# SANworks by Compaq

SAN Director 64 Product Manager
User Guide

Part Number: AA-RPL9B-TE

**Second Edition (February 2002)**

This guide provides an introduction and an overview of the SAN
Director 64 (SD-64) Product Manager. It also explains how to use
SD-64 features to monitor, manage, and configure a Director. Finally
it describes how to use SD-64 logs and how to use the SD-64
maintenance features.

# COMPAQ

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# About This Guide

This publication is part of a documentation suite that supports the StorageWorks SAN Director 64.

## 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 upper case. <br> **NOTE:** UNIX commands are case sensitive and will not 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

These icons may be located on equipment in areas where hazardous conditions may exist.

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

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

Any RJ-45 receptacle marked with these symbols indicates a Network Interface Connection.

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

Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or hot component. 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.
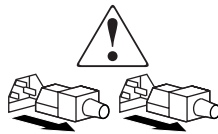
Power Supplies or Systems marked with these symbols indicate the equipment is supplied by multiple sources of power.

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

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

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

# 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 installations.

- ■ The racks are coupled together in multiple rack installations.

- ■ A rack may become unstable if more than one component is extended for any reason. Extend only one component at a time.

# 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.

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

Outside North America, call the nearest Compaq Technical Support Phone Center. Telephone numbers for world wide Technical Support Centers are listed on the Compaq website. Access the Compaq website by logging on to the Internet at http://www.compaq.com.

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

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

## Compaq Website

The Compaq website has latest information on this product as well as the latest drivers. You can access the Compaq website by logging on to the Internet at http://www.compaq.com/storage.

# 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.

<div align="right">

*Chapter* **1**

</div>

# Product Manager Overview

This chapter provides an introduction and overview of the SANworks SAN Director 64 Product Manager. It is intended as a quick reference for using features available through the main Product Manager window.

## Managing the StorageWorks SAN Director 64

Three options are available for managing the Director through a user interface:

■ The Product Manager application installed on a SANworks Director Connectivity Manager (SDCM) Server with the SDCM application. Access to the Product Manager must be through the SDCM and Fabric Manager applications. The SDCM, Fabric Manager, and Product Manager applications are installed on the SDCM Server shipped from the manufacturer.

  The Product Manager application installs automatically with the SDCM and Fabric Manager applications on remote workstations using any standard web browser. For instructions, refer to the appropriate appendix that pertains to the operating system for your workstation in the *SANworks by Compaq Director Connectivity Manager User Guide* (AA-RPL7B-TE).

■ The embedded web server interface. Using a browser-capable PC with an internet connection to the Director, you can monitor and manage the Director through the web server interface embedded in the Director firmware. The interface provides a GUI similar to the Product Manager application, and supports Director configuration, statistics monitoring, and basic operation.

To launch the web server interface, enter the Director's IP address as the internet uniform resource locator (URL) into any standard browser. Enter a user name and password at the login screen. The browser then becomes a management console. Refer to the web server interface online help for details on use.

> **NOTE:** The default user name for the right to view status and other information is "operator." The default user name for the right to modify configuration data, perform maintenance tasks, or perform other options is "administrator." The default password for both user names is "password."

■ The command line interface (CLI). The CLI allows you to access many SDC Manager and Product Manager functions while entering commands during a telnet session with the Director. The primary purpose of the CLI is to automate management of a large number of Directors using scripts. The CLI is not an interactive interface; no checking is done for pre-existing conditions and no prompts display to guide users through tasks. Refer to the *StorageWorks by Compaq SAN Director CLI Guide* (AA-RQ7AA-TE).

This guide provides details on the Product Manager application for the Director only. Refer to the *StorageWorks by Compaq SAN Director 64 Installation Guide* (AA-RQZQB-TE) for more details on the Embedded Web Server, and to the *StorageWorks by Compaq SAN Director CLI Guide* for more details on CLI.

# SDC Management Menu Options

This user's guide provides information on the SD-64 Product Manager application only. Information on the SDC Manager and Fabric manager applications is provided in the *SANworks by Compaq Director Connectivity Manager User Guide* (AA-RPL7B-TE). Following are lists of options available under navigation control panel menus in all three applications. References are provided to the correct publication for detailed information on these options.

## SDC Manager

Following are options available through the SDC Manager. For more information, refer to "Using the SANworks DC Manager Navigation Control Panel" in Chapter 2 of the *SANworks by Compaq Director Connectivity Manager User Guide* (AA-RPL7B-TE).

### View Menu

■ Product View

■  Fabric View

■  Session View

## Configure Menu

■  New Product

■  Users

■  Nicknames

■  Session Options

■  SNMP

## Logs Menu

■  Audit Log

■  Event Log

■  Session Log

■  Product Status Log

## Maintenance Menu

■  Test Remote Notification

■  Enable Call Home Event Notification

■  Configure E-Mail

■  Configure Ethernet Events

## Help

■  Contents

■  About

## Logout/Exit Menu

■  Logout

■  Exit

## Fabric Manager

Following are options available through the Fabric Manager. For more information, refer to "Using the Fabric Manager navigation Control Panel" in Chapter 3 of the *SANworks by Compaq Director Connectivity Manager User Guide* (AA-RPL7B-TE).

### View Menu

■ Topology

■ Zoning

### Configure Menu

■ Zone Sets

■ Deactivate Zone Set

■ Default Zone

■ Show Route

### Help Menu

■ Contents

■ About

### Close Menu

■ Close

## Product Manager

Following are options available through the Product Manager application for your Director. For more information on these options, refer to Navigation Control Panel on page 1- 13 in this manual.

### View Menu

■ Hardware View

■ Port List View

■ FRU List View

■ Node List View

■ Performance View

## Configure Menu

■ Identification

■ Operating Mode

■ Operating Parameters

■ Ports

■ SNMP Agent

■ Management Server

■ Features

■ Date/Time

■ Threshold Alerts

■ Export Configuration Report

■ Enable Embedded Web Server

■ Enable Telnet

## Logs Menu

■ Audit Log

■ Event Log

■ Hardware Log

■ Link Incident Log

■ Threshold Alerts Log

## Maintenance Menu

■ Port Diagnostics

■ Data Collection

■ IPL

■ Set Online State

■ Firmware Library

- Enable E-Mail Notification

- Enable Call Home

- Backup and Restore Configuration

- Reset Configuration

### Help Menu

- Contents

- About

### Close Menu

- Close

# Product Manager Description

The Product Manager for the StorageWorks SAN Director 64 has a Java-based graphical user interface (GUI) that provides in-depth management, configuration, and monitoring functions for individual Directors and their field-replaceable units (FRUs).

In contrast to the Product Manager, the SDCM application enables administrators to monitor operational status for all products and Fibre Channel fabrics managed by a SDCM Server. The SDCM application also provides tools to administer user and product access to the SDCM application and Product Manager.

The Product Manager provides graphical views of Director hardware components and displays of component status. By positioning the cursor on icons, graphics, panels, and other visual elements in these views and clicking the left or right mouse button, you can quickly manage and monitor the Director on your network.

Using the Product Manager, you can:

- Back up and restore configuration data.

- Clear the system error indicator.

- Configure extended distance buffering for ports.

- Configure Fibre Channel operating parameters for the Director.

- Configure individual ports with a port name describing the node attached to the port.

- Configure LIN alerts.

■ Configure SNMP trap recipients and community names.

■ Configure the Director name, location, description, and contact person.

■ Control individual Fibre Channel ports by blocking/unblocking operation and running internal and external loopback diagnostics.

■ Display FRU properties, such as the FRU name, physical position in the Director (chassis slot number), active or failed state, part number, and serial number.

■ Display information for individual Fibre Channel ports, such as the port name, port number, Fibre Channel address, operational state, type of port, and login data.

■ Display information on nodes attached to ports.

■ Display port performance and statistics.

■ Display vital product data for the Director, such as the system name, description, contact person, location, status, model number, firmware and Engineering Change (EC) level, and manufacturer.

■ Enable beaconing for ports and the Director unit.

■ Monitor the operational status of the Director and each of its hardware FRUs.

■ Perform an initial program load (IPL).

■ Perform maintenance tasks for the Director, including maintaining firmware levels, administering the call-home feature, accessing the Director logs, and collecting data to support failure analysis.

■ Reset port operation.

■ Run port diagnostics.

■ Set the date and time on the Director.

Access the Director Product Manager by clicking a Director product icon on the SDCM application's Product View or the Fabric Manager's Topology View.

Figure 1–1 illustrates Director management components. The figure illustrates the following:

■ Remote workstations.

■ SDCM server.

■ SD-64 Director.
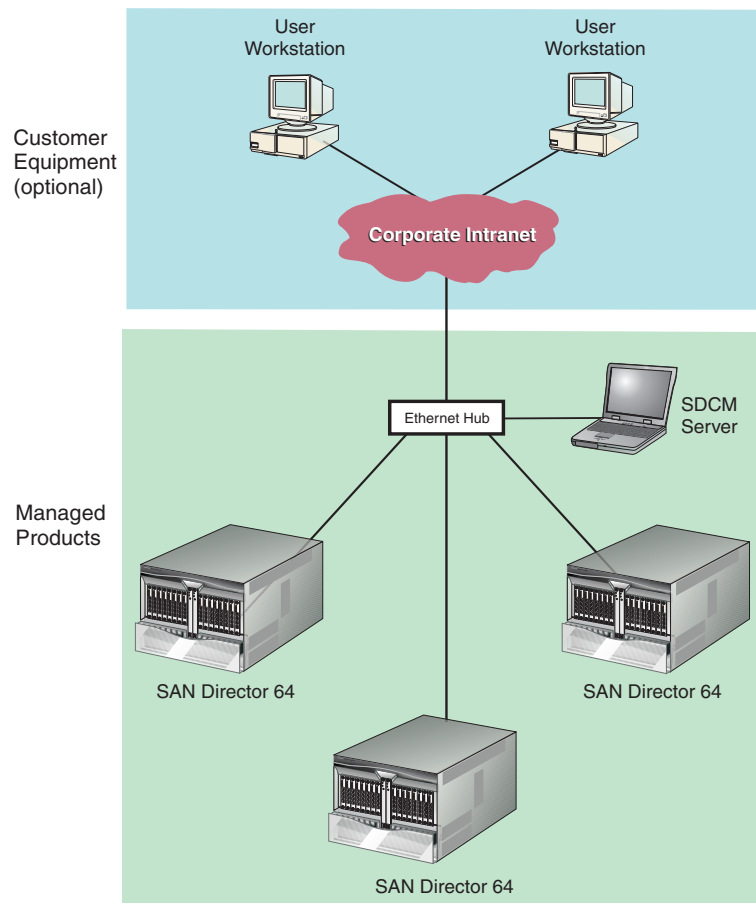


Figure 1–1:  Director Management Components

# Using the Product Manager

This section provides a general overview of the SANworks SAN Director 64 Product Manager application and its functions. For details on performing specific tasks and using specific dialog boxes, refer to the appropriate chapters in this guide.

## Using Dialog Boxes

Buttons, such as OK, Activate and Close or Cancel, initiate functions in a dialog box. Click a button to perform its labeled function. Note the difference between the OK and Activate buttons. The OK button saves the data you entered and closes the dialog box. The Activate button saves the data you entered without closing the dialog box. There is also a difference between the Close and Cancel buttons. The Close button closes the dialog box and saves the data you entered. The Cancel button cancels the operation and closes the dialog box without saving the information you entered.

## Keyboard Navigation

Keyboard navigation is an alternative to mouse navigation. The Product Manager and SDCM application support standard keyboard navigation.

## Illustrations Showing Number of Ports

Illustrations of windows and dialog boxes, such as illustrations of the Hardware View, show a fully-loaded Director with 64 ports installed. Your Director may be shipped with fewer ports.

## Logging in to the SDCM Application

To open the Product Manager, you must first log in to the SDCM application.

1. Perform one of the following steps:

   ❏ If you are using the SDCM Server, the SDCM application automatically starts when you power on or reboot the SDCM Server. If you reboot the Director or the SDCM Server and the SDCM application login screen displays, skip to step 3 to log in.

   ❏ If you are using a remote user workstation, follow steps 2 through 5.

❏ If the SDCM application window is displayed, skip to Opening the Product Manager on page 1- 11.

2. Perform one of the following steps if you are using a remote user workstation (a network PC with a remote client previously installed), and the SDCM application login screen or SDCM application window is not displayed.

   **NOTE:** Install the Product Manager application with the SDCM and Fabric Manager applications on remote workstations using any standard web browser. For instructions, refer to the appropriate appendix that pertains to the operating system for your workstation in the *SANworks by Compaq Director Connectivity Manager User Guide* (AA-RPL7B-TE).

   ❏ If the login screen is displayed, go to step 3.

   ❏ Start the SDCM application and display the login screen by double-clicking the SDCM application icon on the desktop as shown in Figure 1–2 on page 1-10. Note that this icon only displays on a remote workstation running the SDCM remote client software.



Figure 1–2: SDCM application Icon

   The SDCM application login screen appears.

   Go on to step 3.

   ❏ If the SDCM application window is open (Figure 1–3 on page 1-11) and you need to log in as another user or access a different SDCM Server, select Logout from the Logout/Exit or Logout menu on the navigation control panel to display the login screen. Go to step 3.

   **NOTE:** The Exit option is only available if you are running SDCM through a remote client.

3. When the SDCM application login screen displays, enter your user name and password. The default user name is Administrator and password is password unless changed by your system administrator.

   **NOTE:** The default user name for the right to view status and other information is "operator." The default user name for the right to modify configuration data, perform maintenance tasks, or perform other options is "administrator." The default password for both user names is "password."

   **NOTE:** If the SDCM application window is open (Figure 1–3) and you need to log in as another user or you need to access a different SDCM Server, click the Logout or Logout/Exit icon on the navigation control panel to display the login screen.

4. From the drop-down list on the login screen, select the SDCM Server to which you wish to connect. Note that if you are logging into a server locally, localhost is the server name. Type in the network address of the server if it is not in the list.

5. Click Activate or press the Enter key on your keyboard.

   The main SDCM application window displays showing the Product View.
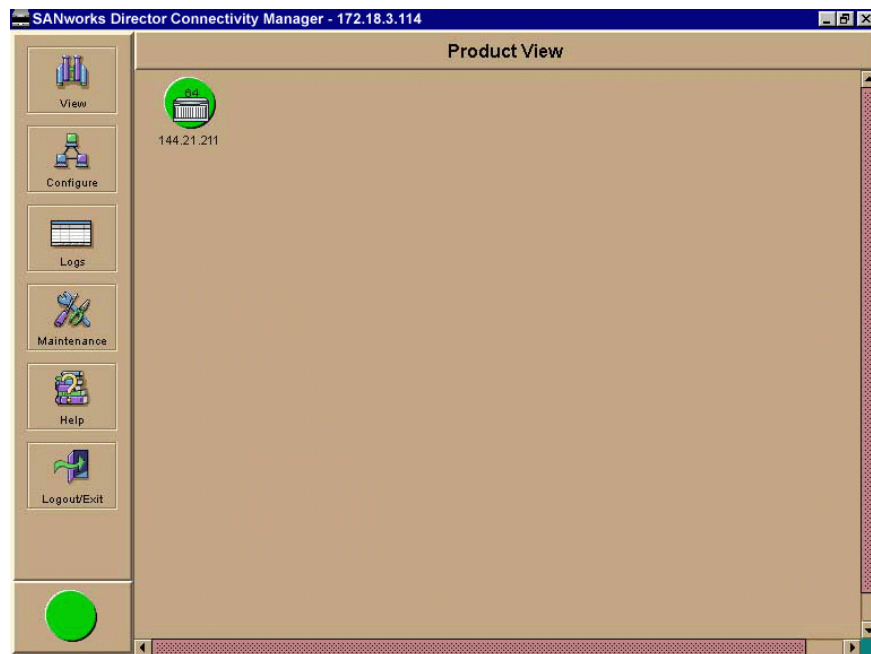


Figure 1–3:  Main SDCM Manager Window

## Opening the Product Manager

To open the Product Manager, click the product icon in the Product View or right-click the icon and select Open.



Figure 1–4:  StorageWorks SAN Director 64 Icon

The Product Manager displays showing the default Hardware View. Figure 1–5 on page 1-12 points out the following parts of the Hardware View window:

❶ Navigation Control Panel

❷ Title Panel

❸ Main Panel

❹ Alert Panel
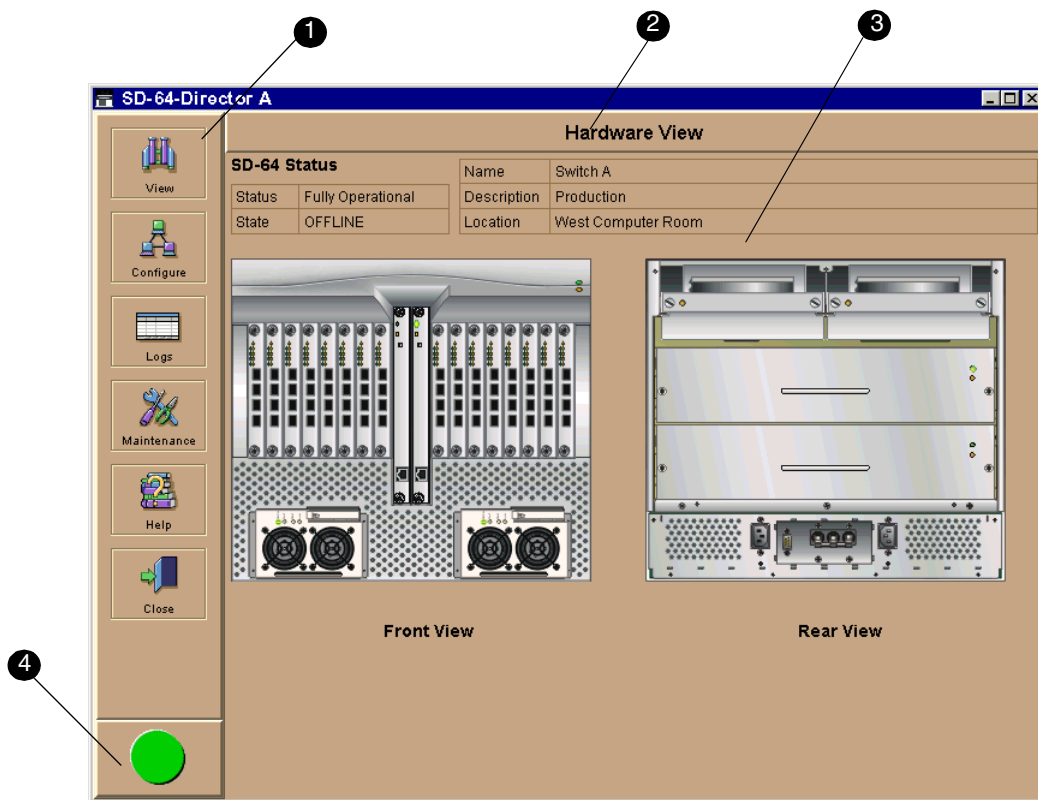


Figure 1–5: SANworks SAN Director 64 Product Manager Window

> **NOTE:** When the Product Manager window displays, the SDCM application window is still available as a separate window. You can drag the Product Manager window away from the SDCM application window and view both windows on your PC desktop or minimize one or both of them to icons if desired. You can have a maximum of four Product Manager windows open concurrently.

## Window Layout and Function

The main Product Manager window is divided into four main panels as shown in Figure 1–5: title panel, navigation control panel, alert panel, and main panel. Use features in these panels to configure Director operation, monitor performance, and access maintenance features.

### Title Panel

The title bar identifies the current view. In Figure 1–5, Hardware View displays in the title panel. Other possible views include Port List View, FRU List View, Node List View, and Performance View.

### Navigation Control Panel

The navigation control panel is the vertical panel on the left side of the window. Move the cursor over each of the six icons in this panel to display menu options that allow you to perform tasks related to the Director. You can select options to change views on the main panel, perform configuration tasks, and access Director performance data, maintenance tools, and online help. The following sections describe Product Manager icons and menus.

#### *View*

Place the cursor over the View icon to display a menu that lists the five following views in the main panel.

■ **Hardware**

The Hardware View is the Product Manager default view.

The Hardware View is a dynamic illustration of all hardware components installed in the front and back of the Director. Operational status of the Director and hardware components is indicated by simulated light emitting diodes (LEDs) and colored alert symbols displayed in the graphics. Refer to Figure 1–5 on page 1-12 for an example of the Hardware View.

For additional information on this view, refer to Hardware View on page 2- 1.

■ **Port List**

The Port List View is a table of data on all Fibre Channel ports in the Director. This data includes the port number, port name, blocked configuration state, operational state (such as online or failed), type of port (G_Port, F_Port, or E_Port), and any link incident alerts.

For additional information on this view, refer to Port List View on page 2- 24.

■ **FRU List**

The FRU List View is a table of detailed information on all FRUs installed in the Director. (A FRU is a hardware component that can be replaced as an assembly if it fails.) Information includes the FRU name, slot position in the chassis relative to identical FRUs in the Director, operational status (active or failed), part number, and serial number.

For additional information on this view, refer to FRU List View on page 2- 28.

■ **Node List**

The Node List View is a table of information about the node attachments to existing F_Ports, sorted by port number. Information includes the Director's port number, node type, port world wide name, and the buffer-to-buffer credit (BB_Credit) allocated to the port. To find out more about the attached node, display the Node Properties dialog box by right-clicking on a port's row and selecting Node Properties from the menu.

For additional information on this view, refer to Node List View on page 2- 30.

■ **Performance**

The Performance View contains a bar graph for each of the Director ports. Each graph shows the current throughput percentage for each port and marks the highest throughput achieved. By clicking a bar graph for a port, you can display cumulative port statistics and error count values for the port, including traffic statistics, class 2 and 3 accounting statistics, and error statistics.

For additional information on this view, refer to Performance View on page 2- 34.

### *Configure*

Place the cursor over the Configure icon to display a menu that lists the following options. For detailed information on using these dialog boxes, refer to Chapter 3, Configuring the Director.

■ **Identification**

Select this option to display the Configure Identification dialog box. Enter the following information in this dialog box:

❏ Name—Assign a product name. Note that you can set this name as the nickname for the Director's WWN, using the Set Name As Nickname checkbox. The nickname then displays instead of the WWN in Product Manager views.

❏ Description—Assign a unique product description.

❏ Location—Describe the product's location.

❏ Contact—Assign a contact either by name, phone number, or e-mail address.

**NOTE:** This information displays in the identification table at the top of the Hardware View and in the SDCM application Product View, if the Product View is configured to display names.

■ **Operating Mode**

**NOTE:** The Director must be offline before you change the operating mode.

Select this option to displays the Configure Operating Mode dialog box. Use this dialog box to configure the directory interoperability (interop) mode for operating on a fabric. Refer to Configure Operating Mode on page 3- 2 for instructions.

■ **Operating Parameters**

Select this option to display the Configure Operating Parameters dialog box for setting Fibre Channel operating parameters. In this dialog box, you can set buffer-to-buffer credit (BB_Credit) from 1 to 60. You can also set the resource allocation time-out value (R_A_TOV) and error detect time out value (E_D_TOV) in tenth-of-a-second increments. In addition, you can configure fabric operating parameters, such as preferred domain ID from 1 to 31 and Director priority level from 1 to 255. Refer to Configure Operating Parameters on page 3- 4 for more information on configuring these parameters for the Director.

■ **Ports**

Select this option to display the Configure Ports dialog box. You can provide a name, block or unblock operation, configure extended distance buffering for 10 to 100km, enable LIN alerts for each port, and define a type (G, F, and E).

**NOTE:** Ports are automatically configured as G_Ports if no device is connected, They are configured as F_Ports if a device is connected. They are configured as E_Ports if a Director is connected.

■ **SNMP Agent**

Select this option to display the Configure SNMP dialog box. Use this dialog box to configure network addresses and community names for up to six SNMP trap recipients. Also authorize write permissions to enable SNMP management stations to modify writable MIB variables. In addition, you can enable authorization traps to be sent to management stations when unauthorized stations request access to Director SNMP data.

■ **Management Server**

This feature is not supported in the current version of the software.

■ **Features**

This feature is not supported in the current version of the software.

■ **Date/Time**

Select this option to display the Configure Date and Time dialog box. Use this option to set the current date and time in the Director. When the Periodic Date/Time Synchronization check box is checked in the dialog box, the Date and Time fields are greyed out (disabled), and the SDCM Server date and time periodically synchronizes the Director date and time. If the Periodic Date/Time Synchronization check box is not checked, you can set the date and time in the dialog box fields manually.

■ **Threshold Alerts**

Select this option to configure threshold alerts for ports. A threshold alert notifies users when the transmit (Tx) or receive (Rx) throughput reaches specified values for specific Director ports or port types (E_Ports or F_Ports). Using this option, you can configure:

❑ A name for the alert.

❑ A threshold type for the alert (Rx, Tx, or either).

❑ Active or inactive state of the alert.

❑ Threshold criteria. This includes configuring the threshold as the percent of port traffic capacity utilized (*% utilization*), the time interval for measuring throughput and sending notification, and the amount of cumulative minutes that the *% utilization* should exist before an alert is generated.

■ **Export Configuration Report**

Select this option to display the Export Configuration Report dialog box, which enables you to specify a file name in which to save an ASCII text file containing all current user-definable configuration options in a printable format. Note that this file cannot be read back into the Product Manager in order to set configuration parameters.

■ **Enable Embedded Web Server**

Select this option by placing a check mark in the check box to enable the Embedded Web Server Interface on the Director. Select the option again to remove the check mark and disable the Embedded Web Server Interface. When disabled, users at remote workstations cannot access the interface.

■ **Enable Telnet**

Select this option by placing a check mark in the check box to enable telnet access to the Director. Select the option again to remove the check mark and disable telnet access. When disabled, users at remote workstations cannot access the Director through telnet to use the Command Line Interface (CLI) or perform other tasks.

### *Logs*

Place the cursor over the Logs icon to display a menu that lists the following options. For detailed information on using these dialog boxes, refer to Chapter 4, Using Logs.

■ **Audit Log**

This log provides a record of all configuration changes made on the Director. Each entry displays the date and time of the change, a description of the change, the source of the change (such as the SDCM Server or SNMP management station), and an identifier for the source, such as the IP address of the SDCM Server or SNMP management station.

■ **Event Log**

Select this option to display the Director event log. This log provides a record of significant events that have occurred on the Director, such as hardware failures, degraded operation, and port problems. Each entry includes the date and time of the event, a reason code for the event, the severity level, a brief description, and up to 32 bytes of supplementary event data. Refer to the *StorageWorks by Compaq SAN Director 64 Service Manual* (AA-RPL8B-TE) for more information.

■ **Hardware Log**

This log displays information on FRUs inserted and removed from the Director. Each log entry includes the name of the FRU inserted or removed, the slot position relative to identical FRUs installed, whether the FRU was inserted or removed, the FRU part number and serial number, and the date and time the FRU was inserted or removed.

■ **Link Incident Log**

The link incident (LIN) log displays the most recent incidents with the date and time, port number, and description of the incident. A link incident can be one of several conditions detected on a fiber optic link. For a list of events that may cause a link incident to be written to the log, refer to Link Incident Log on page 4- 8.

■ **Threshold Alert Log**

This log provides notifications of threshold alerts. Besides the date and time that the alert occurred, it also displays information that was configured through the *Configure Threshold Alerts* option under the *Configure* menu. This includes the alert name, port for which the alert is configured, the type of alert (transmit throughput, receive throughput, or both), threshold utilization of traffic capacity, minutes the threshold was configured for, and the configured time interval for the threshold. For more detail on this log, refer to Threshold Alert Log on page 4- 10.

### Maintenance

Place the cursor over the Maintenance icon to display a menu that lists the following options. For detailed information on using these dialog boxes, refer to Chapter 5, Using Maintenance Features.

■ **Port Diagnostics**

This option displays the Port Diagnostics dialog box. Use this dialog box to run internal and external loopback tests on ports. Refer to the *StorageWorks by Compaq SAN Director 64 Service Manual* (AA-RPL8B-TE) for instructions.

■ **Data Collection**

This option displays the Save Data Collection dialog box. Use this dialog box to collect maintenance data into a file. This file is used by support personnel to diagnose system problems. Refer to the *StorageWorks by Compaq SAN Director 64 Service Manual* (AA-RPL8B-TE) for instructions.

■ **IPL**

Select this option to initiate an initial program load on the Director. A dialog box displays to allow you to confirm the IPL. Note that an IPL does not affect any configuration settings done through the Product Manager. Port operation is interrupted during the IPL.

Refer to the *StorageWorks by Compaq SAN Director 64 Planning Guide* (AA-RPLAB-TE) for more information.

■ **Set Online State**

Select this option to display the Set Online State dialog box. Use this dialog box to change the online state of the Director to offline or online.

■ **Firmware Library**

Select this option to display the Firmware Library dialog box. This dialog box displays all firmware versions currently installed on the SDCM Server that can be downloaded to Directors. Use this dialog box to add a new firmware version to the SDCM Server hard disk, modify the description displayed for an existing version, delete a version from the PC, or download (send) a version for operation on a Director. For additional information on using this option, refer to the *StorageWorks by Compaq SAN Director 64 Service Manual* (AA-RPL8B-TE).

■ **Enable E-Mail Notification**

The Simple Mail Transfer Protocol (SMTP) server and e-mail recipient addresses are configured in the SDCM application (not in the Director's Product Manager). E-mail notification is also initially enabled in the SDCM for all Directors managed by the

SDCM. Note, however, that the E-Mail Notification option on the Product Manager's Maintenance menu must be enabled (checked) for e-mail notification to occur for the specific Director.

The default setting for the Enable E-Mail Notification function is enabled (checked). To disable the function, select Enable E-Mail Notification from the Maintenance menu to clear the check box.

For additional information on using this option, refer to Enable E-Mail Notification on page 5- 4.

■ **Enable Call Home Notification**

> **NOTE:** The default setting for the Enable Call Home Notification function is disabled (unchecked).

Select Enable Call Home Notification from the Maintenance menu to enable the call-home function for the Director.

> **NOTE:** Call-home notification requires installation of Compaq Proactive Service software. This service is offered at no additional charge for subsystems covered under an on-site warranty or on-site storage hardware support contract. To register or order Proactive Services software, contact your Compaq customer service representative.

