Compaq StorageWorks

Fibre Channel Arbitrated Loop Switch (FC-AL Switch)

User Guide

Second Edition (April 2001)
Part Number 185552-002
Compaq Computer Corporation

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About This Guide

This guide is designed to be used as step-by-step instructions for installation and as a reference for operation, troubleshooting, and future upgrades.

Text Conventions

This document uses the following conventions to distinguish elements of text:

Keys	Keys appear in boldface. A plus sign (+) between two keys indicates that they should be pressed simultaneously.
USER INPUT	User input appears in a different typeface and in uppercase.
FILENAMES	File names appear in uppercase italics.
Menu Options, Command Names, Dialog Box Names	These elements appear in initial capital letters.
COMMANDS, DIRECTORY NAMES, and DRIVE NAMES	These elements appear in uppercase.
Type	When you are instructed to *type* information, type the information **without** pressing the **Enter** key.
Enter	When you are instructed to *enter* information, type the information and then press the **Enter** key.

Symbols in Text

These 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 loss of life.

CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

IMPORTANT: Text set off in this manner presents clarifying information or specific instructions.

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

Symbols on Equipment

The following symbols may be placed on equipment to indicate the presence of potentially hazardous conditions:

This symbol in conjunction with any of the following symbols indicates the presence of a potential hazard. The potential for injury exists if warnings are not observed. Consult your documentation for specific details.

This symbol indicates the presence of hazardous energy circuits or electric shock hazards. Refer all servicing to qualified personnel.

WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure. Refer all maintenance, upgrades, and servicing to qualified personnel.

This symbol indicates the presence of electric shock hazards. The area contains no user or field serviceable parts. Do not open for any reason.

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

This symbol on an RJ-45 receptacle indicates a Network Interface Connection.

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

This symbol indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.

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

These symbols on power supplies or systems indicate the equipment is supplied by multiple sources of power.

WARNING: To reduce the risk of injury from electric shock, remove all power cords to completely disconnect power from the system.

This symbol indicates that the component exceeds the recommended weight for one individual to handle safely.

Weight in kg
Weight in lb

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

⚠ Important Safety Information

Before installing this product, read the *Important Safety Information* document provided.

Rack Stability

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.
- The stabilizing feet are attached to the rack if it is a single rack installation.
- The racks are coupled in multiple rack installations.
- Only one component is extended at a time. A rack may become unstable if more than one component is extended for any reason.

Getting Help

If you have a problem and have exhausted the information in this guide, you can get further information and other help in the following locations.

Compaq Technical Support

In North America, call the Compaq Technical Phone Support Center at 1-800-OK-COMPAQ. This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored.

Outside North America, call the nearest Compaq Technical Support Phone Center. Telephone numbers for worldwide Technical Support Centers are listed on the Compaq website. Access the Compaq website at www.compaq.com.

Be sure to have the following information available before you call Compaq:

- Technical support registration number (if applicable)
- Product serial number
- Product model name and number
- Applicable error messages
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level

Compaq Website

The Compaq website has information on this product as well as the latest drivers and Flash ROM images. You can access the Compaq website at www.compaq.com.

Compaq Authorized Reseller

For the name of your nearest Compaq authorized reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.
- Elsewhere, see the Compaq website for locations and telephone numbers.

Chapter **1**

Overview of the FC-AL Switch

This guide provides specific information for installing and configuring the Compaq *StorageWorks*™ FC-AL Switch and its component parts.

NOTE: The Compaq StorageWorks FC-AL Switch 3-Port Expansion Module enables conversion of the FC-AL 8-Port Switch to a FC-AL 11-Port Switch. For information on installing the Compaq StorageWorks FC-AL Switch 3-Port Expansion Module (PEM), refer to the *Compaq StorageWorks FC-AL Switch 3-Port Expansion Module Installation Instructions* (P/N 185054), included in your user documentation.

Organization of this Guide

For Information About	See
Overview of the FC-AL Switch	Chapter 1
Installing the FC-AL Switch	Chapter 2
Configuring the FC-AL Switch	Chapter 3
FC-AL Switch Management Utility	Chapter 4
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continued

Organization of this Guide *continued*

For Information About	See
Electrostatic Notices	Appendix B
Installing the FC-AL Switch 3-Port Expansion Module	Appendix C
Command Line Interface	Appendix D
Updating the FC-AL Switch	Appendix E
FC-AL Switch Technology	Appendix F
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WARNING: To reduce the risk of personal injury or damage to the equipment, refer to the user documentation supplied with the server and observe the appropriate safety precautions.

The FC-AL Switch

The FC-AL Switch is an eight-port Gigabit Interface Converter (GBIC) based fibre channel arbitrated loop switch with the ability to expand to 11 ports. The FC-AL Switch features a 12 Gbps switch engine that enables full duplex non-blocking performance on all ports.

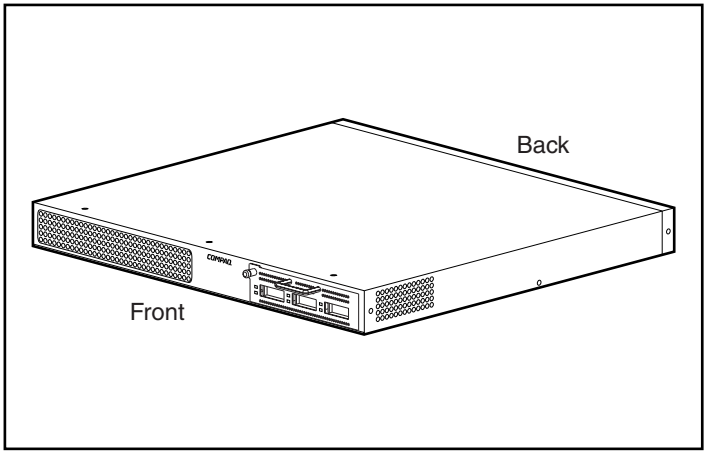

Figure 1-1. The FC-AL 8-port switch with the FC-AL switch 3-port expansion module

Features

The FC-AL Switch includes the following components:

- A main board enclosing the 12 Gbps switching engine
- Microprocessor and other hardware logic support for the firmware agents
- FC-AL Switch Management Utility
  - Full Duplex Communications - A pair of nodes can both simultaneously send and receive data for an aggregate of 2 Gbps
  - Automatic Port Bypass - Improves SAN reliability by automatically bypassing misbehaving ports
- Power LEDs
- RS-232 serial interface port for configuring the FC-AL Switch
- 10-base T Ethernet port for communications to host resident management software applications
- FC-AL Switch 3-Port Expansion Module (PEM) slot (to expand a FC-AL 8-Port Switch to a FC-AL 11-Port Switch)
- Null Modem Cable

Front Panel

The front panel of the FC-AL Switch contains a slot for the insertion of the 3-Port Expansion Module.

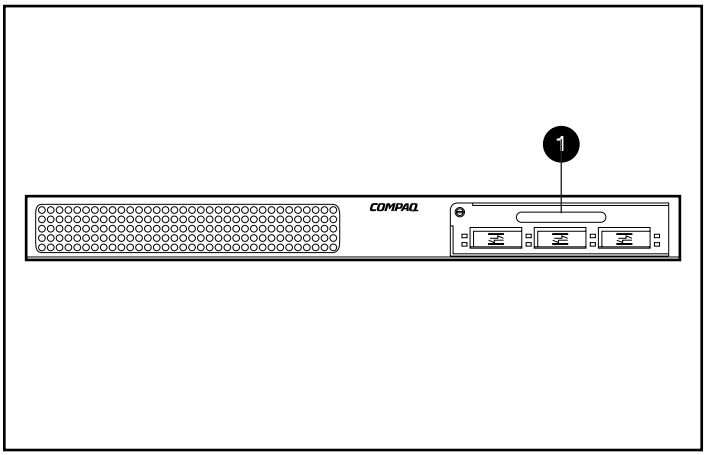

Figure 1-2. FC-AL switch front panel with the FC-AL switch 3-port expansion module ❶

Rear Panel

The rear panel of the FC-AL Switch includes the rear panel LEDs ❶, RS-232 DB-9 serial port ❷, RJ-45 Ethernet connector ❸, and IEC power plug connector ❹.

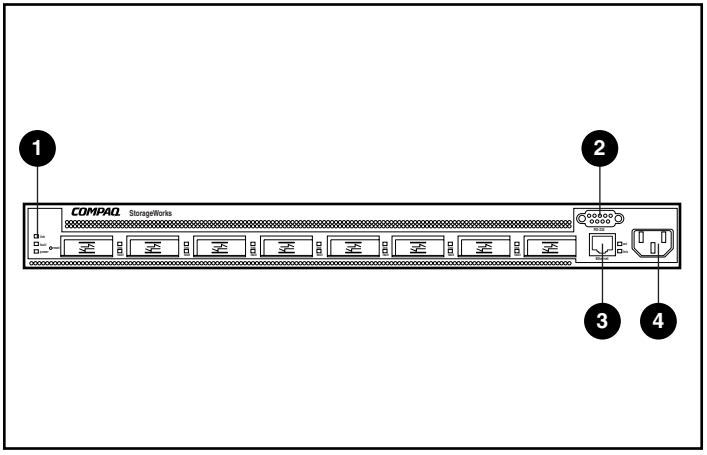

Figure 1-3. Rear panel of the FC-AL switch

Table 1-1
Rear Panel

Callout	Description	Function
❶	Power LEDs	See LED table in Chapter 5, "Troubleshooting."
❷	RS-232 DB-9 Serial Port	A male serial port which may be connected to a host system with a standard 9-pin female to 9 pin female null modem cable. This port can be used to perform initial configuration or local management diagnostic tasks.
❸	RJ-45 Ethernet connector	Ethernet connector to connect the device to a network for management purposes.
❹	IEC power plug connector	Connects the unit to electrical power once installation is complete. Use the AC power cord provided with your kit.

Power LEDs

The LEDs on the rear panel provide a visual reference to the status of the switch. See Chapter 5, “Troubleshooting” for more information about the FC-AL Switch power LEDs.

Installation

Before the FC-AL Switch can communicate with Compaq-managed devices, all devices must be properly connected and powered up. See Chapter 2, “Installing the FC-AL Switch,” for further installation instructions.

Chapter **2**

Installing the FC-AL Switch

This chapter provides information on preparing and installing the Compaq StorageWorks FC-AL Switch in a rack or on a desktop.

Rack-mounting installations require an industry-standard, 19-inch (48.26 cm) electronic enclosure rack or a Compaq 19-inch (48.26 cm) electronic rack. The rack installation procedures provided in this guide are for the Compaq rack only. The desktop installations require a flat, level surface, and the attachment of four rubber feet on the bottom of the chassis.

WARNING: Risk of electrical shock. Do not attempt to open this product. There are no user-serviceable parts inside. Refer all service to a Compaq authorized service provider.`

WARNING: To reduce the risk of electric shock or damage to the equipment:

- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
- To disconnect power from the FC-AL Switch, unplug the power cord from the electrical outlet or from the AC power connector on the unit.

Installing the FC-AL Switch in a Rack

The rack must be set up first before installing the FC-AL Switch. Complete rack install instructions are available on the Rack Products Documentation CD shipped with the Compaq rack. In addition, a Rack Builder Pro Configuration Tool CD kit and Rack Series Products Audio-Visual (AV) CD kit are included. The information contained on these CDs can also be obtained from the Compaq website: www.compaq.com/storageworks.

The entire Rack Resource CD kit ships with all Compaq racks. Contents for each CD includes:

- Rack Products Documentation CD kit

  The resource information shipped on this CD allows you to view, search, and print documentation for Compaq racks and rack options. The information helps you to set up and optimize your new Compaq rack to best fit the needs of your environment.

- Compaq Rack Builder Pro Configuration Tool CD kit

  This information allows you to simulate potential Compaq rack configurations based on your input. The rack builder utility provides:

  - Graphical preview of properly configured racks
  - Site planning data, power requirements, cooling mandates, and physical specifications
  - Ordering information, required components, part numbers, and appropriate quantities

- Rack Series Products Audio-Visual (AV) CD kit

  This information gives a visual overview of operations required to configure a Compaq rack with rack-mountable components. The video covers key configuration steps:

  - Site planning
  - Installing rack options
  - Cabling
  - Coupling multiple racks

Rack Warnings and Precautions

Before beginning installation procedures, make sure that you understand the following warnings and cautions:

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.
- The stabilizers are attached to the rack if it is a single rack installation.
- The racks are coupled in multiple rack installations.

WARNING: To reduce the risk of personal injury or damage to the equipment, at least two people are needed to safely unload the rack from the pallet. An empty 42U rack weighs 253 lb (115 kg), is over 7 ft (2.1 m) tall, and may become unstable when being moved on its casters. Do not stand in front of the rack as it rolls down the ramp from the pallet, but handle it from the sides.

WARNING: A rack may become unstable if more than one component is extended for any reason. To reduce the risk of personal injury, always ensure that the rack is adequately stabilized before extending a component outside the rack, and extend only one component at a time.

WARNING: Before beginning to work on the rack, be sure that the leveling jacks are extended to the floor, that the full weight of the rack rests on the level floor, and that either stabilizers are installed or that multiple racks are coupled together for stability.

The Optimum Environment

When installing your FC-AL Switch in a rack, certain standards of temperature and power requirements must be met.

Space Requirements

Consider the following spatial needs when deciding where to install your rack:

- Clearance in the front of the rack should be a minimum of 25 inches (63.5 cm) for adequate airflow.
- Clearance in the back of the rack should be a minimum of 30 inches (76.2 cm) to allow for servicing and for adequate airflow.

Power Requirements

The electrical current rating for the FC-AL Switch is a maximum steady input of 1.3A rms at 120 VAC or 0.7A rms at 230VAC.

WARNING: To reduce the risk of personal injury, fire, or damage to the equipment, do not overload the AC supply branch circuit that provides power to the rack. Consult the electrical authority having jurisdiction over your facility wiring and installation requirements.

- The power load needs to be balanced between available AC supply branch circuits.
- The overall system AC current load must not exceed 80 percent of the branch circuit AC current rating.
- If power strips are used, the load should not exceed 80 percent of the marked electrical current rating.

The installation of this equipment shall be in accordance with Local/Regional electrical regulations governing the installation of Information Technology Equipment by licensed electricians. This equipment is designed to operate in installations covered by the National Electric Code (ANSI/NFPA 70, 1993) and the code for Protection of Electronic Computer/Data Processing Equipment (NFPA-75, 1992).

For electrical power ratings on options, refer to the product's rating label or the user documentation supplied with that option.

Grounding Requirements

To ensure proper operation and safety, you must properly ground the FC-AL Switch. In the United States, you should install the equipment in accordance with NFPA 70-1993 (National Electric Code) Article 250, as well as any local and regional building codes. In Canada, the equipment should be installed in accordance with Canadian Standards Association, CSA C22.1, Canadian Electrical Code. In all other countries the installation should follow any regional or national electrical wiring codes such as the International Electrotechnical Commission (IEC) 364 parts 1 through 7. Furthermore, you must ensure that all power distribution devices used in the installation - such as branch wiring and receptacles - are Listed or Certified grounding type devices.

When using power strips for electrical distribution, make sure that ground integrity is maintained for each connection made. Plug each component into a reliably grounded outlet.

Temperature Requirements

To ensure continued safe and reliable operation of the equipment, locate the system in a well-ventilated, climate-controlled environment.

The operating temperature inside the rack will always be higher than the room temperature and is dependent on the configuration of the equipment in your rack.

The maximum internal rack temperature for your configuration should not exceed the values shown in the table below.

Table 2-1
Maximum Internal Rack Temperatures

Equipment	Maximum Temperature
Compaq Rack options	40°C/104°F
Other manufacturers' options	See other manufacturers' specifications

CAUTION: To reduce the risk of damage to the equipment when installing third-party options make sure the manufacturer's maximum recommended ambient operating temperature of the optional equipment is not exceeded when installed in the rack.

Airflow Requirements

When viewed from the rear of the rack, the Compaq FC-AL Switch draws air in through the front-facing side and expels warm air through the rear-facing and left-facing sides. Therefore, the front door of the rack must be adequately ventilated to allow ambient air to enter the cabinet. Do not block the ventilation apertures.

CAUTION: If a third-party rack is used, the following minimum requirements should be observed to ensure adequate airflow and to prevent damage to the equipment:

- Front: The rack door should have 120 square inches of holes evenly distributed from top to bottom to permit adequate airflow.
- Side: The clearance between the installed module and the side panels of the rack should be a minimum of 2.75 inches (6.985 cm).
- Rear: The clearance between the back of the rack and the wall should be a minimum of 30 inches (76.2 cm).

Blanking Panels

If all of the vertical space in the rack is not filled by components, the gaps that are left will cause a change in airflow through the rack and across the components. These gaps need to be covered with blanking panels.

Unpacking the FC-AL Switch

Unpack the FC-AL Switch and locate the materials and documentation necessary to install the switch in a rack.

Materials Needed

To install the FC-AL Switch in a rack, the following hardware is needed:

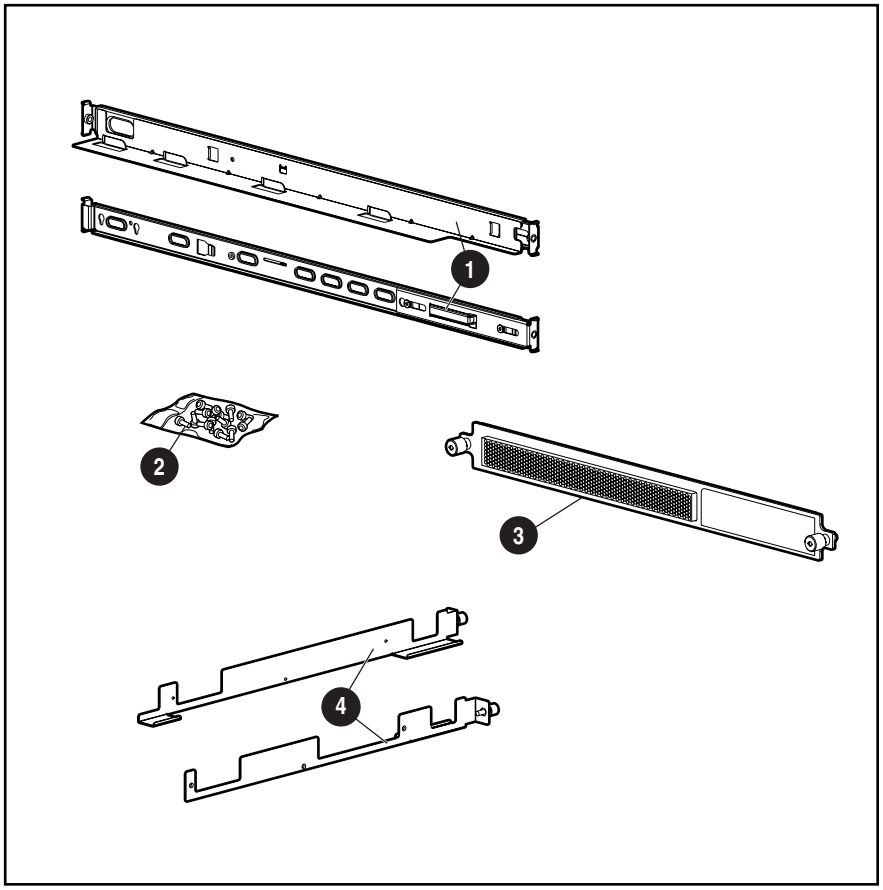

Figure 2-1. Rack mounting hardware

❶ Two spring-loaded rails (longer rails) that are attached to the rack

❷ Bag of screws

❸ One 1U faceplate

❹ Two guide brackets (shorter rails) that are attached to the FC-AL switch chassis

Installation Procedure

Before beginning the installation, be sure that a grounded electrical outlet is easily accessible and is located as close to the storage system as possible.

> **NOTE:** For additional help placing the device in the correct location in a 19-inch (48.26 cm) rack, refer to the Rack Builder Pro Configuration Tool CD kit provided with the Compaq rack. This CD is also available from your local Compaq reseller or authorized service provider.

To install the FC-AL Switch in a Compaq 19-inch (48.26 cm) rack:

1. Remove any blanking panels and other equipment from the chosen rack location.
2. Remove the three screws on each side of the switch chassis. Attach the guide brackets with the M3-.5 Phillips screws that are provided.

