

installation  
guide

# hp StorageWorks MSA SAN switch 2/8

Product Version: 1.0

First Edition (December 2002)

Part Number: 308999-001

The HP StorageWorks MSA SAN Switch 2/8 is a high-performance, 2 Gb/s, 8 port Fibre Channel switch used to connect the Modular SAN Array 1000 storage device to hosts and Enterprise Backup Solutions in a Storage Area Network.



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MSA SAN Switch 2/8 Installation Guide  
First Edition (December 2002)  
Part Number: 308999-001



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## about this guide

This installation guide provides information to help you install, configure, and manage the HP StorageWorks MSA SAN Switch 2/8.

About this Guide topics include:

- [Overview](#), page 8
- [Conventions](#), page 9
- [Rack Stability](#), page 11
- [Getting Help](#), page 12

## Overview

This section discusses the following topics:

- [Intended Audience](#)
- [Related Documentation](#)

## Intended Audience

This book is intended for use by customers and authorized service providers who are experienced with the following:

- Configuration aspects of customer Storage Area Networks (SAN)
- Customer host environments, such as Microsoft Windows™, Linux™, Novell NetWare™, OpenVMS™, or Tru64 UNIX™.

## Related Documentation

In addition to this guide, HP provides several additional supporting documents for this switch.

The following documents are available on both the HP StorageWorks SAN Switch Documentation CD, included in the shipping carton with the switch, and the HP website.

- *HP StorageWorks Fabric OS Procedures User Guide*
- *HP StorageWorks Fabric OS Reference Guide*
- *HP StorageWorks Web Tools User Guide*
- *HP StorageWorks ISL Trunking User Guide*
- *HP StorageWorks Zoning User Guide*
- *HP StorageWorks MIB Reference Guide*
- *HP StorageWorks QuickLoop User Guide*
- *HP StorageWorks Advanced Performance Monitoring User Guide*
- *HP StorageWorks Extended Fabric User Guide*
- *HP StorageWorks Fabric Watch User Guide*

For information about SANs, refer to the *HP StorageWorks SAN Design Reference Guide*, available at the HP website.



## Conventions

Conventions consist of the following:

- [Document Conventions](#)
- [Text Symbols](#)
- [Equipment Symbols](#)

## Document Conventions

The document conventions included in [Table 1](#) apply in most cases.

**Table 1: Document Conventions**

Element	Convention
Cross-reference links	<a href="#">Figure 1</a>
Key and field names, menu items, buttons, and dialog box titles	<b>Bold</b>
File names, application names, and text emphasis	<i>Italics</i>
User input, command and directory names, and system responses (output and messages)	Monospace font COMMAND NAMES are uppercase monospace font unless they are case sensitive
Variables	<monospace, italic font>
Website addresses	Underlined sans serif font text: <a href="http://www.hp.com">http://www.hp.com</a>

## Text Symbols

The following symbols may be found in the text of this guide. They have the following meanings.



**WARNING:** Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or death.



**Caution:** Text set off in this manner indicates that failure to follow directions could result in damage to equipment or data.

---

**Note:** Text set off in this manner presents commentary, sidelights, or interesting points of information.

---

## Equipment Symbols

The following equipment symbols may be found on hardware for which this guide pertains. They have the following meanings.



Any enclosed surface or area of the equipment marked with these symbols indicates the presence of electrical shock hazards. Enclosed area contains no operator serviceable parts.

**WARNING:** To reduce the risk of personal injury from electrical shock hazards, do not open this enclosure.

---



Any RJ-45 receptacle marked with these symbols indicates a network interface connection.

**WARNING:** To reduce the risk of electrical shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.

---



Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or hot component. Contact with this surface could result in injury.

**WARNING:** To reduce the risk of personal injury from a hot component, allow the surface to cool before touching.

---



Power supplies or systems marked with these symbols indicate the presence of multiple sources of power.

**WARNING:** To reduce the risk of personal injury from electrical shock, remove all power cords to completely disconnect power from the power supplies and systems.

---



Any product or assembly marked with these symbols indicates that the component exceeds the recommended weight for one individual to handle safely.

**WARNING:** To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manually handling material.

---

## Rack Stability

Rack stability protects personal and equipment.



**WARNING:** To reduce the risk of personal injury or damage to the equipment, be sure that:

- The leveling jacks are extended to the floor.
  - The full weight of the rack rests on the leveling jacks.
  - In single rack installations, the stabilizing feet are attached to the rack.
  - In multiple rack installations, the racks are coupled.
  - Only one rack component is extended at any time. A rack may become unstable if more than one rack component is extended for any reason.
-

## Getting Help

If you have a question after reading this guide, contact an HP authorized service provider or access our website at <http://www.hp.com>.

## HP Technical Support

In North America, call technical support at 1-800-652-6672, available 24 hours a day, 7 days a week.

---

**Note:** For continuous quality improvement, calls may be recorded or monitored.

---

Outside North America, call technical support at the nearest location. Telephone numbers for worldwide technical support are listed on the HP website under support at <http://www.hp.com>.

Be sure to have the following information available before calling:

- Technical support registration number (if applicable)
- Product model names, numbers, and serial numbers
- Exact text of any applicable error messages
- Operating system type and revision level
- Detailed, specific questions

## HP Storage Website

The HP website has the latest information on this product, as well as the latest drivers. Access storage at <http://www.hp.com>. From this website, select the appropriate product or solution.

## HP Authorized Reseller

For the name of your nearest HP authorized reseller:

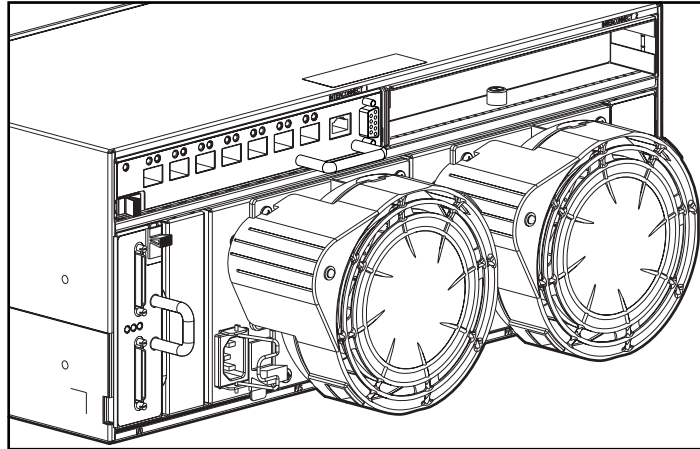
- In the United States, call 1-800-345-1518
- In Canada, call 1-800-263-5868
- Elsewhere, see the HP website for locations and telephone numbers at <http://www.hp.com>.

# About the MSA SAN Switch 2/8

1

The HP StorageWorks MSA SAN Switch 2/8 is a high-performance, 2 Gb/s, 8 port Fibre Channel switch, designed specifically for installation in the Modular SAN Array 1000 (MSA1000) storage device, to connect the MSA1000 to hosts and Enterprise Backup Solutions in a Storage Area Network (SAN).

The MSA1000 provides two slots for embedded interconnect devices. The MSA1000 ships standard with one Fibre Channel I/O Module in the primary slot and a blanking panel in the secondary slot. Available embedded interconnect options include the provided Fibre Channel I/O Module, an MSA HUB 2/3, and this MSA SAN Switch. If a redundant configuration is needed, two MSA SAN Switches may be installed in the MSA1000.



**Figure 1: An MSA SAN Switch 2/8 installed in the primary slot**

Each switch is assigned a system-generated name, dependant on the slot in which it is installed.

