Over 50 million QLogic products have shipped inside servers, workstations, RAID subsystems, tape libraries, disk and tape drives. Powering solutions from leading companies like Cisco, Dell, EMI, Fujitsu, Hitachi, HP, IBM, Network Appliance, Quantum, StorageTek and Sun Microsystems, QLogic’s broad line of controller chips, host bus adapters, network switches and management software move data from storage devices through the network fabric to servers. QLogic was recently named to Business Week’s list of 100 Hot Growth Companies for 2003.

That’s why QLogic is widely recognized as a leader in the market for storage area networking. Recent accolades include:

- Member of NASDAQ 100 Index
- Member of S&P 500 Index
- Barron’s 500
- Bloomberg Top 10 High Tech Company
- BusinessWeek Global 1000
- BusinessWeek Hot Growth Company
- Forbes Best 200 Small Companies
- Fortune’s 100 Fastest Growing Companies
- Network Computing
  - Editor’s Choice
  - “Well Connected” Data Management and Storage Technology Product of the Year
- BusinessWeek Global 100
- BusinessWeek Hot Growth Company
- Forbes
- Best 200 Small Companies
- Fortune’s 100 Fastest Growing Companies
- Network Computing
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<td>Application Software Configuration</td>
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<td>99</td>
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<td>QLogic Press Review</td>
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<tr>
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<td>105</td>
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</tbody>
</table>
Introduction

The QLogic SAN Configuration Guide for LSI Logic Storage is a comprehensive resource for developers and consultants interested in deploying QLogic solutions.

How to Use This Guide

This guide provides detailed solution configurations and interoperability information, which allow you to deploy a QLogic-powered SAN. Updated versions of this guide can be downloaded from the QLogic website at: http://www.qlogic.com/interopguide.

End-to-end interoperability not only includes switches, host bus adapters (HBAs), and storage products; it also extends to the component level. Therefore, this guide includes detailed information outlining the exact configurations tested by QLogic and the procedures necessary to deploy a SAN.

For More Information

Over 50 million QLogic products have shipped inside servers, workstations, RAID subsystems, tape libraries, disk and tape drives. Powering solutions from the industry’s leading storage network providers, the broad line of QLogic controller chips, HBAs, storage network switches and management software move data from storage devices through the network fabric to servers.

Additional QLogic resources can be found at the following locations:

Fibre Channel Host Bus Adapters

Fibre Channel Switches

QLogic Technical Support
http://www.qlogic.com/support/

Interoperability Guides from QLogic Press
http://www.qlogic.com/interopguide/
Statement of Support

QLogic understands the unique needs and complexities of each and every SAN. As a result, the QLogic SANtrack™ Service and Support Program provides customers with a flexible way to create a unique service and support package designed specifically to meet your distinct business requirements.

QLogic switch products allow a wide range of organizations to exploit the power of a SAN. Whether it's a fast growing small firm implementing a network with 10-20 devices or a Fortune 100 Corporation creating a large infrastructure with thousands of devices, QLogic SANtrack Service and Support Program effectively addresses either set of business requirements.

The SANtrack Service and Support Program is a diverse offering of a range of services including: Select and Prime service plans, Pre-Install Analysis, Installation, On-Site and Spare Upgrades. Customers may choose among the services that best meet the demands of their business. Most importantly, customers are assured complete satisfaction since QLogic and its qualified partners fully guarantee all products and services.

NOTE: For additional information on support, please see the QLogic website at: http://www.qlogic.com/support/warranty_santrack.asp.
Test Philosophy

The QLogic SAN configuration test philosophy is broken down into two test levels:

- Application-level interoperability
- Device-level interoperability

Application-Level Interoperability Test

The application-level interoperability test ensures that applications such as backup/restore, LAN-free back-up, serverless backup, and server clustering will run as designed on a combinations of hardware components that are representative of customer configurations. At this level, the hardware configurations are, for the most part, complex and can involve numerous devices that differ by type, vendor and operating system. Since the objective of this test is to determine the feasibility of typical customer SAN solutions, not every function of the application can be tested. While the application-level interoperability test addresses the major functions of the application, successful completion of the test does not guarantee full interoperability. However, it does provide a reasonably high level of confidence that the application will function well in most SAN solution scenarios.

Device-Level Interoperability

The device-level and system integration test verifies functionality of the device with additional hardware and software. The interoperability and system integration test ensures conformance with the ANSI Fibre Channel (FC) standards and interoperability between servers and storage.

Server Interoperability

This ensures there are no problems between the HBA and the server. Potential problems, which may be found in this testing, include incompatibility between the HBA and server PCI chipsets, and conflicts between the HBA driver/BIOS setting and drivers/BIOS setting of other installed devices/adapters in the server.

Storage Interoperability

Storage devices such as disk arrays and tape devices are tested with SAN hardware and HBAs. This ensures compatibility between the end device and SAN hardware. Potential problems that may be found include improper LIP handling, AL_PA and Worldwide Name problems, jitter, and so on.