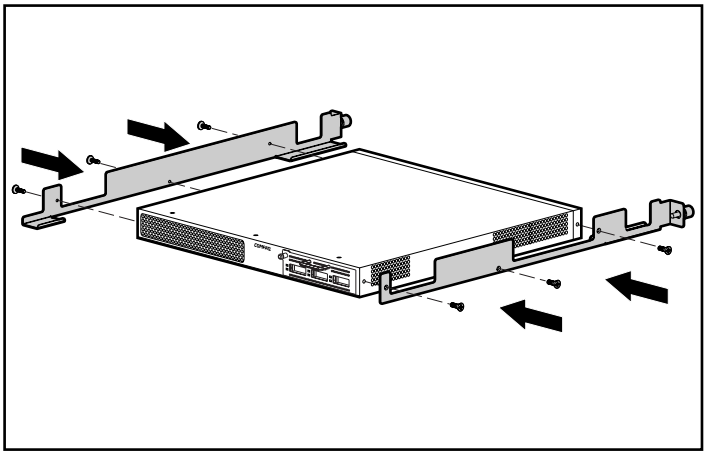

Figure 2-2. Attaching the guide brackets

3. Identify the front ends of the spring-loaded rails using the illustration below.

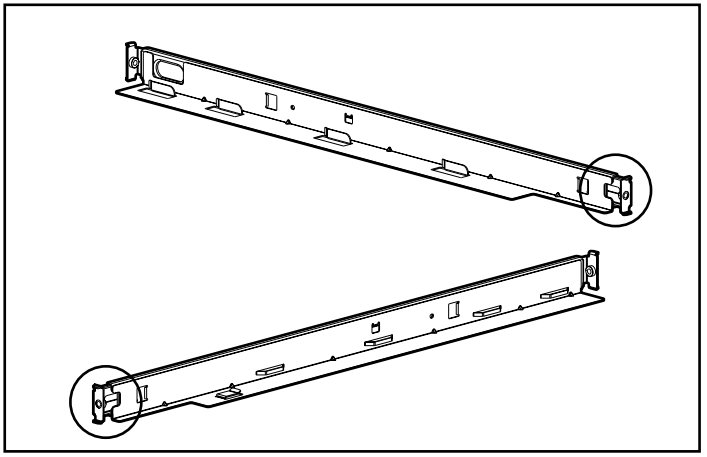

Figure 2-3. Front ends of the spring-loaded rails

4. Insert the front tabs of the spring-loaded rail into the proper holes.

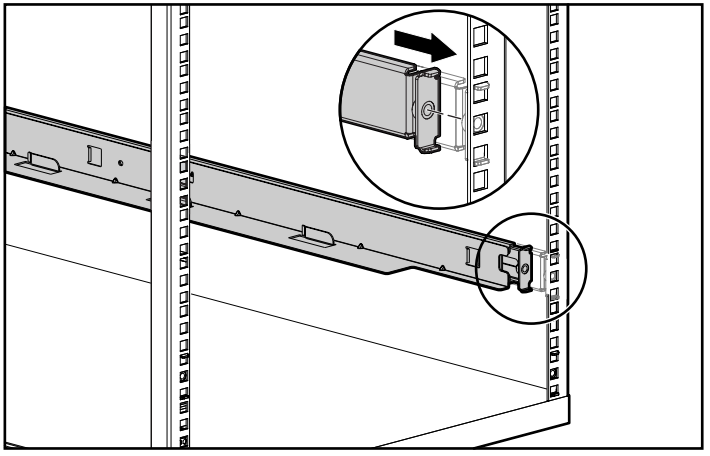

Figure 2-4. Inserting the front tabs of the spring-loaded rails

5. Compress the rail forward and insert the rear tabs of the spring-loaded rail into the proper holes. Repeat these steps for the second spring-loaded rail.

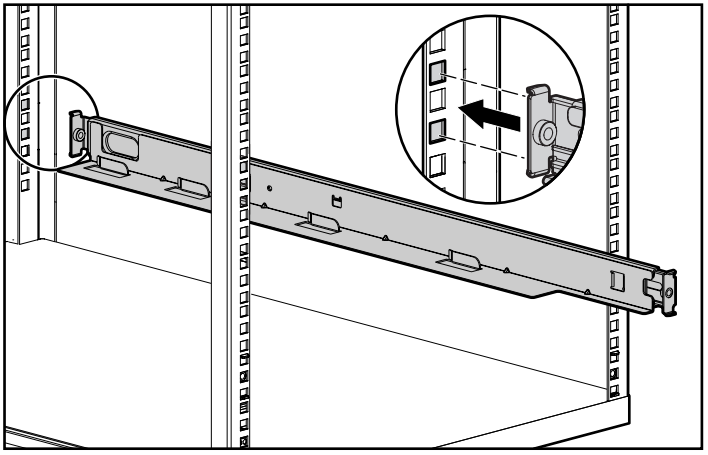

Figure 2-5. Attaching the rear tabs of the spring-loaded rails

WARNING: To avoid injury or equipment damage, the mounting brackets must be level. If the brackets are not level, the Compaq FC-AL Switch cannot be installed correctly.

6. Align the rear end of the guide brackets with the rear end of the spring-loaded rails ❶. Insert the switch, aligning it with the rail guides ❷, and push the switch fully into the rack. Tighten the thumbscrews on the rails.

CAUTION: Keep the unit parallel to the floor when sliding the unit rails into the rack mounting rails. Tilting the unit up or down can result in damage to the rails.

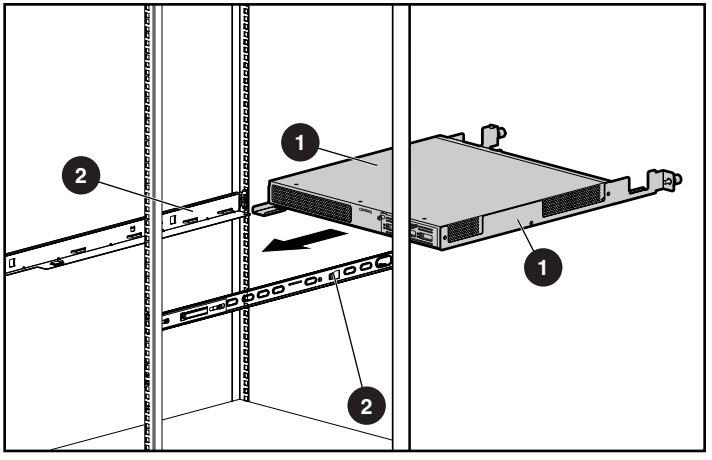

Figure 2-6. Attaching the slide rails

7. Attach the faceplate with the thumbscrews.

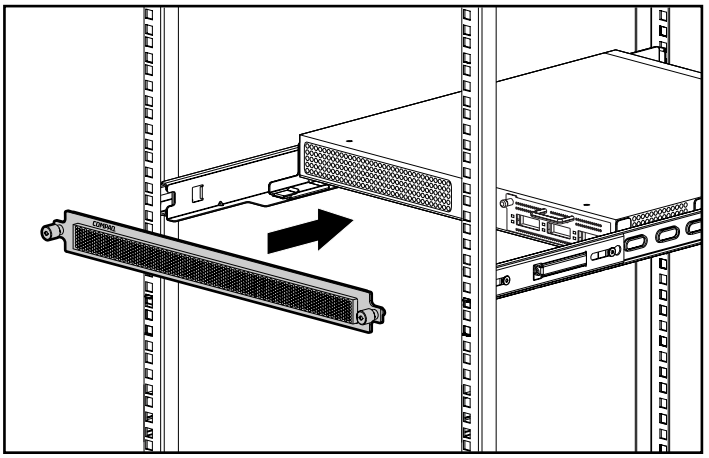

Figure 2-7. Attaching the faceplate

Installation is complete.

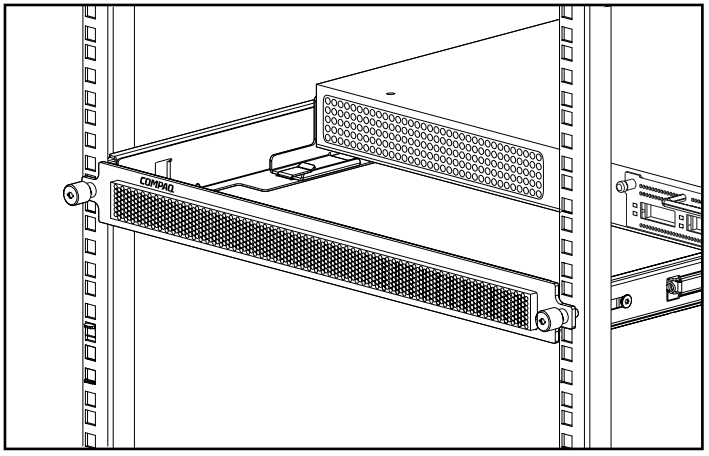

Figure 2-8. Compaq FC-AL Switch installed in a rack

Proceed to the section, “Power Cords.”

Installing the FC-AL Switch on a Desktop

If the unit will not be installed in a rack, the four rubber feet provided in the kit need to be attached. These feet stabilize the base of the unit and minimize damage to any surface on which the unit rests.

CAUTION: Do not stack more than one unit or it may damage your system.

Materials Needed

To install the FC-AL Switch on a desktop, four adhesive rubber feet are needed.

To attach the rubber feet:

1. Turn the unit over and attach one foot to each corner of the unit.
2. Turn the unit upright; place it on a flat, level surface. Use a little alcohol to clean the surface and then let it dry. Apply a rubber pad to each corner.

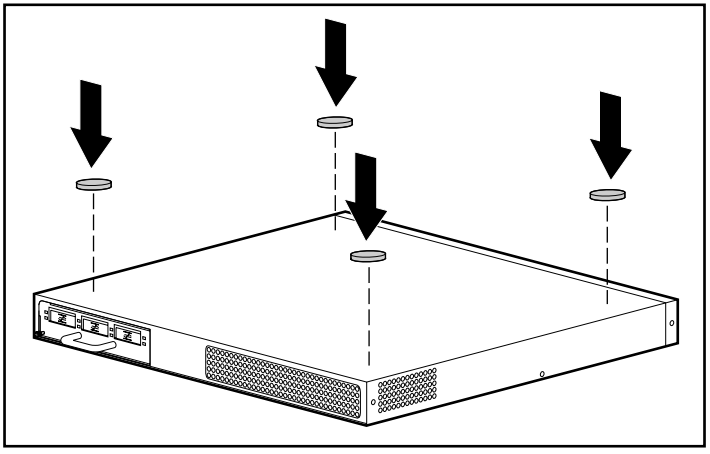

Figure 2-9. Attaching the rubber feet to the FC-AL Switch

IMPORTANT: Six inches of clearance is needed around the unit for adequate ventilation.

Installation is complete. Proceed to the next section.

FC-AL Switch 3-Port Expansion Module (PEM) Installation

To install the FC-AL Switch 3-Port Expansion Module, see Appendix C of this guide, "Installing the FC-AL Switch 3-Port Expansion Module."

Power cords

The power cord set included with the FC-AL Switch meets the requirements for use in the country where you purchased the FC-AL Switch. If you need to use this FC-AL Switch in another country, you should purchase a power cord that is approved for use in that country.

The power cord must be rated for the product and for the voltage and current marked on the product's electrical ratings label. The voltage and current rating of the cord should be greater than the voltage and current rating marked on the product. In addition, the diameter of the wire must be a minimum of 1.00 mm^2 or 18AWG, and the length of the cord must be between 6 feet (1.8 m) and 12 feet (3.6 m). If you have questions about the type of power cord to use, contact your Compaq authorized service provider.

A power cord should be routed so that it is not likely to be walked on or pinched by items placed upon it or against it. Particular attention should be paid to the plug, electrical outlet, and the point where the cord exits from the product.

When installing the power cord, plug the AC power cord into the FC-AL Switch, then into a grounded AC outlet.

Cables

Fibre Channel Cable

The FC-AL Switch is intended primarily for use with Shortwave GBICs and multi-mode Fibre Channel cables. While Longwave GBICs can be used with 9 um single-mode Fibre Channel cables, performance may not be optimal due to transmission latencies.

SW-GBICs and Multi-mode Fibre Channel cables are capable of supporting distances of 2 meters to 500 meters. These cables are for use with Shortwave GBICs only. However, three multi-mode Fibre Channel cable option kits are available from Compaq if longer lengths are desired. Each kit contains a multi-mode Fibre Channel cable with a connector attached to each end. The RA4000 and RA4100 storage systems and associated host bus adapters ship standard with 2m and 5m Fibre Channel cables, respectively. Other available kits are:

- 15-meter multi-mode Fibre Channel Cable option kit (part number 234457-B23)
- 30-meter multi-mode Fibre Channel Cable option kit (part number 234457-B24)
- 50-meter multi-mode Fibre Channel Cable option kit (part number 234457-B25)

To customize your system with multi-mode Fibre Channel cable at distances greater than 50 meters, contact an independent Fibre Channel cable supplier.

If you are using an existing 62.5-micron cable in your infrastructure, you must obtain a 62.5-micron jumper from an independent source. A 50-micron cable cannot be spliced with a 62.5-micron cable.

CAUTION: Make certain the Fibre Channel cables are installed and supported so that no excess weight is placed on the Fibre Channel connectors. This is necessary to prevent damage to the connector and cable and to prevent a cable bend radius less than 3 inches (7.62 cm) at the connector and along the cable length. Excess Fibre Channel cable should be coiled and tied out of the way, being careful not to coil the cable in a tight loop with a bend radius of less than 3 inches (7.62 cm).

Laser Precautions

WARNING: To reduce the risk of injury from laser radiation or damage to the equipment, observe the following precautions:

- Allow only Compaq Authorized Service Technicians to repair the equipment.
- Do not open any panels, operate controls, make adjustments, or perform procedures to a laser device other than those specified herein.
- Do not stare into laser beam when panels are open.

GBIC and Fibre Channel Cable Connector Cleaning Considerations

Optics are susceptible to anything that hinders light transmission. Consequently, manufacturers of both GBIC Modules and Fibre Channel Cable Connectors provide dust covers to protect the optical areas and ensure optical signal integrity for initial system configuration. If the fiber optic interconnects are disengaged, the optical tips can be soiled by human touch, damaged from dropping, or simply collect dust debris when exposed to the open air for extended time periods. A contaminated optic tip may not be visible to the naked eye and could potentially degrade performance of your system.

To minimize the risk of optic contamination on your system, keep the following fibre optic handling guidelines in mind:

- Dust Covers: Dust Covers are provided with all optical components and should be kept in place when not used. Do not throw away the dust covers after initial installation. You may need them to protect optical interconnect areas if reconfiguration is required.
- When to Clean: The best rule of thumb for cleaning fiber optics is common sense. If you have handled fiber optic interconnects and think there may be contamination, clean it. If you need to use a fiber optic interconnect component that is found without the dust covers in place, clean it.
- How to Clean: First, wipe the optics with a lint-free tissue soaked in 100 percent Isopropyl alcohol. Next, wipe optics with a dry lint-free tissue and dry with compressed/canned air.

Ethernet RJ-45 Cable

This connector is provided for management through Simple Network Management Protocol (SNMP). By default, the FC-AL Switch is configured to use an IP address of 127.0.0.1. To change this IP address, use a terminal or terminal emulator connected to the DB-9 serial port. See Chapter 3, "Configuring the FC-AL Switch," for more information.

DB-9 Serial Cable

This connector is provided for advanced configuration and management.

The FC-AL Switch is designed to function directly out of its shipping container with no special configuration required. However, you have the ability to configure and monitor various aspects of the FC-AL Switch by connecting a terminal or terminal emulator to the serial port. See Chapter 3, "Configuring the FC-AL Switch, " for more information on using this interface.

Powering Up

After the FC-AL Switch is installed and connected to a powered-down system, the system is ready to use.

To power on the unit properly:

1. Plug the power cord into the switch's IEC receptacle. On power up (or pressing the reset button), the switch will run several Power-On Self-Tests (POST) and the LEDs will display changing patterns (see the "Reading the Power, Fault, and Initialization LED Indicators" section in Chapter 5, "Troubleshooting").
2. Power on I/O device(s).
3. Power on server(s).
4. Verify that the I/O device(s) are visible to the host(s).
5. Start Applications.

Before the FC-AL Switch can communicate with Compaq-managed devices, all devices must be properly configured, connected, and powered up. Continue to Chapter 3, "Configuring the FC-AL Switch," for installation instructions.

Chapter 3

Configuring the FC-AL Switch

This chapter outlines the procedures to configure the FC-AL Switch. The FC-AL Switch console can be accessed through the serial port. It can also be accessed through the Ethernet using telnet, once the Ethernet interface has been configured. However, only one of these interfaces can be used at a time and if there is a conflict, the serial port will take precedence. The differences between the telnet and serial port interface are as follows:

- The telnet interface can only be used after the FC-AL Switch is completely booted. This means that the results of the initialization tests can not be viewed. In addition, if a reset is issued, the telnet connection will be terminated.
- Users are unable to change the password over the telnet interface.

Configuring the Serial Port

The location of the serial port on the rear panel of the FC-AL Switch is shown in the following figure. It is a standard serial DB-9 connector, marked RS-232.

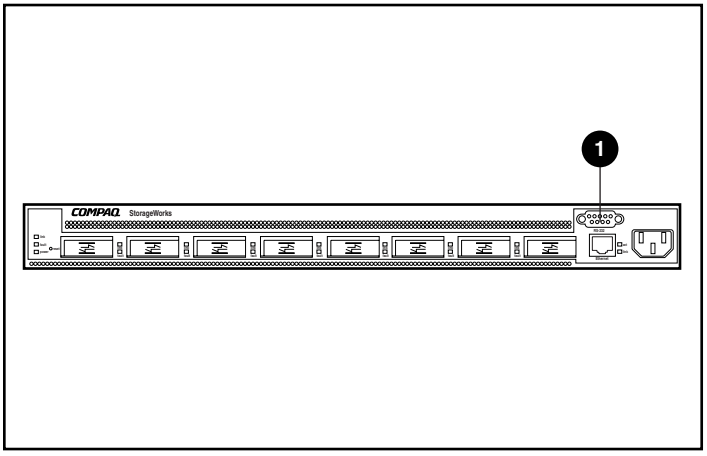

Figure 3-1. FC-AL switch showing RS-232 serial DB-9 connector ❶

What Type of Terminal to use

A “dumb” terminal such as a VT100 type or a PC running a terminal emulator program can be used. There are several terminal emulators available for PCs as well as for laptops and notebooks. HyperTerminal is usually included with most systems since it is distributed with Microsoft Windows (NT, 95, 98 and CE).

The following information refers to configurations taking place on a “dumb” terminal or another emulator.

1. Connect one of the serial ports on the PC via a null modem cable to the RS-232 serial port on the FC-AL Switch. Pins 2, 3 and 5 are used. Pins 2 and 3 are crossed.
2. Start a terminal emulation application to communicate between the PC and the switch. The instructions below are for installing and using HyperTerminal since it is included on all of the Windows CDs and can be readily found on most PCs.
3. Select Programs**,** Accessories**,** Communications (on Windows 98).
4. Select HyperTerminal (the folder). Select HyperTerminal (the executable file).
5. From the HyperTerminal window, select File**,** New Connection and enter a name and connect to COM1 or COM2 (use the port not assigned to the modem).

6. Enter the parameters from Table 3-1 in the corresponding areas on the Port Settings tab of the Properties page of HyperTerminal. This page will appear after the selection of COM1 or COM2.

Table 3-1
Modem Settings

Description	Settings
Bits per second	38400
Bits	8
Parity	none
Stop Bits	1
Flow Control	none

7. Power up or press the Reset button on the switch. The FC-AL Switch will display the start-up message shown in the figure below.

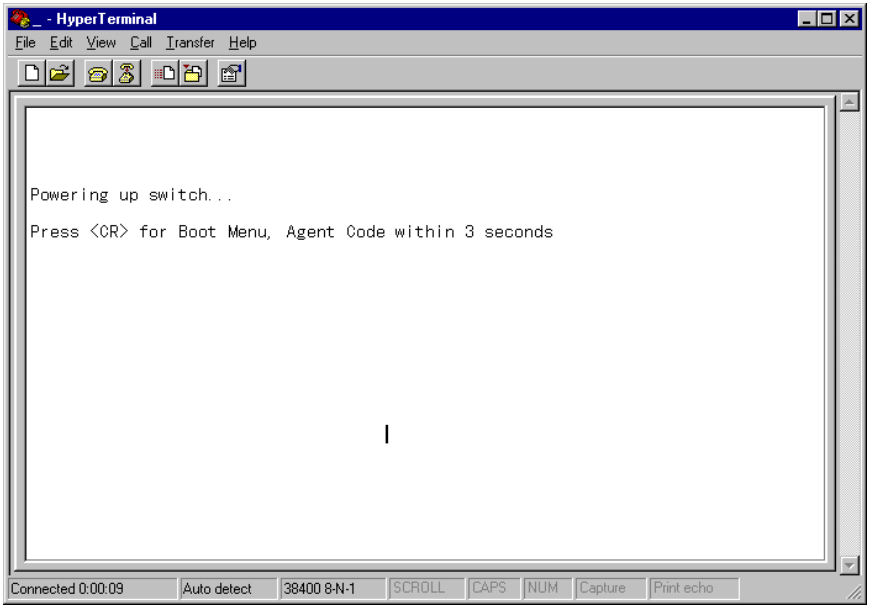

Figure 3-2. Startup message for the FC-AL switch

Configuring the FC-AL Switch Parameters

The FC-AL Switch needs to be configured only once, when it is first installed. However, as the Fibre Channel network grows, it might be necessary to change parameters and settings.

