

# StorageWorks by Compaq

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Release Notes -  
Fibre Channel SAN Switch 2/16 EL

Part Number: AV-RSBBA-TE

**First Edition (April 2002)**

**Product Version:** 3.0.2c

*These Release Notes contain late-breaking and supplemental information for the Compaq StorageWorks Fibre Channel Storage Area Network (SAN) Switch.*

For the latest version of these Release Notes and other Fibre Channel SAN Switch documentation, visit the Compaq storage website at:

<http://www.compaq.com/storage/index.html>

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Release Notes - Fibre Channel SAN Switch 2/16 EL  
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## 3.0.2c Firmware Update

The 3.0.2c firmware that resides on the SAN Switch 16 EL is a maintenance release of firmware version 3.0.2. Firmware release 3.0.2c provides fixes for problems associated with Web Tools, the name server and the Application Programming Interface (API). The SAN Switch 16 EL supporting documentation does not reference the 3.0.2c version number, as no document changes have occurred between firmware release 3.0.2 and 3.0.2c.

**IMPORTANT:** The v3.0.2c firmware works with the Compaq SAN Switch 2 Gb models. The firmware will not work if loaded onto Compaq's SAN Switch 1 Gb switch models.

## Intended Audience

This document is intended for customers who purchased the *StorageWorks*<sup>TM</sup> SAN Switch 2/16 EL by Compaq.

## Important Information about the IV\_Domain\_Fabric License

Read the following sections for important information regarding the IV\_Domain\_Fabric license installed on your SAN Switch 16 EL.

## Four Switch Limitation

The SAN Switch 2/8 EL and 16 EL shipping configurations integrate the IV\_Domain\_Fabric license. The IV\_Domain\_Fabric license limits the number of switches that can be connected to a single fabric to four. If more than four switches (of any type) are added to the fabric where EL switches are installed, Web Tools generates multiple error messages. Refer to chapter 2 in the *StorageWorks by Compaq SAN Switch 16 EL Installation Guide*, Part Number AA-RSBAA-TE for a list of specific errors.

**IMPORTANT:** You can upgrade the 2/8 EL and 16 EL switches to full fabric support by installing an optional upgrade license. See the "Four Switch Limitation Workarounds" described in the next section of these Release Notes for instructions on how to purchase the Full Fabric license.

## Four Switch Limitation Workarounds

Use one of the following workarounds to prevent four switch limitation errors.

- Upgrade the current Compaq SAN Switch 2/8 EL or 2/16 EL IV\_Domain\_Fabric license to the *optional* Full Fabric license. The Full Fabric license provides full fabric functionality, with no limits on the number of switches in the fabric.

For purchasing information, contact your authorized Compaq Sales representative, or go to the Compaq website:

<http://www.compaq.com>

**NOTE:** Complete installation instructions are provided with each license. After the Full Fabric license is installed, the fabric identifies the switch as an 2/8 EL or 2/16 EL with a Full Fabric license, providing full fabric functionality.

- In fabrics which contain five or more switches, with at least one switch with the IV\_FABRIC license installed, reduce the number of switches to four or less.

## Firmware Version 3.0.2c Features

The following are features or enhancements of firmware version 3.0.2c:

- Provides the ability to build large SANs.
- Extends name service query time to 1 second from 0.12 second.
- No longer sends PDISK to a single Arbitrated Loop Physical Address (ALPA) on a single port on the switch.
- A fix for an issue with loops on the SAN Switches where certain AL\_PAs on a loop become inaccessible.
- Provides a new user interface for managing switches with Graphical User Interface (GUI) pages for:
  - fabric discovery
  - zoning
  - name server
  - port enables
  - firmware downloads
  - switch administration
  - user administration

- software readable serial number
- Simple Network Management Protocol (SNMP) administration
- license administration
- other features for managing switches in a fabric.
- Supports both Microsoft Internet Explorer and Netscape Navigator Browsers.
- Commands are insensitive to letter case. For example, the command line accepts fabricshow as well as fabricShow.
- Active Zone Configuration Warning: Web Tools now issues a warning before disabling an active zone configuration. This lowers the risk that a Zoned Fabric may become un-zoned. A "Confirm Zone Delete" window appears confirming deletion of a zone. The window also notifies the user that the specified zone member will be removed from corresponding configurations. The user should click "Yes" to continue, and "No" to cancel the zone delete.
- Fabric Assist Mode Zones: Fabric Assist zoning now supports the ability to assign ALPAs to the targets zoned with private initiators which require a fixed ALPA for specific services such as booting.
- Loop Port Control (LPC) is an Extended Link Service that provides a mechanism to an N\*\_Port to request and an FL\_Port transmit the LPB or LPE primitive sequence on a remote arbitrated loop. There are now two ALPA bitmaps; one bitmap of devices to bypass and another bitmap of devices to enable.
- Switch names may begin with a numeric character.
- New commands including:
  - portCfgFAport c
  - loopPortTest
  - portCfgLPort
  - fazoneCreate

## Optional Software Components

The SAN Switch 2/16 EL ships with version 3.0.2c firmware, and includes the Web Tools and Advanced Zoning applications. These features were enabled at the factory via a software license key. It is recommended that you record the software keys in case they are deleted by accident.

The SAN Switch 2/16 EL with version 3.0.2c firmware supports the following optional software components:

- **Enhanced Trunking** (Compaq part number 262872-B21)

The Enhanced Trunking feature provides a true load balancing capability when provisioning multiple Interswitch Links (ISLs) between switches. Up to four E\_ports may be logically grouped to provide a high bandwidth trunk between two switches. The industry standard Fibre Shortest Path First (FSPF) routing algorithm views the trunk as a single, high bandwidth resource (up to 8 Gbps) when routing connections between switches.

Connections are load-balanced across the individual links, which comprise the logical trunk group. Frames between two endpoints may traverse different links within the group, however, frames always maintain in-order delivery.