**Table 2: System Assigned Switch Names**

MSA1000 Slot Location	Switch Name
Primary (rear-left)	<i>MSA 1000 Controller Name-switch1</i>
Secondary (rear-right)	<i>MSA 1000 Controller Name-switch2</i>
<p><b>Note:</b> The first portion of the switch name is the name assigned to the MSA1000 Controller installed in the associated controller slot.</p>	

This chapter provides the following information:

- [MSA SAN Switch 2/8 Firmware Features](#)
- [MSA SAN Switch 2/8 Hardware Features](#)
- [MSA SAN Switch 2/8 Panel Description](#)

## MSA SAN Switch 2/8 Firmware Features

- Universal and self-configuring optical ports for the following protocols:
  - E\_Port (expansion port)
  - F\_Port (fabric port that is not loop capable)
  - FL\_Port (fabric port that is loop capable)
- Automatic re-routing through the Fabric Shortest Path First (FSPF) algorithm
- Application Programming Interface (API) that allows applications to interface with switch services
- Per port statistics for diagnosing and isolating problem ports without disrupting switch operations
- Per port error detection and fault isolation that automatically disables failing ports and restarts when the problem is resolved
- Industry standard Simple Network Management Protocol (SNMP) Management Information Base (MIB) support
- Automatic self-discovery that discovers and registers host server and storage devices
- Zoning functionality that provides a means to allocate storage controllers to groups of computers

Zoning allows you to create logical subsets of the fabric to accommodate closed user groups or to create functional user groups within a fabric.

For more information, refer to the *HP StorageWorks Zoning User Guide*. This guide is included on the HP StorageWorks SAN Switch Documentation CD.
- Web Tools graphical user interface, for managing the switch from a browser such as Internet Explorer

For more information, refer to the *HP StorageWorks Web Tools User Guide*. This guide is included on the Documentation CD.
- Fabric Operating System provides a command line interface (CLI), for managing the switch through either a workstation connected to the serial port or through a telnet session on the Ethernet port

For more information, refer to the *HP StorageWorks Fabric Operating System Procedures User Guide*. This guide is included on the Documentation CD.

## MSA SAN Switch 2/8 Hardware Features

MSA SAN Switch hardware support includes:

- Embedded design specifically for the MSA1000
- Hot-pluggability

The switch can be installed or replaced without power cycling the MSA1000. When adding or replacing a switch, allow sufficient time to complete the POST tests and the configuration tasks before using.

- Redundancy

In redundant fabric configurations, you can install two MSA SAN Switches to support the redundant MSA1000 controllers.

- Single chip ASIC switch design

- Eight ports

- Seven available 2-Gb/s Fibre Channel ports are compatible with Small Form Factor Pluggable (SFPs) transceiver interconnects (Port 1 through Port 7)

- One internal port (Port 0) for interfacing with the MSA1000 Array Controller, using F\_Port protocol

- Per port automatic negotiation to the highest possible speed
- One IEEE compliant 10/100 Mb/s Ethernet management port; able to auto-sense a straight-through cable or crossover cable configuration
- One DB-9 serial port
- A total of 15 LEDs:
  - One Switch Readiness LED
  - One port status LED for each of the seven available ports
  - One port speed LED for each of the seven available ports



## MSA SAN Switch 2/8 Panel Description

Figure 2 is an illustration of the MSA SAN Switch. The switch panel houses the seven available fiber optic ports, the Ethernet port, the serial port, and the corresponding LEDs.

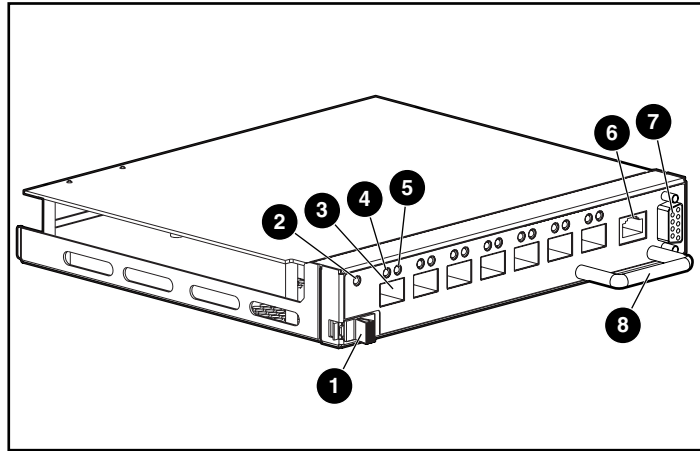


Figure 2: MSA SAN Switch 2/8

Item	Description
①	Latch
②	Switch readiness LED
③	Optical ports (7)
④	Port status LED
⑤	Port speed LED
⑥	10/100 Ethernet port, RJ-45
⑦	Serial port, DB-9
⑧	Handle

## LEDs

The LEDs on the switch provide activity or status information.

For detailed information on all of the switch LEDs, see “Configuring the MSA SAN Switch 2/8.”

## Optical Ports

All optical ports support full fabric capability, allowing the MSA SAN Switch to link or cascade to other HP StorageWorks Fibre Channel switches, building a highly scalable SAN fabric.

The optical ports are connected via Small Form Factor Pluggable (SFP) media, which are universal and self-configuring.

Each optical port supports link speeds up to 2 Gb/s and, independent of the other ports, automatically negotiates to the highest speed possible for the devices connected to that port.

These ports conform to the American National Standards Institute (ANSI) Fibre Channel, FC-PI specification for Fibre Channel SFP transceivers.

The optical ports are numbered from left to right and are color-coded into two groups, indicating which ports can be used in the same ISL Trunking group.

ISL trunking is an optional feature that enables distribution of traffic over the combined bandwidth of up to four ISLs between two directly connected switches, while preserving in-order delivery. Ports 1 through 3 can be used in a three-port trunking group and ports 4 through 7 can be used in a four-port trunking group, creating aggregate bandwidths of 6 Gb/s and 8 Gb/s, respectively. For specific information about ISL trunking, refer to the *HP StorageWorks ISL Trunking User Guide*. This guide is included on the documentation CD, included in the shipping carton.

## Ethernet Port

This connector is used to connect the switch to the SAN management network. Switch configuration and management tasks can be made through the Ethernet port either by using a telnet connection to access the CLI or by using a standard web browser to access the Web Tools graphical user interface.

By default, the switch is configured to use an IP address of 10.77.77.77.

See “Configuring the MSA SAN Switch 2/8” for information on setting the IP address.

## Serial Port

This connector is provided for switch configuration and management. You can access the CLI through a terminal or terminal emulator connected to this port.

The MSA SAN Switch is designed to function directly out of its shipping carton, only requiring the IP address to be set.

See “Configuring the MSA SAN Switch 2/8” for more information.



# Installing the MSA SAN Switch 2/8



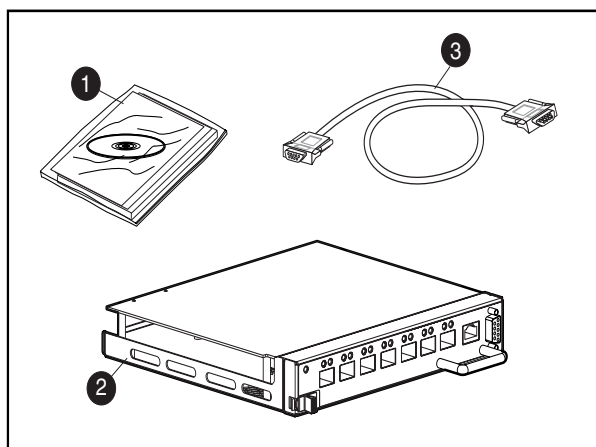
This chapter discusses the following topics:

- [Verifying Carton Contents](#), page 22
- [Installing the MSA SAN Switch 2/8 in the MSA1000](#), page 23
- [Installing an SFP Module](#), page 27

## Verifying Carton Contents

Unpack and inspect the MSA SAN Switch carton contents. Verify that the carton contains the items shown in Figure 3 and listed in the supporting table.

**Note:** If any items are damaged or missing, contact HP or an HP Authorized reseller.



**Figure 3: Carton contents**

Item	Description
①	MSA SAN Switch 2/8 product accessory bag containing: <ul style="list-style-type: none"> <li>■ Printed <i>HP StorageWorks MSA SAN Switch 2/8 Installation Guide</i></li> <li>■ Documentation CD</li> <li>■ License agreement</li> <li>■ Warranty Information</li> </ul>
②	HP StorageWorks MSA SAN Switch 2/8
③	RS-232 serial cable (straight through)

## Installing the MSA SAN Switch 2/8 in the MSA1000



**Caution:** To prevent static shock, which can damage electrical equipment, use industry accepted handling practices when unpacking and moving the switch. See the “Electrostatic Discharge” appendix for more information.

