. Threshold values outside this range are not accepted.

#### Voltage Threshold

Enter voltage values as a percentage. The voltage threshold value range for the LSISAS6160 switch is  $\pm 5.5$  percent to  $\pm 24.5$  percent of the nominal voltage. Threshold values outside this range are not accepted.

SDM-GUI does not accept plus signs or minus signs. The lower end of the range is associated with the low warning or low critical threshold values. The higher end of the range is associated with the high warning or high critical threshold.

Set the voltage high warning threshold lower than the voltage low warning threshold.

---

**NOTE** Other device types, such as expanders, might have different temperature and voltage threshold range values.

SDM-GUI also displays the current state of different elements. If any element is in a critical state or a noncritical state, SDM-GUI also displays the overall device and domain state accordingly.

From the Environmental tab, click **Thresholds** to display or change the Threshold value, as shown in the following figure.

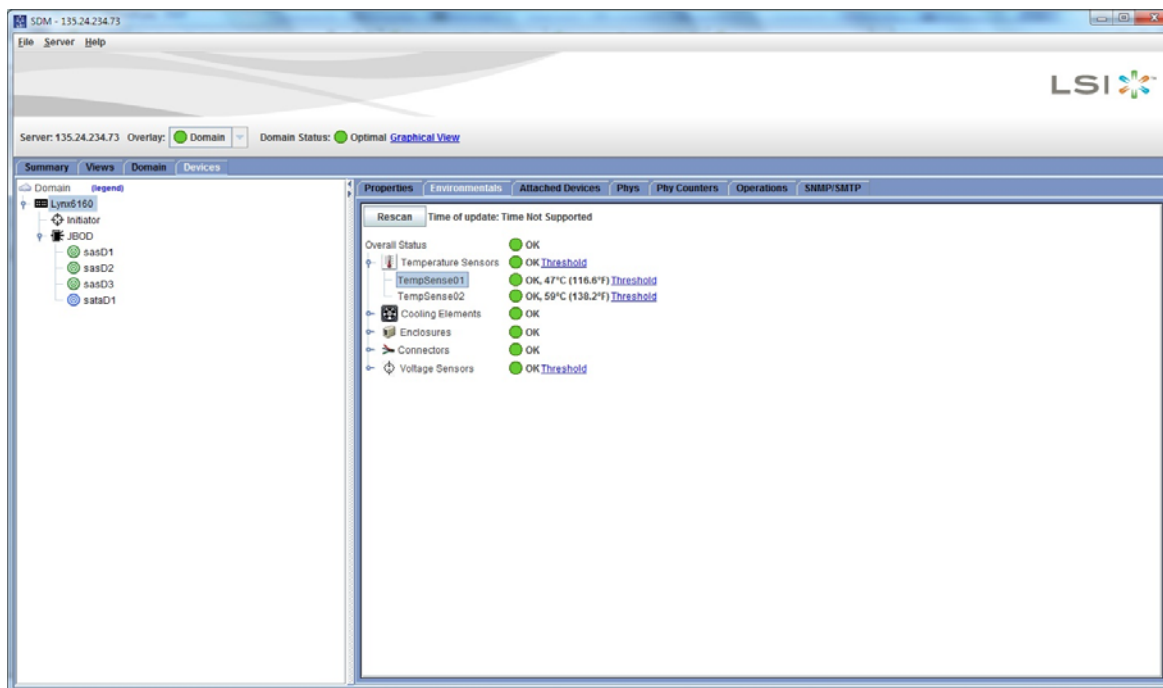
**Figure 38 Threshold Values**

Threshold (in %)	
High Critical:	<input type="text" value="0.0"/>
High Warning:	<input type="text" value="0.0"/>
Low Warning:	<input type="text" value="0.0"/>
Low Critical:	<input type="text" value="0.0"/>

The LSISAS6160 switch firmware does not support changing the overall threshold. Expand the temperature icon or the voltage icon to get the actual elements, as shown in the following figure. The actual elements support the overall threshold.

**NOTE** The firmware for other devices might support changing the overall threshold.

**Figure 39 Supporting Threshold Elements**





### 3.7.4 Phys Tab

The Phys tab, which appears for expanders, lists information about the phys on the selected expander. The following figure shows the Phys tab.

**Figure 41 Phys Tab**

Phy Id	Port Id	Link Speed/Status	Zone Grp	Invalid Table to Table link	Attached Device	Attached Phy Id	Attached Device Type
00	0	3.0 Gb/s	*	-	Initiator	04	SAS Initiator
01	0	3.0 Gb/s	*	-	Initiator	05	SAS Initiator
02	0	3.0 Gb/s	*	-	Initiator	06	SAS Initiator
03	0	3.0 Gb/s	*	-	Initiator	07	SAS Initiator
04		Unknown	*	*			
05		Unknown	*	*			
06		Unknown	*	*			
07		Unknown	*	*			
08	1	6.0 Gb/s	-	-	JBOD	12	Edge Expander
09	1	6.0 Gb/s	-	-	JBOD	13	Edge Expander
10	1	6.0 Gb/s	-	-	JBOD	14	Edge Expander
11	1	6.0 Gb/s	-	-	JBOD	15	Edge Expander
12		Unknown	*	*			
13		Unknown	*	*			
14		Unknown	*	*			
15		Unknown	*	*			

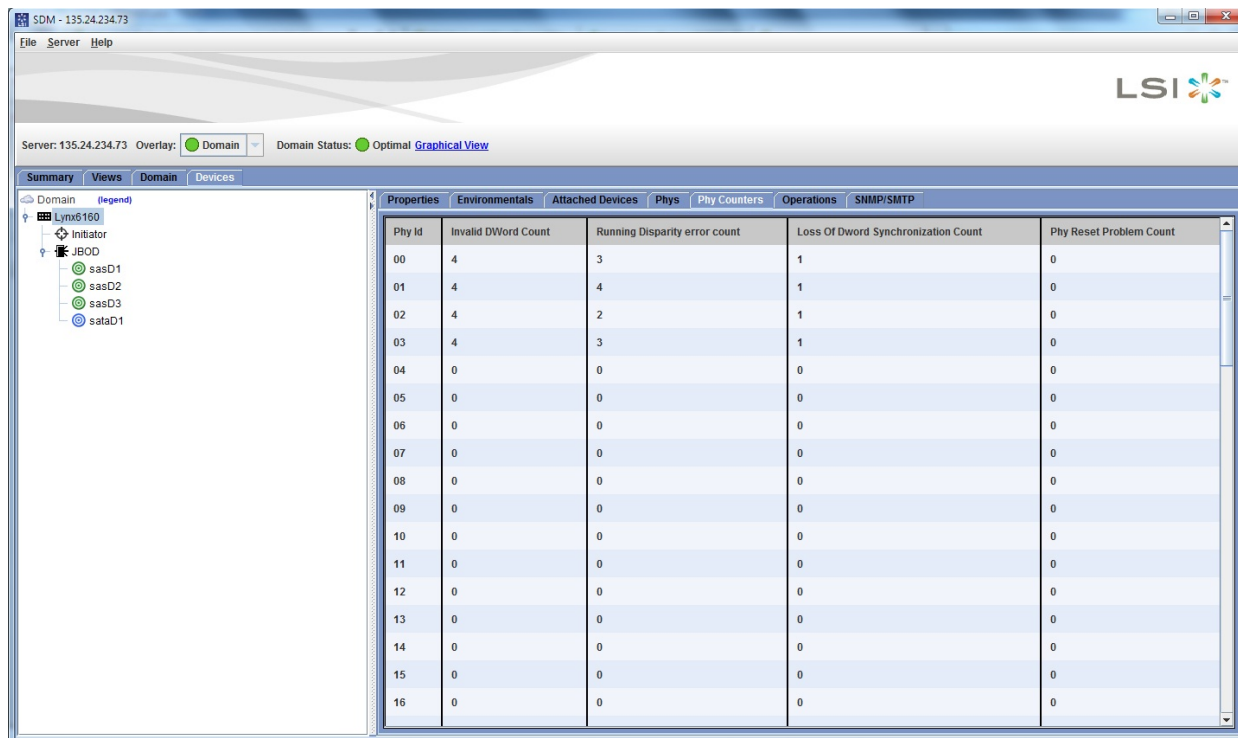
To view detailed information about any phy, click on an entry in the **Phy Id** column. A pop-up window appears with detailed status information.

### 3.7.5 Phy Counters Tab

The Phy Counters tab, which appears for expanders, lists information about the phy error counters on the selected expander.

The following figure shows the Phy Counters tab.

**Figure 42 Phy Counters Tab**



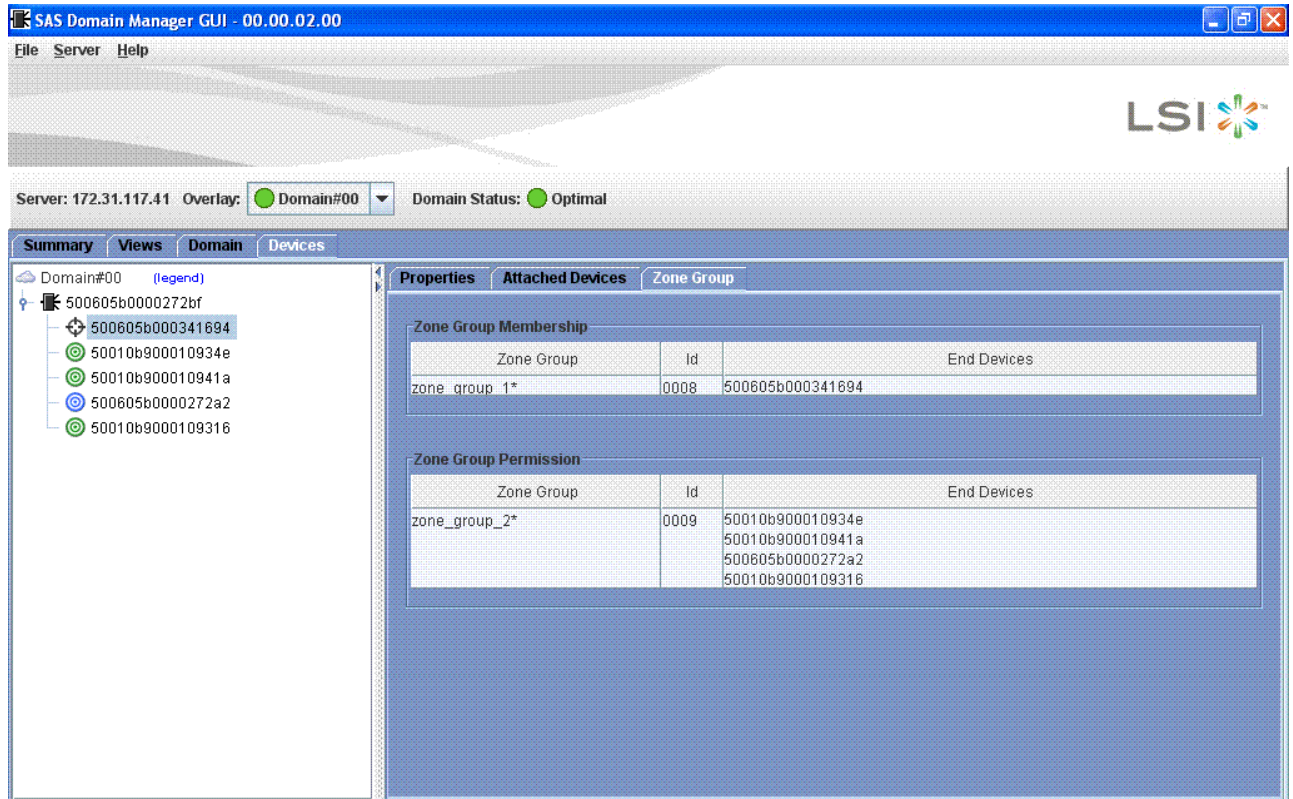


### 3.7.6 Zone Group Tab

The Zone Group tab becomes active if there is an active zone set and if you click on an end device. In the following figure, the Zone Group tab is active because the selected initiator is a member of an active zone set. In the device tree, the devices that can communicate with each other appear in blue. The following two sections exist in the Zone Group tab:

- The Zone Group Membership section shows the zone group to which the selected device belongs.
- The Zone Group Permission section shows that zone\_group\_1 can communicate with zone\_group\_2.