- **Advanced Performance Monitoring** (Compaq part number 262870-B21)

This optional feature provides the ability to monitor and watch specific fabric metrics, giving unprecedented flexibility and control to the Fabric Administrator. This new feature allows you to fine-tune and scale your fabric more efficiently. Performance Monitoring also allows the ability to have an early warning detection of hot-spots within the fabric providing a powerful tool for maintaining overall balanced performance.

- **Fabric Watch** (Compaq part number 262864-B21)

Fabric Watch software monitors the performance and status of Compaq Fibre Channel SAN Switches, and can alert SAN administrators when problems arise. The real-time alerts from Fabric Watch software help SAN administrators solve problems before they become costly failures. SAN managers can configure Fabric Watch software to monitor any of the following:

- Fabric events (such as topology reconfigurations and zone changes)
- Physical switch conditions (such as fans, power supplies, and temperature)
- Port behavior (such as state changes, errors, and performance)
- GBICs (for switches equipped with SMART GBICs or the Small Form Factor Pluggables, such as the Finisar SMART GBIC FTRJ-8519-3-2.5)

- **Performance Package** (combination of three components above)  
(Compaq part number 262874-B21)
- **QuickLoop/Fabric Assist** (Compaq part number 262866-B21)  
QuickLoop is an optional-licensed product that allows arbitrated loops to be attached to a fabric. Without modifying their drivers, private targets on the arbitrated loops can be accessed by public or private hosts elsewhere on the fabric.  
  
Devices attached to QuickLoop communicate with all other devices attached to the same QuickLoop. However, private devices attached to QuickLoop communicate only with devices within the same QuickLoop. Public devices in an arbitrated loop mode are considered private devices when connected to QuickLoop ports.
- **Extended Fabric** (Compaq part number 262868-B21)  
Extended Fabrics uses Fibre Channel technology to create a fabric interconnected at distances of up to 100 kilometers (km) for the 1 Gb Switches and 75 km for the 2 Gb Switches running at 1 Gbps. The use of Extended Fabrics can increase the allowable distance between two switches and optimizes the internal buffering algorithm for the SAN Switches. This optimized buffering results in line speed performance of close to full Fibre Channel speed for switches interconnected at 100 km, providing the highest possible performance for transfers between switches.
- **StorageWorks SAN Switch 2/8 EL Upgrade Kit** (Compaq part number 288162-B21)  
License which increases connectivity of a SAN Switch 2/8 EL from a 4 switch maximum configuration to a full SAN fabric configuration. Please refer to the *StorageWorks by Compaq Heterogeneous Open SAN Design Reference Guide*, Part Number AA-RMPND-TE, for SAN design configurations.
- **StorageWorks SAN Switch 2/16 EL Upgrade Kit** (Compaq part number 288250-B21)  
License which increases connectivity of a SAN Switch 2/16 EL from a 4 switch maximum configuration to a full SAN fabric configuration. Please refer to the *StorageWorks by Compaq Heterogeneous Open SAN Design Reference Guide*, Part Number AA-RMPND-TE, for SAN design configurations.



## Compatibility

SAN Switch firmware v3.0.2c is compatible with the StorageWorks SAN Switch software versions 2.6.0c, allowing both 1 and 2 Gb switches to operate in the same fabric.

For the latest supported configurations, please refer to the *StorageWorks by Compaq Heterogeneous Open SAN Design Reference Guide*, Part Number AA-RMPND-TE, available at:

<http://www.compaq.com/products/storageworks/san/documentation.html>

**IMPORTANT:** *StorageWorks* by Compaq 1 Gb switch models running software version 1.6d are *not* supported with the *StorageWorks* SAN Switch 2/8 EL by Compaq.

## Cascading

Cascading of switches is supported for up to 7 hops where a hop is defined as a connection from one switch to another. Connections should be made such that traffic from an NL\_Port will not transverse more than the number of currently supported hops when traveling through the cascaded switches.

When cascading switches, sequentially assign domain addresses to the switches prior to connecting them to other switches in a SAN. When connecting a powered down switch to a SAN that is running, the SAN will automatically assign a domain number to the new switch when it is powered up. When connecting a SAN to a switch that is already powered up, the switch will not join the SAN if there are duplicate domain numbers. It is best to manually assign a domain number to a switch being added to a SAN. Refer to the *StorageWorks by Compaq Fibre Channel SAN Switch Management Guide*, Part Number AA-RMMJB-TE for more information on compatibility mode and zoning.

## Management Server

Management Server now uses Topology Discovery during the fabric topology discovery process.

The process involves two standards: FC-FS and FC-GS-3.

- **FC-FS**

RTIN/RNID queries: Request Node Identification Data and Request Topology Information are now supported.

- **FC-GS-3**

GATIN/GNID/GTIN: Get Attributes of Topology Information/Get Node Identification Data/ Get Topology Information are now supported.

Information about Fibre Channel standards and the Fibre Channel industry in general can be found on the Fibre Channel Industry Association website, located at:

<http://www.fibrechannel.com>.

## Enterprise Virtual Array

The minimum supported firmware level for the *StorageWorks* Enterprise Virtual Array by Compaq is VCS V1.02. The upgrade of the Enterprise storage subsystem firmware must be performed before the upgrade of the switch firmware. Please consult the Enterprise Virtual Array technical documentation for specific information for upgrading VCS firmware.

## Management Station Requirements

The workstation used to manage a fabric and configure a switch must meet the following requirements in order to install and run Web Tools. Web Tools is installed and runs on the switch but is displayed in a web browser running on the workstation.

## Operating Systems

One of the following operating systems must be installed:

- Solaris 2.61 or later
- Windows 95, 98, or 2000
- Windows NT 4.0

## Memory Requirement (Windows operating systems)

The minimum installed RAM memory requirements are listed next. Generally, managing more switches means a larger memory requirement.