This chapter covers the most common configuration parameters, particularly those needed for the initial setup of the FC-AL Switch. These parameters are organized into menus.

NOTE: The console commands are case-sensitive. Use lower case letters.

Bootup Display

The user is prompted to enter the Boot menu whenever the switch is powered on or reset.

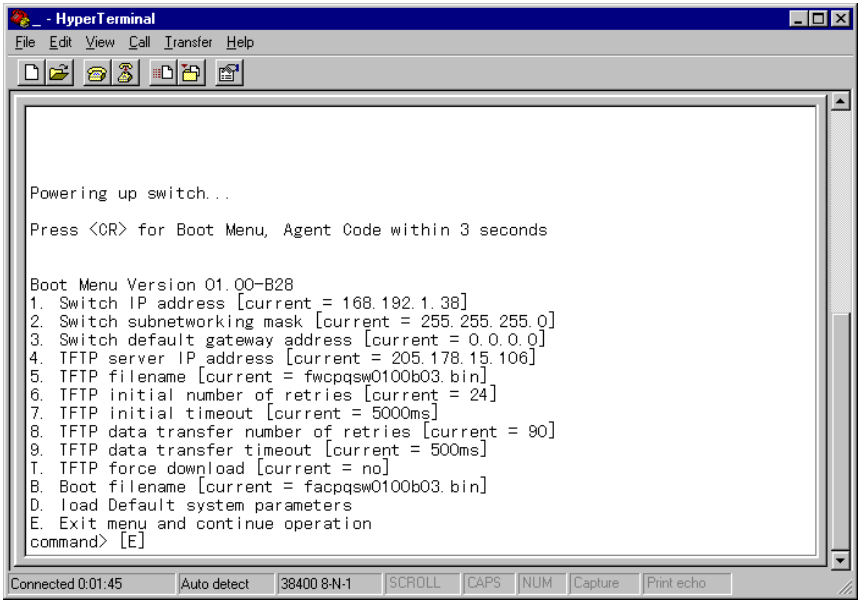

Figure 3-3. Bootup menu

As shown above, if the Enter key is pressed within 3 seconds, the FC-AL Switch will branch to the Boot menu. The Boot menu can be used to download a new copy of Compaq StorageWorks FC-AL Switch Management Utility (see Chapter 4, “FC-AL Switch Management Utility”).

As the timer runs out, the FC-AL Switch will run though a number of self-tests, load Compaq StorageWorks FC-AL Switch Management Utility into RAM memory and then prompt for a login.

Login menu

If the login menu is not immediately displayed, press the Enter key.

The login menu is shown on the bottom of the figure below. First, there is a prompt for a login name. Use "user." Next, a prompt for the password appears. The default set at the factory is "ADMIN." (See the section "Change Password," later in this chapter for information on changing the password.)

NOTE: The password is case-sensitive.

```
>Login: user
>Password: *****_
```

Figure 3-4. Login menu

Once the login is complete, the FC-AL Switch will either go automatically into the Main menu, shown in the figure below, or go directly into the Command Line Interface, which is covered in Appendix D, "Command Line Interface." The choice is based on which interface was used the last time the user logged into the switch. The Main menu is the default for the first time the user logs into the switch.

The Main menu contains a brief summary of the status of the switch including the model number, FC-AL Switch Utility level (indicated in the line marked "Package Version"), and whether it passed its self test. The various choices in the Main menu are discussed below.

```
Compaq StorageWorks FC-AL Switch
StorageWorks FC-AL Switch Management Utility: 01.00-B03
Selftest Status:           passed

2. Networking parameters
3. Management options
4. Command line interface
5. Logout
6. Reset switch
>
```

Figure 3-5. Main menu

Networking Parameters

Select option **2. Networking parameters**, to call up the Network Parameter menu, shown in the figure below. The first option in this menu is to return to the main menu. Choosing this option returns the user to the main menu. Any changes that were made are reset to the previous value.

The second, third and fourth parameters are used to configure the FC-AL Switch's Ethernet interface. All these parameters must be set appropriately for the site before the FC-AL Switch can be managed over the Ethernet and connected to using telnet.

```
Network Parameters Menu

1.  Return to main menu
2.  Set IP address       [current: 168.192.1.38]
3.  Set subnetwork mask  [current: 255.255.255.0]
4.  Set gateway address  [current: 0.0.0.0]
5.  Save modifications and reset switch to activate
>
```

Figure 3-6. Network Parameters menu

Setting IP Address

Select option **2. Set IP Address,** to call up the IP Address menu shown in the figure below. It displays the current IP address. The default is set at the factory. This address should be changed to an IP address appropriate to your site. Check with the network administrator if uncertain of what this should be. Do not use the default as it is a special IP address used for testing purposes only.

```
IP Address Menu

Current IP address: 168.192.1.38
1.  to return to previous menu
or enter new IP address in dotted decimal notation,  e.g.  1.2.3.4
> _
```

Figure 3-7. Network Parameters – Set IP Address

Setting Subnetwork Mask

Select option **3. Set subnetwork mask,** in the Network Parameters menu to call up the Set Sub-networking Mask menu shown in the figure below. The default subnetworking mask is a Class C mask as shown in the figure below. This mask will work in many installations, as Class C IP networks are by far the most common. However, given the heavy use of Ethernet, many institutions and companies have subdivided their available Ethernet network numbers by using the subnetwork mask. Thus, it is likely that the mask will have to be changed, and the best source of the correct mask is your local network administrator.

```
IP Subnetwork Mask Menu

Current subnetwork mask: 255.255.255.0
1. Return to previous menu
or enter new subnetwork mask in dotted decimal notation, e.g. 1.2.3.4
>
```

Figure 3-8. Network Parameters menu – Set Subnet Mask

Setting Gateway Address

Select option **4. Set gateway address,** in the Network Parameters menu to call up the Set Gateway Address menu shown in the figure below. The gateway is a computer or Ethernet router that connects your segment of the Ethernet to other segments. This is also true if using telnet to communicate with the FC-AL Switch over the Ethernet from systems on other segments.

In both these cases, the FC-AL Switch will need the IP address of the gateway system in order for it to function. If there are questions about gateways, check with your local network administrator.

```
IP Gateway Address Menu

Current gateway address: 0.0.0.0
1. Return to previous menu
or enter new gateway address in dotted decimal notation, e.g. 1.2.3.4
>
```

Figure 3-9. Network Parameters menu – Set Gateway Address

Saving Modifications

Though a number of parameters may have been set in the Network Parameters menu, none are permanent until the Save modifications and Reset Switch to Activate option is chosen. This will save the parameters in non-volatile memory and reboot the switch with the new parameters in effect. Another alternative is to select 1. Return to main menu, which sets all the parameters in the Network Parameters menu back to the values they had previously.

Management Options menu

Select option **3, Management options,** in the Main menu to call up the Management Options menu shown in the figure below. The first option in this menu allows the user to return to the main menu. However, unlike the Network Parameters discussed above, individual changes made in this menu become effective as soon as they are made without the need to reset the switch.

```
Management Options Menu

1. Return to main menu
2. Set SNMP get community name  [current: public]
3. Set SNMP set community name  [current: private]
4. Set SNMP trap community name [current: SNMP_trap]
5. SNMP trap server IP address list
6. Change password
> _
```

Figure 3-10. Management Options menu

Selecting **2. Set SNMP get community name** in the Management Options menu calls up the SNMP Get Community Name menu. This allows the user to restore the default SNMP get community name or to enter a new SNMP get community name.

Selecting **3. Set SNMP set community name** in the Management Options menu calls up the SNMP Set Community Name menu. This allows the user to restore the default SNMP set community name or to enter a new SNMP set community name.

Selecting **4. Set SNMP trap community name** in the Management Options menu calls up the SNMP Trap Community Name menu. This allows the user to restore the default SNMP trap community name or to enter a new SNMP trap community name.

Selecting **5. SNMP trap server IP address list** in the Management Options menu calls up the SNMP Trap Server IP Address menu. This allows the user to clear the trap IP address list, to enter a new trap IP address, or to enter an existing trap address to remove it from the list.

Change Password

Choose option **6. Change Password**, to enter a new password as shown in the figure below. There is verification if this has been successfully completed or not. For security reasons, the password can only be changed through the serial port. It cannot be changed through a telnet connection over the Ethernet.

The password can be set to null (that is, a carriage return) with option 2, or an alphanumeric password can be used with up to eight characters. The space cannot be part of the password as it is used to separate the first and second copies of the new password.

> **NOTE:** If the new password is forgotten, contact your network administrator. You will need the unit's serial number and Ethernet MAC address.

```
Change Password Menu

1. Return to previous menu
2. Set a null password
or enter new password twice, separated by a space
> _
```

Figure 3-11. Change Password

Command Line Interface

Select option **4. Command line interface**, on the Main menu, to call up the command line interface, this gives the user the ability to change parameters that normally should not be changed. These parameters can be modified by a knowledgeable user to modify the FC-AL Switch's operational parameters, to set up policies, as well as to troubleshoot problems. The complete Command Line Interface is outlined in Appendix D, "Command Line Interface."

Logout

The user can log out of the FC-AL Switch simply by selecting option 5. Logout in the Main menu is shown in the figure below. The original login prompt is given.

```
Compaq StorageWorks FC-AL Switch
StorageWorks FC-AL Switch Management Utility: 01.00-B03
Selftest Status:           passed

2.  Networking parameters
3.  Management options
4.  Command line interface
5.  Logout
6.  Reset switch
> 5
logging out
>Login: _
```

Figure 3-12. Logout

Reset Switch

Select option **6. Reset Switch**, in the Main menu to reboot the switch. This should not be done in a haphazard manner as all Fibre Channel connections provided by the switch can be affected and any management data stored in the switch will be erased.

Cascading

Cascading allows the connection of two FC-AL Switch switches together. One switch must be configured as the master, and one must be configured as a slave. Configuring both as master or both as slave will prevent a link between the two from being established. The cascaded ports are treated as LIP type ports. They can not be manually bypassed nor can they be ALPA zoned ports. A maximum of one slave port, or one master port can be assigned per FC-AL Switch. All devices on a slave switch will be automatically configured with PORTDEV = LIP.

NOTE: Cascading can not be configured from the Management Applet.

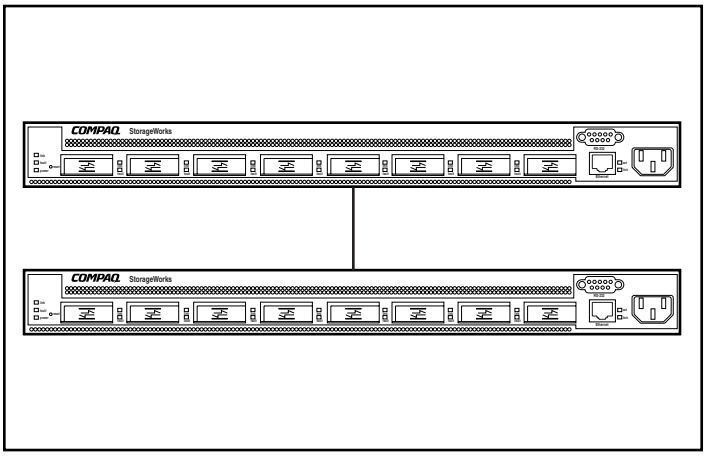

Figure 3-13. Cascaded FC-AL switches

The cascading commands include:

Table 3-2
Cascading Commands

Command	Description
cascade	Displays the cascade port
cascade <m|p>,<port#>= disable	Clears cascade setting for specified port
cascade <m|p>,<port#> = master	Sets <port> to cascade as master
cascade <m|p>,<port#> = slave	Sets <port> to cascade as slave

SAN Switch Cascading

The command flcascade is used to indicate that a particular switch port is connected to a SAN Switch's port. If you connect a FC-AL Switch's port to a SAN Switch's port, you need to indicate the configuration through the FC-AL Switch's command line interface.

FC-AL Switches are shipped with the proxy disabled. Enable the proxy by typing the following at the DOS prompt:

```
cmd> help flproxy

flproxy help
```

Table 3-3
SAN Switch Cascading Commands

Command	Description
flcascade	Displays port connected to the SAN switch port
flcascade = none	Clears port connected to the SAN switch port
flcascade = <m|p>,<port#>	Sets <port> connected to the SAN switch port
flproxy	Displays SAN switch proxy control
flproxy = on	Enables SAN switch proxy
flproxy = off	Disables SAN switch proxy

To determine which port is connected to a fabric FL_Port, type the following from the command prompt:

```
cmd> flcascade

Fl Port: M,3
```

To turn off the command for a switch, type the following from the command prompt:

```
cmd> flcascade = none

Fl Port: none
```

To indicate that a particular port is connected to a SAN switch port, type the following from the command prompt (in this case, to indicate that port 3 on the FC-AL Switch's motherboard is connected to a cascade link):

```
cmd> flcascade = m,3

Fl Port: M,3
```

NOTE: The software will only allow you to configure one port on the switch as the connection port to a SAN switch. The software will not allow you to specify a flcascade port on a FC-AL Switch slave device. A switch slave device is a switch that has been configured to act as a "slave" in a FC-AL Switch's cascaded configuration.

Chapter **4**

FC-AL Switch Management Utility

The Compaq StorageWorks FC-AL Switch Management Utility is a web browser-based utility that enables management of the switch. The SAN Administrator can use StorageWorks Command Console (SWCC), Compaq Insight Manager XE (CIM XE), Microsoft Internet Explorer 5.0 (or later), or Netscape Communicator 4.70 (or later), to launch the Switch Management Utility after the StorageWorks FC-AL Switch's network parameters are properly set up.

To install and use Switch Management Utility with the FC-AL Switch, you must:

- Establish an Ethernet connection between your computer (running Windows NT (Intel) 4.0 with Service Pack 4 or later or Windows 2000) or workstation (running Linux) and the StorageWorks FC-AL Switch.
- Enable the networking parameters through the RS-232 console to assign the following to the StorageWorks FC-AL Switch:
  - a valid IP address
  - a subnet mask
  - a gateway (if you want to access the Web interface from a different network)

Connecting to the StorageWorks FC-AL Switch

Once you have an Ethernet connection to the FC-AL Switch, run an Internet browser on a computer or workstation attached to the Ethernet, and enter the IP address that is assigned to the switch. (Contact your network administrator, for a valid IP address or URL). The Internet browser automatically downloads the Switch Management Utility, which is a Java applet that provides displays of the workstation. You can use these displays to monitor and control the StorageWorks FC-AL switch remotely.

Overview of the StorageWorks FC-AL Switch Management Utility

The first display that appears on the browser is the User Name and Password screen. A prompt appears, asking for a login name and password. Use “user” for the login name. Type “ADMIN” for the password (this is the default password). To change the password, see the section “Change Password,” in Chapter 3.

The second display to appear is the SNMP Community Strings:

Read Community type should be “public”

Write Community type should be “private”

The third display is the Device Summary tab. This tab allows navigation to any other display within the Switch Management Utility. Each display has three sections; two of them are common to all of the screens:

- Device Selection panel on the left side.
- Status Panel appears in a panel on the bottom.
- Device Information and Control panel that presents informational and control features.

The Device Selection tab displays an icon of the switch’s chassis and any installed FC-AL Switch 3-Port Expansion Module (PEM).

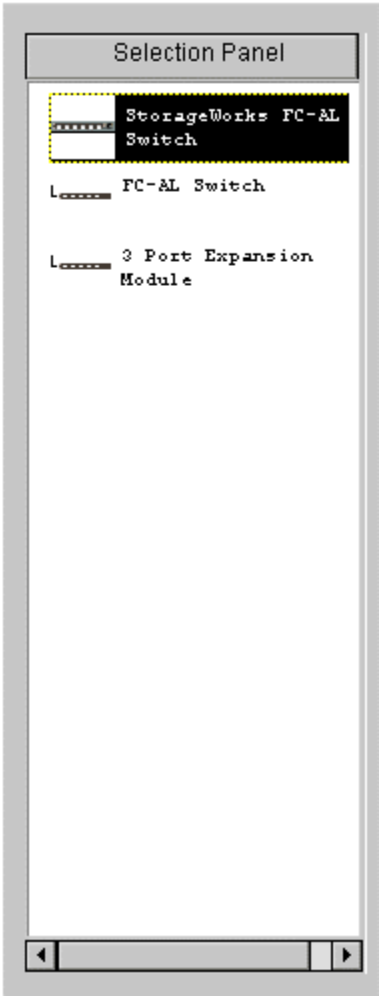

Figure 4-1. Device Selection panel

Status Panel

The Status panel at the bottom of each Switch Management Utility display has three sections: the device status LEDs, the progress information bar, and the message text line.

Device Status LEDs

The four LEDs in the lower part of each display are shown in the following figure. They indicate a fault when they display a blinking red cursor. The first three (Fans, Temperature, and Voltage) indicate the corresponding status on the switch. The fourth LED (Other) indicates a port event.

Figure 4-2. Device Status LEDs

You can see more detailed information by opening the Telnet window, or by clicking on the Port Expansion Module tabs. These LEDs are dynamic: they are updated whenever a change in status is detected. (See the section "Control Buttons.")

NOTE: The red indicator can be reset by clicking on the Clear button.

Progress Indicator Bar

The progress indicator bar displays the percentage of progress completed during a transfer of information from the StorageWorks FC-AL Switch to the Switch Management Utility. This can be reset by the Clear control button.

Message Text Line

The message text line displays important information as ASCII text. This information can include what events have occurred, what activities are being performed, as well as display error messages.

Control Buttons

The three control buttons are shown in the following figure. They are located next to the Progress Status bar.

Figure 4-3. Control Buttons

Their functions are:

- **Clear Button** - Causes the information in the message and progress indicator areas to be cleared. All LEDs then revert to green, indicating normal status.
- **Cancel Button** - Cancels the current activity (used mainly during data transmission).
- **Refresh Button** - This acts as a refresh button. It initiates a discovery of the FC-AL Switch you are monitoring and displays new information.

StorageWorks FC-AL Switch Management Utility

The Switch Management Utility displays are organized hierarchically as follows:

- The first level is for the StorageWorks FC-AL Switch. This is controlled by the Device Selection panel.
- The second level provides tabs across the top of the area of each display. These tabs vary with the device type selected in the selection panel. These tabs let you access functions and information for the specific chassis or switch you selected in the first level.
- The third level consists of the second row of tabs. These tabs vary with the second-level tab selection and might not be present in some displays.

Selecting the View Display Tabs

The following subsections describe the top row of tabs in the Device Information and Control panel.

StorageWorks FC-AL Switch tab

The StorageWorks FC-AL Switch tab shows four management tabs: Device Summary, Device Health, Service, and Network Settings.

Device Summary Tab

The Device Summary tab is shown in the following figure. It presents identification information about the selected StorageWorks FC-AL Switch.

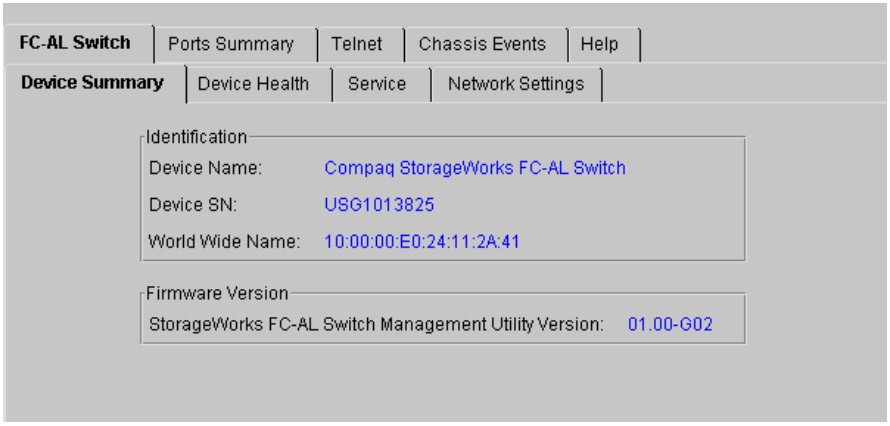

Figure 4-4. Device Summary tab

There are two sections to the FC-AL Switch's Device Summary tab:

- **Identification** - This section of the display provides description, model number, serial number, and worldwide node name for the selected device.
- **Firmware Version** - This section shows the Switch Management Utility revision (or package version) installed on the StorageWorks FC-AL Switch.