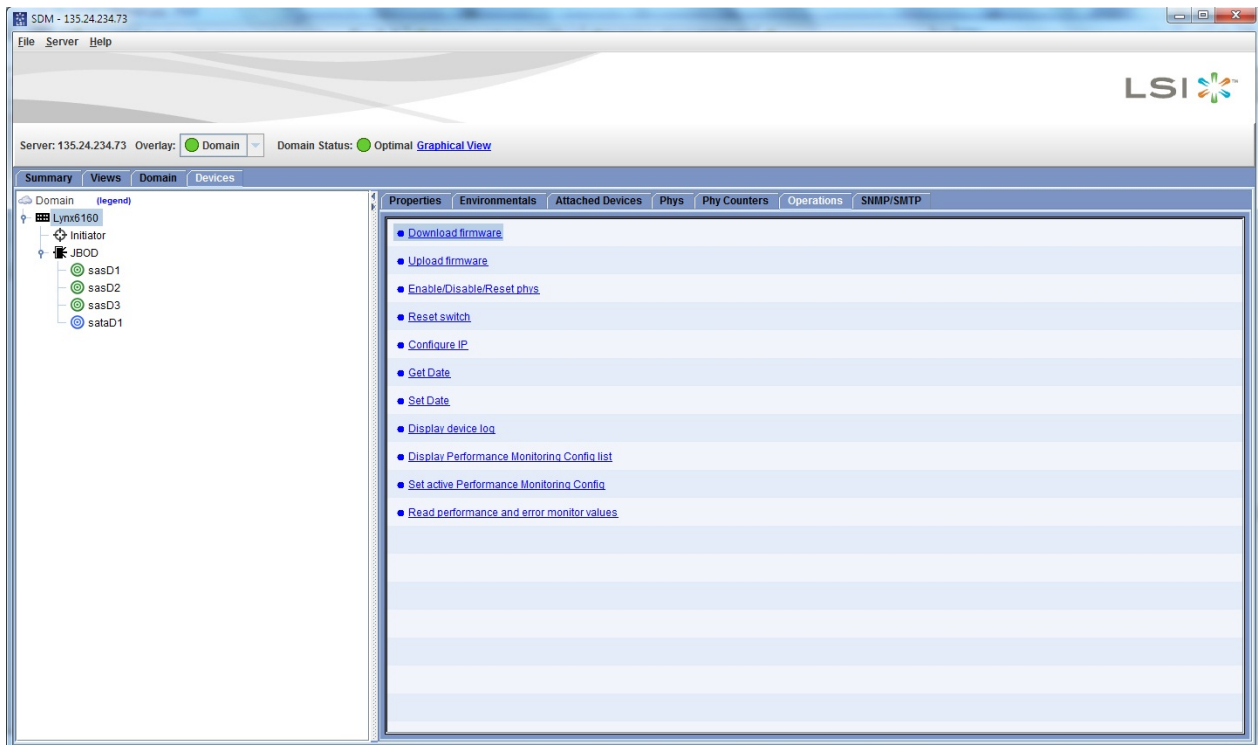
**Figure 43 Zone Group Tab**



### 3.7.7 Operations Tab

The Operations tab appears only when you select an expander from an *admin* account. The following figure shows the commands that are listed in this tab when the LSI6160 switch is selected. The commands vary depending on the selected device type.

**Figure 44 Operations Tab**

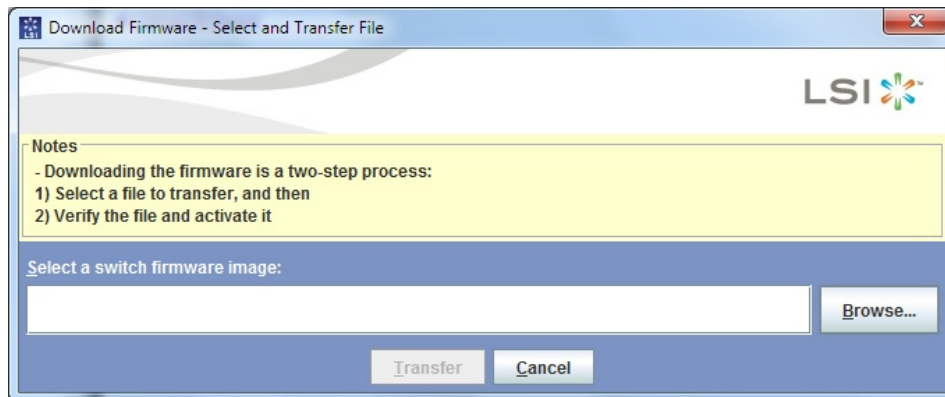


### 3.7.7.1 Download Firmware

Use the Download Firmware command to update the firmware on LSI® SAS 2.0 expanders and LSI SAS 2.0 switches. SDM-GUI verifies that the product identification of the image matches the targeted device. SDM-GUI prevents downloading of incompatible firmware, based on the currently installed firmware version. SDM-GUI automatically resets the expander after a successful update.

The following figure shows the first steps of the update process: First select an expander firmware image. Then verify and activate the file.

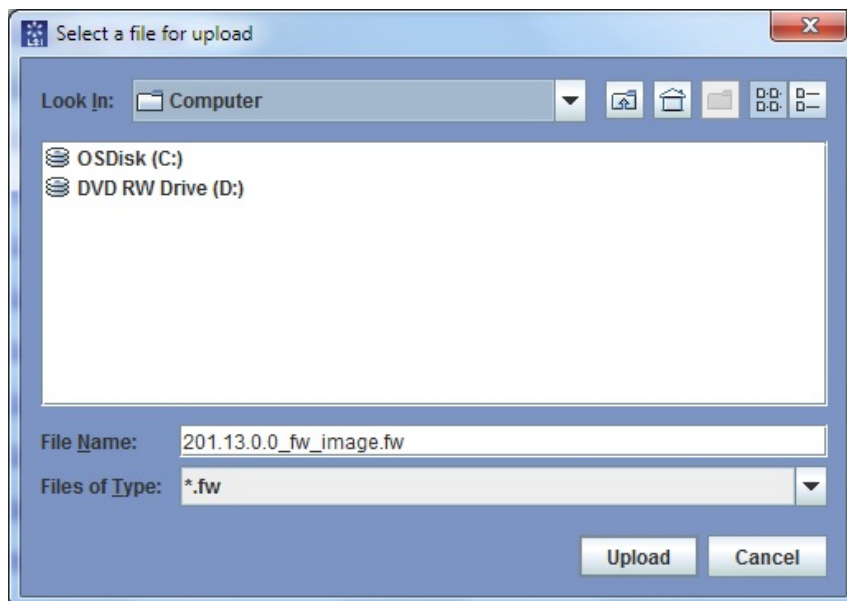
**Figure 45 Download Firmware**



### 3.7.7.2 Upload Firmware

Use the Upload Firmware command to upload the firmware from LSI SAS 2.0 expanders and LSI SAS 2.0 switches. The following figure shows the third step of the update process: saving the file as an expander firmware image.

**Figure 46 Upload Firmware**



### 3.7.7.3 Enable/Disable/Reset Phys

Use the Enable/Disable/Reset Phys command to enable, disable, or reset specified expander phys. To disable one or more phys, remove the check mark in the **Enabled** column and click **Apply**. To reset one or more phys, select the check box in the **Reset** column and click **Apply**. The phys are automatically enabled after a switch reset. The following figure shows the Enable/Disable/Reset Phys window.

**Figure 47 Enable/Disable/Reset Phys**

The screenshot shows a window titled "Enable/Disable/Reset Phys" with the LSI logo in the top right corner. Below the title bar is a yellow "Notes" section containing the following text:

- Enabled phys are indicated by a check in the enabled column.
- Check the reset column to reset a phy. The act of resetting a phy will enable it.
- Rescan button will refresh and reset the dialog.

Below the notes is a table with the following columns: Enabled, Reset, Phy Id, Port Id, Link Speed/Status, Attached Device, Attached Phy Id, and Attached Device Type. The table contains 13 rows of data. The first four rows show ports 0-3 with a link speed of 6.0 Gb/s and attached device "Poydras". The remaining rows show ports 4-12 with a link speed of "Unknown" and no attached device. The "Enabled" column has checkmarks for all ports, and the "Reset" column has empty checkboxes. At the bottom of the window are three buttons: "Apply", "Close", and "Rescan".

Enabled	Reset	Phy Id	Port Id	Link Speed/Status	Attached Device	Attached Phy Id	Attached Device Type
<input checked="" type="checkbox"/>	<input type="checkbox"/>	0	0	6.0 Gb/s	Poydras	00	Switch
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	0	6.0 Gb/s	Poydras	01	Switch
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2	0	6.0 Gb/s	Poydras	02	Switch
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3	0	6.0 Gb/s	Poydras	03	Switch
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4		Unknown			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5		Unknown			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	6		Unknown			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	7		Unknown			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	8		Unknown			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9		Unknown			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	10		Unknown			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	11		Unknown			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	12		Unknown			

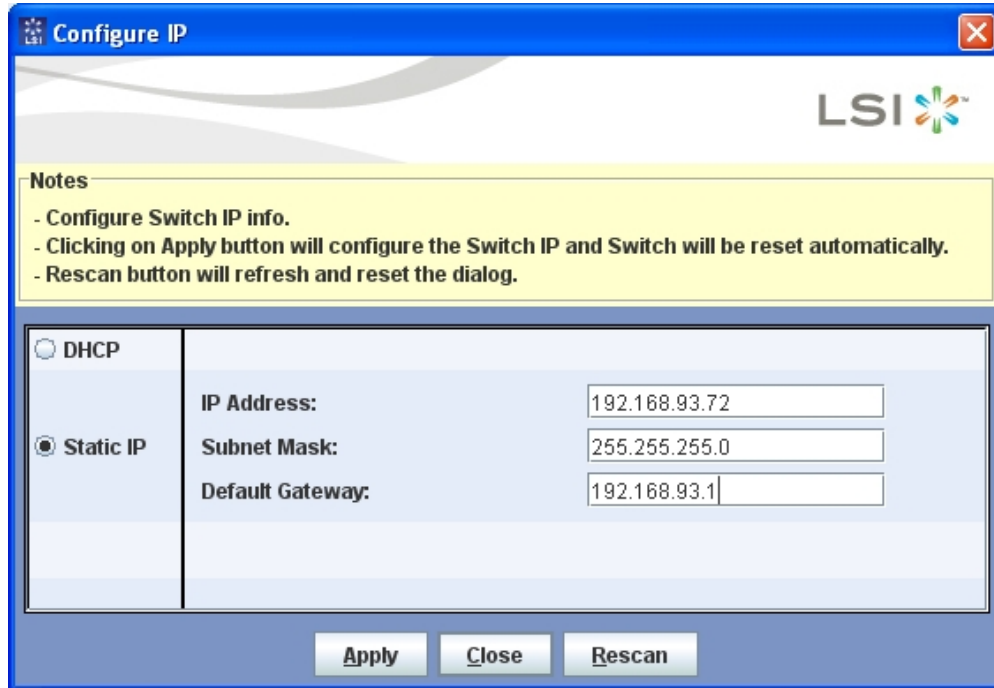
#### 3.7.7.4 Reset Switch

Use the Reset Switch command to reset the LSI SAS 2.0 switch that is currently selected in the device tree. You must confirm the reset command.