■ **Backup & Restore Configuration**

Select this option to save the product configuration stored on the Director to the SDCM Server hard disk or to restore the product configuration from the SDCM Server. Only a single copy of the configuration is kept on the server.

This backup is primarily for single-CTP systems, where a backup is needed to restore the configuration data to a replacement CTP card. You cannot modify the location or the file name of the saved configuration.

For additional information on using this option, refer to Backing Up and Restoring Configuration Data on page 3- 29.

■ **Reset Configuration**

Select this option to reset all Director configuration data back to the factory defaults. A confirmation dialog box displays with a warning upon selecting the option. For additional information on using this option, refer to Reset Configuration on page 5- 7.

> ⚠ **WARNING:** This operation resets all configuration, including any optional features that have been installed. You will need to reenter any feature keys for optional features after resetting the configuration.

### *Help*

Place the cursor over the Help icon to display a menu that lists the following options.

■ **Contents**

Select this option to display the Help window. The Help window contains Contents, Index, and Glossary buttons and hypertext linked items to help you quickly navigate through information. Use the forward (>) and back (<) buttons to scroll forward and backward through the displayed help frames. Exit the help feature at any time by clicking the Close icon at the top of the Help window.

■ **About**

Select this option to display the version number for the Product Manager and copyright information.

### *Close*

Place the cursor over the Close icon and select the Close option to close the Product Manager window and return to the SDCM application.

### Alert Panel

This panel, located below the navigation control panel, displays an alert symbol that indicates the current state of the Director. Refer to Table 1–1 on page 1-21 for the meaning of these alert symbols and of the corresponding alert text that displays in the Director table at the top of the Hardware View in the main panel.

If a gray square displays in the alert panel (no Ethernet connection), a reason for the status displays in the Status table at the top of the Hardware View. Refer to No Link Status on page 2- 3 for details.

**Main Panel**

The main panel displays the Hardware View, Port List View, FRU List View, Node List View, and Performance View. Place the cursor over the View icon and select one of the options from the menu. For detailed information on using these views, refer to Chapter 2, Monitoring and Managing the Director.

**Table 1–1: Operating Status—Alert Panel and Director Status**

| Symbol | Alert Panel | Director Status Table Text | Meaning |
|--------|-------------|---------------------------|---------|
|  | Green Circle | Fully Operational | All components and installed ports are operational; no failures. |
|  | Yellow Triangle | Redundant Failure | A redundant component has failed, such as a power supply, and the backup component has taken over operation. |
| | | Minor Failure | A failure occurred which has decreased the Director operational ability. Normal switching operations are not affected. <br><br> ■ One or more FPM cards failed, but at least one FPM card is still operational. <br> ■ A fan has failed or is not rotating sufficiently. <br> ■ One of two CTP cards failed. <br> ■ One of two SBAR cards failed. |

**Table 1–1: Operating Status—Alert Panel and Director Status (Continued)**

| Symbol | Alert Panel | Director Status Table Text | Meaning |
|--------|-------------|---------------------------|---------|
|  | Red Diamond with Yellow Background | NOT OPERATIONAL | A critical failure prevents the Director from performing fundamental switching operations.<br><br>■  All fans fail.<br>■  Both SBAR cards fail.<br>■  All installed FPM cards fail. |
|  | Gray Square | Never Connected<br><br>Link Timeout<br><br>Protocol Mismatch<br><br>Duplicate Session<br><br>Unknown Network Address<br><br>Incorrect Product Type | Director status is unknown. This occurs if the Ethernet network connection between the SDCM Server and the Director cannot be established or if the CTP fails. Refer to No Link Status for details on the status table text. |

### Hardware View

The Hardware View is the default view that displays in the main panel when you open the Director Product Manager. Refer to Figure 1–6 on page 1-23 for an example of this view.
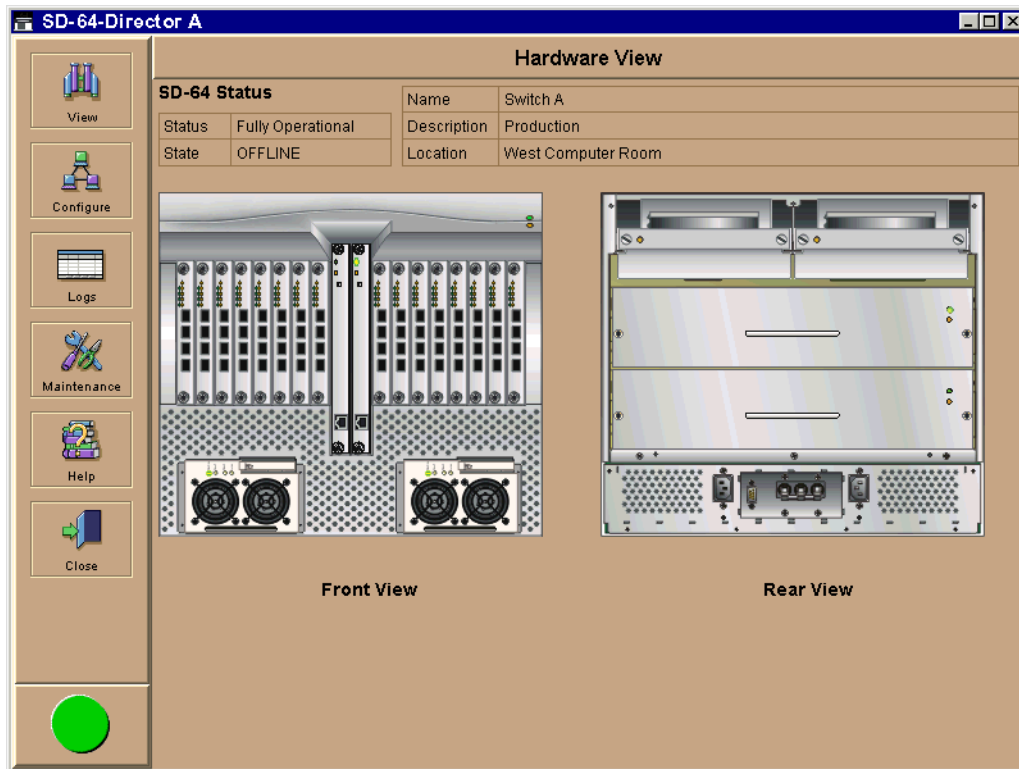
Figure 1–6: Hardware View

In the Hardware View, colored indicators reflect the status of actual LEDs on the Director FRUs. The alert panel displays a symbol to represent the most degraded status currently reported by any of the Director FRUs. For example, for a port failure, indicated by a blinking red and yellow diamond on a port, a yellow triangle displays on the alert panel to indicate a degraded condition. However, if a blinking red and yellow diamond displays over both SBAR cards, the alert panel displays a blinking red and yellow diamond, which indicates a failure requiring immediate attention. For an explanation of the different alert symbols and the reasons they display in the Hardware View or Port List View, refer to Monitoring Hardware Operation on page 2- 4.

Click on the power supply, CTP card, cooling fan module, and SBAR card to display a FRU Properties dialog box containing detailed information on the hardware component. Click on the Director, away from a FRU, to display the Director Properties dialog box.

For details on navigating and monitoring via the Hardware View, refer to Chapter 2, Monitoring and Managing the Director.

### Director Menu

Click on the graphic away from a FRU to display the Director Properties dialog box. right-click a hardware graphic away from a FRU to display the following options:

■ Director Properties

■ Enable Unit Beaconing

■ Clear System Error Light

■ IPL Director

■ Set Director Date and Time

■ Set Director Online State

For details on menu options, refer to Director Menu in Chapter 2.

For details on navigating and monitoring via the Hardware View, refer to Chapter 2, Monitoring and Managing the Director.

### FPM Card Menu

Click on an FPM card to display the Port Card View. Refer to Using the Port Card View on page 2- 15. right-click the FPM card to display the following options:

■ Open Port Card View

■ FRU Properties

■ Enable Beaconing

■ Block All Ports

■ Unblock All Ports

■ Diagnostics

### CTP Card Menu

Click on a CTP card to display the Properties dialog box for the card. Right-click a CTP card to display the following options. For details refer to Using the Port Card View.

■ FRU Properties

■ Enable Beaconing

■ Switchover

### Cooling Fan Module

Click on a Fan Module on the Rear View to display the FRU Properties dialog box for the card. For details refer to Fan Module on page 2- 14.

■ FRU Properties

**SBAR Card Menu**

Click on an SBAR card to display the FRU Properties dialog box for the card. Right-click on a SBAR card to display the following options: For details refer to SBAR Card Menu on page 2- 14.

■ FRU Properties

■ Enable Beaconing

■ Switchover

### Port Card View

Click on an FPM card in the Hardware View or right-click on an FPM card and select Port Card View from the menu to display the Port Card View for that port (Figure 1–7 on page 1-26).

Figure 1–7: Port Card View

In this expanded view of the port card, you can:

■ Determine FPM card status by amber LED at the top of the card. A table also displays on the Port Card View that provides the FRU name, position, operating state, beaconing state, and part number.

■ Determine port status and operation by the alert symbols that display next to the port connectors and simulated LED indicators above the connectors.

■ Right-click on the port card to display a menu with Block All Ports, Unblock All Ports, and Diagnostics options.

■ Right-click the port connector to display a menu with Port Properties, Node Properties, Port Technology, Block Port, Enable Beaconing, Diagnostics, Clear Link Incident Alerts, Reset Port, WWN Binding, and Clear Threshold Alerts options.

■ Click on a port connector to display the Port Properties dialog box.

■ Return the Hardware View by clicking Back To Full View.

You can also open the Port Card View directly by clicking on the port card. Refer to Using the Port Card View on page 2- 15 for detailed information on this view.

### Port List View

Select the Port List View from the View menu. A table listing the port number, port name, the block/unblock configuration, operating state, port type, and alert condition displays in the main panel. Figure 1–8 shows an example of the Port List View.



Figure 1–8: Port List View

The Port List View displays information about all ports installed in the Director. All data is dynamic and updates automatically. Click on any row in this view to display the Port Properties dialog box for the port.

Right-click on a port row to display the same menu options that display when you right-click a port in the Hardware View or a port's bar graph in the Performance View. These include:

- Port Properties
- Node Properties
- Port Technology
- Block Port
- Enable Beaconing
- Diagnostics
- Clear Link Incident Alerts
- Reset Port
- WWN Binding
- Clear Threshold Alerts

For details on these menu options, refer to Port Menu on page 2- 13.

For details on navigating and monitoring using the Port List View, refer to Port List View on page 2- 24.

### FRU List View

Select FRU List from the View menu. A table with information about each of the FRUs installed in the Director displays in the main panel. All data is dynamic and updates automatically. Figure 1–9 on page 1-29 shows an example of the FRU List View.

Figure 1–9:  FRU List View

For details on navigating and monitoring via the FRU List View, refer to FRU List View on page 2- 28.

### Node List View

Select Node List from the View menu. Figure 1–10 on page 1-30 shows an example of the Node List View. This view displays a table with information about all node attachments or N_Ports that have logged in to existing F_Ports on the Director. Only N_Ports display in the Node List View after nodes have logged in to the fabric. The columns that display in the table include port number where the node is attached; node type; WWN of the attached node (device); and BB_Credit used by the attached node.

Click on a port row to highlight it and display the Node Properties dialog box for that port.

Right-click a port row to display the following menu options:

■  Port Properties: Displays the Port Properties dialog box.

■ Node Properties. Displays the Node Properties dialog box.

■ Define Nickname. Displays the Define Nickname dialog box, where you can define a nickname to display for the attached device instead of the device's 8-byte WWN.

■ Display options. Allows you to display attached devices listed under the Port WWN column in the Node List View by the device's nickname configured through the Define Nickname menu option or the device's WWN.



Figure 1–10:  Node List View

For details on navigating and monitoring via the Node List View, refer to Node List View on page 2- 30.

### Performance View

Select Performance from the View menu. Figure 1–11 on page 1-31 shows an example of the Performance View. This view provides a graphical display of performance for all ports. The top portion of the Performance View displays bar graphs that show the level of transmit/receive activity for each port. This information updates every five seconds. Each

bar graph also shows the percentage link utilization for the port. A red arrow marks the highest utilization level reached since the Performance View was opened. If the system detects activity on a port, it represents minimal activity with at least one bar.

When an end device (node) is logged in to a port, moving the cursor over the port's bar graph in the Performance View highlights the graph and displays a message with the WWN of the connected node. If the connected node has more than one port, this is the WWN of the specific port on the node. When a port is functioning as an expansion port (E_Port), the message is "E_Port." When a port is not logged into an end-device (not functioning as an F_Port) or to another Director (not functioning as an E_Port), the message is the port's current online state.
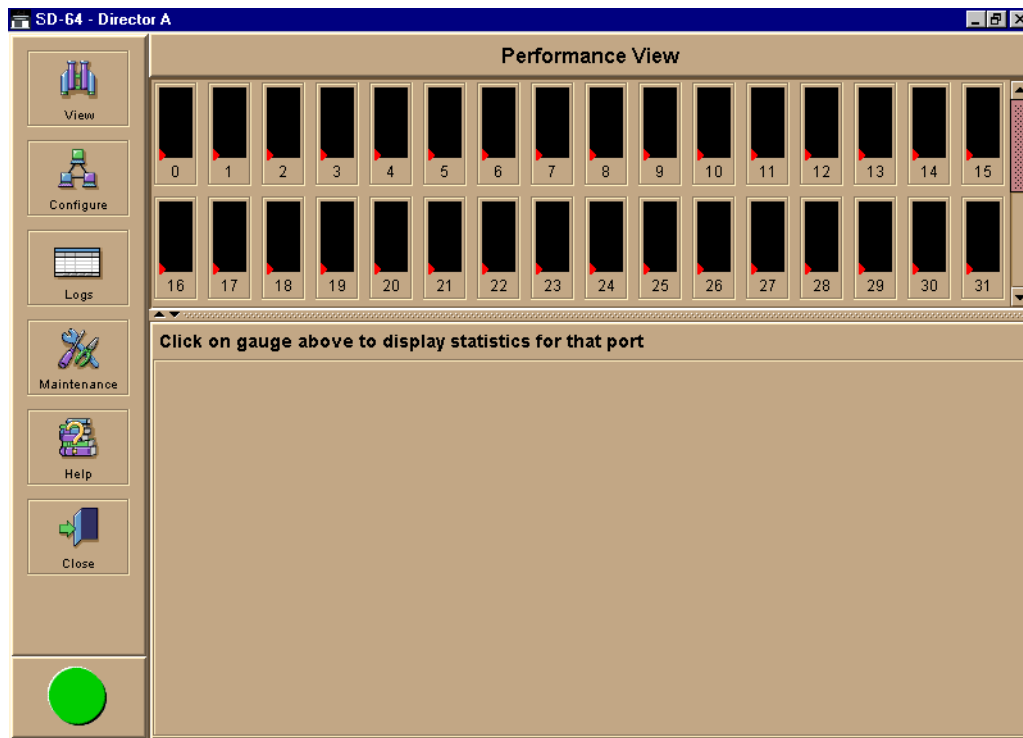


Figure 1–11:  Performance View

Right-click on a bar graph to display a menu of port-related actions. The options available on this menu are the same as those that are available when you right-click a port in the Port Card View or right-click a row in the Port List View. These include:

■   Port Properties

■   Node Properties

■   Port Technology

■   Block Port

■   Enable Beaconing

■   Diagnostics

■   Clear Link Incident Alerts

■   Reset Port

■   WWN Binding

■   Clear Threshold Alerts

For details on port menu options, refer to Port Menu on page 2- 13.

The bottom portion of the Performance View displays cumulative statistical information for the port selected in the bar graph. Click Refresh to update the data with current data from the port.

Click Clear to clear all of the counters to zero for the selected port and to place an entry in the audit log indicating that statistics for the port have been cleared.

> **NOTE:** Clearing the counters clears the statistics for all users.

For more information about the Performance View, including statistics descriptions, refer to Performance View on page 2- 34.

## Closing the Product Manager

To close the Product Manager, select Close from the Close menu on the navigation control panel.

To logout of all SDCM applications, select *Logout* or *Exit* from the *Logout/Exit* menu on the SDC Manager's *Product View* window.

■   If you select *Logout,* the SDC Manager *Login* dialog box displays. You can now log in again using a user name and password. Log into a different SDC Server by selecting a different server from the SDC Server box.

■ If you select *Exit,* the *Product View* window closes.

## User Rights

The SDCM application's system administrator can assign levels of access, or "User Rights," to Product Manager users through the SDCM application.

> **NOTE:** The SDCM application's system administrator only has view rights while operating in a specific Product Manager application. Conversely, a Product Manager's product administrator only has view rights while operating in the SDCM application.

Detailed instructions concerning the assignment of user rights for both the SDCM application and Product Manager applications appear in Chapter 5 of the *SANworks by Compaq Director Connectivity Manager User Guide* (AA-RPL8B-TE).

There are five levels of access or "user rights" that can be assigned to specific users:

■ System Administrator

■ Product Administrator

■ Operator

■ Maintenance

■ View

By default, all users have view rights, which allow for the viewing of configurations but not the changing of configurations. View rights cannot be removed.

The users with system administrator rights can make all control and configuration changes implemented through the SDCM application.

### User Rights for Specific Functions

Table 1–2 itemizes the specific functions available to Product Manager users that have been assigned "user rights" of product administrator, operator, and/or maintenance. If a user does not have the right to perform a specific operation, an error box appears when the operation is attempted stating that the operation is not authorized.

**Table 1–2:  User Rights for Product Manager**

| Product Manager Rights | Product Administrator | Operator | Maintenance |
|---|---|---|---|
| Backup and Restore Configuration | X | X | X |
| Clear Audit Log | X | | |
| Clear Event Log | | | X |
| Clear Hardware Log | X | | X |
| Clear LIN Alert | X | X | X |
| Clear LIN Log | X | | |
| Clear System Error Light | | | X |
| Clear Threshold Alerts | X | | |
| Clear Threshold Event Log | X | | |
| Configure Date/Time | X | X | X |
| Configure Identification | X | | |
| Configure Operating Mode | X | | |
| Configure Operating Parameters | X | | |
| Configure Ports | X | X | |
| Configure SNMP | X | | |
| Configure Threshold Alerts | X | | |
| Configure Zoning | X | | |
| Data Collection | | | X |
| Date/Time Sync Configuration | X | X | X |
| Enable Call Home Notification | X | | |
| Enable E-Mail Notification | X | | |
| Enable Telnet | X | | |
| Enable Web Server | X | | |
| Export Configuration Report | X | X | X |
| FRU Beaconing | | | X |
| FRU Switchover | | | X |
| IPL | X | X | X |
| Manage Firmware | | | X |
| Port Diagnostics | | | X |

**Table 1–2: User Rights for Product Manager (Continued)**

| Product Manager Rights | Product Administrator | Operator | Maintenance |
|---|---|---|---|
| Port Beaconing | X | X | X |
| Set Online State | X | X | X |
| Reset Configuration | | | X |
| Reset Statistics Counters (Performance View) | X | X | |
| Reset Port | X | | X |
| Unit Beaconing | X | X | X |
| View Event Log | | | X |
| View Firmware | | | X |
| View Hardware Log | X | | X |
| View LIN Log | X | X | X |
| View SNMP | X | | X |
| View Threshold Alert Log | X | X | X |

# Backing Up and Restoring Product Manager Data

As long as a Zip disk remains in the Zip drive of the SDCM Server, critical information from both the Product Manager and SANworks Director Connectivity Manager applications automatically backs up to the Zip disk when the data directory contents change or when you reboot the SDCM Server.

The application used for this function is Iomega QuikSync, a separate application installed on the SDCM Server. QuikSync is configured to automatically mirror the contents of the SdcmData directory to the Zip drive when the contents are changed or when you reboot the SDCM Server. This directory contains all SANworks DC Manager and Product Manager data, so it can be copied back to a newly restored SDCM Server to fully recover the preferred operating environment.

The mirroring operation will only occur while a user is logged in to Windows NT on the SDCM Server PC (independent of the SDCM login).

The data contained in the c:\SdcmData directory and mirrored to the Zip disk includes the following:

■ All SDCM application configuration including:

❏ Product definitions.

❏ User names, encrypted passwords, and user rights.

❏ Nicknames.

❏ Session options.

❏ SDCM application SNMP configurations.

❏ E-mail configuration.

■ All log files (both SDCM application log files and individual Product Manager log files).

■ Zoning library (all zone sets and zone definitions).

■ Firmware library.

■ Call-home configuration.

■ Configuration data saved to the SdcmData directory through the Backup & Restore Configuration option on the Product Manager Maintenance menu.

The QuikSync application will be included on the SDCM Applications CD. It automatically installs on the SDCM Server during the SDCM Server install process. A blank Zip disk is required for each SDCM Server and is included with the SDCM Server deliverables.

## Restoring Data to the SDCM Server

To restore data to the SDCM Server, copy the SdcmData directory from the Zip disk to C:\SdcmData.

## Using QuikSync

QuikSync is functioning to back up data when the QuikSync icon displays in the system tray in the right corner of the Windows NT task bar (Figure 1–12). This icon spins when data is writing to the Zip disk.



Figure 1–12:  QuikSync Icon in Windows System Tray

If an icon does not display, you must enable the application using the procedure outlined in Enabling QuikSync (following).

### Enabling QuikSync

1. Click the Windows *Start* button and select Programs, then Iomega QuikSync and choose QuikSync.

   The Iomega QuikSync dialog box displays.
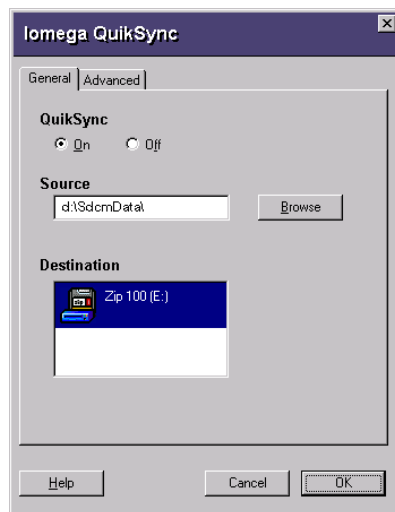


Figure 1–13: Iomega QuikSync Dialog Box

2. Click *On* to enable QuikSync.

3. Click *OK*.

### QuikSync Settings

Do not change the default settings for automatic backup of the SdcmData directory. If you feel that QuikSync is not functioning properly, check the settings using the following steps:

1. Open the QuikSync dialog box using one of these steps.

   ❑ Click the Windows Start button and select Programs, then Iomega QuikSync and choose QuikSync.

   ❑ Double-click the QuikSync icon on the Windows system bar in the lower right corner of the Windows NT desktop.

❏ Right-click on the QuikSync icon and select Settings from the pop-up menu.

2. Verify that the dialog box is configured exactly as it displays in Figure 1–13.

3. The d:\SdcmData\ directory is a mirrored directory of c:\SdcmData\. Do not change this location in the Source field.

4. Click the Advanced tab. The following displays:
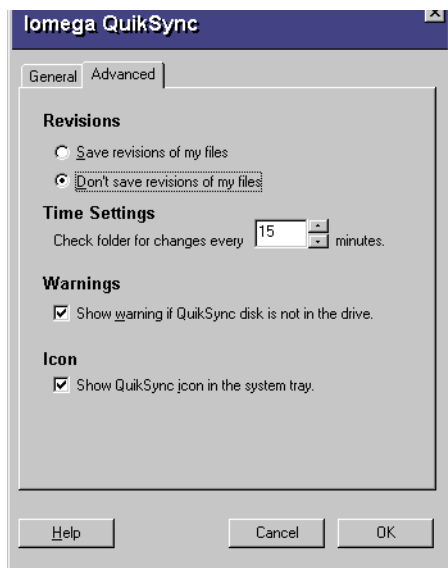


Figure 1–14:  Iomega QuikSync Dialog Box (Advanced Tab)

1. Verify that the dialog box is configured exactly as it displays in Figure 1–14.

2. Click OK.

*Chapter* **2**

# Monitoring and Managing the Director

This chapter describes how to use the features available in the Product Manager main panel to monitor and manage Director operation. These features include status indicators, menu options, and dialog boxes available through the Hardware View, Port List View, FRU List View, Node List View, and Performance View.

## Hardware View

The Hardware View is the default view that is shown when you open the Product Manager. If another view displays, you can display the Hardware View by selecting Hardware from the View menu on the navigation control panel. Using this graphical view of the Director, you can view alert symbols and simulated light emitting diode (LED) indicators, display data, and use mouse functions to monitor status and obtain vital product information for the Director and its hardware components.

### Identifying FRUs

Move the cursor over parts of the Director graphic in the Hardware View to display labels identifying each hardware component and its slot position in the chassis relative to identical components installed in the Director. Components include:

■  Fiber port module (FPM) cards. The Director can contain up to 16 FPM cards, slot positions 15 through 0 (left to right). As you move the cursor over each card, labels appear, identifying the card's slot number and port technology. Acronyms that may display to identify port technology, such as GSML, GXXL, GSF1, GSF2, GLSR, GSMR, GLSL, and GXXR, also display in the FRU column of the FRU List View. Refer to FRU List View on page 2- 28 for details.

■ Control processor (CTP) cards. Two CTP cards are installed, slot positions 1 and 0 (left to right).

■ Power supply modules. Two modules are installed, slot positions 1 and 0 (left to right).

■ Cooling fan modules. Two modules are installed, slot positions 1 and 0 (left to right).

■ Serial Crossbars (SBAR). Two SBARs are installed, slot positions 1 (bottom) and 0 (top).

## Monitoring Director Operation

Monitor the operating status of the Director using the StorageWorks SAN Director 64 Status table on the Hardware View and the status indicator on the alert panel.

### Director Status Table

The Status table at the top of the Hardware View displays the Director's operational status, operational state, name, description, and location.

#### *Status*

Refer to Table 2–1 on page 2-41 for the meaning of the text that displays in the Director Status table and the corresponding alert symbols that display on the alert panel.

#### *State*

The State field displays one of the following:

■ **Offline**

When the Director is "OFFLINE," all ports are offline. The ports cannot accept a login from an attached device or cannot connect to other Directors. You can configure this state through the Set Online State dialog box. Refer to Set Online State on page 5- 3 for instructions.

■ **Online**

All unblocked ports are able to connect with devices. You can configure this state through the Set Online State dialog box. Refer to Set Online State on page 5- 3 for instructions. Note that the Director automatically goes online after a power-up or an initial machine load (IML) or initial program load (IPL).

■ **Coming online**

This is a transitional state that occurs just before the Director goes online. This state normally only happens briefly, unless there is a problem reaching the online state.

■ **Going offline**

This is a transitional state that occurs just before the Director goes offline. This state normally only happens briefly, unless there is a problem reaching the offline state.

### *No Link Status*

If the Ethernet network connection between the SDCM server and the Director is down, the Hardware View displays the front and rear of the unit without FRUs. The Director Status table at the top of the Hardware View changes to display the status (No Link) and reason with a yellow background. The name, description, and location fields are blank.

The Reason field on the Director Status table displays one of the following reasons when there are no links.

■ **Never Connected**

A network connection was never established between the Director and the SDCM Server or if the CTP card fails. Check the IP addresses, the Ethernet local area network (LAN) physical connection between the Director and SDCM Server, and other network connection conditions.

■ **Link Timeout**

The network connection that was established between the Director and server has been lost. Check the IP addresses, the Ethernet LAN physical connection between the Director and SDCM Server, IP addresses, and other network components.

■ **Protocol Mismatch**

The Director and the server are not at compatible software release levels. Update the SDCM application software version.

■ **Duplicate Session**

A link has previously been established between the Director and another instance of the SDCM Server. Connect to the previously established sever from the CEF Manager login screen.

■ **Unknown Network Address**

The address defined for the Director in the SDCM application could not be found in the domain name server (DNS). Either the name was mistyped when the Director was added to the SDCM application, or the name was not available from the DNS. Check

the network IP address for the Director definition in the SDCM application by right-clicking the product icon and selecting Properties. The IP address displays in the Network Address field.

■ **Incorrect Product Type**

The product at the configured network address is not a Director. Verify address, configuration, and product type.

### Alert Panel Status Indicator

The alert panel displays a colored alert symbol that indicates the overall operating status of the Director unit. The operating status depends on hardware component failures, which are indicated by alert symbols that display over component graphics in the Hardware View. Refer to Alert Panel on page 1- 20 for the meanings of alert symbols in the alert panel.

The alert panel indicates the Director operating status based on component failures. For example, for a single port failure, a blinking red and yellow diamond displays on the port connector in the Hardware View. At the same time, a yellow triangle displays in the alert panel to indicate a degraded Director. However, if a blinking red and yellow diamond displays over both fan modules, the alert panel displays a red and yellow diamond, indicating a failure that requires immediate attention.

## Monitoring Hardware Operation

Determine hardware component operating status and states by the simulated LED indicators and alert symbols that appear on FPM cards, CTP cards, power supplies, fan modules, and SBAR cards illustrated in the Hardware View.

■ Green and amber indicators illuminate on each FRU to indicate either an operational or degraded state respectively. LEDs for individual ports do not illuminate on FPM cards in the Hardware View, but do illuminate in the Port Card View for each port (refer to Using the Port Card View on page 2- 15).

■ Alert symbols, such as flashing red and yellow diamonds and yellow triangles, appear on FRUs to reflect the overall state of the hardware as changes occur.

■ Corresponding or additional descriptions of hardware status and states also display when you click on components to display Properties dialog boxes.