Application Device-Level Interoperability

The application device-level interoperability test ensures coexistence with the operating system environment and typical user shrink-wrapped software. It also ensures that the software works with the applicable hardware. In the case of a Windows environment, the component should have successfully completed all applicable Microsoft Hardware Certification program tests.
Tested SAN Configurations

The following SAN illustrations show several different configurations and components certified by QLogic. Your configuration details may differ.

**NOTE:** For information on multi-vendor switch configuration, please see the *Switch Interoperability Guide* at [http://www.qlogic.com/interopguide](http://www.qlogic.com/interopguide).

**Single-Switch Configuration: SANbox2-64**
Cascade Configuration: SANbox 5200

Cascade Configuration: SANbox2-16 and SANbox2-64
Cascade Configuration: SANbox2-64 and McDATA 4500

Cascade Configuration: SANbox2-64 and Brocade 3800
Driver and Firmware Levels

The following driver and firmware levels were used during QLogic certification testing. As new levels of software are released, they will be supported. See the QLogic website for the latest drivers, software, and manuals: http://www.qlogic.com/support/drivers_software.asp.

QLLogic SANblade HBAs

<table>
<thead>
<tr>
<th>Model</th>
<th>Windows Driver</th>
<th>BIOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>QLA2310</td>
<td>8.2.3.11 or above</td>
<td>1.33 or above</td>
</tr>
<tr>
<td>QLA2340</td>
<td>8.2.3.11 or above</td>
<td>1.33 or above</td>
</tr>
<tr>
<td>QLA2342</td>
<td>8.2.3.11 or above</td>
<td>1.33 or above</td>
</tr>
</tbody>
</table>

Switches

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model</th>
<th>Firmware</th>
<th>SANbox Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>QLogic</td>
<td>SANbox 5200</td>
<td>4.0.0.11 or above</td>
<td>4.00.10 or above</td>
</tr>
<tr>
<td>QLogic</td>
<td>SANbox2-64</td>
<td>1.5.0.07 or above</td>
<td>1.05.14 or above</td>
</tr>
<tr>
<td>QLogic</td>
<td>SANbox2-16</td>
<td>1.5.0.07 or above</td>
<td>1.05.14 or above</td>
</tr>
<tr>
<td>QLogic</td>
<td>SANbox2-8</td>
<td>1.5.0.07 or above</td>
<td>1.05.14 or above</td>
</tr>
<tr>
<td>McDATA</td>
<td>Sphereon 4500</td>
<td>040102 4 or above</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Brocade</td>
<td>Silkworm 3800</td>
<td>3.0.2J or above</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Brocade</td>
<td>Silkworm 3200</td>
<td>3.0.2J or above</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

LSI Logic Storage

<table>
<thead>
<tr>
<th>Model</th>
<th>Controller</th>
<th>Firmware</th>
</tr>
</thead>
<tbody>
<tr>
<td>E2400</td>
<td>2772</td>
<td>05.30.06.00 or above</td>
</tr>
<tr>
<td>E2600</td>
<td>2882</td>
<td>05.33 or above</td>
</tr>
<tr>
<td>E4600</td>
<td>4884</td>
<td>05.30.06 or above</td>
</tr>
<tr>
<td>E5600</td>
<td>5884</td>
<td>05.30.06 or above</td>
</tr>
</tbody>
</table>
Application Software

<table>
<thead>
<tr>
<th>Application</th>
<th>Vendor</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>SANsurfer™ Management Suite CD</td>
<td>QLogic</td>
<td>2.0.23 or above</td>
</tr>
<tr>
<td>SANbox® Manager</td>
<td>QLogic</td>
<td>1.05.14 or above (SANbox2 Series)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.00.10 or above (SANbox 5200 Series)</td>
</tr>
<tr>
<td>SANblade™ Manager</td>
<td>QLogic</td>
<td>2.0.23 or above</td>
</tr>
<tr>
<td>SANtricity™ Storage Manager</td>
<td>LSI Logic</td>
<td>08.30 or above</td>
</tr>
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Operating Systems

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Version</th>
<th>Service Pack/Patch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microsoft Windows</td>
<td>2000 Server</td>
<td>SP3 or above</td>
</tr>
</tbody>
</table>

Libraries and Tape Drives

<table>
<thead>
<tr>
<th>Manufacturer *</th>
<th>Model</th>
<th>Microcode</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADIC</td>
<td>Scalar 100 Library</td>
<td>2.72.0012 or above</td>
</tr>
<tr>
<td></td>
<td>SNC 5100 Bridge</td>
<td>0410.14 or above</td>
</tr>
<tr>
<td>ADIC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IBM</td>
<td>ULT3583-TL Library</td>
<td>4.20.25 or above</td>
</tr>
<tr>
<td>IBM</td>
<td>ULT3580-TD1 Tape Drive</td>
<td>25D4 or above</td>
</tr>
<tr>
<td>IBM</td>
<td>SAN Data Gateway Bridge</td>
<td>4.20.25 or above</td>
</tr>
<tr>
<td>SeagateLTO</td>
<td>Viper 200 LTO Tape Drive</td>
<td>1440 or above</td>
</tr>
</tbody>
</table>

* These libraries and tape drives were tested during QLogic certification but procedures are not available. Please check with your tape or library vendor representative for more information.
SAN Setup and Configuration

The following section of the QLogic SAN Configuration Guide for LSI Logic Storage provides instructions to set up and configure your storage, servers, and storage network. Once you have completed these steps, additional procedures illustrate how to connect the host and storage ports to the networks and how to validate your storage network connections.