#### 3.7.7.5 Configure IP

Use the Configure IP command to change the IP address for the LSI SAS 2.0 switch that is currently selected in the device tree. You can set either a static IP address or a dynamic IP address, as shown in the following figures.

**Figure 48 Set a Static IP Address**



The screenshot shows a 'Configure IP' dialog box with the LSI logo in the top right. A yellow 'Notes' section contains the following text:

- Configure Switch IP info.
- Clicking on Apply button will configure the Switch IP and Switch will be reset automatically.
- Rescan button will refresh and reset the dialog.

Below the notes, there are two radio buttons: 'DHCP' (unselected) and 'Static IP' (selected). To the right of these buttons are three text input fields:

- IP Address: 192.168.93.72
- Subnet Mask: 255.255.255.0
- Default Gateway: 192.168.93.1

At the bottom of the dialog box are three buttons: 'Apply', 'Close', and 'Rescan'.

**Figure 49 Set a Dynamic IP Address**

**Configure IP**

LSI

**Notes**

- Configure Switch IP info.
- Clicking on Apply button will configure the Switch IP and Switch will be reset automatically.
- Rescan button will refresh and reset the dialog.

☒ DHCP

☐ Static IP

IP Address: 172.22.93.27

Subnet Mask:

Default Gateway:

Apply Close Rescan

#### **3.7.7.6 Get Date**

Use the Get Date command to obtain the switch date. SDM-GUI shows the device date in a user-friendly format.

#### **3.7.7.7 Set Date**

Use the Set Date command to set the switch date.

#### **3.7.7.8 Display Device Log**

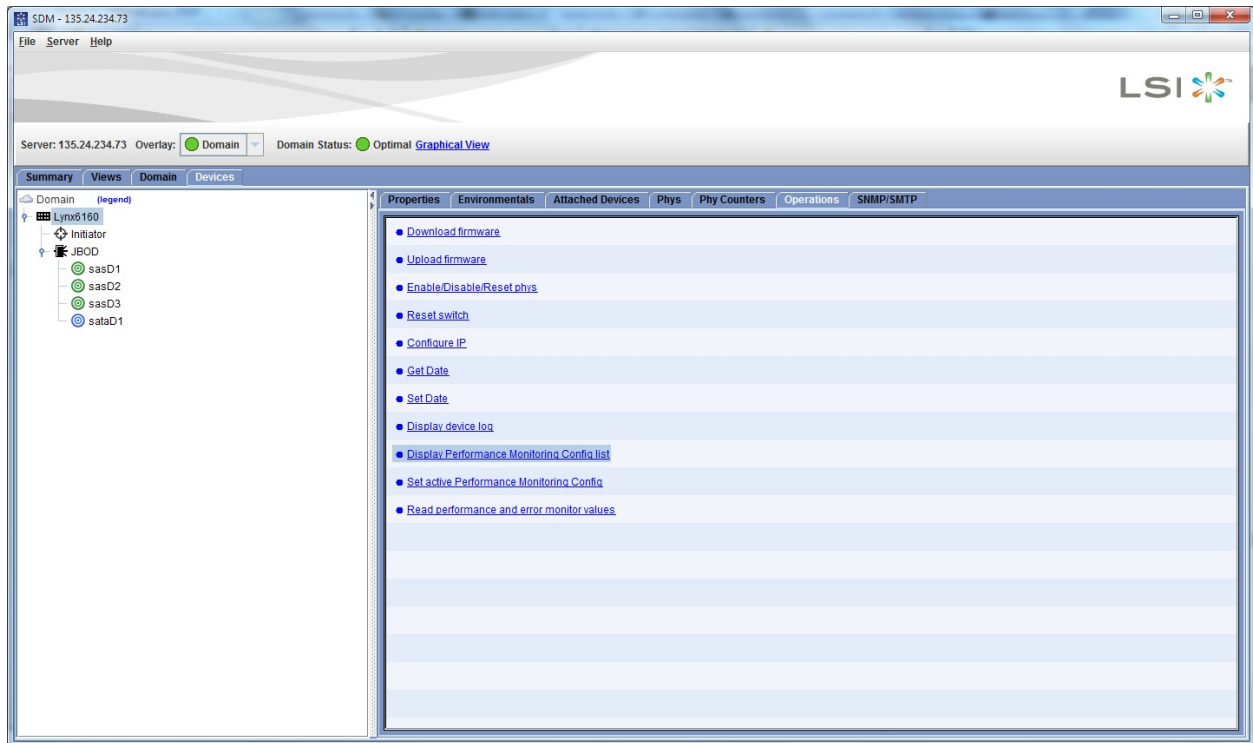
Use the Display Device Log command to show the device log for the selected device.

### 3.7.7.9 Performance Monitoring

The LSISAS6160 switch supports event counters for performance monitoring and error monitoring on all switch phys. An event counter can be configured to count one specific SAS event, such as transmitted SSP frames. Each phy can have up to four event counters configured at a time. A configuration that specifies four event counters is a config set. When a config set is specified, SDM sets all phys on the switch to use the same four event counters.

The use of switch counters does not impact the switch performance. Refer to the Phy Events section of the SAS 2.0 specification for more information about the counters used by the performance monitors and error monitors.

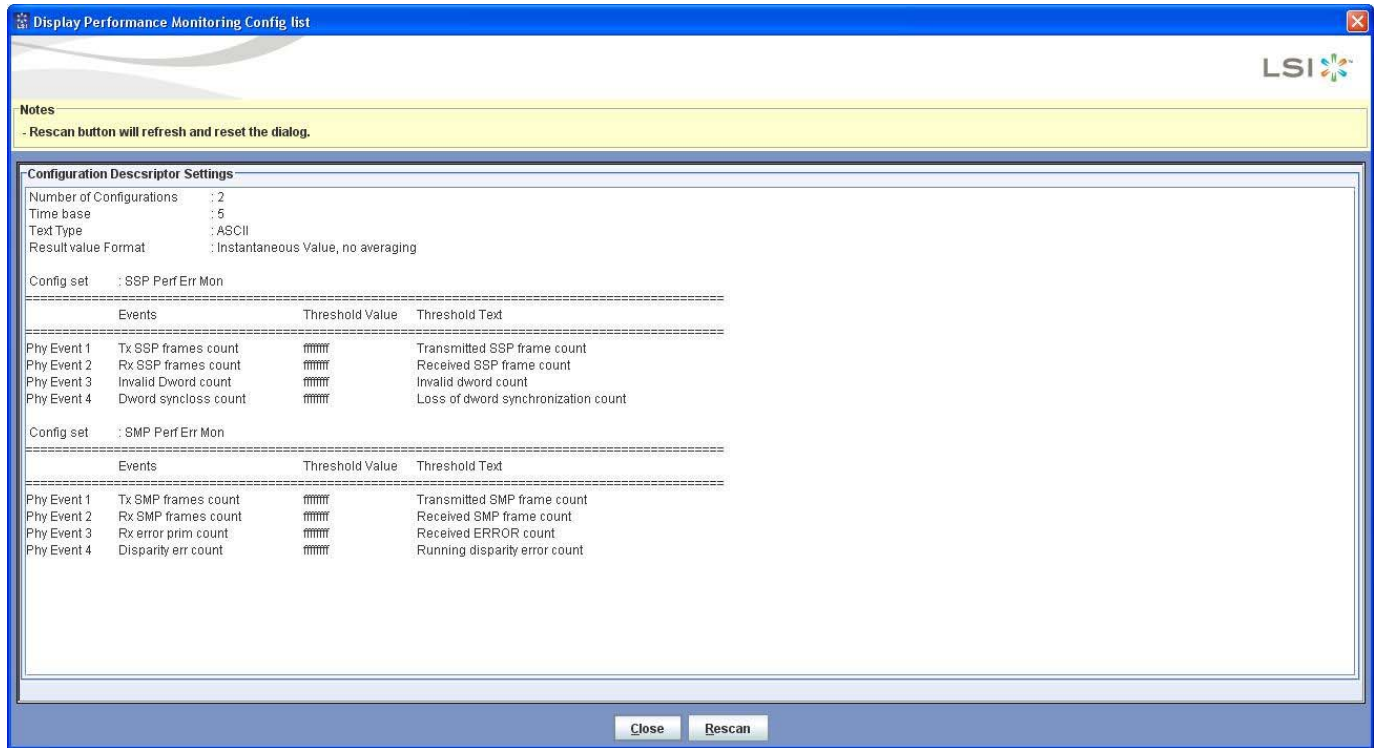
**Figure 50 Performance Monitoring Operations**



SDM-GUI supports the following three monitoring operations:

- **Display** – The *Display Performance Monitoring Config list* command shows the current configurations for all available config sets as shown in the following figure. The user can choose one config set out of a predefined list. This list is nonconfigurable by the user.

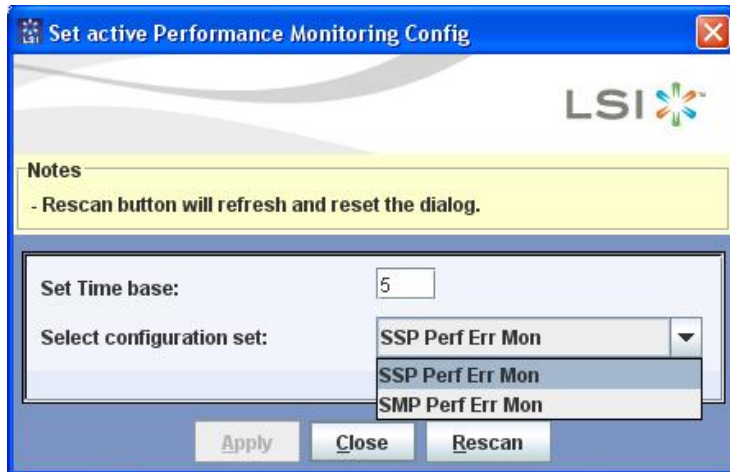
**Figure 51 Display Performance Monitoring Config List**





- **Set Config** – The *Set active Performance Monitoring Config* command, shown in the following figure, lets you apply a different monitoring configset. You can select the time base (in seconds) for monitoring. Changing the time base changes how often the switch firmware updates the monitored values.

**Figure 52 Set Active Performance Monitoring Config**



- **Read** – The *Read performance and error monitor values* command returns the current performance value and the error monitor value. As shown in the following figures, SDM-GUI prompts you for the starting phy and a phy range. Then SDM-GUI displays the current counter values of the specified phys for the active config set.

**Figure 53 Select Range for Monitor Values**

**Select range for monitor values**

LSI

**Notes**

- Enter filter criteria for displaying monitored values.
- Valid entries for starting phy is 0 - 63.
- Valid entries for range is 1 - 64.
- Clicking on Apply button will launch a new dialog with monitored values.

**Select Range**

Starting Phy:

Range:

Apply Close

**Figure 54 Performance Monitor Values**

**Performance monitor values**

LSI

**Notes**

- Valid entries for starting phy is 0 - 63.
- Valid entries for range is 1 - 64.
- Click on the Apply button for the selected range to take effect.
- Rescan button will refresh and reset the dialog.