Monitoring Hardware Operation—Director Hardware View on page 2- 5 illustrates the Director Hardware View with examples of symbols and simulated LED indicators that can help you monitor hardware operation. Numbers by each example are keyed to descriptions that follow.
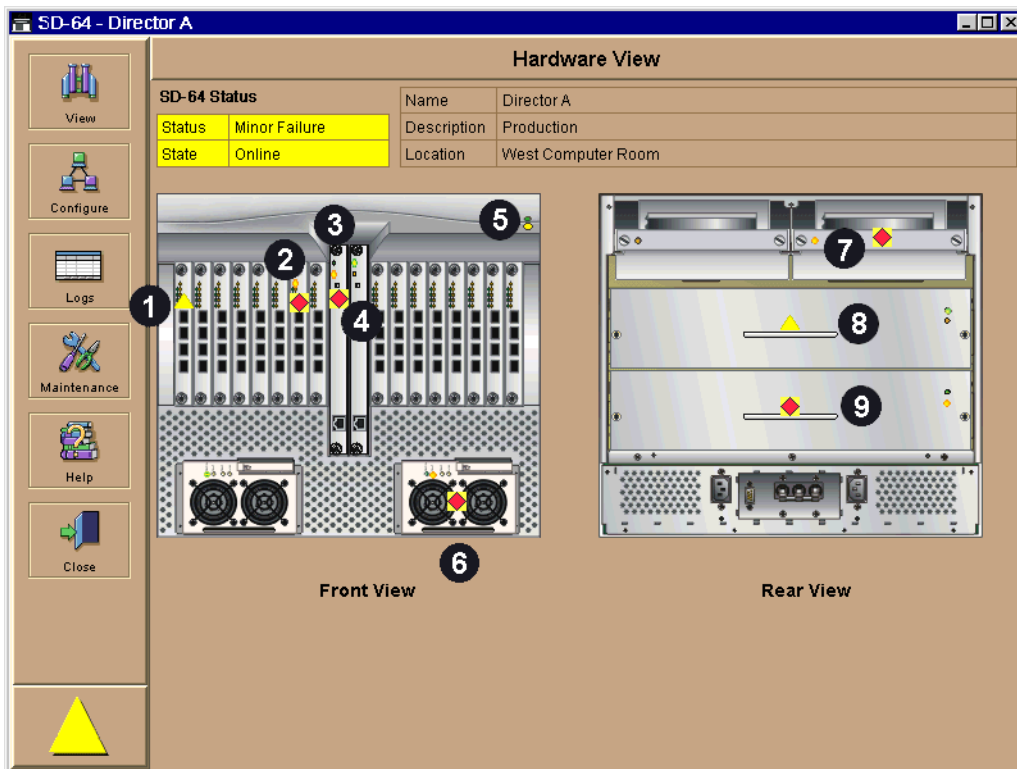
Figure 2–1:  Monitoring Hardware Operation—Director Hardware View

❶ FPM card attention indicator
❷ FPM card failure indicator
❸ CTP card failure indicator
❹ Active CTP card indicator
❺ Power, system error, and unit beaconing indicators
❻ Power supply failure indicator
❼ Cooling fan module failure indicator
❽ SBAR card beaconing indicator
❾ SBAR failure indicator

**FPM card attention indicator:** The yellow triangle alert symbol (⚠) indicates that the FPM card is in a degraded state. This could indicate a problem with an individual port, such as a link failure or service-required status. A yellow triangle could also indicate that a port is in beaconing state. Open the Port Card View by clicking the FPM card to examine individual port status. Refer to Using the Port Card View on page 2-15 for details.

**FPM card failure indicator:** The blinking red and yellow diamond displayed on the FPM card with the amber FPM card LED illuminated may indicate that the card has failed. This may also indicate that an individual port has failed on the card. Open the Port Card View by clicking the FPM card to examine individual port status. If an individual port has not failed, the card is at fault.

Refer to Using the Port Card View on page 2- 15 for details on using the Port Card View. Refer to Table 2–1 on page 2-41 for details on port operating states and the alert symbol and indicator operation.

**CTP card failure indicator:** The blinking red and yellow diamond (◆) on the CTP card with the amber LED illuminated indicates that the card has failed.

**Active CTP card indicator:** The green LED on a CTP card illuminates to indicate that the card is active. Since the redundant CTP card on the left has failed, this CTP card has become the active card. If both CTP cards are operational, no LEDs illuminates on the backup card, while the green LED illuminates on the active CTP card.

**Power, system error, and unit beaconing indicators:** The green and amber indicators on the far right of the front bezel simulate the power and system error LEDs on the actual Director bezel.

❏ **Power Indicator.** The green indicator simulates the power LED on the actual Director. When the indicator illuminates, the Director is connected to facility AC power and is operational. The indicator will be on if either power supply is operating.

❏ **System Error Indicator.** The amber system error light indicator (illuminated in Figure 2–1 on page 2-5) simulates the system error light on the actual Director. When this indicator illuminates, an event has occurred requiring immediate attention, such as a system, fan, power supply, or port failure. View details of system errors by selecting Event Log from the Logs menu on the navigation control panel. The indicator in the Hardware View and the LED on the actual unit remains illuminated until you clear the event by right-clicking on the Director graphic, away from a FRU, and selecting Clear System Error Light from the menu.

NOTE: If the amber LED flashes, this indicates that unit beaconing has been enabled for the Director. Enable or disable unit beaconing by right-clicking on the Director graphic, away from a FRU, and selecting Enable Unit Beaconing from the menu.

**Power supply failure indicator:** When a blinking red and yellow diamond displays on a power supply with the amber Fault indicator illuminated, the power supply has failed. The backup power supply has taken over to supply DC voltage to the Director.

NOTE: A green indicator displays and no alert symbols appear if the power supply is working, as shown on the left (position 1) in the illustration.

**Cooling fan module failure indicator:** When a blinking red and yellow diamond (◆) displays on a fan module with the amber LED indicator illuminated, the module has failed or is rotating insufficiently.

**SBAR card beaconing indicator:** The yellow triangle alert symbol (▲) displaying on the SBAR card with the amber LED illuminated indicates that beaconing has been enabled.

**SBAR failure indicator:** The blinking red and yellow diamond (◆) displaying on the SBAR card with the amber LED illuminated indicates a card failure.

## Obtaining Hardware Information

This section explains how to access the FRU Properties, Port Properties, and Director Properties dialog boxes.

### Displaying FRU Information

Click a CTP card, power supply, cooling fan module, or SBAR card in the Hardware View to display a FRU Properties dialog box. This dialog box displays the FRU name, slot position relative to identical FRUs installed in the chassis, active or failed state, beaconing state (CTP card, fan module, SBAR card), part number, and serial number.

| FRU Properties | |
|---|---|
| **FRU Name** | Power Supply Module |
| **Position** | Position 0 |
| **State** | Active |
| **Part Number** | 254137-001 |
| **Serial Number** | 61234560 |
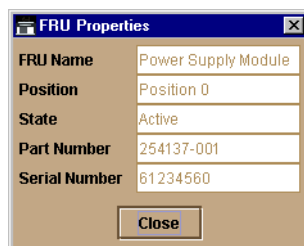
Figure 2–2:  FRU Properties Dialog Box

> **NOTE:** You can display a properties dialog box for all FRUs by right-clicking on the FRU and selecting FRU Properties from the menu that appears.

Display a Properties dialog box for an FPM card by right-clicking on a card and selecting FRU Properties from the menu that appears. To display a properties dialog box for an individual port, you must be in the Port Card View. Refer to Using the Port Card View on page 2- 15 for details.
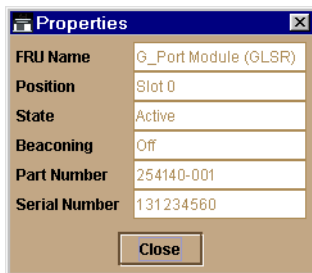
Figure 2–3: FPM Card FRU Properties Dialog Box

### Displaying Director Information

Click on the Director illustration, away from a hardware component, to display the Director Properties dialog box as shown in Figure 2–4.
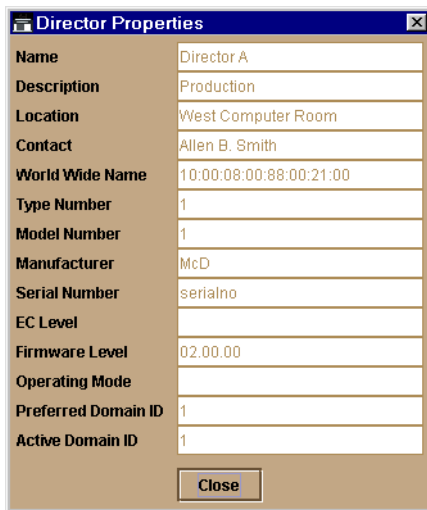


Figure 2–4: Director Properties Dialog Box

The following displays in this dialog box:

■ Director name, description, location, and contact configured through the Configure Identification dialog box.

■ Fibre Channel world wide name (WWN) identifier for the Director.

■ Product type number.

■ Product model number.

■ Product manufacturer.

■ Product serial number.

■ Engineering change (EC) level.

■ Firmware level.

■ Operating Mode. Open Systems mode.

■ Preferred Domain ID. This is set through the Configure Operating Parameters dialog box.

■ Active Domain ID. The actual domain ID assigned to the Director.

> **NOTE:** You can also display the Director Properties dialog box by right-clicking the Director illustration away from a FRU and selecting Properties from the menu.

## Using Menu Options

Right-click various parts of the Hardware View to display menu options for displaying status and information and for controlling the Director and its FRUs.

### Director Menu

Right-click any area of the Director illustration where a hardware component is not installed to display the following menu options:

#### *Director Properties*

Click to display the Director Properties dialog box. This dialog box contains the Director name, description, location, and contact person configured through the Configure Identification dialog box. Also included is other product information as detailed in Displaying Director Information on page 2- 8. You can also display this dialog box by clicking an area on the illustration away from a hardware component.

#### *Enable Unit Beaconing*

Click the check box to toggle unit beaconing on or off. When the check box has a check mark, unit beaconing is on, and the amber system error light on the Director front bezel blinks to help users locate the actual unit in an equipment room. When you click the check box to remove the check mark, unit beaconing is disabled and the amber LED goes out.

> **NOTE:** You can only enable beaconing if there are no system errors (the system error light is off).

### Clear System Error Light

Select this to turn off the amber system error LED, located below the green power LED on the Director front bezel.

### IPL Director

Select this option to initiate an IPL on the Director. When the dialog box displays confirming the IPL, click Yes.

Refer to the *StorageWorks by Compaq SAN Director 64 Service Manual* (AA-RPL8B-TE) for details.

> **NOTE:** An IPL is not intended for ordinary or casual use and should only be performed when directed by your support personnel.

### Set Director Date and Time

Select this option to display the Configure Date and Time dialog box.

1. Click to display the Configure Date and Time dialog box.

   The dialog box displays with a check mark (the default) in the Periodic Date/Time Synchronization check box. If this field is checked, the SDCM Server periodically sets the Director time to automatically synchronize with the SDCM Server time. Daylight savings time automatically updates on the Director using this option.

   The current date and time display in the Date and Time fields. If the Periodic Date/Time Synchronization field is checked, the Date and Time fields are disabled (grayed out).

   To enable and disable Periodic Date/Time Synchronization, click the check box and then click Activate.
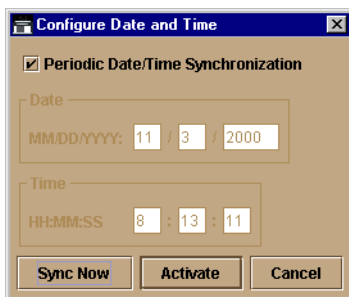


Figure 2–5:  Configure Date and Time Periodic Synchronization Dialog Box

2. Perform one of the following steps:

■ To immediately synchronize the Director date and time with the SDCM Server, be sure the Periodic Date/Time Synchronization option is enabled and then click Sync Now.

> **NOTE:** If you enable the Periodic Date/Time Synchronization feature and click Activate, the time will synchronize at the next update period.

■ To set the Director with a specific date and time, make sure that the Periodic Date/Time Synchronization field is not selected. Refer to Figure 2–6. Enter the date and time, and then click Activate.
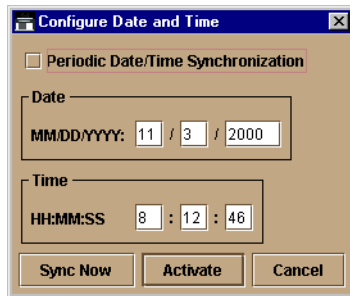
Figure 2–6:  Configure Date and Time (Manually)

> **NOTE:** Use the range of 0 to 23 for hours. Use the range of 0 to 59 for minutes and seconds.

### Set Director Online State

Click to display the Set Online State dialog box. The dialog box displays the current state (offline or online) and provides a button for changing the state.

> **CAUTION:** Before setting the Director offline, warn administrators and users currently operating attached devices that the Director is going offline and that there will be a disruption of port operation. Also, request that the devices affected by an interruption of data flow be set offline.

1. Click Set Offline or Set Online to toggle between offline and online states.

Figure 2–7:  Set Online State Dialog Box (Director is Online)

2. When the Set Online or Set Offline warning dialog box displays, click OK to set the Director online or offline.

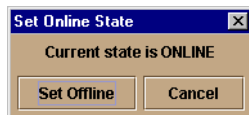   As the Director goes offline, the word, "OFFLINE," displays in the State field in the left corner of the Hardware View. As the Director goes online, the word, "Online," displays in the State field in the left corner of the Hardware View. When going offline, LED indicators on all ports with attached devices stay green, but the Director sends offline sequences (OLS) to these devices.

### FPM Card Menu

Right-click an FPM card in the Hardware View to display the following menu options.

■ **Open Port Card View**

Select this option to open the Port Card View. You can also open the Port Card View by clicking on the FPM card. Refer to Using the Port Card View on page 2- 15 for detailed information.

■ **FRU Properties**

Select this option to display the FPM card's Properties dialog box for the FPM card. This dialog box includes the FRU name, position (slot number in backplane), state (active or failed), beaconing state (on or off), part number, and serial number (refer to Figure 2–3 on page 2-8).

■ **Enable Beaconing**

Select this option to add a check mark to the check box and to enable beaconing for the card. This causes the amber LED on the card to flash to help you locate the card in the unit.

■ **Block All Ports**

Select this option to display the Block All Ports dialog box. Click Yes to block all ports on the selected card or click No to cancel.

■ **Unblock All Ports**

Select this option to display the Unblock All Ports dialog box. Click Yes to unblock all ports on the selected card or No to cancel.

■ **Diagnostics**

Select this option to display the Port Diagnostics dialog box. Use this dialog box to run internal loopback and external loopback tests on any port or all ports on the FPM card.

## Port Menu

To display the a menu of options for a port on a FPM card, open the Port Card View by clicking on a port on the FPM card. Refer to Port Menu on page 2- 20 under Using the Port Card View for details on displaying and using the port menu.

## CTP Card Menu

Right-click the CTP card in the Hardware View to display a menu with the following options:

■ **FRU Properties**

Select this option to display a FRU Properties dialog box for the CTP card. Figure 2–2 on page 2-7 is an example for the power supply module. The FRU Properties dialog box includes the FRU name, position (slot number in the backplane), state (active, backup, or failed), part number, and serial number.

■ **Beaconing**

Select this option to add a check mark to the check box and enable beaconing for the CTP card. This causes the amber LED on the card to flash to help you locate it in the unit.

■ **Switchover**

   **NOTE:** You must have maintenance authorization rights to access this feature.

Select this option to display the Switchover CTP dialog box. Click Switchover to switch operation from the active card to the backup card. When switchover occurs, the green LED illuminates on the backup CTP card to indicate that it is now the active card.
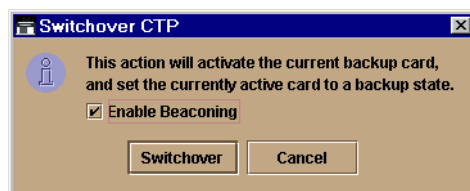


Figure 2–8: Switchover CTP Dialog box

If you click the Enable Beaconing check box to add a check mark, the amber LED beacons (blinks) on the card that was the active card before switchover.

If a redundant card has failed, or is not installed, selecting Switchover displays an error message explaining that two operational cards must be installed to use this feature.

### Fan Module

Click a cooling fan module card in the Hardware View to display the FRU Properties dialog box:

■ **FRU Properties**

This option displays a FRU Properties dialog box for the module. Figure 2–2 on page 2-7 is an example for the power supply module. The FRU Properties dialog box includes the FRU name, position (slot number in the backplane), state (active, backup, or failed), part number, and serial number.

### SBAR Card Menu

Right-click an SBAR card in the Hardware View to display a menu with the following options:

■ **FRU Properties**

Select this option to display a FRU Properties dialog box for the card. Figure 2–2 on page 2-7 is an example for the power supply module. The FRU Properties dialog box includes the FRU name, position (slot number in the backplane), state (active, backup, or failed), part number, and serial number.

■ **Enable Beaconing**

Select this option to add a check mark to the check box and enable beaconing for the SBAR card. This causes the amber LED on the card to flash to help you locate it in the unit.

■ **Switchover**

> **NOTE:** You must have maintenance authorization rights to access this feature.

Select this option to display the Switchover SBAR dialog box which is similar to the Switchover CTP dialog box (refer to Figure 2–8 on page 2-13). Click Switchover to switch operation from the active card to the backup card. When switchover occurs, the green LED illuminates on the backup SBAR card to indicate that it is now the active card.

If you click the Enable Beaconing check box to add a check mark, the amber LED beacons (blinks) on the card that was the active card before switchover.

## Using the Port Card View

In the Hardware View, click an FPM card or right-click and select Open Port Card View to see a detailed view of the FPM card. In the Port Card View, colored indicators reflect functions of the actual LEDs on the card. The table in the Port Card View displays the port operating state and vital product information.

### Symbols and Indicators

The following figure illustrates the alert symbols and LED indicators that may display on an FPM card in the Port Card View.
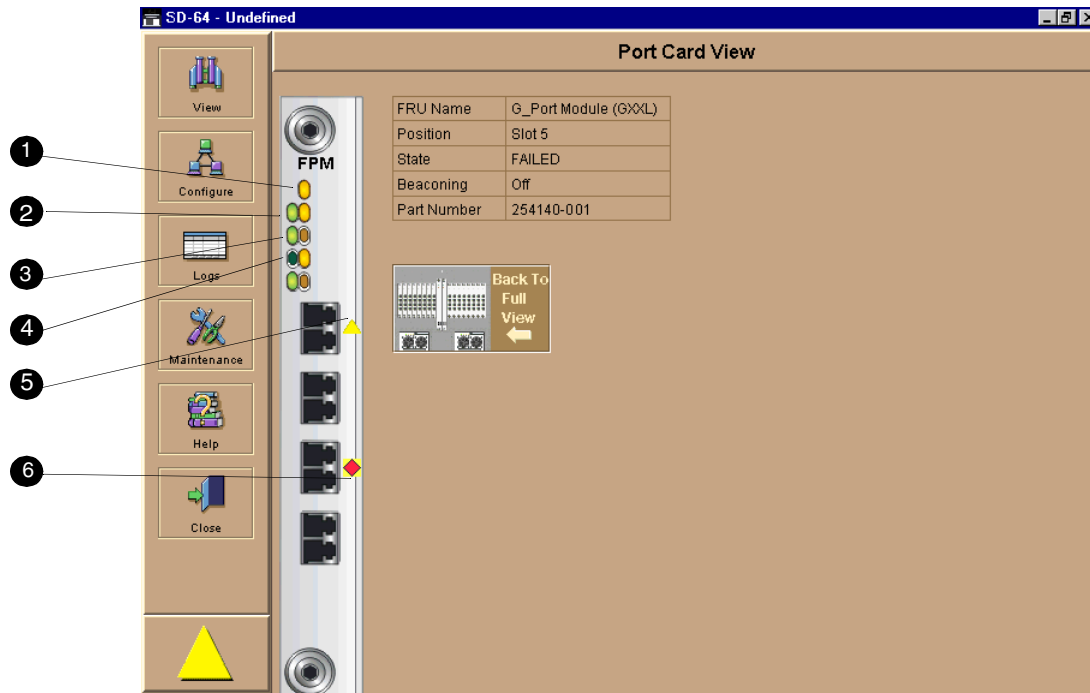


Figure 2–9:  Port Card View

Refer to the following numbered list for the meaning of the alert symbols and LED indicators shown on the Port Card View in Figure 2–9. Port states are described in detail under Port Operational States on page 2- 40.

❶ The amber indicator at the top of a FPM card illuminates when the FPM card fails. An FPM card fails when one or more individual ports fail.
Four sets of green and amber LEDs beneath the amber card status indicator correspond to the four port connectors installed vertically down the FPM card.

❷ In Figure 2–9 on page 2-15, the amber LED is blinking (while the green LED is on) for the first port on the card, and a yellow triangle displays by the port's connector. This indicates that beaconing is enabled for the port and the port is an online state. Note that if the amber port indicator flashes and the green indicator is off, the port is running diagnostics.
The green indicator illuminates when the port is online with an attached device and fully operational. The green port LED remains on as long as the port remains in the online state. The green LED on the physical card flashes when there is active Fibre Channel traffic through the port. It does not flash in the Port Card View.

❸ When the port is operational but not communicating with an attached device, the green indicator remains off. In this case, there may not be a fiber cable attached, no light from the device (the device switch is powered off), the port may be blocked, or the link may be recovering.

❹ If the port fails, the amber indicator for port illuminates and a blinking red and yellow diamond displays next to the port connector.

❺ A yellow triangle (attention indicator) displays next to a port connector for a variety of reasons:

 - Beaconing for the port was enabled through the *Enable Beaconing* option. Note that this is the case in Figure 2–9 (refer to number 1 in this table).

 - The port is receiving the Not Operational sequence from the attached device.

 - The port has an invalid attachment.

 - The Director and attached device are performing a link reset operation.

 - LIN alerts have been enabled for a port in the *Configure Ports* dialog box and a link incident occurs.

 - Diagnostics are running on the port.

❻ The Port Card View indicates a failed port by a blinking red and yellow diamond alert symbol by the port's connector. The amber LED for the port will also illuminate (refer to number 4 in this table).

### Displaying Port Information

Click a port or right-click on a port and select Port Properties from the menu to display the port's Properties dialog box. Also display this dialog box by:

■ Clicking on a row in the Port List View or right-clicking a row and selecting Port Properties from the pop-up menu.

■ Clicking on a port's bar graph in the Performance View or right-clicking the bar graph and selecting Port Properties from the menu.

■ Right-clicking on a port's row in the Node List View and selecting Port Properties from the menu.

Figure 2–10:  Port Properties Dialog Box

The following paragraphs describe the fields in the Port Properties dialog box.

■ **Port Number**

The physical port number.

■ **Port Name**

User-defined port name or description. Refer to Configure Ports on page 3- 8 for instructions.

■ **Type**

❏ G_Port. This displays if nothing is logged into the port.

❏ F_Port. This displays if a device is logged into the port.

❏ E_Port. This displays if the port is connected to another Director's E_Port via an ISL.

■ **Fibre Channel Address**

The port's Fibre Channel address identifier.

■ **Port WWN**

The port's 16-digit world wide name (WWN).

■ **Attached Port WWN**

The WWN of the node logged into the port.

■ **Block Configuration**

Blocked or unblocked. Operation can be blocked or unblocked through the Configure Ports dialog box or through the block ports options on right-click menus in the Port Card View. Refer to Configure Ports on page 3- 8 and Using the Port Card View on page 2- 15 for details.

■ **10–100 km Configuration**

Extended distance buffering. This can be enabled or disabled for the port through the Configure Ports dialog box. Refer to Configure Ports on page 3- 8 for instructions.

■ **LIN Alerts Configuration**

This field indicates whether link incident (LIN) alerts are enabled or disabled. LIN alerts can be configured through the Configure Ports dialog box. The default is for the LIN alerts to be enabled.

■ **Beaconing**

This field indicates the beaconing status for the port. To enable or disable beaconing, right-click the port and select Enable Beaconing.

■ **Link Incident**

Description of the last link incident that occurred on the port.

■ **Operational State**

Online, offline, no light, link down, link recovery, testing, or failed. Refer to Table 2–1 on page 2-41 for definitions of operational states.

■ **Reason**

Lists the reason for a segmented E_Port operating state or for an invalid attachment operating state for the port. An E_Port segmentation only occurs when the Director is connected to another Director or a switch. This field displays "NA" if a segmented E_Port or invalid attachment operating state has not occurred.

Refer to the section on joining zoned fabrics in the *StorageWorks by Compaq SAN Director 64 Planning Guide* (AA-RPLAB-TE).

Reason messages for segmentation can include:

❏ Incompatible operating parameters. Operating parameters, such as resource allocation time-out values (R_A_TOV) or error-detect time-out values (E_D_TOV), are inconsistent. Refer to Configure Operating Parameters on page 3- 4 for more information.

❏ Duplicate domain IDs. Identical preferred domain IDs are configured for two or more Directors or switches. Refer to Configure Operating Parameters on page 3- 4 for more information.

❏ Incompatible zoning configurations. Refer to the *SANworks by Compaq Director Connectivity Manager User Guide* (AA-RPL7B-TE) and the *StorageWorks by Compaq SAN Director 64 Service Manual* (AA-RPL8B-TE) for more information on zoning.

❏ Build fabric protocol error.

❏ No principal switch. A principle Director or switch is not defined for the fabric.

❏ No response from the attached switch.

❏ ELP retransmission failure timeout. A Director or switch with a hardware or link failure attempted to join the fabric and transmitted multiple exchange link protocol (ELP) frames to another Director or switch. Because of the failure, the failed Director or switch did not receive responses to the ELP frames and did not receive a FLOGI frame. The failed Director or switch times out.

A port binding error may be due to an invalid WWN or nickname entry in the Configure Ports dialog box in the Bound WWN column. Refer to Configure Ports on page 3- 8 for an description of the Configure Ports dialog box.

Reasons messages for an invalid attachment can include:

❏ 01 *Unknown*. The reason is not known.

❏ 02 *ISL connection not allowed on this port*. ISL is connected to a port configured as an F_Port.

❏ 03 *ELP rejected by the attached switch*. This Director or switch transmitted an exchange link protocol (ELP) frame that was rejected by the switch at the other end of the ISL.

❏ 05 *External loopback adapter connected to the port*. A loopback plug is connected to the port, and no diagnostic test running.

❏ 06 *N_Port connection not allowed on this port*. The port type configuration does not match the actual port use (the port is configured as an E_Port, but attaches to a node device).

❏ 08 *ISL connection not allowed on this port*. The port type configuration does not match the actual port use (the port is configured as an F_Port, but attaches to a Director or switch).

❏ 10 *Port binding violation—Unauthorized WWN*. The WWN that was entered to configure port binding for this port is not valid, or a nickname was used that was not configured for the attached device in the Product Manager or Fabric Manager.

❏ 11 *Unresponsive node connected to port.* Possible causes are: (1) a hardware problem on a switch or connected node where ELP frames are not delivered; the response is not received, or a fabric login (FLOGI) cannot be received (there may be problem in the switch SBAR); (2) a faulty or dirty cable connection; (3) faulty host bus adapters that do not send out a FLOGI within a reasonable timeframe.

## Port Card Menu

While in the Port Card View, right-click on the card away from a port connector to display a menu of port card functions.

■ **Block All Ports**

Select this option to display the Block All Ports dialog box. Click Yes to block all ports on the selected card or No to cancel.

■ **Unblock All Ports**

Select this option to display the Unblock All Ports dialog box. Click Yes to unblock all ports on the selected card or click No to cancel.

■ **Diagnostics**

Select this option to display the Port Diagnostics dialog box. Use this dialog box to run internal loopback and external loopback tests on any port or all ports on the FPM card. Refer to the *StorageWorks by Compaq SAN Director 64 Service Manual* (AA-RPL8B-TE) for instructions on using these diagnostics.

## Port Menu

While in the Port Card View, right-click on any port to display the following menu options:

### Port Properties

Click this to display the Port Properties dialog box. This dialog box displays information about the port. See Displaying Port Information on page 2- 16 for more information.

### Node Properties

Click this to display the Node Properties dialog box. Note that if a node is not logged into the port, a message appears indicating that node information is not available. For details on information that displays in this dialog box, refer to Displaying Node Properties on page 2- 32.

### Port Technology

Click this to display the Port Technology dialog box. This dialog box displays the following information:

■ Port number.

■ Connector type: Always LC.

■ Transceiver type: Longwave laser LC or shortwave laser LC.

■ Distance: General distance range for port transmission. This can be either short to long distances for the longwave laser LC transceiver or short distances for the shortwave laser LC transceivers.

■ Media: The Fibre Channel mode and optic size. For the longwave laser LC transceiver, this would be singlemode 9 micron. For the shortwave laser LC transceiver, this would be multimode 50 micron or 62.5 micron.

■ Speed: This will always be 1Gbit per second.

### Block Port

Click to display a check mark and block port transmission. If blocked, a node attached to the port is prevented from logging into the Director or communicating with other devices attached to switch ports. A blocked port continuously transmits offline signals (OLS). Click to remove the check mark and unblock the port. If unblocked, a node attached to the port can communicate with the switch and communicate with other nodes attached to the switch.

### Enable Beaconing

Click this to make the amber LED by the port blink on the actual switch and the amber indicator blink for the port in the Hardware View. This enables users to locate the unit where the port is located. When a blinking amber LED indicator displays by a port, an attention indicator (⚠) displays below the port's connector in the Port Card View and on the FPM card in the Hardware View.

### Diagnostics

Click this option to display the Port Diagnostics dialog box. Use this dialog box to run an internal loopback and external loopback test on the port. The Port Diagnostics option enables you to run internal and external loopback tests on any port or all ports on an FPM card. To use this option, follow the detailed steps in the *StorageWorks by Compaq SAN Director 64 Service Manual* (AA-RPL8B-TE).

### Clear Link Incident Alerts

Click this to clear the attention indicator on the Hardware View, the Port List View, and the Performance View. In addition, the procedure clears the alert description in port Properties dialog boxes. If there are no link incident alerts set for a port, no actions occur. Although you can manually clear link incidents, they may also be cleared by actions outside of the user interface, such as when rebooting the SDCM Server.

### Reset Port

Click to display a confirmation dialog box. Click Yes on that dialog box to reset the port. If a switch is attached to the port and is online, this operation sends a link reset to the attached switch; otherwise, this action disables port beaconing for the port. And if the port is in a failed state, such as after failing a loopback test, the reset restores the port to an operational state, clearing the service required (amber) LED. The reset does not affect other ports in the switch.