In most cases, the SAN setup and configuration proceeds in this order:

1. Storage Configuration
2. Server Configuration
3. Storage Network Configuration

After configuration, complete the process by:

- Testing Your SAN
Storage Configuration

This section outlines configuration procedures for the LSI Logic E-Series storage systems.

LSI Logic Storage Overview

The LSI Logic E-Series is a suite of full Fibre Channel systems focused on high performance computing and open systems environments. The LSI Logic controllers that power the E-Series systems share a common firmware for seamless migrations.

The series includes these models:

- The E2400 is an entry-level system powered by the 2772 controller. Its full-fibre design and the 2772 controller offer modular flexibility for either independent capacity or performance scaling. It features a 1 Gb/s Fibre Channel and migration paths to other LSI storage systems.

- The E2600 storage system is a full 2 Gb/s solution with a modular architecture and enterprise-class features. Its 2882 controller offers four host connections and up to seven additional drive modules.

- The E4600 provides eight 2 Gb/s host connections and up to 33 TB capacity for demanding, bandwidth-intensive applications, like databases and OLTP. A dual 4884 controller powers this fully featured storage system to ensure high I/O performance.

- The E5600 solution delivers peak throughput for high performance computing environments. Powered by a dual 5884 controller, the 5600 is a fully redundant system optimized for high-speed, disk-based performance.

For more information about LSI Logic storage solutions, see the LSI Logic website.

LSI Logic E-Series Storage Systems
http://www.lsilogicstorage.com/products/eseries.html

LSI Logic E2400 Product Information
http://www.lsilogicstorage.com/products/e2400.html

LSI Logic E2600 Product Information
http://www.lsilogicstorage.com/products/e2600.html

LSI Logic E4600 Product Information
http://www.lsilogicstorage.com/products/e4600.html

LSI Logic E5600 Product Information
http://www.lsilogicstorage.com/products/e5600.html
E-Series Configuration

The following sections describe how to configure the LSI Logic E-Series storage systems:

- Assumptions
- Configuration Steps

Assumptions

The following procedures assume that:

- You have available storage space of suitable size for the application being used.
- You have already installed the SANtricity management application on a management system.
- You have assigned an IP address to the array.
- Your device is currently connected to the LAN on the same subnet as the management system.

Configuration Steps

Completing these steps will prepare the allocated storage for connection to the fabric:

- Discovering Devices
- Renaming the Storage Array
- Creating a Volume

NOTE: Although you can follow these configuration steps for all E-Series storage systems, the steps are illustrated using only the E2400 model.
Discovering Devices
To discover the storage device, follow these steps:

1. Open the SANtricity Storage Manager Client Application.
2. The SANtricity Storage Manager opens and automatically detects the storage array on the LAN:

   ![SANtricity Storage Manager](image)

   If the application detects the device, skip to step 5. Otherwise, continue with steps 3 and 4 to discover the storage array.
3. If the application does not begin to auto-discover the device, select **Automatic Discovery** from the **Tools** menu:

![Automatic Discovery](image)

4. Select **OK** to begin the automatic discovery of the Storage Array:

![Automatic Discovery Confirmation](image)
5. Double-click **Storage Array** in the left frame to open the Array Management window:
Renaming the Storage Array

To rename the Storage Array, follow these steps:

**NOTE:** If you have already named the Storage Array, skip this section and see “Creating a Volume” on page 26.

1. Choose Rename from the Storage Array menu:

2. Type a name in the **Storage Array** field and click **OK** to apply:
Creating a Volume

1. From the Storage Manager window select **Create Volume** from the Volume Group menu:

2. Select the host type from the drop down menu (such as UNIX, Windows Cluster, Windows Non-Cluster) and click **OK** to apply:
3. Create a new volume group by selecting **Unconfigured capacity (create new volume group)** and click **Next** to continue:

![Create Volume Wizard - Introduction](image)

4. Select a **RAID level** from the list:

![Create Volume Wizard - Specify Volume Group Parameters](image)
5. Under Drive Selection Choices select **Automatic**:

![Create Volume Wizard - Specify Volume Group Parameters](image)

6. Choose the Volume Group Capacity desired by clicking the appropriate configuration and then click **Next**:

![Create Volume Wizard - Specify Volume Group Parameters](image)
7. Assign the desired capacity of the Volume Group as follows:
   a. Specify a value for the **New Volume Capacity**.
   b. Type a Name for the volume (optional).
   c. Click **Use Recommended Settings** for your volume characteristics.
   d. Click **Finish** to save your changes:

   ![Create Volume Wizard - Specify Volume Parameters]

8. Click **OK** to close the Create Volume Wizard.

   ![Create Volume Wizard - Completed]
9. In most cases, the new volume begins to initialize automatically. If not, select **Initialize** from the **Volume** menu.