**Select Range**

Starting Phy:

Range:

Apply

**Performance monitor values**

Current active config set :SSP Perf Err Mon\*

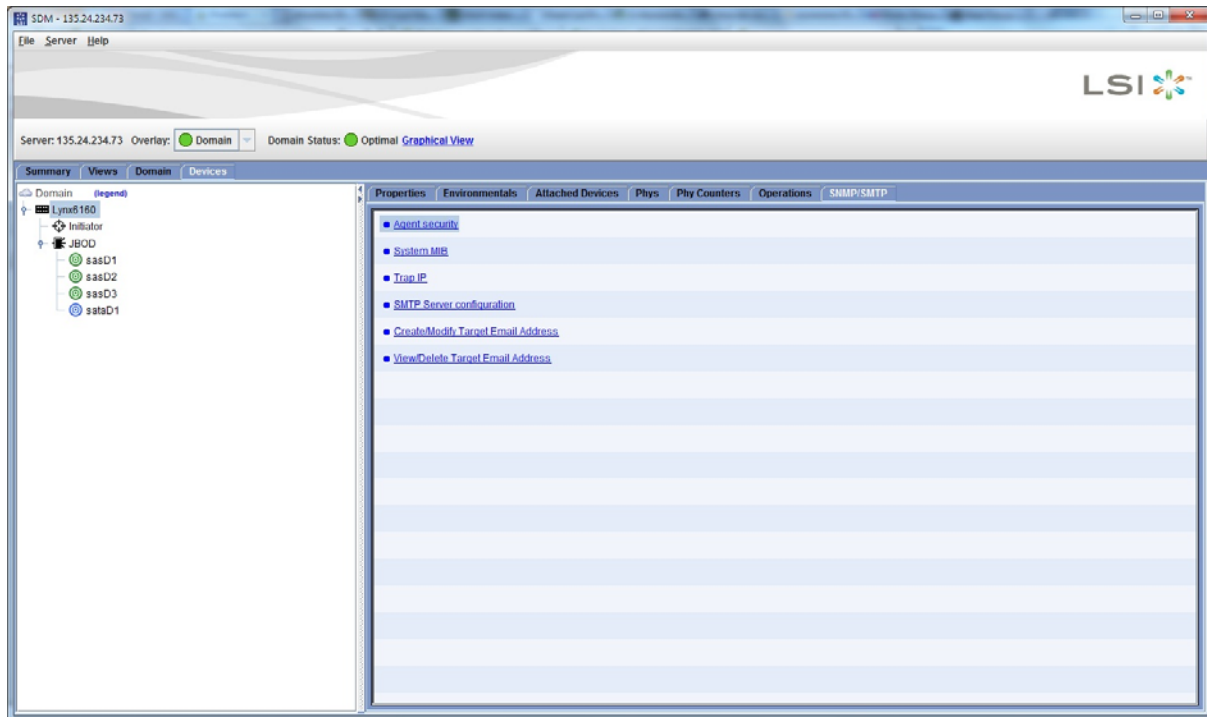
Phy Number	Tx SSP frames count (Hex)	Rx SSP frames count (Hex)	Invalid Dword count (Hex)	Dword syncloss count (Hex)
0002	0000	0000	0000	0000
0003	0000	0000	0000	0000
0004	0000	0000	0000	0000
0005	0000	0000	0000	0000
0006	0000	0000	0000	0000
0007	0000	0000	0000	0000
0008	0000	0000	0000	0000
0009	0000	0000	0000	0000
0010	0000	0000	0000	0000
0011	0000	0000	0000	0000

Close Rescan

### 3.7.8 SNMP/SMTP Tab

As shown in the following figure, the switch SNMP tab lets you configure the simple network management protocol (SNMP) agent or change the settings in the SNMP system management information base (MIB) configuration page.

**Figure 55 SNMP Configuration**



The SNMP agent is compatible with SNMPv3. The switch also supports SNMPv1 and SNMPv2 communication. The switch SNMP agent supports SNMPv3 username, but it does not support authentication or privacy. For SNMPv1 support and SNMPv2c support, the agent supports community string.

**NOTE** The default community string/username is *public*.

Some SNMP managers use objects in the system MIB to perform a scan of the agent.

The MIB is stored in a set of files that are provided to an SNMP server to describe the SNMP interface for the switch. The file set is included on the CD with the switch and is available for download on the LSI website. This specification instead defines the high-level object identifiers (OID) tree. All enterprise objects are organized under the node 3582.200.

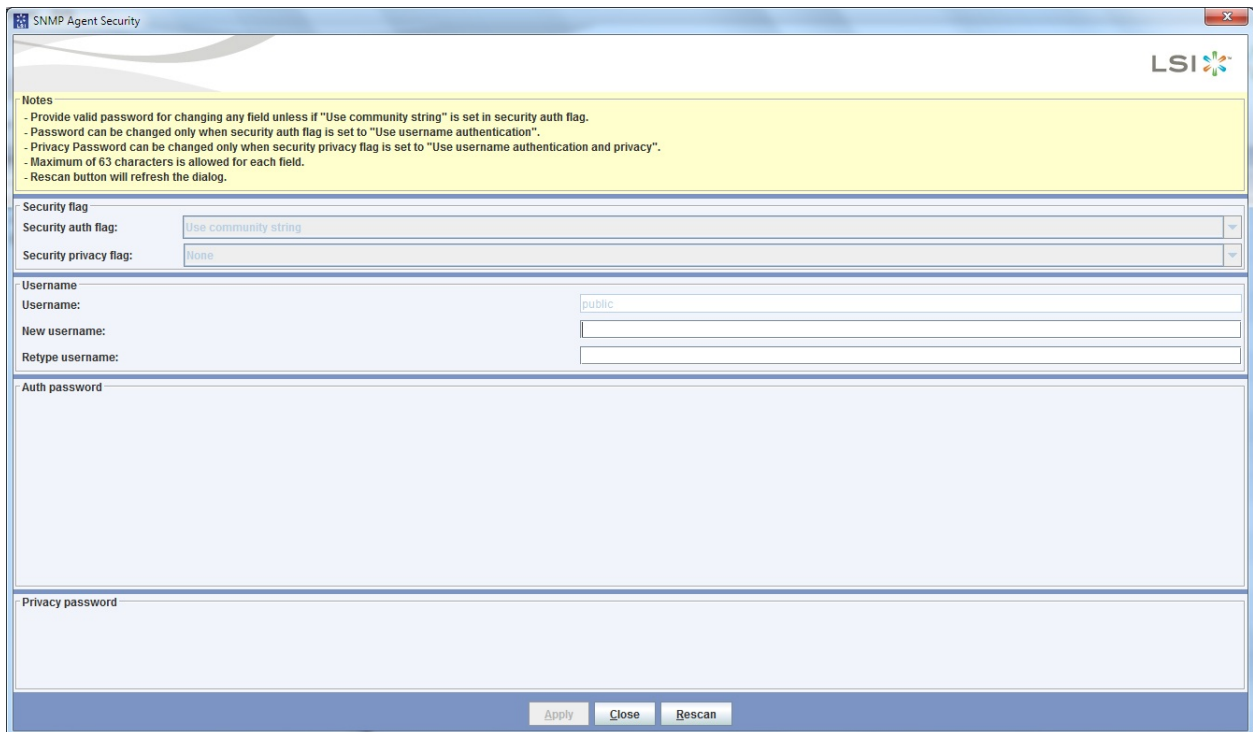
**Agent Security** Use the Agent Security command to configure the SNMP agent. The application provides an option for whether the agent uses a community string/username.

The SNMP agent has the following support:

- Supports enterprise objects, organized under the node 3582.200.
- Supports the system MIB from RFC 1213.
- Supports three SNMP v2 generic TRAPS: coldStart, warmStart, and authenticationFailure.

The following figure shows the Agent Security screen.

**Figure 56 Agent Security**



The figure shows a screenshot of the "SNMP Agent Security" configuration window. The window has a title bar with the LSI logo and a close button. Below the title bar is a "Notes" section with a yellow background, containing several instructions. The main configuration area is divided into sections: "Security flag" with a dropdown menu set to "Use community string"; "Security auth flag" with a dropdown menu set to "None"; "Username" section with fields for "Username:" (containing "public"), "New username:", and "Retype username:"; "Auth password" section with a large text area; and "Privacy password" section with a large text area. At the bottom of the window are three buttons: "Apply", "Close", and "Rescan".

Notes

- Provide valid password for changing any field unless if "Use community string" is set in security auth flag.
- Password can be changed only when security auth flag is set to "Use username authentication".
- Privacy Password can be changed only when security privacy flag is set to "Use username authentication and privacy".
- Maximum of 63 characters is allowed for each field.
- Rescan button will refresh the dialog.

Security flag

Security auth flag: Use community string

Security privacy flag: None

Username

Username: public

New username:

Retype username:

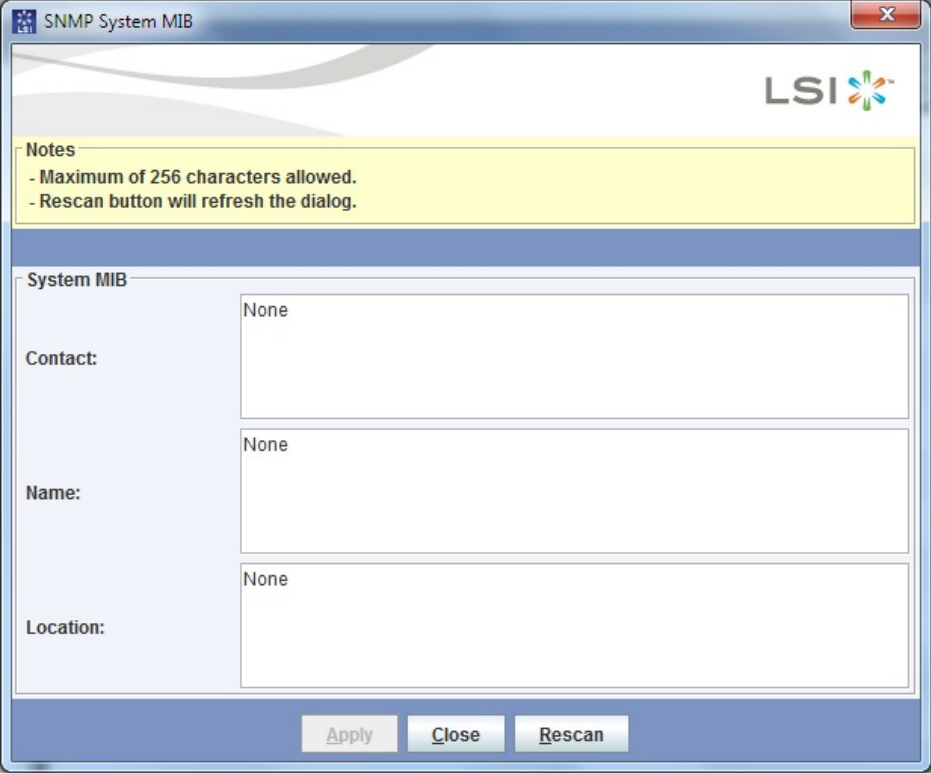
Auth password

Privacy password

Apply Close Rescan

**System MIB** Use the System MIB command to change the settings in the SNMP system MIB configuration page. Any of the three strings can be set to empty. The following figure shows the System MIB screen.

**Figure 57 System MIB**



The image shows a software window titled "SNMP System MIB" with the LSI logo in the top right corner. Below the title bar is a yellow "Notes" box containing the following text:

- Maximum of 256 characters allowed.
- Rescan button will refresh the dialog.

Below the notes is a section titled "System MIB" containing three input fields:

- Contact:** A text box containing the word "None".
- Name:** A text box containing the word "None".
- Location:** A text box containing the word "None".

At the bottom of the window are three buttons: "Apply", "Close", and "Rescan".

**SNMP TRAP IP** Use the SNMP TRAP IP command to configure how the SNMP agent sends TRAPs. Up to 16 target IP addresses can be set. The agent sends all TRAPs to any valid IP addresses specified by this command. To disable an entry, clear the check box to the left of the IP address. All TRAPs are sent using the community string specified in the Agent Security command. The following figure shows the Trap IP screen.

**Figure 58 Trap IP**

The figure shows a window titled "SNMP Trap IP" with the LSI logo. It contains a "Notes" section with the following text:

- Check the enabled column to set/change an IP Address.
- Unchecking the enabled column will set the IP Address to 0.0.0.0.
- Rescan button will refresh and reset the dialog.