### WWN Binding

Click to display the Bind WWN dialog box. Click the WWN Binding check box to enable port binding. Either click the Attached WWN radio button to bind to the attached device listed, or click WWN to enter the WWN or nickname of the device to bind.
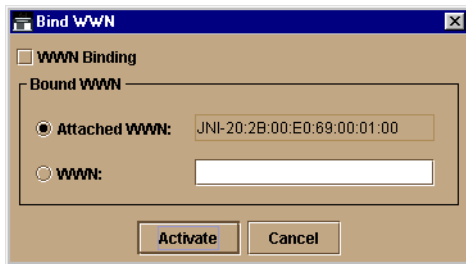


Figure 2–11: Bind WWN Dialog Box

Bind WWN dialog box parameters:

■ **WWN Binding**: Click this check box to place check mark in the box and enable WWN binding for the port. When enabled, only a specific device can communicate through the port.This device is specified by the WWN or nickname entered into the Bound WWN field (either the Attached WWN or WWN options). With the check box cleared, any device can communicate through the port even, if a WWN or nickname is specified in the Bound WWN field.

■ **Attached WWN**: Click the radio button. If a device is logged into the port, the device's WWN will display in the field. The device with this WWN or nickname will have exclusive communication privileges to the port if WWN Binding is enabled.

  **NOTE:** If you click this radio button to bind the port to a logged-in device and there are no devices logged in, the port is essentially bound to a WWN of "0." This prevents any device from logging in until this button is reenabled to bind the WWN of a logged-in device or until you explicitly bind the WWN of a device by clicking the WWN radio button and by entering a WWN or nickname (see the WWN next). Changes only take effect when you click the *Activate* button.

■ **WWN**: Click the radio button and enter a world wide name (WWN) in the proper format (xx.xx.xx.xx.xx.xx.xx.xx) or a nickname configured through the Product or Fabric Manager applications. The device with this WWN or nickname will have exclusive communication privileges through the port if WWN Binding is enabled.

  Note the following:

  ❏ If you do not enter valid WWN or nickname in this field, but the WWN Binding check box is checked (enabled), then no devices can communicate over the port.

  ❏ If you enter a WWN or nickname in this field and do not place a check in the WWN Binding checkbox, the WWN or nickname will be stored, and all devices can communicate over the port.

■ **Activate**: Click this button to activate settings in this dialog box.

Warning and error message display:

■ If one or more of the nodes logged into a port does not match the WWN or nickname configured in the field by the WWN radio button, a warning dialog box displays after you activate the configuration. This warning box displays a list of all nodes that will be logged off if you continue. If you click Continue on the warning box, these nodes will be logged off and the port will only attach to the device with the device with the WWN or nickname configured in the WWN field.

■ An error message displays after you activate the configuration if the format for the WWN entered in the WWN field is not valid (not in xx.xx.xx.xx.xx.xx.xx.xx format) or if you have entered a nickname that was not configured through the Product or Fabric Manager.

### *Clear Threshold Alerts*

Click this to display the *Clear Threshold Alerts* dialog box. Select the appropriate option to clear alerts for the selected port only or all ports on the Director. This clears all attention indicators that notify users of threshold alerts in dialog boxes and views. This action also restarts the notification interval and the cumulative minutes for utilization % interval.
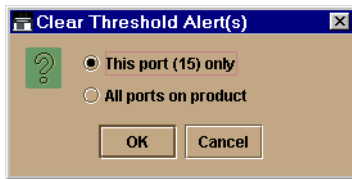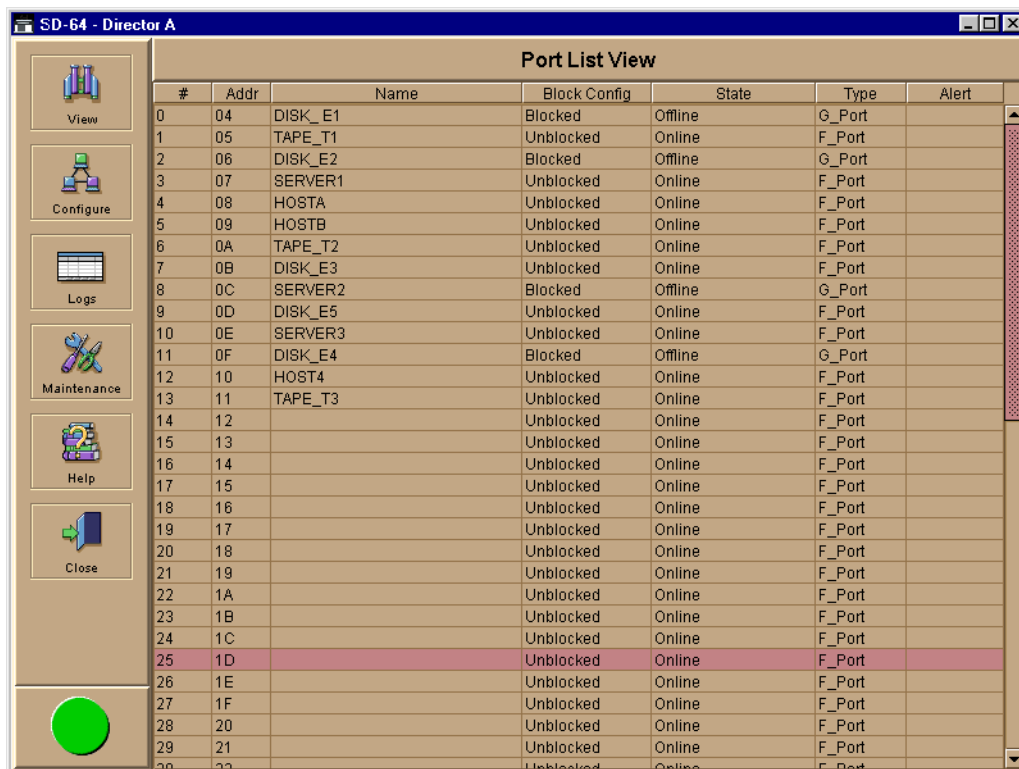


Figure 2–12:  Clear Threshold Alerts Dialog Box

# Port List View

Display the Port List View by selecting Port List from the View menu. Figure 2–13 is an example of the Port List View.

Figure 2–13: Port List View

The Port List View displays the following information on all ports that can be installed in the Director. All information is updated automatically.

■ **#**

Number of the port from 0 through 63.

■ **Name**

Displays the port name as configured through the Configure Ports dialog box.

■ **Block Config**

Indicates the blocked or unblocked configuration of the port as set through:

❏ The Configure Ports dialog box.

❑ The Block Port option available through port right-click menus in the Port Card View, Block All Ports option on the FPM card's right-click menus in the Port Card View and Hardware View, port row right-click menus in the Port List View, and the port bar graph right-click menus in the Performance View.

Blocked states are:

❑ **Blocked**: Devices communicating with the port are prevented from logging into the Director or communicating with other devices attached to Director ports. A blocked port continuously transmits OLS.

❑ **Unblocked**: Devices communicating with the port can log into the Director and communicate with devices attached to any other unblocked port in the same zone.

■ **State**

The following port operational states may display in this table. For more information on these states and corresponding alert symbol and LED indicator operations in the Hardware View, see Port Operational States on page 2- 40.

❑ No Light

❑ Online

❑ Offline

❑ Beaconing

❑ Link Reset

❑ Not Operational

❑ Not Installed

❑ Invalid Attachment

❑ Port Failure

❑ Segmented E_Port

■ **Type**

The type of port. F_Port displays if an N_Port is attached. E_Port displays if another E_Port is attached. G_Port displays if the port can function as either an F_Port or an E_Port, but nothing is currently attached.

■ **Alert**

This column displays a yellow triangle if a link incident occurs on the port or if the port's LED is beaconing. Blinking red and yellow diamonds display for port failures or for ports requiring service. Click on the row to display the reason for the alert in the Port Properties dialog box.

Click a row to select it, highlight it, and display the Port Properties dialog box. For an explanation of the fields on the Port Properties dialog box, refer to Displaying Port Information on page 2- 16.
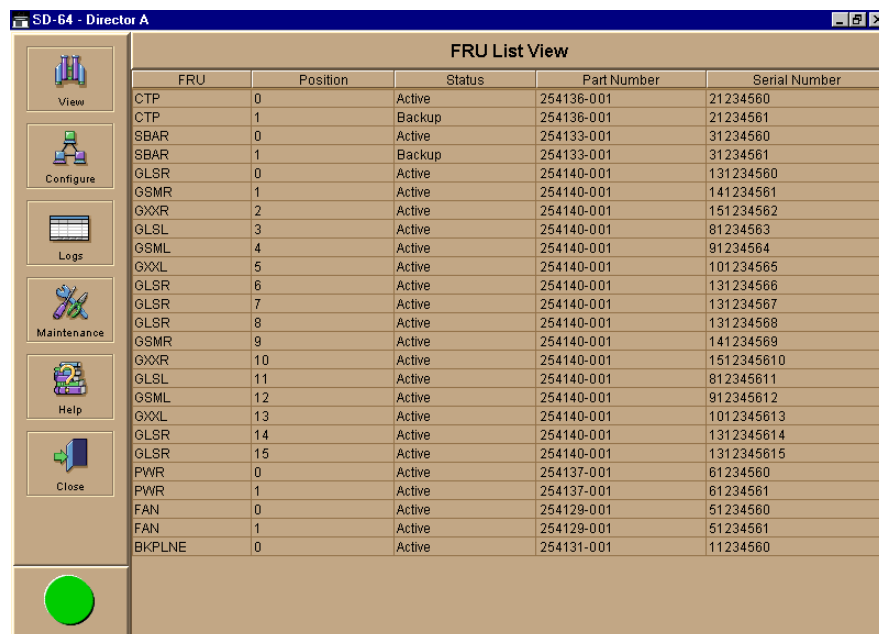
## Menu Options

Right-click a row to select it, highlight it, and display a menu with the following port-related action options. These are the same menu options that display when you right-click a port in the Port Card View and Performance View. Refer to Port Menu on page 2- 20 for an explanation of these pop-up menu options.

■ Port Properties

■ Node Properties

■ Port Technology

■ Block Port

■ Enable Beaconing

■ Diagnostics

■ Clear Link Incident Alert

■ Reset Port

■ WWN Binding

■ Clear Threshold Alerts

> **NOTE:** For Node Properties, if a node is not logged in a message displays indicating that node information is not available.

# FRU List View

Display the FRU List View by selecting FRU List from the View menu. This view displays information about all installed FRUs on the Director. All data is dynamic and updates automatically as the software detects changes.

| FRU | Position | Status | Part Number | Serial Number |
|---|---|---|---|---|
| CTP | 0 | Active | 254136-001 | 21234560 |
| CTP | 1 | Backup | 254136-001 | 21234561 |
| SBAR | 0 | Active | 254133-001 | 31234560 |
| SBAR | 1 | Backup | 254133-001 | 31234561 |
| GLSR | 0 | Active | 254140-001 | 131234560 |
| GSMR | 1 | Active | 254140-001 | 141234561 |
| GXXR | 2 | Active | 254140-001 | 151234562 |
| GLSL | 3 | Active | 254140-001 | 81234563 |
| GSML | 4 | Active | 254140-001 | 91234564 |
| GXXL | 5 | Active | 254140-001 | 101234565 |
| GLSR | 6 | Active | 254140-001 | 131234566 |
| GLSR | 7 | Active | 254140-001 | 131234567 |
| GLSR | 8 | Active | 254140-001 | 131234568 |
| GSMR | 9 | Active | 254140-001 | 141234569 |
| GXXR | 10 | Active | 254140-001 | 1512345610 |
| GLSL | 11 | Active | 254140-001 | 812345611 |
| GSML | 12 | Active | 254140-001 | 912345612 |
| GXXL | 13 | Active | 254140-001 | 1012345613 |
| GLSR | 14 | Active | 254140-001 | 1312345614 |
| GLSR | 15 | Active | 254140-001 | 1312345615 |
| PWR | 0 | Active | 254137-001 | 61234560 |
| PWR | 1 | Active | 254137-001 | 61234561 |
| FAN | 0 | Active | 254129-001 | 51234560 |
| FAN | 1 | Active | 254129-001 | 51234561 |
| BKPLNE | 0 | Active | 254131-001 | 11234560 |

Figure 2–14:  FRU List View

Information on the FRU List View for each FRU includes:

**FRU**—an acronym representing the FRU type. The meanings of FRU acronyms are:

■ **BKPLNE**—backplane.

■ **CTP**—CTP card.

■ **SBAR**—SBAR card.

■ **FPM**—Fiber port module (FPM) card. The following acronyms may display to indicate the card's port technology:

❏ **GLSL**—G_Port, long wave, single mode LC connector, 1 Gigabit

❏ **GSML**—G_Port, short wave, multimode, LC connector, 1 Gigabit

❏ **GXXL**—G_Port, mixed mode, LC connector, 1 Gigabit

❏ GSF1—G_Port, small form factor optics (SFO) pluggable, 1 Gigabit

❏ GSF2—G_Port, small form factor optics (SFO) pluggable, 2 Gigabit

❏ GLSR—G_Port, short wave, single mode, MT-RJ connector, 1 Gigabit

❏ GXXR—G_Port, mixed mode, MT-RJ connector, 1 Gigabit

❏ GXXL— G_Port, mixed mode, LC connector, 1 Gigabit

■ **FAN—**fan module.

■ **PWR—**power supply.

**Position—**a number representing the FRU chassis position. The chassis (slot) position for a nonredundant FRU is **0**. The chassis positions for redundant FRUs are **0** and **1**. The chassis positions for FPM cards are **0** through **15** inclusive.

**Status—**the FRU status (Active or Backup).

**Part Number—**the FRU part number.

**Serial Number—** the FRU serial number.

# Node List View

Display the Node List View by selecting Node List from the View menu. This view displays information about all node attachments to any F_Ports on the Director sorted by port number. All data is dynamic and updates automatically as devices log in and log out.



Figure 2–15:  Node List View

Information that displays for each node includes:

■ **Port #**

Number of the port, from 0 through 63.

■ **Node Type**

The following information, if supported, is supplied by the attached device:

❏ Unknown

❏ Other

❏ Hub

❏ Switch

❏ Gateway

❏ Converter

❏ HBA

❏ Proxy-agent

❏ Storage device

❏ Host

❏ Storage subsystem

❏ Module

❏ Software driver

■ **Port WWN**

The port WWN of the attached node (N_Port). The 16-digit WWN is a set of unique numbers assigned to the device attached to the port. The WWN is prefixed by the manufacturer's name of the host bus adapter that attaches to the device. If there is a nickname assigned, the nickname displays instead of the WWN.

■ **BB_Credit**

The buffer-to-buffer credit that the attached node has available.

Click a row to select it and display the Node Properties dialog box. For an explanation of the fields on the Node Properties dialog box, refer to Displaying Node Properties on page 2- 32.

## Menu Options

Right-click a row to select it, highlight it, and display a menu with the following port-related action options:

■ **Node Properties**

Select this option to display the Node Properties dialog box. Refer to Displaying Node Properties on page -32.

■ **Port Properties**

Select this option to display the Port Properties dialog box (refer to Figure 2–10 on page 2-17).

■ **Define Nickname**

Select this option to display the Define Nickname dialog box, where you can define a nickname to display for the attached device instead of the device's 8-byte WWN.

The Define Nickname dialog box displays the world wide name (WWN) of the device attached to the port. To define a nickname, enter a name of up to 32 characters in the Nickname field, and click OK. The nickname will display under the Port WWN column instead of the device's WWN.

■ **Display Options**

Select Nickname or Worldwide Name from the submenu. Selecting Nickname displays attached devices in the Port WWN column by the nickname configured through the Define Nickname menu option. Selecting Worldwide Name displays attached devices in the Port WWN column by the device's WWN.

## Displaying Node Properties

Open the Node Properties dialog box by clicking a row in the Node List View or right-clicking a row and selecting Node Properties from the menu. You can also display this dialog box by right-clicking on a port in the Port Card View, right-clicking a port's row in the Port List View, and right-clicking on a port's bar graph in the Performance View and selecting Node Properties from the menu that displays. Note that if a node is not logged in, a message appears indicating that node information is not available.
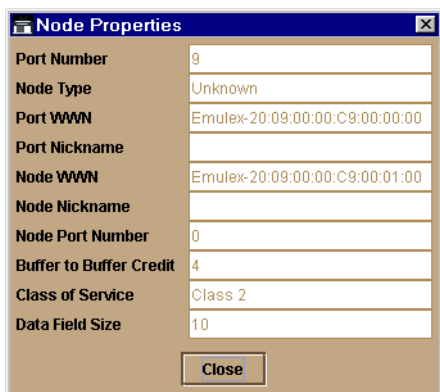


Figure 2–16: Node Properties Dialog Box

■ **Port Number**

The physical port number on the Director to which the node is connected.

■ **Node Type**

Provided by attached device, if supported. Refer to "Node Type" under Node List View on page 2- 30.

■ **Port WWN**

Port worldwide name of the attached device.

■ **Port Nickname**

Nickname for the port WWN. Must be configured to display.

■ **Node WWN**

Node worldwide name of the attached device. Must be configured to display.

■ **Node Nickname**

Nickname for the node WWN.

■ **Buffer-to-Buffer Credit**

The buffer-to-buffer credit that the attached node has available.

■ **Class of Service**

Class of service. This can be class 2, class 3, or both.

■ **Data Field Size**

Data field size. This is the largest size of Fibre Channel frame the node will process. The size is negotiated with the attached device.

> **NOTE:** The Node Properties option is also available from the menu that displays when you right-click on a port's row in the Port List View or on a port's bar graph in the Performance View.

# Performance View

Display the Performance View by selecting Performance from the View menu. This view displays a bar graph at the top of the view for all ports. The lower portion of the view displays statistical values for the specific port's bar graph that you select.
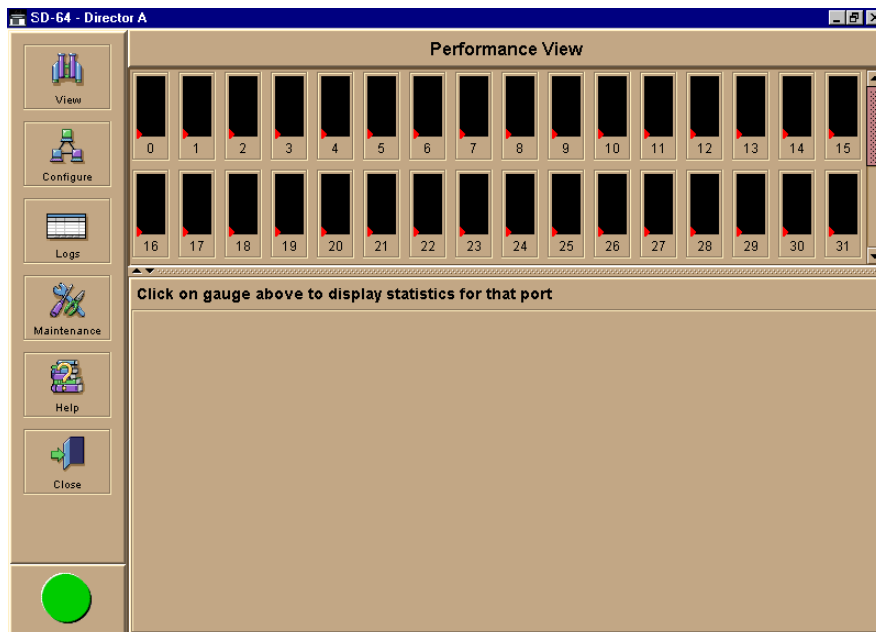


Figure 2–17: Performance View

## Menu Options

Right-click any of the port bar graphs to display a pop-up menu with the following port-related action options. These are the same menu options that display when you right-click on a row in the Port List View. Refer to Port Menu on page 2- 20 for an explanation of these pop-up menu options.

■ Port Properties

■ Node Properties. Note that if a node is not logged in, a message displays indicating that node information is not available.

■ Port Technology

■ Block Port

- Enable Beaconing

- Diagnostics

- Clear Link Incident Alerts

- Reset Port

- WWN Binding

- Clear Threshold Alerts

    **NOTE:** For Node Properties, if a node is not logged in a message displays indicating that node information is not available.

## Bar Graph Display

The Performance View provides a graphical display of performance for all ports. Each bar graph in the upper portion of the main panel displays the level of transmit/receive activity for the port. This information updates every five seconds. Each bar graph shows the percentage of link utilization for the port. A red arrow marks the highest utilization since the opening of the Performance View. If the system detects activity on a port, it represents minimal activity with one bar.

When a port is logged in, moving the cursor over its bar graph displays a message with the attached port's WWN. If the port is an E_Port, the message reads, "E_Port," and if the port is not logged in, the message displays the port's current operational state (refer to Table 2–1 on page 2-41).

## Port Statistics

To select and display more detailed performance information for a port, click the port's bar graph. The bar graph for that port highlights with a darker background and the lower portion of the Performance View main panel displays the statistics values for the port's number and the WWN decoding. The Statistics Values tables contain cumulative port statistics and error statistics. For a description of the Refresh and Clear buttons, refer to Button Functions on page 2- 40.

### Statistics Description

The Statistics Values tables contain statistics in the following groups. To refresh tables with the latest data, click Refresh on the upper right portion of the Statistics Values panel or click the port's bar graph. Clear all counters for all users using Clear.

### Traffic Statistics with Receive and Transmit Values

This section describes the types of statistics that display when you click a port's bar graph:

■ **Link utilization %**

There is a separate value for transmit and receive link utilization. The larger of these two values displays on the bar graph.

The current link utilization for the port is expressed as a percentage. Each port can transmit or receive data at 100 megabytes (MB) per second. This statistic shows the percentage of the maximum link utilization currently being used. Link utilization is calculated over one-second intervals. The maximum link utilization is 100%.

■ **Frames**

The number of frames that the port has received or transmitted.

■ **Four byte words**

The number of words that the port has received or transmitted.

■ **Offline sequences**

The number of offline sequence that the port has received or transmitted.

■ **Link resets**

The number of link reset protocol frames received and transmitted by this port from and to the attached device. The Director transmits a link reset to initiate the link reset protocol or recover from a link timeout. This occurs normally to establish BB_Credit or on any port in order to recover lost BB_Credit. The Director receives a link reset from an attached device if the device wishes to initiate the link reset or recover from a link timeout.

There are no thresholds for these values. You may determine that a problem exists by the rate that the value changes. BB_Credit starvation can occur if data is sent to a device faster than it can consume the frames. This can back up into ISLs causing degraded performance.

### Class 2 Statistics

The Class 2 Statistics table includes:

■ **Received Frames**

The number of Class 2 frames received by this F_Port from its attached N_Port.

■ **Busied Frames**

The number of F_BSY frames generated by this F_Port against Class 2 frames. This can occur if frames are received before the switch completes initialization or if the switch is servicing so many requests that it cannot process a new request. The port generates frames if the switch is not ready to accept commands. This may indicate temporary congestion.

■ **Rejected Frames**

The number of F_RJT frames generated by this F_Port against Class 2 frames.

These frames usually occur because of attached device errors. The device is expected to correct the error based on the reject code, then retry its request. If the device is able to recover, there is no cause for concern. If not, further troubleshooting may be necessary. There are no thresholds for this value. Typically, this occurs because the destination is not available due to the device's action.

■ **Four Byte Words Received**

The number of four-byte words received.

■ **Four Byte Words Transmitted**

The number of four-byte words transmitted.

### Class 3 Statistics

The Class 3 Statistics table includes:

■ **Received Frames**

The number of Class 3 frames received by this F_Port from its attached N_Port.

■ **Discarded Frames**

The number of Class 3 frames discarded, including multicast frames with bad D_IDs.

The Director increments this count when it discards a frame that cannot be routed. This occurs most frequently when a destination becomes unavailable without the source realizing the destination is unavailable. There are no thresholds for this value. Typically, this occurs when the destination is not available due to the destination device's action.

■ **Four Byte Words Received**

The number of four-byte words received.

■ **Four Byte Words Transmitted**

The number of four-byte words transmitted.

### Error Statistics

Port errors indicate that a port is not operating correctly. Use this data to isolate problems with port and link operations. The statistics in this table include:

■ **Link failures**

A link failure was recorded in response to a not operational sequence (NOS), protocol timeout, or port failure. At the Port Card View, a yellow triangle appears to indicate a link incident, or a blinking red and yellow diamond appears to indicate a port failure.

■ **Sync losses**

A loss of synchronization was detected because the attached device was reset or disconnected from the port. At the Port Card View, a yellow triangle appears to indicate a link incident.

■ **Signal losses**

A loss of signal was detected because the attached device was reset or disconnected from the port. At the Port Card View, a yellow triangle appears to indicate a link incident.

■ **Primitive sequence errors**

An incorrect primitive sequence was received from the attached device, indicating a Fibre Channel link-level protocol violation. At the Port Card View, a yellow triangle appears to indicate a link incident.

■ **Discarded frames**

A received frame could not be routed and was discarded because the frame timed out (insufficient buffer-to-buffer credit) or the destination device was not logged into the Director.

■ **Invalid transmission words**

The number of times that the Director detected invalid transmission words from the attached device. This indicates that a frame or primitive sequence arrived at the Director's port corrupted. This corruption can be due to the attached device performing a reset, plugging or unplugging the link, bad optics at either end of the cable, bad cable, or a dirty or poor connection. Moving the connection around or replacing cables can isolate the problem.

Some number of invalid transmission words are expected and acceptable. Invalid transmission words within a frame are used to produce the bit-error threshold link incident. If one or more invalid transmission words are detected in 12 separate 1.5-second samples within five minutes, a bit-error threshold link incident is generated.

■ **CRC errors**

A received frame failed a cyclic redundancy check (CRC) validation, indicating the frame arrived at the Director's port corrupted. Frame corruption may be caused by device disconnection, an optical transceiver failure at the device, a bad fiber-optic cable, or a poor cable connection.

■ **Delimiter errors**

The number of times that the Director detected an unrecognized start-of-frame (SOF) delimiter, an unrecognized end-of-frame (EOF) delimiter, or an invalid class of service. This indicates that the frame arrived at the Director's port corrupted. This corruption can be due to plugging/unplugging the link, bad optics at either end of the cable, bad cable, or dirty or poor connections. Moving the connection around or replacing cables can isolate the problem.

■ **Address ID errors**

A received frame had an unavailable or invalid Fibre Channel destination address, or an invalid Fibre Channel source address. This typically indicates the destination device is unavailable.

■ **Frames too short**

A received frame exceeded the Fibre Channel frame maximum size or was less than the Fibre Channel minimum size, indicating the frame arrived at the Director's port corrupted. Frame corruption may be caused by device disconnection, an optical transceiver failure at the device, a bad fiber-optic cable, or a poor cable connection.

## Troubleshooting Tips

As a general rule, you should clear all counts after the system is stabilized. When looking at the Performance View, roughly keep track of the time interval when errors accumulate to judge the presence and severity of a problem. Also, recognize that there is a link recovery hierarchy implemented in Fibre Channel to handle some level of "expected anomalies." In general, only be concerned with error counts that increment very quickly.

## Button Functions

The two buttons located at the right end of the title bar on the Statistics Values table are:

■ **Clear**

The Clear button clears all counters to zero. Selecting this button displays a Clear Request Confirmation dialog box. Confirming the request clears the statistics in the hardware at the physical port. Note that this also clears counters for other Product Manager users.

An entry identifying when the statistics were cleared and by whom is saved in the Audit Log.

■ **Refresh**

The Refresh button updates the data in the statistics tables and enables you to compare values at any given time. Note that you can also refresh data by clicking the port's bar graph.

# Port Operational States

Table 2–1 describes the port operational states and the LED and attention indicators that display in the Hardware View and Port List View.

> **NOTE:** The alert indicator displays on the port in the Hardware View. It indicates that a corrective action is required to return the port to a normal operating state.

**Table 2–1:  Port States and Indicators**

| Port State | Port Indicators | | Alert Indicator | Description |
|---|---|---|---|---|
| | **Green** | **Amber** | | |
| Beaconing | Off or On | Blink | Yellow Triangle | The port is beaconing. The amber port LED blinks once every two seconds to enable users to find a specific port. Enable beaconing through the port's menu on the Port Card View, Port List View, or Performance View. |
| Invalid Attachment | On | Off | Yellow Triangle | The Director port is in an invalid attachment state in either of five cases: (1) a loopback plug is connected to the port and there is no diagnostic test running, (2) the fiber-optic cable is connected to another port on the same Director, (3) the port type is configured as an F_Port and it is connected to another Director (E_Port), (4) the port type is configured as an E_Port and is connected to an N_Port, or (5) a port binding violation has occurred due to an invalid entry in the Bound WWN column in the Configure Ports dialog box. Note: Ports can be configured as G_Ports, F_Ports, and E_Ports through the Configure Ports dialog box. |
| Link Incident | Off | Off | Yellow Triangle | A link incident occurred on the port. The alert symbol displays in the Port List View, Port Card View, and Hardware View. |
| Link Reset | Off | Off | Yellow Triangle | The Director and the attached device are performing a link reset operation to recover the link connection. Ordinarily, this is a transient state that should not persist. |
| No Light | Off | Off | None | No signal (light) is being received on the Director port. This is a normal condition when there is no cable plugged into the port or when the power of the device attached to the other end of the link is off. |
| Not Operational | Off | Off | Yellow Triangle | The Director port is receiving the Fibre Channel not operational sequence (NOS) indicating that the attached device is not operational. |
| Online | On | Off | None | The attached device has successfully connected to the Director and is ready to communicate or is in the process of communicating with other attached devices. As long as the port remains in the online state, the green port LED remains illuminated. Note that on the actual port in the unit, the green LED blinks when there is active Fibre Channel traffic through the port. |

**Table 2–1: Port States and Indicators (Continued)**

| Port State | Port Indicators | | Alert Indicator | Description |
| | Green | Amber | | |
| --- | --- | --- | --- | --- |
| Offline | Off | Off | None | The Director port was configured as "blocked" and is transmitting the Fibre Channel OLS to the attached device. |
| | Off | Off | Yellow Triangle | The Director port was configured as "Unblocked" and is receiving the Fibre Channel OLS indicating that the attached device is offline. |
| Port Failure | Off | On | Red and Yellow Blinking Diamond | The Director port has failed and requires service. The amber LED for the port remains illuminated. |
| Segmented E_Port | On | Off | Yellow Triangle | The E_Port is segmented preventing the two fabrics from joining (this only occurs when two Directors are connected to each other). Display the Port Properties dialog box to view the segmentation reason. |
| Testing | Off | Blink | Yellow Triangle | Port is executing an internal loopback test. |
| | On | Blink | Yellow Triangle | Port is executing an external loopback test. Note: For any loopback test, the amber LED blinks (beacons) to help users locate the port under test. |

# Link Incident Alerts

A link incident is a problem detected on a fiber-optic link, like the loss of light, invalid sequences and other problems. When a problem occurs, a LIN alert is sent to the Link Incident Log in the Director Product Manager. LIN alerts warn you that there is a link incident being detected through a port connection that may require operator intervention to correct.