---

**Note:** The MSA SAN Switch is a hot-pluggable component of the MSA1000 and can be installed and uninstalled regardless of whether the MSA1000 is powered on.

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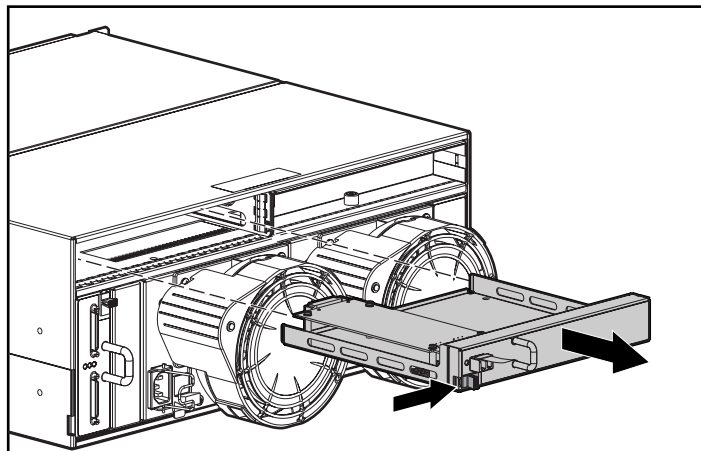
**Caution:** Depending on the operating systems of the servers already attached to the MSA1000 and the applications they are running, verify that they can tolerate a temporary disruption while the MSA SAN Switch is installed. Contact your operating system and application vendors for verification.

---

1. If the MSA SAN Switch is replacing the provided Modular SAN Array Fibre Channel I/O Module in the primary slot of the MSA1000, remove the I/O Module from the bay.

To remove the I/O module, slide and hold the latch on the I/O Module to the right and then grasp the handle and pull the I/O Module straight out of the bay.

See [Figure 4](#) for an illustration.



**Figure 4: Removing the Fibre Channel I/O Module**

---

**Note:** Carefully remove and save the SFP from the Fibre Channel I/O Module; it can be re-used in the MSA SAN Switch. See [“Installing an SFP Module”](#) for information on handling SFPs.

---

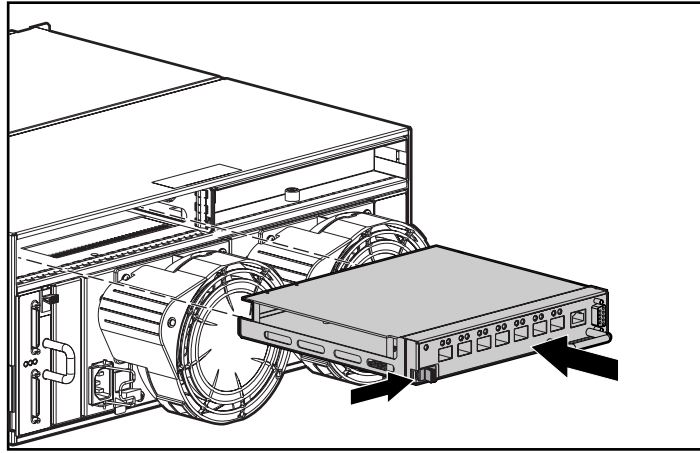
2. Remove the MSA SAN Switch from its protective bag.



3. Insert the MSA SAN Switch into the vacated slot of the MSA1000.

To insert the switch, orient the switch with the handle on the right and insert the edge that contains the rear backplane interface connector into the bay until the connector seats and the latch clicks.

See [Figure 5](#) for an illustration.



**Figure 5: Inserting the MSA SAN Switch 2/8 into the vacant slot**

If the MSA1000 is powered on, the MSA SAN Switch is powered on as soon as it is installed.

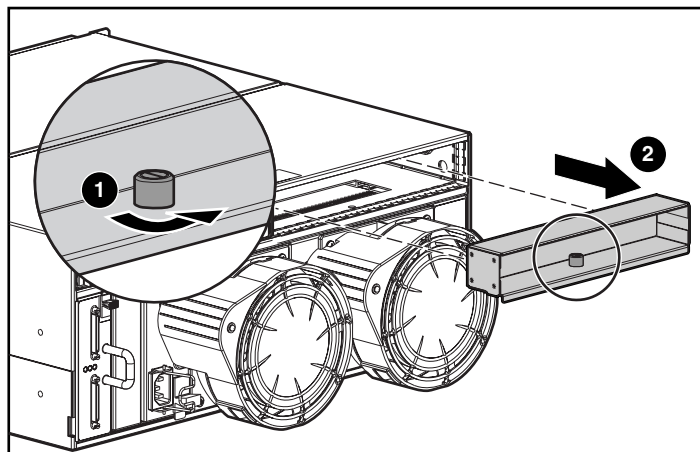
The switch begins running a Power-on Self-test (POST), a system diagnostic that requires approximately seven minutes to complete. See “Interpreting POST Results” under “Managing the MSA SAN Switch 2/8,” for more information about POST.

4. For redundant-controller configurations only:

If an MSA SAN Switch is being installed in the secondary slot, remove the blanking panel and install the switch in the open slot, as previously illustrated in [step 2](#) and [step 3](#).

To remove the blanking panel, loosen the thumbscrew that holds the blanking panel in place and remove the blank from the back of the unit.

See [Figure 6](#) for an illustration of removing the blanking panel.



**Figure 6: Removing the blanking panel**

Save the blanking panel for re-use in the event the redundant switch is ever removed. Either an embedded device or the blanking panel must always be in place for proper airflow and cooling.

---

**Note:** Do not connect the switch to the network until the IP address is correctly set. The shipping IP address for the MSA SAN Switch is 10.77.77.77. For instructions on setting the IP address, see “Configuring the MSA SAN Switch 2/8.”

---

## Installing an SFP Module

Use these steps to connect the SFPs in the ports of the MSA SAN Switch, as required.

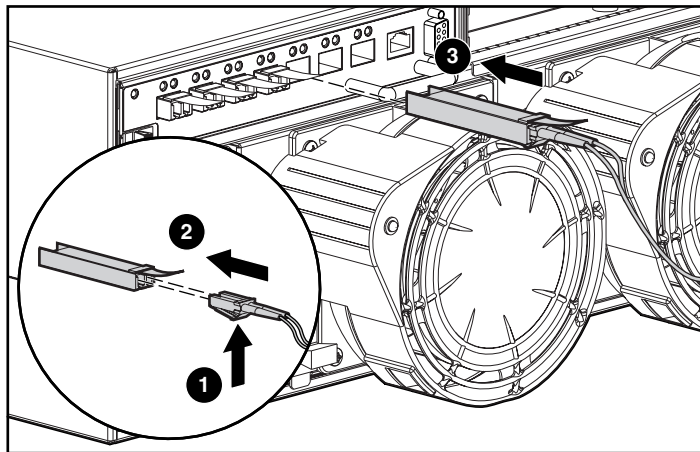
1. Remove the shipping plugs from the appropriate ports on the switch panel.
2. Position the SFP so the key (the tab near the cable-end of the SFP) is on top.
3. Insert the SFP into the port until it is firmly seated and the latching mechanism clicks.

---

**Note:** The SFP is keyed so that it can only be inserted with the correct orientation into the port. If the SFP does not slide in easily, check the orientation.

---

See Figure 7 for an illustration of the fiber cable, the SFP module and tab, and the optical port.



**Figure 7: Installing an SFP**

---

**Note:** To remove an SFP from an optical port, carefully grasp the tab at the top of the SFP and pull the module *straight out of the port*.

Do not pull up on the tab; you may damage your SFP module.

---

---

**Note:** For dust and ESD (electrostatic discharge) protection, a cover is provided for each optical port and should be kept on the port whenever the port is not in use.

---



---

**Caution:** Do not connect the switch to a configured SAN without first configuring the switch.

---

4. Connect the cables to the SFPs as appropriate to the fabric topology, by positioning each cable so that the key (the ridge on one side of the cable connector) is aligned with the slot in the SFP.  
Insert the cable into the SFP until it is firmly seated and the latching mechanism clicks.
5. Proceed to the following chapter in this guide to configure the MSA SAN Switch for your SAN and verify its operation.

