QLOGIC™

SANbox 8200 Series
Storage Services Platform

Installation and Configuration Guide
for StoreAge SVM

Document Revision History
Rev. A, initial release, 3/23/06

Table of Contents

Figures

Figure		**Page**

Tables

Notes

Section 1
Introduction

This installation and configuration guide explains the initial hardware installation and basic configuration procedures for the SANbox® 8200 Series Storage Services Platform (SSP). It contains procedures for installing the system, configuring the different components of the system, and completing basic storage operations. After completing the installation and basic configuration procedures covered in this guide, an administrator can use the SANbox SSP to provision and manage storage and related services, such as virtualization, migration, mirroring, and replication.

The major sections of this guide are as follows:

Section 2 includes intended audience, related documentation, regulatory and safety notices, and warranty and technical support.

Section 3 provides step-by-step instructions for getting started with the SANbox SSP.

Section 3 references each screen and panel in the SANbox SSP Management GUI. Use the SANbox SSP Management GUI to manage the SANbox SSP chassis. The SANbox SSP Management GUI provides the same functions as the command line interface.

Section 4 describes the procedures for using various aspects of the SANbox SSP and the SVM appliance, including SAN zoning, configuring storage, creating virtual volumes, interpreting LEDs, and shutting down.

Section 5 describes the procedures for maintaining the SANbox SSP. Maintenance tasks include updating the SANbox SSP system software, applying software patches, interpreting LED patterns, and replacing hardware.

Section 6 provides troubleshooting procedures for issues that you may experience during system start-up or configuration of the SANbox SSP.

Appendix A lists the SANbox SSP specifications.

Appendix B describes the Telnet command line interface. The commands provide the same functions as the SANbox SSP Management GUI.

This section is organized as follows:

■ Audience

■ Readme File

■ Related Documentation

■ New in this Release

■ Style Conventions

■ Regulatory and Safety Notices

■ Warranty and Technical Support

1.1
Audience

To use this guide, you should be familiar not only with basic networking installation tasks but also with standard storage networking configuration, management, and troubleshooting procedures. You should also have experience configuring, installing, and maintaining different storage components and devices including host bus adapters (HBAs), Fibre Channel switches, and storage arrays.

1.2
Readme File

See the readme.txt file included on the SANbox 8200 Series SSP for StoreAge SVM CD-ROM for updates to this guide.

1.3
Related Documentation

The following websites, manuals, and materials are referenced in the text and/or provide additional information.

■ *SANbox 8200 Series Storage Services Platform Quick Start Guide for StoreAge SVM*

■ SANbox SSP solution guide for your configuration

The solution guides are documents that address the specific host operating systems and storage devices present in your configuration.

■ SANbox SSP Release Notes

■ QLogic's website: http://www.qlogic.com

■ StoreAge documents:

❑ MultiCopy User Manual

❑ MultiMirror User manual

❑ MultiView User Manual

❑ SVM Install Guide

❑ SVM User Manual

1.4
New in this Release

This is the initial release of this document.

1.5
Style Conventions

CAUTION!   A **Caution** notice indicates the presence of a hazard that has the potential of causing damage to the equipment or loss of data.

WARNING!!   A **Warning** notice indicates the presence of a hazard that has the potential of causing personal injury.

1.6
Regulatory and Safety Notices

1.6.1
FCC

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

■ This device may not cause harmful interference.

■ This device must accept any interference received, including interference that may cause undesired operation.

The reader is cautioned that changes or modifications made to the equipment not expressly approved by QLogic Corporation could void the user's authority to operate this equipment.

To comply with radiated emissions, only use SFPs recommended by QLogic Corporation.

The above statements apply to products marketed in the USA.

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet Appareil numérique de la classe A respecte toutes les exigences du réglement sur le matériel brouilleur du Canada.

The above statement applies to products marketed in Canada.

1.6.2

Class I Laser Safety Information – Certification and Classification Information

The SANbox SSP contains a laser product called an optical SFP transceiver. Models of optical SFPs sold by QLogic Corporation are certified as Class I laser products that conform to the requirement contained in the Department of Health and Human Services (DHHS) regulation 21 CFR Subchapter J. The certification is indicated by a UL registered mark and a statement of compliance to DHHS regulation 21 CFR Subchapter J on the label located on the SFP. If another optical SFP is used, other than one recommended and sold by QLogic Corporation, the user must ensure compliance with UL recognized standards and DHHS regulations.

1.6.3

Declaration of Conformity

This Declaration identifies the product, manufacturer's name and address, and applicable specifications recognized in the United States and Canada.

Manufacturer

QLogic Corporation
26650 Aliso Viejo Parkway
Aliso Viejo, California 92656
USA

Product

SANbox 8202-16 Storage Services Platform
SANbox 8202-08 Storage Services Platform
SANbox 8200-08 Storage Services Platform

The Manufacturer declares under sole responsibility that the products to which this Declaration relates is in conformity with the following standards or other documents:

Safety: UL 60950 Listed

CSA C22.2 No.60950

IEC 60950

EN 60825-1:1994+A11

EMC: FCC Rules Part 15, Subpart B,2001.Class A (US)

ICES-003:1997. Class A

ANSI C63.4:2000

EN55022 (1998), Performance Criteria A

EN50081-1 (1992)

EN50082-1 (1997)

EN55024 (1998)

EN61000-3-2 (1995) A14:2000, Performance Criteria A

EN61000-3-3 (1995), Performance Criteria B

IEC61000-4-2 (1995) A1:1998, Performance Criteria B

IEC61000-4-3 (1995) A1:1998, Performance Criteria B

IEC 61000-4-4 (1995), Performance Criteria B

IEC61000-4-5 (1995), Performance Criteria B

IEC61000-4-6 (1996), Performance Criteria A

IEC61000-4-11 (1994), Performance Criteria B and C following the provisions of the Low Voltage Directive 72/23/EEC and EMC Directive 89/336/EEC and is Marked in accordance with the CE Marking Directive 93/68/EEC.

Any device that uses electricity must be handled carefully; follow these guidelines to ensure general safety:

- Keep SANbox SSP area clear and dust-free during and after testing.
- Place SANbox SSP in a secure and stable area.

Use the appropriate AC power for the system. The system components operate on input voltages and frequencies within the ranges of 100 to 240 VRMS and 50/60 Hz without the need for operator adjustments.

WARNING!!   SANbox SSP may have more than one power supply connection for standard operation. All power supply connections need to be removed to fully de-energize the unit.

WARNING!! To prevent personal injury or damage to the SANbox SSP, never attempt to lift or tilt the system using component mounts or device levers; these types of handles are not designed to support additional weight beyond specification. Move the SANbox SSP by lifting the entire unit with both hands.

1.7
Warranty and Technical Support

1.7.1
Warranty

Every QLogic solution is backed by a worldwide warranty for hardware and software products and related services furnished by QLogic. For complete warranty details, go to: http://support.qlogic.com/support/warranty.asp.

1.7.2
Technical Support

Customers should contact their authorized maintenance provider for technical support of their QLogic switch products. QLogic-direct customers may contact QLogic Technical Support; others will be redirected to their authorized maintenance provider. Visit the QLogic support Web site listed in "Contact Information" on page 1-7 for the latest firmware and software updates.

1.7.2.1
Before Contacting Technical Support

Before contacting technical support, run `show debug dump` in the command line interface, and create a trace file in the SVM GUI. QLogic technical support representatives may request this file to assist them in diagnosing issues with your system. For more information about Show Debug Dump, see "Show Debug Command" on page B-19.

To create a trace file in the SVM GUI:

1. Open the SVM GUI, and open Information in the tree view.

2. Click **Trace Dump**, then click **Confirm** to start creating the file.

   NOTE: The system requires several minutes to generate the trace file.

3. View the file in the `c:\Svm_Trace` directory.

   The name of each trace file takes this form:

   ```
   SVM_TraceN.txt
   ```

where `N` is an incremental number. For example, if the last trace file that was generated is SVM_Trace1.txt, then the next one is SVM_Trace2.txt.

1.7.2.2
Availability

QLogic Technical Support is available from 7:00 AM to 7:00 PM Central Standard Time, Monday through Friday, excluding QLogic-observed holidays.

1.7.2.3
Training

QLogic offers certification training for the technical professional for SANblade$^{®}$ HBAs, SANbox switches, and SANbox SSPs. From the training link at www.qlogic.com, you may choose Electronic-Based Training or schedule an intensive "hands-on" Certification course. Technical Certification courses include installation, maintenance and troubleshooting QLogic SAN products. Upon demonstrating knowledge using live equipment, QLogic awards a certificate identifying the student as a Certified Professional. The training professionals at QLogic may be reached by email at tech.training@qlogic.com.

1.7.2.4
Contact Information

Telephone:	+1 952.932.4040
Fax:	+1 952.932.4018
Email:	
Technical Service	support@qlogic.com
Technical Training	tech.training@qlogic.com
Support Web Site:	support.qlogic.com

Notes

Section 2

General Description

This section provides physical and functional overviews of the SANbox Storage Services Platform (SSP) Management GUI, the StoreAge Storage Virtualization Manager (SVM) solution, and related hardware.

This section covers the following topics:

■ SANbox SSP and StoreAge Solution Overview

■ SANbox SSP Overview

■ Supported Network Configurations

■ Port Connections

2.1
SANbox SSP and StoreAge Solution Overview

StoreAge SVM is a SAN appliance that together with the SANbox SSP enables highly available networks and provides centralized, network-based volume management, snapshot, replication, and mirroring across all storage devices within a SAN. For more information about high-availability, see "High-Availability Configuration" on page 2-6 for more information and a diagram.

Unlike host-based or storage-based volume management and data replication technologies, StoreAge SVM is a network-based solution that centrally manages all storage regardless of the operating systems or storage devices in use. By deploying SVM agents on SANbox SSP, StoreAge leverages QLogic's intelligent storage application technology to deliver centralized storage management, business continuity, and disaster recovery capabilities across all attached servers and storage subsystems within a SAN.

The SVM GUI is a web-based interface to the SVM appliance. You can access the SVM GUI from a local or remote location using a standard browser. Use the SVM GUI to configure storage pools, provision virtual volumes and manage access to them, and manage point-in-time copies of virtual volumes.

Using a standard web browser, you can configure, maintain, and monitor the SANbox SSP chassis through the SANbox SSP Management GUI. The GUI provides access to all chassis management functions, including SANbox SSP status, port management and configuration, diagnostics, and a telnet window.

Alternatively, use the command line interface (CLI), which provides the same functions as the SANbox SSP Management GUI through serial, telnet, or ssh connections. All configuration, maintenance, and monitoring tasks for the SANbox SSP chassis are accessible through the CLI.

Figure 2-1 shows a StoreAge-enabled SAN with dual SANbox SSPs. The SANbox SSP provides drop-in deployment of StoreAge capability into the SAN.
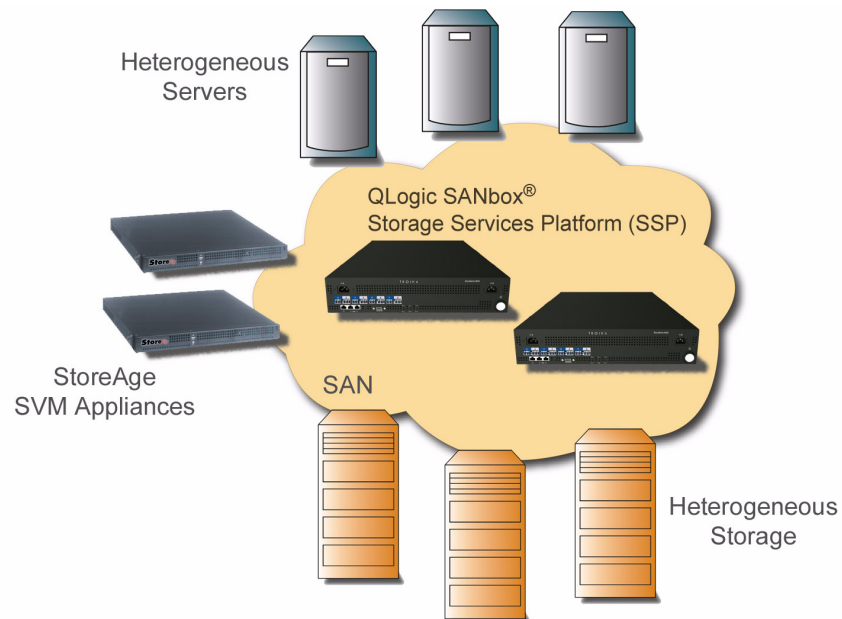
Figure 2-1. SANbox SSP/StoreAge Solution

2.2
SANbox SSP Overview

The SANbox 8200/8202 SSP represents a new category of storage virtualization devices that centralizes the management and delivery of storage and related services, without creating performance bottlenecks in the storage network. Storage services such as virtualization and volume management, snapshots, replication, backup, and mirroring can be deployed and provisioned from the SANbox SSP.

While SANbox SSP can process and switch Fibre Channel packets at wire speed, it is not itself a Fibre Channel fabric switch. Rather, SANbox SSP complements your Fibre Channel fabrics, allowing you to provide storage services uniformly across heterogeneous fabrics, and to configure and manage access between devices on different fabrics. SANbox SSP provides these capabilities without the complication and risk of merging Fibre Channel fabrics.

2.2.1
Features

Three models of SANbox SSPs are available:

SANbox 8200-08 SSP (single power supply integrated with 8 ports)
SANbox 8202-08 SSP (dual hot-swappable power supplies with 8 ports)
SANbox 8202-16 SSP (dual hot-swappable power supplies with 16 ports)

SANbox SSP:

■ Adds new storage services to any existing SAN environment

■ Reduces complexity of managing and protecting data resources by centralizing storage services within the network

■ Integrates host-based agent functionality, avoiding the complexity of managing distributed agents

■ Extends the reach of storage services across multiple SAN islands, eliminating the need for multiple independent deployments

For SANbox SSP specifications, see Appendix A Specifications.

2.3
Supported Network Configurations

The SANbox SSP supports both single-fabric and multiple-fabric configurations. This section shows three examples of supported configurations.

2.3.1
Small SAN Deployment Configuration with Zoning

In the following example of a typical small SAN deployment (Figure 2-2), a single Fibre Channel switch is used to connect all storage and initiators. Zoning is used to partition the front-side initiator ports, and back-side storage and StoreAge SVM into two separate logical SANs. See "SAN Zoning" on page 5-3 for more detailed information about proper zoning configuration.
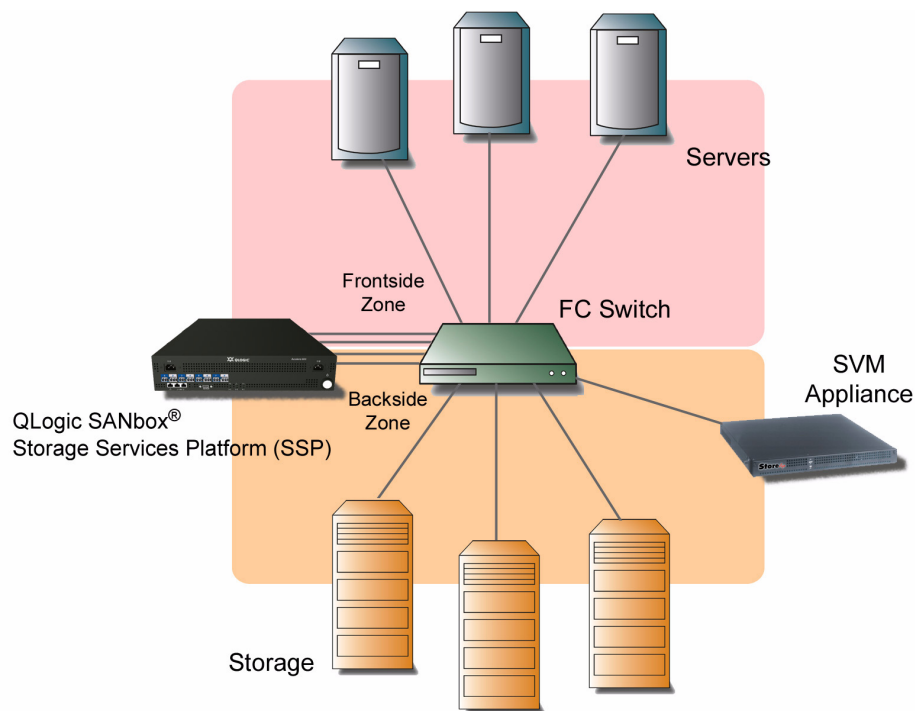
Figure 2-2. Single (Zoned) Fabric Configuration

2.3.2
Small SAN Configuration with Front/Back-Side SANs

In a small SAN deployment with multiple switches, the SANbox SSP is used to physically partition the front-side and back-side SANs. The storage and the StoreAge SVM must be placed on the back-side of the SAN, and the initiators are physically placed on the front-side of the SAN. .

Servers

Frontside
FC Switch

QLogic SANbox®
Storage Services Platform (SSP)

Backside
FC Switch

SVM
Appliance

Storage
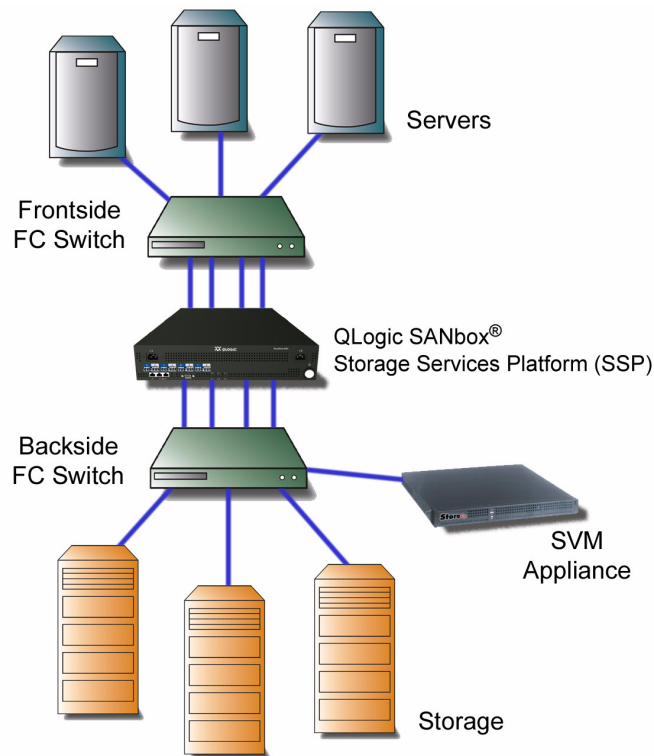
Figure 2-3. Dual Fabric Configuration

2.3.3
High-Availability Configuration

High availability describes a system that is operational a high percentage of the time. Through dual redundancy, a system can maintain high availability in the presence of any single component failure.