Device Health Tab

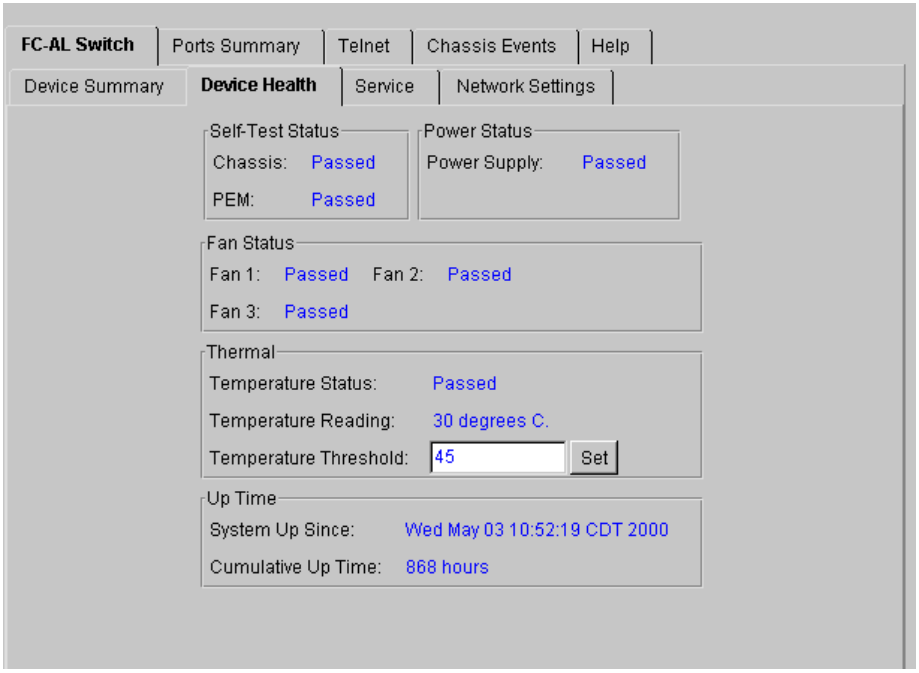

Figure 4-5. Device Health tab

The Device Health tab, shown in the following figure represents a status summary for the switch. This information consists of five groups.

- **Self-Test Status** - Shows the POST (Power-On Self Test) status.
- **Power Status** - Shows the status of the power supply.
- **Fan Status** - Shows the status of each fan in the FC-AL Switch.
- **Thermal** - Shows the current temperature and the temperature threshold of the device. The temperature threshold can be changed by entering a new value and clicking the Set button.
- **Up Time** - Shows how long the device has been running since the last time it was powered up, and the cumulative time the device has been running since manufacture.

Service Tab

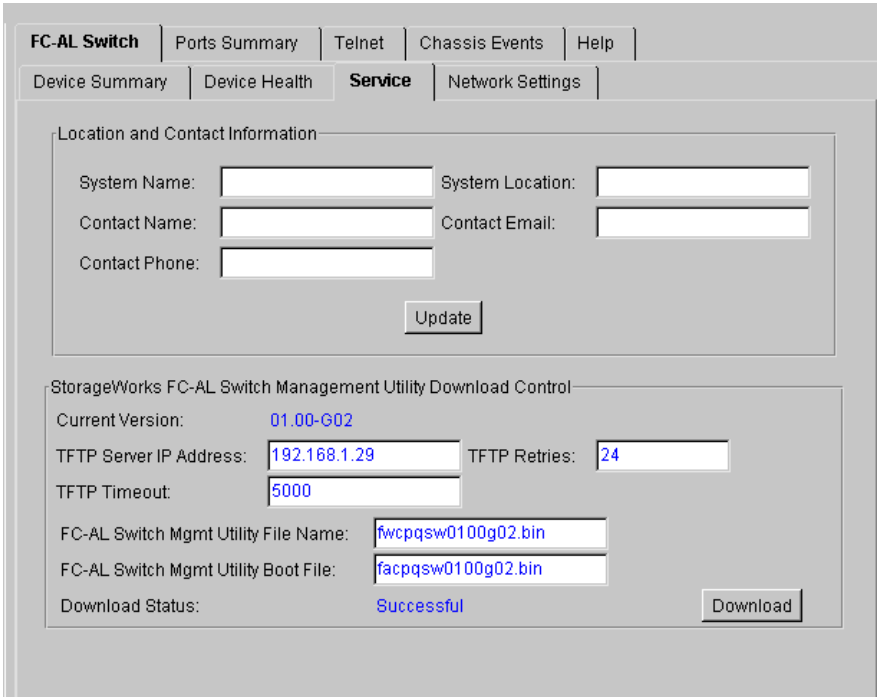

Figure 4-6. Service tab

The Service tab shows information about servicing the StorageWorks FC-AL Switch; it lets you enter and modify that information. It consists of two groups.

- **Location and Contact Information** - This section lets you view and change the system name, the system location, the contact name, as well as the e-mail address and phone number of someone at the facility where the device is installed.
- **Software Download Control** - This panel is used to download software.

Network Settings Tab

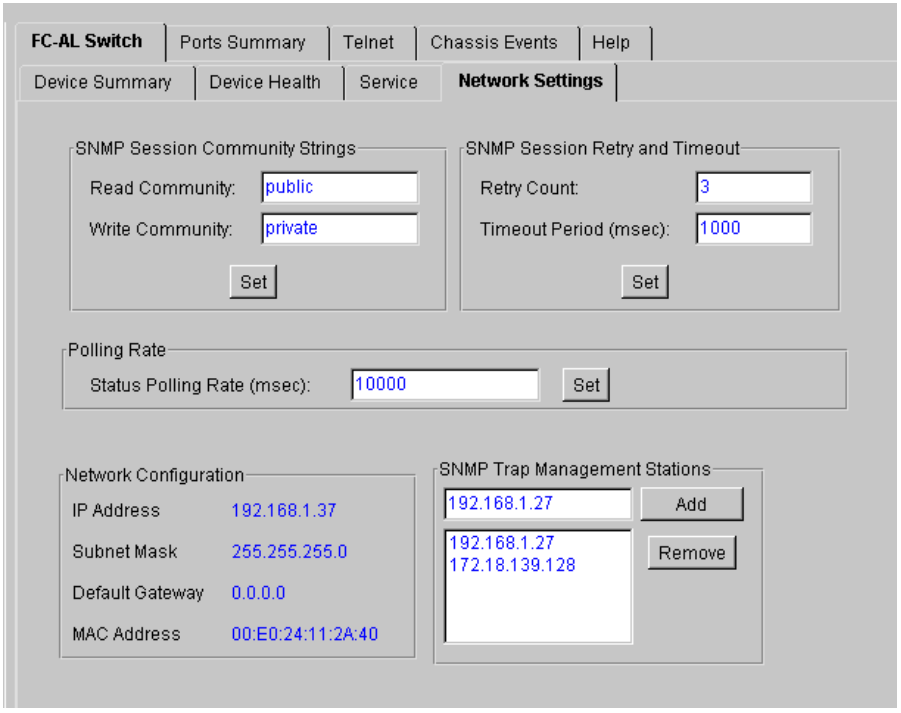

Figure 4-7. Network Settings tab

This tab shown in the following figure displays, and lets you change, the TCP/IP networking and SNMP parameters set during the initial setup and configuration. There are four groups in this display.

- **SNMP Session** – This panel lets you add or change community strings.
- **SNMP Session Retry and Timeout** - This panel lets the SAN administrator set the number of times SNMP will retry sending a message as well as how long it will wait before timing out. The Retry count should be from 2 to 10; the default is 3. The SNMP timeout is set in milliseconds. It should be set from 500 to 5,000 ms; the default is 1,000 (1 second).
- **Polling Rate** - The poll rate establishes how frequently the Switch Management Utility polls the FC -AL Switch for status. The default is 10 seconds. The Poll Rate should be from 100 ms to 7 days (that is, 604,800,000 ms).

- **Network Configuration** - This panel displays the information entered when the TCP/IP networking parameters were set up during the installation of the StorageWorks FC-AL Switch. The Ethernet MAC address is displayed in this panel in hexadecimal format. It is unique to each StorageWorks FC-AL Switch and consists of both a manufacturer's identification code and a unit number.
- **SNMP Trap Management Stations** - Part of the SNMP protocol permits devices to send events and alarms to other management stations. These stations are identified by their IP address. This panel allows the addition, modification, or deletion of IP addresses. Click the arrow on the bottom window to see a complete list of currently available trap management stations. Either individual addresses or the entire list can be selected or removed. Add IP addresses by entering them in the top window of this panel, and then click the Add button.

Ports Summary Tab

The Ports Summary tab displays the panel shown in the following figure. It gives port summary information for all ports.

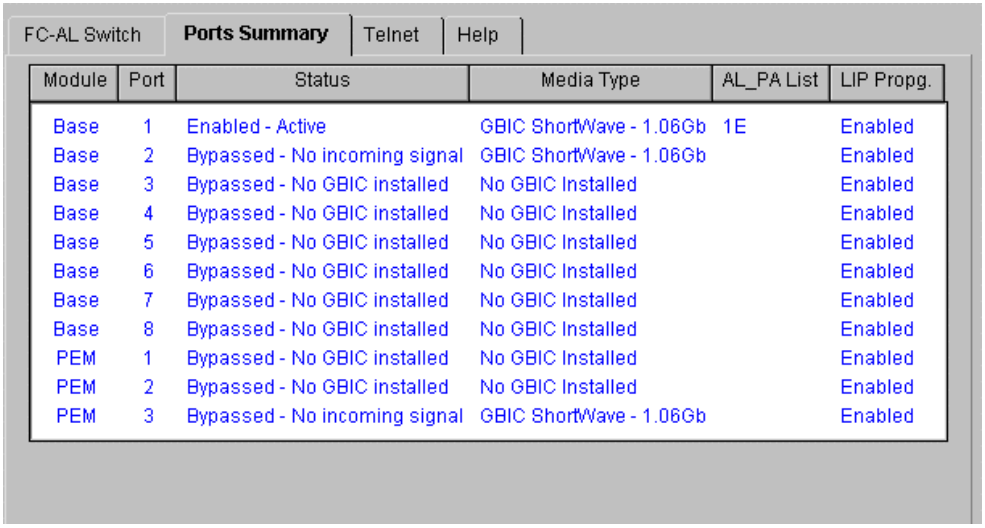

Figure 4-8. Port Summary panel

This table contains one panel, which has the following fields:

- **Module** – Identifies base unit or expansion module.
- **Port** - Identifies the device port by number.

- **Status** - If the port is Enabled, an operating Fibre Channel device is connected to it. Ports can be bypassed for the following reasons:
  - no incoming signal is detected
  - no outgoing signal is detected
  - a K28.5 density fault
  - a running disparity fault
  - a misaligned K28.5
  - the port is force bypassed by management
- **Media Type** - Shows the media type supported or if no GBIC is present.
- **AL_PA List** - Shows the list of arbitrated loop physical addresses (AL_PAs) detected on this port.
- **LIP Propagation –** Displays LIP propagation polices**.**

FC-AL Switch Events tab

The FC-AL Switch Events tab offers port summary information, port detail, switch information and events.

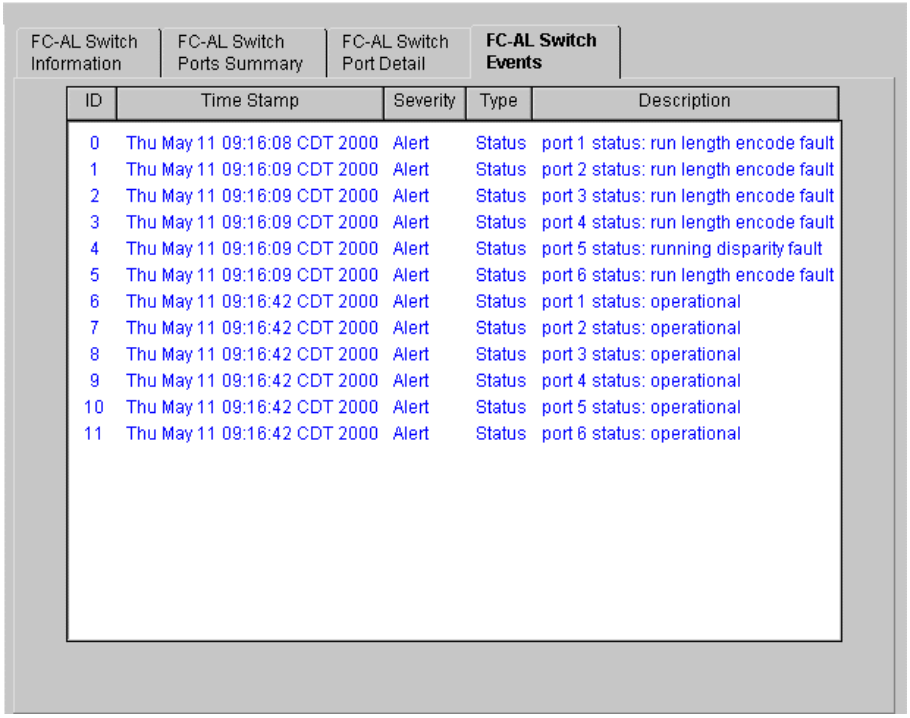

Figure 4-9. The FC-AL Switch Events display

FC-AL Switch Port Details

The Port Details tab provides the configuration information for a specific port. Click on the Port Details tab to see the full Port Details panel.

The left side provides the status of each port, even if it is not connected. It also shows the type of Gigabit Interface Converter (GBIC) in it, if any, as well as the Media Type. The FC-AL Switch Information tab and the Configuration tab are shown on the right side. These tabs display the information for the specific port that is selected in the port view. Double-click on any port in the port view to update the information for that port in these tabs.

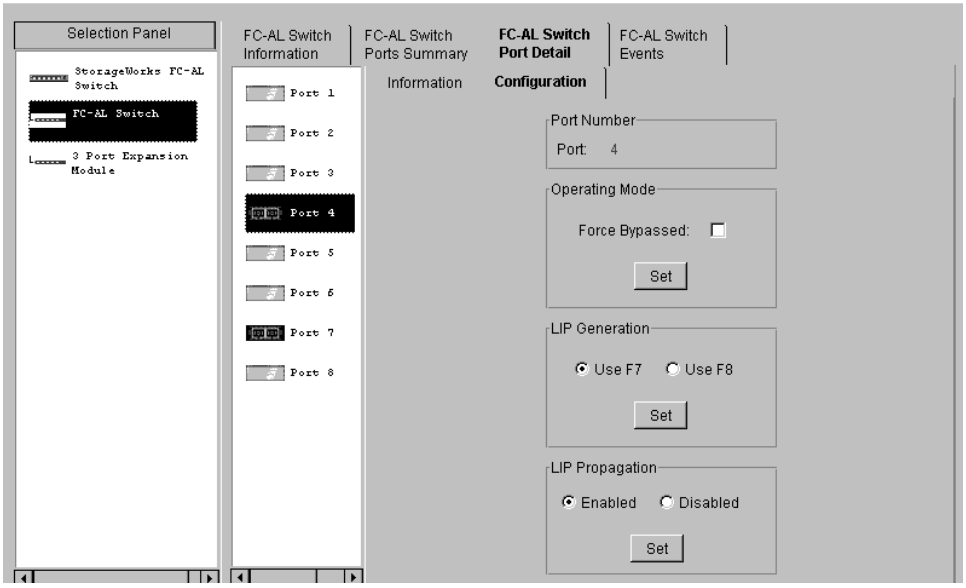

Figure 4-10. Port Details tab, configuration information

Telnet Tab

The Telnet tab lets you manage the FC-AL Switch through the command line interface. The buttons above the panel let you connect or disconnect the telnet session. Clicking the Connect button causes the Switch Management Utility to set up a telnet connection to the switch. If the connection is set up successfully, you can manage the FC-AL Switch through the command line in the black text box. Click the Disconnect button to close the telnet session.

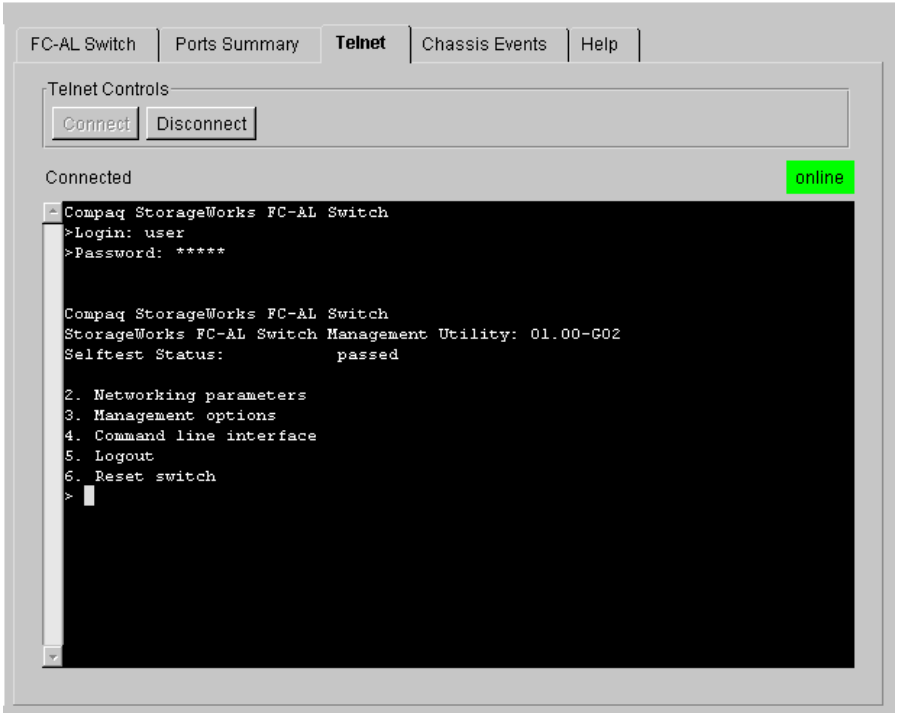

Figure 4-11. Telnet tab

NOTE: If another user is already connected to the StorageWorks FC-AL Switch, either through a telnet session or via the serial port, you must wait until that user has disconnected before attempting to establish your telnet session connection.

Chassis Events tab

The Chassis Events screen reports the descriptions and the severity of events detected by the FC-AL Switch.

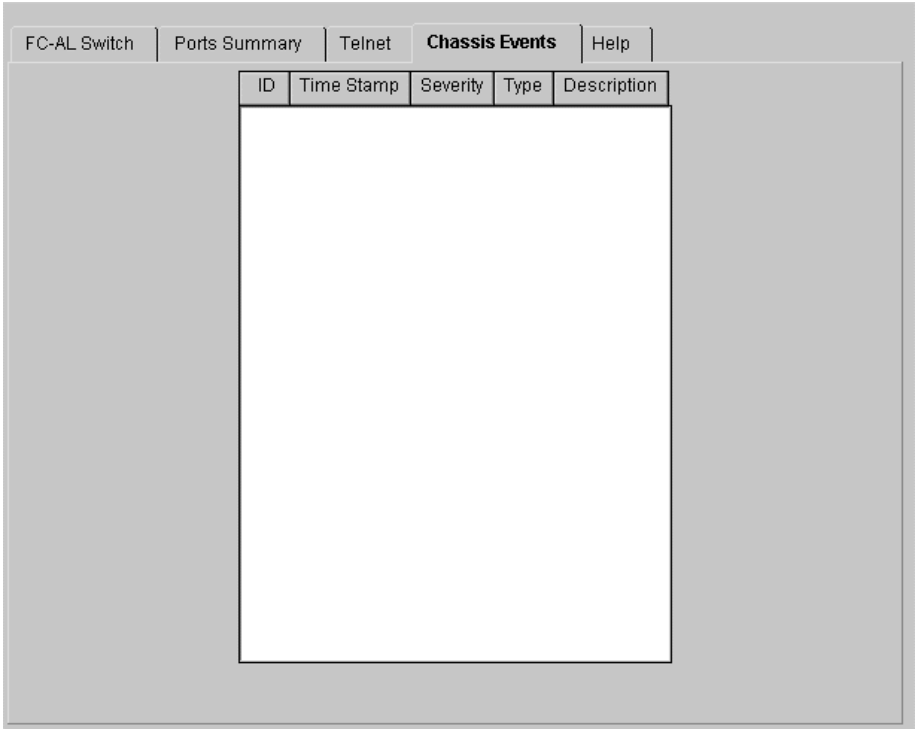

Figure 4-12. Chassis Events tab

Help tab

Clicking the Help tab displays the full Help panel. There are three sections to the FC-AL Switch's Help tab:

- **About** - Provides the application name, the application version number, and the copyright information.
- **Contact** - Provides contact information: name, phone number, fax number, toll free number, and customer service number.
- **View online Help** - Lets you view the StorageWorks FC-AL Switch's Switch Management Utility Web Manager's online help file in another browser window.

Selecting the FC-AL Switch 3-Port Expansion Module (PEM) View Displays

Select the PEM View displays by clicking on the PEM icon in the Device Selection panel.