# Configuring the MSA SAN Switch 2/8

## 3

The process of configuring the MSA SAN Switch includes the initial process of changing the factory-set IP address to a valid IP address for your environment. The IP address must initially be entered using the CLI.

After the IP address is set, additional parameters must be entered, but they may be entered through either the CLI or the Web Tools.

This chapter discusses:

- [Requirements](#), page 30
- [Entering Initial Configuration Settings through the CLI](#), page 31
- [Connecting the MSA SAN Switch 2/8 to the Ethernet Network](#), page 35
- [Completing MSA SAN Switch 2/8 Configuration](#), page 36
- [Verifying Operation](#), page 36

## Requirements

The following items are required to set network addressing:

- An IP address from your Network Administrator
- An installed MSA SAN Switch
- Serial cable (supplied with the switch) for connecting the switch to the workstation  
This cable must be a straight-through cable.
- A local workstation (desktop or notebook computer) with a serial terminal connection
- RS-232 serial communication software (for example, ProComm Plus or HyperTerminal)
- Ethernet cable for connecting the switch to the workstation or to a network containing the workstation  
This cable can be a cross-over cable or a straight-through cable.
- SFPs and fiber cables, as required, to connect the switch to the fabric

## Entering Initial Configuration Settings through the CLI

Initial switch configuration includes:

- [Accessing the CLI](#)
- [Setting Network Addresses](#)

### Accessing the CLI

Depending on your environment and preference, you may access the CLI through either the serial port or through the Ethernet port (via a telnet session).

Instructions for accessing the CLI through each of these methods is detailed in the following paragraphs.

#### Accessing the CLI through the Serial Port

When using the serial port to access the switch, you must first configure the serial port settings.

1. Verify that the installed switch has power and POST has completed.  
See “Interpreting POST Results” for more information.
2. Remove the shipping plug from the MSA SAN Switch serial port.
3. Connect one end of the serial cable to the MSA SAN Switch serial port.
4. Connect the other end of the serial cable to an RS-232 serial port on the workstation.

- Establish a connection from the workstation to the switch using a terminal emulation application such as ProComm or Hyper Terminal.

- In a Windows environment, enter the following settings:

**Table 3: Serial Port Settings**

Parameter	Value
Bits per second	9600
Databits	8
Parity	None
Stop bits	1
Flow control	None

- In a Tru64 UNIX environment, enter the following command:

```
tip /dev/ttyb -9600
```

- Open the terminal connection to the switch, using HyperTerminal or ProComm.

Press **Enter** several times to display the login prompt.

- At the login prompt, enter the user ID. For example:

```
login: admin
```

The password prompt is displayed.

- Enter the password for the user:

```
password: xxxxxx
```

The default password is password.

---

**Note:** For security reasons, the first time you log into the CLI you are requested to change the admin user ID and system password.

---

- If the login was successful, a prompt is displayed showing the switch name and user ID you are logged in as.

For example:

```
MSA1000-switch1:admin>
```



## Accessing the CLI through the Ethernet Port (via a Telnet Session)

Use these steps to log into the MSA SAN Switch from the Ethernet port.

1. Remove the shipping plug from the MSA SAN Switch Ethernet port.
2. Connect one end of an Ethernet cable to the workstation or to an Ethernet network containing the workstation.
3. Connect the other end of the Ethernet cable to the MSA SAN Switch Ethernet port.

The MSA SAN Switch will automatically sense the cable configuration used (straight or cross over.)

4. From your workstation, open a telnet session to the MSA SAN Switch.

To open a telnet session through the command prompt, enter:

```
TELNET 10.77.77.77
```

The login prompt is displayed.

5. At the login prompt, enter the user ID. For example:

```
login: admin
```

The password prompt is displayed.

6. Enter the password for the user:

```
password: xxxxxx
```

The default password is `password`.

---

**Note:** For security reasons, the first time you log into the CLI you are requested to change the admin user ID and system password.

---

7. If the login was successful, a prompt is displayed showing the switch name and user ID you are logged in as.

For example:

```
MSA1000-switch1:admin>
```

## Setting Network Addresses

Use the following steps to enter the MSA SAN Switch IP address, subnetmask, and gateway address.

---

**Note:** During first time setup, you must replace the factory IP address, subnetmask and gateway address with addresses provided by your Network Administrator.

---

1. Log on to the switch using the admin log on.  
See “[Accessing the CLI](#)” for instructions.
2. Enter the following command at the prompt:  
`ipAddrSet`
3. Enter the information at the prompts, as listed below:

---

**Note:** Press **Enter** to pass over a prompt and accept the default value.

---

- Ethernet IP Address [10.77.77.77]:  
Enter the new ethernet IP address.
  - Ethernet subnetmask [255.255.255.0]:  
Enter the new ethernet subnetmask.
  - Fibre Channel IP Address [none]:  
Enter the new Fibre Channel IP address if desired.
  - Fibre Channel subnetmask [none]:  
Enter the new fibre channel subnetmask if desired.
  - Gateway Address [none]:  
Enter the new gateway address.
  - Set IP address now? [y = set now, n = next  
reboot]:  
Enter **y** to set now.
4. Verify that the information was entered correctly by entering:  
`ipAddrShow`  
View the display to confirm the settings.

## Connecting the MSA SAN Switch 2/8 to the Ethernet Network

If you have not yet connected the MSA SAN Switch to the Ethernet segment:

1. Remove the shipping plug from the MSA SAN Switch Ethernet port.
2. Connect one end of an Ethernet cable to the workstation or to an Ethernet network containing the workstation.
3. Connect the other end of the Ethernet cable to the MSA SAN Switch Ethernet port.

The MSA SAN Switch will automatically sense the cable configuration used (straight or cross over.)

4. Verify that you can access the MSA SAN Switch through the Ethernet.

Use the following CLI command to verify the switch connection:

```
PING ipaddress
```

where *ipaddress* is the Ethernet IP address of the MSA SAN Switch.

For example:

```
PING 10.77.77.77
Reply from 10.77.77.77: bytes=32 time<10ms TTL=
Reply from 10.77.77.77: bytes=32 time<10ms TTL=
Reply from 10.77.77.77: bytes=32 time<10ms TTL=
Reply from 10.77.77.77: bytes=32 time<10ms TTL=

Ping statistics for 10.77.77.77:
    Packets: Sent=4, Received=4, Lost=0
Approximate round trip times in milli-seconds:
    Minimum=0ms, Maximum=0ms, Average=0ms
```

---

**Note:** The switch must be connected to your IP network through the Ethernet port to enable connection using telnet.

---

If you cannot connect to the MSA SAN Switch, check your cable connections and enter the `ipaddress` command again to verify that the IP address information was entered correctly.

## Completing MSA SAN Switch 2/8 Configuration

After connecting the cables and entering the IP address information, additional parameters must be set. Some of these tasks include setting the system date and time, setting up zoning information, and backing up the system configuration settings.

---

**Note:** HP strongly recommends backing up the configuration. This ensures that a complete configuration is available if required for a replacement switch. For instructions on backing up the configuration, refer to the “Backing Up Configuration Data and Upgrading Firmware” chapter.

---

These remaining configuration tasks are performed in either of the following user interfaces:

- Command Line Interface (CLI)
- Web Tools

Each of these user interfaces is briefly discussed in “Managing the MSA SAN Switch 2/8” and is discussed in detail in separate user guides.

The user guides for the CLI and Web Tools are available on the documentation CD, included in the shipping carton with the switch.

## Verifying Operation

After making the appropriate connections, as outlined in this chapter, use these steps to verify that the switch is running properly.

1. Access your browser.
2. At the URL address window, enter  
`HTTP://your switch IP address`  
where *your switch address* is the IP address of your MSA SAN Switch.
3. If connected properly, the background of the switch panel displayed in the browser window will be green, indicating Healthy/OK.