Use of redundant components, multipathing, and failover help protect against failures and ensure high availability. Implementing SVM agents on SANbox SSP provides high availability by allowing the use of multiple paths between servers and storage, and ensuring that no single point of failure can prevent access to data.

Failover is a backup operational mode in which the functions of a system component (such as, a server, network, or storage controller, for example) are assumed by secondary system components when the primary component becomes unavailable through either failure or scheduled down time.

With the proper multipathing software running on the host, a high-availability configuration can guarantee access to data even in the event of one or possibly more hardware, software, or infrastructure failures. With the addition of multiple hosts running supported clustering software, even host failures can be tolerated without interrupting critical applications.

In addition to continuous operation through unplanned failures, a correctly set up high-availability configuration enables administrators to take components of the system offline for maintenance or replacement, again without interrupting access to data.

Figure 2-4 shows a recommended high-availability configuration with cross-connected fabric. Within each fabric, zoning is used to partition the front-side initiator ports, both StoreAge SVM ports, and back-side storage. Each server has multiple HBAs installed, with at least one HBA connected to each of two redundant front-side fabrics. Each HBA sees the same virtual disks on each of two redundant SANbox SSPs. Each SANbox SSP has access to physical storage through at least two paths, across two fabrics and at least two RAID controllers. Two SVMs can each manage either or both SANbox SSP units. Two independent fabrics and host failover software ensure availability.
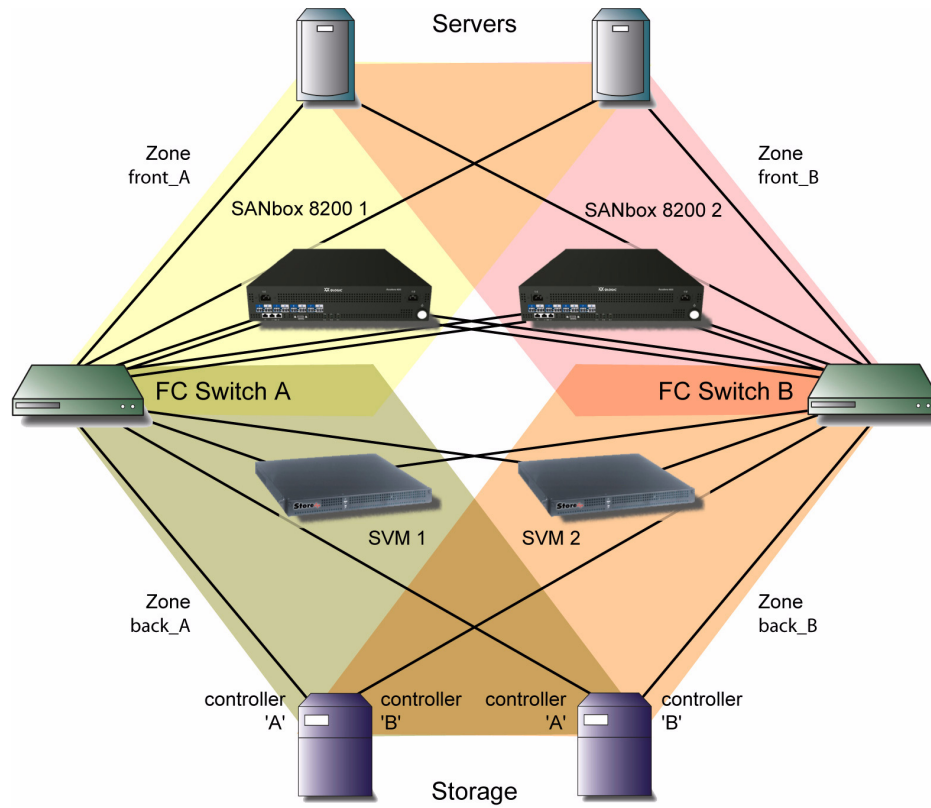
Figure 2-4. High-Availability Fabric Configuration

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2.3.3.1
How the Solution Protects Against Failures

The following tables provides a list of common failure points in a network and the corresponding protection that this high-availability solution provides.

Table 2-1. High-Availability Solution Protection Against Network Failures

Failed Component:	Protection:
HBA or path to SANbox SSP	Host software uses a remaining HBA or path to the same SANbox SSP
All HBAs or paths to one SANbox SSP	Virtual volume becomes active on alternate SANbox SSP, host software uses alternate HBA
One SANbox SSP	Virtual volume becomes active on alternate SANbox SSP, host software uses alternate HBA
One path between one SANbox SSP and storage	■ Back-side I/O uses alternate path ■ LUN uses alternate storage controller, if necessary
All paths between one SANbox SSP and storage	■ Virtual volume becomes active on alternate SANbox SSP ■ Host software uses alternate HBA
Storage controller	■ Back-side I/O uses path to alternate storage controller
SVM appliance	Alternate SVM appliance takes over system management
One or more paths between one SVM and one SANbox SSP	Alternate SVM appliance takes over system management

2.3.3.2
Setup Requirements

To configure a high-availability solution using SVM appliances and SANbox SSPs, you must make sure that:

■ Each HBA sees only one SANbox SSP.

■ Each host sees both SANbox SSP in the high-availability solution, and no others.

■ Each StoreAge SVM appliance sees both SANbox SSPs.

■ Each StoreAge SVM appliance sees all storage ports.

■ If the storage includes dual-controller active/passive RAIDs, each SANbox SSP is cross-connected with the controllers, which means that each SANbox SSP must see both controllers in the RAID.

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For more information about setting up your high-availability system, see "Setting up a High-Availability Configuration" on page 5-1. In addition, see the SANbox SSP solution guide for your application environment for detailed information about configuring SANbox SSPs for specific high-availability configurations.

2.4
Port Connections

2.4.1
Fibre Channel Port Connections

SANbox SSP Fibre Channel ports support Small Form-Factor Pluggable (SFP) industry standard transceivers. All ports can be configured as initiator mode, target mode, or dual mode (initiator/target) to support different configuration topologies. Ports can be configured for fixed 1 Gbps or 2 Gbps data rates, or they can be configured to auto-negotiate between 1 Gbps and 2 Gbps.

By default, ports are configured for dual mode (initiator/target), and also to auto-negotiate the data rate.

2.4.2
Ethernet Connections

SANbox SSP supports one 10/100 Fast Ethernet connection for management and two 10/100 Fast Ethernet connections for high availability cluster communication (labeled HA1 and HA2). The management port is labeled ⊥ on the port side of SANbox SSP and named MGMT if you are accessing using the CLI.

Each Ethernet port is configured with a default IP address. It is recommended that you change the IP address during initial startup. To change IP address settings, see "Modify Eth Command" on page B-13.

> *NOTE:* StoreAge SVM performs cluster communication using Fibre Channel, so the Ethernet HA1 and HA2 ports are not used. These ports should not be connected or configured when using StoreAge SVM.

2.4.3
Console Port Connection

SANbox SSP supports an EIA/TIA-232 asynchronous serial connection through a standard DB-9 port connection. To connect an ASCII terminal to the SANbox SSP, attach one end of the null modem DB-9 cable (included) to the serial port (labeled ɪοɪοɪ) of SANbox SSP and the other end to an ASCII terminal port (such as HyperTerminal).

Notes

Section 3
Getting Started with SANbox SSP

This section describes the tasks you must perform before you begin to install, configure, and operate the SANbox SSP. The tasks should be performed in the order presented in this section.

This section covers the following tasks:

■ Task Roadmap

■ Checking Package Contents

■ Setting Up SANbox SSP

■ Managing your Configuration

3.1
Task Roadmap

Table 3-1 presents the roadmap for setup tasks.

Table 3-1. Roadmap of Setup Tasks

For This Setup Step:	See:
1. For a high-availability system, obtain information about high-availability configurations that use SANbox SSPs and SVM appliances.	■ "High-Availability Configuration" on page 2-6 for overview information. ■ "Setting up a High-Availability Configuration" on page 5-1 for specific information about setting up each component of a high-availability system.
2. Unpack and set up the hardware: mount the SANbox SSP in a rack, install the power supplies, and connect the console port.	■ "Checking Package Contents" on page 3-2. ■ "Setting Up SANbox SSP Hardware" on page 3-4.
3. Start up and configure the SANbox SSPs: configure the terminal settings on the host, use the serial console port, and modify the Ethernet settings for remote access.	■ "Accessing SANbox SSP for the First Time" on page 3-7. ■ "Accessing SANbox SSP for the First Time" on page 3-7.
4. Connect SVM appliances, SANbox SSPs, and hosts to the SAN.	■ "Connecting to the SAN" on page 3-9.

Table 3-1. Roadmap of Setup Tasks (Continued)

For This Setup Step:	See:
5. In Section 4 SANbox SSP Management GUI Reference get tips about zoning your SAN and configuring storage, and use the SVM GUI to manage your configuration.	■ "SAN Zoning" on page 5-3 ■ "Configuring Storage" on page 5-6. ■ "To create storage pools:" on page 5-8. ■ "To create a user defined host (UDH) and set the SCSI personality:" on page 5-9.
6. Review the troubleshooting information as needed.	■ Section 7 Troubleshooting

3.2
Checking Package Contents

> ***CAUTION!*** Before shipping SANbox SSP to another site, remove the power supplies. SANbox SSP must not be shipped with the power supplies installed.

Ensure that all the components of the SANbox SSP arrived in the package. Save the shipping container, foam inserts, and anti-static bags; returning SANbox SSP without this packaging may void its warranty. Check the contents of the package to make sure that you received the following items and components:

■ 1 SANbox 8200-08 SSP, SANbox 8202-08 SSP, or SANbox 8202-16 SSP

■ 1 SANbox SSP CD-ROM:

   ❑ *SANbox 8200 Series Storage Services Platform Quick Start Guide for StoreAge SVM*

   ❑ SANbox SSP Release Notes

   ❑ Installation/Upgrade software including OS and application

   ❑ End User License Agreement

   ❑ Release Notes

■ 1 RS-232 serial null modem cable

■ 2 SANbox SSP power supplies (SANbox 8202-08 SSP and SANbox 8202-16 SSP) or

   1 SANbox SSP power supply (SANbox 8200-08 SSP)

■ 2 U.S. power supply cords (SANbox 8202-08 SSP and SANbox 8202-16 SSP) or

   1 U.S. power supply cord (SANbox 8200-08 SSP)

■ Rack mount kit, if ordered

■ Mounting instructions included with kit, if ordered

■ Warranty card

NOTE: All rack mount kits, including slide, direct, and shelf mount kits for the
SANbox SSP are ordered separately.

3.3
Setting Up SANbox SSP

The SANbox SSP has two serviceable panels: port side and fan side.

Port Side: includes the primary ports. See Figure 3-1.

1 Power Connector 1	6 Ports 9-16 (SANbox 8202-16 SSP only)	11 Console Port
2 Ports 1-8	7 Power Connector 2	12 Fan 1 LED
3 Power Supply 1 LED	8 Management Port	13 Fan 2 LED
4 Alert LED	9 High-Availability Port 1	14 Fan 3 LED
5 Power Supply 2 LED	10 High-Availability Port 2	15 Main Power Switch
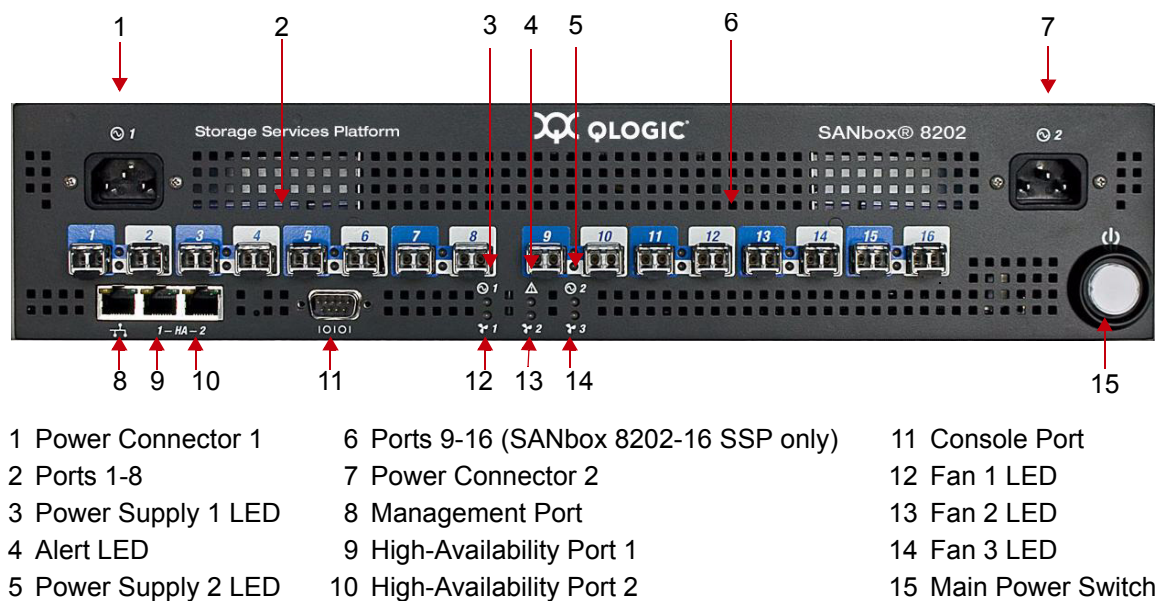
Figure 3-1. SANbox 8200/8202 SSP – Port Side

NOTE: StoreAge SVM performs cluster communication using Fibre Channel, so
the Ethernet HA1 and HA2 ports are not used.

Fan Side: includes the fans and power supplies. See Figure 3-2.

1 Power Supply 2	4 Power Supply 1	6 Fan Assembly 3
2 Locking Knob	5 Locking Knob	7 Fan Assembly 1
3 Fan Assembly 2		
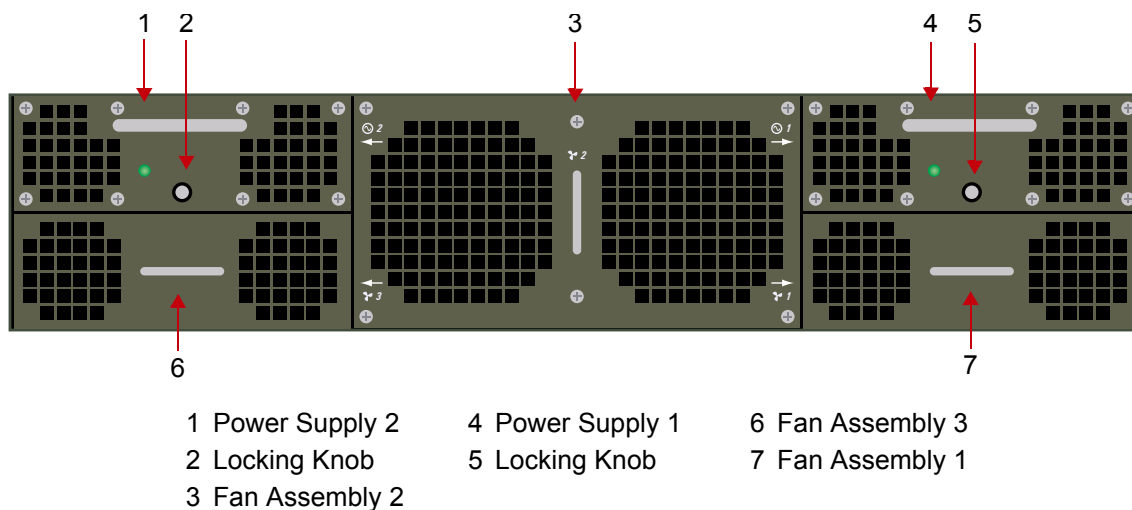
NOTE: For SANbox 8200-08 SSP, Power Supply 1, Fan 1, Fan 2, and Fan 3 are covered. Power Supply 2 is removed.

Figure 3-2. SANbox 8200/8202 SSP – Fan Side

3.3.1
Setting Up SANbox SSP Hardware

Setting up SANbox SSP hardware includes: mounting SANbox SSP in a rack, installing the power supplies, and connecting the power cables.

WARNING!!   The SANbox SSP cannot be directly rack mounted with only two supports. SANbox SSP MUST be mounted using a slide, shelf, or four support brackets.

The SANbox 8200/8202 SSP can be mounted in the following configurations:

■ Slide mount with separate slide mount kit (preferred)
■ Shelf mount with separate rack mount kit
■ Standard rack mount with four mounting brackets

To mount SANbox SSP in a rack:

NOTE:

- See manufacturer's instructions included with the slide mount kit, the rack mount kit, and the brackets.

- Shelf mounting is independent of rack depth.

There are two types of rack mount kits available: the slide kit accommodates rack depths from 20 inches to 30 inches. The direct rack mount kit requires a rack depth of 21.5 inches.

NOTE: Air flows from the fan side to the port side in the SANbox SSP. When installing SANbox SSP in a rack, orient the unit so that the port side faces the rack's air exit.

You can see the Small Form-Factor Pluggable transceivers and power and Ethernet cables from the port side.

To install the power supplies:

1. Remove the power supply from the packaging container.

2. Insert the power supply into the designated slot on the far left, which is located above the fan assembly as shown in the following diagram, so that the power supply is flush with the fan assembly and the label is facing up.

   You may need to apply force when inserting the power supply to make sure it is installed all the way into the slot.
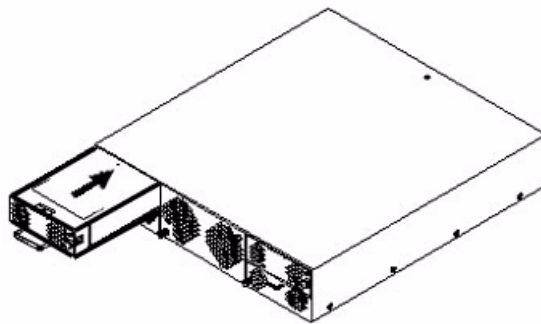
Figure 3-3. Inserting the Left Power Supply

3. Lock the supply in place by rotating the knob clockwise until it stops.

4. Once the power supply has been properly inserted, connect a power cable from an electrical outlet to the power connector on the port side.