If LIN alerts are enabled for a port in the Configure Ports dialog box and a link incident has occurred, a yellow triangle (attention indicator) displays by the port connector in the Hardware View and Port Card View and in the Alert column in the Port List View. Clicking on the port in the Port Card View and Port List View with the yellow triangle displays the Port Properties dialog box.

If LIN alerts have been enabled for a port in the Configure Ports dialog box, the Port Properties dialog box contains a short description of the latest incident in the Link Incident field. Or, if there are no active incidents, "None" displays. The system writes all link incidents to the Link Incident Log.

You will receive e-mail notification of LIN alerts if you enable LIN alerts for a port in the Configure Ports dialog box, configure e-mail notification through the SDCM application, and enable E-Mail Notification through the Maintenance menu.

> **NOTE:** The e-mail notification of LIN alerts is available to all users; no user rights are imposed.

Although you can clear the attention indicator in the Hardware View and the alert description in the Port Properties dialog box manually, they may also be cleared by actions outside of your control: such as on SDCM Server reboot.

You can clear the link incident indicator in the Hardware Card View and the description in the Link Incident field manually. To manually clear the attention indicator (yellow triangle), right-click the port with the yellow triangle and select Clear Link Incident Alerts from the menu. In the Clear Link Incident Alerts dialog box, select the appropriate option and click OK. Be aware that clearing the incident indicator clears it for everyone using the system. If there are no link incident alerts enabled for a port, no actions occur.

# Threshold Alerts

A threshold alert notifies Product Manager users when the transmit (Tx) or receive (Rx) throughput reaches specific values for Director ports or port type (E_Ports or F_Ports).

Select the *Threshold Alerts* option on the *Configure* menu to display the *Configure Threshold Alerts* dialog box. Use this dialog box to configure criteria for generating a threshold alert. One criteria that you must configure is a throughput value that equals a specific percentage of the port's total throughput capacity. You also provide a time interval during which throughput is measured and a time interval during which that throughput value must remain constant. When throughput reaches the threshold value and remains constant for the specified time, an alert is generated.

Threshold alerts occur as the following in the Product Manager:

■ An attention indicator (yellow triangle) that displays on the port in the *Port Card View.*

■ An attention indicator (yellow triangle) that displays on the port card in the Hardware *View.*

■ An attention indicator (yellow triangle) that displays in the *Alert* column of the *Port List View.*

■ An attention indicator (yellow triangle) that displays by the *Threshold Alerts* field in the *Port Properties* dialog box.

■ Detailed threshold alert data recorded in the *Threshold Alert Log.*

For detailed procedures to configure threshold alerts, refer to Configure Threshold Alerts on page 3- 18.

*Chapter* **3**

# Configuring the Director

This chapter describes how to use the options that display on the menu when you move the cursor over the Configure icon on the navigation control panel. Each of these options is explained in the following sections.

## Configure Identification

Use the procedure in this section to identify the Director by its name, description, location, and contact person. This information displays in the following Product Manager locations:

■ Product Manager window title panel (name).

■ Director Properties dialog box (name, location, contact, description).

■ Identification table at the top of the Hardware View (name, location, description).

The name also displays in the Director icon label in the Compaq SANworks Director Connectivity Manager (SDCM) Product View, if the product name is enabled through the SDCM application Display Options.

Data entered through the following procedure is saved in nonvolatile random access memory (NV-RAM) on the Director.

### Procedure

To configure identification for the Director, use the following steps:

1. Select Identification from the Configure menu.

   The Configure Identification dialog box displays.
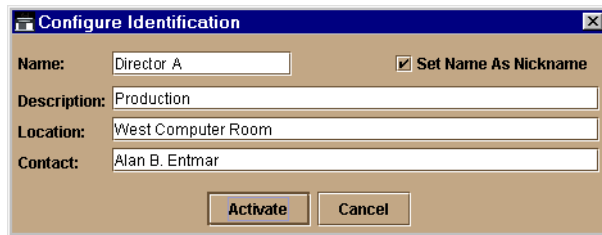
2. Configure Identification Dialog BoxClick in the name field and enter a name for the Director. The name could reflect the Director's Ethernet network domain name service (DNS) host name, if assigned.

3. Click in the Description field and enter a description of the Director.

4. Click in the Location field and enter the location of the Director.

5. Click in the Contact field and enter appropriate information about a contact person, such as a phone number, title, or e-mail address.

6. Click Set Name as Nickname and add a check mark to the check box if you want to use the name in the Name field as a nickname for the Director's WWN. The nickname then displays instead of the WWN in Product Manager views.

7. Click Activate to save the data and close the dialog box.

8. If you are finished configuring the Director, back up the configuration data. For more information, refer to Backup and Restore Configuration on page 5- 5.

# Configure Operating Mode

Use the procedure in this section to change the Director's interoperability (interop) mode.

## Procedure

To configure the operating mode for the Director, use the following steps:

> **NOTE:** The Director must be offline before you change operating modes.

1. If the Director is not offline:

   a. Select Set Online State from the Maintenance menu.

      The Set Online State dialog box displays as shown in Figure 3–1 on page 3-3.

**Set Online State** ⊠

**Current state is ONLINE**

| Set Offline | Cancel |

Figure 3–1: Set Online State Dialog Box (Currently Online)'

    b.  Click Set Offline to set the Director offline.

2.  Select Operating Mode from the Configure menu.

    The Configure Operating Mode dialog box displays.

**Configure Operating Mode** ⊠

Interop Mode    Open Fabric 1.0 ▼

Open Fabric 1.0
Homogeneous Fabric

| Activate | Cancel |
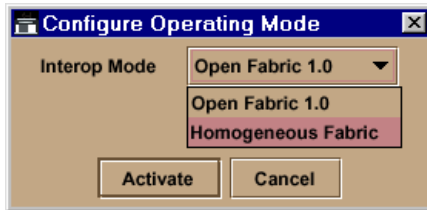
Figure 3–2: Configure Operating Mode Dialog Box

3.  Select either Open Fabric or Homogeneous Fabric mode from the Interop mode drop-down list.

    ❏  Open Fabric - Select this mode if the fabric contains open fabric compliant switches. Select this mode for managing heterogeneous fabrics. We recommend using this mode.

    ❏  Homogeneous Fabric. Select this mode if the fabric contains Directors and switches that are only operating in Homogeneous Fabric mode.

4.  Click Activate to save your changes and to close the dialog box.

5.  Set the Director online:

    a.  Select Set Online State from the Configure menu.

    b.  When the Set Online State dialog box displays, click Set Online to set the Director online.

# Configure Operating Parameters

Use the procedures in this section to configure the following Fibre Channel operating parameters using the Configure Operating Parameters dialog box.

> **NOTE:** Ordinarily, you do not need to change these values from their defaults. The only exception is the Preferred Domain ID. Change this value if the Director will participate in a multiswitch fabric.

## Parameter Descriptions

■ **BB_Credit**

Configure the Director to support buffer-to-buffer credit (BB_Credit) from 1 through 60. This is the value used for all ports, except those configured for extended distance buffering (10–100 km). The default value is 16. For a description of the buffer-to-buffer credit, refer to industry specification, *Fibre Channel Physical and Signaling Interface*.

■ **R_A_TOV**

Configure resource allocation time-out value (R_A_TOV) in tenth-of-a-second increments. This variable works with the error-detect time-out value (E_D_TOV) variable to control the Director's behavior when an error condition occurs. Resources are allocated to a circuit when errors are detected and are not released for reuse until the time set by the R_A_TOV value expires. The default value is 100 tenths (10 seconds). Set a value between 10 tenths and 1200 tenths (1 through 120 seconds).

> **NOTE:** Set the same value for R_A_TOV on all Directors and switches in a multiswitch fabric. If the value is not the same on all units, the fabric segments. Also, the value for R_A_TOV must be greater than the value configured for E_D_TOV.

■ **E_D_TOV**

Adjust the E_D_TOV in tenth-of-a-second increments. An error condition occurs when an expected response is not received within the time limit set by this value. The default value is 20 tenths (2 seconds). Set a value between 2 tenths through 600 tenths (2 through 60 seconds).

> **NOTE:** Set the same value for E_D_TOV on all Directors and Directors in a multiswitch fabric. If the value is not the same, the fabric segments.

■ **Preferred Domain ID**

Use this field to set each Director in the fabric to a unique preferred domain ID. Fibre Channel addresses in the Director include this preferred domain ID to create a unique identification for the port in the fabric. The default value is 1. Set a preferred value from 1 through 31.

The preferred domain ID must be unique for each Director and switch in a fabric. If two Directors or Directors have the same preferred domain ID, the E_Ports segment, causing the fabric to segment.

NOTE: For more information on domain ID, refer to the section on domain ID assignment for multiswitch fabrics in th*e StorageWorks by Compaq SAN Director 64 Planning Guide* (AA-RPLAB-TE) for details.

■ **Switch Priority**

Setting this value determines the principal switch for the multiswitch fabric as follows:

❏ If you set one Director or switch in the fabric to the highest priority of Principal and all others to either Default or Never Principal, you are enabling that unit as the principal switch in the fabric.

❏ If you set more than one Director or switch to Principal, the unit with the lowest world wide name (WWN) number becomes the principal switch, and all the other devices' priority setting is automatically changed to Default.

❏ If you set all the Directors and switches to Default or Never Principal, the unit that is set to Default with the lowest world wide name (WWN) number becomes the principal switch, and all the other devices' priority settings remain unchanged.

❏ If you set all the Directors and switches to Never Principal, no device is the principal switch.

NOTE: Compaq recommends that you leave the switch priority setting as Default. If you are considering setting this value to something other than the default, refer to the section on principal switch selection for multiswitch fabrics in the *StorageWorks by Compaq SAN Director 64 Planning Guide* (AA-RPLAB-TE) for details.

In, for example, the audit log, you may notice that the Principal setting maps to a number code of 1, Default maps to a number code of 254, and Never Principal maps to a number code of 255. The number codes of 2–253 are not now in use.

■ **Rerouting Delay**

Placing a check mark in the check box to the left of the Rerouting Delay option enables rerouting delay. This option is only applicable if the configured Director is in a multiswitch fabric. The default state is disabled.

Enabling rerouting delay ensures that frames are delivered in order through the fabric to their destination. If there is a change to the fabric topology that creates a new path (for example, a new switch is added to the fabric), frames may be routed over this new path if its hop count is less than a previous path with a minimum hop count. This may result in frames being delivered to a destination out of order because frames sent over the new, shorter path may arrive ahead of older frames still in route over the older path.

If rerouting delay is enabled, traffic ceases in the fabric for the time specified in the E_D_TOV field of the dialog box. This delay allows frames sent on the old path to exit to their destination before new frames begin traversing the new path.

The operating parameters are stored in NV-RAM on the switch.

## Procedure

To configure Fibre Channel operating parameters for the Director, use the following steps:

1. Configure the Director offline.

    **NOTE:** Setting the Director offline terminates all Fibre Channel connections.

    a. Select Set Online State from the Maintenance menu.

        The Set Online State dialog box displays as shown in Figure 3–3.



Figure 3–3: Set Online State Dialog Box (Currently Online)

    b. Click Set Offline to set the Director offline.

2. Select Operating Parameters from the Configure menu.

    The Configure Operating Parameters dialog box displays.
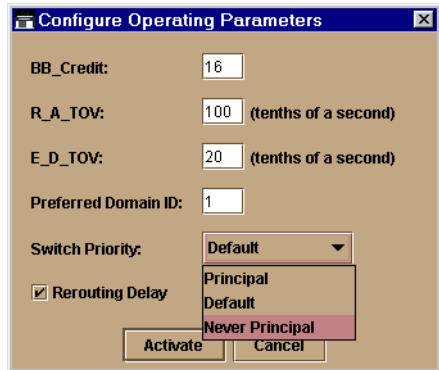
Figure 3–4:  Configure Operating Parameters Dialog Box

> **NOTE:** If the Director is not offline and you click Activate to activate values that you input in this dialog box, a dialog box displays prompting you to set the unit offline. Return to step 1 of this procedure. For more information, refer to Set Online State on page 5- 3.

⚠ **CAUTION:** Setting the Director offline terminates all Fibre Channel connections.

3. Enter data into dialog box fields. Enter as described under Parameter Descriptions on page 3- 4

4. Click Activate to save the configuration and close the dialog box.

5. Set the Director online.

   a. Select Set Online State from the Configure menu.

   b. When the Set Online State dialog box displays, click Set Online to set the Director online.

6. Back up the configuration data when you are finished configuring the Director. For more information, refer to Backup and Restore Configuration on page 5- 5.

# Configure Ports

Use the procedures in this section to configure names, blocked and unblocked state, 10–100 km extended distance buffering, enable or disable link incident (LIN) alerts for ports, port type, WWN binding, and the WWN binding name.

The Port Binding feature must be installed before the WWN Binding and Bound WWN columns can be used. Refer to Configure Feature Key on page 3- 16 to install the Port Binding feature.

Port configuration data is stored in NV-RAM on the switch. Configure data in the following columns of the Configure Ports dialog box:

■ **Port #**

You cannot edit this field. This column identifies the port number. The port numbers range from 0 through 63.

■ **Name**

Enter a name for the port. The port names display in the Port Properties dialog box and elsewhere in the Product Manager to identify the port.

> **NOTE:** To identify port numbers for which you want to provide names, place the cursor over the ports in the Hardware View. As you move over a port, a message displays that identifies the slot number where the port is installed.

■ **Blocked**

Placing a check mark in the check boxes of this column blocks the operation of the port.

■ **10–100Km**

This column is for extended distance buffering. You can enable extended distance for a port even if it is not an extended distance port. However, enabling extended distance buffering on a port disables the ability for the port to send broadcast traffic. When you select this option, the port can support up to 60 buffer-to-buffer credits (BB_Credits) to handle link distances up to 100 km. This enables the port to process 2K frames from attached devices. If this option is not enabled, the port uses the BB_Credit (1–60) configured through the Operating Parameters dialog box.

If a device is connected and logged in to the fabric when extended distance is enabled or disabled on the corresponding port, the switch will send OLS for 5 ms to force the device to log in again and obtain the new BB_Credit value set for the port.

■ **LIN Alerts**

A link incident (LIN) is a problem detected on a fiber optic link, such as the loss of light or invalid sequences. When a problem occurs, a LIN alert is sent to the Link Incident Log in the switch Product Manager. LIN alerts warn you that there is a link incident being detected through a port connection.

Place or remove check marks in the check boxes in this column to enable or disable link incident alerts. The factory default is to enable LIN alerts.

A link incident causes a yellow attention indicator (triangle) to display for the port in the Hardware View, Port Card View, and in the alert column of the Port List View. Once a LIN occurs, you must acknowledge it by selecting the Clear Link Incident Alert option from the right-click menu for the port (Hardware View). A description of the alert displays in the Link Incident field of the Port Properties dialog box (refer to Figure 2–10 on page 2-17).

If the check boxes in this column are not selected, no link incident indicators display in the Hardware View. Also, the Link Incident field of the Port Properties dialog box is blank and a link incident is recorded in the Link Incident Log. LINs are always logged in the Link Incident Log, regardless of the configuration.

If LIN Alerts are enabled, you can receive e-mail notification when a LIN occurs. To receive e-mail notification, you must configure and enable this feature in the Maintenance menu of the SANworks Director Connectivity Manager (SDCM) and enable e-mail notification through the Enable E-Mail Notification option in the Product Manager's Maintenance menu.

For additional information about LIN alerts, refer to Link Incident Alerts on page 2-43.

■ **Type**

Select each port's type (G_Port, E_Port, or F_Port) in this column from the drop-down list.

■ **WWN Binding**

Placing a check mark in the check boxes of this column enables the binding state of the port.

■ **Bound WWN**

If the Bound WWN column is disabled, the Port Binding feature has not been installed. Refer to Configure Feature Key on page 3- 16 to install the Port Binding feature.

Enter the WWN or nickname of the device that is attached to the port.

If the check box in the WWN Binding column is checked and a WWN is entered in the Bound WWN field, only the specified device can attach to the port.

If the check box in the WWN Binding column is checked but no WWN is entered in the Bound WWN field, no device can connect to the port.

If the check box in the WWN Binding column is not checked, any device can connect to the port (provided that the port type matches and the check box in the Blocked column is not checked). Any WWN or nickname entered in the Bound WWN field is, however, stored.

When you click Activate, if the check box in the WWN Binding column is checked and the WWN or nickname in the WWN Binding column does not match the device actually connected to the port, the warning dialog box displays. If you click Continue, the currently attached devices are logged off.

### Warning and Error Messages

When you click Activate, if any node attached to a port does not match the WWN or nickname in that port's Bound WWN column, a warning dialog box displays. If you click Continue, all the nodes listed will be logged off, and the ports will attach to the respective devices identified in the Bound WWN column.

| Port # | Bound WWN | Attached WWN | |
|---|---|---|---|
| 0 | Server 1 | Sun-20:00:08:00:20:00:01:00 | ▲ |
| 1 | Disk Storage 1 | Sun-20:01:08:00:20:00:01:00 | |
| 2 | 10:14:02:1C:10:12:2B:11 | Sun-20:02:08:00:20:00:01:00 | |
| 3 | Server 2 | Emulex-20:03:00:00:C9:00:... | |
| 4 | Server 3 | JNI-20:04:00:E0:69:00:01:00 | |
| 5 | 14:D3:11:06:E8:10:15:09 | 20:05:00:60:48:00:01:00 | |
| 6 | Disk Storage 2 | 20:06:00:60:48:00:01:00 | |
| 7 | Server 4 | 20:07:00:60:48:00:01:00 | ▼ |

**Warning!**
**The bound WWN does not match the currently attached node WWN on the following ports:**

**Continuing will log off the attached nodes.**

[ **Continue** ] [ **Cancel** ]

Figure 3–5: Warning! Dialog Box

When you click Activate, if the format for the WWN or nickname in the Bound WWN column is not valid, an error message displays. For example, the WWN is not in the xx.xx.xx.xx.xx.xx.xx.xx format.

## Menu Options

Menu options are available by right-clicking any column except the Port # column:

- **Name**
  - ❏ **Clear All Port Names—**Clears all port names entered in this column.
- **Blocked**
  - ❏ **Block All Ports—**Places a check mark in all check boxes in the Blocked column and blocks all ports on the switch.
  - ❏ **Unblock All Ports—**Clears all check boxes in the Blocked column and unblocks all ports on the switch.
- **10–100 km**
  - ❏ **Clear All 10–100 km—**Clears all check boxes in the column. No port will be set for extended distance buffering.
  - ❏ **Set All 10–100 km—**Places a check mark in all check boxes in the column and sets extended distance buffering for all ports.
- **LIN Alerts**
  - ❏ **Clear All LIN Alerts—**Clears all LIN Alert check boxes in the column. LIN alerts will be disabled for all ports on the switch.
  - ❏ **Set All LIN Alerts—**Places a check mark in all check boxes in this column. LIN alerts will be enabled for all ports on the switch.
- **Type**
  - ❏ **Set All F_Ports—**Sets all fields in this column to F_Port and configures all ports on the switch as F_Ports.
  - ❏ **Set All G_Ports—**Sets all fields in this column to G_Port and configures all ports on the switch as G_Ports.
  - ❏ **Set All E_Ports—**Sets all fields in this column to E_Port and configures all ports on the switch as E_Ports.
- **WWN Binding**
  - ❏ **Bind All WWNs**—Places a check mark in all check boxes in this column and binds each port to the device with the WWN or nickname entered in the Bound WWN column for that port.
  - ❏ **Unbind All WWNs**—Removes check marks in all check boxes in this column. A device with any WWN can attach to all ports.

❏ **Bind All Ports to Attached WWN**—Places a check mark in all check boxes in this column and binds each port to the device currently attached to that port. The Bound WWN column will display that device's WWN.

❏ **Bind Port to Attached WWN**—Places a check mark in the check box for the port where you clicked to display the menu. This binds that port to the device currently attached to that port. The Bound WWN column will display that device's WWN.

■ **Bound WWN**

❏ **Bind All WWNs**—Places a check mark in all check boxes in this column and binds each port to the device with the WWN or nickname entered in the Bound WWN column for that port.

❏ **Unbind All WWNs**—Removes check marks in all check boxes in this column. A device with any WWN can attach to all ports.

❏ **Bind All Ports to Attached WWN**—Places a check mark in all check boxes in this column and binds each port to the device currently attached to that port. The Bound WWN column will display that device's WWN.

❏ **Bind Port to Attached WWN**—Places a check mark in the check box for the port where you clicked to display the menu. This binds that port to the device currently attached to that port. The Bound WWN column will display that device's WWN.

## Procedure

To configure ports, use the following steps:

1. Select Ports from the Configure menu.

   The Configure Ports dialog box displays.

Figure 3–6:  Configure Ports Dialog Box

Ports are numbered from 0 through 63.

2.  Click a Name field and type a name that reflects the end device connected through the port. For example, use "XYZ Server," where *XYZ* is the brand name of the server.

3.  Block or unblock operation for a port by clicking the check box in the Blocked column. When a check mark displays, the port is blocked.

4.  Enable or disable extended distance buffering for the port by clicking the check box in the 10–100 km column. When a check mark displays, extended distance buffering is enabled.

5.  Enable or disable LIN alerts for the port by clicking the check box in the LIN Alerts column. When a check mark displays, LIN alerts are enabled.

    **NOTE:** The factory default for LIN alerts is enabled.

6.  Select a port type by clicking in the Type field and selecting from the list.

7.  Prevent an unspecified device from being connected to the port by clicking the check box in the WWN Binding column.

8.  Click the Bound WWN field, and type the WWN or nickname of the specific device to be connected to the port.

9. Use the scroll bar on the right side of the Configure Ports dialog box table to display additional ports that you want to configure.

10. Activate changes and close the dialog box by clicking Activate.

11. If you are finished configuring the switch, back up the configuration data. For more information, refer to Backing Up and Restoring Configuration Data on page 3- 29.

# Configure SNMP

Use the procedures in this section to:

■ Configure the SNMP agent that runs on the Director and implements the following MIBs:

❑ MIB-II.

❑ Fibre Channel Fabric Element MIB.

❑ Director private MIB.

❑ Fibre Alliance MIB.

For complete information on objects defined in MIBs and steps to download MIB variables to your SNMP workstation, refer to the *StorageWorks by Compaq SAN Director SNMP Guide* (AA-RQ7BA-TE).

■ Configure network addresses and community names for up to six SNMP trap recipients.

An SNMP trap recipient is a network management station that receives messages through SNMP for specific events that occur on the Director.

■ Define SNMP community names that SNMP managers use for reading variables.

■ Authorize write permissions for writable MIB variables.

> NOTE: SNMP managers may request, but will not receive, traps and SNMP data through SNMP management stations that are not configured with community names.

## Procedure

To configure SNMP traps and assign community names, use the following steps:

1. Select SNMP from the Configure menu.

The Configure SNMP dialog box displays.
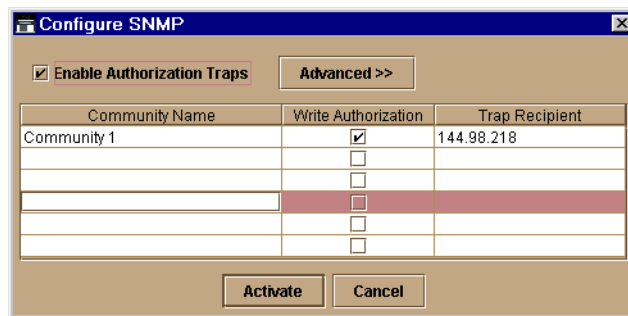
Figure 3–7:  Configure SNMP Dialog Box

2.  Click the Enable Authorization Traps field to enable authorization traps to be sent to SNMP management stations when unauthorized stations try to access SNMP information from the Director.

3.  Click a field in the Community Name column to select the row. Enter the SNMP community name for the trap recipient. Enter up to 32 characters. This also defines community names from which SNMP managers can read MIB variables from or write MIB variables to the Director. Refer to the note under Configure SNMP on page 3- 14 for more information about assigning community names.

4.  Click the Write Authorization check box to enable write authorization for the community name. A check mark displays in the box to indicate that write authorization is enabled.

5.  Enter the IP address for a trap recipient (SNMP management station) by clicking in the Trap Recipient column and entering an IP address.

    **NOTE:**  Steps 6 and 7 usually are not necessary. If you do not wish to override the default UDP number, skip to step 8.

6.  Click Advanced if you wish to override the default user datagram protocol (UDP) trap port number. The dialog box expands to add the UDP Port Number column (Figure 3–8 on page 3-16).

7.  Enter UDP port numbers in the UDP Port Number column. You can override the default UDP port number of 162 with any legal UDP port number (1 to 65535).
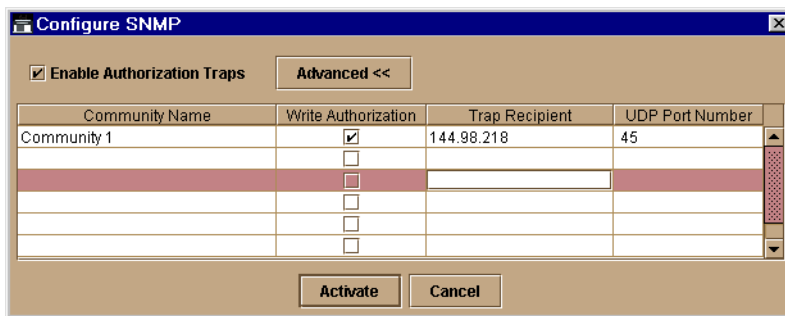
Figure 3–8: Configure SNMP Dialog Box

8. Click Activate to activate the data and close the dialog box.

   The SNMP configuration is stored in NV-RAM on the Director.

9. If you are finished configuring the Director, back up the configuration data. For more information, refer to Backup and Restore Configuration on page 5- 5.

# Configure Management Server

This feature is not supported in this version of the software.

# Configure Feature Key

A feature key is a string of alphanumeric characters that enables optional features for the Product Manager. This feature is not supported in this version of the software.

# Configure Date and Time

Use the procedures in this section to display and change the date and time set on the Director. You must set the current date and time on the Director using this dialog box so the correct time stamps display in the Event Log, Audit Log, Hardware Log, and Link Incident Log.

## Procedure

Set the Director date and time using the following steps:

1. Select Date/Time from the Configure menu.

The Configure Date and Time dialog box displays.

If the Periodic Date/Time Synchronization check box in the Configure Date and Time dialog box is selected, the SDCM Server periodically synchronizes the Director time to the SDCM Server and daylight savings time automatically updates. When the Periodic Date/Time Synchronization option is selected, the Date and Time fields are disabled (grayed out).

If the Periodic Date/Time Synchronization check box is not selected, you can set the SDCM Server date and time manually.
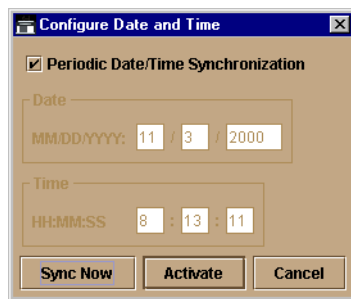


Figure 3–9:  Configure Periodic Date/Time Synchronization

To disable Periodic Date/Time Synchronization, click the check box to remove the check mark, then click Activate. To re-enable Periodic Date/Time Synchronization, click the check box to display the check box, then click Activate.

**NOTE:**  Click Activate to synchronize the date and time at the next update period. Click Sync Now to synchronize the date and time immediately.

2. Perform one of the following steps:

■ To immediately synchronize the Director date and time with the SDCM Server, click Sync Now. Make sure that a check mark is in the Periodic Date/Time Synchronization check box.

**NOTE:**  If you click Activate, the date and time synchronize at the next update period.

■ To synchronize the Director date and time with a specific date and time that you enter:

a. Make sure that Periodic Date/Time Synchronization is disabled (no check). Refer to Figure 3–10 on page 3-18.
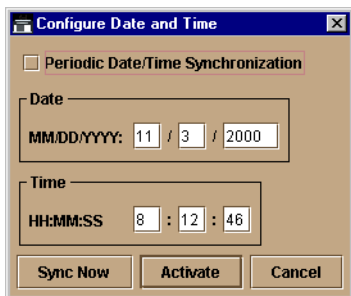
Figure 3–10:  Configure Date and Time Manually

    b.  Click in a Date or Time field that you want to change.

    c.  Delete characters and enter new ones as required or highlight the existing character by dragging the mouse cursor over the character and typing the new character.

      **NOTE:** When entering the hours, use the range of 0 to 23, for minutes and seconds, use the range of 0 to 59.

    d.  Click Activate to set the date and time on the Director.

3.  If you are finished configuring the Director, back up the configuration data. For more information, refer to

# Configure Threshold Alerts

A threshold alert notifies users when the transmit (Tx) or receive (Rx) throughput reaches specified values for specific Director ports or port types, (E_Ports or F_Ports).

You are notified of a threshold alert by:

■  An attention indicator (yellow triangle) that displays on the port in the *Port Card View.*

■  An attention indicator (yellow triangle) that displays on the port card in the *Hardware View.*

■  An attention indicator (yellow triangle) that displays in the *Alert* column of the *Port List View.*

■  An attention indicator (yellow triangle) that displays by the *Threshold Alerts* field in the *Port Properties* dialog box.

■  Detailed threshold alert data recorded in the Threshold Alert Log.

Use the *Threshold Alerts* option on the *Configure* menu to configure the following:

■  Name for the alert.

■  Type of threshold for the alert (Rx, Tx, or either).

■  Active or inactive state of the alert.