# Managing the MSA SAN Switch 2/8

## 4

This chapter discusses the following management topics:

- [Command Line Interface \(CLI\) Overview](#), page 39
- [Web Tools Overview](#), page 40
- [Optional Management Tools](#), page 42
- [LED Activity Definitions](#), page 45
- [MSA SAN Switch 2/8 POST and Diagnostic Tests](#), page 48

The management functions of the MSA SAN Switch 2/8 allow you to monitor fabric topology, port status, physical status, and other information to aid in system debugging and performance analysis.

The MSA SAN Switch can be managed through a serial or an Ethernet connection, and is compatible with the following management interfaces:

- **Command Line Interface (CLI)** via a serial connection or Ethernet telnet session—allows for configuration and management of the switch in a command line format.

The CLI must be used to initially set the Ethernet IP address of the switch.

For more information, see the following section and refer to the *HP StorageWorks Fabric OS Procedures Guide* and the *HP StorageWorks Fabric OS Reference Guide*. These guides are included on the documentation CD included in the shipping carton.

- **Web Tools** via an Ethernet connection—provides an easy-to-use graphical user interface, allowing the SAN administrator to monitor and manage entire fabrics and individual switches and ports from any standard workstation, through a standard web browser. Web Tools provides you with the advantage of being “virtually” in front of any fabric, switch, or port.

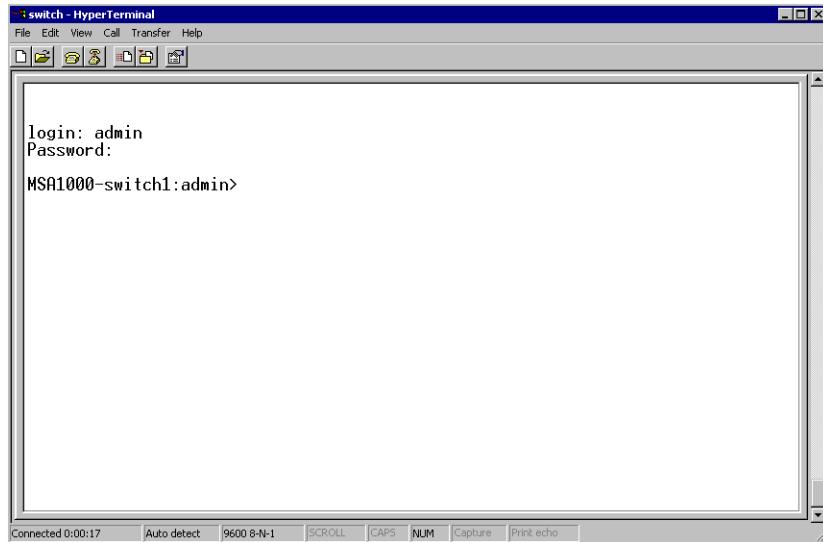
For more information, see the following section and refer to the *HP StorageWorks Web Tools User Guide*. This guide is included on the documentation CD included in the shipping carton.

- **Standard SNMP applications**—For more information refer to the *HP StorageWorks MIB Reference Guide*. This guide is included on the documentation CD included in the shipping carton.

## Command Line Interface (CLI) Overview

As already detailed, the CLI must be used to initially set the IP address of the switch. In addition to this initial configuration task, this user interface can be used to complete the switch configuration and perform maintenance tasks.

All MSA1000 supported operating systems can use the CLI to manage their switch.



**Figure 8: CLI initial menu**

For details on using the CLI to manage your MSA SAN Switch, refer to the *HP StorageWorks Fabric OS Procedures Guide* and the *HP StorageWorks Fabric OS Reference Guide*. These manuals are available on the documentation CD, included in the shipping carton with the switch.

## Web Tools Overview

Web Tools provides a graphical user interface that allows the administrator to monitor and manage entire fabrics and individual switches and ports from any standard workstation.

Using a standard Web browser with a Java™ Plug-in, Web Tools can be used to manage the MSA SAN Switch either locally or remotely.

---

**Note:** Web Tools can be run from any workstation that supports a Java Runtime Environment version JRE 1.2.-008 or later.

---

The Java Plug-in can be loaded from the documentation CD included in the shipping carton with the switch. The plug-in is loaded in the *Firmware* subdirectory. Double-click on the *JAVAPLUGIN.EXE* file to begin the installation procedure.

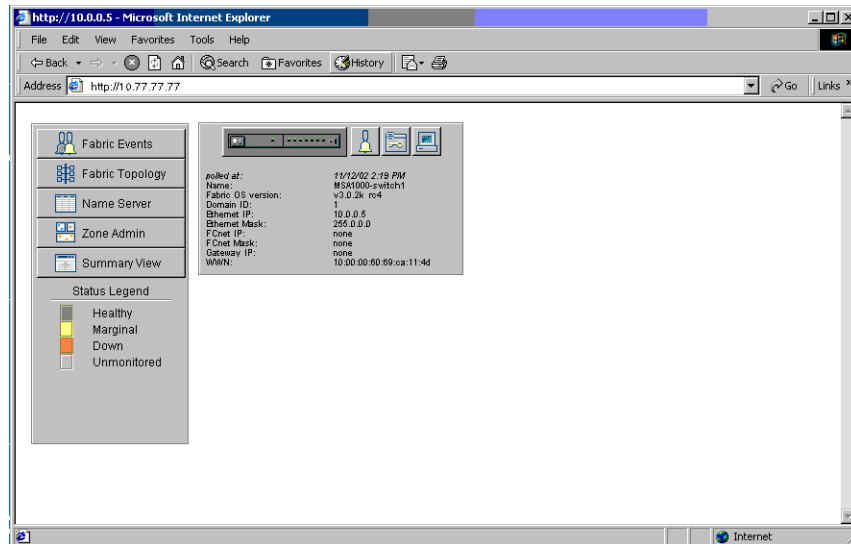
---

**Note:** Before the switch can be used or can be managed through Web Tools, an appropriate IP address, subnet mask, and gateway address must be first entered through the CLI.

---

[Figure 9](#) is an illustration of the initial Web Tools screen display.





**Figure 9: Initial Web Tools display**

All switches in the fabric are displayed in the Web Tools main window, including switches that do not have a Web Tools license. However, only switches that have a Web Tools license can be managed through the Web Tools GUI.

---

**Note:** The switch panel image in the documentation is a representation of the switch. The switch panel on your screen display will accurately represent your switch.

---

For instructions using Web Tools to manage your MSA SAN Switch and on installing the Java Plug-in, refer to the *HP StorageWorks Web Tools User Guide*. This manual is available on the documentation CD, included in the shipping carton with the switch.

## Optional Management Tools

Your MSA SAN Switch includes the Web Tools and Advanced Zoning components. These tools were enabled at the factory with a software license key.

In addition to Web Tools and Advanced Zoning, the MSA SAN Switch supports the following optional management tools:

- [ISL Trunking](#)
- [QuickLoop](#)
- [Fabric Watch](#)
- [Advanced Performance Monitoring](#)
- [Extended Fabrics](#)

---

**Note:** Each management tool requires a license. The license is provided to you when you purchase the component. For information on purchasing an optional feature, contact your HP Authorized Reseller.

---

---

**Note:** Some licenses may have been installed on the switch at the factory. HP recommends recording all software keys, in case they are deleted by accident. See [“Displaying the Optional Feature Licenses.”](#)

---

## ISL Trunking

The optional ISL trunking feature enhances switch to switch performance in a SAN while simplifying management tasks and improving reliability.

Advantages to integrating ISL Trunking into your SAN include:

- Combining up to four ISLs into a single, logical ISL
- Load sharing traffic across all ISLs in a trunk
- Maintaining in-order delivery of frames
- Avoiding rerouting if one of the server links between two switches fails
- Simplifying management by implementing fewer ISLs

For more information, refer to the *HP StorageWorks ISL Trunking User Guide*. This guide is included on the documentation CD included in the shipping carton.

## QuickLoop

The optional QuickLoop feature allows arbitrated loops to attach 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.

Advantages to integrating QuickLoop into your SAN include:

- Supports communication between devices that are not fabric-aware. For example, QuickLoop allows the MSA SAN Switch to emulate a hub environment, while offering the additional benefit of fabric connectivity.
- The QuickLoop and Zoning combination allows a private host to fully participate in a SAN.