Number of Switches	Minimum Memory Requirement
1-4	64 MB
5-9	96 MB
10-20	128 MB
21 or more	256 MB

## Disk Space

Free disk space of 5 MB or more is required to store the program. Free disk space of 256 MB is recommended to run the program efficiently.

## Web Browsers

One of the following web browsers must be installed:

- Netscape Communicator 4.5x, 4.7x
- Internet Explorer 4.x, 5.x

**NOTE:** The browser must be configured to work with Web Tools. For configuration information, refer to the *StorageWorks by Compaq Fibre Channel SAN Switch Management Guide*, Part Number AA-RMMJB-TE.

## Java Plug-in

The correct Java Plug-in must be installed for the operating system installed on the workstation.

- **Windows 95, 98, 2000, or NT:**  
Java Plug-in version 1.3.1\_01 is required for the SAN Appliance.
- **Solaris:**  
Java Plug-in version 1.2.2-02 for Solaris, including the Java Plug-in patch created by Sun Microsystems for Solaris, is required.

## SNMP-Based Management

Many SNMP Fibre Channel Management programs have the capability to log SNMP trap information (error and status events) occurring on the switch into the Windows NT application Event log. To enable this capability, the following parameters must be set on the switch:

**NOTE:** These parameters can be set either through the switch GUI by selecting the **admin.** button and clicking on the **SNMP Admin** tab, or by using the Telnet interface along with the `agtcfgSet` Telnet command.

The switch will send one copy of a trap message to each IP address that is listed in the communities. If you enter the same IP address into more than one of the communities, you will get multiple copies of the same trap message.

- **swEventTrapLevel: (0..5)**—must be set for a severity level from 0 to 5
  - 0 – none
  - 1 – critical
  - 2 – error
  - 3 – warning
  - 4 – informational
  - 5 – debug

**NOTE:** Additional information is provided in the *StorageWorks by Compaq Fibre Channel SAN Switch Management Guide*, Part Number AA-RMMJB-TE.

- **authTrapsEnabled: (true, t, false, f)**—must be set to “true” or “t” to enable sending of traps

**NOTE:** This parameter is set to “true” or “t” by default.

## Web Management Tools

The following features have been added or modified in Web Tools.

### Zone Admin View

The new Zoning Configuration Analyze screen, available from the Zone Admin View, displays a summary of the saved configuration and indicates some of the zoning conflicts before applying the changes to the switch. For more information, refer to the *StorageWorks by Compaq Web Tools User Guide*, Part Number AA-RQ6GA-TE.

## Admin View

- **Network Configuration Tab**

The new Network Configuration tab, available from the Admin View, can be used to manage the IP networking functionality of the switch. For more information, refer to the *StorageWorks by Compaq Web Tools User Guide*, Part Number AA-RQ6GA-TE.

- **Port Settings Tab**

The new Port Settings tab, available from the Admin View, can be used to disable and enable ports on a switch. The Port Settings tab is also used to set port speed to 1 GB/2GB/Autosense as well as disable and enable the Trunking feature. For more information, refer to the *StorageWorks by Compaq Web Tools User Guide*, Part Number AA-RQ6GA-TE.

- **Routing Tab**

The new Routing tab, available from the Admin View, can be used to view the routing table and to set the link cost for the selected ports and static route. For more information, refer to the *StorageWorks by Compaq Web Tools User Guide*, Part Number AA-RQ6GA-TE.

- **Trunk Information Tab**

The new Trunk Information tab, available from the Admin View, is a read-only tab that displays trunk information. For more information, refer to the *StorageWorks by Compaq Web Tools User Guide*, Part Number AA-RQ6GA-TE.

- **Report Tab**

The new Report tab, available from the Admin View, is a read-only tab that displays information about all of the switches, interswitch links, and ports in the Fabric. For more information, refer to the *StorageWorks by Compaq Web Tools User Guide*, Part Number AA-RQ6GA-TE.

- **SNMP Tab**

The SNMP tab, available from the Admin View, has been updated to include "Community and Trap Recipient Configuration" and "Access Control List Configuration" information. It can now be used to specify the switch community string, location, trap level, and trap recipients. For more information, refer to the *StorageWorks by Compaq Web Tools User Guide*, Part Number AA-RQ6GA-TE.

## SAN Integrated Switch Software CD, Version 3.0.2c

The *StorageWorks* SAN Switch 2/16 EL by Compaq ships with the latest version of the firmware installed. A copy of the latest version of the firmware as of this date, v3.0.2c, is also contained on the CD. The v3.0.2c firmware is also available on the Compaq website at:

<http://www.compaq.com/products/storageworks/hubs-and-bridges/firmwareupdate.html>

Instructions for downloading the firmware onto a switch are also contained on the software CD.

## CD Directory Structure

The SAN Integrated Switch Software CD version 3.0.2c contains the following items.