■  Threshold criteria:

❏  Percent traffic capacity utilized. This is the percent of the port's throughput capacity achieved by the measured throughput. This setting constitutes the threshold value. For example the value of 50 means that the port's threshold is reached when throughput is 50% of capacity.

❏  Time interval during which throughput is measured and alert notification can occur.

❏  The time that the percentage of throughput capacity (% utilization) must exist during the set time interval before an alert generates.

■  Ports for which you are configuring threshold alerts.

You can configure up to 16 alerts, and any number of alerts can be active at one time.

## Procedures

Use the following procedures to create a new threshold alert, or to modify, activate, deactivate, or delete an alert.

### Create New Alerts

1.  Select *Threshold Alerts* from the *Configure* menu.

The *Configure Threshold Alerts* dialog box displays.
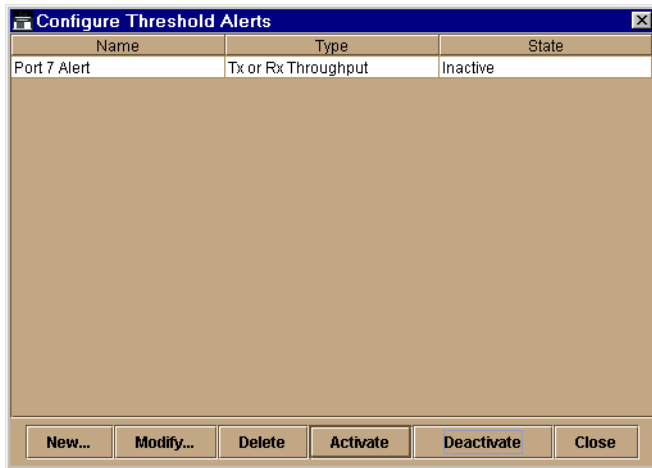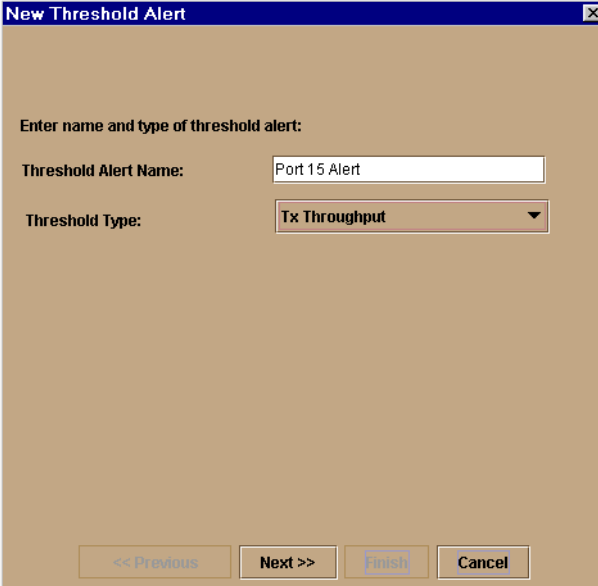


Figure 3–11: Configure Threshold Alerts Dialog Box

If alerts are configured, they will display in table format showing the name of the alert, type of alert (Rx, Tx, or Rx or Tx), and alert state (inactive or active).

2. Click *New*

The *New Threshold Alert* dialog box displays.



Figure 3–12:  New Threshold Alerts Dialog Box - First Screen

3. Enter a name from one to 64 characters in length. All characters in the ISO Latin-1 character set, excluding control characters, are allowed.

4. Select one of the following from the drop-down list under the *Name* field:

   a. *RX Throughput.* An alert will occur if the threshold set for receive throughput is reached.

   b. *Tx Throughput.* An alert will occur if the threshold set for transmit throughput is reached.

   c. *Rx or Tx Throughput.* An alert will occur if the threshold set for either receive or transmit throughput is reached.

5. Click *Next.*

   A new screen appears with additional parameters. The name configured for the alert appears at the top of the screen.

   ❏ Click *Previous* if you need to return to the previous screen.
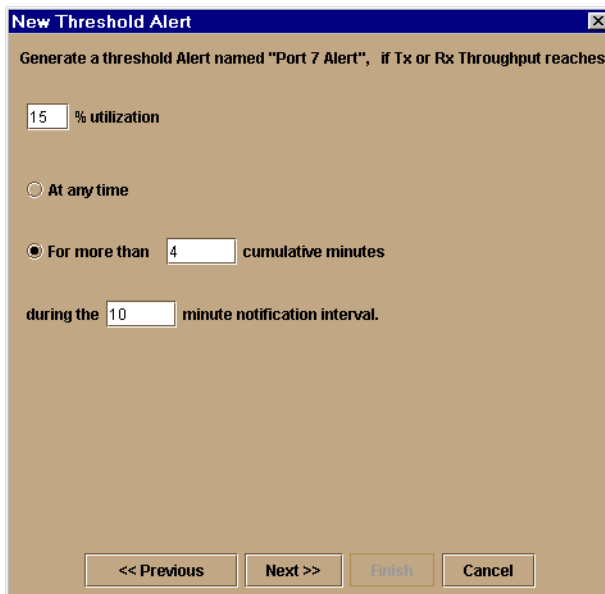
Figure 3–13: New Threshold Alerts Dialog Box - Second Screen

6. Enter a percentage from 1 through 100 for *% utilization.* When throughput reaches this percentage of port capacity, a threshold alert will occur.

7. Enter the amount of cumulative minutes in which the *% utilization* should exist during the notification interval before an alert is generated. You can also select *At any time* if you want an alert to occur whenever the set *% utilization* is reached. The valid range is 1 to the interval set in step 8.

8. Enter the interval in minutes in which throughput is measured and threshold notifications can occur. The valid range is 5 minutes to 70,560 minutes.

9. Click *Next.*

A new screen appears for selecting ports for the alerts.
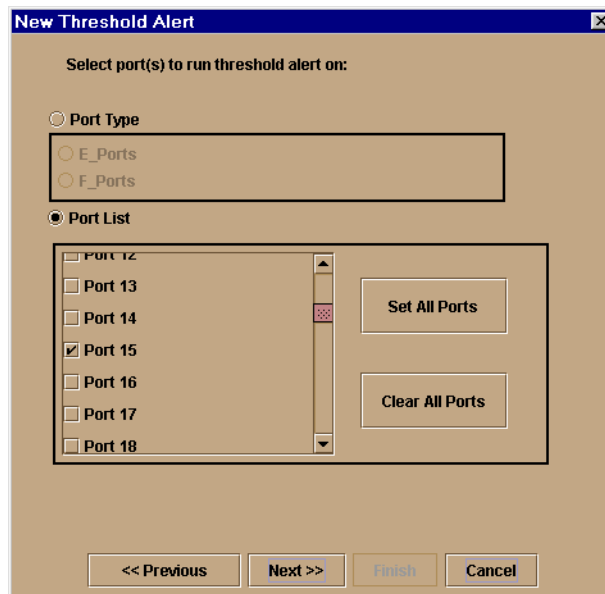


Figure 3–14:  New Threshold Alerts Dialog Box - Third Screen

10. Either select Port Type or Port List.

❏ If you select *Port Type,* selecting either E_Ports or F_Ports will cause this alert to generate for all ports configured as E_Ports or F_Ports respectively.

❏ If you select *Port List,* you can select individual ports by clicking the check box by each port number or set all ports. Selecting *Set All Ports* places a check mark by each port number. Selecting *Clear All Ports* will clear the check marks by each port number.

11. Click *Next.*

A final screen appears to provide a summary of your alert configuration. To make any changes, move backwards and forwards through the configuration screens by selecting the *Previous* and *Next* buttons.
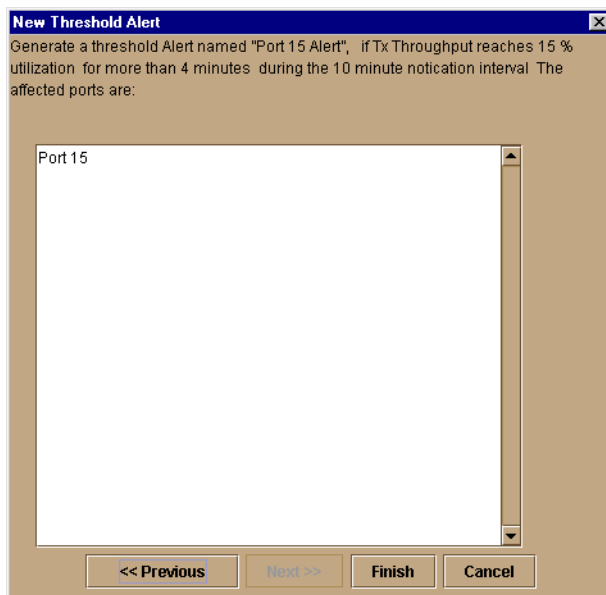


Figure 3–15: New Threshold Alerts Dialog Box - Summary Screen

12. Select *Finish.*

The *Configure Threshold Alerts* dialog box appears listing the name, type, and state of the alert that you just configured.

13. At this point, the alert is not active. To activate the alert, select the alert information that displays in the *Configure Threshold Alerts* table and select *Activate.*
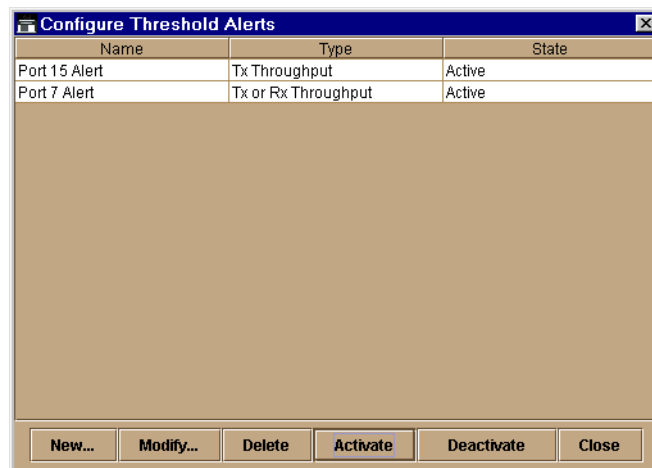


Figure 3–16: Configure Threshold Alerts Dialog Box - Alert Activated

## Modify Alerts

Use the following steps to modify an existing threshold alert configuration.

1. Select *Threshold Alerts* from the *Configure* menu.

   The *Configure Threshold Alerts* dialog box displays.

2. Select the alert that you want to modify by clicking the alert information in the table.

3. If the alert is active, select *Deactivate,* then select the alert information in the table again.

4. Select *Modify.*

   **NOTE:** If the alert is active, an error message displays prompting you to deactivate the alert.

   An initial *Modify Threshold* screen appears where you can change the threshold type.

5. Select a threshold type from the drop-down list.

6. Select *Next* when you are done. A *Modify Threshold* screen appears where you can change the % utilization, cumulative minutes for the threshold to occur before notification, and the time interval for measuring throughput and for alert notification.

7. Make appropriate changes, then continue through the *Modify Threshold* screens, making changes as necessary, until the summary screen appears displaying the alert configuration.

8. Perform either of the following steps:

    a. If you need to change any parameters, select *Previous* and *Next* to display the desired *Modify Threshold* screen.

    b. Select *Finish* when you are done.

## Activate or Deactivate Alerts

Use the following steps to activate or deactivate existing threshold alerts. In the active state, notifications are generated for the alert. In the inactive state, notifications do not occur.

1. Select *Threshold Alerts* from the *Configure* menu.

    The *Configure Threshold Alerts* dialog box displays. The port's current state, inactive or active, is listed under the *State* column.

2. To change the state, select the alert by the alert information in the table.

3. If the alert is active, select *Deactivate* to change to the inactive state. If the alert is inactive, select *Activate* to change to the active state.

## Delete Alerts

Use the following steps to delete existing threshold alerts.

1. Select *Threshold Alerts* from the *Configure* menu.

    The *Configure Threshold Alerts* dialog box displays.

2. Select the alert that you want to delete by selecting the alert information in the table.

3. Select *Delete.*

    A message displays asking you to confirm the deletion.

4. Select Yes.

    The alert is removed from the dialog box.

# Export Configuration Report

Use this option to save an ASCII file of configuration data currently saved in Director NV-RAM to your hard drive or a diskette. Use any desktop publishing application to import this ASCII file for viewing or printing.

> **NOTE:** This file cannot be used to set configuration parameters through the Product Manager.

Data in the file includes:

■ **Product identification**

Data input into the Configure Identification dialog box.

■ **Operating parameters**

Data input into the Operating Parameters dialog box.

■ **Port parameters**

Data input into the Configure Ports dialog box.

■ **SNMP parameters**

Data input into the Configure SNMP dialog box.

■ **Active zoning configuration**

This specifies the active zone and zone members, if set, and whether the default zone is enabled or disabled.

## Procedure

To export a configuration report:

1. Select Export Configuration Report from the Configure menu.

   The Export Configuration Report dialog box displays.
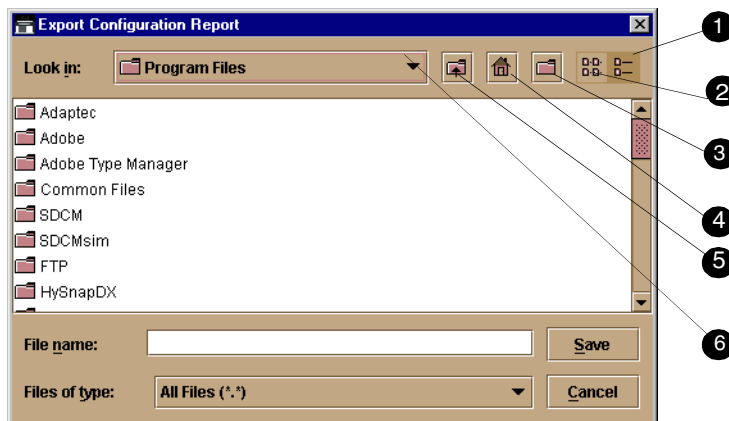
Figure 3–17:  Export Configuration Report Dialog Box

The Export Configuration dialog box contains the following features as called out in
Figure 3–17:

❶   Details button

❷   List button

❸   Create New Folder button

❹   Home button

❺   Go Up One Level button

❻   Drive List drop-down list

2.  Select the folder where you want to save the file.

3.  Type in a file name and extension in the File name field.

4.  Click Save.

The file saves to the specified folder as an ASCII text file.

# Enable Embedded Web Server

Select this option by placing a check mark in the check box to enable the Embedded Web
Server Interface on the Director. Select the option again to remove the check mark and
disable the Embedded Web Server Interface. When disabled, users at remote workstations
cannot access the interface.

# Enable Telnet

Select this option by placing a check mark in the check box to enable telnet access to the Director. Select the option again to remove the check mark and disable telnet access. When disabled, users at remote workstations cannot access the Director through telnet to use the Command Line Interface (CLI) or perform other tasks.

# Backing Up and Restoring Configuration Data

Use the Backup and Restore Configuration option to back up the NV-RAM configuration, which includes all of the data that you input through instructions in this chapter, This option is available through the Maintenance menu. Selecting this option backs up the configuration data to a file on the SDCM Server hard drive. The restore function writes this data back to NV-RAM on the Director. Using the restore function overwrites the existing configuration. For more information, refer to Backup and Restore Configuration on page 5- 5.

In addition to the *Backup and Restore Configuration* option, the Iomega QuikSync application backs up configuration and other critical data from the SDCM Server automatically. As long as a Zip disk remains in the Zip drive of the SDCM Server, data backs up to the Zip disk whenever the directory contents change or you reboot the SDCM Server. For more information, refer to Backing Up and Restoring Product Manager Data on page 1- 35.

> **NOTE:** Compaq doesn't recommend changing the default QuikSync settings.

*Chapter* **4**

# Using Logs

This chapter describes the StorageWorks SAN Director 64 logs. To access these logs, place the cursor over the Logs icon and select one of the following options from the menu:

■ Audit Log

■ Event Log

■ Hardware Log

■ Link Incident Log

■ Threshold Alert Log

## Using Logs

The Audit, Event, Hardware, and Link Incident logs store up to 1000 entries each. The most recent entry displays at the top of the log. After 1000 entries are stored, new entries overwrite the oldest entries.

### Button Function

Button function is the same for all logs:

■ **Clear**

Clicking the Clear button clears all entries in the log for all users. A warning dialog box displays requesting confirmation that you want to clear all entries in the log.

■ **Refresh**

Clicking the Refresh button reads the current data and refreshes the screen with the new display.

■ **Close**

Closes the log and displays the Director Product Manager window.

■ **Export**

Clicking Export on a log window displays the Save dialog box shown in Figure 4–1. Click the Home icon to return to the files in your home directory. The folders listed in the display area of the Save dialog box, after clicking the Home icon, are those that are stored in your home directory. If you choose, you may create a folder for your home directory and save the file there.

To save a log file in American Standard Code for Information Exchange (ASCII) format to a location on your system's hard drive or to a diskette, use the following steps. You can open this file in any desktop publisher for viewing or printing.

1. Click Export on the log window to display the Save dialog box.

   This dialog box contains the following controls as shown in Figure 4–1:

❶ Drop-down list for drives.

❷ Go up one level button.

❸ Home directory button.

❹ List button.

❺ File details button.

❻ Create new folder button.
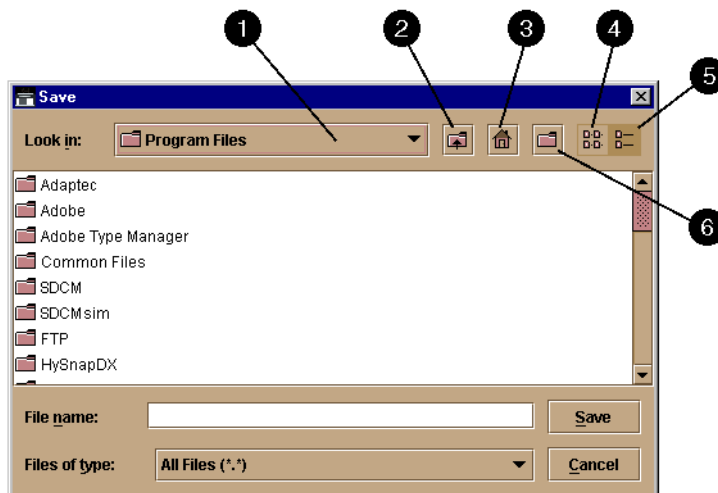


Figure 4–1: Save Dialog Box - Log Windows

2. In the Save dialog box, select the folder where you want to save the file.

3. Type in a file name and extension in the File Name field.

4. Click Save.
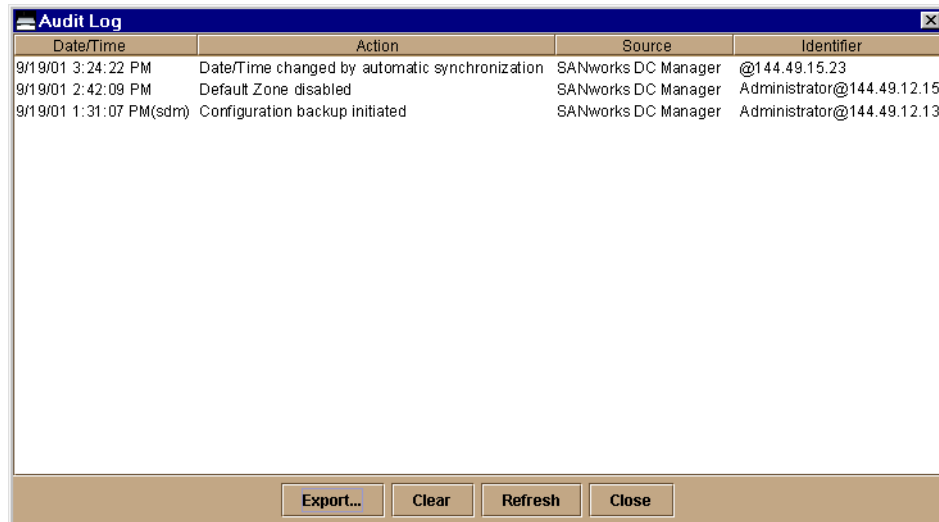
The file saves to the specified folder as an ASCII text file.

## Expanding Columns

Expand columns in logs by placing the cursor over the line separating column headings until a double arrow appears, then hold down the left mouse button and widen the column as necessary.

# Audit Log

The audit log displays a history of all configuration changes applied to the Director from any source such as SDCM, SNMP management stations, or host.



Figure 4–2: Audit Log

Some actions, such as backing up configuration data and enabling automatic date/time synchronization, are performed only by the SANworks Director Connectivity Manager (SDCM) Server without Director interaction. These actions are indicated when SANworks DC Manager displays in the Source column (refer to Figure 4–2). If SANworks DC Manager does not display, the time stamp is from the Director.

■ **Date/Time**

The date and time of the change on the Director.

■ **Action**

User action that caused the configuration change, such as offline status, port name change, or change of address.

■ **Source**

Identifies the user making the change through the Director Product Manager and IP or DNS host name address of the remote user's workstation.

❏ Maintenance Port: Change was made by a user connected to the maintenance port.

❏ SDCM application: Change was made by a Product Manager user.

❏ SNMP: Change was made by a remote SNMP management station.

❏ Fabric: Change was initiated by another Director in the fabric that is not managed by this SDCM Server.

❏ Web server: Change was made by a user through the embedded web server interface.

■ Identifier - Identifies the user making the change according to the source:

❏ Maintenance Port: No entry displays.

❏ SDCM application: Includes user@address, where "user" is the Product Manager user name, and "address" is the network address of the workstation (remote user workstation or SDCM Server).

❏ SNMP: Contains the network address of the SNMP management station.

❏ Fabric: No entry displays.

❏ Web Server:  The Identifier column contains user@address, where "user" is the web server user name and "address" is the network address of the web user.

# Event Log

The event log provides a record of significant events that have occurred on the Director, such as hardware failures, degraded operation, port problems, FRU failures, FRU removals and replacements, port problems, Fibre Channel link incidents, and SDCM Server-to-Director communication problems. The information is useful to maintenance personnel for fault isolation and repair verification.

| Date/Time | Event | Description | Severity | FRU-Position | Event Data |
|---|---|---|---|---|---|
| 12/5/00 10:34:59 AM | 071 | Switch has become isolated. | Informational | | FF 00 00 00 04 00 00 00 1E 00 00 00 |
| 12/4/00 1:54:22 PM | 203 | Power supply AC voltage recovery. | Informational | PWR-0 | |
| 12/4/00 1:54:21 PM | 200 | Power supply AC voltage failure. | Major | PWR-0 | |
| 12/4/00 1:54:20 PM | 207 | Power supply installed. | Informational | PWR-0 | |
| 12/4/00 1:54:14 PM | 416 | Backup CTP installed. | Informational | CTP-1 | 38 30 33 32 32 31 36 36 00 00 30 31 2E 30 30 2E 30 30 2( |
| 12/4/00 1:54:04 PM | 206 | Power supply removed. | Informational | PWR-0 | |
| 12/4/00 1:54:04 PM | 416 | Backup CTP installed. | Informational | CTP-1 | 38 30 33 32 32 31 36 36 00 00 00 00 00 00 00 00 00 00 00 |
| 12/4/00 1:54:02 PM | 410 | CTP card reset. | Informational | CTP-0 | 00 |
| 12/1/00 1:52:07 PM | 510 | SFP optics hot insertion initiated. | Informational | GSF1-7 | 1E FF FF FF 9B 79 C9 0A FF FF FF FF FF FF FF FF FF F |
| 12/1/00 1:52:03 PM | 513 | SFP optics hot removed | Informational | GSF1-7 | 1E FF FF FF 7E 68 C9 0A FF FF FF FF FF FF FF FF FF F |
| 12/1/00 11:26:12 AM | 508 | Fibre Channel port anomaly detected. | Informational | GSF1-10 | 29 0D FF FF F6 E3 43 0A 29 00 FF FF FF 29 00 FF FF FF F |

Export...    Clear    Refresh    Close

Figure 4–3:  Event Log

All detected firmware faults and hardware failures are sent to the SDCM Server and recorded in the event log. The log provides a maximum of 1000 log entries before it wraps and overwrites the oldest entries.

For detailed information on event data and problem resolution, refer to the *StorageWorks by Compaq SAN Director 64 Service Manual* (AA-RPL8B-TE).

Each log entry includes the following:

■ **Date/Time**

The date and time of the event on the Director.

■ **Event**

Events are identified by a unique code.

Event codes include:

#### Table 4–1:  Event Codes

| Code | Event |
|------|-------|
| 000–199 | System events |
| 200–299 | Power supply events |
| 300–399 | Fan module events |
| 400–499 | CTP card events |
| 500–599 | Port (FPM) card events |
| 600–699 | SBAR card events |
| 800–899 | Thermal events |

■ **Description**

A short description of the event.

■ **Severity**

There are four classifications of severity that identify the importance of the event.

    0—Informational

    2—Minor

    3—Major

    4—Severe (not operational)

■ **FRU Position**

An acronym representing the FRU type, followed by a number representing the FRU chassis position. FRU acronyms are:

❑ **BKPLNE**—backplane.

❑ **CTP**—control processor (CTP) card.

❑ **SBAR**—serial crossbar (SBAR) card.

❑ **FPM**—fiber port module (FPM) card.

❑ **FAN**—fan module.

❑ **PWR**—power supply.
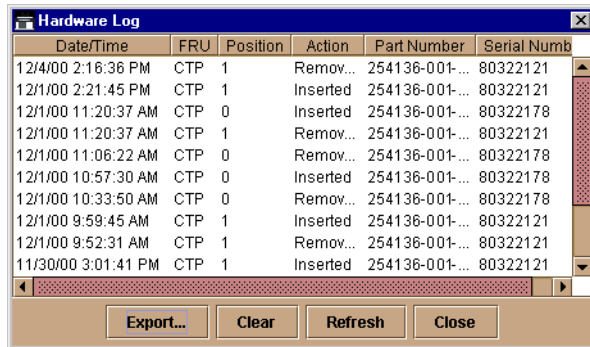
The chassis (slot) position for a nonredundant FRU is **0**. The chassis positions for redundant FRUs are **0** and **1**. The chassis positions for FPM cards are **0** through **15**.

■ **Event Data**

Up to 32 bytes of supplementary information for the event in hexadecimal format. For detailed information on event data and problem resolution, refer to the event code tables appendix in the *StorageWorks by Compaq SAN Director 64 Service Manual* (AA-RPL8B-TE).

# Hardware Log

The hardware log displays information on FRUs inserted and removed from the Director.



Figure 4–4:  Hardware Log

Each log entry includes the following:

■ **Date/Time**

Date and time of the insertion or removal of the FRU.

■ **FRU**

The name of the inserted or removed FRU.

**Table 4–2:  FRU Names**

| FRU Code | FRU Name |
|----------|----------|
| FAN | Fan module |
| PWR | Power supply module |
| CTP | Control processor |
| SBAR | SBAR card |
| BKPLNE | Backplane |
| FPM | FPM card |

- **Position**

  Slot position in the chassis relative to identical components installed.

- **Action**

  Inserted or removed.

- **Part Number**

  Part number of the component.

- **Serial Number**

  Serial number of the component.

# Link Incident Log

The link incident log displays the 1000 most recent link incidents with the date the incident occurred, the time it occurred, and the port on which the incident took place. The information is useful to maintenance personnel for isolating port problems [particularly expansion port (E_Port) segmentation problems] and repair verification.



Figure 4–5: Link Incident Log

Each log entry contains:

- **Date/Time**

  The date and time of the incident.

- **Port**

  The number of the port on which the incident occurred.

- **Link Incident**

  A short description of the incident. The following events may cause a link incident to be written to the log.

  - Implicit incident.

    The attached node detects a condition that may cause problems on the link.

  - Bit-error threshold exceeded.

    The number of code violation errors has exceeded threshold.

  - Loss-of-signal or loss-of-synchronization. This occurs if a cable is unplugged from an attached node.

    Loss-of-synchronization condition has persisted for longer than the resource allocation time out value (R_A_TOV).

  - Not-operational (NOS) primitive sequence received.

    A NOS was recognized.

  - Primitive sequence timeout.

    Link reset protocol timeout occurred.

    Timeout occurred for an appropriate response while in NOS receive state and after NOS is no longer recognized.

  - Invalid primitive sequence received for the current link state.

    Either a link reset or a link reset response primitive sequence was recognized while waiting for the offline sequence.

Refer to the diagnostics chapter in the *StorageWorks by Compaq SAN Director 64 Service Manual* (AA-RPL8B-TE) for corrective actions in response to these link incident messages.

# Threshold Alert Log

This log provides details of threshold alert notifications. Besides the date and time that the alert occurred, the log also displays details about the alert as configured through the *Configure Threshold Alerts* option under the *Configure* menu.



Figure 4–6: Threshold Alert Log

- **Date/Time**

  Date and time stamp for when the alert occurred.

- **Name**

  Name for the alert as configured through the *Configure Threshold Alerts* dialog box.

- **Port**

  Port number where the alert occurred.

- **Type**

  The type of alert: transmit (Tx) or receive (Rx).

■ **Utilization %**

Percent usage of traffic capacity. This is the percent of the port's throughput capacity achieved by the measured throughput. This setting constitutes the threshold value and is configured through the *Configure Threshold Alerts* dialog box. For example, a value of 25 means that threshold occurs when throughput reaches 25 percent of the port's capacity.

■ **Alert Time**

The time that the utilization % must exist before an alert is generated. This is set through the *Configure Threshold Alerts* dialog box.

■ **Interval**

The time interval during which the throughput is measured and an alert can generate. This is set through the *Configure Threshold Alerts* dialog box.

*Chapter* **5**

# Using Maintenance Features

This chapter describes how to use the options that display on the menu when you move the cursor over the Maintenance icon on the navigation control panel.

## Run Port Diagnostics

The Port Diagnostics option enables you to run internal and external loopback tests on any port or all ports on an FPM card. To use this option, follow the detailed steps in the *StorageWorks by Compaq SAN Director 64 Service Manual* (AA-RPL8B-TE).

## Collect Maintenance Data

The Collect Maintenance Data option enables you to collect maintenance data that can help support personnel diagnose system problems. Save the maintenance data as a .zip file on a Zip disk (or other medium with the appropriate capacity), and forward it to technical support personnel.