For more information, refer to the *HP StorageWorks QuickLoop User Guide*. This guide is included on the documentation CD included in the shipping carton.

## Fabric Watch

The optional Fabric Watch feature allows you to monitor the performance and status of Fibre Channel SAN Switches.

Advantages to integrating Fabric Watch into your SAN include:

- Real-time alerts to potential problems within the SAN
- Monitoring of fabric events (like reconfiguration and zone changes), physical switch conditions, and individual port status

For more information, refer to the *HP StorageWorks Fabric Watch User Guide*. This guide is included on the documentation CD included in the shipping carton.

## Advanced Performance Monitoring

The optional Advanced Performance Monitoring (APM) feature provides SAN performance management through an end-to-end monitoring system.

Advantages to integrating APM into your SAN include:

- Increased end-to-end fabric visibility
- Provides more accurate reporting for service level agreements and charged access applications

For more information, refer to the *HP StorageWorks Advanced Performance Monitoring User Guide*. This guide is included on the documentation CD included in the shipping carton.

## Extended Fabrics

The optional Extended Fabrics feature increases the maximum bandwidth between two switches (at extended distances).

Advantages to integrating Extended Fabrics into your SAN include:

- Provides the highest possible performance of data transfer between switches.
- Provides maximum buffering between E\_Ports connected over an extended distance

For more information, refer to the *HP StorageWorks Extended Fabric User Guide*. This guide is included on the documentation CD included in the shipping carton.

## Displaying the Optional Feature Licenses

Use these steps to display optional features installed on your switch.

1. Log on to the switch as the admin user.
2. At the command line, enter:

```
licenseShow
```

This command displays the license keys that have been entered for the switch and the features enabled by those licenses.

## Enabling Licensed Features

All optional licensed features must be enabled with a license key. After you have purchased these features, you are provided with a key to unlock the feature.

Use these steps to enable a licensed feature.

1. Log on to the switch as the admin user.
2. At the command line, enter:

```
licenseAdd aaaBbbCcc
```

where *aaaBbbCcc* is the license key for a particular feature

---

**Note:** You must enter a license key for a feature to activate. License keys are case-sensitive.

---

## LED Activity Definitions

MSA SAN Switch activity and status can be determined through the activity of the LEDs on the switch panel.

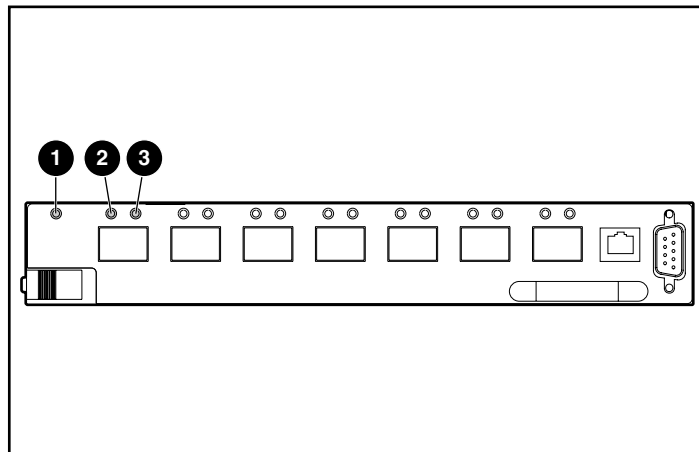
The LEDs will flash green, yellow, or amber while the switch is booting and while POST or other diagnostic tests are running. These patterns are normal and do not indicate a problem. Wait until POST or other diagnostic tests are completed before examining and interpreting the LEDs.

---

**Note:** Any errors related to LED activity are listed in the error log. For information about the error log, refer to the *HP StorageWorks Fabric OS Procedures Guide*.

---

The MSA SAN Switch panel and its associated LEDs are illustrated in [Figure 10](#).



**Figure 10: LED locations on the MSA SAN Switch 2/8**

Item	Description
①	Switch readiness LED
②	Port status LED
③	Port speed LED

## Switch Readiness LED Definitions

**Table 4: Switch Readiness LED Definitions**

LED Color	Hardware Status	Recommended Action
No light	Switch has no power.	Verify switch is installed correctly.
Steady green	Switch is on and all ports are ready for use.	No action required.
Steady yellow	One or more ports are offline <i>OR</i> Switch is booting and has not logged into the MSA T000.	Verify the switch has completed booting and is not disabled. If light is still yellow, check the error log and the Port Status LEDs.
Slow flashing yellow (on 1 second; off 1 second)	Error log contains one or more port diagnostic error messages.	Check error log, port status LEDs, port media, and cables or loopback plugs.

## Port Speed LED Definitions

**Table 5: Port Speed LED Definitions**

LED Color	Hardware Status	Recommended Action
No light	Port is transmitting at 1 Gb/s	No action required.
Steady green	Port is transmitting at 2 Gb/s	No action required.

## Port Status LED Definitions

**Table 6: Port Status LEDs**

LED Color	Hardware Status	Recommended Action
No light	No signal or light carrier (media or cable) detected.	Check media and cable.
Steady green	Port is online (connected to external device) but shows no traffic.	No action required.
Slow-flashing green (on 1 second; off 1 second)	Port is online, but segmented, indicating a loopback cable or incompatible switch.	Verify correct device is connected to the port.
Fast-flashing green (on 1/4 second; off 1/4 second)	Port is in internal loopback (diagnostic).	No action required.
Flickering green	Port is online.	No action required
Steady amber	Port is receiving signal carrier, but is not yet online.	No action required.
Slow-flashing amber (on 1 second; Off 1 second)	Port is disabled (result of diagnostics or <code>portDisable</code> command).	Enable port (can use <code>PortEnable</code> command; refer to the HP StorageWorks Fabric OS Reference for more information).
Fast-flashing amber (on 1/4 second; off 1/4 second)	Port is faulty.	<ol style="list-style-type: none"> <li>1. Check port status LEDs, error log, and cable or loopback plug.</li> <li>2. Clear the error log.</li> </ol>
Alternating green and amber	Port is bypassed.	Check configuration of the Fibre Channel loop.

## MSA SAN Switch 2/8 POST and Diagnostic Tests

Read the following sections for information on the POST and diagnostic tests.

### POST Results

Each time the MSA1000 is powered on or the MSA SAN Switch is reset or reseated, the switch automatically performs a Power-on Self-Test (POST), verifying that the switch is operating properly. During POST, the port status LEDs flash. POST completes in approximately seven minutes.

POST runs through the following test cycles:

- Preliminary POST diagnostics
- Initialization of operating system
- Initialization of hardware
- Tests on circuitry, port functionality, memory, parity, statistics counters, and serialization

To determine whether POST completed without errors, verify that all LEDs return to a normal state after POST is complete. If one or more LEDs do not return to a normal state or if the CLI switch prompt does not display when POST completes, POST was unsuccessful.

Check the success/fail results of the diagnostic tests run during POST via LED activity, the error log, or the CLI using the `errShow` command. For more information about error messages, refer to the *HP StorageWorks Fabric OS Reference Guide*.

### Disabling POST

If desired, you can configure your switch to bypass the POST routines.

---

**Note:** HP does not recommend disabling POST.

---

To disable POST through the CLI, use the command `diagdisablepost`.

To disable POST through Web Tools, enable Fastboot in the Administration page.

For specific instructions, see the *HP StorageWorks Fabric OS Reference Guide* or the *HP StorageWorks Web Tools User Guide*. These guides are included on the documentation CD, included in the shipping carton.



## Diagnostic Tests

Diagnostic tests are provided to help troubleshoot the hardware and the firmware. The diagnostic tests provided on the switch include tests of internal connections and circuitry, fixed media, and any SFP modules and fiber optic cables in use. The tests are implemented by command, either through a telnet session or a serial connection.

All diagnostic tests are run at link speeds of both 1 Gbps and 2 Gbps. For information about the specific diagnostic tests and how to run them, refer to the *HP StorageWorks Fabric OS Procedures User Guide*.

---

**Note:** The transmit and receive speed of the links may be temporarily locked to a specific speed during diagnostic testing.