   The corresponding power supply LED should be illuminated indicating that the power supply and power cable have been properly installed.

5. Repeat step 1 through step 4 for the second power supply, inserting the power supply into the power supply slot on the far right.
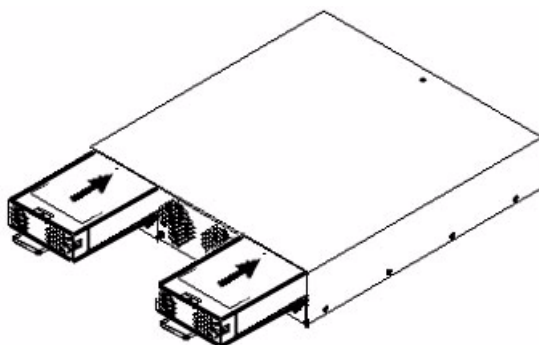
Figure 3-4. Inserting the Right Power Supply

6. Plug in both power cables.

   NOTE: Note: For maximum fault tolerance, plug the power cables into separate circuits.

To connect the console port:

Attach the provided serial cable between the serial (console) port (labeled ıoıoı) on SANbox SSP and an RS-232 serial port on your laptop or host computer.

If the serial cable provided with SANbox SSP is not available, use a standard RS-232 null-modem cable to connect the console port to a host computer.

See Figure 3-1 to see exactly where the console port is located.

3.3.2

Accessing SANbox SSP for the First Time

The SANbox SSP supports accessing the command line interface (CLI) through the serial console port. Once you have access to the CLI through the local console, you can modify the Ethernet settings to enable remote access to SANbox SSP through the SANbox SSP Management GUI or the CLI.

NOTE: Please allow sufficient time (approximately 2 minutes) for SANbox SSP to load all the necessary drivers and system software and complete necessary Power-On Self Test (POST) diagnostics.

To power up SANbox SSP:

Power on SANbox SSP by pressing the Main Power Switch on the port side.

The Main Power Switch should be illuminated, indicating the unit has begun the power on cycle. See Figure 3-1 to view a picture of the port side of SANbox SSP.

While POST is in progress, the port status LEDs turn amber in color and flicker intermittently. POST is complete when the port LEDs turn off; this takes approximately 1-2 minutes. See "POST and the LEDs" on page 6-6 for more information.

You can also use the Main Power Switch to shut down the SANbox SSP. For more information, see "Shutting Down SANbox SSP" on page 5-11.

To configure the terminal settings on the host computer:

1. Run a terminal emulation program such as HyperTerminal on the host computer.

    NOTE: For best results, configure the terminal program for ANSI terminal emulation.

2. Configure the terminal on your host computer for 9600 baud, 8 data bits, no parity, 1 stop bit, and no flow control.

To access the CLI through the serial console port:

1. Press the Enter key to get a prompt on your terminal emulation program.

2. If prompted, enter a login and password to gain administrative privileges.

    The default login is `kadmin`, and the default password is `kahuna`.

3. QLogic recommends that you change the password; run the Modify User command to change the password. See "Modify User Command" on page B-16 for more information.

    Now that you are locally logged on to the command line interface (CLI), configure the Ethernet settings for remote access to SANbox SSP. See the next section, "To modify Ethernet settings for remote access:" on page 3-8.

To modify Ethernet settings for remote access:

1. Type `modify eth` to configure the IP address for the management port (labeled ⊓ on the port side of SANbox SSP), and enter your IP address, subnet mask, and gateway parameters.

   NOTE: Use the management port, labeled ⊓ ,to connect your SANbox SSP to your LAN for management access. If you are connecting SANbox SSP to a host computer instead of an Ethernet network, you must use a crossover Ethernet cable.

   NOTE: You can connect your host computer directly to the management port using a crossover cable. If you want to do so without first configuring the management Ethernet port via the serial console, the default parameters for the port are:

   IP address: `192.168.1.4`
   Gateway: `192.168.1.1`
   Netmask: `255.255.255.0`

   For example, if the Ethernet name of the device is MGMT, the IP address is `192.168.1.4`, the gateway is `10.4.2.1`, and the subnet mask is `255.255.255.255`, here is the command line to enter:

   modify eth MGMT ip `192.168.1.4` gateway `10.4.2.1` netmask `255.255.255.255`

   See "Modify Eth Command" on page B-13 for more information about the Modify Eth command and configuring the management port.

2. See "Managing SANbox SSP" on page 4-1 to begin managing SANbox SSP remotely using the SANbox SSP Management GUI and the command line interface.

   Once the management port has been properly configured, IP based management (telnet and web) can be accessed by using the newly defined IP address, or the default address of `192.168.1.4` if using a crossover cable.

3.4

Connecting to the SAN

This section provides instructions for connecting StoreAge SVM appliances, SANbox SSPs, and hosts to the storage area network.

3.4.1

Connecting StoreAge SVM Appliances to the SAN

When setting up a high-availability configuration, you must make sure that each SVM appliance:

■ Is connected through the back-side fabric to both SANbox SSPs.
■ Can access all storage ports.

To connect SVM appliances to the SAN in a high-availability configuration:

1. Power up one SVM appliance, and connect the first port to the switch labeled FC Switch A in the configuration diagram, shown in Figure 2-4.

2. Connect the SVM appliance's second port to the switch labeled FC Switch B.

3. Power up the other SVM appliance, connect its first port to the switch labeled FC Switch A, and then connect its second port to the switch labeled FC Switch B.

4. Create two zones: one zone on FC Switch A named `Zone back_A`, and another zone on FC switch B named `Zone back_B`.

5. Add the ports on the SVM appliance to the new zones.

3.4.2
Connecting SANbox SSPs to the SAN

For high-availability configurations, you must make sure that each SANbox SSP:

- Can access all storage ports.

- Is connected to both SVM appliances through the back-side fabric.

To connect SANbox SSPs to the SAN:

1. Using a standard multi-mode (62.5/125um) optical cable, connect ports 1 and 2 of both SANbox SSPs to the switch labeled FC Switch A in the configuration diagram, shown in Figure 2-4.

    The status LED for each SANbox SSP port transitions from off (no light) to green when the port is connected to the SAN and the Fibre Channel link becomes active; the port LEDs are shown in Figure 3-5:

Port 1 LED. Link is up when LED is green (cable not shown).

Port 2 LED. Link is down.
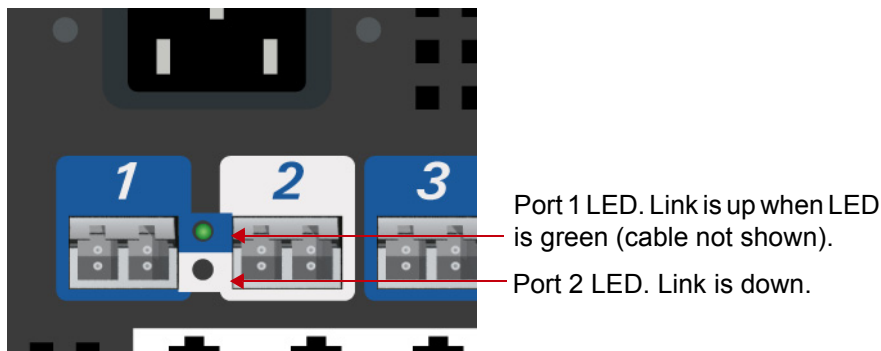
Figure 3-5. SANbox 8200/8202 SSP Port LED Transitions

2. Connect ports 3 and 4 of both SANbox SSP to the switch labeled FC Switch B in the configuration diagram.

3. Create two zones: one on FC Switch A named `Zone front_A`, and another zone on FC Switch B named `Zone front_B`.

4. Add the SANbox SSP ports connected to FC Switch A to both `Zone front_A` and `Zone back_A`.

5. Add the SANbox SSP ports connected to FC Switch B to both `Zone front_B` and `Zone back_B`.

3.4.3

Connecting Hosts to the SAN

When setting up a high-availability configuration, you must make sure that each host:

■ Includes installed and supported high-availability or multi-pathing software.

■ Is connected to both SANbox SSPs in the high-availability solution, and not connected to any other SANbox SSPs.

To connect hosts to the SAN:

1. Connect one HBA port on each host to the switch labeled FC Switch A in the configuration diagram in Figure 2-4, and add each of these ports to `Zone front_A`.

2. Connect the other HBA port on each host to the switch labeled FC Switch B in the configuration diagram, and add each of these ports to `Zone front_B`.

3. To access the SVM GUI, start a web browser and point to the IP address you configured for the SVM appliance.

4. Use `SVMAdministrator` as the user name, and `SVMAdministrator` for the password the first time you access the SVM GUI.

5. Configure a new password to use for the SVM GUI.

3.5

Managing your Configuration

See Section 5 Using the SANbox SSP for information about configuring storage, zoning your SAN, and managing your SAN using the SVM GUI.

Use the SVM GUI to complete management tasks, such as creating storage pools, virtual volumes, and user-defined hosts (UDH); and assigning a SCSI personality to each UDH.

Notes

Section 3
SANbox SSP Management GUI Reference

This section provides a reference for each screen and panel in the SANbox SSP Management GUI. Use the SANbox SSP Management GUI to manage the SANbox SSP chassis. The SANbox SSP Management GUI provides the same functions as the command line interface.

This section covers the following topics:

■ Managing SANbox SSP

■ Navigating the SANbox SSP Management GUI

3.1
Managing SANbox SSP

You can manage the SANbox SSP in three ways:

■ Remotely through the SANbox SSP Management GUI.

■ Remotely through the command line interface (CLI)

■ Locally through the CLI using the local administrative console

The following sections provide more detailed information about each of the three ways of accessing SANbox SSP.

NOTE: The examples shown in this section illustrate the interface for the SANbox 8202-16 Storage Services Platform. Operation of the SANbox 8200-08 SSP and SANbox 8202-08 SSP are identical with SANbox 8202-16 SSP, with the exception that eight fewer ports are shown in the SANbox SSP Management GUI and command line interface.

3.1.1

Using the SANbox SSP Management GUI

The SANbox SSP Management GUI is supported on Microsoft Windows platforms running Internet Explorer version 5 or greater. To run the SANbox SSP Management GUI, Java WebStart must be installed on your management station. Java WebStart is an application that allows you to download and run a full-featured Java application, such as the SANbox SSP Management GUI, directly from a web page.

SANbox SSP simplifies the task of configuring the management station by automatically detecting whether Java WebStart needs to be installed when the management station first accesses SANbox SSP. If Java WebStart is not present on the management station, SANbox SSP can provide a copy of the application that you can download and install. See "To install Java WebStart:" on page 4-2 and "To download the SANbox SSP Management GUI from a web browser:" on page 4-3 for more information.

Once you've installed the WebStart application, the web console enables you to access the SANbox SSP Management GUI remotely using your standard web browser. For web browsers already running Sun's Java WebStart application, skip the next two sections and see "To log into the SANbox SSP Management GUI:" on page 4-4.

NOTE: Sun Microsystems provides versions of Java WebStart for Windows and other platforms through its Java website. You may be able to use the SANbox SSP Management GUI from non-Windows management stations using a version of Java WebStart provided by Sun; however, QLogic only supports the use of the SANbox SSP Management GUI on Windows platforms running Internet Explorer version 5 or greater in conjunction with the version of the Java WebStart application provided with your SANbox SSP.

To install Java WebStart:

For web browsers on Windows platforms that are already running Sun's Java WebStart application, see the next section "Using the Web Console" instead. For web browsers on Windows platforms that do not yet have Sun's Java WebStart application installed, follow this procedure:

1. From a web browser, enter the management port (labeled ⊹) IP address as the URL and press the Enter key.

2. In the screen that displays, click **Here is a local copy for Windows users** to install the Sun Java WebStart Application on your machine.

3. The License Agreement dialog box displays. In the License Agreement dialog box, click **Accept** to begin software installation.

4. In the Installation Directory dialog box, enter the path for the directory to install the Sun Java WebStart application.

5. The Installation Directory dialog box displays. Click **Next** and then **Finish** to complete the installation.

To download the SANbox SSP Management GUI from a web browser:

NOTE: At least 100MB of free disk space must be available on your host system's hard drive for the SANbox SSP Management GUI and WebStart software. WebStart must be installed from the browser from which you will access the SANbox SSP Management GUI. For example, you cannot install WebStart using Netscape and run the SANbox SSP Management GUI from Internet Explorer.

1. In your web browser, type the IP address of the SANbox SSP management port, labeled ┳┻, (example: `http://10.4.2.123`). The following screen displays.
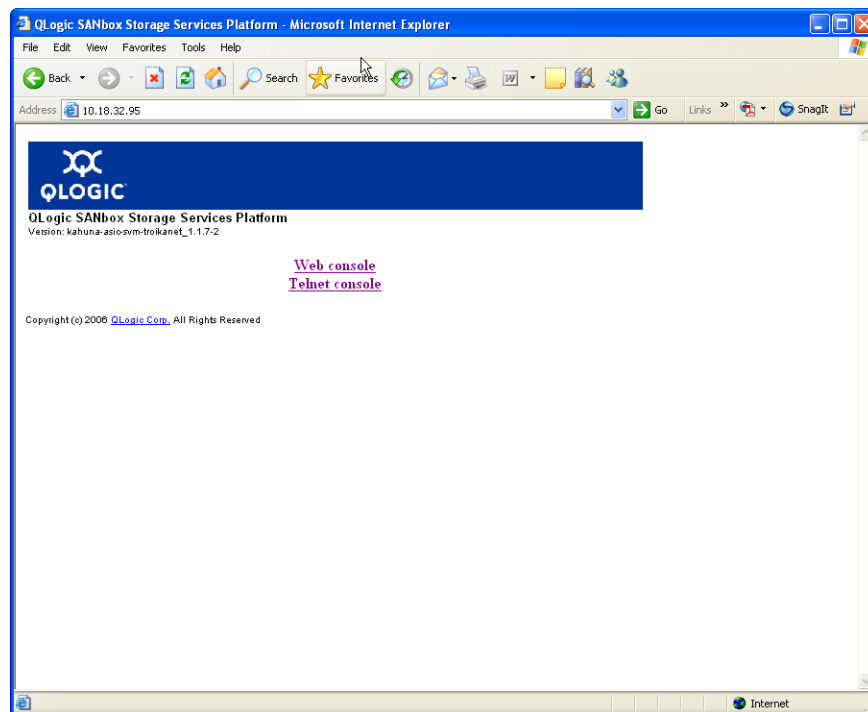
Figure 3-1. QLogic SANbox Storage Services Platform (SSP) Screen

NOTE: The version number of SANbox SSP is listed next to the Version label.

2. Click **Web Console** to start loading the SANbox SSP Management GUI application. The following screen displays.
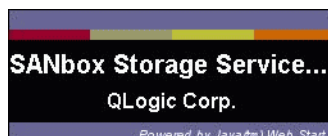
Figure 3-2. SANbox SSP Management GUI Application Installation Screen

WebStart downloads the SANbox SSP Management GUI from the web server and installs it on your host system.

3. Click **Yes** when WebStart prompts *Do you want to install this application?*

The SANbox SSP Management GUI application start ups automatically after WebStart downloads the jar.

To log into the SANbox SSP Management GUI:

1. From a web browser, log in with your username and password, using the same web browser from which the WebStart application was installed:

username: kadmin
password: kahuna
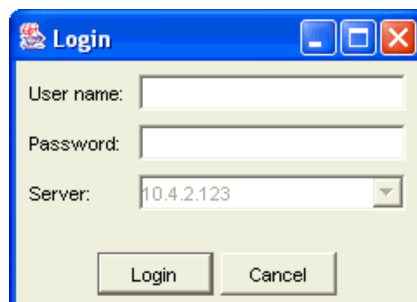
Figure 3-3. SANbox SSP Management GUI Login Screen

2. After typing the username and password, click **Logon**.

3. QLogic recommends that you change the password if you did not already do so during setup:

   ■ If you are using the SANbox SSP Management GUI, change the password on the Telnet screen. See "Telnet" on page 4-12 for more information.

   ■ If you are using the CLI, run the Modify User command to change the password. See "Modify User Command" on page B-16.

3.1.2
Using the Command Line Interface (Remotely)

You can remotely connect to the CLI through telnet or ssh. Before you can access the CLI remotely, you must configure the management port (labeled ⊓ on the port side of SANbox SSP). If you did not yet configure the management port for remote access, see "Accessing SANbox SSP for the First Time" on page 3-7.

After you access the CLI through telnet or ssh, see Appendix B Command Reference for information about basic operation and configuration commands.

To access the CLI using telnet:

For more information about remotely accessing the CLI through telnet, see "To telnet to the CLI from a web browser:" on page B-4.

To access the CLI using ssh:

You can download a free ssh client from http://www.ssh.com. The ssh command line to log in to the management IP address is:

```
ssh kadmin@10.4.2.123
```

3.1.3
Using the Command Line Interface (Locally)

Most users access the CLI locally only once for configuration when starting the SANbox SSP for the first time. If you have not yet completed this step, see "Accessing SANbox SSP for the First Time" on page 3-7.

3.2
Navigating the SANbox SSP Management GUI

The top-level navigation point for the SANbox SSP Management GUI is the Chassis panel on the System tab. The Chassis panel provides property information for the SANbox SSP.
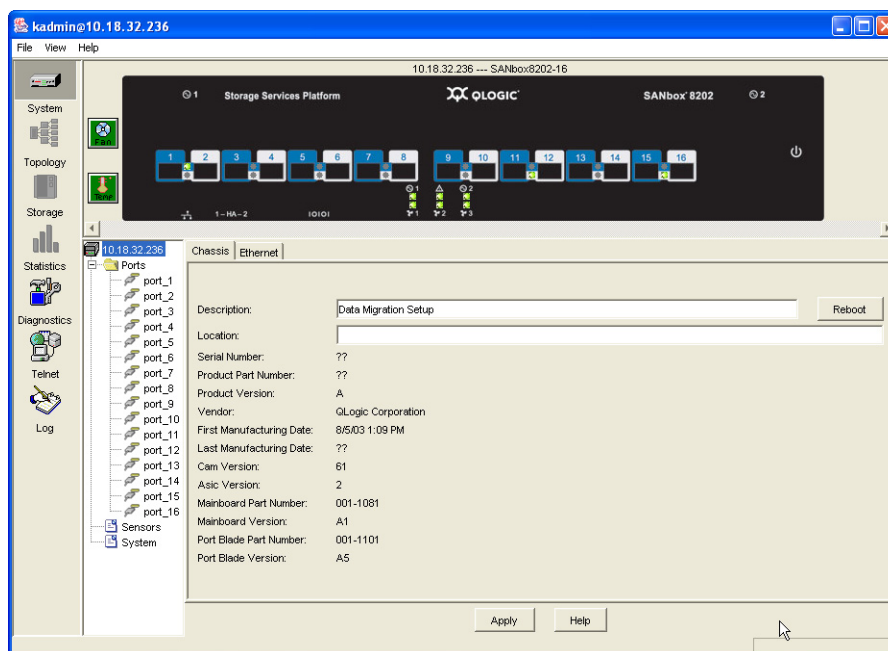
Figure 3-4. SANbox SSP Management GUI Screen

Using the SANbox SSP Management GUI, you can access these functions.