Below the notes is a table with two columns: "Enabled" and "Trap IP Address". The table has 16 rows. The first row has a checked checkbox and the IP address "0.0.0.0". The remaining 15 rows have unchecked checkboxes and the IP address "0.0.0.0". At the bottom of the window are three buttons: "Apply", "Close", and "Rescan".

Enabled	Trap IP Address
<input checked="" type="checkbox"/>	0.0.0.0
<input type="checkbox"/>	0.0.0.0
<input type="checkbox"/>	0.0.0.0
<input type="checkbox"/>	0.0.0.0
<input type="checkbox"/>	0.0.0.0
<input type="checkbox"/>	0.0.0.0
<input type="checkbox"/>	0.0.0.0
<input type="checkbox"/>	0.0.0.0
<input type="checkbox"/>	0.0.0.0
<input type="checkbox"/>	0.0.0.0
<input type="checkbox"/>	0.0.0.0
<input type="checkbox"/>	0.0.0.0
<input type="checkbox"/>	0.0.0.0
<input type="checkbox"/>	0.0.0.0
<input type="checkbox"/>	0.0.0.0
<input type="checkbox"/>	0.0.0.0
<input type="checkbox"/>	0.0.0.0

**SMTP Server Configuration** Use the SMTP Server Configuration screen to configure the following SMTP server characteristics:

- **SMTP Address** – This field holds the IP address of the SMTP server that is available in the network.
- **SMTP Server Name** – This field holds the name of the SMTP server (mail.company.com) that is available in the network. The string length is limited to 256 characters. Depending on the selection, either the SMTP server IP address is used directly, or the SMTP server name is dereferenced for the IP address that uses DNS.
- **Source Email Address** – This address is the email address from which emails are sent. This address is placed in the *From* field of outgoing emails. This address might be different from the account that authenticates the SMTP server. The string length is limited to 256 characters.

- **Custom Subject Prefix** – This field permits the user to add up to a 32-character prefix to the subject field. The default for a standard LSI switch is *LSI SAS 616X Alert*.
- **Authentication**
  - **Login:** This is the account used to log into the SMTP server.
  - **Password:** This is the password used to log into the SMTP server (used with the server login). The string length is limited to 64 characters with trailing spaces removed.

The following figure shows the SMTP Server Configuration screen.

**Figure 59 SMTP Server Configuration**

SMTP server configuration

LSI

**Notes**

- Server address can be changed only when "Use server address" is checked.
- Maximum of 256 characters is allowed for server name, source email address and login.
- Maximum of 32 characters is allowed for custom subject prefix.
- Maximum of 64 characters is allowed for password.
- Rescan button will refresh the dialog.

**Set SMTP flags**

☐ Use server address

**SMTP Server details**

SMTP Server address: 0.0.0.0

SMTP Server name:

Port number: 25

Source Email address:

Custom subject prefix: [LSI SAS 616X Alert]

**Authentication**

Login:

Password:

Apply Close Rescan

**Create/Modify Target Email Address** Use this screen to create and modify emails.

- **Target Email Address** – This field contains a valid email address target for email alerts. Each valid target address receives a copy of each email alert. The string is limited to 256 characters. Empty target email address entries (either null or a space character) are considered as unused.

**Alert Flags** – The switch has five predefined system alert events that can trigger email. You can select a combination of alerts for each target email address. You must select at least one alert flag for a target email address.

**Figure 60 Create/Modify Emails**

**Create/Modify Target Email Address**

LSI

**Notes**

- Selecting "Add new email address" will allow to create new target email address.
- Selecting any existing email address from the list will allow to modify that target email address.
- Multiple flags can be selected for a target email address.
- Selecting atleast one alert flag for an email address is mandatory.
- Maximum of 256 characters is allowed for target email address.
- Rescan button will refresh the dialog.

**Create/Modify Email Address**

Select target email address: Add new email address

Rename target email address:

**Choose alert flags**

- ☒ Reset Related Events
- ☒ Failover Events
- ☒ Switch Chassis Status Events
- ☒ SNMP Agent Events
- ☒ Connector Events

Apply Close Rescan

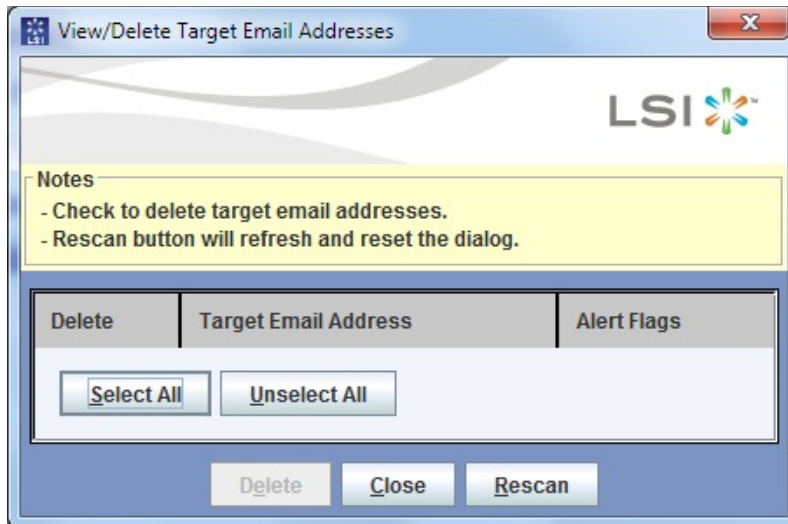
**View/Delete Target Email Address** Use this screen to view and delete emails.

**NOTE**

The SMTP client in the switch requires an SMTP server in the network for sending and receiving emails. Not all server protocols are supported; for example, SMTPS (SMTP over SSL) is not supported.



**Figure 61 View/Delete Emails**



## 3.8 Configuration Backup and Restore

SDM-GUI lets you store aliases, zone groups, and zone sets. There are two types of restore: restore and smart restore.

To create a backup, launch the configuration backup dialog from the **Server > Configure > Backup** menu.

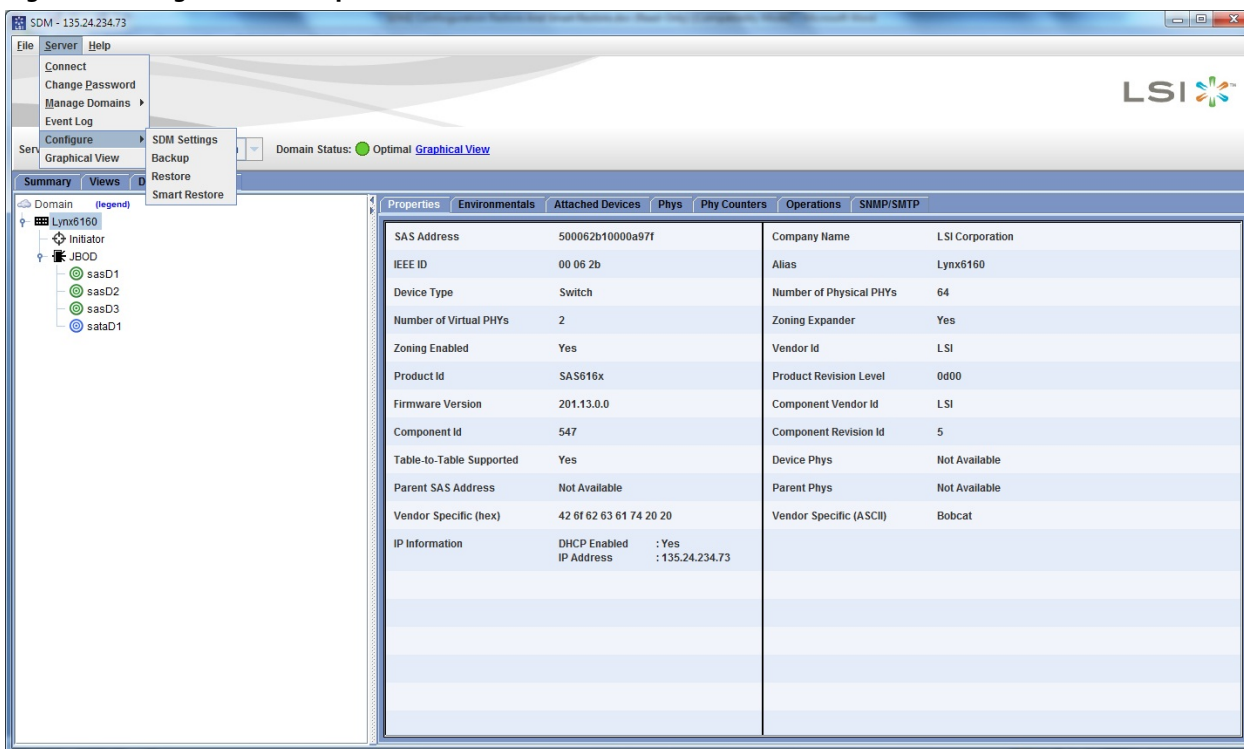
To perform a restore, launch the configuration backup dialog from the **Server > Configure > Restore** menu.

To perform a smart restore, launch the configuration backup dialog from the **Server > Configure > Smart Restore** menu.

### 3.8.1 Restore

Use this feature to restore zone groups, zone sets, and aliases without performing a topology match. You can bypass topology validation and restore configuration data on a new switch that can have a new SAS address. You can use this feature if the whole topology is not online and you can use it with only a switch without powering up other devices. This feature copies the backup configuration data onto the new switch irrespective of the present.

**Figure 62 Configuration Backup and Restore**



### 3.8.2 Smart Restore

Use this feature to duplicate an existing setup, or to create similar zone groups and zone sets on a new setup. In addition, if you remove a faulty device and add a new device, this functionality can quickly restore the aliases from the faulty device. You can use this feature to back up any existing topology. The SDM supports the following conditions for successfully restoring a topology:

- You can restore the database onto another SDM host (a host on which the backup did not occur).
- The restore topology should have the same device types connected on the same phy numbers as the backup topology.
- The restore topology can have more devices than the backup topology.
- The restore topology cannot have fewer devices or different device types than the backup topology.
- You can change SAS addresses of any device between the restore topology and backup topology.

---

## Chapter 4: SAS Domain Manager Command Line Interface

This chapter explains how to use the commands supported by the SAS Domain Manager command line interface (SDM-CLI) with the LSISAS6160 switch. Access SDM-CLI using a telnet client or Secure Shell (SSH) client.

SDM-CLI has powerful, flexible commands that enable you to manage the host switch and other switches or expanders within the domain.

### 4.1 Command Usage and Syntax

The syntax for CLI commands is as follows:

`command [arguments]`

In this syntax, `[arguments]` can consist of any combination of the following:

- Optional argument: `[optional]`
- Choice between a or b: `(a|b)`
- User-supplied value or string: `<string>`

SDM-CLI does not permit spaces in file names and paths, even if the operating system permits them. All user-supplied names (domains, aliases, zone groups, zone sets, and so on) are case sensitive.

Use the up and down arrow keys to access a small command history buffer. Move the cursor with the left arrow key and right arrow key to edit commands.

To start SDM-CLI, open a telnet session or an SSH session to the IP address or host name of the LSISAS6160 switch. Log in when you see the prompt.

SDM-CLI provides two accounts that control access and privileges: *user* and *admin*.

- The *user* account permits you to view the domain topology, configuration, and operating environment. The default password is **user**.
- The *admin* account permits you to view domain information. It also grants permission to use commands that can change the configuration of the domain or of managed devices within the domain. The default password is **admin**.
- The LSISAS6160 zone manager is handled separately. Its default password is **lynx**.

### 4.2 SDM-CLI Commands

Two types of SDM-CLI commands exist:

- *Extra-Domain commands*, such as `passwd`, have no impact on any device in the domain topology.
- *Intra-Domain commands*, such as `show`, have an impact on devices in the domain.

Each of the following command descriptions indicates whether the command is *Extra-Domain* or *Intra-Domain*.

#### NOTE

You can use shortcuts when you type commands. In the following command descriptions, the bolded letters indicate the minimum characters that are necessary to recognize the command. For example, you can enter `ali cr` to invoke the `alias create` command.