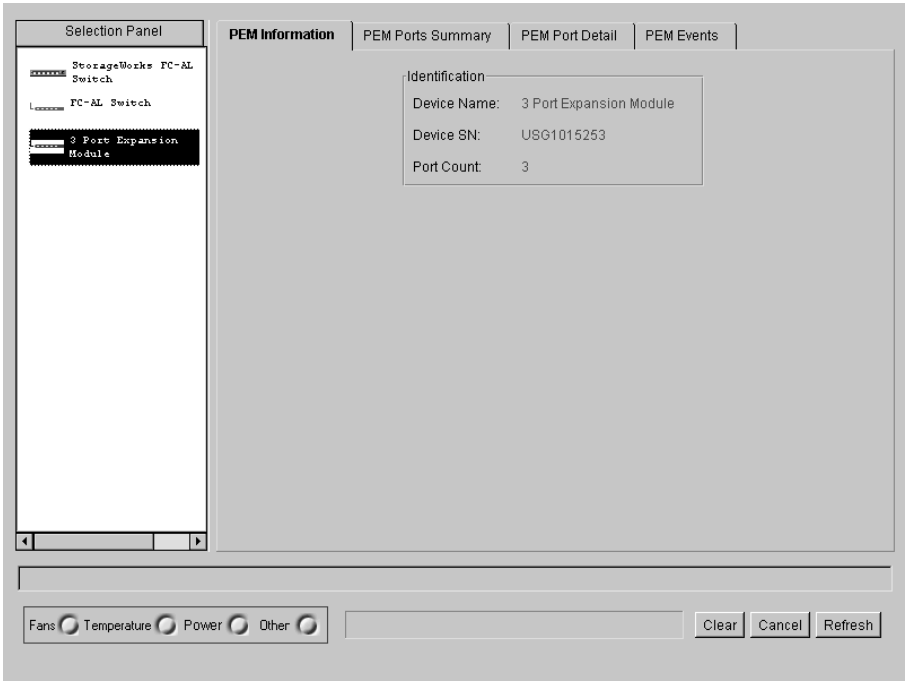

Figure 4-13. PEM view displays

PEM Information Tab

Clicking this tab displays the PEM Information shown in the following figure.

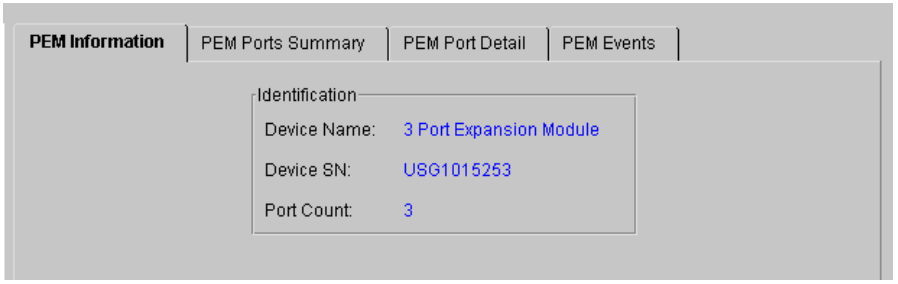

Figure 4-14. PEM Information panel

The FC-AL Switch's PEM Information tab contains the **Identification** summary, which provides descriptions, model numbers, and serial numbers for the selected PEM.

PEM Ports Summary Tab

Click the PEM Ports Summary tab to see the PEM Ports Summary display, as shown in the following figure. It gives summary information for all ports on the selected PEM. The ports are identified by port numbers on that PEM.

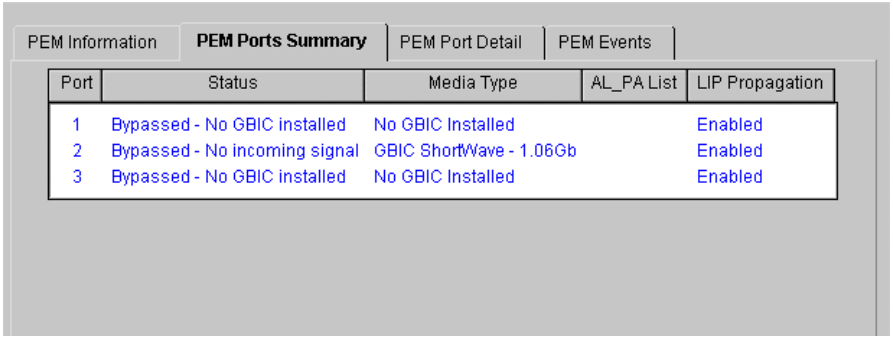

Figure 4-15. PEM Ports Summary tab

There is one table in this tab; it contains the following fields:

- **Port** - Identifies the device port by number.
- **Status** - If the port is Enabled, that port has a properly operating Fibre Channel device connected to it; its Force Bypass control is not set.

If the port is Bypassed, there are several possible reasons:

- No GBIC (Gigabit Interface Controller) is installed or no cable is connected
- The port is auto-bypassed due to one of the following:
- no incoming signal is detected
- no outgoing signal is detected
- a K28.5 density fault
- a running disparity fault
- a misaligned K28.5
- the port is force bypassed by management

- **Media Type** - Shows the media type supported, or indicates that no connector is present.

PEM Port Details Tab

The Port Details tab provides the configuration information for a specific port. Click on the Port Details tab to see the full Port Details panel.

The left side provides the status of each port, even if it is not connected. It also shows the type of Gigabit Interface Converter (GBIC) in it, if any, as well as the Media Type. The Port Information tab and the Configuration tab are shown on the right side. These tabs display the information for the specific port that is selected in the port view. Double-click on any port in the port view to update the information for that port in these tabs.

PEM Events

The PEM Events tab reports the descriptions and the severity of events detected by the FC-AL Switch.

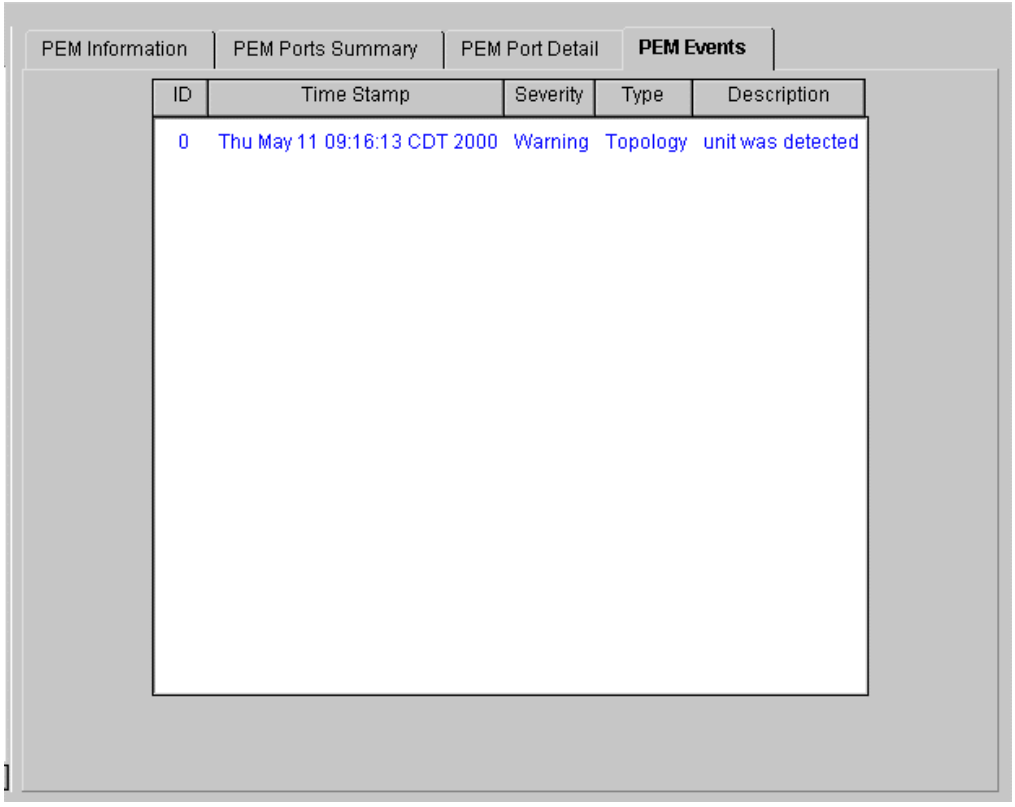

Figure 4-16. PEM Events tab

Configuration Tab

Click on the Configuration tab to see the full Configuration panel.

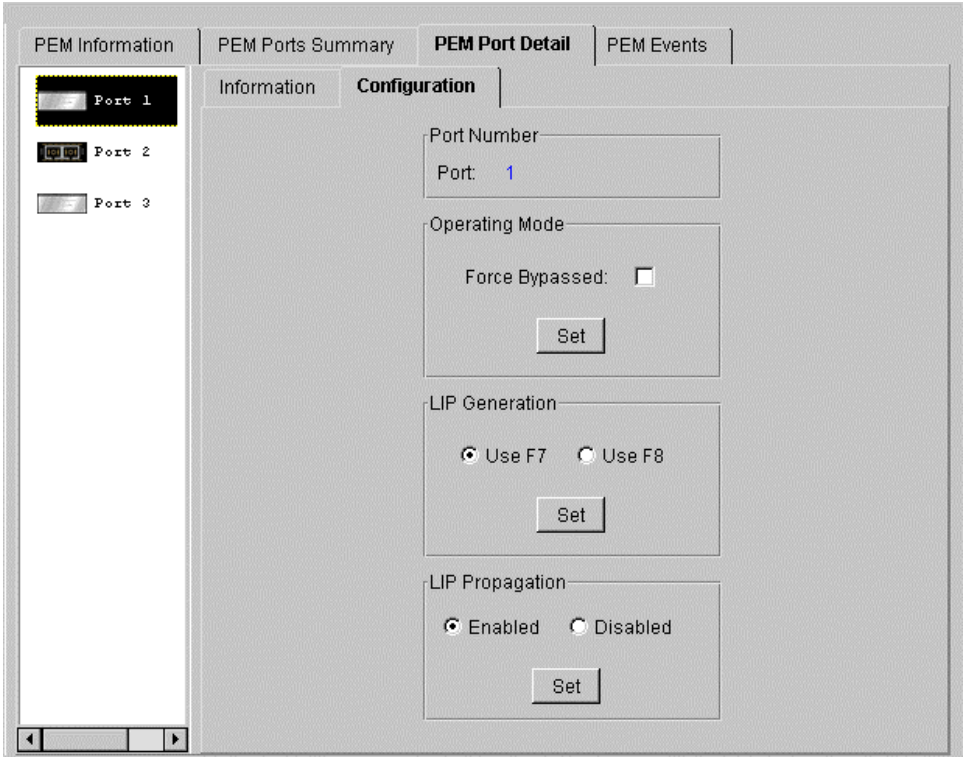

Figure 4-17. Port Details - Configuration tab

There are five groups on the Configuration tab: Port Number, Operating Mode, LIP Generation, LIP Propagation.

- **Port Number** - Shows the number that identifies the selected port.
- **Operating Mode** - Shows the following option:

  Force Bypass - By checking or unchecking Forced Bypass for a port, that port will be forced bypassed or enabled,respectively. When a port is forced bypassed, a device can be connected to the port, but it is not allowed into the loop. If a port is enabled and a device is attached to that port, that device is allowed to enter the loop.
- **LIP Generation** - The FC-AL Switch can generate forced LIPs when it detects a change in a port state. The “Use F7” and “Use F8” options instructs the switch to generate either an (F7, x) or (F8, x) type of LIP.

- **LIP Propagation** – This specifies whether LIPs generated by devices attached to this port should be propagated to the other switch ports. Switch ports populated with hosts are candidates for disabling LIP propagation. LIP propagation should not be disabled for ports populated with target I/O devices.

Managing the FC-AL Switch with StorageWorks Command Console (SWCC)

SWCC provides two ways to monitor and configure your FC-AL Switch, using Web-based software or using Windows-based Client software for the FC-AL Switch. SWCC has three components:

- Command Console Client
- Fibre Channel Interconnect Client
- Fibre Channel Interconnect Agent

For more information about managing the FC-AL Switch and SWCC features, refer to *Compaq StorageWorks Command Console Version 2.2 for Hubs, Switches, and Tape Controllers* (P/N 136265 / AA-RHDAC-TE).

Managing the FC-AL Switch with Compaq Insight Manager (CIM XE)

The FC-AL Switch can also be managed with CIM XE. Information and documentation on CIM XE can be found at www.compaq.com/support.

Chapter 5

Troubleshooting

This chapter covers the following information about your new Compaq StorageWorks FC-AL Switch.

- Troubleshooting guidelines
- Troubleshooting the FC-AL Switch with the LED status indicators and Reset Button
- Preventative Maintenance Solutions

Troubleshooting Guidelines

If there is a problem accessing an FC-AL device connected to the switch, the source of the problem can be the FC-AL Switch or any of the connections between the host and device. Use this chapter to troubleshoot the FC-AL Switch.

Troubleshooting the FC-AL Switch

If there is a problem accessing a device connected to the FC-AL Switch, the source of the problem can be with the device, the switch, the host, or any of the connections between the host and device. Follow the steps outlined below to investigate the problem. The following is a description of possible symptoms:

1. Check the power LED. If it is off, the unit may not be plugged into a main power source.
2. Inspect the switch fault LED indicators for apparent problems. If the fault LED goes on, the switch may be faulty or the temperature may be out of defined limits.
3. Inspect the cabling between the switch and attached Fibre Channel devices. Check for loose, dirty, broken, or bent cabling and connectors. If Compaq-supported GBICs are in use, check that they are properly inserted and that their cables are properly seated.
4. Check the port status LEDs.

Reading the Power, Fault, and Initialization LED Indicators

The LED indicators provide information about the status of the switch. These should be used as the first stage in troubleshooting. If either the serial or the Ethernet link to the switch is running, use the appropriate Command Line Interface command (See Appendix D, “Command Line Interface,” for the appropriate command). The power, fault, and initialization LEDs can be interpreted by reviewing Table 5-1.

Table 5-1
Power, Fault, and Initialization LEDs

Label	LED Color/Pattern	Interpretation	Possible Causes
Power	Green/ON	The unit is connected to an AC power source and the internal power supply is functioning.	This is the normal state when powered on.
	Green/OFF	There is no power within the switch.	■ The line has no voltage ■ The switch is disconnected or the power cable is bad ■ The switch is faulty
Fault	Amber/ON	■ Switch is running self test ■ If the light remains on after 15 seconds, the switch failed the self-test	■ This is the normal self-test state ■ If the test fails, the switch may be faulty
	Amber/OFF	Self test completed with no fault found	Normal running state
Initialize	Green/ON	Switch is re-initializing	This is normal if not done excessively. Expect to encounter this when devices are being added or deleted from the Fibre Channel network. If this occurs too often, check for excessive LIPs.
	Green/OFF	Switch is not re-initializing	Normal state

Reading the Ethernet LED Indicators

Table 5-2
Ethernet LEDs

Label	LED Color/Pattern	Interpretation	Possible Causes
Active (Act)	Green/BLINKING	The switch is properly installed and registering network activity.	This LED blinks each time there is a packet on the network, even if the packet is not directed at the switch.
	Green/ON	The network link is up.	The network is up but there is no activity. If activity is expected, check the other systems. They may be at fault.

continued

Table 5-2
Ethernet LEDs *continued*

Label	LED Color/Pattern	Interpretation	Possible Causes
Link (link)	Green/ON	There is a network link established.	Normal state.
	Green/OFF	There is no network link.	If the LED is off, then there is no connection to the network. One or more of the following could be the cause: ■ The network is down for some reason. Check to see if other systems on the network are functioning. ■ The switch is not connected to the network. Check the cable to see if it is seated properly. Try replacing the cable. ■ The switch is not functioning. Is the power on to the switch? Can you communicate with it via the serial port? ■ The switch may be connected to a network that is not 10Base T compatible. It could be 100BaseT only, or some other LAN link.

Reading the Port LED Indicators

Table 5-3
Port LEDs

Link (Green)	Fault (Amber)	Interpretation	Possible Causes
OFF	OFF	No Signal	■ No GBIC has been installed or ■ No cable with a valid signal has been attached since the GBIC was installed
ON	OFF	Good Signal	Normal State for a valid port connection
OFF	ON	Port is bypassed	Bad signal, no signal, or bypassed by management
ON	ON	Switch is resetting. Not a valid state at any other time.	Power up or a reset by management

Reset Button

The reset button, located on the front panel of the switch, resets the internal control microprocessor of the switch. Often pressing the reset button clears a problem that appears to be the result of an unidentified error. Pushing the Reset button interrupts all traffic and forces re-initialization of the loop. On reset, the switch bypasses all ports and resumes normal power-on operations. Afterwards, the switch reconnects the network by initializing all the ports connected to active devices. Resetting the switch disrupts the network. This may affect performance, but does not corrupt data on disk drives attached to the switch. It does, however, erase any statistics and other management data that have been collected. The Reset button should be used with caution.

Serial Communication Problems

The RS-232 interface can be the source of interface variations. If problems can be traced to the serial cable, check that the cable is plugged-in correctly and that it has the correct pin connections. A null modem cable should be used.

Connections

The following section describes the proper use of Compaq-supported GBICs and Fibre Channel cables.

Compaq-supported GBICs

Use caution when handling GBICs. Take normal precautions to protect them from a static electrical discharge and any other damage:

IMPORTANT: Always wear an anti-static wrist strap when handling Compaq-supported GBICs. They are static sensitive.

- Leave the device in its anti-static bag until ready to install it.
- Hold the GBIC by its edges and handle it carefully.
- Always follow the Compaq-supported GBIC manufacturer's recommended procedures for cleaning the GBIC. This is especially true of the type of solvent used for cleaning optical surfaces.

IMPORTANT: Do not install any GBIC that appears physically damaged. This may result in permanent damage to the switch. Keep unused GBIC connectors covered with the plugs that are shipped with them to prevent contamination from obscuring or attenuating the light signals.

Fibre Channel Cables

The FC-AL Switch uses Fibre Channel cables to communicate with end-node devices. Loose or broken cables can cause a number of problems. Inspect the cabling between the FC-AL Switch and attached Fibre Channel devices. Check for loose, dirty, broken, or bent cabling and connectors.

- Inspect the switch fault LED indicators for apparent problems.
- Check that the Compaq-supported GBICs are properly inserted.
- Check the port status LEDs.
- Check to see if the LED next to the special Fibre Channel interface cable connector is lit. If it is not, a viable connection to the Fibre Channel network has not been established.

Temperature Control

The FC-AL Switch is designed to work in a normal room temperature environment, between 10º and 40º Celsius (50º F to 104 º F). In order to maintain adequate cooling, the FC-AL Switch is equipped with fans and a filler panel.

Fans

IMPORTANT: The installation should never block the switch air vents.

The operating temperature must be within 10º to 40 degrees Celsius (50ºF to 104 º F). Three fans provide forced-air cooling and operate in parallel.

Filler Panel

If a PEM is not installed, the filler plate panel that came with the switch must be left in the panel slot in order to direct the forced-air cooling. The Compaq-supported GBIC slots have doors that serve the same purpose as the filler panel. They must remain closed if a GBIC is not installed.

Preventative Maintenance Solutions

To protect the switch for longer use, Compaq recommends the following:

- Periodically vacuum the external surfaces of the switch to remove dust.
- Do not drop fiber optic cable connectors onto hard surfaces. This can cause internal glass fractures and intermittent signals.
- Keep unused cable ends covered to prevent contamination from obscuring or attenuating the light signals.

IMPORTANT: Always use an anti-static wrist strap while handling GBICs. These are static-sensitive devices.

- Keep unused Compaq-supported GBIC connections covered to prevent contamination from obscuring or attenuating the light signals.
- Always follow the Compaq-supported GBIC manufacturer's recommended procedures for cleaning the GBIC. This is especially true of the type of solvent used for cleaning optical surfaces.
- Never insert foreign objects into optical transmit and receive ports.
- Do not bend fiber cable to less than a 3-inch bend radius.

Appendix **A**

Regulatory Compliance Notices

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 (personal computers, for example). 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 which class (A or B) the equipment falls into. Class B devices have an FCC logo or FCC ID on the label. Class A devices do not have an FCC ID on the label.

Class B Equipment

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or television technician for help.

Declaration of Conformity for Products Marked with the FCC logo – United States Only

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.

For questions regarding your product, contact:

Compaq Computer Corporation
P. O. Box 692000, Mail Stop 530113
Houston, Texas 77269-2000

or call 1-800- 652-6672 (1-800-OK COMPAQ) valid in North America only. (For continuous quality improvement, calls may be recorded or monitored.)

For questions regarding this FCC declaration, contact:

Compaq Computer Corporation
P. O. Box 692000, Mail Stop 510101
Houston, Texas 77269-2000

or call (281) 514-3333.

To identify this product, refer to the Part, Series, or Model number found on the product.

Modifications

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

Cables

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)

Class B Equipment

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

Cet appareil numérique de la classe B 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 (in brackets are the equivalent international standards):

- EN55022 (CISPR 22) - Electromagnetic Interference
- EN50082-1 (IEC801-2, IEC801-3, IEC801-4) - Electromagnetic Immunity
- EN60950 (IEC950) - Product Safety

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。

Taiwanese 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。

Appendix ***B***

Electrostatic Discharge

To prevent damage to 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 ± 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 an Authorized Compaq Reseller install the part.

NOTE: For more information on static electricity, or for assistance with product installation, contact your Compaq authorized reseller.

Appendix C

Installing the FC-AL Switch 3-Port Expansion Module

The Compaq StorageWorks FC-AL Switch 3-Port Expansion Module (PEM) is a 3-port Fibre Channel optical interface plug-in module. Use these instructions to install the PEM in the expansion slot located at the front of the chassis.