- DSGGD

- Docs

- README.TXT, includes late-breaking changes to documentation
- AA-RSB6A-TE.pdf, *StorageWorks by Compaq SAN Switch 2/8 EL Installation Guide*
- AA-RSBAA-TE.pdf, *StorageWorks by Compaq SAN Switch 2/16 EL Installation Guide*
- AV-RSB7A-TE.pdf, *StorageWorks by Compaq SAN Switch 2/8 EL Release Notes*
- AV-RSBBA-TE.pdf, *StorageWorks by Compaq SAN Switch 2/16 EL Release Notes*
- AA-RR7TA-TE.pdf, *StorageWorks by Compaq SAN Switch 2/16 Advanced Performance Monitoring Release Notes*
- AA-RR7UA-TE.pdf, *StorageWorks by Compaq Advanced Performance Monitoring User Guide*
- AA-RR82A-TE.pdf, *StorageWorks by Compaq ISL Trunking User Guide*
- AA-RR81A-TE.pdf, *StorageWorks by Compaq SAN Switch 2/16 ISL Trunking Release Notes*
- AA-RR89A-TE.pdf, *StorageWorks by Compaq SAN Switch 2/16 Performance Bundle Release Notes*
- AA-RQ6EA-TE.pdf, *StorageWorks by Compaq Fabric OS Procedures User Guide*
- AA-RR7KA-TE.pdf, *StorageWorks by Compaq SAN Switch 2/16 Quick Loop Release Notes*
- AA-RR7LA-TE.pdf, *StorageWorks by Compaq Quick Loop User Guide*
- AA-RQ6FA-TE.pdf, *StorageWorks by Compaq Fabric OS Reference Guide*
- AA-RQ6GA-TE.pdf, *StorageWorks by Compaq Web Tools User Guide*
- AA-RQ6HA-TE.pdf, *StorageWorks by Compaq MIB Reference Guide*
- AA-RQ6YA-TE.pdf, *StorageWorks by Compaq Zoning User Guide*
- AA-RR7QA-TE.PDF, *StorageWorks by Compaq Extended Fabric Version 3.0 User Guide*
- AA-RR7YA-TE.PDF, *StorageWorks by Compaq Fabric Watch Version 3.0 User Guide*
- AA-RR7PA-TE.PDF, *StorageWorks by Compaq SAN Switch 2/16 Extended Fabric Version 3.0 Release Notes*
- AA-RR7XA-TE.PDF, *StorageWorks by Compaq SAN Switch 2/16 Fabric Watch Version 3.0 Release Notes*

- Firmware (StorageWorks by Compaq Fibre Channel Firmware and Updates)
  - firmwareupdate.txt, instructions for updating firmware
  - v3.0.2c, switch firmware
  - femib.smiv 2/2/15/01
  - festd.smiv2 2/27/01
  - v3\_OFA.mib (Management Information Base (MIB) for Fabric Alliance) 2/15/01
  - v3\_OFE.mib (MIB for fabric) 2/15/01
  - v3\_OSW.mib (MIB for switch) 7/6//01
  - v3\_OTRP.mib (MIB for traps) 3/19/01
  - j2re-1\_3\_1\_01-win.exe (sun Java plug-in for windows self install for browser)
  - NTAlpha
    - Cat.exe (mover for upgrading firmware from an Alpha)
    - Rshd.exe (small server for upgrading firmware from an Alpha)
  - NTIntel
    - Cat.exe (mover for downloading firmware from a PC)
    - Rshd.exe (small server for upgrading firmware from PC)
- Acrobat
  - rp505eng.exe (installer for Acrobat Reader plus search to enable viewing of pdf files)
- manuals.pdf (Home page for all PDF documentation included on the CD-ROM)

## Serial Cable Part Number

To order a serial cable through your Compaq sales representative or authorized reseller, use part number: 230436-B21. This number replaces 188851-B21.

## Using the Java Plug-In

The proper execution of the Web Tools application requires that the Java Plug-In is installed on your workstation. Web Management Tools version 2.1 requires the Java Plug-In version based on Java 1.2 (also known as Java 2) to operate correctly. The Java Plug-In is similar to other plug-ins used on your browser such as Real Audio, Adobe Acrobat, and Macromedia Director. Once the Java Plug-In is installed, its use is transparent. Microsoft Windows requires Java Plug-In 1.3.1, and Compaq Tru64 UNIX and Solaris require 1.2.

The Java Plug-In can be loaded from the Compaq CD ROM included with the switch. The plug-in is located in the FIRMWARE subdirectory. Double-click on the *JAVAPLUGIN.EXE* file to begin the installation procedure.

## Release MIB Files V3.0.2c

The MIB files are used for SNMP applications such as Compaq Insite Manager and other SNMP management tools.

The release MIB Files for version 3.0.2c are as follows:

- femib.smiv 2/15/01
- festd.smiv2 2/27/01
- v3\_OFA.mib (MIB for Fabric Alliance) 2/15/01
- v3\_OFE.mib (MIB for fabric) 2/15/01
- v3\_OSW.mib (MIB for switch) 7/6//01
- v3\_OTRP.mib (MIB for traps) 3/19/01

The above MIB files can be copied from the Compaq CD in the DSGGD/firmware subdirectory. Some management applications require you to change the file extension to "txt" and may require you to delete the underscore between the 3 and the 0 in the filename. Other non-switch specific standard MIB files may be required to run an SNMP application and can be obtained from various sites on the internet including the American National Standards Institute (ANSI).

## New Commands and Changes

Three new options have been added to the commands:

- **Disable RLS Probing**

When RLS Probing is not selected (enabled or "0"), the switch port will issue RLS Extended Link Service to the attached devices every four seconds to collect link status data. Otherwise, RLS will not be sent to the devices. RLS Probing is selected by default (disabled or "1").

- **Ethernet Link Mode**

This command sets the Ethernet speed and is similar to the Telnet command `ifmodeset`. The parameters are auto, 10H, 100H, 100F where H=Half duplex and F=Full duplex.

- **Suppress Class F Traffic**

This command suppresses class F traffic for remote switch configuration. The parameters are "0" for off and "1" for on.



## Licenses

Prior to replacing a switch or motherboard, display and record the current licenses that are active in the unit. Additional licenses could have been added to the switch after the installation. Licenses that are active can be viewed from a Telnet session using the `licenseshow` command, or they can be viewed from the Web Tool GUI.

Replacement units are shipped with all licenses enabled, with the exception of the Remote Switch Services license.

To obtain a Remote Switch Services license for your replacement unit, call the Compaq Technical Phone Support Center at 1-800-OK-COMPAQ.

An optional software component is enabled via a license key which is obtained when you purchase the product.