Table 3-1. SANbox SSP Management GUI Functions

GUI Area	Function	For more information, see:
System	Overall system functionality, SANbox SSP status, port management, system configuration	"System" on page 4-7
Topology	The Topology tab is not used for the SANbox SSP implementation that runs the StoreAge software	not applicable
Storage	The Storage tab is not used for the SANbox SSP implementation that runs the StoreAge software	not applicable
Diagnostics	Diagnostics for ports and virtual disks	"Diagnostics" on page 4-11
Telnet	Telnet window	"Telnet" on page 4-12
Log	List of system events	"Log" on page 4-13

3.2.1
System

System allows you to manage and configure port settings on the SANbox SSP.

To manage external port behavior:

1. Click **System** on the left pane window.

2. Navigate within the lower window to the Ports folder.

3. Click the specific port to manage. The Port Information screen displays (see Figure 3-5).
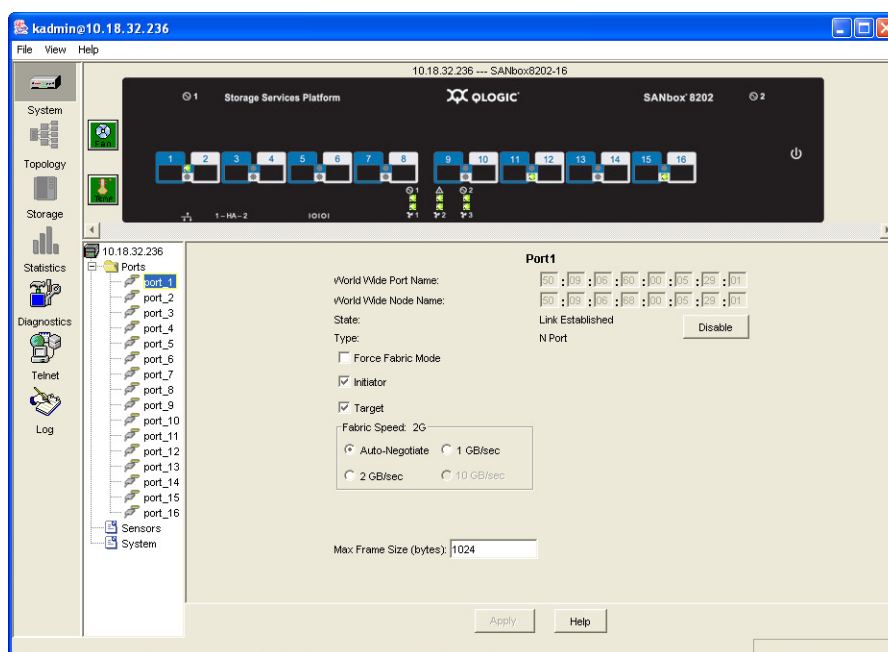
Figure 3-5. System Port Information Screen

The following information displays:

- World Wide Port Name
- World Wide Node Name
- Link State
- Link Type
- Current Port Settings
- Force Fabric
- Initiator
- Target
- Port Speed
- Enabled/Disable Port

In addition, the following settings can be changed on the System screen:

NOTE: For all the Force Fabric, Initiator, Target, and Speed settings, you must click **Apply** before the settings are saved. The Initiator, Target, and Max Frame Size settings take effect only after rebooting the SANbox SSP.

Force Fabric: selecting this box forces this port to operate in Fabric Mode Only (no loop support).

Initiator: selecting this box enables initiator (storage back-end) operations through this port.

Target: selecting this box enables target (front-end) operations through this port.

Speed: changing this box enables you to force the speed operation of the SANbox SSP port.

Enabling and Disabling Ports

NOTE: Enabling and Disabling ports takes effect immediately after clicking the **Enable**/**Disable** buttons.

Disable: click **Disable** to disable a port.

Enable: click **Enable** to enable a port.

Ethernet Panel (System)

The Ethernet panel in the System area shows Ethernet configuration information for the SANbox SSP. To view the Ethernet panel, click the top-level icon in the tree hierarchy on the left side. Figure 3-6 displays the System Ethernet panel.
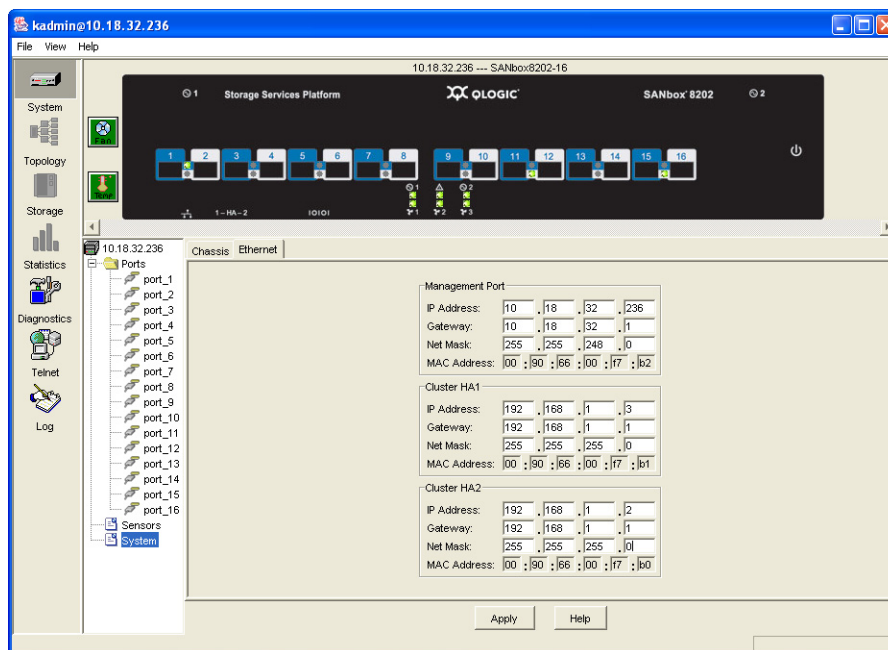
Figure 3-6. System Ethernet Panel

An amber LED indicates that the corresponding component is missing, has failed, or will likely fail soon. Even if your SANbox SSPs appear to be performing normally, you should replace parts if their corresponding LED has turned amber. See "Replacing Hardware Components" on page 6-6 for information about ordering and installing replacement parts.

Sensors Panel (System)

The Sensors panel in the System area shows diagnostic information for temperatures, fans, power supplies, and voltages for the power supplies on the SANbox SSP. To the view the Sensors panel, click **Sensors** in the tree hierarchy on the left. Figure 3-6 displays the System Sensors panel.
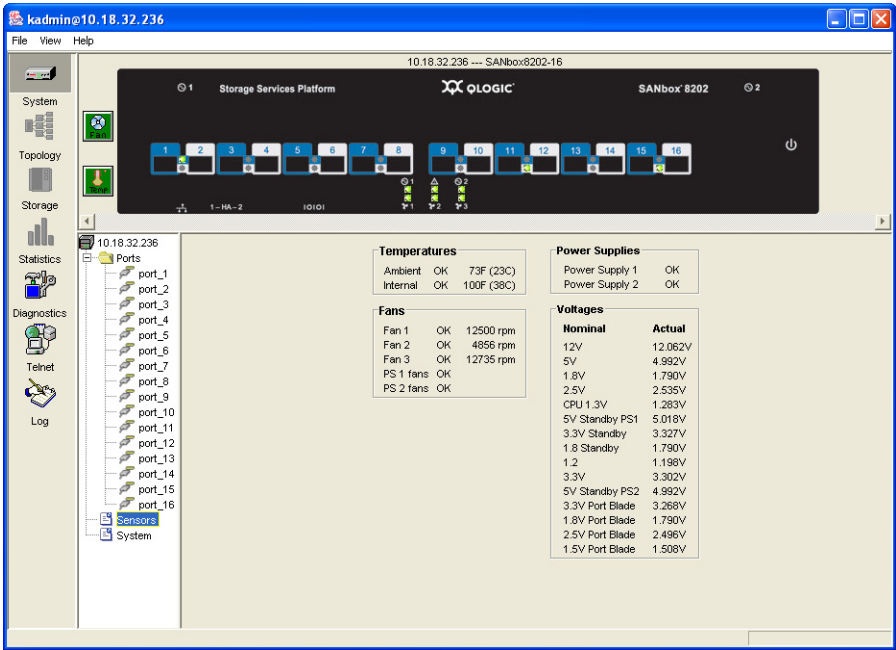
Figure 3-7. System Sensors Panel

3.2.2
Diagnostics

The Diagnostics screen provides statistics for various aspects of the system.

To use the Diagnostics panel:

1. Select an object type:

    ■ Port

    ■ Virtual Volume

2. Select a value for the object, such as port number if the object is port.

3. Select a variable to graph.

    For example, utilization, errors, and transmit frames are among the variables that you can graph for a port on the Diagnostics screen.

    The following screen shows utilization for ports 4 and 8 (see Figure 3-8):
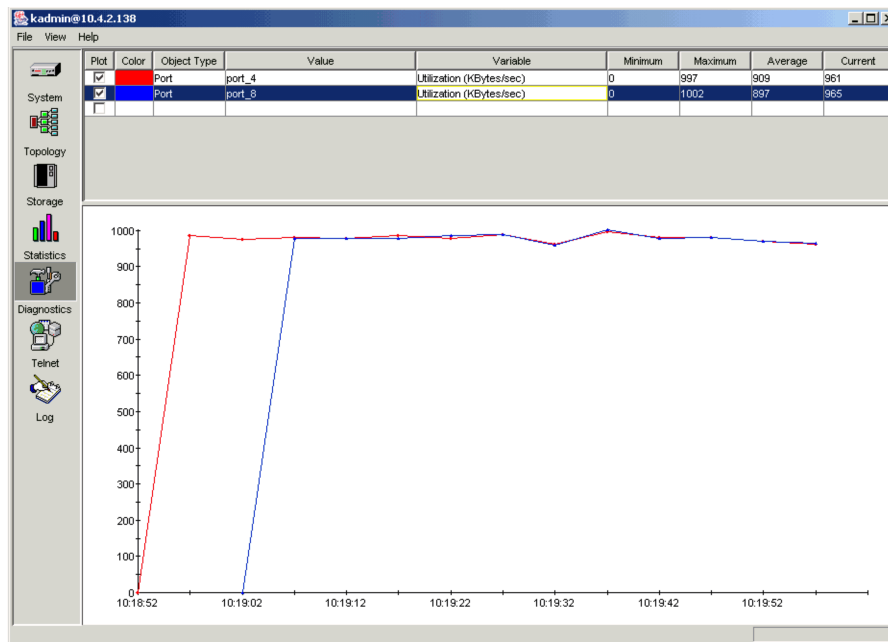
Figure 3-8. Diagnostic Screen Displaying Port Utilization

3.2.3
Telnet

The Telnet screen enables you to initiate a telnet session from the SANbox SSP Management GUI.

To begin a telnet session from the SANbox SSP Management GUI:

1. Click **Telnet** in the left-most pane.

2. Enter the correct administrative login and password.

    The following Telnet screen displays (see Figure 3-9):
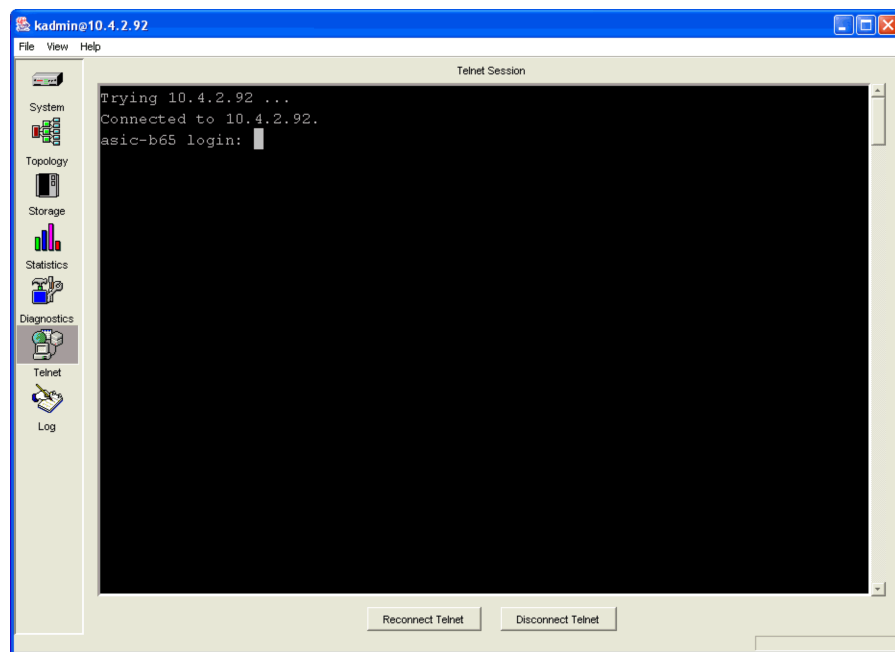
Figure 3-9. Telnet Screen Initiated from the SANbox SSP Management GUI

The options in the lower window are:

Reconnect Telnet: Re-establishes a telnet session.

Disconnect Telnet: Disconnects a telnet session.

3.2.4
Log

The Log panel shows a list of system events (see Figure 3-10)
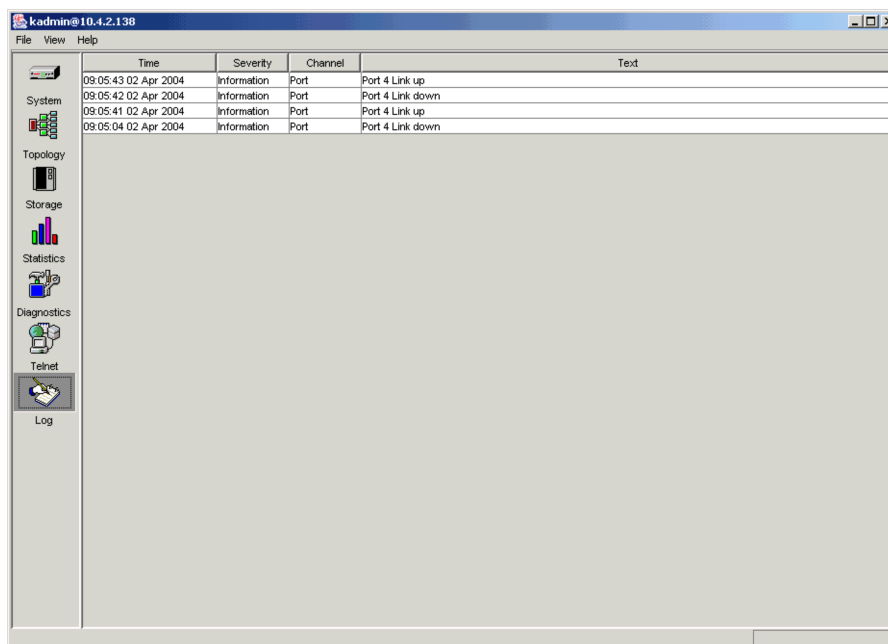
Figure 3-10. Diagnostic Screen Log Panel

Events are reported for the following channels on the Log screen:

■ System
■ Port
■ Chassis
■ Hardware
■ Storage Application

Each event is assigned one of the following severity levels:

■ Emergency
■ Alert
■ Critical
■ Error
■ Warning
■ Notice
■ Information
■ Debug

Notes

Section 4

Using the SANbox SSP

This section provides procedures for using the SANbox SSP, including SAN zoning, configuring storage, creating virtual disks, interpreting LEDs, and shutting down.

This section describes the following procedures:

- Setting up a High-Availability Configuration
- SAN Zoning
- Directly Connecting Devices to SANbox SSP
- Configuring Storage
- Using the SVM GUI to Manage Virtual Storage
- Shutting Down SANbox SSP

4.1
Setting up a High-Availability Configuration

Table 4-1 provides the specific requirements for each component that is part of the recommended high-availability configuration. The table presents the information for a highly available configuration with a single host.

Table 4-1. Required Configuration for the Components
of a High-Availability System

Component Type[a]	Minimum Required	Required Configuration per Component
Host	1	■ Supported high-availability or multi-pathing software installed. ■ Connected to both SANbox SSPs in the high-availability solution, and not connected to any other SANbox SSPs.
HBA	2 per host	■ Each connected to one SANbox SSP (directly or through a fabric). Each must see only one SANbox SSP.
SANbox SSP	2	■ Each can access all storage ports. ■ Each connected to both SVM appliances through the back-side fabric.
StoreAge SVM Appliance	2	■ Each one connected through the back-side fabric to both SANbox SSPs. ■ Each one can access all storage ports.

***Table 4-1. Required Configuration for the Components
of a High-Availability System (Continued)***

Component Type[a]	Minimum Required	Required Configuration per Component
Storage array	At least 1 device	■ Supported RAID device with two or more independent controllers. ■ All ports are accessible from both SVM appliances. ■ If a dual-controller active/passive RAID is used, the SANbox SSPs must be cross-connected with the controllers, which means that each SANbox SSP must see both controllers in the RAID.
Fibre Channel switches *or* Director-class switch	2 or more	■ Supported Fibre Channel switch.
	1	■ High availability ■ Multiple zones

[a]See the SANbox SSP release notes for the list of supported hardware including host operating systems, HBAs, storage, and FC switches.