10. At the prompt, type **yes** to confirm that you want to initialize the volume and click **OK** to begin:
11. To monitor the initialization progress, select the volume and click **Properties** on the Volume menu:
12. Use the blue progress bar to monitor the initialization process or click Close to exit the status window:

13. Once the initialization process completes, you can detect and format your new volume.

   For instructions to further configure the storage device, see the product manuals provided by your vendor.
Server Configuration

This section walks you through the steps needed to ready your server for connection to the storage network, including information on:

- Fibre Channel HBAs from QLogic
- Installing and configuring HBA drivers
- Installing the HBA and switch device management application (SANsurfer Management Suite)
- Configuring the HBA with appropriate settings

Once you have completed the steps in this section, you can continue to set up the storage network and connect the server to the fabric.

Fibre Channel HBAs Overview

The award-winning QLogic SANblade 2300 Series Fibre Channel HBAs offer 2Gb performance for demanding SANs and are available in PCI-X form factor, which is backwards compatible to PCI. QLogic SANblade HBAs are the industry's highest-performing and most widely deployed host adapter solutions for server, networking, storage and clustering solutions.

The SANblade 2300 Series architecture is the result of more than 15 years of progressive development and testing. The QLogic proven architecture delivers higher overall reliability and enables advanced functionality with its single chip integration, placing QLogic years ahead of its competitors. The SANblade 2300 also has proven interoperability with all major software applications, hardware platforms and operating systems.

The QLogic QLA23xx HBAs tested with the LSI Logic storage systems are:

- QLA234x
- QLA2310

Assumptions

The following procedures assume that:

- You have installed the HBA device into the system according to specifications in the hardware installation guide provided with the HBA. For more information, see the SANblade user manual at: http://www.qlogic.com/support/home_resources.asp?id=76.
- Your operating system and appropriate patches have been installed to meet the software and driver requirements for all components. For more information, see “Driver and Firmware Levels” on page 17.
Installing HBA Drivers

The following sections illustrate how to:

- Windows 2000 HBA Driver
- Windows 2000 HBA Pseudo LUN Driver

Windows 2000 HBA Driver

The QLA23xx HBAs are plug-and-play devices automatically detected by Windows 2000.

1. Download the latest driver from the Download section of the QLogic website (http://www.qlogic.com/support/drivers_software.asp) and extract them.

2. Windows 2000 detects the newly installed device, then displays the Found New Hardware Wizard message. Click Next to begin the driver installation.

3. When prompted, select Search for a suitable driver for my device (recommended) and click Next.
4. Check **Specify a location** and click **Next:**

![Found New Hardware Wizard](image1)

5. Browse to the directory containing the driver and click **OK:**

![Found New Hardware Wizard](image2)
6. When the **Driver Files Search Results** display, click **Next**:

![Found New Hardware Wizard]

- The wizard found a driver for the following device:
  - Fibre Channel Controller

- Windows found a driver for this device. To install the driver Windows found, click Next.

- c:\documents and settings\administrator\desktop\\driver\\driver\32\2010\setup.inf

7. Click **Finish** to complete the installation.

**Windows 2000 HBA Pseudo LUN Driver**

Windows 2000 detects the newly installed device automatically.

1. Click **Next** to begin the driver installation from the Found New Hardware Wizard message.
2. When prompted, select **Search for a suitable driver for my device (recommended)** and click **Next**.
3. Check **Specify a location** and click **Next**.
4. Browse to the directory containing the driver and click **OK**.
5. When the **Driver Files Search Results** display, click **Next**:

![Driver Files Search Results](image)

6. Click **Finish** to complete the installation.

**Solaris HBA Driver**

1. Install the QLA23xx HBA.
2. Power up the computer.
3. Download the latest driver from the **Download** section of the QLogic website ([http://www.qlogic.com/support/drivers_software.asp](http://www.qlogic.com/support/drivers_software.asp)) and uncompress the file using the **uncompress** command.
4. Follow the example below to install the driver:

   ```
   sodium:/qlogic-> uncompress qla2300_pkg_v406.Z
   sodium:/qlogic-> pkgadd -d ./qla2300_pkg_v406
   ```

   The following packages are available:
   