## configUpload Telnet Command

An FTP server must be installed and running when performing the Telnet command `configUpload` on a Windows NT or 2000 system. If you do not have a Microsoft Windows NT or 2000 FTP service previously installed on your system, you need to install it.

Use the following steps to install and configure a Windows NT or 2000 FTP server.

1. Create a folder to put the switch firmware and configuration files in.
2. Install the Windows NT or 2000 FTP server on your system from your Windows installation CD.

**NOTE:** If you only use the FTP server for the firmware and configuration loads, you can specify the folder created in Step 1 as the FTP Publish Directory.

3. Open the Internet Service Manager Tool.
4. Use the Telnet command `configUpload`. Save the configuration.

FTP Service uses the standard users defined under Windows NT. A user can be created using the Windows NT administrative tools.

Appropriate permissions for the created folder (NTFS volumes only) must be set up to allow the user to have read and write privileges.

## **New and Modified Telnet Commands**

The following commands have been added or modified since firmware version 2.1.9m:

- turboRamTest
- portCfgSpeed
- switchCfgSpeed
- msTDEnable
- msTDDisable
- islShow
- portCfgShow
- diagHelp
- statsTest
- fDefectTest
- perfAddEEMonitor
- perfAddIPMonitor
- perfAddReadMonitor
- perfAddRWMonitor
- perfAddSCSIMonitor
- perfAddUserMonitor
- perfAddWriteMonitor
- perfCfgClear
- perfCfgRestore
- perfCfgSave
- perfClrAlpaCrc
- perfDeIEEMonitor
- perfHelp
- LoopPortTest (available in v2.6)
- portCfgFAport (available in v2.6)

- portCfgLport (changed in v2.6)
- fazoneCreate(changed in v2.6)

## portCfgSpeed

**Synopsis:** portCfgSpeed port\_number [, speed\_level]

**Availability:** admin

**Description:** Use this command to configure the speed of a port. After this command is issued, the port is disabled and enabled so that the port comes up with the new speed setting. The configuration is saved in the non-volatile memory and is persistent across switch reboots or power cycles.

If the command is specified without the speed\_level operand, you are prompted to enter the speed value. Press **CTRL-D** to cancel the configuration update.

The output of portShow displays achieved speed level and portCfgShow displays the user's desired speed setting.

**Table 1: portCfgSpeed Operands**

Operand	Description
port	Specify the port number getting the speed change. This operand is required.
speed_level	Specify the speed of a port. This operand is optional. Valid values are one of the following: <ul style="list-style-type: none"> <li>• <b>0:</b> Auto-sensing mode. The port automatically configures for the highest speed.</li> <li>• <b>1:</b> 1 Gbps mode. The port will be at fixed speed of 1 Gbps.</li> <li>• <b>2:</b> 2 Gbps mode. The port will be at fixed speed of 2 Gbps.</li> </ul>

## portCfgSpeed Example

To configure the speed of port 3 to 2 Gbps:

```
switch:admin> portCfgSpeed 3, 2
Committing configuration...done.
```

## portCfgFAport

**Synopsis:** portCfgFAport port\_number, mode

**Availability:** admin

**Description:** Locks a port as a Fabric Assist Host port. This command enables a user to hard configure a port as a Fabric Assist Host port. The switch attempts to initialize the port as a private loop port only. This command should not be used on ports that are not intended to be contained within a Fabric Assist Zone.

**Table 2: portCfgFAport Operands**

Operand	Description
port_number	The port number you want to designate as a Fabric Assist Host port. This operand is required.
mode	A value of 1 to configure the port_number as a Fabric Assist Host port. Specify a value of 0 to release the port from its previous role as a Fabric Assist Host port. This operand is required.

**NOTE:** Without any operand, the command will report a list of ports with their current setting.

## portCfgFAport Example

To configure switch port 3 as a Fabric Assist Host port:

```
admin> portCfgFCompaq Aport 3,1
Committing configuration...done.
switch:admin> portCfgFAport
Ports: 0 1 2 3 4 5 6 7
```

## portCfgLport

**Synopsis:** portCfgLport port\_number, Lportmode [,privatemode]

**Availability:** admin

**Description:** Locks a port as an L\_port. This command enables a user to designate a port as a locked L\_port. The switch only attempts to initialize that port as an FL\_port. By default the L\_port will be a public L\_port. If the port is designated private, then the FLOGI is rejected.

The switch does not attempt point-to-point (F\_PORT) initialization on the port. However, if the device attached to the port initiates point-to-point communication, then the switch responds accordingly, and the port may then become an F\_PORT. Similarly, being locked as an L\_port does not prevent the port from becoming an E\_PORT. Locking a port as an L\_port only affects what actions the switch initiates, and does not change how the switch responds to an initialization request.

**Table 3: portCfgLport Operands**

Operand	Description
port_number	The port number you want to designate as a Fabric Assist Host port. This operand is required. When the port operand is present, the Lportmode operand must be present as the second parameter. When no port number is specified, the command will report a list of ports with their current settings.
Lportmode	A value of 1 designates the specified port as a locked L_port. A value of 0 releases a port from its previous role as a locked L_port. This operand is required.
privatemode	If this operand is not specified the default value is set to 0. A value of 1 designates the port as a private L_port where any FLOGI is rejected. A Value of 0 designates the L_port as a normal public L_port. This operand is optional.

### portCfgLport example

To configure switch port 3 as a locked and private L\_port:

```
switch:admin>portCfgLport 3, 1, 1
Committing configuration...done.
```

## loopPortTest

**Synopsis:** loopPortTest [ passCount, port ]

**Availability:** admin

**Description:** Tests the L\_port path on a loop. This command verifies the functional operation of the switch by sending frames from one port transmitter, and looping the frames back through an external fiber cable, including all the devices on the loop, into a second ports receiver. This exercises all the switch components from the main board, to the SFF transceiver, to the fiber cable, to the transceivers (of the devices and the switch) and back to the main board.