4.2

SAN Zoning

NOTE: If you configure your SAN zoning using Fibre Channel World Wide Port Names (WWPNs), note that SANbox SSP WWPNs begin with the hexadecimal digits 5009066. StoreAge SVM appliance WWPNs begin with 2000111.

Zoning is a SAN management technique for making the most efficient use of storage devices in the SAN. This section provides two examples of zoning.

In Figure 4-1, a single Fibre Channel switch is used to connect all storage and initiators. Zoning is used to partition the front-side initiators (HBAs) and back-side (target) storage and SVM appliances into two separate logical SANs.
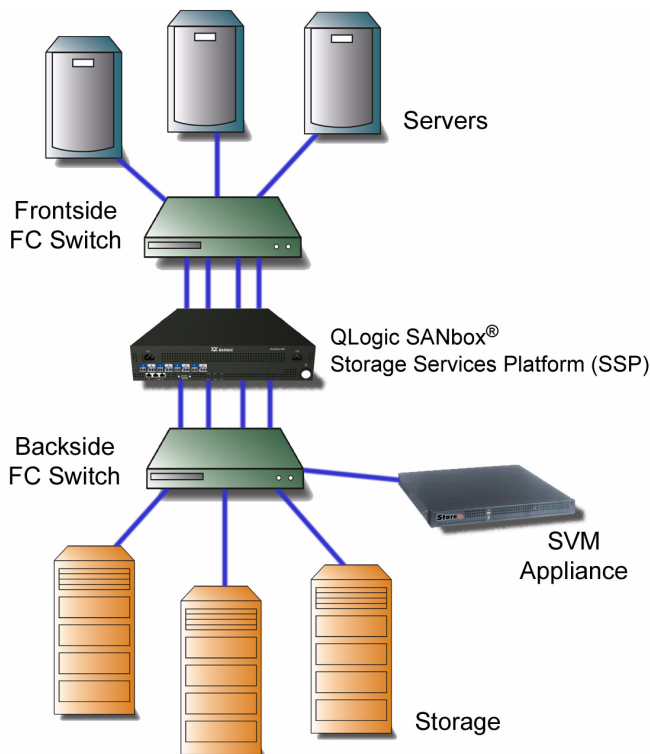
Figure 4-1. Single (Zoned) Fabric Configuration

Note the following about Figure 4-1:

■ Zone A (pink-shaded area): initiators. All initiators and SANbox 8200-08 SSP front-side ports (ports 1-4) are zoned together.

■ Zone B (orange-shaded area): storage. All storage ports, the StoreAge SVM appliance, and SANbox 8200-08 SSP back-side ports (ports 5-8) are zoned together.

■ The figure shows a configuration that does not use high-availability features.

In Figure 4-2, two independent fabrics and host failover software are used to ensure availability. Within each switch, zoning is used to partition the front-side initiators, and back-side (target) storage and both SVM ports. The figure uses SANbox 8200-08 SSPs/SANbox 8202-08 SSPs.
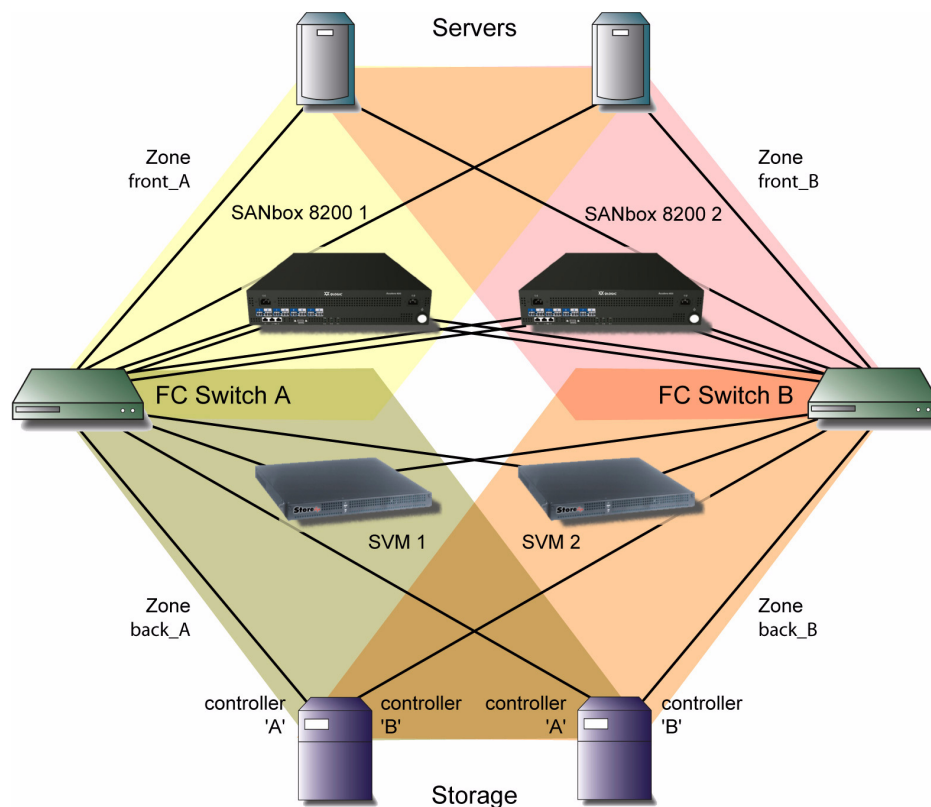
Figure 4-2. High-Availability Fabric Configuration with Zoning

Note the following about Figure 4-2:

Primary Fabric (FC Switch A)	Secondary Fabric (FC Switch B)
Zone front_A: Primary Initiators (*yellow zone*)	**Zone front_B: Secondary Initiators** (*pink zone*)
All primary HBA ports for each host	All secondary HBA ports for each host
SANbox SSP 1, Ports 1-4	SANbox SSP 2, Ports 1-4
Zone back_A: Primary Storage (*green zone*)	**Zone back_B: Secondary Storage** (*orange zone*)
All Primary storage ports	All Secondary storage ports
SANbox SSP 1, Ports 5-6	SANbox SSP 1, Ports 7-8
SANbox SSP 2, Ports 5-6	SANbox SSP 2, Ports 7-8
StoreAge SVM Appliances, primary ports	StoreAge SVM Appliances, secondary ports

4.3
Directly Connecting Devices to SANbox SSP

SANbox SSP supports the direct connection of its ports to initiator devices. When directly connecting a device to an SANbox SSP port, make sure that:

- The device is explicitly configured for loop-only operation (point-to-point is not supported for directly connecting at this time). See the documentation for your device for more information.

- if you are attaching a host, the SANbox SSP port mode is set to target or initiator-target mode. Do not directly connect storage devices or the SVM appliance to the SANbox SSP.

See "Modify Port Command" on page B-14 for details on configuring port modes.

Figure 4-3 shows initiators connected directly to a SANbox 8202-16 SSP:
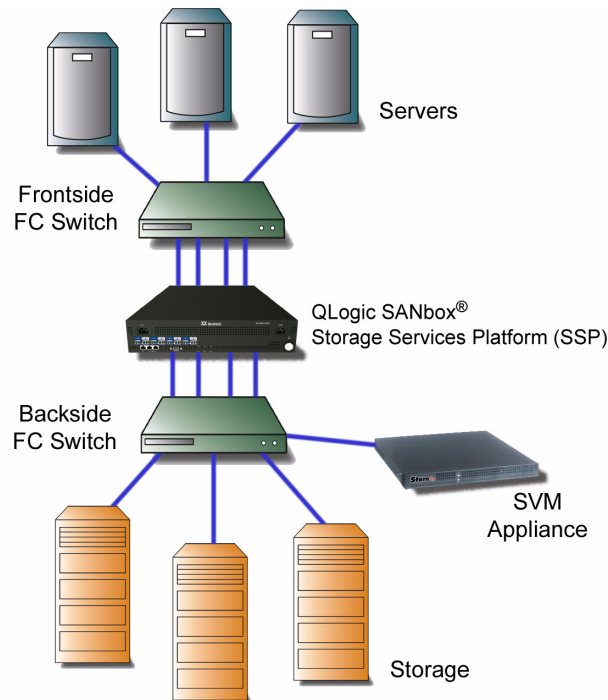
Figure 4-3. Connecting Initiators Directly to SANbox SSP

4.4
Configuring Storage

This section provides guidelines for proper zoning, storage access, and maximum frame size when configuring storage for use with SANbox SSP.

4.4.1
Zoning

See "SAN Zoning" on page 5-3 for zoning examples using the SANbox SSP. As you configure your storage and plan the zoning, consider the specific requirements of your particular installation.

4.4.2
Access

The SANbox SSP port connected to the storage must have permission to access the storage. If you are using a RAID with LUN masking, you must make sure that the SANbox SSP port has access to the LUN.

4.4.3
Maximum Frame Size

The default maximum frame size for the SANbox SSP is 1024 bytes. The maximum frame size must be set to the smallest maximum frame size of any device on the SAN.

If no device on the SAN is less than 2048 bytes, set the maximum frame size to 2048 bytes for a potential performance advantage. See "Modify Ports Command" on page B-15 for more information about setting the maximum frame size.

NOTE: The maximum frame size for most SANs can be set to 2048.

4.4.4
Configuration Restriction on RAID Devices

CAUTION! Failure to comply with this restriction can cause the SVM to be unable to see or access the available storage, or, in the most extreme cases, data corruption.

This StoreAge-specific restriction affects RAID devices that are used as back-side storage.

Some RAID devices allow the administrator to expose multiple logical units on multiple ports of the RAID device using the same logical unit number (LUN). This means that a logical unit can be exposed on controller A port 1 as LUN 3, for example, while simultaneously a different logical unit can be exposed on controller B port 2, also as LUN 3.

While this is a legal configuration for the RAID devices in question, the device manager in the SVM GUI (Storage Virtualization Manager Graphical User Interface) interprets those two distinct LUNs as a single piece of physical storage, with two available paths.

When accessing storage through SVM GUI, it is important that the administrator not assign the same LUN ID to different logical units on the same RAID device, even if those logical units are visible on different ports. Each logical unit on a given RAID device *must* have a unique LUN ID.

See Figure 4-4 for a visual representation of the StoreAge-specific restriction affects RAID devices.
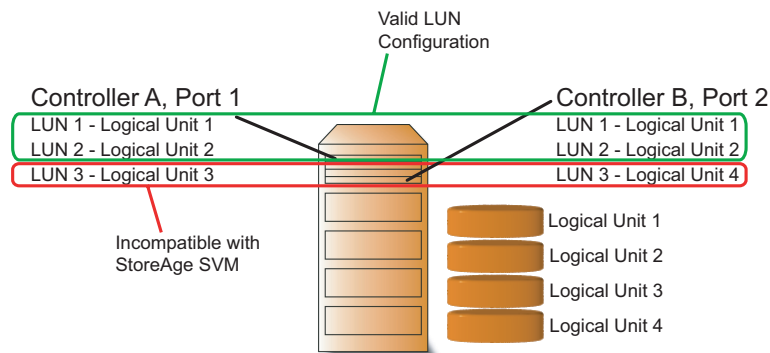
Figure 4-4. StoreAge Configuration Restriction on Back-Side Storage RAID Devices

4.5
Using the SVM GUI to Manage Virtual Storage

This section provides general instructions for creating storage pools and virtual volumes, creating groups of HBAs, called UDHs (user defined hosts), and assigning a storage device profile to a UDH. For more information, see the StoreAge documentation.

NOTE: This information is provided for your convenience. For additional details about the SVM GUI, see the StoreAge documentation. If there are differences between the StoreAge documentation and this installation and configuration guide, follow the StoreAge documentation.

To create storage pools:

1. Open the SVM GUI, and open Volume Manager in tree view.

2. Click **Pool**, click **Create**, and then select the physical disks that you want to include in the pool.

   WARNING!! This step removes the data on the physical disks that are added to the pool. Once a physical disk is added to a pool, the SVM GUI controls that disk. The data on disks that are not in a pool are not subject to this issue.

   NOTE: When you create the first storage pool, you are prompted to provide a domain name that identifies the management domain for the SVM appliance. Enter a domain name, and then click the **Submit** button to commit the new name to the configuration.

3. Enter a name for the pool, and then click **Continue**.

To create a user defined host (UDH) and set the SCSI personality:

1. Open the SVM GUI, and open Volume Manager in tree view.

2. Click Host, then select Create UDH.

3. Type the name of the host, select the operating system type, and then select the HBAs to be included in this UDH.

   NOTE: A UDH, which is a group of HBAs, enables you to easily control the virtual volumes exposed to multiple HBAs installed in a single server.

4. Click **Confirm** to save the association between the host and the selected HBAs.

5. Click Manage under the Host tree, and then click the **Manage** button on the far right side of the host to which you want to assign a storage device profile.

   NOTE: The storage device profile is called a SCSI Personality in the SVM GUI.

6. Click the **Set SCSI Personality** button, and select the personality that you want to assign to the selected UDH.

   See Table 4-2 for the guidelines for selecting the storage device profile. Make sure you select the personality that is supported for your high-availability configuration. For a given high-availability configuration, only one personality type is supported. See the solution guide that corresponds to your high-availability setup for more information.

Table 4-2. Guidelines for Selecting the Storage Device Profile

If you have:[a]	Select this Personality:
VMWare	LSI RDAC
Windows	StoreAge Default
HP-UX	HPUX Personality

[a]If your platform is not listed, see the SANbox SSP solution guide for your configuration.

7. Click **Confirm**.

NOTE: You can expose the same virtual volume to different hosts with different personality settings.

To create virtual volumes:

1. Open the SVM GUI, and open Volume Manager in the tree view.

2. Click Volume, select Create, and then type a name for the new volume.

3. Select the pool to use for the volume, and enter the capacity that you want to use from the pool.

4. Assign permissions: R/W for read and write or Off (read only is not supported), and then click **Continue**.

5. The new volume displays in the volume list.

6. Perform a hardware rescan on the system. Depending on the system, you may also need to reboot the initiator to discover the new volume.

4.5.1
Failing Back

Failover to secondary paths on the back-side and front-side is automatic when you are using an SVM appliance, while failback is manual. Failback causes I/O traffic to resume using the primary paths. The system does not automatically fail back once the primary back-side paths are restored. The administrator must perform an operation on the primary paths to make them active. Until the primary paths are also active, the system continues using the secondary paths.

On the back-side, if primary path failure has forced the activation of secondary paths, the primary paths must be made available and active as soon as possible. This requires both addressing the cause of the failure, and performing a manual failback operation once the primary paths are made available. If you do not manually fail back, and all secondary back-side paths fail, the system does not automatically activate the primary paths on the back-side. Even if the primary paths are available, the system does not automatically activate the primary paths.

The failback behavior between front-side and back-side paths differs in the case that all secondary paths fail. For both front-side and back-side paths, primary paths are not automatically made active once they are available. On some systems, however, host-based front-side multipathing software does activate the primary paths if all secondary paths fail on the front-side. This reduces the urgency of performing the failback operation on the front-side, since a path failure can still be tolerated. The administrator must still address the failure on the front-side paths and return the primary paths to an available state.

To fail back front-side traffic (to resume using primary paths):

1. Open the SVM GUI, and open Volume Manager in the tree view.

2. Click Volume, select Manage under the host tree, and then click the **Manage** button on the far right side of the host that you want to failback.

3. Click **Fail Back**.

The SVM GUI provides the name of the SANbox SSP that the selected host resumes using.

To fail back back-side traffic (to resume using primary paths):

1. Open the SVM GUI, and open Physical Devices in the tree view.

2. Click Manage, and then click the **Manage** button on the far right side of the device that you want to failback.

3. Click **Fail Back**.

4.6
Shutting Down SANbox SSP

This section provides the steps for restarting or shutting down the SANbox SSP.

To restart SANbox SSP from the CLI:

1. Issue the Reboot command from the CLI.

2. Confirm that you are rebooting the system by typing Y at the `Reboot system?` prompt.

   The system shuts down and restarts, terminating active management sessions in the process. SANbox SSP will accept new management sessions once the system is restarted.

To shut down SANbox SSP from the CLI:

1. Issue the Shutdown command from the CLI.

2. Confirm that you are shutting down the system by typing Y at the `Shut down system?` prompt.

To shut down SANbox SSP using the Main Power Switch:

WARNING!!

- AC power must be removed from both power supplies to cut power to the SANbox SSP electronics.

- If AC power is removed before the unit is placed into standby, SANbox SSP automatically starts the boot sequence when power is restored.

To initiate shutdown, press the power button, and wait until the Alert, FAN 1, FAN 2, and FAN 3 LEDs turn amber.

Once shutdown is complete, the system is in standby mode, and the Alert, FAN 1, FAN 2, and FAN 3 LEDs turn off.

NOTE: The PS 1 and PS 2 LEDs remain illuminated with a green light as long as the AC power is connected to the power supplies.

Notes

Section 5
Maintaining the SANbox SSP

This section provides information about maintaining the SANbox SSP. Maintenance tasks include updating the SANbox SSP system software, applying software patches, interpreting LED patterns, and replacing hardware.

The software may require periodic updates to reflect current software releases and ensure optimum product performance and functionality.

This section covers the following topics:

- SANbox SSP System Software
- Boot Sets
- Maintenance Mode
- Updating SANbox SSP System Software
- Interpreting the LED Patterns
- Replacing Hardware Components

5.1
SANbox SSP System Software

SANbox SSP has two system software components that can be updated:

- **System software image:** The system software image contains the operating environment for SANbox SSP, including the StoreAge SVM Agent for SANbox SSP.

- **Maintenance Mode image:** The Maintenance Mode image contains software that implements basic system maintenance functions for the platform, including system update capability.

Each release of the SANbox SSP system software includes the system software image file used to update the SANbox SSP. Maintenance Mode functionality, however, rarely changes. The release notes for each system software release indicate whether a new Maintenance Mode image is included, and whether installation of the new Maintenance Mode image is required to update the system.

The system update capability provided by SANbox SSP also supports the incremental update of an existing system image by applying a patch file supplied by QLogic. This system patching capability allows QLogic to distribute critical system updates between full releases of the system software.

5.2
Boot Sets

SANbox SSP allows you to install two system images on the platform at once, and to choose which system image loads when the system boots. The two locations where system images can be installed are called boot sets.

A valid boot set is one that has been successfully installed with a system image. An invalid boot set is either empty or contains an image that cannot be used by SANbox SSP.