---



# Backing Up Configuration Data and Upgrading Firmware



This chapter discusses the following topics:

- [Backing Up System Configuration Settings](#), page 52
- [Restoring System Configuration Settings](#), page 53
- [Upgrading or Restoring the Switch Firmware](#), page 54

## Backing Up System Configuration Settings

HP strongly recommends saving the configuration after the initial configuration is completed and periodically thereafter.

The FTP or the RSHD protocols may be used to backup the system configuration.

---

**Note:** The two supplied utilities, *RSHD.EXE* and *CAT.EXE* are available from the HP support website at <http://www.hp.com>.

---

Use these steps to upload a backup copy of the configuration settings to a host computer.

1. Verify that the RSHD service or the FTP service is running on the host computer.
2. Log in to the switch as the admin user.
3. At the command line, enter:

```
CONFIGUPLOAD HOSTIPADDR USER PATH_FILENAME PASSWORD
```

where *HOSTIPADDR* is the IP address of the host computer, *USER* is the User ID used to log into this computer, *PATH\_FILENAME* is the path location and filename of the configuration file, and *PASSWORD* is the password for the User ID specified.

---

**Note:** The password operand is required only if you are using FTP.

---

If only `CONFIGUPLOAD` is entered, the system will prompt you for each parameter, as shown in the following example:

```
switch:admin> configupload
Server Name or IP Address [host]: www.xxx.yyy.zzz
User Name [user]: admin
File Name [config.txt]: switch1
Protocol (RSHD or FTP) [rshd]: ftp
Password:
Upload Complete
```

## Restoring System Configuration Settings

Use these steps to restore the system configuration settings from a backup.

1. Verify that the RSHD service or the FTP service is running on the host computer.
2. Log in to the switch as the admin user.
3. At the command line, shut down the switch by entering:

```
SWITCHDISABLE
```

Because the switch is disabled, a warning message about the switch status is displayed.

4. Enter:

```
CONFIGDOWNLOAD HOSTIPADDR USER PATH_FILENAME PASSWORD
```

where *HOSTIPADDR* is the IP address of the host computer, *USER* is the User ID used to log into this computer, *PATH\_FILENAME* is the path location and filename of the configuration file, and *PASSWORD* is the password for the User ID specified.

---

**Note:** The password operand is required only if you are using FTP.

---

If only `CONFIGDOWNLOAD` is entered, the system will prompt you for each parameter, as shown in the following example:

```
switch:admin> configdownload
Server Name or IP Address [host]: www.xxx.yyy.zzz
User Name [user]: admin
File Name [config.txt]: switch1
Protocol (RSHD or FTP) [rshd]: ftp
Password:
Download Complete
```

5. Restart the switch by entering:

```
FASTBOOT
```

## Upgrading or Restoring the Switch Firmware

The MSA SAN Switch ships with preloaded firmware. In most cases, it is not necessary to update the firmware on a new switch.

The firmware version can be obtained and downloaded as follows:

- [Downloading New Switch Firmware through the CLI](#)
- [Downloading New Switch Firmware through Web Tools](#)

Each of these methods is discussed in the following sections.

---

**Note:** All switches in the fabric must be running the same version of the firmware. If you upgrade the firmware on one switch, you must upgrade all switches.

---

### Downloading New Switch Firmware through the CLI

Before you upgrade the firmware on your switch, verify the version of the firmware you are currently using.

### Determining Your Firmware Version through the CLI

To view the current version of the firmware on the switch:

1. Log on to the switch as the admin user.
2. At the command line, enter:

```
VERSION
```

The system displays the Kernel version, Fabric Operating System release number, and other information about the firmware.

## Performing a Firmware Upgrade through the CLI

Use these steps to upgrade or restore the switch firmware:

1. Verify that the RSHD service or the FTP service is running on the host computer.
2. Download the firmware from the HP Website at <http://www.hp.com>.  
Go to the Support page for the required loaders and instructions.
3. Log in to the switch as the admin user.
4. At the command line, enter:

```
FIRMWAREDOWNLOAD HOSTIPADDR, USER, PATH_FILENAME, PASSWORD
```

where `HOSTIPADDR` is the IP address of the host computer, `USER` is the User ID used to log into the switch, `PATH_FILENAME` is the path location and filename of the configuration file, and `PASSWORD` is the password for the User ID specified.

---

**Note:** The password operand is required only if you are using FTP.

---

If only `FIRMWAREDOWNLOAD` is entered, the system will prompt you for each parameter, as shown in the following example:

```
switch:admin> firmwaredownload
Server Name or IP Address [host]: www.xxx.yyy.zzz
User Name [user]: admin
File Name [config.txt]: switch1
Protocol (RSHD or FTP) [rshd]: ftp
Password:
Firmware Download Complete
```

5. Verify the download was successful.
6. Restart the switch by entering:

```
FASTBOOT
```

## Downloading New Switch Firmware through Web Tools

Before you upgrade the firmware on your switch, verify version of the firmware you are currently using.

### Determining Your Firmware Version through Web Tools

To view the current version of the firmware on the switch:

1. Access Web Tools.

The Fabric View is displayed by default.

A panel for each switch in the fabric is displayed on the screen.

Figure 11 is an illustration of the Web Tools Fabric View.

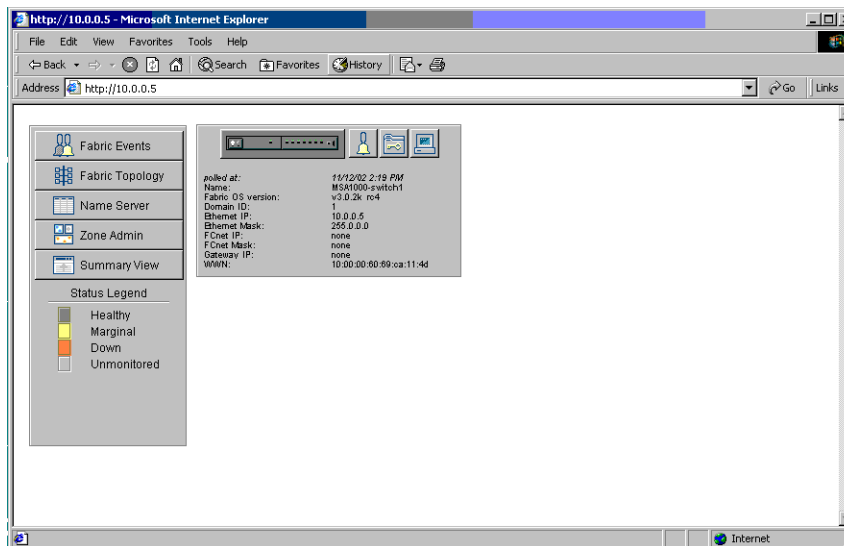


Figure 11: Web Tools initial Fabric View menu



2. Locate the panel for this switch and view the display.  
If necessary, click the **Detail View** button to display more information.  
The following information is displayed for the switch:
  - Name
  - Fabric OS version
  - Domain ID
  - Ethernet IP
  - Ethernet Mask
  - FCnet IP
  - FCnet Mask
  - Gateway IP
  - WWN

## Performing a Firmware Upgrade through Web Tools

To download the latest version of the firmware on the switch:

1. Download the firmware from the HP website at <http://www.hp.com>.  
Go to the Support page for the required loaders and instructions.
2. Access Web Tools.
3. Click the **Admin** icon button (next to the switch panel display) to go to the Administrative Interface.