---

### 4.2.1 Help Command

(*Extra-Domain*) Use the `help` command to display the SDM-CLI command line help.

**Authority:** User

**Syntax:**

```
help [<command>]
```

**Usage:**

- `help [<command>]`  
Displays detailed help for a specific command if you provide the [`<command>`] name. Otherwise, it displays a list of all available commands.

### 4.2.2 Passwd Command

(*Extra-Domain*) Use the `passwd` command to change the password for an account after prompting for the admin password. Passwords must have between 4 characters and 16 characters.

**Authority:** Admin

**Syntax:**

```
passwd (admin | user)
```

**Usage:**

- `passwd admin`  
Starts a dialog to change the password for the *admin* account.
- `passwd user`  
Starts the following dialog to change the password for the *user* account:

```
SDMCLI> passwd user
passwd user
Please enter the current 'admin' password: *****
Please enter the new password for user: *****
Please re-enter the new password for user: *****
Password changed.
```

### 4.2.3 Quit Command

(*Extra-Domain*) Use the `quit` command (or `exit` or `logout`) to log out and exit SDM-CLI.

**Authority:** User

**Syntax:**

```
exit
logout
quit
```

### 4.2.4 Alias Command

(*Intra-Domain*) Use the `alias` command to create or delete aliases. An *alias* is a user-defined name that is bound to a SAS address. After you create an alias, you can use it anywhere that you would normally use a SAS address.

**NOTE** You can assign only a single alias to a SAS address.

SDM does not use aliases directly. For example, if you use an alias to define a zone group, SDM does not track the alias in the zone group's structures. Instead, it tracks the SAS address bound to the alias. Therefore, the zone group is not affected if you make subsequent changes to the alias.

**Authority:** Admin

**Syntax:**

```
alias create <name> <sas address>
alias delete (single <name> | all [noconfirm])
```

**Usage:**

- **alias create** <name> <sas address>  
Creates an alias that is bound to a specific device within the domain. The alias name can have a maximum of 24 characters. Valid characters are 0 through 9, A through Z, a through z, # (pound), - (dash), and \_ (underscore). An alias name must not closely resemble a valid SAS address (16 hexadecimal characters that start with a 5).
- **alias delete single** <name>  
Deletes a single specified alias.
- **alias delete all** [noconfirm]  
Deletes all aliases. If you specify the [noconfirm] option, the deletion occurs immediately without an additional confirmation prompt. Otherwise, SDM first prompts you to confirm the action.

## 4.2.5 Device Command

(*Intra-Domain*) Use the device command to manage individual devices (LSI expanders) within the domain.

**Authority:** Admin

**Syntax:**

```
device (<sas address>|<alias>) reset [noconfirm]
device (<sas address>|<alias>):<phy> reset [counters]
device (<sas address>|<alias>):<phy> (disable|enable)
device (<sas address>|<alias>): rescan [all | ses | counters]
device (<sas address>|<alias>) download <file> <ip address>
device (<sas address>|<alias>) upload <file> <tftp server ip address>
device (<sas address>|<alias>) ip (dhcp|static <ip address> <mask>
<gateway>)
```

**Usage:**

- **device** (<sas address>|<alias>) **reset** [noconfirm]  
Resets a device after user confirmation. If you specify the [noconfirm] option, the reset occurs immediately without an additional confirmation prompt. Otherwise, SDM first prompts you to confirm the action.
- **device** (<sas address>|<alias>):<phy> **reset**  
Resets a phy.
- **device** (<sas address>|<alias>):<phy> **reset counters**  
Clears a phy's counters.
- **device** (<sas address>|<alias>):<phy> **disable**  
Disables a phy until the next device reset.
- **device** (<sas address>|<alias>):<phy> **enable**  
Enables a previously disabled phy.
- **device** (<sas address>|<alias>) **download** <file> <ip address>  
Installs a new firmware image on the specified device and automatically resets the device after a successful update. SDM checks to make sure that the product identification of the image matches the targeted device. The targeted device is responsible for any other image validation.

- **device** (<sas address>|<alias>) **upload** <file> <tftp\_server ip address>  
Uploads the firmware image from the switch to a machine that runs a tftp server.
- **device** (<sas address>|<alias>): **rescan** [all | ses | counters]  
Rescans the SES data, rescans the phy error counters, or both.
- **device** (<sas address>|<alias>) **ip** (dhcp|static <ip address> <mask> <gateway>)  
Configures TCP/IP address and other TCP/IP settings for LSI switches and LSI expanders.

## 4.2.6 Show Command

(*Intra-Domain*) Use the **show** command to display domain, device, and phy information. (See [Section 4.3, Sample Output for Show Command](#), to view samples of the kind of information that the command returns.)

**Authority:** User

**Syntax:**

```
show alias [<alias>]
show device [<sas address>|<alias>]
show domain
show phy [(<sas address>|<alias>)[:<phy>]]
show version
show zonegroup [<name>]
show zoneset [active|data <name>]
show discoveryconfig
show log [failed|warning|optimal]
show invalidt2t
```

**Usage:**

- **show alias**  
Displays a list of all aliases.
- **show alias** <alias>  
Displays detailed information for a single alias.
- **show device**  
Displays a table of all devices (expanders and end devices) in the domain.
- **show device** <sas address>|<alias>  
Displays detailed information about a specific device (expander or end device). SES environmental data is a subset of the information displayed for expanders.
- **show domain**  
Displays all domain overlays and their bindings to physical domains, flagging the domain currently under focus.
- **show phy**  
Displays, in a tabular format, all expander phys residing in the domain.
- **show phy** (<sas address>|<alias>)  
Displays, in a tabular format, all phys residing on a specific expander.
- **show phy** (<sas address>|<alias>):<phy>  
Displays detailed information about a particular phy.
- **show version**  
Displays version information for both SDM-CLI and SDM-D (the embedded server version of SDM).
- **show zonegroup**  
Displays a list of all zone groups.
- **show zonegroup** <name>  
Displays detailed information about a single zone group.

- **show zoneset**  
Displays a list of all zone sets.
- **show zoneset active**  
Displays the name and detailed information for the active zone set.
- **show zoneset data <name>**  
Displays detailed information about a single zone set.
- **show discoveryconfig**  
Displays discovery configuration details, such as discovery status and polling interval.
- **show log [failed|warning|optimal]**  
Displays SDM event logs according to severity.
- **show invalidt2t**  
Displays attributes and SAS address of those phys whose routing attributes differs on attached device.

## 4.2.7 Zonegroup Command

(Intra-Domain) Use the `zonegroup` command to manage zone groups and zone group membership. Zonegroup commands have no effect on the active zone set until you reactivate it.

**Authority:** Admin

**Syntax:**

```
zonegroup add <name> (<sas_address>|<alias>):<phy>
zonegroup create <name>
zonegroup delete ((single <name>)|(all [noconfirm]))
zonegroup remove <name> (<sas_address>|<alias>):<phy>
zonegroup rename <old> <new>
```

**Usage:**

- **zonegroup add <name> (<sas address>|<alias>):<phy>**  
Adds a phy to an existing zone group.

**NOTE** Phys internal to the ZPSDS must be in Zone Group 1. Therefore, exclude them from this command.

- **zonegroup create <name>**  
Creates a new zone group. The zone group name can have a maximum of 32 characters. Valid characters are 0 through 9, A through Z, a through z, # (pound), - (dash), and \_ (underscore).
- **zonegroup delete single <name>**  
Deletes a single zone group.

**NOTE** You cannot delete a zone group if it is currently a member of a zone set. This restriction also applies to the `zonegroup delete all` command.

- **zonegroup delete all [noconfirm]**  
Deletes all zone groups. If you specify the `[noconfirm]` option, the action occurs immediately without an additional confirmation prompt. Otherwise, SDM first prompts you to confirm the action.
- **zonegroup remove <name> (<sas address>|<alias>):<phy>**  
Removes a phy from an existing zone group.
- **zonegroup rename <old> <new>**  
Renames an existing zone group.

## 4.2.8 Zoneset Command

(*Intra-Domain*) Use the `zoneset` command to manage zone sets and zone set membership.

Before you can activate zoning, you must use the `zoneset passwd` command to synchronize the zone manager password of all the zoning expanders and switches on the domain. If the zoning expanders and switches use different zoning passwords, you must use this command many times and make multiple entries for each different password.

**NOTE** Only the `zoneset activate` and `zoneset deactivate` commands affect the state of the active zone set. Other types of `zonegroup` commands and `zoneset` commands have no effect until you subsequently activate the zone set.

**Authority:** Admin

**Syntax:**

```
zoneset activate <name>
zoneset add <name> <zone group> <zone group>
zoneset create <name>
zoneset deactivate
zoneset delete (single <name> | all [noconfirm])
zoneset passwd
zoneset remove <name> <zone group> <zone group>
zoneset rename <old> <new>
```

**Usage:**

- **zoneset activate <name>**  
Activates a zone set after prompting you for the zone manager password. Only a single zone set can be active at a time, so this command also deactivates the current active zone set before it activates a new one. Changes to the active zone set, or changes to zone group permissions, do not take effect until the next zone set activates.

**NOTE** Depending on the zoning configuration and how SDM accesses the domain, you might not always be required to enter a valid zone manager password to modify or disable zoning after it is enabled. You can apply changes made to the active zone set by reactivating it. SDM validates the zone set within the topology when activation occurs.

- **zoneset add <name> <zone group> <zone group>**  
Adds two zone groups to an existing zone set, which gives them permission to communicate with one another. The maximum number of zone groups is 248 for a zone set.

**NOTE** A phy can be only a member of one zone group per zone set.

- **zoneset create <name>**  
Creates a new zone set. The zone set name can have a maximum of 32 characters. Valid characters are 0 through 9, A through Z, a through z, # (pound), - (dash), and \_ (underscore).
- **zoneset deactivate**  
Deactivates the active zone set after it prompts you for the zone manager password.

**NOTE** Zoning within the domain is disabled when no zone set is active, and access is unrestricted. When zoning is disabled, all end devices in the domain can see one another.

- **zoneset delete single <name>**  
Deletes a single zone set.



- **zoneset delete all** [noconfirm]  
Deletes all zone sets. If you specify the [noconfirm] option, the action occurs immediately without an additional confirmation prompt. Otherwise, SDM first prompts you to confirm the action.
- **zoneset passwd**  
Changes the zone manager password for an expander or switch. Passwords are text strings that contain any valid ASCII character. The maximum password length is 32 characters.  
  
When prompted for the current zone password, type the current password for any expander or switch. When prompted for the new zone manager password, type the new password. Type it again to confirm it when asked to re-enter.  
  
Repeat this process until all the expander and switch zoning passwords are changed to the new password. The new password can be one of the current passwords for any switch or expander, or it can be a new one. All expanders and switches must have the same password. If all the zoning expanders and switches inside the ZPSDS do not have the same zone manager password, you receive a zoning password error while activating the zoning.

**NOTE** The default zone manager password is **lynx**.

- **zoneset remove** <name> <zone group> <zone group>  
Removes communication privileges between two zone groups in an existing zone set. A zone group is purged from the zone set if no other communication privileges remain.
- **zoneset rename** <old> <new>  
Renames an existing zone set.

**NOTE** If you have other zoning-capable devices in the topology, each with its own zone manager password that is different from the switch default, you must synchronize passwords to avoid a situation in which the default password for the switch does not work.

## 4.2.9 SES Threshold

(Intra-Domain) Use the **threshold** command to set the high critical, high warning, low critical, and low warning threshold values for temperature elements and voltage elements. See [Section 3.7.2.1, Set SES Thresholds](#), for more SES-threshold details.