The default boot set, selected during system startup, supplies the system software that the SANbox SSP uses when booted. You can override this default selection from the local administrative console when the system starts. See "To select the active boot set from the local console:" below. The selected boot set is used to boot the system and becomes the active boot set; the boot set that was not selected is called the inactive boot set.

To **select the active boot set from the local console:**

1. Connect to the local administrative console using a terminal emulator, such as HyperTerm.

2. Start or reboot the system.

   After the first phase of system initialization completes, output that is similar to the following displays:

   ```
   GNU GRUB  version 0.93  (630K lower / 2096128K upper memory)

   -------------------------------------------------------------

   0: Boot Set 1 - StoreAge SVM Version 1.1.0-8 Ide0

   1: Boot Set 1 - StoreAge SVM Version 1.1.0-8 Ide0 DIAG

   2: Maintenance mode - Version 1.1.0-8 Ide0

   3: Maintenance mode - Version 1.1.0-8 Ide0 ip=dhcp

   -------------------------------------------------------------


   Use the ^ and v keys to select which entry is highlighted.

   Press enter to boot the selected OS, 'e' to edit the commands
   before booting, or 'c' for a command-line.


   The selected entry is 0

   Entry 0 will be booted automatically in 10 seconds.
   ```

3. Use the arrow keys to select a boot set, and then press the Enter key to boot using the selection.

The selected boot set becomes the default boot set when the system is next restarted.

NOTE: Boot set items marked DIAG are for use by QLogic field service personnel; they should not be selected under normal operating conditions.

5.3
Maintenance Mode

Maintenance Mode provides menu options for installing and upgrading your SANbox SSP software. Maintenance Mode is accessible even when no valid boot set is installed on the system.

To access Maintenance Mode from the local console:

1. Connect to the local administrative console using a terminal emulator, such as HyperTerm.

2. Start or reboot the system. At the boot menu, use the arrow keys to select an entry labeled Maintenance Mode, and then press the Enter key to boot using the selection.

If the entry tagged with `ip=dhcp` is selected, the system attempts to obtain an IP address automatically from a DHCP server. Otherwise, you must manually configure IP from Maintenance Mode to enable access to the SANbox SSP management port (labeled 品 on the port side of the SANbox SSP).

3. Log into the system as `kadmin`.

The Maintenance Mode menu displays. The options are:

`e`: Reconfigure Ethernet

`g`: Get image package from network

`i`: Install image package

`d`: Delete image file

`l`: List available images to install

`s`: Show installed versions

`r`: Reboot

`m`: Show Menu

5.4
Updating SANbox SSP System Software

This section provides procedures for the following:

■ Installing a new system software image

■ Applying a system software patch

■ Installing a new Maintenance Mode image

To install a new system software image on SANbox SSP:

1. Load the current system image file onto a server that is accessible via SCP from the SANbox SSP to be updated.

   ```
   A system image for this release has a name similar to:
   t3-prod_name-image_1.1.0-15_i386.deb
   ```

   where *prod_name* is a string specific to your product.

   NOTE: The current system image file is available through ftp or on CD-ROM.

2. Install the new release on one of the boot sets of the SANbox SSP.

   a. Reboot the system.

   b. Select Maintenance Mode in the boot menu.

   c. Log in as `kadmin` to enter the Maintenance Mode menu.

   d. Type `e` to configure the Ethernet port, if it is not already configured.

   e. Choose option `g` to transfer the image file from the network:

      ```
      t3-prod_name-image_1.1.0-15_i386.deb
      ```

   f. Choose option `i` to install that image.

   g. Choose the boot set to which the image will be installed (either `1` or `2`), and type `YES` to confirm erasure of the boot set.

   h. After the image is installed, select option `r` to reboot the system.

To apply a system software patch:

1. Reboot into Maintenance Mode.

2. Login as `kadmin` user.

3. Choose option `e` to configure network (if not configured).

4. Choose option `g` to transfer the following file:

   ```
   t3-patch_1.1.0-15c_i386.deb
   ```

5. Choose option `i` to install the following (or the desired boot set):

```
t3-patch_1.1.0-15c on bootset 1
```

6. Choose option `r` to reboot.

**To install a new Maintenance Mode image on SANbox SSP:**

The release notes for a given SANbox SSP software release indicate whether an update to Maintenance Mode is necessary. See the release notes for instructions on installing the Maintenance Mode image.

5.5
Interpreting the LED Patterns

Figure 5-1 shows the six LED indicator lights on SANbox SSP and the function to which each light corresponds. A green light indicates normal operation.

An amber LED indicates that the corresponding component is missing, has failed, or will likely fail soon. Even if your SANbox SSPs appear to be performing normally, you should replace parts if their corresponding LED has turned amber. See "Replacing Hardware Components" on page 6-6 for information about ordering and installing replacement parts.
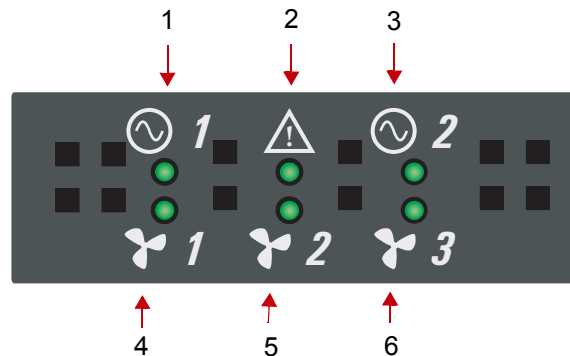
1 Power Supply 1 LED indicator light.
2 Alert LED indicator light: amber indicates a
   temperature alert or an internal voltage fault.
3 Power Supply 2 LED indicator light.
4 Fan 1 LED indicator light.
5 Fan 2 LED indicator light.
6 Fan 3 LED indicator light.

Figure 5-1. SANbox SSP LED Panel Indicator Lights (Port Side)

5.5.1
POST and the LEDs

Power-On Self Test (POST) is a diagnostic testing sequence that the SANbox SSP runs while powering on. If all the hardware is detected and found to be operating properly, SANbox SSP begins to boot.

While the software is loading, all the port LEDs turn amber and then turn off.

POST has successfully completed when all LED activity has stopped; this takes approximately 1-2 minutes. SANbox SSP has powered on successfully when the Alert LED is green, and all port lights are off. If POST never completes, all six LEDs remain amber.

NOTE: The port LEDs blinks if there is traffic on the SAN.

5.6
Replacing Hardware Components

SANbox SSP comes with transceivers and fans already installed. This section provides information if you need to replace a fan, transceiver, or power supply.

To replace the fans:

To replace Fan 1 or Fan 3 (40 mm fan), order replacement fan 097-0005 from QLogic Corporation. The kit includes instructions for replacing the fan.

To replace Fan 2 (80 mm fan), order replacement fan 097-0004 from QLogic Corporation. The kit includes instructions for replacing the fan.

To replace the power supplies:

Order replacement power supply 097-0006 from QLogic Corporation. The kit includes instructions for replacing the power supplies.

If you need to *install* the power supplies, see "To install the power supplies:" on page 3-5.

5.6.1
About the Transceivers

> *NOTE:*
>
> - If the port is not being used, leave the rubber dust cover plugged into the transceiver.
>
> - Always use the bail latch to remove and insert the transceiver; do not pull on the transceiver body.
>
> - Always put the bail latch into the up position before inserting the Fibre Channel cable.

SANbox SSP comes with a full set of transceivers already installed, one in each port. QLogic's transceivers include a bail latch that must be in the down position before removing the transceiver and put in the up position before inserting the Fibre Channel cable.

> *NOTE:* QLogic highly recommends that you use only transceivers certified and sold by QLogic. The transceivers that QLogic sells are Small Form-Factor Pluggable industry standard transceivers. If another optical SFP transceiver is used, other than one recommended and sold by QLogic Corporation, the user must ensure compliance with UL recognized standards and DHHS regulations.

To replace a transceiver:

1. Order replacement transceivers, part number 097-0007.

   The kit includes four transceivers.

2. Pull down on the bail latch, and then pull the old transceiver out of the port.

3. Insert the new transceiver into the port.

4. Remove the rubber dust cover from the transceiver before inserting the Fibre Channel cable.

Notes

Section 6
Troubleshooting

This section provides resolutions for issues that you may experience during system start-up and configuration of the SANbox SSP.

NOTE: The recommended actions in this section assume that you are troubleshooting components of the SANbox SSP, and that the platform is in the original factory configuration. If you have removed or replaced components or changed any default settings or driver firmware, the recommendations in this section may not apply.

This section discusses:

■ Before Looking at the Problem Statements

■ Problem Statements and Troubleshooting Procedures

6.1
Before Looking at the Problem Statements

Before looking through the list of problem statements:

■ Confirm that the SANbox SSP is powered on and that the Alert LED is green.

■ Configure the IP address for the management port: from the command line interface (CLI), run the Modify eth command. See "Modify Eth Command" on page B-13 for more information about this command.

■ Confirm that all connected ports are fully seated and the link LED is illuminated.

■ Confirm that all the other components of the system (fabric switches, storage arrays, and so on) are powered up and properly configured.

Before contacting technical support, see "Warranty and Technical Support" for more information, including how to run Show Debug Dump and how to create a trace file.

6.2
Problem Statements and Troubleshooting Procedures

This section discusses the troubleshooting procedures for each problem statement.

BACK-END STORAGE NOT FOUND (LOOP/FABRIC)

Check that:

- SANbox SSP is correctly connected to the fabric.

- Storage device is correctly connected to the fabric.

- Zoning of storage-side fabric is correct.

  See "SAN Zoning" on page 5-3 for zoning tips.

- Storage device is configured to allow the SANbox SSP to access the appropriate LUN.

  If you are using a RAID with LUN masking, make sure that the SANbox SSP port has access to the LUN. In addition, make sure that physical LUNs from the storage array are configured for Open Systems host mode. The SANbox SSP supports LUNs 0-255 only.

- Maximum frame size is correctly set.

  Check that SANbox SSP ports are set to the lowest maximum frame size of any device connected to the fabric. See "Configuring Storage" on page 5-6 for more information.

BACK-END STORAGE NOT FOUND BY SVM

Check that:

- SVM device is correctly connected to the fabric.

- Storage device is correctly connected to the fabric.

  The storage device must be configured to allow access to the SVM appliance and the SANbox SSP. The LUN may be accessible by the SVM appliance but not by the SANbox SSP. In this case, new virtual volumes created in SVM are not actually created and are missing from the Show Debug Kdisks list.

  See "Show Debug Command" on page B-19 for more information about this command.

- Zoning of storage-side fabric is correct. See "SAN Zoning" on page 5-3 for zoning tips.

- Storage device is configured to allow SVM to access the appropriate LUN.

  Configure storage devices to allow access to the SVM appliance and the SANbox SSP. If you are using a RAID with LUN masking, you must make sure that the SANbox SSP port has access to the LUN.

■ Different logical units have different LUN identifiers.

When accessing storage through the SVM GUI, it is important that the administrator not assign the same LUN ID to different logical units on the same RAID device, even if those logical units are visible on different ports. Each logical unit on a given RAID device must have a unique LUN ID.

See "Configuration Restriction on RAID Devices" on page 5-7 for more information about this topic.

■ See also "Back-End Storage Not Found (Loop/Fabric)" on page 7-2.

CANNOT ACCESS SANbox SSP CONSOLE PORT

Make sure the terminal settings are properly configured. Set the terminal parameters for 9600 baud, 8 data bits, no parity, 1 stop bit, and no flow control. In addition, make sure you are connected to the correct COM port on your system.

CANNOT LOG INTO SANbox SSP (GUI or CLI)

Make sure that:

■ IP address is properly configured.

From the command line interface (CLI), run the Modify eth command. See "Modify Eth Command" on page B-13 for more information about this command.

■ Make sure your Ethernet cable is connected to the management port (labeled ⊹), which is the first Ethernet port from the left. The high-availability ports are the two Ethernet ports on the right.

■ Username and password are correct.

■ SANbox SSP is powered on and that the Alert LED is green.

INITIATOR NOT FOUND (LOOP/FABRIC)

Check that:

■ SANbox SSP is correctly connected to fabric.

■ Initiator is correctly connected to the fabric.

■ Zoning of storage-side fabric is correct. See "SAN Zoning" on page 5-3 for zoning tips.

■ Maximum frame size correctly set.

Check that SANbox SSP ports are set to the lowest maximum frame size of any device connected to the fabric. See "Configuring Storage" on page 5-6 for more information.

INITIATOR NOT FOUND BY SVM

Check that:

■ SVM device is correctly connected to the fabric.

  The switch must show that the SVM port is present. Unplug and then plug in the SANbox SSP front-side connections to the fabric.

■ Initiator is visible to SANbox SSP. If not, try rebooting the SANbox SSP.

  Run `show debug wwpn` in the command line interface. If the initiator is visible to the SANbox SSP, it displays in the output of this command. See "Show Debug Command" on page B-19 for more information about this command.

■ See also "Initiator Not Found (Loop/Fabric)" on page 7-3.

■ SANbox SSP is visible to the SVM.

  Perform a `reinit config` on SVM, and then try rebooting the SVM appliance.

■ Reboot the fabric switch.

VIRTUAL VOLUME NOT DISCOVERED BY INITIATOR

Verify that:

■ Initiator is visible to SANbox SSP.

■ Storage is visible to SANbox SSP.

Perform or run these operations:

■ Run `show debug wwpn` in the CLI. See "Show Debug Command" on page B-19 for more information about this command.

■ Perform a rescan on the initiator.

■ Reset the initiator's Fibre Channel link. See your initiator documentation for more information.

■ Reboot the initiator.

Appendix A
Specifications

This appendix contains the specifications for the SANbox 5602 Fibre Channel switch. Refer to Section 2 General Description for the location of all connections, switches, controls, and components.

A.1
Performance Characteristics

Processors
- SANbox 8202-16 .... Dual Intel Pentium Xeon
- SANbox 8202-08/8200-08 .... Single Intel Pentium Xeon

Memory
- SANbox 8202-16 .... 2 GB
- SANbox 8202-08/8200-08 .... 1 GB

Ports
- SANbox 8202-16 .... 16 Fibre Channel ports, each N_port or NL_port configurable
- SANbox 8202-08/8200-08 .... 8 Fibre Channel ports, each N_port or NL_port configurable

Port Speed.................................... Auto-negotiating 2 Gbps full duplex (2.125 Gbps)

Backplane..................................... Non-blocking 80 Gbps

Performance
- SANbox 8202-16 .... 460,000 IOPs aggregate
- SANbox 8202-08 .... 285,000 IOPs aggregate
- SANbox 8200-08 .... 195,000 IOPs aggregate

A.2
Media

Media.. Hot-plug, Small Form-Factor Pluggable (SFP)

A.3
Storage Management

Maximum physical back-end
storage... 131,072 TB

Maximum virtual LUN size.............. 2 TB

Maximum number of virtual LUNs
per port (assigned to initiator)........ 256

Maximum number of virtual
LUNs per port (assigned to initiator)
- SANbox 8202-16 4,096
- SANbox 8202-08 2,048
- SANbox 8200-08 1,024

Maximum number of initiators: 32,768

Maximum number of LUNs:............ 65,536

A.4
High Availability Features

Clustering ....
- Supports Active/Active ñ Active/Passive failover
- Dual 10/100 Ethernet RJ-45 connections for clustering

Hot swappable fans .... SANbox 8202-16/8202-08

Redundant, hot swappable power
supplies
- SANbox 8202-16/8202-08 .... Standard
- SANbox 8200-08 .... Not available

A.5
Standards

....
- FC-PH
- FC-AL
- FCP-SCSI
- Fibre Alliance MIB
- SNMP v1,2,3

A.6
Device Management

Access .... SSH, Telnet, Web Browser, SOAP/XML, SNMP Interfaces

Interfaces ....
- 1 10/100 Ethernet RJ-45 for management
- 1 Serial DB-9 RS232 for configuration

A.7
Mechanical

Dimensions .... 17 in. (W) x 3.5 in. (H) x 21 in. (D)

Enclosure .... 2U rack mountable

Weight
- SANbox 8202-16 .... 35 lbs.
- SANbox 8202-08/8200-08 .... 30 lbs.

A.8
Environmental

Temperature .... +10°C to +40°C

Humidity .... 5% to 85% noncondensing

Altitude .... 0 to 10,000 feet

Shock .... 5g, 11ms, half sine

Vibration .... 0.5g, 40 to 3000 Hz

A.9
Electrical

Power 100-230VAC

Frequency 50-60Hz

A.10
Regulatory

.... ■ UL
■ CE
■ cUL
■ FCC

Appendix B
Command Reference

Using the SANbox SSP command line interface (CLI), you can configure and manage SANbox SSP with common command sets.

This appendix provides a reference for each command in the command line interface for the SANbox SSP. The commands provide the same functions as the SANbox SSP Management GUI.

You can access the CLI through either the Local Administrative Console or a telnet session. This appendix provides the steps for accessing the CLI and describes each of the commands.

This appendix covers the following topics:

■ Command Line Interface (CLI) Overview

■ Accessing the CLI

■ Commands

B.1
Command Line Interface (CLI) Overview

The SANbox SSP provides a command line user interface through serial, telnet, and ssh connections. All configuration, maintenance, and monitoring of the SANbox SSP are accessible through the command line interface.

B.1.1
Command Quick Reference by Object

Table B-1 shows which commands are available for the major object types.

Table B-1. Commands by Object Type

Object Type	Command	Page
eths	Disable Eth Command	page B-9
	Enable Eth Command	page B-10
	Modify Eth Command	page B-13
	Show Eth Command	page B-21
	Show Eths Command	page B-22
ports	Disable Port Command	page B-9
	Enable Port Command	page B-11
	Modify Port Command	page B-14
	Modify Ports Command	page B-15
	Reset Port Command	page B-17

Table B-1. Commands by Object Type (Continued)

Object Type	Command	Page
users	Create User Command	page B-8
	Delete User Command	page B-8
	Disable User Command	page B-10
	Enable User Command	page B-11
community	Set Community Command	page B-18
	Show Community Command	page B-19
date/timezone	Modify Date Command	page B-13
	Modify Timezone Command	page B-16
	Show Date Command	page B-19
fans	Show Fan Command	page B-22
	Show Fans Command	page B-23
groups	Show Group Command	page B-23
	Show Groups Command	page B-23
therms	Show Therm Command	page B-26
	Show Therms Command	page B-27
voltages	Show Voltage Command	page B-28
	Show Voltages Command	page B-28

B.1.2
Command Syntax and Command Completion

The CLI command syntax is as follows:

command
    keyword *[value]*
    keyword [value1] [value2]

The command is followed by one or more keywords. Consider the following rules and conventions:

■ Commands and keywords are case sensitive.