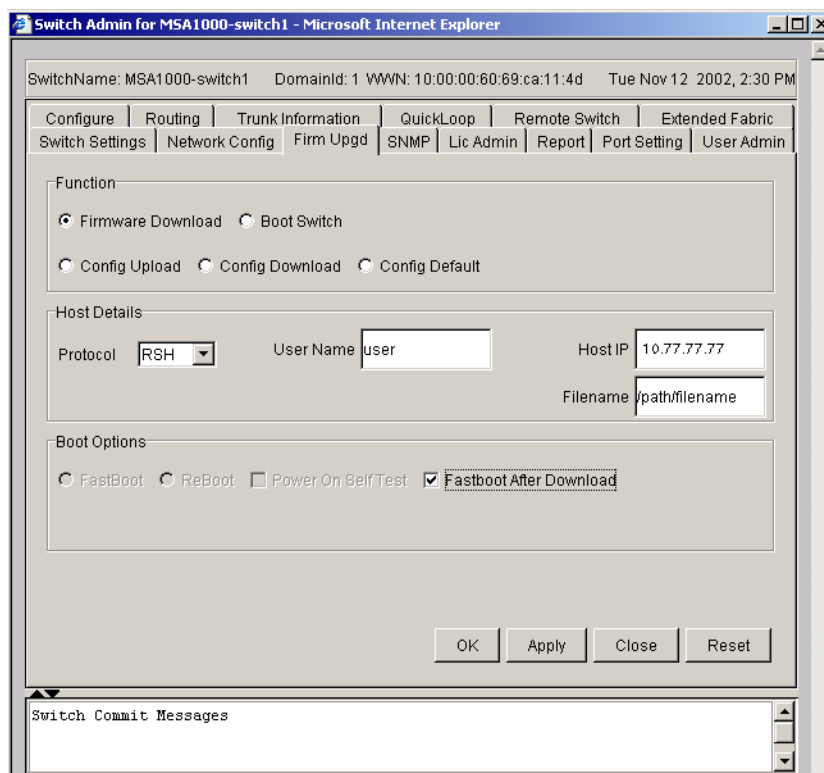
At the prompt, enter a user name and password with administrative privileges and click OK.

The Administrative Interface is displayed, with the Switch Settings tab selected by default.

4. Select the Firmware Upgrade (**Firm Upgrd**) tab.

The Firmware Upgrade page is displayed.

[Figure 12](#) is an illustration of this Firmware Upgrade page.



**Figure 12: Firmware Upgrade tab**

5. Select the **Firmware Download** function.
6. Modify the **Host IP** address to indicate the host with the firmware.
7. Modify the **Filename** to indicate the path and filename of the firmware.
8. Select the **Fastboot After Download** boot option.
9. Select **Apply**.

Wait for the firmware download to complete and the switch to restart.

# Regulatory Compliance Notices



## Regulatory Compliance Identification Numbers

For the purpose of regulatory compliance certifications and identification, your HP StorageWorks MSA SAN Switch 2/8 is assigned an HP series number. The HP series number for this product is: Series EK 1506.

The series number can be found on the product label, along with the required approval markings and information. When requesting certification information for this product, always refer to this series number. This series number should not be confused with the marketing name or model number for your MSA SAN Switch 2/8.

## Federal Communications Commission Notice

Part 15 of the Federal Communications Commission (FCC) Rules and Regulations has established Radio Frequency (RF) emission limits to provide an interference-free radio frequency spectrum. Many electronic devices, including computers, generate RF energy incidental to their intended function and are, therefore, covered by these rules. These rules place computers and related peripheral devices into two classes, A and B, depending upon their intended installation. Class A devices are those that may reasonably be expected to be installed in a business or commercial environment. Class B devices are those that may reasonably be expected to be installed in a residential environment (for example, personal computers). The FCC requires devices in both classes to bear a label indicating the interference potential of the device as well as additional operating instructions for the user.

The rating label on the device shows the classification (A or B) of the equipment. Class B devices have an FCC logo or FCC ID on the label. Class A devices do not have an FCC logo or ID on the label. After the class of the device is determined, refer to the corresponding statement in the sections below.

## **Class A Equipment**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at personal expense.

## **Declaration of Conformity for Products Marked with the FCC Logo**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

## **Modifications**

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Hewlett-Packard Company may void the user's authority to operate the equipment.

## **Network and Serial Cables**

Serial connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

## **Canadian Notice (Avis Canadien)**

The following sections list Canadian equipment notices.

### **Class A Equipment**

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 Règlement sur le matériel brouilleur du Canada.

## European Union Notice

Products with the CE Marking comply with both the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community.

Compliance with these directives implies conformity to the following European Norms (the equivalent international standards are in parenthesis):

- EN55022 (CISPR 22)—Electromagnetic Interference
- EN50082-1 (IEC801-2, IEC801-3, IEC801-4)—Electromagnetic Immunity
- EN60950 (IEC950)—Product Safety
- Also approved under UL 1950, 3<sup>rd</sup> Edition/CSA C22.2 No. 950-95, Safety of Information Technology Equipment

## China Taiwan Notice

警告使用者：

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

## Japanese Notice

ご使用になっている装置にVCCIマークが付いていましたら、次の説明文をお読み下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスB情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。  
取扱説明書に従って正しい取り扱いをして下さい。

VCCIマークが付いていない場合には、次の点にご注意下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

## Laser Devices

All HP systems equipped with a laser device comply with safety standards, including International Electrotechnical Commission (IEC) 825. With specific regard to the laser, the equipment complies with laser product performance standards set by government agencies as a Class 1 laser product. The product does not emit hazardous light; the beam is totally enclosed during all modes of customer operation and maintenance.

## Laser Safety Warnings

To reduce the risk of exposure to hazardous radiation:

- Do not try to open the laser device enclosure. There are no user-serviceable components inside.
- Do not operate controls, make adjustments, or perform procedures to the laser device other than those specified herein.
- Allow only HP authorized service technicians to repair the laser device.

## Compliance with CDRH Regulations

The Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration implemented regulations for laser products on August 2, 1976. These regulations apply to laser products manufactured from August 1, 1976. Compliance is mandatory for products marketed in the United States.

## Compliance with International Regulations

All HP systems equipped with laser devices comply with appropriate safety standards including IEC 825.

## Laser Product Label

The following label or equivalent is located on the surface of the HP supplied laser device.



This label indicates that the product is classified as a CLASS 1 LASER PRODUCT. This label appears on a laser device installed in your product.

## Laser Information

The following table lists laser specifications.

**Table 7: Laser Specifications**

Item	Specification
Wave length	850 nm $\pm$ 35 nm
Divergence angle	53.5 degrees $\pm$ 4.5 degrees
Output power	Less than 2.0 mW or 10,869 Wm-2 sr-1
Polarization	Circular 0.25
Numeric aperture	0.45 inches $\pm$ 0.04 inches



# Electrostatic Discharge



## B

To prevent damaging the system, be aware of the precautions you need to follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

To prevent electrostatic damage, observe the following precautions:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always make sure you are properly grounded when touching a static-sensitive component or assembly.

## Grounding Methods

There are several methods for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm  $\pm$  10 percent resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have a HP authorized reseller install the part.

# I/O Connection Specifications



This appendix covers the following topics:

- [The serial port can be used to connect the switch to a computer workstation to configure the switch IP address without connecting to the fabric. The serial port's parameters are 9600 baud, 8 data bits, no parity, 1 stop bit, and no flow control.](#), page 67
- [Ethernet Port Specifications](#), page 68

The serial port can be used to connect the switch to a computer workstation to configure the switch IP address without connecting to the fabric. The serial port's parameters are 9600 baud, 8 data bits, no parity, 1 stop bit, and no flow control.

The port requires a straight serial cable with a female 9-pin subminiature-D connector. Only pins 2, 3, and 5 are supported, as shown in Table 8.

**Table 8: Serial Port Cabling Pin Layout**

Pin	Signal	Description
1	NC	
2	TX	Transmit data
3	RX	Receive data
4	NC	
5	GND	Ground
6	NC	
7	NC	
8	NC	
9	NC	

---

**Note:** For dust and ESD (electrostatic discharge) protection, a cover is provided for the serial port and should be kept on the port whenever the serial port is not in use.

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## Ethernet Port Specifications

The Ethernet port uses the pin layout specified in Table 9.

**Table 9: Ethernet Port Cabling Pin Layout**

Pin	Signal	Function
1	TX+	Transmit data
2	TX-	Transmit data
3	RX+	Receive data
4	NC	
5	NC	
6	RX-	Receive data
7	NC	
8	NC	
9	NC	

---

**Note:** For dust and ESD (electrostatic discharge) protection, a cover is provided for the Ethernet port and should be kept on the port whenever the Ethernet port is not in use.

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