The cables and SFFs connected should be of the same technology, for example, a short wavelength SFF switch port is connected to another short wavelength SFF device port through a short wavelength cable; or a long wavelength port is connected to a long wavelength port.

Only one frame is transmitted and received at any time. When the test is running, the port LEDs flicker green rapidly. When this command detects a failure, one or more of the following error messages are displayed:

- DIAG-INIT
- DIAG-PORTDIED
- DIAG-XMIT
- DIAG-TIMEOUT
- DIAG-ERRSTAT
- DIAG-STATS
- DIAG-PORTWRONG
- DIAG-DATA

**Table 4: LoopPortTest Operands**

Operand	Description
passcount	The number of times (or number of frames per port) execute this test. If omitted, the default value used is 0xfffffe. This operand is optional.
port	The number of the port to be tested. If omitted, the test will be executed on all online L_ports. This operand is optional.

## LoopPortTest Example

To run this command 100 times on port 8:

```
switch:admin> loopPortTest 100, 8
Configuring L-port 7 to CableLoopback Port.....done.
Running Loop Port Test ..... passed.
Configuring Loopback L-port(s) back to normal
L-port(s).....done.
value = 0
```

## fazoneCreate

**Synopsis:** fazoneCreate fazoneName, fazoneMemberList

**Availability:** admin

**Description:** Creates a Fabric Assist zone (fazone). There are two operands for this command, fazoneName and fazoneMemberList.

**Table 5: fazoneCreate Operands**

Operand	Description
fazoneName	fazoneName is the name for the new fazone, and cannot be already used for any other fazone object. The name of the fazone must be enclosed in quotation marks. This operand is required.
fazoneMemberList	A list of members, the member list must be enclosed in quotation marks. Each member must be separated by a semi-colon (;). This operand is required.

A fazone name is a C-style name, i.e. a name beginning with a letter and followed by any number of letters, digits and underscore characters. Names are case sensitive for example "Zone\_1" and "zone\_1" are different fazones. White space is ignored.

Physical Fabric port numbers are specified as a pair of decimal numbers "s,p" where "s" is the switch number (domain ID) and "p" is the port number on that switch. For example, "2, 12" specifies port 12 on switch number 2. When a fazone member is specified by physical Fabric port number, then all devices connected to that port are in the fazone. If this port is an arbitrated loop, then all devices on the loop are in the fazone.

`fazoneMemberList` is a list of one or more physical Fabric port numbers, WWNs, `fazone` alias names, or exactly one FA host member. The `fazone` member list must have at least one member, as empty lists are not allowed.

WWNs are specified as eight hex numbers separated by colons, for example "10:00:00:60:69:00:00:8a". Zoning has no knowledge of the fields within a WWN, the eight bytes are simply compared with the Node and Port Names presented by a device in a login frame (FLOGI or PLOGI). When a `fazone` member is specified by Node Name, then all ports on that device are in the `fazone`. When a `fazone` member is specified by Port Name then only that single device port is in the `fazone`.

Zone alias names have the same format as `fazone` names, and are created with the `aliasCreate` command. The alias must resolve to a list of one or more physical Fabric port numbers, or WWNs, or QuickLoop AL\_PAs or an Initiator member.

An FA host member is defined by wrapping the physical fabric port or a physical device (aWWN) between "H{" and "}". For example, H{5,6} or H{10:00:00:60:69:00:00:8a} is an initiator member. Several methods can be used to define members of the member group. For example, a `fazone` defined with the following members: "2,12; 2,14; 10:00:00:60:69:00:00:8a" would contain what ever devices are connected to switch 2, ports 12 and 14, and the device with a WWN of "10:00:00:60:69:00:00:8a" (either Node Name or Port Name) whichever port in the Fabric it is connected to.

Each target listed within the `fazone` definition shall be assigned an ALPA when the private host performs loop initialization. When the private host communicates with this assigned ALPA the private loop frame shall be translated into a public format and then delivered to the target's location within the fabric.

Loop devices that are zoned with the private host shall be assigned the same ALPA that they claimed during their own loop initialization, provided that it is still available on the private host's loop. Other public devices zoned with the private host shall be assigned the lowest available ALPA during the private host's loop initialization.

If however, the ALPA by which the `fazoned` target must be identified by does not conform to the default ALPA assignment process, then a preferred ALPA may be assigned to each target within the `fazone` definition. The identified preferred ALPA shall be the ALPA value that is assigned to the target during the private host's loop initialization, provided that it is not claimed by the private host or another preferred ALPA assignment.



To assign a preferred ALPA add to the definition of the target (Domain,Port or WWN) the preferred ALPA within square brackets [ ]. For example, a fazone defined as

```
"H{1,1}; 2,12[0xe2]; 2,14[0xe8]; 10:00:00:60:69:00:00:8a[0xef]"
```

would contain all devices connected to switch 2, ports 12 and 14, and the device with a WWN of "10:00:00:60:69:00:00:8a" (either Node Name or Port Name) whichever port in the Fabric it is connected to. The target connected to switch 2, port 12 would be assigned an ALPA value of 0xE2, and the target connected to port switch 2, port 14 would be assigned an ALPA value of 0xE8. Finally, the ALPA assigned to the target identified by the WWN would be assigned a value of 0xEF.

Preferred ALPA assignments given to a Domain Port that is not a public N\_Port device are ignored, and the fazone is created without error.

**NOTE:** The fazoneCreate command changes the defined configuration, use the cfgShow command to review changes. For the change to become effective, an appropriate fazone configuration must be enabled using the cfgEnable command. For the change to be preserved across switch reboots, it must be saved to non-volatile memory using the cfgSave command.