<table>
<thead>
<tr>
<th>Package</th>
<th>Description</th>
<th>Solaris</th>
<th>Revision</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 QLA2300-1</td>
<td>QLogic QLA2300 driver</td>
<td>(sparc) Solaris 2.6, Rev=4.06</td>
<td></td>
</tr>
<tr>
<td>2 QLA2300-2</td>
<td>QLogic QLA2300 driver</td>
<td>(sparc) Solaris 7, Rev=4.06</td>
<td></td>
</tr>
<tr>
<td>3 QLA2300-3</td>
<td>QLogic QLA2300 driver</td>
<td>(sparc) Solaris 8-9, Rev=4.06</td>
<td></td>
</tr>
<tr>
<td>4 QLSDMLIB</td>
<td>QLogic SDM Library</td>
<td>(sparc) Solaris 7-8-9, Rev=2.02</td>
<td></td>
</tr>
<tr>
<td>5 QLSDMLIB6</td>
<td>QLogic SDM Library</td>
<td>(sparc) Solaris 2.6, Rev=2.02</td>
<td></td>
</tr>
<tr>
<td>6 scfx2-6</td>
<td>QLogic SANblade Control FX (HBA Configuration Utility)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
(sparc) Solaris 2.6, 7 Rev=1.18
7 scfx2-8 QLogic SANblade Control FX (HBA Configuration Utility)
(sparc) Solaris 8-9 Rev=1.18

Select package(s) you wish to process (or 'all' to process all packages). (default: all) [?,??,q]: 3 (choose the correct driver for your OS version.)

Processing package instance <QLA2300-3> from </qlogic/qla2300_pkg_v406>

QLogic QLA2300 driver
(sparc) Solaris 8-9, Rev=4.06

Copyright (c) 1996-2002, by QLogic Corporation. All rights reserved.

Where do you want the driver object installed (default=/kernel/drv): <Hit Enter>

## Executing checkinstall script.
Using </> as the package base directory.
## Processing package information.
## Processing system information.
## Verifying disk space requirements.
## Checking for conflicts with packages already installed.
## Checking for setuid/setgid programs.

This package contains scripts which will be executed with super-user permission during the process of installing this package.

Do you want to continue with the installation of <QLA2300-3> [y,n,?] y

Installing QLogic QLA2300 driver as <QLA2300-3>
## Installing part 1 of 1.
/kernel/drv/qla2300
/kernel/drv/qla2300.conf
/kernel/drv/sparcv9/qla2300
[ verifying class <none> ]
## Executing postinstall script.
Reboot client to install driver.

Installation of <QLA2300-3> was successful.
SANsurfer Management Suite

The SANsurfer Management Suite CD contains both the SANblade Manager (HBA management) and SANbox Manager (switch management). These applications are used to configure the QLogic HBAs and switches.

The following procedures show you how to install both SANbox Manager and SANblade Manager, though you use only the SANblade Manager at this time. When you configure switches later, you can access the SANbox Manager.

Installing SANsurfer Management Suite on Windows

1. Download the latest version from the Download section of the QLogic website (http://www.qlogic.com/support/drivers_software.asp) and double click the icon to start the installation.
2. When the Introduction dialog displays, click Next.
3. Select the option to install Both GUIs (Blade/Box) and Agent. Click Next.
4. Read the **Application Notes** carefully and click **Next** when you’re ready:

5. Edit the path where you want to install the software or click **Choose** and browse to the location. Click **Next**:
6. Select the **Shortcut Profile** you wish to use. Click **Next**:

7. Check **Create a Desktop Icon** if you wish. Click **Install**:

8. Click **Done** when the installation process completes.
Configuring the HBA

The following section illustrates how to configure the HBA on Windows 2000 Server.

Configuring the HBA on Windows 2000 Server

1. Launch SANsurfer.
2. From the SANblade Manager, click Connect on the toolbar:
3. From the **Connect to Host** dialog, select the host from the list and click **Connect**:

![Connect to Host dialog](image1)

4. From the SANblade Manager, select the adapter in the left frame and select the **NVRAM Settings** tab in the right frame:

![SANblade Manager](image2)
5. Click the **NVRAM Settings** tab and choose **Extended NVRAM Settings** from the **Select NVRAM Section** list:
6. Select the connection type from the **Connections Options** list:
7. Select the connection speed from the **Data Rate** list:
8. Check Enable FC Tape Support:

9. Click Save.

10. Enter the Password in the Security Check dialog box:

    ![Security Check dialog box]

    **NOTE:** The default password is "config". Contact your System Administrator if the password was changed.

11. Click OK to close the NVRAM Save confirmation message:
Storage Network Configuration

This section provides instructions to set up and configure the QLogic Fibre Channel switches in the SANbox 5000 Series and SANbox2 Series. Completing the configuration steps in this section prepares the network for host and storage connections.

Fibre Channel Switches from QLogic

Deployed as standalone units or in multi-stage fabrics of any size, QLogic SANbox switches come with all the software tools necessary to create easy-to-manage, resilient and intelligent SANs. For additional information, see http://www.qlogic.com/products/fc_san_switches.asp.