For additional information relating to the Compaq FC-AL Switch 3-Port Expansion Module, refer to the *Compaq StorageWorks FC-AL Switch 3-Port Expansion Module Installation Instructions* (P/N 185054-001).

Preparing for Installation

The system does not need to be powered off prior to installation.

Observe the following precautions:

WARNING: PEMs are static-sensitive devices. Follow the precautions below to protect them from static electrical discharge:

- Always use an anti-static wrist strap while handling the device.
- Leave the device in its anti-static bag until ready to install it.
- With the device still in the anti-static bag, touch it to a metal frame of the system while also touching the same metal frame with your other hand.
- Hold the PEM by its edges and handle it carefully when removing it from the anti-static bag.
- If you need to lay the PEM down, lay it on the anti-static bag, and before picking it up again, touch both the bag and the metal frame of the chassis at the same time.

Begin the Installation

The PEM module filler plate is located at the front of the chassis, on the right. You may need Flathead and Phillips head screwdrivers for this installation.

1. Insert the metal shaft of a Flathead screwdriver beneath the raised upper left corner of the PEM filler panel. Pull the filler panel with the screwdriver until the panel snaps free. Remove the filler plate.

   NOTE: If it should be necessary to remove a plug-in module, reattach the filler plate. The filler plate is necessary to maintain proper air flow inside of the chassis.

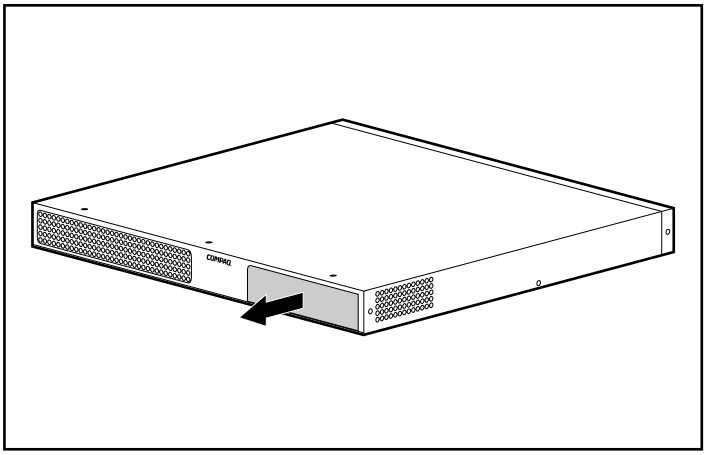

Figure C-1. Removing the filler panel

2. Wearing a grounding strap, remove the PEM from its anti-static bag, holding it by the edges. Insert the module into the open slot. Guide the module along the rails until the front plate is flush with the front of the chassis and the PEM is fully seated.

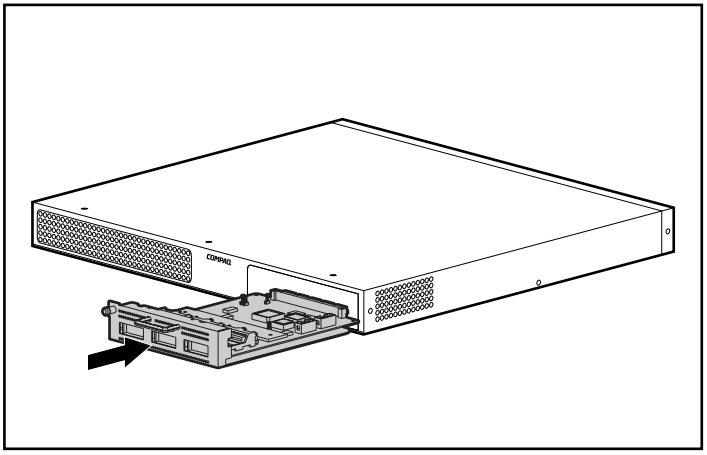

Figure C-2. Inserting the PEM

3. Hand-tighten the thumbscrew on the left side, and then secure the PEM using a Phillips head screwdriver.

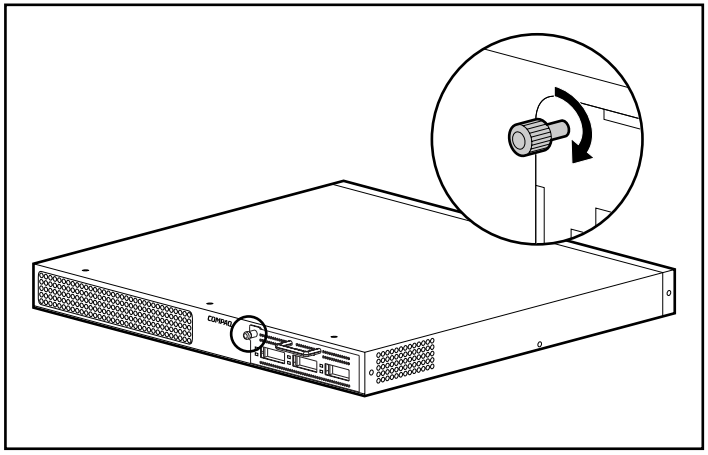

Figure C-3. Securing the PEM

Verifying operation

IMPORTANT: The verification process can disrupt a Fibre Channel network. Conduct this operation at a time when the network is not in use.

Verify that a successful test has been completed by checking the LED status indicators. The following conditions should be present:

- The green power LED on the plug-in module is on.
- The green link LEDs for each port should be off if no devices are attached.
- The amber fault LEDs for each port on the plug-in module should be off.

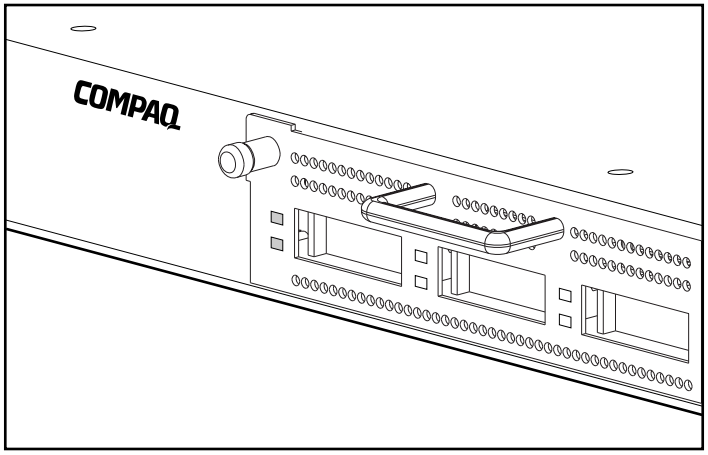

Figure C-4. Verifying operation by checking the LED status indicators

NOTE: Port operation can also be verified by inserting a loop-back optical cable into the port, and then observing if the plug-in module's green port LED lights up for that port. The amber LED should remain off during this process. It may take more than 15 seconds for the green link LED to begin operating.

Installing a GBIC

The FC-AL Switch 3-Port Expansion Module has three sockets for hot-pluggable GBICs. To install a GBIC, remove it from its anti-static bag and hold it by the edges. Make sure it is correctly oriented for proper insertion.

Slide the GBIC through the port door and plug it into the 20-pin connector on the host circuit board until it is seated firmly. If the GBIC does not install easily into the port, remove it, and check that the orientation is correct.

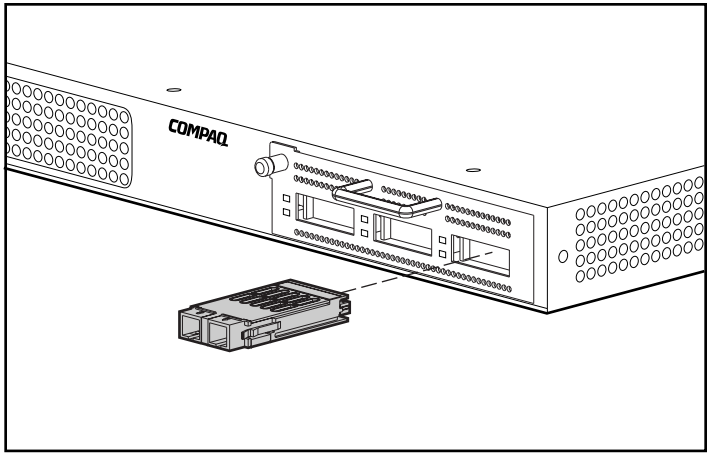

Figure C-5. Installing the GBIC

WARNING: To reduce the risk of exposure to hazardous radiation:

- Do not try to open the unit 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 Compaq Authorized Service technicians to repair the unit.

NOTE: If the cabling is not installed at this time, leave the protective plug (supplied with the GBIC) in place. This will shield the laser in optical GBICs.

Cabling in the Rack

NOTE: It may be necessary to remove the FC-AL Switch and guide bracket assembly in order to complete this procedure.

Route the three cables through the rack rail opening along the channel to the front of the rack, and plug them into the three ports on the PEM. Replace the FC-AL Switch and guide bracket assembly, if applicable.

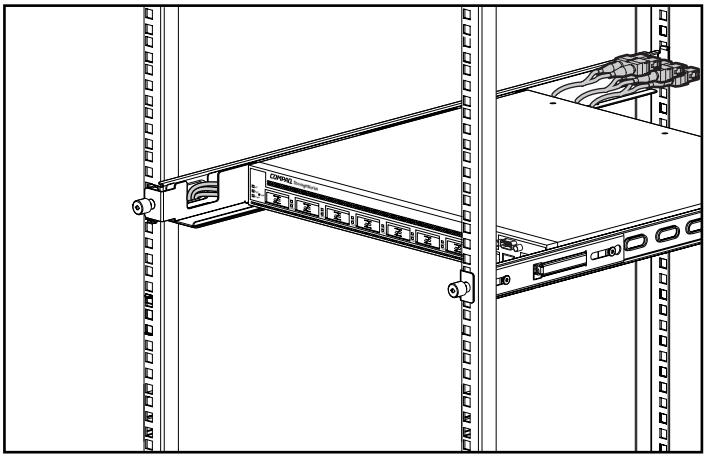

Figure C-6. Cabling in the rack

Fiber optic cables are used to connect to the GBICs in the expansion module. There are a variety of cable lengths available that can handle most distances. Any cable that complies with the GBIC connector standards can be used if a matching GBIC is inserted in the expansion module.

Connect the fibre optic cable(s) to the GBIC(s) in the expansion module.

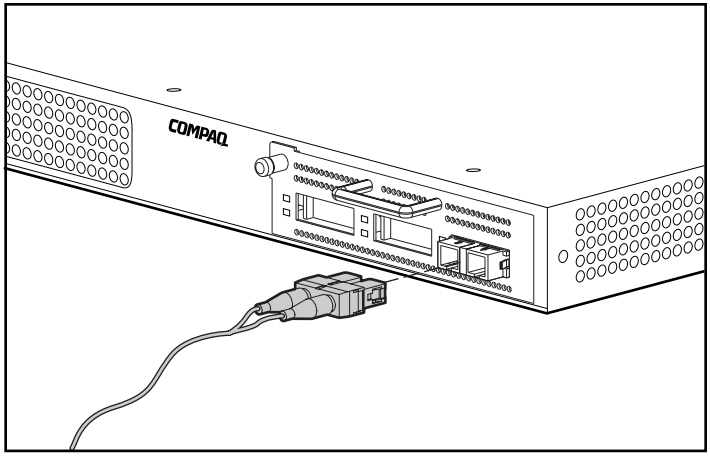

Figure C-7. Connecting the fibre optic cable

Appendix D

Command Line Interface

Most of the configuration commands used to set up and maintain the FC-AL Switch can be controlled from the main menu's first two options: Networking Parameters and Management. For more advanced functions, the FC-AL Switch Management Utility offer a further level of complexity. This more advanced level of parameters operates from a command line interface (CLI).

The table below provides an overview of the commands available through the CLI.

Table D-1
Command Line Interface Summary

Command	Meaning
exit	Exits the command line interface
help	List of all implemented commands
hwcfg	Displays the hardware configuration

continued

Table D-1
Command Line Interface Summary *continued*

Command	Meaning
logout	Logs out of the user interface
pemcfg *	Displays the PEM configuration
pemstat *	Displays the PEM status
reset	Resets a device
swcfg	Displays the switch configuration
swstat	Displays the switch status
syscon	Displays/modifies the MIB2 system contact
sysloc	Displays/modifies the MIB2 system location
sysname	Displays/modifies the MIB2 system name
temp	Displays/modifies the temperature parameters
portstat*	Displays the port status
portbyp*	Displays/modifies the port management bypass control

continued

Table D-1
Command Line Interface Summary *continued*

Command	Meaning
portliptyp*	Displays/modifies the port LIP type control
portdev*	Displays/modifies the port device type configuration
portperf*	Displays the port performance statistics
portmap*	Displays the list of AL-Pas of the devices attached to the switch ports
log	Displays/modifies the event log parameters
tftpdl	Displays/Modify TFTP download parameters

Invoking the Command Line Interface

The CLI can be called up by choosing **4.Command line interface** selection on the main menu. It will respond with a "cmd>" prompt, as shown in the following figure.

```
Compaq StorageWorks FC-AL Switch
StorageWorks FC-AL Switch Management Utility: 01.00-B03
Selftest Status:           passed

2.  Networking parameters
3.  Management options
4.  Command line interface
5.  Logout
6.  Reset switch
> 4

cmd>
```

Figure D-1. Main menu

Using the Command Line Interface

The CLI is a general-purpose ASCII line interface separated by carriage returns. The syntax can best be seen by typing "**help.**" More detailed information is available by typing "help" followed by a command name, as shown below:

```
cmd> help command_name
```

```
Supported commands:
  help -        List of all commands implemented.
  logout -      Logs out of the system.
  exit -        Exit command line interface.
  reset -       Reset a device.
  hwcfg -       Display the hardware configuration.
  swcfg -       Display the switch configuration.
  swstat -      Display the switch status.
  sysname -     Display/modify MIB2 system name.
  syscon -      Display/modify MIB2 system contact.
  sysloc -      Display/modify MIB2 system location.
  temp -        Display/modify temperature parameters.
  tftpdl -      Display/modify TFTP download parameters.
  pemcfg -      Display module configuration.
  pemstat -     Display module status.
  portmap -     Display FC devices connected to port.
  portperf -    Display port performance statistics.
  portstat -    Display port status.
  portbyp -     Display/modify port management bypass control.
  portliptyp -  Display/modify port lip type control.
  portdev -     Display/modify port device type specification.
  log -         Event log display and control.

cmd>
```

Figure D-2. Help menu

By typing the Help command, you can access a list of all available commands along with a brief overview of the syntax. In addition, it is possible to assign values to various parameters by using the equal sign separated by spaces. For example,

```
cmd> temp = 90
```

sets the temperature threshold to 90 degrees.

Logout of CLI

The logout command screen in the CLI is the same as the logout option in the main menu.

```
cmd> logout
>Login: _
```

Figure D-3. Logout screen

Exiting from CLI

The Exit command of the CLI returns the user to the main menu, as shown in the figure below. The Exit command can be distinguished from the Logout command in that the user does not exit the program but remains logged in and retains the ability to select a new item from the main menu.

```
cmd> exit


Compaq StorageWorks FC-AL Switch
StorageWorks FC-AL Switch Management Utility: 01.00-B03
Selftest Status:           passed

2. Networking parameters
3. Management options
4. Command line interface
5. Logout
6. Reset switch
>
```

Figure D-4. Exit menu

Reset

The CLI Reset command requires a parameter. Choosing “0” as the parameter resets the switch. If no parameter is given, the CLI prompts back with the “help reset” command. Resetting the switch has the same effect as using the Reset option on the main menu.

Hardware Configuration (hwcfg)

The **hwcfg** command displays the hardware configuration of the switch. This command takes no parameters and is an informational display only.

```
cmd> hwcfg

Hardware configuration:

  Banner:                 Compaq StorageWorks FC-AL Switch
  Serial number:          USG1014933
  StorageWorks FC-AL Switch Management Utility: 01.00-B03
  MAC address:            0x00e024-1129e0
  Switch WWN:             0x100000e0241129df
  Agent WWPN:             0x100000e0241129df
  Number power supplies: 1
  Number fans:            3
  MotherBoard type:       8 port FC-AL Switch
  Number of ports:        8
  PEM Present
    PEM type:          3 port Expansion Module
    Banner:            3 Port Expansion Module
    Serial number:     USG1015253
    Number of ports:   3

cmd>
```

Figure D-5. Hardware Configuration Switch

Switch Configuration (swcfg)

The **swcfg** command displays the network configuration of the switch. It takes no parameters. This is an informational display only.

To change the TFTP parameters, see the **tftpdl** command, described in a section later in this chapter. The temperature threshold can be set with see the **temp** command (also shown later in this section).

```
cmd> swcfg

Switch configuration:

  Banner:                       Compaq StorageWorks FC-AL Switch
  System description:           Compaq StorageWorks FC-AL Switch
  System name:
  System contact:
  System location:
  System object ID:             1.3.6.1.4.1.1754.1.6.3
  TFTP server IP address:       205.178.15.106
  TFTP download filename:       fwcpqsw0100b03.bin
  TFTP boot filename:           facpqsw0100b03.bin
  TFTP request timeout value:   5000 ms
  TFTP request retry count:     24
  TFTP data timeout value:      500 ms
  TFTP data retry count:        90
  Temperature threshold:        45 c

cmd> _
```

Figure D-6. Switch configuration

Switch Status (swstat)

The **swstat** command displays the status of the various elements of the switch. This command takes no parameters and displays the information shown below.

```
cmd> swstat

Switch status:

  Selftest status:       passed
  Init LED state:        off
  Fault LED state:       off
  Temperature:           27 c (threshold: 45 c)
  Power supply 1 status: good
  Fan 1 status:          good
  Fan 2 status:          good
  Fan 3 status:          good
  Switch up time:        0:01:42 hr:min:sec
  Cumulative up time:    0:01:42 hr:min:sec
  TFTP download status:  Successful

cmd> _
```

Figure D-7. Switch Status

System Name (sysname)

The **sysname** command will display or modify the MIB2 system name string as shown below.

```
cmd> sysname = Compaq_Device
System name: Compaq_Device

cmd> sysname
System name: Compaq_Device

cmd> _
```

Figure D-8. System Name

System Contact (syscon)

The **syscon** command will display or modify the MIB2 system contact string as shown below.

```
cmd> syscon = administrator
System contact: administrator

cmd> syscon
System contact: administrator

cmd>
```

Figure D-9. System Contact

System Location (sysloc)

The **sysloc** command will display or modify the MIB2 system location string as shown below.

```
cmd> sysloc = IT_dept
System location: IT_dept

cmd> sysloc
System location: IT_dept

cmd> _
```

Figure D-10. Switch Status

Temperature (temp)

The **temp** command displays the device's current temperature and temperature threshold. Use the **temp** command to display and modify the temperature threshold. To accomplish this, do not use any embedded spaces. The entries must be in the numeric form shown below, and Centigrade (also Fahrenheit) can be used. The equal sign must be surrounded by spaces or tabs.

```
cmd> temp
Current temperature:  26 c
Temperature threshold:  45 c

cmd> _
```

Figure D-11. Temperature screen

TFTP Downloading (tftpdl)

The FC-AL Switch Management Utility can be downloaded over the Ethernet. There are three methods to update the StorageWorks FC-AL Switch Management Utility (see Appendix E, "Updating the FC-AL Switch"). The **tftpdl** command can be used to set the parameters of the TFTP and to start the download. The most recent FC-AL Switch Management Utility is available on the Compaq website, www.compaq.com/storageworks in the Support section.

After downloading the updated utility from the web site to a local system, use the **tftpdl** command to download it from the local system to the FC-AL Switch. The IP address shown for the host will require changing, as the default is a test IP address. Check with the network administrator for the host system IP address of the host system. A TFTP server must be running on this host. This is explained in Appendix E, "Updating the FC-AL Switch." A TFTP server application for Windows NT is available at www.compaq.com/storageworks.

The timeout and retry parameters will not require parameter resetting unless the network being used is overloaded with other traffic.

IMPORTANT: The FC-AL Switch's IP address and other networking parameters also must be set properly set as well for the download to work.

```
cmd> tftpdl
TFTP download file name:    fwcpqsw0100b03.bin
TFTP boot file name:        facpqsw0100b03.bin
TFTP IP address:            205.178.15.106
Request time out:           5000 ms
Request number of retries:  24
Data time out:              500 ms
Data number of retries:     90

cmd>
```

Figure D-12. Downloading

The download of new FC-AL Switch Management Utility into a FC-AL Switch occurs from a local TFTP server. The file is copied over the Internet to the server and transferred to the FC-AL Switch by a local Ethernet connection.