## fazoneCreat Example

To create three fazones using a mixture of port numbers and fazone aliases:

```
switch:admin> fazoneCreate "Red_fazone", "H{1,0};loop1"
switch:admin> fazoneCreate "Blue_fazone",
"H{1,1};array1;1,2;array2".
switch:admin> fazoneCreate "Green_fazone",
"1,0;loop1;H{1,2};array2".
switch:admin> fazoneCreate "Yellow_fazone",
"1,0[0xe2];loop1;H{1,2};array2[0x02]"
```

## switchCfgSpeed

**Synopsis:** switchCfgSpeed speed\_level

**Availability:** admin

**Description:** Use this command to configure the speed of all the ports on a switch to a particular level in a single operation. The configuration is saved in the non-volatile memory and persists across switch reboot or power cycle.

The output of portShow displays achieved speed level and portCfgShow displays the user's desired speed setting.

**Table 6: switchCfgSpeed Operands**

Operand	Description
speed_level	<p>Specify the speed of a port. This operand is required.</p> <p>Valid values are one of the following:</p> <ul style="list-style-type: none"><li>• <b>0</b>: Auto-sensing mode. The port automatically configures for the highest speed.</li><li>• <b>1</b>: 1 Gbps mode. The port will be at fixed speed of 1 Gbps.</li><li>• <b>2</b>: 2 Gbps mode. The port will be at fixed speed of 2 Gbps.</li></ul>

### switchCfgSpeed Example

To set the speed level for all ports on a switch:

```
switch:admin> switchCfgSpeed 0
Committing configuration...done.
```

## Known Issues

This section describes the known issues and problems related to the Fibre Channel SAN Switch 2/16 EL.

### Hardware Zone Limit

The number of hardware zone members per 4 port group is limited to 64. If more than 64 members are entered, the switch reverts to software zoning.

### Telnet Configure Command

One parameter, reserved for future use and identified below in bold, is present in the Compaq StorageWorks SAN Switch configuration dialog invoked with the Telnet command configure. Changing the default value of this prompt is not supported by Compaq.

Do not change the default value of the command "Core Switch PID Format." This parameter is highlighted in the following Telnet session example:

```

Switch:admin> configure
Configure...
Fabric parameters (yes, y, no, n): [no] y
  Domain: (1..239) [4]
  BB credit: (1..27) [16]
  R_A_TOV: (4000..120000) [10000]
  E_D_TOV: (1000..5000) [2000]
  WAN_TOV: (0..2000) [0]
  MAX_HOPS: (7..13) [7]
  WAN_RTT_DLY_MAX: (0..9500) [200]
  Data field size: (256..2112) [2112]
  Sequence Level Switching: (0..1) [0]
  Disable Device Probing: (0..1) [0]
  Suppress Class F Traffic: (0..1) [0]
  SYNC IO mode: (0..1) [0]
  VC Encoded Address Mode: (0..1) [0]
  Core Switch PID Format: (0..1) [0]
  Per-frame Route Priority: (0..1) [0]
  Long Distance Fabric: (0..1) [0]
Virtual Channel parameters (yes, y, no, n): [no] y
  VC Priority 2: (2..3) [2]
  VC Priority 3: (2..3) [2]
  VC Priority 4: (2..3) [2]
  VC Priority 5: (2..3) [2]
  VC Priority 6: (2..3) [3]
  VC Priority 7: (2..3) [3]
Zoning Operation parameters (yes, y, no, n): [no] y
  Disable NodeName Zone Checking: (0..1) [0]
  RSCN Transmission Mode (yes, y, no, n): [no]
NS Operation Parameters (yes, y, no, n): [no] y
  Pre-zoned responses Mode
    (0 = Standard Mode, 1 = Pre-zoning On): (0..1) [0]
Portlog events enable (yes, y, no, n): [no] y
  start(a switch start or re-start event )      (on, off): [on]
  disable(a port is disabled )                  (on, off): [on]
  enable(a port is enabled )                    (on, off): [on]
  ioctl(a port I/O control is executed )       (on, off): [on]
  Tx(a frame is transmitted )                  (on, off): [on]
  Tx1(a frame is transmitted, class 1)        (on, off): [on]

```

Tx2(a frame is transmitted, class 2)	(on, off): [on]
Tx3(a frame is transmitted, class 3)	(on, off): [on]
Rx(a frame is received )	(on, off): [on]
Rx1(a frame is received, class 1 )	(on, off): [on]
Rx2(a frame is received, class 2 )	(on, off): [on]
Rx3(a frame is received, class 3 )	(on, off): [on]
stats(port status or statistics )	(on, off): [on]
scn(a state change notification )	(on, off): [on]
pstate(a port changes physical state )	(on, off): [on]
reject(a received frame is rejected )	(on, off): [on]
busy(a received frame is busied )	(on, off): [on]
ctin(a CT based request is received )	(on, off): [on]
ctout(a CT based response is transmitted )	(on, off): [on]
errlog(a message is added to the error log)	(on, off): [on]
loopscn(a loop state change notification )	(on, off): [on]
create(a task is created )	(on, off): [on]
debug(generic debug info )	(on, off): [off]
nbrfsm(neighbor state transition )	(on, off): [on]
timer(timer )	(on, off): [on]
sn(speed negotiation )	(on, off): [on]
nsRemQ(inter-sw NS query )	(on, off): [on]
nsRemR(inter-sw NS response )	(on, off): [on]
rscn(RSCN )	(on, off): [on]
reconf(fabric reconfiguration )	(on, off): [on]

## route.delayReroute Parameter

If a `configdefault` command is issued to a switch, it will reset all switch settings to the Compaq default values except for the “route.delayReroute” parameter. If you use the `configdefault` command, you must reset the “route.delayReroute” parameter by issuing the `iodset` command. The Compaq default value is “route.delayReroute: 1”

The `iodset` command can be used to set the `route.delayReroute:` parameter to a 1.

```
it4:admin> iodset
Committing configuration...done.
```