**Authority:** Admin

**Syntax:**

```
show device <sas_addr>|<alias> threshold
device <sas_addr>|<alias> threshold <element_id> <HC> <HW> <LW> <LC>
```

**Usage:**

- **show device** <sas\_addr>|<alias> **threshold**  
Shows the device thresholds.
- **device** <sas\_addr>|<alias> **threshold** <element\_id> <HC> <HW> <LW> <LC>  
Allows you to set the device thresholds.

## 4.2.10 Get Date

(Intra-Domain) Use the **date** command to get the switch date.

**Authority:** User

**Syntax:**

```
show device ({SAS address} | {alias}) date
```

---

**Usage:**

- **show device** ({SAS address} | {alias}) **date**  
Shows the device date in DAY YYYY-MM-DDThh:mm:ss format. For example, *SUN 2011-11-28T23:56:55*.

#### 4.2.11 Set Date

(Intra-Domain) Use the **date** command to set the switch date.

**Authority:** Admin

**Syntax:**

```
device ({sas address} | {alias}) date weekday year month month-day hour
minute seconds
```

**Usage:**

- **device** ({sas address} | {alias}) **date** weekday year month month-day hour minute seconds  
Enter the date and time parameters in the format specified by ISO® 8601. The format is DAY YYYY-MM-DDThh:mm:ss. For example, *SUN 2010-02-28T23:56:55*.

#### 4.2.12 Performance Monitoring

(Intra-Domain) Use the **monitor** command to monitor the performance and errors on all switch phys.

**Authority:** Admin

**Syntax:**

```
device <sas_addr>|<alias> monitor selectconfigset <Config>
device <sas_addr>|<alias> monitor changetimebase <time_base>
```

**Usage:**

- **device** <sas\_addr>|<alias> **monitor selectconfigset** <Config>  
Moves the active Config set to <Config>.
- **device** <sas\_addr>|<alias> **monitor changetimebase** <time\_base>  
Changes the time base.

**Authority:** User

**Syntax:**

```
show device <sas_addr>|<alias> monitor configsettings
show device <sas_addr>|<alias> monitor monitoredvalues <phy_offset>
<phy_range>
```

**Usage:**

- **show device** <sas\_addr>|<alias> **monitor configsettings**  
Shows the Config settings options from the device <sas\_addr>|<alias> **monitor selectconfigset** <Config> command.
- **show device** <sas\_addr>|<alias> **monitor monitoredvalues** <phy\_offset> <phy\_range>  
Shows monitored values for the active Config set.

---

### 4.2.13 Get SNMP

(Intra-Domain) Use the `snmp` command to show the SNMP configuration.

**Authority:** User

**Syntax:**

```
show device <sas-address|alias> snmp agentsecurity
show device <sas-address|alias> snmp systemmib
```

**Usage:**

- `show device <sas-address|alias> snmp agentsecurity`  
Shows the agent security details used to configure the SNMP agent.
- `show device <sas-address|alias> snmp systemmib`  
Shows the SNMP system MIB configuration.

### 4.2.14 Set SNMP

(Intra-Domain) Use the `snmp` command to configure SNMP.

**Authority:** Admin

**Syntax:**

```
device <sas-address|alias> snmp agentsecurity username
device <sas-address|alias> snmp agentsecurity authsecflag
device <sas-address|alias> snmp agentsecurity privsecflag
device <sas-address|alias> snmp agentsecurity authpass
device <sas-address|alias> snmp agentsecurity privpass
device <sas-address|alias> snmp systemmib contactstring
device <sas-address|alias> snmp systemmib locationstring
```

**Usage:**

- `device <sas-address|alias> snmp agentsecurity username`  
Sets the username or community string.
- `device <sas-address|alias> snmp agentsecurity authsecflag`  
Sets the security authentication flag.
- `device <sas-address|alias> snmp agentsecurity privsecflag`  
Sets the security privacy flag.
- `device <sas-address|alias> snmp agentsecurity authpass`  
Sets the password for SNMPv3 authentication.
- `device <sas-address|alias> snmp agentsecurity privpass`  
Sets the password for SNMPv3 privacy.
- `device <sas-address|alias> snmp systemmib contactstring`  
Sets the name of the person responsible for the device at an end-user site.
- `device <sas-address|alias> snmp systemmib locationstring`  
Sets the physical location of the device.

---

### 4.2.15 Get SMTP

(Intra-Domain) Use the `smtp` command to show the SMTP configuration.

**Authority:** User

**Syntax:**

```
show device (<sas_address> | <alias>) smtp outputconfig
show device (<sas_address> | <alias>) smtp serverconfig
show device (<sas_address> | <alias>) smtp email
show device (<sas_address> | <alias>) smtp alertflags
```

**Usage:**

- `show device (<sas_address> | <alias>) smtp outputconfig`  
Displays the SMTP output page configuration of a switch.
- `show device (<sas_address> | <alias>) smtp serverconfig`  
Displays the SMTP configuration of a switch.
- `show device (<sas_address> | <alias>) smtp email`  
Displays the SMTP email addresses and their alert flags.
- `show device (<sas_address> | <alias>) smtp alertflags`  
Displays the SMTP alert flags.

### 4.2.16 Set SMTP

(Intra-Domain) Use the `smtp` command to configure the SMTP.

**Authority:** Admin

**Syntax:**

```
device (<sas_address> | <alias>) smtp serverconfig
device (<sas_address> | <alias>) smtp add email
device (<sas_address> | <alias>) smtp remove email (entry_number)
device (<sas_address> | <alias>) smtp remove email all
device (<sas_address> | <alias>) smtp remove email all noconfirm
```

**Usage:**

- `device (<sas_address> | <alias>) smtp serverconfig`  
Configures SMTP server values.
- `device (<sas_address> | <alias>) smtp add email`  
Adds an email address and its supported alert flags.
- `device (<sas_address> | <alias>) smtp remove email (entry_number)`  
Removes an email address.
- `device (<sas_address> | <alias>) smtp remove email all`  
Removes all email addresses with a confirmation.
- `device (<sas_address> | <alias>) smtp remove email all noconfirm`  
Removes all email addresses with no confirmation.

---

## 4.2.17 Configuration Backup

(*Extra-Domain*) Use the `backup` command to backup settings. See [Section 3.8, Configuration Backup and Restore](#), for more information.

**Authority:** Admin

**Syntax:**

```
config backup <file name>
config backup <file name> <ip-address>
```

**Usage:**

- `config backup <file name>`  
Use in a single-switch system. Saves the topology configuration.
- `config backup <file name> <ip-address>`  
Use in a multiple-switch system. Saves the topology configuration of the specified switch.

## 4.2.18 Configuration Smart Restore

(*Extra-Domain*) Use the `smart restore` command to restore saved settings. See [Section 3.8, Configuration Backup and Restore](#), for more information.

**Authority:** Admin

**Syntax:**

```
config smartrestore <file name>
config smartrestore <file name> <ip-address>
```

**Usage:**

- `config smartrestore <file name>`  
Use in a single-switch system. Restores the topology configuration.
- `config smartrestore <file name> <ip-address>`  
Use in a single-switch system. Restores the topology configuration to the specified switch.

## 4.2.19 Configuration Restore

(*Extra-Domain*) Use the `restore` command to restore saved settings. See [Section 3.8, Configuration Backup and Restore](#), for more information.

**Authority:** Admin

**Syntax:**

```
config restore <file name>
config restore <file name> <ip-address>
```

**Usage:**

- `config restore <file name>`  
Use in a single-switch system. Restores the topology configuration.
- `config restore <file name> <ip-address>`  
Use in a multiple-switch system. Restores the topology configuration to the specified switch.

## 4.2.20 Display SDM Event Log

(*Intra-Domain*) Use the `log` command to get the device log.

**Authority:**User

**Syntax:**

```
show log
show <domain id> log
show <domain id> log (<failed|<critical>|<optimal>)
```

**Usage:**

- `show log`  
Shows the event log for all domains and all severities.
- `show <domain id> log`  
Shows the event log of the specified domain and all severities.
- `show <domain id> log (<failed|<critical>|<optimal>)`  
Shows the event log of the specified domain and filters by severity.

## 4.2.21 Query and Display Switch/Expander Firmware Event Log

(*Intra-Domain*) Use the `log` command to show the switch or expander event log.

**Authority:**User

**Syntax:**

```
show device <sas-address> log
```

**Usage:**

- `show device <sas-address> log`  
Show the specified device's firmware event log.

## 4.3 Sample Output for Show Command

This section shows sample output for some variations of the `show` command. The first line of each example shows the actual syntax of the command that you enter at the **SDMCLI>** prompt.

### 4.3.1 show alias

```
SDMCLI> show alias
```

SAS Address	Alias
500605b0006b75b0	Bacchus
50012be0000380ff	Calhoun
500605b0000220bf	Carrollton

### 4.3.2 show alias <alias>

```
SDMCLI> show alias Calhoun
```

SAS Address	Alias
50012be0000380ff	Calhoun

### 4.3.3 show device

SDMCLI> show device

**NOTE**

In the following example, *ZExpander* means *zoning capable expander*.

Device			Parent		
=====					
	Num	Alias /		Alias /	
Type	Phys	SAS Address	Phys	SAS Address	Phys
-----					
Switch	64+2	Tchoupitoulas			
End	01	500062b10000417d	00	Tchoupitoulas	64
Switch	64+2	Poydras	00-01-02-03	Tchoupitoulas	00-01-02-03
End	04	Bacchus	00-01-02-03	Poydras	40-41-42-43
End	01	500062b10000127d	00	Poydras	64
ZExpander	36+2	Calhoun	32-33-34-35	Poydras	16-17-18-19
End	01	5000c500176c844d	00	Calhoun	00
End	01	5000c500176c9609	00	Calhoun	01
End	01	5000c500176e7041	00	Calhoun	02
End	01	5000c500176c9959	00	Calhoun	03
End	01	5000c500176a867d	00	Calhoun	04
End	01	5000c5001769ed95	00	Calhoun	05
End	01	5000c500176d141d	00	Calhoun	06
End	01	5000c500176cb319	00	Calhoun	07
End	01	5000c500176a1ff5	00	Calhoun	12
End	01	5000c500176cf39d	00	Calhoun	13
End	01	5000c500176cb0f1	00	Calhoun	14
End	01	5000c500176e7165	00	Calhoun	15
End	01	5000c50017689651	00	Calhoun	28
End	01	5000c5001765e50d	00	Calhoun	29
End	01	5000c500176a32cd	00	Calhoun	30
End	01	5000c500176c9211	00	Calhoun	31
End	01	50012be0000380fd	00	Calhoun	36

#### 4.3.4 show device <alias>

**NOTE** A Device Type of *ZExpander* means *zoning capable expander*.

**SDMCLI> show device Calhoun**

```
=====
Domain Device Information
=====
Company Name: Astek Corporation
SAS Address: 50012be0000380ff
IEEE ID: 0012be
Device Type: Edge Expander
Number of Physical Phys: 36
Number of Virtual Phys: 2
Zoning Expander: Yes
Zoning Enabled: Yes
Vendor Id: AstekCor
Product Id: Snowcat-Brann
Product Revision Level: 0100
Firmware Version: 3.1.0.0
Component Vendor Id: LSI
Component Id: 547
Component Revision Id: 4
Table-to-Table Supported: Yes
Device Phys: 32-33-34-35
Parent SAS Address: 500062b10000127f
Parent Phys: 16-17-18-19
Vendor Specific (hex): 00 00 00 00 00 00 00 00
Vendor Specific (ASCII):

- Environmentals Information -
Last Update: Time Not Supported
Chip Temperature: OK, 68 Celsius
Board Temperature: OK, 44 Celsius
Astek-Brann: OK
Expander: OK
J1:Interconnect 32-35: OK, SAS Mini 4i Plug
J2:Uplink 24-27: OK, SAS Mini 4i Plug
J3:Drives 20-23: OK, SAS Mini 4i Plug
J4:Drives 16-19: OK, SAS Mini 4i Plug
J5:Drives 12-15: OK, SAS Mini 4i Plug
J6:Interconnect 28-31: OK, SAS Mini 4i Plug
J7:Drives 00-03: OK, SAS Mini 4i Plug
J8:Drives 04-07: OK, SAS Mini 4i Plug
J9:Drives 08-11: OK, SAS Mini 4i Plug
```