■ Required keyword values appear in standard font: [value]. Optional keyword values are shown in italics: *[value].*

This CLI provides command completion to minimize the typing needed to run commands. This feature enables you to press the completion key (the Tab key) to complete a partially typed command line. If the command line fragment is unambiguous, it is completed with the remainder of the command line.

If there is more than one possible match for a command line fragment, continue pressing the Tab key to see each of the possible matches. You then type enough of the command line to distinguish it from the other possible matches.

In addition, you can get a list of legal fields at any point in the command line. For example if you type `show user`, and then press the Tab key, a list of existing users is returned.

The completion feature in the CLI also validates previously typed input. If there is an error in the command line prior to the point where you have requested completion, an error is printed and the cursor is set to the point where the command line breaks the defined syntax rules.

B.1.3
Online Help

The CLI for the SANbox SSP includes online help. Type part of a command to view the help information, such as a list of arguments or the proper syntax.

Help Commands

For information about getting a list of commands, see . For information about getting help with a particular command, see .

Example 1:

Typing `modify` returns these results:

```
required arg not present
one of [therm, port, ports, timezone, date, user, eth, '?'] required
```

Example 2:

Typing `show user` returns these results:

```
kadmin@k-> show user
user - (syntax: show user <user name>)
users - (syntax: show users)


"user" is ambiguous, must differentiate between: [user, users]
Please refer to command syntax for detail.
```

Accessing the CLI

Once the management port (labeled ⊥ on the port side of SANbox SSP) has been properly configured with an IP address, a user can telnet to the SANbox SSP using a web browser or standard telnet application. After successful bootup, the management port is available for management purposes.

See "To modify Ethernet settings for remote access:" on page 3-8 or "Modify Eth Command" (page B-13), if you did not already configure the management port for remote access.

NOTE: To gain access to the CLI, type the default login and password.

> login: `kadmin`
> password: `kahuna`

To telnet to the CLI from a web browser:

1. In your web browser, type the IP address of SANbox SSP (example: `http://10.4.2.123`).

   The following screen displays (see Figure B-1):

   NOTE: The version number of the SANbox SSP is listed next to the Version label at the top of the screen.
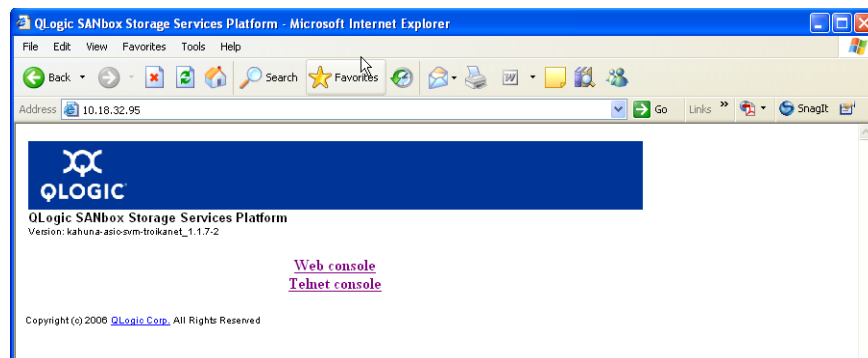
Figure B-1. QLogic SANbox Storage Services Platform (SSP) Screen

2. Click **Telnet Console** to run a HyperTerminal session. The following screen displays (see Figure B-2):
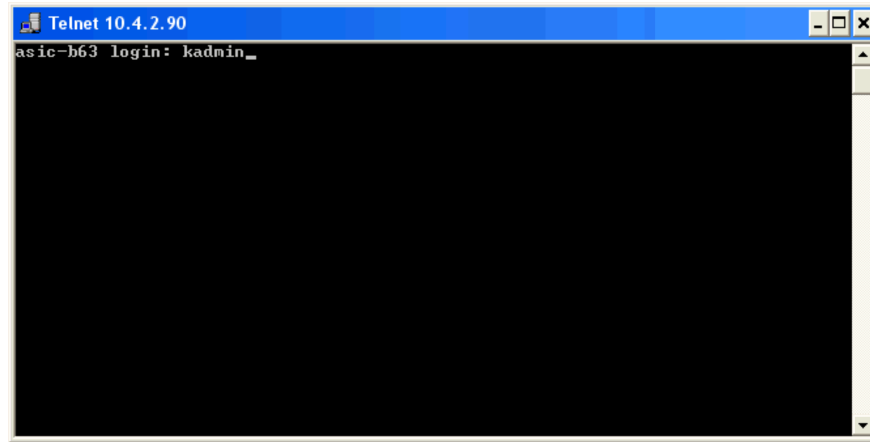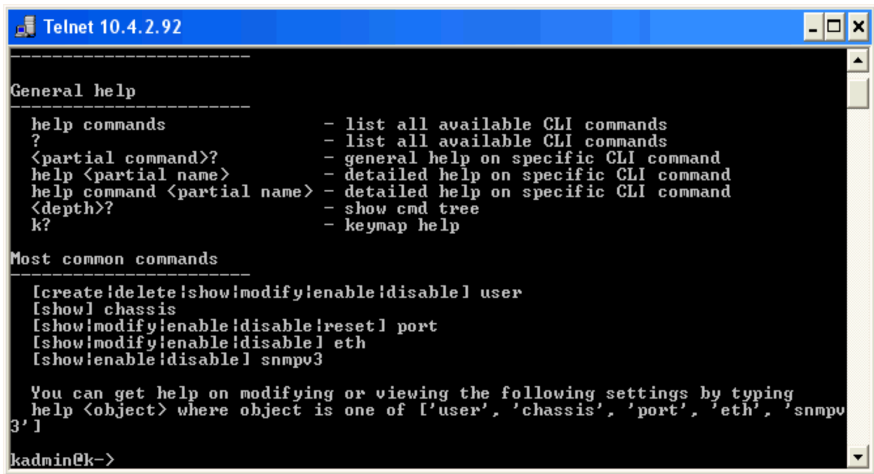
Figure B-2. Telnet Console Login Screen

Log in with the default login and password.

NOTE: QLogic recommends that you change the default password. If you have not already done so, run the "Modify User Command" (page B-16) to change the password.

login: kadmin
password: kahuna

The following menu options display (see Figure B-3):

Figure B-3. Telnet Console Menu Options

3. Enter commands into the telnet window to begin managing the SANbox SSP with the CLI commands.

B.2.1
Users and Groups

The SANbox SSP provides two built-in users and two built-in groups: `kadmin` is a member of the `Administrator` group, and `kmonitor` is a member of the `Monitor` group.

The default password for both accounts is `kahuna`. See "Modify User Command" (page B-16) for information about changing the password.

Users in the `Monitor` group are limited to commands that only *view* system configuration and status; `Monitor` users cannot change the system configuration. See the `show` commands, such as "Show User Command" (page B-27) and "Show Port Command" (page B-23), and so on, for more information.

Users in the `Administrator` group can create and delete users, and can also modify users, eths, and ports. See "Create User Command" (page B-8), "Delete User Command" (page B-8), "Modify User Command" (page B-16), "Modify Eth Command" (page B-13), "Modify Port Command" (page B-14), and "Modify Ports Command" (page B-15) for more information.

Table B-2 summarizes the features of the built-in users and built-in groups.

Table B-2. Built-In Users and Groups

Built-in Users	Built-in Groups	Default Password	View System Configuration and Status	Create/Delete Users and Modify Eths/Ports/Users
kadmin	Administrator	kahuna	yes	yes
kmonitor	Monitor	kahuna	yes	no

███████████████

B.3
Commands

Clear Command

Clears the screen of text.

Syntax   **clear**

Create User Command

Creates a new user in the specified group, or views user settings. The groups defined for SANbox SSP are `Administrator` and `Monitor`. When new users are added, they get the same permissions as the existing kadmin and kmonitor users. When you issue this command, you must enter an SNMP password greater than eight characters in length, in addition to your normal account password.

Syntax   **create user [user name] group [group name]**

Keywords   **create user [user name]**
Name of the new user

group [group name]
Name of the group to which the user will belong: `Administrator` or `kmonitor`.

Notes   Only users belonging to the Administrator group can add, delete, and disable/enable users, and the current user cannot be disabled or deleted.

See Also   "Delete User Command" on page B-8
"Disable User Command" on page B-10
"Enable User Command" on page B-11
"Show User Command" on page B-27
"Show Users Command" on page B-27

Delete User Command

Removes the specified user from the list of administrators who can manage the SANbox SSP.

Syntax   **delete user [user name]**

Keywords   **delete user [user name]**
Name of the user that you are removing from the system.

Notes   Only users belonging to the Administrator group can add, delete, and disable/enable users, and the current user cannot be disabled or deleted.

See Also "Create User Command" on page B-8
"Disable User Command" on page B-10
"Enable User Command" on page B-11
"Show User Command" on page B-27
"Show Users Command" on page B-27

Disable Eth Command

SANbox SSP includes three Ethernet connections, MGMT, HA1, and HA2. This command disables the specified Ethernet connection so that it cannot send or receive network traffic.

This command is used for tightened security purposes. Once you disable the Ethernet connections using this command, you can access the CLI and administer SANbox SSP only from the serial console.

Syntax **disable eth [ethernet name]**

Keywords **disable eth [ethernet name]**
Name of the Ethernet that you are disabling: MGMT, HA1, or HA2.

Notes If you are connected through the management port, disabling the MGMT Ethernet terminates any active network GUI and CLI sessions, requiring relogin. If you are using the CLI on the serial console, the connection is not be disrupted.

See Also "Enable Eth Command" on page B-10
"Modify Eth Command" on page B-13
"Show Eth Command" on page B-21
"Show Eths Command" on page B-22

Disable Port Command

Disables the specified Fibre Channel port number so that it cannot send and receive Fibre Channel traffic.

Syntax **disable port**
[port number]
[*]

Keywords **disable port [port number]**
Port number is an integer 1-8 for SANbox 8200-08 SSP/SANbox 8202-08 SSP or 1-16 for SANbox 8202-16 SSP to indicate the Fibre Channel port.

disable port [*]
* indicates all Fibre Channel ports.

Disable snmpv3 Command

This command does not turn off Simple Management Protocol. By default, the system runs Simple Network Management Protocol, version 2. Disabling SNMPv3 means that SNMPv2 is running instead of SNMPv3.

Syntax   **disable snmpv3**

Disable User Command

Temporarily disables the user account without deleting it. The account can later be enabled using the Enable User Command command.

Notes   Only users belonging to the Administrator group can add, delete, and disable/enable users, and the current user cannot be disabled or deleted.

Syntax   **disable user [user name]**

Keywords   **disable user [user name]**
Name of the user account that you are disabling.

Enable Eth Command

SANbox SSP includes three Ethernet connections, MGMT, HA1, and HA2. This command enables the specified Ethernet connection so that it can send or receive network traffic.

Syntax   **enable eth [ethernet name]**

Keywords   **enable eth [ethernet name]**
Name of the Ethernet that you are enabling: MGMT, HA1, or HA2 .

See Also

Enable Port Command

Enables the specified Fibre Channel port number so that it can send and receive Fibre Channel traffic.

Syntax   **enable port**
      [port number]
      [*]

Keywords   **enable port [port number]**
An integer 1-8 for SANbox 8200-08 SSP/SANbox 8202-08 SSP or 1-16 for SANbox 8202-16 SSP to indicate the Fibre Channel port.

enable port [*]
* indicates all Fibre Channel ports.

See Also

Enable snmpv3 Command

By default, the system runs Simple Network Management Protocol, version 2. Enabling SNMPv3 means that SNMPv3 is running instead of SNMPv2.

Syntax   **enable snmpv3**

See Also

Enable User Command

Enables the user account that was previously disabled using the Disable User Command command.

Syntax   **enable user [user name]**

Keywords   **enable user [user name]**
Name of the user account that you are enabling.

Notes   Only users belonging to the Administrator group can add, delete, and disable/enable users, and the current user cannot be disabled or deleted.

See Also   "Disable User Command" on page B-10
"Modify User Command" on page B-16
"Show User Command" on page B-27
"Show Users Command" on page B-27

Exit Command

Quits this command line interface session, terminates the telnet session, and logs the user out.

Syntax   **exit**

See Also   "Quit Command" on page B-17

Help Command

Provides information about using the specified commands.

Syntax   **help**
            [partial command name]
            [command name]

Keywords   **help [partial command name]**
            Part of a help command (enough of the command to uniquely identify it).

            help [command name]
            Entire command name.

Examples   Executing the command `help mod` provides the same information as `help modify`.

            `help re` returns this help information:

```
reset - (Reset to known state.)
restart - (Restart a process.)
reboot - (Reboot the host.)
```

See Also   "Help Commands" on page B-13

Help Commands

Provides a list of the first-level commands available in this command line interface.

Syntax   **help commands**

See Also   "Help Command" on page B-12

Modify Date Command

Sets the system date and time.

Syntax   **modify date [MM/DD/YYYY hh:mm:ss]**

Keywords   **modify date [MM/DD/YYYY hh:mm:ss]**
MM/DD/YYYY is the month, day, and year for the system time (year must be 4-digits long). hh:mm:ss is the hours, minutes, and seconds for the system time.

Notes   Once the time zone is set, the system automatically switches between Standard Time and Daylight Saving Time.

See Also   "Modify Timezone Command" on page B-16

Modify Eth Command

Configures the Ethernet properties—ip address, gateway, and subnet—for the specified Ethernet connection.

Syntax   **modify eth [ethernet name]**
         ip [ip addr]
         gateway [gateway router]
         netmask [subnet mask]

Keywords   At least one of the optional keywords is required:

modify eth [ethernet name]
Ethernet connection that you are modifying: `MGMT`, `HA1`, or `HA2`.

ip [ip addr]
IP address of the specified Ethernet.

gateway [gateway router]
Router for the specified Ethernet.

netmask [subnet mask]
Subnet mask for the specified Ethernet.

Notes   If you are connected through the management port, modifying the MGMT Ethernet terminates any active network GUI and CLI sessions, requiring relogin. If you are using the CLI on the serial console, the connection is not disrupted.

See Also

Modify Port Command

Changes the specified keywords—type, capability, speed—for the specified Fibre Channel port number.

Syntax   **modify port [port number]**
    type [port type]
    capability [port capability]
    speed [port speed]

Keywords   At least one of the optional keywords is required:

modify port [port number]
An integer 1-8 for SANbox 8200-08 SSP/SANbox 8202-08 SSP or 1-16 for SANbox 8202-16 SSP to indicate the Fibre Channel port.

capability [port capability]
`FCP_TARGET`: to enable the port to be used as a front-end (looks like a storage array port).

`FCP_INITIATOR`: to initiate back-end traffic to disks (cannot receive storage).

`both`: traffic can go both ways.

speed [port speed]
`1G`, `2G`, `NEGOTIATE`

type [port type]
`N_PORT`: the port functions only in conjunction with a single-attached device that is capable of fabric mode operation.

`AUTO`: enables the port to initialize in the most appropriate mode, either loop (NL_Port) or fabric (N_Port), according to what is on the other end of the link.

NOTE: Ports should generally run in fabric mode because fabric yields better throughput and links recover more quickly.

Notes   You must restart the system for port capability or port speed changes to take effect.

maxframesize is not a keyword for this command because all ports must share the same frame size.

See Also

Modify Ports Command

Changes the specified keywords—type, capability, speed—for all SANbox SSP ports.

Syntax   **modify**
> *ports type [port type]*
> *capability [port capability]*
> *speed [port speed]*
> *maxframesize [size (in bytes)]*

Keywords   At least one of the following keywords is required:

capability [port capability]
`FCP_TARGET`: to enable the port to be used as a front-end (looks like a storage array port)

`FCP_INITIATOR`: to initiate back-end traffic to disks (cannot receive storage)

`both`: traffic can go both ways

maxframesize [size (in bytes)]
Smallest maximum frame size of any device on the SAN, usually `2048`. Some systems require `1024`, or even smaller.

This number specifies the maximum frame size that Kahuna can negotiate to exchange with other Fibre Channel devices. *This number must be the same throughout the SAN*.

ports type [port type]
`N_PORT`: the port functions only in conjunction with a single attached device that is capable of fabric mode operation.

`AUTO`: enables the port to initialize in the most appropriate mode, either loop (NL_Port) or fabric (N_Port), according to what is on the other end of the link.

NOTE: Ports should generally run in fabric mode because fabric yields better throughput and links recover more quickly.

speed [port speed]
NEGOTIATE, 1G, 2G

Notes   You must restart the system for port capability, port speed, or frame size changes to take effect.

See Also

Modify Timezone Command

Starts a Time Zone Configuration utility that enables you to select your geographical area and time zone, and then modify your local time if needed.

Syntax   **modify timezone**

Notes   Once the time zone is set, the system automatically switches between Standard Time and Daylight Saving Time.

See Also

Modify User Command

Adds the specified user to the specified group. This command also changes the password defined for the specified user.

The groups defined for SANbox SSP are Administrator and Monitor. When new users are added, they get the same permissions as the existing kadmin and kmonitor users.

Syntax   **modify user [user name]**
    group [group name]
    password

Keywords   **modify user [user name]**
User name that you want to add to the specified group.

group [group name]
Name of the group to which you are adding the specified user: Administrator or Monitor.

password
Include this keyword if you want to change the password.

See Also

Quit Command

Exits this command line interface session, terminates the telnet session, and logs the user out.

Syntax   **quit**

See Also

Reboot Command

Restarts the SANbox SSP.

Syntax   **reboot**

Reset Port Command

Shuts down the port and then restarts it, leaving the properties of the port unchanged. Use this command to clear a port that is in an unknown state and trigger the discovery process.

> **_WARNING!!_**   Running this command disrupts any traffic on this port, and should never be performed on a port that is moving data. Doing so could cause read/write failure and error conditions in software if traffic has occurred.

Syntax   **reset port**
　　　　　[port number]
　　　　　*

Keywords   **reset port [port number]**
An integer 1-8 for SANbox 8200-08 SSP/SANbox 8202-08 SSP or 1-16 for SANbox 8202-16 SSP to indicate the Fibre Channel port.

reset port *
* indicates all Fibre Channel ports.