SANbox 5000 Series Stackable Switches

The SANbox 5200 is the first switch in the new SANbox 5000 Series, providing the benefits of stackable IP switches for your SAN. It delivers the seamless scalability and performance of a chassis switch in an easy-to-manage, pay-as-you-grow solution. With up to sixteen 2Gb ports plus a four-pack of high-speed 10Gb ISL ports, each 5200 stackable switch provides maximum flexibility for configuring, managing and scaling SANs.

SANbox2 Switches

All the SANbox2 switches offer a scalable, highly available solution to protect the investment in your SAN backbone. The next-generation SANbox2 switches bring performance, reliability and simplicity to storage networking. The SANbox2-64 switch is designed to meet the needs of your growing enterprise while the SANbox2-8 and SANbox2-16 switches offer twice the throughput of today's 1 Gb products at a lower cost of entry.

Configuration Overview

The basic steps to configure your SANbox switch are similar, whether you use the SANbox 5000 Series or the SANbox2 Series. Refer to the appropriate section for your switch:

- SANbox 5000 Series Configuration
- SANbox2 Configuration

After you have completed the configuration steps for your SANbox switch, the following sections provide guidelines for testing applicable to both the SANbox 5000 and SANbox2 Series switches:

- Testing Your SAN
  - Zone Verification
  - Test Configuration
SANbox 5000 Series Configuration

The following procedures explain how to configure the SANbox 5200 switch, verify the connections and test your configuration:

- Configuring the Switch
- Connecting Cables
- Configuring Zones

**NOTE:** The SANbox 5200 switch requires a later version of the SANbox Manager than what was available for download with the SANsurfer Management Suite when this guide was published. Be sure to verify the correct version before you configure the switch. Refer to “Application Software” on page 18.

Configuring the Switch

The following procedures explain how to configure the SANbox 5200 switch:

- Installing SANbox Manager
- Selecting Configuration Options
- Configuring Port Properties
Installing SANbox Manager

**NOTE:** The following steps explain how to download and install the SANbox Manager separately from the SANsurfer Management Suite.

1. Download the SANbox Manager version required for the SANbox 5200 from the Download section of the QLogic website (http://www.qlogic.com/support/drivers_software.asp) and double-click the icon to start the installation.

2. From the Introduction screen, click **Next**:
3. From the Choose Install Folder screen:
   a. Select an installation folder.
   b. Click **Next**.
4. From the Choose Shortcut Folder window:
   a. Select a location for the SANbox Manager shortcut.
   b. Click Next.
5. From the Pre-Installation Summary screen, review the configuration information and click **Install** to start the installation.
6. When you see the Installation Complete message, click **Done** to close the window.
Selecting Configuration Options

1. Launch SANbox Manager.
2. From the Initial Start Dialog:
   a. Select Open Configuration Wizard.
   b. Click Proceed.
3. From the Introduction window, click **Next**:
4. From the Select Configuration Option window:
   a. Select **Configure a new switch**.
   b. Click **Next**.
5. From the Temporary IP Address Assignment window:
   a. Enter a temporary IP Address and Subnet Mask.
   b. Click **Next**.
6. From the Admin Password window, click **Next**.

**NOTE:** User authentication is disabled by default.
7. When the Auto-connection window displays:
   a. Power on or cycle power on the switch.
   b. When the new switch information appears in the window, click **Next**.

8. From the Domain ID Configuration window:
   a. Select the desired **Domain ID** (optional if Domain ID Lock disabled).
   b. Check **Domain ID Lock** if you want to hard set your Domain ID.
c. Click **Next**.
9. In the Switch Symbolic Name window:
   a. Enter a name for the switch.
   b. Click **Next**.
10. From the Network Configuration window:
   a. Enter the desired IP Address and other network information.
   b. Click **Next**.
11. From the Switch Date and Time window:
   a. Check **Use date/time from this workstation** or manually enter the date and time for the switch if you are not using the local system information.
   b. Click **Next**.

12. From the Switch Admin User Password window:
   a. Check **Enable user authentication** if you want to use this option. Otherwise, leave unchecked.
   b. Enter and confirm a **New Admin Password** if you are enabling user authentication. Otherwise, leave these fields blank.
c. Click **Next**.

13. From the Commit Changes window:
   a. Review the configuration settings.
   b. Check **Save switch archive after committing changes** if you want to save the switch configuration archive file; then select the location and file name.
c. Click **Next**.
14. From the Apply Changes window:
   a. Verify that all changes were applied.
   b. Click **Next**.
15. From the Reset Switch window, click **Finish** to complete the configuration.

16. From the Finished window, click **Close**.
Configuring Port Properties

1. From the SANbox Manager, select Add Fabric from the Fabric menu:

   ![SANbox Manager](image1)

2. From the Add a New Fabric dialog:
   a. Enter a Fabric Name, IP Address, and Login Name/Password (if user authentication enabled).
   b. Click Add Fabric.