### 4.3.5 show domain

SDMCLI> show domain

Overlay Name	Id	Domain Access Point
(Domain)	1	SAS6160 (500062b10000417f)

Note: (Name) denotes focused domain

[Name] denotes domain overlays currently not bound to a physical domain

### 4.3.6 show phy

SDMCLI> show phy

**NOTE** In the following example, T = Table, S = Subtractive, and D = Direct.

Notes:

- RA - Routing Attributes: \* phy is an Invalid T to T link.
- VP - Virtual PHY
- LS/S - Link Speed/Status: 1.5|3.0|6.0 Gb/s
  - phy enabled but link uninitialized
  - \* phy disabled
- ZG - Zone Grp
  - Zoning Active: Zone Group Number
  - Zoning Inactive: \* phy may be assigned to a zone group
    - phy may not be assigned to a zone group
- Capabilities
  - lxxxxxxx - Attached SMP Initiator
  - xlxxxxxxx - Attached STP Initiator
  - xxlxxxxxx - Attached SSP Initiator
  - xxxlxxxxx - Attached SATA Host
  - xxxxlxxxx - Attached SMP Target
  - xxxxxlxxx - Attached STP Target
  - xxxxxxlxx - Attached SSP Target
  - xxxxxxxlx - Attached SATA Target
  - xxxxxxx1 - Attached SATA Port Selector

Phy						Attached			
Alias /	Phy	RA	VP	LS/S	ZG	Alias /	Phy	Device	Capabilities
SAS Address						SAS Address		Type	IIIIITTTTS
Tchoupitoulas	00	T	-	6.0	-	Poydras	000	Switch	000010000
Tchoupitoulas	01	T	-	6.0	-	Poydras	001	Switch	000010000
Tchoupitoulas	02	T	-	6.0	-	Poydras	002	Switch	000010000
Tchoupitoulas	03	T	-	6.0	-	Poydras	003	Switch	000010000
Tchoupitoulas	04	T	-	-	*	-----	---	None	000000000
Tchoupitoulas	05	T	-	-	*	-----	---	None	000000000
Tchoupitoulas	06	T	-	-	*	-----	---	None	000000000
Tchoupitoulas	07	T	-	-	*	-----	---	None	000000000
Tchoupitoulas	08	T	-	-	*	-----	---	None	000000000

Tchoupitoulas	09	T	-	-	*	-----	---	None	000000000
Tchoupitoulas	10	T	-	-	*	-----	---	None	000000000
Tchoupitoulas	11	T	-	-	*	-----	---	None	000000000
Tchoupitoulas	12	T	-	-	*	-----	---	None	000000000
Tchoupitoulas	13	T	-	-	*	-----	---	None	000000000
Tchoupitoulas	14	T	-	-	*	-----	---	None	000000000
Tchoupitoulas	15	T	-	-	*	-----	---	None	000000000
Tchoupitoulas	16	T	-	-	*	-----	---	None	000000000

Not all output shown in this example.

Rampart	32	T	-	-	*	-----	---	None	000000000
Rampart	33	T	-	-	*	-----	---	None	000000000
Rampart	34	T	-	-	*	-----	---	None	000000000
Rampart	35	T	-	-	*	-----	---	None	000000000
Rampart	36	D	*	6.0	-	500605b0000210bd	000	End	101000100
Rampart	37	D	*	-	-	-----	---	None	000001000

### 4.3.7 show phy <alias>

**SDMCLI> show phy Calhoun**

**NOTE** In the following example, T = Table, S = Subtractive, and D = Direct.

Notes:

- RA - Routing Attributes: \* phy is an Invalid T to T link.
- VP - Virtual PHY
- Zone Grp
  - Zoning Active: Zone Group Number
  - Zoning Inactive: \* phy may be assigned to a zone group
    - phy may not be assigned to a zone group
- Capabilities
  - lxxxxxxx - Attached SMP Initiator
  - xlxxxxxxx - Attached STP Initiator
  - xxlxxxxxxx - Attached SSP Initiator
  - xxxlxxxxx - Attached SATA Host
  - xxxxlxxxxx - Attached SMP Target
  - xxxxxlxxx - Attached STP Target
  - xxxxxxlxx - Attached SSP Target
  - xxxxxxxlx - Attached SATA Target
  - xxxxxxx1 - Attached SATA Port Selector

Phy Table for 50012be0000380ff (Calhoun):

Phy						Attached				
Phy	RA	VP	State	Link Speed	Zone Grp	Alias / SAS Address	Phy	Device Type	Capabilities	
									IIIIITTTTS	
000	D	-	Enabled	6.0	*	5000c500176c844d	000	End	000000010	
001	D	-	Enabled	6.0	*	5000c500176c9609	000	End	000000010	
002	D	-	Enabled	6.0	*	5000c500176e7041	000	End	000000010	
003	D	-	Enabled	6.0	*	5000c500176c9959	000	End	000000010	

---

004	T	-	Enabled	6.0	*	5000c500176a867d	000	End	000000010
005	T	-	Enabled	6.0	*	5000c5001769ed95	000	End	000000010
006	T	-	Enabled	6.0	*	5000c500176d141d	000	End	000000010
007	T	-	Enabled	6.0	*	5000c500176cb319	000	End	000000010
008	T	-	Enabled	-	*	-----	---	None	000000000
009	T	-	Enabled	-	*	-----	---	None	000000000
010	T	-	Enabled	-	*	-----	---	None	000000000
011	T	-	Enabled	-	*	-----	---	None	000000000
012	T	-	Enabled	6.0	*	5000c500176a1ff5	000	End	000000010
013	T	-	Enabled	6.0	*	5000c500176cf39d	000	End	000000010
014	T	-	Enabled	6.0	*	5000c500176cb0f1	000	End	000000010
015	T	-	Enabled	6.0	*	5000c500176e7165	000	End	000000010
016	T	-	Enabled	-	*	-----	---	None	000000000
017	T	-	Enabled	-	*	-----	---	None	000000000
018	T	-	Enabled	-	*	-----	---	None	000000000
019	T	-	Enabled	-	*	-----	---	None	000000000
020	T	-	Enabled	-	*	-----	---	None	000000000
021	T	-	Enabled	-	*	-----	---	None	000000000
022	T	-	Enabled	-	*	-----	---	None	000000000
023	T	-	Enabled	-	*	-----	---	None	000000000
024	S	-	Enabled	-	*	-----	---	None	000000000
025	S	-	Enabled	-	*	-----	---	None	000000000
026	S	-	Enabled	-	*	-----	---	None	000000000
027	S	-	Enabled	-	*	-----	---	None	000000000
028	T	-	Enabled	6.0	*	5000c50017689651	000	End	000000010
029	T	-	Enabled	6.0	*	5000c5001765e50d	000	End	000000010
030	T	-	Enabled	6.0	*	5000c500176a32cd	000	End	000000010
031	T	-	Enabled	6.0	*	5000c500176c9211	000	End	000000010
032	T	-	Enabled	6.0	-	Poydras	016	Switch	000001000
033	T	-	Enabled	6.0	-	Poydras	017	Switch	000001000
034	T	-	Enabled	6.0	-	Poydras	018	Switch	000001000
035	T	-	Enabled	6.0	-	Poydras	019	Switch	000001000
036	D	*	Enabled	6.0	-	50012be0000380fd	000	End	010100010
037	D	*	Enabled	-	-	-----	---	None	000000100

### 4.3.8 show phy <alias>: <phy>

```
SDMCLI> show phy Lincoln:01

=====
                        Phy Information
=====
                        SAS Address: 500605b0000282bf
                        Phy Identifier: 01
                        State: Enabled
                        Link Speed: 6.0 Gb/s
                        Virtual Phy: No
                        Routing Attribute: Subtractive
                        Minimum Link Speed: 1.5 Gb/s
                        Maximum Link Speed: 6.0 Gb/s
                        Supported Minimum Link Speed: 1.5 Gb/s
                        Supported Maximum Link Speed: 6.0 Gb/s
                        Connector Type: No Information
                        Connector Element Index: 00
                        Connector Physical Link: 00
                        Phy Fault LED: OFF
                        Phy Change Count: 2
                        SAS Zone Group: Zoning Inactive

- Attached Device Information -
  Attached SAS Address: 500605b0006b75c0
  Attached Phy Identifier: 06
  Attached Device Type: End Device
  Attached Device Capabilities: SAS Management Initiator
                               SATA Initiator (SAS Tunneled)
                               SAS Initiator

- Error Statistics -
  Invalid Dword Count: 0
  Running Disparity Error Count: 0
  Loss of Dword Synchronization Count: 0
  Phy Reset Problem Count: 0
```

### 4.3.9 show version

```
SDMCLI> show version

SDM-CLI Version 2.250.5.0
SDM-D   Version 2.250.5.0
```

**NOTE**           SDM-D is the embedded server version of SDM, and SDM-CLI is the client.

---

### 4.3.10 **show zonegroup <name>**

```
SDMCLI> show zonegroup ZoneOne#001

Zone Group
  Member Alias/SAS Address: Phy List
-----
ZoneOne#001:
Lincoln      : 00 01 02 03
```

### 4.3.11 **show zoneset active**

```
SDMCLI> show zoneset active

Zone Set
  Zone Group: Permitted Zone Group List
  Member Alias/SAS Address: Phy List
-----
ZoneOne:
  ZoneOne#001: ZoneOne#002
Lincoln      : 00 01 02 03
  ZoneOne#002: ZoneOne#001
Lincoln      : 08 09 10 11
```

### 4.3.12 **show zoneset data <name>**

```
SDMCLI> show zoneset data ZoneOne

Zone Set
  Zone Group: Permitted Zone Group List
  Member Alias/SAS Address: Phy List
-----
ZoneOne:
  ZoneOne#001: ZoneOne#002
Lincoln      : 00 01 02 03
  ZoneOne#002: ZoneOne#001
Lincoln      : 08 09 10 11
```

## Chapter 5: Troubleshooting

The following table lists several troubleshooting issues related to the LSISAS6160 switch and the remedies for them.

**Table 5 Common Troubleshooting Issues and Remedies**

Issue	Remedy
The password for the <b>admin</b> account is lost and you cannot access the switch-management capabilities.	Reset the switch to factory defaults by pressing the reset switch and power-cycling the switch. This process resets both the <b>admin</b> and <b>user</b> account passwords to their default values, clears all alias and zoning data, and clears the event log.
When trying to log in to the SDM-GUI utility from a Microsoft Windows Server® 2003 system, the system stalls at the loading screen.	In the Internet Explorer web browser, select <b>Tools &gt; Internet Options &gt; Security</b> . Click the <b>Trusted Sites</b> icon, then click <b>Sites...</b> Add the IP address of the LSISAS6160 switch to the list of trusted websites.
You changed the default IP address of the LSISAS6160 switch, but you forgot the address and you can no longer access the switch through the Ethernet.	To retrieve the IP address through an in-band connection, use the Xip utility supplied on the CD that ships with the LSISAS6160 switch. To list the available expanders in your topology, run the following command:  <code>xip -i get avail</code>  This command lists all expanders in your topology with the switch IP address next to each switch SAS address. Alternatively, you can query information (including the IP address) from an individual expander by using its SAS address. For example, if the SAS address is 500062b15555557f, use this command to list information specific to that expander:  <code>xip -i 500062b15555557f get exp</code>
All ports are showing yellow LEDs, but you still have SAS traffic. The switch functions at half performance.	This problem might be caused by a failure of either the master controller or the slave controller. Contact your vendor to replace the switch.



Storage. Networking. Accelerated.™