The meanings of the parameters are described below:

- **Download file name** - The name of the downloaded package of FC-AL Switch Management Utility that is on the TFTP server. The name might not be the same as the one on the Compaq website because it can be changed locally.
- **Boot file name** - The name of the file within the downloaded package of FC-AL Switch Management Utility that is to be executed by the FC-AL Switch whenever it is powered up or reset. This name changes from release to release and will show on the Compaq website, along with other information about how to update the FC-AL Switch Management Utility.
- **IP address** - The IP address of the TFTP server
- **Request time out** – This shows the length of time that the FC-AL Switch should wait in milliseconds before timing out while attempting to connect to the TFTP server. The range for this parameter is between 0 and 60,000 milliseconds.
- **Request number of retries** - The number of consecutive timeouts to permit before giving up on trying to connect to the TFTP server.
- **Data time out** – The length of time the FC-AL Switch should wait in milliseconds before timing out a data transfer. This is used only during data transfers and comes into play after the connection is made. The range for this parameter is between 0 and 60,000 milliseconds.
- **Data number of retries** – This determines how many consecutive data time outs to allow before ending the process. The range for this parameter is between 0 and 100 retries.

PEM Configuration (pemcfg)

The **pemcfg** command displays PEM configuration. The “M” under “MB/PEM” (FC-AL Switch 3-Port Expansion module) refers to the motherboard or baseboard ports of the FC-AL Switch. The “P” PEM refers to the ports of the optional FC-AL Switch 3-Port Expansion Module installed in the FC-AL Switch.

```
cmd> pemcfg
   MB/   port   mgmnt   LIP     dev
   PEM   num    byp     type    type
   ----- ------ ------- ------- --------
    M     1     no      f7      lip
    M     2     no      f7      lip
    M     3     no      f7      lip
    M     4     no      f7      lip
    M     5     no      f7      lip
    M     6     no      f7      lip
    M     7     no      f7      lip
    M     8     no      f7      lip
    P     1     no      f7      lip
    P     2     no      f7      lip
    P     3     no      f7      lip

cmd> _
```

Figure D-13. Portmap PEM configuration screen

PEM Status (pemstat)

The **pemstat** command displays PEM status.

```
cmd> pemstat

MotherBoard status:
  Selftest status:    passed
  Status:             Good
  Switch up time:     0:09:22 hr:min:sec

PEM status:
  Selftest status:    passed
  Status:             Good
  Up time:            0:09:16 hr:min:sec

cmd>
```

Figure D-14. PEM Status screen

Port Map (portmap)

The mapping of the devices attached to the PEMs can be displayed with the **portmap** command. This command shows the devices on all PEMs as well as those on a specific PEM and port combination. The information displayed is shown in the figure below. The /l option displays the loop IDs of the devices instead.

The “M” under “MB/PEM” (FC-AL Switch 3-Port Expansion module) refers to the motherboard or baseboard ports of the FC-AL Switch. The “P” PEM refers to the ports of the optional FC-AL Switch 3-Port Expansion Module installed in the FC-AL Switch.

```
cmd> portmap

MB/
PEM Port  Cnt AL_PA list   (hexadecimal, Operational Ports)
--- ----  --- ------------------------------------------
  M    1    1 1e
  M    2    1  4

  P    3    1  1


cmd>
```

Figure D-15. Port Map command screen

Port Performance (portperf)

The FC-AL Switch analyzes data flow through the network according to the number and size of received frames or according to the number of transmitted frames on a port-by-port basis. It starts, stops, displays, and resets the performance counters on a port-by-port basis.

Example output for this tool is shown at the bottom of the figure below. The counters are reset whenever the FC-AL Switch is rebooted.

Under the heading “MB/PEM,” the “M” refers to the motherboard or baseboard ports of the FC-AL Switch. The “P” refers to the ports of the optional FC-AL Switch 3-Port Expansion Module if installed in the FC-AL Switch.

```
cmd> portperf

MB/       Cnts RxFrameCnt RxFrameCnt RxFrameCnt RxFrameCnt TxFrameCnt Tx   Rx
PEM Port  Enbl   < 128     128-511    512-1023   > 1023     Summary    Util Util
--- ----  ---- ---------- ---------- ---------- ---------- ---------- ---- ----
  M    1    no          0          0          0          0          0    0    0
  M    2    no          0          0          0          0          0    0    0

  P    3    no          0          0          0          0          0    0    0


cmd>
```

Figure D-16. Port Performance screen

Port Status (portstat)

The **portstat** command displays the status of any individual port. The command can also be used to display the status of all the ports. This is an informational-only display. The pound sign (#) indicates the last port to trigger an initialization.

```
cmd> portstat

MB/                                                                AL_PA  Init
PEM Port  Media              Status                                Count  Count
--- ----  ------------------ ------------------------------------ -----  --------
  M    1  GBIC SW-Optic      Operational                           1         1
  M    2  GBIC SW-Optic      Operational                           1 #       1
  M    3  GBIC not present   Bypassed-No GBIC                     0         0
  M    4  GBIC not present   Bypassed-No GBIC                     0         0
  M    5  GBIC not present   Bypassed-No GBIC                     0         0
  M    6  GBIC not present   Bypassed-No GBIC                     0         0
  M    7  GBIC not present   Bypassed-No GBIC                     0         0
  M    8  GBIC not present   Bypassed-No GBIC                     0         0
  P    1  GBIC not present   Bypassed-No GBIC                     0         0
  P    2  GBIC not present   Bypassed-No GBIC                     0         0
  P    3  GBIC SW-Optic      Operational                           1         1

cmd>
```

Figure D-17. Port Status screen

Port Management Bypass Control (portbyp)

The **portbyp** command displays the port management bypass control. Under the heading “MB/PEM,” the “M” refers to the motherboard or baseboard ports of the FC-AL Switch. The “P” refers to the ports of the optional FC-AL Switch 3-port Expansion Module if installed in the FC-AL Switch.

```
cmd> portbyp

Port management bypass state:
   MB/   port  mgmnt
   PEM   num   byp
   ----- ----- -----
    M     1     no
    M     2     no
    M     3     no
    M     4     no
    M     5     no
    M     6     no
    M     7     no
    M     8     no
    P     1     no
    P     2     no
    P     3     no

cmd>
```

Figure D-18. Port Management Bypass Control

Port LIP Type Control (portliptyp)

The **portliptyp** command displays the port lip type control. Under the heading "MB/PEM," the "M" refers to the motherboard or baseboard ports of the FC-AL Switch. The "P" refers to the ports of the optional FC-AL Switch 3-port Expansion Module if installed in the FC-AL Switch.

```
cmd> portliptyp

Port LIP type:
   MB/   port  LIP
   PEM   num   type
   ----- ----- ----
    M     1     f7
    M     2     f7
    M     3     f7
    M     4     f7
    M     5     f7
    M     6     f7
    M     7     f7
    M     8     f7
    P     1     f7
    P     2     f7
    P     3     f7

cmd> _
```

Figure D-19. Port LIP Type Control screen

Port Device Type (portdev)

Use this command to set the LIP propagation policy for a given port. Individual ports on the FC-AL Switch can be configured as “lip” or “no lip.” Use the **portdev** command, to display or change the current LIP propagation policy. It is necessary for the policy to be set correctly for the LIP propagation policies work properly. For example, the port must be set to “lip.” LIPs will be forwarded by default.

Under the heading “MB/PEM’, the “M” refers to the motherboard or baseboard ports of the FC-AL Switch. The “P” refers to the ports of the optional FC-AL Switch 3-port Expansion Module if installed in the FC-AL Switch.

```
cmd> portdev

Port device type:
   MB/   port   dev
   PEM   num    type
   ----- ------ --------
    M     1     lip
    M     2     lip
    M     3     lip
    M     4     lip
    M     5     lip
    M     6     lip
    M     7     lip
    M     8     lip
    P     1     lip
    P     2     lip
    P     3     lip

cmd>
```

Figure D-20. Port Device Type menu

Log

The log command permits the operator to observe the log of events inside of the FC-AL Switch. It can be set to use either on a demand basis, with the **log list** command, or scrolled continuously to the console device, using the log disp = yes command.

In the case of the log list command, the log is read from a buffer and is filtered for only specific levels of messages, while in the log disp = yes command, all messages are displayed as they are generated. The filter can have more than one level enabled.

```
cmd> log filter = dwf

Event log display parameters:
  Filter = debug, warning, fatal
  Disp = no

cmd> log disp = yes

Event log display parameters:
  Filter = debug, warning, fatal
  Disp = yes

cmd> log list_
```

Figure D-21. CLI Log screen

Once a filter is selected, use the log list command to display the current contents of the log buffer. This command uses the filter to remove information and status information as set up in the log filter = dwf.

To set up continuous scrolling of messages to the console set log disp to **yes**. Turn this off by typing a carriage return (Enter) and then entering log disp = no.

Appendix ***E***

Updating the FC-AL Switch

FC-AL Switch Management Utility

The FC-AL Switch embedded device management program is referred to as the FC-AL Switch Management Utility. The baseline software management capabilities for the FC-AL Switch can also be accessed through a command line interface (CLI), which provides support for port and switch configuration and monitoring. This section will describe the three methods available for updating the FC-AL Switch Management Utility.

Finding the FC-AL Switch Management Utility Version Number

The current version of the FC-AL Switch Management Utility is displayed on the FC-AL Switch, Device Summary tab. It can also be found on the main menu of the command line interface, labeled “StorageWorks FC-AL Switch Management Utility.” The FC-AL Switch Management Utility contains the embedded agents used by the FC-AL Switch.

```
Compaq StorageWorks FC-AL Switch
StorageWorks FC-AL Switch Management Utility: 01.00-B03
Selftest Status:           passed

2.  Networking parameters
3.  Management options
4.  Command line interface
5.  Logout
6.  Reset switch
> _
```

Figure E-1. Main menu

Downloading the Switch Management Utility Update

The latest version of FC-AL Switch Management Utility can be obtained from the Compaq website, www.compaq.com/storageworks, in the support section. The FC-AL Switch Management Utility is transferred to the FC-AL Switch over the 10BaseT Ethernet by using TFTP. A server on the network must be configured to act as a TFTP server. A Windows TFTP server application is available from the Compaq website, www.compaq.com/storageworks. UNIX machines need to launch the TFTP daemon.

Updating the FC-AL Switch Management Utility using the Web Browser

The FC-AL Switch Management Utility can be updated using the web browser interface under the FC-AL Switch Service tab (see Chapter 4, "FC-AL Switch Management Utility"). Use this screen to set the FC-AL Switch parameters and to start the download process.

The IP address shown for the TFTP server must be changed to the IP address running the TFTP daemon. The IP address field does not have the ability to resolve host names.

The StorageWorks Management Utility file name must be changed to match the name of the FC-AL Switch Management Utility update file. The StorageWorks Management Utility Boot File is automatically extracted from the download file by the StorageWorks FC-AL Switch once the transfer is complete. The boot file name needs to be set for a successful update. This will be provided along with the download file at the Compaq website: www.compaq.com/storageworks.

Typically, both the timeout and retry parameters do not require resetting unless the network used is overloaded with other traffic.

With all fields completed correctly and the TFTP daemon running, click on "Download" to initiate the transfer. The FC-AL Switch Management Utility will report the success or failure of the update.

Updating the FC-AL Switch Management Utility using the Command Line Interface

The FC-AL switch can also be updated using the command line interface.

Use the **tftpdl** command to set the FC-AL Switch TFTP parameters and to start the download process. For information about the **tftpdl** command, see Appendix D, "Command Line Interface."

The IP address shown for the TFTP server must be changed to the IP address running the TFTP daemon. The IP address field does not have the ability to resolve host names.

The download file name must be changed to match the name of the FC-AL Switch Management Utility update. The boot file is automatically extracted from the download file by the StorageWorks FC-AL Switch once the transfer is complete. The boot file name needs to be set for a successful update. This will be provided along with the download file at the Compaq website: www.compaq.com/storageworks.

Typically, both the timeout and retry parameters do not require resetting unless the network used is overloaded with other traffic.

IMPORTANT: The FC-AL Switch's IP address and other networking parameters must be properly set for the download to work.

```
cmd> help tftpdl

Compaq StorageWorks FC-AL Switch

tftpdl help
Syntax:
  tftpdl                              - Display TFTP parameters.
  tftpdl dfile = <file name>          - Modify download file name.
  tftpdl bfile = <file name>          - Modify boot file name.
  tftpdl ip = <xx.xx.xx.xx>           - Modify host IP address.
  tftpdl rtimeout = <req timeout>     - Modify req packet timeout.
  tftpdl rretry = <req num retries>   - Modify req number of packet retries.
  tftpdl dtimeout = <data timeout>    - Modify data packet timeout.
  tftpdl dretry = <data num retries> - Modify data number of packet retries.
  tftpdl start                        - Start TFTP download.
Description:
  This command will display and modify the TFTP download parameters.
  The TFTP download parameters are used to download a new code image into
  the switch.  Prior to executing the TFTP download command, the code will
  verify that the specified image is valid.

cmd> _
```

Figure E-2. Command Line Interface -TFTP downloading

Once the transfer is initiated, the FC-AL Switch Management Utility package number is compared with the package already resident in the FC-AL Switch. If the FC-AL Switch Management Utility being downloaded is newer and appears compatible, the download status will be set to “in progress” and remains so until the transfer is complete. Once the FC-AL Switch Management Utility is updated, the system reboots itself to initialize the new FC-AL Switch Management Utility and changes the status to “complete.”

If the FC-AL Switch Management Utility being downloaded is older than the present or incompatible with the system, the FC-AL Switch stops the transfer and sets the download status to “rejected due to incompatible package versions.”

Updating the FC-AL Switch Management Utility using the Boot Menu

The FC-AL switch can also be updated using the Boot Menu. The Boot Menu is accessible immediately after the FC-AL Switch is powered up or reset. The Boot Menu permits you to configure the networking parameters necessary to download new FC-AL Switch Management Utility with TFTP even if the current utility program is not functioning. To access the Boot Menu, connect to the switch directly using a null modem cable and use a program such as HyperTerminal in Windows. The default terminal settings are 38400/8N1/No Flow Control. With the null modem connected and HyperTerminal running, reset the switch. To access the Boot Menu, you must hit the Enter key when prompted, this occurs within the first few seconds following the reset.

```
Powering up switch...

Press <CR> for Boot Menu, Agent Code within 3 seconds


Boot Menu Version 01.00-B28
1.  Switch IP address [current = 192.168.1.38]
2.  Switch subnetworking mask [current = 255.255.255.0]
3.  Switch default gateway address [current = 0.0.0.0]
4.  TFTP server IP address [current = 205.178.15.106]
5.  TFTP filename [current = fwcpqsw0100b03.bin]
6.  TFTP initial number of retries [current = 24]
7.  TFTP initial timeout [current = 5000ms]
8.  TFTP data transfer number of retries [current = 90]
9.  TFTP data transfer timeout [current = 500ms]
T.  TFTP force download [current = no]
B.  Boot filename [current = facpqsw0100b03.bin]
D.  load Default system parameters
E.  Exit menu and continue operation
command> [E] _
```

Figure E-3. boot Menu

The IP address shown for the TFTP server IP address (4.) must be changed to the IP address running the TFTP daemon. The IP address field does not have the ability to resolve host names.

The TFTP file name (5.) must be changed to match the name of the FC-AL Switch Management Utility update. The boot file is automatically extracted from the download file by the FC-AL Switch once the transfer is complete. The Boot Filename (B.) needs to be set for a successful update. This will be provided along with the download file at the Compaq website, www.compaq.com/storageworks.

Typically, both the timeout and retry parameters do not require resetting unless the network used is overloaded with other traffic.

With all parameters completed correctly and the TFTP daemon running, choose “E” to exit the boot menu and reset the switch. The update will occur automatically following the reset.

Appendix ***F***

FC-AL Switch Technology Overview

The operation of a Storage Area Network changes dramatically when comparing the FC-AL Switch environment with a traditional hub setting. The FC-AL Switch increases the aggregate bandwidth without requiring any additional functionality from the end-node devices.

The FC-AL Switch also maintains signal and data integrity by re-timing and re-amplifying the signal at each port. The difference between hub technology and the switch environment becomes especially clear in terms of data-path routing.

A traditional Fibre Channel physical loop structure routes traffic through all nodes. Since the physical media is shared by all the nodes, it is shared by all nodes that wish to communicate. The addition of a hub allows the cables from each node to go to a centralized location (such as a wiring closet) where the hub is located. Media and bandwidth are still shared by all devices attached to the hub.

The FC-AL Switch has been designed with a non-blocking switch backplane. This configuration offers enough switch matrix bandwidth available to support simultaneous conversations between any and all pairs of nodes. The FC-AL Switch helps reduce the time arbitration and loop initialization required in an active Fibre Channel network. The FC-AL Switch also provides additional agents and functionality designed to improve upon traditional FC-AL hub operation. These features are explained further in this chapter.

Fibre Channel Arbitration in the FC-AL Switch

Typical Fibre Channel data traffic operation is constrained by loop tenancies. A loop tenancy represents the time required for a complete data transfer to be completed. A Fibre Channel node wanting to send data begins a loop tenancy by arbitrating for ownership of the loop. Upon gaining arbitration, the device intending to send data opens a communication channel to its destination. When the destination device responds with a message of available buffer space, the sender transmits data until it is finished. After the data transfer is complete, the sender closes the loop tenancy.

In an example of a traditional hub environment, node C intends to send data to node A. Node C issues an arbitrate message. The arbitrate message has to circulate through nodes D, A, and B. Any of those nodes are capable of replacing C's arbitrate message with its own of higher-priority message, resulting in node C losing arbitration.

In the switch implementation, node C wins arbitration immediately, unless node A is already active with a third node. If it is, node C has to wait, but the wait is only for as long as node A remains active. Three different switch-based scenarios are explained below:

- If node A is free, node C's data is forwarded directly to node A without interference. The messages do not circulate through other devices enhancing latency savings on this transaction. All transactions are directed between the two communicating nodes. No traffic circulates the entire network as it would in a hub-based loop topology.
- If node A is busy with another loop tenancy, (for instance, with node D), the open message from node C is held until that loop tenancy is completed.
- If A is busy and B, C, and D all simultaneously intend to send data to A, a "first-come, first-serve" algorithm will be is enforced. This enforcement is accomplished by the prioritized queuing of open messages at the destination. If the queue is greater than a programmable value, the switch responds with a close message to all subsequent open requests from other nodes.

StorageWorks FC-AL Switch Initialization

The loop initialization behavior of the FC-AL Switch is enhanced by a feature called Intelligent LIP Control. Intelligent LIP Control minimizes the impact of loop initialization on open tenancies.

Intelligent LIP Control is an advanced method of managing loop initialization events. Loop initialization is prompted by a Loop Initialization Primitive (LIP) being issued by a device on the arbitrated loop. The LIP can be issued at any time and is potentially disruptive if issued during frame transfer. If such a disruption occurs, error-handling code at the driver or application layer is triggered by a timeout to prevent I/O errors or data corruption. Intelligent LIP Control avoids the disruption in the first place by holding the LIP, up to a certain maximum period, until a minimum gap in frame transfer occurs.

Appendix G

Browser Configuration

Browser Configuration

To configure your browser, follow the instructions below.

Using Netscape (Communicator/Navigator)

NOTE: Java support must be enabled.

1. Click Edit > Preferences.

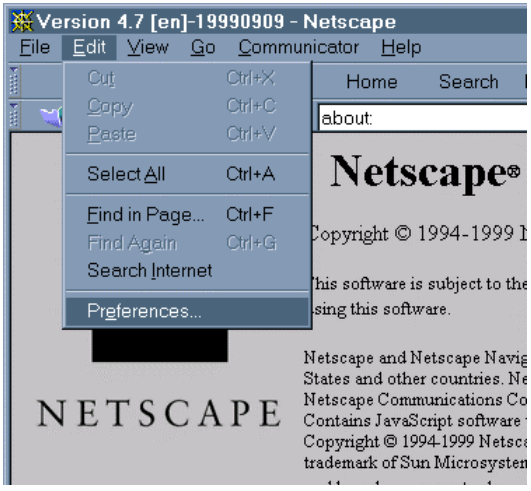

Figure G-1. Netscape's Edit menu

2. Click the Advanced section and enable Java support on the right hand pane.

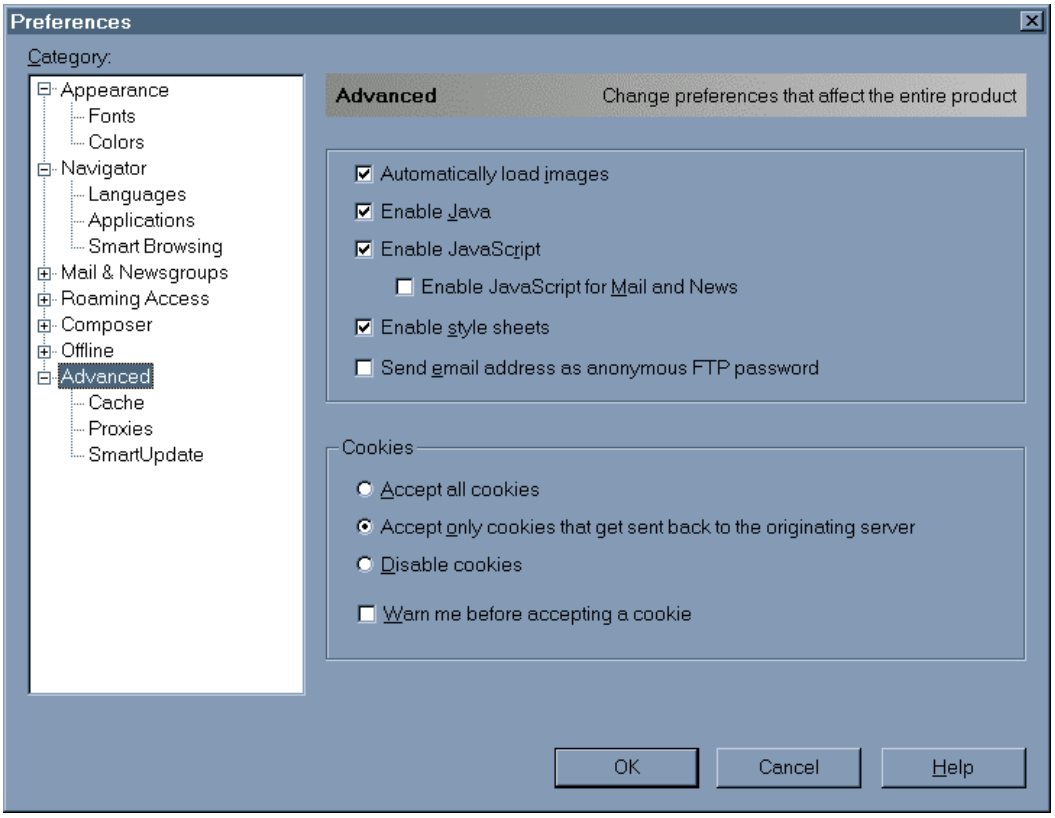

Figure G-2. Netscape's Preferences menu

Using Microsoft Internet Explorer

Make sure the switch IP address maps to an FQDN in the domain name server.