To use this option, follow the detailed steps in the *StorageWorks by Compaq SAN Director 64 Service Manual* (AA-RPL8B-TE).

# Execute an IPL

⚠️ **CAUTION:** The Ethernet connection between the Compaq SANworks Director Connectivity Manager (SDCM) Server and Director is interrupted momentarily during an IPL.

**NOTE:** An initial program load (IPL) is not intended for ordinary or casual use and should only be performed if the active control processor (CTP) card is suspected to be faulty. This operation resets the active CTP card (an IML resets both CTP cards). Do not use this option unless directed by your support representative or if you need to reset a failed CTP card.

If it is necessary for you to execute an IPL on the Director, use the following steps:

1. Select IPL from the Configure menu.

   A dialog box displays confirming the IPL.
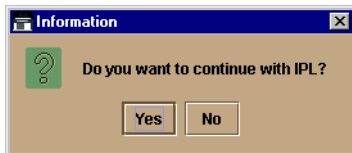


Figure 5–1: IPL Confirmation Dialog Box

2. Click Yes.

Selecting IPL from the Maintenance menu causes Ethernet connection between the Director and SDCM Server to drop momentarily. The following occurs in the Product Manager window:

■ As the network connection drops, the Director Status table on the Hardware View turns yellow.

■ The Status field in the table displays "No Link" and the State field displays the reason for no link.

■ A grey square displays in the alert panel. Refer to Table 1–1 for an explanation of this alert panel display.

■ The FRUs in the illustration in the Hardware View do not display. They display again as the connection is reestablished.

For details on functions performed by an IPL, refer to the *StorageWorks by Compaq SAN Director 64 Service Manual* (AA-RPL8B-TE).

# Set Online State

Use the procedure in this section to display the current Director operating state (offline or online) and change the state as required.

The Director can have one of the following operational states:

■ **Online**

When the Director is in the online state, all of the unblocked ports are allowed to log in to the fabric and to begin communicating. Devices can connect to the Director and communicate with another device if:

■ The port is not blocked.

■ If the default zone is enabled or both devices are in the same zone.

■ **Offline**

When the Director is in the offline state, all the installed ports are offline. The ports transmit an OLS (offline sequence), and they cannot accept a login for connection from an attached device. All ports in the Director, including E_Ports, are placed offline regardless of whether they were blocked or unblocked and the Director is removed from a multiswitch fabric.

> △ **CAUTION:** Before setting the Director offline, warn administrators and users currently operating devices that are attached to the Director that it is going offline and that there will be a disruption of communications. Make sure administrators of devices attached to ports quiesce Fibre Channel traffic through the Director.

To set the Director online or offline (depending on current state), right-click on the Director in the Hardware View and select Set Online State from the menu, or use the following steps:

1. Select Set Online State from the Maintenance menu.

   One of the following dialog boxes displays, depending on the current operating state.



Figure 5–2: Set Online State Dialog Box (State Is Offline)

Figure 5–3:  Set Online State Dialog Box (State Is Online)

2.  Click Set Offline or Set Online, depending on the operating state you want to set.

3.  When a warning box displays requesting you to confirm the offline or online state, click OK.

As the Director goes offline, "OFFLINE" displays in the State field of the Director Status table in the Hardware View. LED indicators on all ports with attached devices stay green, but the Director is sending offline sequences (OLS) to these devices.

# Manage Firmware Versions

Firmware refers to the internal operating code for the Director. You can maintain up to eight firmware versions on the SDCM Server for downloading to a Director. To use the Firmware Library option to manage firmware versions, follow the steps in the *StorageWorks by Compaq SAN Director 64 Service Manual* (AA-RPL8B-TE).

# Enable E-Mail Notification

E-mail addresses and the simple mail transfer protocol (SMTP) server address for e-mail notification of Director events must be configured through the SDCM application. Refer to the *SANworks by Compaq Director Connectivity Manager User Guide* (AA-RPL7B-TE) for instructions on configuring e-mail.

> **NOTE:**  E-mail recipients are configured in the SDCM application through the Configure E-Mail dialog box. A valid SMTP address is configured in this dialog box.

Use the Enable E-Mail Notification function on the Product Manager to enable e-mail notification for events that occur on a selected Director. The default state is disabled.

To enable e-mail notification, use the following steps:

1.  Select Enable E-Mail Notification from the Maintenance menu.

2.  To enable e-mail notification, select the option to add a check mark to the check box.

3.  To disable e-mail notification, select the option to remove the check mark from the check box.

# Enable Call-Home Notification

The call-home feature enables the SDCM Server to automatically contact a support center to report system problems. The support center server accepts calls from the SDCM Server, logs reported events, and notifies one or more support center representatives.

Use the Enable Call Home Notification function on the Product Manager to enable call-home notification for events that occur on the selected Director. The default state is disabled.

> **NOTE:** You must enable Call-Home Event Notification through the SANworks Director Connectivity Manager application Maintenance Menu before enabling this function through the Product Manager for individual Directors.

> **NOTE:** Call-home notification requires installation of Compaq Proactive Service software. This service is offered at no additional charge for subsystems covered under an on-site warranty or on-site storage hardware support contract. To register or order Proactive Services software, contact your Compaq customer service representative.

To enable call-home notification for a Director, select Enable Call Home Notification from the Maintenance menu.

A check mark displays next to the menu option to indicate that call-home notification is enabled.

# Backup and Restore Configuration

Select this option to save the product configuration stored on the Director to the SDCM Server hard disk, or to restore the product configuration from the SDCM Server. Only a single copy of the configuration is kept on the server.

The purpose of the backup is primarily for single-CTP systems, such as the Director, where a backup is needed in order to restore a replacement CTP card. You can also use this feature for a special purpose configuration or for temporary testing of a configuration. You cannot modify the location and file name of the saved configuration.

> **NOTE:** You can only restore the configuration to a Director with the same IP address.

1. Select Backup and Restore Configuration from the Maintenance menu to display the Backup and Restore Configuration dialog box.
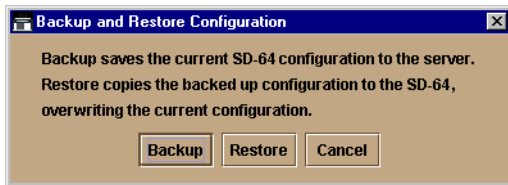
Figure 5–4: Backup and Restore Configuration Dialog Box

The Backup and Restore dialog box consists of a short description of the features performed when you select Backup or Restore.

2. Click Backup to save the current Director configuration to the SDCM Server. The following is a list of configurations that are backed up to the SDCM Server:

   ❏ Identification data (Director name, description, and location).

   ❏ Port configuration data (port names, blocked states, and extended distance settings).

   ❏ Operating parameters (BB_Credit, E_D_TOV, R_A_TOV, Director priority, and preferred domain ID).

   ❏ SNMP configuration (trap recipients, community names, and write authorizations).

   ❏ Zoning configuration (active zone set and default zone state).

   A backup is immediately attempted when you click Backup on this dialog box. A dialog box displays to confirm that the backup to the server is complete. If the backup fails, a dialog box displays to inform you that the backup to the server failed.

3. Set the Director to offline before performing the restore function. If you select Restore and the Director is online, a message dialog displays requesting that you turn the Director offline. No action takes place when you close the dialog box. For instructions on setting the Director offline or online, refer to Set Online State on page 5- 3.

4. Click Restore on the Backup and Restore Configuration dialog box to copy the backed up configuration to the nonvolatile random access memory (NV-RAM) on the Director.

   If the Director is already offline and you click Restore, a confirmation dialog box displays indicating that the restore will overwrite any existing configurations already on the Director and it displays the date of the restored backup.

   **NOTE:** The restore operation initiates an IPL.

   The Export Configuration Report function accessed through the Configure icon on the navigation control panel is an ASCII file of the backup performed in this section.

# Reset Configuration

This feature is used to reset all configuration data for the Director to factory default values.You must have maintenance authorization rights to access this feature.

The internet protocol (IP) address will reset to the factory default value during this procedure, you may not recover the Ethernet connection between the Director and SDCM Server if you have changed the Director's IP addressing from that default value. In this case you must reenter LAN addressing, such as IP and gateway addresses, through a terminal attached to the maintenance port.

Before using the reset configuration option, record the Director's current IP address, which displays below the switch's icon in the SDCM application's Product View when the view's Display Options are set to Network Address. You can also find the current IP address through the embedded web-server interface.

After resetting the configuration, reset LAN addressing to the desired values through the maintenance port or the embedded web-server interface.

> **NOTE:** Use of the maintenance port is not covered in this manual. Refer to the installation chapter in the *StorageWorks by Compaq SAN Director 64 Service Manual* (AA-RPL8B-TE) for procedures.

Use the following steps to reset the configuration parameters on the Director to the default values.

1. Select Reset Configuration from the Maintenance menu. The following warning displays:

   > ⚠ **WARNING:** This operation will reset all Director configuration data and nonvolatile settings to factory default values. The Director must be offline to continue.

2. Set the Director offline. For instructions, refer to Set Online State on page 5- 3.

3. To continue the reset operation, click Reset on the Reset Configuration dialog box. If you want to cancel the operation, click Cancel.

**Table 5–1: Data Default Values**

| Configuration | Description | Default |
| --- | --- | --- |
| Identification | Director Name | NULL string |
| | Director Description | "Fibre Channel Director" |
| | Director Contact | "End User Contact (please configure)" |
| | Director Location | "End User Contact (please configure)" |
| Ports | Port Names | NULL strings |
| | Port Blocked States | Unblocked |
| | Extended Distance (10-100km) | Disabled |
| | LIN Alerts | Disabled |
| | Port Address | Port number plus 4 |
| Director Addressing | IP Address | 10, mac[3], mac[4], mac[5] converted to word32 |
| | | MAC addresses are set in hexadecimal; IP addresses in decimal. A MAC address of 08 00 88 **20 00 57** will be reset to an IP address of 10.**32**.**0**.**87**. |
| | Subnet Mask | 255.0.0.0 |
| | Gateway Address | 0.0.0.0 |
| | MAC Address | PROM value |
| Operating Parameters | Preferred Domain ID | 1 |
| | Buffer-to-Buffer Credit | 16 |
| | R_A_TOV | 10 seconds (100 tenths) |
| | E_D_TOV | 2 seconds (20 tenths) |
| | Director Priority | 254 |
| | Rerouting Delay | Disabled |
| SNMP | SNMP Communities | "public" — 5 NULL strings |
| | SNMP Write Authorizations | Read only per community |
| | Trap Recipient IP Addressees | 0 for each |
| | UDP Port | 162 |
| | SNMP Authorization Trap State | 5 |

**Table 5–1:  Data Default Values (Continued)**

| Configuration | Description | Default |
|---|---|---|
| Zoning | Number of Zone Members | 0 |
| | Number of Zones | 0 |
| | Number of Zone Sets | 0 |
| | Zone Names | None |
| | Zone Sets Names | None |
| | Zone Members | None |
| | Default Zone State | Enabled |
| | Active Zone Set State | Disabled |
| | Active Zone Set Name | NULL string |

# Appendix *A*

# Information and Error Messages

This appendix lists information and error messages in alphabetical order that appear in pop-up message boxes at the SANworks Director Connectivity Manager (SDCM), Fabric Manager, and SANworks SAN Director 64 Product Manager applications.

The first section of the appendix lists SDCM and Fabric Manager messages. The second section lists Product Manager messages. The text of each message is followed by a description and recommended course of action.

# SDCM and Fabric Manager Messages

This section lists SDCM and Fabric manager information and error messages in alphabetical order.

## Table A–1:  SDCM Messages

| Message | Action | Description |
|---|---|---|
| An SDCM application session is already active from this workstation. | Only one instance of the SDCM application is allowed to be open per remote workstation. | Close all but one of the SDCM application sessions. |
| Are you sure you want to delete this nickname? | The selected nickname will be deleted from the list of nickname definitions. | Click Yes to delete the nickname or No to cancel the operation. |
| Are you sure you want to delete this product? | The selected product will be deleted from the list of product definitions. | Click Yes to delete the product or No to cancel the operation. |
| Are you sure you want to delete this user? | The selected user will be deleted from the list of user definitions. | Click Yes to delete the user or No to cancel the operation. |
| Are you sure you want to delete this zone set? | The selected zone set will be deleted from the zone library. | Click Yes to delete the zone set or No to cancel the operation. |
| Are you sure you want to delete this zone? | The selected zone will be deleted from the zone library. | Click Yes to delete the zone or No to cancel the operation. |
| Are you sure you want to remove all members from this zone? | All members will be deleted from the selected zone. | Click Yes to delete the members or No to cancel the operation. |
| Cannot connect to SDCM server. | The SDCM application at a remote workstation could not connect to the SDCM server. | Verify the SDCM server internet protocol (IP) address is valid. |

**Table A–1:  SDCM Messages (Continued)**

| Message | Action | Description |
|---|---|---|
| Cannot delete product. | The selected product cannot be deleted. | Verify the SDCM server-to-product link is up.<br><br>■ If the link is up, the SDCM server may be busy.<br><br>■ Another Product Manager instance may be open.<br><br>■ The user may not have permission to delete the product. |
| Cannot have spaces in field. | Spaces are not allowed as part of the entry for this field. | Delete spaces from the field entry. |
| Cannot modify product. | The selected product cannot be modified. | Verify the SDCM server-to-product link is up.<br><br>■ If the link is up, the SDCM server may be busy.<br><br>■ Another Product Manager instance may be open.<br><br>■ The user may not have permission to modify the product. |
| Cannot open Fabric Manager. | The SDCM application encountered an internal error and cannot open the Fabric Manager application. | Contact the next level of support to report the problem. |
| Click OK to remove all contents from log. | This action deletes all contents from the selected log. | Click OK to delete the log contents or Cancel to cancel the operation. |

**Table A–1: SDCM Messages (Continued)**

| Message | Action | Description |
|---------|--------|-------------|
| Connection to SDCM server lost. Click OK to exit application. | The SDCM application at a remote workstation lost the network connection to the SDCM server. | Start the SDCM application to connect to the SDCM server. |
| Could not export log to file. | A log file input/output (I/O) error occurred and the file could not be saved to the specified destination. The disk may be full or write protected. | If the disk is full, use another disk. If the disk is write protected, change the write-protect properties or use another disk. |
| Download complete. Click OK and start the SDCM. | Download of the SDCM and Product Managers applications is complete. | Start the SDCM application to continue. |
| Duplicate name in zoning configuration. | Every name in the zoning library must be unique. | Modify (to make it unique) or delete the duplicate name. |
| Duplicate nickname in nickname configuration. | Duplicate nicknames cannot be configured. | Modify the selected nickname to make it unique. |
| Duplicate World-Wide Name in nickname configuration. | A world-wide name can be associated with only one nickname. | Modify (to make it unique) or delete the selected world-wide name. |
| Duplicate zone in zone set configuration. | More than one instance of a zone is defined in a zone set. | Delete one of the duplicate zones from the zone set. |
| Duplicate zone member in zone configuration. | More than one instance of a zone member is defined in a zone. | Delete one of the duplicate zone members from the zone. |

**Table A–1:  SDCM Messages (Continued)**

| Message | Action | Description |
|---|---|---|
| Error transferring files < *message* >. | An error occurred while transferring files from the PC hard drive to the SDCM application. The message varies, depending on the problem. | Try the file transfer operation again. If the problem persists, contact the next level of support. |
| Field cannot be blank. | The data field requires an entry and cannot be left blank. | Enter appropriate information in the data field. |
| Field has exceeded maximum number of characters. | The maximum number of data entry characters allowed in the field was exceeded. | Enter the information using the proscribed number of characters. |
| Invalid character in field. | An invalid character was entered in the data field. | Remove invalid characters from the entry. |
| Invalid network address. | The IP address specified for the product is unknown to the domain name server (invalid). | Verify and enter a valid product IP address. |
| Invalid SDCM server address. | The IP address specified for the SDCM server is unknown to the domain name server (invalid). | Verify and enter a valid SDCM server IP address. |
| Invalid UDP port number. | The specified user datagram protocol (UDP) port number is invalid. The number must be an integer from **1** through **65535** inclusive. | Verify and enter a valid UDP port number. |

**Table A–1: SDCM Messages (Continued)**

| Message | Action | Description |
|---------|--------|-------------|
| Invalid World-Wide Name. | The specified world-wide name format is invalid. The valid format is eight two-digit hexadecimal numbers separated by colons (**xx:xx:xx:xx:xx:xx:xx :xx**). | Enter a world-wide name using the correct format. |
| Invalid zone in zone set. | The defined zone no longer exists and is invalid. | Delete the invalid zone from the zone set. |
| No attached nodes selected. | An operation was attempted without an attached node selected. | Select an attached node and try the operation again. |
| No SDCM server specified. | An SDCM server is not defined to the SDCM application. | At the SDCM Login screen, type a server name in the SDCM server field and click Login. |
| No zone member selected. | A zoning operation was attempted without a zone member selected. | Select a zone member and try the operation again. |
| No zone selected. | A zoning operation was attempted without a zone selected. | Select a zone and try the operation again. |
| No zone set active. | A zone set cannot be deactivated if there are no active zones. | Informational message only-no action is required. |
| No zone set selected. | A zoning operation was attempted without a zone set selected. | Select a zone set and try the operation again. |

**Table A–1: SDCM Messages (Continued)**

| Message | Action | Description |
| --- | --- | --- |
| Password and confirmation don't match. | Entries in the password field and confirmation password field do not match. The entries are case sensitive and must be the same. | Enter the password and confirmation password again. |
| Product Manager instance is currently open. | A product cannot be deleted while an instance of the Product Manager application is open. | Close the Product Manager application, then delete the product. |
| Remote session support has been disabled. | The connection between the specified remote workstation and the SDCM server was disallowed. | Consult with the customer's network administrator to determine if the workstation entry should be modified at the Session Options dialog box. |
| Remote sessions are not allowed from this network address. | Only IP addresses of remote workstations specified at the Session Options dialog box are allowed to connect to the SDCM server. | Consult with the customer's network administrator to determine if the IP address is to be configured for remote sessions. |
| Resource is unavailable. | The specified operation cannot be performed because the product is unavailable. | Verify the SDCM server-to-product link is up. If the link is up, the SDCM server may be busy. Try the operation again later. |
| SDCM error <*error number 1 through 8* >. | The SDCM application encountered an internal error (**1** through **8** inclusive) and cannot continue operation. | Contact the next level of support to report the problem. |

**Table A–1:  SDCM Messages (Continued)**

| Message | Action | Description |
|---|---|---|
| SDCM is shutting down. Connection will be terminated. | The SDCM application is closing and terminating communication with the attached product. | Reboot the SDCM server. If the problem persists, contact the next level of support. |
| SDCM server could not log you on. Verify your username and password. | The incorrect username and password (both case sensitive) were used while attempting to login to the SDCM application | Verify the user name and password with the customer's network administrator and retry the operation. |
| SDCM server could not log you on. Verify your username and password. | The incorrect username and password (both case sensitive) were used while attempting to login to the SDCM application. | Verify the user name and password with the customer's network administrator and retry the operation. |
| Server shutting down. | The SDCM application is closing and terminating communication with the attached product. | Reboot the SDCM server. If the problem persists, contact the next level of support. |
| SNMP trap address not defined. | If an SNMP community name is defined, a corresponding SNMP trap recipient address must also be defined. | Enter a corresponding SNMP trap recipient address. |
| The Administrator user cannot be deleted. | The administrator user is permanent and cannot be deleted from the Configure Users dialog box. | Informational message only-no action is required. |

**Table A–1:  SDCM Messages (Continued)**

| Message | Action | Description |
|---|---|---|
| The link to the Director is not available. | The Ethernet connection between the SDCM Server and Director is down or unavailable. | Establish and verify the network connection. |
| The maximum number of members has already been configured. | The maximum number of zone members that can be defined to the Fabric Manager application was reached. | Delete an existing zone member before adding a new zone member. |
| The maximum number of nicknames has already been configured. | The maximum number of nicknames that can be defined to the SDCM application was reached. | Delete an existing nickname before adding a new nickname. |
| The maximum number of products has already been configured. | The number of managed Compaq products (48) that can be defined to the SDCM application was reached. | Delete an existing product before adding a new product. |
| The maximum number of products of this type has already been configured. | The number of Compaq products of this type (48) that can be defined to the SDCM application was reached. | Delete an existing product of this type before adding a new product. |
| The maximum number of remote network addresses has already been configured. | A maximum of four IP addresses for remote workstations can be configured at the Session Options dialog box. That number was reached. | Delete an existing IP address before adding a new IP address. |

**Table A–1: SDCM Messages (Continued)**

| Message | Action | Description |
| --- | --- | --- |
| The maximum number of SDCM application sessions has been reached. | A maximum of four concurrent remote management sessions can be configured at the Session Options dialog box. The specified number was reached. | Increase the number of remote sessions allowed (if less than four), or terminate a session before attempting to initiate a new session. |
| The maximum number of SDCM server network addresses has already been configured. | The number of SDCM server IP addresses that can be defined to the SDCM application was reached. | Delete an existing IP address before adding a new address. |
| The maximum number of users has already been configured. | The number of users (16) that can be defined to the SDCM application was reached. | Delete an existing user before adding a new user. |
| The maximum number of zone sets has already been configured. | The maximum number of zone sets that can be defined to the Fabric Manager application was reached. | Delete an existing zone set before adding a new zone set. |
| The maximum number of zones per zone set has already been configured. | The maximum number of zones that can be defined in a zone set to the Fabric Manager application was reached. | Delete an existing zone before adding a new zone to the zone set. |
| The SDCM server is busy processing a request from another Product Manager. | The SDCM server PC is processing a request from another instance of a Product Manager application, and cannot perform the requested operation. | Wait until the process is completes, then perform the operation again. |

**Table A–1:  SDCM Messages (Continued)**

| Message | Action | Description |
|---|---|---|
| The software version on this SDCM server is not compatible with the version on the remote SDCM server. | A second SDCM server PC (client) connecting to the SDCM server must be running the same software version to log in. | Upgrade the software version on the downlevel SDCM server PC. |
| This network address has already been assigned. | The specified IP address was assigned and configured. A unique address must be assigned. | Consult with the customer's network administrator to determine a new IP address to be assigned and configured. |
| This user name has already been assigned. | The specified user name is already assigned and configured. | Modify (to make it unique) or delete the duplicate name. |
| You do not have a compatible version of the SDCM server software. In order for the SDCM application to function properly, a compatible version must be installed on the client machine. Click OK to install a compatible version. | The SDCM application version running on the SDCM server differs from the version running on the remote workstation (client). A compatible version must be downloaded from the SDCM server. | Download a compatible version of the SDCM application to the remote workstation (client) using the web install procedure. |
| You do not have rights to perform this action. | Configured user rights do not allow this operation to be performed. | Verify user rights with the customer's network administrator and change as required. |
| You must define an SMTP server address. | A simple mail transfer protocol (SMTP) server address must be defined and configured for e-mail to be activated. | Define the SMTP server address at the Configure E-Mail dialog box. |

**Table A–1: SDCM Messages (Continued)**

| Message | Action | Description |
|---|---|---|
| You must define at least one E-mail address. | At least one e-mail address must be defined and configured for e-mail to be activated. | Define an e-mail address at the Configure E-Mail dialog box. |
| You must define at least one remote network address. | At least one IP address for a remote workstation must be configured for a remote session to be activated. | Define an IP address for at least one remote workstation at the Session Options dialog box. |
| You must download the SDCM client via the web install | An attempt was made to download the SDCM application to a remote workstation (client) using an improper procedure. | Download a compatible version of the SDCM application to the remote workstation (client) using the web install procedure. |
| Zoning name already exists. | Duplicate zone names are not allowed in the zoning library. | Modify (to make it unique) or delete the duplicate zone name. |

# SANworks SAN Director 64 Product Manager Messages

This section lists SANworks SAN Director 64 Product Manager information and error messages in alphabetical order.

**Table A–2:  Product Manager Messages**

| Message | Description | Action |
|---|---|---|
| A Product Manager instance is already open. | Only one instance of the Product Manager application can be open at one time. | Close the open Product Manager application so the desired instance of the Product Manager application can be opened. |
| All port names must be unique. | A duplicate Fibre Channel port name was configured. All port names must be unique. | Reconfigure the Fibre Channel port with a unique name. |
| Another Product Manager is currently performing a firmware install. | Only one instance of the Product Manager application can install a firmware version to the Director at a time. | Wait for the firmware installation process to complete and try the operation again. |
| Are you sure you want to delete firmware version? | This message requests confirmation to delete a firmware version from the SDCM server's firmware library. | Click Yes to delete the firmware version or No to abort the operation. |
| Are you sure you want to send firmware version? | This message requests confirmation to send a firmware version from the SDCM server's firmware library to the Director. | Click Yes to send the firmware version or No to abort the operation. |
| Cannot have spaces in field. | Spaces are not allowed as part of the entry for this field. | Delete spaces from the field entry. |

**Table A–2: Product Manager Messages (Continued)**

| Message | Description | Action |
|---|---|---|
| Cannot install firmware to a Director with a failed CTP card. | A firmware version cannot be installed on a Director with a failed control processor (CTP) card. | Replace the failed CTP card and retry the firmware installation. |
| Cannot retrieve current SNMP configuration. | The Director SNMP configuration cannot be retrieved by the Product Manager application because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Cannot retrieve diagnostics results. | Director diagnostic results cannot be retrieved by the Product Manager application because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Cannot retrieve Director date and time. | The Director date and time cannot be retrieved by the Product Manager application because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Cannot retrieve Director state. | The Director state cannot be retrieved by the Product Manager application because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Cannot retrieve port configuration. | The port configuration cannot be retrieved by the Product Manager application because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |

**Table A–2: Product Manager Messages  (Continued)**

| Message | Description | Action |
|---|---|---|
| Cannot retrieve port information. | Port information cannot be retrieved by the Product Manager application because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Cannot retrieve port statistics. | Port statistics cannot be retrieved by the Product Manager application because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Cannot run diagnostics on a port that is failed. | Port diagnostics (loopback tests) cannot be performed on a port that has failed any previous diagnostic (power-on diagnostic, online diagnostic, or loopback test). The amber LED associated with the port illuminates to indicate the failed state. | Reset the port and perform diagnostics again. |
| Cannot run diagnostics on a port that is not installed. | Port diagnostics (loopback tests) cannot be performed on a port that does not have a small form factor (SFF) optical transceiver installed. | Install a transceiver in the port and perform diagnostics again. |
| Cannot run diagnostics while a device is logged-in to the port. | Port diagnostics (internal loopback test) cannot be performed on a port while an attached Fibre Channel device is logged in. | Ensure the device is logged out and perform diagnostics again. |

**Table A–2:  Product Manager Messages  (Continued)**

| Message | Description | Action |
|---------|-------------|--------|
| Cannot save port configuration. | The port configuration cannot be saved at the Product Manager application because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Cannot save SNMP configuration. | The Director SNMP configuration cannot be saved at the Product Manager application because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Cannot set Director date and time. | The Director date and time cannot be set at the Product Manager application because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Cannot set Director state. | The Director state cannot be set at the Product Manager application because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Cannot set fibre channel parameters. | Fibre Channel parameters for the Director cannot be set at the Product Manager application because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Cannot start data collection. | The data collection procedure cannot be started by the Product Manager application because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |

**Table A–2: Product Manager Messages (Continued)**

| Message | Description | Action |
|---|---|---|
| Cannot start firmware install while CTP synchronization is in progress. | The Director's CTP cards are synchronizing and firmware cannot be installed until synchronization is complete. | Install the firmware after CTP card synchronization completes. |
| Cannot start port diagnostics. | Port diagnostics cannot be started at the Product Manager application because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Click OK to remove all contents from log. | This action deletes all contents from the selected log. | Click OK to delete the log contents or Cancel to cancel the operation. |
| Connection to SDCM server lost. Click OK to exit application. | The SDCM application at a remote workstation lost the network connection to the SDCM server. | Start the SDCM application to connect to the SDCM server. |
| Could not export log to file. | A log file I/O error occurred and the file could not be saved to the specified destination. The disk may be full or write protected. | If the disk is full, use another disk. If the disk is write protected, change the write-protect properties or use another disk. |
| Could not find firmware file. | A firmware version could not be found because the data directory structure for the SDCM server is corrupt. | Reinstall the SDCM and Product Manager applications. If the condition persists, contact the next level of support. |

**Table A–2:  Product Manager Messages  (Continued)**

| Message | Description | Action |
|---|---|---|
| Could not remove dump files from server. | Dump files could not be deleted from the SDCM server because the notebook PC or Product Manager application is busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Could not stop port diagnostics. | Port diagnostics could not be stopped by the Product Manager application because the Ethernet link is down or busy, or because the Director is busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Could not write firmware to flash. | A firmware version could not be written from the SDCM server to FLASH memory on the Director's FCTP card. | Retry the operation again. If the condition persists, contact the next level of support. |
| Date entered is invalid. | The date is entered incorrectly at the Configure Date and Time dialog box. Individual field entries may be correct, but the overall date is invalid (for example, a day entry of **31** for a 30-day month). | Verify each entry is valid and consistent. |
| Device applications should be terminated before starting diagnostics. Press NEXT to continue. | Port diagnostics (loopback tests) cannot be performed on a port while an attached device application is running. | Terminate the device application and perform diagnostics again. |

| Table A–2: Product Manager Messages  (Continued) | | |
|---|---|---|
| **Message** | **Description** | **Action** |
| Director must be offline to configure. | The Director must be set offline prior to configuring Fibre Channel operating parameters. | Set the Director offline, reconfigure parameters at the Configure Operating Parameters dialog box, and retry the operation. |
| Do you want to continue with IPL? | This message requests confirmation to initial program load (IPL) the Director. | Click OK to IPL the Director or No to cancel the operation. |
| Duplicate Community names require identical write authorizations. | Duplicate community names are entered at the Configure SNMP dialog box, and have different write authorizations. | Delete the duplicate community name or make the write authorizations consistent. |
| Error retrieving port information. | An error occurred at the Product Manager application while retrieving port information because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Error retrieving port statistics. | An error occurred at the Product Manager application while retrieving port statistics because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Error stopping port diagnostics. | An error occurred at the Product Manager application while attempting to stop port diagnostics from running because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |

**Table A–2: Product Manager Messages (Continued)**

| Message | Description | Action |
|---------|-------------|--------|
| Error transferring files < *message* >. | An error occurred while transferring files from the PC hard drive to the Product Manager application. The message varies, depending on the problem. | Try the file transfer operation again. If the problem persists, contact the next level of support. |
| Field cannot be blank. | The data field requires an entry and cannot be left blank. | Enter appropriate information in the data field. |
| File transfer aborted. | The user aborted the file transfer process. | Verify the file transfer is to be aborted, then click OK to continue. |
| File transfer is in progress. | A firmware file is being transferred from the SDCM server hard drive, or a data collection file is being transferred to a diskette. | Informational message only-no action is required. |
| File transfer is in progress. | A firmware file is being transferred from the SDCM server hard drive, or a data collection file is being transferred to a diskette. | Informational message only-no action is required. |
| Firmware download timed out. | A firmware download operation timed out and aborted. | Retry the operation. If the problem persists, contact the next level of support. |
| Firmware file I/O error. | A firmware download operation aborted because a file I/O error occurred. | Retry the operation. If the problem persists, contact the next level of support. |

| Table A–2: Product Manager Messages (Continued) | | |
|---|---|---|
| **Message** | **Description** | **Action** |
| Firmware file not found. | The firmware version is not installed (or was deleted) from the firmware library at the SDCM server. | Add the firmware version to the library and retry the operation. |
| Internal file transfer error received from Director. | The Director detected an internal file transfer error. | Retry the operation. If the problem persists, contact the next level of support. |
| Invalid character in field. | An invalid character was entered in the data field. | Remove invalid characters from the entry. |
| Invalid firmware file. | The file selected for firmware download is not a firmware version file. | Select the correct firmware version file and retry the operation. |
| Invalid network address. | The IP address specified for the product is unknown to the domain name server (invalid). | Verify and enter a valid product IP address. |
| Invalid port number. | The Fibre Channel number entered is invalid. The port number must be an integer from **0** through **63** inclusive. | Verify and enter a valid port number. |
| Invalid response received from Director. | An error occurred at the Director during a firmware download operation. | Retry the firmware download operation. If the problem persists, contact the next level of support. |
| Invalid SDCM server address. | The IP address specified for the SDCM server is unknown to the domain name server (invalid). | Verify and enter a valid SDCM server IP address. |

**Table A–2: Product Manager Messages (Continued)**

| Message | Description | Action |
|---------|-------------|--------|
| Invalid UDP port number. | The specified user datagram protocol (UDP) port number is invalid. The number must be an integer from **1** through **65535** inclusive. | Verify and enter a valid UDP port number. |
| Invalid value for BB_Credit. | At the Configure Operating Parameters dialog box, the buffer-to-buffer credit (BB_Credit) value must be an integer from **1** through **60** inclusive. | Verify and enter a valid number. |
| Invalid value for day (1 - 31). | At the Configure Date and Time dialog box, the DD value (day) must be an integer from **1** through **31** inclusive. | Verify and enter a valid date. |
| Invalid value for E_D_TOV. | At the Configure Operating Parameters dialog box, the error detect time-out value (E_D_TOV) must be an integer from **2** through **600** inclusive. | Verify and enter a valid number. |
| Invalid value for hour (0 - 23). | At the Configure Date and Time dialog box, the HH value (hour) must be an integer from **0** through **23** inclusive. | Verify and enter a valid time. |
| Invalid value for minute (0 - 59). | At the Configure Date and Time dialog box, the MM value (minute) must be an integer from **0** through **59** inclusive. | Verify and enter a valid time. |

| Table A–2:  Product Manager Messages  (Continued) | | |
|---|---|---|
| **Message** | **Description** | **Action** |
| Invalid value for month (1 - 12). | At the Configure Date and Time dialog box, the MM value (month) must be an integer from **1** through **12** inclusive. | Verify and enter a valid date. |
| Invalid value for R_A_TOV. | At the Configure Operating Parameters dialog box, the resource allocation time-out value (R_A_TOV) must be an integer from **10** through **1200** inclusive. | Verify and enter a valid number. |
| Invalid value for second (0 - 59). | At the Configure Date and Time dialog box, the SS value (second) must be an integer from **0** through **59** inclusive. | Verify and enter a valid time. |
| Invalid value for year. | At the Configure Date and Time dialog box, the YYYY value (year) must be a four-digit value. | Verify and enter a four-digit value for the year. |
| Invalid World-Wide Name. | The specified world-wide name format is invalid. The valid format is eight two-digit hexadecimal numbers separated by colons (**xx:xx:xx:xx:xx:xx:xx:xx**). | Enter a world-wide name using the correct format. |
| Link dropped. | The SDCM server-to-Director Ethernet link was dropped. | Retry the operation. If the condition persists, contact the next level of support. |

**Table A–2: Product Manager Messages (Continued)**

| Message | Description | Action |
|---|---|---|
| Log is currently in use. | Access to the log is denied because the log was opened by another instance of the Product Manager application. | Retry the operation later. If the condition persists, contact the next level of support. |
| Maximum number of versions already installed. | The number of firmware versions that can be defined to the SDCM application's firmware library was reached. | Delete an existing firmware version before adding a new version. |
| No firmware versions to delete. | There are no firmware versions in the firmware library to delete, therefore the operation cannot be performed. | Informational message only-no action is required. |
| Nonredundant Director must be offline to install firmware. | If the Director has only one CTP card, the Director must be set offline to install a firmware version. | Set the Director offline and install the firmware. |
| Performing this operation will change the current state to Offline. | This message requests confirmation to set the Director offline. | Click OK to set the Director offline or Cancel to cancel the operation. |
| Performing this operation will change the current state to Online. | This message requests confirmation to set the Director online. | Click OK to set the Director online or Cancel to cancel the operation. |
| Product Manager error < *error number 5001 or 5002* >. | The Product Manager application encountered an internal error (**5001** or **5002**) and cannot continue operation. | Contact the next level of support to report the problem. |

**Table A–2:  Product Manager Messages  (Continued)**

| Message | Description | Action |
|---|---|---|
| Product Manager error < *error number 5001 or 5002* >. | At the Configure Operating Parameters dialog box, the R_A_TOV entry must be greater than E_D_TOV entry. | Verify and change one of the entries to make the relationship valid. |
| Send firmware failed. | A firmware download operation failed. | Retry the firmware download operation. If the problem persists, contact the next level of support. |
| SNMP trap address not defined. | If an SNMP community name is defined, a corresponding SNMP trap recipient address must also be defined. | Enter a corresponding SNMP trap recipient address. |
| The data collection process failed. | An error occurred while performing the data collection procedure. | Try the data collection procedure again. If the problem persists, contact the next level of support. |
| The data collection process has been aborted. | The user aborted the data collection procedure. | Verify the data collection procedure is to be aborted, then click OK to continue. |
| The Director did not accept the request. | The Director cannot perform the requested action. | Retry the operation. If the condition persists, contact the next level of support. |
| The Director did not respond in the time allowed. | While waiting to perform a requested action, the Director timed out. | Retry the operation. If the condition persists, contact the next level of support. |
| The Director is busy saving maintenance information. | The Director cannot perform the requested action because it is busy saving maintenance information. | Retry the operation later. If the condition persists, contact the next level of support. |

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| | **Table A–2: Product Manager Messages  (Continued)** | |
|---|---|---|
| **Message** | **Description** | **Action** |
| The Ethernet link dropped. | The Ethernet connection between the SDCM Server and the Director is down or unavailable. | Establish and verify the network connection. |
| The firmware file is corrupted. | A firmware version file is corrupt. | Contact the next level of support to report the problem. |
| The firmware version already exists. | This firmware version already exists in SDCM Server's firmware library. | Informational message only-no action is required. |
| The link to the Director is not available. | The Ethernet connection between the SDCM Server and the Director is down or unavailable. | Establish and verify the network connection. |
| The SDCM Server is busy processing a request from another Product Manager. | The SDCM Server PC is processing a request from another instance of a Product Manager application, and cannot perform the requested operation. | Wait until the process is completes, then perform the operation again. |
| This feature is not installed. Please contact your sales representative. | This feature is not supported in this software version. | Contact your sales representative. |

**Table A–2: Product Manager Messages (Continued)**

| Message | Description | Action |
|---------|-------------|--------|
| Unable to save data collection file to destination. | The SDCM Server could not save the data collection file to the specified location (PC hard drive, diskette, or network). | Retry the operation. If the condition persists, contact the next level of support. |
| You do not have rights to perform this action. | Configured user rights do not allow this operation to be performed. | Verify user rights with the customer's network administrator and change as required. |

# Glossary

This glossary defines terms used in this guide or related to this product and is not a comprehensive glossary of computer terms.

## A

**access control**

Method of control (with associated permissions) by which a set of devices can access other devices across a network. *See also* persistent binding and zoning.

**active FRU**

A redundant field-replaceable unit that is currently operating as the active and not the backup FRU. *Contrast with* backup FRU.

**active zone set**

Single zone set that is active in a multi-switch fabric. It is created when you enable a specified zone set. This zone set is compiled by checking for undefined zones or aliases.

**agent**

Software that processes queries on behalf of an application and returns replies.

**alarm**

Simple network management protocol (SNMP) message notifying an operator of a network or device problem.

### alias server

Fabric software facility that supports multicast group management.

### arbitration

Process of selecting one device from a collection of devices that request service simultaneously.

### audit log

Log summarizing actions (audit trail) made by the user.

### authentication

Verification of identity for a person or process.

## B

### backplane

The backplane provides 48 VDC power distribution and connections for all logic cards.

### backup FRU

When an active FRU fails, an identical backup FRU takes over operation automatically (failover) to maintain Director and Fibre Channel link operation. *Contrast with* active FRU.

### BB_Credit

*See* buffer-to-buffer credit.

### beaconing

Use of light-emitting diodes on ports, port cards, field-replaceable units, and Directors to aid in the fault-isolation process; when enabled, active beaconing causes LEDs to flash for selected components.

### BER

*See* bit error rate.

**bidirectional**

In Fibre Channel, the capability to simultaneously communicate at maximum speeds (100 Mbps) in both directions over a link.

**bit error rate (BER)**

Ratio of received bits that contain errors to total of all bits transmitted.

**blocked port**

Devices communicating with the port are prevented from logging into the Director or communicating with other devices attached to the Director. A blocked port continuously transmits the offline sequence.

**bridge**

Device that connects and passes packets between two network segments that use the same communications protocol.

**broadcast**

Send a transmission to all N_Ports on a fabric. *See also* multicast.

**broadcast frames**

Data packet, also known as a broadcast packet, whose destination address specifies all computers on a network.

**buffer**

Storage area for data in transit. Buffers compensate for differences in processing speeds between devices. *See also* buffer-to-buffer credit.

**buffer-to-buffer credit (BB_Credit)**

*See* buffer-to-buffer credit. Indicates the maximum number of frames a port can transmit without receiving a receive ready signal from the receiving device.

# C

### call-home

Product feature which requires installation of Compaq Proactive Service software and enables the SDCM server to automatically transmit system events (failure information) to a Compaq customer support center. The Compaq support center server accepts calls from the SDCM server, logs reported events, and can notify one or more support center representatives.

### channel

Point-to-point link that transports data from one point to the other.

### channel path

A single interface between a central processor and one or more control units along which signals and data can be sent to perform I/O requests.

### class of Fibre Channel service

Defines the level of connection dedication, acknowledgment, and other characteristics of a connection. Class F, Class 2, and Class 3 services are supported.

### Class F Fibre Channel service

Used by switches to communicate across interswitch links (ISLs) to configure, control, and coordinate a multi-switch fabric.

### Class 2 Fibre Channel service

Provides a connectionless (not dedicated) service with notification of delivery or nondelivery between two N_Ports. In-order delivery of frames is not guaranteed.

### Class 3 Fibre Channel service

Provides a connectionless (not dedicated) service without notification of delivery or nondelivery between two N_Ports. Also known as datagram.

### community profile

Information that specifies which management objects are available to what management domain or SNMP community name.

### concurrent maintenance

Ability to perform maintenance tasks, such as removal or replacement of field-replaceable units (FRUs), while normal operations continue without interruption. *See also* nondisruptive maintenance.

### configuration data

Configuration data includes: identification data, port configuration data, operating parameters, SNMP configuration, and zoning configuration. A configuration backup file is required to restore configuration data if the control processor (CTP) card in a nonredundant Director is removed and replaced.

### connectionless

Nondedicated link. Typically used to describe a link between nodes which allows the switch to forward Class 2 or Class 3 frames as resources (ports) allow.

### connector

*See* optical fiber connector.

### control processor (CTP) card

Circuit card that contains the Director microprocessor. The CTP card also initializes hardware components of the system after power-on. A 10 Mbps RJ-45 twisted pair connector is located on the CTP card to connect to an Ethernet LAN and communicate with the SDCM server or a specific management station.

### control unit

A device that controls the reading, writing, or displaying of data at one or more input/output units.

### CRC

*See* cyclic redundancy check.

### CTP card

*See* control processor card.

**cyclic redundancy check (CRC)**

System of error checking performed at both the sending and receiving station using the value of a particular character generated by a cyclic algorithm. When the values generated at each station are identical, data integrity is confirmed.

# D

**DASD**

Acronym for direct access storage device.

**datagram**

*See* Class 3 Fibre Channel service.

**default**

Pertaining to an attribute, value, or option that is assumed when none is explicitly specified.

**default zone**

Contains all attached devices that are not members of a separate zone.

**destination identifier (D_ID)**

Address identifier that indicates the targeted destination of a data frame.

**device**

Product (server or storage), connected to a managed Director, that is not controlled directly by the SD-64 Product Manager application. *See also* node.

**diagnostics**

Procedures used by computer users and service personnel to diagnose hardware or software error conditions.

**dialog box**

Dialog box is a window containing informational messages or data fields to be modified or filled in with desired options.

**D_ID**

*See* destination identifier.

**Director**

An intelligent Fibre Channel switching device providing any-to-any port connectivity between nodes (end devices) on a switched fabric. The Director sends data transmissions (data frames) between nodes in accordance with the address information present in the frame headers of those transmissions.

**DNS name**

Host or node name for a device or managed product that is translated to an internet protocol (IP) address through a domain name server.

**domain ID**

Number (1 through 31) that uniquely identifies a switch in a multi-switch fabric. A distinct domain ID is automatically allocated to each switch in the fabric by the principal switch.

**domain name service (DNS)**

*See* DNS name.

# E

**E_D_TOV**

*See* error detect time-out value.

**E_Port**

*See* expansion port.

**embedded web server**

Administrators or operators with a browser-capable PC and Internet connection can monitor and manage a Director through an embedded web server interface. The interface provides a GUI similar to the SD-64 Product Manager application, and supports Director configuration, statistics monitoring, and basic operation.

### error detect time-out value (E_D_TOV)

User-specified value that defines the time a Director waits for an expected response before declaring an error condition.

### error message

Software message that indicates an error was detected. *See also* information message and warning message.

### Ethernet

A widely implemented local area network (LAN) protocol that uses a bus or star topology and serves as the basis for the IEEE 802.3 standard, which specifies the physical and software layers. Baseband LAN allows multiple station access to the transmission medium at will without prior coordination and which avoids or resolves contention.

### Ethernet hub

A customer-supplied device used to LAN-connect the SDCM server and managed Directors.

### event code

Error code that provides the operator with information concerning events that indicate degraded operation or failure of a Director.

### event log

Record of significant events that have occurred at the Director, such as FRU failures, degraded operation, and port problems.

### expansion port (E_Port)

Physical interface on a Fibre Channel switch within a fabric, that attaches to an expansion port (E_Port) on another Fibre Channel switch to form a multi-switch fabric. *See also* segmented E_Port.

## F

### fabric

Fibre Channel entity that interconnects node ports (N_Ports_ and is capable of routing (switching) Fibre Channel frames using the destination ID information in the Fibre Channel frame header accompanying the frames.

### fabric element

An active switch, Director, or node in a Fibre Channel switched fabric.

### Fabric Manager application

Application that implements the management user interface for Fibre Channel fabrics. When a fabric instance is opened from the SDCM application's Fabric View, the Fabric Manager application is invoked.

### fabric port (F_Port)

Physical interface on the Director that connects to an N_Port through a point-to-point full duplex connection.

### failover

Automatic and nondisruptive transition of functions from an active FRU that has failed to a backup FRU.

### FCC-IOC

*See* Fibre Channel input/output controller.

### fiber

Physical media types supported by the Fibre Channel specification, such as optical fiber, copper twisted pair, and coaxial cable.

### fiber optics

Branch of optical technology concerned with the transmission of light pulses through fibers made of transparent materials such as glass, fused silica, and plastic.

### fiber port module (FPM) card

Each fiber port module card provides four Fibre Channel connections through duplex small form factor (SFF) pluggable fiber-optic transceivers.

### Fibre Channel

Integrated set of standards recognized by the American national Standards Institute (ANSI) which defines specific protocols for flexible information transfer. Logically, a point-to-point serial data channel, structured for high performance.

### Fibre Channel input/output controller (FCC-IOC)

A device that controls the embedded Fibre Channel port and configures the ports' ASICs.

### field-replaceable unit (FRU)

Assembly removed and replaced in its entirety when any one of its components fails.

### firmware

Embedded program code that resides and executes on the Director.

### FPM card

*See* fiber port module card.

### F_Port

*See* fabric port.

### FRU

*See* field-replaceable unit.

## G

### gateway

A multi-homed host used to route network traffic from one network to another, and to pass network traffic from one protocol to another.

### gateway address

A unique string of numbers (in the format xxx.xx.xxx.xxx) that identifies a gateway on the network.

### generic port (G_Port)

Physical interface on a Director that can function either as a fabric port (F_Port) or an expansion port (E_Port) depending on the port type to which it connects.

### G_Port

*See* generic port.

# H

**hardware log**

Record of FRU insertions and removals for the Director.

**HBA**

*See* host bus adapter.

**heterogeneous fabric**

A fabric with both Compaq and non-Compaq products.

**high availability**

A performance feature characterized by hardware component redundancy and hot-swappability (enabling non-disruptive maintenance). High-availability systems maximize system uptime while providing superior reliability, availability, and serviceability.

**hop**

Data transfer from one fabric node to another node.

**homogeneous fabric**

A fabric consisting of only Compaq products.

**hop count**

The number of hops a unit of information traverses in a fabric.

**host bus adapter (HBA)**

Logic card that provides a link between the server and storage subsystem, and that integrates the operating systems and I/O protocols to ensure interoperability.

**hot-swapping**

Removing and replacing a device's components while the device continues to operate normally.

**hub**

In Fibre Channel, a device that connects nodes into a logical loop by using a physical star topology.

# I

**IML**

*See* initial machine load.

**information message**

Software message that indicates to a user that a function is performing normally or has completed normally. *See also* error message and warning message.

**initial machine load (IML)**

Hardware reset for all installed CTP cards on the Director. It does not affect other hardware. It is initiated by pushing the white button on a Director's CTP card.

**initial program load (IPL)**

Process of initializing the device and causing the operating system to start. Initiated through a menu in the Product Manager, this option performs a hardware reset on the active CTP only.

**interface**

Hardware, software, or both, linking systems, programs, or devices.

**internet protocol address**

Unique string of numbers (in the format xxx.xxx.xxx.xxx) that identifies a device on a network.

**interoperability**

Ability to communicate, execute programs, or transfer data between various functional units over a network.

**interswitch link (ISL)**

Physical E_Port connection between two Directors in a fabric.

**IP address**

*See* internet protocol address.

**IPL**

*See* initial program load.

**ISL**

*See* interswitch link.

# J

**jumper cable**

Optical cable that provides physical attachment between two devices or between a device and a distribution panel. *Contrast with* trunk cable.

# L

**latency**

When used in reference to a Fibre Channel switching device, latency refers to the amount of time elapsed between receipt of a data transmission at a switch's incoming F_Port (from the originating node port) to retransmission of that data at the switch's outgoing F_Port (to the destination N_Port). The amount of time it takes for data transmission to pass through a switching device.

**LIN**

*See* link incident.

**link**

Physical connection between two devices in a switched fabric.

**link incident (LIN)**

Interruption to a Fibre Channel link due to loss of light or other cause.

**load balancing**

Ability to evenly distribute traffic over multiple interswitch links within a fabric. Load balancing on Compaq Directors takes place automatically.

### logical unit number (LUN)

In Fibre Channel addressing, a logical unit number is a number assigned to a storage device which, in combination with the storage device's node port's world wide name, represents a unique identifier for a logical device on a storage area network.

### loopback plug

In a fiber optic environment, a type of duplex connector used to wrap the optical output signal of a device directly to the optical input.

### loopback test

Test that checks attachment or control unit circuitry, without checking the mechanism itself, by returning the output of the mechanism as input.

### LUN

*See* logical unit number.

## M

### MAC address

See Media Access Control address.

### maintenance port

Connector on the Director where a PC running an ASCII terminal emulator can be attached or dial-up connection made for specialized maintenance support.

### managed product

Hardware product that can be managed with the SDCM application. For example, the SD-64 Director is a managed product. *See also* device.

### management information base (MIB)

Related set of software objects (variables) containing information about a managed device and accessed via SNMP from a network management station.

### Management Services application

Software application that provides back-end product-independent services to the SDCM application. Management Services runs only on the SDCM server, and cannot be downloaded to remote workstations.

### management session

A management session exists when a user logs on to the SDCM application. The application can support multiple concurrent management sessions. The user must specify the network address of the SDCM server at logon time.

### Media Access Control (MAC) address

Hardware address of a node (device) connected to a network.

### MIB

*See* management information base.

### multicast

Delivery of a single transmission to multiple destination N_Ports. Can be one to many or many to many. All members of the group are identified by one IP address. *See also* broadcast.

### multi-switch fabric

Fibre Channel fabric created by linking more than one Director or switching device within a fabric.

# N

### name server

Program that translates names from one form into another. For example, the domain name service (DNS) translates domain names into IP addresses.

### name server zoning

N_Port access management that allows N_Ports to communicate if and only if they belong to a common name server zone.

**network address**

Name or address that identifies a managed product on a transmission control protocol/internet protocol (TCP/IP) network. The network address can be either an IP address in dotted-decimal notation (containing four three-digit octets in the format xxx.xxx.xxx.xxx), or a domain name (as administered on a customer network).

**nickname**

Alternate name assigned to a world wide name for a node or Director in the fabric.

**node**

In Fibre Channel terminology, node refers to an end device (server or storage device) that is or can be connected to a switched fabric.

**node port (N_Port)**

Physical interface within an end device which can connect to an F_Port on a switched fabric or directly to another N_Port (in point-to-point communications).

**nondisruptive maintenance**

Ability to service FRUs (including maintenance, installation, removal and replacement) while normal operations continue without interruption. *See also* concurrent maintenance.

**N_Port**

*See* node port.

# O

**offline sequence (OLS)**

Sequence sent by the transmitting port to indicate that it is attempting to initialize a link and has detected a problem in doing so.

**OLS**

*See* offline sequence.

### optical cable

Fiber, multiple fibers, or a fiber bundle in a structure built to meet optical, mechanical, and environmental specifications. *See also* jumper cable*,* optical cable assembly, and trunk cable.

### optical cable assembly

Optical cable that is connector-terminated. *See also* jumper cable and optical cable.

### optical fiber connector

Hardware component that transfers optical power between two optical fibers or bundles and is designed to be repeatedly connected and disconnected.

### out-of-band management

Transmission of management information using frequencies or channels (Ethernet) other than those routinely used for information transfer (Fibre Channel).

# P

### packet

Logical unit of information (usually in the form of a data frame) transmitted on a network. It contains a header (with all relevant addressing and timing information), the actual data, and a trailer (which contains the error checking function, usually in the form of a cyclic redundancy check).

### password

Unique string of characters known to the computer system and to a user who must specify it to gain full or limited access to a system and to the information stored within it.

### path

In a network, any route between any two ports.

### persistent binding

A form of server-level access control that uses configuration information to bind a server to a specific Fibre Channel storage volume (or logical device) using a unit number.

### port

Receptacle on a device to which a cable leading to another device can be attached.

### port card

Field-replaceable hardware component that provides the port connections for fiber cables and performs specific device-dependent logic functions.

### port card map

Map showing numbers assigned to each port card by card slot.

### port name

Name that the user assigns to a particular port through the Product Manager.

### POST

*See* power-on self test.

### power-on self test (POST)

Series of self-tests executed each time the unit is booted or reset.

### preferred domain ID

Domain ID that a Director or switch is assigned by the principal switch in a switched fabric. The preferred domain ID becomes the active domain ID except when configured otherwise by the user.

### principal switch

The Director or switch that allocates domain IDs to itself and to all other switches in a fabric. There is always one principal switch in a fabric. If a switch is not connected to any other switches, it acts as its own principal switch.

### product name

User-configurable identifier assigned to a managed product. Typically, this name is stored on the product itself. For the SD-64 Director, the product name can also be accessed by an SNMP manager as the system name.

# R

### R_A_TOV

*See* resource allocation time-out value.

### redundancy

Performance characteristic of a system or product whose integral components are backed up by identical components to which operations will automatically failover in the event of a component failure. Redundancy is a vital characteristic of virtually all high-availability (24 hours per day, seven days per week) computer systems and networks.

### remote access link

Connection to a device or program on a computer network via a (geographically) remote workstation.

### remote notification

A process by which a system is able to inform remote users and/or workstations of certain classes of events that occur on the system. E-mail notification and the configuration of SNMP trap recipients are two examples of remote notification programs that can be implemented on Director-class switches.

### remote user workstation

Workstation, such as a PC, using the SDCM and SD-64 Product Manager applications that can access the SDCM server over a LAN connection.

### resource allocation time-out value (R_A_TOV)

User-specified value used to time out operations that depend on the maximum possible time that a frame could be delayed in a fabric and still be delivered.

### RFI

Acronym for radio frequency interface.

# S

### SAN

*See* storage area network.

**SANworks Director Connectivity Manager (SDCM) application**

Application that implements the management user interface for Compaq Fibre Channel switching products, and as a launching point for the SD-64 Product Manager and Fabric Manager applications. The application runs locally on the SDCM server or on a remote workstation.

**SANworks Director Connectivity Manager (SDCM) server**

Notebook computer shipped with a Director to run the SDCM, SD-64 Product Manager, and Fabric Manager applications.

**SBAR**

*See* serial crossbar assembly.

**SC**

Acronym for subscriber connector.

**SD-64 Product Manager application**

Application that implements the management user interface for a specified SD-64 Director. When a product instance is opened from the SDCM application's Product View, the SD-64 Product Manager application is invoked.

**SDCM application**

*See* SANworks Director Connectivity Manager application.

**SDCM server**

*See* SANworks Director Connectivity Manager server.

**segmented E_Port**

E_Port that has ceased to function as an E_Port within a multi-switch fabric due to an incompatibility between the fabrics that it joins. *See also* expansion port.

**SEL**

Acronym for system error light.

**serial crossbar (SBAR) assembly**

Responsible for Fibre Channel frame transmission from any Director port to any other Director port. Connections are established without software intervention.

**SFF**

Acronym for small form factor (a type of Fibre Channel connector). *See also* fiber port module card.

**simple Network management protocol (SNMP)**

A protocol that specifies a mechanism for network management that is complete, yet simple. Information is exchanged between agents, which are the devices on the network being managed, and managers, which are the devices on the network through which the management is done.

**SNMP**

*See* simple network management protocol.

**SNMP community**

Also known as SNMP community string. An SNMP community is a cluster of managed products (in SNMP terminology, hosts) to which a server or managed product running the SNMP agent belongs.

**SNMP community name**

The name assigned to a given SNMP community. Queries from an SNMP management station to a device running an SNMP agent will only elicit a response if those queries are addressed with the correct SNMP community name.

**SSP**

*See* system services processor.

**storage area network (SAN)**

A high-performance data communications environment that interconnects computing and storage resources so that the resources can be effectively shared and consolidated.

### subnet mask

Used by a computer to determine whether another computer with which it needs to communicate is located on a local or remote network. The network mask depends upon the class of networks to which the computer is connecting. The mask indicates which digits to look at in a longer network address and allows the router to avoid handling the entire address.

### switchover

Changing a backup FRU to the active state, and the active FRU to the backup state.

### switch priority

Value configured into each switch in a fabric that determines its relative likelihood of becoming the fabric's principal switch.

### system services processor (SSP)

Controls the RS-232 maintenance port, the Ethernet port, and the operator panel of a Fibre Channel Director.

## T

### TCP/IP

*See* transmission control protocol/internet protocol.

### topology

Logical and/or physical arrangement of stations on a network.

### transmission control protocol/internet protocol (TCP/IP)

A suite of communication protocols used to connect host systems to the Internet. *See also* network address.

### trap

Unsolicited notification of an event originating from an SNMP managed device and directed to an SNMP network management station.

### trap host

SNMP management workstation that is configured to receive traps.

**trunk cable**

Cable consisting of multiple fiber pairs that do not directly attach to an active device. This cable usually exists between distribution panels. *See also* optical cable, c*ontrast with* jumper cable.

# U

**unblocked port**

Devices attached to an unblocked port can login to the Director and communicate with devices attached to any other unblocked port.

**unicast**

Communication between a single sender and a single receiver over a network. Compare to *multicast* and *anycast* (communication between any sender and the nearest of a group of receivers).

# V

**vital product data (VPD)**

System-level data stored by the backplane in the electrically erasable programmable read-only memory. This data includes serial numbers and identifies the manufacturer.

**VPD**

*See* vital product data.

# W

**warning message**

Software message that indicates a possible error was detected. *See als*o error message and information message.

**world wide name (WWN)**

Eight-byte address that uniquely identifies a switch, or a node (end device) on global networks.

### WWN

*See* world wide name.

## Z

### zone

Set of devices that can access one another. All connected devices may be configured into one or more zones. Devices in the same zone can see each other. Those devices that occupy different zones cannot.

### zone member

Specification of a device to be included in a zone. A zone member can be identified by the port number of the Director to which it is attached or by its world wide name. In multi-switch fabrics, identification of end-devices/nodes by world wide name is preferable.

### zone set

*See* zone.

### zoning

Grouping of several devices by function or by location. All devices connected to a connectivity product, such as the Director, may be configured into one or more zones. *See also* zone.

# Index