   ![Add a New Fabric](image2)
3. From the SANbox Manager – Faceplate dialog, expand the fabric and select the switch you wish to configure:
4. From the SANbox Manager – Faceplate dialog:
   a. Select one or more 1G/2G ports from the list.
   b. Select **Port Properties 1G/2G** from the Port menu.
5. From the Port Properties dialog:
   a. Select the desired port settings.
   b. Click OK.

6. Click OK to close the Updating Port Properties message:
Connecting Cables

1. Connect the devices to the SANbox 5200 switch ports you configured.
2. Verify that the green Login LED is illuminated for each device.
3. Launch SANbox Manager and connect to the SANbox 5200.
4. From the SANbox Manager – Faceplate dialog, verify that all devices are listed in the Name Server.
Configuring Zones

1. Launch the SANbox Manager and connect to the SANbox 5200.
2. From the SANbox Manager – Faceplate dialog, select **Edit Zoning** from the Zoning menu:
3. From the Edit Zoning dialog, select **Create Zone Set** from the Edit menu:

![Create Zone Set dialog](image)

4. From the Create a zone set dialog:
   a. Enter a **Zone Set Name**.
   b. Click **OK**.

![Create a zone set dialog](image)
5. From the Edit Zoning dialog:
   a. Select the new zone set in the left frame.
   b. Select **Create a Zone** from the Edit menu.

6. From the Create a zone dialog:
   a. Enter a **Zone Name**.
   b. Click **OK**.

7. From the Edit Zoning dialog:
   a. Expand the zone set and select the zone in the left frame.
   b. Highlight the devices to add in the right frame.
   c. Select **Add Members** from the Edit menu.
d. Click **OK**.

8. From the Error Check dialog:
   a. Click **Perform Error Check**.
b. Verify that there were no errors reported:

![Error Check dialog box]

There were 0 errors found.

**Status: Error Check Complete**

- Proceed With Save
- Return to edit

![Status: Error Check Complete]

c. Click **Proceed with Save**.

9. Click **OK** to close the Zoning data confirmation message:

![Zoning data dialog box]

Configured zoning data saved OK.
You must activate or deactivate to affect the active zoning.

**OK**

10. Click **OK** to close the Update Zoning information message:

![Update Zoning information dialog box]

Change request successful.
Status: Update complete. Click 'OK' to continue.

**OK**
11. From the SANbox Manager – Faceplate dialog, select **Activate Zone Set** from the Zoning menu:

![SANbox Manager Faceplate Dialog]

12. From the Activate Zone Set dialog:
   a. Select the Zone Set to activate from the list.
   b. Click **Activate**.
13. Click **OK** to close the Activate Zone Set confirmation message:
SANbox2 Configuration

The following procedures explain how to configure the SANbox2 switch, verify the connections and test your configuration:

- Configuring the Switch
- Connecting Cables
- Configuring Zones

The SANbox2-64 was tested in both standalone and cascade environments.

If your SAN configuration uses a multi-vendor environment, see the QLogic Switch Interoperability Guide located at http://www.qlogic.com/interopguide for configuration procedures.

Configuring the Switch

The following procedures explain how to configure the SANbox2 switch:

- Configuring Serial Ports
- Assigning IP Address
- Configuring Port Properties
- Setting up HBA Persistent Binding

Configuring Serial Ports

1. Connect a DB9 (female) Null modem cable to the switch.
2. Launch a serial communication application and configure it with the following settings:
   - **BAUD Rate**: 9600
   - **Data Bits**: 8
   - **Parity**: None
   - **Stop Bits**: 1
   - **Flow Control**: None

Assigning IP Address

Using the Command Line Interface (CLI):

1. Login to the switch. (username: admin, Password: password)
2. Start the administrator mode:
   ```
   SANbox2 #> admin start
   ```
3. Start the switch setup program to configure the IP address.
   ```
   SANbox2 (Admin) #> set setup system
   Eth0NetworkAddress (dot-notated IP Address) [10. 0.0.1] <IP Address>
   Eth0NetworkMask (dot-notated IP Address) [255.0.0.0] <Net Mask>
   ```
**SANbox2 Configuration**

**Configuring the Switch**

**Eth0GatewayAddress** (dot-notated IP Address) [10.0.0.1] <Gateway>

**Eth0NetworkDiscovery** (1=Static, 2=Bootp, 3=Dhcp, 4=Rarp) [Static]

**AdminTimeout** (dec value 0-1440 minutes, 0=never) [30]

**TempMonitoringWarning** (dec value 0-100 degrees Celsius) [65]

**TempMonitoringFailure** (dec value 0-100 degrees Celsius) [70]

**TempFailurePortShutdown** (True / False) [False]

**SecurityEnabled** (True / False) [False]

**LocalLogEnabled** (True / False) [True]

**RemoteLogEnabled** (True / False) [False]

**RemoteLogHostAddress** (dot-notated IP Address) [10.0.0.254]

Do you want to save and activate this system setup? (y/n): [n] y

System setup saved and activated.