See Also

Restart snmp Command

Stops and then restarts the Simple Network Management Protocol process.

Syntax   **restart snmp**

Set Community Command

Changes the name of the community string. The community string for SANbox SSP is `public`.

Syntax   **set community [community name]**

Keywords   **set community [community name]**
Name to which you want to change the community string.

Notes   The SNMP Community string is similar to a user id or password that allows access to a router's or other device's statistics. It is standard practice for network managers to change the community string so that outsiders cannot see information about the internal network.

See Also

Show Chassis Command

Returns the part number, MAC base address, serial number, or original manufacture date for the SANbox SSP.

Syntax   **show chassis**
[part_num]
[MAC_base_address]
[serial_num]
[orig_mfg_date]

Keywords   At least one of the following keywords is required:

MAC_base_address
Indicates the base address for the Ethernet MAC on SANbox SSP.

orig_mfg_date
Indicates the original manufacturing date for this SANbox SSP.

part_num
Indicates the part number of SANbox SSP. Use it to determine the OEM or manufacturing information about the switch.

serial_num
Indicates the serial number for this SANbox SSP.

Examples
```
show chassis part_num
show chassis MAC_base_address orig_mfg_date
show chassis orig_mfg_date serial_num
```

Show Community Command

Returns the name of the community string and whether the string is read-only or read-write. The community string for SANbox SSP is public.

Syntax   **show community**

Notes   The SNMP Community string is similar to a user id or password that allows access to a router's or other device's statistics.

See Also   "Set Community Command" on page B-18

Show Date Command

Returns the current date, time, and the time zone.

Syntax   **show date**

Show Debug Command

Returns information that may be helpful to QLogic support engineers in debugging a problem.

Notes   As this command returns a large amount of information to the screen, turn on logging in your terminal program so that you can capture all the information in a file to send to QLogic.

Syntax   **show debug**
[dump]
[fcptstate]
[fcsexch]
[fcsluns]
.
.
.
[wwpn]

Keywords   At least one of the following keywords is required:

dump
Shows cumulative system debug information.

fcptstate
Provides the state of the SCSI target driver.

fcsexch
Provides per port FCS exchange allocation diagnostic.

fcsluns
FCS LUN discovery. Local port database of remote ports with LUNs per remote port.

fcsstate
Provides a summary table showing how many targets, LUNs, and initiators are discovered by each port. Each port discovers itself.

fpsdiag
Shows firmware debugging information.

fpspsc
Provides a list of the physical disks in use by the firmware/fastpath.

fpsstats
Shows the firmware/fastpath statistics.

hwstate
Provides the state of the HBA hardware driver.

interrupts
Shows interrupt load.

kdisks
Shows the virtual disks created by the application, remote initiator WWN, port WWN, LUN identifier, current state, type, and handle.

kdstats
Shows virtual disk I/O statistics, such as number of forwarded commands and the number of reads handled by the SANbox SSP software.

meminfo
Shows memory usage.

modules
Provides a list of the loaded kernel modules.

ppeinfo
Shows the firmware status.

pscs
Provides a list of the PSCs registered by the application.

pscstats
Provides statistics for each PSC registered by the application, such as total reads and writes issued on the PSC by the SANbox SSP software.

top
Shows CPU activity by task.

wwn
Shows the list of World Wide Port Names for SANbox SSP ports.

NOTE: Port 0 in the list corresponds with the physical port labeled Port 1.

wwnmap
Provides local port display of World Wide Name and port capabilities.

wwpn
Provides a list of World Wide Port Names discovered on each of the SANbox SSP ports.

NOTE: Port 0 in the list corresponds with the physical port labeled Port 1.

Show Eth Command

Returns the configuration—ip address, subnet mask, and gateway—for the specified Ethernet connection.

Syntax   **show eth [ethernet name]**

Keywords   **show eth [ethernet name]**
Ethernet connection that you are modifying: MGMT, HA1 or HA2

See Also   "Disable Eth Command" on page B-9
"Enable Eth Command" on page B-10
"Modify Eth Command" on page B-13
"Show Eths Command" on page B-22

Show Eths Command

Returns the configuration—ip address, subnet mask, and gateway—for the three Ethernet connections: `MGMT`, `HA1`, and `HA2`. In addition, this command also provides the MAC base address and the host name for the Ethernet connections.

Syntax   **show eths**

See Also   "Disable Eth Command" on page B-9
"Enable Eth Command" on page B-10
"Modify Eth Command" on page B-13
"Show Eth Command" on page B-21

Show Fan Command

Displays the status, either OK or Error, and the RPM of the specified fan.

Syntax   **show fan**
[fan number]
[*]

Keywords   **show fan [fan number]**
An integer between 1 through 10, inclusive.

show fan [*]
Indicate all fans.

Notes   If the fan is a power supply fan (Fan 1 and Fan 3), the RPM is not available. The RPM displays as 0 if the fan is not operational; as 1 if the fan is operational.

See Also   "Show Fans Command" on page B-23

Show Fans Command

Displays the status, either OK or Error, and the RPM for all 10 fans in the SANbox SSP.

Syntax   **show fans**

Notes   If the fan is a power supply fan (Fan 1 and Fan 3), the RPM is not available. The RPM displays as 0 if the fan is not operational; as 1 if the fan is operational.

See Also   "Show Fan Command" on page B-22

Show Group Command

Returns the list of user names that belong to the specified group name. The groups defined for SANbox SSP are `Administrator` and `Monitor`.

Syntax   **show group [group name]**

Keywords   **show group [group name]**
Name of the group to which the user belongs: `Administrator` or `Monitor`.

Show Groups Command

Returns a list of the users assigned to each group that is defined for this SANbox SSP. The groups defined for SANbox SSP are `Administrator` and `Monitor`.

Syntax   **show groups**

See Also   "Show Users Command" on page B-27

Show ID Command

Returns the user account that was authenticated for the current telnet session.

Syntax   **show id**

Show Port Command

Returns diagnostic and status information for the specified port, 1-8 for SANbox 8200-08 SSP/SANbox 8202-08 SSP or 1-16 for SANbox 8202-16 SSP. See the sample output in the Examples section, below, for more information.

Syntax   **show port**
            [port number]
            *

Keywords　**show port [port number]**
An integer 1-8 for SANbox 8200-08 SSP/SANbox 8202-08 SSP or 1-16 for
SANbox 8202-16 SSP to indicate the Fibre Channel port.

show port *
* indicates all Fibre Channel ports on the SANbox SSP.

Examples　Here is the output for port 1 on a demonstration system after running `show port 1`.

```
Port1:

    WWNN: 50:09:06:68:00:05:24:71
    WWPN: 50:09:06:60:00:05:24:71
    State: LINK_ESTABLISHED
    Capability: ['FCP_INITIATOR', 'FCP_TARGET']
    Type  - Configured: AUTO        Actual: N_PORT
    Speed - Configured: NEGOTIATE          Actual: 1G
    Class - Capabilities: ['THREE']
    Max Frame Size (in bytes):      2048
```

See Also　

Show Ports Command

Returns diagnostic and status information for all the ports on the SANbox SSP
(8 ports for SANbox 8200-08/SANbox 8202-08 and 16 ports for
SANbox 8202-16). See the sample output in the Examples section, below, for
more information.

Syntax　**show ports**

Keywords　**show ports**
Indicates all Fibre Channel ports on the SANbox SSP.

Examples　Here is the output for port 5 on a demonstration system after running `show ports`.

```
    Port5:

        WWNN: 50:09:06:68:00:05:24:71
        WWPN: 50:09:06:60:00:05:24:75
        State: LINK_ESTABLISHED
        Capability: ['FCP_INITIATOR', 'FCP_TARGET']
        Type - Configured: AUTO        Actual: N_PORT
```

```
Speed - Configured: NEGOTIATE   Actual: 1G
Class - Capabilities: ['THREE']
Max Frame Size (in bytes):    2048
```

See Also

Show ps Command

Returns the status (Error or OK) and voltage information for the specified power supply. The SANbox SSP provides two power supplies.

Syntax   **show ps**
    [power supply number]
    ps [*]

Keywords   **show ps [power supply number]**
    1 or 2

    show ps [*]
    * indicates both power supplies.

Notes   When looking at the fan side of the SANbox SSP, power supply 1 is on the right side, and power supply 2 is on the left side.

See Also

Show pss Command

Returns the status (Error or OK) and voltage information for each of the two power supplies on the SANbox SSP.

Syntax   **show pss**

Notes   When looking at the fan side of the SANbox SSP, power supply 1 is on the right side, and power supply 2 is on the left side.

See Also

Show snmpv3 Command

Reports whether Simple Network Management Protocol is enabled or disabled.

Syntax   **show snmpv3**

See Also

Show Status Command

Returns the current status of all power supplies, fans, thermometers, and voltages for SANbox SSP, and reports errors where detected.

Syntax   **show status**

Show Therm Command

Returns the status, current temperature in Celsius and Fahrenheit, and the minimum and maximum thresholds for the specified thermometer. SANbox SSP has seven thermometers.

Syntax   **show therm**
               [therm number]
               [*]

Keywords   **show therm [therm number]**
               An integer between 1 and 7, inclusive.

               show therm [*]
               * specifies all thermometers in SANbox SSP.

See Also

Show Therms Command

Returns the status, current temperature in Celsius and Fahrenheit, and the minimum and maximum thresholds for each of the seven thermometers in the SANbox SSP.

Syntax   **show therms**

See Also   "Show Therm Command" on page B-26

Show Timezone Command

Shows the time zone configuration settings for this SANbox SSP. Use the Modify Timezone Command (page B-16) to change the settings.

Syntax   **show timezone**

Notes   Once the time zone is set, the system automatically switches between Standard Time and Daylight Saving Time.

See Also   "Modify Timezone Command" on page B-16

Show User Command

Returns the name of the group to which the specified user belongs and whether the user is enabled.

Syntax   **show user [user name]**

Keywords   **show user [user name]**
Name of the user for which you need the group name and whether enabled.

See Also   "Disable User Command" on page B-10
"Enable User Command" on page B-11
"Modify User Command" on page B-16
"Show Users Command" on page B-27

Show Users Command

Returns a list of the users assigned to each group that is defined and whether the users are enabled. The groups defined for SANbox SSP are `Administrator` and `Monitor`, and the users are `kadmin` and `kmonitor`.

Syntax   **show users**

See Also   "Disable User Command" on page B-10
"Enable User Command" on page B-11
"Modify User Command" on page B-16
"Show Groups Command" on page B-23
"Show User Command" on page B-27

Show Voltage Command

Returns the nominal and actual voltages for the SANbox SSP. The nominal voltage is the expected voltage when everything is operating correctly. The actual voltage is the current voltage.

Syntax   **show voltage**
[voltage number]
[*]

Keywords   **show voltage [voltage number]**
An integer between 1 and 15, inclusive.

show voltage [*]
* specifies all voltages in the SANbox SSP.

See Also   "Show Voltages Command" on page B-28

Show Voltages Command

Returns the nominal and actual voltages for the SANbox SSP. The nominal voltage is the expected voltage when everything is operating correctly. The actual voltage is the current voltage.

Syntax   **show voltages**

See Also   "Show Voltage Command" on page B-28

Version Command

Returns the SANbox SSP version.

Syntax   **version**

Glossary

Active Boot Set

The boot set used to supply system software in a running system.

Active/Active RAID

A storage device that presents volumes on multiple ports, and the volumes are simultaneously active on all ports. See also Active Path, Passive Path, and In Use Path.

Active/Passive RAID

A storage device that presents volumes on multiple ports of multiple storage controllers, and at any point in time a volume is only active on the ports of one controller and passive on the ports of the other controllers. See also Active Path, Passive Path, and In Use Path.

Active Path

A path that is currently available for use. See also Active/Active RAID, Active/Passive RAID, Passive Path, and Primary Path.

Back-side Path

A path between the SANbox SSP and the physical storage.

Boot Set

Either of two selectable locations provided by SANbox SSP for storing a system software image.

CLI

Command Line Interface. SANbox SSP provides a CLI through the local administrative console (serial port console), telnet, or SSH.

Cross-connected

A property of a high-availability configuration in which both SANbox SSPs connect to both back-end SANs, allowing either SANbox SSP to access both controllers of a dual-controller RAID.

Default Boot Set

The boot set that becomes the active boot set when the system is started, unless the user selects a different boot set.

Failback

When a previously failed path is made available once again, I/O traffic can resume use of that path. In some cases, the system begins using the original path automatically (auto-failback). In other cases, operator intervention is required to allow the system to begin using the original path (manual-failback).

In an active/passive configuration, the term *failback* commonly refers to traffic resuming the use of the primary paths, instead of the secondary paths, which requires that the primary paths be made active.

Failover

When an in-use path fails, if another active path is available, it is automatically used. When all active paths have failed, a set of passive paths can be made active and used. See also Active Path, In Use Path, and Passive Path.

In an active/passive configuration, the term failover usually refers to failing traffic from the primary paths to the secondary paths, which usually requires that the secondary paths be made active.

Front-side Path

A path between the host (HBA) and the SANbox SSP.

GUI

Graphical User Interface

In Use Path

A path that is currently being used for I/O traffic.

Inactive Boot Set

The boot set that is not in use in a running system.

Initiator

See Initiator Device.

Initiator Device

A device that contains one or more initiator ports.

Initiator Port

A Fibre Channel port capable of issuing SCSI commands.

Invalid Boot Set

A boot set that is empty or otherwise does not contain a usable system image.

LUN

Logical Unit Number, a numeric identifier for a virtual disk exposed through a particular target.

Maintenance Mode Image

Software component that implements basic system maintenance functions for the SANbox SSP, including system update capability.

Passive Path

A path that must have some operation performed on it to make it Active. See also Active/Active RAID, Active/Passive RAID, Active Path, and Secondary Path.

Patch File

Incremental update to an existing system image.

Physical disk

A SCSI disk device that can be discovered and managed by SANbox SSP.

POST

Power-On Self Test, the diagnostic sequence executed by SANbox SSP during system startup.

Primary Path

For an active/passive device, a path belonging to the set of paths that are active by default. See also Active/Passive RAID, Active Path, and Secondary Path.

SCSI Personality

A storage device profile that you assign to a user-defined host in the SVM GUI. For more information, see "To create a user defined host (UDH) and set the SCSI personality:" on page 5-9.

Secondary Path

For an active/passive device, the set of paths that are passive by default. See also Active/Passive RAID, Passive Path, and Primary Path.

SFP

Small Form-Factor Pluggable, the removable transceiver form factor used by SANbox SSP.

SNMP

Simple Network Management Protocol, the protocol used by SANbox SSP to report exception conditions to third-party network management applications.

SSH

Secure Shell, a protocol and application for communicating with a remote computer system. SSH is a more secure alternative to using telnet to communicate with SANbox SSP.

SSP

Storage Services Platform. A SAN-based system, separate from the core Fibre Channel switching infrastructure, that provides storage services across heterogeneous hosts, storage, and SAN fabrics.

Storage Pool

The StoreAge-specific term used to describe a collection of physical disks managed by the SVM appliance.

SVM

Storage Virtualization Manager. StoreAge's software for managing pools of virtualized SAN storage.

System Software Image

Updateable software component that contains the operating environment for SANbox SSP, including the StoreAge SVM Agent for SANbox SSP.

Target

See Target Device.

Target Device

A device that contains one or more target ports.

Target Port

A Fibre Channel port capable of presenting storage in the form of one or more SCSI LUNs.

Transceiver

A device that provides an interface between the SANbox SSP hardware and the external network cable. SANbox SSP uses optical SFP (Small Form-Factor Pluggable) transceivers.

Valid Boot Set

A boot set that contains a usable system image.

Virtual Disk

A SCSI disk device, presented by an SSP to one or more initiators, that maps to one or more physical disks. Also called virtual volume.

Virtual Volume

StoreAge-specific term for a virtual disk.

WWNN

World Wide Node Name, the globally unique identifier for a system containing Fibre Channel ports.

A WWNN is a 64-bit value, typically represented as a string of 16 hexadecimal digits.

WWPN

World Wide Port Name, the globally unique identifier for an individual Fibre Channel port.

A WWPN is a 64-bit value, typically represented as a string of 16 hexadecimal digits.

Index

Enable User command *B-11*
environmental specifications *A-3*
Ethernet
   changing port IP address *2-9*
   port connection *2-9*
   SANbox SSP Management GUI system
     panel *4-9*
   settings for remote access *3-8*
Exit command *B-12*

F

failing back *5-10*
fans *6-6*
features *2-3*
Fibre Channel port connections *2-9*
frame size *5-7*

G

getting started with SANbox SSP *3-1*
   checking package contents *3-2*
   set up *3-3*
   task roadmap *3-1*
glossary *C-1*

H

hardware
   chassis diagram *3-3*
   fans *6-6*
   high-availability requirements *5-3*
   main power switch *5-11*
   port LEDs *3-10*
   power supplies *6-6*
   setting up *3-4*
   transceivers *6-7*
Help command *B-12*
Help commands *B-13*
high-availability configuration *2-6*
   configuration with zoning example *5-4*
   protecting against network failures *2-8*
   setup requirements *2-8*, *5-1*, *5-3*

high-availability features specifications *A-2*
host connection *3-11*

I

INITIATOR NOT FOUND (LOOP/FABRIC)
     problem statement *7-3*
INITIATOR NOT FOUND BY SVM problem
     statement *7-4*
introduction *1-1*

L

LEDs *3-10*, *6-5*

M

main power switch *5-11*
maintaining the SANbox SSP *6-2*
   interpreting LED patterns *6-5*
   maintenance mode *6-3*
   replacing hardware components *6-6*
   system software *6-1*, *6-4*
Maintenance Mode
   accessing from the local console *6-3*
   image *6-1*
   installing an image on SANbox SSP *6-5*
mechanical specifications *A-3*
media specifications *A-1*
models *2-3*
Modify Date command *B-13*
Modify Eth command *B-13*
Modify Port command *B-14*
Modify Ports command *B-15*
Modify Timezone command *B-16*
Modify User command *B-16*

N

network configurations *2-4*
   high availability *2-6*
   small SAN with front/back-side SANs *2-5*
   small SAN with zoning *2-4*
new features *1-3*

Notes