> **NOTE:** A bug in older versions of Microsoft Internet Explorer JVMs will prevent the applet from working unless the switch's IP address maps to a valid FQDN in the DNS server used by the browser host. For example, 192.168.13.13 should resolve to myswitch.mycompanyxxxx.com. Proper operation depends on the JVM version.

If Microsoft Internet Explorer version 5.0 or later is installed, verify Java Virtual Machine (JVM) is also installed. Microsoft JVM is an optional component of Microsoft Internet Explorer version 5.x, unlike version 4.x, which had it installed by default.

To verify that the JVM is installed:

1. Click Tools > Internet Options.

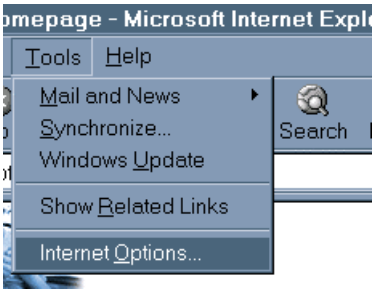

Figure G-3. Microsoft Internet Explorer's Tools menu

2. Click the Advanced tab.
3. Scroll down to find the Microsoft VM section as shown in Figure G-4.

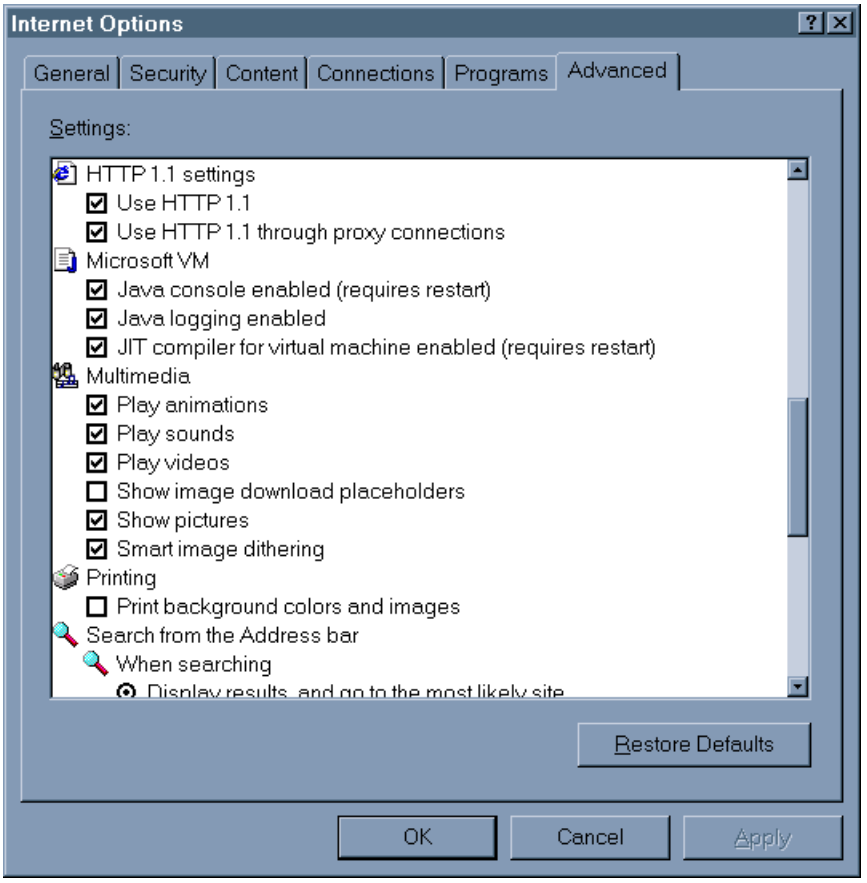

Figure G-4. Microsoft Internet Explorer's Advanced tab screen

If this section is missing, the JVM is not installed. To install the JVM:

1. Select the Tools menu > Windows Update.

NOTE: For Microsoft Internet Explorer 4.0x users, visit the URL www.microsoft.com/windowsupdate instead of following the instructions above.

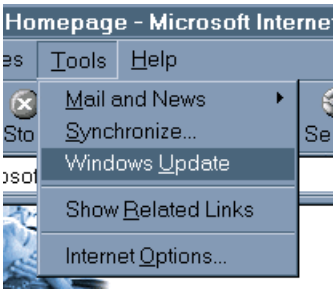

Figure G-5. Microsoft Internet Explorer's Tools menu

2. An HTML-based wizard will guide you through the Windows updates. Allow the Windows Update ActiveX control to access your computer.

Figure G-6. Security Warning screen

3. The Windows Update ActiveX control scans the hard drive to determine the software updates available.

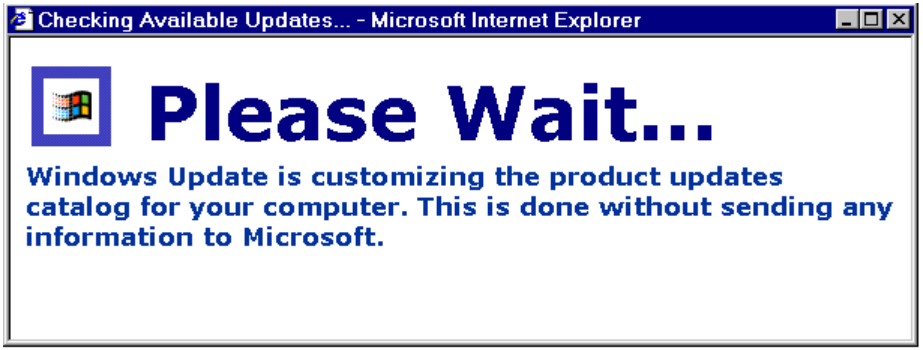

Figure G-7. Checking Available Updates screen

4. You will be presented with a list of software updates that are available for your version of windows. Make sure you choose Microsoft Virtual Machine and any other updates desired.

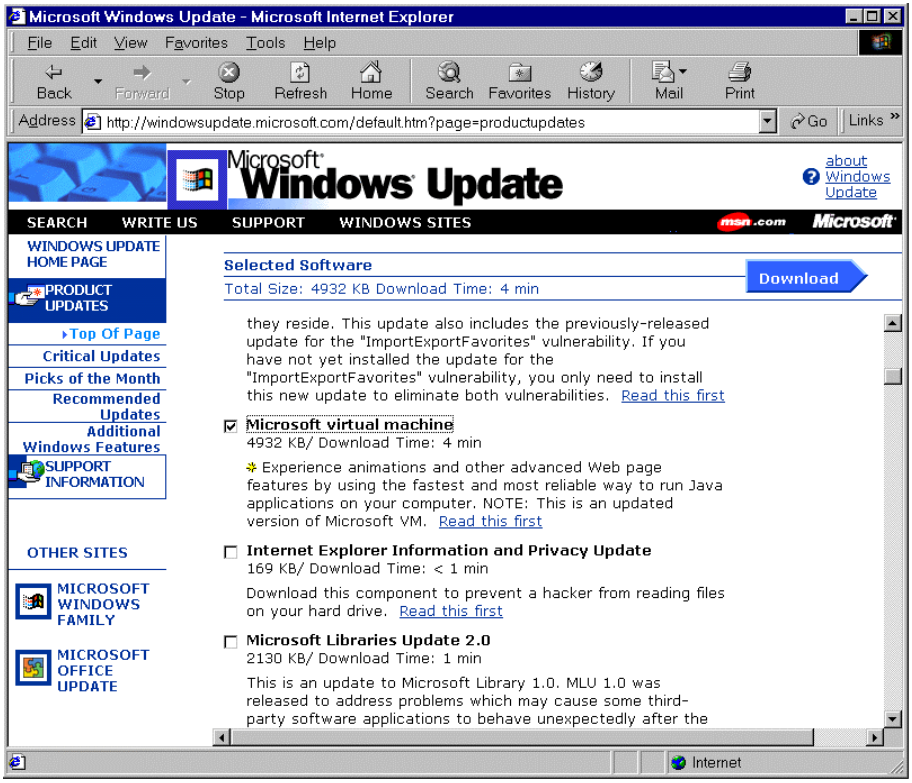

Figure G-8. Microsoft Windows Update screen

5. After choosing the updates, click the Download button.
6. Click Start Download and wait until the installation is finished.

Once the installation is complete you will be asked to restart the computer. Installation of the JVM will not be complete until the computer is restarted.

> **NOTE:** The second option is to download the Internet Explorer installer and make sure that Microsoft Virtual Machine is one of the components selected for installation along with the basic browser. You can download the installer from www.microsoft.com/ie. If you run into problems with Windows Update please contact your system administrator or go to www.microsoft.com/ie for further help.

Adding FC-AL Switch IP Address/Host Name to trusted sites

1. Select the Tools menu > Internet Option.
2. Click the Security tab. Select the Trusted Sites icon.

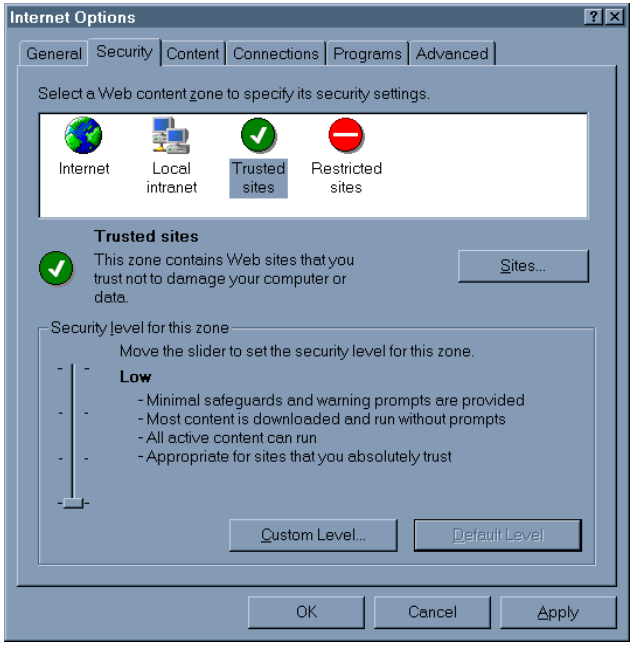

Figure G-9. Security Tab screen

3. Click the Sites button and add the switch's hostname (FQDN) to the trusted sites list.

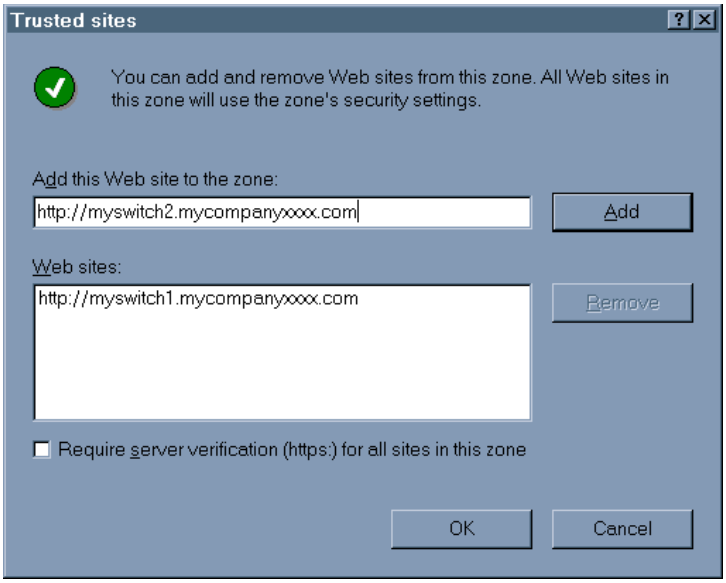

Figure G-10. Trusted Sites screen

Enabling unsigned applets to access the Network

1. Select the Tools menu > Internet Options.
2. Click the Security tab. Select the Trusted Sites icon.
3. Click the Custom Level button.
4. Scroll down until you see the Microsoft VM section, then set the Java Permissions to Custom. This will bring up the Java Custom Settings button.

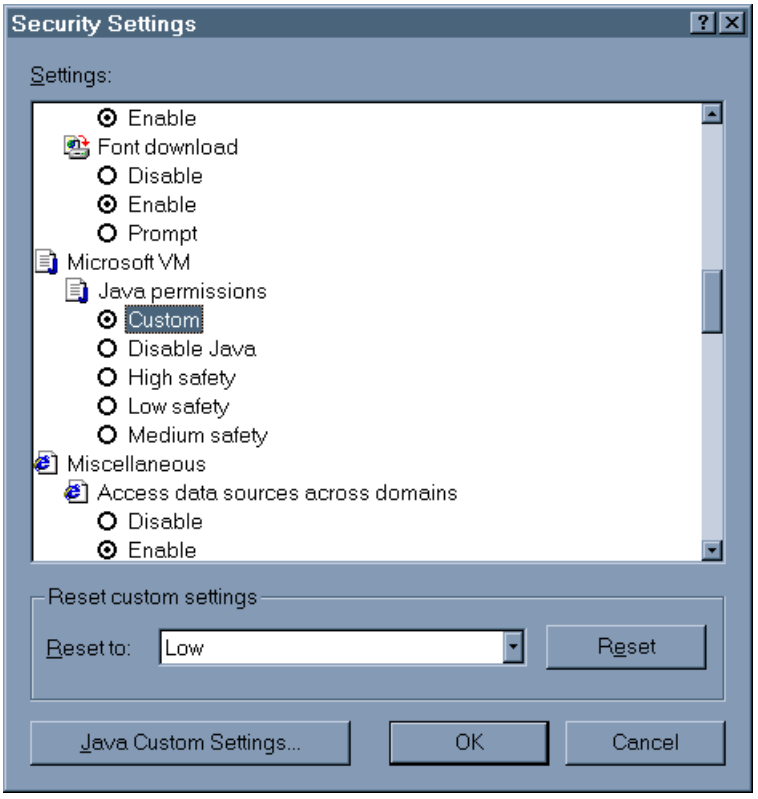

Figure G-11. Security Settings screen

5. Click the Java Custom Settings button. Click the Edit Permissions Tab.
6. Make sure Run in sandbox is checked under Run Unsigned Content. Under Unsigned Content, scroll down to the Access to all Network Addresses section and set it to Enable.

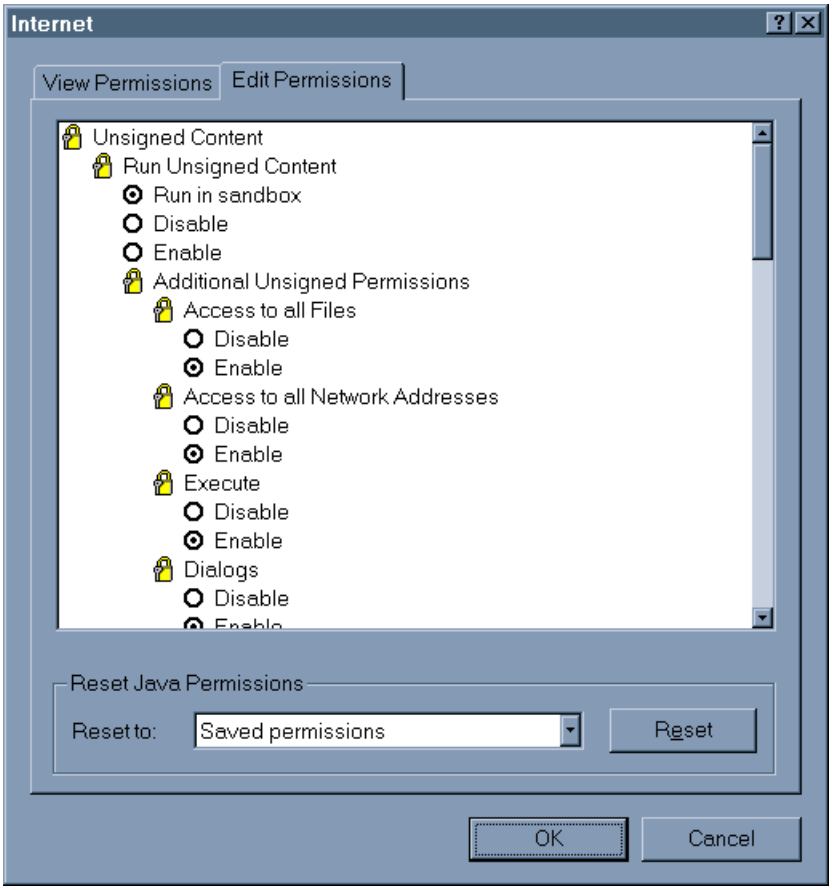

Figure G-12. Permissions screen

7. Click OK and restart the browser before accessing the FC-AL Switch Management Utility Applet.

Enabling Java Console and Logging

1. Click the Tools menu > Internet Options.
2. Click the Advanced tab and enable Java Console enabled, Java logging enabled and JIT compiler for virtual machine enabled (requires restart).
3. Click OK.

Accessing the FC-AL Switch Management Utility Applet with a browser

In the browser's Location bar, type in the URL of the switch. For example: if the hostname of the switch is myswitch.mycompanyxxxx.com, the URL that needs to be entered is myswitch.mycompanyxxxx.com.

> **NOTE:** If your switch doesn't have a FQDN associated with it, use the Internet address of the switch to access it through a browser. For example: If the IP is 192.168.13.13 then the URL that needs to be entered is http://192.168.13.13. Please be aware that the Switch Management Utility applet will not work under some versions of Microsoft Internet Explorer if the Internet address of the switch does not resolve to a valid FQDN.

Logging into the Switch Management Utility Applet

You will be asked to enter the username and password to be able to access the FC-AL Switch Management Utility Applet.

The username/password combination is the same as those used for console/telnet.

Entering the SNMP Community Strings

Once the FC-AL Switch Management Utility applet has started, you will be asked to enter the SNMP read/write community strings to be able to access the switch.

Figure G-13. Enter Community Settings screen

If you only want to view the configuration and passively monitor the switch, the read community string is all that is necessary. If you intend to change the switch configuration, both the read and the write community strings are required.

If you started the FC-AL Switch Management Utility Applet with only the read community string, but want to be able to change the switch's configuration, follow the steps below:

1. Click the Chassis tab, and then select the Network Settings tab.
2. Enter the write community string and click on the Set button.

If a wrong read community string was entered, the only recourse to get the FC-AL Switch Management Utility Applet to work is to close the current browser session and restart a new one.

Accessing the FC-AL Switch Management Utility Applet through firewalls.

The network administrator should configure your firewall to allow access to ports 80/TCP (HTTP) 161/UDP (SNMP) of the switch's IP Address.

To download the updated software:

1. Configure the switch's IP address, subnet mask, and gateway IP address.
2. Enter the IP address of the TFTP server. This must be a system that the FC-AL Switch can reach through the 10BaseT Ethernet port.

3. Enter the name of the FC-AL Switch Management Utility package file as it is named on the TFTP system.
4. Alter the various timeout and retry parameters as necessary. The defaults should work in most circumstances. The limits for each of these parameters are automatically displayed when the parameter is selected.
5. Change the name of the boot file, if necessary. This should not be necessary unless you are instructed to do so by the information on the Compaq website.
6. The “force download” command can be used to load a new copy of the present or previous version of FC-AL Switch Management Utility. Typically, only newer versions will be downloaded.
7. Enter “E” to exit and continue. Type “y” to continue and start the download.

This completes the process of updating the FC-AL Switch Management Utility.

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