**Configuring Port Properties**

1. Launch SANbox Manager.
2. From the main window, click the **FC Fabric** tab:
3. Select **Add Fabric** from the **Fabric** menu:

![Add Fabric Screen]

4. Enter a **Fabric View Name** and the **IP Address** of the switch; click **Add Fabric**:

![Add Fabric Dialog Box]
5. Expand the **Fabric** in the left frame and select the switch you wish to configure:
6. From the SANbox Manager – Faceplate dialog:
   a. Select a single port or using the Ctrl/Shift key select a number of ports.
   b. Select **Port Properties** from the **Port** menu.
7. From the Port Properties dialog, select the **Port Speed** and **Port Mode** for the selected port(s):

![Port Properties dialog](image)

8. Click **OK** to close the status message:

![Updating Port Properties](image)

**Setting up HBA Persistent Binding**

Persistent binding is an optional setup step to ensure that devices will be identified in a consistent fashion to the Operating System each time a device is discovered. For example, a device with WWN 50:05:0d:80:00:00:50:72 is detected by the Operating System as controller 2, target 2, LUN 0. Settings should also remain consistent after each reboot of the server.

Please see [http://www.qlogic.com/support/home_resources.asp?id=76](http://www.qlogic.com/support/home_resources.asp?id=76) for more information on persistent binding.

**NOTE:** Persistent binding is an optional step that must be completed after configuration of all SAN devices.
Connecting Cables

1. Connect the devices to the switch ports you have already configured.
2. Verify that the green Login LED is illuminated for each device.
3. Launch the SANsurfer Manager and connect to the SANbox2-64.
4. From the SANbox Manager-Faceplate dialog:
   a. Select the **Name Server** tab in the lower right frame.
   b. Verify that all devices are listed.
Configuring Zones

1. In the SANbox Manager – Faceplate dialog, select **Edit Zoning**... from the **Zoning** menu:
2. In the Edit Zoning dialog, select **Create Zone Set** from the **Edit** menu:

![Create Zone Set dialog](image)

3. From the Create a Zone Set dialog, enter the name of the zone set and click **OK**:

![Create a Zone Set dialog](image)
4. From the Edit Zoning dialog, click on the new zone set and select **Create a Zone...** from the **Edit** menu.

5. From the Create Zone dialog:
   a. Click on the new zone.
   b. Select the devices from the right frame.
c. Select **Add Members** from the **Edit** menu.

d. Click **OK**.

6. Click **OK** to the Zoning Data message:
7. Click OK to close the Update Zoning Information message:

![Update Zoning information - SANbox Manager]

Change request successful.
Status: Update complete. Click 'OK' to continue.

OK

8. In the SANbox Manager – Faceplate dialog, select **Activate Zone Set...** from the Zoning menu:
9. From the Activate Zone Set dialog, select the zone set you wish to use and click **Activate**:

![Activate Zone Set](image)

10. Click **OK** to the Activate Zone Set message:

![Activate Zone Set](image)
Testing Your SAN

After completing the storage configuration, the last step is to validate that your storage area network is set up and configured correctly. The following steps will provide you with a very basic test that ensures your storage is accessible by the host and data can be passed across the SAN.

You can use these tests for both the SANbox2 and SANbox 5000 Series switches:

- Zone Verification
- Test Configuration

Zone Verification

To verify zones in Windows 2000 Server:

1. Launch the Windows Microsoft Management Console (MMC) and click the Device Manager icon.
2. Verify that Disk Drives, Medium Changers, Tape Drive, and any other device zone with the host is present in the device tree.

   **NOTE:** Components may appear under the Unknown Devices tree until you install the proper driver.

Test Configuration

To test configuration with Windows 2000 Server (Disk):

1. Launch the Windows MMC and click the Disk Management icon.
2. Verify that the correct number of LUN(s) is present.
3. Write signatures, partition and format the LUN(s) to meet your needs.
4. Copy data to the newly created partition and verify the data transferred correctly by using the DOS Compare command or a data comparison application of your choice.
Application Software Configuration

Prior to installing any application software, be sure that:

- Test systems are ready.
- Operating system software is configured and can see all devices.
- Fibre channel HBAs, tape library, and all the needed SAN infrastructure are available.
- Servers can ping one another on the LAN.
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For more information about QLogic markets and applications, sales channels, products, milestones and technology roadmaps, please visit the QLogic website at www.qlogic.com or use one of the following contact numbers.

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That’s why QLogic is widely recognized as a leader in the market for storage area networking. Recent accolades include:

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- Member of S&P 500 Index
- Barron’s 500
- Bloomberg Top 10 High Tech Company
- Business Week Global 1000
- Business Week Hot Growth Company
- Forbes Best 200 Small Companies
- Fortune’s 100 Fastest Growing Companies
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