The `iodshow` command can also be used to examine the state of the `route.delayReroute` parameter.

```
it4:admin> iodshow
IOD is set
```

The command `configshow` can also be used to examine the state of the `route.delayReroute` parameter.

```
it4:admin> configshow
route.delayReroute: 1
```

## QuickLoop

QuickLoop, with large numbers of looplets (16), can cause some adapters to time out during initialization, resulting in repetitive initializations. A new Telnet command has been added that can speed up initialization:

**Synopsis:** `qllifa [0|1]`

**Availability:** Admin

**Description:** This command enables or disables a special handling for a quick loop Fabric Assigned ALPA conflict issue. When `qllifa` is set to 1, the switch will fill LIFA with 0xFF bytes to force all looplets to give up their Fabric Assigned ALPA and claim ALPA from LIPA, LIHA, or LISA phases.

**Table 7: qllifa Operands**

Operand	Description
No argument	Displays the current setting
0	qllifa is disabled
1	qllifa is enabled

## qllifa Example

Type <CR> to continue, Q<CR> to stop:

The following command disables `qllifa` handling:

```
sw5:admin> qllifa 0
```

## Qlunmasklipa

**Synopsis:** qlunmasklipa [0|1]

**Availability:** Admin

**Description:** The **qlunmasklipa** command allows a primary and secondary controller of a device device attached to the loop to have the same AL\_PA address.

**Table 8: qlLIFA Operands**

Operand	Description
No argument	Displays the current setting
0	qlunmasklipa is disabled
1	qlunmasklipa is enabled

## Web Management Tools

- Netscape 4.6 (IRIX) fails to load SwitchManager.html (core dump of Netscape or SwitchApplet cannot start error).
- When using Internet Explorer version 5.0 or lower, scrolling errors may occur. Internet Explorer version 5.01 or higher is recommended.
- When using an Internet Explorer or Netscape browser, for the SUN plug-in to work correctly, you must type a slash after the URL (for example: <http://192.168.60.45/>).
- When updating switch firmware from 2.1.9m using Web Tools, an error will be reported by the GUI, and Web Tools will not respond. The firmware will have loaded correctly on the switch. You will need to reboot the switch to complete the firmware download procedure.

When using Telnet commands, no errors are reported. You will still need to reboot the switch to enable access to Web management of the switch.

## Switch Operating System

- When connected to some Ethernet switches, the Fibre Channel SAN Switches with 100BaseT sometimes fail to connect through Telnet and the user interface. If you have problems downloading firmware into the switch, try using a crossover cable directly from the host, that you are loading the firmware from, to the switch. It is recommended to match the switch Ethernet speed to the Ethernet speed of the management station.

- The **Backspace**, **Delete**, and **Left Arrow** keys do not work properly with the default setting for a Telnet session to a Fibre Channel SAN Switch from a Compaq Tru64 UNIX or OpenVMS machine. The keyboards shipped with these machines produce a “question mark” character instead of deleting characters when using the **Backspace** key. It is necessary to type **Control + H** to delete characters. The **Delete** key changes the case of the letter at the cursor and prevents you from adding anything to the line. The **Left Arrow** key deletes the character to its left and prevents you from adding anything to the line.

Use the Telnet command called `backSpace`. The `backSpace` command without any parameters returns the current state of the parameter. Using `backSpace 1` sets the backspace character in the switch to the Delete character. Using `backSpace 0` sets the Backspace character to Backspace (Control +H). This process makes the delete key work on Tru64 UNIX and OpenVMS machines.

- New Fibre Channel SAN Switches are configured with a default IP address of 10.77.77.77. This IP address may not be compatible with your configuration. The IP address can be changed via a serial connection, or via the front panel.

On switches that include a serial port, make a serial port connection and use the `ipAddrSet` command to change the default IP address to the IP address that is suitable for your configuration. For additional information, see the *StorageWorks by Compaq Fibre Channel SAN Switch Management Guide*, Part Number AA-RMMJB-TE.

**NOTE:** When using a serial port connection, the flow control must be set to None.

Another method to change the IP address is to use the default IP address and an Ethernet connection to the switch. Once the Ethernet is connected to the switch, use the `ipAddrset` command to change the IP address. You must set up a computer with an address on the same subnet to do this.

## Supported Configurations

This release supports cascading of switches. See Compaq Solutions Kits for supported configurations involving cascading of switches.

## Cables

Optical cables for the Fibre Channel SAN Switches must be ordered separately. Cables that are 500 meters or less for 1 Gbps and 300 meters or less for 2 Gbps, should be multi-mode Fibre Channel cables. Cables that are longer than 500 meters should be single-mode. Multi-mode optical cables are connected to shortwave Small Form

Factor Pluggable (SFP) modules in Fibre Channel SAN Switches. Single-mode optical cables are connected to longwave SFP modules in the Fibre Channel SAN Switches. Multi-mode cables should use 50/125 optical fibers, SC Duplex connectors with a PC finish. Use of 62.5/125 should be restricted to situations where 62.5/125 optical fiber was previously installed and the link lengths are to be kept shorter than 200 meters at 1 Gbps and shorter than 150 meters for 2 Gbps. Single-mode cables typically use 9/125 optical fibers for distances up to 10 km.

## **Optical Transceivers**

This switch does not use GBIC modules. It uses the new industry-standard removable Small Form Factor (SFF) hot pluggable optical transceivers. The Compaq part number for the shortwave optical SFF module for multi-mode cable is 21292-001.

Multi-mode SFF transceivers for the SAN Switch 2/16 EL must be ordered separately (Compaq part number 221470-B21).

- Short wavelength (850nm), LC connector.  
Both ends of the link must be the same wavelength.
- Long wavelength (1310 nm), LC connector.  
Both ends of the link must be the same wavelength.